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la sfida del presente verso il futuro

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di discipline Odontostomatologiche ETS

DIGITAL DENTISTRY:

la sfida del presente verso il futuro

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THE ACCURACY OF JAWS REPOSITIONING IN PATIENTS WITH CLEFT LIP AND PALATE

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Aim: the study aims to compare the accuracy of jaws repositioning in bimaxillary orthognathic surgery in patients with cleft lip and palate and in those with skeletal class III malocclusion without craniofacial anomalies.

Methods: this study included 32 patients divided into two groups. n = 16 with cleft lip and palate and n = 16 non-syndromic with III class malocclusion. Each patient received an orthodontic-surgical treatment with bimaxillary surgery. A 2D presurgical Visual Treatment Objective (VTO) was prepared for each patient to predict hard tissue changes; the surgical planning was digitally performed to simulate osteotomies and the bone segments were repositioned exactly where established in the VTO. The surgical splints were then produced with CAD-CAM technology.

The accuracy of the orthognathic surgery was measured by comparing specific cephalometric measurements obtained by the VTO with those obtained by the after-surgery cephalometry.

Results: the statistical analysis shows that measurements planned on the VTO are comparable with those obtained on the after surgery cephalometry in both groups. Only one measurement showed a greater difference between the surgical result and the virtual surgical planning in cleft lip and palate group.

Conclusions: the accuracy of jaw repositioning in bimaxillary orthognathic surgery using digital surgical planning is comparable in patients with cleft lip and palate and in those with a III class malocclusion: only one measurement shows that the obtained maxillary advancement slightly deviates from what has been planned in the former.

SURGICAL-ORTHODONTIC MANAGEMENT OF A CLEFT LIP AND PALATE IN A YOUNG PATIENT: CASE REPORT

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Aim: Cleft lip and palate (CLP) is a congenital malformation due to genetic and environmental factors.

Dental anomalies, agenesis, supernumeraries, transpositions are often found in these patients especially in the cleft area. This condition requires a multidisciplinary approach.

The aim of this work is to show the surgical-orthodontic management of the outcomes of a CLP in a young girl.

Methods: a 16 years old female patient with unilateral right CLP, referred to the Dental Department of Policlinico of Bari to improve her smile.

She was in first dental and skeletal class tending to third, with upper arch contracted, severe lower crowding, transposition of 1.3, palatinization of 1.4, inclusion of 2.3, agenesis of 2.5. She had received primary lip repair and palatoplasty when she was 6 and 24 months old respectively.

After the evaluation of RX-OPT, T-LL and TC CONE BEAM, orthodontist and surgeon planned: lingual arch cementation and extraction of 3.4 and 4.4 to resolve lower crowding with maximum anchorage; alignment and leveling of upper arch after extraction of impacted 2.3 and application of palatal expander with fan screw.

Results: under general anesthesia, after a trapezoidal papilla preservation flap, we proceeded to osteotomy and extraction of vestibular-horizontal impacted 2.3, horizontal mattress silk suture, and extraction of 3.4 and 4.4. PRP technique was applied in all surgical sites to favor tissue healing.

Conclusions: in these patients, a timely and appropriate multidisciplinary approach is required to improve the quality of life, aesthetics and function of patients with CLP.

SINUS LIFT WITH ALGIPORE® FRIOS® AND AUTOGENOUS TOOTH BONE GRAFT COMPARED WITH BIO-OSS® AND PRP

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Aim: implant placement and its restoration becomes clinically challenging when the alveolar ridge lacks sufficient bone volume. Among suitable biomaterials for sinus grafting in severely atrophic maxillae, the porous fluorohydroxyapatitic (FHA) biomaterial Algipore® FRIOS® and anorganic bovine bone have been studied. The aim of this trial was to explore the outcomes by using porous fluorohydroxyapatite (Algipore®FRIOS®) combined with autogenous tooth bone graft, in comparison with anorganic bovine bone (Bio-Oss®).

Methods: seventy-six patients were randomized to receive porous fluorohydroxyapatitic (FHA) biomaterial FRIOS Algipore with autologous tooth bone graft or anorganic bovine bone (Bio-Oss®) for maxillary sinus floor augmentation. The Piezo-assisted

Split-Crest technique with the two-steps implant insertion procedure was applied. Group A (n= 38) received porous fluorohydroxyapatitic (FHA) biomaterial FRIOS Algipore with autogenous tooth bone graft; thirty-eight patients (Group B) received anorganic bovine bone (Bio-Oss®) in combination with autologous peripheral blood derived growth factors and bone graft.

Results: in total, seventy-six implants were placed. The grafts, in all cases analyzed, was subjected to physiological and bone remodeling phenomena, demonstrating an excellent integration with the host tissues.

Conclusions: the outcomes showed a faster healing process compared to other more conventional procedures applied in soft and hard tissue regeneration.

SURGICALLY ASSISTED RAPID PALATAL EXPANSION *VERSUS* MULTISEGMENTAL LE FORT I OSTEOTOMY

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Aim: the main objective of this work is to illustrate a complete overview of the main surgical methods and the treatment of adult patients with contraction of transverse maxillary diameters through analysis of the international literature in order to evaluate risks and benefits.

Methods: a systematic review of the international literature was conducted on MedLine database. The chosen keywords were: "surgical palatal expansion"; "rapid palatal expansion"; "Le Fort I osteotomy"; "crossbite"; "transverse maxillary hypoplasia". Then the research has been restricted using the "humans" filter. Finally, the authors have considered only articles dedicated specifically to surgical techniques of surgically assisted rapid palate expansion (SARPE) and multisegmented Le Fort osteotomy.

Results: the main treatment is the surgical treatment for restoring a correct relationship between the maxillary and mandibular bones by Surgically Assisted Rapid Palatal Expansion

(SARPE) and multisegmental Le Fort I osteotomy. The SARPE technique seems to be the ideal treatment in terms of success, reduced invasiveness and stability, for the correction of severe cases with only transverse maxillary deficiencies, whereas the multisegmental Le Fort I osteotomy is found to be useful to correct transverse defects under 7-8 mm, associated with complex dentoskeletal deformities, ensuring a wide freedom of movement of the osteotomized segments in the three planes of space and the consequent restoration of the face harmony solving the whole malocclusion in a single surgical step.

Conclusions: in conclusion, we can affirm that the SARPE technique is safe and with predictable results but finds application in a limited number of cases. On the contrary, it is advisable to use the multisegmental Le Fort I osteotomy technique to obtain a greater expansion and a more complete approach for the patient.

HOW CAD/CAM HELPS ORAL REHABILITATION WITH DENTAL IMPLANTS IN JAW RECONSTRUCTION

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Aim: the purpose of this abstract is to evaluate the dental implants survival rate (ISR) of computer assisted surgery for segmental mandibular reconstruction with free flap (FFF).

Methods: between November 2016 and September 2018, 12 patients (5 male and 7 female) underwent implant rehabilitation after CAD/CAM reconstruction of the mandible or maxilla with FFF at the Maxillo-Facial Unit of Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico di Milano. Virtual surgical Planning (VSP), stereolithographic models (STL) and a custom-made titanium mesh were designed prior to surgery to enable vertical and horizontal reconstruction of FFF. The primary affliction were chronic sclerosing osteomyelitis, fusocellular pleomorphic neoplasia, mucoepidermoid carcinoma, keratocystic

odontogenic tumor, squamous cell carcinoma, pseudoarthrosis, odontogenic mixoma, Ossifying fibroma, odontogenic cyst.

Results: 45 implants were placed and only 6 implants of 1 patient failed with ISR of 88,23%. This patient placed all 6 implants during the maxillo-facial surgery. The flap and implants failed due to oral wound dehiscence, and he underwent to a second surgery of FFF and placement of zygomatic implants in a second time.

Conclusions: the application of CAD/CAM technology in the microvascular reconstruction of jaw's defects using FFF in patients that needed dental implants, enables to planning an accurate vertical height essential for dental rehabilitation leading to satisfactory functional and long-lasting result.

IATROGENIC FACIAL EMPHYSEMA: LITERATURE REVIEW AND FOLLOW-UP OF A CASE

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Aim: several procedures in dentistry may lead to iatrogenic emphysema such as improper root canal therapy, tooth extraction, periodontal treatment and restorative protocols. The aim of this work is to report about subcutaneous emphysema after endodontic treatment in literature, its management and to show the follow-up of a case.

Methods: the review part was performed in two digital databases: PubMed and ResearchGate using the following keywords "emphysema; endodontic" including articles from 2004 to 2022 describing subcutaneous emphysema post endodontic therapy, both in children and in adults. Other characteristics stressed were the onset, the resolution and the pharmacological treatment when reported. A case and its fol-

low-up were also shown with detailed clinical photos and radiological images.

Results: from a total of 30 articles 12 were included. The onset described was variable: immediate, after few minutes or couple of hours. Pharmacological therapy is diversified in molecules and time. The case reported was solved by amoxicillin and clavulanic acid 3g/die for 7 days.

Conclusions: facial emphysema is a potentially life-threatening condition which may rarely appear after root canal therapy. Pressurized air stream should be carefully used when a perforation is suspected. Awareness among dental professionals is fundamental and pharmacological guidelines should be required.

FULL DIGITAL WORKFLOW FOR SURGICAL AND PROSTHETIC REHABILITATION WITH FREE FIBULA FLAP IN MANDIBLE

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Aim: oncological patients who undergo ablative surgery develop functional and esthetic sequelae that require immediate reconstruction. Bony reconstruction of jaw defects using the Free Fibula Flap and dental rehabilitation mostly requires insertion of dental implants within the transferred fibula bone. Conventional freehand immediate placement of dental implants is technically challenging in the jaw reconstructive surgery. Computer-aided surgery might help the surgical positioning of dental implants and enhance the final prosthetic rehabilitation.

The purpose of this report is to illustrate a full digital workflow, assisted by virtual surgical planning, of a patient treated with Free Fibula Flap, and to assess the postoperative outcomes compared with preoperative digital project.

Methods: one patient was treated for the resection and reconstruction of a mandibular defect, with Free Fibula Flap

and dental implants insertion. A computer-aided designed and three-dimensional printed patient specific surgical plate, which contains functions of fibula segmentation, surgical plate positioning and implant placement, was used to guide the reconstructive surgery and simultaneous dental implant placement.

Results: the patient was successfully treated with the insertion of 5 implants within the transferred fibula flap. The digital planning was compared with the post-operative CT and with the position of the dental implants obtained by the Intra Oral Scanner.

Conclusions: the preliminary data indicate that pre-operative digital planning and patient specific surgical plate facilitate simultaneous dental implant in patients underwent jaw reconstruction.

OSTEONECROSIS OF THE JAW: AN OBSERVATIONAL STUDY

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Aim: osteonecrosis of the jaw (ONJ) is a severe clinical condition consisting of progressive bone destruction in the maxillofacial region. ONJ is commonly associated with the use of antiresorptive and anti-angiogenic medications such as bisphosphonates and some monoclonal antibodies. The aim of this study is to find a correlation between our observational study and literature review about the risk factors, incidence, pathogenesis, age, drugs of this complication.

Methods: the retrospective study was conducted using data obtained by 2581 medical records of the Odontostomatological Clinic of the University of Chieti between 2017 and 2020. For each patient we drew up a full list of age, gender, medical and dental history, level of oral hygiene and treatment of osteonecrosis. Inclusion and exclusion criteria set the boundaries for the review: in our study we included 27 patients.

Results: the results showed that 24 patients have been in therapy with Zoledronate. There were 25 oncology patients (15 with metastases), the 2 others were in therapy for osteoporosis. 7 cases, without undergoing dental treatment, developed MRONJ. Bacterial superinfection in 24 of 27 cases.

Conclusions: intravenous BPs are most associated with MRONJ (Zoledronate).

Excellent oral hygiene is a determining factor in avoiding the degeneration of MRONJ. Neoplastic diseases are the most related to MRONJ. The disease mainly affects women. Osteonecrotic lesions in the mandibular district are more severe (4 cases in Stage 3).

Spontaneous onset of MRONJ is common. The high average age (70.4 years) is an important factor.

ULTRASOUND-GUIDED *VERSUS* 'BLIND' INJECTIONS OF BOTULINUM TOXIN IN DROOLING'S TREATMENT

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Aim: this study evaluates the efficacy and safety of local application of Botulinum Toxin (BoNT) for the treatment of sialorrhea in children with neurological disorder.

Methods: patients with neurological disorder with severe sialorrhea were included. Bilateral injections with BoNT-A (Botox, Allergan) were performed in both submandibular glands (20 U per gland) and parotid (30 U per gland). Based on the physical state of the patients, the injections were administered under ultrasound guidance (Group A) or according to anatomical landmarks (Group B). The primary endpoints were the changes in unstimulated salivary flow and the Thomas-Stonell and Greengard scale from the infiltration session (T0) to the 4th week (T4) and the impression of caregivers according to the "Drooling Impact Scale".

Adverse events were recorded.

Results: 6 patients were enrolled in GROUP A and 5 in GROUP B. 1 patient did not report subjective improvement in sialorrhea at T1. Group A showed a significantly higher rate of saliva reduction already at T1, while in group B the reduction was not significant. Comparing the unstimulated salivary flows at each follow-up visit, it was found that ultrasound-guided injections were superior to those according to anatomical landmarks in reducing saliva. 2 patients showed mild hypotonia for a transitional period of 2 weeks.

Conclusions: the ultrasound-guided injection of BoNT-A at the level of the salivary glands was found to be more effective and generally safe for the treatment of sialorrhea.

QUALITATIVE AND QUANTITATIVE 3D ANALYSIS OF SKELETAL STABILITY AFTER ORTHOGNATHIC SURGERY

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Aim: this study aimed to evaluate maxillary and mandibular post-surgical skeletal stability compared to virtual surgical planning (VSP) in patients undergoing orthognathic surgery.

Methods: a prospective study was conducted including orthognathic class III patients. VSP and CBCT scans at 12 months follow-up (T2) were compared. A voxel-based superimposition was performed. Morphometric analysis focused on 3D models of mandibular condyles, gonial regions, symphysis, and premaxilla. For all these districts, qualitative analysis was performed through colormap overlays of VSP and T2 models. Quantitative assessment was determined calculating any discrepancies between planned and post-surgical position of each area on axial, sagittal, and vertical axis. Statistical analysis was performed with $\alpha = 0.05$.

Results: fourteen patients (mean age 25.7 ± 3.2 years) were included in the study sample. Eight patients (57.1%) showed skeletal asymmetry. Posterior, lower, and medial displacement was determined for most condyles, recording a mean movement of condylar surface of 0.46 ± 0.3 mm on the right, and 0.5 ± 0.31 mm on the left. Posterior, lower, and lateral displacement of gonial region was assessed (0.5 ± 0.4 mm on the right; 0.4 ± 0.3 mm on the left). Symphysis and premaxilla showed higher displacement on the sagittal plane with an anterior position of the lower jaw (0.89 ± 0.7 mm) and a posterior position of the upper jaw (1.4 ± 1 mm) at T2.

Conclusions: at 12 months follow-up, the results of this study showed irrelevant post-operative changes in maxillary and mandibular position compared to VSP.

EVALUATION OF OC ASSET IN ONJ CASES: POSSIBLE 3D BIOPRINTING METHOD TO REPAIR BONE DEFECT

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Aim: Osteonecrosis of the jaw (ONJ) is an adverse event that may occur in patients with bone metastasis treated with anti-resorptive drugs. In this study we evaluated the difference in osteoclast precursors (OCPs) number between pre-treated patient and the ONJ group. We also quantified the OCs in *in vitro* peripheral blood mononuclear cell (PBMC) culture w/ or w/o osteoclastogenic factor, and analyzed the cells viability in hybrid scaffolds (PCL/Al₂O₃) for bone healing.

Methods: patients' PBMC cultures with or without M-CSF and RANKL were stained through TRAP staining kit in order to obtain OCs number. The OPs (CD14/CD51-61/CD11b+) were detected with flow cytometry. To obtain the mix of polymer (PCL) and ceramic (Al₂O₃), a solvent casting method was used. Then we 3D bioprinted the hybrid scaffolds and we pla-

ted Human ASC52 hTert cell line on them with foetal bovine serum (FBS) or human platelet lysate (hPL), to evaluate cell viability with CellTiter-Glo kit.

Results: we saw that the number of OCPs were not significantly modified between the ONJ and pre-treated patients, while the spontaneous *in vitro* osteoclastogenesis was increased in patients with bone metastasis, according to the anti-resorptive treatment. The hybrid scaffolds allowed cell adhesion and growth, we also reported that hPL enhanced cell viability compared to FBS.

Conclusions: ONJ patients did not show an increase in circulating OCPs and *in vitro* osteoclastogenesis, because of the drugs treatment. The results obtained with the hybrid scaffold represents a first step to develop a new substitute of the necrotic zone.

COCAINE-INDUCED MIDLINE LESIONS (CIMDL): A REAL CHALLENGE FOR MAXILLO-FACIAL SURGERONS

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Aim: a cocaine-related syndrome, named cocaine-induced midline destructive lesion (CIMDL), characterized by centrofacial midline necrosis, has been described. The objective of the current investigation was to characterize, from the authors' experience and literature data, the great variety of oral and maxillo-facial lesions produced by cocaine use and abuse.

Methods: the authors have extensive, long-term experience with a patient cohort occasionally willing to admit their addictions and recreational drug uses. Our observations of this patient's cohort, and from other similar cases reported in current scientific international literature, are herein summarized relative to oral and maxillofacial lesions.

Results: oral and maxillo-facial effects were identified by the authors as a consequence of repeated use of these drugs. The most described, included: 1. Hard palate osteonecrosis, perforated septum from recurrent interaction with cocaine; 2. Typical saddle-nose deformities; 3. Mucosal and gingival manifestations, including retractions, ulcerations and keratosis; 4. Heat damages, from glass or clay pipes to inhale the drugs.

Conclusions: CIMDL is an emerging health problem due to cocaine abuse. The diagnosis of these lesions can be challenging because numerous conditions can present with similar signs and symptoms. A multidisciplinary approach is mandatory.

NEW STRATEGY PLANNING FOR CONDYLAR FRACTURES

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Aim: mandibular fractures are the third most prevalent maxillofacial traumatic event. Surgical approaches to the condyle are a debated topic. This study described a mini-invasive technique for condylar fracture reduction.

Methods: the patient of this study was a polytraumatic girl with a carotid artery dissecting aneurysm, which contraindicated the standard open reduction and internal fixation (ORIF) technique. The author's technique involves intraoral access and fragments realignment using a periosteal elevator, a molar occlusal splint, and intermaxillary fixation—intraoperative radiologic imaging checks for condyle reposition.

Results: the authors avoided skin incisions or tissue dissections, with good aesthetic outcomes and facial nerve preservation. This technique proved to be safe and simple to be executed and less demanding for the patient, with a shorter recovery time.

Conclusions: the results suggest this technique to be considered a good option for the surgical treatment in the condylar neck fractures showing favorable rim morphology with primary stability after reduction. This technique is also useful as a first step for surgical open treatments in case of unstable or unsatisfactory condylar position after a minimally invasive approach.

DIFFICULTY OF LOWER THIRD MOLAR SURGERY: COHORT STUDY AND PROPOSAL FOR NEW CLASSIFICATION

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Aim: to assess whether the degree of complexity of impacted lower third molar extraction, estimated preoperatively, corresponds to the actual difficulty of the intervention, established ex post.

Methods: a total of 80 lower third molars in an equally sized sample of patients (ranging from 13 to 58 years of age) were preoperatively assessed in a cohort study using Pederson and newly proposed Comprehensive Simplified Difficulty Score (CSDS) classifications. All interventions were carried out by the same experienced operator, who also registered intraoperative data concerning osteotomy, tooth crown and root sectioning, as well as surgical time. Such variables were statistically

analyzed in order to objectify the difficulty of the procedures and investigate the accuracy of the aforementioned scoring systems.

Results: both Pederson and CSDS classifications correlate with the osteotomy values as determined at the time of surgery. Moreover, CSDS alone and surgical time appear to be significantly correlated one another ($p < 0.001$).

Conclusions: CSDS offers a reliable tool for predicting the operative time and difficulty in impacted mandibular third molar surgery, thus serving both the clinician and the patient in the process of decision-making and surgical planning.

THE USEFULNESS OF PLATELET CONCENTRATES IN ENDODONTIC SURGERY: A SYSTEMATIC REVIEW

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Aim: this systematic review was aimed to evaluate the usefulness of platelet concentrates (PCs) in endodontic surgery and evaluate whether the design of the primary studies may affect the results.

Methods: a literature search was conducted up to the end of December 2021 on PubMed, Scopus and Cochrane Databases. Studies addressing the use of PCs in endodontic surgery were included. No restrictions were applied concerning language and type of PC used. Case report/series and animal studies were excluded. Clinical and radiographical findings were reported. The level of evidence was evaluated by means of the Grades of Recommendation, Assessment, Development and Evaluation (GRADE) tool.

Results: the search resulted in 17 papers.

The findings showed that when PCs were used, patients exhibited significantly less pain and swelling and greater reduction of apical radiolucency after 12 months follow-up on average.

The methodological quality of most of the studies was moderate. A comparative meta-analysis was not possible due to the high heterogeneity of the studies.

Conclusions: this systematic review found that PCs may improve clinical and radiographical findings when used in association with endodontic surgery. However, more studies are needed to support these hypotheses.

CORONECTOMY AS A SURGICAL APPROACH TO MANDIBULAR THIRD MOLARS: A 10-YEAR FOLLOW-UP STUDY

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Aim: the extraction of third molars is the most common surgical procedure performed in the oral cavity. Coronectomy is a surgical protocol to reduce the risk of neurologic lesions to the inferior alveolar nerve. Early (up to 6 month) and late (from 12 to 120 months) postoperative complications were evaluated.

Methods: the present prospective cohort study enrolled patients treated at the Unit of Oral and Maxillofacial Surgery, University of Bologna. The predictor variable was the time after coronectomy with up to 10 years' follow-up. To assess the rate of postoperative complications, the outcome variables were neurologic injuries, postoperative pain, swelling, fever, alveolitis, pulpitis, and root exposure. The success rate, need for a second surgical procedure, probing pocket depth, and bleeding on probing also were investigated.

Results: onehundredsixteen coronectomies were performed in 94 healthy patients (37 men and 57 women; mean age, 28.99! 8.9 years). At 10 years' follow-up, 48 patients with 62 coronectomies were re-evaluated. No cases of neurologic lesions to the inferior alveolar nerve or lingual nerve were observed after surgery. Residual roots were removed 3 years after surgery in 5 cases and 10 years in 2, without any neurologic complications. No periapical infections were observed around the residual roots.

Conclusions: this prospective study on coronectomy of third molars in a close relationship with the mandibular canal found no cases of neurologic lesions, no cases of late infection of the retained roots or the development of pathologies at 10 years.

CROWN-TO-ROOT RATIO IN ENDODONTIC SURGERY: A SURVIVAL STUDY

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Aim: to assess the influence of the crown height (CH), root length (RL) and crown-to-root ratio (CRR) on the survival of teeth subjected to surgical endodontic retreatment and classified as periapically healed.

Methods: a single operator performed all the endodontic microsurgery interventions. The present analysis selected the teeth classified as "complete periapical healing" according to the Molven-Halse-Grung scale. The periapical radiographs were analyzed by two independent calibrated examiners, who measured CH and RL in a blind manner. The CRR was calculated as the ratio of the two variables CH and RL. The measurements were performed by comparing the post-operative radiographs (t_0) with those taken for a previous retrospective analysis (t_1) and the most recent available (t_2). An independent

statistician conducted a survival analysis using Kaplan-Meier plots and a log-rank test ($\alpha = 0.05$).

Results: thirty-eight patients were evaluated, each one contributing to the study with a single tooth. The mean follow-up period was $5,96 \pm 3,36$ years. Comparing the CRR and RL values between t_1 and t_2 , the difference was found statistically significant ($p = 0.03$). Survival was improved for the teeth with roots longer than 7 mm. There were no statistically significant differences among the remaining comparisons.

Conclusions: root length ≥ 7 mm exhibited better chances of long-term survival. Over time, a risk of further decrease of clinical RL due to periodontal disease and consequent increase of CRR could be critical by a mechanical point of view. Other studies are needed.

INFLUENCE OF VASCULARIZATION ON SCHNEIDER MEMBRANE PERFORATIONS IN SINUS ELEVATION SURGERY

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Aim: Schneider's Membrane (SM) is of great importance for endosteal positioning and osseointegration in the sinus lift procedure. Potential factors to membrane perforation include: individual anatomical variations such as membrane thickness, sinus shape (V-shaped sinus cavity), and the presence of antral septa. Vascular complications also often compromise the results of the surgical procedure: anastomosis between the infraorbital artery and the posterior superior alveolar artery can cause bleeding problems during lateral window osteotomies. The presence of the extraosseous posterior superior alveolar artery can often be a cause of complication of the procedure. The aim of our study was to evaluate the impact of anatomic variables on the success of large sinus lift.

Methods: in 52 patients (47 sinus elevations) six of them had a dense arterial network in SM. The range of patients' age was 45-65 years old, and 4 were smokers. Procedure followed in sinus lift with lateral windows. In all cases we use collagen membrane, CGF clot and sticky-bone with allograft bone.

Results: of the six cases with arterial network in SM, 5 of them suffered total membrane damage. The arteries were also damaged during the procedure and there were no big hemorrhagic complications. The procedure was continued with the "Loma Linda pouch" technique. In this case, the membrane was elevated mesially where the graft was placed with a collagen membrane.

Conclusions: these cases are difficult to diagnose in advance at CBCT, when encountered in daily practice such anatomy of arteries increases the possibility of membrane damage.

A EUROPEAN MULTICENTER STUDY ABOUT THE EPIDEMIOLOGY AND MANAGEMENT OF ODONTOMAS

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Aim: the objective of the present study was to assess the demographic variables, patterns, diagnostic features, and management issues of odontomas treated at several European departments of maxillofacial and oral surgery.

Methods: this study was conducted at 8 European departments of oral surgery between January 1, 2004, and December 31, 2018. Only patients with odontomas were included. The following data were recorded for each patient: gender, age, comorbidities, site, size of odontomas, radiographic features, type and treatment of odontomas, complications, recurrence.

Results: 127 patients (70 male and 57 female patients) with odontomas were included. Mean age was 22 years; 71 odontomas were found in the mandible, whereas 56 in the maxilla. In the mandible, the most frequently involved subsite was the parasymphysis, while in the maxilla, the most common subsi-

te was the upper incisor region. Mean size of included odontomas was 15.3 mm. On the whole, 62 complex odontomas, 50 compound odontomas, and 15 mixed type odontomas were observed. Complete excision of the odontomas was performed in 121 patients. In 24 patients the extraction of deciduous teeth was performed, and in 43 patients one or more permanent teeth were removed. In 9 patients a partial excision of the odontoma was performed. Recurrence was observed in 4 cases out of 127 patients.

Conclusions: dental practitioners should be aware of the distinct clinical and radiographic features of odontoma, in order to perform an appropriate and early diagnosis. Conventional radiography is often sufficient technique for a diagnosis after clinical suspicion or for an incidental diagnosis to prevent later complications, such as impaction or failure of eruption of teeth.

INNOVATIVE PORCINE COLLAGEN MATRIX IN GINGIVAL RECESSIO TREATMENT: MULTICENTER PILOT STUDY

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Aim: evaluate the effectiveness of an innovative porcine collagen matrix NovoMatrix® RTM in maxillary gingival recessions treatment with a 6 months follow-up.

Methods: 10 patients, avg. age 48 (± 2) years, (8 F-2M), in good general health were selected. All patients showed a total of 26 single or multiple gingival recessions (4 mm). Probing depth (PD), gingival recession depth (REC), gingival recession width (WR), clinical attachment level (CAL), keratinized tissue width (KTW) were recorded. Soft tissue healing was monitored and all parameters were recorded at baseline, 3 and 6 months after surgery.

Results: at baseline (T0) the soft tissue evaluation showed: PD 1.31 ± 0.21 mm; REC 4.27 ± 0.25 mm; WR 4.15 ± 0.25 mm; CAL 5.58 ± 0.49 mm and KTW 1.35 ± 0.59 mm. No post-surgical complications were recorded. Significant improvements were

found for all the sites treated. Both at 3 months (T1) and even more at 6 months (T2) after surgery, improvements in all clinical parameters were found. At T1 the recorded values were: PD 1.04 ± 0.07 mm; REC 1.54 ± 0.38 mm; WR 3.15 ± 0.60 mm; CAL 2.62 ± 0.41 mm; KTW 3.27 ± 0.08 mm. While at T2 were: PD 1mm; REC 1.23 ± 0.37 mm, WR 2.92 ± 0.59 mm, CAL 2.04 ± 0.4 mm, KTW of 3.46 ± 0.37 mm.

Conclusions: a longer follow-up and a larger sample size will be needed to better understand and confirm the results obtained in this pilot study. However, these interesting positive results have confirmed that use of heterologous porcine NovoMatrix in gingival recessions in esthetic area improve all clinical parameters, the patient compliance and reduce all surgical complications.

EVALUATION OF RECURRENCE OF MRONJ POST-SURGICAL TREATMENT: AN OBSERVATIONAL CLINICAL STUDY

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Aim: Medication-Related Osteonecrosis of the Jaw (MRONJ) is a potentially severe complication, consisting of progressive bone destruction in the maxillofacial region. MRONJ can be caused by different pharmacological agents: bisphosphonates, denosumab and angiogenesis inhibitors. The aim of this study was to analyze if there is any predictive factor of recurrence after local debridement and which surgical approach can guarantee the elimination of the complication without generating recurrence episodes in MRONJ patients.

Methods: thirty-four MRONJ patients treated at the Dental School - University of Brescia, were included in this observational study. All of them were treated surgically by sequestrectomy and radical surgical excision of all diseased bone. The observation period was between January 2018 and September 2021. Information regarding type, administration and dura-

tion of therapy with bisphosphonates/denosumab and stage and site of the complications were recorded.

Results: zoledronic acid was the main antiresorptive used (50%) followed by denosumab (26.47%) and alendronic acid (17.65%). Cancer (47.06%), osteoporosis (29.41%) and multiple myeloma (23.53%) were the main diseases because the patients were taking BP/denosumab. We found after performing the multivariate model that patients with cancer diagnosis were related to recurrence ($p = 0.052$).

Conclusions: in this study, MRONJ surgical treatment caused the recurrence of the complication in 20.59% of the patients. It seems to be more frequent in patients with cancer, mandibular site of the osteonecrosis, duration of therapy (> 2 years), advanced stage of the complication and after zoledronic acid administration.

AUTOLOGOUS PERIOSTEAL STEM CELLS ENRICHED GRAFT FOR BONE REGENERATION: LONG-TERM FOLLOW UP

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Aim: the success of a dental implant depends on the long-term stability of the tissues that support it: the aim of the following study was to evaluate the efficacy of autologous periosteal stem cells micro grafts used for the regeneration of bone defects.

Methods: 8 patients were recruited to undergo bone regeneration procedures with autologous micro grafts of stem cells collected from the periosteum. For bone regeneration, different types of scaffold were tested: hydroxyapatite, animal collagen, poly (lactic-co-glycolic acid), porcine and equine deproteinized bone. After the healing of the regenerated sites, the implants were positioned. Clinical success and radiographic bone loss were evaluated during scheduled follow up visits up to five years and reported.

Results: clinical and radiographic evaluations during follow-up highlighted: 1. success in terms of presence of the fixture and graft over time; 2. peri-implant bone loss of 1.27 ± 0.31 mm, slightly greater in the distal sites; 3. complete absence of symptoms and clinical signs of peri-implantitis and/or mucositis in the area. In all patients, the rehabilitated areas did not present functional and/or aesthetic complications over time.

Conclusions: data from this pilot study showed no issues in using autologous stem cells micro grafts for bone regeneration. The result proved to be valid and stable even in the medium/long term. Further studies with a larger sample are needed.

IL-37 EVALUATION AFTER PERIODONTAL TREATMENT WITH AND WITHOUT LOW LEVEL LASER THERAPY

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Aim: IL-37 level evaluation during scaling and root planing (SRP) with and without the Low Level Laser Therapy (LLLT) in two cronical periodontitis (CP) patient groups.

Methods: in 2 private Dental Clinics and in Foggia University Dental School 30 no-smoker patients with CP were recruited and selected in 2 homogenous groups. Group 1 (G1) was treated with SRP therapy and Group 2 (G2) SRP and LLLT. In all sites periodontal pocket depth (PPD), bleeding on probing (BOP) and gingival crevicular fluid (GCF) IL-37 were recorded before (T0) and 10 (T1), 30 (T2) and 60 (T3) days after treatment.

Results: at baseline (T0) PPD deep was $2.68 (\pm 0.11)$ in G1 and $2.39 (\pm 0.09)$ in G2. After 10 days (T1) was $1.78 (\pm 0.11)$ in G1 and $1.58 (\pm 0.17)$ in G2; after 30 days (T2) $1.67 (\pm 0.10)$ in

G1 and $1.48 (\pm 0.12)$ in G2 and, finally, after 60 days (T3) was $1.68 (\pm 0.08)$ in G1 and $1.38 (\pm 0.09)$ in G2. BOP decreased in G1 from 35% (T0) progressively to 11% (T1), 6% (T2) and 3% (T3); in G2 from 39% (T0) to 11% (T1), 5% (T2) and 2% (T3). IL-37 increased in G1 from $0.13 (\pm 0.12)$ (T0) to $1.63 (\pm 0.11)$ (T1), $1.84 (\pm 0.12)$ in T2 and $1.31 (\pm 0.12)$ in T3 and in G2 from $0.14 (\pm 0.13)$ (T0) to $1.95 (\pm 0.14)$ (T1), $1.99 (\pm 0.12)$ (T2) and $1.98 (\pm 0.12)$ (T3).

Conclusions: LLLT, due to biostimulatory and anti-inflammatory functions, has confirmed its role in periodontal healing not from conventional SRP. IL-37, anti-inflammatory cytokine, has confirmed its capability of being used as a marker of periodontal healing.

HPV AND ORAL LESIONS: WHAT IS THE BEST DIAGNOSTIC METHOD?

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Aim: squamous cell papilloma is associated with HPV 6 and 11, it is the most common papillary lesion of the oral mucosa. The diagnostic techniques currently available are different and can be more or less invasive depending on the type of lesion and the need for the clinician. The aim of this work is to identify the best diagnostic method.

Methods: in this study, two clinical cases subjected to a double diagnostic technique were considered in order to exclude any possible risk of false negatives.

Results: the Polymerase Chain Reaction (PCR) technique showed a lower sensitivity or in any case dictated by a limited number of HPV strains analyzed.

Conclusions: histological examination nowadays turns out to be the best diagnostic method despite requiring a surgical phase. Surely new methods and new diagnostic techniques (such as salivary ones) will allow clinicians to make a diagnosis more quickly and in a less invasive way, anticipating the times, especially in the case of potentially cancerous or cancerous lesions.

TREATMENT OF PERI-IMPLANTITIS WITH REGENERATIVE TECHNIQUES: A SYSTEMATIC REVIEW

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Aim: peri-implantitis is a plaque-associated pathological condition occurring in tissues around dental implants, characterized by inflammation of the peri-implant mucosa and subsequent progressive loss of supporting bone.

The aim of this study is to compare regenerative surgical treatments of peri-implantitis: "Open Flap Debridement" (OFD) in association with a biomaterial versus OFD alone.

Methods: this study was carried out following the "PRISMA Statement 2009".

Following PICOS questions, only studies on human subjects undergoing treatment of peri-implantitis by OFD in association with a biomaterial compared to OFD alone and evaluating BL (primary outcome), PD, BoP and PuS (secondary outcomes) were included.

Results: the research on electronic databases led to the selection of 6 articles. The use of a biomaterial (Enamel Matrix Derivative - EMD, Porous Titanium Granules - PTG, Endobon® or D-PLEX₅₀₀) proved to be more effective in the regenerative treatment: all the studies found an increase in BL (0.5 mm-2.56 mm) and a decrement of PD (mm), BoP (%) and PuS (%) with the association OFD and a biomaterial.

Conclusions: from the qualitative analysis of the data, despite the limitations of this study, it can be concluded that the addition of a biomaterial seems to improve all the evaluated outcomes and, therefore, the clinical performance of OFD alone in the treatment of peri-implantitis. Further studies are needed in order to carry out a quantitative analysis and, therefore, a meta-analysis to confirm the effectiveness of this therapeutic options.

EARLY PATHOLOGICAL CHANGES OCCURRING IN THE DISTAL AREA OF LOWER THIRD MOLARS

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Aim: the aim of this study was to evaluate the early pathologic changes occurring in dental follicle of erupted (E) and vertical partially erupted (PE) lower third molars with radiolucency distal area of lower molar (DALM) less than 2.5 mm.

Methods: 100 healthy patients presenting E or PE lower third molars associated with a DALM less than 2.5mm were selected. Contextually to the dental extraction the biopsy of the DALM was executed. After the histological examination, the samples were classified into two groups: non-pathologic and pathologic-DALM.

Results: 76 specimens were included in the non-pathological DALM group (25 physiological dental follicles, 18 gingival tissue with inflammatory infiltrate, 10 physiological gingival tissue, 15 fibrotic tissue, and 8 granulation tissue) and 24 in the pathological DALM group (9 periodontal cyst-like, 4 focal

squamous epithelial metaplasia with intraparietal epithelial islands organized in micro-cyst, 4 islands of odontogenic epithelial residues organized micro-cyst with keratocystic/ameloblastic appearance, 4 giant cell tumors, and 3 hemangiomas). Pathological changes didn't have differences in incidence between the two genders (p value = 1) and any correlation with age (p value = 1).

Conclusions: about one-quarter of the analyzed DALM samples were characterized by pathological changes.

These findings suggest that the lack of radiographic appearance of the disease is not a reliable indicator of the absence of disease and that the prevalence of soft tissue pathosis is higher than generally assumed from radiographic evaluation alone.

PROTON PUMP INHIBITORS AS AN ADDITIONAL RISK TO DEVELOPMENT OF MRONJ: HISTORICAL PROSPECTIVE STUDY

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Aim: the aim of the study is to analyze the influence of antiacid therapy based on proton pump inhibitors (PPI) in the development of MRONJ in pharmacologically at risk patients, since in literature is documented a direct action on bone tissue from PPI (malabsorption of Ca⁺, Mg⁺, Vit. B12, secondary osteoporosis, increased risk of fracture).

Methods: information about medications taken and possible development of the MRONJ were gained from the medical records of the patients which have been visited and treated at the Dental School – University of Brescia, from January 2019 to December 2020, and put in two databases.

Results: in this prospective study 713 teeth have been selected, 343 (48.1%) were patients' in antiresorptive therapy

and 370 (51.9%) were antiresorptive and PPI patients. From statistical analysis (Kaplan Meyer curves' evaluation), the risk of adverse event development in antiresorptive patients is higher than PPI+antiresorptive patients. Specifically, the probability is 11% (SE = 4,5% and CI = 5%-24%) and 7.7% (SE = 3.7% and CI = 3%-19%; p = 0.0974).

Conclusions: it has been observed that the use of PPIs does not increase the risk of developing MRONJ, on the contrary it seems to reduce the occurrence of the adverse event. The hypothetical mechanisms underlying this result could be two: the reduction of drug absorption in the stomach, especially as regards bisphosphonates taken orally, or the inhibition of the vacuolar proton pumps present in the osteoclasts, due to a decrease in pH.

PREOPERATIVE USE OF PREDNISONE IN THIRD MOLAR SURGERY. RANDOMIZED, SPLITMOUTH, PILOT STUDY

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Aim: swelling, pain, and trismus after lower third molar (L3M) surgery have a negative impact on patients' quality-of-life following surgery. The study aims to evaluate the effectiveness of Oral Prednisone (OS) in reducing these outcomes.

Methods: six patients were recruited who needed bilateral impacted L3M extractions with similar surgical difficulty. A test (25mg/OS Prednisone) or a placebo were randomly administered one hour before surgery. Study variables were assessed before surgery (T0), at 3 days (T1) and 7 days (T2) after surgery. The study variables considered were: pain (VAS score), trismus (maximum buccal opening) and swelling, evaluated by facial scans with Bellus 3D software (Bellus3D, version 2.5.2, Bellus3D, Inc. Campbell, CA, USA) and compared using 3DSlicer software (3D Slicer, version 4.11.20210226, Brigham and Women's Hospital, Harvard University, NIH). A bivariate statistic was performed using the Student's t-test with $\alpha = 0.05$.

Results: six participants (2 male and 4 female, mean age 21 ± 2.89 years) were included. The statistical analysis showed a significant difference between the two groups. At T1 mean facial swelling measurements were 3.7 ± 1.3 mm in the test group and 6.8 ± 0.98 mm in the placebo group ($p = 0.0012$). The mean pain score was 1.8 ± 1.8 in the test group and 4.5 ± 2.3 in the placebo group ($p = 0.049$). The mean maximum buccal opening was 40.8 ± 3.13 mm in the test group and 33.8 ± 3.8 mm in the placebo group ($p = 0.006$). At T2 a significant difference was evidenced only in facial swelling between the two groups ($p = 0.015$).

Conclusions: the pre-operative administration of Prednisone (OS) reduces post-operative sequelae such as swelling, trismus, and pain in the surgical L3M extraction. More randomized clinical trials are needed to confirm these results.

IMMUNE STATE IN CANCER PATIENTS UNDERGOING ANTIRESORPTIVE TREATMENT AT RISK TO DEVELOP ONJ

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Aim: Medication-Related Osteonecrosis of the Jaw (MRONJ) is a side effect of the treatment with antiresorptive (AR) drugs, such as zoledronate (ZOL) and denosumab (DMAB). This work aims to monitor gamma/delta T cells ($\gamma\delta$) and activated T cell subsets in AR drugs-treated patients. Since in MRONJ osteoclast (OC) activity is impaired, we evaluated circulating OC precursors (OCPs) and their ability to differentiate into OCs in *in vitro* cultures.

Methods: peripheral blood mononuclear cells (PBMCs) derived from MRONJ and bone metastatic patients before and after AR therapy were analyzed by flow cytometry. The expression of $\gamma\delta$ chains, T cell activation and OCP markers were evaluated. OC formation was studied in *in vitro* PBMC cultures.

Results: both ZOL- and DMAB-induced MRONJ patients showed a comparable marked reduction in $\gamma\delta$. After 6

months of treatment, the level of $\gamma\delta$ in ZOL patients significantly decreased reaching values comparable to MRONJ patients, while DMAB patients $\gamma\delta$ remained constant as well as CD4+ and CD8+. No differences in circulating OCPs were reported, while they lost the ability to differentiate into OCs *in vitro*.

Conclusions: these results confirmed the reduction of circulating $\gamma\delta$ in ZOL patients, suggesting the possibility to monitor the level of $\gamma\delta$ during ZOL treatment as a predictive marker of MRONJ development. On the other hand, since DMAB patients levels after 6 months were stable, likely DMAB-induced $\gamma\delta$ impairment is slower than ZOL. This suggests that even though $\gamma\delta$ reduction holds an important role in MRONJ pathogenesis, also other factors are involved and currently under investigation.

DENTAL AUTOTRANSPLANTATION BY WAY OF 3D RESIN REPLICAS: A PRELIMINARY CONTROLLED STUDY

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Aim: the present study aimed to investigate the clinical outcomes of dental autotransplantation with the use of 3D resin replicas.

Methods: patients requiring extraction of a hopeless molar and presenting another non-functioning molar were included. CBCT DICOM dataset was used to produce a 3D printed resin replica of the tooth to be transplanted. After extraction of the hopeless tooth, post-extractive socket was modified with piezosurgery until reaching perfect adaptation of the resin replica. The donor element was then extracted and immediately transplanted into the recipient site. Total surgical time, site preparation time and extralveolar time of the transplanted tooth were recorded. Transplanted tooth was splinted to the adjacent teeth using an orthodontic wire: after 21 days (T1) the splint was removed and root canal therapy was performed. Transplanted (test) and contralateral (control) tooth stability was assessed by using Periotest (PTV) at T1, after 3 and 6 months

(T2 and T3) and analyzed with one-way repeated measures ANOVA test.

Results: ten patients were included in the final analysis. No complications were recorded. Mean surgical time, site preparation time and extraalveolar permanence of transplanted tooth were 81.9 ± 30.2 min; 18.9 ± 9.0 min and 25.7 ± 27.42 sec, respectively. Mean test group stability at T1, T2 and T3 was 21.6 ± 8.7 PTV; 14.5 ± 7.9 PTV and 10.6 ± 6.3 PTV, respectively ($p = 0.002$). Test and control group stability resulted significantly different at T1 ($p = 0.002$), T2 ($p = 0.003$) and T3 ($p = 0.002$).

Conclusions: transplanted tooth stability significantly increased during the first six months of healing. At 6-month follow-up, tooth stability in test group was still significantly lower than in control group. Long-term evaluations are necessary to further evaluate stability pattern and to monitor possible future complications.

ANALYSIS OF PROGNOSTIC FACTORS OF MRONJ: UP TO 6-YEAR FOLLOW-UP RETROSPECTIVE COHORT STUDY

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Aim: the aim of this retrospective single cohort study was to evaluate the recurrence pattern of MRONJ over time and to identify potential prognostic factors that could influence the recurrence of treated MRONJ.

Methods: patients affected by MRONJ, treated from January 2015 to December 2021 were included in the study. Survival analysis was performed using the Kaplan-Meier method and a Cox regression model was mounted.

Results: 85 patients with the occurrence of 102 MRONJ lesions were treated. The mean follow-up was 18,51 (range 1-98) months. 78 (76.47%) MRONJ lesions were located in the mandible and 24 (23.53%) in the maxilla. 87 (85.29%) MRONJ

lesions were surgically treated. In 19 (18.63%) cases platelet-rich plasma (PRP) was used. After the treatment, 43 (42.16%) MRONJ lesions recurred. The type of drug (especially Zoledronate) and smoking are negative prognostic factors, and the finding was statistically significant ($p < 0.05$), while the use of platelet-rich plasma resulted to be a protective factor; the risk of recurrences decreased by 78,9% in MRONJ lesions surgically treated with the addition of PRP (22.09%).

Conclusions: according to the present study, the administration of Zoledronate, smoking habit and oral hygiene levels may influence the risk of recurrence, while the use of PRP in conservative surgery is a protective factor.

IMPACT OF COGNITIVE FACTORS ON DENTAL ANXIETY

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Aim: to establish if cognitive dimensions (perceived professionalism, lack of control, communication) have a role, in association with non-cognitive factors (e.g. traumatic dental experiences), in generating dental anxiety, and to assess their influence on patients' perception of dental procedures.

Methods: the assessment was conducted through the evaluation of 253 patients, who answered a survey composed of 3 sections: Level of Exposure-Dental Experiences Questionnaire (LOE-DEQ), Dental Beliefs Survey (DBS-R), Modified Dental Anxiety Scale (MDAS), which respectively analyze the distress of previous traumatic dental experiences, patients' percep-

tions of dentist and dental treatment, level of dental anxiety. Statistical analysis was performed using bivariate correlations and a structural equation model to evaluate mediation.

Results: non cognitive factors were positively associated with dental anxiety. Among the cognitive factors, only lack of control was associated with dental anxiety and showed a mediating role between traumatic dental experiences and anxiety.

Conclusions: the perception of not being in control of the situation and not having the possibility of taking a break during treatment influences patients' perceptions on dental procedures, contributing to generate dental anxiety.

3D ANALYSIS OF CLINICAL OUTCOMES AFTER THIRD MOLAR SURGERY IN RELATION TO FACIAL MORPHOLOGY

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Aim: this pilot study investigated any correlation between clinical outcomes and different facial growth patterns after lower third molar surgery.

Methods: a morphometric analysis of the jaw was performed after 3D reconstruction. Predictor variable was the angle between cranial base and mandibular plane (SNGoGn[^]) to define two groups: Short-Face (SF) and Long-Face (LF). Outcome variables were pain (VAS score), bleeding, trismus (buccal opening), and swelling (Bellus3D facial scanner app), measured before (T0), 3 days (T1), and 7 days (T2) after surgery. Pre- and post-operative swelling were compared using qualitative and quantitative analysis of colormaps (3D Slicer software). Statistical analysis was performed setting $\alpha = 0.05$.

Results: the study sample included 11 patients (8 female; me-

an age 25.4 ± 6.3 years), 4 in SF group and 7 in LF group. The mean value of SNGoGn[^] was $28.6 \pm 2.3^\circ$ in SF group and $40.4 \pm 5^\circ$ in LF group. All patients showed a good recovery of dynamic functions at T2. At T1, swelling was greater in SF patients (3.9 ± 1.6 mm) compared to LF (2.8 ± 1.7 mm). At T2, higher reduction of swelling was noted in LF group, but no statistical significance was found ($p = 0.2$). Pain (4.1 ± 2.4 in SF; 4 ± 2.4 in LF) and trismus (34.6 ± 2.4 mm in SF; 35.6 ± 2.4 mm in LF) worsened equally at T1, but improved better in LF group at T2, despite without significant difference ($p > 0.05$). Bleeding was absent in all patients.

Conclusions: SF patients appeared to be associated with more severe morbidity after third molar surgery. Further studies are required to evaluate the reliability of this conclusion.

MANAGEMENT OF PERI-IMPLANT HARD AND SOFT TISSUES IN SUBCRESTAL O-T-A IMPLANTS: PRELIMINARY RESULTS

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Aim: this study will be performed to assess the efficacy of a new prosthodontics device (GFA, Gingival Former Abutment) in management of hard and soft tissue in subcrestal One Time Abutment (OTA) implants in terms of MBL (marginal Bone Level) and peri-implant tissues health after 3 months from surgery before loading.

Methods: 27 healthy patients, with posterior intercalated mo-noedentulia, receive crestal implant or 2 mm subcrestal implant with immediate placement of GFA. To assess the quality of hard and soft tissue periapical X-Ray and Probing Depth (PD) is registered. The MBL is measured with ImageJ software.

Results: PD changes are clinically e statistically ($p < 0.001$) significant for the test group: at 3 month the mean PD is 0.93mm in test group and 2.57mm control group, with a ratio of 0.39. In MBL changes aren't clinically and statistically significant between group.

Conclusions: the preliminary results show that the GFA performs an impenetrability of the probe as management of soft tissue thanks to OTA concept and there are a remodeling of the MBL also before the loading but not significant between group.

“CYSTS” INCLUDING IMPACTED CANINES: CLINICAL-PATHOLOGIC DIAGNOSIS AND THERAPEUTIC CHOICES

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Aim: the current retrospective study shows clinical-pathologic data on cases of impacted canines associated with wide, simple, or complex, cyst-like radiolucencies referred to the Unit of Odontostomatology of Aldo Moro University of Bari from 2010 to 2020.

Methods: authors analyzed clinical records, radiological, cyto- and histological exams. All patients underwent panoramic radiography and computed axial tomography. The preoperative cytopathological diagnosis was obtained by using fine needle biopsy; otherwise, the frozen section provided diagnosis intraoperatively. Authors extracted canines associated with tumors, cheratocysts, and/or calcifying odontogenic cysts, whereas orthodontic traction and treatment were performed for those associated with other dysontogenic cysts, in-

flammatory cysts, and compound odontomas. All patients underwent clinical and radiological follow-up. In the absence of recurrences, extractive cases proceeded with implantology in adults and orthodontic space maintainers in children.

Results: 36 patients were included; 11 received extractive treatment, due to unicystic ameloblastoma, odontogenic adenomatoid tumor, dentinogenic ghost cell tumor, complex odontoma, ameloblastic fibroma, myxoma, calcifying odontogenic cyst, and cheratocysts; 25 received orthodontic traction and treatment. No recurrence was observed.

Conclusions: in our experience, impacted canines were associated with odontogenic cysts and benign tumors. Preoperative diagnosis has been important for both prognosis of impacted teeth and complete excision of associated lesions.

LONG TERM FOLLOW UP OF DENTAL IMPLANTS INSERTED IN RIDGE PRESERVED SITES

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Aim: to evaluate peri-implant health and marginal bone level (MBL) of dental implants positioned in ridge-preserved sites after 9 years of function.

Methods: adult patients who met the inclusion criteria were recalled for a clinical and radiographical visit. Following parameters were registered: probing depth, bleeding on probing, suppuration, periodontal screening record, marginal bone levels, visual inflammation signs, history of periodontitis, n. of follow up months.

Results: 50 patients (38 females and 12 males; mean age 57 ± 20 years) with 58 implants were analyzed with a follow-up ran-

ging from 5 to 15 years; no implant was lost because of peri-implantitis in this period. 30 implants were classified as "healthy" (51,7%), 23 presented mucositis (39,7%), and 5 presented peri-implantitis (8,6%). Significant differences ($P < 0.0004$) were found between the peri-implant status groups considering history of periodontitis and follow up length.

Conclusions: alveolar ridge preservation confirmed to be a predictable procedure with a favorable long-term prognosis for the health of dental implants. History of periodontitis and follow up length were associated with a worse peri-implant status.

CORONECTOMY AS AN ALTERNATIVE TO SURGICAL AVULSION OF THE LOWER THIRD MOLAR: SYSTEMATIC REVIEW

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Aim: lower third molar extraction may present, as complication, a temporary lower alveolar nerve injury in approximately 8% of cases, and a permanent one in less than 1% of cases. Risk factors include difficult operative conditions, but the most important one is the nearness between the roots and the mandibular canal.

The aim of this systematic review with meta-analysis is to compare coronectomy and complete extraction of lower third molars with high risk of nerve injury, according to four variables: onset of pain, post extraction alveolitis, incidence of infection and loss of sensation.

Methods: articles were collected from Embase, Cochrane, and PubMed search engines, through the search string "coronectomy AND (third molar)". After the application of inclusion and exclusion criteria, 6 articles were included in the systematic review.

Results: with an OR = 0.36 [0.17, 0.73], coronectomy seems to reduce the risk of dry socket, compared to the complete extraction of the third molar. On the other hand, with regard to the "onset pain" and "incidence of infection" outcomes, with OR = 0.08 [0.03, 0.23] and OR = 0.87 [0.43, 1.78] respectively, there were no statistically significant differences between the two techniques. Finally, the "loss of sense" outcome was evaluated: it was found a statistically significant superiority in reducing the risk of IAN injury for coronectomy rather than lower third molar extraction, with OR = 0.08 [0.03, 0.23].

Conclusions: considering the "loss of sensation" and "post-extraction alveolitis" outcomes, there is a statistically significant difference between the two techniques, favorable to coronectomy surgery. On the other hand, for the "dolorability" and "incidence of infection" outcomes, there is no statistically significant difference between the two techniques.

DERIVED DENTIN GRAFT AS AUTOLOGOUS BONE REGENERATION IN IMPLANT SURGERY

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Aim: this trial has been conducted to evaluate the dentin regeneration potential as an autologous graft material for the preservation of the bone volume in the post-extraction socket. Tooth Transformer has been used as the device required to demineralize the dentin got from the extracted elements, which led to obtaining a granular material rich in collagen and growth fac-tors.

Materials and Methods: all 8 patients selected for the trial underwent two surgical procedures. During the first surgery, the affected elements have been extracted, the Tooth Transformer protocol has been run, and the material has been grafted into the existing bone defects and post-extraction socket. After three months, the biopsy of the regenerated

areas has been performed and the implants re-quired for prosthetic rehabilitation were placed in the same site. For two of the 8 patients, the implant has been placed with the support of a surgical guide.

Results: CBCT and histological analysis' results after 3 months confirmed the actual replacement of grafted material and the regeneration of bone tissue suitable for implant rehabilitation.

Conclusions: thus, the Tooth Transformer proves to be an effective device to produce an innovative autologous material from dentin, which is capable of predictable viable bone tissue regeneration able to support prosthetic implant rehabilitation in edentulous sites.

ANTIBIOTICS: PAIN, OEDEMA, FUNCTIONAL LIMITATION AND ALVEOLITIS IN LOWER THIRD MOLAR SURGERY

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Aim: we investigated the use of Amoxicillin and Amoxicillin combined with Clavulanic Acid in the postoperative period of the lower third molar surgery, to verify their effectiveness in the prevention of pain, functional limitation, oedema, and alveolitis sicca.

Methods: was identified a search string, which on the databases used (PubMed, Cochrane Library, and Embase) gave as initial results the retrieval of 3,588 articles. It was possible to carry out a first screening, to obtain 398. The elimination of duplicates resulted in 217 articles. 159 articles were excluded (58 articles included). At the end were included 11 articles, through a final selection of eligibility.

Results: from the Forest plots study, parameters are then reported as an overall average to get a general picture of the outcome considered. The Confidence Interval chosen was 95. Pain: the overall Risk Ratio is equal to 0.58 [0.42, 0.80]. Tri-

smus: First postoperative period: there are no statistically significant differences (Standardized Mean Difference 0.14 [-0.37,0.65]). Second postoperative period: the overall result is not significant (Standardized Mean Difference 0.56 [-0.22,1.35]). Alveolitis sicca: the result is a Risk Ratio equal to 0.52 [0.17, 1.61]. Infection: a superiority of the treated over the controls, with Risk Ratio 0.41 [0.27, 0.63] and 0.39 [0.16, 0.93]. Oedema: the differences between treated patients and the Control group are not considered significant.

Conclusions: the results demonstrate efficacy for the control of painful symptoms and infection, and not least the results relating to the control of alveolitis sicca must be considered, which demonstrate how its presence, initially, is not etiopathologically correlated to bacterial over-admission, but, more likely, to an interruption of the healing process of the alveolus.

AN ANCIENT SCIENCE TO IMPROVE CLINICAL PRACTICE: HUMAN ANATOMY MEETS ORAL SURGERY

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Aim: to emphasize the usefulness of dissection to understand the reason of the possible lack of anesthesia during symphysis surgeries.

Methods: in the surgeries of the symphysis, it is necessary to anesthetize the surgical area through the mental nerve bilateral block. Sometimes, however, patient refers intraoperative pain despite the correct execution of the anesthesia.

Results: the mandibular symphysis usually receives innervation from inferior alveolar nerve (IAN) terminations, but, in some rare cases, a particular anastomosis involves the lingual nerve and the nerve to the mylohyoid. Thanks to an in-depth anatomical study through anatomical dissection of the lower jaw, it is possible to see that the lingual nerve, crossing the

duct of the submandibular gland, can give rise to an unusual lateral branch that anastomoses with the nerve to the mylohyoid, usually below it, as it passes through the mylohyoid muscle. In such case the mylohyoid nerve collects the sensitivity of the symphyseal area. Therefore, in patients who have the described anastomosis, the clinician must proceed, in the event of sensory perception during surgery in the symphyseal area, with a bilateral anesthetic block of the lingual nerves.

Conclusions: the study of anatomy through dissection can be a useful tool for clinicians today, to find answers to their daily practice questions, as the reason why the patient could feel pain during the symphysis surgery, raising their level of preparation and the quality of their work.

NASOPALATINE DUCT CYST: LITERATURE REVIEW AND CASE REPORT

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Aim: the aim of this study is to describe the management of an upper jaw cyst with involvement of the nasopalatine nerve and to compare our technique with the most predictable ones according to the literature.

Methods: a 50-year-old patient came at the Department of Dentistry of IRCCS San Raffaele with swelling in the anterior palate. The first step of the diagnostic process highlighted a symmetrical edema at the interincisal papilla, with a fluctuating consistency. The OPT showed a radiolucent area in the premaxilla and the CBCT displayed the presence of a rounded lesion with radiopaque, clear margins and with involvement of the naso-palatine nerve. A vitality test was performed from element 1.3 to 2.3 excluding the odontogenic origin of the lesion.

After locoregional anesthesia, an intrasulcular incision was made and an envelope flap was created. The lesion was totally excised and sent to the Histology and Pathology Department of the San Raffaele Hospital. The cavity was carefully revised and filled with fibrin sponges. Then simple sutures were performed.

Results: the patient was kept on a follow-up program and a CBCT was performed which confirmed the remission of the lesion. In addition, excellent healing of the soft tissues was highlighted.

Conclusions: this study demonstrates the importance of the diagnostic phase for the correct surgical planning and the treatment success.

OSTEOLITIC LESION ASSOCIATED TO IMPACTED THIRD MOLAR: LITERATURE REVIEW AND CASE REPORT

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Aim: the aim of this clinical report is to discuss our approach of a surgical excisional biopsy of an osteolytic lesion located in correspondence of the element 38 compared to the state of art in scientific literature.

Methods: a 46-year-old patient presented to the Department of Dentistry of San Raffaele Hospital for a check-up visit.

After an accurate clinical and radiographic analysis, we noticed the presence of a lesion associated with the element 38, which was not vital.

The chosen treatment was a surgical exeresis of the lesion and the surgical extraction of the element, performed under local anesthesia. A mucoperiosteal incision was made to detach a full-thickness flap. With a straight handpiece the excision of

the element and associated lesion were performed.

After a thorough revision of the cavity, absorbable hemostatic sponges were inserted into the neo-cavity, and a suture was placed to close the wound.

Results: the histological examination indicated that the lesion in the III quadrant was a 2.8 cm inflammatory orthokeratinized odontogenic cyst. At the 3-years follow-up visit complete soft tissue healing and a steady reduction in radiolucency were observed, still without any lesion recurrence.

Conclusions: precise and accurate pre-surgical evaluation coupled with timely intervention increases the chance of achieving complete healing and optimal preservation of both soft and hard residual structures.

APICOECTOMY AFTER ENDODONTIC TREATMENT FAILURE: LITERATURE REVIEW AND CASE REPORT

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Aim: the purpose of this case report is to present a clinical case of apicectomy with 2-years follow-up comparing it with the current scientific literature.

Methods: a 47-year-old patient presented at Dentistry Department of San Raffaele Hospital for a dental consultation reporting a persistent pain on left pre-maxilla. On clinical examination there was a fistula in correspondence of the apex of element 23, previously treated endodontically. On radiographic examination we noticed an apical radiolucency.

Under local anesthesia, we proceeded to set up a mucoperiosteal triangular flap and excision of the lesion. Then we performed an apicectomy and retrograde obturation. After a careful revision of the cavity, absorbable haemostatic sponges were

inserted and sutures were placed to close the wound. The removed neoformation was sent to the Histology and Pathology Department of San Raffaele Hospital for histopathological analysis.

Results: the histological examination indicated that the lesion was an apical granuloma of 0,6cm in size. At the 2 years follow-up visit we noticed a complete tissue healing and an improvement in radiolucency.

Conclusions: even if an adequate endodontic therapy is performed, due to the high percentage of secondary canals in the last 3 mm of the tooth apex, one may encounter a failure. In such cases, performing an apicectomy allows to obtain a good apical seal and a good canal disinfection.

EFFICACY OF INTRAMUSCULAR INJECTION OF CORTICOSTEROIDS IN THIRD MOLAR SURGERY

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Aim: this systematic review aimed to identify randomized, placebo-controlled trials investigating the effectiveness of intramuscular corticosteroids in the control of facial edema, pain, and trismus following third molar surgery.

Methods: searches were performed in the PubMed, Embase, and Cochrane Library databases. The search identified 139 studies. After assessing eligibility, five studies were included in the meta-analysis. Each outcome was considered the first postoperative period, including the first 72 h after surgery, and the second postoperative period concerning the analysis on the sixth or seventh day after surgery.

Results: corticosteroids were effective in controlling pain, both in the first postoperative period ($p < 0.00001$; MD -1.20; 95%

CI -1.56 to -0.84) and in the second postoperative period ($p < 0.00001$; MD -1.09; 95% CI -1.45 to -0.74), and in edema control, both in the first postoperative period ($p = 0.02$; MD -2.30; 95% CI -4.23 to -0.37) and in the second postoperative period ($p = 0.01$; MD -1.01; 95% CI -1.79 to -0.24). In contrast, for the control of trismus, corticosteroids were less effective, both in the first postoperative period ($p = 0.15$; MD -0.50; 95% CI -1.17 to 0.18) and in the second postoperative period ($p = 0.65$; MD -0.15; 95% CI -0.81 to 0.50).

Conclusions: intramuscular injection of corticosteroids is effective in reducing postoperative sequelae of surgical removal, particularly in the control of facial edema and pain, in contrast to trismus, both in the first postoperative period and in the second postoperative period.

MAXILLARY ODONTOGENIC CYST: LITERATURE REVIEW AND CASE REPORT

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Aim: the purpose of this paper was to perform a literature review on management of maxillary odontogenic cyst with implementation of a clinical case.

Methods: a 52-year-old patient was referred to the Dentistry Department of San Raffaele Hospital, for discomfort in the first quadrant. After a clinical and radiological evaluation through orthopantomography (OPT) and CBCT, an apical neoformation at element 16 was observed with vestibular cortical resorption and oro-sinus communication.

A trapezoidal full-thickness flap was elevated and after tooth's extraction, the enucleation of the lesion was performed. After revision of the cavity, fibrin sponges were placed, and stitches

were applied. The sample was sent to the Histology and Pathology Department of San Raffaele Hospital for histopathological analysis.

Results: histopathological examination confirmed our hypothesis of an inflammatory odontogenic cyst. Clinical and radiographical analyses at 2-years follow-up showed proper hard and soft tissue healing.

Conclusions: according to literature, an accurate pre-surgical evaluation, and the use of radiographic examinations, in case of proximity to noble structures must be performed for a safe surgical procedure with good control of possible intraoperative complications.

DECOMPRESSION OF JAW CYSTIC LESIONS: A CBCT ANALYSIS IN FOUR PATIENTS

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Aim: Odontogenic Cysts (OC) arise from the odontogenic epithelium and occur in the tooth-bearing regions of the jaws. This study aims to evaluate the effects of decompression in jaw cystic lesions, using CBCT analysis before cystectomy; moreover it evaluates the new walls formation where solutions of continuity with extraoral districts were present.

Methods: four patients with jaw cystic lesions compatible with OC of inflammatory origin, solution of continuity between cyst wall and extraoral districts (maxillary sinus, oral floor and nasal cavity) were selected.

A surgical decompression of the OC was performed, inserting a cannula and fixing it to the adjacent teeth. For five months patients daily performed saline solution washings, then a second CBCT was executed to perform oral surgery. Results we-

re assessed on CBCT both before drain insertion and cystectomy, measuring the OC on the three axis by taking fixed landmarks.

Results: the Kolmogorov-Smirnov test was performed to evaluate the normality of the sample, which resulted parametric (p value $> 0.1000 - 0.0924$). T-test was subsequently performed for paired data (P value 0.0002). The results showed a statistically significant association between drain placement and size reduction in the three planes of space.

Conclusions: these results suggest that decompression can be an effective treatment to reduce size of cysts lesions when the dimension of the cysts creates a continuity solution between oral bones and extraoral districts, also showing new walls formation.

IMPACT OF LORNOXICAM AND FLURBIPROFEN ON POSTSURGICAL MANAGEMENT AFTER THIRD MOLAR SURGERY

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Aim: the aim of the present study was to evaluate the efficacy of Lornoxicam versus Flurbiprofen and placebo in reducing perioperative sequelae following mandibular third molar surgery.

Methods: ninety-one patients were enrolled and randomly allocated to receive one of the following treatments twice a day for 5 days after surgery: placebo ($n = 29$), Flurbiprofen ($n = 31$), or Lornoxicam ($n = 31$). Postoperative pain (primary outcome) was evaluated through the visual analogue scale (VAS) score at 30 min, 2, 6, 12, 24, 48 h, 7 and 10 days following surgery. Postoperative swelling and maximum mouth opening values were the secondary outcomes measured. Statistical analyses were performed, and a p -value < 0.05 was set as statistically significant.

Results: compared to placebo, treatment with Flurbiprofen and Lornoxicam significantly reduced postoperative pain. Moreover, after surgery the treatment with Lornoxicam presented significantly lower median pain scores at 2 h ($p < 0.001$) and at 6 h ($p = 0.016$) compared to Flurbiprofen and at 2 h ($p < 0.001$), 6 h ($p = 0.01$), and at 24 h ($p = 0.018$) compared with placebo. Swelling and maximum mouth opening values were not significantly different between the groups at each follow-up session.

Conclusions: the treatment with Lornoxicam determined a decrease in the incidence and severity of pain in the first postoperative phase following mandibular third molar surgery compared to Flurbiprofen and to control group.

PATIENT'S SATISFACTION AFTER DENTAL EXTRACTION USING THE MAGNETIC MALLET®

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Aim: Magnetic Mallet® is a revolutionary tool in oral surgery that simplifies teeth extraction helping to preserve the alveolar bone in a considerable manner. The objective of this study is to assess the patient's feedback and satisfaction after dental extraction using the Magnetic Mallet®.

Methods: 49 teeth considered as "hopeless" after clinical and radiographic evaluation on 37 patients had been extracted using the Magnetic Mallet®.

After the avulsion was performed, the patient was asked to quantify and report the pain using the NPRS scale (Numeric Pain Rating Scale) and a standard therapy of Paracetamol and Chlorhexidine 0,12% mouthwash was given. Clinical controls were scheduled at intervals of one week and then after 21 days. A medical record was gathered in order to docu-

ment patients' level of pain at 24 and 72 hours and then at 7 and 21 days.

Results: the mean pain level after tooth extraction was limited to 0.49. The mean pain in the follow ups was 3.18 after 24 hours; 2.14 after 72 hours and 1.02 after one week following the procedure. During the 21-day follow-up the average pain was assessed again and stood at 0.18.

Conclusions: based on the results that were gained we can form an impression about the easiness of tooth extraction with the help of Magnetic Mallet®. Its effectiveness and its capability in reducing the damage to the tissues and bone creates a positive post-surgery satisfaction for the patient that can be considered as good as or better compared to the traditional technique described in the literature.

CUSTOM BONE REGENERATION (CBR): A HUMAN CASE SERIES STUDY

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Aim: the aim of this retrospective clinical study is to evaluate the reliability of the Guided Bone Regeneration (GBR) surgical technique through the use of customized CAD CAM titanium meshes (Yxoss CBR® Reoss).

Methods: 9 patients presenting 10 bone defects were referred to solve an oral dysfunction due to edentulous atrophic ridges. Guided bone regeneration was performed with titanium meshes combined to autogenous bone graft and heterologous bovine bone mineral graft. A "poncho technique" soft tissue approach was exclusively performed.

After a mean 9 months of graft healing, meshes were removed and implant surgery was subsequently performed.

Results: 1 site met titanium mesh exposure. However, a significant gain in width and thickness was achieved for all the 10 sites.

The statistical results were estimated uploading and superimposing cbct scans before and after CBR surgery for each patient. It was thus possible to evaluate the maximum linear vertical and horizontal bone gain through a dedicated Cad Cam software (Exocad GmbH®). The average results were: a horizontal gain of $6,37 \pm 2,17$ mm, a vertical gain of $5,95 \pm 2,06$ mm and a bone volume gain of 3012 ± 1938 mm³.

A total of 18 implants were placed into the grafted sites with a 100% survival rate.

Conclusions: the findings from this retrospective study suggest that Yxoss CBR® Reoss represents an affordable and safe approach to pursue GBR in horizontal, vertical or combined defects. The soft tissue management is diriment: a "poncho" flap approach was chosen to reduce the most frequent exposure complications.

ENUCLEATION OF A NEOFORMATION IN THE VENTRAL PART OF THE TONGUE: MUCOCELE OF BLANDIN-NUHN GLANDS

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Aim: the aim of this study is to report a rare case of mucocele of Blandin-Nuhn glands and discuss the most appropriate therapeutic approach of it, describing a case treated by the authors.

Methods: a 16-year-old female patient, in good general health, referred to us reporting the recurrence of a circumscribed neoformation located on the apex of the ventral part of the tongue. The parents reported the relapse of the lesion following an initial surgery. Based on the clinical aspects, the probable diagnosis is determined as cyst of the Blandin-Nuhn glands, suggested by histopathological examinations after an excisional biopsy of the lesion performed with a classical scalpel. Within 7 days of the biopsy, complete repair of the tissue was observed.

Results: clinically it presents as a longitudinal swelling of the ventral surface of the tongue, parallel to the frenulum, with a major axis of 0.6cm. Since it was a relapse, the definitive diagnosis of the case was oral mucosa with stroma occupied by lymphocytic and histocytic infiltrates in a context of eosinophilic amorphous material, with intense chronic inflammation and ectasia of the peri-lesional lymphatic vessels.

Conclusions: surgical removal of the mucocele is the first choice treatment; removal of the traumatic aetiological agent is an alternative conservative therapeutic treatment. It is indeed very important to identify them in order to provide complete excision of the Blandin-Nuhn gland and avoid relapses.

MAGNETIC MALLET: AN ALTERNATIVE TO TRADITIONAL THIRD MOLAR EXTRACTION SURGERY

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Aim: Magnetic Mallet is a surgical magneto-dynamics device that allows performing simple and complex extractions in an atraumatic way, preserving the bone crest. It represents an alternative to rotary and manual surgical instruments that could be invasive in several cases. The aim of this study is to evidence the benefits of magnetic surgery compared to the traditional one by analyzing five third molar split-mouth extractions.

Methods: split-mouth extractions were performed, with both traditional (C) and magnetic (T) surgery, two weeks apart. The following parameters were considered for each patient: intraoperative pain (VAS scale); duration of surgery; one-, three-, seven- and twenty-one-days postoperative pain (VAS scale) and post-surgical complications.

Results: the sample showed that the T group reported less intraoperative and postoperative pain than the C group. The duration of surgery was shorter on average in the T group. There were no significant differences between the T and C groups for postoperative complications.

Conclusions: the magnetic mallet has proven to be a valid support for the surgical extraction of erupted or partially erupted third molars. It allows a cleaner, simpler and less traumatic surgery than the traditional one. In addition, it has been shown to significantly reduce patients' postoperative discomfort, usually associated with surgery with manual instruments.

ODONTOGENIC KERATOCYST SURGERY AND RECURRENCE IN GORLIN-GOLTZ SYNDROME: A NARRATIVE REVIEW

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Aim: Gorlin-Goltz syndrome (GGS) is an autosomal dominant hereditary disorder. Typical manifestations involve the maxillary region, with the presence of keratocystic lesions, basal cell carcinomas, and skeletal deformities. For this reason, early diagnosis of the disease is necessary to improve the patient's quality of life by limiting the recurrences after keratocysts excision.

Methods: a narrative review of the literature was performed using the PubMed database to identify surgical methods for the treatment of keratocysts currently in use, showing recurrence rates for each method.

Results: post-surgical recurrence rates for odontogenic keratocysts are variable: 30% following enucleation, 9%-17% fol-

lowing enucleation and irrigation with Carnoy's solution, 14.5%-38% with enucleation and cryotherapy, 18% with enucleation and peripheral ostectomy, 13%-14.6% with decompression and cystectomy, 32%-33% with marsupialization, and 0%-8.4% following surgical resection. The resective en bloc technique proves to be the best because it has shown no cases of recurrence in the literature, but it is also the most invasive technique.

Conclusions: the potential recurrence of keratocysts treated with enucleation has marked the treatments on the resective surgery option, but recently the treatment plan preferred is the intermediate plan between enucleation and resective surgery. Extensive lesions preclude the use of resection.

BETA CALCIUM TRIPHOSPHATE VS AUTOGENOUS TOOTH BONE GRAFT MATERIAL FOR BONE REGENERATIVE PROCEDURE

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Aim: the objective of this study was to compare the long-term clinical outcome of using beta calcium triphosphate as a bone grafting material for maxillary sinus floor augmentation (MFSA) versus autogenous tooth bone graft material.

Methods: fifty-seven healthy patients, aged 42 to 58 years, with severe posterior maxillary jaw atrophy with an average residual bone height in the sinus area of 2.8 mm underwent sinus floor elevation. The Piezo-assisted Split-Crest technique was performed with the two-stage implant placement procedure. Original bone was augmented with Compact Bio-bone with use of β -Tricalcium phosphate for the test group (n = 28) or with autologous tooth processed by the Toot Transformer (TT)

device (control group, n = 29). Implants were placed after a healing period of ~6 months.

Results: at 8 years of follow up, both the combination of Compact Bio-bone and of β -Tricalcium phosphate and the use of autologous tooth in the presence of a small amount of residual bone, showed expected results over time, without inflammatory infiltrate, and with an elevated level of mineralization. both biomaterials restored the function of the physiologically and anatomically replaced part ensuring complete biocompatibility without causing rejection and collaterals.

Conclusions: this investigation shows that both biomaterials are suitable for sinus grafting of severely atrophic maxillae.

EXTRACTION OF AN IMPACTED MAXILLARY PREMOLAR: LITERATURE REVIEW AND CASE REPORT

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Aim: the purpose of this study is to show the surgical extraction of a maxillary premolar in total bone inclusion compared to the state of art in scientific literature.

Methods: a 14-year-old female patient came to the Dentistry Department of San Raffaele Hospital with impacted element 2.5. Anamnesis, clinical evaluation, OPT and Cone Beam are accomplished. Element 2.5 location is defined in relation to noble structures. Under local anesthesia, a full-thickness palatal flap with paramarginal incision, papillae preservation and distal release incision is performed. An osteotomy is carried out to gain access; dislocation, partial odontotomy and extraction of element 2.5 are then carried out. After the revision

of the cavity and the insertion of absorbable haemostatic sponges into the surgical neo-cavity, sutures in detached stitches are used to close the wound.

Results: element 2.5 in total bone inclusion is successfully extracted, respecting the anatomy and noble structures. The 1-year follow-up shows the reorganization of the bone complex and the restitutio ad integrum of both hard and soft tissue.

Conclusions: the extraction of maxillary premolars in total bone inclusion is more predictable for the surgeon and more tolerated by the patient if supported by an attentive Cone Beam planning and performed with literature validated techniques.

PREMAXILLARY PERIAPICAL LESIONS: LITERATURE REVIEW AND CASE REPORT

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Aim: the root cyst is the most frequent odontogenic cyst and originate from the epithelial components that remain from the odontogenesis. The purpose of this study is to present a clinical case of root cyst located in premaxilla, surgically treated by excisional biopsy in a 68-year-old patient, accompanied by a literature review on the topic.

Methods: the patient came at the Department of Dentistry of San Raffaele Hospital for an osteolytic lesion in the premaxilla. After an accurate clinical and radiographic analysis, we confirmed the presence of the lesion bounded by the mesial wall of the maxillary sinus and the floor of the nasal cavity. The chosen treatment was a surgical exeresis of the lesion, which was performed under local

anesthesia. A mucoperiosteal incision was made and a full-thickness flap was raised. The excision of the lesion was carried out and after a carefully revision of the cavity, collagen sponges was inserted and a 4/0 suture was placed to close the wound.

Results: the histological examination indicated that the lesion was a 2cm phlogosated odontogenic cyst. The 1-year follow-up visit complete soft tissues healing and a steady and significant reduction in radiolucency were observed, still without any lesion recurrence.

Conclusions: precise and accurate pre-surgical evaluation joined with timely intervention can lead to complete healing and optimal preservation of both soft and hard tissues.

GUIDED ZYGOMATIC IMPLANT SURGERY: CRITICAL REVIEW AND OUR EXPERIENCE

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Aim: Zygomatic implants (ZI) are one of the possible options for immediate implant rehabilitation without grafting the atrophic edentulous maxilla. A literature review is performed regarding guided surgery for ZI placement.

Methods: an electronic search was performed on databases (PubMed, MEDLINE, ScienceDirect) including studies that evaluated the accuracy of computer-guided static surgery for ZI placement.

Results: a total of 81 studies were identified, only 4 studies included the criterion of accuracy of computer-guided static surgery for the placement of ZI. Studies on human cadavers were conducted using stereolithographic surgical guides resting on the maxillary crest inserting a total of 28 ZI (Van Steenberghe D et al. In 2003; Chrcanovic BR et al. In 2010; Schirotti G et al.),

finding a discrepancy compared to pre-surgical planning. 40 ZIs were inserted into a study on human cadavers using a bone-supported surgical guide (Grecchi F. et al in 2021) with positive outcome with respect to pre-surgical planning.

Conclusions: on the basis of our experience, in accordance with the literature, the most predictable technique for the placement of ZI remains the freehand one, as long as it is entrusted to expert clinicians with a high surgical background. It can also be stated, from a critical examination of the literature, that the surgical guide resting on the maxillary crest (with or without bone support) presents substantial criticalities; the use of a bone-supported surgical guide (lateral wall of the maxillary sinus) has brought good results, having such a cost/benefit ratio that this technique cannot be imported into outpatient clinical practice.

DENTAL EXTRACTION USING THE MAGNETIC MALLET® TECHNIQUE

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Aim: Magnetic Mallet® is the latest and most modern device proposed to facilitate dental extraction by preserving and compacting the alveolar bone to ensure the replacement of the extracted tooth. The aim of this study is to evaluate the effectiveness and easier use of the Magnetic Mallet® in the simple extractions and the acceptability of its use by the patients.

Methods: after a circumferential luxation performed using the Magnetic Mallet®, 49 non-recoverable teeth were extracted on 37 patients. The day of the intervention, many data regarding the procedure details were recorded. In particular, it was registered which of the 4 different power levels selectable from the frontal dial selector, was used. Follow-ups were settled at 7 and 21 days to evaluate clinically and radiographically the socket healing.

Results: in 69,39% of the cases, the power of 1 or 2 was sufficient to conclude the case, proving that a medium force is enough to remove the tooth, limiting the discomfort for the patient.

Endodontically treated and ankyrotic teeth were always extracted intact, without fractures during the study, proving the effectiveness of the instrument in these cases.

From the 21-days results, it was always possible to observe an optimal healing with good alveolus preservation.

Conclusions: data and clinical evidence preliminary suggest that the use of the Magnetic Mallet® facilitated tooth extraction through the compaction of the alveolar bone simplifying the luxation phase, making it less traumatic for the patient and easier for the clinician.

CORONECTOMY PERFORMED THROUGH COMPUTER-ASSISTED SURGICAL NAVIGATION: A CASE REPORT

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Aim: to describe a successful surgical case of coronectomy of an impacted mandibular third molar in close contact with the inferior alveolar nerve (IAN) using dynamic navigation.

Methods: a 42-years-old woman was referred for the treatment of an impacted left mandibular third molar. The patient reported recurrent pericoronitis requiring antibiotics. The orthopantomography and the cone-beam computed tomography (CBCT) images showed close proximity of the roots with the IAN and the presence of an associated dentigerous cyst closed to the second molar's roots. To minimize iatrogenic injuries to the IAN a coronectomy was performed using a surgical dynamic navigation system.

Results: coronectomy and cyst removal were successfully performed. High surgical accuracy was provided, thanks to

the dynamic navigation system that allows the surgeon to perform the procedures following in real-time the instruments' position on the CBCT images. No neurological damages or other intraoperative complications occurred. The surgical site healed by primary intention. After 2 years, no long-term postoperative complications were reported. The vitality of the left mandibular second molar was preserved and a physiologic probing depth on its distal aspect was detected. Follow-up radiographs showed roots migration and stabilization together with the complete bone mineralization.

Conclusions: dynamic navigation can provide high intraoperative accuracy that is an essential goal, in particular in the case of management of teeth in close proximity to the IAN.

POST EXTRACTIVE IMPLANT PLACEMENT WITH IMMEDIATE LOADING: A CASE REPORT

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Aim: the purpose of this study is to show the placement of a post extractive implant fixture with flapless technique in the mandibular first molar site, associated with a literature review on bone compaction techniques.

Methods: a female 52-year-old patient comes to the dentistry department of the San Raffaele hospital with symptoms affecting the third quadrant. After an accurate clinical and radiographic analysis, we noticed a root fracture of the element.

Under local anesthesia the extraction of the element is performed. To maintain the morphology of the septum, the roots are separated. For the preparation of the implant site, osteotomes

in series are used with the mechanical compaction technique. The chosen implant fixture is inserted and immediate loading is performed.

Results: post-operative Cone Beam shows the success of the surgery with the improvement in bone density from D3 to D2, due to the mechanical compaction technique. The 3 years follow up reveal the osteointegration of the fixture and the restitutio ad integrum of tissue.

Conclusions: the use of second level radiographic examinations, respecting the ALARA principles, during the diagnostic phase allow us to visualize the improvement in bone density following the use of mechanical compaction.

CANALICULAR ADENOMA OF THE LIPS: LITERATURE REVIEW AND CASE REPORT

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Aim: the purpose of this study is to analyze a soft tissue lesion located in the left upper lip area both from a diagnostic and a therapeutic point of view, through the description of our clinical experience and a literature review of the perioral neoformations.

Methods: a 71-year-old patient was referred to the Dentistry Department of San Raffaele Hospital for the presence of an upper lip lesion. Macroscopic examination of the region revealed a well-defined, round, smooth, firm, elastic and hard nodule. After local anesthesia, we proceed with a scalpel incision, to the surgical exeresis of the lesion by blunt dissection.

The sample, 1,2x0,7x0,6cm, was sent to the Histology and Pathology Department of San Raffaele Hospital for Histopatholo-

gical analysis with diagnostic suspect of mucocele of pleomorphic adenoma.

The wound is then closed with 4/0 resorbable sutures with simple stiches.

Analgesic drug therapy was prescribed and the patience was placed in a control protocol.

Results: the histological examination confirmed that the lesion was a canalicular adenoma. At the 1 years follow-up visit, a complete tissue healing was observed.

Conclusions: it is very important to carefully examine the oral mucosa as part of a dental examination to identify lesions in a preventive manner.

CLINICAL MANAGEMENT OF AN ODONTOGENIC NASOLABIAL ABSCESS: A CASE REPORT

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Aim: the odontogenic abscess is a frequent consequence of caries, traumas and failed dental root canal treatments.

The aim of this study is to report about the clinical management of facial odontogenic abscesses and their follow-up.

Methods: a 45-year-old man with a painful swelling at the level of the right nasolabial fold came to our attention. Clinically it appears as a 10 cm lesion including the five cardinal signs of inflammation and trismus. The patient underwent an attentive informed consent concerning his clinical data disclosure. The involvement of the 1.6. periapical area is reported by the OPT exam analysis, showing a previous endodontic treatment. At the first appointment a transcutaneous haemo-purulent drainage of the abscess has been followed by a systemic administration of Ceftriaxone (Rocefin 1g/3,5 ml). The drainage has

been performed inserting a syringe in the lowest and central sites of the lesion. Therefore, the clinician opted for an #11 scalpel blade incision to ease the flow. The second session has shown a remarkable reduction of the symptoms. A second transcutaneous drainage has been useful to deplete the content of the abscess, easing the first upper right molar extraction.

Results: the immediate results determined a partial resolution of the edema re-establishing the physiological opening of the jaw, alongside a decrease of the pain. It ensured a total successful follow-up.

Conclusions: a timely treatment for this condition is crucial to avoid potentially severe life-threatening complications and achieve a restitutio ad integrum.

LOWER THIRD MOLAR AUTOTRANSPLANTATION IN LOWER FIRST MOLAR FRESH SOCKET: A CASE REPORT

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Aim: autogenous tooth transplantation is the surgical transfer of a tooth from one site to another in the same patient. A case of lower third molar autotransplantation in a lower first molar fresh socket is presented.

Methods: in September 2021, a 25-year-old female patient was referred to the Oral Surgery Unit of the Umberto I Hospital of Rome for the extraction of the lower left first molar because of a destructive decay. Since the lower left third molar was healthy and its morphology and dimensions were compatible with those of the tooth which had to be extracted, it was extracted as well in the same session, transplanted in the first molar site and splinted to the adjacent teeth.

Results: the first follow-up visit and suture removal were performed 7 days after surgery. Third molar pulp test vitality

was performed after 15 days and gave a positive, although delayed, result. After further 30 days, the tooth showed a normal vitality.

A last visit was performed in mid-December, when the patient underwent a new orthopantomography which showed no periapical nor periodontal radiolucency on the transplanted tooth. The splint was therefore removed and the normal vitality of the tooth was confirmed again.

Conclusions: third molar autotransplantation can be considered an option for the substitution of non-restorable first molars, especially in young patients. Although endodontic treatment of the transplanted tooth is usually performed a cautious extraction and a quick transplantation make tooth vitality maintenance possible.

CLEIDOCRANIAL DYSPLASIA: A CASE REPORT OF CRANIOFACIAL AND DENTAL ABNORMALITIES

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Aim: this case describes surgical extractions of supernumerary teeth in a Cleidocranial dysplasia patient. CCD (Cleidocranial dysplasia) is an autosomal dominant genetic disorder, characterized by general dysplasia, skeletal and dental deformities. Aplastic or hypoplastic clavicles, supernumerary teeth, failed eruption of permanent teeth, and a hypoplastic maxilla are the most common features.

Methods: a young woman with CCD, inherited from her father, characterized by missense mutation in the RUNX-2 gene (c.674G > A), resulting in the replacement of arginine with glutamine at residue 225 (p.Arg225Gln); with short stature, brachycephalic head, hypoplastic maxillary and broad nasal bridge

were referred to Oral Surgery Department, for the avulsion of supernumerary included teeth in the area of maxillary canines. The patient presented an Angle class III malocclusion, lower crowding, negative overjet and multibrackets straightwire fixed appliance.

Results: to expose the teeth, a full thickness flap was raised and osteotomy was performed. After extractions, the flap was repositioned and sutured. Finally, antibiotic and inflammatory therapy was prescribed.

Conclusions: the interdisciplinary approach between geneticist and dentist is fundamental to produce early diagnosis and to perform the treatments in cleidocranial dysplasia patients.

SURGICAL-ORTHODONTIC THERAPY OF AN ENCLOSED RIGHT LOWER CANINE: CASE REPORT

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Aim: this paper documents a case of bony inclusion of the right mandibular canine restored to the arch with an orthodontic surgical approach.

Methods: some of the causes of bony inclusion of the canine are: failure of resorption of the deciduous canine, obliteration of the gubernaculum dentis with loss of eruptive guidance, lack of space in the arch, ect.

In a 12-year-old patient, we find absence of permanent canines and retention of deciduous canine. After a radiographic evaluation with opt x-ray, a dental inclusion of the 4.3 element with the crown inclined towards the apices of the lower incisors was revealed. CBCT was also performed for a correct planning of the intervention, of the localization of the dental elements and of the anatomical structures.

After local anesthesia we proceeded with the avulsion of the deciduous element (8.3), the execution of a full-thickness flap with mesial vertical incision at 4.1 to expose bony cortical and the crown of 4.3. Using an adhesive technique, an orthodontic button was placed on 4.3 to which a metal ligature was attached for traction in the arch, and finally, non-resorbable sutures were applied.

Results: after 8 months from surgery and subsequent orthodontic traction, the included canine was returned to the arch.

Conclusions: for a successful orthodontic surgical therapy of included canines, an early and accurate diagnosis made with clinical and radiological examinations such as OPT and CBCT radiographs and the evaluation of the predictive factors of dental eruption is essential.

CAD/CAM CUSTOMIZED AND ENGINEERED GBR SCAFFOLDS WITH AUTOLOGOUS STEM CELLS

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Aim: the goal of this work was to develop a CAD/CAM guided bone regeneration technique allowing the realization of customized, engineered scaffolds with autologous stem cells for the treatment of diffuse maxillary atrophy with a fully digital workflow.

Methods: starting from the acquisition of X-ray images by CBCT, the DICOM files was processed by a specific software able to realize 3D model files of the maxillary bone.

The STL file was processed with CAD software that allows the virtual reconstruction of the alveolar ridge and grants scaffold design to integrate specific anatomical shape in the most appropriate position. The 3D scaffold geometry was then imported into the CAM software for fabrication with a four-axis CNC milling machine. The material used for the scaffold consists of

BCP. Moreover, these scaffolds were engineered with periodontal ligament stem cells and growth factors to ensure an adequate supply of osteoprogenitor cells and promote the regeneration process.

Results: this tissue engineering protocol simplifies surgery, reduces intraoperative time, allows perfect adaptation of the scaffold and finally allows the seeding of autologous stem cells above and inside the scaffolds, which are the main responsible for true tissue regeneration.

Conclusions: nowadays, digital tools enable new alternatives for bone surgery planning. The possibility of modelling the bone graft in a suitable three-dimensional architecture and the ability to ensure an adequate supply of growth factors and osteoprogenitor cells in the surgical site are paramount goals.

GUIDED BONE REGENERATION IN POST-EXTRACTION SOCKETS WITH NANOSTRUCTURED HYDROXYAPATITE

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Aim: post-extractive socket preservation procedures aim to prevent alveolar ridge atrophy and maintain adequate dimensions of bone in order to facilitate implant placement. Here we report the clinical results of a guided bone regeneration strategy tackled with SpherHA, a biomimetic nanostructured hydroxyapatite, and Collygen, an absorbable collagen membrane.

Methods: 10 teeth had been extracted in patients between 26 and 66 years old. The sockets had been filled with either hydroxyapatite porous chips or mouldable crunch and then covered by a collagen membrane and sutures. After 3 and 6 months we controlled the bone healing measuring the bone height with personalized plastic masks, probing 5 different points for each tooth with a periodontal probe. We also evaluated the pain of the patients, using a NRS Scale (Numeric Rate Scale).

Results: a successful bone regeneration has been observed in all the patients treated. No adverse effects were observed. Mean post-operative pain after treatment at 15 days was 3.2 ± 1.1 . None of the patients reported pain at 3 and 6 months. Radiographs show proper bone healing; the measurement results show minimal resorption at 6 months, with maintenance of the initial bone volume.

Conclusions: the use of bone substitutes, such as SpherHA, contributes to a long-term maintenance of the bone structure, favoring the maintenance of an adequate bone volume useful for future implant placement. An artificial bone structure, based on hydroxyapatite, allows osteoblastic cells to use it as a scaffold for the formation of a new native bone structure; it is possible to observe a complete restitutio ad integrum after 6 months.

RADIOGRAPHIC AND HISTOMORPHOLOGIC EVALUATION OF THE MAXILLARY BONE AFTER CRESTAL MINI SINUS LIFT

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Aim: after tooth extraction, the alveolar bone loses over time volume in height and width, so that reconstructive procedures may be necessary to perform implant placement. In the maxilla, to increase the bone volume, a mini-invasive surgery such as sinus lift by crestal approach could be performed.

Methods: a crestal approach was used in this study to perform the sinus lift, fracturing the bone and putting collagens (condress®). The single dental implant was placed in the healed bone after six months.

Results: the newly formed bone after healing, was histologically analyzed. Histomorphological analyses confirmed the quality of the new bone formation even without graft biomaterials. This is probably due to the enlargement of the space, meaning more vascularization and stabilization of the coagulum.

Conclusions: using just collagen could be sufficient to have proper new bone formation in particular clinical situation and using a minimally invasive surgery to perform a sinus lift.

OUTPATIENT MEDICAL SURGICAL TREATMENT OF CUTANEOUS FISTULA: A CASE REPORT

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Aim: the aim is the management of a patient with persistent cutaneous fistula.

Methods: a 56 y/o man was referred for fistulized mandibular swelling present for over a month with fever. On the anamnesis: hypertension, III degrees obesity, active smoker and in therapy with Lopridam. The swelling did not regress following a double cycle of oral and IM antibiotic therapy. OPT shows a large periapical lesion on tooth 3.4 with an incongruous endodontic treatment with temporary filling. After antibiotic therapy element 3.4 is extracted. One month later, the fistulized skin swelling is still present concurrently with lymph node involvement. The CT shows disintegration of the spongiosa of the alveolar and basal process, from region 4.2, with continuous solution of the vestibular cortex, to region 3.4. CLL, respiratory

insufficiency with secondary polyglobulia are diagnosed following urgent haematological consultation. Later a surgical revision of the osteonecrotic area is performed. Before surgery, Betamethasone IM and Ketorolac IM are administered; a full thickness vestibular flap and isolation of the mental nerve is performed, granulation tissue is removed, Rifamycin is used. Periosteal releases were performed and flaps sutured. At 14 days the suture was removed.

Results: one month after outpatient surgery, the patient showed complete skin and intraoral healing.

Conclusions: it seems difficult to establish the nature of the mandibular osteonecrosis outbreak as there were no risk factors such as antiresorptive drugs or history of radiotherapy. Surgical sequestrectomy proved to be successful.

THE USE OF LASERS IN DENTISTRY: CYSTECTOMY IN COAGULOPATHIC PATIENTS

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Aim: about 250,000 patients in Italy are subjected to anticoagulant therapy and many of them require surgical treatment of the oral cavity. In order to promote haemostasis, anticoagulant therapy can be suspended, and the use of lasers is very important to promote coagulation in oral surgery, to have immediate haemostasis.

Methods: a cardiopathic patient with a previous heart attack and on anticoagulant therapy came to our observation. On the first visit he reported pain and the mobility of elements 4.3 and 4.5 was evident; radiologically in correspondence of the afore-said teeth there was a radiolucent lesion with clear limits. After careful evaluation with blood screening and cardiological consultation, the surgical treatment was performed using a strict

protocol. The patient had preoperative drug therapy with tranexamic acid, subsequently the teeth 4.3 - 4.5 were removed and the cystectomy was performed according to the Parstch II technique with lateral displacement of the mental nerve. During the operation, the bleeding status was checked using an 808 nm diode laser, then the tissues were sutured with Vicryl 5-0 and bio-styled, again using the laser.

Results: the patient had home drug therapy based on systemic antibiotics, anti-inflammatory drugs and topical chlorhexidine gel. No noteworthy postoperative complications were found.

Conclusions: the follow-up was carried out at 7, 15 and 30 days, or until the surgical site had completely healed and so the use of laser during the treatments was very important.

MAXILLOFACIAL UNUSUAL FOREIGN BODY: SURGICAL MANAGEMENT WITH THE AID OF 3DCT RECONSTRUCTION

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Aim: Foreign bodies (FB) in maxillofacial region are not frequently reported. Aetiology of this event could be traumatic, iatrogenic and self-harm injuries. Presence of FB is usually free from life-threatening risk but can cause functional disorders, pain, infection and discomfort. Surgical removal of FB could be challenging for proximity to important anatomic structures (IAS). Recent reports describe usefulness of radiologic 3D digital imaging for preoperative planning and intraoperative navigation for safe removal of FB.

Case report: a 82 y.o. male patient presented to DDOS for pain in the right mandibular posterior region and cheek associated with headache and cervicgia. A follow-up orthopantomography prescribed by private dentist occasionally revealed presence of FB in soft tissues of right buccal region. Reason

for its presence and its nature was unclear, patient reported surgical extraction of 4.8 years before (fracture of extraction tool?). A maxillofacial CT scan was performed and 3DCT reconstruction was obtained to assess exact position of FB. Surgical removal was safely obtained under local anesthesia. No perioperative complications were observed. Improvement of symptoms was reported.

Conclusions: FB in maxillofacial region are uncommon. No guidelines exist regarding their management. Radiologic 3D digital imaging is highly recommended for FB close to IAS to assess possibility and safety of surgical removal. In this case 3DCT reconstruction permitted to plan the best surgical approach to protect IAS during incision, dissection and removal of FB (parotid duct, buccal nerve, facial artery).

ORAL ULCERATION WITH BONE SEQUESTRATION ON TORUS PALATINUS: CASE REPORT

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Aim: this report is about a case of a 52-year-old female patient who had an ulceration with bone necrosis at the level of a palatine torus. The patient did not have any disease and did not take any drugs. The hypothesized cause was mechanical traumatism. The aim of this study was to report a case of oral ulceration with bone sequestration (OUBS) to raise awareness amongst dental clinicians.

Methods: the diagnosis of OUBS was made by clinical examination. The torus palatinus and the necrotic bone were surgically removed in general anesthesia. A histological examination was also performed to confirm the diagnosis.

Results: at the clinical follow-up the region was completely healed.

The histopathological examination confirmed the presence of compact bone with necrotic changes.

Thus, the final diagnosis was oral ulceration with bone sequestration on torus palatinus.

Conclusions: OUBS is a very distinct entity, today it is considered rare but it is probably underestimated because there are few studies in the literature that deal with this topic. It is therefore important that clinicians know this disease in order to diagnose and treat it correctly.

KERATOCYST SIMULATING PERIODONTAL LATERAL CYST IN PREMOLAR REGION: A CASE REPORT

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Aim: to highlight the attention on the differential diagnosis of lesions that can have unexpected location and can lead doubts on diagnosis, therapy, and follow-up and the leading role of biopsy.

Methods: a 34-year-old man presented to Department of Oral Surgery of the University of Naples Federico II, with a complaint of soft pain in the vestibular aspect of left mandibular second premolar and first molar region of two months duration. Vital teeth, no mucosal swelling, and no drainage were observed. The radiographic examination (CBCT) showed a well circumscribed hypodensity area extending between 35 and the apex of mesial root of 36. No displacement and no resorption of the roots. Upon clinical and radiographical examination, a provisional diagnosis of LPC was made, but a surgical treatment consisting of the enucleation

of the lesion and histological examination was planned. The lesion was removed and sent to the anatomic pathology laboratory.

Results: histologically a cystic wall partially lined by a keratinizing squamous epithelium was observed. The diagnosis of Odontogenic Keratocystic was done and follow-up was established every 6 months for the first 5 years and every year from 5 years upwards.

Conclusions: radiolucent lesions in the premolar and canine region are frequently clinically and radiographically misdiagnosed. The identification of keratocyst in a location preoperatively favouring a lateral periodontal cyst should be suspected and biopsy must be considered in all cases to establish the nature of the lesion, the best surgical treatment, and the follow-up appointments.

DENS INVAGINATUS IN RELATION TO A LARGE CYSTIC LESION: ENDO-SURGICAL MANAGEMENT

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Aim: this case report shows the endo-surgical treatment of a large radicular cystic lesion, due to a developmental dental anomaly.

Methods: the patient A.L. (24 y.o.) was referred to our oral surgery unit for a large first quadrant abscess. On physical examination the patient showed temperature and significant swelling from the element 1.2 to the element 1.6. Orthopantomography revealed a large cystic-like lesion. The periodontal probing of the elements and the pulp vitality tests were negative; there were not mobility of dental elements. The CBCT showed a large capsulated lesion engaging dental elements eroding the buccal bone wall, showing element 1.2 with an anatomical anomaly and presented 2 independent canals. We performed the root canal treatments of the elements from 1.2 to 1.6 with Protaper

Next and the obturation of canals with carrier-based system. The second canal of 1.2 with bigger apex was obturated with MTA. We conducted the treatment in narcosis with an intrasulcular flap from 1.1 to 1.7. We performed the radical cystectomy with piezosurgery and surgical endodontics of the 1.2.

Results: after 2 years of follow up the patient has no symptoms, presents complete mucosal healing and good radiological healing. The result of histological examination is compatible with a radicular cyst.

Conclusions: dental elements that present anomalies require continuous monitoring, because they are more involved in the formation of cystic lesion. The multidisciplinary approach and a correct diagnosis are fundamental for a correct surgical planning.

ANATOMIC VARIANT OF THE EXTERNAL CAROTID ARTERY (ECA) ORIGIN: A CASE REPORT

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Aim: the aim of this study is to highlight a variation of external carotid artery (ECA), occasionally observed during an anatomical dissection for teaching purposes.

Methods: at the ICLO research and teaching centre in Verona (Italy), Professor A. Cicconetti *et al.* have performed 50 dissections on head-neck fresh-frozen samples of corpses between 43 and 75 years old, of which 38 men and 12 women. ECA course was followed as identification guide of the main anatomical structures, and, for teaching purposes, to reach the oral cavity through its branches.

Results: in 50 anatomic dissections it was reported the presence of a specific anatomic variant, that can be defined as: a

single emergency section from which three collateral branches depart, that are including the lingual artery, facial artery and internal maxillary artery.

Conclusions: anatomical expertise is essential in oral surgery; however, the existence of anatomic variants requires the adoption of a specific surgery technique which aims to identify the main anatomic landmarks for the realization of specific surgeries.

Furthermore, it was possible to verify how the executed anatomic dissection for teaching purposes may be useful of the oral surgeon in achieving the right awareness of the deep areas directly connected to the oral cavity.

ASSESSMENT OF BILATERAL SINUS LIFT GRAFT VASCULARIZATION BY MAGNETIC RESONANCE IMAGING

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Aim: the purpose of this work is to evaluate angiogenesis in grafting biomaterials with or without the addition of platelet-rich fibrin (PRF) by means of contrast-enhanced magnetic resonance imaging (CE-MRI).

Methods: bilateral sinus augmentation surgery was performed in a patient of 50 years old with severe maxilla atrophy. The left sinus was grafted only with Bio-Oss®, while in the right sinus Bio-Oss® with the addition of PRF was applied. CE-MRI was performed before the surgery (T0), 11, 25, 53, and 104 days after surgery. Analysis were performed with STIR and conventional TSE T1 weighted sequences. Subsequently, dynamic scans and SPIR sequences after the endovascular injection of a contrast agent were used. Images were examined to evaluate angiogenesis by the enhancement of the contrast agent in the two different grafts.

Results: after 11 days an equivalent peripheral enhancement was visible in both grafting sites.

At 25, 53 and 104 days a circumferential peripheral enhancement was visible, while it was not in the central area of the left sinus graft.

The right side showed a wider enhancement of the whole graft starting from 25 days, growing progressively in all successive analysis, and becoming massive at 104 days.

Conclusions: CE-MRI offers quantitative parameters to evaluate vascularization of biomaterials. This case report showed that vascularization progressively increased centripetally around Bio-oss® graft, whereas appeared to be more uniform and well represented in Bio-oss® with the addition of PRF.

Further studies are needed to confirm this different trend.

HISTOMORPHOMETRIC ANALYSIS OF NEW BONE FORMATION AFTER BILATERAL SINUS LIFT: A CASE REPORT

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Aim: the aim of this case report was to compare new bone formation in grafting biomaterials with or without the addition of platelet-rich fibrin (PRF) by means of histomorphometric analysis.

Methods: bilateral sinus augmentation surgery was performed in a patient of 50 years old with severe maxilla atrophy. Graft in left sinus was performed only with Bio-Oss®, meanwhile in right sinus Bio-Oss® with the addition of PRF was applied. After 6 months, before dental implants insertion, cylindrical bone biopsies were developed in both grafting sites (T = 0). The bone obtained was prepared with the Schenk method and analyzed quantitatively with a computer software. In the samples were marked and distinguished: old bone, newly formed bone, Bio-oss® and connective tissue/bone marrow. After 10

years, before implants insertion, control bone biopsies were performed and analyzed with the identical procedures (T = 1).

Results: at T = 0 no quantitative differences were observed in new bone and residual biomaterial in both sites. New bone formation was only peripheral in the left sinus, whereas it developed both peripherally and through biomaterial in the right sinus. At T = 1 a similar new bone formation was found, however in left sinus Bio-oss® particles were still present, while in right sinus they were not.

Conclusions: this case report showed that the adjunct of PRF led to a more homogeneous new bone formation and helped to complete long term biotransformation of biomaterial. Further studies are needed with a wider sample dimension to evaluate this phenomenon.

COMPOUND ODONTOMA ASSOCIATED WITH IMPACTED MAXILLARY CANINE: A CASE REPORT

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Aim: odontomas are benign odontogenic tumors formed from fully differentiated epithelial and mesenchymal cells. Usually asymptomatic, their presence is often revealed on routine radiographs. According to their structure, they are divided into compound and complex. The aim of this study was to report a case of compound odontoma in the anterior maxilla of a 13yo boy which was causing the impaction of the right maxillary canine.

Methods: patient medical history excluded trauma, infection and family history of odontoma. Extraoral examination revealed no facial asymmetry. Intraoral clinical examination revealed a stage of permanent dentition with the absence of the right maxillary canine, 13. An orthopantomography was performed to investigate the cause of uneruption, revealing a radiopaque

well-defined mass above the crown of 13. A cone beam computed tomography of the upper jaw confirmed the presence of an amorphous mass surrounded by a radiolucent envelope, measuring 6,9 x 8,1mm. The treatment consisted of surgical removal of the odontoma under local anesthesia.

Results: the post-operative periapical radiograph showed the complete surgical removal of the mass. Due to the incomplete development of the root of element 13, a spontaneous eruption may occur, otherwise orthodontic traction will be required.

Conclusions: clinical experience and literature suggest that a radiographic examination should be performed for any pediatric patient with delayed tooth eruption. Early diagnosis and appropriate treatment ensure better prognosis, increasing the possibility of preserving the impacted teeth.

RETROMOLAR CANAL AND FORAMEN: A CASE REPORT

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Aim: the retroMolar canal (RMC) and foramen (RMF) represent rare anatomical variations located in the retromolar area of the mandible, behind the third molar tooth. This case report highlights the clinical importance of these structures because of their involvement in several surgical procedures such as lower third molar extractions.

Methods: a 28-year-old female patient with impacted third molar presented to our department. A thorough preoperative investigation was performed, where both OPTG and CBCT were examined. The patient was treated with a standard surgical protocol. The presence of the anatomical variable of the RMC was detected intraoperatively.

Results: anatomical knowledge of RMC and its intraoperative isolation allowed the successful outcome of surgery without

complications. The frequency of retromolar canal commonly reported in bilateral CBCT studies ranges from 5.0 to 16% per side and from 8.5 to 28.1% per patient. Conventional two-dimensional radiographs such as OPTGs have been shown to be insufficient to detect the presence of RMC, whereas sectional imaging, such as Computed Tomography (CT) and Cone-Beam CT (CBCT), has been reported to be superior for its identification.

Conclusions: RMC and RMF have great importance in the clinical practice due to prevalence of the pathological processes and complications related to retromolar area. Since their incidence is extremely variable, with any suspected alteration in the mandibular canal, it is recommended to always perform an accurate pre-operative investigation such as CBCT to prevent any possible complication.

SURGICAL ASPORTATION OF AN AMELOBLASTIC FIBROMA: A 2-YEAR FOLLOW-UP CASE REPORT

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Aim: this work has the aim of presenting a case of ameloblastic fibroma and its successful removal and recovery in a pediatric patient, with 2-year follow-up.

Methods: a 7-year-old patient presented with an Orthopantomography performed for asymmetrical dentition with a significant delay in the eruption of tooth 4.6 compared to the contralateral one. It showed a radiolucent lesion with clear margins distally to 8.5, element 4.6 was impacted and hindered in its eruption. Absence of 4.5 and delay in germ formation of 4.7 compared to contralateral were also observed. Simple surgical excision of the lesion was performed under general anesthesia, in order to avoid traumas to 4.6 and allow its spontaneous eruption.

Results: the histological examination confirmed the diagnosis of ameloblastic fibroma.

During the clinical check-ups a correct healing was evaluated, and the radiographical follow-up at 1 and 2 years showed complete re-ossification of the area with no relapses, and progressive spontaneous eruption of 4.6

Conclusions: within the limits of this work, early diagnosis and tempestive intervention appear to be resolute in the management of this kind of lesions. As confirmed by Literature data and the results of this case report, the complete surgical asportation of the tumor with a conservative approach is the best treatment in order to avoid relapses and to permit physiological healing.

COMBINED ENT AND ORAL SURGERY APPROACH IN A CASE OF POST-GRAFT MAXILLARY SINUSITIS

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Aim: the aim of this work is to present a case of combined ENT and oral surgery, for the resolution of a maxillary sinusitis caused by a biomaterial graft used for a sinus lift and GBR.

Methods: a 66-year-old female patient presented in emergency for an abscess with intra-oral fistula, following a sinus lift and GBR made 1 month before in a private clinic abroad. Radiographic exams, OPT and CT scan, showed congestion and presence of material in the right maxillary sinus. The patient was referred to the ENT department where complete obliteration of the cavity on an inflammatory basis and polypoid hypertrophy of the mucosa were diagnosed. FESS surgery and removal of the residual infected graft via transoral access were planned: the patient was operated un-

der general anesthesia and orotracheal intubation. Endoscopic approach from the osteo-meatal complex was performed by the ENT surgeons, then transoral access to the right maxillary sinus was executed by oral surgeons, with complete removal of infected graft and granulation tissue.

Results: at post-operative check-ups the patient showed a good healing process and over-infections were excluded.

Conclusions: as exemplified by the presented case, poorly planned and/or badly executed surgery can lead to severe complications requiring then a multidisciplinary approach. It is mandatory for the surgeons to project scrupulously the procedure. Patients must look for serious clinics with high surgical standards and respect the post-operative instructions and follow-ups.

STABILITY OF TISSUES: KEY TO SUCCESS IN PATIENTS WITH SERIOUS SYSTEMIC DISEASES

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Aim: this study was aimed at demonstrating the success of bone regeneration, using autologous bone, in adult patients with severe suppression of the immune system. Following an appropriate antibiotic prophylaxis, autologous bone was taken from the mandibular branch and this graft was then positioned and fixed at the recipient site by means of osteosynthesis screws in the same surgical session. After 4 months, the reopening of this receiving site was carried out to remove the osteosynthesis screws and proceed to the insertion of titanium implants.

Methods: were considered 101 patients, 6 of them have presented common parameters such as: organ transplantation without systemic complications, cyclosporine intake, need for

extraction of at least one dental element and no more than 3 contiguous teeth to each other with need of subsequent regeneration for implant purposes. These patients were matched 6 healthy control patients.

Results: healing checks showed that post-operative complications are the same for test patients as for control patients. No overinfections or exposure of the graft occurred and after 10 months oral function was fully recovered in all patients.

Conclusions: this study confirms the effectiveness of bone regeneration in healthy patients and opens an important reflection on the use of autologous bone as a grafting material in patients with severe impairments of the immune system.

USE OF THE ORTHODONTIC MICROSURGERY TECHNIQUE FOR THE TREATMENT OF DENTAL ANKYLOSIS

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Aim: the purpose of this study is to evaluate the efficacy of microsurgery as a treatment alternative for dental ankylosis.

Methods: a male patient comes to observation with ankylosis of three mandibular elements. An orthodontic-surgical treatment is decided upon. In light of the patient's lack of compliance, surgery was performed under general anesthesia with nasal endotracheal intubation.

The Piezosurgery Medical II piezoelectric device with the following settings was used: cutting power, bone 1; pump level for irrigation solution 4; saline at 20°C for irrigation. After performing a full-thickness flap on the vestibular side with a paramarginal incision, vertical and horizontal corticotomies, approximately 2 mm deep, were performed on the vestibular side using OT7 and OT8 inserts; the corticotomy design was modified according to the root anatomy and bone type.

Control endoral radiographs were taken the day after surgery. Cortical bone dislocation and ligament distraction were performed

with multibracket devices consisting of nickel-titanium brackets (0.21 x 0.25 inch), bands, and orthodontic wires (21 x 25 inch). Intense biomechanical force was applied prior to surgery.

Results: the postoperative course did not present particular complications. It was favorable, there weren't infections, wound dehiscences and bleeding. The desired tooth movement was achieved in about 60 days. After the surgery, a slight edema of the soft tissues of the face was noticeable, in particular in the area of the mandible subjected to corticotomy; however, there weren't signs of inflammation of the surrounding oral tissues or bruising. Periodontal tissues were respected, radiographs and periodontal examination showed that corticotomy techniques didn't damage these tissues significantly.

Conclusions: microsurgery has proven to be a painless, safe, fast technique associated with minimal morbidity. For these reasons, it may find application in the treatment of ankylosed teeth in adult patients.

GUIDED IMPLANT SURGERY IN PATIENT WITH FFF AFTER PARTIAL MANDIBULECTOMY: A CASE REPORT

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Aim: Free Fibula Flap (FFF) is nowadays the gold standard for reconstruction after partial mandibulectomy. Prosthetic-implant rehabilitation represents a challenge for the clinician. Digital planning of the surgery allows to better understand the anatomy distorted by cancer ablation as well as reducing surgical times and patient discomfort. The clinical case consists of a two stages implant placement in a FFF in a patient with history of oral SCC of retromolar trigone subjected to radio-chemo adjuvant therapy.

Methods: the patient came to our attention 6 years after the mandible reconstruction requesting rehabilitation of the right site. Followed the execution of an intraoral clinical examination, complete-arch impression with 3D scanner and finally the execution of a CBCT. Then STL files were matched with the DI-

COM files and surgical planning was executed using a dedicated software. Finally, a mixed-support surgical guide was printed allowing the insertion of 3 implants in 4.4, 4.5 and 4.6 sites inside the fibula graft.

Results: following a precautionary protocol, after 6 months the healing screws were placed and a further time of 1 month was necessary to obtain complete healing of the mucosa; in 3 months prosthetic phase and digital impressions were scheduled.

Conclusions: implant-prosthetic rehabilitation in patients who underwent mandibular resection, consequent FFF and adjuvant therapy is tricky. In this context, digital features as 3D scanners and software for computer-guided surgery allows for more predictable results.

DIGITALIZATION OF IMPLANT-PROSTHETIC REHABILITATION IN NOSE CANCER: A CASE REPORT

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Aim: the digitalization of the rehabilitation processes of nasal epitheses allows to create a prosthesis relying on patient's original anatomy and to shorten reconstruction times for an early social reintegration. The clinical case consists of the construction of a nasal epithesis supported by dental implants in an oncologic patient undergoing a total rhinectomy.

Methods: the prosthetic planning started with a pre-surgical phase in which the patient's nose anatomy was recorded using a 3D scanner and photographic documentation. Then a computer-aid surgical planning made on the CBCT allowed to select the best sites for implant placement in proximity of the nasal pyramid. During the surgical phase, right after the total rhinectomy performed by ENTs, three implants were placed in

the anterior surface of the maxilla: two implants in the right and left alveolar processes and the last one in the right body nearby the piriform aperture. Three months after the end of the radiation therapy (RT, up to 18 Gy was delivered in fractions of 2 Gy over nine days), the prosthetic phase was planned

Results: five months after surgery the defect was restored delivering a nasal epithesis: the internal structure consisted of a CrCo bar screwed to the three maxillary implants and a silicone super-structure designed based on the digital nose file.

Conclusions: the application of the digital prosthetic workflow treating cancer patients seems to have an important role in the development of a customized prosthetic reconstruction, shortening rehabilitation after cancer resection and RT.

MEDICATION-RELATED OSTEONECROSIS OF THE JAW IN A PATIENT AFFECTED BY KIDNEY CANCER

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Aim: the aim of this case report is to highlight the possible correlation between sunitinib, which is a receptor tyrosine kinase inhibitor and chemotherapeutic agent used for the treatment of renal cell carcinoma (RCC), and medication-related osteonecrosis of the jaw.

Methods: a 65 y.o. male was referred to the dental clinic of the hospital of Rho with exposed bone in the fourth quadrant of the mandible, around the right first lower molar implant. He was undergoing treatment with sunitinib for RCC. He had no history of radiotherapy of the head and neck region nor treatment with bisphosphonates. Following the removal of necro-

tic bone tissue, a biopsy was carried out, along with the removal of the implant.

Results: the histopathology results revealed necrotic bone tissue and no signs of neoplasia. At 1 week, 2 weeks and 1 month follow up controls the healing on the extraction site proved to be good, no signs of necrosis. In accordance with the oncologist sunitinib was replaced by nivolumab.

Conclusions: this care report shows that cooperation between oncologists and dentists is essential, particularly before the start of this kind of therapies in order to prevent medication related complications.

DENTIGEROUS CYST AROUND A BUCCOLINGUALLY IMPACTED LOWER THIRD MOLAR

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Aim: we detailed the surgical approach to a case of buccoverted impaction of a lower third molar and associated dentigerous cyst in an adult patient.

Methods: a 53-year-old male presented to our unit on referral from his dentist, who first noticed a mandibular radiolucency in tandem with the crown of an impacted third molar upon routine OPT. For further investigation, a CBCT scan was taken of the left inferior jaw showing a defined area of osteolysis and deep impaction of 38 inclined in a buccolingual fashion with its roots projecting across the lingual bone plate. Due to the position of the tooth, its surgical removal was scheduled to be performed under general anesthesia

Results: access to the lesion and tooth was achieved via the reflection of a full-thickness flap on the buccal aspect of the posterior mandible; soft tissues on the lingual side were additionally reflected to place a spatula retractor for protection. A bony window was made to expose 38 and dissect it from its roots: two fragments were pulled out separately by an elevator. Thus the concomitant cystic lesion could be enucleated and was sent for histopathological examination, which was consistent with dentigerous cyst.

Conclusions: this case report dealt with clinical management of buccoverversion of a lower third molar in association with an odontogenic cyst, which were successfully removed in a minimally invasive technique.

DIODE LASER GINGIVECTOMY IN A PATIENT AFFECTED BY TUBEROUS SCLEROSIS

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Aim: tuberous sclerosis complex (TSC) is a rare autosomal-dominant genetic disease characterized by the presence of hamartomas in multiple organs, especially the skin and the central nervous system. Oral manifestations such as gingival enlargement and dental enamel pitting are reported. The aim of this case report was to show benefits of laser-guided excision mostly in patient with scarce compliance.

Methods: a female 33-year-old patient affected by TSC presented to the section of Oral Medicine of University of Bari Aldo Moro complaining diffuse gingival enlargement. She had the typical TSC's triad (cognitive delay, facial spot, and epilepsy). She underwent CBC, EKG, dental hygiene. Due to her lack of compliance, the patient was set to receive treatment under general anesthesia and it was not possible to perform x-ray.

Mepivacaine hydrochloride 2% was employed for local anesthesia, and diode laser set at 7 W/cm² with continuous wave was used to remove the enlarged gingiva. The excised tissue was submitted for the histopathological exam. No suture was required. Post-surgery antibiotic and analgesic therapy was prescribed.

Results: the follow up visit was established at 1 week, 3 weeks, and each month for 3 months and the patient did not present any recurrence nor complication. The histological exam reported a diagnosis of angio-fibromatosis.

Conclusions: the diode laser represents a quick and feasible tool to treat gingival enlargement with good post-operative outcomes, particularly useful in lacking compliance patient, unable to perform an adequate after surgery care.

ORTHO-SURGICAL MANAGEMENT OF AN UPPER CENTRAL INCISOR RETAINED BY SUPERNUMERARY TOOTH

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Aim: an orthodontic and surgical treatment was performed to restore correct masticatory and aesthetic function in a 10-year-old patient with 1.1 retention.

Methods: during the intraoral examination we observed a right deviation of the upper interincisal line and lack of space in the arch due to the medial dislocation of 1.2 and 2.1. The retention of 1.1 is also due to the presence of an included supernumerary tooth, in a horizontal position, which blocked its eruption. The first phase of the treatment involved opening the space in 1.1 region using the straight-wire technique, subsequently the extraction of the supernumerary, followed by the traction of the retained tooth.

Results: after opening the space in 1.1 region and the extraction of the supernumerary, the central incisor restarted its eruptive path. 6 months after extraction, we did the orthodontic traction of 1.1 to reach the correct position in the arch, finalizing the orthodontic treatment to correct the malocclusion and restore the patient's aesthetics.

Conclusions: supernumerary teeth can be in any region of the oral cavity hindering the dental exchange and complicating orthodontic treatment. The collaboration between surgeon and orthodontist is essential for a joint treatment plan suitable for restoring the patient's aesthetics and function.

ENUCLEATION OF MAXILLARY OSTEOLYTIC LESION WITH PRESERVATION OF LE FORT PILLARS

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Aim: the aim of this case report is to show the surgical procedures for the enucleation of an extensive osteolytic lesion set in the second and third sextants, drawing attention to the preservation of the anterior maxillary pillar, which is the structure with the highest resistance to loads together with the zygomatic and the pterygoid maxillary pillars. This was made possible thanks to the use of a minimally-invasive approach.

Methods: a cone-beam computed tomography has been prescribed with the aims of evaluating the extent of the osteolytic lesion and planning the surgery in an atraumatic way. Apicectomy of the involved teeth has been performed simultaneously with the surgical excision. Histopathological evaluation was later requested to confirm the nature of the lesion.

Results: based on clinical, radiographic and histopathological findings, a final diagnosis of "radicular odontogenous cyst" was made, presenting a major axis of 2,5 cm.

The postoperative course was uncomplicated, with no pain and no swelling at 1 and 4 weeks of follow-up.

There was a good wound healing process by primary intention with no dental mobility or flap dehiscence.

Conclusions: this case report shows the importance of pre-surgical planning, based on clinical and instrumental tests, for a minimally invasive approach.

This allows maintenance of the supporting bone structures also in surgical excision of large-scale lesions affecting multiple teeth.

LATERAL AND CORONAL ADVANCED FLAP FOR THE TREATMENT OF A SINGLE RECESSION: A CASE REPORT

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Aim: the purpose of this case is to correct a single unaesthetic recession using the laterally and coronally advanced flap technique. This approach is indicated in the treatment of isolated recession involving the lower incisors or the mesial root of the upper molars, where the local anatomical conditions do not allow the execution of the coronal displaced flap.

Methods: a 47-year-old woman presented to our attention complaining of marked symptomatology to thermal stimuli and aesthetic problems due to a single recession on element 3.1. Treatment starts with the performance of professional oral

hygiene and instruction on effective, non-traumatic brushing technique, followed by mucogingival surgery using a displaced lateral and coronal flap.

Results: the follow-up at 3,6,9 months shows complete root coverage of exposed root and its maintenance over this time with functional and aesthetic improvements.

Conclusions: laterally and coronally advanced flap can be considered a valid option to cover the root of a single recession in presence of anatomical local conditions that don't allow to perform the coronally advanced flap.

A SECOND CHANCE: TOOTH GERM AUTOTRASPLANTATION CASE REPORT WITH 24 MONTHS OF FOLLOW-UP

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Aim: autotransplantation of third immature molars could be an alternative to fill edentulous space in younger subjects and it can offer many advantages, including normally functioning periodontium, preservation of pulp vitality and a complete root formation. This Case Report describes a successful case autotransplantation open-apex mandibular and third molar in place of the hopeless first mandibular molar in a growing patient.

Methods: the clinical case reported in this study is an 18-years-old male subject presenting a severe cavity in the element 4.6 and a germ of 1.8. Diagnosis was obtained by clinical and radiographic examination. After local anesthesia, the treatment was divided into a first phase with the extraction of the element 4.6, a second phase with the extraction of the element

1.8 and a third phase with the transplantation of the element 1.8 in the site of 4.6, which had to be modified by a slight alveoloplasty. A provisional fixation to the adjacent tooth was made with flow composite to ensure the engagement of the tooth.

Results: after 36 months of follow-up the wisdom tooth showed physiologic mobility, absence of infection and ankylosis, positive pulp vitality test, and the periodontal integration was fully formed. The radiographic examinations confirmed a remarkable radicular edification.

Conclusions: the success of this case can be attributed to germ incomplete root formation and its potential growth. Furthermore, the open apex of the donor tooth and the surgical atraumatic technique have been critical to long-term success.

CHRONIC SINUSITIS TREATED WITH HEMODERIVATIVES AND SINUS LIFT SURGERY: 18 MONTHS FOLLOW-UP

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Aim: chronical sinusitis is a multifactorial disease, often derived by an odontogenic cause. Here is a case of healed rhinosinusitis after a sinus-lift performed with piezo-surgery and aided by using Plasma Rich Fibrin (PRF). In the same surgical time an implant was positioned to rehabilitate edentulous lacuna.

Methods: was included into this study a 61 year old female patient, with a good oral hygiene and no-smoker. She reported a rhinosinusitis diagnosis, made by otolaryngologist which gives her a medical therapy which relieved symptoms but not eliminate the cause, that may be individuated in a previous attempt of sinus lift without implant positioning. Radiological images as Rx OPT and Cone Beam Computerized Tomography (CBCT) were obtained to a pre-surgical planning. After collecting informed consent, sinus lift was performed

with piezosurgery. Bone graft with heterologous bovine substitutes and autologous bone was used to permit following prosthetic rehabilitation. PRF was used in addition to bone graft to improve handling and regenerative process. Finally, was placed an implant. Follow up visits were conducted at 3, 6, 9, 12 and 18 months.

Results: follow up visits, helped by a CBCT performed at 6 months show formation of mature bone, in correspondence of sinus lift, with an average bone density of 32% around implant. Furthermore, there was complete restitutio ad integrum of chronical sinusitis, with disappearing of symptoms.

Conclusions: a well-performed sinus lift, aided by PRF could be a treatment of chronic sinusitis, besides improve prosthetic rehabilitation.

A CASE OF EXTRACTION OF AN INTRABONY MIGRATING IMPACTED MANDIBULAR THIRD MOLAR

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Aim: the purpose of this work is to present the extraction by piezoelectric technology of a lower third molar migrated in the direction of the mandibular angle, following a prior unsuccessful extraction procedure, evaluating the possible causes responsible for the intrabony migration.

Methods: a 49-year-old male patient in good health was referred to us after an unsuccessful attempt to extract the impacted 3.8 element.

Orthopantomography and CBCT showed deep impaction in the mandibular angle and proximity to the nerve.

For these reasons he was operated under general anesthesia using piezoelectric devices.

Results: the histological examination reported the presence of

fibro-connective tissue with inflammatory infiltrate, not referable to a cystic lesion. Since the patient presented after an unsuccessful attempt of extraction of the element, an in-depth analysis of the literature regarding the possibility of iatrogenic dislocation was performed. However, there are no data about iatrogenic displacement within the bone.

Conclusions: intraosseous migration of an impacted tooth is a rare event that may recognize several causes: one of these could be represented by inflammation, although the mechanism through which it is made remains unknown. A proper anamnesis, a constant follow-up and accurate surgical planning and technique are therefore fundamental, in order to reduce the risk of complications.

SURGICAL MANAGEMENT OF ODONTOGENIC MYXOMA

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Aim: Odontogenic myxoma (OM) is a rare, locally invasive, not encapsulated, benign neoplasm of mesenchymal and/or ectomesenchymal origin. The present describes the surgical management of a central OM.

Methods: a 28-year-old woman was referred for a painless swelling with progressive expansion. On clinical examination, the lesion extended from 23 to 27 site and had a soft-elastic consistency. Elements 25 and 27 presented a II degree mobility. The OPT and CT examinations revealed a large neoformation involving the left hemimaxilla and the ipsilateral sinus in its entirety, and root resorption of 27 and 28. A punch-biopsy revealed a sub-epithelial myxoid mesenchymal proliferation thus the intervention was planned.

Results: following local anesthesia, a partial thickness flap was

performed from 21 to the maxillary tuberosity. A palatal flap was performed to evaluate the noninvolvement of the homolateral cortex. The lesion was isolated and *en bloc* resection was performed with the consequent loss elements from 24 to 28. The flap was repositioned by a silk mattress suture to close the bone defect. The histological examination showed a mesenchymal proliferation, with abundant myxoid stroma composed of cells in fascicular architecture. Segments of mature bone tissue and rare intra and perilesional fibrotic shoots were observed. The preoperative diagnosis of OM was confirmed.

Conclusions: 18 months after surgery, the patient showed excellent clinical and radiographic recovery. Considering the rate of recurrence of OM, *en bloc* resection appears to be a definitive treatment option.

ADIPOSE TISSUE NEOFORMATIONS: 2 RARE CASES OF ORAL LOCALIZATION

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Aim: oral lipomas are benign neoplasms arising from adipose tissue. They are common body subcutaneous neoplasms but the oral involvement is uncommon. Rarely lipomas can hide liposarcomas, so the lesion's examination is mandatory. The aim of this case series is to show 2 cases of oral lipoma with different clinical appearance.

Methods: in 2021, 2 male patients were referred to the Complex Operating Unit of Oral pathology and Surgery, University of Bari Aldo Moro, complaining oral discomfort for oral space-occupying lesions. The examination revealed a soft texture lesion on the left cheek mucosa in the first patient, maybe of Bichat's fat pad origin, and on the lower left lip in the second patient, likely of "ex vacuo" origin. An intraoral high-definition ultrasound scan was performed to confirm the clinical suspi-

cious of adipose tissue neoplasms. First patient underwent general anesthesia because the lesion was deeper and close to vital structures, the second patient only a conscious sedation. The lesion enucleation revealed a racemose, multi-lobed and poorly cleavable lesion in the first case, and an encapsulated, uni-lobed and well demarked lesion in the second patient.

Results: in both cases a histological diagnosis of lipoma was achieved, despite the strange clinical aspect of the first lesion. 3 months follow-up revealed no signs of recurrence in any case.

Conclusions: oral lipomas are uncommon benign neoplasm. Even if rare, dental surgeon should deal with this kind of lesions and a histological evaluation of the specimen is mandatory. In the diagnostic phase oral ultrasonography plays an important role.

IMPLANT REHABILITATION IN PATIENTS WITH ECTODERMAL DYSPLASIA

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Aim: Ectodermal Dysplasia (ED) denotes a heterogeneous group of genetic diseases characterized by congenital defects in ectodermal structures such as hair, teeth, nails and sebaceous glands. The main manifestations of the oral cavity include dental anomalies in numbers (hypodontia, anodontia) or tooth malformations with conic or knife blade shape. This report describes the fixed prosthetic rehabilitation in children with ectodermal dysplasia.

Methods: two male children aged ten and eleven years were affected by ED. Conoid incisors teeth, premolars and first molar were present in the upper jaw of the patients. In the lower arch, however, only the permanent canines were present with-

out the presence of dental buds from other teeth. They were treated with a fixed prosthetic rehabilitation. In lower arch, an overdenture was designed after placement of three tapered implants (3,8 x 10mm).

Results: at three-years of follow-up, implants had no clinical or radiographic negative signs. An adequate vertical height was maintained. The overdenture was well accepted by the patients who reported excellent improvements in masticatory function and aesthetics.

Conclusions: in children with ED, the oral rehabilitation with fixed prosthesis can be considered a valid therapeutic alternative to removable prostheses even in pediatric patients.

LASER BIOSTIMULATION IN IMPLANT DENTISTRY AND ASSESSMENT OF ITS RELIABILITY

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Aim: Low level laser therapy (LLLT) is based on the principle that photons produced by low power laser stimulating chromophores involved in Krebs Cycle such as NAD and FAD enzymes, improve ATP production enhancing mitosis, and reducing the time of healing for the injured tissues.

Methods: we reported the application of LLLT as aid in the osseointegration in two patients undergone to implant surgery in the upper jaw. In one hemi-arch the LLLT was applied and the other one was used as control. A Nd-Yag laser was used (length wave 1024 nm), fixing power at 1.00 W, energy at 100 mJ, and time at 60''. An optical fiber of 600 lm was used, so as to apply it in the fornix at the T0, the 3rd, the 5th and the 7th day from the intervention.

Results: the assessment of the bone area surrounding the fixtures was performed by means of cone beam computed tomography at 4th month follow-up and the area of bone-implants contact was measured by means of InVesalius® software. It was possible to notice that the bone formed around the fixtures was better for quality and quantity than that one in the other untreated side.

Conclusions: the photobiostimulation medicine represents a very promising therapeutic option to speed the bone healing after oral surgery procedures, including the implant placement. However, the strength of its reliability must be further investigated together with an established protocol.

SURGICAL EXTRACTION OF AN IMPACTED THIRD MOLAR: CASE REPORT

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Aim: impacted third molar extraction is a commonly surgical procedure performed in oral surgery. Due to the lack of space their eruption often results in disodontiasis. After an accurate analysis with scientific literature on the topic, the aim of this case report is to present the extraction of a distally inclined element 3.8 in total bone inclusion.

Methods: a 66-year-old female patient came to the Dentistry Department of San Raffaele Hospital for neuralgic symptoms related to the III quadrant. The patient reports a past episode of gingival abscess with pus discharge, which spontaneously regressed. Anamnesis, evaluation of the case, OPT and Cone Beam are accomplished. Element 3.8 in total bone inclusion is

close to NAI. Under local anesthesia and sedation, a full-thickness triangular flap with marginal incision and mesial release incision is carried out. Dislocation, coronotomy and extraction are then performed. After the revision of the cavity and the insertion of absorbable haemostatic sponges into the surgical neo-cavity stitches are applied to close the wound.

Results: element 3.8 in total bone inclusion is successfully extracted, respecting the anatomy and noble structures. Neuralgic symptoms are no longer reported by the patient.

Conclusions: the extraction of the mandibular impacted third molars is more predictable and avoids complications if supported by a careful Cone Beam evaluation.

COMPUTER-GUIDED OSTEOTOMY IN IMMEDIATELY LOADED FULL-ARCH REHABILITATION: A CASE REPORT

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Aim: osteotomy is a procedure requiring precise indications in the context of immediate loaded full arch rehabilitation. Despite the digitalization of the process, it is difficult to be able to program the prosthesis before surgery. This case report presents a possible treatment protocol in immediate loaded cases with large osteotomy using a fully digital approach.

Methods: the osteotomy, implants placement and delivery of the provisional prosthesis were performed in the same surgery. It was possible to place the implants with a surgical guide, despite the osteotomy, as the landmarks were identified in CBCT by means of stabilization pins coinciding with those of

the osteotomy guide. After 4 months, smile design, metal bar and its passivation, assembly of the teeth and delivery of the final prosthesis were obtained during four sessions.

Results: the completely digital protocol presented made it possible to plan and complete the osteotomy, the placement of the implants and the delivery of the temporary prosthesis in the same session as the extractions.

Conclusions: the digital planning, not only of the implant placement, but also of the osteotomy, allows an optimization of surgery time and comfort in immediate loaded full arch rehabilitations.

TEMPERATURE'S INFLUENCE ON WEIGHT LOSS OF RESTORATIVE MATERIALS EXPOSED TO ACID BEVERAGES

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Aim: consumption of acidic beverages and foods could provoke an erosive damage both for teeth and for restorative materials. Temperatures of consumption could influence the erosive effects of these products. The aim of this *in vitro* study is to assess the influence of an acidic challenge on the weight loss of different restorative materials.

Methods: resin composites and Glass-Ionomer Cements (GIC) were tested. The medium storage was Coca-Cola (Coca-Cola, Coca-Cola Company, Milano, Italy) at two different temperatures, 4°C and 37°C, respectively for Group A and Group B. After 7 days, weight was assessed for each sample and the percentage weight loss was calculated.

Results: for all the composite resins (Groups 1-13), no significant weight losses have been noticed (< 1%). Conversely, GIC (Groups 14 and 15) showed a significant weight loss during the acidic challenge, which was reduced in case of those materials including a protective layer applied above. Significant differences were registered with intra-group analysis; weight loss for specimens immersed in Coca Cola at 37°C was significantly higher for almost all materials tested when compared to specimens exposed to cooler medium.

Conclusions: in conclusion, all the composite resins showed a reliable behaviour when exposed to acidic erosion, whereas glass-ionomers cements generally tended to solubilize.

MECHANICAL PROPERTIES OF A NOVEL GRAPHENE-BASED MATERIAL FOR DENTAL RESTORATIONS

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Aim: recently, graphene has attracted both academic and industrial interest because it showed to enhance mechanical, physical and chemical properties of biomaterials. This work aimed at comparing the mechanical properties of a novel graphene-based material and a conventional and commercially available nanohybrid resin-based dental composite, used as control.

Methods: the composites were subjected to the following mechanical tests: 3-point flexural strength (FS) test, compressive strength (CS) test and Vickers hardness (VH) test. For each different mechanical test, ten samples of each composite were prepared (n = 10), according to following specimen design: bar-shaped (2 x 2 x 25 mm) for FS, cylindrical (4 mm diameter, 8 mm height) for CS, disc-shaped (4 mm diameter, 2 mm height) for VH. All tests were performed using a universal testing machine (Lloyd Instruments- LR30KPlus). Means and standard deviations were calculated and compared using the Student-t tests (P < 0.05).

Results: in all mechanical tests performed, the ultimate strength/hardness observed for the graphene-based material appeared comparable or slightly increased compared to the nanohybrid resin-based dental composite. Moreover, both the flexural modulus of elasticity (recorded on the FS test) and the compressive modulus of elasticity (recorded on the CS test) were significantly reduced for the graphene-based material, compared to the control.

Conclusions: the experimental graphene-based material tested in this study showed ultimate strength and hardness at least as good as those observed for conventional dental composites. At the same time, the significantly reduced flexural and compressive moduli describe a considerably more elastic material. Further studies are needed, to definitely understand the clinical meaning of the mechanical differences herein observed.

IN VITRO EVALUATION OF SURFACE AND OPTICAL CHARACTERISTICS OF A REPAIRED CAD/CAM COMPOSITE

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Aim: to evaluate the surface characteristics and optical properties of a CAD/CAM composite block after repair with different resin composites.

Methods: three adhesive/resin composites combinations [One Coat 7 Universal adhesive/Brilliant EverGlow (Coltene), iBond universal adhesive/Venus Pearl (Kulzer), iBond universal/Venus Pearl One (Kulzer)] were used to repair CAD/CAM composite blocks (Brilliant Crios, Coltene; A2 HT 14L) after they were submitted to laboratory aging (10.000 thermocycles, 5-55 °C). Each specimen was tested with a chewing simulator (CS-4.4 SD Mechatronik). Surface roughness, gloss and color (according to the CIE L*a*b* color scale) measurements were repeated at different stages: baseline, after thermocycling, after

repairing, after chewing simulator. Data were statistically analyzed ($p < 0.05$).

Results: color stability and surface gloss were influenced by thermocycling ($p < 0.05$), chewing simulator ($p < 0.05$) and type of composite ($p < 0.05$). Roughness was only influenced by chewing ($p < 0.05$). Differences were observed between composites ($p < 0.05$), with Venus One showing inferior color changes and higher surface gloss values compared to the other two repairing materials.

Conclusions: although the resin composites used for repairing showed clinically acceptable values in terms of colour, surface gloss and roughness, they could not reproduce the initial characteristics of the CAD/CAM resin composite block.

THE INFLUENCE OF ADHESIVE EVAPORATION ON BONDING PERFORMANCES TO DENTIN

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Aim: to evaluate the effect of two adhesive evaporation techniques on the microtensile bond strength (μ TBS) of a universal adhesive to dentin.

Methods: the middle/deep dentin of 20 sound human molars were bonded with a universal adhesive (Quick bond, Tokuyama Inc.) applied in total-etch (TE) or self-etch (SE) modes. Two adhesive evaporation techniques were tested ($n = 5$): i) TE/Air: the adhesive was air-dried with the disposable air/water syringe; ii) TE/Suction: the adhesive was air-dried with the disposable suction device; iii) SE/Air: the adhesive was air-dried; iv) SE/Air: the adhesive was aspirated with the suction device. Then, the adhesive was light-cured for 10s. Direct coronal restoration was performed with two 2mm-thick layers of a resin composite

material. After 24 h, the specimens were cut into sticks and submitted to the μ TBS test. Fractures were classified and analyzed under SEM. Data were statistically analyzed ($p < 0.05$)

Results: air-drying resulted in significantly higher μ TBS values than suction ($p < 0.05$). SE/Air performed significantly better than SE/Suction, TE/Air and TE/Suction. No differences were found between the TE groups. SEM images showed the presence of water-tree formations at the adhesive interface when suction was used for adhesive evaporation.

Conclusions: the use of the air with the disposable syringe should be preferred to air-suction to enhance bonding performances of an ethanol-based universal adhesive, especially when used in the self-etch mode.

DEEP CERVICAL MARGINAL RELOCATION: A RETROSPECTIVE CLINICAL STUDY

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Aim: the aim of the present study was to evaluate the efficacy of different materials in deep cervical marginal relocation (DMR) in deep second class cavities. The null hypothesis tested was that there is no difference between flowable and not flowable materials in DMR neither for the parodontal response (1) nor for the restauration result (2).

Methods: patients with at least a deep interproximal caries in posterior teeth were selected. Initial periodontal parameters were taken (probing depth, recession, plaque index, bleeding on probing). After decay removal, due to the impossibility of rubber dam isolation, gingivectomy without osteoplasty was performed. After sutures, rubber dam was repositioned and standardized adhesive procedures were performed with a two-step self-etch adhesive with enamel pre-etching. Patients were

then divided in two groups according to the material used for the first horizontal layer: group 1 (Grandioso Heavy-Flow, Voco) group 2 (Grandioso, Voco). Remaining cavity was filled using the centripetal build-up technique. During follow ups two operators independently calibrated evaluated periodontal tissues health and restoration quality following FDI criteria.

Results: 47 patients were recalled with a mean follow-up of 24.6 months. Chi-square test showed better marginal adaptation ($p = 0.0001$) and periodontal health ($p = 0.0001$) for group 2. Restorations showed clinical acceptable qualities regarding FDI criteria.

Conclusions: the first null-hypothesis could be rejected since flowable composite showed increased BoP than traditional one.

BONDING PERFORMANCES OF SILVER DIAMINE FLUORIDE-TREATED DENTIN

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Aim: to evaluate the effects of two silver diamine fluoride (SDF) surface pre-treatments on the dentin bonding potential and matrix-metalloproteinases (MMPs) activity of a simplified universal adhesive.

Methods: sixty non-carious sound human molars were cut to expose enamel-free coronal dentin. Groups were formed ($n=10$) according to the dentin surface pre-treatment and etching mode of the universal adhesive (Zipbond, SDI) used for bonding procedures: 1) Zipbond applied in the self-etch mode (SE); 2) Riva Star + SE (RSE); 3) Riva Star Aqua + SE (ASE); 4) Zipbond applied in the total-etch mode (TE); 5) Riva Star + TE (RTE); 6) Riva Star Aqua + TE (ATE). After 24h, the specimens were sectioned into 1-mm thick slices and subjected to microtensile bond strength (μ TBS) test and scan-

ning electron microscope (SEM) at baseline (T_0) and after 6 months (T_6) of artificial storage. To investigate the effect of SDF on MMPs activity, 3 additional molars per group were processed for the *in situ* zymography analysis at T_0 and T_6 . Data were statistically analyzed ($p < 0.05$).

Results: the dentin pre-treatment, etching mode, aging and their interactions significantly influenced the bond strength and MMPs activity ($p < 0.05$). Both pre-treatments, as well as aging decreased bond strength ($p < 0.05$). Pretreatment (Riva Star > Riva Star Aqua = control), etching and aging increased the MMPs activity ($p < 0.05$).

Conclusions: due to the lower enzymatic activity in the Riva Star Aqua pretreated groups, a more stable hybrid layer might be expected over time compared to Riva Star.

CONVERSION DEGREE STABILITY WITH BULK-FILL MATERIALS: A RAMAN SPECTROSCOPY STUDY

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Aim: to evaluate the degree of conversion before and after thermocycling in high c-factor dental cavities restored with five different bulk composites.

Methods: 50 extracted molars were collected and two first-class cavities, 2 mm and 4 mm deep, were prepared on the occlusal surface. After performing standardized adhesive procedures, specimens were randomly divided in five groups, according to the composite employed: Venus One (Kulzer), Tetric Powerfill (Ivoclar), Tetric Power Flow (Ivoclar), Filtek Posterior (3M), Filtek BulkFill (3M). The composites were placed in the cavity in a unique horizontal layer.

Half of the specimens were submitted to thermocycling (10000 cycles between 5°C and 55°C) and then vertically sectioned to expose the lateral surface of restored cavity, along which Ra-

man Spectroscopy measurement were performed from top to bottom of the restoration. The degree of conversion of the tested materials was calculated and were collected and statistically analyzed with ANOVA test.

Results: in all groups the monomer conversion slightly decreased from the top surface along the depth of the composite restoration. However, any significant differences were found between the tested composites ($p = 0.0672$), while the thermocycling induced a significant reduction of the conversion degree.

Conclusions: bulk-fill materials showed an efficient light transmission through the composite mass which led to a uniform conversion from monomer to polymer. However, the one-shade composite tested showed a similar trend, probably thanks to its optical properties.

REHABILITATION OF SEVERELY DAMAGED TEETH USING LITHIUM DISILICATE INDIRECT RESTORATIONS

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Aim: to restore function and esthetics of severely damaged teeth exploiting adhesive procedures in order to avoid full crown preparations.

Methods: a 55-year-old male patient came to our clinic complaining pain and discomfort during chewing activity in upper left quadrant. Radiographic and clinical examination showed incongruous restorations on 2.7, 2.6, 2.5, 2.4 and 2.3 with destructive caries on 2.7 and cusp fracture on 2.4. Rubber dam was placed from 2.7 to 2.2 after local anesthesia infiltration. During caries removal procedures pulp were exposed on 2.7 and root canal treatment was performed. All cavities were cleaned simultaneously from 2.6 to 2.3 with diamond and carbide

burs, whereupon build-ups from 2.7 to 2.4 and a direct composite restoration on 2.3 were made. Preparations for overlays on 2.7 2.6 2.5 and 2.4 were performed and silicone impressions were taken. After 7 days, lithium disilicate overlays were bonded with multi-step resin cement under rubber dam isolation.

Results: radiographic and clinical examination after 1 month showed good integration, function and esthetics. Patient reported any symptoms or discomfort.

Conclusions: adhesive partial restorations could be a good solution also in cases with severe tooth substance loss and little amount of enamel available, leading to a more conservative and less expensive treatment.

EFFECT OF DIFFERENT CURING PROTOCOLS ON MARGINAL INTEGRITY AND CONVERSION DEGREE OF LUTING CEMENTS

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Aim: the aim of this study is to investigate the influence of the tack-curing process on the conversion degree and marginal adaptation of a dual-curing cement in full-crown luting procedures.

Methods: single-rooted teeth, extracted for periodontal reasons, were selected and prepared for a full-crown with chamfer margin. Crowns were milled using a lithium silicate material (Celtra Duo, Dentsply). Once completed the sintering and glazing/polishing procedures (10 minutes sintering, 10 minutes glazing), the crowns were luted over the prepared specimen using a universal dual-curing cement, which has been applied in self-adhesive mode, following the manufacturer instructions. Samples were then divided in two subgroups, based on the curing protocol: conventional curing (G1); tack-curing (G2).

Specimens were scanned with a micro-CT and Raman spectroscopy, before and after thermocycling (10000 cycles between 5°C and 55°C). The degree of conversion and the marginal adaptation were calculated and statistically analyzed with ANOVA test.

Results: both curing protocols tested lead to a good polymerization, without significant differences in the degree of conversion ($p = 0.063$), which was not influenced by the thermocycling, along the cement-tooth interfacial surface. However, marginal adaptation was conditioned by the curing process ($p = 0.0001$), before and after thermal fatigue.

Conclusions: the tack curing protocol seems to be effective in reaching a satisfying degree of conversion but it could lead to a reduced marginal adaptation when luting cements are employed.

EFFECT OF TWO GLUTARALDEHYDE-BASED PRIMERS ON DENTIN BOND STRENGTH AND ENZYMATIC ACTIVITY

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Aim: to evaluate the effects of two glutaraldehyde-based solutions (GLUMA) on the microtensile bond strength (μ TBS) and endogenous enzymatic activity (MMPs) of simplified universal adhesives (UAs) to dentin.

Methods: two UAs were used in the self-etch modes: iBond universal (IBU, Kulzer) and Adhese Universal (AU, Ivoclar). The dentin surfaces of sound human molars were pre-treated with GLUMA solutions available in 2 consistencies ($n = 8$): G1: Gluma Desensitizer (GD) + IBU; G2: Gluma Desensitizer Powergel (GG) + IBU; G3: IBU (control); G4: GD + AU; G5: GG + AU; G6: AU (Control). Specimens were cut into sticks and stressed under tension with the μ TBS test after 24h of artificial storage at 37°C. The MMPs activity within the hybrid layer was evaluated with the *in situ* zymography ($n = 4$). Data were statistically

analyzed (Kruskal-Wallis test and Two-Way ANOVA, respectively) ($p < 0.05$).

Results: the dentin surface pre-treatment, bonding system and their interactions significantly influenced the results ($p < 0.001$). The Gluma primers increased the μ TBS of AU to dentin ($p < 0.001$). No differences were found between the IBU groups ($p > 0.05$). The groups treated with both GG and GD showed an immediate lower level of gelatinolytic activity, independent of the UAs ($p < 0.05$).

Conclusions: the effect of the glutaraldehyde-based primers on dentin bond strength is material-dependent. However, they are potentially beneficial to stabilize the adhesive interfaces. The consistency of the solutions did not influence the results.

CEMENTATION OF INDIRECT LITHIUM DISILICATE RESTORATIONS WITH PRE-HEATED COMPOSITE

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Aim: to evaluate the luting ability of pre-heated resin composite for cementation of indirect lithium disilicate restorations.

Methods: a 58-year-old male patient with good general health attended to the Clinic due to dental sensitivity referred to the I quadrant. Clinical and rx examination revealed secondary caries on 1.7, 1.6, 1.5 and 1.4. After professional oral hygiene, data were recorded (photos, videos, rx, impressions, scans). After isolation, the treatment plan foresees removal of the old restorations, removal of the carious lesions and composite build-ups of 1.5 and 1.7 and direct composite restorations of 1.4 and 1.6 (Optibond FL, Kerr+ Empress direct, Ivoclar), preparation of 1.7 and 1.5 and upper, lower and occlusion intraoral scan (Omnicam - Dentsply Sirona). The internal surface of the

restorations were sandblasted (AL_2O_3 50 μm for 10s), etched with 9% HFI acid for 10s, ultrasonicated in alcohol for 1 min and a silane (Ultradent) applied for 5 min. Cementation was performed under rubber dam with a 3-step adhesive (Optibond FL) and pre-heated resin composite (Empress Direct). After occlusal check the patient was dismissed.

Results: at 1 week, 6 months, 1 – 2- and 3- years recalls no symptoms were referred. The teeth maintained vitality. Occlusal checks and rx revealed good adaptation of the restorations with overall good esthetical satisfaction of the patient.

Conclusions: pre-heated resin composite demonstrated good performances. After 3 years no discoloration, chipping, or marginal infiltration were observed.

COLOR MATCH EVALUATION OF TWO SINGLE SHADE COMPOSITES BEFORE AND AFTER BLEACHING PROCEDURE

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Aim: the aim of this case report was to evaluate instrumental and visual color match of two single shade resin-based composites in human extracted teeth before and after bleaching treatments.

Methods: two extracted human posterior sound teeth were used. Round shaped V class cavities (2x2x4mm) were prepared buccally 2mm away from the CEJ. Two single shade resin composites (ES-Essentia Universal, GC and CL-Clearfill Majesty ES2 Universal, Kuraray) were used for the restorations. Tooth color was measured 1mm beside the cavity and in the center of the restoration using a spectrophotometer (VITA Easyshade V, VITA Zahnfabrik). Visual analysis were carried out by 16 calibrated observers and differences were graded as 0:excellent match; 1:very good match; 2:not so good match; 3:obvious

mismatch; 4:huge mismatch. Teeth were then bleached using 40% H_2O_2 (Opalescence Boost PF, Ultradent) and instrumental and visual evaluations were replied after 24 hours.

Results: at baseline, both ES restoration and tooth showed an A3 VITA scale grade, and respectively A2 and C2 after bleaching. Color match visual analysis showed a mean value of 0.25 both prior and after bleaching. At baseline, both CL restoration and tooth showed an A4VITA scale grade, and respectively A3 and C3 after bleaching. Color match visual analysis showed a mean value of 0.87 before and 0.31 after bleaching.

Conclusions: within the limits of a single case report, both composites seem to have excellent color match properties with the surrounding tooth structure, from both instrumental and visual points of view.

A MULTIDISCIPLINARY APPROACH IN MICRODONTIA AND AGENESIS: A CASE REPORT

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Aim: the aim of this case report is to suggest a multidisciplinary approach based on conservative, prosthetic dentistry and orthodontics in order to treat a patient that presents microdontia and agenesis.

Methods: first, we acquired the photographic documentation of the patient's smile and through a caliper we measured the central incisors' size, then following the principles of Digital Smile Design (DSD), we reproduced the right proportions of the central incisors, through Keynote.

We performed the dental reconstruction with resin composites in order to reduce the diastema and obtain the correct shape

of the teeth. The last step was the orthodontic treatment that allowed us to achieve the correct spaces and to make room for the congenitally missing lateral incisors that we replaced with two Maryland bridge.

Results: we managed to reduce the diastema and create a correct shape of the central incisors, replace the missing lateral incisors with two Maryland bridge and align the smile of the patient.

Conclusions: a multidisciplinary approach could represent an effective treatment alternative in selected clinical cases that require a collaboration between different dental disciplines.

EPIDEMIOLOGICAL CHANGES IN DENTAL TRAUMATOLOGY IN THE SARS-COV-2 PANDEMIC AT THE HOSPITAL IN MILAN

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Aim: traumatic Dental Injuries (TDI) are an important topic for both its prevalence and frequency. For this reason, we decided to analyze clinical data regarding TDI at IRCSS Cà Granda Fondazione Ospedale Maggiore Policlinico, Milano during the first national lockdown for COVID - pandemic from 8 March to 11 June 2020. To evaluate epidemiological changes, a comparison with an historic sample from the same hospital was made.

Methods: all patients with TDI from 8 March to 11 June 2019 and the same timeframe in 2020 were included. Data regarding age, gender, number and type of teeth, type of injury and trauma etiology were collected. The period in 2019 was used as historic sample for comparison. Furthermore, an electronic search on TDI was performed.

Results: a total of 80 patients were included in the study (61 in 2019 and 19 in 2020). In both periods pediatric patients (< 14 y.o.) were more affected (84% in 2019, 76% in 2020), upper central incisors were mostly involved, and subluxation was the most frequently recorded trauma in deciduous teeth, while crown fractures were more common in permanent teeth. Sex distribution, more male patients in 2019 (62%) and more female in 2020 (58%), as well as trauma etiology (24% sports, 18% school, 16% domestic in 2019 while 81% domestic, 0% school and sports in 2020) differ between the two samples.

Conclusions: Sars-Cov-2 pandemic has changed daily habits of patients, especially due to stay-at-home orders. This decreased overall prevalence of TDI, especially at school and during sports activities. The results agree with data in literature.

SALIVARY BIOMARKERS FOR DIAGNOSIS OF CARIES: A SYSTEMATIC REVIEW

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Aim: the present systematic review aims to answer to the question: “Is there evidence that support the use of salivary biomarkers for diagnosis of dental caries?”.

Methods: the systematic review has been approved and registered on PROSPERO. A multiple database research (Medline, Scopus, Web of Science) of the scientific English literature published after 2000 was set. The entry terms “saliva” and “salivary biomarkers” were combined through the Boolean indicator “AND” with “tooth decay” and “dental caries”.

Studies performed on healthy subjects with and without dental caries, and providing detailed information concerning clinical diagnosis of caries (DMFT and ICDAS criteria) were included. Conference proceedings, meeting abstracts, short communications, editorials, letters to editor and reviews were excluded. Final eligibility was assessed through full-text evaluation, according to the exclusion and inclusion criteria. Data extraction from each study were summarized into three Excel tables (1:

“General characteristics of studies”; 2: “Biochemical techniques for identification and quantification of salivary biomarkers”; 3: “Statistical association of salivary biomarkers and dental caries”). We performed a qualitative analysis of the selected articles, using the JBI Critical Appraisal Checklist for Qualitative Research.

Results: from the initial 12.818 records, 19 papers were included in the review. 17 out of 19 are case-control studies. Selected papers showed 54 salivary biomarkers (e.g.: MUC1, urea etc.) with a statistically different concentration in subjects with and without caries. Some studies included in the review present risk of bias, such as the identification of confounding factors and the clear definitions of the source population.

Conclusions: according to the present systematic review, other studies are needed to improve the quality of scientific evidence and to correlate some salivary biomarkers with the presence of caries.

DIRECT VS INDIRECT INLAY RESTORATIONS IN DEEP MARGIN ELEVATION: A MICRO-CT STUDY

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Aim: the aim of the present study was to evaluate interfacial 3D adaptation of different direct and indirect inlay restorations in combination with flowable materials before and after cyclic fatigue in a simulated deep-margin elevation scenario. The null hypothesis tested was that marginal sealing of enamel and dentin cervical margins is not influenced by flowable composites.

Methods: extracted premolars were selected and a class II MOD cavity was prepared with the mesial box with cervical margin 1mm above CEJ and distal box with cervical margin 1mm below CEJ. After performing adhesive procedures, specimens were divided in 4 groups according to the employed materials for horizontal deep-margin relocation: nanohybrid composite with (G1) and without (G2) medium viscosity flowable composite; indirect inlay restoration (Vita Enamic) with (G3)

and without (G4) medium viscosity flowable composite. To reveal interfacial gap progression specimens were scanned with a micro-CT, before and after 500000 cycles of thermomechanical chewing simulation (50N, 1Hz). Interfacial gap and internal voids, expressed in mm³, were collected and statistically analyzed with ANOVA test.

Results: the mean external gap increase was tridimensionally measured as volume. Flowable composites showed significantly more gaps when employed in combination with indirect restoration.

Conclusions: the initial null hypothesis is accepted since flowable resin composites were equally able to seal enamel and dentin cervical margins in deep-margin elevation technique independently of the restoration material.

EFFECT OF THERMOMECHANICAL LOADING ON INTERFACIAL GAP IN V CLASS CAVITIES: AN OCT STUDY

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Aim: the aim of the present study was to evaluate gap at enamel and dentin margin of different flowable materials after thermomechanical fatigue in a class 5 restoration. The null hypothesis tested was that flowable composites are not able to provide enamel and dentin marginal sealing.

Methods: single-rooted teeth were selected. On the buccal surface a standardized class 5 cavity was created. A self-etch adhesive was applied after 30s selective enamel etching. Specimens were divided in 3 groups, according to the materials selected for class 5 restoration: Majesty ES Flow SuperLow (Kuraray); Majesty ES Flow Low (Kuraray); Clearfil Majesty ES-2 (Kuraray). The interfacial adaptation at enamel and dentin margins was evaluated before and after thermomechanical fatigue (500000 cycles of chewing simu-

lation with temperature shift at 5°C and 55°C) using OCT. Five images of each restored tooth were obtained and analyzed using ImageJ software that measured the entire length of the gaps at the enamel/dentin-restoration interface. The length of gaps (μm) was analyzed using ANOVA and the Tukey tests.

Results: there was a significant interaction between materials and chewing simulation ($p = 0.0001$), and a significant difference among all materials ($p < 0.0001$). Increased gaps at the dentin margins were noticed.

Conclusions: the initial null hypothesis is accepted since tested flowable resin composites, independently of their viscosity, showed more gap formation at enamel margin than nanohybrid composites.

INTERFACIAL GAP WITH FLOWABLE COMPOSITES IN V CLASS CAVITIES: AN OCT STUDY

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Aim: the aim of the present study was to evaluate gap at enamel and dentin margin of different flowable materials after thermal fatigue in a V class restoration. The null hypothesis tested was that flowable composites are not able to provide enamel and dentin marginal sealing.

Methods: single-rooted teeth were selected. On the buccal surface a standardized class V cavity was created. A self-etch adhesive was applied after 30s selective enamel etching. Specimens were divided in 3 groups, according to the materials selected for class V restoration: Majesty ES Flow SuperLow (Kuraray); Majesty ES Flow Low (Kuraray); Clearfil Majesty ES-2 (Kuraray). The interfacial adaptation at enamel and dentin margins was evaluated before and after TC (10000 cycles between 5°C and 55°C) using OCT. Five images of each resto-

red tooth were obtained and analyzed using ImageJ software that measured the entire length of the gaps at the enamel/dentin-restoration interface. The length of gaps (μm) was analyzed using ANOVA and the Tukey tests.

Results: there was a significant interaction between materials and TC ($p = 0.001$), and a significant difference among all materials ($p < 0.0001$), before and after TC ($p < 0.0001$). Increased gaps at the enamel and dentin margins were noticed after TC for all groups. Flowable resins seems to better seal margins than nanohybrid composites.

Conclusions: the initial null hypothesis is rejected since tested flowable resin composites, independently of their viscosity, showed less gap formation at enamel and dentin margin than nanohybrid composites.

3D ANALYSIS OF THE ADHESIVE INTERFACE IN DEEP MARGIN ELEVATION: A MICRO-CT STUDY

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Aim: the aim of the present study was to evaluate interfacial 3D adaptation and internal voids of different flowable materials before and after cyclic fatigue in a simulated deep-margin elevation scenario. The null hypothesis tested was that marginal sealing of enamel and dentine cervical margins is not influenced by flowable composites with different viscosities.

Methods: extracted premolars were selected and a class II MOD cavity was prepared with the mesial box with cervical margin 1mm above CEJ and distal box with cervical margin 1mm below CEJ. After performing adhesive procedures, specimens were divided in 4 groups according to the employed materials for horizontal deep-margin relocation: nanohybrid composite; medium viscosity flowable composite; low viscosity flowable composite; conventional viscosity flowable com-

posite. To reveal interfacial gap progression specimens were scanned with a micro-CT, before and after 500000 cycles of thermomechanical chewing simulation (50N, 1Hz). Interfacial gap and internal voids, expressed in mm³, were collected and statistically analyzed with ANOVA test.

Results: the mean external gap augmentation was tridimensionally measured as volume. Flowable composites showed significantly less gaps than nanohybrid composites ($p = 0.0023$). Any differences were found between different tested flowables.

Conclusions: the initial null hypothesis is accepted since flowable resin composites with different viscosities were equally able to seal enamel and dentin cervical margins in deep-margin elevation technique.

A MULTIDISCIPLINARY APPROACH FOR THE EVALUATION OF BULK-FILL COMPOSITE RESTORATIONS

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Aim: this study aimed to investigate the behavior of three different bulk-filling techniques, analyzing in terms of internal and external adaptation of class II resin-composite restorations, by evaluating the gap formation using microcomputed tomography (μ -CT) and scanning electronic microscopy (SEM) coupled with energy-dispersive X-ray spectroscopy (EDS).

Methods: two standardized class II mesio/disto-occlusal slot cavities (4 mm long, 4 mm wide and 3 mm deep) were prepared in fifteen extracted sound molar ($n = 30$ cavity preparations). The cavities were randomly assigned into three groups ($n = 10$ per group) according to three bulk filling techniques: Bulk Traditional (BT), Bulk&Go (BG) and Bulk&Flow (BF). Therefore, after universal bonding application, followed by the light curing, the same bulk-fill composite was used for restorations. Thereafter, samples were scanned with μ -CT to evaluate 3D interfacial gaps. Acquired μ -CT data were analyzed to

quantify the gap formation. Complementary information to the μ CT, the teeth were analyzed by SEM to investigate the external marginal seal and the chemical composition of tooth-restoration interface was analyzed by EDS.

Results: the internal marginal adaptation by means of μ CT examination revealed gaps formation at the tooth-restoration interface only for BT group, while an intimate contact free of gaps were found in the other two groups. Moreover, in BT and BF groups voids were present within the restoration. SEM investigation showed a right external marginal seal for all groups examined as confirmed by the EDS analysis, highlighting the presence of adhesive layer at the tooth-restoration interface.

Conclusions: BG and BF techniques can be considered as reliable alternatives to BT technique, as they simplify the class II restoration without transforming it into class I, thus ensuring a successful result.

ADHESION FORCE OF UNIVERSAL ADHESIVES TO DENTINE: A SYSTEMATIC REVIEW

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Complex Operative Unit of Odontostomatology Director: Prof. G. Favia. Specialization School in Orthognatodontics Director: Prof. F. Inchingolo, Interdisciplinary Department of Medicine D.I.M., University of Bari Aldo Moro, Bari, Italy

Aim: determine whether the etch-and-rinse or self-etching technique is the best protocol for dentin adhesion by universal adhesives.

Methods: a systematic literature review was performed in accordance with PRISMA guidelines. The reviewer performed a literature search in three international databases: MEDLINE, Scopus, The Cochrane Library.

Inclusion criteria: only studies evaluating the bond strength of universal adhesives to dentin by the etch-and-rinse and self-etch strategies by *in vitro* evaluation of μ TBS and μ SBS, published from 01/01/2012 to 1/06/2021, were included.

Results: 9445 potentially relevant articles were identified on da-

tabases (identification), 8407 articles selected, eliminating duplicates, for evaluation by title and abstract reading (screening), 64 articles selected for full-text reading (eligibility), 26 articles included in the review that meet the inclusion criteria (inclusion).

These 26 articles evaluate the bond strength (μ TBS and μ SBS) of 17 different universal adhesives.

Conclusions: the performance of the multimodal adhesives evaluated in the articles included shows that all the new adhesive systems tested are highly versatile. The values of the adhesion force are statistically equivalent in the different techniques etch-and-rinse ($\mu = 36.7$ MPa) and self-etch ($\mu = 36.2$ MPa).

INTEGRATIVE TEACHING METHOD FOR CLINICAL PRACTICE IN RESTORATIVE DENTISTRY: INSTRUCTIONS!

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Aim: a survey carried out on Italian dentistry students and currently in review by the *European Journal of Dental Education* showed a decreasing of self-confidence of students in the practical approach because of the interruption of clinical activities due to the COVID-19 outbreak. The study aimed to assess the effectiveness of an integrative didactics solution proposed to improve the practical teaching of restorative dentistry.

Methods: the students of the fourth year of undergraduate program of University of Verona were randomly divided into two groups and two ways of teaching restorative dentistry were assessed. The first group (9 students) underwent traditional lessons by slides, the second one (10) received both slides and video-tutorials of clinical restorative procedures (preparation and filling of caries). A questionnaire about the followed

teaching method satisfaction was administered to the students and a final assessment (scoring) of clinical ability of students was carried out by teacher of the course. Statistical analyses were performed.

Results: the comparison between the scoring of clinical procedures carried out by the two groups showed a better clinical ability of students of the second group (Mann-Whitney U test). The possibility to have available a video-tutorial was largely appreciated by the students.

Conclusions: the interruption of the clinical practice training significantly affected the self-confidence of students. An integrative teaching method involving the use of video-tutorials as support in teaching clinical procedures deserves to be considered.

3D INTERFACIAL GAP FORMATION WITH BULK MATERIALS: A MICRO-CT STUDY

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Aim: to evaluate the effect of light curing on the contraction shrinkage and consequently on the internal gap formation in high c-factor dental cavities restored with five different composites.

Methods: 40 extracted molars were collected and two first-class cavities, 2 mm and 4 mm deep, were prepared on the occlusal surface. After performing standardized adhesive procedures, specimens were randomly divided in five groups, according to the composite employed: Venus One (Kulzer), Tetric Powerfill (Ivoclar), Tetric Power Flow (Ivoclar), Filtek Posterior (3M), Filtek BulkFill (3M). The composites were placed in the cavity in a unique horizontal layer. A micro-CT scan of each specimen was performed before and after composite light curing (20s) to tridimensionally evaluate interfacial gaps and in-

ternal voids after curing process. Specimens were then submitted to thermocycling (10000 cycles between 5°C and 55°C) and a micro-CT scan was repeated. Volumetric gaps and voids related to curing process and thermocycling were calculated and statistically analyzed with ANOVA test.

Results: the bulkfill materials showed lower interfacial gaps than conventional composite, which were mainly located at the cavity floor. Any significant differences were found regarding the internal voids, which were detected in any restoration independently of the tested materials. Thermocycling induced a general increase of the interfacial gaps in all restorations.

Conclusions: based on the study results, the volumetric gap detection seems to be reduced with the use of bulkfill materials.

INFLUENCE OF TWO POLISHING PASTE SYSTEMS ON SURFACE ROUGHNESS OF NANOFILLED COMPOSITES

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Aim: to evaluate surface roughness of packable and flowable nanofilled resin composites after polishing with one-step and two-step diamond-based paste systems.

Methods: silicon molds (2 mm depth, 4 mm diameter) were used as a template to produce 120 specimens with packable (n = 60) and flowable (n = 60) nanofilled resin composite (Filtek Supreme XTE and Filtek supreme XTE Flow, 3M ESPE). The top surfaces of the discs were covered with a Mylar strip and light-cured. Twenty unpolished specimens for each material were used as controls whereas specimens to be polished were finished with P1200 sandpaper and assigned to two polishing protocols: one-step diamond-based paste (Unigloss, Intensive) (n = 40) and two-step diamond-based paste (Diamond Polishing Mint, Ultradent Products) (n = 40). A linear rugosimetric parameter (R_a) was measured three ti-

mes on randomly selected areas on the top surface of all specimens. Data were subjected to statistical analysis with Kruskal-Wallis and Mann-Whitney tests with Bonferroni correction ($p < 0.05$).

Results: the mean surface roughness values and their standard deviations were: packable/one-step system, $0.057 \pm 0.006 \mu\text{m}$; packable/two-step system, $0.048 \pm 0.005 \mu\text{m}$; flowable/one-step system $0.044 \pm 0.006 \mu\text{m}$; flowable/two-step system $0.049 \pm 0.006 \mu\text{m}$. The surface of the packable composite polished with the one-step system was significantly rougher than the Mylar control ($p < 0.01$) and the flowable composite polished with the same protocol ($p < 0.05$).

Conclusions: a two-step diamond-based paste polishing system appears preferable for polishing packable nanofilled composite.

ARTICLES PUBLISHED IN THE “GIORNALE ITALIANO DI ENDODONZIA” FROM 1987 TO 2021: A BIBLIOMETRIC ANALYSIS

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Aim: the “Giornale italiano di Endodonzia” (GIE) is a peer-reviewed journal founded in 1987. It is the official journal of the Italian Society of Endodontics (SIE) and it is currently indexed in Scopus and Embase (years 1990-1991 and from 2011 to now). In order to offer a comprehensive evaluation of the scientific journal production, we carried out a bibliometric analysis of the articles published on GIE.

Methods: we searched the journal website archive for the non-indexed articles and the Scopus and Embase databases for the indexed articles. Relevant data were extracted from each article. Bibliometric analysis was performed using Biblioshiny, Publish or Perish and VOSviewer.

Results: a total of 601 documents were found, 246 (41%) of them were indexed in electronic databases. The annual produc-

tion ranges from 4 (1987) to 37 (2021) with a mean annual growth rate of 6,76%. The total number of citations was 454. Dabelian 2016 was the most cited document with 29 citations. 1177 different authors contributed with at least 1 article. Gagliani M was the most contributing author with 34 documents. The most important contributing country was Italy, followed by Brazil and Iran. The most contributing institution was the University La Sapienza of Rome, followed by the University of Turin and the University of Naples. The most frequent keywords were “endodontics”, “MTA”, “CBCT”, “cyclic fatigue” and “root canal treatment”.

Conclusions: GIE showed an increasing internationalization and a growing impact in the endodontic field. Alongside classic topics of interest, new “hot topics” have emerged concerning innovative materials and technologies.

DENTINAL TUBULE PENETRATION FOLLOWING ULTRASONIC ACTIVATION OF INTRACANAL-HEATED SODIUM HYPOCHLORITE

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Aim: this study investigated the effect of ultrasonic activation of intracanal-heated sodium hypochlorite (NaOCl) on its dentinal tubular penetration.

Methods: in the experiment, mandibular premolars were randomly allocated to three groups (n = 8): group A, ultrasonic activation; group B, ultrasonic activation of intracanal-heated NaOCl and group C, syringe-and-needle irrigation.

Penetration of the fluorescent-labelled NaOCl was investigated using light microscopy. Data were statistically analyzed using Kruskal-Wallis and Mann-Whitney tests (P = 0.05).

Results: the highest penetration of NaOCl was observed in group B, followed by group A (P < 0.05).

Conclusions: dentinal tubule penetration of NaOCl and root canal cleanliness were significantly improved by ultrasonic activation of intracanal-heated NaOCl.

ROOT CANALS CLEANING AFTER DIFFERENT IRRIGATION TECHNIQUES: AN *EX-VIVO* ANALYSIS

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Aim: the endodontic space is a complex area, on both micro and macro levels, therefore traditional irrigation techniques may not guarantee a complete cleaning of such a complicated tridimensional system. The presented ex vivo study aimed to evaluate root canal cleanliness, obtained through an equal volume of traditionally applied sodium hypochlorite, compared to ultrasonically activated sodium hypochlorite and ultrasonically activated sodium hypochlorite preceded by intracanal heating.

Methods: totally 60 freshly extracted human mandibular premolars underwent roots samples length standardization (18mm), root canal preparation and, based on the irrigation method employed, were randomly and equally assigned to 3 study groups, composed of root samples treated with ultra-

sonically activated (group A), ultrasonically activated preceded by intracanal heating (group B) and traditionally applied (group C) sodium hypochlorite. Root Specimens were subsequently fixated with 4% buffered formalin solution and decalcified in Morse liquid. Ten six micron-thick serial cross-sections were obtained, dyed using hematoxylin and eosin and examined through an optical microscope at 40X, 100X, and 200X.

Results: group B showed a significantly less amount of debris compared to group A and C (P value < 0.05).

Conclusions: root canal cleanliness resulted significantly enhanced by ultrasonically activated sodium hypochlorite preceded by intra-canal heating.

CLSM EVALUATION OF ROOTS SUBJECTED TO ACTIVATION PROTOCOL IN ENDODONTIC MICROSURGERY

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Aim: this study evaluated the penetration of the irrigant subject to activation after performing retro-preparation in endodontic microsurgery.

Methods: forty mandibular premolars were prepared and filled. Subsequently, 1 mm from the root apex was cut using a multi-blade bur and the retro-preparation was performed. In group 1, the retro-cavity was cleaned with 2 mL of saline and then with 2 mL of 5.25% NaOCl gel mixed with 0.1% Rhodamine B. In group 2, the retro-cavity was cleaned with 2 mL of

saline, 17% EDTA gel was activated ultrasonically for 30 s and 5.25% NaOCl gel was mixed with 0.1% Rhodamine B and activated for 30 s. After 7 days, the roots were cut at 1mm from the apex and the slices were evaluated with confocal laser scanning microscopy.

Results: the samples of group 2 showed statistically better results.

Conclusions: the activation protocol proposed resulted in enhanced irrigant penetration when compared to the traditional.

A NOVEL MODIFIED OBTURATION TECHNIQUE USING BIOSEALERS: AN *EX VIVO* STUDY

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Aim: this research aimed to evaluate the actual temperature of the biosealer during the obturation phase inside the root canal using a new hot technique. In addition, this study evaluated the penetration depth of the biosealer inside dentinal tubules.

Methods: in this study, 42-second mandibular premolars were used, and two experiments were carried out. In the first experiment, two premolars were utilized, and two thermocouples of K-type for each tooth were used. During the second experiment, the penetration depth of the biosealer was examined. In the first experiment, the Bonferroni method was performed to compare the temperature data. The tests used in the se-

cond experiment were Shapiro–Wilk’s test, Kruskal–Wallis, and Mann–Whitney tests.

Results: the first experiment results showed that the heat does not reach the apical third using the new obturation method. In the second experiment, the results showed in Group B significantly higher biosealer penetration into the dentinal tubules as compared to Group A ($P < 0.05$).

Conclusions: the highest level of penetration of the biosealer in the dentinal tubules was observed in the group of the new obturation method, and the last apical 3 mm remained at 37° using this new technique providing no risk of chemical alteration of the biosealer.

TORSION, STATIC AND DYNAMIC CYCLIC FATIGUE RESISTANCE OF RECIPROCATING AND CONTINUOUS ROTATING NITI

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Aim: the aim of the present study was to evaluate torsion, dynamic and static cyclic fatigue resistance of the new reciprocating One RECI (OR, Micromega, Besançon, France), WaveOne GOLD (WOG, Dentsply Maillefer, Ballaigues, Switzerland), rotary One Curve (OC, Dentsply Sirona, Ballaigues, Switzerland) and ProTaper Next X2 (PTN X2, Dentsply Sirona, Ballaigues, Switzerland) instruments.

Methods: 120 NiTi instruments (25 mm in length; $n = 30$): OR, WOG, OC and PTN X2 were used. Torque and rotation angle until failure and under quasi-static torsion loading were measured according to ISO 3630-1. Fatigue resistance was measured as the time to fracture (TTF) of the instrument rotating in an artificial stainless-steel canal with a 60° angle and a 5-mm radius of curvature. The results were compared statistically

with one-way ANOVA. Post-hoc Tukey tests and the alpha-type error was set at 5%. Fracture surfaces of each fragment from torsion and fatigue tests were examined with scanning electron microscope.

Results: OR showed higher static fatigue resistance and rotation angle at fracture than WOG, OC and PTN X2 ($P < .05$). WOG exhibit higher torsion resistance than the other tested groups ($P < .05$). Dynamic cyclic fatigue resistance test showed highest TTF than static cyclic fatigue resistance test for PTN X2 and WOG groups ($P < .05$). OR and WOG showed higher TTF than OC and PTN X2 in the dynamic cyclic fatigue tests ($P < .05$).

Conclusions: OR instruments showed higher static cyclic fatigue resistance and torsion angle at fracture but lower torsion resistance than WOG.

ANALYSIS OF MECHANICAL LOADS DEVELOPED WITH TWO DIFFERENT TECHNIQUES

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Aim: comparison of the mechanical loads stored in an instrument sequence according to the selected instrumentation technique.

Methods: 40 sequences of Fanta Dental (13.03, 20.04, 25.06) were selected. The sequences were divided in 2 groups based on the used instrumentation technique: crown down (CD) and step back (SB). The CD instrumentation technique was performed activating the 25.06 in the first 1/3 of the canals, followed by the 20.04 until the 2/3 of the canals and reaching the working length (WL) with the 13.03. After that the WL was reached with 20.04 and 25.06. The SB technique was performed instrumenting the entire WL with the following sequence: 13.03, 20.04 and 25.06. After the instrumentation of simulated inferior resin molars the sequences of each group were divided in 2 subgroups (A= cyclic fatigue and B= torsional resi-

stance) according to the static test. Cyclic fatigue was measured calculating number of cycles to fracture (NCF) whilst torsional resistance was calculated measuring torque to fracture (Ncm).

Statistical analysis were performed through one-way ANOVA with Bonferroni correction, setting α at 0.05.

Results: both group CD A and CD B showed higher values of NCF and TtF in comparison to SB A and SB B groups with a statistically significant difference ($p < 0.05$), except for instrument 25.06 which showed a lower torsional resistance in case of CD technique.

Conclusions: the CD technique seems to be safer than the SB technique for both cyclic fatigue and torsional resistance, except for the torsional resistance of 25.06 which was the most stressed instrument in CD technique.

APICAL EXTRUSION OF DEBRIS USING THREE DIFFERENT NITI RETREATMENT SYSTEMS

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Aim: to compare the amount of apically extruded debris using three rotary NiTi retreatment systems.

Methods: thirty extracted single-root permanent human teeth were selected among those presenting a straight root. The root canals were prepared up to size 30 using the ProTaper Next system (Dentsply Sirona, Ballaigues, Switzerland), filled with gutta-percha and AH Plus sealer (Dentsply De Trey, Konstanz, Germany) using the continuous wave of condensation technique and they were randomly divided into three retreatment groups ($n = 10$) after a storage period of thirty days. The root fillings were removed with the following systems: ProTaper Universal Retreatment (Dentsply Sirona, Ballaigues, Switzerland), HyFlex Remover (Coltene/Whaledent AG, Altstätten, Switzerland) or VDW. Rotate Retreatment (VDW, Munich, Germany). Final apical preparation up

to size 40 was obtained in each group using the respective shaping files. Apically extruded debris was collected in Eppendorf tubes, which were weighed with a microbalance (10^{-5} g) before and after retreatment procedure. The statistical analysis of data was performed using the Kruskal-Wallis test with a significance level set at 5%.

Results: the highest amount of extruded debris was associated to Hyflex Remover (0.85 ± 0.82 mg), followed by VDW. Rotate Retreatment (0.78 ± 0.41 mg) and ProTaper Universal Retreatment (0.62 ± 0.28 mg). However, no significant differences were detected amongst the three retreatment techniques concerning apically extruded debris ($p > .05$).

Conclusions: all the three studied retreatment systems were associated with apical extrusion of debris, with no significant differences between them.

WEAR ANALYSIS OF TWO SIMILAR INSTRUMENTS BEFORE AND AFTER 4 USES IN SIMULATED ROOT CANALS

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Aim: the aim is to assess surface alteration of EdgeOne Fire (EOF) and WaveOne Gold (WOG) before and after 4 canals uses.

Methods: 30 instruments were selected: 15 EOF and 15 WOG. The only difference of those instruments is their heat-treatments. Each instrument was inspected through a scanning electron microscope (SEM) to detect any manufacturing alterations of the surface. The micrographs were acquired at the tip, 4, 8 and 12mm from it to analyzed microfractures, metal defects (metal flash, metal strips), deformations, blunt and disruption of cutting edges, debris, pitting, tip flattening. Both NiTi instruments were used on resin molars up to 4 canals with a reciprocating motion (300rpm and 180°/60°). Then, the SEM observations were repeated and the results were analyzed by

Chi square test performed to verify homogeneity of defects distribution and GLM to evaluate the differences of RMS at baseline and after use for both groups (α level 0.05).

Results: before the use, EOF instruments showed metal defects on the tip and debris on their entire length, while the WOG presented disruption of cutting edge on their entire length. After instrumentation, the EOF showed some of the above-mentioned alterations in different parts of the instruments, with a significant difference in comparison to WOG. No instrument fractured, spiral distortions in 6 EOF instruments and microfractures in 2 EOF instruments and in 3 WOG instruments were observed.

Conclusions: EOF instruments are more affected by clinical use than WOG in terms of blunt of cutting edge, distortion and debris accumulation.

EVALUATION OF PULP TISSUE DISSOLUTION THROUGH DIFFERENT ROOT CANAL IRRIGATION PROTOCOLS

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Aim: the aim of this study is to evaluate *in vitro*, using artificial lateral canals, the rate of dissolution of the pulp tissue through different protocols of canal irrigation.

Methods: one hundred artificial canals provided with lateral canals have been used. Each lateral canal was filled with pulp tissue and calibrated to 0.002 mg. All canals were irrigated using five different protocols. Five groups have been used for the experiment: Group A, distilled water (control); Group B, preheated NaOCl; Group C, NaOCl heated inside the canal; Group D, NaOCl ultrasonically activated; and Group E, NaOCl heated inside the canal with ultrasonic activation. All samples were weighed through professional microbalance in three different phases: before insertion of the pulp tissue into the lateral canal, after insertion of the pulp

tissue and, finally, after different protocols of irrigation. A statistical analysis with Kruskal-Wallis test and Mann-Whitney test was performed.

Results: the partial dissolution of the pulp tissue inside the artificial lateral canal occurs only using the protocol with NaOCl heated inside the canal with ultrasonic activation. Other irrigation protocols are not able to dissolve the pulp tissue.

Conclusions: the main objective of endodontic therapy is the removal of damaged tissues and bacteria. Modern literature highlights that it is impossible to remove all the pulp tissues and bacteria from the whole endodontic space. Hence, to achieve excellence and get positive results in the short and long term, it is necessary to use techniques and technologies that may increase the degree of root canal detercion.

INFLUENCE OF DENTINAL AGING ON THE INTRACANALAR ADHESION STRENGTH OF FIBER POSTS: *EX VIVO* STUDY

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Aim: the aim of the present study is to determine the bond strength and the micro-morphological characteristics of the interface between root dentin and two resin cements (self-etch and self-adhesive) in endodontically treated elements and re-treated elements with a real endodontic history.

Null hypothesis: the treatment of the root substrate, the topography (coronal vs apical) and the type of cement used (self-etch vs self-adhesive) do not influence, in terms of adhesive strength and morphology of the interface, the adhesion.

Methods: 16 vital mono-rooted elements and 16 treated were selected, mechanically shaped with ProTaper Next up to X3. The canals were sealed with gutta-percha cones and cement. After 48h, fiber posts were cemented. All the samples were therefore divided into two groups according to the cement used (iCem or Clearfil), then sectioned perpendicularly to the long axis; push-out test was subsequently performed on each section. After the test the samples were analyzed under a stereomicroscope to identify the types of failure.

4 vital permanent molars and 4 RCT molars were selected and processed as described above. In these teeth the adhesive system (Clearfil) was pigmented with fluorescein and the cements (Clearfil and iCEM) with rhodamine. The sections obtained with the procedure described above were examined under confocal microscopy.

Results: adhesion is greater in newly treated teeth than in those with older endodontic treatment.

Most of the failures in each group are of the adhesive type: between dentin and resin cement.

Hybrid Layer is thicker in newly endodontically treated teeth. Self-adhesive cement produces a thinner HL than self-etch. The coronal half of the post space shows more penetrated tubules than the apical portion.

Conclusions: aging has a negative effect on the bond strength: since there is no significant difference between self-adhesive cements and traditional cements and that the use of self-adhesives, on complex substrates, such as endodontically retreated post-spaces, it may be considered an appropriate choice.

UNDERGRADUATE ENDODONTIC TEACHING IN ITALIAN DENTAL SCHOOLS

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Aim: we conducted a survey to evaluate the teaching of Endodontics in the Italian dental schools.

Methods: the questionnaire firstly proposed by Al Raisi et al. (2019) was modified and translated into Italian. The endodontic course owner in each Italian dental school was contacted and invited to participate in the survey using Google Form.

Results: twenty-eight out of 36 schools (78%) responded. In most schools, Endodontics is taught in the fifth year to 15-29 students. All schools planned pre-clinical endodontic training and in 3 schools clinical endodontic training was not provided. The average number of hours spent for pre-clinical and clinical training was $34,3 \pm 23,6$ and $84,1 \pm 76,7$, respectively. The course program varied among schools. All schools used rotary NiTi files in the clinical training and the vertical compaction

of hot gutta-percha was the most frequently taught obturation technique. In 60.7% of the schools there was a clinical area specifically assigned to Endodontics. The academic qualification of the course owner (full or associate professor Vs other figures) has a significant impact on some of the considered variables (years in which the course is held, number of teaching collaborators, number of students, mean number of hours for teaching of some specific topics).

Conclusions: endodontic teaching is not homogeneous among Italian dental schools. Clinical training should be implemented in many schools. Teachers should strive to better fulfill the ESE Undergraduate Curriculum Guidelines. Endodontic courses held by a full or associate professor seem to be better structured.

EVALUATION OF SERUM INFLAMMATORY MARKERS IN SUBJECTS AFFECTED BY CHRONIC APICAL PERIODONTITIS

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Aim: to investigate if chronic Apical Periodontitis (AP) could play a role in the sustaining of systemic inflammation by raising the serum levels of pro-inflammatory cytokines such as IL-8; moreover, to evaluate the effect of the endodontic therapy on IL-8 levels.

Methods: eleven patients diagnosed for AP and 8 control subjects were assessed at the baseline and six months after root canal treatment in a case-control study. A medical anamnesis was conducted before the study, and all subjects were asked about their demographic and behavioral background. Both groups subjects presented the following inclusion criteria: BMI < 25 Kg/m² and an age between 18 and 55 years, excluding patients with periodontal disease, any declared disease or drug therapy. The diagnosis of apical periodontitis was performed radiographically. All subjects enrolled underwent blood sampling at the baseline and six months after root canal therapy (patients group) or six months after baseline

(control group) in order to evaluate serum glucose and IL-8, whose levels were measured conducting ELISA tests. The endodontic treatment was performed according to the guidelines of the state of the art. The wound healing of endodontic lesions was assessed radiographically. The comparison of IL-8 levels between groups was analyzed statistically with variance analysis (One-Way ANOVA) and Tukey test.

Results: there were no differences for demographic and behavioral variables within the groups. At the baseline, the AP group showed increased IL-8 levels ($81,8 \pm 9,1$ pg/ml) than control group ($36,7 \pm 4,6$ pg/ml) ($p < 0,001$). Nevertheless, six months after root canal treatment, IL-8 levels were similar between patients and controls ($p = 0,3886$), emphasizing an initial efficacy of endodontic therapy in the decrease of inflammatory serum markers.

Conclusions: the root canal treatment showed early evidence in ameliorating the systemic inflammation by reducing the levels of inflammatory markers such as IL-8.

CONSERVATIVE SHAPING COMBINED WITH THREE-DIMENSIONAL CLEANING CAN BE A POWERFUL TOOL: CASE SERIES

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Aim: the purpose of this case series was to report on the outcome of root canal treatments following a conservative canal preparation, followed by three-dimensional cleaning technique.

Methods: three clinical cases were reported. For each case, 3D cleaning technique (intracanal heating and ultrasonic activation of NaOCl) was performed.

Results: healing of periapical disease was achieved in the reported cases following conservative root canal preparation, ir-

rigation with 17% EDTA, and intracanal heating and ultrasonic activation of NaOCl.

Conclusions: conservative endodontics has been introduced about a decade ago. Since then, it has been demonstrated that less canal preparations lead to more dentin preservation resulted in decreased stress on tooth structure, mainly in the coronal third of the root, and potentially a higher resistance to fracture. In addition, smaller and larger canal preparations were comparable with regard to the cleanliness of the root canal.

EVALUATION OF SEALING ABILITY OF PREMIXED BIOCERAMIC ROOT CANAL SEALER IN APICOECTOMY

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Aim: premixed bioceramic sealers are a group of materials available in endodontics used, among other things, as filling materials for root canal system. The aim of this study is to analyze the sealing ability of Fill Root ST (Dental World SRL) in teeth subjected to apicoectomy.

Methods: in 2021, three patients were referred to the Complex Operating Unit of Oral Pathology and Surgery, University of Bari "Aldo Moro", for an occasional RX-OPT finding that showed a round radiolucency in the first quadrant. No pain was reported. Two of the patients presented a root residue that represented likely the cause of the round radiolucency. The other one referred a trauma in 2011. Vitality test was performed on teeth involved that showed the negative response of some of them. Endodontic therapy

was performed in ten teeth and the root canal system were filled completely with Fill Root ST. No guttaperca cone was used. Then surgery and apicoectomy were performed without using any ultrasonic devices and retro-filling materials. Five roots apex were analyzed with microscope and coloured with methylene blue

Results: the analysis of the five roots apex under high magnification showed no gaps between the Bioceramic sealer and the dentin walls.

Conclusions: premixed Bioceramic sealer (Fill Root) used as the only filling material during endodontic treatment seems to have a good sealing ability. Furthermore it permits to perform apicoectomy in an easy way, with no need of ultrasonic tips and retro-filling materials.

TREATMENT OF AN ENDO-PERIO LESION: CASE REPORT

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Aim: treatment of endo-perio lesion is a highly challenging task to dentist because differentiating between periodontal and endodontic problems can be difficult.

In this work we present a clinical case of a patient in which endodontic treatment was planned before than periodontal one.

Methods: this is a case report of a 40-year-old male patient, current smoker, complaining of pain and pus discharge from the third quadrant.

He has positive familiar anamnesis for periodontal disease, pain localized on 3.7 tooth, M1 mobility; there is purulent exudate and spontaneous gingival bleeding on the same element. The presence of deep periodontal pocket measuring 10mm on the distal root was observed and there is furcation involvement. Radiograph shows an endo-perio lesion, with enlargement of the periodontal space and a large area of ra-

diolucency of the periapical area of the distal root, extended to the furcation.

The cold test and the cavitory test confirmed the pulpal necrosis of the affected element. It was immediately treated with Ni-Ti rotary instruments and warm vertically compacted gutta percha obturation technique. Subsequently, 2 sessions of scaling and root planing and topical application of antibiotic in the periodontal pocket are carried out.

Results: after 1 year a periapical radiograph shows the healing of the lesion, with mineralization of the bone defect; the periodontal probing depth is improved and there is no longer involvement of the furcation.

Conclusions: the correct diagnosis and therapy of the endo-perio lesion led to successful resolution of a complex dental problem.

THE IMPORTANCE OF ADEQUATE KNOWLEDGE OF THE ENDODONTIC ANATOMY IN IATROGENIC COMPLICATIONS

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Aim: the purpose of this study is to describe the use of innovative technologies for the functional restoration of dental elements that undergone iatrogenic perforation.

Methods: the clinical case presented is related to a young woman who was referred to our attention because of endodontic access difficulties by the previous dentist. Endoral X-rays and CBCT (Cone Beam Computer Tomography) showed besides an important periapical lesion, a perforation of the coronal portion of the root in the disto-lingual direction. Then we proceeded to the rectification of the endodontic access, to the detection and the shaping of the canal. The obturation phase was carried out using the vertical condensation technique with gutta-percha up

to the perforation, which was obturated with Root Repair Material. The clinical procedure was performed using the operative microscope, which allowed a precise management of the detection of the canal and the obturation of the perforation.

Results: a six-month follow-up, performed by endoral X-ray, showed a reduction of the periapical lesion. Moreover, the CBCT confirmed the success of the endodontic treatment and the bone remodeling.

Conclusions: the literature supports the management of iatrogenic perforations and the missed anatomy using innovative techniques, such as the use of RRM and cutting-edge technologies such as operative microscope and CBCT.

ENDODONTIC TREATMENT OF A CENTRAL INCISOR WITH A SEVERE POST-TRAUMATIC CALCIFICATION

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Aim: the purpose of this study is to focus on concepts, technologies and operating sequences that may help clinicians to face teeth with severe dystrophic calcifications.

Methods: a 40-year-old female patient had suffered trauma to her maxillary incisors two years before coming to our attention. Initially, she observed only discolouration of the 2.1 element and no pain. Later, the symptoms of painful apical periodontitis with an abscess appeared. The previous dentist tried to drain the abscess, but when he realized that the tooth was calcified, he chose to refer the patient to our practice. The CBCT (Cone Beam Computed Tomography) showed a deviation of the access cavity, confirmed the severity of the calcification, the presence of a periapical radiolucency and erosion of the vestibular cortical bo-

ne. After rectifying of the endodontic access, identifying the canal and probing it, it was shaped with reciprocating Ni-Ti instruments. Then it was obturated with vertically condensed thermoplasticized gutta-percha, using the continuous wave technique.

Results: at 8 months follow-up, periapical radiography showed the healing of the peri-apical radiolucency. In agreement with the patient, a CBCT was performed which confirmed bone healing. The 3D reconstruction of the vestibular cortical, after 8 months, appeared perfectly normal.

Conclusions: the use of CBCT, operating microscope, ultrasonic tips and the excellent operator experience allows the achievement of therapeutic success in the treatment of severe post-traumatic calcification.

PRINT AND TRY TECHNIQUE: 3D-PRINTING PREVIEW OF TEETH EXTERNAL RESORPTIONS

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Aim: the purpose of this report is to evaluate the applicability of a novel Print and Try technique in the presence of external resorptions (ECR) and to achieve a predictable treatment with improved outcome. The difficulties in interpreting three-dimensionally the ECR defect with conventional intra oral radiography have been overcome with the use of CBCT. The knowledge of the ECR morphology and its frequent variations is a basic requirement to correctly manage the ideal clinical approach and material choice.

Methods: three molars with presence of external resorptions have been selected for testing the predictability of the Print & Try technique. The defects were asymptomatic with a different extension and location. For all cases a CBCT has been requested. From CBCT it has been obtained a file that was transformed in an STL and printed after with a high definition 3d printer. First case was an upper asymptomatic second molar with external resorption located distally at the interproximal area. A root canal treatment and a contextual defect seal with a bioceramic putty material represented the treatment of choice. The second

case reported treatment of a necrotic lower first molar with ECR at the coronal level of the mesio buccal root. The defect has been treated in a single visit with a surgical approach and flow composite seal of the defect and contextual root canal treatment. The last case was a lower first molar with ECR located in disto buccal area close to the pulp chamber. A pulp capping after ECR management with putty bioceramic material and composite restoration represented the treatment plan of choice.

Results: a clear 3D-plastic tooth model including its root canal system represents an ideal training ground for both the expert clinician facing a complex endodontic case with ECR lesion. A Print and Try approach has a clinical and educational value as it allows to decide the best treatment plan and to practice each operative stage.

Conclusions: in complex ECR lesions, patient-specific 3D-models seem to facilitate treatment planning and, subsequently, they seem to make the actual therapy extremely precise, increasing the comfort for clinicians and patients and positively influencing the outcome.

GUIDED ENDODONTIC MICROSURGERY: A DEFINITIVE APPROACH

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Aim: the diagnostic-therapeutic software has expanded becoming an increasingly efficient tool in implantology. We have been using this software to improve performance in surgical endodontics, trying every day to optimize its use. Guided Endodontic MicroSurgery (GEMS) aims to reach the lesion site of the apical root and excise it, making endodontic microsurgery an easy and safe process in accurate way.

Methods: the bone-supported surgical guides have been designed to directly access the apex of the infected tooth, refining their accuracy in reaching the target apex and assisting in the movement of tissues during the surgical procedure. Previously, GEMS accuracy was evaluated in a human cadaver study. Fifty-eight patients regardless of the dental district (excluding third molars) were treated with GEMS by two diffe-

rent operators. Correct identification of the apex and its subsequent removal was considered the success of the procedure. Endodontic success was also evaluated after 12 months.

Results: the success consisted in the actual reaching of the root affected by the pathology and in its direct removal with the drills used for the access procedure. In 54 patients this was achieved; in the remaining 4 cases the objective was partial even if it was possible to complete the intervention without damaging the anatomical structures adjacent to the lesion. The 12-month success of surgical endodontics was 96.5%

Conclusions: GEMS showed an optimal success rate, a relevant percentage of safety and precision and a remarkable adaptability regardless of the position of the treated dental elements.

ORTHODONTIC MANAGEMENT OF TRAUMATIZED TEETH WITH CORTICOTOMY AND ROOT SEPARATION

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Aim: corticotomy is a surgical procedure aiming to shorten orthodontic treatment time. Cortical bone that strongly resists orthodontic forces is removed, maintaining bone tissues vascularization and continuity. This leads to a necrosis risk reduction and tooth movement facilitation. We herein report a rare presentation of successful orthodontic treatment in a root-sectioned 1.2 during corticotomy procedures. Despite this, the tooth remained viable and stable in the new position. Two-year follow-up revealed no signs of tissue pain, and patient never complained any symptoms, so that endodontic therapy was not necessary.

Methods: since orthodontic forces was not enough to bring 1.2 into the archway, corticotomy was the only way to achieve

the treatment goal. During the bone section, the root was dissected with root canal involvement, but the orthodontic treatment and tooth maintenance were not compromised.

Results: 1.2 gone back to the arch, without signs or symptoms of necrosis and weak vitality in the first 6 months. Two years follow-up revealed increased vitality, although reduced.

Conclusions: the orthodontic treatment didn't compromise the maintenance of the root-amputated tooth, but allowed its stabilization in the new bony structure, according to the primary orthodontic treatment goals. Therefore, this case demonstrates not only orthodontic, but also endodontic success. Tooth vitality was not compromised and no inflammatory reaction occurred although unconventional roots morphology.

SURGICAL ENDODONTIC RETREATMENT: A CASE REPORT

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Aim: the purpose of this case report is to describe a modified surgical endodontic retreatment protocol for immature teeth when the MTA apical plug technique doesn't give the expected results.

Methods: a 18-years old patient was referred to our attention in May 2020, due to an acute apical abscess in the left maxillary anterior region. Endoral X-ray and CBCT (Cone Beam Computed Tomography) showed the presence of a radiolucency around the central incisors. Consequently, an endodontic access and calcium hydroxide medication were performed. Then, the canal was shaped and obturated using the apical plug technique with MTA. At 6-month follow-up, the patient presented increased mobility of tooth 2.2 and clinical evidence of a fi-

stula. It was decided to perform an apicectomy of the element. A subperiosteal flap with preservation of the papilla was elevated between areas 1.1 and 2.3. The vestibular cortical bone was intact, but really thin, so it was removed with a microsurgical curette. The lesion was excised and the apical 3 mm of the root was abraded with a StartX #2 ultrasonic tip. Later, resorbable membrane was applied and the flap was sutured.

Results: the 9-month follow-up it showed almost complete healing, which is an excellent result considering the initial condition of the patient. Another CBCT is scheduled in 1 year.

Conclusions: surgical endodontic retreatment could be the best choice which guarantee right tissue healing and bone regeneration.

HEATING OF SODIUM HYPOCHLORITE AND MAINTENANCE OF INTRACANAL TEMPERATURE: AN *EX VIVO* STUDY

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Aim: the objective of the present study was to compare the effectiveness of several methods of sodium hypochlorite (NaOCl) heating in terms of temperature values obtained at different levels of the root canal.

Methods: five thermocouples were positioned at different levels of the root canal system (apical foramen, 5 mm from the apex, 10 mm from the apex, at external surface 3 mm from the apex, within the root canal at the cervical third level) of 12 extracted human premolars. NaOCl solution was heated extraorally (until 50 °C, 60 °C, and 70 °C, respectively) or intracanal using F-06, XF-30/04, and ML-12 pluggers at 100 °C, 150 °C, and 180 °C, respectively.

Results: extraoral heating and ML-12 plugger were similarly

unable to provide a significant temperature increase at the root apex, even though the latter provided slightly better outcomes when set at 180 °C. Conversely, F-06 and XF-30/04 pluggers showed any differences in terms of temperature maintenance across the root. XF-30/04 provided the highest time intervals when set at 180 °C.

Conclusions: within the limitation of the present *in vitro* study, it was demonstrated the effectiveness of intracanal heating by System B plugger providing a better temperature persistence in the middle third of the root canal system. Only ML-12 plugger showed comparable outcomes to extraoral heating demonstrating to be ineffective to produce a significant temperature increase within the root canal system.

CORRELATION BETWEEN ROOT CANAL TAPER AND RESIDUAL RESISTANCE OF RESTORED MAXILLARY PREMOLARS

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Aim: to investigate the effect of canal taper on the residual cervical dentin volume and the fracture resistance of maxillary premolars restored with and without fiber post and with full-crown preparation.

Methods: thirty maxillary premolars were selected, micro-Computed Tomographic (micro-CT) scanned and divided into three groups. In the group TN shaping was achieved with Tru-Natomy up to Prime Shaping File (#26, .04), in the group B4U with .05 taper instruments up to #23 while in the group PTN ProGlider and ProTaper Next were used up to X2 (#25, .06). Afterwards specimens were obturated with a single cone and bioceramic sealer and micro-CT scanned. Then a MOD cavity was prepared. In the subgroup FP a fiber post (FP) was luted in the palatine root followed by a composite restoration while in the subgroup NFP no FP was used. Afterwards all specimens

were prepared for a full-crown restoration and micro-CT scanned. The volume of removed dentin in the cervical third was analyzed in the preoperative, post-shaping and post-restoration micro-CT scans. Specimens were submitted to static fracture resistance test.

Results: the mean dentin removed volume after full-crown preparation resulted higher than the amount spared with different shaping systems in both groups. For FP and NFP subgroups, the mean dentin removal in the cervical third resulted similar. No significant differences among fracture resistance resulted in both TN and PTN groups.

Conclusions: regardless of the presence of a fiber post the spare of cervical dentin during instrumentation resulted not related to the final cervical dentin volume after full-crown preparation and to tooth fracture resistance.

MECHANICAL BEHAVIOR OF PREMOLARS RESTORED WITH ENDODONTIC COMPOSITE POSTS

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Aim: nowadays the enhanced post-dentin interface and the material placement homogeneity is provided by endodontic hollow posts thanks to the material delivery through the post hole. The aim of the present study was to analyze the mechanical features of continuous glass or carbon fiber endodontic posts to enhance retention and resistance of the tooth-restoration system.

Methods: mechanical properties were determined through bending tests of three types of endodontic posts, a glass fiber compact post, a glass fiber hollow post and a carbon fiber hollow post. Teeth were aged thanks to cyclic fatigue in a water environment at a constant temperature. The compression stiffness of teeth was assessed through static compression test and finally fracture patterns were microscopically analyzed.

Results: mechanical stability of tooth-restoration system with composite posts was increased more than 100% compared to premolars restored only with particulate composite. Among the investigated systems, the highest strength and the potential of tooth re-treatment after fracture had been taken in account. In particular, carbon fiber hollow post presented the highest compression strength with an impracticable tooth re-treatment, while glass fiber hollow post was more compliant with a favorable type of fracture that allowed tooth re-treatment.

Conclusions: the best trade-off between strength and the potential of tooth re-treatment after fracture was achieved by the glass fiber hollow post.

INFLUENCE OF WIRE DIAMETER ON FATIGUE RESISTANCE OF ENDODONTIC FILES AT BODY TEMPERATURE

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Aim: the aim of this study was to compare the fatigue resistance of TS2 prototypes (Micro-Mega, Besançon, Francia) obtained from 1.0 and 1.2 diameter NiTi wire differently thermally treated at room ($25^\circ \pm 1^\circ\text{C}$) and body temperature ($37^\circ \pm 1^\circ\text{C}$).

Methods: eighty NiTi TS2 1.0 and TS2 1.2 files differently heat treated (Controlled-Memory wire and T-wire) were used at $25 \pm 1^\circ\text{C}$ and $37 \pm 1^\circ\text{C}$ temperatures for fatigue testing using a customized test device with an artificial channel of 60° angle curvature and 5mm radius. For each file, the number of cycles to fracture was calculated and the length of the fractured fragment was measured. Data were analyzed using 2-way

analysis of variance followed by Tukey post hoc test at 5% significance level.

Results: the CM-wire files had the statistically highest fatigue resistance, both at room and body temperature independently from the wire dimensions. Body temperature negatively affected fatigue of all tested prototypes. 1mm wire diameter files made by T-Wire showed higher fatigue resistance than 2mm wire files, while for CM-wire there were no significant differences between the two wire dimensions at both temperatures.

Conclusions: TS2 prototypes made of CM alloy showed higher fatigue strength than TS2 T-Wire files, regardless of wire size.

INFLUENCE OF HEAT TREATMENTS AND TEMPERATURES ON RESISTANCE OF NITI FILES WITH SAME DESIGN

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Aim: this study aimed to evaluate the influence of different temperatures and different heat treatments on cyclic fatigue resistance of 2Shape instruments (Micro-Mega, Besancon, France).

Methods: 80 2Shape TS1 (#25.04) and 80 TS2 (#25.06) instruments with different heat treatment (no treated, C-Wire, T-Wire, CM-Wire) were tested at room ($25^{\circ} \pm 1^{\circ}\text{C}$) and body ($37^{\circ} \pm 1^{\circ}\text{C}$) temperatures in 16 mm stainless steel artificial canal with a curvature of 60° and 5 mm of radius. Files were tested in continuous rotation of 300 rpm and 4.1 Ncm in a customized device. Cyclic fatigue resistance was expressed in number of cyclic to fracture (NCF). Surface of each fractured fragment was examined with a scanning electron microscope (SEM). Data were analyzed statistically using 2-way analysis of varian-

ce and the Bonferroni multiple comparison post hoc test at 0.05 as level of significance.

Results: all TS1 and TS2 files with CM-Wire showed higher NCF than all the other groups both at room and body temperature ($P < 0.0001$). TS2 C-Wire showed higher resistance than TS2 NHT and TS2 T-Wire files ($P < 0.0001$), with no significant differences between the last two files ($P > 0.05$).

Body temperature significantly decreased cyclic fatigue of all tested files ($P < 0.05$) except for TS1 no treated and T-Wire.

Conclusions: within the limitations of this *in vitro* study, body temperature negatively affected cyclic fatigue resistance of C-Wire and CM-Wire TS1 and of all TS2 files. In addition, all the instruments produced with CM-Wire heat-treatment exhibited the highest cyclic fatigue resistance among all the tested files.

IN VITRO CYTOTOXICITY OF DIFFERENT BIO CERAMIC ROOT CANAL SEALERS

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Aim: this investigation assessed *in vitro* the cytotoxic properties of different bioceramic sealers on human gingival fibroblasts over different time periods (24, 48 and 72 h).

Methods: the bioceramic sealants used in this study were Fill Root ST, BioRoot™ RCS, Well-Root™ PT, CeraSeal; Pulp Canal Sealer™ EWT was used as control. Immortalized human gingival fibroblast-1 were incubated at 37°C for 24 h with 100 μL of extraction medium made eluting each root canal sealer sample in cell culture medium for 24, 48 or 72 h at 37°C . Cells incubated with fresh medium was used as control. The amount of viable cells in

each well was calculated relative to control cells set to 100%.

Results: all the tested bioceramic sealers showed a mild cytotoxicity after 24 h, except for CeraSeal, with a moderate cytotoxicity after each time of incubation ($P > 0.05$). The cell viability significantly reduced after incubation of 48 h and 72 h with Fill Root ST but did not significantly reduce with BioRoot™ RCS and Well-Root™ PT ($P < 0.05$).

Conclusions: fill Root ST, BioRoot™ RCS and Well-Root™ PT bioceramic sealers appeared less cytotoxic after setting, compared with CeraSeal and Pulp Canal Sealer™ EWT.

RECIPROC BLUE AS INSTRUMENT FOR RETREATMENT OF GUTTAFUSION CARRIER-BASED SYSTEM

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Aim: to evaluate the effectiveness of reciprocating NiTi during a secondary root canal treatment (SRCT) of oval shaped canals filled with bioceramic sealer.

Methods: 16 single-rooted oval-shaped roots were shaped to size 25.06 using Rotate (VDW, Munich, Germany) NiTi and randomly divided into 2 groups: single cone group (SC; N = 8) was filled with Neosealer (NuSmile, TX, USA) and single cone, Guttafusion group (GF; N = 8) was filled with Neosealer and Guttafusion (VDW, Munich, Germany). Each tooth was retreated using Reciproc Blue (RB; VDW, Munich, Germany) #25, #40 and #50 with adequate irrigation. X-rays and CBCT were taken before first canal treatment, after instrumentation, after filling procedures, after SRCT with RB#40 and after RB#50. Periapical X-rays were used to

quantify the area of the root and remnants in the coronal, middle and apical third of the canal. CBCT images were used to calculate the volume of the canal and the volume of residual filling material.

Results: X-rays allowed the quantification of remnants Area. GF group revealed great number of remnants at middle third. The remnants Volume was calculated by CBCT. SC group showed great number of remnants with a Volume higher than GF group. Middle third resulted the most affected root Area with the greatest remnants Area and Volume.

Conclusions: filling remnants were mainly located in the middle third of root. X-rays was reliable in detecting remnants. CBCT shows similar images but with some distortion that may affect the clinical interpretation.

ENDODONTIC POSTS AND FRACTURE RESISTANCE: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Aim: the present study aimed to answer the following PICO question: Is the fracture resistance of endodontically-treated maxillary premolar increased by different posts and composite reconstruction?

Methods: the PRISMA protocol was adopted to evaluate *in vitro* studies including endodontically-treated maxillary premolars, restored with different type of posts (fiber and metal) supporting direct composite reconstructions (layering technique, flowable composite or their combination). Meta-analyses were carried out only on homogeneous studies using fixed-effect model and Trial Sequential Analysis (TSA) was performed. The risk of bias was assessed and a further overall quality of evidence was evaluated using Grading of Recommendations Assessment Development and Evaluation (GRADE).

Results: 24 articles were included in the systematic review and 13 studies were also included in the meta-analysis. Fracture resistance of endodontically-treated premolars restored with fiber posts reported an enhanced fracture resistance when compared to equivalent teeth without post ($p = 0.003$), although the same outcome was significantly less than sound teeth ($p < 0.00001$). High power of the performed analyses was obtained by TSA. GRADE system showed moderate strength of evidence, since 23 studies revealed moderate risk of bias and 1 study showed high risk.

Conclusions: endodontically-treated maxillary premolars restored with a fiber post and direct composite restoration demonstrated an enhanced fracture resistance, tending to statistical significance, then equivalent teeth restored without post.

SINGLE VS MULTIPLE-VISIT ENDODONTIC TREATMENT IN NECROTIC TEETH: SYSTEMATIC REVIEW AND META-ANALYSIS

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Aim: a systematic review of the literature was conducted to determine if root canal treatment of necrotic teeth performed in a single visit or in two or more visits, with or without medication, makes any difference in terms of effectiveness or complications. This review updates the previous version published in 2016 on Cochrane Database of Systematic Reviews.

Methods: a thorough search for randomized and quasi-randomized controlled trials (RCTs) was performed. The outcomes of interest were tooth extraction for endodontic problems; radiological failure after at least one year; post-operative and post-obturation pain; swelling or flare-up; painkiller use and presence of sinus track after at least 1 month.

Results: we included 22 RCTs, with a total of 1836 participants

and 1800 teeth analyzed. We judged 5, 11 and 6 studies to be at low risk, high and unclear risk of bias, respectively. No studies reported data on tooth extraction due to endodontic problems. We found no evidence of a difference in terms of radiological failure (RR 0.83, 95% CI 0.60 to 1.15; 924 participants; 10 studies; $I^2 = 15\%$; moderate evidence). The incidence of post-treatment pain within a week and the incidence and intensity of pain until 72 h post-obturation were not significantly different in the 2 groups. Swelling or flare-up, painkiller use and the presence of sinus track were not significantly different with the two approaches.

Conclusions: there was no evidence to suggest that one treatment regimen was better than the other, neither can prevent all short- and long-term complications.

ORTHODONTIC TREATMENT IN A PATIENT WITH ANTISYNTHEASE SYNDROME: CASE REPORT

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Aim: to show possible risk of orthodontic treatment in a patient with antisynthetase syndrome (ASS). ASS is an immune-mediated, chronic pathology, which can affect multiple systems of the body. Common sign and symptoms of ASS are interstitial lung disease, inflammatory myopathy, and inflammatory polyarthritis.

Methods: the patient, a 33-years-old woman, presented a skeletal and dental Class I malocclusion with a crowding of 7 mm, OVJ 5 mm and a slight lateral open bite on sector 1. Patient suffered ASS, was followed by a rheumatologist and was under systemic therapy with monoclonal antibodies. The patient was treated with clear aligners and vertical elastics. One year after the treatment start, patient reported unjustified muscle fatigue and muscular and joint pain. The clinical examina-

tion following the diagnostic criteria for temporomandibular disorders allow a diagnosis of arthralgia, myofascial pain and headache attributed to TMD.

Results: therapy consists in counseling and physiotherapy with massage and stretching exercise to repeat five times per day and suspension of the vertical elastics. After two months of therapy patient reported no more fatigue or pain.

Conclusions: this case report highlights the importance of a comprehensive diagnosis. In patient with ASS particular attention should be paid to the presence of signs and symptoms of TMD given their possible predisposition to these symptoms. A stop and start protocol that provide the treatment of TMD symptoms before to continue orthodontic therapy could be suggested in these patients.

PREVALENCE OF SLEEP BRUXISM: POLYSOMNOGRAPHIC DIAGNOSIS, TOOTH-WEAR AND OROFACIAL PAIN

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Aim: Sleep bruxism (SB) is a condition of great interest although is still complex to define. Polysomnography (PSG) recordings are currently the gold standard for diagnosis. The purpose of this controlled cohort study is to compare clinical tooth wear, head-neck muscles pressure pain thresholds (PPT), diagnosis of temporomandibular disorders (TMD) and the results of SB self-assessment questionnaires between SB patients diagnosed with PSG and non-SB patients.

Methods: adult and self-sufficient patients undergo an ambulatory PSG recording; bruxism episodes are recorded and analyzed through the signal of electrode positioned on masseter and audio-video recordings. The incisal/occlusal tooth-wear is clinically recorded using scale TWES2.0. PPT are measu-

red using Fisher algometer. A clinical examination is carried out to evaluate the presence of TMD and orofacial pain, according to the international diagnostic criteria. SB self-assessment questionnaires are administered.

Results: 7 SB patients and 23 non-SB subjects were included. The analysis of tooth wear does not show a significant difference between SB-patient and non-SBs, as well as PPT and SB's self-assessment questionnaires. There is no evidence of relation between TMD and SB.

Conclusions: results confirm that tooth-wear is not pathognomonic of active SB and that the SB self-assessment is not reliable. Furthermore, the absence of a relationship between TMD and SB confirm the poor relevance of effects of SB activity compared to a daytime clenching.

RHABDOMYOSARCOMA OF THE TEMPOROMANDIBULAR JOINT SPACE: A PECULIAR CASE REPORT

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Introduction: Rhabdomyosarcoma (RMS) is an aggressive malignant tumor composed of neoplastic mesenchymal cells. RMS is the most common soft tissue sarcoma in children, and in 40% of the cases it occurs in the head and neck region where it often presents facial swelling, throat discomfort, or nasal airway obstruction, lacking specific signs and symptoms.

Case report: we report a rare case of RMS developed in the space of the right temporomandibular joint in a 12-year-old male patient. After 6 months of intractable pain around his right ear and mandible, an orofacial pain specialist was consulted. The patient reported a high intensity pain of short duration that occurred every 3/5 minutes. On a clinical examination, there was a severe limitation of mouth opening with a mandible deviation to the right side. Evaluated with Von Frey hairs, the patient re-

ported paresthesia in the right auricular area and hyperalgesia in the right side of the mandible. All these clinical aspects suggested requesting urgent magnetic resonance imaging that revealed the presence of the neoplastic mass. An incisional biopsy led to the diagnosis of poor prognosis *Embryonal RMS*.

Discussion: the difficulty in making a correct diagnosis is attributable to the intracranial growth of the tumor which led to an unusual presentation of the problem. Nevertheless, the accurate evaluation of the patient's history and of the characteristics of pain was crucial to improve the diagnostic process. Continuous and nonspecific signs and symptoms like limited mouth opening and persistent pain both during function and spontaneous should alert despite patients do not show any facial swelling.

FORENSIC DAMAGE ASSESSMENT OF TEMPOROMANDIBULAR JOINT: A REVIEW

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Aim: recent studies highlight the underestimation of traumatic orofacial lesions and related individual sequelae. Forensic assessment should not be limited to detecting dental fractures and traumas, and the persistence of painful symptomatology and functional and muscular limitation should be considered pathological. The purpose of this study is to determine whether there is a relationship between damage assessment and TMD.

Methods: the research for the keywords "damage assessment" and "TMD" joined by the boolean operator "AND", on the search engine PubMed, until February 2022, produced 69 results. There were 5 articles included that satisfied the question: 4 retrospectives, and 1 prospective study.

Results: all studies show direct proportionality between severity and type of trauma with soft tissue changes. Damage assessment should always be supported by diagnostic examination on both sides of the face, regardless of the characteristics of the impact: TMJ is often subject to involvement by indirect trauma, despite the *restitutio ad integrum*.

Conclusions: this review wants to expose the existing correlation between orofacial damage and the individual sequelae that in direct and indirect ways involve in good percentage the TMJ.

Future studies will clarify the real extent of a traumatic event, as well as its management and treatment.

GNATHOLOGY IN SPORT: NEW TECHNOLOGIES IN A MULTIDISCIPLINARY ANALYSIS

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Aim: the aim of this work is to analyze oral, postural, podiatric and performance conditions of a group of athletes.

Methods: the study included 30 basketball players of three Italian clubs, aged between 18 and 27. After anamnesis, the dental team evaluated each athlete in oral, gnathological and postural condition. A surface electromyography (Teethan) was used to measure masticatory muscles parameters. A band accelerometer (Baiobit) was used to register posture, balance and functional mobility. Data were integrated with a baropodometric platform (Loran) analysis, made by a podiatrist. Performance jump tests were standardized and registered by clubs' athletic trainer, using infrared sensors (Optojump).

Results: 97% of examined athletes had at least one type of

gnathological asymmetry: dental, muscular, articular or functional. Elettromiography confirmed these results reporting quantitative data on muscular parameters. Accelerometer tests detected postural asymmetries, the most relevant was pelvic rotation in axial jump movements ($19.65^\circ \pm 0.70$). Baropodometric tests reported that 93% of participants had at least one type of asymmetry in plantar support in terms of pressure, surface, antero-posterior or latero-lateral.

Conclusions: the results highlight the importance of gnathological and multidisciplinary approach in athletes in order to design targeted therapies. Further studies will evaluate any possible correlations between selected parameters, integrating a multidisciplinary follow-up after gnathological treatment.

EXTRACORPOREAL SHOCK WAVE THERAPY IN PAIN RELIEF FOR PATIENTS WITH TEMPOROMANDIBULAR DISORDERS

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Aim: Temporomandibular Disorders (TMD) are defined as a set of disorders affecting the masticatory muscles, TMJ, and/or associated structures. This study aimed at comparing the efficacy of physical therapy, with or without Radial Extracorporeal Shock Wave Therapy (rESWT), in TMD patients.

Methods: in this pilot randomized clinical trial, patients were recruited from University Hospital "Mater Domini", Catanzaro, Italy in a 6-month period (July-December 2021) and randomly assigned 1:1 to receive physical exercise combined with rESWT or sham rESWT for 4 weeks. Inclusion criteria were: diagnosis of myofascial pain (Group Ia,Ib - DC/TMD); VAS ≥ 3 ; pain lasting from at least three months on at least one masseter muscle. Primary outcome was pain intensity measured by VAS; secondary outcomes were muscle activity assessed by sEMG of anterior temporalis and masseter muscles.

Results: fifteen patients were enrolled after providing informed consent and were randomized to rESWT therapy plus physical therapy (n = 8; mean age: 28.50 ± 8.85 years) or physical therapy alone (n = 7; mean age: 30.71 ± 8.98 years). A significant improvement in pain in the group A (Right side: p = 0.02; Left side: p = 0.02) at the end of treatment. Concerning the secondary outcome, Group A patients showed a statistically significant reduction in BAR (at T2: p = 0.04; at T3: p = 0.03). Moreover, rESWT group reported significant increase in total standardized muscle activity (IMP, IMPACT score) and a significant POC in masseter muscles at T1 (p = 0.04).

Conclusions: taken together, findings of the present study showed that the synergistic approach between rESWT and physical therapy reported a significantly lower pain and a higher POC index on the masseter muscles compared to the control group.

A CASE OF SEVERE TMJ DEGENERATIVE DISEASE WITH LEFT CHONDROMATOSIS

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Aim: to present a case of extensive unilateral TMJ chondromatosis. Synovial Chondromatosis (SC), a benign proliferation of cartilaginous tissue in synovial joints, is relatively rare in TMJ, especially when cartilaginous calcified bodies are particularly voluminous. Relationship of calcified bodies with bone components of the joint or disk and articular spaces are depicted in CT and MRI respectively and help in clarifying pathogenesis and guiding surgery. Secondary SC may be associated with degenerative changes of the joint components and with previous trauma. Differential diagnosis concerns osteo-cartilaginous neoplasms.

Methods: a 61-years-old female patient referred to Gnathology Dep, Dental School, Turin University, complained of left TMJ pain, with articular crunch, restriction on opening the

mouth and sporadic dizziness. A fall down from a high chair at 2 years old has been reported. Clinical examination: crackling, muscle and joint pain were evident on masseter palpation on both sides at the pressure of 1 kg, bilateral joint pain and crackling, reduction of active and passive opening, 27 mm and 38 mm respectively. TMJ CT was prescribed.

Results: CT findings: unilateral severe degenerative changes with osteophytes, pseudocysts, cortex sclerosis and erosion, flattening of the condyle head and multiple calcified bodies in the left TMJ with no calcified bodies or degenerative changes in right TMJ. No direct signs of condylar fractures.

Conclusions: CT unilateral pathological findings and anamnestic datum of trauma orient the diagnosis toward a post traumatic SC.

TEMPOROMANDIBULAR JOINT DISORDER IN SJOEGREN SYNDROME: A SYSTEMATIC REVIEW

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Aim: Sjogren Syndrome (SS) is a chronic systemic autoimmune disease characterized by progressive lymphocytic infiltration of the exocrine glands and sicca syndrome. Oral functions impairment due to low salivary flow includes difficulty in chewing, swallowing and talking, dysgeusia, tooth decay, mucosal atrophy. Muscular and nervous domains are frequently involved in SS but their clinical relevance in the oro-facial district have rarely been investigated. The aim of this systematic review is to evaluate the possible association of temporomandibular joint disorders (TMJD) with SS.

Methods: PubMed, Embase, Web of Science and Scopus databases were electronically searched for observational studies reporting TMJD or TMJ involvement in patients with a diagnosis of SS according to the 2002 American-European Consensus Group (AECG) classification criteria.

Only articles in English were included.

Results: from 42 articles 7 relevant articles have been selected and read in full. SS patients presenting symptoms and signs of TMJ involvement ranged between 29% - 91% and prevalence of TMJD ranged between 29% and 54%. All controlled studies agreed on reporting a significant higher prevalence of TMJD in the SS group. Two studies reported a significant decrease in masticatory muscle activity and tongue strength compared to age-and-sex-matched controls.

Conclusions: when investigated, symptoms and signs of TMJD are reported in most of SS patients, who show a much higher prevalence of TMJD compared to the general population (31% among adults, 11% in adolescents). More data are needed to assess the possible association between SS and TMJD and its causes.

NEW PERSPECTIVES FOR SOFTWARE-ASSISTED REHABILITATION IN PATIENTS WITH SYSTEMIC DISEASES

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Aim: the aim of this case report is to include a patient in a computerized workflow, that can follow him in every phase of the treatment and track the mandibular position and movements as closely as possible to reality, in order to create customized devices.

Methods: the objective test of the vulnerable patient that was selected, revealed mobility and extrusion of the periodontally involved elements 3.2 and 4.2, severe impairment of masticatory function and an altered mandibular position, due to the deviant precontact offered by 3.2 and 3.3 elements. The lateral incisors, above mentioned, were extracted and, in order to rehabilitate edentulism through fixed prostheses on osseointegrated implants, a software which combines the full-arch digital impressions, the 3D CBCT data of the jaws and the JMT data, was used.

Results: the software shows on the screen a 3D image of the patient's specific mandibular movement. The spaces and volumes available can be measured with maximum precision, in order to select the most suitable areas for implant placement. In this case a four-element bridge was chosen. The most correct implants angulation and sinking were established, in order to prepare the site and to offer a prosthetically guided axis for the abutment. Then a CAD-CAM surgical guide was ordered.

Conclusions: using the modern computerized approach, it is possible to obtain static and dynamic information, which will be useful in the realization of the prosthesis, relying on the real movements of the patient and considerably reducing the chair time and the patient discomfort.

RELATIONSHIP BETWEEN PERIODONTITIS AND OSA IN ADULTS: A SYSTEMATIC REVIEW

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Aim: the purpose of this systematic review was to evaluate whether there is scientific evidence regarding the association between periodontitis and OSA in adults.

Methods: the study was conducted according to the PRISMA statement. An electronic search was performed on Medline/PubMed including prospective and retrospective longitudinal studies, cohort studies and case-control studies conducted in human adults affected by both OSA and periodontitis, published between 2000 and 2021. Two reviewers extracted the data using a custom Excel spreadsheet. A methodological assessment of the quality of the studies was performed using the Newcastle-Ottawa scale.

Results: fourteen studies were included. All studies evaluated the association between periodontitis and OSA. None of the

studies evaluated the cause-effect relationship. Eleven studies found a significant positive relationship between periodontitis and OSA, while three found no statistically significant association. The evidence for a dose-response relationship was conflicting. Several study limitations were observed, such as lack of standardization of study groups, diagnosis of periodontitis and OSA and differences in study design.

Conclusions: evidence of a plausible association between periodontitis and OSA was found. The possible relationship could be explained by systemic inflammation, oral breathing, and the comorbid relationship attributable to common risk factors. Observational and randomized controlled studies are needed to clarify the mechanism of interaction between the two conditions.

ASSESSMENT OF ORAL BEHAVIOURS IN INDIVIDUALS WITH HEADACHE

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Aim: oral behaviors are predisposing factors for the development of temporomandibular disorder (TMD). There are no information regarding the contribution of these oral activities in the onset of headache disorders. The aim of the current study was to assess the frequency of oral behaviors in patients different type of headache.

Methods: participants were retrospectively recruited from the Section of Orthodontics and Temporomandibular Disorders of the University of Naples Federico II. Adult patients with a diagnosis of headache attributed to TMD, or migraine, or both, were included. The oral behaviors were measured with the Oral Behavior Checklist (OBC). OBC total score, sum of non-functional activities (NFA) and functional activities (FA) were computed. Between groups differences were calculated

by means of a one-way Analysis of Variance (ANOVA), with Bonferroni post-hoc. Statistically significant level was set at $P < 0.05$.

Results: one-hundred fourteen (114) patients were selected, of which: 19 with migraine (4 M, 15 F, mean age 40.7 ± 14.7 years), 74 with headache attributed to TMD (12 M, 62 F, mean age: 40 ± 17.9 years), and 21 with mixed headache (3 M, 18 F, mean age 37.5 ± 12.7 years). Considering all the study variables, the oral behaviors in the migraine group were lower, as compared to both headaches attributed to TMD and mixed headache patients. However, these results did not reach statistical significance.

Conclusions: oral behaviors seem to play a limited role in the development of headache disorders.

PRELIMINARY STUDY WITH FMRI ON PATIENTS WITH TMD DISORDERS

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Aim: this study aims to evaluate by fMRI the efficacy of gnathological therapy on patients with teeth clenching and myofascial pain and study the variations and effects on the CNS. Correct clinical treatment can modify the functional activation of cerebral networks associated with pain and unconscious teeth clenching, specifically the pain network (PN) and default mode network (DMN).

Methods: a case series on 10 pts (5 intra-articular-5 extra-articular). Each pt was treated with passive aligners and biofeedback exercises (only one pt has not been assigned a biofeedback exercise). All pts are examined monthly with VAS and muscle palpation. MRI of the TMJ and fMRI of the brain are performed on each pt before and after treatment.

Results: this study showed the reduction of symptoms in 10/10 pts, both in referred pain and trigger points detected during muscle palpation and VAS. The fMRI of the brain showed that 9/10 pts have a homogeneous functional modification of PN and DMN. In only one patient, the values of the networks are opposite because he did not perform the exercise.

Conclusions: the gnathological therapy with passive aligners and biofeedback exercises improved clinically myofascial pain in all patients. This type of therapy may be an effective treatment option for patients with TMD. These results are decisive because they allow associating an external and completely subjective datum (pain) to an objectively repeatable activity at the level of precise cerebral networks.

CLINICAL EFFECTS OF ABDOMINAL ACUPUNCTURE TREATMENT IN NON-RESPONDING TMD PATIENTS

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Aim: Temporomandibular Disorders (TMD)-related pain is often characterized by little or no response to conventional treatments. *Abdominal acupuncture* (AA) is successfully used for treating pain and neurological disorders, but evidence of its effectiveness in orofacial pain field is lacking. This retrospective study aimed to analyze the effects of AA on pain and pain interference in quality of life of TMD patients non-responding to previous therapies.

Methods: 28 patients, 24 females and 4 males (average age = 49.36 years) visiting our Clinical Gnathology Unit, between January 2019 and February 2021, with subacute and chronic treatment resistant TMD-related pain were fully treated and analyzed. All patients underwent to 8 AA sessions, twice a week, each lasting 30 min. At the start (T0) and end (T1) of AA

treatment the maximum mouth opening (MMO) and craniofacial pain intensity (VNS) were measured. At T0 and T1, all patients also completed the Oral Behaviour Checklist (OBC). The Wilcoxon signed-rank test was used to compare the VNS, MMO, and OBC results at T0 and T1 (statistical significance for $P < 0.05$).

Results: the difference in MMO and the improvement in oral functioning (OBC) and pain perception, according to VNS, at T0 and T1, resulted statistically significant for all the considered variables (all $P < 0.05$).

Conclusions: AA effectively improved subacute/chronic TMD-related pain and symptoms. Further studies with larger samples and appropriate design are needed to elucidate AA efficacy non-responding TMD patients.

THE ROLE OF NUTRACEUTICALS IN THE MANAGEMENT OF TEMPOROMANDIBULAR DISORDERS

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Aim: to evaluate the efficacy of short-term treatments with nutraceuticals a) isolated or b) combined with splint therapy in subjects with temporomandibular disorders. Nutraceutical used was composed by Boswellia Serrata Casperome, Magnesium, Tryptophan and vitamins B2 and D with a posology of 1 tablet per day before sleep for 40 days.

Methods: as for the purpose a), 140 subjects with neuro-muscular disorders were eligible for the study and randomly divided into 2 groups (treatment group and control group). As for b), 140 subjects in therapy with occlusal splint were randomly divided into groups (treatment group and control group). Presence of muscle pain, headache, neck pain and sleep/emotional disorders were assessed at T0 and at T1, after 40 days. ANOVA was performed to compare treatments with nutraceutu-

tics and their respective controls, as for the variables related to painful symptomatology. c^2 test was performed to assess differences in sleep/emotional disorders between groups. The level of statistical significance was $p < 0.05$.

Results: as for all the parameters under consideration in the ANOVA test, a significative effect of Therapy, Time and their interaction was found with $p < 0.05$. In all groups using nutraceuticals, subjects reported a significant improvement over controls. c^2 analysis showed a reduction of sleep and emotional disorders in subjects taking nutraceuticals compared with controls.

Conclusions: the use of nutraceuticals seems to be a valuable support for TMD therapy in the short term either alone or when combined with occlusal splint therapy.

THE ROLE OF COGNITIVE INHIBITION IN RESPONSE TO PAIN INDUCTION IN TEMPOROMANDIBULAR DISORDERS

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Aim: temporomandibular disorders (TMDs) are a group of pathological entities involving temporomandibular joints and related structures, with a multifactorial etiology. Chronic pain is one of the most frequent issues and its management often represents a challenge for the clinician. As emerged from fMRI, this type of pain is characterized by brain structural and functional alterations and weakening of central and peripheral mechanism of pain modulation, which leads to a lowering of pain threshold and tolerance. Cognitive impairment may also be present in subjects with chronic pain. To address the research purpose, the authors investigated the association between cognitive inhibition and pain in TMD.

Methods: a population of 15 healthy adults and 15 patients diagnosed with chronic TMD, recruited at the Department of

Oral and Maxillo-facial Sciences, Sapienza University of Rome, completed the experimental procedure. The Stroop Color Test was administered to assess cognitive inhibition in a randomized order; the Cold Pressure Arm Wrap was adopted to induce cold pain.

Results: a positive correlation between pain measures (thresholds and tolerance) and cognitive inhibition in TMD ($r = 0.63$; $p = 0.01$), in particular performance (i.e. reaction time) in the Stroop Task predicted pain threshold.

Conclusions: these findings suggest that TMD subjects with higher cognitive inhibition are more likely to manage pain successfully. Further studies, including a growing number of participants and other methods of pain induction, could be conducted to improve the significance level of the study.

MAGNETIC MALLET AND LASERS FOR A MINIMALLY INVASIVE IMPLANTOLOGY: A FULL ARCH CASE REPORT

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Aim: the use of Magnetic Mallet and the laser allows the same interventions to be performed in less time, in a minimally invasive way and with a reduction of postoperative complications. It is possible to exploit the photoablative potential of the Erbium Laser on the bone tissue to create the invitation to the inserts of the Magnetic Mallet with which to practice the expansion of a residual bone crest lacking in thickness and/or the preparation of the implant sites, as well as the properties decontaminants and photo-bio-modulators of photodynamic therapy without dye.

Methods: case report in an 81-year-old patient, fragile subject (ASA-3), with mobility of the upper elements remaining to support a removable prosthesis. The patient requests to rehabilitate the upper arch with a fixed prosthesis. The extraction of the remaining dental elements, root residues and implants, is proposed in the same intervention, with the Magnetic Mallet, after antibiotic prophylaxis; Oxygen High Level Laser Therapy (OHLTL) protocol is performed on post-extraction sites; er-

bium laser is used to increase the regenerative capacity of the site and to create an access where to house the ostotomy inserts of the magnetic mallet; the inserts of the Magnetic mallet are used to compact the bone (increasing its density) and create new implant sites where eight implants are inserted. 4-0 silk sutures, after placing centrifuged PRF to protect the flaps and extraction sites. ATP38 session is performed for 12 minutes within the next two days, the implants will be loaded with a temporary total prosthesis with immediate load screwed to them of the Toronto Bridge type.

Results: the patient had no pain or other complications during the surgery. In the following days, patient declares the absence of edema or post-operative pain. She did not need to take pain relieving or anti-inflammatory drugs. No evidence of infectious complication.

Conclusions: the combined use of the laser and the Magnetic Mallet has made it possible to perform complex therapy even in fragile patient.

CORRELATION BETWEEN ACCURACY IN COMPUTER-GUIDED IMPLANTOLOGY AND PERI-IMPLANT HEALTH

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Aim: the Present Pilot study evaluated the correlation between accuracy, intended as the deviation between the preoperative digital planning and the actual implant position, and peri-implant health.

Methods: five patients underwent computer-guided implant surgery and full-arch immediate loading. Accuracy was calculated on 34 implants overlapping pre and postoperative CT scans. After 1 and 5 years of follow-up, peri-implant health was assessed clinically and radiographically measuring marginal bone loss (MBL), peri-implant probing depth (PPD), bleeding on probing (BOP), width of the peri-implant keratinized mucosa (KM), peri-implant mucosal recession (REC), and plaque accumulation. Statistical analyses were performed using generalized linear models with a level of significance $\alpha = 0.05$.

Results: mean linear deviation was 0.57 ± 0.23 mm at implant head and 0.69 ± 0.26 mm at implant apex, while mean angular deviation of the long axis was $2.88^\circ \pm 1.22^\circ$. A mean MBL of 1.16 ± 0.94 mm and 2.01 ± 1.76 mm was observed after 1 and 5 years of follow-up, respectively. At 5 years, mean PD was 4.09 ± 1.44 mm, 66.6% of the evaluated implants showed BOP, KM was < 2 mm in 48.4% of cases, REC ≥ 1 mm was assessed in 45.4% of the included implants, plaque accumulation occurred in 66.6% of cases. A negative correlation was observed between bucco-palatal/lingual linear inaccuracy and MBL, PD, BOP and KM.

Conclusions: a tendency toward increased MBL, PD, BOP and KM was observed when implants were placed more buccally compared to the preoperative planning. Thus, inaccuracy may compromise peri-implant health.

NEW FLAT DESIGN OF ZYGOMATIC IMPLANTS IN A PARTIAL REHABILITATION

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Aim: description of partial rehabilitation with the use of zygomatic implants with new flat design and a traditional fixture in premolar area.

Methods: in this clinical case was used a traditional implant in position 1.4 (Fixo 10 x 3.5 head 0°, Oxy implant, Colico, Italy) that was inserted with the Sincrest method (Meta Technologies, Reggio Emilia, Italy). In position 1.7 was inserted a new type of zygomatic implant with flat morphology and 52.5° pre-angled head, with a length of 42.5 mm and a diameter of 4 mm (Oxy implant, Colico, Italy). A temporary prosthesis was screwed a few hours apart for immediate loading which is particularly indicated in zygomatic implantology.

Results: this new model combines a series of innovations already introduced on other fixtures and introduces a particular design characterized by a flat surface at the vestibular level on the body of the fixture to favor a better expression of the soft tissues and contains the risk of decubitus and plaque buildup.

Conclusions: zygomatic implantology has proven to be reliable over time and represents a valid alternative to bone reconstructions in cases of severe atrophy, reducing rehabilitation time and both biological and economic costs, as well as offering the possibility of performing the surgery chairside in conscious sedation especially for partial rehabilitations.

FULL ARCH REHABILITATION WITH NEW FLAT DESIGN ZYGOMATIC IMPLANTS

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Aim: description of a full arch rehabilitation with the use of zygomatic implants with new flat design and three traditional fixtures in premaxilla.

Methods: in this clinical case three one-piece Fixo fixtures with a length of 10 mm and a diameter of 3.5 mm were inserted (Oxy implant, Colico, Italy) already equipped with integrated abutments with 0° angulation in sites 1.2, 2.1 and 2.3. It was also inserted a new type of zygomatic implant with flat morphology, 52.5° pre-angled head, length of 37.5 mm and a diameter of 4 mm, one on each side. A temporary prosthesis was screwed a few hours apart for immediate loading which is particularly indicated in zygomatic implantology.

Results: this new model combines a series of innovations already introduced on other fixtures and introduces a particular design characterized by a flat surface at the vestibular level on the body of the fixture to favor a better expression of the soft tissues and contains the risk of decubitus and plaque buildup.

Conclusions: zygomatic implantology has proven to be reliable over time and represents a valid alternative to bone reconstructions in cases of severe atrophy, reducing rehabilitation time and both biological and economic costs, as well as offering the possibility of performing the surgery chairside in conscious sedation especially for partial rehabilitations.

THE CURVED PRE-SPLITTING TECHNIQUE IN AN EDENTULOUS ATROPHIC MANDIBLE: A CASE REPORT

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Aim: to describe a surgical case of curved two-staged pre-splitting technique as a suitable alternative to the bone augmentation procedures in a fully edentulous horizontally atrophic mandible.

Methods: a 58-years-old systemically healthy patient was referred for an implant-supported rehabilitation of edentulous inferior jaw. The mean available bone detected on Cone Beam Computerized Tomography (CBCT) scans was enough to perform a two-step split-crest technique and it was about 3 mm in width of which 1 mm of cancellous bone. At first, four linear corticotomies were performed using a piezoelectric device in antibiotic prophylaxis regimen. After 4 weeks, the bone expansion was performed and four implants were placed in the interforaminal area.

Results: postoperative CBCT images showed a mean bone width gain of about 3.7 mm.

Six months after the second stage surgery, implants were uncovered and a vestibuloplasty involving an autologous epithelial connective tissue graft was performed.

One month later a provisional fixed screw-retained prosthesis was delivered.

Conclusions: this approach could be used as a reconstructive technique avoiding grafts, reducing times, possible complications, post-surgical morbidity and costs, exploiting as much as possible patient's native bone.

Aware of the limitations of a case report, Randomized Controlled clinical Trials are needed to confirm the authors' results and validate this technique.

SINGLE IMPLANT-SUPPORTED TWO-UNIT IN THE POSTERIOR AREA: CASE REPORT AND LITERATURE REVIEW

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Aim: this study describes a clinical case with a digital workflow for the rehabilitation of two missing teeth in the posterior maxilla with a single implant retained fixed cantilevered zirconia prosthesis and review the current literature regarding the outcome of a single implant supporting fixed dental prostheses made of two crowns designed to replace posterior missing adjacent teeth.

Methods: a systematic electronic search in the Medline and PubMed medical databases was performed for articles published in the English language until February 2022. Only articles that considered single- implant supporting two fixed units in the posterior area with a mean follow-up of at least 3 years were selected. The outcome variables were the survival of implants, the presence of peri-implantitis, and mechanical and technical prosthetic complications. The review was performed according to the PRISMA statements.

Results: a total of four papers were selected, which reported high survival rates of the rehabilitations.

The estimated survival rates for 3–9 years were calculated to be 96.78% for the implants and 100% for the fixed partial dentures.

Mechanical, technical and biological complications were reported with a complication rate of 5.37% and 15.05% for the implants and for the prosthesis, respectively.

Conclusions: although the evidence is encouraging regarding the survival rates, the insertion of a single implant supporting two adjacent posterior units needs to be carefully assessed in daily practice while considering the high rates of prosthetic complications.

Antirrotational implant connections and monolithic restorative materials could be an advantage for this type of rehabilitation.

EVALUATION OF ZIRCONIA IMPLANTS IN AESTHETIC AREA: A CLINICAL CASE WITH 16 YEARS FOLLOW UP

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Aim: the aim of this report was to evaluate surgical and clinical management of zirconia one piece implants in aesthetic area of the upper jaw.

Methods: a female patient came in our department in 2006 for an implant-prosthetic rehabilitation in the aesthetic area. Orthopantomography was used for pre-surgical evaluation. The clinical-surgical decision was to place two one-piece implants in 1.1 and 2.1 position to rehabilitate the area. A surgical guide was performed to correctly guide the preparation of the implant site.

Two ceramic implants were placed (*WhiteSky, Bredent medical GmbH & Co.KG, Senden, Germania*). Provisional prosthesis was placed immediately after surgery.

The definitive prosthesis was placed after 6 months. Follow-ups were scheduled to evaluate both post operative and long term healing every 6 months for the first five years and then annually up to now, 16 years after.

Results: the zirconia implants allow to overcome the limits of titanium, in terms of restoration, as in the case of rehabilitations in the anterior area in patients with thin gingival biotype. All follow-ups show excellent healing results, in particular the follow-up 16 years after the surgery, shows a satisfactory clinical and radiographic result.

Conclusions: the zirconia implants seem to give excellent results even in the long term both from the point of view of stability and peri-implant tissues, especially in the aesthetic area.

CLINICAL EVALUATION OF A NEW ALVEO LINE ZIRCONIA IMPLANT DESIGN

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Aim: the aim of this report is to evaluate surgical and clinical management of a new one piece design, alveo line zirconia implant.

Methods: a female patient asked for an implant-prosthetic rehabilitation in an edentulous area of the second quadrant. Bone crest was well preserved. An orthopantomography was done before the surgery. We decided to place two alveo line zirconia implants. A surgical guide based on the future prosthetic rehabilitation was prepared to correctly insert the fixtures. Surgery started with a crest incision from canines to the median margin of the first molar and a subsequent creation of a full-thickness trapezoidal flap. Drills were used to prepare the implant sites. Two ceramic alveo line implants (*Bredent, WHI-*

TE SKY alveo line) were placed. A new orthopantomography was done after surgery. The definitive prosthesis was placed after 6 months.

Results: the new alveo line implant design has two main characteristics: the ability to fill the cavity and to customize the implant, which is a new step compared to the tissue line implant that didn't allow any customization of the implant body. After 6 months from the surgery the tissues are healed and reconditioned in an excellent way.

Conclusions: new implant design gives very good results and seems to be an excellent solution especially in specific situation as post extraction rehabilitation or if it's necessary an improvement of emergence profile.

REHABILITATION OF ATROPHIC MAXILLA WITH ZYGOMATIC IMPLANTS: CASE REPORT

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Aim: conventional implants treatment cannot be performed in the edentulous maxilla in some patients because of advanced bone resorption and/or the presence of extensive maxillary sinuses. There are many rehabilitative techniques that can be used in the case of patients with atrophic jaws, one of these is zygomatic implantology. The aim of the article is to present a case with severe atrophy of the jaw-bones and previous failed treatments that required an approach with zygomatic surgery.

Methods: the patient is 65 years old, clinical and radiological examination showed severe atrophy in the premaxilla and also posteriorly. He was wearing an unstable removable maxillary prosthesis and he had already been previously treated with standard implants and sinus lift both of which failed. Due to the

previous failed treatments it was decided to intervene with the placement of four zygomatic implants. The type of approach depends by the different bone availability, with both anterior and posterior atrophy, as in the case presented, the right solution is use of four implants.

Results: due to the primary stability assessed after surgery and thanks to an excellent seal of the mucous tissues around the MUA, immediate loading was performed.

Conclusions: zygomatic implants remains a surgery to be used as a last resort, in case of : significant atrophy that does not allow rehabilitation with standard implants, patients with previous unsuccessful surgeries or still in patients with previous maxillectomies.

ACCURACY OF IMPLANT PLACEMENT WITH COMPUTER-GUIDED SURGERY IN PARTIAL EDENTULISM

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Aim: the purpose of the present study is to evaluate the accuracy of guided implant surgery in a single partial edentulism case.

Methods: a CBCT and a digital intraoral scan were required for case planning and a virtual diagnostic wax-up was produced by the data acquired. These data were converted into a printed surgical dime. The surgery involves micro flaps setup to preserve keratinized tissue, the preparation of the implant site through calibrated drills with depth stop, and implant insertion in 14 and 16 sites. The post-operative intraoral scan is taken ten weeks after surgery with PEEK scan bodies. The metal-ceramic final restoration was cemented with water-soluble cement. Finally, the crestal and apical point deviation, depth deviation and angular deviation was calculated.

Results: data analysis showed the following outcomes (mm): a lateral apical point deviation of 1,87 (14) and 0,51 (16), a depth apical deviation of 0,10 (14) and 0,43 (16), a lateral coronal deviation of 0,81 (14) and 0,27 (16), a coronal depth deviation of 0,07 (14) and 0,44 (16), an angular deviation of 5,29° (14) and 1,20° (16).

Conclusions: this case report confirms the predictability of guided surgery: the correspondence between project and realization respects the security standard set by literature at 2,00mm. It allows a precise implant placement, a correct prosthetic therapy and the preservation of the noble anatomical structures, however, deviation between virtual planning and realization may occur because of the errors accumulated throughout the steps of the digital workflow.

MULTIDISCIPLINARY CASE OF AGENETIC LATERAL INCISOR IN PATIENT WITH CLEFT LIP AND PALATE

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Aim: the aim of this treatment is to solve an agenesis within an area of high aesthetic value.

Methods: A.R. (22 y.o.), surgically treated for cleft lip and palate comes to attention of the orthodontic department due to an agenesis of 2.2. The ortho treatment aims to distalize the element 2.3 to create the space for the implant-prosthetic rehabilitation of 2.2. The ortho treatment was carried out using aligners. For the case study, alginate impressions were taken from which plaster models were obtained. The dental technician carried out an immediate aesthetic temporary rehabilitation. The implant insertion surgery was planned. A crestal incision was made from element 2.1 to element 2.3 with a mucoperiosteal flap. The implant site was prepared using a sequence of dedicated drills of the Nobel Biocare N1tm system. The

first drill supported the engagement in the bone; the second taper of the drill body allowed the correction of the pilot osteotomy direction. The drill created a specific osteotomy for the N1 implant. A temporary abutment was screwed at 15 Ncm. The Maryland was adapted on the abutment. The provisional was finished and relieved of the occlusion. The flap has been repositioned.

Results: the case was solved with the insertion of an implant with a non-functionalized load to meet the aesthetic needs of the patient.

Conclusions: the multidisciplinary treatment allowed the resolution of the case respecting the biological times of healing. The immediate provisional allows the correct conditioning of the tissues, responding to the high aesthetic demands of the patient.

COMPUTER GUIDED IMPLANTOLOGY IN EDENTULOUS PATIENT: CASE REPORT

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Aim: computer guided surgery is a surgical technique that through the use of 3D radiographic investigations and specific programming software allows a very precise planning of surgery, and the realization of it through surgical guides. A CT scan of the patient wearing radiological templates is performed and it is match with a file (STL or DICOM) that reproduces the anatomy of the patient's oral cavity. The purpose of this poster is to show a clinical case of a completely edentulous patient rehabilitated with guided implants through a new data acquisition protocol named "Dual Scan Plus".

Methods: the completely edentulous 69-year-old patient was rehabilitated with 4 implants for the upper arch and 4 for the lower arch, then two all-on-four for a total of 10 teeth. The acqui-

sition data were obtained with a CT scan of the patient who was wearing the radiological templates matched with the STL obtained by scanning the templates with a laboratory scanner according to Dual Scan Plus protocol.

Results: in the upper arch the surgery was performed flapless, a small flap was made in the lower arch to preserve the adherent gingiva, in both cases the implants had good primary stability so immediate loading was performed.

Conclusions: in conclusion in cases of total edentulism with severe bone resorption like this one, guided implantology is extremely advantageous because it reduces the risk of damaging important anatomical structures and increases the chances of performing an immediate load. So in this case the Dual Scan Plus protocol was proved to be valid.

SOCKET SHIELD TECHNIQUE AND IMMEDIATE GUIDED IMPLANT PLACEMENT: A CASE REPORT

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Aim: the present study aims to show the digital workflow in the socket shield technique for single tooth replacement in the aesthetic area.

Methods: the patient is a male, 58 years old, ASA I, with a central incisor (1.1) decay on the palatal aspect. The tooth was stable with the absence of periodontal disease and periapical lesions. CBCT showed a thin buccal cortical plate with most residual alveolar bone on the palatal side. An intraoral scan was performed for digital implant planning. Socket Shield Technique was used to prevent the resorption of the vestibular alveolar bone and implant placed with a surgical template. A straight abutment with a milled resin crown was the solution

for the immediate provisional phase.

Results: the follow-up at three months highlight good soft and hard tissues healing, with no marginal changes.

Conclusions: the success of this result was due to the minimally invasive surgical protocol, the use of the “one abutment one time” concept and digital planning of the prosthesis. The socket shield technique is very promising for preserving hard and soft tissues in aesthetic areas, such as anterior maxillary teeth, in cases of post-extraction immediate implant placement. The definitive abutment, placed at the time of surgery, guides soft tissue healing and improves the final aesthetic results.

POST-EXTRACTIVE CONDITIONING OF PERIMPLANT TISSUES WITH CUSTOMIZED HEALING ABUTMENT: CASE REPORT

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Aim: the purpose of this case report is to present post-extraction surgical implant techniques that reduce the invasiveness of the intervention and facilitate the consequent prosthetic rehabilitation.

Methods: following the extraction of element 1.5, a titanium implant of 4 mm of diameter is placed. The coronal mesio-distal space of the alveolus is 5mm and the buccal-palatal surface is 7 mm. The healing abutment is made of acetal resin, having a diameter of 7 mm with the characteristic of being customizable according to clinical needs, since it is equipped with a through screw.

Results: the healing took place without complications and after 4 months the healing abutment was removed to perform the prosthetic rehabilitation. The great advantage is the ideal conformation assumed by peri-implant soft tissues, which do not require further adaptive conditioning to the prosthetic element.

Conclusions: with implant customized healing abutment the socket is preserved in its shape; soft tissue conditioning takes place during extraction/implant positioning and it is conservative.

THE FULL-DIGITAL FLOW IN POST-EXTRACTIVE IMPLANT REHABILITATION, FROM THE SURGICAL PHASE TO THE PROSTHETIC FINALIZATION: A CASE REPORT

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Aim: the purpose of this work is to present a case of post-extraction implant rehabilitation managed prosthetically in full-digital mode, from the provisional phase to the prosthetic finalization.

Methods: following a fracture of element 1.4, a pre-operative scan with a digital intraoral scanner of the element is performed to prepare the pre-shaping provisional of the element. On the day of surgery, extraction of 1.4 is performed with immediate placement of a 4mm diameter titanium implant. The provisional is locked to a temporary titanium abutment using self-curing resin and transformed into a screw-retained crown by means of a hole created on the occlusal surface. After 4 months, the provisional is removed and the final metal-free screw-retained crown is created by digital scanning.

Results: the healing took place without complications and after 4 months the provisional was removed to perform the definitive prosthetic rehabilitation. The great advantage of this technique is the ideal conformation assumed by the peri-implant soft tissues through the immediate provisional and the reduced invasivity of the digital technique which allows to temporarily and definitively rehabilitate the implant without using impression materials.

Conclusions: the full-digital flow in both temporary and definitive implant prosthetic rehabilitation allows to preserve the architecture of the peri-implant tissues and reduce invasivity towards the patient, avoiding the use of any impression material, thus improving the ergonomics of the rehabilitation therapy.

10-YEARS EVALUATION OF THE FIRST ROOT ANALOGUE IMPLANT ON HUMANS MADE USING DMLS

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Aim: in dental field, implant rehabilitation is increasingly in demand. The purpose of this work is to take a first step to validate the new custom made RAI technique made with the DLMS technique and the realization of the models using the CAD-CAM method. To do this, we performed a long 10-year follow-up on the first ROOT ANALOGUE IMPLANT (RAI) in Ti-6Al-4v made by us and inserted in a 50-year-old female patient in good health.

Methods: during the checks the patient was subjected to an anamnestic examination, looking for possible presence of pathological symptoms. Meticulous examinations were carried out by observation, palpation, percussion and probing, collecting periodontal / peri-implant health index data. Intraoral radiographs were performed with parallel x-rays technique supported by customized resin checks.

Results: no pathological symptoms were reported, over the years the peri-implant tissues have adapted perfectly and remain healthy. PPD was within the normal values (2,5mm), BOP wasn't present, there wasn't sign of gingival recession, no in-

creased mobility and dimensional stability was highlighted. No sign of bone resorption (0mm) was evident, considering the distance between the bone crest and the implant shoulder as a reference.

Conclusions: the result obtained is very satisfactory as the crestal bone has not altered its size over time and no complications have been highlighted. Obviously, to support the thesis it is necessary that further studies and statistical analyzes will have to confirm what is highlighted in this work on a single case, which is meant to be a first step. This method therefore seems to give predictable results over time although at the present stage the limits seem to be of an organizational nature as designing and producing individualized products with this technique requires several design phases. In recent years the various 3D printing methods are spreading and some of these are so common that there are machines produced for hobby use; it is not unthinkable that the DLMS production technique could be made more available in the future.

ALVEOLINE: A NEW ZIRCONIA IMPLANT DESIGN FOR IMMEDIATE PROSTHETIC-IMPLANTS REHABILITATION

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Aim: the aim of this report is to describe the surgical management of an immediate implant-prosthetic rehabilitation using ceramic implants by computer-guided surgery.

Methods: a 64 years-old female patient needed to rehabilitate the lower jaw, in which there were root residues of the elements 3.5, 3.6 and 3.7.

A pre-operative orthopantomography and a digitally planned CBCT were performed by matching the CBCT with the patient's intraoral scan which allowed to analyze the future position of the implants. A surgical template was realized for the placement of the implants.

For the surgical protocol, after extraction of the root residues, two monolithic ceramic implants (White Sky AL, Bredent medi-

cal GmbH & Co.KG, Senden, Germania) were placed into pre-molar and molar socket using the surgical template. Immediate loading was performed by fixing provisional crowns on the two zirconia abutments.

Results: the design of this zirconia implants and the guided surgical protocol guarantee high primary stability with all types of bone density and thus create the ideal prerequisite for immediate load rehabilitation.

Conclusions: zirconia implants are made of zirconium oxide with a tetragonal structure, which offers the best mechanical properties for oral implantology. Thanks to their elasticity, the bone tissue is protected from overloads during the osseointegration phase.

VERTICAL GUIDED BONE REGENERATION IN THE ESTHETIC ZONE: CASE PRESENTATION

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Aim: a literature review was conducted to evaluate the state of art on horizontal and vertical GBR to examine the various surgical techniques, graft materials and membranes. Complications related to the various methods were also carefully evaluated in order to select the best surgical approach. A case report is reported to describe a modification of the surgical technique in order to reducing postoperative complications. A paracrestal method is described to evaluate an alternative treatment option in comparison to the incision in the center of the bone crest, especially in the case of thin and aesthetic biotypes.

Methods: the patient presents a combined horizontal and vertical bone defect in the esthetic zone.

Vertical guided bone regeneration was performed and, after preparing the implant site by drilling, two conical implants were inserted.

Results: no complications occurred and the clinical and radiographic outcome is reported after 9 months of healing.

Conclusions: there are no differences between the paracrestal approach compared to the classic GBR approach in terms of postoperative complications.

REHABILITATION OF THE FIRST LOWER MOLAR USING A NEW GENERATION OF HEALING ABUTMENT

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Aim: this case report aims to evaluate the efficacy of implant-prosthetic rehabilitation in the non-aesthetic area by using a new type of healing abutment (Iphysio) and Connective Tissue Graft (CTG).

Methods: a 30-year-old woman, ASA I and negative medical history need the implant-prosthetic rehabilitation of the first lower molar. After the failure of the endodontic treatment, the tooth needed to be extracted. Following the preparation of a full-thickness envelope flap, a Naturactis implant was placed, and after, the Iphysio healing abutment was screwed to the implant with a CTG sutured internally to the flap. After two months, a digital impression was taken using the Iphysio healing abutment as a scan body. The implant was rehabilitated with a definitive prosthetic crown in monolithic zirconia cemented to a T-base.

Results: at the end of the treatment, there was a good integration of the soft and hard peri-implant tissues with a good emergence profile in a non-aesthetic area.

Conclusions: the management of the surgical and prosthetic phases was effortless thanks to the characteristics of the scan body/healing abutment.

Without the provisional crown, it was possible to reduce the length of the treatment. Healing abutment works as a profile designer until the end of treatment, when it was also used as a scan body and unscrewed to place the final restoration. The CTG helps get the best results regarding the quality and quantity of the soft tissues.

The reduction in the number of connection reconnection of screwed components preserves the stability of the peri-implant tissues.

CASE REPORT: IMMEDIATE LOADING OF TWO ONE-PIECE ZIRCONIUM OXIDE IMPLANTS BY GUIDED SURGERY

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Aim: this case describes the placement of two (4x10mm) one-piece WhiteSKY implants (Bredent srl, Bolzano, Italy) via guided surgery with immediate loading.

Methods: on oral examination of the patient, root remnants at sites 3.5, 3.6 and 3.7 are revealed. A preliminary intraoral scan and CBCT is performed to make an implant-prosthetic evaluation. The DICOM file and the STL file are matched within the Real Guide system (3DIEMME srl, Cantù, Italy), implant-prosthetic processing software for the design of the template for guided surgery. The procedure is performed under local anesthesia (articaine 1:100000) in buccal and lingual site. Once the avulsions of the roots have been performed, the surgical tem-

plate is positioned and the implant placement is carried out. The whiteSKY prosthetic copings are then fitted over the implant abutment without the need for retention screws or cement, but only with mechanical retention. On the copings will then be passivated, through resin, the temporary, which after polishing and finishing is ready for delivery.

Results: the ability to use a screwless and cementless immediate load provisional leads to a reduction in forces that are not congruent with implant osseointegration.

Conclusions: guided surgery for the placement of zirconia implants leads to an increase in esthetic yield and facilitates the operator to perform complex cases.

IMPLANT-SUPPORTED REHABILITATION USING GBR ON RECONSTRUCTED MAXILLA WITH FIBULA FREE FLAP

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Aim: the aim of this study is to present a clinical case of fibrous dysplasia treated with association of GBR on a maxillary reconstructed area with Free Fibula Flap (FFF). This case was documented in 2019: no previous evidence existed in literature.

Methods: a 27-year-old female's medical history was positive for Fibrous Dysplasia of the maxillofacial bones. Due to an increasing facial swelling, the patient underwent right-sided maxillomalar reconstruction with FFF. The FFF was remodeled and 4 dental implants were placed. 12 years later, the onset of peri-implantitis had caused the loss of 1 of the 4 dental implants and bone resorption with consequent thinning of the fibula flap. It was decided to use GBR technique to avoid the risk of fracture and restore the bone volumes. GBR was performed

by using heterologous biomaterials in combination with a non-reabsorbable titanium-reinforced membrane and 4 fastening screws to pin the membrane.

Results: 6 months after GBR, TC showed a good bone regeneration. After removal of the membrane, two implants were placed. Then a fixed implant-supported prosthesis with a custom-milled titanium bar screwed to the implants was made. The prosthesis satisfied the patient both esthetically and functionally with significant improvements in oral function and psychosocial activities.

Conclusions: this case has demonstrated that good bone regeneration can be obtained with GBR technique even on reconstructed maxilla with Free Flaps by following carefully the operative protocol and respecting its principles.

SURGICAL TREATMENT OF PERI-IMPLANTITIS. A SYSTEMATIC REVIEW

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Aim: alongside with a wide diffusion of dental implant rehabilitation, the occurrence of peri-implant complications requiring treatment become more frequent. There is no consensus on the choice of materials, instruments or procedures for surgical treatment of peri-implantitis. The aim of present study is to systematically review the available literature in order to evaluate the effectiveness of surgical treatments of peri-implantitis and summarize the results.

Methods: electronic databases PubMed, Scopus and Web of Science were explored in order to identify clinical trials comparing different surgical treatments of peri-implantitis. Studies with minimum 10 participants per group and a follow-up of minimum 6 months were included. Primary outcomes consisted of implant survival. Secondary outcomes included: Probing

depth (PD) reduction, Bleeding on Probing (BoP) reduction and Marginal bone level (MBL) gain.

Results: a total of 21 articles, with examination of 1090 implants were included. Success rate of the treatment was reported only by 10 studies and ranged between 70 and 100%. Regenerative procedures were performed in 14 studies, reporting a mean PD reduction of 2,63 mm and a mean MBL gain of 1,67 mm with use of bone substitutes. In groups where only Open Flap Debridement was performed, PD reduction was of 1,94 mm and bone gain of 0,44 mm in average. Furthermore, a mean reduction of 41,78% in BoP was observed in the studies.

Conclusions: the use of regenerative materials seems to improve clinical and radiologic results of surgical treatment of peri-implantitis.

BONE DENSITY AND IMPLANT STABILITY IN KIDNEY-TRANSPLANTED PATIENTS: A PROSPECTIVE STUDY

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Aim: this study evaluated bone density and clinical outcomes (implant stability and survival) in kidney-transplanted patients.

Methods: patients with mono- or partial edentulism, who underwent kidney transplant for congenital or acquired pathologies, and presenting satisfactory systemic compensation and local bony and periodontal pre-requisites for implant placement, were included in this study. Following informed consent, patients underwent placement of implants with platform-switched conical connection; during implant site preparation, a bone biopsy was collected with a trephine bur for histomorphometric evaluation. RFA (Osstell, Göteborg, Sweden) was measured at implant placement and four months after prosthetic loading.

Results: a total of 12 patients were included in the study, receiving a total of 19 implants. Seventeen bone biopsies were performed (15 mandibular and 2 maxillary), showing a mean trabecular space area of $41.6 \pm 14.4\%$ and $58.3 \pm 14.5\%$ of lamellar bone. No implants were lost before prosthesis delivery, and one failure occurred during the first year of loading. Mean ISQ were 71.7 ± 10.5 and 73.0 ± 9.3 at implant placement and at 4-month follow-up, respectively.

Conclusions: bone density and clinical outcomes recorded in kidney-transplanted patients seem to be comparable to normal population. Accurate patient selection and a correct surgical protocol are crucial pre-requisites for successful implant therapy. Further studies are necessary to evaluate the success of implant therapy on larger samples and long-term follow-up.

A NEW HORIZONTAL GBR TECHNIQUE: “THE SLING TECHNIQUE”

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Aim: the aim of this study was to introduce a new technique for massive horizontal alveolar ridge augmentation through an innovative use of expanded-polytetrafluoroethylene (e-PTFE) membrane, to reduce the risk of biological complication related to membrane exposure.

Methods: eligible patients for implant rehabilitation with horizontal bone defect were enrolled in our study. All patients were treated with our new GBR approach called “Sling Technique” (ST) which consisted on covering the vestibular side of the bone defect with a stretched e-PTFE membrane. This technique allowed the amplification of the membrane surface, as long as the compression and the immobilization of the underlying graft material (50% autologous bone and 50% bovine xenograft). The membrane was placed far from the surgical in-

cision of the mucosa, to avoid infective complications. Pre and post regenerative surgery CBCT scans were used to assess the tissue gain amount after GBR.

Results: 10 patients (4 females, 6 males; age range: 45-60 years old) were enrolled in our study and 33 implants were placed in regenerated bone. An average of 4mm bone gain was achieved using the ST. Nor membrane exposure or biological complications were registered during the postoperative healing period. After a 24-month follow-up a 100% implant survival rate was observed, without hard or soft tissue dehiscence.

Conclusions: the e-PTFE membrane positioned with the “Sling Technique” gave satisfactory results in horizontal bone augmentation. Considering the small sample, further confirmations with larger studies are certainly needed.

EVALUATION OF SOFT TISSUE STABILITY IN POST-EXTRACTION IMPLANT: A 3D SUPERIMPOSED STUDY

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Aim: the volume stability of soft tissue plays a key role to achieve an aesthetic result, especially in cases of post-extractive implants in aesthetic areas. Several authors have pointed out that hard and soft tissue changes occur after tooth extraction. The aim of this pilot study is to analyze the volumetric changes of soft tissue in post-extraction implants with and without the placement of an immediate temporary by means of 3D overlay analysis.

Methods: a total of 6 teeth that could no longer be restored (1 upper central incisor, 2 upper lateral incisors, 3 upper premolars) were extracted and replaced with 6 post-extraction implants. Slow-resorbing material (DBBA) was placed in all sites to fill the jumping-gap and immediate temporary loading was performed randomly on 3 implants. A digital impression was

taken 4 months after surgery. The .stl files were analyzed using software (3D slicer, Brigham and Women's Hospital, Harvard University, NIH) to assess volumetric changes in the sites.

Results: a total of 5 patients were enrolled in this preliminary study (59 ± 4.18 age). In the group with immediate provisional a volumetric contraction of less than 1 mm in the V/P direction was found (0.52 ± 0.48 mm), while in the group without immediate provisional a linear contraction of 2 mm was measured (2.12 ± 0.98)

Conclusions: the use of an immediate temporary in the case of post-extraction implants would appear to decrease the volumetric contraction of the soft tissues, improving the aesthetic result. More randomized clinical trials are needed to confirm these results.

DYNAMIC GUIDED SURGERY: ACCURACY OF PTERYGOID IMPLANT PLACEMENT

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Aim: the purpose of this study is to demonstrate accuracy and reduction in operative time comparing dynamic surgery with freehand surgery. The results of this work, allow us to evaluate the differences between these two kinds of procedures.

Methods: the sample of this study is composed of 39 patients and a total of 63 implants placed, 31 by dynamic navigation and 32 by freehand surgery. The patients included are partially edentulous and need rehabilitation with at least one pterygoid implant. Implant placement is performed freehand or using dynamic navigation surgery. This surgery type is randomized on the same day. A sample of 24 patients treated with bilateral pterygoid implants and 15 with unilateral pterygoid implants.

Results: the results show a greater precision of dynamic surgery compared to freehand surgery.

This is emphasised by the two most important variables: the average depth 0.67 mm in dynamic surgery compared to 1.17 mm in freehand surgery; and the angular discrepancy: 2.64° in dynamic surgery compared to 12.49° in freehand.

Important evidence to consider is the distance between the implant and the greater palatine hole, which is smaller in dynamic navigation surgery; at the same time dynamic navigation was 9 minutes compared with 22 minutes in freehand surgery.

Conclusions: this peculiar surgery allows us to obtain greater precision in the implant's insertion, reduction of operative time and, less invasiveness of the special procedure.

Thus, dynamic navigation implant surgery was found to be a predictable successful technique.

ACCURACY OF STATIC COMPUTER-AIDED IMPLANT SURGERY WITH TOOTH-SUPPORTED SURGICAL GUIDES

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Aim: the aim of this study was to assess the accuracy of virtual planning of computer-aided surgery based on the actual outcomes of clinical dental implant placement using tooth-supported surgical guides.

Methods: the inclusion criteria were as follows: 1) no mouth opening limitation; 2) sufficient bone volume based on preoperative CBCT images. The exclusion criteria were as follows: 1) uncontrolled systemic disease; 2) smokers (> 5 cigarettes per day); 3) radiotherapy of cervical-facial district; 4) pregnant or breastfeeding women. A conventional gypsum material dental cast made from polyvinyl siloxane impression was scanned into STL file. To establish implant placement plan and create digital tooth-supported implant guides, DICOM data and STL data were matched. Implants were placed with fully guided surgery and flapped approach.

To compare the position of the preoperative planned implant with the actual position of the implant after the surgery, implants impression were taken after osseointegration. Then 4 parameters were evaluated as follows: Coronal Vertical Deviation (CVD), Coronal Global Deviation (CGD), Apical Global Deviation (AGD) and Angular Deviation (AD).

Results: a total of 9 implants were placed in 5 patients (3 males and 2 females, age between 40 and 60). The average of the results was: CVD 0,60 (σ 0,59; SE 0,26); CGD 0,82 (σ 0,43; SE 0,15); AGD 1,07 (σ 0,40; SE 0,13); AD 1,84 (σ 1,31; SE 0,44).

Conclusions: fully guided implant surgery with tooth-supported surgical guides shows high accuracy in implant placement. More cases to improve statistic value of the study are needed.

A NOVEL MINI-INVASIVE APPROACH TO RIDGE AUGMENTATION IN THE ESTHETIC ZONE WITH TI-FOIL

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Aim: the aim of this case series is to propose a simplified approach for ridge augmentation in the esthetic zone obtained through the use of Ti-foil. The Ti-barrier was positioned on the defect by opening an envelope flap, without fixing screws and left exposed intentionally without releasing incisions.

Methods: five patients with horizontal bone defect in the esthetic zone were enrolled in this study. A single incision was performed in the middle of the ridge and extended marginally on the adjacent teeth. Autologous bone was harvested from the zone of the defect, mixed with a 1:1 rate with demineralized freeze-dried bone allograft, placed into the defect and covered with the Ti-barrier. The flap was sutured leaving a portion of the foil exposed.

Results: the exposure of the foil increased overtime, without compromising the new bone regeneration. Under the titanium

barrier a healthy soft tissue was found covering the new bone. Hard tissue histological examination confirmed new bone formation, while soft tissue examination revealed keratinized epithelial tissue.

Conclusions: this technique ensured good isolation of the regenerative space, optimal clot stability and excellent bone formation.

Simplified soft tissue management, without the need to mobilize the flap, is an important feature. Furthermore, the intentional exposure of the barrier has shown that the foils are difficult to colonize by bacteria. Of great interest was the finding of keratinized epithelial tissue below the membrane. This healthy tissue may have provided the isolation of regenerative space from bacterial invasion.

PERI-IMPLANT CONDITION AND PROSTHETIC RESIDUAL CEMENT: AN ENDOSCOPICAL EVALUATION

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Aim: the main objective of this study is to evaluate under endoscopic vision the eventual presence of submucosal residual prosthetic cement (CE) in peri-implant disease cases. The correlation between the pathological condition and the apical position of CE has been also investigated.

Methods: forty-six patients with clinical and/or radiographic signs of peri-implant disease (mucositis or peri-implantitis) were included. All patients had a definitive cemented prosthesis loaded for at least 3 months. Patients with mucositis were treated with gentle debridement and re-evaluated at one month; if mucositis was resolved the patient was not included in the study. All enrolled patients underwent to endoscopic analysis (DV2 Perio-

scope) at the implant site, to identify eventual submucosal CE. The proximity of CE to implant platform was measured by means of a periodontal probe (PCP UNC-15) under endoscopic vision.

Results: CE was detected in 37 out of 46 implants (80.4%) and were mainly located at vestibular and lingual or palatal areas. The most apical portion of the CE was located at 1.80 mm from the edge of the implant platform. This distance was lower for implants with a diagnosis of peri-implantitis (1.11 mm) than in sites with mucositis (2.21mm) ($p = 0.001$).

Conclusions: the presence of CE was strongly associated with peri-implant disease. The proximity of CE to implant platform was correlated to the severity of peri-implant disease.

ONE-STAGE VS TWO-STAGE TECHNIQUE USING EXTRASHORT IMPLANTS IN PARTIALLY EDENTULOUS REHABILITATIONS

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Aim: evaluation of the differences between peri-implant tissue behavior using extrashort implants with one-stage or two-stage technique.

Methods: 12 subjects, mean age 60,8, who needed to receive two adjacent extra-short implants have been enrolled. Patients were all partially edentulous with high level of bone resorption. Two adjacent distal implants (extrashort BTI 5,5 or 6,5 length) were inserted during the same surgery. One was submerged (2-stage technique) and one was immediately connected by the multim abutment (1-stage technique). The second stage surgery was performed after 3 months. The two implants were then loaded with screw-retained splinted rehabilitation. ISQ value (Osstell) was performed to analyze the implant stability. Peri-implant bone levels were evaluated on intraoral paralleling

radiographs. Peri-implant probing depth, plaque index, BOP, mobility and pain were also evaluated. Follow-up and measurements were made at T0, T3, T6, T12. A statistical analyze was then elaborated.

Results: at T12 the linear mixed model of the ISQ results shows a non-significant difference between one-stage group and two-stage group. The MB mesial for one-stage was mean of 1,15 (SD: 0,55), while for two-stage was mean of 1,2 (SD: 0,62). ($p = 0,522$). The MB distal was for one-stage mean of 1,22 (SD: 0,61) while for second stage was mean of 1,21 (SD: 0,56). ($p = 0,601$). No statistically differences were found in any of the peri-implant parameters evaluated.

Conclusions: according to 12 months results, no statistically differences resulted between the two techniques.

EFFECTIVENESS OF AN ANTIBACTERIAL COATING OF IMPLANT CHAMBER WITH REAL-TIME VOCs ASSESSMENT

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Aim: the implant-abutment junction represents a peri-implant tissues loss causal factors, as a bacterial reservoir that results in halitosis due to the release of Volatile Organic Compounds (VOCs) produced by bacterial metabolism. This study aims to assess the efficacy of an antibacterial coating (PiXiT) in reducing bacterial proliferation by using real-time VOCs analysis.

Methods: for the present study, they were recruited 20 patients (9M-11F) with a mean age 41 ± 6.3 years affected by partial or total edentulism. A total of 40 implants were positioned, 20 fixtures with PiXiT within chlorhexidine gluconate 1% and an alcoholic solution (T) and 20 implants with no internal coating (C). The VOCs evaluations were performed on the internal chamber of the implant after removing the healing screw.

Results: the VOCs max peak amplitude was assessed for Test and Control Group at the baseline (T0), after 7 (T1) and 14 (T2) days. At T0, Test and Control group showed a VOCs max peak mean respectively of 2.15 ± 0.71 and 2.21 ± 0.69 with no significant differences ($p > 0.05$). A significant difference ($p < 0.01$) at T1 between groups was detected (2.26 ± 0.76 Test- 3.15 ± 0.85 Control). At T2 the Test showed a mean of 2.29 ± 0.73 , the Control a mean of 3.65 ± 0.91 with a significant difference ($p < 0.01$). A significant increase of Control T1 and T2 VOCs max peak was reported ($p < 0.05$).

Conclusions: the antibacterial internal coating (PiXiT) demonstrated the capacity to decrease the microbial VOCs activity and resists the bacterial penetration. The present device represented an effective tool for peri-implant tissues health.

HORIZONTAL GBR USING SAUSAGE TECHNIQUE: A COHORT STUDY

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Aim: to evaluate if GBR using "sausage technique" is effective for horizontal bone augmentation in the maxilla.

Methods: 5 patients with class IV and V maxillary defects requiring implant treatment were enrolled for a total of 10 implants placed. All the sites evaluated were healed post extraction (> 4 months). A CBCT was executed at T0 (prior to surgery). GBR with sausage technique was performed using a resorbable double layered collagen membrane and a mixture of 50% autologous bone and 50% ABBM by the same operator in every case. 8 months after GBR procedure, implants were placed in a prosthetically driven position and a new CBCT (T1) was taken. In a CBCT software a plane parallel to the implant long axis was created and this was crossed with perpendicular planes every 1.5 mm. CBCT sections at T0 and T1 were then superimposed, and

205 Measurements were obtained. The measurements at T0 and T1 were then compared. Thickness variation was the main outcome evaluated. A statistical analysis was carried out using SPSS Statistics with an interval of confidence of 95%.

Results: the average thickness gain was 2.82 ± 1.79 mm. The maximum gains were obtained at 4.5mm from the most coronal crest line (3.8 ± 1.51 mm). Maximum thickness obtained was 8.92 ± 1.54 mm (T0: 6.58 ± 2.64 mm)

Conclusions: GBR sausage technique was effective and shows low percentage of post-operative complications. The biggest gains were obtained at the intermediate vertical point of the membrane. Within the limits of this study we conclude that sausage technique is effective for horizontal GBR in the maxilla.

THE ACCURACY OF DYNAMIC NAVIGATION IN PLACING TILTED AND STRAIGHT IMPLANTS: A COHORT STUDY

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Aim: comparing the accuracy of dynamic navigation in placing tilted and straight implants.

Methods: 15 implants were placed (7 axially and 8 tilted) on 7 patients needing implant-prosthetic rehabilitation of a posterior maxillary atrophic area, using a dynamic navigation system with a flapless approach. Each patient received at least one straight and one tilted implant.

Postoperative cone beam was superimposed to the preoperative ones and the placed implants positions were compared to the planned ones.

The implant placement's accuracy was assessed measuring the vertical deviations and linear deviations at the entry and apical points.

Results: the median of implant length was 10 mm for implants axially placed and 12.25 mm for tilted ones. The mean horizontal deviations measured at the implant entry point were 0.81 ± 0.40 mm for straight and 1.01 ± 0.53 mm for the tilted implants. The mean horizontal deviations measured at the implant apical point were 0.91 ± 0.53 mm for the straight and 0.85 ± 0.51 mm for tilted group. The mean vertical deviations were respectively 0.72 ± 0.56 mm and 0.49 ± 0.66 mm.

Conclusions: similar accuracy for implants placed axially or tilted were found. According to this study, dynamic navigation can be considered as an accurate and reliable technique for implant placement; further data are needed before making more reliable clinical recommendations.

COMPUTER-AIDED REHABILITATION SUPPORTED BY ZYGOMATIC IMPLANTS: A COHORT STUDY

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Aim: to evaluate the survival and clinical success rate, complications, and patients' quality of life after computer-aided rehabilitation supported by zygomatic implants in cases of severe maxillary atrophy (10 patients) and in bone defects in oncologic patients (10 patients).

Methods: all patients underwent computer-aided planning and surgery. Seventy-three zygomatic implants were placed. The mean follow-up period was 39.9 months. Implant survival and clinical success rate, the effectiveness of planning the implant length, biological and prosthetic complications, and the quality of life were evaluated.

Results: the five-year implant survival rate for patients with maxillary atrophy and oncologic patients was 97.4% and

96.7%, respectively. The prosthetic survival rate was 100%. Two implant failures occurred in the first year. One implant failure was observed in each group. Minor biological and prosthetic complications occurred in both groups without significant differences. All complications were managed without affecting the treatment. The quality of life increased by 71.3% in the atrophic group and by 82.9% in the oncologic group.

Conclusions: zygomatic implant rehabilitation seems to be a reliable technique for patients with maxillary atrophy and for oncologic patients. The three-dimensional computer-aided approach allows the surgeon to plan the surgery and increase its predictability. Early prosthetic loading certainly allows for better functional outcomes.

EVALUATION OF INNOVATIVE TITANIUM SURFACE ESTHETIC PROPERTIES: AN *IN VITRO* STUDY

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Aim: the purpose of the study was to evaluate the physical and esthetic improvements of the dental implant colored titanium Grade 5 laser treated surface.

Methods: five specimens of titanium Grade 5 (Ti6Al4V) were selected and for 10 min ultrasonically cleaned first in acetone, after in Millipore water and dried in a thermostatic oven. A specific ytterbium laser nano-second pulses sequences were used to ablate the specimens using. Physical and topographic properties were evaluated by stereo, light and electron microscopy and profilometric analyses. L*a*b* colorimetric coordinates were measured by spectrometry, and the superficial chemical characteristics were evaluated by energy dispersive X-ray analysis.

Results: pink Type 1 (P1), Pink Type 2 (P2), Incarnadine (I) and white (W) colors were selected for the study. The topography, texture, hues, saturation, roughness, and porosity of the samples were compared with machined (M) and sand-blasted and etched (SBAE) control surfaces. P1, P2 and I, similar in hue and roughness ($R_a \cong 0.5 \mu\text{m}$), had a microgroove spacing of $56 \mu\text{m}$ and a decreasing porosity. The W sample with a "checkerboard" texture and a light color ($L^* 96.31$) was similar to the M samples ($R_a = 0.32 \mu\text{m}$), but different from SBAE ($R_a = 1.41 \mu\text{m}$, $L^* 65.47$).

Conclusions: these preliminary results showed in innovative physical titanium improvements due to laser treatment and represent interesting perspectives in order to obtain esthetic in dental implants innovation and more predictable esthetic use.

USE OF RADIOMIC FEATURES TO DEFINE A PREDICTIVE MODEL OF MBL AROUND IMPLANTS

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Aim: the aims of the present study were: i) to extract radiomic features from 2D intraoral images, ii) to search for a correlation between radiomic features and early MBL of dental implants, iii) To develop an artificial intelligence –based prediction model for early MBL after osseointegration.

Methods: 2D intraoral images of 44 patients were used. Each patient underwent 3 periapical intraoral radiographs: T0 (baseline), T1 (after 3 months), T2 (after 5 months). T0 images were analyzed using LifeX software which is able to extract radiomic features from mesial and distal regions of interest. A predictive model of MBL, based on the extracted features, was calculated using machine learning techniques. Finally the real MBL between T1 and T0 was measured.

Results: the mean MBL in the studied cohort was 0.48 ± 0.49 mm. Based on such results two categories of MBL were obtained by categorizing for the median value. Radiomics analysis revealed features correlates with high/low MBL at logistic regression analysis. Such features were put together in a machine learning prediction model in order to predict the occurrence of MBL in the studied cohort. The best performing model was based on an ANN architecture who yielded a performance of 0.706 in area under the curve (AUC) with a sensitivity of 81.4% and specificity of 51.1%.

Conclusions: based on the obtained findings, coupling Radiomics with machine learning seems to be a very promising approach for the prediction of early MBL after dental implant insertion.

OSTEOBLAST LIKE CELLS PROLIFERATION AND BONE DEPOSITION ONTO 3 DENTAL IMPLANTS SURFACES

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Aim: *in vitro* evaluation of osteoblast-like cells behavior during proliferation and growth onto 3 different titanium surfaces.

Methods: after differentiation, osteoblast-like cells (hOcs) from human primary sub-cutaneous adipose stem cells, were cultured onto 3 different nano and micro-roughness titanium surfaces: 2 innovative laser-treated (L1; L2) and one sandblasted and acid-etched (SBAE). After 60 days, Cell Proliferation Viability Test (MTT), Scanning Electron Microscopy (SEM), Energy Dispersive X-Ray (EDAX), and Matrix Phosphoglycoprotein (MEPE), Alkaline Phosphatase (ALP) and Osteocalcin (OCN) RT-PCR and WB analysis of hOcs behavior was evaluated.

Results: profilometric and SEM analysis showed crucial differences all samples analyzed. After 20 days of cell culture, SEM evaluation showed a small number of hOcs onto SBAE specimens. While, onto L1 surface a monolayer of osteoblasts with

initial bone deposition were detected. In L2 specimens, a thickness network of flattened stellate cells interconnected in multi-layer adherent to titanium surface and several crystalline bone structures were observed. At same time, EDAX analysis showed absence of impurities and confirmed bone matrix deposition in L2 samples compared to L1 and SBAE. All biological osteogenic markers evaluation have shown higher level in L2 samples compared to L1 and SBAE.

Conclusions: further *in vivo* studies will be need to confirm the interesting results of the present study. However, titanium laser treatment confirmed the high biocompatibility level compared to SBAE surface used as a control. Furthermore, after hOcs proliferation and differentiation, L2 samples have showed higher cell adhesion, growth, and osteogenic markers levels compared to L1 and SBAE.

ALVEOLAR SOCKET PRESERVATION WITH TOOTH DERIVED BIOMATERIALS AND DENTAL IMPLANT EVALUATION

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Aim: evaluation of dental implants 1 year after loading, placed in human maxillary sites after alveolar socket preservation (ASP) procedures through an innovative autologous tooth derived graft material.

Methods: 504 patients (average age 54 years) were recruited and 483 dental implants were placed after tooth extraction. The extracted teeth, after water irrigation cleaned procedures, were cut in small pieces (10x10 mm) and inserted in the Tooth Transformer®. Tooth demineralized autologous graft were obtained and placed in the alveolar post-extractive socket sites and covered by a resorbable collagen membrane. After 4 months healing period, 100 bone biopsies were performed for histological and histomorphometric evaluation. After a year,

periapical X-rays were performed to evaluate the bone and dental implants osseointegration behavior.

Results: biopsies histomorphometric analysis showed 43,58% (± 12.09) average value of BV (Bone Volume), 10.47% (± 10.68) of the RG (Residual Graft) and 32.38 (± 17.15) of the NB (New Bone). One year after loading the implant failure rate was 1,7% and the implant survival rate was 98,2%.

Conclusions: further studies will be necessary, with a larger number of implants and a longer follow up to confirm this promising results. Therefore, the high BV and NB level in the biopsies and the high dental implant success rate confirmed the promising role of the demineralized tooth graft materials in dental implant rehabilitations.

MACHINED VS LASER-TEXTURED IMPLANTS COMPARED IN IL-6 AND IL-1B SULCUS FLUID CONCENTRATIONS

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Aim: to Microbiologically evaluate and compare gingival tissue healing in surgically manipulated periodontal tissues (T+), non-surgically manipulated periodontal tissues (T-) and soft tissue healing in sites that have received implants with surfaces machined (MS) vs Laser-microtextured (LMS) surfaces with one-stage surgical protocol.

Methods: twenty-four non-smoking patients were recruited for this clinical evaluation. They received two implants in a split-mouth design study on the same jaw: one implant with a MS collar and ones with a LMS collar. At weeks 1,2,3,4,6,8 and 12 soft tissues healing of T(+) and T(-) sites, MS and LMS implant sites were compared by evaluating clinical and biochemical parameters: sulcus fluid volume (SF), IL-6 and IL-1 β . Two paper strips were used for these data collection. Periotron

8000 was used for volume quantification of SF. For the biochemical analysis, the paper strips were placed in a single Eppendorf vial containing 100 μ l phosphate-buffered saline and stored at -80°C .

Results: throughout the study period, LMS and T(+) showed no statistically significant differences for the analyzed parameters ($p > 0.05$), while higher mean values were noted in MS implant sites with statistical significance ($p < 0.05$).

Conclusions: peri-implant gingival healing differs from periodontal healing and show a higher pro-inflammatory state. LMS characteristics and their distinct relationships with surrounding tissues and marginal implant-gingivae interface may create environmental changes that could modify the cytokines production during the post-surgical healing phase.

HOW LASER MICROGROOVED OR MACHINED HEALING ABUTMENT REPLACEMENT INFLUENCED SOFT TISSUES

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Aim: the present study aims to evaluate the clinical and biochemical effect on peri-implant tissues of repeated disconnection/reconnection of both laser microgrooved (LMS group) and machined healing abutments (MS group).

Methods: twenty-four patients received 2 implants with one-stage protocol in a split-mouth design study on the same jaw. In each patient, one implant received a LMS healing and prosthetic abutment, while the other received MS ones. After four months from implant placement (T0), to carry out the prosthetic procedures, the healing abutments were removed three times. Four weeks later (T1), definitive prosthetic abutments were applied with screw-retained crowns. Modified plaque index (mPI), modified gingival index (mGI), bleeding on probing (BoP), probing depth (PD) were assessed at T0 and T1. There-

fore, peri-implant crevicular fluid (PICF) was collected with standardized paper strips to quantify interleukin-1 β (IL-1 β), interleukin-6 (IL-6), and tumor necrosis factor (TNF)- α levels, using the ELISA kit.

Results: the two groups (LMS and MS) showed no significant difference in mPI and mGI, at T0 and T1, while higher PD and BoP values were noted for the MS group. The mean PICF volume and levels of proinflammatory cytokines in the LMS group were less than those in the MS group. Moreover, amongst mean concentrations of interleukins at T0 and T1 in the MS group, a significant increase was found, differently from the LMS group.

Conclusions: multiple disconnections/reconnections of LMS healing abutments resulted in less inflammation compared to conventional ones.

ACCURACY IN POSITIONING OF BONE BASES RESPECT TO IMPLANT NEEDS IN THE SOFTWARE-ASSISTED IMPLANT PROJECT

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Aim: an implant project must be absolutely precise and accurate to allow the surgeon maximum reliability and predictability. The software normally reposition the images of the bone bases with automatism linked to their algorithms but often the measurements we take are not accurate precisely because of this automatism. It therefore becomes important to reposition the bone bases with respect to the axis of the implant which must be inserted in prosthetically guided mode and not skeletally guided.

Methods: 25 CTCBs were planned for the replacement of a single missing tooth by prosthetically guided implant surgery with and without correct alignment. Measurements were made from the crest to the anatomical limit to be reached. The Bland-Altman plot was used to assess the agreement between the

two measurements. The level of agreement was also assessed through Lin's concordance correlation coefficient of absolute agreement and the intraclass correlation coefficient.

Results: a good level of agreement between the two measurements was observed from the Bland-Altman plot with a mean difference of 0.76 (95% CI: 0.48; 1.03), although this mean difference showed a statistically significant difference from the line of equality. This was also confirmed by the Lin Agreement correlation coefficient of Absolute Agreement of 0.9452 and ICC 0.9718 (95% CI: 0.9412 to 0.9865).

Conclusions: a statistically significant difference between the two average measurements indicates that maximum attention is required in the correct verification of the position of the bone bases to give correct information to the surgeon

MARGINAL BONE LOSS IN RELATION TO SUBCRESTAL IMPLANT PLACEMENT, FOLLOW UP FROM 3 TO 10 YEARS

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Aim: determine radiographically the long-term "stability" of marginal bone in sub-crestally placed implants, with a follow-up of 3 to 10 years, and identify the main risk factors for the marginal bone resorption.

Methods: 93 patients treated with an implant-prosthetic rehabilitation between 2010 and 2016 were considered, with a Follow-up from 3 to 10. 410 plants have been examined, equipped with internal conical connection and platform-switching positioned sub-crestally, were radiographically examined and the marginal bone level was evaluated. Immediate loading cases were excluded, cases in which uses had required tissue regeneration and those in which a periapical radiograph had not been performed at the time of prosthetic loading. The marginal bone resorption that occurred between the time of prosthetic loading (t0) and the time of the follow-up visit (t1) was calculated. A multiple regression model was performed to identify the most relevant risk factors for marginal bone resorption.

Results: in the following study, 410 implants were examined from 93 different patients. The mean follow-up of the study was 3.58 years. The mean value of the marginal bone level observed was -1.09 ± 0.65 mm at the time of delivery of the prosthesis (t0) and -1.00 ± 0.37 mm at the follow-up visit (t1). The combination of the presence of type 2 diabetes in patient and the vertical position of the implant, resulted in the increased predictability of changes related to marginal bone level.

Conclusions: despite the limitations of the following study, implants equipped with a tapered internal connection and platform-switching, inserted at a subcrestal level of about mm1, showed a stable marginal bone level and a low rate of peri-implantitis or peri-implant mucositis after medium and long-term follow up. Type 2 diabetes, vertical implant position, and follow-up time had the greatest influence on marginal bone resorption. However, further studies are needed to verify the long-term clinical validity of subcrestal implant placement.

A RETROSPECTIVE STUDY OF MARGINAL BONE LOSS AROUND 110 IMPLANTS WITH A SUBCRESTAL PLACEMENT

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Aim: the aim of this study is to evaluate the Marginal Bone Loss (MBL) around implants with a peculiar macrogeometry combined with a subcrestal positioning technique.

Methods: a population of 25 patients was selected for progressive radiographic evaluation on orthopantomograms and/or intraoral radiographs. The implant sample included 110 fixtures, of variable length and diameter, but all with the same characteristic crestal module, defined “without neck” (EVEN, Mech & Human, Grisignano, Italy), and placed subcrestally (≥ 0.5 mm). Using an image processing software (ImageJ), two operators measured the distance between the implant shoulder and the crestal bone level both on the mesial and the distal aspect of each fixture, from the first surgical time to the latest available control radiograph. The

data obtained were analyzed separately by a statistician and compared with the results from similar clinical studies found in the literature.

Results: after a mean follow-up of 8 years (range 10-161 months), the overall MBL was 0.98 mm ($SD \pm 0.89$ mm). There were no statistically significant differences among different functional loading times or number of surgical phases (1 or 2). The clinical behavior observed was better than what we expected basing on the review of available literature.

Conclusions: despite the limited sample size and the retrospective nature of the work, the MBL values recorded for EVEN “without neck” implants seem promising, and tend to suggest a subcrestal positioning technique whenever possible, at least with this peculiar fixture morphology.

MONOLITHIC ZIRCONIA CROWNS FOR SINGLE IMPLANTS IN POSTERIOR REGIONS: A RETROSPECTIVE STUDY

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Aim: a retrospective study was made to evaluate the survival rate at short and medium-term for monolithic zirconia crowns used in posterior regions as single implants.

Methods: inclusion criteria for each clinical case are single implants supported crowns and the absence of periapical lesions and periodontal problems in adjacent teeth. US Public Health Service criteria have been used to evaluate the results in the short and medium-term. Possible adverse events have been grouped in a table to evaluate their occurrence.

Results: the study was made on 41 clinical cases with a follow-up ranging from 8 months up to 78 months (with an average duration of 37.8 months). The results were classi-

fied as excellent in 30 cases (73%); Success was reached in 11 samples (27%) these have been defined as acceptable cases since they had a partial impairment of a single evaluation parameter: in all 11 cases, it was the color factor. In only one case there was an adverse event, represented by the fracture of the connecting screw between the abutment and the crown.

Conclusions: the study showed a high level of trust for monolithic zirconia crown used in posterior regions as a single implant, based on the survival rate at both short and medium-term. Monolithic zirconia crowns on implants look like a valid option for clinical usage.

EFFICACY OF AIR-POLISHING DEVICES WITHOUT REMOVAL OF IMPLANT-SUPPORTED FULL-ARCH PROSTHESES

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Aim: long-term success of titanium dental implants is influenced by various factors, including the maintenance of good oral hygiene. The present study aimed to evaluate cleaning effectiveness and patient satisfaction with glycine powder air-polishing and traditional professional oral hygiene treatments when applied to implant-supported full-arch restorations without removal of the fixed prostheses.

Methods: 85 patients (357 implants) supporting full-arch fixed restorations were included. After removal of the prostheses (T0), Plaque Index, peri-implant spontaneous bleeding, probing depth, bleeding on probing were recorded. After prostheses reinsertion, the patients were divided into three groups, each receiving two hygiene therapies randomly administered in each hemiarch.

The possible treatments were: glycine powder air-polishing and use of sponge floss vs sponge floss only in group 1; glycine air-polishing vs use of an ultrasonic device with a polyethe-

rethetone fibre tip coating in group 2; glycine air-polishing vs use of carbon fibre curettes and sponge floss in group 3. After instrumentation, the prostheses were removed to assess the Plaque Index and peri-implant spontaneous bleeding. Questionnaires were used to record patients' levels of comfort and satisfaction.

Results: glycine air-polishing reduced significantly better plaque around implants compared to control treatments ($P = 0.020$). Glycine powder air-polishing followed by application of sponge floss provided the greatest reduction of plaque deposits on the prosthetic surfaces. About 80% of patients rated glycine air-polishing highest with regard to satisfaction.

Conclusions: glycine air-polishing is a highly effective and comfortable treatment to maintain good oral hygiene in clinical practice, and could be used as an alternative to manual and mechanical instrumentation when dealing with implant-supported restorations.

THE EFFICACY OF OSSEODENSIFICATION BURS: A COMPARATIVE STUDY IN VITRO

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Aim: a proper bone density of the implant site can ensure optimal primary stability to achieve a successful osseointegration. Among the different techniques used to increase bone density in the implant site, the use of osseodensification burs shows promising results. A comparative in-vitro study is carried out in order to define the greater efficacy of osseodensification burs compared to osteosubtractive burs.

Methods: an osseodensification burs kit is used to realize 48 osteotomies on a rigid polyurethane foam test ground. Burs are used on a TMM2 implant motor for a greater entirety of collected data. The osteotomies are divided into 2 study groups (A and C) in which the sites, extended respectively 12 and 14 mm deep, are prepared by the cutters in a compaction rotation; the two control groups B and D represent osteotomies for which the cutters are used in a cutting direction. In each site has been inserted a conical implant 3.8x12. For each implant were collected data about peak torque (cp), average tor-

que (cm), integral depth-curve (I.). The implants are subjected to the resonance frequency analysis RFA to evaluate the implant stability quotient ISQ.

Results: a correlation analysis was performed between (I), Cm, Cp and ISQ. One-way variance analysis (ANOVA) was used to identify statistically significant differences between averages of the considered values in the groups. C group, representative to osteotomies prepared to 14 mm with osseodensification burs, always showed a significantly higher value in each parameter.

Conclusions: implants in sites obtained with osseodensification cutters and prepared to a length to accommodate the autologous particulate graft produced by the drilling, show a significant increase of each parameter. The use of osseodensification burs may improve primary stability in the clinical scenario on tapered implants. Further randomized controlled trial studies *in vivo* are necessary to validate this.

PARTIAL VS FULL THICKNESS FLAP: PRELIMINARY RESULTS OF A RCT

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Aim: the primary purpose of this prospective multicenter study is to evaluate whether the partial thickness detachment of a flap results in a maintenance of the stability of the hard and soft peri-implant tissues, following the respective peri-implant indices for a follow-up of three years.

Methods: patients with partial edentulism of at least 1 element received an implant 0.5 mm below the bone crest positioned with partial thickness flap detachment mode or with full thickness flap detachment mode. MBL was measured at Baseline, 1 year (T1) and 2 years (T2) of follow up.

Results: only patients with a minimum follow-up period of 2 years were considered in the present analysis. All patients received their implant treatment between October 2018 and Fe-

bruary 2022. Due to the pandemic condition one patient dropped out of the study after 1 year. A total of 18 implants has been applied to 5 patients and analyzed in the present study. No one implant or patient was diagnosed with peri-implantitis or showed major or minor prosthetic complications. The statistical analysis showed no significant differences between groups in terms of marginal bone level changes ($p = 0.67$).

Conclusions: within the limitations of the present study, no difference could be found at 2-year follow-up between the two different flap approach for the surgical phase of implant insertion. However, improvements in sample size and follow-up are needed to better elucidate marginal bone level changes in the next future

NARROW IMPLANTS VERSUS HORIZONTAL BONE AUGMENTATION: 1-YEAR RCT RESULTS

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Aim: to evaluate a year post-loading the effectiveness of immediately loaded 3 mm-diameter implants as an alternative to horizontal bone augmentation for placing 4 mm-diameter implants.

Methods: partially edentulous patients with between 4 and 5 mm of bone width were randomized to receive one to three 3.0 mm-diameter implants (23 patients) to be loaded immediately if the insertion torque was ≥ 35 Ncm, or after 4 months, or horizontal crest augmentation for placing one to three 4 mm-diameter implants (22 patients). Four mm-diameter implants were loaded after 4 months using provisional screw prostheses, replaced after 4 months by definitive ones.

Results: in the augmentation group two patients dropped out and two implants failed ($P = 0.2333$). Five patients with narrow-

diameter implants were affected by six complications versus 11 augmented patients with 12 complications, the difference being statistically significant ($P = 0.0477$). One year after loading, patients with 3 mm-diameter implants lost on average 0.14 mm of peri-implant bone, while augmentation patients lost 0.52 mm. The difference in bone loss between the two groups was statistically significant ($P = 0.0112$). Six 3-mm group patients versus four augmentation group patients were partially satisfied with function ($P = 0.4205$) and aesthetics ($P = 0.5900$).

Conclusions: one year after loading, 3 mm-diameter implants group exhibited better results, so it might be the preferable choice to horizontal bone augmentation. However, longer follow up data will be necessary.

FREE-HAND VS COMPUTER GUIDED IMPLANT SURGERY: PRELIMINARY RESULTS OF A RCT ON MBL

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Aim: a 3-years prospective study was conducted to evaluate which type of surgical protocol was the best between the insertion of the implant fixture free-hand in opposition to guided implant surgery with templates based on technology of CBCT. Strengths and weaknesses were evaluated, with an accurate description of predictability and precision of surgical protocols.

Methods: for each selected patient, the same number of implants for site were placed, without the need of bone regeneration techniques. After preparation of the site in accordance with the two techniques indicated, conical implants (Megagen Anyridge, Seoul, South Korea®) were inserted 0,5 mm under bone crest, with variable dimensions depending on the available bone and adjacent dental elements. The following parameters were considered: Marginal Bone Level (MBL) measured with standardized x-rays at Baseline, 1 year (T1) and 2 years

(T2) of follow up; prosthetic and implant complications in the follow-up period.

Results: only patients with a minimum follow-up period of 2 years were considered in the present analysis. All patients receive their implant treatment between October 2018 and February 2020. Due to the pandemic condition one patient dropped out after 1 year. Hence a total of 18 implants belonging to 5 patients were analyzed. No implant or patient was diagnosed with peri-implantitis or showed minor or major prosthetic complication. The statistical analysis showed no significant differences between groups (study and control) in terms of MBL change ($p = 0.67$).

Conclusions: within the limitations of this study, no difference could be found at 2-year follow-up. Improvements in sample size and follow-up are needed in order to better elucidated MBL change in the next future.

DRILLS VERSUS PIEZOELECTRIC SURGERY FOR ZYGOMATIC IMPLANT PLACEMENT: 3-YEAR RCT

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Aim: 3-year results of a within-person randomized controlled trial to compare the outcome of site preparation for two zygomatic oncology implants per zygoma using conventional preparation with rotary drills or piezoelectric surgery with dedicated inserts.

Methods: twenty edentulous patients with severely atrophic maxillae had their hemi-maxillae randomized according to a within-patient study design into implant site preparation with either conventional drills or piezoelectric surgery. Two zygomatic oncology implants were placed in each hemi-maxilla.

Results: six patients experienced at least one complication at drilled sites and five at piezoelectric surgery sites ($P = 1.0$). Implant placement with drills took on average 14.35 ± 1.76 minutes

vs. 23.50 ± 2.26 minutes with piezoelectric surgery, the implant placement time being significantly shorter with conventional drilling (difference = 9.15 ± 1.69 minutes; $P = 0.000$). Post-operative haematomas were larger at drilled sites in 11 patients and similar at both sides in nine patients ($P = 0.0001$), and 16 patients found both techniques equally acceptable while four preferred piezoelectric surgery ($P < 0.0001$).

Conclusions: although these results may be system-dependent, and therefore cannot be generalized to other zygomatic systems with confidence, both drilling techniques achieved similar clinical outcomes. However, conventional drilling required 9 minutes less and could be used in all instances, though it was more aggressive.

ZYGOMATIC VS CONVENTIONAL DENTAL IMPLANTS IN AUGMENTED ATROPHIC MAXILLA: 3-YEAR RCT

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Aim: to compare 3 years post-loading the clinical outcomes of immediately loaded cross-arch maxillary prostheses supported by zygomatic implants versus conventional implants placed in augmented bone.

Methods: seventy-one edentulous patients with severely atrophic maxillae were randomized according to a parallel-group design to receive either zygomatic implants (35 patients) to be loaded immediately or xenograft followed, after 6 months of graft consolidation, by placement of six to eight conventional dental implants submerged for 4 months (36 patients).

Results: eight prostheses could not be fitted or failed in the augmentation group versus two prostheses in the zygomatic group ($P = 0.082$). Nine patients in the augmentation group lost

42 implants versus three patients who lost six zygomatic implants, the difference being not statistically significant ($P = 0.052$). 16 augmented patients were affected by complications versus 29 zygomatic patients, the difference being statistically significant ($P = 0.007$). The mean number of days to functional prosthesis fitting were 444.32 ± 207.86 in augmentation patients and 1.34 ± 2.27 in zygomatic patients ($P < 0.001$), the difference being statistically significant.

Conclusions: immediately loaded zygomatic implants are associated with fewer prosthesis failures, implant failures and less time needed for functional loading as compared to augmentation procedures and conventionally loaded dental implants. More complications were reported for zygomatic implants.

INTERNAL VS EXTERNAL CONNECTIONS IN IMMEDIATELY LOADED FULL-ARCH REHABILITATIONS: SPLIT-MOUTH STUDY

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Aim: the aim of the study was to evaluate the difference between peri-implant tissue behavior using internal and external connections in immediately loaded-full-arch implant rehabilitations after 48 months follow-up.

Methods: 10 subjects aged 46-77 years have been enrolled, all partially edentulous with high level of bone resorption. After extraction of the remaining teeth, patients were rehabilitated with four post extractive implants according to the All on 4 Protocol®, using two implants with external connection in one emi-jaw and two with internal connection in the other one. Full-arch resin prosthesis supported with metal framework, according to Columbus Bridge Protocol®, were screwed following immediate loading protocol (24 to 48 h after the surgery). In each patient, the following parameters were evaluated:

peri-implant bone loss, implant survival rate, peri-implant probing depth, plaque index, bleeding on probing, mobility and pain.

Results: implant success rate was 97% at 48 months. Bone resorption at 48 months was $1,75 \pm 0,62$ mm for the external connection and $1,69 \pm 0,52$ mm for the internal connection (p-value 0.386).

Conclusions: in 48 months there was a moderate not statistically significant greater bone resorption with the use of the external connection. Regarding peri-implant probing, no differences emerged between the two types of connections. The implant survival at 48 months was found to be comparable. Further studies are needed in order to define whether one type of connection is more suitable than the other.

MANAGEMENT OF MAXILLOFACIAL BALLISTIC TRAUMA

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Aim: this study aims to define the best management of maxillofacial ballistic trauma and to describe a standardized, surgical and prosthetic, rehabilitation protocol from the first emergency stage up until the complete aesthetic and functional rehabilitation.

Methods: we undertook a retrospective review of all patients prosthetically rehabilitated for maxillofacial ballistic trauma. We evaluated the mechanism of injury, the anatomic sites involved, the surgical and reconstructive procedure performed, the following prosthetic choice and the complications.

Results: in low-velocity ballistic injuries (bullet speed < 600 m/s), the wound is usually less severe and non-fatal, and the management should be based on early and definitive surgery with reconstruction, followed by oral rehabilitation. High-velocity

ballistic injuries (bullet speed > 600 m/s) are associated with extensive hard and soft tissue disruption and the management should be based on a 3-stage reconstructive algorithm: debridement and fixation, reconstruction, and final revision.

Conclusions: the management of these patients requires a multi-step and multi-disciplinary treatment plan. The prosthetic rehabilitation has the greatest impact on the patient's quality of life: an implant-supported prosthesis allows the restoration of aesthetic, functional and psychological outcomes. In our opinion, the fixed hybrid prosthesis guarantees the best follow-up because the metal structure ensures a better distribution of forces while the space under the prosthesis flanges facilitates the maintenance of hygiene by preventing the accumulation of food and plaque.

EFFECTS OF PROSTHETIC EMERGENCE ANGLES ON MARGINAL BONE LEVEL: A RETROSPECTIVE STUDY

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Aim: the aim of the present retrospective study was to evaluate marginal bone level changes in patients restored with implant fixed rehabilitation with different prosthetic emergence angles (EA).

Methods: seventy-four patients were included in the analysis and a total of 312 implants were examined. Patients had a mean 3-year follow-up, in which marginal bone level (MBL) was first assessed at prosthesis installation (t0) and then at 3-years follow up visit (t1). Two groups were considered: Group 1 and Group 2 included restorations with angle between implant axis and prosthetic emergence profile > 30° and ≤ 30°, respectively.

Furthermore, peri-implant soft tissue parameters, such as modified bleeding index (MBI) and plaque index (PI), were assessed.

Results: mean EA in Group 1 and 2 was respectively 45° ± 4° and 22° ± 7°. Mean MBL change was 0.06 ± 0.09 mm in Group 1 and 0.06 ± 0.10 mm in Group 2. Differences in MBL between the two groups were not statistically significant (p = 0.969).

Conclusions: MBL stability may not be affected by more than 30 degrees and less than 50 degrees emergence angles with a tight and stable implant to abutment connection and platform switching of the abutment diameter. Nevertheless, long-term data are required to confirm this trend.

MMP-8 LEVELS IN PERI-IMPLANT MARGINAL BONE LOSS PROGRESSION: A RETROSPECTIVE STUDY

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Aim: the purpose of this retrospective study was to evaluate the possible correlation between peri-implant sulcular fluid levels of Metalloproteinase-8 (MMP-8) and peri-implant Marginal Bone Loss (MBL) progression.

Methods: two groups of patients (A and B) were selected. In group A, 39 implants with a laser-microtextured collar surface were surgically placed in 39 patients, while, in group B, 41 implants with a machined/smooth surface were inserted in 41 subjects. Periapical radiographs and a software package were used to measure MBL rates for each patient. ELISA test was performed to analyze implant fluid samples. Rates of MBL and MMP-8 were recorded in three timeframes (6 months post-surgery- restoration delivery (T0)-and 6 (T6) and 24 (T24)-months post-loading).

Results: elevated MBL levels at T24 were strongly related with high rates between T0 and T6. The values of MMP-8 were significantly higher around implants with MBL, comparing to implants without MBL. The MBL rates at T24 were associated with initial bone loss rates and initial levels of MMP-8.

Conclusions: the presence of peri-implant sulcular fluid levels of MMP-8 is statistically associated to peri-implant MBL progression. Additionally, the initial high levels of MBL and MMP-8 can be predictive of the consecutive progression of peri-implant MBL: implants with increased MBL rates and MMP-8 levels at 6 months after loading are likely to reach further marginal bone loss values.

FOUR MM ULTRASHORT VERSUS LONGER IMPLANTS PLACED IN AUGMENTED BONE: A 5-YEAR RCT

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Aim: to evaluate if 4-mm ultrashort implants could be an alternative to bone augmentation in the severely atrophic posterior jaws.

Methods: eighty partially edentulous patients with posterior atrophic jaws were included: 40 patients in the maxilla and 40 in mandible. The patients were randomized to receive one to three ultrashort or at least 10-mm long implants in augmented bone. Results are reported 5 years after loading with the following outcome measures: implant and prosthetic failures, complications and peri-implant marginal bone level changes.

Results: thirty-two complications were reported for the control group in 18 patients versus 13 complications in 10 patients in the test group, the difference being not statistically significant

($p = 0.103$). In the augmented group, 12 implants failed in 6 patients versus 7 short implants in 6 cases, and 9 prostheses failed in the control group while 4 in the test one, without statistically significant differences ($p = 1.000$ and 0.363). At 5 years after loading, short implants lost on average 0.58 ± 0.40 mm of peri-implant marginal bone and long implants 0.99 ± 0.58 mm, the difference was statistically significant ($p = 0.006$).

Conclusions: ultrashort implants showed similar if not better results compared to longer implants placed in augmented jaws 5 years after loading. For this reason, their use could be in specific cases preferable to bone augmentation. However, longer follow-ups and larger trials are needed.

THE INFLUENCE OF THE KERATINIZED TISSUE ON SHORT IMPLANTS: A RETROSPECTIVE STUDY

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Aim: to assess whether the presence/absence of keratinized tissue height (KTh) influence short implants health.

Methods: the study was designed as a parallel cohort retrospective research. Short implants with an implant length < 7 mm were considered. One cohort was composed of patients with short implants surrounded by ≥ 2 mm of KTh; the other one included implants with < 2 mm of KTh. Outcome measures were: marginal bone level changes (MBL), failures and complications.

Results: 110 patients treated with 217 short and ultrashort implants were retrospectively included. The mean follow-up was 4.1 years after prosthetic loading. The differences between groups in MBL were not statistically significant at every follow-up considered: 0.05 mm at 1 year ($P = 0.48$), 0.06 mm at 3 ye-

ars ($P = 0.34$), 0.04 mm at 5 years ($P = 0.64$) and 0.03 at 8 years ($P = 0.82$). A total of 9 complications were reported, 3 in the narrow KTh group and 6 in the wide one, the difference being not statistically significant ($P = 0.14$). Five implants failed due to peri-implantitis, 2 in the narrow KTh group and 3 in the wide, without a statistically significant difference ($P = 0.29$).

Conclusions: there are no statistically significant differences in MBL, complication and implant failure rates between short implants with adequate or inadequate KThs. However, a KT graft could be helpful in making brushing comfortable and in limiting plaque accumulation. Nevertheless, longer follow-ups, larger number of patients and RCTs are needed before making more reliable clinical recommendations.

VOLUMETRIC STABILITY OF REGENERATED TISSUE FIVE YEARS AFTER CRESTAL SINUS FLOOR ELEVATION

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Aim: this study evaluated, at 5-year follow-up, the clinical outcomes of transcrestal sinus floor elevation (implant survival, regenerated tissue stability and formation of new apical cortical layer).

Methods: patients with residual crestal height < 5mm who underwent tSFE and implant-supported rehabilitation were included. Grafted area height was evaluated on periapical radiographs at functional loading (T0) and after 5 years of function (T1), using implant platform as landmark. Demographic data, anatomical variables and histomorphometric outcomes were correlated with implant failure rate, apical cortical layer formation and graft volumetric stability using univariate and multivariate regression logistic models.

Results: thirty-three patients were included. Implant failure

was recorded in 3 patients (9.1%): bucco-palatal sinus width > 16.5mm resulted to be a perfect predictor for this outcome. Mean height of grafted material at T0 and T1 was 12.5 ± 2.7 mm and 11.2 ± 3.2 mm, respectively. Mean graft resorption was 1.3 ± 1.9 mm, showing strong inverse correlation with the percentage of newly formed bone after 6 months of healing ($p < 0.000$). The formation of apical cortical layer was present in 14 out of 33 cases at T0 (42.4%) and in 21 out of 30 at T1 (70%). This outcome showed strong inverse correlation with bucco-palatal sinus width ($p = 0.009$).

Conclusions: bucco-palatal sinus width seems to be a crucial factor influencing clinical and histological outcomes after tSFE. Careful preoperative planning and case selection is needed to optimize long-term results of this surgical technique.

PRE-SHAPED TITANIUM MESHES AT DEHISCENCE-TYPE PERI-IMPLANT DEFECTS: A PROSPECTIVE STUDY

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Aim: the aim of the present prospective study was to evaluate the use of a newly preformed titanium mesh to support bone regeneration simultaneously to implant placement at dehiscence-type defects both from clinical and radiological outcomes. This device can be fixed directly to the implant with no need of extra fixation screws.

Methods: overall, 13 implants were placed in 8 patients. All sites were treated with preshape titanium mesh. Horizontal bone augmentation was promoted with autogenous bone and deproteinized bovine bone in a 1:1 ratio. Clinical measurements and radiographic evaluations (Cone Beam CT) were performed to assess the horizontal bone gain after 6 months from surgery.

Results: the healing proceeded uneventfully in the majority of patients. Late complications included loss of the cover screw in one patient and bilateral exposure of the titanium mesh at the occlusal-lingual aspect in another patient. Clinically, a mean horizontal bone gain of 3.34 ± 0.59 mm, and a mean horizontal bone thickness of 8.19 ± 0.93 mm were assessed. A mean horizontal bone gain of 3.39 ± 0.43 mm associated with a mean horizontal thickness of 8.50 ± 0.50 mm were observed radiographically. Well vascularized newly formed bone-like tissue was observed in intimate contact with the implants.

Conclusions: the results suggest that preformed titanium mesh may be effective in supporting simultaneous horizontal bone regeneration at dehiscence-type peri-implant defects.

MARGINAL BONE MAINTENANCE WITH DIFFERENT PROSTHETIC EMERGENCE ANGLES

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Aim: many studies have shown throughout the years that over-contoured restorations tend to have an influence on gingival inflammation and plaque retention. The aim of this study is to investigate the influence on marginal bone level stability of restorations with different emergence angles (EA) of implants with internal conical connection and platform-switching.

Methods: the radiographic images were then analyzed with a software program (Image J, NIH, Montgomery County, Maryland, USA) to measure the peri-implant bone level (Marginal Bone Level, MBL). Measurements were made at mesial and distal aspect of each implant and were reported in millimeters. All radiographs were performed at the time of prosthetic deli-

very and at the follow-up visit through customized plastic supports. In addition, radiographs were used to measure the emergence angle (EA) between implant long axis and the line tangent to the restoration.

Results: results from the regression model showed that complete vs partial restoration and the time from prosthetic delivery (follow-up) are significant predictors of variation in MBL change (adjusted $R^2 = 0.036$; $F(5,306) = 2.302$; $p = 0.045$).

Conclusions: within the limits of the present investigation, it could be concluded that emergence profile comprised between 30 and 50 degrees might not influence the marginal bone level stability in the short term.

PERI-IMPLANT TISSUE HEALTH IN IMPLANT-SUPPORTED FIXED PARTIAL REHABILITATIONS

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Aim: to investigate peri-implant tissue health in patients with implant-supported fixed partial rehabilitations.

Methods: 44 patients rehabilitated with fixed partial implant-supported rehabilitations were included. The following parameters were measured: spontaneous bleeding, suppuration, bleeding on probing (BOP), probing depth (PD), plaque index (PI). Periapical radiographs were taken to measure crestal bone loss (BL). A non-parametric test (Spearman's rank coefficient) was used to identify possible correlations between the clinical parameters recorded.

Results: 121 implants have been analyzed. Mean PI and BOP were 1.98% and 0.80% respectively; there were no cases of suppuration (0.00), and only two implants showed spontaneous bleeding. Mean BL was 1.53 mm (SD 0.98). There was a very weak statistically significant correlation between PI and BL $r_s = 0.26$ $p(2\text{-tailed}) = 0.65$, and between PI and the other peri-implant parameters (BOP $r_s = 0.13$ $p =$

0.13, PD $r_s = 0.04$, $p = 0.6$). A very weak correlation was also found between BL and BOP $r_s: 0.1$ $p = 0.2$ and between BL and PD ($r_s = 0.02$ $p = 0.7$). Correlation was found between BL and age ($r_s = 0.13$, $p = 0.81$) and between the other peri-implant parameters and age (≥ 65 years) using dichotomized: (PI $r_s: -0.14$, $p = 0.11$; PD $r_s: -0.21$ $p = 0.01$; BOP $r_s: -0.21$ $p = 0.01$; SB $r_s: 0.05$ $p = 0.53$). No statistically significant correlations were found between the clinical parameters evaluated and sex or the dental arch treated (maxilla vs. mandible). In contrast, the correlation between periodontal parameters and years since surgery (follow-up) was significant ($p = 0.75$, $z\text{-score} = 12.9$).

Conclusions: the present research suggests that in implant-supported fixed partial rehabilitations, dental implants with greater plaque accumulation are more likely to present peri-implant health problems, although the correlation was statistically very weak.

SHORT VERSUS LONGER IMPLANTS IN NON-ATROPHIC SITES: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Aim: the present meta-analysis aims to analyze the clinical performance of short compared to longer implants inserted in sites without the need for bone augmentation.

Methods: the protocol of the present PRISMA-driven meta-analysis was registered on PROSPERO (CRD42021264781). Electronic and manual searches were performed up to January 2022. All Randomized Controlled Trials (RCTs) comparing short (≤ 6 mm) to longer (≥ 8.5 mm) implants placed in non-atrophic and non-augmented sites were included. The quality of the included studies was assessed using the Cochrane risk of bias tool for randomized clinical trials (RoB 2) and the quality of evidence was determined with the Grading of Recommendations Assessment, Development, and Evaluation (GRADE) approach. A meta-analysis was performed on implant survival rate, marginal bone level change (MBLc), technical and biologic complications at the available follow-up time points.

The power of the meta-analytic findings was determined by trial sequential analysis (TSA).

Results: from 1485 initial records, 13 articles were finally included. No significant difference was found in the survival rate between short and long implant at any follow-up (moderate quality of evidence). Significantly more bone loss for long implants at 1 and 5 years from implant placement and more technical complications with short implants at 10 years were found. No other significant inter-group differences in terms of MBLc, and biologic complications were detected.

Conclusions: a moderate evidence exists that short implants perform as well as longer ones in the rehabilitation of edentulous sites without the need for bone augmentation. Further studies, however, are still needed, to provide specific evidence-based clinical recommendations for an extended use of short implants in non-atrophic sites.

WHAT WE KNOW ABOUT MALPRACTICE AND DENTAL IMPLANT PROSTHETIC THERAPIES: A SCOPING REVIEW

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Aim: the purpose of this scoping review is to search the current literature on malpractice and implant prosthesis to obtain information on the presence and incidence of malpractice in the onset of personal injury.

Methods: the research period considered runs from 1990 to 2022. The research was conducted on various databases using different keywords and applying suitable inclusion and exclusion criteria to obtain data relating to the lack of clinical tests and documentation, type of damage and type of proposed implant-prosthetic therapy.

Articles available in both English and Italian were included. The exclusion criteria applied exclude systematic reviews and case reports that have references other than implant-prosthetic therapies.

Results: of the 47 articles found, 31 were subjected to a review of the abstract. As a result, 7 fully reviewed articles were selected. 6 articles reported relevant information about the lack of clinical examinations and documentation, 4 reported information about the type of damage most frequent, while none of the reviewed articles reported information about the type of surgery implant or prosthetic implant rehabilitation involved in malpractice.

Conclusions: this scoping review highlighted a clear correlation between the lack of documentation necessary for the purpose of therapy and cases of malpractice, identifying the most frequent types of damage caused by therapeutic procedures. However, there is no specific indication of the most frequent types of implant prosthetic therapies involved to a greater extent in determining personal injury.

MAINTAINABILITY OF NON-RESORBABLE MEMBRANES AFTER EXPOSURE: A SYSTEMATIC REVIEW

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Aim: non-resorbable membranes are nowadays used in horizontal and vertical bone regeneration and are divided into two main categories: titanium mesh and PTFE membranes.

The aim of this review is to investigate the possibility of keeping a non-resorbable membrane in place after exposure.

Methods: two independent reviewers electronically and manually searched the EMBASE, PubMed/MEDLINE, Scopus, and Cochrane bibliographic databases, to retrieve pertinent articles available between January 2000 and March 2021. Only human studies describing the type of treatment and the soft-tissue outcome following exposure of PTFE-ms or TMs were included.

Results: overall, 11 articles in the PTFE-ms group and 24 in the TMs group were included for data analysis. A statistically significant evidence of an association between the type of bar-

rier membrane and the exposure rate ($P = .019$) and between the type of exposed device in terms of removal rate ($P < .001$) was noted.

Conclusions: in conclusion, the titanium mesh can usually be left in place with no bone loss after delayed exposure, in case of early exposures bone regeneration is compromised instead. PTFE membranes are removed 2 weeks to 4 months after exposure with a regeneration rate of 90-100%, the e-PTFE must be removed in the first weeks while the d-PTFE could be left in place for a period between 2 - 4 months under plaque control. Premature removal of PTFE membranes is more common than that of titanium membranes, because the latter, especially custom-made membranes, show a lower degree of exposure and better responsiveness to treatment.

PRE-SHAPED TITANIUM MESH FOR GBR WITH CONTESTUAL IMPLANT REHABILITATION: LITERATURE REVIEW

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Aim: the aim of the present review was to evaluate the use of a newly preformed titanium mesh to support bone regeneration simultaneously to implant placement at dehiscence-type defects both from clinical and radiological outcomes.

Methods: a search on the main databases as PubMed, Cochrane library, Medline was performed. Only human studies reporting the use of pre-shaped titanium mesh were included. The studies must indicate bone gain in percentage or in millimeters and observation time of the healing. Rehabilitation through implant must be reported.

Results: overall, 6 articles were included for data analysis. In 3 reports horizontal bone gain is evaluated by CBCT with a me-

an of 3.94 ± 0.89 mm. Vertical bone gain is reported in 3 reports by clinical measurements or CBCT with a mean of 4.21 ± 1.13 mm. Percentage bone gain varies between 80 and 93.5%. Reports have an average healing time of 5.6 months.

Conclusions: titanium mesh are advantageous devices applied to GBR procedures: Most literature studies, however, only report GBR procedures performed prior to implant placement. A therapeutic approach involving bone regeneration at the same time as fixture insertion would save time, reduce post-operative morbidity and number of surgeries, and reduce economic costs. As highlighted by literature, implant survival rate in regenerated bone is close to the one in native bone.

TREATMENT OF PERIMPLANTITIS: CURRENT SURGICAL AND NON-SURGICAL PROTOCOLS

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Aim: the purpose of this study is to systematically review the literature on the surgical regenerative treatment of the peri-implantitis.

Methods: four electronic databases were searched from 1990 to 2018. Research included human clinical trials of surgical treatment of peri-implantitis. Parameters evaluated: probing depth reduction, clinical attachment level gain, bleeding on probing reduction, radiographic bone fill, and mucosal recession.

Results: the first search obtained 883 citations, but only 21 articles were included in the review. Four groups have been identified: access flap and debridement only; resective approach; application of bone grafting material; guided bone regeneration. Non-resorbable and resorbable membranes were used. Contaminated implant surfaces were treated primarily with air abrasives, curets and implantoplasty. Chemotherapy was commonly accompanied by mechanical debridement. Implantoplasty with resective surgery was associated with a hi-

gher implant survival rate, reduced PD, and reduced bone loss compared with resective surgery alone. Care should be taken when performing implantoplasty on narrow implants as it can lead to fracture of the fixture. CO₂, diode, and Er: YAG lasers have been applied in several studies, suggesting that these lasers produce results similar to hand curettes. Most surgical protocols included pre- or post-operative systemic antibiotics followed by chlorhexidine rinse.

Conclusions: currently available surgical approaches carry out some clinical benefits measured at surrogate endpoints in the short term. The therapeutic effect on implant survival and patient-centric outcomes is unknown. The results provided a PD reduction, among other parameters that could be used to predict treatment outcomes. Regenerative procedures using bone grafts and membranes appeared to result in a significant reduction in PD. The patient's general condition, defect characteristics and material type can affect outcomes.

GRAPHENE-DOPED POLY (METHYL-METHACRYLATE) (PMMA) IMPLANTS OSSEOINTEGRATION

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Aim: graphene-based materials present high traction strength, an optimal thermal expansion coefficient, biological activity, absorption and lubrication capacity, flexibility and high resistance ratio. The aim of the present *in vivo* investigation was to assess the osseointegration of PMMA and GD-PMMA implants in rabbit knee-joints.

Methods: a total of eighteen (18) GD-PMMA implants and eighteen PMMA implants were positioned into the femoral knee joint of New Zealand male white rabbits and retrieved at 15, 30 and 60 days.

The biopsies were evaluated by Micro-CT and histomorphometry to evaluate the new bone formation and the osseointegration.

Results: the study findings reported that a successful osseointegration was achieved for 36 implants. A higher compo-

nent of cortical bone was reported in contact with the upper implant's threads, while the lower threads appeared in contact with newly formed bone and marrow spaces. No evidence of fibrous tissue interposition was reported for all implants. The osseointegration of the GP-PMMA and PMMA implants was confirmed by histomorphometry and Micro-CT. Wide parts of the implant surfaces appeared in close contact with the cortical bone, including the space in the medullary canal.

Conclusions: the present study findings reported that GD-PMMA improves the osseointegration in rabbit femurs. This should incentivize further research and formulations in order to obtain GD-PMMA with greater radiopacity.

Further experimental protocols involving animals *in vitro* and *in vivo* are necessary to evaluate a potential clinical use for the applications of dental implants on humans.

MICRO-ROUGH SURFACE ENRICHED WITH CALCIUM AND PHOSPHORUS IMPROVES OSTEOBLASTS BIOACTIVITY

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Aim: the aim of this study was the evaluation of the response of human oral osteoblasts (hOBs) to three different titanium surfaces: Machined, double etched (Osteopore), and double etched surface enriched with Calcium and Phosphorus (CaP) (Nanopore).

Methods: the surface characterization was investigated by scanning electron microscopy (SEM) and by sessile drop technique. The biocompatibility and osteoinductive properties were assessed by: (i) cell proliferation at 2 and 5 days; (ii) adhesion by multiphoton microscopy at day 2; (iii) the interaction with Ti-discs by blue toluidine staining at day 5; (iv) Alkaline Phosphatase (ALP) activity at 14 days; (v) calcium deposition by Alizarin Red Staining (ARS) and Cetylpyridinium Chloride (CPC), at 14 days.

Results: the surface investigations confirmed that Nanopore and Osteopore were characterized by the same micro-topography and a reduced hydrophilicity, respect to Machined. Furthermore, they showed similar osteoblasts proliferation and adhesion that were increased compared to Machined. However, Nanopore attracted a higher number of osteoblasts and promoted higher osteogenic activity as observed by an increased ALP activity and calcium deposition, with respect to the other groups.

Conclusions: CaP enrichment of DAE surfaces seemed to stimulate oral osteoblasts response and osteogenic activity, inspiring their use for *in vivo* applications.

CONTAMINATION OF ABUTMENTS BY ORAL BIOFILM: A MATHEMATICAL MODEL

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Aim: bacterial colonization of connection inner portion can be correlated with peri-implant bone loss and peri-implantitis. Many authors have suggested how decontamination can be promoted by micro-geographically smoother surfaces. Aim of this study is to build up a mathematical model capable to explain how roughness and wettability of a surface may affect bacterial contamination.

Methods: nine different surfaces used for abutment and implant junction manufacturing were submitted to SEM and Contact Angle Analysis. Oral biofilm taken from periodontal pocket with probing greater than 7 mm has been cultured on sterile samples. Contaminated samples were valuated with ImageJ using Cell-Count plugin. Obtained results were analyzed with MathLab software.

Results: surfaces roughness ranged from $S_a=0.2$ to $S_a=21$. Surfaces had wettability with maximum values of 114 ± 6.2 at minimum 48.7 ± 2.7 . The “Roughness–Wettability” mathematic model was thus investigated and led to the following equation: Contamination= $a \cdot \text{wettability} + b \cdot \text{roughness} + c$ where $a = -0.142$ (CI= 95%: $-0.2712, -0.01475$) $b = 0.5273$ (CI= 95%: $0.4001, 0.6546$) $c = 16.4$ (CI= 95%: $5.461, 27.33$) $R^2_{\text{adjusted}} = 74.87\%$

Conclusions: surface roughness seems to increase the possibility of creating ecological niches conducive to bacterial colonization. Surface wettability increases the bioactivity of the surface by recalling integrins and proteins that seem to promote bacterial adhesion. Further studies will be needed to fully understand the dynamics of bacterial contamination.

PERIPHERAL GIANT CELL GRANULOMA: A CASE REPORT

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Aim: peripheral giant cell granuloma (PGCG) or giant cell tumor (GCT), is a tumor-like lesion arising on the mucosa of the adherent vestibular or lingual gingiva, or edentulous alveolar ridge mucosa. It is a rather frequent lesion but it is often underdiagnosed because it is mistaken for pyogenic granuloma. The aim of this work is to present a case of peripheral giant cell granuloma and its surgical laser excision.

Methods: a 62-year-old female patient of Dominican origin came to the Oral Medicine and Pathology unit of the U.O.C of Odontostomatology and Maxillofacial Surgery of Ospedale Maggiore Policlinico Fondazione IRCCS Ca' Granda in Milan for clinical follow-up and evaluation of oral conditions. Physical examination revealed suspected pyogenic granuloma with dimensions of about 10-14 mm in diameter in 2.1-2.2 area. Pri-

mary diagnosis is gingival hypertrophy associated with gingival epulis.

Results: the patient underwent laser-assisted excisional biopsy of and subsequent histopathological analysis, which reported a diagnosis compatible with peripheral giant cell granuloma. A radiological check-up with orthopantomography and Cone Beam CT was required to assess any recurrence of the lesion and to evaluate the surgical site.

Conclusions: laser-assisted excisional biopsy has been shown to be effective in excising the lesion. Diagnostic images show no evidence of recurrence of the lesion.

Collaboration with the anatomic pathologist is suggested to get a correct diagnosis and set up an appropriate treatment plan.

PROLIFERATIVE VERROUCOUS LEUKOPLAKIA AND LASER-ASSISTED EXCISION: A CASE REPORT

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Aim: proliferative verroucous leukoplakia (PVL) is a particularly aggressive and potentially malignant disorder, characterized by a marked tendency to neoplastic transformation. It is defined as a white plaque that cannot be characterized neither from a clinical point of view nor from a histological point of view. The incidence of the disease is about 3% and the malignant potential is estimated to be between 4% and 17%. The aim of this work is to present a case of PVL and its surgical treatment by laser-assisted excision.

Methods: a 54-year-old female patient came to the Oral Medicine and Pathology unit of the U.O.C of Odontostomatology and Maxillofacial Surgery of Ospedale Maggiore Policlinico Fondazione IRCCS Ca' Granda in Milan for clinical follow-up

and evaluation of oral conditions. Physical examination revealed PVL with dimensions of about 3 cm in diameter in posterior palatal area. A previous biopsy and histological diagnosis had already confirmed the suspect of PVL.

Results: the patient underwent laser-assisted excisional surgery to remove the palatal lesion. A histopathological analysis was performed in order to exclude the presence of dysplasia.

Conclusions: laser-assisted excisional biopsy has been shown to be effective in excising the lesion, but it's not effective in prevent the recurrency. Infact the patient has shown the recurrence of another lesion, but in a different area. It could be considered a valid method for treating extensive lesions with minimal invasiveness and patient discomfort.

SCLERODERMA AND DIODE LASER TREATMENT: A CASE REPORT

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Aim: scleroderma is a chronic, generalized disorder of the connective tissue. It is characterized by immune disorders, abnormalities of morphology and functions of small blood vessels, and the presence of inflammatory process. The oral cavity may be the place of pathological manifestations within soft and hard tissues. The oral abnormalities that are frequently reported in scleroderma are: xerostomia, microstomy, increased risk of periodontal disease, mandibular resorption, trigeminal neuropathy and telangiectasia of the face and mucous membranes.

Methods: an Italian 54-year-old patient shows up at the surgery of Oral Medicine and Pathology of the U.O.C. of Odontostomatology and Maxillofacial Surgery of the Ospedale Maggiore Policlinico Fondazione IRCCS Ca' Granda in Milan for

the evaluation of vascular lesions to the upper and inferior lips. The patient reports bleeding of certain injuries and diagnosis of scleroderma of the attending physician. On the physical examination it has point lesions with a maximum diameter of 3mm, the oral mucous membranes are moderately hyperemic and normal blood flow was present.

Results: after the application of Luan 2% topical anesthesia, the patient underwent surgical cauterization of the lesions through the use of diode laser.

Conclusions: the patient shows no signs of relapse nor spontaneous bleeding and good healing of the treated site is noted. Laser assisted cauterization could be an effective approach to treat oral vascular lesions, with minimum discomfort for patients during recovery.

LOW LEVEL LASER THERAPY AND PRGF EFFICACY IN THIRD MOLAR EXTRACTION: PRELIMINARY RESULTS

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Aim: the aim of this study is to test the efficacy of the Low-Level Laser Therapy (LLLT) and Plasma Rich in Growth Factors (PRGF) in reducing post operative complications (oedema, trismus, pain) after the extraction of an impacted inferior third molar.

Methods: data regarding pain were assessed through the Visual Analogue Scale and the Mc Gill Pain Questionnaire Short Form while measures regarding trismus and oedema were carried out with a gauge measuring tool. Data were recorded at five time points: before surgery (T0), right after surgery (T1), at 48 hours (T2), at 7 days (T3) and at 15 days (T4). Patients were randomly divided in four groups: in the first group patients were treated with LLLT session and PRGF, in the second group

patients received only PRGF, in the third group patients underwent only LLLT and the fourth group were control patients.

Results: preliminary results regarding 40 patients show that those who received both PRGF and laser application experienced on average less pain, reduced oedema and trismus at T2 and T3 compared to the other groups ($p < 0.05$). Moreover, group 2 and 3 showed better results in the three analyzed variables compared to the placebo group even though not statistically significant.

Conclusions: the use of LLLT and PRGF can be a useful tool in inferior third molar extractions in order to reduce post operative complications. More data regarding a larger sample size will be needed to confirm these results.

PAIN IN FIXED ORTHODONTIC TREATMENT. ROLE OF PHOTOBIOMODULATION: DREAM OR REALITY?

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Pain is an unpleasant emotional and sensory experience. For many years orthodontists have been looking for an effective method of reducing this feeling of discomfort. In recent years, Photobiomodulation (PBM) has taken hold in the orthodontic field. Among the countless advantages it can modulate the painful feeling. The aim of this research is to identify the use of photobiomodulation in subjects undergoing fixed orthodontic treatment, to reduce the pain and discomfort that it causes. The research was conducted from the Web of Science, Pubmed and Scopus databases. Only 14 of all articles met the inclusion and exclusion criteria and were therefore used to

conduct the research. The different studies compared, in most cases, patients whose mouth was divided into a part treated with laser therapy and a placebo part. The results show a statistically significant difference in perceived pain between the irradiated arch and the non-irradiated arch. Three authors didn't find statistically significant results in favour of Photobiomodulation, but it is important to remember that they used different parameters. To obtain generally valid studies, with consistent and reproducible results, it is necessary to standardize the different parameters used that are independent by operator performing the procedure.

LASER-ASSISTED TREATMENT OF MRONJ: COMBINATION OF ER:YAG LASER AND OZONE THERAPY

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Aim: the purpose of this study is to evaluate the efficacy of the combination of ozone gel and Er: YAG laser in the treatment of drug-induced osteonecrosis of the jaws (MRONJ).

Methods: 7 patients with MRONJ of stages I, II and III were treated with a protocol that provides home and hospital medical therapy (Tm) + ozone therapy + surgical treatment with the Er: YAG laser. The protocol provides for a specific organization chart: Initially, medical therapy (TM) is performed; 8 applications of ozone gel once a week; Er: YAG laser surgery session; monitoring of healing for at least 12 months. Medical therapy (TM) includes: Hospital dressings of osteonecrotic lesions every 7 days: irrigation with physiological solution and application of 0.8% hydrogen peroxide gel for 15 minutes; Homemade dressings: patient also irrigated the wound with saline every 12h at the end of each meal. 0.8% hydrogen peroxide gel was applied for 15 minutes once a day; Antibiotics: administered in cases of perilesional soft tissue superinfection with suppura-

tion and pain symptoms. The recommended antibiotic therapy is: amoxicillin clavulanate 1 gr every 12 hours + metronidazole 250 mg every 8h, for 7 days in case of exclusive medical treatment and 14, with surgery on the seventh day, in case of combined treatment. Patients were reassessed weekly for the first month, monthly for the following semester then every 3 months until the year. The radiographic survey was carried out 6 and 12 months after the last treatment.

Results: TM + Ozone therapy + Er: YAG laser surgery: all treated patients achieved complete clinical and radiographic recovery (100%) with complete remission of osteonecrosis.

Conclusions: the proposed combined treatment allows to obtain excellent results in the resolution of MRONJ. This success is explained by a series of characteristics specific to laser technology, in fact, thanks to the photoacoustic, photochemical, photothermal and photomechanical properties, the laser makes it possible to reduce the bacterial load at the intervention site.

RECURRENT LEUKOPLAKIA SUCCESSFULLY TREATED WITH DIODE LASER: A CASE REPORT

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Aim: oral leukoplakia is a white plaque lesion, classified as potentially malignant disorder. Approximately 1% of leukoplakias will transform into carcinoma every year. Management can be challenging as some leukoplakias will recur, irrespectively from treatment approach adopted. Diode laser has a wavelength of 810-980 nm and it has affinity for melanin and hemoglobin. Some advantages of laser use are promotion of a faster wound healing, reduction of bleeding, less traumatization, minimal invasiveness and ease of use. Here we report a case of recurrent leukoplakia successfully treated with diode laser.

Methods: a 70-year-old male was referred to the Department of Oral Surgery and Medicine of the University of Parma for a white plaque lesion of about 1.0 cm, with homogeneous color and surface, regular margins, asymptomatic and not ulcerated, on inferior surface of the tongue.

Results: surgical excision with scalpel was performed maintaining 0.5 cm resection margins, followed by histopathological examination, which excluded known white diseases. A definitive diagnosis of leukoplakia with mild dysplasia was rendered. At a 5-month follow-up visit, 2 small white lesions, compatible with recurrences, were identified in the same subsite. Surgical excision of such recurrences was performed with diode laser. Histopathological examination confirmed absence of dysplasia. At a 12-months follow-up no further lesions were identified.

Conclusions: diode laser is probably one of the most useful tools in soft tissue surgery. Lasers allow to safely perform surgery in highly vascularized sites, such as inferior surface of the tongue and oral pelvis, drastically reducing risk of bleeding. Recent evidence suggests that recurrence rate of leukoplakia is somewhat lower after laser excision.

ANTIMICROBIC EFFECT OF ER:YAG LASER ON CARIOUS LESIONS COMPARED TO TRADITIONAL THERAPY

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Aim: this study aimed to evaluate Erbium:Yttrium-Aluminum-Granate (Er:YAG) laser photothermal and mechanical effects on the composition of the microbial load and on the concentration of cariogenic species in treatment cavities to compare the reduction of microorganisms with conventional treatments.

Methods: adult patients with deep carious lesions of Black class I on permanent teeth were enrolled and randomized into the "control" and "intervention" groups and treated with manual and rotating conventional therapy (dentin spoon, turbine and drill handpiece) and Er:YAG, respectively. Two samples were collected from each patient in both groups using a sterile microbrush wiped on the cavity dentinal tissue before and after the treatments. The percentage of microbial reduction and

the resulting colony forming units (CFU) after laser and conventional therapies were compared for total microorganisms, including *Candida* spp., *Streptococcus* spp. and *Lactobacillus* spp. Microbial typing was performed by sterile sampling of the isolated colonies, setting up a pure culture analyzed by mass spectrometry with MALDI TOF technology.

Results: the microbial reduction was significant for total microorganisms and *Streptococcus* spp. ($p < 0.05$) and ranged from 90.2% to 100%.

Conclusions: the Er:YAG laser reveals a promising future for clinical applications in conservative dentistry, in particular with "special needs", non-collaborative and pediatric patients, due to its minimally invasive nature and effect on reducing the overall microbial load.

PHOTODYNAMIC THERAPY BASED ON NEW 5-ALA GEL AND 630NM-LED PROMOTES OSTEOGENIC EFFECTS

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Aim: the strong antimicrobial effects of new gel 5% delta-aminolevulinic acid (ALAD) associated with 630nm-LED as photodynamic therapy (ALAD-PDT) in treating periodontitis and peri-implantitis drove us to explore its potential regenerative effect on bone tissue by testing this new ALAD-PDT on primary human oral osteoblasts (hOBs).

Methods: the hOBs, explanted from human mandible bone fragments, were cultured, and incubated with ALAD gel for 45 minutes and subsequently irradiated with a 630nm-LED for 7 minutes (ALAD-PDT). To determine the time-dependent effects of ALAD-PDT treatment, the following points were evaluated: (1) cellular accumulation of the photosensitizer PpIX by 0.5M HClO₄, after 0, 48 and 72 h; (2) proliferation by MTT assay, after 48 and 72 h; (3) Alkaline Phosphatase (ALP) activi-

ty after 3 days; (4) calcium deposition by Alizarin Red Staining, and by Cetylpyridinium Chloride, after 14gg. Cells exposed to LED as positive control. Untreated and unexposed cells as negative control.

Results: the results showed significant accumulation of PpIX immediately after 45 min of incubation (0h), but this did not increase at 48 h and 72 h. Interestingly, these same time-points were associated with a significant enhancement of hOBs proliferation, with an increase of 46.83% and 127.75%, respectively. Furthermore, the ALP activity resulted stimulated and there was a significant increase in calcium deposition of 72.33%.

Conclusions: in conclusion, our data, for the first time, highlighted the osteoinductive effects of 5-aminolevulinic acid on human oral osteoblasts.

ORAL VASCULAR LESION TREATED WITH DIODE LASER PHOTOCOAGULATION: A 18 MONTHS FOLLOW UP

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Aim: vascular lesions such as neoformations accounts for 7% of all benign tumors. The oral cavity is the most frequent site, accounting for 14% all cases. Capillary and cavernous hemangiomas are the most frequent variants. Treatment options include topical beta blockers, oral propranolol, or steroid injections. Surgical excision and laser therapies may be necessary to optimize long term outcomes. The aim of this work is to report a case of vascular lesion of the buccal mucosa of the upper lip treated with Diode lasers by photocoagulation without complications and relapses.

Methods: a 38-year-old patient went to our observation for a dark-blue lesion on the upper lip mucosa. Anamnesis was positive for cholecystectomy, hysteroscopy, removal of a thyroid carcinoma, uterine myomas and tachycardia. She takes Levotiroxine (125 mg). After positive diascopy, a diagnosis of possible capillary hemangioma was made. We had decided to avoid invasive treatments, given the very aesthetic location and to

use diode laser to treat this lesion through photothermo coagulation. After local anesthetic injection (mepivacaine without vasoconstrictor), diode laser 980 nm with power of 7 Watts, in pulsed mode, with a 300 µm optical fiber was activated, at a distance of 0.5 cm from the lesion surface, for a total of 2 minutes of irradiation.

Results: at two weeks after laser-assisted treatment, good tissue healing was evident with no edema and bleeding. No recurrence of the lesion occurred at the 6-month follow-up and healing was stable at 18 months.

Conclusions: in conclusion it can be stated that the minimally invasive treatment of photothermo coagulation with diode laser, was stable in the results, obtaining a quick and painless recovery for the patient. Surgery is not recommended because damage to these structures and formation of fistulas, infections and dehiscence of wounds and scars can occur in a highly aesthetic area.

LASER THERAPY OF OROPHARYNGEAL VENOUS MALFORMATIONS: A SYSTEMATIC REVIEW

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Aim: the use of laser therapy (LT) has been recently proposed as an alternative approach in the treatment of Venous Malformations (VMs), which represent the most common vascular malformations in oropharyngeal region (1-4%). The aim of this systematic review was to analyze the effectiveness of the LT used for treating oropharyngeal VMs.

Methods: a systematic review was carried out following the PRISMA guidelines. Searches were accomplished in 5 databases (Medline, Scopus, Embase, Cochrane Library, Web of Science) until 15/01/2022. Data on type of laser machines, protocols, clinical characteristics of the VMs, and outcomes were collected. Due to the heterogeneity of the studies, a

qualitative analysis was performed.

Results: out of 759 articles, 14 studies were finally included. Nd:YAG laser was the most used (9 studies), followed by Diode laser (3 studies). CO2 and KTP laser were used respectively in 2 and 1 study. Almost all treated lesions had a reduction in volume > 75%. The mean of LT applications was 2.2 for the Nd:YAG laser, 3.1 for the Diode laser and 1 for both CO2 and KTP lasers. No major complications had been reported.

Conclusions: tMs of the head-neck region. Notably, the minimal invasiveness and the absence of major complications made the LT safe and potentially more tolerable than the conventional treatments.

PAIN MANAGEMENT AFTER THIRD MOLAR SURGERY USING 980NM LASER: A REVIEW

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Aim: the surgical extraction of the lower third molar is widely practiced in oral surgery and pain is a common postoperative sequela in the patients. Several methods have been used to reduce this postoperative complication, including the use of corticosteroids, nonsteroidal anti-inflammatory drugs, analgesics, antibiotics, less traumatic surgical methods, and the use of photobiomodulation. The aim of this narrative review is to summarize the current evidence on the effect of PBM with 980nm laser on pain after third molar surgery.

Methods: a literature search using MEDLINE (NCBI PubMed and PMC), EMBASE, Scopus, Cochrane library, Web of Science, and Google Scholar was undertaken up to February 2022. Inclusion criteria were (1) studies in the English language; (2)

studies involving humans; (3) studies with primary outcomes including pain, swelling, and trismus; and (4) studies in which were used 980nm laser and the laser parameters were clearly stated. Exclusion criteria were (1) conference proceedings, letters to the editor, short communications; (2) *in vitro* or *in vivo* animal studies; and (3) studies with less than ten subjects.

Results: nine articles met the inclusion criteria. Eight studies reported a reduction of pain when compared to placebo or drug therapy, one study reported no statistically significant difference of PBM on reducing pain in comparison with placebo.

Conclusions: photobiomodulation with 980nm laser can be considered an alternative and useful method in order to control pain following impacted wisdom tooth surgery.

ORAL MUCOSITIS AND PHOTOBIOMODULATION: BETTER TO PREVENT OR TREAT?

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Aim: oral mucositis (OM) is one of the most debilitating side effects related to autologous hematopoietic stem cell transplantation (AHSCT), in particular during the conditioning chemotherapy regimen. Photobiomodulation (PBM) is recognized as a supportive therapy for reduction of local inflammation and pain.

Methods: our study is aimed at the prevention of the occurrence of OM in patients undergoing conditioning chemotherapy for AHSCT. The protocol provides daily PBM therapy sessions from the first day of conditioning up to two days after the replanting. A diode laser device was used with a specific protocol, according to the most recent literature evidences. In addition, we compared the clinical course of OM in this patients' cohort with a control group that underwent PBM therapy at the onset of OM.

Results: among 111 patients undergoing AHSCT, 9 subjects (8.11%) were treated with preventive PBM. OM was diagnosed in 55.86% of subjects, whereas patients with treated with preventive PBM developed significantly lower grade of OM (WHO scale, $p = 0.0002$) and pain scores (NRS scale, $p = 0.0077$) maintaining a better ability in swallowing, chewing and speaking.

Conclusions: PBM represents an effective therapeutic strategy not only in the management, but even in the prevention of OM, able to improve the quality of life of AHSCT patients. One of the main aims of this study is also to promote collaboration between specialists of oral medicine and hematology, in such a way as to introduce standard protocols to prevent OM, as encouraged by the most recent international guidelines for supportive care.

TREATMENT OF PERIODONTAL AND PERI-IMPLANT DEFECTS WITH LASER: A CASE SERIES

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Aim: to demonstrate that the use of diode and erbium Er:YAG laser in the removal of the granulation tissue, in periodontal and peri-implant defects, reduces surgical time, reduces bleeding, increases patient's comfort and enhances wound healing.

Methods: a case series of periodontal and peri-implant defects treated with laser for granulation tissue removal in addition to manual curettage.

Results: clinicians assessed the usefulness of diode and erbium laser use in terms of operative time, bleeding reduction and patient comfort compared with manual curettage.

Conclusions: the use of diode and erbium laser is an effective additional tool in the removal of granulation tissue in periodontal and peri-implant defects.

IS LASER LINGUAL FRENOTOMY PAINLESS IN NEWBORNS? A RETROSPECTIVE STUDY

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Aim: many authors depict laser lingual frenotomy in newborns as a painless intervention, but only a few measured such pain. The current study aims to provide an estimation of pain felt by newborns during laser lingual frenotomy by using a validated tool.

Methods: the authors conducted a retrospective study by analyzing the video records of laser lingual frenotomies performed in newborns with ankyloglossia causing breastfeeding difficulties from October 2021 to February 2022. Before surgery, all newborns received topic anesthesia by lidocaine 2,5% + prilocaine 2,5% cream. Diode laser frenotomy was performed by using a power of 4.5 W in continuous wave mode and external cooling by an icing tip. Observations about crying, oxygen saturation, heart rate, facial expression, and degree of

sleepiness were combined and converted into pain scores according to C.R.I.E.S. scale's criteria (range 0-10 points); in addition, the last of each surgery was recorded too.

Results: 15 newborns (8 males, 7 females; 2.0 ± 0.8 months of age) underwent laser lingual frenotomy within the study period. During surgery: all newborns were awake and had an oxygen saturation of over 95%; 6 newborns had a heart rate increment $> 20\%$. The intraoperative mean pain score was 5.8 ± 1.1 points, whereas the mean last of surgery was 2.7 ± 1.2 minutes.

Conclusions: the current results showed that laser lingual frenotomy caused moderate pain in newborns despite the use of topic anesthetic. Further efforts are ethically necessary to find optimal anesthesia for newborns.

TRANSMUCOSAL AND INTRALESIONAL LASER IN VOLUMINOUS INTRA- AND EXTRA-ORAL VASCULAR DISEASES

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Aim: the 2018 ISSVA classification for vascular anomalies (VAs) divides them into vascular tumors and vascular malformations; the latter can be single or multiple (syndromic or not). This study aims to describe a transmucosal and intralesional laser treatment for voluminous intra- and extra-oral VAs.

Methods: authors studied patients affected by voluminous VAs (width $> 3\text{cm}$; depth $> 5\text{mm}$) referred to the Unit of Odontostomatology Aldo Moro University of Bari from 2018 to 2021. Intraoral and/or extraoral ultrasonography estimated the superficial extension, depth expansion, and type of vessels for all VAs; in addition, all patients underwent magnetic resonance imaging too. The laser treatment employed a diode laser (wavelength $800 \pm 10\text{nm}$) in pulsed mode (t-on 190ms / t-off 250ms) with a quartz fiber ($320\mu\text{m}$ diameter); the transmucosal

no-contact photocoagulation delivered 8-12W of power, whereas the intralesional one delivered 13W up to 5mm of depth. External cooling was applied by ice. Follow-up lasted one month postoperatively.

Results: authors studied 5 pediatric and 15 adult patients; all of them had a swallowing impairment due to the VAs; one had a breathing impairment too. Preoperative diagnosis were: 8 angiomas, 2 hemolymphangiomas, 7 telangiectasias, 3 malformations. Both a significant reduction of the lesion volume and improvement of swallowing and breathing were observed at the end of the follow-up.

Conclusions: in our experience, transmucosal and intralesional photocoagulation debulked the voluminous VAs and resolved the related swallowing and breathing issues.

USING THE DIODE LASER AS SNORE THERAPY: TECHNICAL NOTE FOR TWO LASERS WITH DIFFERENT WAVELENGTHS

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Aim: snoring is generated by soft tissue vibration of the upper airway that partially obstructs airflow during sleep. It is a social problem and a potential risk for obstructive sleep apnea (OSAS). The treatment for OSA is CPAP (positive airway pressure). For snoring, there are conservative and surgical options. The photothermal effects of diode lasers are painless and can be used in combination with and in addition to CPAP and MAD (mandibular advancement).

Methods: the most effective photobiomodulation parameters were defined for 2 diode lasers on 2 male adults (1 laser and 1 patient). The risk of OSA was defined by intra and extraoral physical examination and ESS, TSS, and VSS questionnaires. The diode laser is applied in motion to the right and left soft palate, right and left tonsillar pillars, and uvula for 5 minutes at

each point, once a week, for 6 weeks. Objective pre and post-operative assessment was obtained with polysomnography. Diode laser (Oralia) Power 20W 810 nm, Frequency 10000Hz, Pulse 1:4 and 20µs Energy 4J, Fiber 800µ. Diode laser (Fisioline) Power 8W 1064nm, 100W 910nm (400mW 650nm continuous), Frequency 30000Hz, Energy 6kJ, Fiber 1000µ.

Results: in the 2 individuals with OSA, photobiomodulation by diode laser was shown to be effective in reducing snoring and other sleep disturbances as measured by ESS, TSS, and VSS questionnaires without significant changes in AHI or RDI.

Conclusions: nonsurgical, minimally invasive treatment with the 2 diode lasers has been shown to have statistically significant efficacy in reducing snoring and many other symptoms of sleep disorders.

EVALUATION OF ACCURACY AND PRECISION OF DENTAL CROWNS 3D PRINTED AT DIFFERENT ANGULATIONS

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Aim: to evaluate the accuracy and precision of crowns 3D printed with different angulations in terms of fidelity to the digitally designed crown (accuracy), repeatability of the print (precision) marginal accuracy and occlusal surface quality.

Methods: an artificial molar was prepared to receive a full crown and scanned using an intraoral scanner. The crown was designed using a dedicated software, then printed using a commercial 3D DLP printer and a dental resin. A total of 15 resin crowns were printed with an axis angulation of either 90°, 135° or with a Custom angulation for which fewer printing supports were needed (5 crowns for each group). The crowns were then scanned and compared to the original 3D model for accuracy and among themselves for precision using a speciali-

zed software. The marginal accuracy and occlusal surfaces were then evaluated macroscopically.

Results: 3D printed resin crowns printed using a 90° angulation show a higher fidelity to the digital model (accuracy) compared to other angulations only in the internal aspect of the crown: for the occlusal aspect, Custom angulation crowns were better. Custom Crowns also showed a higher repeatability of the print (precision) regarding the internal aspect and were equal to 90° crowns regarding occlusal aspect. 135° performed equal or worse in all aspects for both precision and accuracy.

Conclusions: from a clinical standpoint, Custom angulation crowns might represent an optimal solution for both internal and occlusal results for 3D printed provisional crowns, in terms of fidelity to the digital model and print repeatability.

BONDING EFFECTIVENESS OF A COMMERCIAL DENTAL ADHESIVE SYSTEM CONTAINING EXPERIMENTAL QAMS

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Aim: this study aimed at investigating the bond strength of a commercial 3 steps E&R adhesive containing experimental antibacterial quaternary ammonium dimethacrylate monomers (QAMs) designed and synthesized in our research laboratory (Italian patent n° 102019000020949, publication date 20.10.2021). The null hypothesis was that the microtensile bond strength (μTBS) was not affected by the antibacterial QAMs.

Methods: four patented experimental antibacterial QAMs (Q1, Q2, Q3, Q4) were used for this study. Fifty extracted non-carious human third molars were selected for the study. The teeth were cut to expose middle/deep dentin and assigned to one of the following groups: (1) E&R (Adper Scotchbond Multi-Purpose, 3M ESPE), (2) E&R+1%Q1, (3) E&R+1%Q2, (4) E&R+1%Q3, (5) E&R+1%Q4. Specimens were processed for

μTBS test following the non-trimming technique and μTBS was performed after 24h of storage in artificial saliva at 37°C. Groups were statistically pairwise compared with the non-parametric Kruskal-Wallis test ($\alpha = 0.05$).

Results: only group 5 showed a statistically significant decrease in the bond strength of the adhesive when compared to the other groups ($p < 0.05$). The presence of the QAMs did not affect bond strength in the other four groups, which exhibited similar bond strength values ($p > 0.05$).

Conclusions: the null hypothesis was partially rejected because a statistically significant decrease of μTBS was observed for group 5. Further studies with different aging conditions of the adhesive interface will be performed to assess the long-term behavior of the experimental QAMs.

COMPARATIVE ANALYSES OF THE REMINERALIZATION EFFECT OF DIFFERENT REMINERALIZING AGENTS ON ENAMEL

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Aim: this study aimed to compare qualitatively and quantitatively the remineralizing effect of four commercially available remineralizing agents on artificial enamel lesions using Scanning Electron Microscopy (SEM) and Energy Dispersive X-ray Spectroscopy (EDS).

Methods: twenty-four extracted third molars were collected and randomly assigned to six groups ($n = 4$): Control Group (CG), without treatment; Negative Group (NG), treated with a demineralizing solution; Mousse Group (MG), treated with a mousse of casein phosphopeptide and amorphous-calcium-phosphate (ACP), associated with 0.33% sodium monofluorophosphate; Nano-hydroxyapatite Group (N-HAG), treated with a gel containing zinc-hydroxyapatite; Duraphat Group (DG), treated with a 5% sodium fluoride varnish; Biosmalto Group (BG) treated with a dentifrice containing ACP functionalized with fluoride and carbonate-coated with citrate. Except for

CG, all groups were suspended in demineralizing solution for 72h in order to create artificial enamel lesions. Then, each sample was treated for 28 days with the assigned remineralizing agent, following the product's instructions. The pH cycle (demineralization-remineralization) was used to simulate the oral pH fluctuation patterns. Analyses of the specimens' enamel surfaces morphology were performed by SEM and EDS. Data were statistically analyzed for multiple group comparison by one-way ANOVA/Tukey's test ($p < 0.05$).

Results: scanning electron micrographs showed that MG, N-HAG, DG and BG had significantly higher amount of remineralization than group NG. Regarding the Ca/P ratio, the NG was statistically different from other groups, while all tested groups showed no differences with the CG.

Conclusions: this study concluded that all groups tested showed improved surface remineralization.

DEGREE OF CONVERSION AND THERMAL ANALYSIS OF A DENTAL ADHESIVE CONTAINING NEW ANTIBACTERIAL MONOMERS

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Aim: adding antibacterial quaternary ammonium dimethacrylate monomers (QAMs) into a commercial 3-steps E&R adhesive resin (Adper ScotchBond Multipurpose, SBMP, 3M ESPE) can prevent the onset of secondary caries. In this study, four different antibacterial QAMs, designed and synthesized in our research laboratory (Italian patent n°102019000020949, publication date 20.10.21), were added to SBMP; degree of conversion (DC%) and thermal analysis of the obtained resin mixtures were investigated. The null hypothesis was that adhesive performance was not affected by the antibacterial QAMs.

Methods: the four patented experimental antibacterial QAMs were added at 1%(w/w) to SBMP. The degree of conversion (DC%) of SBMP adhesive containing QAMs was obtained by Attenuated Total Reflection Fourier Transform Infrared spec-

troscopy (ATR-FTIR) measurements of the resins ($N = 10$) before and after 40s of photopolymerization. Ten disks of each photopolymerized resin mixture (SBMP+1%QAMs) were thermally analyzed through Differential Scanning Calorimetry (DSC) and glass transition temperatures (T_g) were identified. Samples of pure SBMP were used as a control.

Results: DC% and glass transition temperature (T_g) of SBMP adhesive were not significantly affected by the presence of 1%(w/w) of the four different QAMs. In all samples tested, DC% values were around 74% and glass transition temperatures were similar to the SBMP baseline (71°C).

Conclusions: the null hypothesis was accepted, as glass transition temperature and degree of conversion of SBMP+1%QAMs were not significantly different from the control.

NEW PROSTHETIC RESIN PA12: MECHANICAL CHARACTERIZATION BY DMA OF AM VS MILLING TECHNIQUES

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Aim: in this paper the Young's Modulus (E) of a new resin Polyamide-12 (PA12) in Additive Manufacturing (AM) was evaluated and compared to a milled PA12 (TECAMID 12 natural) manufactured by Ensinger Italia S.r.l., Ensinger GmbH, Germany.

Methods: Young's Modulus (E) of AM PA12 was evaluated using Dynamic Mechanical Analysis (DMA).

To evaluate the Young's Modulus, six PA12 samples were analyzed by the "Three-Point Bending" test. The measurements were performed in frequency domain, ranging from 1 Hz to 100 Hz with an increase of 5 Hz, and a force amplitude of 1

N. Each sample was tested ten times to ensure statistical significance.

Results: the results showed a mean elastic modulus (E) of PA12 AM (2041.37 ± 236.13 MPa), with a statistical significance ($p < 0.05$), higher than milled one in PA12 (1700 MPa).

Conclusions: in conclusion, the manufacturing technique of PA12 influences the mechanical properties of the material. In particular, AM samples displayed suitable mechanical properties for dental prostheses. Future developments will be to study *in vitro* on oral human cell populations in order to verify biocompatibility and cytotoxicity.

VITRO BACTERIAL ADHESION TO IMPLANT SURFACES SUBJECTED TO FOUR DIFFERENT TREATMENTS

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Aim: bacterial adhesion to the surfaces of dental implants is an important factor for the development of peri-implant pathologies. The development of surfaces that reduce bacterial adhesion could reduce the development of peri-implant infections.

Methods: commercially pure titanium disks were subjected to the following surface treatments: machining (G1), machining and anodization (G2), sandblasting and etching (G3) and sandblasting, etching and anodization (G4). A reference strain of *S. aureus* (ATCC BAA-1717) was used for the *in vitro* adherence test. The materials were exposed under static conditions to a bacterial suspension of known concentration. Each material disk was placed on the bottom of a well, using sterile techniques, and exposed to a bacterial suspension having a cell concentration of 10^7 cells/mL in PBS buffer. One ml of cell suspension was added to each well. After incubation at 37°C for

4 h, the test materials were washed three times with 1 ml of a sterile PBS buffer solution in order to remove non-adhering cells. Each disk was placed in a glass tube containing 1 ml of PBS buffer. Bacteria adherent to the biomaterial surfaces were detached by sonication, bringing them into suspension. Serial dilutions of the bacterial cells suspensions were prepared and deposited onto BHI agar plates. The plates were incubated for 24 hours at 37°C and the number of colonies counted. The results are expressed as Colony Forming Units (CFU) per mL.

Results: bacterial adhesion was significantly different on the various surfaces. The anodizing treatment allows to reduce bacterial adhesion.

Conclusions: the surface treatment affects bacterial adhesion. Surfaces that reduce bacterial adhesion could reduce the onset of peri-implant pathologies.

METAL-FREE SURFACE ROUGHNESS AFTER ETCHING: SEM, AFM AND ALICONA 3D MICROSCOPE ANALYSIS

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Aim: acid etching increases micromechanical adhesion values in leucite-based ceramics. The aim of the study is to understand how the concentration of the acid used for etching can affect surface roughness while evaluating the formation of salt crystals and microcracks in the treated specimens.

Methods: six leucite-based ceramic samples were treated with three concentrations of hydrofluoric acid for 60 seconds followed by cold water rinsing for 20 seconds: HF9.5% (Ultradent, USA), HF5% (Ivoclar Vivadent, Liechtenstein), HF3% (DenMat, USA). The surface analysis was carried out using AFM, SEM (50x, 100x, 5.000x, 10.000x) and 3D microscope Alicona Infinite Focus® (5x, 10x, 20x, 50x, 100x), based on Focus Variation (FV) technology.

Results: SEM's analysis showed a surface with larger fissures and microcracks in the most aggressively treated samples. The

AFM analysis confirmed the results showing the presence of a higher incidence of darker areas with maximum peak height (Sp) of 4.14µm in HF9.5%, and 2.53µm in HF3%. The Height Maps of the FV analysis showed greater superficial irregularities in the most aggressively treated specimens with an average roughness (Sa) of 0.85µm; the same value was equal to 0.81 µm for HF3% (FVM, 10x).

Conclusions: etching increased roughness that is necessary for good adhesion. Greatest roughness was obtained after treatment with HF 9.5% although surface microcracks and salt crystals were observed in these specimens. Further studies could be carried out using the same acid concentration for shorter times to obtain a good roughness while avoiding the formation of crystals and the weakening of the material.

COMPARISON OF STRESS DISTRIBUTION BETWEEN ZIRCONIA AND BIO-HPP ABUTMENTS: A FEA STUDY

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Aim: bio-HPP (High Performance Polymer) is a biomaterial based on a semi-crystalline linear polycyclic thermoplastic polymer. Bio-HPP is used to manufacture dentures superstructure and implant abutment. This study aimed to evaluate, through Finite Element Analysis (FEA), how the stress distribution change in implant, abutment, and screw when two different abutments (zirconia VS Bio-HPP) were used.

Methods: two implant models with a resinous fixation cylinder simulated the peri-implant tissues. A compressive load was applied at 30 degrees from the implant axis, with magnitude of 100 N. A FEA software was used to evaluate the stress distribution in the implant-abutment-screw models. Von-Mises stress maps were calculated for the qualitative evaluation and the stress peaks values in each structure were obtained for quantitative comparison.

Results: regardless the abutment material, the highest stress peak values were observed in the abutment structure. There was a similar stress pattern between the models for the mechanical response. There is a higher magnitude for Bio-HPP, caused by the higher deformation generated at the loading moment. However, the inner portion with the implant connection was similar for both models.

Conclusions: it is suggested that CAD/CAM Bio HPP abutments present acceptable stress distribution pattern. The mechanical behavior of fixture and screw were not affected by the abutment material, however Bio-HPP showed a more concentrated area of stress distribution in the abutment when compared to Zirconia, due to its increased flexibility.

CONFOCAL LASER MICROSCOPE EVALUATION OF SURFACE ROUGHNESS: ZIRCONIA VS BIO-HPP

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Aim: the relationship between implant abutments and soft tissues creates a protective barrier to separate peri-implant bone from the oral environment. For many years, standard stock titanium abutments were the only option available. However, alternative materials such as ceramics, hybrid materials, composites, zirconia and PEEK can be used to achieve a better aesthetic result. The aim of this study was to evaluate the surface characteristics of two different types of CAD/CAM milled prototype made of a modified PEEK, (Bio-HPP Bredent, Senden, Germany) or Zirconia (Zirkonzahn, Steger, Ahrntal, Italy).

Methods: the surface roughness of 6 samples was analyzed with the confocal Laser microscope μ -surf (NanoFocus AG,

Oberhausen, Germany). For each sample, three different areas of $320 \mu\text{m} \times 320 \mu\text{m}$ were evaluated. The software (Version 6.0, NanoFocus AG, Oberhausen, Germany) was used to analyze the samples surface and to create the dataset.

Results: the data showed a mean Ra of $0,221 \mu\text{m} \pm 0.9 \mu\text{m}$ for Bio-HPP and $1.075 \mu\text{m} \pm 0.24 \mu\text{m}$ for Zirconia. Both surface profile had an adequate smoothness, regardless the measurement axis and roughness parameter.

Conclusions: CAD/CAM High Performance Polymer abutments could induce a better fibroblast cell behavior and produce an adequate than unpolished zirconia abutment. In conclusion, Bio-HPP can represent a valid alternative to titanium.

USE OF EARPHONES WITH ACTIVE NOISE CONTROL AS PROTECTIVE DEVICE AGAINST DENTAL WORK NOISE

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Aim: there are no protective measures against hearing damage caused by exposure to dental work noise that have been tested. This study has 4 aims: 1) estimate noise produced by dental instruments; 2) analyze the noise shielding capacity of earphones with Active Noise Control function; 3) estimate the average dental work noise; 4) evaluate the reduction of dental work noise and discomfort perceived by operator equipped with the earphones.

Methods: this study was organized in 4 phases: 1) 20 noise measurements of turbine, scaler and saliva aspirator in non-contact mode using a dummy head device, 2) following the same protocol of the previous phase, measurements were made using the earphones in 2 different active noise control functions, 3) 51 students of the Perugia Dental College, randomized into 3 groups like the 3 measurement modes of the pre-

vious phases, performed a dental work simulation, 4) 30 students performed a dental work simulation 2 times, at first not wearing the earphones, then having them on in "Noise Cancelling" mode.

Results: in non-contact mode, no instrument generates noise greater than 85 dB(A), while when used in contact with commercial ceramics values vary from 79.9 dB(A) to 100.6 dB(A). Earphones' noise shielding was about 40% and resulted effective in reducing noise discomfort.

Conclusions: although the earphones were not specifically designed for the study, the results were promising enough to promote further studies.

Future developments could involve the investigation of the main frequencies of dental noise and focus on them the acoustic shielding of the earphones.

MECHANICAL TYPING OF NARROW DIAMETER IMPLANT “EVEN”: FEM ANALYSIS AND CYCLIC FATIGUE

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Aim: the aim of this study is to evaluate the response of a new implant system “EVEN” with conometric connection, consisting of the implant (3.4 x 8mm), the connection screw and the abutment, to the stresses of cyclic fatigue. The implant system was subjected to preliminary finite element analysis (FEM) which made it possible to identify the areas of greatest stress to fatigue. Fatigue tests, performed according to ISO 14801 /2016 (“worst possible case criteria”), allow to predict with a good approximation the clinical behavior of these prosthetic devices.

Methods: the fatigue test was performed in immersion in saline solution (n = 8) for 2X10⁶ cycles. At the end of each test, the survival or failure event of each sample was recorded. Scanning optical and electron microscopy was used to analyze fracture patterns and compare them with finite element analysis, finally, the force regimes used in the tests

were compared with the masticatory forces present in the literature.

Results: during the first test (210 N) (n = 4), all samples tested survived, setting a lower cyclic load limit (210 N) below which no failure occurred experimentally. A further test was performed, with a load increased by about 10%, (240 N) (n = 4). At the end of the test, three successes and one failure were recorded. At this point the cyclic fatigue resistance test is considered finished by defining a limit value between 210N and 240N.

Conclusions: the coincidence of the theoretical data (FEM) with the experimental ones, together with the comparison with the masticatory forces reported in the literature, allows to predict that the system can withstand with a high degree of safety the wide spectrum of static and dynamic stresses that it may encounter during clinical function, in particular when used in the anterior sectors of the dental arch.

REFLECTIVITY AND MECHANICAL BEHAVIOUR OF ORTHODONTIC COMPOSITE

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Aim: relationships between reflectivity and chemical composition of the dispersed phase in orthodontic composites: Transbond XT (3M Unitek), Light-Cure Orthodontic Paste (Leone) and Bisco Ortho Bracket Paste LC (Bisco), were *in vitro* investigated to evaluate if reflectivity results can be useful to interpret mechanical behaviors and not only optical qualities of these resins.

Methods: 8 discs of each composite were realized for a total of 24 samples. By Lambda 35 UV/Vis spectrophotometer, light transmission through the resins was measured, evaluating the spectral range from 190-1100 nm, at samples preparation (T₀),

after 24 hours (T₁) and after 10 days (T₂) of immersion in 5 ml Coke® or human saliva.

Results: the reflectivity spectra revealed that Bisco has the highest reflectivity, Leone shows an absorption pattern in the UV region very similar to Bisco and TXT shows the lowest reflectivity compared to the other two resins.

Conclusions: Bisco and Leone, due to the low and similar filler content, explain the similarities in mechanical performance which are lower than those of TXT whose higher filler content, in particular quartz as observed by the UV-Vis analysis, makes it the composite clinically more used for orthodontic bonding.

EFFECT OF PRIMERS CONTAINING FLUORINATED GRAPHENE ON THE ADHESION OF FIBER-GLASS POSTS

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Aim: to evaluate the effect of 2%wt fluoride graphene (FG) on the push-out bond strength (PBS) of 10-MDP-based primers used for fiber post luting.

Methods: twenty single-rooted human teeth were endodontically treated and prepared to receive fiber posts [Hi-Rem R103 (HR) and Hi-Rem Plus (HR+); Overfibers s.r.l., Italy). The dentin and fiber post surfaces were pre-treated with primers experimentally saturated with 2%wt FG. Then, the luting procedures were performed with a post-and-core resin cement (OverCO-RE). Groups were formed according to the primer (with/out FG) and fiber post type ($n = 5$): 1. CTRL + HR, 2. FG 2% + HR; 3. CTRL + HR +; 4. FG 2% + HR +. After 24h, specimens were cut into slices and submitted to the PBS test. Data were stati-

stically analyzed ($p < 0.05$). Additionally, the fractographic analysis with stereomicroscope was conducted on debonded beams.

Results: no statistically significant differences were found among groups, independent of the presence of 2%wt FG or fiber post type ($p > 0.05$). The most predominant failure mode was at the dentin-cement and post-cement interfaces in all the tested groups. Higher percentage of post-cement deboning were observed in the FG groups, independent of the fiber post.

Conclusions: independent of the fiber post type, the results suggest a possible use of 2%wt fluoride graphene for enhancing dentin adhesion. Long-term studies are warranted to confirm the results.

THE USE OF ADHESIVE SYSTEMS FOR A MULTIDISCIPLINARY CONSERVATIVE THERAPY OF EICR

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Aim: the diagnosis and the treatment of External Invasive Cervical Resorption (EICR) could be a challenging clinical situation even for the most experienced dentists. It is a quite rare lesion, a poorly understood phenomenon, and its insidious and aggressive nature can lead to tooth loss. Even in dental implant era, try to save a compromised tooth it is imperative for any clinicians. The aim of this report is to show a complex clinical case managed thanks to the use of modern restorative materials.

Methods: this report presents a case of an upper central incisor's EICR (Heithersay class II) in which the treatment was carried out using a multidisciplinary approach and the defect was

restored with resin composite; besides, the endodontic treatment was completed thanks to the use of a resinous cement and a fiber-reinforced posts.

Results: the use of modern materials not only made it possible to avoid tooth extraction, but also to achieve satisfactory aesthetic results. The follow-up at 6 years demonstrated the success of the therapy and the absence of clinical symptoms.

Conclusions: after an analysis of the scientific literature, the authors through this case underline the importance of EICR early detection and how the composite resins could offer an effective and aesthetic restauration of the defect and also good health of gingival tissue.

CUSTOMIZED PCL/ β -TCP 3D-PRINTED SCAFFOLDS FOR BONE AND PERIODONTAL REGENERATION

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Aim: personalized blocks presenting morphological and mechanical features, able to fit bone or periodontal defects, are leading to a strong amelioration of patient care. The main objectives of this project are to: define the optimal mixture of polycaprolactone/ β -tricalcium phosphate (PCL/ β -TCP), obtain customized 3D-printed scaffolds and evaluate their biological effectiveness.

Methods: PCL/ β -TCP powders have been used to create filaments for 3D-printers at relative percentages of 60/40 and 30/70 and customized scaffolds have been obtained through 3D-printing.

100%PCL has been used as control. Scaffolds wettability and biological effectiveness (i.e. cytotoxicity, cell proliferation and gene expression) have been tested in the regards of MC3T3-E1 osteoblasts.

Results: filaments showed adequate mechanical/physical characteristics for 3D-printing, with a higher concentration of β -TCP if compared to literature data (up to 60%). Surface wettability appeared similar on all the samples and biological assays did not show the release from composite mixtures of any toxic agent in the culturing medium. Nevertheless, cell proliferation on both PCL/ β -TCP samples increased during the time in a significative manner. The expression of genes related to bone differentiation (i.e. BSP, OCN, OPG) was higher on PCL/ β -TCP samples if compared to PCL.

Conclusions: we validated the possibility to drastically enhance up to 70% the amount of β -TCP loaded in a PCL filament obtaining a composite material presenting optimal characteristics for 3D-printing. PCL/ β -TCP scaffolds showed a good effect on both, biocompatibility and cell differentiation.

INTRAORAL SCANNERS ON VERTICAL AND HORIZONTAL DEEP SUBGINGIVAL MARGINS: 3D ANALYSIS AND ACCURACY

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Aim: evaluate the accuracy of 2 intraoral scanners (IOSs) (TRIOS 4 and Medit i700) on both horizontal and vertical tooth-preparations at different depth levels below the gingival margin and assess if the IOSs detect the area beyond the finish line of these preparation designs.

Methods: four abutments of a maxillary first molar were designed using CAD software, with vertical and horizontal preparation lines at 1 and 2 mm from the gingival margin. The abutments were printed in resin and placed on a reference typodont. Ten scans were made with the IOSs on each preparation design to obtain 8 experimental groups: about Medit i700 they were named for horizontal preparation “H-1M” at 1 mm from the gingival margin and “H-2M” at 2 mm, while for vertical ones “V-1M” at 1 mm and “V-2M” at 2 mm. About TRIOS 4, they were named “H-1T”, “H-2T”, “V-1T”, and “V-2T”.

The scans were imported into a dedicated software, then trueness and precision were evaluated in μm . In addition to descriptive statistics, the Games-Howell was run to analyze differences among groups ($\alpha=.05$).

Results: about the trueness, statistically significant differences were found for H-1T/H-2T, H-1M/V-1M, H-2M/V-2M, V-1M/V-2M, H-1T/H-1M, H-2T/H-2M, V-1T/V-1M, V-2T/V-2M.

As regards the precision, significant differences were detected for H-2T/V-2T, V-1T/V-2T, H-1M/H-2M, H-1T/H-1M, V-2T/V-2M. Only for vertical preparations, it was possible to record the area beyond the finish line.

Conclusions: although only vertical preparations allow for registration beyond the finish line with IOSs, the mean accuracy values for both the vertical and horizontal geometries are within the clinically approved threshold at 1 and 2 mm below the gingival margin.

DIGITAL AESTHETIC DENTISTRY COURSE FOR UNDERGRADUATES: OUR DESIGN AND ASSESSMENT

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Aim: nowadays, digital dentistry represents a fundamental skill to acquire for dentists of this era. The digital workflow took hold and it is widespread in most of the disciplines of the dentistry. Because of this, it could be advisable to insert this content in the undergraduate program. The aims of this work were to create a course in digital aesthetic dentistry and to evaluate its effectiveness.

Methods: dental students of University of Verona (from the third to the sixth year) attended a pilot course of 2 hours about the topics of photography, digital esthetic analysis and rehabilitations digitally planned. Students were randomly divided into two groups, the first group attended the course held with video-tutorials and second one attended traditional lessons with slides. The ability of students was tested in per-

forming a digital aesthetic analysis and rehabilitation; furthermore, a questionnaire was administered to understand the satisfaction of the students about the course and the method of administration. Statistical analyses were performed.

Results: the course was greatly appreciated, especially by the students who received the video-tutorial lessons. Good results in performing digital analysis and rehabilitation were obtained and they resulted better in the first group.

Conclusions: the digital aesthetic dentistry was a success in terms of new skills acquired, in this perspective the proposal of a course of this topic in undergraduate program deserves to be accurately evaluated. The video-tutorial method seems to be a good form to teach operative digital procedures.

ACCURACY AND PRECISION OF DIGITAL AND CONVENTIONAL IMPRESSIONS WITH SCANNABLE MATERIALS

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Aim: the aim of this study was to compare the accuracy and precision of 3 intraoral scanners and one impression material with scannable properties, by means of three-dimensional analysis of a complete dental arch.

Methods: a modified anatomical model of complete upper fully dentate arch provided of a Scan body, placed in the retroincisive area was used. It was firstly scanned by a laboratory scanner to create a digital reference model. Then, twenty-five impressions ($n = 25$) of the model were taken and the five groups were built: $n = 5$ impressions with scannable PVS material using standard trays (PVSc), $n = 5$ impressions with scannable PVS material using 3D printed customized trays (PVSi), $n = 5$ digital impressions with Trios4, $n = 5$ digital impressions with Omnicam and $n = 5$ digital impressions with Ite-

ro. STL files obtained from the IOS scans and scanned impressions were three-dimensional superimposed on the STL file of the reference model by using the Scan body.

Results: the ANOVA test with post-hoc Bonferroni correction shows statistically significant differences between the accuracy and precision values of the groups analyzed. The most precise and accurate impression technique was that with polyvinylsiloxanes and commercial impression trays. OMNI-CAM results the least accurate group (45.4 ± 29) while PVSi results the least precise (46 ± 11)

Conclusions: scannable impression polyvinylsiloxane materials used in standard trays result equally or more accurate and precise than the IOSs tested. Each impression system shows clinically acceptable deviations from the reference model

PURPOSE OF A NEW METHOD OF DENTAL ARCHES SUPERIMPOSITION

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Aim: the aim of this study was to present a new method of dental arches 3D superimposition for *in vitro* comparison of the accuracy and precision of digital or conventional dental impressions

Methods: an upper dental arch model was provided of a Scan body in the retroincisive area and scanned by a laboratory scanner to create a digital reference model. Then, it was scanned by an experienced operator using an intraoral scanner (Trios4) with the scan strategy recommended by the manufacturer. The STL file obtained from the IOS was three-dimensionally superimposed to the STL file of the reference model with 3 different methods by using a 3D point cloud processing software: full-arch best-fit alignment, best-fit alignment only at the Scan body and best-fit alignment at the tooth where the

scan started. 3D discrepancies of the mesh file from the reference model were registered for each superimposition

Results: the Gaussian distribution of the discrepancies between the two models shows different levels of accuracy depending on the method of superimposition used: 28 ± 95 for full-arch best-fit alignment, 38 ± 165 μ m for best-fit alignment at the Scan body and 95 ± 190 μ m for best-fit alignment at the tooth where the scan started. Furthermore, the distribution of discrepancies between the models visibly changes according to the superimposition method

Conclusions: different 3D superimposition methods result in different values of accuracy and precision for complete dental arch impressions. A systematic method of comparison should be investigated to obtain more reliable results.

DIGITAL REHABILITATION WITH ENDOCROWN OF A SEVERELY COMPROMISED DENTAL ELEMENT

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Aim: aim of this case report was to validate the efficacy of a endo-resto procedure such as conservative therapy on integrity and durability of conservative treatment.

Methods: the patient presented with severe carious lesion on the element 4.6 with a large periapical lesion. The pulp vitality test and the periodontal probing were negative; the tooth had a grade I mobility. The root canal treatment was performed with Protaper Next and the canal system was obturated with a carrier based system. An immediate chairside endocrown was realized with the hybrid ceramic CAD-CAM. For this kind of chair side restoration, the Cerec System was used. As first step, a set of digital impressions plus a biocopy of the lower arch were taken. Later, the distal portion of the enamel visible was left and easy reachable, instead of building up completely the distal wall.

The prep stage ended using the bud shaped bur, being careful to remain in the depth of the enamel: the shape of the bur will give us a well defined finish line. The chosen block was milled, the clinician finish and characterize it, the inner part was sandblasted and inserted on the tooth.

Results: after 6 months from the endo-resto procedure a clinical and radiographic healing were performed.

Conclusions: this procedure was able to preserve the endodontic seal, the tooth integrity and function. This preparation is designed for adhesive techniques and for CAD-CAM materials, that rely mainly on bonding to the tooth structures, no kind of retention is needed or looked for, simply stability as an aid positioning of the restoration.

VIRTUAL ANTHROPOLOGY IN DENTISTRY: FUTURE TOOLS TO INVESTIGATE THE PAST

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Aim: teeth are an important resource for the study of the populations of the past, due to their great resistance over time, even in poor environmental conditions. Radiology is the most appropriate approach to the study of skeletal remains because it can be used without any damage to the sample. Virtual dental anthropology consists in modern imaging tools applied to paleodontological investigation. The present study aims to evaluate the reliability and accuracy of CBCT and intraoral scanning (IOS) for the assessment of dental and oral diseases of a collective burial discovered in Northern Italy.

Methods: during the renovation of the ancient hospital in Parma ("Ospedale Vecchio"), the commingled and disarticulated skeletal remains of 12 individuals dating back to the 18th century were discovered. After a thorough cleaning of the findings, the mandibles were associated with the respective upper jaws, then a virtual dental anthropological approach was performed using CBCT, IOS and high-detailed photographs.

Results: combining visual inspection and imaging, we identified features and diseases affecting teeth and alveolar bone.

The most frequently observed feature was dental wear (8 of 12), while tooth decay was less prevalent. In some subjects, we detected enamel hypoplasia, which was excellently displayed with IOS. Periodontal disease was the main cause of tooth loss in our sample (6 of 12) and CBCT enabled to improve the examination with metric and non-metric parameters. Also, dental age estimation of a subject with mixed dentition was performed with CBCT.

Conclusions: the investigation of paleodontological material using CBCT is an excellent option to improve the assessment of oral status and it provides an unbiased view of dentition, that conventional 2D radiographs cannot reveal. Scanning with IOS allows to obtain the most reliable record of unique archaeological material, on which dental impression should not be made due to the risk of damage. We expect that these tools will increasingly support traditional techniques in osteo-archaeological research.

ZYGOMATIC AND PTERYGOID IMPLANTS IN SEVERE MAXILLARY ATROPHIES: A FULLY DIGITAL WORKFLOW

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Aim: the use of zygomatic and pterygoid implants in severe atrophies is an increasingly popular surgical solution. The digitalization of dental processes related to these extreme solutions has simplified treatment plans making them accessible to a greater number of practitioners.

Methods: in the first step, an impression is made with an intra-oral scanner of the rebased prosthesis, and through reverse engineering, employing CAD software, a prototype is obtained through 3D printing, with which a digital axiography is recorded. Based on the axiography and thanks to the digital articulator, a temporary restoration is made using CAM. Once functionalized in the mouth, the temporary prosthesis is scanned to obtain a copy that will constitute the radiological template. A CBCT of the patient is performed with the radiological tem-

plate and the resulting DICOM file is superimposed on the STL file of the temporary prosthesis within a guided surgery software. Finally, based on the collected data, the implant insertion is designed with the consequent realization of a surgical template. Once the intervention is performed, it is possible, thanks to the digital workflow, to carry out the immediate load without the need for a further impression.

Results: the final position of the implants is determined by bone availability and the prosthetic project, as the latter especially, being more difficult to comply with inside the traditional technique.

Conclusions: the digital workflow allows to obtain a predictable product in all its phases giving the doctor and the patient a safe and repeatable result.

THE USEFULNESS OF STEREOPHOTOGRAMMETRY IN CLEFT LIP AND PALATE SURGERY: A CASE SERIES

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Aim: the aim of this case series is to present the usefulness of stereophotogrammetry in Cleft lip and palate surgery.

Methods: the 3D imaging system that we used is the Vectra M3® (3D Imaging System; Canfield Scientific, Parsippany, NJ, USA) and the inherent software (Face Sculptor®, Mirror® PhotoFile®, Mirror® PhotoTools®). We acquired the images of four children under the age of two. The patients were born with: cleft palate associated with Pierre Robin syndrome; incomplete left cleft lip; right cleft lip and palate; bilateral cleft lip.

Results: we acquired the pre- and post-surgery images for all the patients, compared the change in volume of the soft tissue involved (with a colour distance map) and the overall result of the surgery.

Conclusions: Vectra M3® (3D Imaging System; Canfield Scientific, Parsippany, NJ, USA) proved to be a very useful and accurate tool not only for comparing the pre and the post-surgery, thus allowing to obtain a fast, effective and immediate comparison, but it also allowed to measure changes in volume of the soft tissue and to storage the data.

3D PRINTED CUSTOM POST EXTRACTIVE HEALING ABUTMENTS: AN INNOVATIVE DIGITAL APPLICATION

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Aim: peri-implant tissue healing in the case of post-extractive implant can be difficult to predict due to variables related to both soft and hard tissues. The progress of healing can lead to a deficit of both soft and hard tissues. This case series presents a protocol to preserve the socket and condition the gingiva in case of post-extractive implant placement.

Methods: this case series presents a non-interventional study; all patients consented to the publication of the data. All surgical interventions involved the extraction of a single tooth and the simultaneous positioning of an implant, using a surgical guide. At the end of each surgery, a 3D printed customized healing abutment was screwed in. Each abutment was tailored

upon the extracted tooth and based upon the desired implant emergence profile.

Results: all cases presented had optimal initial healing with no signs or symptoms of complication. Six months after surgery, the alveolar bone was preserved and the desired emergence profiles were achieved. A longer duration of surgery caused by the placement of the customized healing abutment can be compensated for by the absence of membranes, sutures, the need for stitch removal and second surgery.

Conclusions: this protocol is promising for peri-implant tissue healing in case of post-extractive implant. Further large cohort studies are needed.

IMAGING SOFTWARE ACCURACY FOR 3D RENDERING OF DENTITION, A SURFACE-TO-SURFACE ANALYSIS

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Aim: the present study aimed to assess the accuracy of 3D rendering of the dental anatomy obtained from four free-source software.

Methods: a total of 20 Cone-beam computed tomography (CBCT) were selected to perform semi-automatic segmentation of dentition by testing Invesalius, ITK-Snap, Slicer 3D and Seg3D software. The same models were manually segmented (Mimics) and set as the ground truth (GT) of the investigation. A specific 3D imaging technology was used to perform model superimposition (semi-automatic model/GT) and surface-to-surface matching analysis. The accuracy of semi-automatic segmentation was evaluated by comparing volumetric and percentage of matching data.

Results: statistically significant differences were found in the volumetric dimensions and the matching percentage among the tested software ($p < 0.001$). Two software showed an underestimation of the teeth models (Invesalius; Seg 3D), while the other software showed an overestimation (ITK-Snap, Slicer 3D) of the same models. Semi-automatic segmentation methods highly correlated with manual segmentation (0,859 to 0,985) and excellent reliability was found for both intra-observer (0.971 to 0.997) and inter-observer readings (0,877 to 0,980).

Conclusions: dental anatomy obtained with semi-automatic segmentation should be taken with caution when an accurate definition of radicular area is required.

CBCT ANALYSIS OF DEVIATIONS BETWEEN DIGITAL PLANNED IMPLANT POSITION VS *IN VIVO* PLACEMENT

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Aim: implant rehabilitation in cases of mono-edentulism in the esthetic area is a challenge for the clinicians. The aim of our study was to test the diagnostic-therapeutic accuracy of computer-guided implant placement in the esthetic area using implant guided surgical kit (Neoss guide, Neoss Ltd., Harrogate, UK).

Methods: post implant surgery Cone Beam Computed Tomography (CBCT) scans were retrospectively analyzed to assess the accuracy of computer-guided implant placement compared to the pre-operative computer-digital planned implant position. We selective enrolled CBCT scans of patients underwent immediate or delayed implant placement of a single maxillary incisor, treated with computer-guided implant surgery through tooth-supported digitally designed 3D printed guide. Our analysis consisted in 3 digital measurements: the me-

an deviation of implant axis, and the mean mesiodistal implant deviation measured both at the apex and at the head of the implant.

Results: 95 implants were placed in 95 patients (60 Males, 35 Females; age from 27 to 45-year-old). Congruence analysis, between digital planned ideal implant position and after implant placement position, showed a mean deviation of implant axis of $1,04^\circ \pm 0,56^\circ$ in sagittal projection, a mean mesiodistal implant deviation between adjacent teeth of $0,14 \text{ mm} \pm 0,07 \text{ mm}$ at implant head level and $0,8 \text{ mm} \pm 0,3 \text{ mm}$ at the apex in axial projection.

Conclusions: computer-guided implant placement through tooth-supported guide was extremely accurate in the esthetic area because the deviations between real implant position and the preoperative planning was not clinically relevant.

PSYCHOPHYSIOLOGICAL RHYTHMS IN YOUNG DENTISTRY: IS THERE ANY PROOF OF STRESS RELATED ACTIVATION?

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Aim: the primary goal is to evaluate the relationship between physiological parameters like: electrodermal activity (EDA), heart rate variability (HRV) and heart rate (BPM), during working time in comparison with non-working activity. A secondary aim is to evaluate if there is any difference between young dentists self-referring anxiety while approaching the patient in comparison to non-anxious dentists.

Methods: 8 young dentists (5M, 3F), aged between 26 and 33 years, with a mean of 3 years of practice are enrolled in two groups. Group 1, composed of 4 people with anxiety during the relationship with the patient and Group 2 with low level of anxiety, both of them wore a wearable device to measure EDA, HRV and BPM, during a 24-hour period.

Results: there were no statistical differences between Group 1 and Group 2, as regards working time and non-working time physiological activity, but an interesting pattern has been displayed. Anxious dentists showed lower sympathetic activity during sleep and higher parasympathetic activity during working time. However, no statistical difference comparing all subjects in working time versus non-working time in all the parameters was found.

Conclusions: the small size of the sample didn't allow to reach a level of significance, but we observed several sustained electrodermal responses during working time, in both groups and a pattern of physiological activity that need to be further studied. Further research is needed to deepen the understanding of this topic.

ASSESSMENT OCCLUSAL MORPHOLOGY ZIRCONIA CROWNS: CORRELATION TECHNIQUE VERSUS LIBRARY METHOD

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Aim: the purpose of this clinical trial was to compare the occlusal morphology of monolithic zirconia crowns of molars designed by using correlation technique and library technique.

Materials and Methods: 28 molars of 24 participants were included in this trial. For each tooth one interim crown and two definitive crowns were constructed. The definitive crowns were fabricated by using the correlation technique or the library technique. The interim and definitive crowns were evaluated intraorally for Intercuspal occlusion and lateral interference, while were recorded by using articulating paper 24-micron-thick. The clinical photographs were taken immediately to calculate area of static and dynamic contacts (SDC) using software (ImageJ) and analyzed by the Kruskal-Wallis test.

Results: the average and $\pm$ standard deviation (SD) of area of the occlusal contacts on interim crowns was 32.27 ± 3.45

mm². The areas of definitive crowns designed by using the correlation technique and library technique respectively were 31.01 ± 3.73 mm² and 36.85 ± 5.78 mm². No statistically significant difference was found ($p = 0.091$) between the occlusal contacts areas of the interim and definitive crowns designed by using the correlation technique. Instead, there were significant differences between the areas of occlusal contacts of the interim and definitive crowns designed by using the library technique, and between the areas of occlusal contacts of definitive crowns designed by using the correlation and library techniques ($p < 0.001$)

Conclusions: the occlusal information of definitive crowns designed by using correlation technique is similar to that one of interim crown. Crowns designed by using the correlation technique produced improved SDC compared to the library method that is less effective.

ARTIFICIAL INTELLIGENCE: A NEW DIAGNOSTIC SOFTWARE IN DENTISTRY. A PRELIMINARY STUDY

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Aim: Artificial Intelligence (AI) has taken hold in public health because more and more people are looking to make a diagnosis using technology that allows them to work faster and more accurately, reducing costs and the number of medical errors. The primary objective of this preliminary study was to evaluate the accuracy measures of a diagnostic tool based on artificial intelligence and machine learning. The secondary objective was to analyze the accuracy of this tool for the diagnosis of different dental diseases or conditions.

Methods: in the present study, 120 panoramic X-rays (OPGs) were randomly selected from the Unit of Dental Prosthesis at the Department of Oral and Maxillofacial Sciences of Sapienza University of Rome, Italy. The OPGs were acquired and analyzed using Apox which takes a panoramic X-ray and auto-

matically returns the dental formula, the presence or absence of teeth, the presence of dental implants, prosthetic crowns, fillings and root remnants. A descriptive analysis was performed presenting the categorical variables as absolute and relative frequencies.

Results: in total, the percentage values of true positive (TP) was 2.195 (19.06%); true negative (TN), 8.908 (77.34%); false positive (FP), 132 (1.15%); and false negative (FN), 283 (2.46%). The overall sensitivity was 0.89, while the overall specificity was 0.98.

Conclusions: the present study shows the latest achievements in dentistry, analyzing the application and credibility of a new diagnostic method to improve the work of dentists and patients' care.

REPRODUCIBILITY OF DIGITAL SET-UP FOR TREATMENTS WITH CLEAR ALIGNERS: A STANDARDIZED PROTOCOL

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Aim: the aim of this study was to investigate the reproducibility of digital orthodontic set-up of the same patient when using a standardized prescription protocol.

Methods: 50 patients were evaluated by the same orthodontist who formulated an individual prescription, applying a standardized protocol for set-up planning. Virtual set up, according to these prescriptions, were prepared by 3 different operators at the begin of the study (t_0) and after 1 month (t_1). After a three months wash out period (t_2), the same virtual models were sent to the same operators with a simple request of teeth alignment, leveling and derotation; this procedure was repeated after one month (t_3).

Results: the comparison between t_2 and t_3 set-up showed both statistically and clinically significant differences with re-

gard to extrusion, intrusion, and inclination correction's values in the anterior teeth, and with regard to inclination correction's values in the posterior teeth. The same differences were found after comparing t_0 and t_1 mean results with t_2 and t_3 mean results. No significant differences were found between t_0 and t_1 set-up. The intra-operator reproducibility study showed excellent reproducibility at t_0 and t_1 , and good reproducibility at t_2 and t_3 . The inter-operator reliability showed high reliability at t_0 and t_1 and good reproducibility at t_2 and t_3 .

Conclusions: the use of an individual prescription for each patient and the application of a strict set up protocol are effective in improving virtual set-up reproducibility when planning an invisible aligner treatment.

TELEDENTISTRY: AN OVERVIEW ON ACTUAL DIFFUSION AND FUTURE DEVELOPMENTS IN DENTAL CARE

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Aim: this narrative review aims to investigate the possible applications and the potential future developments of teledentistry (TD).

Methods: an electronical search focused on the keyword "teledentistry" was performed on the MEDLINE (PubMed). The search was limited to clinical trials (CT) and randomized clinical trials (RCT) published in English, without time limitation.

Results: nine studies were included. Four of them were RCT, while 5 were prospective observational studies. Five papers evaluated the use of TD for orthodontic purposes (2 RCT and 3 observational studies), while 3 studies (2 RCT and 1 observational study) analyzed its efficacy in early caries diagnosis in children. Finally, one study investigated the utility of TD as screening method in an inmate population.

When used for orthodontic purposes, TD resulted to be a beneficial time-saving approach both for patients and specialists, improving domiciliary oral hygiene motivation and reducing inappropriate orthodontic referrals. TD was also considered a useful dental caries screening method for children living in rural areas, while no benefits were found when compared to face-to-face visitation in non-rural areas.

Finally, TD appears to ease the first consultation on entry into detention and the organization of dental care.

Conclusions: teledentistry appears to be a useful complementary tool both for clinicians and patients, improving inter-professional communication, easing oral health care access and screening procedures. Future developments may include the prevention of periodontal and peri-implant diseases.

BIOBANKING AND RESEARCH: DIGITAL TOOLS

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Aim: biobanks are not-for-profit services for the collection, processing, storage and distribution of biological samples and data for research and diagnostic purposes. Aim of this update is to illustrate the available digital resources and how to use them in research in the dental field.

Methods: a literature research was conducted in PubMed up to March 2021; a search was also performed on official websites of some biobanks and specific search engines. Most recent evidence and developments in the digital biobanks were summarized.

Results: Dental biological materials and data are stored in biobanks and can be used for large-scale studies. Biobanks se-

arch engines such as BBMRI are useful tools which redirect to the official biobanks websites where catalogues can often be found, along with instructions to request a biosample from them. Although biobanks in the dental field are available and studies have already been conducted using their resources (i.e. MoBa), a systematic approach to this asset seems to be lacking.

Conclusions: biobanking in dentistry represents an efficient tool for effectively advancing research and clinical translation on oral and systemic disorders. It should also help to generate therapeutic benefits and be a fundamental step towards personalized medicine.

AUGMENTED REALITY AND VIRTUAL REALITY IN DENTISTRY: FROM DENTAL EDUCATION TO DENTAL PHOBIA

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Aim: this review aims to summarize the applications of Augmented Reality (AR) and Virtual Reality (VR) in dentistry.

Methods: this review was conducted according to the preferred reporting items for a narrative review and was guided by the Scale for the Assessment of Narrative Review Articles. Articles in which AR and VR were applied in dental field were considered.

Results: AR and VR may represent essential tools in the educational field since they can facilitate student's learning of anatomical structures and clinical training by specific virtual environment and dental simulator. AR and VR may be also used during clinical practice: AR can be used to add digital data to reality, acting as automatic information filters that display only the most relevant information directly on the patient. In addition, clinicians may apply VR for training or for a digital wax-up providing a pre-visualization of the result, enhancing the com-

munication between dentist, patient, and technician. AR and VR may aid also in patient education. In fact, they can be considered an important tool to educate old and young patient. The expected outcome in using VR and AR for oral home care is to provide a digital instrument to improve oral hygiene practice in children and adults, motivating the prevention of oral diseases, and making educational practices attractive. In addition, AR and VR may also be employed to eradicate dental phobia in patients, absorbing the patient in a total virtual environment. For this reason, not only video stimulation, but also audio simulation may be detrimental to make the users' experience more immersive.

Conclusions: modern digital technologies can potentially reshape dentistry both on educational and clinical level. Students may improve their knowledge and practical skills. Dental clinicians may use these technologies as useful aids in their practice.

MAGNETIC RESONANCE IMAGING FOR GUIDED IMPLANT PLANNING: A VIABLE OPTION

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Aim: multi-slice Computed Tomography (CT) and Cone Beam Computed Tomography (CBCT) are currently the gold standard for computer-guided implant surgery, however they expose patients to high doses of ionizing radiations. For this reason, Magnetic Resonance Imaging (MRI) has been proposed as an alternative. Aim of this review is to summarize the main findings on the feasibility, applicability and accuracy of MRI in implantology.

Methods: a literature research was conducted in PubMed using keywords up to 5th March 2022. Keywords search items included guided-implant surgery, dental implants and Magnetic Resonance Imaging. A hand search was also performed.

Results: 8 articles published between 2019 and 2021 were included. Overall, studies have shown that MRI can achieve comparable results to those with 3D-X-ray-radiographic methods. Furthermore, advantages result in portraying bone tissue without exposing the patient to ionizing radiations and a higher soft tissue contrast (i.e. direct nerve visualization). On the other hand, there are limitations, such as artifacts, cost-availability and length of the procedure.

Conclusions: MRI is an alternative to CT/CBCT. This review highlights the necessity for further research to determine whether MRI can be used in clinical routine.

MRI IN DENTISTRY: AN INNOVATIVE AND ETHIC APPROACH

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Aim: the aim of this poster is to suggest to the oral and maxillofacial community the use of the magnetic resonance imaging (MRI) as an alternative diagnostic exam to the conventional x-ray imaging.

Methods: systematic reviews and metanalysis with high impact factor of the last 10 years in the main scientific databases were investigated and data were retrieved. We only included studies with statistically significant results.

Results: 17 studies were found. The use Of MRI in dentistry was successfully applied in conservative and endodontic procedures (1 study), in oral surgery (1 study), in temporomandibular disorders (1 study), in oral and maxillofacial pathology

(excluding oncology, 2 studies) and in guided dental implant planning (1 study).

Compared to the conventional x-ray imaging, the MRI has numerous advantages; first of all its use isn't associated with any ionizing radiation risk. Moreover, MRI is capable to identify areas of suppuration, oedema, hypovascularized bone and intra bone inflammatory infiltrate.

Conclusions: the usefulness of MRI in dentistry has been confirmed; however, researchers pointed out that there are some disadvantages, such as the longer scanning time, the costs, the waiting lists and the reduced availability of MRI scanners.

A STUDY TO EVALUATE THE LEARNING CURVE AND THE IMPORTANCE OF BACKGROUND IN DIGITAL IMPRESSIONS

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Aim: the study investigates the correlation between the ability of a subject to use an oral scanner and its experience and background and aims at evaluating the learning curve of intra-oral scanning.

Methods: a sample of 40 subjects was selected among the Dentistry Department of the University of Parma. Through a survey participants are divided into subgroups according to their experience and background. A 3Shape Trios scanner was used to carry out the investigation and the impressions were performed on the same patient, as to avoid bias. *Time* and *number of images per dental arch*, were taken into consideration as variables to compare impressions performed by different subjects and evaluate any correlation between their digital scanning ability and their experience and background. Af-

terwards, the study focused on the evaluation of the oral scanning learning curve. Therefore, 6 subjects without any previous scanning experience were selected among the group, and they were instructed to perform 10 impressions to assess any improvement in terms of reduction of scanning time and number of images per scanning session.

Results: statistical analysis was performed, showing a significant correlation between the subject's background and its scanning ability and proving that repeated scans lead to an immediate improvement followed by a plateau.

Conclusions: more experienced subjects seem to have a better scanning ability. However, given the steepness of the learning curve, scanners should be implemented thanks to their versatility.

EVALUATION OF THE READING ACCURACY OF 7 INTRAORAL SCANNERS, ON AN IMPLANT ARCH. *IN VITRO* STUDY

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Aim: the goal of this *in vitro* study is to evaluate the accuracy of 7 intra-oral scanners (I.O.S.) in taking an impression in a situation of extensive implant rehabilitation.

Methods: the measurements were detected on a model representing a structure that replicates an impression on several implants solidarized together. In this case we examined a clinical situation with six implants on a dental arch. The reference points for the measurements were made by position-

ing a point in the exact center of all scan bodies; this allowed to reduce the possibility of errors during paths calculations. For each scanner, 9 scans of the entire model were performed by a single operator to avoid operator-dependent variables.

Results and conclusions: the results show differences both in defect and in excess with respect to the reference values, depending on the intraoral scanner used.

EVALUATION OF THE ACCURACY OF READING DEPTH OF INTRAORAL SCANNERS. WIRELESS VS WIRED. *IN VITRO* STUDY

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Aim: the goal of this *in vitro* study is to measure and compare the reading depth detectable by two types of intraoral scanners with different acquisition technology: wireless vs wired.

Methods: the measurements were detected on a cube-shaped reference solid with grooves of different depth and width marks on the 4 sides, in order to best simulate the

possible situations encountered in clinical practice. For each scanner 9 scans were performed, all detected by the same operator to avoid operator dependent variables.

Results: the results show a possible evenness of the evaluations found between the two intraoral scanners used.

Conclusions: the wireless scanner represents a future solution for evolution and ease of use.

EVALUATION OF THE READING ACCURACY OF INTRAORAL SCANNERS, ON IMPLANT ARCH. WIRELESS VS WIRED

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Aim: the goal of this *in vitro* study is to evaluate the accuracy of two intraoral scanners with different acquisition technology: wireless vs wired (I.O.S.), in taking an impression in an extended implant rehabilitation situation.

Methods: the measurements were detected on a model representing a structure that replicates an impression on several implants solidarized together; in this case we examined a clinical situation with six implants on a dental arch. By positioning a point in the exact center of the transfer, the measurements we-

re estimated; this allowed to reduce the possibility of error during paths calculations.

For each scanner, 9 scans of the entire model were performed by a single operator to avoid operator-dependent variables.

Results: the results show a possible evenness of the evaluations found between the two intraoral scanners used.

Conclusions: the wireless scanner represents a future solution for evolution and ease of use.

EVALUATION OF THE ACCURACY OF THE READING DEPTH OF 7 INTRAORAL SCANNERS. *IN VITRO* STUDY

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Aim: the object of this study is to measure and compare 7 different intraoral scanners (I.O.S.) and their reading depth.

Methods: the measurements were taken on a solid cube with grooves varying in depth and width on 4 lateral sides in order to best simulate possible situations encountered in clinical practice. For every scanner 9 scans were performed. All scans

were performed by the same operator in order to remove the variable of differing operators.

Results: the results of these scans show a large inconsistency between different scanner models.

Conclusions: the reading depth of intraoral scanners (I.O.S.) is closely related to the technology that each scanner uses.

EVALUATION OF THE OPERATOR-DEPENDENCE IN FULL-ARCH SCANS ON IMPLANTS

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Aim: in this study we are going to evaluate how the operator experience changes the performance of an intraoral scanner (IOS). We will evaluate and compare trueness and precision of 5 IOS (TRIOS 4[®], 3-Shape, Copenhagen, Denmark; i-700[®], Medit, Seoul, South Korea; CS 3600[®], Carestream Dental, Atlanta, GA, USA; Aoralscanner[®], 3DSHINING, China; Panda 2[®], FREQTY, China) in a scan performed by an experienced operator "EO" (> 5 years of experience) and an inexperienced operator "IO" (< 1 year of experience).

Methods: a type IV plaster model of a maxilla on which 6 implant analogs have been placed with 6 scan body Oxy Implant[®] (BIOMEC, Colico, Italy) screwed in, will, initially, be scanned by a lab scanner (DOF Freedom UHD, Seongdong, Seoul, Korea) in order to digitalize it to obtain a virtual referen-

ce model. Then the model will be scanned by EO and IO using the 5 IOS (10 scans each). The scans will then be compared with the virtual reference model.

Results: what emerges is that the results with regard to the precision, obtained by EO and IO are substantially superimposable and that in some cases, even, the precision of the IOS is greater when using IO. Having to identify the best scanner for its trueness in the case of IO, it is possible to state without doubt that the Panda 2[®] scanner is the best scanner; in the case of EO the scanner that shows the best results in terms of trueness Medit i700[®].

Conclusions: the results of the study allow us to say that the performance obtained by EO and IO are substantially overlapping.

PRECISION OF HORIZONTAL JAW MOTIONS REGISTRATION USING A DIGITAL ARTICULATOR

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Aim: the aim of this study was to evaluate the range described by jaw movements on the horizontal plane using a virtual 3D articulator in 5 patients.

Methods: the mandibular horizontal movements of five different subjects were registered using the 3D digital articulator Cyclops (Itaka way med) in five different moments of the day. The horizontal movements considered described the gothic arch of the patient maintaining the teeth in contact. The angles, obtained between the frontal plane, MI and sagittal condylar path, were evaluated on the horizontal plane with the Angle Meter app. For each subject the mean, the median and the standard deviation of the angles for the right and the left side were calculated.

Results: the mean values obtained shows a high range from the lowest $7^\circ \pm 0,83$ and the highest $38^\circ \pm 12,35$. Wide differences between and within each subject and between the right and the left side were found.

Conclusions: from the data obtained, a wide range of individual paths described during horizontal mandibular movements can be observed. The system analyzed and in general 3D virtual articulators may be the starting point for the individualization of the occlusal plane to avoid interferences in excursions for the rehabilitation of high complex clinical cases. Other studies should be performed also considering the occlusal anatomy.

PALATAL SHAPE IN OPEN BITE VS NORMAL OVERBITE PATIENTS: A GEOMETRIC-MORPHOMETRIC ANALYSIS

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Aim: this pilot study aimed to evaluate the influence of open bite on palatal shape in patients with crossbite.

Methods: eight patients, two males and six females, aged between seven and nine years, with unilateral (seven) or bilateral posterior crossbite (one) were enrolled and divided into two groups: the experimental group included four patients with posterior crossbite and open bite, while the control group enrolled four patients with posterior crossbite but normal overbite. Upper arch digital models of these patients were imported into Stratovan Checkpoint software; eighty-one landmarks were identified over the palatal vault. Landmark coordinates were then imported into the MorphoJ software. Procrustes fit and

Discriminant Function Analysis (DFA) with leave-one-out cross-validation and permutation test were used to evaluate the presence of statistically significant differences between the two groups.

Results: DFA revealed the presence of significant differences ($p = 0.046$) between the two groups. Patients with open bite showed a palate narrower in the occlusal region and deeper in the midpalatal zone, along with a more anteriorly displaced concavity.

Conclusions: this pilot study revealed a significant difference in palatal shape between patients with crossbite and open bite and patients with crossbite without open bite. A larger study will be useful to investigate this aspect.

ACCURACY OF MILLED FRAMEWORKS FABRICATED WITH DIGITAL AND PLASTER IMPRESSIONS: A CLINICAL STUDY

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Aim: the aim of this research will allow to highlight the accuracy of a new digital impression system, comparing it to the plaster impression technique already validated for many years of clinical use in the creation of full-arch implant-supported frameworks.

Methods: in the present clinical investigation 11 scans (8 of the upper maxilla and 3 of the lower jaw) were taken on a sample of 9 patients, previously treated with immediate loading full-arch rehabilitation following the Columbus Bridge Protocol (CBP) since at least 4 months. On each patient selected, two impressions were taken: one traditional cast impression using pick-up copings and an open tray technique and a second one using an intra-oral scanner. In the following 48 hours two metal substructures were constructed, using the luting technique. The precision and the passivity of the substructures were analyzed through: Sheffield test endo-oral radiographs and comparing the digital scans according to the Hausdorff's method.

Results: the Sheffield test showed an excellent passivity for the frameworks obtained through both the digital and the analogic method. Precisely in 81.81% of cases ($n = 9$) both substructures were found to have a perfect fit with excellent passivity, in 18.18% ($n = 2$) of cases the substructures were found to have a slight discrepancy. From the radiographic examination, no gaps between the frameworks and the implant heads or MUAs were highlighted, with 100% accuracy. By superimposing digital files of scans according to Hausdorff's method, a reduced discrepancy was found between the digital scans and for the digital models obtained from plaster impressions.

Conclusions: despite its limitations, this study clinically demonstrated that full-arch frameworks obtained through a digital scan have an accuracy comparable to those obtained with the traditional plaster impression.

IMPACTED INVERTED SUPERNUMERARY TOOTH IN A BOY: MINI-INVASIVE ENDOSCOPIC APPROACH

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Aim: this report presents an extremely rare occurrence of an impacted inverted supernumerary tooth (ST) associated with a follicular cyst in a teenager patient.

A 14-years-old boy came to our observation for a first attempt at the University Hospital “Federico II”, Naples, Italy. The orthopantomography (OPT) revealed an impacted inverted ST in the anterior maxilla, surrounded by an unilocular radiolucent area. A cone-beam computed tomography (CBCT) showed that the crown was in close approximation to the nasal fossa floor. Thus, an endoscope-assisted surgical treatment was planned to improve visualization and preserve all the key anatomic structures.

Methods: the patient was treated under general anesthesia. A vestibular approach was chosen and a trapezoidal and para-

marginal flap was made with a total thickness, from right upper lateral incisor to left upper lateral incisor. Then, osteotomy was made to enable the complete removal of the ST, along with the soft tissue mass. The residual bone cavity was filled with fibrin sponges. Finally, a detached stitches suture was performed.

Results: the soft tissue mass was confirmed as follicular cyst by histological analysis.

The post-surgical phase was uneventful. The patient was followed-up at 1 week and 2 weeks from the surgery. Six months later, the intra-oral examination revealed a complete healing.

Conclusions: this case was solved with an endoscopic surgical approach, allowing to obtain a higher accuracy and a greater respect of the anatomic structures, preserving bone, and preventing possible damage.

HECK'S DISEASE: A CASE REPORT WITH MOLECULAR DIAGNOSIS

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Aim: focal epithelial hyperplasia (FEH) or Heck's disease, is a rare benign condition of the oral mucosa caused by HPV subtypes 13 and 32. The disease typically affects young Native American patients and is characterized by multiple asymptomatic papules on lips, tongue, and gingiva. The etiology of FEH is unknown, but the ethnic and geographic distribution suggests that genetic predisposition plays a pivotal role. Diagnosis is often based on clinical presentation and histopathology, but HPV genotype can be determined using PCR with specific primers.

Methods: we report a case of a 11-year-old boy who presented with asymptomatic papules, located on the lower lip and buccal mucosa. Medical history was mute.

Results: histopathological analysis showed the presence of hyperplastic squamous epithelium with papillomatosis, para-

keratosis and acanthosis. The rete ridges were widened and elongated. There were multiple cells with clumping of nuclear chromatin (mitosoid bodies) and cells with perinuclear vacuolization and irregular nuclei (koilocytes) within the spinous layer. HPV-PCR and sequencing revealed the presence of HPV13-DNA, consistent with the diagnosis of FEH.

Conclusions: a correct diagnosis of FEH may be made both clinically and histologically; however, standard molecular assays used to identify low- and high-risk HPV subtypes do not screen for HPV13 or 32. If HPV13 or -32 is suspected, specific PCR for HPV identification and sequencing should be performed. FEH is a benign condition that typically regresses spontaneously, and it is not associated with malignant transformation.

ORAL HEALTH AND MANAGEMENT STRATEGIES IN HYGIENE SESSION IN PRESCHOOL CHILDREN WITH ASD

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Aim: Autism Spectrum Disorders (ASD) have a prevalence of 1-5%. Children with ASD find no answer for their needs and requirements in dental field. Our aim is to observe major problems these children face with, role that family plays in care as well as strategies that dental professional can adopt to manage operative session, preventing onset or worsening of oral pathologies.

Methods: 42 Patients were recruited at Dental school and Child Neuropsychiatry of University of Verona. Two visits of 30 minutes for each patient were set to allow the children to adapt to environment and professionals properly. Visits included: oral inspection, photos, questionnaire addressed to the caregiver about eating habits and home oral hygiene. Caregivers were instructed devices and tools for proper domiciliary

dental hygiene and to increase child's compliance.

Results: oral health of autistic population was found at risk due to poor facilities for those weak children. An increased dmft was highlighted compared to that in the literature for healthy children, poor oral hygiene was detectable in all sample (augmented plaque index). Behavioral difficulties, anxiety and phobia towards dental procedures result in difficult professional oral hygiene sessions.

Conclusions: difficulties of caring ASD patients are an important issue to deal with, helping and supporting caregivers could be a pivot action to improve cares of ASD patient. It would be desirable to create suitable access routes to oral care and parents' education thanks to the collaboration of occupational medicine and dentistry.

DENTAL ANOMALIES IN PRIMARY DENTITION: THE IMPORTANCE OF INTERCEPTIVE TREATMENT

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Aim: dental anomalies in primary dentition are less common rather than in permanent dentition. Early diagnosis and treatment are indispensable to prevent different risks: delayed exfoliation, diastemas, crowding, deviation of midlines, impaction, dental caries, ectopic eruption and other orthodontic, aesthetic and phonetic problems. These anomalies are often associated between them and in high percentage they are repeated in the permanent dentition.

Methods: clinical and radiographic examination are necessary to the diagnosis. Four different cases of number and shape anomalies in primary dentition has been analyzed: mesiodens, agenesis, supplementary teeth and fusion.

Results: the most common clinical complications of mesio-

dens include an abnormal central diastema, delayed eruption, abnormal tooth eruption and aesthetic problems. Congenitally missing primary and permanent maxillary lateral incisors are often related. This condition is associated with an increased risk of impaction of upper canines and needs to be monitored. Supplementary teeth are rarely observed in deciduous dentition, and they can cause problems in the eruption and alignment of normal dentition. Fusion is more commonly associated with dental caries.

Conclusions: early treatment of dental anomalies in primary dentition is important to prevent different implications. A long-term follow up is likewise necessary until the completion of permanent dentition.

MANDIBULAR BUCCAL BIFURCATION CYST: SURGICAL MANAGEMENT IN AN 8-YEAR-OLD GIRL

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Aim: Buccal Bifurcation Cyst (BBC) is an inflammatory odontogenic cyst that develops on the buccal aspect of the first or second permanent mandibular molar in children. Swelling of the involved area, delayed tooth eruption or partial tooth eruption with deep periodontal pockets can be observed. In some cases, infection, with drainage of pus, and pain can be present. The patient who came to our observation at the University Hospital "Federico II", Naples, Italy, was an 8-year-old girl with a chief complaint of painful swelling on the left side of the face. Radiographic images showed the presence of a radiolucent well-defined lesion, involving the periapical region of the left permanent first mandibular molar.

Methods: the surgical procedure was conducted under general anesthesia: a full thickness flap was performed, and

the lesion was carefully detached and enucleated. The removed tissue was stored and sent for histopathological examination.

Results: histological examination showed a thin nonkeratinized stratified squamous epithelium and chronic inflammation, compatible with BBC. The healing of the lesion was followed-up clinically and radiographically at 3, 12 and 24 months, showing the absence of relapses.

Conclusions: BBC characteristically involves the buccal region of the mandibular first molar, usually during the first decade of life. The diagnosis is established by correlation of clinical, radiographic, surgical, and histologic findings. Surgical enucleation of the cyst without extraction of the involved tooth is effective in the management of BBC.

CLASS III TREATMENT WITH MIXED-ANCHORING ERP IN A CASE OF PARTIALLY EDENTULOUS MAXILLA

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Aim: miniscrews, as an alternative method for absolute orthodontic anchorage, have been extensively used in the last few years. The major advantages compared with dental implants or microplates are small size, allowing placement in many intraoral areas, low cost, and easy implantation and removal.

The aim of this study is to use of mini-screws in a complex case of class III orthodontic correction with the use of a hybrid expander in partially edentulous maxilla.

Methods: this study presents a case report of a pediatric patient with class III malocclusion and partial edentulism as surgical result in order to remove maxillary melanocytic progenoma at 40 days of age, in a patient who came to our observation at the age of 9 y. To this end, a rapid palate expander (ERP)

was developed with a mixed anchorage: dental in the first quadrant and skeletal in the second quadrant by inserting miniscrews in line with the missing tooth elements. Anchorage control during tooth movement is one of the main factors for ensuring successful orthodontic treatment.

Results: after one year, the treatment results are evident at the dental level with the resolution of class III malocclusion as well as the skeletal asymmetry of the palate and cephalometric improvement in the intermaxillary relationship.

Conclusions: this case shows that the use of mini-screws in the construction of hybrid devices significantly contributes to the resolution of complex orthodontic cases in a multidisciplinary approach.

SURGICAL APPROACH TO AN IMPACTED SUPERNUMERARY IN A PEDIATRIC PATIENT: A CASE REPORT

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Aim: the purpose of this case report was to identify the right diagnosis and surgical steps of a supernumerary tooth that allows optimal treatment of the element.

Methods: the mesiodens is the most frequently observed supernumerary element, which is a cone-shaped tooth generated at or near the maxillary sutures. A mesiodens is usually detected radiographically or by CT cone beam in the first decade, when it may lead to median diastema and asymmetric eruption of permanent central incisors. Our case shows a pedodontic patient of 10 years old with two supernumerary conical teeth in the anterior sextant. The first one erupted lateral to the interincisive suture, second one in vestibular inclusion. The CT cone beam showed the anomalous path of eruption of the two centrals in a general context of total nor-

mal interarch relationships. According to literature, the best time to operate on supernumerary elements in the anterior maxillary area seems to be between 6 and 7 years. We decided to plan the avulsion of the first erupted tooth and to proceed with the setting up of a vestibular mucoperiosteal flap under general anesthesia.

Results: through CT scan it was possible to plan the surgery and reduce all complications related to the procedure such as bleeding, injury to permanent teeth, cystic or neoplastic degeneration of the follicle

Conclusions: the presence of a supernumerary is common in everyday dental practice, if the surgical removal is performed in mixed dentition, the permanent central incisor will erupt in the arch, otherwise orthodontic treatment will be necessary.

UPPER LIP FRENULOTOMY IN A CHILD WITH RADIO FREQUENCY DEVICE: A CASE REPORT

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Aim: to report a case of lip frenulotomy with radio frequency device.

Methods: a 7-year-old good health male patient came to our observation for a hypertrophic short upper lip frenulum. The child had a major diastema between elements 11 and 21 and had to undergo orthodontic therapy. The orthodontist had requested our advice to perform a possible frenulotomy, as the hypertrophic and slightly short labial frenulum was considered the cause of the diastema. Frenulotomy, after anesthesia with mepivacaine with adrenaline 1: 100,000, was performed with an ablative radiofrequency device (Top Quality Group, Città di

Castello, PG, Italy), monopolar, with long tip. The frequency emitted by the handpiece is comprised between 30 to 150 Khz, the power used was 65%. After drying the lip with cotton rollers and aspirators, the radio scalpel was used for 8 minutes with very delicate horizontal movements above the frenulum.

Results: during the entire duration of the operation no bleeding, not even the slightest was observed. Healing at 5 days was optimal.

Conclusions: radiofrequency devices can be considered safe and effective to perform minimally invasive frenulotomies in pediatric age.

EFFECTIVENESS OF A NEW SELF-ADHESIVE COMPOSITE HYBRID IN A SPECIAL-NEEDS PATIENT: A CASE REPORT

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Aim: aim of this case report is to evaluate a new self-adhesive composite hybrid, recently marketed as a device for restorative treatments, even in most difficult cases, such as treatment of special needs patients. Manufacturers suggest it by comparing its efficient and easy-to-use procedure with restoration longevity and ability to release fluoride. In the UOC of Paediatric Dentistry, *Sapienza*, University of Rome, this material was applied in I and II classes cavities.

Methods: an 8 y.o. Autism Spectrum Disorder (ASD) patient was treated for several cavities. Due to patient's pathology, removal of carious lesions was performed only using manual instruments. Furthermore, it was not possible use normal procedures for isolating operative field with rubber dam. For these reasons Surefil One (Dentsply Sirona®) was positioned on pre-

pared surface, following manufacturer's instructions. The patient was placed on a 1-year follow-up program.

Results: the treatment was performed in a single appointment, without losing patient compliance, achieving a definitive restoration. During follows up restoration respected parameters of a good performance, such as shape, function and biointegration.

Conclusions: Clinically Surefil One (Dentsply Sirona®) has been demonstrated that it respects characteristics reported by manufacturers. This restorative device could be a predictable tool for restorative treatment of those cavities where it is not possible to avoid a whole operative field isolation. For these clinical features it could be suitable for treatment of special needs patient.

A RARE CASE OF NON-TUBERCULOUS CERVICAL ADENITIS OF ODONTOGENIC ORIGIN

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Aim: the aim of the study is to make a differential diagnosis between odontogenic abscess and non-tuberculous mycobacterial adenitis (Non-Tuberculous Mycobacteria, NTM) and to carry out the correct treatment.

Methods: an 8-year-old girl presented for observation because of a right submandibular skin fistula at the lymph node site. Drainage and antibiotic therapy were administered. Since there was no resolution, a microbiological investigation for tuberculous mycobacterium was carried out, which proved negative. Following the persistence of the solution of continuity, a culture for atypical mycobacteria was carried out and, after endoral X-ray, the extraction of the carious element 8.5 was planned, as it was considered a possible means of spreading mycobacterium to the lymph node station.

Results: the bacterial culture, associated with the absence of periapical lesions, confirmed the presence of the atypical mycobacterium and allowed the diagnosis of non-tuberculous cervical adenitis and the exclusion of a classic odontogenic abscess. Extraction of the involved element led to healing of the solution with scarring outcome.

Conclusions: non-tuberculous cervical adenitis, also known as scrofula, is a rare lymph node infection that predominantly involves children, who are usually immunocompromised. On the basis of this case report, it can be concluded that teeth affected by destructive caries may be the conduit through which this bacterium can reach the lymphatic system and replicate causing the disease.

COATS DISEASE AND ORAL MANIFESTATIONS: A POSSIBLE LINK?

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Aim: we would like to describe a case of Coats' Disease (CD) in a pediatric patient with particular oral manifestations and to perform a small literature review.

Methods: we report a case of a 7-year-old girl with sovranumerary teeth, very early exchange of dental elements and an exophytic intraosseous lesion on the upper gingiva with a previous diagnosis of CD. We used PubMed, Elsevier and Google Scholar to prove if a correlation between CD and her oral condition exists. We used "sovranumerary teeth in syndrome" and "Coats disease", "Coats disease oral manifestations" as keywords.

Results: CD is an idiopathic ophthalmic condition characterized by unilateral teleangiectasias and intra- or sub-retinal exu-

dation, which leads to retinal detachment and blindness.

The exophytic intraosseous lesion is localized among elements 1.2 and 1.3. It presents as rapidly growing, no mobile and of hard consistency; from CT investigation we assert it does not erode the cortical bone. Its nature is still under investigation. In literature uncommon ophthalmic diseases also giving oral manifestations are reported. We consider Nance-Horan Syndrome and Oculo-facio-cardio-dental Syndrome, although very rare, for a differential diagnosis, where oral anomalies and ocular lesions are linked together.

Conclusions: we cannot assume for sure this oral condition is linked to CD, due to the lack of data and to the rarity of the pathology, this could be the first case documented.

GUM HYPERTROPHY AND ACNE VULGARIS: ROLE OF ORAL HYGIENE WITH TOPICAL PROBIOTICS

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Aim: the aim of this work is to report the effect of the *Lactobacillus reuteri* on gingival swelling in two orthodontic patients.

Methods: a 14-year-old female and a 15-year-old male patients in general systemic good health with acne vulgaris developed gum hypertrophy related to fixed orthodontic treatment, refractory to professional oral hygiene. Tablets of *Lactobacillus reuteri* DSM 17938 ATCC PTA 5289 was prescribed to be taken twice a day, for four weeks, slowly dissolving in the mouth after careful oral hygiene. Patients were advised not to drink, eat or rinse for the next 60 minutes, and to avoid mouthwashes.

Results: at the fourth-week follow-up in both cases, there was a marked improvement in hypertrophic gingivitis with a reduc-

tion of the plaque and bleeding indexes. A reduction of the acne vulgaris on the skin of the face was also observed. In the girl already after the first week of probiotic therapy, a less dry and brighter skin was evident, at 3 weeks the improvement was very more marked. The male patient was observed at 1,2 and 3 weeks. Also in this case, the improvement in skin inflammation was evident, the skin was velvety and at 4 weeks almost free of pimples.

Conclusions: *L. reuteri* may be a useful probiotic agent to control the growth of bacteria involved in oral inflammation and acne. It prevents these two conditions, because of its ability to produce substances against pro-inflammatory agents, cariogenic bacteria and oral biofilm formation.

PEDIATRIC AMELOBLASTIC FIBROMA: A CASE REPORT IN A 12-YEAR-OLD CHILD

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Aim: ameloblastic Fibroma is a rare benign odontogenic tumor composed of epithelial and mesenchymal tissue, located in most cases in the mandible premolar-molar region of young female patients. Its etiology is unknown, and it can be diagnosed during routine oral examination or with an orthopantomographic radiograph. In most cases this lesion is associated with an impacted tooth and from the histological point of view, it is characterized by plump fibroblasts and collagen fibrils. The aim of this case report is to show the treatment of a 12-year-old girl presenting a suspicious neoplastic lesion of the left posterior region of the mandible, associated with an impacted tooth.

Methods: clinical and radiographic examination (orthopantomography and computed tomography), showing an impacted

inferior second molar with a radiolucent pericoronal lesion, were compatible with the diagnosis of pediatric ameloblastic fibroma. The lesion was treated with complete enucleation and bone curettage; tooth 37 was also extracted. The histopathological examination confirmed the diagnosis of ameloblastic fibroma.

Results: one year follow up orthopantomography and computed tomography were performed showing bone defect healing and no evidence of recurrence.

Conclusions: in this case report, a conservative therapy provided a good healing with no sign of recurrence after one year from surgical treatment, however bone resection can be considered in larger and recurrent lesions.

PERIPHERAL GIANT CELL GRANULOMA IN A 3-YEAR-OLD GIRL: A CASE REPORT

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Aim: Peripheral Giant Cell Granuloma (PGCG) is a benign, reactive lesion that clinically presents as a soft to firm, reddish purple, polypoid, or nodular lesion, occurring most frequently on the alveolar ridge or gingiva of anterior area of the mandible. It is encountered often in adult population, more rarely in children and in this case the lesion appears to be more aggressive. The patient who came to our observation at the University Hospital "Federico II", Naples, Italy, was a 3-year-old girl, presenting an increase of soft tissue with an inflamed appearance in the lingual anterior mandibular zone. Patient's mother referred a previous trauma of that area. Radiographic images showed a radiolucent lesion and early root resorption of 7.1, 8.1, 8.2.

Methods: a complete surgical removal of the lesion was planned under general anaesthesia, because of the age of the pa-

tient. Excision was carried out along with curettage, to lessen the chances of recurrence, and involved primary teeth were extracted. The removed tissue was stored and sent for histopathological examination.

Results: the histological examination of the surgical piece revealed the presence of abundant giant multinucleated cells, high mitotic activity and abundant haemorrhagic foci, compatible with PGCG.

After surgical healing, the patient was recalled every month. No recurrence has been reported six months post-excision.

Conclusions: a complete surgical excision with curettage is effective in the management of PGCG in children. Because of the potential recurrence of this type of lesion, a close follow-up is recommended.

DOUBLE STEP TECHNIQUE IN SEVERE CARIOUS LESION: A CASE REPORT WITH 1 YEAR FOLLOW UP

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Aim: Silver Diamine Fluoride (SDF) is a solution that combines the antibacterial effects of silver and the remineralizing effects of fluoride, reducing biofilm counts and hindering the degradation of collagen. The aim of this study is to describe the management of a carious lesion in an uncooperative patient by application of SDF followed by Glass Ionomer Cement (GIC) filling.

Methods: a 7-year-old female was referred to the dental clinic and presented multiple carious lesions on primary teeth and a destructive lesion on a first molar (16) that was valued 5 on the ICDAS scale. The child showed a very uncooperative attitude towards dental treatments, so a non-invasive approach was chosen: SDF was applied directly to the surface of the affected tooth for 1 minute, instructing the child to avoid eating

and drinking for 1 hour. Hygiene and dietary recommendations were given. A second SDF application was carried out 1 month later. After another month, the caries lesion was arrested: probing with a light force, the dental tissue resulted hard. Since the patient's cooperation improved, a minimally invasive approach was adapted, filling the cavity with GIC.

Results: at 1 year follow up, no signs/symptoms of infection were recorded, and radiographic assessment confirmed clinical findings, showing an increased radiopacity of the carious tissue and a complete root formation.

Conclusions: application of SDF, especially if repeated, followed by ART, can be a valid alternative in arresting cavitated lesions in pediatric patients, in particular those with a low grade of collaboration.

ORTHODONTIC TREATMENT OF ANTERIOR CROSS-BITE: PARODONTAL CLINICAL ASPECTS

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Aim: the aim of this case report is to evaluate the changes that may affect the periodontal structure of the maxillary anterior teeth, by labial tipping of the maxillary tooth, during the orthodontic correction of an anterior cross bite.

Methods: a young healthy girl, in mixed dentition, affected by an anterior crossbite-monitored also from a periodontal point of view, has been added in this case. Treated with the utility arch proposed by Ricketts, with braces bonded on the incisors and bands on the upper molars.

Results: after 9 months of treatment there is an alteration in gingival and periodontal structure involving the element 1.1 with a creation of a pocket depth of 5mm. In the resolution of anterior cross-bite, the movement of the maxillary teeth can

bring it into an unfavorable position where there is lack of bone and gingival tissue. In this case after the debonding, gum regained a normal shape gradually and improved its aspect during the follow up of 15 months without a surgical intervention.

Conclusions: in some articles it has been stated that there is no permanent damage to healthy periodontium after and during orthodontics treatment, others that it can cause gingival recession and an earlier periodontitis. Orthodontic correction of anterior crossbite leads to a temporary increase in gingival inflammation and probing depths during treatment. Analyzing periodontal changes, which can be fleeting or lasting, oral hygiene, orthodontic movement, tooth position, gum thickness and alveolar bone should also be considered.

PEDIATRIC DENTISTRY RESEARCH AND CLINICAL EXCHANGE BETWEEN ITALY AND KENYA

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Aim: this case control study aims to compare the prevalence of Developmental Defects of Enamel (DDE) and recurrent aphthous stomatitis (RAS) in children with Celiac Disease (CD) and in healthy controls.

Methods: the study was carried out on children aged 6 to 12 years of both sexes enrolled in Bologna at the Ospedale Maggiore. Unaffected children represented the control group (n = 100), children neo-diagnosed with CD represented the case group (n = 100). Diagnosis of DDE was made using the Aine classification, while RAS presence and history was investigated through a clinical examination and an ad hoc prepared questionnaire.

Results: among 100 celiac patients, 49 had at least one tooth affected by DDE, while among 100 healthy controls only 12 children showed DDE presence. In celiac patients, the most af-

ected teeth were deciduous first molars (38,3%), followed by deciduous second molars (22,2%), permanent incisors (17,2%), permanent first molars (13,2%) and deciduous canines (9,1%). The majority of healthy controls showed grade 1 DDE (discolorations), while grades 1, 2 (slight structural defects) and 3 (obvious structural defects) DDE were found in CD children. Among celiac children, 46 had or referred RAS history, while among the healthy controls only 9 children were diagnosed with RAS. RAS were observed more frequently as minor and major lesions.

Conclusions: the high presence of DDE and/or RAS recorded in children with CD, calls to evaluate the presence of celiac disease in all children with these oral manifestations, in order to diagnose atypical or silent forms of the disease.

ASSOCIATION BETWEEN DDE, RAS AND CELIAC DISEASE IN MIXED DENTITION: A CASE-CONTROL STUDY

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Conclusions: the high presence of DDE and/or RAS recorded in children with CD, calls to evaluate the presence of celiac disease in all children with these oral manifestations, in order to diagnose atypical or silent forms of the disease.

ORAL HEALTH DURING PREGNANCY AND EARLY CHILDHOOD: A SURVEY ON A SAMPLE OF MOTHERS IN ITALY

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Aim: children's oral health is closely related to mothers' oral health. The aim of this study was to evaluate mothers' knowledge about oral health during pregnancy and in early childhood of their children.

Methods: an anonymous questionnaire was administered to 1291 women with at least one child 0 to 36 months old. The questionnaire was divided in 3 domains: demographic characteristics, oral health during pregnancy and child's oral health. ANOVA was used to evaluate association between answers and demographic information and Pearson's index to evaluate items correlation.

Results: the majority of mothers (73%) declared to go to the dentist before pregnancy, but just 39% during pregnancy. Just 19% of mothers believe that oral problems may affect pregnancy and baby's health. More than half (65%) of sur-

veyed didn't receive oral health information during pregnancy. Pearson's index shows a correlation between those who have been to the dentist and who received advice on oral health. Although 91.6% of mothers believe that primary teeth are important, just 35.2% know that cariogenic bacteria can be transmitted from mother to child. The majority of women (83.9%) don't know the effects of prolonged bottle or breastfeeding. Better knowledge resulted associated with a higher level of mothers' education and employment and more than a child.

Conclusions: oral health prevention programs during pregnancy need to be implemented. Health care professionals that care mothers during pregnancy and newborns need to collaborate with pediatric dentists to improve in mothers' healthy behaviors.

TREATMENT PROTOCOL FOR CHILDREN WITH SUSPECTED OBSTRUCTIVE SLEEP APNEA SYNDROME

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Aim: Obstructive Sleep Apnea Syndrome (OSAS) is characterized by intermittent nocturnal episodes of total or partial obstruction of the upper airways, with interruption of nocturnal ventilation and normal sleep patterns. Prevalence in children has a wide range, from 1.2% to 5.8%, due to the lack of an uniform estimation in literature. The aim of this study is to define a management protocol for children with suspected OSAS.

Methods: our sample included 48 subjects between 5 and 15 years old with suspected OSAS based on nocturnal and diurnal signs and symptoms and clinical evaluation. In order to confirm diagnosis, all 48 children underwent a Home Respiratory Polygraphy (HRP). Children with OSAS were classified into 2 subgroups: children with and without contracted palate.

The first group underwent orthodontic treatment, while the second one was referred to other specialists.

Results: 10 patients with suspected OSAS resulted positive at HRP. 6 of 10 needed orthodontic treatment: 5 underwent rapid maxillary expansion, 1 is awaiting for orthognathic surgery; children with OSAS but without indications for orthodontic treatment, were referred to the cardiologist and otolaryngologist. The other 38 children without confirmation of OSAS are periodically monitored.

Conclusions: the diagnosis and treatment of OSAS in children requires a multidisciplinary approach, where dentists have a fundamental sentinel role for an early screening of this pathology often underdiagnosed, but with important consequences on the quality of life in pediatric subjects.

ORAL MANIFESTATIONS IN CHILDREN AFFECTED BY DIGEORGE SYNDROME: A CASE SERIES

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Aim: the aim of this study is to present the oral manifestations of two brothers affected by DiGeorge syndrome. DiGeorge syndrome also known as 22q11.2 deletion syndrome is a rare syndrome caused by a microdeletion on long arm of chromosome 22. The main symptoms are congenital heart defects, palatal abnormalities with velopharyngeal insufficiency, immune deficiencies due to thymus hypoplasia, hypoparathyroidism with hypocalcemia, renal and gastrointestinal diseases and brain involvement causing learning and intellectual disabilities.

Methods: G.R. (16 years old) and L.R. (8 years old) are affected by DiGeorge syndrome and attended the Paediatric Dentistry Department of Policlinico of Bari.

Results: the clinical examinations showed diffuse hypomine-

ralization and several caries, concordant with literature: McDonald-McGinn DM [2000], Nordgarden H [2012], AlQarni MA [2018] and Wong DH [2021]. Both patients were treated under conscious sedation; oral prophylaxis, fluoride application, pulp therapy, extractions of hopeless teeth and restorations of carious and hypomineralised teeth were performed.

Conclusions: the management of patients with DiGeorge syndrome should be conducted by a multidisciplinary dental team, with an early pathway of prevention and follow-up. The literature on oral manifestations of DiGeorge syndrome is rather sparse. However, our review of relevant literature indicated that a early diagnosis of oral manifestations is mandatory in DiGeorge syndrome patients to improve the quality of their life.

EFFICACY OF ELASTODONTIC DEVICES ASSESSED VIA 3D IMAGING TECHNOLOGY. A PROSPECTIVE STUDY

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Aim: the aim of the present study was to evaluate the skeletal and dento-alveolar changes and palatal morphology of children with early signs of malocclusion, obtained after 1 year of treatment with Elastodontic Appliances (EA).

Methods: the study included 20 subjects aged between 7-10 years with a skeletal and/or dental class II malocclusion who received treatment with EA for 1 year (study group) and a control group of 20 subjects aged matched. Skeletal and dentoalveolar parameters were compared between T0 and T1, after analyzing L-L radiograph and intra-oral scans. A 3D imaging technology (deviation analysis and surface-to-surface matching technique) was used to compare palatal morphology between T0 and T1.

Results: in the study group, there was an increment of the

number of subjects showing no signs of crowding and a Class I occlusal relationship compared to the control group, from T0 to T1. In the treated group, there was a statistically significant reduction in overjet and overbite from T0 to T1 ($p < 0.05$) compared to the control group. In the study group, no significant differences were found between the SNA° values detected at T0 and T1 ($p > 0.05$), instead, the SNB° , ANB° , and IIA° values showed a significant increment ($p < 0.05$). Finally, the 3D deviation analysis shows a significant recovery of the palatal asymmetry (+ 8.15%) in the treated subjects, compared to the control group (- 0.76%) ($p < 0.05$).

Conclusions: EAs could be effectively used for the interceptive orthodontic treatment as well as for favouring the harmonization of maxillary growth.

GERMECTOMY OF THIRD MOLAR AND MANAGEMENT OF SECOND MOLAR IMPACTED: TIMING AND EARLY DIAGNOSIS

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Aim: the purpose of this study was to investigate third molar germectomy and the management of lower second molar impaction and retention in a pediatric population sample. Impacted second molar tooth represent a rare eruption defect with a prevalence between 0-2,3%. This condition should be diagnosed and treated early with a multidisciplinary approach between the age of 9-12 years.

Methods: this study was conducted at the Department of Oral and Maxillofacial Sciences of Sapienza University of Rome, UOC of Pediatric Dentistry. A sample of 10 pediatric patients aged 9 to 12 (5 male and 5 female) was retrospectively investigated by evaluation of orthopantomograms. According to Demirjian's classification we evaluated stage D of tooth calcification, i.e., when crown formation is complete up to

dentin-enamel junction associated with an anatomical bone inclusion.

Results: our results confirm that there is no clear standard solution for the treatment of the retained or impacted second molar. Early germectomy of the lower third molar remains the best therapeutic choice to promote eruption of the impacted second molar, but a surgical-only approach has proven to be insufficient to ensure its proper eruption. As shown in our study, the association between surgical exposure and orthodontic intervention were found to be the most successful treatment.

Conclusions: the management and treatment of impacted lower second molars require a multidisciplinary approach, which involved surgical techniques and orthodontic biomechanics.

DIRECT CAPPING OF DECIDUOUS TEETH WITH A BIO CERAMIC CEMENT: CROSS-SECTIONAL PANEL STUDY

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Aim: the study's primary aim was to evaluate the pulp viability of deciduous teeth after direct capping with calcium trisilicate cement.

Methods: assuming a success rate of 80% of the direct capping procedure, the sample size was set at 62 patients. Primary molars with an ICDAS decay between 4 and 6, asymptomatic and not previously treated, with accidental pulp exposure during decay removal were selected in patients with 5 to 9 years of age if matching radiographic criteria. Not isolable elements were excluded. Teeth were treated with direct pulp capping with a bioceramic cement and restored following the usual clinical procedure. Follow-ups were scheduled after 3 (T1) and 12 months (T2), checking the response to thermal stimulus and percussion

test, presence of fistulas, phlogistic processes, or mobility. At T2, an x-ray was planned to evaluate any signs of pulp distress, root resorption, or calcification of the pulpal tissue.

Results: 10 patients have been enrolled so far. Preliminary results showed that at T1 only 2 out of 10 teeth showed an increased response to the thermal stimulus and only one had a grade 1 mobility without symptoms. No teeth had a positive response to the percussion test.

Conclusions: direct pulp capping of primary teeth is a less invasive and faster treatment than pulpotomy. The results of this study are still partial but promising because in 80% of teeth treated with the calcium trisilicate cement the pulp viability was maintained.

SURVEY ON WOMEN'S KNOWLEDGE ON ORAL HEALTH AND NUTRITION IN PREGNANCY AND IN THE NEWBORN

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Aim: to evaluate the knowledge and attitude of pregnant women and new mothers about their own and their newborns' oral health and nutrition.

Methods: the study, designed as a cross-sectional observational survey, was performed at the IRCCS Burlo Garofolo, Trieste. 100 women aged 18-49 years were enrolled according to specific inclusion/exclusion criteria after the informed consent signature. Included women were divided into groups A = 50 pregnant women and B = 50 new mothers. An anonymous assessment questionnaire of about 20 questions divided into 3 domains (1: demographic and occupational data; 2: oral health data; 3: nutrition data) was given to all participants who received an informative brochure with advice on the topics object of the study.

A descriptive analysis was performed.

Results: 65% of participants were aged between 25 and 35 years, 52% had a high educational level, 92% were Italians. 14 pregnant women vs 29 new mothers stated to have received a dental checkup during their pregnancy; 13 pregnant women vs 30 new mothers had received information on oral hygiene practices in newborns; 11 pregnant women and 22 new mothers were informed that dental caries is an infectious transmissible disease and prolonged breastfeeding is a risk factor for Early Childhood Caries.

Conclusions: the results of this survey confirm that educational programs for future mothers on oral health and nutrition and multidisciplinary paths involving pregnant women's and newborns' caregivers are needed.

ORAL MICROBIOTA IN DEVELOPMENTAL AGE: IMPLICATIONS OF THE USE OF *S. SALIVARIUS* M18

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Aim: the aim of the work is to evaluate whether *S. Salivarius* M18 can be a protective factor towards the genesis of caries in developmental age.

Methods: the study was conducted at the Pedodontics Department in the Department of Medical, Oral and Biotechnological Sciences of the G. D'Annunzio Chieti-Pescara University. The oral health status of the child was assessed before, during and after therapy by administering the probiotic based on *Streptococcus Salivarius* M18 (Carioblis®). Clinical indices describing bacterial pathology (DMFT, FMPS and salivary pH) and quantitative values of *S. Mutans* colonies detected by observation of the culture media provided by the Kariescreen-test kits were considered. The sample examined was divided into the test group, subjected to administration of Carioblis®,

and the control group. The groups were evaluated in four time frames (T0-T1-T2-T3). For the statistical analysis, tests of normality (Shapiro-wilk test) and homogeneity of variances (Levene test) and ANOVA were performed.

Results: the clinical index values undergo a relative improvement, mainly due to the antibacterial action exerted by bacteriocins and to bacterial antagonism by *S. Salivarius* M18. Direct observation of the bacterial count shows a reduction in *S. Mutans* colonies in the test group.

Conclusions: considering the characteristics of *S. Salivarius* M18 and the possibility of controlling the clinical and bacteriological indices, the administration of these probiotics can be included in the control of the oral microbiota and in the maintenance of a state of eubiosis.

DIFFERENCE BETWEEN PREVALENCE OF OSA RISK IN DOWN SYNDROME PATIENTS WITH AND WITHOUT SLEEP BRUXISM

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Aim: obstructive sleep apnea syndrome (OSAS) is a sleep-related breathing disorder characterized by repetitive episodes of airflow cessation, resulting in brief arousals and intermittent hypoxemia. OSAS is associated with a number of adverse health consequences, and suspecting the disease is therefore an important matter. Aim of the present study is to observe if Down Syndrome patients with sleep bruxism have a major risk of OSAS than those without sleep bruxism.

Methods: twenty-five Down patients, 17 males and 8 females, median age of 16 years who were referred to the pediatric dentistry department at the A Gemelli Hospital, were analyzed. All patients underwent a complete dental examination, and their caregivers were asked to complete questionnaires in order to

assess OSA risk and risk of suffer from sleep bruxism. Chi Square Test was used to compare data.

Results: seventeen subjects presented high risk of suffering from sleep bruxism and 52% of those were also considered to be at high risk of OSA. Eight subjects presented a low risk of suffering from sleep bruxism and 25% of those were considered to be at high risk of OSA. The difference between groups was found to be statistically significant.

Conclusions: Down syndrome patients with sleep bruxism present a statistically significant higher OSA risk than patients without sleep bruxism. When evaluating Down syndrome patients experiencing sleep bruxism, the presence of OSA should be evaluated.

USE AND BENEFITS OF DIGITAL TECHNOLOGIES IN PEDIATRIC DENTISTRY

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Aim: the use of digital technologies in pediatric dentistry has shown a remarkable development in recent years. The purpose of this study is to show the benefits of these technologies over traditional techniques and its many applications. The digital workflow helps the pediatric dentist in both diagnosis and treatment. It reduces fear in the child and improves his collaboration in treatments.

Methods: for diagnosis, scanners are used for impressions and 3D models are then made. CAD CAM system is used for therapy. With this system many orthodontic interceptive devices can be made: palatal expanders, space maintainers, inlays with the function of space maintainers in case of infraoccluded teeth. New materials, such as PEEK, can also be used to design metal-free devices in special need patients.

Results: the results show that the scanners get rid of the unpleasant sensations of traditional alginate impressions and the speed of scanning reduces the time to the chairside and increases the collaboration. The impressions can be sent in real time to the dental lab. The precision of 3D models is very high and systematic errors that can be made during the various phases are eliminated. The computer simulation of the treatment plan is useful to the operator to virtually design and view the therapy, it is useful to inform parents and also increases the acceptance of the children.

Conclusions: the digital workflow improves the quality of the treatment, reduces time and costs. It's a valuable aid for pediatric dentistry and a widespread use of these technologies is desirable in the near future.

USE OF RME IN PEDIATRIC PATIENTS WITH OSTEOGENESIS IMPERFECTA

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Aim: the aim of the study is to analyze the results obtained following the use of traditional rapid palatal expanders or on mini-screws (RME) in patients with Osteogenesis Imperfecta and in treatment with quarterly infusions of Neridronate (BP) subject to specific orthopedic protocol.

Methods: in 10 years of clinical experience at the U.O.C of Pediatric Dentistry of Sapienza University of Rome, 50 patients suffering from Osteogenesis Imperfecta (7-12 years) underwent orthodontic treatment with RME. All patients were treated with quarterly infusions of Neridronate and with the same protocol that provides for a phase of beginning therapy with infusion of BP and the application in the following days of RME, the suspension of the subsequent infusion of BP at 3 months with maintenance of REM, and a subsequent resumption of BP infusions at

6 months. This protocol, applied in the orthopedic field for the execution of osteotomies of long bones, has been applied in the orthodontic field by assimilating the opening of the median palatine suture made by REM to an orthopedic osteotomy.

Results: the results obtained show that in all patients receiving REM and BP treatment with the same protocol, with a 10 years follow-up, no problems of management of rapid palatal expansion related to pathology or intake of BP have been identified.

Conclusions: in pediatric patients with Osteogenesis Imperfecta and treated with RME and BP with a specific orthopedic protocol, all palatal expansions were carried out regularly with normal ossification of the palate and absence of cases of osteonecrosis.

BOND STRENGTH TO PRIMARY TEETH OF SELF-ADHESIVE MATERIALS: A REVIEW AND META-ANALYSIS

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Aim: the objective of the present systematic review and meta-analysis was to assess the *in vitro* bond strength of Self-adhesive Flowable Composites (SFCs) and Glass Ionomer Cements (GICs) on primary teeth.

Methods: a literature search was manually and electronically carried out according to PRISMA statement on 4 databases (MEDLINE/PubMed, Google Scholar, Scopus, and Embase), to evaluate *in vitro* studies comparing GICs and SFCs bond strength values on primary teeth. Bond strength values of restorations on deciduous teeth made by conventional Flowable Composites (CFs) were used as control. Risk of bias of included papers was further evaluated and 3 groups of meta-analyses were performed.

Results: three articles met the inclusion criteria and underwent both qualitative and quantitative assessment. Although there was no statistically significant difference between SFC versus GIC groups, both materials provided significantly lesser bond strength than Conventional Flowable Composites (CFs).

Conclusions: CFs showed successful outcomes, however, the need for simplification of operative steps in young or uncooperative children introduced the use of SFCs as reliable alternatives. Within the limitation of the present study, it can be concluded that SFCs showed slightly better bond strength values than GICs, although the absence of significant difference, and may be considered a valid option in the restoration of deciduous teeth.

DEPTH OF CURE OF BULK-FILL FLOWABLE COMPOSITES: AN *IN VITRO* COMPARATIVE STUDY

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Aim: to evaluate and compare the Depth of Cure (DOC) of two bulk-fill flowable composites (Filtek Bulk Fill Flowable Restorative and Tetric EvoFlow Bulk Fill), two conventional flowable composites (Filtek Supreme XTE Flowable Restorative and G-ænial Flo X) and one high-strength universal injectable composite (G-ænial Universal Injectable).

Methods: specimens were placed in a stainless-steel mold with an orifice of 4 mm in diameter and 10 mm in depth and light-cured for 20 seconds using a LED LCU with an irradiance of 1000 mW/cm²; DOC was assessed using the ISO 4049 scrape technique and the absolute length of the specimen of cured composite was measured in millimeters with a digital caliber. The same procedure was repeated with 14 samples

for each material under investigation, for a total number of 70 test bodies.

Results: the average DOC of both bulk-fill composites was more than 4 mm, while the one of the conventional flowable composites was much lower; DOC of the high-strength injectable composite was greater than the one of traditional composites, but not to the level of bulk-fill materials. Statistical analysis revealed significant difference (p-values < 0,05) in the depth of cure between bulk-fill flowable composites and other composites while there was no difference (p-values > 0,05) between the materials of the same type.

Conclusions: bulk-fill flowable composites showed significantly higher depth of cure values than both traditional flowable composites and high-strength injectable composites.

PARENTAL ACCEPTANCE OF ADVANCED BEHAVIOUR MANAGEMENT TECHNIQUES IN PEDIATRIC DENTISTRY

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Aim: Advanced Behavior Management Techniques (ABMTs) are used to achieve successful dental treatments in uncooperative children and include passive/active restraint (PR/AR), N2O sedation and general anesthesia (GA). The purpose of this survey is to assess parental acceptance of ABMTs in children with or without disabilities, during routine dental care (RDC) and emergencies (E).

Methods: an anonymous questionnaire, already validated in several countries, was created on Google Forms and distributed at school or through social networks.

Results: 100 surveys were analyzed from the following groups: parents of children without disabilities with (Group 1 n = 25) and without previous experience of ABMTs (Group 2 n = 25), parents of children without disabilities with (Group 3 n =

25) or without previous ABMTs experience (Group 4 n = 25). Groups 1 and 2 stated that they preferred N2O sedation in both RDC (38% and 40%, respectively) and E (44% and 46%, respectively); Groups 3 and 4 chose AR as their preferred ABMT in RDC (40% and 46%, respectively). Regarding E, the aforementioned groups agreed that GA was the first choice (42% and 44%, respectively) on par with AR for group 3 (42%). Passive restraint was the least accepted by all in both treatment situations (RDC: 44%; E: 26%).

Conclusions: parents are more willing to consent to ABMTs in emergency situations; active restraint and N2O sedation were the most preferred techniques and general analgesia was more accepted than passive restraint in both ordinary and emergency situations.

MODIFIED VERSION OF THE C-OHIP FOR SCHOOL-AGED CHILDREN AFTER 2 YEARS OF COVID19: AN ITALIAN PROPOSAL

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Aim: the COHIP is a tool that assesses the impact of oral diseases on quality of life in children. Our aim is to propose a modified version of the C-OHIP for children 3-14 years old to investigate and analyze the impact of COVID-19 pandemic into children's life and dental health.

Methods: in February-March 2022, two questionnaires have been proposed according to age (3-6 yrs -45 items and 7-14 yrs -49 items) with five domains (oral health, functional well-being, socio-emotional well-being, school/environment, self-image). Answers (i.e. always, often, sometimes, almost never and never) refer to some conditions (i.e. general, psychological and dental) related to Covid-19 period and last 3 months.

Results: 100 questionnaires are filled: 50 for the 3-6 yrs group (44% female-56% male, mean age 5yrs) and 50 for the 7-14 yrs group (58% female-42% male, mean age 10 yrs). Respect

to the pre-pandemic period, in *Oral health* domain both groups show less interest in dental hygiene and prefer sweetest foods; in *Functional well-being* both groups report difficulties in sleeping; in *Social-emotional well-being* both groups mention to feel more sad, worried; regarding *School environment*, both are happy to go to school; in *Self-image* 3-6 yrs group has high levels of self-esteem.

Conclusions: Covid-19 pandemic seems to have higher impact on the 7-14 yrs group than the little ones. Measures to contain the spread of COVID-19 (e.g. school closures, quarantine and community lockdown) have been secondary impacts on children and families. Change of lifestyle habits overlooks oral health with unhealthy eating habits, difficult in sleeping, anxiety and worry and lower levels of self-esteem. Further analysis is in progress in order to validate the questionnaire.

THE ECC STATUS IN APULIAN CHILDREN: A PREVALENCE STUDY CONDUCTED IN 'POLICLINICO DI BARI'

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Aim: to quantify the presence of children affected by Early Childhood Caries (ECC) among the patients of the department of pediatric dentistry of 'Policlinico di Bari' during 2021.

ECC is defined by AAPD as the presence of 1 or more decayed, missing (due to caries), or filled tooth in a child of 6 years of age or younger.

Methods: the study included only patients under six years of age and in good general health. They underwent anamnestic examination with the cooperation of the parents and clinical examination.

Results: on a total of 47 patients under six years of age who visited the department of pediatric dentistry during 2021, 30 were affected by ECC with a prevalence of 63,8%. The anamnestic questionnaire showed that ECC was attributable to a

lack of prevention and incorrect dietary habits, with the aggravating factor of a significant diagnostic delay that could only partly be traced back to the pandemic situation.

In addition to oral problems as loss of vertical dimension, alteration of the correct occlusal relationships, these children had also general health issues such as difficulties in nutrition due to pain, daytime sleepiness and learning difficulties.

Conclusions: since the prevalence of patients with ECC is still high, we want to emphasize the importance of a multidisciplinary approach to child oral health, starting from pediatrician collaboration to increase the spread of prevention techniques and arriving to general dentists that must adopt the right approach to the young patient in order to gain his confidence and treat him as early as possible.

EFFECTS OF AN EDUCATIONAL BOOK ON PAEDIATRIC ORAL HEALTH KNOWLEDGE IN A SAMPLE OF WOMEN

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Aim: the primary objective of the study is to evaluate the educational effectiveness of the text on nutrition and prevention of oral diseases in a sample of about 100 women (≥ 18 years), potential caregivers of one or more children (mothers, grandmothers, baby-sitters, educators, etc.), resident in Italy.

Methods: the study is ongoing and the participants are enrolling. They are given a questionnaire of 30 multiple choice questions to be completed before reading the informative text. After they have to read the informative text "Oral health of mother and baby in the first 1000 days of life". At the end of the

reading they must answer the same questionnaire of 30 multiple choice questions.

Results: the first 1000 days of life, understood as the period between conception and the first 24 months of the child, are important for the oral and systemic health of the child and to set up serious and effective maternal and child prevention programs. Only in this way is it possible to reduce the incidence of both pregnancy-related diseases and those affecting children, and this is undoubtedly one of the greatest challenges in public health.

Conclusions: thanks to this information tool, we expect an improvement in caregivers' knowledge of oral health.

HYPER IG-E SYNDROME: A RARE GENETIC DISEASE THAT NEEDS THE PAEDIATRIC DENTIST

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Aim: the purpose of this work is to present a rare genetic syndrome, the Hyper Ig-E Syndrome (HIES), that involves facial and oral manifestations and to emphasize the role of the Pediatric Dentist within the multidisciplinary team for the care of these patients.

Methods: Hyper Ig-E syndrome is a hereditary genetic disease that affects 1/100,000 live births in Italy and as well as worldwide. HIES has 2 modes of inheritance, an autosomal dominant mode AD (type 1)-HIES, which seems to produce a less severe disease, and an autosomal recessive mode AR (type 2)-HIES that presents serious health conditions, often is even lethal. A newborn rash or eczema is frequently the first manifestation of AD-HIES. Many other infections can be associated such as candidiasis and herpes simplex virus 1.

Results: during growth, especially in AD (type 1)-HIES, other pathognomonic signs of the disease may appear, the most typical of which involves the face with the typical facial appearance called "Job's face". Facial asymmetry, broad nose, and deep-set eyes with a prominent forehead are commonly present. The facial skin has a rough appearance. Delayed exfoliation of deciduous teeth, oral fungal and viral infections, caries lesions, periodontal problems as well as malocclusions are also frequently found in these patients.

Conclusions: the characteristics of HIES and its clinical manifestations in the oral cavity require a multidisciplinary approach with the presence of a pediatric dentist in the therapeutic team in order to manage the oral manifestations of this complex pathology.

THE EFFECTIVENESS OF VISUAL PEDAGOGY IN ASD CHILDREN IN DENTISTRY

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Aim: the aim of this randomized double-blind clinical trial was to evaluate the effectiveness of two different visual aids to improve the collaboration of Autism Spectrum Disorders (ASDs) children during the first dental visit and a preventive procedure.

Methods: 84 ASD children (3-15 years) were randomly divided into two groups: the study group (n = 41) received a video-modelling based visual support, and the control group (n = 43) received a paper social story. The primary outcome was to evaluate patient cooperation measured by the number of steps completed (1-11 steps) and by the opinion of two pediatric dentists (blinded to patient allocation) according to the Frankl Behavioral Scale. The secondary outcome was to investigate the parent's opinion regarding the visual aid provided.

Results: patients in the study group completed on average more steps (7.98 ± 3.37) than patients in the control group (6.53 ± 3.51); the difference between groups was almost significant ($p = 0.059$). The percentage of patients who received a positive opinion on cooperation (score 3 or 4) was higher in the study group, both for the visit (56.12% vs 56.10%) and for the preventive procedure (53.66% vs 46.34%); however, these differences were not statistically significant. Parents considered the visual aid provided "very useful" or "quite useful" (78.05% in the study group and 76.74% in the control group).

Conclusions: both the visual aids resulted useful to improve collaboration of ASD children in the first dental visit.

ASTHMATIC PEDIATRIC PATIENTS AND DENTAL CARIES: AN OBSERVATIONAL STUDY

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Aim: asthma is a respiratory disease frequent in children. The treatment involves inhaled corticosteroids (ICS), short- or long-acting beta agonists or short- or long-acting muscarinic receptor agonists, administered in combination with ICS. The correlation between asthma medications and dental caries has been investigated in several studies. The administration of inhaled drugs alters saliva in quality and quantity. Saliva reduction increases caries risk, increasing cariogenic microbiota and reducing the physiological mechanism of tooth cleaning. Many inhaled drugs have sugar as an excipient, contributing to alter the plaque pH. Beta 2 agonists activate beta2 receptors in the salivary glands, promoting cyclic adenosine monophosphate production which reduces salivary secretion and protein synthesis.

Methods: all patients aged 4-14 years who required dental caries due to caries at the Bellaria Hospital in Bologna between January 2021 and January 2022 were investigated regarding asthma prevalence.

Results: among 860 children with dental caries, 17.44% (n = 150) reported to suffer of asthma. In particular, 78 children reported to suffer of mild intermittent asthma with occasional use of inhaled drugs, while 54 suffering of mild persistent asthma and 18 with moderate persistent asthma reported to use continuative inhaled drugs therapy.

Conclusions: the high percentage of asthmatic children among children with caries lesions confirms an association between the two conditions. Preventive caries measures need to be taken in children using inhaled bronchodilators and/or corticosteroids.

ORAL MANIFESTATIONS OF COVID-19 AND MULTISYSTEM INFLAMMATORY SYNDROME (MIS-C) IN PAEDIATRIC PATIENTS

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Aim: COVID-19 pandemic seems to affect pediatric population only marginally; nevertheless, a postviral immunologic reaction resulting in a multisystem inflammatory syndrome in children (MIS-C) has been well described as long-term side effect of COVID-19 in pediatric patients. To date, there is scarce knowledge of COVID-19 oral manifestations in childhood. The aim of this study was to investigate the oral manifestations in children during and after COVID-19.

Methods: twenty pediatric patients (average age 5.6 y.o.) were included in the current study. They were all hospitalized in the "Papa Giovanni XXIII Children Hospital" of Bari, 10 of them (Group 1) in the Infective Diseases Unit because of SARS-CoV-2 positivity, the other 10 (Group 2) in the Pediatric Unit due to the diagnosis of MIS-C. They all underwent oral examination, in order to evaluate the presence of oral lesions.

Results: considering patients of Group 1, only 1 presented an ulcerative and painful lesion on the lower lip, but it was probably due to dental trauma during an epileptic seizure, which was the cause of hospitalization. Differently, 5 patients of Group 2 presented swelling and redness of the labial mucosa, while 6 had strawberry tongue. All these signs were evaluated before the diagnosis of MIS-C.

Conclusions: several oral manifestations have been described in adults during COVID-19. In a different way, oral lesions are not frequent during SARS-CoV-2 infection in pediatric population, but they have been described in more than one-half of patients affected by MIS-C. So, they could be considered an early indicator of MIS-C, and dental care providers may have important role in the early diagnosis of MIS-C.

PREVALENCE OF RISK FOR OSA IN ADHD PEDIATRIC PATIENTS: A PROSPECTIVE STUDY

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Aim: obstructive sleep apnea syndrome (OSAS) is a sleep-related breathing disorder which may be associated to neuropsychological deficits in children. The purpose of the present study is to assess the prevalence of OSA risk in a population of pediatric patients with attention deficit hyperactivity disorder (ADHD).

Methods: fifteen ADHD children, 11 males and 4 females, aged between 7 and 12 years, were referred to the Pediatric dentistry department at the A. Gemelli Hospital for dental evaluation. Caregivers were asked to complete the Italian version

of the Pediatric Sleep Questionnaire (PSQ) in order to assess the risk of suffering from OSA.

Results: based on PSQ results, 60% of ADHD patients were found to present a high risk of suffering from OSA, compared to 9.7% of the general pediatric population. A significant difference was observed between the two groups.

Conclusions: the prevalence obtained shows that a high risk OSA is present in pediatric patients with ADHD, suggesting the need of a growing attention toward sleep disorders in the pediatric population.

FIRST NIGHT EFFECT IN PEDIATRIC PATIENTS

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Aim: polysomnography represents the gold standard for obstructive sleep apnea (OSA) diagnose. Aim of the present study is to evaluate whether there is a first night effect (FNE) in the pediatric population undergoing PSG for suspected OSA.

Methods: twenty pediatric patients, 9 males and 11 females, aged between 4 and 14 years, were recruited from the Pediatric dentistry department at the A. Gemelli Hospital to undergo PSG recording for suspected OSA. All patients were asked to record 2 consecutive nights. Apnea-hypopnea index (AHI), lowest oxygen desaturation and sleep duration were compared between the 2 nights.

Results: in 40% of patients a significant difference between

first and second night was observed with a variation in AHI that represents a change in OSA severity as described by the American Academy of Sleep Medicine. The factor presenting the strongest correlation to AHI variation is sleep duration. In 45% of patients a significant difference between first and second night was observed as far as lowest oxygen desaturation, presenting one night above 80% and another night below 80%, with no correlation to sleep duration.

Conclusions: in children and adolescents there is a FNE which may result in differences in OSA severity. Therefore, it is strongly suggested to provide 2 nights PSG recordings when suspecting OSA in pediatric patients.

EVALUATION OF PREVALENCE OF OSA RISKS AND MALOCCLUSIONS IN PATIENTS WITH NOONAN SYNDROME

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Aim: Noonan syndrome is rare congenital syndrome characterized by distinctive facial features, congenital heart disease and other comorbidities. The purpose of the present study is to assess the prevalence of OSA risk and malocclusion in a population of pediatric patients with Noonan syndrome.

Methods: six children with Noonan syndrome, two males and four females, median age of 12 years, were referred to the Pediatric dentistry department at the A. Gemelli Hospital for a complete dental evaluation. Caregivers were asked to comple-

te the Italian version of the Pediatric Sleep Questionnaire (PSQ) in order to assess the risk of suffering from OSA.

Results: based on PSQ results, none of patients presented a high risk of suffering from OSA. From the orthodontic evaluation 83% of Noonan patients presented a malocclusion, where class III malocclusion and maxillary constriction were the most common conditions observed.

Conclusions: patients with Noonan syndrome experience a high prevalence of malocclusion, but a low risk of OSA.

MICROSTRUCTURAL AND CHEMICAL ANALYSIS OF DECIDUOUS AND PERMANENT TEETH: A MULTIDISCIPLINARY APPROACH

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Aim: the present study aims to: 1) characterize the microstructure and chemical/elemental composition of deciduous and permanent human teeth, in terms of lingual and vestibular sites, and 2) validate a new multidisciplinary analytical and high-resolution approach for obtaining multiple information on calcified tissues.

Methods: Raman MicroSpectroscopy (RMS), Scanning Electron Microscopy (SEM), Energy Dispersive X-ray Spectrometry (EDS), and Vickers microHardness (VMH) test were exploited to characterize the external lingual and vestibular surfaces of deciduous and permanent teeth, and the corresponding outer enamel, inner enamel and dentin.

Results: all applied techniques evidenced differences between permanent and deciduous teeth. SEM micrographs identified areas with irregular appearance in the vestibular and lingual surfaces, which presented also different VMH va-

lues. A different composition in terms of mineral/matrix and carbonates/phosphates ratios, and crystallinity of outer and inner enamel and dentin, both in deciduous and permanent teeth, were displayed by RMS. A good linear correlation was found between RMS spectral profiles and EDS and VMH measurements.

Conclusions: these results allow to improve knowledge on the chemical/elemental composition and microstructure of human teeth, and, thus, they could be useful in clinical practice to develop new strategies in restorative dentistry and in the choice of materials with the best performances. Moreover, the good correlation between VMH and EDS measurements and RMS spectral profiles suggested, for the first time, that RMS may be considered a useful and non-destructive diagnostic tool for obtaining multiple information on calcified tissues, in a reduced observation time.

MUSIC THERAPY IN PEDIATRIC DENTISTRY: A REVIEW

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Aim: uncooperative pediatric patients are difficult to treat chairside and create difficulties in completing treatment, increasing the duration of treatment and influencing its long-term prognosis. According to the literature, "dental phobia" is accentuated by various stimuli, such as auditory stimuli. There are both pharmacological and non-pharmacological methods that can reduce patient anxiety. Music therapy is one of the most studied non-pharmaceutical methods. The music, covering any other noise related to medical/surgical procedures, reduces anxiety, relaxing the patient. The aim of the review work is to evaluate the effectiveness of music therapy in reducing the level of anxiety in children during dental procedures.

Methods: a PubMed search for the last 10 years has been

conducted using the following keywords: "Music Therapy", "Effect Music Therapy", "Music Dentistry", "Children with Dental Anxiety". The search identified 26 documents, 5 of which were relevant to the review.

Results: the results show that listening to music acts on a biological and psychological level and has an impact on reducing patient anxiety during dental treatment, especially in pediatric patients. The included studies used several methods to measure dental anxiety, including the Venham image test and pulse oximetry.

Conclusions: there was substantial agreement between studies on the effectiveness of listening to music in reducing anxiety, systolic blood pressure and heart rate when performing standard dental treatments.

PRIMARY ERUPTION FAILURE: A REVIEW

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Aim: Primary Eruption Failure (PEF) is defined as an incomplete dental eruption despite the presence of a clear eruption route. The posterior teeth are the most affected, and generally, all teeth distal to the affected tooth show the disorder. Differential diagnosis should exclude systemic disorders or syndromes, other mechanical failures of eruption and isolated ankylosis. The aim of this review is to analyze the existing literature to evaluate the etiological, clinical and genetic characteristics of the PEF.

Methods: the literature search was performed using PubMed and Scopus. Overall, 50 articles were evaluated, but only 30 refer to PEF and were analyzed.

Results: in all studies molars and premolars were only involved in the disorder. The affected teeth were both permanent

and deciduous teeth. It was not possible to determine if the prevalence was different in males and females. Only 5 articles presented an association between PFE and hypodontia. Mutations in the PTH1R gene responsible for PFE were not present in all patients analyzed and not all had a family member with PFE. Tooth extraction is one of the key treatments, but segmental osteotomy and distraction osteogenesis can also be performed.

Conclusions: mono or bilateral posterior infraocclusion appears to be the hallmark of PFE. Treatment depends on the patient's age and clinical situation but should be evaluated in future clinical studies. A genetic test for the PTH1R gene mutation should be recommended before any orthodontic treatment to avoid the risk of ankylosis.

POSITIONAL PLAGIOCEPHALY AND ASSOCIATED STOMATOGNATHIC DISORDERS IN DEVELOPMENTAL AGE

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Aim: explore the relationship between positional plagiocephaly and associated stomatognathic disorders in developmental age. Prepare guidelines for safe sleep and plagiocephaly prevention for child health specialists. The aim of our study is also to develop a further study to compare the orthodontic situation in the primary dentition of children with positional plagiocephaly and children without cranial deformities.

Methods: a literature search was conducted using PubMed and Google Scholar using the following keywords: "positional plagiocephaly", "SIDS", "malocclusions", "primary dentition".

Results: the "back to sleep" campaign has drastically decreased the incidence of SIDS over the past two decades, but it has simultaneously led to an increase in proportions almost epidemic of cases of positional plagiocephaly. Currently, asymmetries of the neonatal skull are considered imperfections and as such must be prevented and treated. Positional plagiocephaly, cranial deformities, and postural torticollis in

newborns and infants are the most frequent asymmetries of posture and movement and are frequently associated with orofacial, orthodontic, and jaw disorders. The anatomical parts involved in the stomatognathic system represent a functional continuity, strongly related to the skull and the vertebral column, the highly sophisticated mechanical synergy between the parts makes it clear how an alteration of one of them has consequences on the others with a ripple effect.

Conclusions: in order to promote the health of the stomatognathic system and its related functions, pediatric dentists and orthodontics play an essential role in the prevention of potency plagiocephaly. For a good prognosis, it's essential to provide an accurate diagnosis, plagiocephaly screening pathway, and minimize the trigger factors. Positional plagiocephaly interfaces medicine and dentistry. As it is a common disorder, this etiology has to be considered in the prevention and therapy of malocclusion.

BREASTFEEDING: PHYSIOLOGICAL CONFORMATOR OF THE STOMATOGNATHIC SYSTEM

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Aim: identify an individual therapy strategy directly associated with the evolving orofacial musculature in developmental age in orthodontic and pediatric dentistry practice. Strengthen the cooperation between the dentists and the pediatricians. Exclusive breastfeeding for more than 6 months is recommended since it is linked to primary dental arch shaping and development in the anterior sagittal dental segment, as well as primary dentition horizontal arch width. Functional mother breastfeeding brings benefits to the development of the infant's oral cavity, which include prevention from oro-functional disorders.

Methods: a literature search was conducted using PubMed and Google Scholar using the following keywords: "breastfeeding", "oral cavity development", "malocclusion" in developmental age, "stomatognathic muscles", "pediatric dentistry", "pediatrics".

Results: the lack of breastfeeding is the etiopathogenesis of the pathologies of odontostomatological interest that manifest

themselves in early childhood, such as spoiled habits and malocclusions, which, moreover, represent a significant entity for multi- and interdisciplinary skills that involve the pediatrician in particular and the orthodontist. It has been observed that breastfed infants have a lower incidence of malocclusion, in fact, as ascertained by multiple studies, a prevalence of malocclusion in non-breastfed infants has been observed. The consequences of failure to breastfeed seem to determine only complications of an aesthetic nature, instead they represent orthodontic repercussions of a functional nature for the alterations that occur in the individual dental elements and in the growth of the stomatognathic system, involving all oral functions.

Conclusions: child dentists and orthodontists play an essential role in teaching and the promotion of mother breastfeeding. Functional mother breastfeeding brings benefits to the development of the infant's oral cavity and include prevention from oro-functional disorders.

IMPORTANCE OF VERTICAL TRANSMISSION OF MICROBIOTA: ORAL MICROBIOTA IN THE PERINATAL PERIOD

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Aim: general and oral health prevention begin in the prenatal period. A woman's oral health and her oral microbiota can directly affect her pregnancy, fetal development, and her babies' oral health. The purpose of this study is to provide an overview of the importance of vertical transmission of oral, vaginal and intestinal microbiota in the perinatal period and monitoring the health of the pregnant woman to prevent the onset of pathologies in developmental age and.

Methods: a literature search was conducted using PubMed and Google Scholar using the following keywords: "intestinal-vaginal-oral microbiota", "pregnant oral health", "women microbiota", "vertical transmission", "new-borns oral diseases", "Streptococcus mutans".

Results: one third of the human pathologies has a microbial origin. The most commonly studied oral organism in infants and children is *Streptococcus mutans*. The diet rich in sucrose and high maternal salivary counts of *S. mutans* were associated with increased colonization of children's oral microbiota. Children acquire *S. mutans* mainly by vertical transmission from the mother. Both edentulous and toothed children are more likely to harbor not only *S. mutans*, but also *Streptococcus sobrinus*, *Actinomyces species*, *Fusobacterium nucleatum*, *Prevotella intermedia* and *Porphyromonas gingivalis*.

Conclusions: dental control of the oral microbiota before and during pregnancy improves the quality of life of women and decreases the incidence of dental diseases in developmental age.

OBSTRUCTIVE SLEEP APNEA IN DEVELOPMENT AGE: FROM THE SCIENCE TO DAILY PEDIATRIC DENTISTRY

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Aim: encourage in defining the problems related to OSAS and intervene therapeutically by paying attention to the relative craniofacial characteristics: oral breathing, the elongated face, dental crowding, the high and narrow palate and collect elements concerning school performance, the ability to concentrate, the possible presence of bedwetting, poor appetite, obesity and recurrent infections of the airways. Emphasizing the importance of restoring normal nasal breathing is the stability of the effects of orthodontic treatment.

Methods: these keywords have been entered on the following search engines PubMed, Google Scholar: “obstructive sleep apnea syndrome”, “pediatric dentistry”, “stomatognathic disorders”.

Results: the pathophysiology of Obstructive Sleep Apnea Syndrome (OSAS) is complex and only partially known in pe-

diatric age and is characterized by repeated episodes of complete (apnea) or partial (hypopnea) cessation of air flow through the upper airways during sleep. We can describe the etio-pathogenesis of OSAS as a multifactorial phenomenon where 3 main factors are combined: the structural abnormality of the upper pathways, decreased neuromuscular control, adenotonsillar hypertrophy and stomatognathic disorders. The prevalence of obstructive sleep apnea syndrome affects school-aged children in a percentage varies from 3% to 21%.

Conclusions: the specialty of child dentistry and orthodontics involves much more than just the teeth alignment and oral cavity health. As experts in craniofacial growth and development they have important rule in OSAS screening and in dentofacial components identifying, both to optimize the care of patients with OSAS.

A.R.T. AND OZONE-THERAPY: CARIOUS LESIONS TREATMENT AND PREVENTION PROTOCOL IN PEDODONTICS

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Aim: the aim of the study was to assess the effectiveness of ozone therapy in the treatment and prevention of caries in children and try to establish a correct protocol for use, reviewing only the clinical studies in literature.

Methods: a search was performed in the main databases, using keywords such as “ozone”, “caries”, “pediatric dentistry”, “primary teeth”. Only clinical studies on children’s teeth with a clear ozone therapy operative protocol (application time, form of ozone, its concentration and number of sessions) have been selected.

Results: from 90 articles found on ozone therapy, 10 published from 2004 to 2020 were selected and reviewed. The studies reported a follow up varying between 3 and 16 months. All

selected studies involve the use of ozone in gaseous form on the dental surface for a time varying from 10 to 120 seconds. The concentration, when specified, is 1,200 ppm. The number of sessions varies from 1 to 4. The results found by the selected studies are not unambiguous given the diversity of the articles. Preventive effectiveness of ozone, its antimicrobial power and its remineralization capacity were evaluated.

Conclusions: most of the clinical studies reported ozone to be a promising solution in caries management especially in anxious and special needs children. On the other hand a few studies have shown ozone to be insufficient for preventing caries and reducing microbial load in lesions. More evidence is required about its benefits and to establish a proper protocol of use.

ORAL MANIFESTATIONS OF HEMATOLOGICAL DISEASES IN CHILDREN

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Aim: the aim of this work is to describe the oral manifestations of hematological diseases in children.

Methods: a literature review was performed using PubMed (MEDLINE) database identifying published articles on orofacial manifestations of some hematologic diseases in children.

Results: primary oral alterations are identified in up to 90% of cases of acute myeloid leukemia and consist of petechiae, spontaneous bleeding, mucosal ulceration, gingival hypertrophy with or without necrosis, infections, haemorrhagic bullae on the tongue and cracked lips. Sick cell anemia is an inherited defect that affects the structure and synthesis of hemoglobin; oral and dental manifestations in children include orofacial pain, paresthesia of the mental nerve, stepladder appearance

of the alveolar bone on radiographs, pulpal necrosis and enamel hypomineralization. Studies have shown that individuals with sickle cell anemia have a high risk of developing a general or dental infection which could be responsible for precipitating sickle cell crises. Oral lesions can be the first manifestation of aplastic anemia. The most common oral manifestations of the disease were hemorrhage, candidiasis and viral infection.

Conclusions: oral lesions may be the first signs of hematologic diseases. Oral hygiene is an important measure to prevent infections that are at risk for abscess formation or sepsis. Thorough history taking and physical examination by dentists may aid in determining the underlying etiology of oral changes and allow for earlier intervention by medical colleagues.

DROOLING: A NARRATIVE REVIEW OF EFFECTS ON CHILDREN'S ORAL HEALTH

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Aim: drooling is an uncontrolled overflowing of saliva from the mouth. It is considered a pathologic condition if it persists after the age of 4 years. It is mainly due to neurological diseases, like cerebral palsy, or local orofacial problems, like lip incompetency, oral breathing, macroglossia and atypical swallowing reflex. The aim of this work is to evaluate consequences of drooling and its treatment to improve children's oral health.

Methods: a review of the literature was conducted through PubMed, Scopus and Web of Science databases, to identify articles concerning drooling and oral health.

Results: children affected by drooling may suffer of perioral skin breakdown and infections (candidiasis in particular). Patients undergoing salivary glands surgery to treat drooling, pre-

sented higher percentages of white spot lesions because of the reduced salivary flow rate and higher salivary osmolality. Pseudo-bulbar palsy, orofacial incoordination and hypotonia, which are often correlated to drooling, may present a higher risk of developing malocclusions with prominent maxillary incisors and incompetent lips. Those factors represent local risks that further predisposing to dental trauma.

Conclusions: children pathologically affected by drooling are often affected by a cluster of conditions that compromise the oral health beside drooling itself. Surgery treatment can lead to higher white spot prevalence with the connected weakening of the enamel. A particularly careful follow up by a dental practitioner may be needed to prevent the development of oral diseases.

ORAL FEATURES OF PAEDIATRIC PATIENTS AFFECTED BY DOWN SYNDROME

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Aim: Down Syndrome (DS) is a chromosomal abnormality caused by the presence of a third chromosome 21. Systemic clinical features include congenital heart defects, metabolic disorders and deficiencies in the immune system; oral health condition include reduced prevalence of caries and high prevalence of gingivitis and periodontitis. The aim of this study is to evaluate oral health status in a pediatric population.

Methods: 40 patients (20 males and 20 females) with Down Syndrome, aged 3-18 years (10.26 ± 3.97) were included in the study. All patients have been treated at the Section of Pediatric Dentistry at the Dental School-University of Turin. Out of the 40 subjects initially recruited, six were excluded due to a lack of cooperation. All were examined by the same operator and the

clinical procedures were performed using an oral mirror, a dental probe and a periodontal probe. DMFT/dmft indices, Plaque Control Record (PCR), Full Mouth Bleeding Score (FMBS) and Gingival Index (GI) were evaluated.

Results: the final sample included 34 patients (17 males and 17 females) The prevalence of subjects affected by caries was 23.35%; the mean Plaque Control Record was $56\% \pm 0.27\%$, the mean FMBS was $24\% \pm 0.14\%$, with a GI of 62%.

Conclusions: our investigation shows how patients affected by Down Syndrome are particularly susceptible to plaque and gingival bleeding. Follow-up procedures are essential in monitoring oral conditions, particularly in pediatric age patients; guardians and caregivers must be informed about the complications related to poor oral hygiene conditions.

CRANIOFACIAL GROWTH IN BECKWITH-WIEDEMANN SYNDROME PATIENTS

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Aim: Beckwith-Wiedemann Syndrome (BWS) is a rare congenital overgrowth disorder characterized by omphalocele, gigantism and macroglossia that may lead to malocclusion. The aim of this cross-sectional study was to assess any association between the genetic pattern and maxillo-facial growth in Caucasian BWS children.

Methods: BWS patients referred to Section of Pediatric Dentistry at University of Turin were recruited for this study and underwent a complete dental examination. Cast models, orthopantomography and lateral telerradiographs of the head were taken for each patient who did not undertake tongue reduction surgery and orthodontic treatment before. Cephalometric measurements using Björk-Jarabak's analysis were performed. According to the genetic diagnosis, BWS patients

were classified, and a statistical analysis were carried out.

Results: 25 Caucasian BWS children satisfy inclusion criteria; 12 patients had a loss of methylation at imprinting center 2 (IC2-LoM), 5 had mosaic paternal uniparental isodisomy of chromosome 11 (UPD(11)pat), and 8 had negative genotype. BWS children with IC2-LoM and negative genotype showed marked macroglossia, hyperdivergence values $> 30^\circ$, clockwise growth tendency, and skeletal class II into the same cluster while UPD(11)pat patients showed mild macroglossia ($p = 0.048$).

Conclusions: according to the result of our preliminary study, the IC2-LoM subtype seems to have a negative skeletal growth prognostic pattern and consequently they should need early and individualized protocols for monitoring craniofacial growth to prevent malocclusion.

KNOWLEDGE ABOUT ANTIBIOTIC RESISTANCE AMONG ITALIAN DENTISTS: A SURVEY STUDY

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Aim: antibiotic resistance is a growing phenomenon that is estimated to result in the deaths of many people in the coming years. Therefore, it is crucial to prescribe antibiotics according to the guidelines. The aim of this study was to describe the knowledge of antibiotics prescription and the phenomenon of antibiotic resistance among Italian dentists.

Methods: an online questionnaire was submitted to Italian dentists from October 1, 2021, to December 31, 2021, with items regarding general characteristics of the sample, main activity performed, years of experience, knowledge of the phenomenon of antibiotic resistance, and antibiotic prescribing habits.

Results: a total of 384 participants answered the multiple-choice questionnaire. Nearly all dentists (99%) were aware of

antibiotic resistance, but half (53.4%) did not regularly consult antibiotic prescribing guidelines. In addition, 43% of dentists believed that their prescribing habits could increase antibiotic resistance. Surprisingly, 34.8% declared that the primary motivation for administering antibiotics was to avoid legal controversy. Dentists prescribed antibiotic therapy as prophylaxis for complex extractions (87.4%), implant placement (70.7%), and simple extractions (62.3%), whereas it was prescribed as a treatment for pulpitis in 35.6% of cases.

Conclusions: the majority of dentists are familiar with the phenomenon of antibiotic resistance but often ignore guidelines for proper administration, increasing the risk of antibiotic resistance in patients.

A NOVEL METHOD FOR THE CLINICAL ASSESSMENT OF MASTICATORY PERFORMANCE

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Aim: during their clinical practice, clinicians should be able to assess whether the masticatory function of their patients achieves its purpose. Many methods were proposed to measure masticatory performance (MP), but none of them can be easily used in clinical settings. The present study aims at assessing the reliability of a novel device for the clinical measurement of MP.

Methods: fully dentate adult volunteers were enrolled in the study. All the subjects performed the two-color mixing ability test, chewing a two-colored chewing-gum for 20 chewing cycles. Boluses were flattened to a standard thickness of 1 mm using a purpose-built press. The two sides of the flattened samples were digitalized using a conventional flatbed scanner (control group) and using a purpose-built camera applied on

the top of the novel device (test group). The images were evaluated optoelectronically to obtain the variance of hue (VoH) and the percentage of the mixing-colored area (MI).

Results: fifty young adults (mean age: 23.0 ± 2.7 years old) were enrolled in this study. The results obtained by the optoelectronic evaluations of the chewing-gums were comparable within the two study groups as no statistically significant differences were observed ($p > 0.05$). In the control group, VoH and MI were 0.394 ± 0.044 and 0.443 ± 0.138 , respectively, while they were 0.409 ± 0.111 and 0.421 ± 0.142 in the test group.

Conclusions: the novel device avoids data loss, and it may be used to digitalize the samples obtained by the application of the two-color mixing ability test in clinical settings.

TELEHEALTH IN SPECIAL CARE DENTISTRY

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Aim: the aim of this work is to evaluate the effectiveness of Televisita's service in the post-operative monitoring of patients with collaboration deficits treated under general anesthesia for dental treatment.

Methods: 62 non collaborating patients undergoing dental treatment under general anesthesia at the Department of Dentistry and Oral Surgery, Mauriziano Umberto I Hospital, Torino, from May 2021 to March 2022. While discharging, the next follow up visit is planned, and the instructions are provided to the family member/caregiver. The patient could log into the Televisita's service through a dedicated app available for personal

computer and smartphone. The adherence rate and the patient satisfaction rate were evaluated with the TUQ test (Telehealth Usability Questionnaire).

Results: during Televisita post-operative complications were intercepted in 2 patients and so re-evaluated in presence.

Conclusions: Televisita's service is a suitable tool to improve access to patient care and to monitor the immediate post-operative period in non collaborating patients. The Televisita's service needs further studies in order to assess the satisfaction rate and effectiveness.

UPDATE ON REMINERALISING AGENT

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Aim: the general objective is to know the current situation of the different remineralizing agents for the remineralizing agents for tooth hard tissues. The secondary objectives: To evaluate their efficacy on enamel and dentine, to know their mechanism of action and to assess the efficacy of two or more combined agents.

Methods: 22 scientific articles in Spanish and English were searched for and analyzed; the search included articles from 2010 to February 2020.

Results: among the various active ingredients, those with higher biomimetic activity seem to promise better results for effective remineralization of the hard tissue of teeth. The increased presence and bioavailability of ions such as calcium and phosphate seem to be connected to a better remineralizing action resulting from these principles. The progressive increa-

se in knowledge and the advent of nanotechnology have certainly helped the development of highly bioavailable mineral particles, mainly based on calcium, phosphates and fluorine.

Conclusions: beyond the active ingredient used, only the intervention of the biological processes that normally take place within the oral cavity can lead any product to find the ideal environment to work. It is therefore essential to understand when a remineralization treatment should be used, to know in depth the biological mechanisms that regulate the balance between acid demineralization and remineralization, to understand the biochemical mechanisms by which an active ingredient contained in a product that the practitioner is about to use must work, to identify risk factors that could reduce the efficacy of the treatment and to remove, if possible, any obstacles to the functioning of the therapy.

CARIES-RISK ASSESSMENT WITH KIDS CARIO TEST APP: A PILOT STUDY

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Aim: formulating personalized prevention plans is the strategy to manage chronic diseases like dental caries. Aim of this study is to present Kids Cario Test (KCT), a smartphone application that provides a caries-risk assessment.

Methods: sixty-two patients from 4 to 12 years old, were enrolled and evaluated with KCT for five indicators:

- Dmft;
- dietary habits;
- oral hygiene;
- fluoroprophylaxis;
- general factors

which were given a 0-9 severity score.

Then, a total score indicated the *overall caries-risk* of the pa-

tient [low (0-8), medium (9-15) and high (16-45)].

Results: sixty-two patients were evaluated for KCT. The median age was 6,3 years old. For the 83% was the first dental visit. The overall dmft score was 0,75 (range 0-9). No patient was following a specific diet with at least five meals during the day. Less than two-thirds of the patients had optimal oral hygiene. Only 12% of patients were not using any fluoride product.

Conclusions: every patient received a personalized treatment plan according to KCT score. KCT represents an easy instrument to evaluate the caries risk assessment and prediction that need to be validated with future prospective studies. It is also a good way for motivation and instruction to the patient's parents.

A NEW PATENT TO DETECT HUMAN CORONAVIRUSES(HCOVS) IN 1195 PATIENTS BY MULTIPLEX PCR

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Aim: the SARS-CoV-2 pandemic struck several countries worldwide with 430.257.564 confirmed cases of COVID-19 and 5.922.049 deaths as of February 25, 2022. A more efficient tool to detect Human Coronaviruses can be critical to contain and prevent future infection surges. This study aims to assess the ability of this rapid and sensitive diagnostic approach for multiple detections of pandemic Coronaviridae family viruses, including SARS-CoV-2, SARS-CoV, MERS-CoV, and four HCoVs, in clinical specimens obtained from persons suspected to have COVID-19.

Methods: 1195 nasopharyngeal swabs were collected from patients suspected of having COVID-19 in several Apulian hospitals and forwarded to the IZSPB. A multiplex PCR test specific to SARS-CoV-2, SARS-CoV, MERS-CoV, and HCoVs viral

targets was run using viral RNA isolated from nasopharyngeal swabs. Pham et al. published a study in 2020 that revealed the precise nucleotidic sequence of the primers and probes that needed to be used for this purpose.

Results: the assays yielded a positive rate of 69 per cent (835/1195) for SARS-CoV-2. SARS-COV-2 positive and negative samples were confirmed using the GSD NovaType II SARS-CoV-2 and GSD NovaType III SARS-CoV-2.

Conclusions: the assay has excellent performance and a low reagent cost; it is simple to perform and does not require specialists. It can detect the presence of multiple viruses from the *Coronaviridae* family, all of which are potentially fatal. Because of these findings, this tool is ideal for large-scale population screening.

SHORT- AND LONG-TERM BNT162B2 VACCINE RESPONSE EVALUATION IN 230 HEALTHCARE WORKERS

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Aim: the aim of this study was to evaluate the immune reaction in health workers of the Polyclinic of Bari to identify the relationship of antispikes titer with blood type, sex, age and comorbidities after vaccination with BNT162b2.

Methods: the primary objective of this prospective observational research (RENAISSANCE) was the assessment of serologic response to BNT162b2 at three blood draws: 1st at 60 days after the second dose; 2nd draw at 75 days after the first draw; and 3rd draw at 130 days after the second draw. Anti-SARS-CoV-2 Spike IgG antibodies were assessed with the LIAISON® SARS-CoV-2 TrimericS IgG assay.

Results: out of 230 enrolled staff members, all responded to mRNA Pfizer (BNT162b) VACCINE. All the patients responded to vaccine with an antispikes IgG level above 500 BAU/ml at the

first anti-spike protein Essay; at the second draw 1.7% of patients showed antispikes IgG level under 500 BAU/ml; at the third draw 16.1% of patients showed antispikes IgG level under 500 BAU/ml.

The data analysis revealed that patients with blood group 0 had the highest amount of antibodies compared to the other groups, regardless of their rhesus factor. There was no correlation between low antibody levels and sex or age.

Conclusions: the vaccination campaign led to an excellent serological response and the complete absence of COVID-19 incident cases, so the antibody response was excellent.

Covid 19 Vaccine Booster Shot should be given after 9 months, but not before an anti-spike titer is taken to see whether there is any sign of diminishing immunity in that patient.

OLFACTORY DYSFUNCTION IN COVID-19 PATIENTS: A PILOT STUDY WITH SUGGESTIONS FOR DENTISTS

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Aim: smell and taste dysfunction are frequently reported by SARS-CoV-2 positive patients. The degree of olfactory and gustatory dysfunction varies from a very mild reduction to their complete loss. Several studies have been performed to determine their prevalence in COVID-19 patients, mostly using subjective measurement methods. The literature lacks long-term studies regarding duration and recovery.

Methods: we assessed olfactory performance, using the Sniffin' Sticks olfactory test, in a group of patients who had not reported olfactory dysfunction, around 131 days after their COVID-19 diagnosis.

Results: 11 out of 20 subjects showed no olfactory reduction (55%), while 9 subjects showed reduced TDI score (45%). A total of 13 subjects (65%) scored above the cutoff point for Threshold, 16 subjects (80%) scored above the cutoff point for discrimination and 13 subjects (65%) scored above the cutoff point for identification.

Conclusions: objective measurement methods of olfactory performance show a higher prevalence of olfactory reduction compared to patients' self-reported questionnaires. Olfactory dysfunction can last even months after its onset and because of its high prevalence, it could be a screening symptom for suspect COVID-19 cases.

ORAL HEALTH PROMOTION IN CHILDREN WITH DOWN SYNDROME

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Aim: to promote healthy oral habits in Down Syndrome (DS) children through a personalized motivation path that includes information and instruction; to evaluate whether the acquisition of new skills regarding personal care interferes on the child's self-esteem and personal relationships positively.

Methods: 6 to 16 years old DS children were included. After the first visit, the child and parents were accompanied to a separate room where the *ad hoc* prepared dentist promoted healthy oral habits using a computer, video projector, plastic mouth and toothbrush model. The proposed material was created considering DS children's characteristics with regards to communication and presented respecting individuality and each child's processing time. Lastly we distributed: a brochure with the information provided to the child; a weekly chart

for the child to mark the oral health habits; a kit with toothbrush, toothpaste and hourglass; "Guidelines for children's oral health" for parents. A questionnaire for parents and children was distributed to evaluate self-esteem and personal relationships.

Results: our preliminary results on 34 DS children are satisfactory, with a reduction of IP mean values from 1,82 (T0), 1,2 (3 months) to 0,32 (6 months). A general improvement regarding patient cooperation was noticed.

Conclusions: despite the difficulty induced by the COVID-19 pandemic regarding dental visits, our results are satisfactory and encourage a long term study. It will be possible therefore to evaluate the obtained results in time, together with the impact on the patient's quality of life.

C-CONTROLLED LOCAL ANESTHETIC DELIVERY SYSTEM IN THE IMPROVEMENT OF PATIENTS MANAGEMENT

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Aim: the demanding of technical instrument able to improve patient compliance is essential in modern dentistry. The aim of the study is to evaluate the effectiveness of Computer-Controlled anesthesia (C-Clad) system, comparing it to traditional anesthetics' techniques in order to minimize pain and reduce high levels of anxiety.

Methods: 90 Patients (age ranged between 12-60 years) from the Department of Oral and Maxillo-Facial Sciences, underwent to endodontic therapy were enrolled for the study. The selected teeth were randomly allocated to three different groups differentiated for anesthesia method: Loco regional block nerve; Intraligamentary Anesthesia; Single tooth anesthesia through C- Clad system. The efficiency of anesthetic procedure was evaluated through vitality scanner test at base-

line, T1 = 60 sec and T2 = 5 minutes. The pain's perception is measured through Visual Analogue Scale (VAS).

Results: the results obtained shows that the probability that teeth are anesthetized at T1 is expected to be higher among patients with computer based anesthesia and it is expected to be lower among smokers rather than no smokers. Among teeth not asleep at T1, Traditional anesthesia ranks at the first place in terms of probability that teeth are asleep at T2. The VAS score was significantly lower in the C-Clad group compared to others.

Conclusions: our results suggest that C-Clad anesthesia is an effective technique which generates lower levels of pain perceptions among subjects. These results are important to promote the empowerment of patients in dental care.

ATTITUDES OF DENTISTS TREATING HIV PATIENTS: A 10 YEARS LATER UPDATE

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Aim: the purpose of the study is to update the data published in a report of 2009 that assessed the relationship between HIV-patients and dentists, which revealed that about 4.5% of the dentists participating had discriminatory attitudes towards HIV-patients.

Methods: cross sectional study was performed in 2021 through a national observational survey involving dentists from almost all Italian regions. The questionnaire was developed by 2 dentists, a specialist in infectious diseases and a psychologist. An external society dealt with the dissemination of the questionnaire with the help of the main national dental scientific labour association through a special link. The data was collected after 6 months. The questionnaire consisted in 4 major sections, following our previous report published in 2009.

Results: 1529 from all Italy answered the questionnaire in a 6 months time frame. All dentists answered the question “Do

you think it is right not to treat someone who is HIV positive?” and 45 (0.04%) answered “YES”. Feeling greater stress when treating HIV positive patients (odds ratio [OR] 2.7; 95% confidence interval [CI] 1.4-5.4 and $p = 0.005$); charging different fees for HIV positive patients (OR 6.6; 95% CI 1.9-18.9 and $p = 0.002$); wearing particular protective clothing while treating HIV positive patients (OR 2.5; 95% CI 1.2-5.3 and $p = 0.01$); deliberate refusal to treat HIV positive patients (OR 9.6; 95% CI 3.8-24.2 and $p = 0.001$) were associated with thinking it was right not to treat an HIV positive patient.

Conclusions: we are witnessing to a substantial maintenance of the data recorded 10 years ago. These discriminative attitudes may increase the risk of cross-infection, in order to prevent those episodes, it is necessary to widen the knowledge of the matter and the moral and ethical propensity on the part of the dental profession.

PPE AND INFECTION CONTROL PROCEDURES AMONG HEALTH WORKERS: A NEW AWARENESS IN COVID-19 ERA

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Aim: health workers (HW) were particularly affected by COVID-19 in terms of infection rates and deaths, especially at the beginning, when adequate PPE was lacking. Of the 500 COVID-19-related deaths among Italian HW, 370 were doctors, of which more than 200 were general practitioners (GPs) and physicians, while about 30 were dentists. Dentistry is an exposure prone profession; therefore, strict PPE use and infection control procedures are routinary among dentists. National and international data reported that COVID-19 did not impact on dental professionals more than other categories of HW. The aim of this study was to analyze data from FNOMCeO, to assess the number of COVID-19-related deaths among its associates and among identifiable categories like GPs and dentists.

Methods: we extrapolated professional, demographic and geographical data for each listed death, from the board's public files and by googling.

Results: Italy counts about 63000 dentists and 396000 doctors, 42000 of which are GPs. As of December 31, 2021, 364 deaths were reported. Dentists and doctors, in general, seem to have been similarly affected, concerning death proportion, geographic and temporal trend, by COVID-19. Of the 364 deaths, 140 were GPs and 38 dentists. GPs seem to have died about 3 times more than other doctors and dentists. All groups displayed similar ages.

Conclusions: considering the outcome “death”, dentists, despite at high risk, were apparently not particularly affected by COVID-19.

THE IMPACT OF COVID-19 PANDEMIC ON DENTAL CARE OF PEOPLE WITH DISABILITIES

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Aim: according to the WHO and United Nations, the COVID-19 pandemic brought a range of additional barriers for people with disabilities, who constitute approximately 15% of the world population, including access to dental treatments. The aim of this retrospective study is to report changes in dental care for patients with disabilities before (year 2019) and during the COVID-19 pandemic (year 2020).

Methods: the study included patients with disabilities referred at the Gorizia-Monfalcone Dental Unit, who were treated in outpatient mode or general anesthesia during the years 2019 and 2020. Demographic and clinical characteristics, as well as the type of treatments provided were recorded. Statistical analysis was performed employing Mann-Whitney U test and Fischer's exact test.

Results: the total number of patients with disabilities referred before and during pandemic was similar (129 patients in 2019, 131 in 2020), while the total number of treatments performed decreased in 2020 (1140 versus 820). Mean age of patients was significantly lower in 2020 ($p < 0.0001$). Results show a significant increase in the number of outpatient therapies compared to general anesthesia ($p = 0.0427$). There was also a significant change ($p = 0.0480$) in the proportion of different types of therapies (conservative, endodontic, surgery, dental hygiene).

Conclusions: the COVID-19 pandemic had a significant impact on oral treatments in patients with disabilities. There was a higher proportion of interventions performed in outpatient mode, and a higher frequency of surgical treatments compared to conservative ones.

IMPACT OF COVID-19 ON POST LOCKDOWN ACCESS TO PUBLIC DENTAL CARE: PILOT STUDY

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Aim: the worldwide spread of the SARS-CoV-2 virus has led to a severe international health crisis, which has significantly impacted the delivery of health services in both the public and private settings, inevitably including the dental sector. The aim of the study is investigate the impact of pandemic on access to dental and medical care and also investigate the influence that the use of masks has had on the perception of patient care needs.

Methods: questionnaire was administered online via google form platform, during the first visit to patients attending the dental clinic of the Policlinico Umberto I in Rome, Italy. The only one exclusion criterion was barrier language.

Results: 15 female and 27 male patients were enrolled. 48% of these access after more than 1 year from the appearance of

this problem, the 67% believes that the pandemic played a crucial role and 33% delayed dental care although he needed it. For 45% the face mask has influenced on the situation of discomfort caused by oral disorder of his mouth, of this for 68% had impacted positively in dissemble own oral condition and 32% became aware of the problem.

Conclusions: the survey shows that the mandatory use of the mask has significantly influenced the patients' uncomfortable situations and the perception of the need for oral care. Due to the decline in the provision of primary and secondary prevention services observed in the most critical period, today the complexity of the treatments necessary to restore good oral health is greater.

FRAGILITY AND ELDERLY: A QUESTIONNAIRE TO EVALUATE TWO WORK TOOLS FOR ORAL HEALTH IN NON COMMUNICATIVE FRAIL ELDERS

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Aim: the aim of present study is to present a questionnaire to evaluate two work tools for oral health: ODONTOALERT and MOUTH.

Methods: mouth and Odontoalert objectives are to intercept oral problems in the non-communicative frail elders and to improve oral health skills in the formal and informal caregivers. The questionnaire proposed is anonymous, is made of 25 questions: it collects and records data and opinions from clinicians and caregivers to evaluate the tools created to intercept oral problems in the non communicative frail elders. People surveyed: health professionals in hospital setting are called to evaluate the tool MOUTH, and formal and informal caregivers

the ODONTOALERT. The survey areas of the questionnaire are: socio-demographic and occupational data, oral health opinions and knowledge on frailty in non-communicative patients, evaluation of two instruments.

Results: the dissemination of the questionnaire has just begun, and it is planned to reach more clinicians and caregivers.

Conclusions: the creation of questionnaire has highlighted the importance of integration between different professional figures in order to frame the elderly person in the whole, especially when he is in a situation of fragility and lack of independence. The oral health is essential for overall good health and it plays a crucial role in quality of life during old age.

TELEDENTISTRY: OUR PROTOCOL FOR INTRA-ORAL HOME-TAKING PICS. REALITY OR FANTASY?

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Aim: the aims of this study were to create a protocol for home-taking intra-oral photographs for telediagnosis of caries using a smartphone and to assess the viability to used it at home.

Methods: two authors tested different perspectives and settings to take intra-oral photographs at home. One of the authors played the patient and the second author shot the photographs. To achieve a wider view, spoons were used by "patient". Photos were shot with a smartphone with 10 mpx. 10 photos were shot from 5 different perspectives with a room light (one with flash and one without): frontal, maxillary and mandibular occlusal surfaces, left and right vestibular side. The distance between camera and teeth was ranged between 5 to 10 cm. 300 photographs were taken and sharpness, absence of dark areas, presence of teeth (7 to 7), exposition

and focus were assessed by two authors and scored (0 to 5 for each parameter). Mann-Whitney tests were carried out to assess differences for each parameter between photographs shot with and without flash.

Results: 300 photographs were analyzed, 21 photographs were excluded because of poor quality. None statistically significant differences were found between photographs shot with and without flash for each parameter.

Conclusions: the protocol established in this work seemed to be useful for taking intra-oral photographs at home. It could be useful in helping diagnosis of caries and in telediagnosis. It should be advisable to provide patients with images for illustrative purpose combined with a training for using the protocol at chair-side.

CRANIO-ORO-FACIAL TRAUMA CARE CHANGES IN COVID-19 PANDEMY. AN EPIDEMIOLOGICAL ANALYSIS

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Aim: the patient's behavior, the organization of hospitals and of health care centers have been deeply modified by the COVID-19 pandemic. The aim of this epidemiological analysis is to evaluate if and how the COVID-19 pandemic has determined an alteration in cranio-oro-facial traumatology service.

Methods: the information set incorporated hospital emergency room access of the six-monthly pre-pandemic period and a six-monthly period into pandemic outbreak. The variables collected were: patient age, gender, type of emergency access with relative color code, Glasgow Coma Scale Score, type of discharge.

Results: 537 vs. 237 (pre-pandemic vs. pandemic) patients accessed the hospital emergency room. The mean age decre-

ased from 60.79 ± 25.34 to 56.75 ± 24.50 . Pre-pandemic vs. pandemic Yellow codes access went from 28.9% to 37.5% and green codes access went from 66.1% to 57.7%. Glasgow Coma Scale (GCS) shows an increase of 16.6% vs. 27.8% of 15 grade score, a 28.7% vs. 28.5% of the 14 grades score and reduction of 13 and 12 grade 40.2% and 14.5% vs. 37.1 and 9.7% (pre-pandemic vs. pandemic).

Conclusions: since the COVID-19 outbreak goes on, epidemiological information are still needful to execute public health intervention strategies and to appropriately predict the population needs, in order to properly administrate the COVID-19 connected to oral pathologies as well as the most common health issues.

COMPLETE DENTAL CARE SESSIONS IN NON-COOPERATING/NON-AUTONOMOUS SPECIAL NEEDS INDIVIDUALS

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Aim: Special Care Dentistry provides oral care for people with fragility/disability (Special Needs Individuals, SNI). When these patients are not cooperating for care or even inspection, lack of fundamental dental therapies (fillings, scaling and root planning, avulsions) may have disastrous consequences, such as abscesses or necessity of hospitalization for emergency care.

Methods: at U.O.C. Odontostomatologia, A.O.R.N. A. Cardarelli, Naples, Italy, all consecutive SNIs from 2003 to 2020 have undergone every 6/8 months a Complete Dental Care Session (CDCS) in conscious sedation (CS), reserving general anesthesia (GA) only to patients unsuitable for CS. During each CDCS, inspection, rx exams, tooth decay, scaling and root planing, teeth extraction were performed. Treatment plan took into consideration patients'/caregivers' degree of home cooperation of dental hygiene. Dental/anaesthesiological feasibility and complication rate were analyzed; dental

emergencies during the in-between periods were recorded.

Results: 1276 patients received CDCSs 8-12 months. 3 patients (0.2%) had general condition for which GA was necessary. Preliminary data analysis showed no patients undergoing CS experienced major complication. One patient (0.07%) who underwent conscious sedation experienced oxygen desaturation and was thus intubated. Drop of dental avulsions was noted in patients undergoing multiple sessions and no patient experienced dental emergency amongst CDCSs.

Conclusions: with proper anaesthesiological evaluation, preliminary data analysis shows that CDCSs are a safe and effective way to prevent dental emergencies in non-cooperating/non-autonomous SNI. Furthermore, patients undergoing regular CDCS are less likely to need tooth avulsion. Drop of dental acute events and teeth's life lengthening may have a tremendous impact on such individuals' QoL, their families' and community.

USE OF AN AIR PURIFIER DEVICE WITH HEPA 14 FILTER

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Aim: the purpose of this study was to evaluate the efficacy of an air purifier device (professional XXI inn-56 innoliving) with HEPA filter 14, applied on a Portable Aspiration Device (PAC). This device can be used to reduce the number of suspended particles, as a vector for Covid-19 transmission, generated because of dental procedures.

Methods: the study was conducted in a dental treatment room at the Dental clinic of San Raffaele Hospital. Two dental procedures were analyzed: oral hygiene and oral surgery. A test group (with application of filtering device) and a control group (without filtering device) were examined. For each group, hygiene procedure and oral surgery procedure were

performed, for a total of 80 dental procedures. All procedures were monitored during clinical controls using professional instruments such as molecular particle counters (Lasair III 350L 9 50 litres/min), bacteriological plates (Tryptic Soy Agar), sound meters for LAFp sound pressure level (SPL) and LCpk instantaneous peak level.

Results: PAC showed an important reduction in particle contamination. Its effectiveness has also been demonstrated from a microbiological point of view. Furthermore, it does not produce any additional noise during dental procedures.

Conclusions: the addition of the PAC equipment proved effective in further reducing microbiological risk.

IMPACT OF THE COVID-19 PANDEMIC ON UNIVERSITY TEACHING. STUDENTS' POINT OF VIEW PRELIMINARY RESULT

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The usual education in Italy provides “face to face” teaching. But also in other countries, digitization in schools has been characterized as a slow process.

However, this pandemic not only creates the need, but can also provide the opportunity to accelerate the digital transformation in education.

This could have a positive effect on students' future education beyond COVID-19.

It is accepted that the attitude and predisposition of students are important factors that benefit from the value of online learning; the evaluation of their attitudes are important factors in evaluating their success, paying particular attention to the issues of equal opportunities in the use of digital devices and to the evaluation of the subjective perception of the experience. Therefore, the aim of this study is to evaluate the students' perspective towards Sapienza's new online learning courses

through the administration of an online questionnaire in the difficult period of the SARS-CoV-2 pandemic.

Experimental Approach: this is a cross-sectional study conducted through an online survey (Google Form). The items of the questions were initially drafted and discussed informally with a group of medical and dental students before undergoing a careful review and modification process (Focus Group).

The final questions explored the following three themes:

1. General demographics. (8 items);
2. the use and experience of online teaching during the COVID-19 pandemic. (13 items);
3. perceived benefits and barriers of online teaching (12 items).

Main result and conclusions: 400 university students from the Sapienza University of Rome responded.

There is an overall positive opinion on the online teaching but the one in presence remains essential.

FOCUS ON THE MANDIBULAR CHONDROSARCOMA

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Chondrosarcomas are malignant tumors characterized by formation of cartilage by neoplastic cells. They can affect any bone, but only 10% of all CS comprises head/neck area, most of them arising from nasal structures and from larynx, rarely developing in the jaw bones. CS show a mottled radiolucent area without delimited borders.

Materials: healthy 34-year-old woman a 1-month duration painless soft tissue mass and paresthesia in right retromolar area. Intraoral examination revealed a 1.5 cm in diameter firm tumoral mass. CT images showed an irregular hard tissue mass with expansion mainly into lingual cortical. Surgical resection via partial hemimandibulectomy from the second molar to the middle of ramus involving part of the coronoid process and reconstruction using autologous rib was performed. Histological analysis confirmed diagnosis of chondrosarcoma.

Discussion: chondrosarcomas constitute a heterogeneous group of malignant neoplasms that have the production of cartilage matrix by the tumor cells in common. CS are third most common bone cancer after myeloma and osteosarcoma, head and neck region is uncommon. Retrospective studies found a slight male predilection, while others reported no

sex prevalence, and age of diagnosis was at the middle thirties. CS have a variety of signs and symptoms, usually presenting as a local painless swelling and paresthesia. CS don't have a classical or pathognomonic radiographic pattern, which makes radiographic analysis inconclusive. CS show a radiolucent image with scalloped borders with calcification areas, suggestive of a malignant lesion. CT is important to determine lesion extension for surgical planning and CT revealed the tumor showing a "sun ray" pattern, which is common in osteosarcomas. They are aggressive and locally invasive, but prognosis is generally favorable, and it is strongly correlated with its size, histological grade, early treatment and adequacy of surgery. Recommended treatment is wide surgical resection. The use of chemo and radiotherapy is controversial, some authors support it as therapy in large or non-operated cases, but most studies suggest CS aren't sensitive to these treatments.

Conclusions: did them and the prevention made by our hospitals and dental surgeries. Thanks also to modern technologies in both diagnostic and interventional but also thanks to scientific research we can cure our population in the best way.

DISEASE BE INCLUDED AMONG THE RISK FACTORS FOR COVID-19?

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Aim: periodontal disease can affect the systemic health status of patients with previous inflammatory or autoimmune diseases through the release of IL-1, IL-6 and inflammatory mediators and formation of autoantibodies by bacteria involved in pathogenesis such as RA. Covid-19 leaves sequelae in healed patients. The present study's aims to identify a possible correlation between Periodontal disease and COVID-19 in hospitalized patients now discharged and negative for SARS-CoV-2.

Methods: retrospective and prospective cohort study and follows the Strobe list, included in a large single-center observational study, the COVID-BioB study, conducted at San Raffaele University Hospital in Milan. All patients aged ≥ 18 years, admitted to the Emergency Department of San Raffaele University Hospital from February 25, 2020, for CO-

VID-19 were consecutively enrolled in the COVID-BioB study. The inflammatory status and periodontal disease were assessed by a specialist using the periodontal probe by recording the patient's PSR.

Results: 2000 enrolled patients hospitalized for COVID-19 from May 2020 to December 2021. All data collected were analyzed using statistical methodology to confirm this on 298 patients a multivariate binary statistical analysis was also performed.

Conclusions: contrary to what has been reported in the literature, no pathological probing was reported in previously hospitalized COVID-19 patients. It can be stated that patients who had pathology and had periodontal disease had it previously or hospitalization worsened their oral hygiene conditions.

ORAL MANIFESTATIONS AND MAXILLO-FACIAL FEATURES IN THE ACROMEGALIC PATIENT, A REVIEW

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Aim: acromegaly is a chronic disease caused by an excessive secretion of Growth Hormone (GH). It is characterized by a slow progression of signs and symptoms with multisystemic involvement. The literature underlines that the most evident and early signs are those related to soft tissue thickening and skeletal overgrowth, especially in the acral and head and neck region.

Methods: the authors reviewed the available literature on acromegaly oro-dental features, selecting articles from PubMed and Google Scholar. The aim of this review was to summarize all the reported clinical oro-dental features of the acromegalic patient.

Results: the most common facial dimorphisms involved the maxillofacial area, in particular paranasal sinuses, frontal bones and glabella. The most frequent oro-dental signs are dental diastema, mandibular overgrowth and prognathism, macroglossia. These signs of acromegaly can be significantly reduced with adequate and early treatment.

Conclusions: increased awareness of acromegaly among dentists and maxillo-facial surgeons along with the early identification of oro-facial changes could lead to an earlier diagnosis and treatment, improving patients' quality of life and prognosis.

PERIODONTIUM AND ORTHODONTICS: WHEN, HOW AND WHY TO OPERATE. CASE REPORT

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Aim: the aim of this study is to illustrate a case of intrusion of severely compromised maxillary periodontal incisors through the application of light orthodontic forces and diode laser without periodontal side effects and with good finalization of the orthodontic treatment.

Methods: a 37-year-old woman with hypothyroidism, depression and chronic generalized periodontitis. On intraoral examination the patient presented 21 and 22 with severe vertical bone defect, bleeding on probing and suppuration, grade 2 mobility according to the Mille scale, and severe extrusion and distal tipping of the same. After periodontal treatment with scaling, root planing and diode laser, fixed orthodontic therapy

was carried out using a straight wire and low friction technique. Orthodontic tooth movements were monitored with diode laser, with a "bone socket sterilization" program (0.8 W, fibre 300) and "biostimulation" (0.1 W, fibre 300).

Results: in 11 months of treatment, intrusion and levelling of 21 and 22 were obtained, with improvement of mobility and depth of periodontal pockets. Retention with retainers 13 to 23 and Essix per maxillary arch were used.

Conclusions: the application of light forces associated with the monitoring of bacterial plaque and biostimulation of periodontal sockets using the diode laser allowed the control of the inflammatory state of periodontal sockets preventing their progression.

SYNDROME: SURGICAL DENTAL THERAPY. CASE REPORT

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Aim: Rett's Syndrome (SR) is defined as a degenerative disorder of genetic aetiology. Through direct DNA sequencing the presence of mutations in the MECP2 gene was found in zone Xq28, it plays a vital role in the development of the nervous system. The experiences of rehabilitation of the oral cavity have been refined especially through dental extraction at the dental clinic of the University of Bari.

Methods: twenty-six female patients with SR were examined. The case with the most evident characteristics is examined. At first dental visit correlated with panoramic radiography and gnathological examination were performed. The patient had dental extraction under general anesthesia and had follow-up at 1, 2 and 4 weeks to evaluate the tissue regeneration capacity.

Results: during the study were found: sucking and/or biting of fingers and/or hands (26/26), atypical swallowing (10/26), bruxism (22/26), oral breathing (12/26), reduced oropharyngeal clearance (23/26), hypomobile tongue (10/26), anterior open-bite (20/26), juvenile periodontitis (8/26), masseterin hypertrophy (23/26), single dental inclusions (18/26), abscesses dental and periodontal (9/26), cysts (18/26). No dental anomalies in number, size, shape, structure were observed and only one patient showed physiological occlusion.

Conclusions: patients suffering from SR need a multidisciplinary therapeutic, it is important to carry out an early diagnosis to orient preventive and curative strategies of the diseases of the oral cavity.

AUTISM AND MUSIC THERAPY: CASE REPORT

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Aim: autism spectrum disorders (ASDs) are long-life neurodevelopmental disorders that can profoundly affect quality of life. The aim of this work is to report the case of a patient suffering from autism spectrum disorder in need of restorative care.

Methods: an uncooperative, non-verbal 17-year-old man with ASD was referred to the Dental Clinic for restorative care. Previous dental treatments have always been carried out with the administration of benzodiazepines and nitrous oxide. A new behavioral approach was planned. It was decided to reduce anxiety and unwanted behaviors by placing a wireless neckband speaker on the dental unit that played relaxing music at 432 Hz. Local anesthesia was then administered, a rubber dam was placed and the tooth decayed. it has traditionally been treated and restored.

Results: the patient, initially very agitated and uncooperative, became calm after the administration of a relaxing music, allowing the dentist to perform the dental surgery. Listening to music at 432 Hz, by increasing the production of endorphins, has probably helped to relax the patient.

Conclusions: patients with severe disabilities such as those with non-verbal autism spectrum disorders need to receive special dental care performed by dentists trained both in the particularity of ASD and in all available behavioral techniques. The use of different types of behavioral approaches such as the tell show do technique or music therapy can allow to obtain dental care in many patients with special needs, avoiding the use of sedative drugs.

POST-TRAUMATIC PROSTHETIC REHABILITATION OF A YOUNG PATIENT WITH SPECIAL NEEDS

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Aim: increased over-jet and labial incompetence represent well-known risk factors for dental traumas in children and adolescents. With the presence of cognitive and psychomotor impairment, the incidence of traumas rises dramatically, along with the difficulty to realize an appropriate rehabilitation protocol. The patient who came to our observation at the University Hospital “Federico II” of Naples, Italy, was a 16-year-old girl with severe cognitive impairment. She had lost 1.1 and 2.1 after a dental trauma, four years before, and she suffered from an acute plaque-induced gingivitis.

Methods: because of her systemic conditions, the patient was treated in two sessions under general anaesthesia. The first time, an impression of the mouth was taken, and scaling and root planing were conducted. Thus, a pre-filed resin Maryland

bridge was realized. During the second session, palatal slots were prepared on 1.2 and 2.2, in order to increase adhesion, and the Maryland bridge was cemented with composite material, after having appropriately adjusted it.

Results: the patient was followed-up at 1, 3 and 6 months and 1 year from the prosthetic rehabilitation. Even though it is hard to maintain a good plaque control in a disabled teenager, it was observed a good bio-integration of the device and 1 year later no signs of decementation or secondary caries were detected.

Conclusions: this case was solved combining conservative, prosthetic and periodontal skills. It is often necessary in paediatric dentistry to have a multidisciplinary approach, especially when treating special needs patients.

DOMESTIC ORAL HYGIENE OF AUTISTIC CHILDREN: CUSTOMIZED INFORMATION FOR PARENTS/CAREGIVERS

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Aim: conveying customized information to parents/caregivers of patients affected by Autistic Spectrum Disorder (ASD) attending the Pediatric Dentistry Unit of Policlinico Umberto I of Rome, in order to provide them the necessary instruments and skills to take care and improve their children's oral health.

Methods: starting from October 2021 parents/caregivers of ASD patients were given informative material in the form of pamphlets and practical instructions. Pictures show the more effective positions for brushing children's teeth (e.g. hand below the chin) and the methods to open wide lips and cheeks to release muscle tension. Switching to an electric toothbrush is recommended due to its similarity with the handpiece, but in the end the best device results to be the one the adult suc-

ceeds in using effectively. Apps and videos are effective in helping the child focus on the procedure. Low-fluoride concentration toothpaste is recommended for remineralization in those patients who are not able to rinse, to be less harmful if swallowed. Pictures and suggestions for orthodontic devices are included, for those patients whose compliance allows their use.

Results and Conclusions: as a result of a daily clinical interaction with ASD children and their families, this wants to be a useful instrument to sum up all the recommendations made at every check-up, so as to be more effective in helping to improve the oral health of ASD patients. Feedback was overall positive: enhancements based on it will be made, as well as records regarding improvements in oral hygiene standards.

LONG-TERM IMPACT OF COVID-19 IN CLINICAL MANAGEMENT OF AUTISTIC CHILDREN

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Aim: in July 2020 the working activity in the Pediatric Dentistry Department of Policlinico Umberto I of Rome restarted. The primary goal was to take up again the service dedicated to children with Autistic Spectrum Disorder (ASD). However, the new increasing number of infections, impacted again on the services, with consequences on the oral health of ASD patients. In light of this, a new evaluation survey was administered to the same group of interviewees of June 2020, to evaluate the evolution of the pandemic on the reorganization of the clinical service.

Methods: the study included parents of ASD children aged between 3 and 18, attending the Department.

Results: in June 2021, 100 parents were administered an online anonymous survey; 70 fully filled surveys were received.

The questions focused on the level of satisfaction regarding the service offered between July 2020 and May 2021 and the impact of Covid-19 on the reorganization of the project. 56% of the subjects affirms that pandemic greatly affected the organization of our department, while 44% does not. The same difficulties encountered in using Telemedicine in the lockdown in 2020 are still present. 18% (2021) versus 19% (2020), finds it difficult to use, while 41% (2021) versus 19% (2020), finds it easy to use.

Conclusions: as soon as the conditions will allow it, we wish to improve the most critical aspects and make our department a medical center of excellence. Furthermore, we believe that creating a permanent Telemedicine center will be of essential support for families, even in emergency periods.

CARE PROTOCOL FOR HOME PROSTHETIC DENTISTRY IN FRAIL AND INSTITUTIONALIZED PATIENTS

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Aim: the aim of our work is to investigate the possibility of simplified treatments in order to reduce the number of sessions for the fabrication of total removable prostheses, using the patient's old and incongruous prosthetic devices as a reference.

Methods: the clinical case was treated according to a simplified two-step procedure: during the first one, the maxillary position was detected with the facial arch and phonetic tests were performed, then the centric relation was recorded and finally the polysulfide precision impression was taken using the patient's old prostheses as individual impression trays, after beading; in the second one, the new artefacts were delivered to the patient.

In addition, an intraoral scan of the prostheses and soft tissues was performed to compare their accuracy to the traditional impression.

Results: the traditional impression procedure allowed the fabrication of removable prostheses with a correct vertical dimension that improved patient's masticatory function and aesthetics, while as for intraoral scanning we could not obtain the same accuracy due to the difficulty in detecting soft tissues.

Conclusions: this method is applicable to a home pathway where patients who turn out to be frail or unable to go to the surgery are assisted thanks to a simplified protocol.

ORAL HEALTH STATUS IN PATIENTS WITH HEAD AND NECK CANCER: A CROSS-SECTIONAL STUDY

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Aim: the aim of this cross-sectional study was to present a description of the oral status of a cohort of patients with head and neck cancer (HNC) at the time of dental evaluation prior to radiotherapy (RT).

Methods: two hundred and thirteen patients with HNC, for which a RT treatment was scheduled, were examined with the support of orthopantomography. Among the parameters recorded during the examination were: DMFt, periodontal status and grade of mouth opening. The protocol was approved by the ethics committee of the Catholic University of the Sacred Heart (Ref: 22858/18) and was registered on ClinicalTrials.gov (ID: NCT04009161).

Results: one hundred ninety-five patients were included in the final analysis. The 74.9% (146/195) of the patients had poor

oral conditions (defined as having a DMFt score ³ 13 and stage 3 or 4 periodontitis). Univariate analysis showed that some population characteristics were correlated with poor oral conditions, namely tumor site, smoking habit, and age of patients (in decades): χ^2 Test - $p < 0.05$. Multiple logistic regression analysis confirmed smoking habit (OR = 3.27; 95% CI = 1.46-7.33; $p < 0.05$) and age (OR = 2.98; 95% CI = 2.01-4.41; $p < 0.05$, for age) as risk factors for poor oral health.

Conclusions: this study confirms that the oral conditions of patients with HNC are often compromised even before starting cancer treatments and, consequently, highlights the relevance of promptly scheduling a dental evaluation for all patients who are diagnosed with HNC.

DENTAL TRAUMA IN CHILDREN WITH AUTISTIC DISORDER: A RETROSPECTIVE STUDY

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Aim: to assess the oral status of autistic children, comparing it with no autistic patients.

Methods: a retrospective study analyzed the oral health status of 70 children, 35 with autism and 35 without the disorder. Conditions assessed were dental trauma type, periodontal tissue injuries, soft tissue lip injuries, different treatments carried out, associated soft tissue findings and disorders, and the long-term management. All patients (≤ 15 years of age) were chosen consecutively.

Results: females (57%) suffered more traumatic injuries than males (43%) in the autistic group, whereas males affected by dental trauma (54%) are predominant in the control group. The enamel fracture was the main finding among

the dental trauma types in both groups followed by enamel/dentin/pulp fracture (31%), root fracture (11%), and avulsions (3%) in the autistic group and by avulsions (20%), root fracture (11%), and enamel/dentin/pulp fracture (6%) in the control group. The comparison of all variables of the two groups showed a statistically significant difference ($P < 0.012$). The lower lip was statistically more injured than the upper lip ($P < 0.005$).

Conclusions: the composite restorative technique was the most common approach carried out; the long-term evaluation, when possible, was predominantly managed through root canal therapy in the control group (81%), and root canal therapy (50%) and tooth extraction (50%) in the sample group.

DO THE MATERIAL AND DIAMETER OF MINISCREWS AFFECT THEIR BENDING AND MAXIMUM LOAD?

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Aim: orthodontic miniscrews were introduced to avoid the side effects of anchorage loss during tooth movements. Different diameters and materials of miniscrews are available on the market and their fracture is the most severe side effect. Consequently, the aim of this study was to measure and compare forces to bend and fracture miniscrews with two different diameters (1.5mm and 2.0mm) and materials (titanium and stainless steel).

Methods: 7 different miniscrews were compared. For each type of screw, 10 different specimens were exposed to tangential load in the collar region, with a 1mm/min crosshead speed, using a Universal Testing Machine. Bending force (at

0.1mm and 0.2mm deflections) and maximum load before screw fracture were recorded and statistically analyzed (Kolmogorov-Smirnov test, ANOVA and Turkey test, with level of significance set at $p < 0.05$).

Results: bending forces and maximum load were statistically significant higher for 2.0mm miniscrews than 1.5mm screws. No significant differences were found between screws of different material if the same diameter.

Conclusions: when maximum bending and fracture resistance are needed, a larger diameter is safer regardless of the miniscrew material.

ADHESIVE SYSTEMS FOR CAD-CAM CUSTOMISED LINGUAL ORTHODONTIC BRACKETS: HOW TO CHOOSE?

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Aim: the increasing aesthetic requirements of adult and paediatric patients led to the development of lingual orthodontics and to the introduction of CAD-CAM customised bracket bases. This study aims to compare the Shear Bond Strength (SBS) and Adhesive Remnant Index (ARI) scores of customised lingual brackets bonded with different adhesive systems.

Methods: customised CAD-CAM lingual bracket bases were bonded on sixty human permanent premolars extracted for orthodontics reasons by using three different adhesive systems: a pre-mix chemical cure adhesive (Transbond IDB), a chemical cure adhesive system (Maximum Cure) and a dual-cure self-adhesive resin cement (RelyX Unicem 2). All samples were tested

in shear mode on a Universal Testing Machine in order to calculate SBS and ARI scores. Statistical analysis was performed with ANOVA and Tukey tests concerning SBS values and with chi-square test regarding ARI scores.

Results: significantly higher SBS values were provided by dual-cure self-adhesive resin cement (RelyX Unicem 2), while there were no significant differences between the two other systems. ARI scores did not significantly differ according to the adhesive system.

Conclusions: considering its higher SBS values, dual-cure self-adhesive resin cement should be selected to improve CAD-CAM lingual brackets' adhesion.

METAL SPLINT VS FRC FULL BONDING VS FRC SPOT BONDING: BRUSHING EFFECTS

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Aim: this study aims to evaluate the mechanical and surface properties of different splinting techniques after electrical tooth brushing. Tests were made by comparing fiber-reinforced composite (FRC) spot bonding technique splints with stainless steel splints and FRC full bonding technique splints.

Methods: specimens were mandibole model splints fixed with flow composite. The surface of each element was mechanically brushed for 26 minutes with a toothpaste in order to simulate 6 months of tooth brushing. Then the strength required to bend the retainer was measured at 0.1 mm of deflection and at maximum load. SEM microphotographs were taken using a scanning electron microscope.

Results: the lowest values have been reported with metallic splint. FRC full bonded technique showed the highest forces. SEM images after brushing showed wear for FRC fibers left uncovered, while no relevant wear signs in metal and conventional FRC fibers were noticed.

Conclusions: spot bonded FRC reported lower flexural forces, showing an advantage over the traditional full bonding technique, even after toothbrushing.

However, the surface wear of the fibers left uncovered was visually greater.

Further tests have to be performed before promoting this technique for routine clinical use.

APPLICATION OF MSE AND FACEMASK TREATMENT IN A GROWING FEMALE WITH A CLASS III SKELETAL RELATIONSHIP

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Aim: this case report describes a combined application of Maxillary Skeletal Expander and face mask treatment in a growing female with class III skeletal relationship and anterior crossbite.

Methods: the expansion was performed using a miniscrew-assisted Maxillary Skeletal Expander (MSE), that presents a body with the expansion jackscrew unit and four slots for mi-

cro-implants insertion and four connecting arms to the molar bands. Maxillary protraction with facemask was performed immediately after the end of the MSE activations.

Results: the interincisal space between the two halves of the maxilla is uniform in width. After four months of protraction with facemask the anterior cross bite was corrected.

FAILURE OF II-CLASS ORTHODONTIC TREATMENT CAUSED BY POOR PATIENT COMPLIANCE

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Aim: patient compliance is essential for the success of orthodontic treatments. We describe the case of dental crowding treated with MBT System in which the bad outcome was due to the patient's poor collaboration.

Methods: a healthy 30-years-old Caucasian woman showed crowding of superior and inferior teeth, increased overjet and overbite, open bite and tooth 36 missing, as showed by OPT, teleradiography and dental model plasters. In this case, we chose to remove molars 16 and 26 because compromised, 46 because already treated and not in good condition and 17 because carious and not recoverable. Subsequently, upper and lower MBT brackets were placed with 0.16 NiTi wire, then 19x25 NiTi and finally 19x25 steel wire for alignment and closing extraction spaces. After a year, interarch II-class orthodontic elastics were applied giving instruction

on their use. Finally, a new aesthetic reconstruction was done on tooth 11, replacing an obsolete one after a childhood trauma. The result was stabilized through upper and lower fixed retainers, because the interarch joint had not been perfected.

Results: after almost 3 years of therapy with fixed brackets, the correct alignment of teeth was achieved, as well as the correction of the bite, overjet and overbite. However, the result was not achieved from the point of view of symmetry: the lower midline was deviated to the left and the class has been partially corrected, because the patient did not use the orthodontic elastics.

Conclusions: the collaboration of the patient proves to be a fundamental prerequisite for the complete success of an orthodontic therapy.

CORTICOTOMY AND CLEAR ALIGNERS FOR ORTHODONTIC CROWDING CORRECTION: A CASE REPORT

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Aim: several surgical methods are described in the Literature to speed up orthodontic tooth movement. Corticotomy is considered one of the safest and most effective because it aids tooth movement due to the acceleration of bone metabolism caused by controlled surgical damage. The authors propose the combination of clear aligners and corticotomy for fast, aesthetic, and comfortable orthodontic treatment.

Methods: a 37-year-old patient with I class dental/skeletal, deep bite presented moderate inferior crowding. The lower midline was displaced 2 mm to the right. On CBCT examination, no bone resorption was evident, and on clinical examination the periodontium was healthy. A combined approach of clear aligners and lower arch corticotomy was proposed. The attachments were placed before the surgical procedure. Lo-

wer corticotomy was performed after reflecting a full-thickness flap beyond the tooth apices; the alveolar bone was exposed buccally. Interproximal linear surgical incisions were made from canine to canine, where there was more crowding. Immediately after surgery, the orthodontic force was applied.

Results: the patient wore each aligner for 22 hours per day and changed every 4 days instead of 15. The alignment phase is completed in 4 months.

Conclusions: the corticotomy safely accelerated dental movement while reducing the duration of treatment. The use of clear aligners allowed the application of effective orthodontic forces easily accepted by the patient for aesthetics. This case report, encourages combined treatment, limited to selected cases, to treat moderate crowding.

ALT-RAMEC TECHNIQUE IN A PATIENT WITH CLEFT LIP AND PALATE: A CASE REPORT

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Aim: to show the effectiveness of the Alt-RAMEC technique (Liou and Tsal, 2005) in combination with facemask, in the late correction of a class III with biretrusion, in a patient with right complete cleft lip and palate.

Methods: the patient is a 13-year-old boy with cleft lip and palate treated with cheiloplasty and soft palate plastic at the age of nine months. After the extraction of impacted 1.2 and various orthodontic treatments with rapid maxillary expansion, he still shows hypoplasia of the upper jaw and anterior crossbite. The patient orthodontic evaluation and the cephalometric analysis were essential to highlight biretrusion of the jaws and

a tendency to mandibular postrotation. Alt-RAMEC technique was performed followed by fixed orthodontic therapy and extraction of 2.2.

Results: after 8 months from the beginning of the therapy, resolution of the anterior crossbite was observed with an increase in overjet and an improvement in facial aesthetics.

Conclusions: according to literature, Liou's protocol allows for satisfactory maxillary protraction in a patient suffering from cleft lip and palate (Meazzini et al., 2019). Nowadays this technique is considered a valid alternative solution for a patient initially candidate for maxillofacial surgery.

CASE REPORT OF A YOUNG WOMAN WITH LATERAL CROSSBITE AND SEVERE CROWDING TREATED WITH INVISALIGN

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Aim: show the effectiveness of Invisalign® aligners treatment in an adult patient with a lateral crossbite and severe anterior crowding.

Methods: 27-year-old female patient with the predominantly aesthetic request to resolve the anterior crowding and widen her smile using a highly aesthetic treatment. Facial analysis showed a mildly increased lower third with competent thin lips and a convex profile. Intraoral physical examination revealed: bilateral I- molar and canine class; bilateral open bite in the canine-incisal area; left posterior crossbite; significant anterior crowding; Wala ridge exposure, especially in the second and fourth quadrant; mesial rotation of 3.5 and 1.1 with vestibule-inclination. Invisalign® treatment has been proposed and accepted by the patient. It lasted approximately 13 months, consisting of a main phase of 24 weeks, a two-stage finish of 16

weeks and 18 weeks. Interproximal reduction (IPR) was performed to allow a proper alignment. Aligners were carefully and consistently worn for 22 hours a day and changed one week after the other.

Results: a full correction of crossbite, severe crowding and derotations was achieved. The smile is fuller, with a reduction in dark buccal corridors, and is more pleasing to the eye.

Conclusions: the treatment with Invisalign® aligners completely resolved all the issues identified in the initial analysis. It required minimal cooperation and simple management by the patient, who is fully satisfied with the result. However, careful planning at the clincheck stage is essential to achieve a successful outcome. Invisible aligners are thus a useful treatment tool, albeit they necessitate the patient's full compliance to express their orthodontic strength fully.

THE USE OF TECAR AS A NON-INVASIVE METHOD TO ACCELERATE ORTHODONTIC MOVEMENTS

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Aim: several strategies for accelerating tooth movement have been proposed in the literature, many of which are invasive and have numerous side effects. TECAR (capacitive and resistive energy transfer) is endogenous thermotherapy that uses electrical currents, commonly used in physical practice and orthopaedic therapy. The goal of this research is to investigate how much TECAR can speed up the orthodontic alignment phase.

Methods: the study's subject was a 24-year-old man male with moderate inferior crowding. The patient presented a good oral hygiene condition. TECAR was applied for the first time during the same appointment of the bandage with Ni-Ti thermal arch 0.015 inches. Follow-ups were performed every week. In each appointment, TECAR was applied using an in-

traoral transducer for 6 minutes at 7% power to stimulate hard and soft tissues of the third quadrant only. The right hemiarch was not stimulated for comparison at the end of the alignment phase.

Results: the alignment phase was completed in three weeks. The two hemiarches were compared by evaluating the orthodontic movements of the single tooth, in particular translation and rotation. Although the initial crowding was similar in the two quadrants, it was found that the teeth on the TECAR-treated side aligned faster in the same unit of time.

Conclusions: the use of TECAR, according to the authors, is a non-invasive approach that speeds up the orthodontic alignment phase without compromising patients' compliance and with a reduction in treatment duration.

ANTERIOR CROSSBITE TREATMENT IN GROWING PATIENT WITH AMCOP APPLIANCE: CASE REPORT

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Aim: this case report aims to describe the elastodontic therapy with AMCOP appliance to solve a functional anterior crossbite in a growing patient.

Methods: an 8-year-old patient was referred to our clinic with I class malocclusion with crowding of the upper and lower arch, anterior crossbite, and anterior displacement of an inferior central incisor, with poor hygiene and some decay on primary teeth. Motivation for improving hygiene and some extraction and fillings of primary teeth were done before starting orthodontic therapy. In the beginning, the patient was instructed to wear AMCOP OS3 integral during the day for 1 hour and not during the night, for 1 week. After one week the patient started to wear the AMCOP for 1 hour during the day and during the night. After some weeks the functional crossbi-

te was already partially solved, hygiene quality improved and the displacement of the lower incisor started to reduce. After some months the upper and lower arches were more aligned, less contracted, and it was necessary to do some selective ameloplasty on the primary left lower canine to complete anterior crossbite resolution.

Results: after 6 months the patient was instructed to wear the AMCOP appliance only during the night and anterior crossbite and crowding were solved. It was evident how solving the lower incisor displacement its periodontal tissues were improved too.

Conclusions: in selected cases of functional crossbite AMCOP can be very helpful to treat malocclusion in growing patients

THE ROLE OF THE MIDPALATAL SUTURE STADIATION IN THE TREATMENT OF TRANSVERSAL DISCREPANCY

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Aim: in early young patients with permanent dentition, the daily challenge is how to perform the correction of the transversal discrepancy. This case report shows how the midpalatal suture stadiation through a novel classification method for individual assessment of midpalatal suture morphology with CBTC scan, can drive the treatment plan between traditional rapid maxillary expansion and surgically assisted rapid maxillary expansion.

Methods: this is a case report of a 10+6-year-old female patient who had menarche six months before therapy began. She had permanent dentition, an ogival-shaped palate, a transversal discrepancy of about 6-8 mm, crowding upper and lower arch, presence of dental compensation. The patient midpalatal suture stadiation belonging to Angelieri et al. results

to be in stage C, in which fusion of the suture already has occurred partially or totally, and so it is suggested to perform surgically assisted RME. Therefore we used a hybrid rapid palatal expander on 2 miniscrews, giving 5 turns at the moment of insertion, and then 1 turn per day for 20 days.

Results: we achieve a skeletal maxillary expansion of 6 mm, avoiding dental compensation on first molars, which is the negative side effect of traditional dental-supported rapid maxillary expansion.

Conclusions: in borderline cases, such as early permanent dentition, early menarche already occurred, with the presence of dental compensation and need for skeletal expansion, the midpalatal suture stadiation through CBCT can help the decision-making process.

ORTHODONTIC SURGICAL TREATMENT IN PATIENT WITH CRANIAL CLEIDO DYSOSTOSIS

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Aim: the aim is to analyze the surgical-orthodontic management of a patient diagnosed with cleido-cranial dysplasia (CCD) for over 10-year period.

Methods: a 10-year-old patient showed numerous supernumerary permanent elements in both jaws in the frontal area, delayed dental eruption and ogival palate. The patient underwent radiographic exams (OPT and CBCT), multiple extractions of the permanent supernumerary teeth and deciduous teeth and orthopaedic upper and orthodontic lower expansion. Fixed orthodontic therapy and surgical exposure of the impacted teeth, related to the cleido-cranial diso-

stosys, was performed.

Results: after 10 years since the beginning of orthodontic treatment, thanks to the recovery of all the dental elements, the patient shows good aesthetics and function, with a harmonious smile and stable occlusion.

Conclusions: patients affected by CCD present various skeletal malformations and dentition abnormalities that make the management of orthodontic treatment long and difficult. The right choice is the multidisciplinary approach, with particular attention to an early diagnosis, preventing dental complications and offering a better quality of life.

UNILATERAL OR BILATERAL POSTERIOR CROSSBITE IN MIXED DENTITION

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Aim: the aim of this study was to demonstrate the importance of early interception of posterior crossbite (PXB) and its treatment in mixed dentition for preventing craniofacial asymmetry during growth. Crossbite is a malocclusion characterized by a negative transverse discrepancy between the maxilla and the mandible when the two arches occlude. The most effective treatment for solving this malocclusion is palatal expansion with Hyrax type rapid maxillary expander (RME).

Methods: three patients aged from 7 to 12 years old with PXB (unilateral or bilateral) and upper crowding, were treated in this study with Hyrax type RME with a retention period from 3 to 12 months after device activation. The discrepancy between the two jaws was measured by the difference between the palatal

first upper molar cusps and the distance between the lower first molar central fossae.

Results: all three patients solved their PXB and the upper crowding improved after treatment with RME.

Conclusions: RME is an effective treatment of posterior crossbite because produces clinical and skeletal effects. The timing of treatment is very important on the skeletal effects of RME. The expansion through the opening of the palatal suture progressively becomes more difficult as the patients grow old. In fact, in old-aged patients, the upper expansion produces only dental and dentoalveolar effects by buccal tipping of posterior teeth. We can affirm that the early interception and the early treatment of this malocclusion are very important for the future development of our children-patients.

USE OF ALIGNERS AND AUXILIARY APPLIANCE TO SOLVE A CLASS I MALOCCLUSION: A CASE REPORT

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Aim: mesiodistal tipping is the most predictable movement to do with aligners, instead rotation is one of the most difficult one. Here we present a clinical case treated using both aligners and braces to correct the mesial rotation of tooth 35.

Methods: this is a case report of a 30-year-old female patient with class I malocclusion and upper and lower crowding. Tooth 35 was 49° mesial rotated. The treatment started with aligners and in the clincheck there was programmed the derotation of 35 tooth and 0,2 mm of mesial and distal IPR to help the correct movement. After 10 aligners, tooth 35 did not move as predicted in the initial clincheck, so the decision was to improve the distal rotation using conventional braces. Sectional appliance included brackets from tooth 36 to tooth 33 and a

0,014 NiTi archwire was engaged. Last phase of the treatment was completed with a set of 15 aligners.

Results: thanks to the use of auxiliary appliances after three months of fixed sectional appliance, the mesial rotation of the element was corrected and the case was completed with 15 additional aligners to solve only the anterior crowding.

Therefore, after using a first set of aligners for 4 months and then the traditional braces for 3 months, the patient had to use the second set of aligners for only 5 months.

Conclusions: the combination of both traditional multibraces treatment and aligners made it possible to obtain the rotation of tooth 35 and, consequently, a rapid positive outcome of the therapy and less discomfort for the patient.

A CASE REPORT OF ANTERIOR OPEN BITE CLOSURE USING CLEAR ALIGNERS

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Aim: the increasing demand for aesthetic appliances in patients seeking orthodontic treatment led the aligners technology to enhance orthodontic treatment outcomes. Nowadays with clear aligners is possible to treat a variety of complex malocclusions, such as anterior open bite in adult patients. This case report was conducted to evaluate the dental and skeletal effects that occur in the correction of anterior open bite with clear aligners.

Methods: a 30 years old male presented with a skeletal and dentoalveolar open bite of 4.3mm, molar class 2 subdivision 1 malocclusion, lower crowding and labial inclination of incisors was treated with clear aligners. Element 1.4 was extracted before the patient's first visit to our clinic. Dental impression, RX OPT and cephalogram were taken. Thirty-five upper and twenty lower aligners were required, with eighteen upper refinement aligners in the final stage. Four passive lower aligners were worn to account for the difference in treatment duration between the arches. Aligners were changed every 10 days. The compliance was generally good, and the aligners tracked

well with the prescribed treatment plan. After 20 months of treatment, a new cephalogram was required.

Results: the skeletal and dental changes were evaluated by cephalometric analysis based on pre- and post- treatment records of the patient. The overbite changed from 4.3mm to 1.9 mm, probably due to a combination of maxillary and mandibular molars intrusion and maxillary and mandibular incisors extrusions. Mandible showed a counterclockwise rotation, as demonstrated by interincisive angle [ANS-PNS/Go-Gn from 33.9° to 29.4°], goniac angle [Co/Go-Gn from 137.9° to 134°] and facial height [from 138.7mm to 136.5mm].

Conclusions: this case report demonstrates how complex cases such as dentoalveolar open bite, which had previously been treated exclusively with fixed appliances, can be solved efficiently using clear aligners. Clear aligners are effective in reducing the vertical dimension because the double thickness of the clear appliances on the occlusal surface in combination with the patient's mastication force, exerted intrusive forces on the posterior teeth.

JUVENILE IDIOPATHIC ARTHRITIS: FIXED THERAPY VS INVISALIGN®

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Introduction: Juvenile Idiopathic Arthritis (JIA) is a type of rheumatoid arthritis, a chronic disease of joint inflammation that appears before the age of 16 and persists for at least 6 consecutive weeks. This is not a single disease, but a syndrome with unknown etiological differences. The primary objective of the corrective orthodontic function will therefore be to stimulate the mandibular aesthetic development by restoring a vectorial age of growth. Following the first phase achieved with the use of the devices listed above if passed to the phase for alignment. It is important to specify that orthodontic therapy is complementary to systemic therapy, therefore pending the period of application of orthodontic appliances, the patient must continue the treatment with the drugs prescribed by the specialist and deemed most suitable for the form of their disease.

Objective: the aim of this work is to evaluate the advantages of using the Invisalign® technique over traditional fixed multi-

bracket therapy for the purpose of the first phase of functional equipment in patients with JIA clinically healed or with little TMJ compromise.

Methods: this study was conducted on a group of JIA patients in the Orthognadontics ward of the Ospedale Maggiore Policlinico IRCCS Ca' Granda treated with Invisalign® and with fixed multibrackets therapy.

Results: we have found the advantages of Invisalign® therapy: patient comfort, greater aesthetics, easier home oral hygiene, absence of urgencies, no compromise on diet. Furthermore, in JIA patients the main advantage is the possibility of temporarily suspending therapy in the event of the reappearance of pains and the use of the mask as a hold and bite.

Conclusions: Invisalign® therapy in JIA patients can be considered an excellent alternative to multibrackets therapy.

INTERDISCIPLINARY APPROACH FOR A CONGENITAL AGENESIS OF UPPER CENTRAL INCISOR

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Aim: Solitary Median Maxillary Central Incisor (SMMCI) Syndrome (originally called “solitary median maxillary central incisor, short stature, choanal atresia/midnasal stenosis syndrome) is a rare malformation characterized by the presence of a single central incisor in the median position. It is associated with bone and median soft tissue defects, along with an increased risk of brain and pituitary malfunction. The etiology of SMMCI is still unknown, however it may be related to an abnormal development of the premaxilla during the gestational period connected to a missense mutation in the SHH gene (I111F) at 7q36. It affects females more frequently. The aim of this scientific work is to illustrate the combined orthodontic and implant-prosthetic treatment plan of a 50-year-old female patient affected by SMMCI.

Methods: the patient had a lack of the left upper central incisor (element 21) associated with poor self-confidence and psychological discomfort. Intra and extra oral photos, orthopantomography, latero-lateral telerradiography, CBCT,

cephalometric analysis and digital study were performed. The chosen therapy was composed by two phases: the orthodontic phase and the surgical one. In the first phase the extractions of the upper second premolars (elements 15 and 25) and the use for 18 months of aligners (Invisalign) supported by an orthodontic movement accelerator device (Ortho-Pulse) were planned. The second implant-prosthetic phase involved the implantation of an osseointegrated fixture (JD Evolution).

Results: at the end of the orthodontic and implant-prosthetic treatment, the patient showed an important improvement in the dento-facial aesthetics and referred psychologically a significant improvement in her self-esteem.

Conclusions: combined orthodontic and implant-prosthetic therapy represents a valid therapeutic strategy for the treatment of SMMCI syndrome. The multidisciplinary approach proves to be fundamental for the resolution of complex cases with high aesthetic value.

AXIOGRAPHY FOR EARLY DETECTION OF TMJ INVOLVEMENT IN JUVENILE IDIOPATHIC ARTHRITIS

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Aim: Juvenile Idiopathic Arthritis (JIA) is an autoimmune inflammatory disease that can involve the temporomandibular joint (TMJ) favoring the appearance of severe morphological changes in development. Children with JIA, if untreated, may develop a second class with mandibular deficit and are more at risk of developing temporomandibular disorders from adolescence onwards. The objective of this study is to verify the effectiveness of the axiography in detecting early alterations of the jaw function in subjects affected by JIA.

Methods: we recorded the axiographs of 16 patients with JIA aged 10-14 and compared them with a group of age and sex matched healthy controls (HC). A Cadiax Compact 2 device was used for the recordings. Unguided opening and closure paths were recorded for each patient. Quantity index and qua-

lity indices, such as harmony and symmetry and the gamma angle (index of the isolated rotational component of the movement), were extrapolated and a comparative analysis between the two groups was performed.

Results: the two groups showed significant differences in quantity index and in the gamma angle. JIA patients showed an average mobility equal to half of the HC group. Similarly, a gamma angle value of $12.445^\circ \pm 5.498$ was found in JIA against $15.789^\circ \pm 9.108$ in HC.

Conclusions: axiography showed to be effective in detecting signs of functional limitation associated with TMJ involvement typical of JIA. The axiography is a non-invasive, inexpensive and repeatable examination, suitable for the early detection of the onset of TMJ abnormalities in JIA.

CORRECTION OF A SEVERE CLASS II MALOCCLUSION WITH TEUSCHER ACTIVATOR: CASE REPORT

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Aim: to show in a patient with severe class II malocclusion, the effectiveness of functional therapy with Teuscher's activator, a tooth-supported device with full coverage of occlusal surfaces and cannulas for inserting extraoral traction.

Methods: at the beginning of treatment, the 11-year-old female patient presents: mild cognitive and behavioral problems, II skeletal class (ANB 7°), II dental class I division, 11mm overjet, exoinclination of the upper incisors (125°) and habit of mouth breathing associated with nocturnal snoring (OSAS grade 1, according to polysomnography). It was therefore decided to start with functional therapy using a Teuscher's activator, made with an advanced construction bite in hyper-correction and torque springs to control the anterior sector. The patient wears the device associated with extraoral traction for 14 hours a day for 14 months.

Results: at the end of the treatment it was possible to solve a

dysgnathic situation with the achievement of a I skeletal class (ANB 1°), with a right and left I molar class in hyper-correction and with a reduction of the overjet from 11 to 4 mm. Eventually, the patient achieved an improvement in airway patency.

Conclusions: the present case shows the effectiveness of Teuscher's activator, capable of slowing the growth of the maxilla down and forward, while allowing the oral musculature to adapt to the new skeletal position. According to the literature, Teuscher's activator associated with extraoral traction can be useful in cases of II skeletal class I division. The reduction of the patient's overjet of 7 mm obtained with this device is a particularly significant figure as it reduces the patient's risk of incurring dentoalveolar trauma. There is in fact an association between increased overjet and dentoalveolar traumatology: the literature shows that an overjet greater than 6 mm has an important impact on the risk of trauma with a relative risk of 3,37.

EARLY ORTHODONTIC TREATMENT OF CLASS II WITH FUNCTIONAL APPLIANCE

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Aim: according to the scientific literature, children who have psychological and social problems, related to their oral aspect, should receive early functional orthodontic therapy for the correction of Class II dysgnazia. Early intervention enhances facial harmony and simplifies the second orthodontic phase and it also recommended to avoid traumatic injury in situations of maxillary incisor protrusive inclination. This study aimed to determine the efficacy of orthodontic therapy with Simoes Network SN3 appliance.

Methods: the study included a 9-year-old child with Class II, overjet (OVJ) 7,5 mm, convex profile, difficulty chewing meat, labial incompetence, oral respirator, low lingual posture, exclusive bottle-feeding and pacifier up to 4 years, oral habits (Doudou), allergic to dust and pollen with asthma episo-

des. The treatment was carried out using SN3 appliance.

Results: extraoral photographs (it was too early for new radiographs) show, after 7 months, correct OVJ, labial competence, good dental exposure, dark labial corridors disappeared, better mandibular projection and nasolabial angle, centered midlines and increased transverse palatal diameters.

Conclusions: in II classes, interceptive treatment can have significant clinical and psychological effects. After only 7 months of treatment, our little child was no longer bullied, because of his rabbit-like dental appearance, demonstrating how proper therapy can improve patient's quality of life. In growing patients, neuromuscular balance is restored, when unfavorable habits are eliminated early with functional treatment.

ORTHODONTIC TREATMENT IN A PATIENT WITH II CLASS MALOCCLUSION AFFECTED BY HYPOGONADISM

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Aim: the purpose of this case is to describe the effects of II class orthodontic treatment with twin block and multibrackets therapy in a 13-year-old patient with hypogonadism during growth hormone (GH) administration.

Methods: a 13-year-old female patient, in complete permanent dentition, showed a dental II class division 2 malocclusion, severe deep bite and scissor bite of 1.4. The patient was affected by hypogonadism in therapy with growth hormone (GH) and estrogen. With cephalometric analysis, skeletal class II (SNA 80° SNB 74,2° ANB 5,8°), retrusion of the mandible with a short corpus, and a hyperdivergent face pattern were highlighted. After the alignment of the upper dental arch, multi-

brackets treatment was associated with twin block appliance for 12 months. Afterwards, lower arch was bonded, and the therapy continued only with multibrackets.

Results: in the reported case therapeutic targets were achieved with the resolution of II class II division malocclusion (SNA 81°, SNB 78°, ANB 3°) and the improvement of overbite and facial esthetics.

Conclusions: according to the literature the administration of human GH seems to induce the cartilage-mediated growth of the mandibular condyle. The twin block can be used simultaneously with the fixed appliance to improve the mandibular advancement and reduce the treatment time and patient's compliance.

ELASTODONTIC THERAPY OF A LATERAL CROSS BITE AND TONGUE DYSFUNCTION: A CASE REPORT

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Aim: elastodontic therapy is a new functional approach aiming to correct the skeletal and dentoalveolar components of malocclusions and restore normal muscular movements by rebalancing the perioral, oral, and lingual musculature. The aim of this case report is to describe the treatment of a lateral open bite due to tongue interposition with an elastodontic device.

Methods: patient of 11 years old with atypical swallowing and lateral tongue interposition between the arches. Intraoral examination revealed lateral open bite, diastemas, molar and canine class III malocclusion on the right side, molar and canine class I on the left side, left deviation of the lower midline. Cephalometric analysis showed skeletal class III. The treatment plan included the use of the AMCOP TC Bio-Activator

for 18 months. This device is characterized by an upper anterior sliding plane, a vestibular and a lingual flange which act as shields, a lingual ramp and a button that guide the correct tongue positioning. The Bio-Activator was worn every night and 1 hour during the day for 8 months and then only at night. The patient also underwent speech therapy sessions.

Results: elastodontic therapy in association with speech therapy allowed to correct tongue posture and atypical swallowing. After treatment the closure of the posterior open bite and class I was achieved.

Conclusions: the elastodontic device in association with speech therapy allowed the correction of the functional disorders favoring the restoration of a correct occlusion.

SURGICAL-ORTHODONTIC RECOVERY OF A VESTIBULAR INCLUDED UPPER CANINE

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Aim: demonstrate the importance of a precise clinical and radiological diagnosis of the impacted canine's position in relation to the crown of the lateral incisor, so that the surgical and orthodontic techniques can be used appropriately to achieve a more stable result.

Methods: a 15-year-old patient presented with a skeletal class II, a deep bite, mild crowding, and an included primary canine. On initial orthopantomography, specific predictive angular and linear parameters were measured to define eruption angles and tooth position. These were the canine angle (α); the distance between the cusp tip and the occlusal line (d); and, as Ericson-Kuroi suggests, the medial position of the crown in sectors 1-5. Using Cu.Ni.Ti 0.14, arches and brackets were placed using a low-friction technique. The primary

canine was then extracted, and a bony window was opened to create a surgical exposure for bonding the permanent tooth. To improve anchorage, the 0.14 arches were replaced with 0.14x0.25 Cu.Ni.Ti, and the displaced tooth received a 0.13 Cu.Ni.Ti arch.

Results: the canine medial crown position was in sector 1 and the mesial inclination to the midline was 12°. The distance (d) to the occlusal line of the permanent maxillary canine was 21 mm. The results showed that the surgical-orthodontic treatment and its stability were both favorable.

Conclusions: predicting and preventing permanent maxillary canine inclusion in late teething is critical because it reduces the complexity of the treatment plan in terms of devices used, time, and cost.

INTERCEPTIVE TREATMENT OF SKELETAL CLASS III OPEN BITE IN A 3-YEAR-OLD PATIENT WITH SHORT FRENULUM

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Aim: interceptive orthodontic therapy is based on influencing and correcting functional problems during the most active phase of a patient's skeletal and dental growth. The goal of this study is to emphasize the importance of treating pathological frenulum and associated malocclusions, starting in the first years of life, with minimally invasive surgical techniques and atraumatic devices capable of developing light, biological, and functional forces, such as those used in AMCOP elastodontic therapy.

Methods: after L.A. infiltration with 2% mepivacain (adrenaline 1:100.000), a three-year-old patient with hereditary class III, anterior open-bite, left deviation of the lower midline, and upper short labial frenulum was submitted to frenectomy with V-shaped incision using a diode laser in continuous mode. Be-

cause of the laser's haemostatic effect, no surgical sutures were necessary. The elastodontic AMCOP TC was applied every night and for one hour throughout the day. One month following surgery, the first follow-up was performed.

Results: the patient's healing occurred by second intention after surgery. At the same time, face symmetry was restored after 6 months of elastodontic therapy, with re-centering of the midline, closure of the open-bite, and skeletal class III improvement.

Conclusions: laser surgery of the short frenulum is an effective therapeutic choice, it considerably minimizes intra- and post-operative discomfort. The elastodontic AMCOP TC device has showed the capacity to intercept malocclusions early, allowing for appropriate growth and bite closure.

CBCT EVALUATION OF VOLUMETRIC CHANGES OF SUPERIOR AIRWAYS AFTER HYRAX AND MCNAMARA RPE

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Aim: the aim of this study is to evaluate through CBCT the volumetric changes of the upper airways after treatment with RPE and the volumetric differences after the use of the Hyrax-type and McNamara-type RPE.

Methods: 21 subjects were selected (mean age: 9.71 years): 11 treated with McNamara expander and 10 with Hyrax expander. Patients performed a CBCT before treatment (T0) and one during the removal of the device (T1). For each CBCT, the Total Volume, the Retro-palatal Volume and the Retro-glossal Volume were measured with the ITK-Snap software. The overall data (T1-T0) were statistically analyzed with the Paired Student's T-Test. The Student's T-Test for unpaired data was used to compare the volumes of two devices (T1-T0).

Results: overall, a statistically significant increase was obtained in the Retro-palatal Volume (1106 mm³, $p = 0.0008$) and in the Total Volume (3396 mm³, $p = 0.013$) unlike the Retro-glossal Volume (279 mm³, $p = 0.08$). No significant differences emerged from the volumetric comparison between the two groups of RPE.

Conclusions: the statistically significant increase in Retro-palatal Volume and Total Volume, which predisposes the reduction in upper airway resistance, may allow prevention and treatment of sleep-related breathing disorders. Between the two devices, the volumetric differences were not statistically significant: it indicates that the expansions have similar effects on the upper airways, and this can obtain better respiratory function. Further studies are needed to evaluate the long-term stability of these airway changes.

PREDICTABILITY OF CROWDING RESOLUTION DURING TREATMENT WITH CLEAR ALIGNERS

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Aim: to assess the efficacy of different strategies to gain space and the predictability of crowding resolution during clear aligner treatment.

Methods: 10 clinicians were randomly recruited using the Doctor Locator by Align Technology (California). For each clinician, four consecutive patients treated with aligners and manual stripping were selected for a total of 40 subjects. Thus, 80 arches were collected and uploaded on the Orthoanalyzer software for arch measurements. The data were gained on the starting arch form (T0), on the virtual arch developed with digital planning (vT1), and on the arch form achieved at the end of the aligner sequences (T1). The following parameters were scored: Little's irregularity Index, transversal arch diameters, (intercuspid, interpremolar, and intermolar width), incisor position/arch length, and enamel interproximal reduction (IPR).

Results: for all measurements statistically, significant differences

were found at the different stages. The predictability of crowding resolution was very high, ranging from 87% in the upper arch and 81% in the lower one. Among the different strategies to gain space, variations in sagittal incisor position were predictable, with a value of 70% both in the upper and lower arch. Conversely, changes in arch diameters were less reliable varying between 49-67% in the lower arch and 59-83% in the upper one. Moreover, IPR was the least accurate procedure, wavering from 44.95% in the upper arch and 37.02% in the lower arch.

Conclusions: the predictability of crowding resolution during treatment with aligners was high. However, the virtual arch forms obtained at the end of digital planning (vT1) did not correspond with the arch forms at the end of the aligner sequences (T1). The IPR was the least predictable strategy to gain space, being, perhaps, an operator-dependent procedure.

EVALUATION OF HORIZONTAL TOOTH MOVEMENT AND SUPPORTING TISSUES IN TREATMENTS WITH ALIGNER INVISALIGN

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Aim: in the study, the statistical correlation between orthodontic tooth movement and tissue movement was analyzed by evaluating changes in and examining data from 28 patients undergoing orthodontic therapy treated with Alainer Invisalign®.

Methods: the analysis was performed on the comparison of 56 intraoral scans, performed with Itero Element 4, corresponding to 28 cases. The teeth under evaluation had a minimum horizontal body displacement of 1mm as inclusion criterion, while those with a displacement of less than 1mm were excluded from the statistics, for a total of 322 teeth. Pre- and post-displacement dental displacement was calculated and compared with tissue displacement. For standardization of measu-

rements, a repeatable technique was adopted for each element. In addition, the distance between the vestibular cuspal apex and the gingival festoon was measured. Intrusive and extrusive movements were not examined in the study.

Results: it was verified that the average difference between tooth and tissue displacement is about 0.1mm, with an average shrinkage of 0.4596mm and shrinkage peaks of up to 1.8mm in some cases.

Conclusions: it was inferred, therefore, that tooth movement, during orthodontic treatment, affects the keratinized gingiva, and that vestibular displacement was more likely to cause its reduction and retraction.

PERIODONTAL TISSUE AND TORQUE MODIFICATIONS IN GINGIVAL RECESSION AFTER ALIGNERS TREATMENT

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Aim: the objectives of this study are:

- to evaluate the periodontal tissue of incisors with gingival recession associated to root malposition, before and after orthodontic treatment with aligners, through clinical and aesthetic indices;

- to measure the root torque on CBCT before and after treatment, to verify the coherence between the orthodontic prescription and the obtained final position.

Methods: five patients presenting a lower incisor with gingival recession associated to root malposition are selected and treated with aligners. The periodontal parameters are clinically detected during periodical check-ups. The modification from the aesthetic point of view of the periodontal tissue is visualized through the intraoral photos taken before, during and after treatment. The 3D planned correction of the bucco-lingual in-

clination is measured on CBCTs with Osirix software before and after treatment and the obtained final torque is compared to the orthodontic initial prescription.

Results: using aligners, an improvement of all the clinical and aesthetic indices of the periodontal tissues around the gingival recession was achieved. Furthermore, the predetermined final root position of the lower central incisor was achieved, with good accuracy between the prescription and the result.

Conclusions: the correction of bucco-lingual inclination of lower incisors with gingival recession associated to root malposition improves the surrounding periodontal tissues clinically and aesthetically.

This kind of selective torque movement can be clinically predicted and obtained with aligners.

CHANGES IN POSTURAL ATTITUDE ACCORDING TO DIFFERENT SKELETAL AND DENTAL CLASSES

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Aim: the present study aimed to analyze a correlation between postural attitudes and dental occlusion, according to different skeletal and dental classes and different parameters evaluated.

Methods: 70 patients were selected for this study and analyzed with an orthodontic diagnosis (following the clinical and instrumental protocol of the University of Chieti "D'Annunzio") and a clinical and instrumental postural diagnosis (baropodometric and spinometric examination and kinesiography). The patients were divided into groups according to different dental and skeletal classes, and for each group were analyzed different postural parameters such as foot posture and plantar pressure, the symmetry of vertebral column on the frontal plane,

the inclination of the trunk on the sagittal plane, scoliosis, kyphotic and lordotic angles, deglutition and jaw movements.

Results and Conclusions: from the data obtained, there aren't well defined postural changes in different groups, but 62% of 70 patients have scoliosis, 71% altered kyphotic and lordotic angles, 68% altered symmetry of vertebral column on the frontal plane, 70% altered plantar pressure and 52% altered foot posture, 100% uncorrected deglutition and 80% jaw deviation during mouth opening. Almost all 70 patients with dental malocclusion have postural problems, clinical and instrumental. A broader diagnostic approach is needed in orthodontics: malocclusion could be an expression and consequence of different problems and a cause of these.

RISK OF MAXILLARY CANINE IMPACTION IN PATIENTS WITH MAXILLARY CONSTRICTION

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Aim: maxillary canine impaction represents a challenging condition for orthodontists. The aim of the present investigation was to evaluate whether maxillary constriction represents a risk factor for maxillary canine impaction.

Methods: we retrospectively analyzed patient records collected from the Department of Orthodontics at the A. Gemelli Hospital. Inclusion criteria were non-syndromic patients, age between 7 and 13 years, maxillary deciduous canines in the dental arch and indication to undergo rapid maxillary expansion. Inclination of the canine (alpha angle) was measured on panoramic radiographs of these patients and compared to those observed in a population of patients without maxillary constriction, matched by sex and age with the study group. Alpha angle higher than 25° was considered to be a

high risk for canine impaction. Chi-squared test was used to compare values between patients with and without maxillary contraction.

Results: twenty-eight patients, 15 males and 13 females, median age 8.3 + 1.4, with maxillary contraction were included and compared to 28 controls without maxillary contraction. 21.4% of patients with maxillary contraction presented at least a maxillary canine with increased risk of impaction. In the control group 25.9% of patients were considered to be at risk. The difference between groups was not found to be statistically significant.

Conclusions: based on the present findings, maxillary constriction does not represent an indirect marker for an increased risk of maxillary canine impaction.

INTRAORAL SCANNER: AN IMPORTANT DEVICE FOR AESTHETIC ANALYSIS IN ORTHODONTIC TREATMENTS

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Aim: in orthodontic treatments, the aesthetic result represents a primary achievement and, herefore, perioral tissues become a relevant element. The aim of this preliminary study is the evaluation of the morphological variations of the labial competence related to the dental-maxillomandibular characteristics. An intraoral scanner was employed for detection.

Methods: 25 patients aged between 13-35 were selected, 17 females and 8 males, divided into three groups according to the skeletal class, diagnosed by cephalometric evaluation according to Gianni. A literature review was conducted and the following points of reference have been selected: subnasal point, labiale superior/inferior, crista philtri left/right, chei-

lion left/right, stomion. An anatomo-morphological evaluation of the lips has been done for each patient, using serial soft tissue scans.

Results: employing an intraoral scanner for the profile analysis would enable to overcome the bi-dimensionality of traditional images, allowing a three-dimensional vision with an accuracy of $6,9 \pm 0,9 \mu$ (Trios 3Shape). The IOS enabled the creation of digitally images, which could be comparable during the treatment.

Conclusions: the purpose of this preliminary study is to sets the future goal to verify the efficacy of this device and to detect the presence of possible associations between measured parameters at lips level and characteristics of patient's occlusion.

COMPARATIVE ANALYSIS BETWEEN LABIAL MORPHOLOGY AND ANTHROPOMETRIC CHARACTERISTICS

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Aim: in the past, the goal of orthodontic treatment was only to improve balance and function of the stomathognathic system. Now the patients request is to achieve the same result with an excellent aesthetics. Therefore the clinician's attention has to involve not only the hard tissues, but necessarily also the perioral soft tissues. The aim of this work is to evaluate the different analysis devices adopted for the study of perioral soft tissue.

Methods: a literature review was conducted on the study of lips and the points of reference most analyzed are: Upper and Lower Lip Point, mid-point of the vermilion line, Mid-Philtrum point, in the groove of the philtrum, and Soft Tissue Pogonion, the most prominent point on the chin. These values are identi-

fied on radiographic and photographic examinations and then we can evaluate them in both analyses.

Results: the study of soft tissues can be conducted with a two or a three-dimensional analysis with different parameters according to the method used. When a radiological study has been selected, the patient will be subjected to an amount of radiation that other methods do not require. The choice of stereophotogrammetry over photographic analysis allows for high-resolution three-dimensional results.

Conclusions: the use of an intraoral scanner not only as an impression method for the jaws, but also for soft tissue analysis could become a winning choice for the study of these aspects in order to achieve optimum results.

TRACTION OF IMPACTED CANINES USING CANTILEVERS WITH SECOND ORDERS AND THIRD ORDER FOLDS

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Aim: the impacted maxillary canines represent a challenge in orthodontic practice. The aim of this study is to evaluate the differences in efficiency using cantilevers with second order and third order folds.

Methods: thirteen patients were selected, divided into two groups, second order group (SO) and third order group (TO), with canine palatal inclusion. Both groups of selected patients were treated by using a Gosgharian bar between the first upper molars and a fixed multibracket therapy according to the prescription of Prof W. Roth. The correct management of the spaces was carried out with open coil springs. Was used a 0.019 x 0.025 Accuform steel arch associated with the transpalatal bar. A cantilever modeled in TMA was applied to both groups starting from the double tube of the molar band homolateral to the inclusion. A 0.017 x 0.025 diameter wire was used on the SO Group in order to reduce the force applied in the disinclusion, and the second order fold was applied anteriorly, the first order fold in the vestibular direction.

The TO Group used a 0.019 x 0.025 diameter wire to which the third order fold was applied just anteriorly to the wire exit from the molar band.

Results: the efficiency of the cantilevers, was evaluated from the moment of application of the lever to the appearance of the canine in the oral cavity through the palatal mucosa. The statistical analysis showed that the difference between the two systems is not statistically significant for a Pvalue > 0.05.

Conclusions: the analysis shows that the use of cantilever with the second order fold allows a disinclusion of the canine on average in about 6 months and 25 days. While using a cantilever with third order fold on average the canine is disincluded in 4 months and 25 days. On average, the use of third-order fold anticipates the disinclusion of the canine by 2 months. The study, despite having detected a decrease in the timing of disinclusion in the cantilevers with third order fold, indicates that it is necessary to carry out further studies with larger samples to verify the actual statistical significance.

DIGITAL CHEILOSCOPY: A COMPARATIVE STUDY BETWEEN TWO METHODS FOR LIP PRINTS RECORDING

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Aim: recent research has highlighted the role of the morphology of lip prints in the identification and diagnosis of non-syndromic cleft lip and palate; the purpose of this experimental study is to investigate the accuracy and repeatability of two different methods of recording lip prints.

Methods: thirty-one volunteers underwent a lip print detection using two different protocols: the first method involved the self-application of dark-colored lipstick by the subject, who subsequently made a visible lip impression on an adhesive tape; in the second method a latent lip print on a glass plate was developed using carbon powder. Both procedures were repeated after 3 weeks, and the recorded lip prints were converted to digital format with the aid of a professional scanner. Then, the qualitative analysis was performed using the classification of

“Suzuki and Tshuchiashi” which divides the labial furrows into five types based on the morphological aspect. The statistical analysis was conducted using the coefficient k, which estimates the degree of agreement between the collected data.

Results: repeatability was good for the registration of lip prints using lipstick, both for upper (K = 0.73) and lower lips (K = 0.71); while using carbon powder, the repeatability was moderate for the upper lip (K = 0.40) and fair for the lower lip (K = 0.37).

Conclusions: the experimental detection of lip impressions using lipstick has proven to be reliable, repeatable, ergonomic, easy to perform and inexpensive; therefore it can be a non-invasive tool for studying the inheritance of congenital craniofacial malformations.

“IS THERE A CORRELATION BETWEEN TMDS, ARTHRITIS AND FIBROMYALGIA?”: RESULTS OF A SURVEY

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Aim: this study aims to analyze an eventual relation between temporomandibular disorders, fibromyalgia, arthritis and neck pain and to evaluate the potential association with malocclusion.

Methods: an anonymized questionnaire was submitted to 105 subjects through an online survey containing questions about demographic data, temporomandibular joint pain and arthritis. Descriptive statistics was performed for all the variables.

Results: the majority of patients who reported malocclusion underwent an orthodontic treatment ($p < 0.05$). The malocclusion was related to neck pain ($p < 0.05$), Fibromyalgia ($p < 0.05$), but not to arthritis. Orthodontic treatment did not show benefits for 87 (83%) of whom reported cervical pain, 84 (80%)

of those with arthritis pain and 85 (81%) of whom reporting back pain. Report of fibromyalgia confronted to arthritis was significant. Medical therapy for arthritis was reported not improving TMJ symptoms in the majority of cases (60.4%). Confronting arthritis and TMJ pain onset age it is significantly lower for TMJ pain ($p < 0.01$).

Conclusions: this study reported a correlation between malocclusion and systemic disease. Fibromyalgia and cervical pain, according to these preliminary results, are linked to malocclusion. In this study, it doesn't appear a direct relationship between arthritis and malocclusion. An early diagnosis and multidisciplinary approach are the key of the treatment of patients with arthritis and fibromyalgia.

3D EVALUATION OF PALATAL RUGAE PATTERN IN CLEFT PATIENTS USING DIGITAL MODELS

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Aim: to compare palatal rugae patterns of patients affected by different types of orofacial cleft with those observed in healthy subjects.

Methods: the sample comprised 97 subjects with no cleft abnormalities and 98 clefts patients, including 55 with unilateral cleft of the lip and palate (UCLP), 23 with bilateral cleft lip and palate (BCLP), 6 with cleft lip (CL), 7 with isolated hard palate cleft (CP), 7 with isolated soft palate cleft (SCP). A computerized analysis was performed on 3D digital dental models (stl files); the first three palatal rugae on the right (r1d, r2d, r3d) and on the left (r1s, r2s, r3s) were evaluated, considering length, type, shape, direction. Statistical analysis was performed using χ^2 test, ANOVA test and *post hoc* Turkey-Kramer test. Statistical significance was tested at $P < 0.05$.

Results: a significantly reduced length was observed for r1d, r1s, r2s in UCLP group, for r1d and r1s in BCLP group, and for r1s in CP patients. With regard to the shape, patients with BCLP have a higher prevalence of *curved* rugae for r2s compared to controls and patients with CL present a prevalence of rugae with a *straight* shape for r1d. Finally, in control group the rugae with *backwarded* direction have a higher prevalence for r1d if compared to BCLP, and for r1s if compared to CL, UCLP and CSP.

Conclusions: the most important morphological differences are noticed in BCLP and UCLP groups, with a greater deformity in the anterior part of the palate. The shape of the rugae has a reduced variability. The third ruga was found to be the most stable and apparently is not affected by the congenital defect.

QUANTITATIVE EVALUATION OF PALATAL POSTERIOR SUPRA ALVEOLAR INSERTION SITE (PPSAIS)

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Aim: the aim of this study was to evaluate the bone thickness, cortical bone thickness, and mucosae depth of this anatomical site that, in this study, was defined as a palatal posterior supra-alveolar insertion site.

Methods: the sample of fifty-five patients (30 F, 25 M) was in accordance to inclusion criteria. The evaluations were performed at three different coronal scans located in the different antero-posterior levels: interproximal contact point between the second premolar and the first molar (P2-M1), at the upper first molar furcation (M1F), and interproximal contact between the first and the second molar (M1-M2) within the bluskybio software.

Results: the evaluation of bone availability of palatal posterior supra-alveolar insertion site at different antero-posterior levels, showed that the maximum amount of total bone thickness was found between the second premolar and the first molar. At this level total bone, thickness is significantly ($p < .05$) greater compared to the other sagittal sites and it offers on average around

2mm of extra bone depth for miniscrew placement. Cortical bone thickness is adequate for primary miniscrew stability. Overall, cortical bone thickness considered at different insertion sites showed significant statistically ($p < .05$) differences. The findings of this study showed that palatal mucosa is particularly thick with average values ranging from 4 to 7mm, its extension ultimately affects miniscrew length selection. Palatal mucosa thickness showed no clinically significant differences comparing different sagittal and vertical insertion site. Data also showed that palatal mucosal thickness slightly significantly increases ($p < .05$) with the inclination of the insertion axis relative to the occlusal plane.

Conclusions: Palatal posterior supra-alveolar insertion site is an appropriate site for posterior insertion of palatal miniscrews. Considering high individual variation preliminary CBCT evaluation is important to achieve optimal miniscrew placement.

ARCH CHANGES EVALUATION AFTER RAPID MAXILLARY EXPANSION AND TWO DIFFERENT TRANSPALATAL ARCHES

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Aim: the use of transpalatal arch (TPA) would be recommended to stabilize the results obtained with rapid maxillary expansion (RME) and to limit or avoid the relapse. Thus, the aim of this study is to evaluate short-term maxillary changes in patients treated with RME followed by TPA with and without palatal arms.

Methods: a total of 30 patients, 16 females and 14 males (ranged between 9 and 12 years) were treated by expansion with palatal Hyrax-type expander. After this treatment, the expander was removed and one of the two different types of TPA was used. The two different TPA was a 0.036-inch stainless steel wire with a loop directed mesially in the middle, one maintained original design (TPA), the second one presented

arm extended to canines (TPAa). Dental casts were collected before (T0), after expansion (T1) and after TPA or TPAa (T2). They were digitalised to make more predictable the measurements compared with caliper measurement that have intra- and inter-examiner measurements errors.

Results: in TPAa group no statistically significant differences are found between the end of expansion and retention period. Instead, in TPA group there are a reduction of values in almost all dental transverse diameters. Significant differences are found in dental measurements between TPAa and TPA.

Conclusions: our results confirm the hypothesis that TPAa can allow to better maintain the dental transverse dimensions after treatment in mixed dentition.

SURVEY ANALYSIS OF POSSIBLE RELATIONSHIPS BETWEEN TMDS, HEADACHE AND GUT ILLNESS

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Aim: this study aims to find out the possible relationship between Temporomandibular Disorders (TMDs), headache and gut's disease. Moreover, the study wants to determine the prevalence of malocclusion in patients affected by these pathologies.

Methods: 169 consecutive patients were enrolled (71 males and 98 females). All of them had over 18 years old. The form was composed of various questions. Some of them were:

- do you know what is a dental malocclusion?
- Do you suffer from leaky gut/gut's disease?
- Do you have a dental malocclusion?
- Do you suffer from temporomandibular joint pain?
- Do you suffer from headache?

The statistical analysis was performed to investigate any correlation between the variables.

Results: all the participants answered the questions and the results showed statistically significant associations:

- 71 patients suffer from leaky gut's/ gut disease and TMJ pain ($p < 0.01$);
- 81 patients suffer from leaky gut's/gut disease and headache ($p < 0.01$);
- 93 patients suffer from headache and TMJ pain ($p < 0.01$).

Conclusions: the preliminary research reports a statistically significant correlation between temporomandibular and gut's disorders, in particular, leaky gut and irritable bowel syndrome. Moreover, it correlates these problems with a common daily issue as headache. Despite headache can be linked to many other pathologies, it can be one of the principal symptoms of gut's disorder and TMD. To confirm these findings, more studies are required on larger sample.

"CAN CLEAR ALIGNERS INFLUENCE PATIENTS' DAILY LIFE?": PRELIMINARY RESULTS OF A SURVEY

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Aim: the study aims to evaluate if clear aligners therapy can influence patients' life and if it can compromise their well-being, as well as their oral and TMJ health. Another important purpose of the study is to determine if aligners therapy can affect the level of bruxism; moreover, if this kind of therapy can be related to headache and mucosal lesions. Finally, it wants to investigate the patients' satisfaction in relation to the therapy.

Methods: an anonymized questionnaire was submitted to 175 orthodontic patients who experienced clear aligner treatment. The questions were about the perception of the devices' aesthetic, hygiene and plaque accumulation, gum health, mucosal lesions, bruxism and pain.

Results: it resulted that 82.9% of the patients had a grade of satisfaction over 8 (in a scale between 1 and 10), in addition

only the 24.6% felt embarrassed. Half of patients had bruxism or clenching during the treatment (50.3%), while the 45.7% suffered of mucosal lesions. Moreover, only the 5.8% had a significant level of pain (over 8, in a scale between 1 and 10), the 24% experienced TMJ pain and the 26.9% had headache.

Conclusions: the study highlights that clear aligners are an important technique which responds to the increased request of adults to improve their smile and oral functions. In this way they present more advantages than fixed appliances such as aesthetics and periodontal health. Furthermore, other positive aspects are hygiene, comfort, gingival health and low grade of pain. Another aspect is that they don't determine plaque's accumulation and mucosal lesions.

COMPARATIVE SEM ANALYSIS OF BRACKETS WEARING IN CONVENTIONAL AND SELF LIGATING DEVICES

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Aim: this study aims to determine the level of wear and to evaluate the variation of plaque sediments (amount of accumulation and consistency) in relation to brackets typology in a qualitative way, through the scanning electron microscopy (SEM).

Methods: 15 patients with fixed appliance were selected and 30 brackets were removed from upper canine or upper premolars: 10 In-Ovation® brackets, 10 Smart Clip™ (3M) brackets and 10 Roth conventional brackets (Omniarch, Dentsply Sirona). The different level brackets' wearing was analyzed in 4 different moments (T0, T1, T2 and T3) the Scanning Electron Microscope was used to visualize patients' brackets. analyzed at beginning and after 3,5,7 months.

Results: the SEM analysis at T0 demonstrated the presence of smooth and rounded surfaces on the panoramic scans at

21.2x and 31.4x in all the types of brackets. At 44.4x magnification and even more at 110x, it was always highlighted an irregular surface with micro-porosity was visible in all brackets. In-Ovation® brackets were the only ones that present dark spots appearing as irregularities. Rounded corners of the edges of the slots of the In-Ovation® and the Roth types were observed, although it looks less refined in the latter, while rounded corners in the traditional attachments presented with irregularities. All brackets were characterized by grainy surfaces and micro-cavities.

Conclusions: in all four conditions, the conventional brackets showed highest level of wear while then least amount of mechanical wear was found in the In-Ovation® Technique brackets.

THE TRUE VERTICAL LINE: A RELIABLE PARAMETER TO ASSESS THE ANTERIOR LIMIT OF THE DENTITION

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Aim: the study aimed to analyze the cephalometric skeletal and dental values in a population of growing and adult subjects, assessing the influence of vertical and sagittal skeletal patterns on the position of the incisors.

Methods: from 2567 cephalograms obtained from a radiological center, we selected patients older than 8 years and excluded patients with implants, prosthetic frameworks, orthodontic appliances and low quality radiographs. The cephalometric analysis was performed using Deltadent software. The sample was divided into different groups: growing versus adult subjects, mesofacial versus dolichofacial and brachyfacial, class I versus class II and class III. For the statistical analysis, a linear regression was performed between the True Vertical Line (TVL) and the values of the

different groups. The p value was set to < 0.05.

Results: the final sample consisted of 1256 cephalograms. The mean of the TVL values in growing subjects was 3.4 ± 3.8 , in adults it was 2.4 ± 4.8 ; in the mesofacial ones 2.7 ± 3.4 , in the dolichofacial ones 5.1 ± 3.7 and in the brachyfacial ones 0.7 ± 3.8 ; in those with I class 1.6 ± 2.8 , in those with II class 4.8 ± 3.6 and in those with III class -0.8 ± 3.4 . There were no statistically significant differences in TVL between growing and non-growing subjects. Instead, the b coefficients of the ANPg, SNGoGn and IMPA were respectively 0.45, 0.36 and 0.23 ($P < 0.001$).

Conclusions: the TVL was influenced by vertical and sagittal patterns of the subjects and reflected these variations better than the IMPA angle.

COMPARISON OF CONDYLES BETWEEN HEALTHY AND JUVENILE IDIOPATHIC ARTHRITIS PATIENTS

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Aim: Juvenile Idiopathic Arthritis (JIA) is a group of inflammatory joint diseases of unknown etiology, with onset before the age of 16, lasting more than 6 weeks. There are several signs and symptoms on the mandibular level including lesions of the temporomandibular joint and in particular lesions of the condyle. The aim of this retrospective study is to evaluate the media-lateral, anterior-posterior diameters of the condyles in patients with JIA by analyzing the patients' CBCT and comparing the same values with those found in healthy patients.

Methods: the retrospective analysis was conducted on 100 patients in the Orthodontics department of Ospedale Maggiore Policlinico IRCCS Ca' Granda, Milan. From the initial sample, the final group consisted of 90 patients, 60 with JIA (45 females and 15 males) and 30 healthy (20 females and 10 males). The age of the patients ranged from 3-16 years. Each patient underwent CBCT for skull analysis.

Results: of the patients with JIA, 42 had the bilateral form while

18 had the unilateral form. It was found that in pathological condyles the medio-lateral diameter was about 1.5 mm smaller than in healthy condyles with p value < 0.0001 and also the anterior-posterior diameter was smaller but with a no significant p value. We also found that the healthy condyles of patients with JIA were slightly smaller than those of healthy patients, but with no significant p value. Finally, it was highlighted that both in pathological males and females the condylar growth tends to stop earlier than in healthy ones.

Conclusions: the medio-lateral diameter is affected with greater intensity than the anterior-posterior one, causing a typical condylar shape. Furthermore, it has been shown that the pathology, in the case of unilateral JIA, does not affect only the pathological condyle, but also the corresponding condyle which would seem healthy in reality is partially compromised. In addition, it has been observed that the growth of diseased condyles tends to stop earlier than the condyles of healthy patients.

ANALYSIS OF THE FINISHING PHASE WITH F22 ALIGNER: A RETROSPECTIVE STUDY

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Aim: this scientific study aims to provide indications on any hypercorrections for each movement to be included in the first initial setup, to make treatment with clear aligners more effective and efficient.

Methods: from the 2019-2020 database at Sweden&Martina, 150 patients treated with F22 aligners that required a finishing step were selected, according to certain inclusion criteria. Then, variations in initial setup and refinement setups of vestibololingual inclination movements, mesiodistal angulation, rotation, intrusion, and extrusion were analyzed, with descriptive statistics and classification and regression trees (CART) for all dental elements and for each movement using the MOB (model based recursive partitioning) approach.

Results: *inclination.* From $12,2^\circ$ of initial prescription hypercorrection of $2,4^\circ$ is required for incisors; canines need $2,1^\circ$ of hypercorrection above a $10,1^\circ$ prescription. *Angulation.* The hypercorrections are $< 1^\circ$. *Rotation.* Prescriptions $\leq 17,5^\circ$ needs a hypercorrection from 2° to $3,5^\circ$ for incisors and canines; above this threshold value, the required hypercorrection exceeds 4° , depending on the teeth considered. *Intrusion.* It is recommended to add 0,2mm if the prescribed movement is $> 0,9$ mm. *Extrusion.* If programmed within 1mm does not require hypercorrections.

Conclusions: the inclination and rotation movements have shown greater need for hypercorrections, especially about incisors and canines, also with respect to different threshold values.

ANALYSIS OF BIOLOGICAL AND STRUCTURAL FACTORS IMPLICATED IN THE CLINICAL SUCCESS OF TADS

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Aim: to analyze the factors implicated in the clinical stability of temporary anchorage devices (TADs), after their interradicular placement in the posterior sectors of the maxilla.

Methods: a total of 676 miniscrews were inserted in 276 patients and immediately loaded. When clinical goals had been reached with survival and good stability of the TADs, clinical success was stated (mean time 13 ± 3 months). Therefore, the failure rate was investigated respect to some factors, i.e., structural factors (miniscrew length, diameter and body shape), operative factors (side of insertion site, using of the pilot hole drilling or not), and biological factors (maximal insertion torque [MIT] and type of gingiva). A chi-square test with Monte Carlo correction was performed to detect the influence of these variables on the failure rate and also multivariate logistic regression and post-hoc analysis were carried out, follo-

wed by CART (Classification and Regression Trees) analysis.

Results: the success rate was 88% (i.e., 595). Among the factors investigated miniscrew length, type of gingiva and MIT values are statistically associated with a higher failure rate ($p < 0.05$). Multivariate logistic regression and subsequent post-hoc analysis performed on them, showed that 8mm miniscrew length (respect to those of 9 and 10mm), alveolar gingiva and 5-10 Ncm MIT values are statistically related to higher failure rate. According to CART, miniscrew length ≤ 8 mm is the principal factor for premature failure. For miniscrews > 8 mm, 5-10 Ncm MIT values (i.e., soft bone) are more likely associated to premature failure.

Conclusions: clinicians should be discouraged from using miniscrews of length ≤ 8 mm and MIT values < 10 Ncm, even with longer miniscrews.

PERCEPTION OF PATIENTS DURING TREATMENT WITH DIFFERENT DEVICES: BRACKETS, ALIGNERS, BFO

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Aim: the aim of this study is to compare the perception about esthetics, comfort, pain and related quality of life of patients with different orthodontic appliances: conventional brackets, aligners and Bracketless Fixed Orthodontics (BFO).

Methods: a questionnaire was submitted to patients over 14 years who had finished orthodontic treatment for less than two years. The cohort was divided into 3 groups based on the orthodontic appliance: conventional brackets group (CBG), aligners group (AG), BFO group (BFOG). The answers were on a scale of 0 to 4, except for a VAS scale to assess pain intensity. The data were reported as mean values of the answers and a student t test was carried out to compare the means between the groups. Level of significance was set at $P < 0.05$.

Results: the final sample included 68 patients (36 M, 32 F). 21 (mean age = 21 ± 8.6) were in the CBG group, 23 (mean age = 28.6 ± 12.6) were in AG, 24 (mean age = 32.1 ± 10.5) were in BFOG. In AG patients reported fewer changes in their eating habits, less frequency and intensity of orthodontic pain, and less difficulty in maintaining oral hygiene compared with the other 2 groups. In BFOG patients experienced better aesthetics, less difficulty in compliance and less discomfort with their relational life. In the other variables investigated there were no statistically significant differences between the groups.

Conclusions: conventional appliances were perceived more negatively than aesthetic appliances in some parameters that could affect the patient's quality of life during orthodontic treatment.

ASSESSMENT OF SKELETAL MATURITY IN ORTHODONTICS: A COMPARISON OF TWO METHODS

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Aim: the purpose of this study was to compare the cervical vertebral maturation method (CVM) and the third finger middle phalanx (MPM) maturation analysis: a diagnostic agreement between different maturation stages was investigated, particularly in the evaluation of the growth peak.

Methods: 55 patients (28 F and 27 M, ranging from 8,0 to 17,6 years old), waiting for orthodontic treatment at the orthodontic department of the Polyclinic of Bari were examined and the lateral cephalogram and X-ray of the middle phalanx of the third finger were collected for each of them. The MPM index according to Fishman, Hagg, Taranger, Rajagopal, Kansal, and CVM analysis by Baccetti et al. were recorded. The patients were gender-divided, each was assigned a stage of the CVM method and the corresponding stage of the MPM method. In both

genders, the maximum, minimum, and mean age of occurrence of each CVM and MPM maturation stage was calculated and then their distributions were compared. The six MPM and CVM maturation stages were grouped into three groups: prepubertal (MPS1-MPS2, CS1-CS2), pubertal (MPS3-MPS4, CS3-CS4), and postpubertal (MPS5-MPS6, CS5-CS6), and concordance between them was calculated.

Results: the results showed that CVM and MPM had an 88.9% diagnostic agreement with a concordance index of $K=0,899$ and a 92.72 % concordance between the growth stages prepubertal, pubertal, and postpubertal.

Conclusions: MPM method could replace the CVM method for evaluating pubertal spurt (MPS3-MPS4) in orthodontic diagnosis.

SCANNING TIME EVALUATION WITH ITERO® BETWEEN DIFFERENT CATEGORIES OF DENTAL PRACTITIONER

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Aim: the purpose of this study is to evaluate the use, in terms of scanning time and experience of use, of the iTero® 5D+ scanner by operators with varying degrees of experience using intraoral scanners.

Methods: a group of people was selected: 3 of them had never used an intraoral scanner (dental students, group 1), 3 of them had an average experience in taking intraoral impressions (< 1 years of experience, group 2) while 3 of them already had a mature familiarity with this type of scanner (more than 5 years of experience, group 3). Each operator performed 5 intraoral scans. The parameters monitored and registered were scanning time for areas following iTero® suggested scanning protocol and the time used to fill holes of the mesh.

Results: the average time spent to perform a complete scan was evaluated: 12 minutes for the inexperienced (group 1), 7 minutes for the operator with average experience (group 2), and 3 minutes for experienced operators (group 3). The most critical areas, for which more time was spent, were found on the upper vestibular side and in the finishing phase.

Conclusions: the use of intraoral scanners for the record of dental impressions is the current state of art in orthodontics, this technique helps to reduce the chair time, stress for the patient and operator. We can state that a greater experience is a determining factor in the speed and accuracy of impression taking process, but the results are good even for who haven't taken any impression. After a training time and some experience, time is reduced and operator satisfaction increase.

CYBER-PHYSICAL DEVICES FOR MONITORING THE INTRAORAL PRESSURES

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Aim: the aim of the study was to develop a wireless device for the monitoring of the real-time behaviour of the pressures exerted on the stomatognathic system during the day. Therefore, a prototype was proposed, and its calibration was performed

Methods: the device is composed by a $120\ \Omega$ strain-gauge sensor (015LW by VPG Inc., strain gauge factor (G) of $2.095 \pm 0.5\%$), which records the variation of the voltage (V_{OUT}) produced by the pressures' changes, and a Printed Circuit Board (PCB) that contains an analog-to-digital converter (ADC), powered by a 3V coin battery. The converted digital signal is sent to an external smartphone application via Bluetooth protocol (X-NUCLEO-IDB04A1). The sensor is calibrated in a controlled setting with static gain (2 and 300 V/V) and time of sampling (100 ms) using incremental weights (50-100-200 g)

for subsequent measurements of the V_{OUT} ; finally, a regression analysis was performed.

Results: respectively for 50, 100 and 200 g, the V_{OUT-M} values were: 0.741 V, 0.49 V, 0.265 V with gain 2 V/V; and 1.36 V, 1.31 V, 1.23 V with gain 300 V/V. The regression analysis showed that the sensor is more accurate for greater weights with a lower gain setting (2 V/V), while a higher gain (300 V/V) is more accurate for smaller weights.

Conclusions: the sensors settings need to be adapted according to the pressures under investigation, to achieve the most accurate results. Further research is necessary to implement the sensor inside the oral cavity bonded to a passive intraoral retainer, and the intraoral calibration must be performed.

ORTHODONTIC TREATMENT WITH MINISCREWS INSERTION IN THE INFRAZYGOMATIC REGION: CASE REPORT

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Aim: the following case report reports the treatment of a 22-year-old female patient with a Class 2 Division 1 malocclusion with a deep bite, mandibular hyperdivergence, and a gummy smile. The patient refused the proposed treatment with orthognathic surgery and any treatment alternative involving the extraction of permanent teeth except upper third molars.

Methods: the treatment plan accepted by the patient is as follows: Orthodontic therapy multibrackets, MBT prescription. Extraction of the right upper third molar, distalization of the molars of the upper arch with traction in the posterior and superior directions, using a 200-gr NiTi closed coil spring and an orthodontic miniscrew applied in the infrazygomatic ridge re-

gion. The stages of treatment were: first of all, the alignment and leveling, next extraction of the right upper third molar was performed. Subsequently, two 1.8-mm-diameter and 10-mm-long miniscrews were placed in the infrazygomatic region and used to distalize the maxillary arch en-masse and simultaneously intrude the upper dentition.

Results: it was possible to obtain: a correction of the second class and the overjet, without having a worsening of the divergence. The patient's smile improved significantly because of the intrusive effect of mechanics on the upper incisors, which reduced gingival exposure at the end of therapy.

Conclusions: this result while a clinical compromise allowed for good aesthetic and functional results.

COMPLIANCE IN ORTHODONTIC PATIENTS WEARING ALIGNERS

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Aim: the aim of our study is to evaluate compliance in orthodontic patients wearing aligners. The patients chosen for the study were in the age range between 15 and 48 years old, with I and II malocclusions.

Methods: we asked some questions, after 3-4 months of treatment, to thirty patients in our clinical office.

We asked:

- is it comfortable or uncomfortable to wear aligners during school or university time?
- Was the first aligner particularly annoying?
- Do you wear aligners when you go out with your friends?
- Do you notice any change in your aspect after the first months of therapy?
- How do you clean your aligners? Do you use specific products?
- Are you happy with the therapy in general?
- How often do you clean your aligner?

Results: 30 patients (100%) answered it's comfortable to wear aligners and that they wear them also when hanging out with friends. The patients that didn't wear aligners when going out due to the COVID-19 pandemic patients rarely went out, so they didn't affect the duration of the therapy even if misbehaving. 86% said that the first aligner was more annoying than the future ones. 90% noticed changes in their aspect and 100% were happy with the therapy in general. Just 16% of them used specific products to clean aligners, most of them used hand soap or toothpaste to do that. To clean the aligner is a very important aspect of the treatment and shouldn't be underestimated. We personally recommend Geldis, daily cleanser, to clean the aligners.

Conclusions: the compliance in orthodontic patients wearing aligners is very good. The patients found the aligners quite comfortable, and they are happy with their therapy. The home management is easy for patients.

BONE BORNE VS HYBRID PALATAL EXPANDER IN YOUNG ADULTS: DENTOALVEOLAR AND SKELETAL CBCT ANALYSIS

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Aim: the aim of this study is to analyze and compare the dentoalveolar and skeletal changes of two expansion devices: one with purely skeletal support (bone-borne appliance), and one with dento-skeletal support (hybrid appliance), used in the correction of transverse maxillary discrepancies, with CBCT and 3D image analysis.

Methods: the sample consists of two 18-year-old female patients treated with bone anchored palatal expander (bone-borne, BB) and tooth-bone anchored palatal expander (tooth-borne borne, TBB). Both appliances design includes 4 miniscrews (4 Hdc Tads) with bands on the first molars in the tooth-bone anchored palatal expanders. The same expansion protocol was used for all patients: one activation a day for the first ten days, one week with no activation and then an activation every day for the entire length of the expansion screw (12 mm). CBCT scans were acquired at the beginning of the treatment (T0) and at the end of the activations (T1) to evaluate maxillary expansion and dentoalveolar changes. The measurements were performed using ITK-SNAP software.

Results: a significant maxillary expansion was observed in both patients. In particular, the palatal suture showed a somewhat triangular (V-shaped) opening of the suture that was wider anteriorly in both groups: the sutural opening was 3,51 mm anteriorly and 2,48 mm posteriorly in the patient treated with Bone-Borne expander and 3,56 mm anteriorly and 2,2 mm posteriorly in the patient treated with Tooth-Bone Borne expander. All measurements gave comparable results except for the teeth movement: dental support gave an extra positive torque to the first molar in the patient treated with tooth-bone borne expander. The angle between first molar axis and NF in TBB patient showed an improvement ($1.6 = +12^\circ$; $2.6 = +11^\circ$). Instead, in BB patient, molar torque didn't improve or even decreased ($1.6 = -1,3^\circ$; $2.6 = -3^\circ$).

Conclusions: at the end of the treatment, the analyzed data showed a widening of the suture width in both patients even if treated with two different devices. The hybride device conferred greater dentoalveolar effects found above all in an increase in torque at the level of the first molars.

THE TREATMENT OF SKELETAL CLASS II MALOCCLUSION IN GROWING PATIENTS: CASE REPORTS

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Aim: the purpose of this study is the evaluation through case reports of two different bite-jumping approaches for the treatment of Skeletal Class II and Angle Class II division 1 malocclusion: the fixed appliance Herbst Miniscope and the removable functional appliance Sander.

Methods: two caucasian patients were selected based on the following inclusion criteria: 1) Vertebral staging CS2-CS4; 2) Skeletal Class II by mandibular retrusion (cephalometric evaluation and Frankel manœuvre) and Angle Class II Division 1 malocclusion; 3) Absence of TMJ disfunction signs and symptoms; 4) Absence of dolicofacial growth pattern. The patients, treated by Herbst Miniscope appliance and Sander appliance were evaluated by cephalometric analyses (based on UMG Deltadent Software analyses and Pancherz one) and profilometric/photographic study.

Results: both Herbs Miniscope and Sander treatments resulted in an Angle Class I molar relationship and good overjet and overbite. Cephalometric superimposition after one year of treatment showed a significant mandibular growth in a favorable direction, combined orthopedic and orthodontic effect and no significant modification in jaw divergence. Herbst appliance treatment was shorter than Sander, being a fixed appliance and not requiring the patient's collaboration.

Conclusions: Herbst Miniscope appliance and Sander functional appliance produced orthopedic and orthodontic (dentoloveolar) effects and soft tissue changes, leading to correction of Skeletal Class II. Literature widely reports an increase in oropharyngeal volume through these appliances. Herbst has the advantages of a single stage treatment also, combined with fixed appliances.

IDENTIFICATION OF SKELETAL GROWTH PEAK: DURATION OF STAGES IN THE MPM METHOD

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Aim: to determine the age at the beginning and the duration of each stage corresponding to the circumpubertal period in the Middle Phalanx Maturation method (MPM) and to assess the difference between males and females.

Methods: sets of x-rays of the third finger middle phalanx taken at 6-month intervals were analyzed for 128 orthodontic patients (54 females and 74 males) between 9 and 14 years of age. After staging, the duration of each stage was derived from chronological ages, and the difference between males and females at each stage were investigated.

Results: MPS2 showed an average duration of 13 months in males and 11 months in females. MPS3 lasted significantly less in males (9 months) than females (11 months) ($P = 0.009$).

MPS4 lasted between 7 and 8 months in both males and females. For stages from MPS2 to MPS5 significant differences were found between males and females on age at the beginning of each stage ($P \leq 0.001$). MPS2 started at 10y10m in females and 12y2m in males, MPS3 started at 11y9m in females and 13y2m in males, MPS4 started at 12y9m in females and 13y10m in males, and MPS5 started at 13y5m in females and 14y4m in males.

Conclusions: stage MPS3 is significantly shorter in males than females, that therefore must be closely monitored when they are approaching this stage, to ensure correct treatment timing. All stages showed a duration around the year, with slightly lower means compared to previous evidence.

COMPARISON BETWEEN TWO DIFFERENT SYSTEMS FOR IPR: OSCILLATING AND MANUAL STRIPS

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Aim: to evaluate the enamel reduction efficiency, the effects on enamel surface and abrasive property decay of the strips of two different IPR systems: oscillating versus manual strips.

Methods: three oscillating strips and three manual strips were tested on 12 teeth obtained from patients who had an extraction therapy at the Department of Orthodontics, University of Rome "Tor Vergata". All teeth were cleaned of debris and soft tissue, then conserved and fixed in 4% glutaraldehyde in 0.2-M sodium cacodylate buffer solution at 48 °C. Each strip underwent one test of 8 cycles (30s each). Both abrasive tracks and teeth surfaces were qualitatively evaluated before and after IPR by means of SEM analysis; in detail, both abrasive tracks were analyzed to qualitatively evaluate the abrasive grain distribution on the metallic strip matrix and the pre-

sence of enamel debris before and after their use. The independent t-test was used, and significance level was set at $p < 0.05$.

Results: mechanical IPR system showed higher efficiency in terms of enamel reduction ($p < 0.005$) as compared to manual IPR system (0.16mm and 0.09mm, respectively). Quantity of removed enamel decreased throughout the 8 cycles for both systems. Less presence of enamel debris and detachment of abrasive grains were observed on mechanical strips than manual strips. SEM analysis revealed more regular surface of teeth undergone mechanical IPR procedures.

Conclusions: oscillating strips showed more controlled efficiency when compared with the manual IPR system leading to a more regular enamel surface.

EFFECTS OF IPR BY MECHANICAL OSCILLATING STRIPS SYSTEM ON BIOLOGICAL STRUCTURES

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Aim: the aim of the present investigation was to evaluate by means of scanning electronic microscope (SEM) the effects on enamel surfaces of oscillating mechanical systems for interproximal enamel reduction (IPR).

Methods: all strips of complete oscillating IPR sequence (Dentasonic, Cham, Switzerland) were tested. A single metallic strip for active IPR phase of 0.2 mm (Dentasonic, Cham, Switzerland) was selected to be compared with the sequence. Tribological tests with alternative dry-sliding motion were performed on samples for each type of sequence strips by a standard tribometer (Linear Reciprocating Tribometer, C.S.M. Instruments, Peseaux, Switzerland). Wear evaluation was assessed by means of a contact probe surface profiler and a Tay-Map software for the 3D analysis. Then, SEM analysis of ena-

mel surfaces was conducted with a FEI Quanta 200 (Hillsboro, USA) in High Vacuum at 30.00kV. Images were acquired at 30X, 100X and 300X of magnification.

Results: SEM evaluation showed smoothers and more regular surfaces when IPR was performed by complete oscillating IPR sequence. Single oscillating metallic strip of 0.2 mm determined a more irregular surface characterized by extended grooves, alternated with enamel ridges and irregular fragments.

Conclusions: the adoption of a standardized oscillating IPR sequence determines more regular and harmonious enamel surfaces at the end of the procedure. An adequate polishing after IPR plays a crucial role to guarantee a good long-term prognosis and a good respect of biological structures.

CHANGES IN HYOID BONE AND TONGUE POSITION IN CLASS I SUBJECTS AFTER TREATMENT WITH RPE

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Aim: the rapid palatal expander (RPE), may cause changes in hyoid bone and tongue position. The present study aimed to evaluate the effects of RPE on the position of the hyoid bone and tongue in skeletal Class I patients, compared to an inactive and an active control group.

Methods: eighty-four Class I subjects, aged 6-14, were selected retrospectively. Among these, 28 patients were treated with a RPE, 28 with a function-generating bite appliance (FGB) and 28 were untreated subjects. Lateral cephalograms taken before (T0) and after (T1) treatment were retrieved, and T1-T0 was equal to 17.1 ± 7 months. The craniocervical angulation was measured to verify that the patient's positioning in the craniostat was repeatable between T0 and T1. Finally, changes in the position of the hyoid bone and tongue were evaluated through

a cephalometric analysis, and the area of the free space between the tongue and the palatal vault was also measured.

Results: the statistical analysis revealed that there was good repeatability of the craniocervical angulation between T0 and T1; confirming the reliability of the measurements. No statistically significant difference in the hyoid and tongue posture was observed across the three groups. However, there were significant differences for HC3 (distance from H point to the third cervical vertebrae), H2H (distance from H point to SN plane) and TT-Eb (tongue length) between T1 and T0 in all the three groups.

Conclusions: hyoid bone position and tongue posture after RPE treatment and treatment with FGB appliances are the same as the untreated control group.

SMILE OUTCOMES IN PHASE 1: TRADITIONAL INTERCEPTIVE THERAPY VS INVISALIGN FIRST

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Aim: to compare children's smile outcomes by using the interceptive therapy with Rapid Maxillary Expansion and Schwarz plate (RS) vs Invisalign First (IF).

Methods: 59 Class I patients with constricted arches were selected: 31 have been treated with RS and 28 with IF. Extra-oral photographs and lateral radiographs were analyzed before the treatment (T1) and at the end of treatment (T2) that was respectively of 10 ± 6 months for RS patients and 12 ± 3 months for IF patients. 17 variables were selected to assess the smile outcomes. 12 aesthetic variables were evaluated on extra-oral photographs including 7 linear variables (smile width, buccal corridor, upper lip thickness, lower lip thickness, incisor gingival display, canine gingival display, maxillary dental midline), 3 percentage variables (lip symmetry, smile index, buccal corri-

dor) and 2 angular variables (canine angulation, smile cant). On radiographs 5 cephalometric variables, 3 linear (oj, ob, maxillary incisor position) and 2 angular (maxillary incisor inclination, IMPA), were measured.

Results: at T2, RS patients showed a greater increase of smile width and a greater decrease of buccal corridors compared to IF patients. IF therapy was more effective in improving incisor gingival display, canine gingival display, smile cant, maxillary dental midline, c angulation, maxillary incisor position, maxillary incisor inclination, oj, ob.

Conclusions: both interceptive therapies were effective. The RS therapy showed a greater smile width and decrease in buccal corridors. IF provided greater gingival visualization and smile aesthetics.

3-DIMENSIONAL EVALUATION OF FACIAL ATTRACTIVENESS IN PATIENTS BEFORE AND AFTER EXTRACTION THERAPY

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Aim: this study aimed, by means of tridimensional facial scans (3D-FS), to determine if the orthodontic treatment with extraction (ET) changes facial attractiveness respect to orthodontic treatment without extraction (NET).

Methods: 3D-FS of 30 patients (15 ET and 15 NET, crowding > 4 mm) pre and post treatment were analyzed by 11 laypersons, 10 dentists and 10 orthodontists. Initially, 72 facial scans, including 12 duplicates, were showed singularly and the examiners indicated facial and profile attractiveness on a numeric rate scale from 0 (not attractive) to 10 (very attractive). Data were analyzed by means of Student T test for paired data, ANOVA for repeated measures. P-value was set as < 0.05.

Results: a total of 1860 observations of single scans were performed by the three groups excluding duplicates. The 3D-FS of ET patients post treatment were judged attractive as pre-treatment for both profile and face (Profile Pre: 5.3 ± 1.6 , Profile Post: 5.2 ± 1.5 , $P > 0.05$; Face Pre: 5.4 ± 1.4 , Face Post: 5.4 ± 1.5 , $P > 0.05$). On the other hand, the 3D-FS of NET patients post treatment were judged as less attractive as pre-treatment for both profile and face (Profile Pre: 5.5 ± 1.5 , Profile Post: 5.2 ± 1.4 , $P < 0.001$; Face Pre: 5.7 ± 1.2 , Face Post: 5.6 ± 1.1 , $P = 0.014$). No differences among the three groups in their ratings of profiles and faces were found (ANOVA Profile $P > 0.05$; ANOVA Face $P > 0.05$).

Conclusions: NET in borderline patients might reduce the attractiveness of facial and profile judged by different groups of observers.

EFFECTS OF BIMAXILLARY SURGERY IN CLASS III MALOCCLUSION: A 3D SOFT TISSUE EVALUATION

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Aim: the aim of this retrospective study was to compare the changes in 3-D facial scans observed in skeletal Class III patients who had undergone bimaxillary orthognathic surgery.

Methods: a total of 51 skeletal Class III patients (25 F, 26 M, mean age $26.0 \text{ years} \pm 8.1$) were included in the study. All patients had a 3D photo taken at two time points: at T0, preoperative and at T1, between three months and one year after the surgery; the images were analyzed using 3dMDVultus Software. A total of twenty-three soft tissue points on facial scans of the facial profile were identified and evaluated. Analysis of coordinate movements were performed. The paired t-test was used. The level of significance was set at $P < 0.05$.

Results: after surgery statistically, significant differences were reported for the AL_R (Z-axis $+ 2.8 \pm 1.8$; $P < 0.001$) and AL_L (Z-axis $+ 2.8 \pm 2.4$; $P < 0.001$) points that showed a statistically significant advancement of the alar area of the nose. Maxillary point showed a statistically significant advancement SS (Z-axis $+ 1.8 \pm 1.7$; $P < 0.001$) and LS (Z-axis $+ 1.3 \pm 2.3$; $P < 0.001$), similarly both the crista philtra points moved forward CPH_R (Z-axis $+ 1.3 \pm 2.3$; $P < 0.001$) and CPH_L (Z-axis $+ 1.7 \pm 2.6$; $P < 0.001$) these indicates a forward movement of the maxilla. No clinically relevant differences, with movement greater than 1 mm were present for all the points for X-axis or Y-axis.

Conclusions: class III patients treated by orthognathic surgery showed statistically significant soft changes above all nose and perioral tissue of the maxilla.

INFERIOR MOLARS DISTALIZATION WITH ALIGNERS: BODILY MOVEMENT OR UPRIGHTING?

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Aim: the aim of this retrospective study is to analyze the efficacy of the lower molar distalization with clear aligner treatment (CAT).

Methods: 16 patients were selected for the study. Cephalometric analysis was performed at two different times, before starting treatment (T0) and at the end of it (T1). The distalization movement has been programmed using a sequential protocol similar to the one proposed by Align Technology for the upper molars distalization. Class III elastics were the only used auxiliaries (auxiliary treatment?).

Results: no significant variations between T0 and T1 were found in ANB, Wits Index, SN-MP and PP-MP. Final overjet and overbite remained unaltered. Significant variations were

found in the tipping of first and second lower molars. The analysis of the first molar showed a decreased mesio-distal inclination compared to the Co-Go line and the Go-Me, from T0 to T1. The second molar showed significant variations of mesio-distal inclination only related to the Go-Me line. A bodily movement of molars was not detected. On the other hand, lower incisors showed significant differences, even if their antero-posterior position didn't show any significant difference.

Conclusions: this study suggested that the virtually planned lower molars distalization resulted in a distal inclination of the molar crowns. Class III inter-arch elastics are advisable in order to reduce the anterior anchor loss caused by the aligner deformation.

A LITERATURE REVIEW ON CLEFT LIP AND PALATE: A COMPARISON ON DIFFERENT PROTOCOLS

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Aim: cleft lip and palate are congenital malformations found isolated or in association with additional abnormalities or syndromes. This scientific work introduces the current state of the art related to CLP treatment in the last 12 years of published literature review.

Methods: bibliographical research of exclusively reviews from 2010 to February 2022 in MedLine was considered. Keywords used were: "cleft lip", "cleft palate", "cleft lip and palate" and "cleft palate" NOT "lip".

Results: nine papers to establish current protocols of CLP treatment were selected. Two reviews explain that NAM within 1 week from birth, and in association with lip-taping, can reduce cleft defects and nasal deformities. Two papers agree on early repairing of the palate, which can affect negatively growth po-

tential. It however allows optimal speech development, compensating the former. Two papers assess that maxillary expansion executed before or after secondary ABG in UCLP brings about no difference in bone density and volume after 12 months. Another review reports a long-term success of 72-95% for ABG before the canine eruption, increasing to 70-97% after the orthodontic treatment. For adult patients, the orthognathic surgery protocol involves LeFort-1. Osteogenic distraction is on the other hand indicated to reduce later need for ABG. The last review asserts that BCLP has the highest index of orthognathic surgery (38,1%) above UCLP, ICP, and ICL.

Conclusions: in conclusion, CLP is still today a topic on which there is currently no consensus for therapy, although various studies agree on the value of the hitherto described protocols.

UNILATERAL INCISOR AGENESIS AND CLEFT LIP AND PALATE: A REVIEW ON DIFFERENT APPROACHES

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Aim: the aim of this review is to establish whether in literature a gold-standard for dental treatment of unilateral lateral incisor agenesis in unilateral cleft lip and palate patients exists.

Methods: clinical studies published between January 2000 and January 2022 were searched in electronic databases (PubMed, Scopus and Web of Science) using different combinations of the following keywords: “Cleft Lip and Palate”, “Lateral Incisor Agenesis”, “Orthodontic Treatment”, “Canine Substitution”, “Dental Implant”, “Dental Autotransplantation”, “FPD”, “RBFDP”. The analysis was supplemented with a manual search of relevant books and articles.

Results: 14 articles were included in the present study. The orthodontic mesialization with canine substitution and the dental implant rehabilitation are the treatment options most

frequently reported. The former provides grafted bone maintenance thanks to the prompt functional load offered by canine eruption in the bone grafted cleft area. As regards implant placement in such an aesthetic area, bone quality and quantity (a regraft could be necessary), position of adjacent teeth and smile height are crucial factors for the success of the therapy.

Conclusions: to date, the Scientific Literature cannot provide sufficient evidence to establish a gold-standard treatment, perhaps due to a small number of articles and a lack of homogeneity of the study designs. However, most of the authors agree that the indications for one type of intervention or another depend on the condition of the bone, teeth, periodontium and the intermaxillary relationships.

THERAPEUTIC MANAGEMENT OF DISPLACED MAXILLARY CANINE

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Aim: the most appropriate approach to manage a displaced maxillary canine is the early diagnosis to intercept a potential impaction. This study has focused attention on the preventive procedures to avoid the impaction of malposed canine, as suggested by the literature.

Methods: to find the relevant articles, the authors conducted an electronic PubMed search. The investigation was based on the keywords “impacted maxillary canines” - “displaced maxillary canine” - “palatal impacted canine and interceptive treatment”. Articles referring to craniofacial anomalies, syndromes and case reports were excluded. The final result of this search was 11 articles; retrospective studies and RCT were included in the final list.

Results: malposed maxillary canine therapy can be con-

ducted in several ways depending on the type and severity of the displacement, the intraosseous position and the age at which the diagnosis is made. Extraction of the primary canine, deciduous canine and primary first molar, extraction of deciduous canine combined with fixed orthodontic treatment, extraction of deciduous canine alone or with distalization of posterior sectors and maxillary expansion is the interceptive treatments suggested by literature to prevent the permanent canine impaction.

Conclusions: an interceptive approach may be the only intervention to be performed when a displaced upper canine is detected or the initial phase of a longer and more complex treatment to create space in the maxillary arch for the canine eruption and its alignment.

AESTHETICS AND SMILE: CORRELATION BETWEEN UPPER CENTRAL INCISOR MORPHOLOGY AND FACE SHAPE

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Aim: the purpose of this literature review is to identify and select the available scientific studies on the relationship between the shape of the upper incisor and the face.

Methods: a search was carried out on major electronic databases (such as PubMed, Scopus, Medline), selecting articles from 2015 to nowadays. We analyzed articles with similar inclusion and exclusion criteria, *in vitro* investigation and with different correlation methods.

Results: 10 articles were analyzed after passing a first selection and each one received bias evaluation by mean of Jadad Scale. The visual evaluation method has obtained correlation values of 50%, 41.1%, 52% and 40%; William's evaluation method has obtained values of 31.5% and 56.8%; geometric

evaluation method has obtained values of 44% and 48%. With the method of the superimposition of the contours between the two forms were obtained values of 31.41% and 22%. While the studies that applied Fourier analysis and the linear equation confirmed the correlation.

Conclusions: some studies had limitations such as subjectivity and two-dimensional analysis. Mathematical methods turned out to be more objective. In these works, the different shapes of the face and central incisor are not taken into consideration and therefore further studies are needed. Correlating the shape of the face and the central incisor can reveal an important aspect in the aesthetics of the smile and in the harmony of the face.

CLEAR ALIGNERS *VERSUS* FIXED APPLIANCES, LIMITS AND POSSIBILITIES: A SYSTEMATIC REVIEW

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Aim: the aim of this "systematic review" is to analyze, through the current scientific knowledge in the literature, the differences and limitations of Invisalign compared to fixed multibrackets orthodontic techniques, in order to understand if clear aligners can really be considered a valid alternative to the traditional method, also by virtue of the innovations recently made.

Methods: this "systematic review" follows the "checklist" of the Prisma 2020 protocol. Following a keyword search on the main scientific databases, which showed 371 clinical studies, 12 articles were selected on the basis of precise inclusion and exclusion criteria. The quality of non-randomized (nRCT) cohort and case-control studies was assessed using the New Castle-Ottawa Scale, and then defined as having low, moderate, or high risk of "bias." The one randomized trial (RCT) was analyzed using the Cochrane "RoB 2.0" system.

Results: all included studies were of high quality, except for one defined as having a moderate risk of "bias." The results of the reviewed studies showed a contrasting situation: some studies still reaffirmed the superiority of fixed orthodontics,

while others showed no statistically significant difference between the two techniques. What was certain, however, is the effect of the evolution of Invisalign technologies, which have allowed an improvement in the results in biomechanical terms, which can be defined, therefore, promising.

Conclusions: the results obtained with the Invisalign technique in the achievement of adequate occlusal contacts, posterior torque, marginal ridge alignment, anteroposterior discrepancies, although significantly increased over the years, are still not in line with those achievable with fixed multibrackets orthodontics. The buccolingual inclination of the mandibular incisors and canines, on the other hand, is the same, if not superior, in the Invisalign technique compared to the multibrackets technique, as well as that of the maxillary incisors; while the results of overjet and overbite appeared superimposable. Treatment with clear aligners resulted to be faster, more comfortable and aesthetic. It also emerged the importance of the clinical skills of the orthodontist in the use of the Invisalign technique, and of the "compliance" of the patient.

EVALUATION OF ORTHODONTIC INTRUSION ON PERIODONTAL SUPPORT: A SYSTEMATIC REVIEW

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Aim: to the best of our knowledge, it has not been examined effects of orthodontic intrusive movement on periodontal support. The aim of this systematic review was to evaluate clinical effects of orthodontic tooth intrusion on periodontal tissues.

Methods: seven databases were searched from December 2021 to February 2022. The study selection was executed by two independent authors according to Cochrane guidelines. The search was conducted on the following keywords: <<TEETH OR TOOTH orthodontic OR dental AND intrusion AND Gingival probe OR probing depth OR periodontium OR gingival OR periodontal attachment OR Gingiva or Periodontal OR Bone OR connective attachment OR epithelial attachment OR

clinical attachment level OR attached gingiva OR pocket depth>>. The preliminary searches ticked 1940 articles, after elimination of duplicates, reading title and abstract, it has been selected 48 from the author (B) and 50 from the author (B). Final study selection between the two operators has given 23 articles including: CCT, clinical trials, prospective, retrospective and clinical studies, case reports.

Results: orthodontic intrusion, supported by high level of oral hygiene, has not relevant effect on periodontal tissue. Combined orthodontic and periodontal treatment, in defective bone sites, reduce probing depth, improve clinical attachment and infrabony defects.

PEDIATRIC OBSTRUCTIVE SLEEP APNEA: THE ROLE OF ORTHODONTIST IN THE INITIAL EVALUATION

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Aim: Obstructive Sleep Apnea Syndrome (OSAS) is a respiratory disorder characterized by a partial or complete obstruction of the upper airways during sleep. It is common in healthy children and occurs with a higher incidence among children with craniofacial anomalies. Untreated OSAS can lead to multiple adverse neurodevelopmental and cardiometabolic consequences. Early diagnosis and treatment are mandatory given the potential benefits on child's development, cognitive abilities and social interaction. The purpose of this study is to evaluate the role of the orthodontist in the diagnosis of pediatric OSAS.

Methods: a search of literature was performed using the PubMed databases in January 2022 with keywords "sleep

apnea", "children" and "orthodontic", limiting the search to papers published from 2017 in English and Italian language.

Results: the initial search yielded 164 articles, on the basis of the relevance were selected 12. From the research emerges that polysomnography is still considered the gold standard for the diagnosis of OSAS. However, most of the studies consider screening questionnaires for OSA useful alternative diagnostic tools. All the studies agree with the evidence of an association between some specific craniofacial features and OSAS and most of the studies highlights the importance of an orthodontic evaluation in screening for paediatric OSAS.

Conclusions: the orthodontist can play a pivotal role in the early diagnosis of pediatric OSAS.

PEDIATRIC OBSTRUCTIVE SLEEP APNEA: THE ROLE OF ORTHODONTIST IN THE MANAGEMENT

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Aim: pediatric obstructive sleep apnea syndrome (OSAS) is a common disorder characterized by partial or complete airways obstruction during sleep. Early diagnosis and treatment are necessary to avoid sequelae of OSAS in children. Patients who exhibit multiple levels obstruction or comorbidities, including craniofacial abnormalities or obesity may require a multidisciplinary approach, involving orthodontic evaluation. The aim of this review is to define the role of the orthodontist in the management of pediatric OSAS.

Methods: a search of literature was performed using the PubMed databases in January 2022 with keywords "sleep apnea children orthodontic", limiting the search to papers published from 2017 in English and Italian.

Results: the search yielded 164 articles, basing on relevance

were selected 28. From the research emerges that AT is still the most effective treatment for pediatric OSAS in patients with adenotonsillar hypertrophy. Continuous positive airways pressure is an effective alternative to AT, however the compliance is often low. Emerging evidence demonstrate that orthodontics treatments may represent effective adjunctive or alternative therapies for pediatric OSAS, especially in patients with craniofacial risk factors, and that combined therapies have better results. High quality further studies are needed to confirm the evidence and to better target responders. These findings highlight that an interdisciplinary effort is necessary to treat pediatric OSAS.

Conclusions: the orthodontist should be considered a key figure in the management of pediatric OSAS.

RME IN PEDIATRIC PATIENTS WITH OBSTRUCTIVE SLEEP APNEA SYNDROME: A LITERATURE REVIEW

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Aim: OSAS is defined as a breathing disorder during sleep, characterized by upper airway obstruction with many subsequent daytime and nocturnal symptoms. Children with OSAS may show abnormalities of the maxillary structure. This review aimed to evaluate the effectiveness of RME as a treatment for OSA in children, in order to reduce apnea/hypopnea index and oxygen saturation.

Methods: an electronic search for all articles published in English up to January 2005 and February 2022. The study subjects were children between 5 and 12 years old and met the following inclusion criteria: clinical signs of malocclusion, no syndromic children, adenotonsillar hypertrophy, signs and symptoms of OSA, with an AHI > 1 at polysomnography, that underwent an otolaryngiatric evaluation and no previous tre-

atment for OSA. The device was fixed to the second deciduous molars. After 12 months the RME was removed.

Results: 80 journal articles were identified and 7 were selected. The included studies involved collectively 132 subjects. All studies reported the use of rapid maxillary expansion as an intervention for obstructive sleep apnea in children. All studies used the AHI and clinical symptoms to evaluate the treatment effectiveness. The polysomnography showed that the AHI measured when treatment ended decreased significantly from baseline, while oxygen saturation increased.

Conclusions: this review shows that RME, through the enlargement of dental arches and of nasal and maxillary structures, may be a useful approach in children with malocclusion and OSAS.

CHANGES IN VERTICAL DIMENSION AFTER FIXED ORTHODONTIC TREATMENT WITH EXTRACTIONS: SYSTEMATIC REVIEW

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Aim: the objective of our work was to investigate this topic through the main databases of scientific literature in order to analyze, with a systematic review, if there is a real relationship between changes in the vertical dimension on the face and extractives and / or non extractives orthodontic treatments.

Methods: we carried out a research on the main scientific databases, including only the “in vivo” studies, which comprehended a sample of at least 10 patients. Reviews, meta-analyses, case reports and expert opinion were excluded.

Results: 36 articles satisfied our parameters and were included. 26 studies found no difference in facial vertical di-

mension between extractive orthodontic treatment and non- extractive orthodontic treatment. 10 studies found out a relationship between extraction treatment and changes in facial vertical dimension, however, according to the cephalometric data, only one of these discovered statistically significant results.

Conclusions: there is no specific effect of premolar extraction treatment compared to non-extraction treatment protocols on the vertical dimension of the face. This demonstrated the limitations of conventional orthodontics in significantly altering vertical skeletal dimensions.

COMPARISON OF THE EFFICACY BETWEEN DIFFERENT APPROACH TO OSAS TREATMENT

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Aim: the aim of this study is to establish and compare the efficacy of different types of OSAS treatment evaluating C-PAP, MAD, I phase surgery (rhinoseptoplasty, tonsillectomy, uvulopalatopharyngoplasty or genioplasty associates to hyoid bone advancement) and phase II surgery (maxillofacial bimaxillary surgery).

Methods: two types of research have been defined via PubMed, Embase and Web of Science including 11 articles published between 2000 and 2020. the first research based on a systematic review of the literature evaluating the efficacy between C-PAP, MAD, and surgery; the second research based on comparisons of the efficacy between different types of OSAS surgery treatment: phase I and phase II.

Results: best results were obtained with maxillofacial bimaxil-

lary surgery evaluating Epworth Somnolence Scale (ESS), AHI (Apnea-Hyponea Index), RERA (Respiratory Effort Related Arousal) and minimum oxygen saturation. Maxillofacial bimaxillary surgery induced a resolution between 82% and 100% of OSAS evaluating AHI index with minimum complications. Using MAD the efficacy was from 78% to 92%, and using C-PAP the efficacy was from 67% to 95%. The efficacy of phase I surgery was between 40% and 80%.

Conclusions: articles we analyzed present as first choice of therapy for OSAS, with high symptoms, the use of bimaxillary orthognathic surgery, given the considerable success rate. On the contrary, with low symptoms, the use of MAD or PAP may be sufficient according to the patient's compliance.

OPTICAL PROPERTIES OF CLEAR ALIGNERS: A SPECTROPHOTOMETRY ANALYSIS BEFORE AND AFTER AGING

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Aim: the aim was to assess and compare transmittance and absorbance values of six different clear orthodontics aligners before and after *in vitro* aging, to determine colour stability and aesthetic properties over time.

Methods: 21 samples of aligners from 6 manufacturers were examined: All In (Micerium, Avegni, Italy), Air Nivol (NIVOL SRL, Navacchio Cascina, Italy), Arc Angel (Dextra Group Srl, Modena, Italy), Invisalign (Align Technology, Santa Clara, USA), F22, F22 EvoFlex (Sweden & Martina, Due Carrare, Italy), and Nuvola (G.E.O. UK, European Orthodontic Ltd). Each sample was subjected to spectrophotometry analysis of both its transmittance and absorbance before aging. Subsequently, the aligners were aged *in vitro* at constant temperature in artificial saliva and food colouring for 14 days. The spectroscopy

protocol was then repeated, and the resulting data were compared using analysis of variance (ANOVA) ($p < 0.05$).

Results: all aligners examined in the study maintained their optical properties almost unchanged after 14 days of aging; no significant differences were recorded between the absorbance and transmittance measurements taken before and after aging. The spectrophotometry results obtained by this study show that F22 and F22 EvoFlex have significantly lower absorbance and significantly higher transmittance values than all the other aligners examined.

Conclusions: although there were no significant differences between the clear orthodontic aligners before and after *in vitro* aging, F22 and F22 EvoFlex have significantly better absorbance and transmittance than the others.

CAN PROFESSIONAL DENTAL HYGIENE INCREASE THE FAILURE RATE OF LINGUAL ORTHODONTIC BRACKETS?

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Aim: to evaluate ultrasonic instrumentation (UI) effects on shear bond strength (SBS), adhesive remnant index (ARI) and the relationship between brackets' adhesive areas and bonding strength.

Methods: 200 bovine incisors were divided into five test and five control groups. Four different lingual brackets (STB, Ormco; TTR, Rocky Mountain Orthodontics; Idea, Leone; 2D, Forestadent) and a vestibular control bracket (Victory, 3M) were bonded. The test groups were submitted to UI for 15 seconds on each side of the bracket, whereas the control groups did not receive any treatment. All the teeth were tested with their bonding surface parallel to the force applied, using a universal testing machine; the ARI scores were recorded

using an optical microscope at 20x magnification. Two-way ANOVA and Tukey tests were applied for bond strength values, linear regression to evaluate the effect of bracket area on SBS values and chi-square test to determine significant differences in the ARI.

Results: brackets with lower mesh area significantly reduced their adhesion capacity after UI. There is a linear correlation between lower bracket areas and SBS reduction after UI. UI significantly increased ARI scores of brackets with narrow bases.

Conclusions: brackets with lower mesh area significantly reduced their adhesion capacity after UI.

Moreover, UI significantly increased ARI scores of brackets with smaller bases.

THE DARK SIDE OF RAPID PALATAL EXPANSION IN ADOLESCENT IDIOPATHIC SCOLIOSIS

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Aim: the question of whether orthodontic therapy by means of rapid palatal expansion (RPE) affects the spine during development is important in clinical practice. RPE is an expansive, fixed therapy conducted with heavy forces to separate the midpalatal suture at a rate of 0.2–0.5 mm/day. The aim of the study was to evaluate the influence of RPE on the curves of the spine of juvenile/adolescent idiopathic scoliosis patients.

Methods: eighteen patients under orthopedic supervision for juvenile/adolescent idiopathic scoliosis and independently treated with RPE for orthodontic reasons were included in the study: Group A, 10 subjects (10.4 ± 1.3 years), first spinal radiograph before the application of the RPE, second one during

the orthodontic therapy with RPE; Group B, 8 patients (11.3 ± 1.6 years), first radiograph during the use of RPE second one after the removal.

Results: group A showed a significant worsening of the Cobb angle ($p \leq 0.005$) at the second radiograph after RPE. Group B showed a significant improvement of the Cobb angle ($p = 0.01$) at the second radiograph after removal of RPE.

Conclusions: based on the results, the use of RPE during adolescence might influence the spinal curves of patients with idiopathic scoliosis. Orthodontic treatment planning should take into account this clinically important result to avoid unwanted and unforeseeable side effects.

POSTURE ASYMMETRY AND CHEWING IN DEVELOPING PATIENTS WITH UNILATERAL POSTERIOR CROSSBITE

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Aim: to investigate whether the presence of unilateral posterior crossbite (UPX) with functional shift is associated with chewing pattern alterations and degree of spine flexibility in children with the malocclusion.

Methods: 46 patients with mixed dentition were included: 24 with unilateral posterior crossbite (UPX; 9.8 ± 2.4 [yr,mo]) and 22 controls (C; 11.2 ± 2.4 [yr,mo]). Essential clinical data were collected: medical and dental history, clinical investigation, study casts, OPT, LL and PA teleroX and cephalometric analysis, intra- and extraoral photos. Chewing patterns were recorded with K7-I; Myotronics, Tukwila, WA, USA; the Spinal

Mouse was used for postural analysis.

Results: patients with UPX showed a significantly increased percentage of reverse chewing cycles on the side of the malocclusion ($p < 0.001$), while no difference between the sides was found in the C group. Moreover, in UPX a significant difference was found between left and right flexion angles ($p < 0.001$), whereas no difference was observed in the C group.

Conclusions: this preliminary study highlighted the possible association between unilateral posterior crossbite, asymmetrical chewing patterns and asymmetrical posture of the spine.

ALIMENTARY PREFERENCE AND CRANIAL STRUCTURE

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Aim: a study of bolus hardness preferences in relation to craniofacial structure.

Methods: a total of 108 patients (M = 44, $14,3 \pm 3.9$ [yr,mo]; F = 64, $16,9 \pm 9,1$ [yr,mo] with dental malocclusion were included. Essential clinical data were collected: medical and dental history, clinical investigation, study casts, OPG, LL and PA teleRX and cephalometric analysis, intra- and extraoral photos. Patients were divided in 3 groups according to SpP^GoGn: hypodivergent HO ($10^\circ \pm 5^\circ$); mesodivergent ME ($20^\circ \pm 5^\circ$); hyperdivergent HE ($30^\circ \pm 5^\circ$). 3 structured questionnaires (Q) were administered, evaluating bolus consistency perception (between hard and soft boluses) (Q1), habitual dietary preferences (Q2) and preference between simi-

lar foods with different consistency (e.g. bread crum/bread crust; Q3).

Results: patients in all three groups correctly perceived bolus consistency and reported a greater difficulty in chewing hard boluses (Q1). Patients in ME group reported a significant preference for foods with a softer consistency ($p < 0,05$; Q2). There was a general preference for softer foods in all three groups (Q3), with a tendency towards harder foods in the HO group.

Conclusions: this study suggests a link between bolus consistency and cranial structure. The observed tendency to prefer harder boluses in HO subjects might be explained considering that they develop more intense masticatory forces when compared to ME and HE subjects.

IMPROVED INTER-MOLAR DISTANCE IN POSTERIOR CROSSBITE TREATED WITH FGB AFTER FOLLOW UP

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Aim: to evaluate the efficacy and stability of Function Generating Bite (FGB) treatment in crossbite and control patients, before and after the correction of the malocclusion and at the end of follow up of 3 years.

Methods: 30 patients with mixed dentition were treated with Function Generating Bite (FGB): 20 with posterior crossbite (PX; $9,2 \pm 2,6$ [yr,mo]) and 10 controls (C; $10,3 \pm 2,5$ [yr,mo]). Essential clinical data were collected: medical and dental history, clinical investigation, 3 study casts (at presentation T0, after correction T1 and at follow up T2), OPT, LL and PA telerX and cephalometric analysis, intra- and extraoral photos. The distance between the mesiobuccal cusps of permanent maxillary first molars (inter-molar distance, IMD) was measured with digital callipers on study casts. FGB was manufactured with

acrylic resin, expansion springs and resilient, stainless steel posterior bites that prevent occlusal contacts between opposing teeth during swallowing.

Results: In PX at T0, mean IMD was smaller ($p < 0,001$) than C. In PX, there was a significant increase in mean IMD T0/T1 ($p < 0,001$), T1/T2 ($p < 0,001$) and T0/T2 ($p < 0,001$); between T0 and T2, mean IMD increased by 6,42 mm. No difference was found in mean IMD between the groups after the correction of the malocclusion (T1).

Conclusions: FGB, a non-cariogenic, atraumatic and self-regulating removable appliance, is effective in treating PX and is associated with significant increase in mean IMD, even in the course of follow up: for the time being, it is the only appliance capable of obtaining this result.

EFFECTS OF INDUCED MALOCCLUSION ON VERTEBRAL ALIGNMENT IN RATS: A CONTROLLED STUDY BY CBCT

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Aim: the aim of this study was to assess by CBCT the vertebral alignment alteration caused by an induced malocclusion in rats.

Methods: crown pads were applied on upper molars at one randomly selected site to create a premature contact with 0,5 mm increase in occlusal vertical dimension (OVD). The opposite side was left untreated (control side). Animals were divided in 4 groups, ten rats each. In groups A, B and C, the crowns were applied at time 0 (t0). No premature contacts were applied in group D. In group A, the crowns were removed after 2 weeks (t2) and rats euthanized after two more weeks, while in groups B and C, the animals were euthanized after 2 and 4 weeks (t4). In all animals CBCT were taken at t0 before ap-

plying the crowns and before the euthanasia, while in the group A CBCT were taken at t2, too.

Results: changes in the iliac crest angle (ICA) that formed between the superior external margin of the iliac crest and the vertebral spine were assessed. In groups A and B, after 2 weeks, the changes in ICA were statistically significant at $p = 0.028$ and $p = 0.042$. In group C, and in the control group D, the changes of ICA were not statistically significant ($p = 0.058$ and $p = 0.414$).

Conclusions: the results from the present study suggest that the unilateral increase in OVD could produce an inclination of the occlusal plane on the frontal plane so that the vertebral spine rotates towards the same side.

DIGITAL INDIRECT BONDING VS TRADITIONAL INDIRECT BONDING: A LITERATURE REVIEW

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Aim: plaster or digital models have been used to determine the bracket position and allow an indirect bonding. The tray used to transfer the information can be of different materials with different stability. The purpose of this study is to evaluate, through a literature review, the accuracy of bracket placement of digital indirect bonding (CAD/CAM technology) versus traditional indirect bonding

Methods: an electronic search was conducted in PubMed, Medline and Cochrane Library up to February 2022. The eligibility criteria were: type of study (Randomized Clinical Trials (RCTs), Controlled Clinical Trials (CCTs), observational studies); Language (articles written in English). Exclusion criteria were: article regarding lingual indirect bonding, article comparing direct vs indirect bonding

Results: of the 62 articles identified by the search, 38 were excluded because they were duplicated, 9 because of the type

of study, 2 because they were not written in English, 4 because they were about lingual fixed appliance, 2 because they were about direct bonding vs manual indirect bonding and finally 7 articles were included in the study. From the analysis of the latter it emerges that, compared to traditional transfer trays, 3D digital printed trays shown both lower angular errors and lower mean height errors. The explanation for these results could be that the 2 types of trays had different thickness and physical properties: manual trays are usually thinner than 3D printed trays, and this made the bonding process more affected by operator skills. On the other hand, highly precise scanner and printers are required for 3D printed trays and this is often expensive.

Conclusions: it is possible to conclude that both digital and traditional indirect bonding are highly accurate but the traditional one shows greater errors compared to the digital one.

COMPARISON BETWEEN CARRIERE MOTION® 3D™ AND INTERMAXILLARY ELASTICS IN CLASS II CORRECTION

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Aim: to analyse skeletal and dento-alveolar changes in class II patients treated with Carriere Motion® 3D™ appliance (CMA) followed by fixed multibracket appliance (FMA) and class II elastics associated with FMA.

Methods: 30 Caucasian patients with initial class II malocclusion were divided into two groups: group one treated with CMA and later with FMA and group two treated with FMA and class II elastics. Digital dental casts, lateral cephalograms before and after treatments were analysed to compare the two groups using VAM (Vectra, Canfield Scientific, Fairfield, NJ, USA) and Dolphin Imaging (Chatsworth, Calif) software respectively.

Results: class I was achieved in both groups. In the first one class II correction was faster than in group two. Dental cast analysis revealed a reduced tip of the upper canine and upper first molar, mainly in the group treated with CMA which means that it causes a distal inclination of the crowns to which it was bonded. From cephalometric analysis no skeletal changes emerged and the main variations were of dento-alveolar nature.

Conclusions: both treatment methods were effective in achieving class II correction. CMA appliance was not able to determine a bodily distalization but the correction was due to a combination of dento-skeletal effects. No significant differences emerged between the two groups.

SLEEP QUALITY AND ACADEMIC PERFORMANCE RELATION IN A GROUP OF MEDICINE STUDENTS

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Aim: students of medical faculties are continuously exposed to high physical and psychological stress due to the intense training and responsibilities to which they are subjected. It has been proven the existence of a correlation between stress and poor sleep quality as well as its consequences on cognitive abilities and performances. The goal of this study is to evaluate the sleep quality of a group of medicine students and investigate the possible relationship between sleep habits and academic performance.

Methods: a questionnaire based on Epworth Sleepiness Scale and STOP-Bang questionnaire was provided in the period January-February 2022 to undergraduate students of Medicine at the University of Padua.

The number of exams passed, and the average of the marks

were assumed as evaluation criteria for academic performances.

Results: a total of 302 students answered the questionnaire, a significant number of subjects presented an ESS value that may suggest a possible sleep disorder while 51.3% of them considered their sleep restful and 69,5% reporting an excessive daytime sleepiness. There was a substantial correlation between better sleep quality and higher academic performance, however, it was found also a significant number of data that do not support this relationship.

Conclusions: the high stress to which medical students are subjected is a determining factor in increasing the likelihood of developing sleep disorders, instead, the influence on academic performance remains quite uncertain.

CERVICAL VERTEBRAL MATURATION: ARE POSTPUBERTAL STAGES ATTAINED IN ALL SUBJECTS?

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Aim: reliable use of the cervical vertebral maturation (CVM) method implies that pubertal stages have to mature into postpubertal as soon as the growth peak is terminated. The present study was aimed at determining whether postpubertal CVM stages 5 or 6 are attained in all subjects.

Methods: a total of 450 adult subjects (270 females and 180 males; mean age, 30.4 ± 27.3 years; range, 20-45 years) seeking orthodontic treatment and having a lateral head film were included in the study. Customized cephalometric analysis was used, and each recording was converted into an individual CVM code according to the concavities of the C2 to C4 and shapes of C3 and C4. The retrieved CVM codes, either falling within the reported norms (regular cases) or not (exception cases), were also

converted into the CVM stages and a newly introduced CVM score (0-9) capable of defining intermediate stage.

Results: the most frequent CVM stage was 5, while the CVM stage 6 was attained in only one third of the sample. Up to about 11% of adult subjects showed the pubertal CVM stage 4. Irrespective of the CVM stage or CVM score, no significant differences were seen between the sexes or across ages. The C4 showed a rectangular vertical shape in only 16.4% of the cases.

Conclusions: the percentage of adult population maintaining a pubertal CVM stage 4 is not high, but still relevant from a clinical standpoint. In light of this finding, planning treatment timing-based only on CVM appears not fully reliable.

GINGIVAL MARGINS' MODIFICATIONS DURING ORTHODONTIC TREATMENT WITH INVISALIGN FIRST

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Aim: to evaluate modifications of gingival margins after orthodontic treatment with Invisalign First.

Methods: the study group included 18 subjects (10 females, 8 males, mean age of 8.9 years) treated with Invisalign First. The following measurements were performed on photographs before treatment (T0) and at the end of the first set of aligners (T1) at level of permanent incisors, deciduous canines and molars: gingival margin height (GMH), that is perpendicular distance between the mucogingival line and the most apical point of the gingival margin; crown length (CL), which is distance between the most apical point of crown and the incisal/occlusal line and deciduous canine inclination (DCI), that is the angle between the long axis of upper deciduous canine and the mucogingival

line. A paired t-test was used to compare T1-T0 changes. The level of significance was set at 5%.

Results: reduction of GMH at T1 was documented for each tooth on both sides. Deciduous canines' GMH showed the major reduction between T1 and T0 accounting for 0.87 mm on the right side and 0.86 mm on the left side respectively. DCI increased of 7.11° on the right side and of 7.5° on the left side at T1.

Conclusions: teeth's movements during treatment with Invisalign First affected GMH of upper teeth and DCI. Attention should be paid to changes in the GMH and in the DCI because of the aesthetic impacts on smile of growing patients after Invisalign First treatment.

CHANGES IN MUSCULAR ACTIVITY AFTER ORTHOGNATHIC SURGERY

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Aim: to investigate changes in masticatory muscle activity during different tasks, before and after surgical orthodontic treatment.

Methods: the sample consisted of 40 adults (19 males, 21 females; mean age 26 ± 7.2) recruited at the School of Orthodontics of the University of Naples "Federico II", where surgical treatment was considered the therapeutic choice. The group was composed by 28 skeletal Class III patients and 12 skeletal Class II patients, and by 15 patients with skeletal crossbite and 25 without. Electromyographic analysis of the anterior temporalis (AT), masseter (MM) and submental muscles (SM) was performed to evaluate the muscle activity at baseline (T0). At least 3 months after surgery, a new electromyographic assessment was performed only in 20 patients

(T1). All the data were compared by means of paired and unpaired Student T test, with a $p < 0.05$.

Results: orthognathic surgery patients showed a general asymmetric activation of the muscles during clenching, chewing and deglutition independently by the type of malocclusion. Comparing the data of the patients before and after orthognathic surgery, the results showed a significant decrease in muscle activity (Impact_T0 89.5 ± 47 ; Impact_T1 69.2 ± 29.7 ; $P = 0.046$), and a better symmetry of the muscle activity during chewing (Module_T0 223.3 ± 427 ; Module_T1 60.9 ± 65.7 ; $P = 0.042$).

Conclusions: patients undergoing orthognathic surgery tend to have an asymmetrical muscles activation. After surgery patients increased their symmetry during mastication but reduced the muscular recruitment.

WEBSITES ON PEDIATRIC OBSTRUCTIVE SLEEP APNEA: A CONTENT, QUALITY AND READABILITY ANALYSIS

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Aim: to analyze content, quality and readability of the most likely visited websites providing online information on pediatric obstructive sleep apnea (OSA).

Methods: Google, Yahoo and Bing were queried with the terms "children, sleep apnea, breathing disorder". The first 100 results for each search engine were selected. After removal of duplicates and irrelevant results, websites were analyzed for content as well as for quality (DISCERN instrument) and readability scores (Flesch Reading Ease Score, FRES, and Flesch-Kincaid Reading Grade Level, FKGL).

Results: 103 websites were included. Content was incomplete, with academic websites describing more comprehensively treatment options (median: 1.00, 95%CI: 0.77-0.97) compared to those operated by health professionals (0.50, 95%CI: 0.50-

0.72). Quality was poor, with median DISCERN score being 37 and higher scores being observed for academic websites (43.00, 95%CI: 39.47-46.53) compared to health professional ones (35.00, 95%CI: 32.27-37.87). Median FRES and FKGL scores were, respectively, 54.40 and 7.40. Health professional websites were easier to read (FRES = 57.30, 95%CI: 54.27-59.60) and to understand (FKGL = 7.15, 95%CI: 6.77-7.60) compared to academic ones (FRES = 50.05, 95%CI: 44.64-55.84; FKGL = 7.80, 95%CI: 7.11-8.73).

Conclusions: online information on pediatric OSA is incomplete, may be difficult to read and have significant deficiencies in quality. Clinicians should be aware of the shortcomings of these resources and consider the impact they may have on parents' decision making and on appropriate OSA care.

ERP ANCHORED ON DECIDUOUS TEETH IN EARLY MIXED DENTITION INCREASES ARCH SIZE EFFECTIVELY

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Aim: the purpose of this study was to see how efficient a Haas expander anchored to deciduous teeth was at changing dental arch dimension and improving crowding, as well as to see how stable the alterations were until permanent dentition.

Methods: closed cohort retrospective and case-control research were used in this study. 18 patients with lateral crossbite who were treated early (mean age 7.6 years) were studied. The treated group was compared to 72 control subjects, including 32 untreated adolescents with and without lateral crossbite, 18 adults and 18 adolescents with dental Class I and 32 untreated adolescents with and without lateral crossbite and the same canine dental class as treated patients before expansion (Class II Division 2). Gender was matched in all groups (males:females ratio of 8:10). Patients

were compared to control group at the last follow-up.

Results: the increase in intermolar width and reduction in anterior crowding in treated patients was considerable and lasted throughout adolescence. Treatment patients, adolescents without lateral crossbite, and adolescents and adults with a normal occlusion showed no differences. Adolescents with lateral crossbite who were not treated had the narrowest transversal widths and the most irregularity.

Conclusions: in individuals with lateral crossbite, the Haas expander anchored on deciduous teeth is successful in reducing dental arch constriction and crowding. Until permanent dentition, the effect remains steady. In the absence of therapy, dental arch constriction may persist, resulting in increased irregularity.

CLINICAL INDICATIONS AND RECOMMENDATIONS FOR ORTHODONTIC RETENTION: A NARRATIVE REVIEW

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Aim: the aim of the study is to present a review of the literature regarding orthodontic retention methods, analyzing the various types, and their different uses in order to help the clinician in choosing the best restraint protocol.

Methods: PubMed database was searched using the keywords "Orthodontic retainers" OR "Orthodontic retention". The following inclusion criteria were considered: English-language, published between 2011 and 2021, randomized clinical trials, studies comparing fixed and removable retainers or different restraint protocols, articles with patients in mandibular and/or maxillary restraint. Otherwise, the exclusion criteria were: studies analyzing syndromic, surgical or periodontal patients.

Results: due to the lack of homogeneity of restraint protocols and statistical methods and in some studies an insubstantial number of participants, comparison between the various re-

sults of the studies was difficult. The parameters examined by most of the studies were: Little index, intercanine and intermolar width, arch length, overjet/overbite, survival rate of restraints, periodontal health and patient cooperation. The results of the research have led to heterogeneous conclusions.

Conclusions: based on the results of the studies analyzed, it is possible to affirm that retention is essential to maintain the results achieved following orthodontic treatment over time and to avoid the onset of recurrences both in the short and long term. In modern orthodontics, the choice of retention protocol is still a very debated topic. Removable appliances facilitate oral hygiene but often cause less cooperation from the patient; on the contrary, the fixed ones do not require cooperation, but more attention in oral hygiene. Based on these factors, the clinician must choose the ideal restraint for his patient.

ORTHODONTIC TREATMENT OF UPPER LATERAL INCISOR AGENESIS: AN OVERVIEW OF LITERATURE

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Aim: the aim of this review is to analyze the different possibilities of treatment of maxillary lateral incisor agenesis in the permanent dentition, according to the clinical characteristics of each patient.

Methods: three online databases (Medline Complete, PubMed, Dentistry & Oral Sciences Source) have been searched up to January 2022 using the following search string: “maxillary lateral incisors AND agenesis AND treatment”. Only studies published after 2010 and written in English or Spanish were considered. Inclusion criteria regarded articles about the treatment of agenesis of upper lateral incisors in the permanent dentition.

Results: 26 articles met the inclusion criteria and were considered. As shown in these articles there are several options

for the treatment of upper lateral incisors agenesis: autotransplantation, prosthetic replacement and space closure with canine mesialization, each with its advantages and disadvantages. Before any choice is made the clinician should consider the patient's age, facial profile, type of malocclusion and crowding, canine morphology, smile line, periodontal situation and, finally, the patients' preferences and cooperation.

Conclusions: there is no sufficient evidence to draw conclusion on the best treatment since there are several variables to be considered. A multidisciplinary approach is needed since it affects an aesthetic region thus influencing the patient's social life and poses many challenges.

REPRODUCIBILITY OF SYSTEMATIC REVIEWS ON MAD EFFECTIVENESS FOR OSA TREATMENT

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Aim: to determine whether the reporting of primary study search and selection strategies of systematic reviews (SRs) on mandibular advancement devices (MAD) effectiveness for the treatment of obstructive sleep apnea (OSA) is reproducible.

Methods: PubMed, Scopus and Cochrane Library were searched for SRs directly comparing MAD effectiveness versus other interventions, inactive control, or no intervention in adults affected by OSA. Studies measuring treatment effectiveness using the apnea-hypopnea index or any other objective or subjective outcome evaluated with a validated scale were included. The criteria to evaluate the reporting of study search and selection developed by Faggion et al. (2018) were adopted.

Results: from 182 articles identified, 22 were included. None of the SRs listed excluded articles after titles and abstracts

screening, while only 3 SRs listed excluded articles with reasons for exclusion after full-text assessment. Respectively 1 and 6 SRs adequately reported sources of gray literature and handsearching.

Only 8 SRs specified the keywords and Boolean operators adopted for each database.

Conclusions: the reporting of search and selection strategies in SRs on MAD effectiveness is incomplete. This can compromise the chance for SRs to be replicated or updated by others and, also, may not allow a critical judgement of the available evidence thus diminishing their value for healthcare recommendations. These findings call for the need to improve clarity and transparency of reporting through a strict adherence to the 2020 PRISMA guidelines.

DOES PACIFIER USE BE RESPONSIBLE FOR DENTAL AND ORTHODONTICS PROBLEMS?

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Aim: the aim of this review is to evaluate benefits and risks of pacifier use, clarifying doubts and providing practical recommendations regarding the use of the different type of pacifier, the timing and other key elements to manage this habit.

Methods: a search on the following databases was conducted: Medline via PubMed, Scopus, Embase, Cochrane Central Register of Controlled Trials, Web of Science, OpenGrey and LILACS. The following keywords “pacifier AND malocclusion” were used, considering only articles written in English and published within the last 10 years. Finally, 14 articles were selected for the analysis.

Results: some authors stated that prolonged use of pacifier is correlated with a higher prevalence of anterior open bite, increased overjet or posterior crossbite. It also causes the presence of a reduced transverse palatal diameter (ogival palate) which increases, from a myofunctional perspective, the esta-

blishment of atypical swallowing, oral respiration and hypertonia of the facial muscles. There are pacifiers with an anatomical design, called “orthodontic pacifiers”, which have been studied and compared with conventional ones regarding the action that different designs exert on oral structures. Finally, the pacifier is considered to be a bacterial reservoir or infection vector, so different methods of disinfection and sterilization were evaluated with the aim of preventing oral infections.

Conclusions: the use of pacifier is recommended at night in the first year of life, then it has to be avoided after 2 years. Three is the limit age beyond which it is essential to end this habit. Choosing an anatomically designed pacifier is helpful to prevent the onset of malocclusion. The knowledge of the correct use of the pacifier allows professionals to provide recommendations to the parents to profit by beneficial effects of pacifier.

PREVALENCE OF DENTAL MALOCCLUSIONS IN DIFFERENT GEOGRAPHICAL AREAS: SCOPING REVIEW

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Aim: World Health Organization considers malocclusion one of the most important oral health problems, after caries and periodontal disease. Its prevalence is highly variable and is estimated to be between 39% and 93% in children and adolescents. This inhomogeneity may be due to ethnic and age differences of patients considered in studies. Due to the importance of malocclusions in dentistry, the aim of this review is to assess the frequency of malocclusions among different geographical regions.

Methods: a literature research was performed through the PubMed, Medline, Scopus, Web of Science, LILACS, Open Grey and Cochrane Library databases. The “PRISMA” guidelines were used for the following review. Fourteen studies were analyzed for this review: two of them were carried out in Italy,

while the remaining 10 in different countries, in order to observe possible differences in the prevalence of malocclusion in each population.

Results: class I was found most frequently, followed by class II and finally class III. Considering the other anomalies, crowding was one of the most frequent with a prevalence of up to 84%, followed by spacing, which reached a frequency of 60%. Prevalence of crossbite and openbite was quite variable, while the evaluation of deepbite revealed more uniform values.

Conclusions: the prevalence varied widely for most of the types of malocclusion in relation to the different populations, which suggests a role of genetics and environmental influences, typical of each population in determining dental problems.

ORTHODONTIC, SPEECH THERAPY OR BOTH: WHICH THE BEST FOR ATYPICAL SWALLOWING AND OPEN BITE?

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Aim: the cause-effect relationship between atypical swallowing and anterior open bite, two conditions that are strongly related and often accompanied by speech disorders, is still not fully understood. These difficult-to-resolve conditions can be treated with an orthodontic protocol, a speech therapy protocol, or a combination of both. The purpose of this scoping review is to compare the various types of treatment to determine their effectiveness in improving skeletal conditions, normalising muscular activity, and stability over time.

Methods: a manual and electronic research was conducted using PubMed and The Cochrane Library without language-temporal limitations and following PRISMA guidelines. All types of studies in humans in deciduous or mixed dentition

with anterior open bite related to atypical swallowing and subjected to three different types of treatment (myofunctional only, orthodontic only, combined) were selected.

Results: only 9 studies fulfilled the inclusion criteria. This review was written following a three-part structure (one for each type of treatment) analysing the following information: sample, age, dentition, treatment, duration and results.

Conclusions: the most successful treatment in cases of atypical swallowing with an open bite appears to be a combination of traditional orthodontic therapy and myofunctional therapy. It would be useful to carry out further studies to develop a universal logopedic protocol to be followed in these cases.

SARS-COV-2 PROTECTIVE MASKS AND THEIR CORRELATION WITH TEMPOROMANDIBULAR DISORDERS

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Aim: to investigate the possible association between the prolonged use of protective masks as indispensable measure to prevent the diffusion of SARS-CoV-2 and the presence of temporomandibular disorders (TMD).

Methods: an anonymous online survey was created for general population. The inclusion criteria were subjects with an age of ≥ 18 years. Participants were recruited through advertisements posted on main social channels with a link to a custom-designed questionnaire available from November 2020. The questionnaire included 34 multiple-choice questions on demographics, use of protective masks i.e. type, duration and modality of wearing during the day and on the presence of TMD.

Results: the replies received were 664 (313 M and 349 F).

37% were healthcare professionals, 21.2% of whom dentists. 334 (50.3%) subjects used protective mask FFP2 and 578 (87%) wore the mask with two elastics behind the ears. 28% of people had pain in the anterior region to the ears, of which 76 had a pain never felt before while 23 had a pain already existent but increased. There was a significant association with FFP2 (64.7%) and consecutive wearing 4-8 h (57.1%). 38% participants reported headache while wearing the mask and most referred wearing it for several hours. An association was found with the interval 4-8 hours (39%).

Conclusions: a correlation between the prolonged use of protective masks and the presence of TMD, mainly headache, was confirmed with this survey.

DIRECT VS INDIRECT BONDING IN ORTHODONTICS: EFFECTS ON PERIODONTAL HEALTH

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Aim: the aim of this study was to realize a systematic literature review comparing direct and indirect brackets bonding techniques, evaluating which better for patients' oral hygiene maintenance and periodontal health.

Methods: all articles concerning direct and indirect bonding, both traditional and digital, focusing on oral hygiene maintenance and periodontal health, were searched using specific mesh terms within the following electronic databases: PubMed, Web of Science, Scopus, Cochrane Library, Google Scholar and Research Gate. Then, articles research - using appropriate mesh terms - focused on all articles concerning oral hygiene and periodontal health.

Results: a total of 2025 articles were found, including 72 articles related to direct and indirect bonding: 41 from PubMed, 9

from Scopus, 11 from Web of Science, 11 from Research Gate, no one from Cochrane. After inclusion and exclusion criteria application, 15 articles were identified. After a quality selection, based on F.G.R. Fowkes and P.M. Fulton's patterns, 3 articles were included in the final review.

Conclusions: analyzing these 3 articles, the difference between direct and indirect bonding was not significant. Although not significant, there are some differences. Indirect bonding has many advantages, such as better hygiene for patients, less composite utilization in brackets adhesion and less loosening of brackets. Indirect bonding can also prevent teeth demineralization, with a lower incidence of white spots, despite the higher costs for the orthodontist.

ROLE OF BIOMARKERS IN DETECTING ORTHODONTIC ROOT RESORPTION: A SYSTEMATIC REVIEW

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Aim: to evaluate different biomarkers found in the gingival crevicular fluid (GCF) to assess their usefulness to detect root resorption (OIIRR) in adult or adolescent patients undergoing a fixed orthodontic treatment, compared with untreated subjects, or treated with no root resorption evidence.

Methods: PubMed, EMBASE, Scopus, Web of Science, Cochrane databases were analyzed without language and initial date restrictions. Seven out of 1127 articles analyzed qualified for the final review. A quality assessment instrument (QAI) was developed to evaluate the risk of bias.

Results: five studies were at a moderate risk of bias, and two at a low risk. Inflammatory cytokines, osteopontin, osteoprotegerin, RANKL and alkaline phosphatase are not specific enough for OIIRR.

Dentine sialoprotein (DSP) emerged as a potential biomarker, but not helpful in detecting root resorption because also produced during bone turnover. Dentine phosphoprotein (DPP) may be an excellent biomarker of OIIRR as it is a mainly organic, non-collagenous constituent of dentine, more indicative of permanent loss of root structure compared to cementum proteins.

Conclusions: DPP may be considered a relatively useful marker for root resorption. The large heterogeneity among the studies did not allow a quantitative synthesis and a solid evaluation of the diagnostic abilities of the GCF biomarkers for early OIIRR. However, the summary of the results of the review is a useful basis for the development of new clinical trials.

EFFECTS OF BOTOX ON MASTICATORY MUSCLES

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Aim: aim of the present research is to describe the effects of Botox (botulinum toxin A) injections in masticatory muscles on Obstructive Sleep Apnea (OSA).

Methods: a 66-year-old male patient underwent Botox injections on masseters and temporalis muscles in order to reduce sleep bruxism. A total amount of 55 units were injected.

The therapy was conducted in the Neurological department of our hospital of the A. Gemelli Hospital.

The patient underwent polysomnographic (PSG) recordings

before and after the injections.

Results: the PSG did not show the presence of sleep apnea before or after the injections and no significant variations were observed as far as Apnea Hypopnea Index and Lowest Desaturation. The patient reported no improvement in sleep quality and no bruxism variation.

Conclusions: botox injection on masticatory muscles may cause muscular spasm reduction but do not cause a significant variation in sleep.

DISINCLUSION OF PALATALLY IMPACTED CANINES WITH SURGICAL AND PBM ACTION OF DIODE LASER: CASE REPORT

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Aim: the impaction of permanent maxillary canine is observed in 2% of patients who require orthodontic treatment. The aim of this case report is to describe a new orthodontic-surgical approach using diode laser for the exposure of the palatally impacted canines, and the photobiomodulating effect of this high intensity laser on dental movement.

Methods: a 14 years old patient came to the UOC of Orthodontics of the Umberto I Polyclinic of Rome referred the maxillary primary canines persistence in the dental arch. After the clinical examination and the evaluation of the OPT, which showed impaction of permanent maxillary canines, Cone Beam Computer Tomography was requested to plan the surgical-orthodontic treatment. Surgical exposure was performed with the diode laser and a periodontal pack was applied. No orthodontic devices were applied for impacted teeth traction on the

palate. Canines' movement was monitored at 1-, 8- and 16-weeks post-surgery with photo and intraoral scanner CS3500 (Carestream Health, Atlanta, USA). When canine crowns were erupted on the palate, indirect bonding technique was performed.

Results: complete disinclusion of canine's crowns was obtained in 16 weeks. In agreement with the literature, this case confirms that exposure with diode laser has advantages if compared with traditional surgery: no bleeding, decontaminant effect, no suture, and a fast eruption.

Conclusions: surgical exposure with the diode laser causes spontaneous eruption of palatally impacted canines without the use of orthodontic devices. The pre-orthodontic uncovering of impacted canines provides simplified, predictable, and more aesthetic outcomes.

MANAGEMENT OF SURGICAL-ORTHODONTIC TREATMENT IN PERIODONTAL PATIENTS: A CASE REPORT

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Aim: this study aims to emphasize the importance of periodontal management during a combined surgical-orthodontic treatment.

Methods: this case report shows a 30-years-old female patient; diagnostic evaluation by clinical and radiographic investigations shows Class II dento-skeletal (ANB = 9° Wits = 8mm) patient with deep overbite that has caused periodontal and dental trauma and overjet with multiple anterior distema. The patient was treated with a combined orthodontic-surgical approach in order to resolve both dental and skeletal discrepancies and to improve periodontal tissue health.

Results: before starting the orthodontic treatment, an active periodontal treatment was performed, the patient's oral hygiene and her cooperation were monitored. During orthodontic treatment, periodontal follow-up was performed at shorter intervals

(6 weeks) with oral hygiene sessions and Periodontal Screening Recording protocol. Maintaining proper oral hygiene after the placement of orthodontic brackets is essential to avoid gingivitis. On the brackets steel ligatures were used instead of elastic ones, since the elastomeric ones cause a greater accumulation of plaque than steel ligatures; the change of the arch has been delayed in order to reduce the stress on periodontal tissues and to obtain a physiological tooth movement. After the first phase of presurgical orthodontics, the patient underwent surgery to advance the mandibular body (bilateral sagittal osteotomy).

Conclusions: a multidisciplinary surgical-orthodontic approach in patients with severe skeletal malocclusion and periodontal disease is recommended when untreated dental or skeletal discrepancies result in the worsening of the periodontal health status.

EFFECT OF RAPID MAXILLARY EXPANSION ON SLEEP APNEA IN A CROUZON PATIENT

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Aim: pediatric patients with Crouzon syndrome have great possibilities of suffering from Obstructive Sleep Apnea (OSA). Our aim is to report a case of a patient with Crouzon syndrome who experienced significant improvement of OSA following orthodontic treatment with rapid maxillary expansion.

Methods: a 10-years old girl with Crouzon Syndrome was referred for dental evaluation at the orthodontic department at the A. Gemelli Hospital. A class III malocclusion with class III skeletal pattern and maxillary retrusion was observed. Since a significant maxillary constriction was present, the decision was made to provide treatment with rapid maxillary expansion and orthopedic face mask. Before and after maxillary expansion,

polysomnographic (PSG) examinations were recorded to assess the presence of OSA and the effect of the orthopedic treatment on this parameter.

Results: PSG examinations were recorded prior the application of the orthodontic appliance and 8 months later, after maxillary expansion and the retention period. After maxillary expansion the Apnea-Hypopnea Index was reduced from 5.7 to 2.9 and the lowest desaturation increased from 53% to 82%. The median heart rate frequency went from 81.5 bpm to 80.0 bpm and the number of snoring events increased from 1 to 23.

Conclusions: a significant improvement in OSA can be observed in patients with Crouzon Syndrome following rapid maxillary expansion.

3D ANALYSIS OF THE SPHENO-OCCIPITAL SYNCHONDROSIS CHANGES AFTER TOOTH-BORNE AND BONE-BORNE RME

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Aim: this study aimed to assess the changes in spheno-occipital synchondrosis after rapid maxillary expansion (RME) treatment performed with conventional tooth-borne (TB) and bone-borne (BB) appliances, using images obtained from Cone Beam Computed Tomography (CBCT) and voxel-based superimposition technology.

Methods: 40 subjects with diagnosis of transverse maxillary deficiency were treated with TB RME or BB RME. The radiographic investigation was performed via CBCT scans before treatment (T0) and after a 6-month retention period (T1). Segmentation of 3D surface models of the spheno-occipital synchondrosis and basilar part of the occipital bone was performed using semi-automatic software. The CBCTs taken at T0 and T1 were registered at the anterior cranial fossa using

voxel-based superimposition. Linear measurements and Euclidean distances were used to evaluate the Basion displacement. The volume of the synchondrosis and the Nasion-Sella-Basion angle (N-S-Ba°) were calculated for each time point. All data were statistically analyzed to perform inter-timing and intergroup comparisons.

Results: a slight increment of the volume of the synchondrosis and of the N-S-Ba° ($P < .05$) was found in both groups. Basion showed a postero-superior pattern of displacement. However, no statistically significant differences ($P > .05$) were found between the two groups.

Conclusions: even though TB and BB RME seemed to have some effects on the spheno-occipital synchondrosis, differences were very small and clinically negligible.

NASAL SEPTUM CHANGES AFTER TOOTH-BORNE AND BONE-BORNE RME: A CBCT RETROSPECTIVE STUDY

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Aim: this study aims to assess the effect of Rapid Maxillary Expansion (RME) on Nasal Septal Deviation (NSD) changes from Cone-Beam Computed Tomography (CBCT) scans.

Methods: the present investigation included 40 subjects with diagnosis of transverse maxillary deficiency who were treated with Tooth-Bone (TB) RME or Bone-Borne (BB) RME. Cone-beam computed tomography images (CBCT) were taken before treatment (T0), and after a 6-month retention period (T1). To quantify NSD, the tortuosity ratio (TR) was calculated by dividing the actual length of the septum by the ideal length in the midsagittal plane using Mimics software. Differences of TR values among these groups were evaluated using the statistical method of Student t test for repeated measures with no significance at level of $p \leq .05$.

ted measures with no significance at level of $p \leq .05$.

Results: Tortuosity Ratio (TR) values found were: TB group = 1.05 ± 0.03 at T0 and 1.01 ± 0.01 at T1; BB group = 1.05 ± 0.03 at T0, and 1.02 ± 0.01 at T1. Results showed slight significant reductions in TR values in each group between T0-T1 ($p \leq .05$), and no differences were found between the two groups ($p > 0.05$).

Conclusions: NSD slightly reduced when comparing pre- and post-treatment values of TR, which would suggest potential changes in NSD with limited clinical relevance. Accordingly, RME should not have relevant effects on the degree of nasal septum deviation in the medium-term (post retention), either with tooth-borne or bone-borne appliances in place.

SOURCES OF KNOWLEDGE ABOUT OBSTRUCTIVE SLEEP APNEA (OSA): A CROSS-SECTIONAL STUDY

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Aim: this study aims to analyze knowledge sources about OSA in patients affected by this disorder, mainly focusing on dentist as pathology sentry.

Methods: this cross-sectional observational study included 79 adult OSA patients that applied to Dental Clinic, University of Bologna. The questionnaire they were given consisted of: sociodemographic data form, OSA knowledge level, source of knowledge of OSA.

Results: analyzing the results of the questionnaire, it emerged that the patient heard about the pathology for the 1st time from a physician in 67.1% of cases, and in 15.2% of cases from the bedroom partner who addressed in 43% of cases the patient towards the diagnosis. The professional who first provides information about OSA to the patient is the otolaryngologist in

36,7% of cases, while the dentist just in 13,9% of cases, who directs the patient towards a diagnosis in 5,1% of cases.

Although only 3,8% of patients used a digital platform as their first diagnostic tool, 58,2% of patients said that they used Google to find information about OSA.

Conclusions: the information that the patients had collected about OSA were satisfactory, but they did not use all the sources they had. In most cases the main source of knowledge was the otolaryngologist, followed by the bedroom partner. OSA patients could easily find some help by visiting the general dentist that can give very useful information, make a screening or address the patient to the sleep physician; but often this doesn't happen. Since the sources of knowledge are few, OSA remains an underdiagnosed pathology in 96% of cases.

PONTICULUS POSTICUS: CBCT EVALUATION, PREVALENCE AND ASSOCIATION WITH APAD, SB AND MCI

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Aim: this cross-sectional study aimed to verify a correlation between dentoskeletal anomalies in the midface and neck area such as maxillary canine impaction (MCI), atlas posterior arch deficiency (APAD), sella turcica bridging (SB) and ponticulus posticus (PP).

Methods: this study was performed on 400 CBCT images from young patients. Data were subjected to statistical analysis using the IBM SPSS 17 software (IBM Corporation, New York, USA) and the Stata 9.0 software (StataCorp LP, College Station, Texas, USA). The chi-squared test was used to analyze the differences between the data collected. The significance level was set at $p < 0.05$ with a 95% CI.

Results: the analysis of 400 CBCT images revealed the presence of the PP in 88 patients (22%). Of these 88 patients, 18

patients (20,4%) with complete bilateral PP, 10 patients (11,3%) with complete PP on the left, 4 patients (4,5%) with complete PP on the right, 6 patients (6,8%) with complete PP on the right and partial on the left, 5 patients (5,7%) with complete PP on the left and partial on the right, 24 patients (27,2%) with partial bilateral PP, 14 patients (15,9%) with partial left PP, 8 patients (9,1%) with partial right PP.

Conclusions: the bilateral partial and complete bilateral variants are the most represented morphotypes in the sample. The prevalence of MCI is positively associated with PP and with SB. The presences of APAD and types II and III SB are not associated with the PP. Dentists can consider MCI a predictor for a precocious diagnosis of the PP since it is visible in radiographic images.

OCCUSAL PLANE MODIFICATION IN ADULT PATIENTS, TREATED WITH CLEAR ALIGNERS

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Aim: this study presents two purposes: i) a 3D evaluation of maxillary occlusal plane changes after clear aligners therapy; ii) an evaluation of correlation between occlusal plane changes and patient divergence.

Methods: 3D maxillary models of 32 patients (7 males and 25 females; mean age 20 +/- 3 year) treated with clear aligners, were analyzed. CAD-CAM software is used to describe an angle (a) in sagittal view, included between a reference palatine plane and maxillary occlusal plane. The differential calculation of the angle between two planes pre (a0) and post (a1) treatment, Da (a1-a0) was carried out. Six angular cephalometric measurements (Sn-GoMe; PP-PO; PO-PM; PP-PM,AFP/

AFA%.) were performed and related to Da. The subjects were further divided in three group according to Jaraback ratio.

Results: after aligner treatment Da increases in hyperdivergents and decreases in hypodivergent patients and significant difference was rilevated ($p < 0.05$) between these groups. Da showed a significant positive correlation with Sn-GoMe ($\rho = 0.44$) and negative correlation with AFP/AFA% ($\rho = - 0.53$).

Conclusions: aligners treatment involves counterclockwise rotation of maxillary occlusal plane compared to palatine plane reference, even if this rotation occurs differently according to divergence. Sn-GoMe increase and AFP/AFA% reduction leads to counterclockwise rotation of maxillary occlusal plane.

CORRELATION BETWEEN MANDIBULAR ARCH FORM AND VERTICAL RELATIONSHIP IN GROWING PATIENTS

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Aim: the purpose of this study is to study the correlation between mandibular arch form and vertical skeletal relationships in growing patients.

Methods: cephalometry in latero-lateral projection and scans of plaster study models were performed on a sample of 73 Caucasian subjects (33 males and 40 females) with biological age CS2-CS3.

Results: Spearman's correlation test (R), used to associate

the shape of the mandibular arch with the cephalometric data related to the evaluation of the vertical dimension of the face showed the presence of 7 statistically significant correlations ($p < 0.05$).

Conclusions: the results show the presence of statistical significant correlations between the vertical growth patterns and transversal dimensions of the mandibular arch in growing patients.

EFFECTS OF DENTAL AND MUSCLE VIBRATION ON THE OCCLUSAL TACTILE ACUITY OF HEALTHY INDIVIDUALS

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Aim: Occlusal Tactile Acuity (OTA) is the ability to detect small thicknesses between antagonist teeth. Studies performed on the skin pointed out that vibratory stimulation determine a reversible decrease in sensitivity. The aim of the current study was to evaluate changes of OTA following vibratory stimuli.

Methods: healthy volunteers were divided into two groups: Group 1 (18 females, 12 males, mean age 27.5 ± 2.4 years) for intraoral vibration, Group 2 (18 females and 12 males, mean age 28.8 ± 2.4 years) for extraoral vibration. The Novafon device (GmbH, Weinstadt, Germany) was used to apply 1-minute vibration of 100 Hz. Intraoral vibration was performed on the upper right first molar, while extraoral vibration was performed on the right masseter muscle. OTA was measured at the baseline, immediately after vibration, after 1 hour, and af-

ter 24 hours. Nine aluminum foils (range 8-72 μ m) and one sham test (no foil) were used. The thicknesses were placed in the molar area, and participants were asked to close their mouth and to refer if they felt them. Each thickness was randomly tested 10 times and the mean percentage of correct answer was computed. A mixed effects linear model for repeated measurements was used. Significance level was set at $P < 0.05$.

Results: no statistically significant differences between the four time-points were observed following both intraoral and extraoral vibratory stimuli (all $p > 0.05$).

Conclusions: OTA does not change following dental and muscle vibratory stimuli, supporting a contribution of receptors other than pulpar and muscle spindles.

DIFFERENT COMPOSITE RESINS USED FOR CLEAR ALIGNER ATTACHMENTS: AN *IN VITRO* STUDY

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Aim: to compare the mechanical properties and the wear performance of two nanocomposite by means of mechanical and tribological tests.

Methods: 12 samples for both flowable nanocomposite (FNC) and conventional nanocomposite (CNC) were created. The following tests were performed: thermal analysis and burning test; flat instrumented indentation test and a compression stress relaxation test; tribological analysis and wear evaluation (TayMap software). A customized step-sliding test was conducted to simulate the clinical application of materials with a polymethyl methacrylate (PMMA) ball used as counterpart.

Results: FNC showed lower density values ($1.62 \text{ g/cm}^3 \pm 0.02$) and inorganic percentage residue (41%) than the CNC (re-

spectively $1.95 \text{ g/cm}^3 \pm 0.01$ and 23%). Significant differences in terms of decrement of stress values, elastic modulus ($1,114.12 \pm 91.39 \text{ MPa}$), and stress relaxation rate ($24.39\% \pm 3.23$) were observed for the CNC when compared to the FNC (respectively $835.04 \pm 184.73 \text{ MPa}$ and $40.19\% \pm 4.65$). FNC showed higher values of dynamic friction coefficient (0.72 ± 0.017) and more worn and deeper profiles than the conventional ones. The step-sliding test with a PMMA ball confirmed a higher friction coefficient for FNC and a greater wear of the PMMA surfaces when used against flowable samples.

Conclusions: CNC showed greater performance and resistance under mechanical stresses than the flowable ones, resulting in being more suitable for clinical needs.

TOOTH COLOR CHANGES AFTER BRACKET REMOVAL

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Aim: possible changes in tooth color are concern of many patients planning to undergo orthodontic therapy. The aim of this study was to evaluate enamel color changes associated with placement and removal of orthodontic brackets.

Methods: orthodontic brackets were cemented on extracted human premolars following 4 protocols (n = 10): (G1): 37% H₃PO₄ etching (E&R) and Transbond XT adhesive primer and cement (TB; 3M); (G2): E&R +Scotchbond Universal Plus adhesive (SBU; 3M) +RelyX Universal cement (RXU; 3M); (G3): SBU in self-etch mode (SE) +RXU; (G4): RXU in self-adhesive mode (RXUSA). The bracket removal was conducted with an Instron Universal Testing machine. After bracket debonding, 2 different cement removal techniques were evaluated: Sof-Lex on low-speed handpiece and tungsten-carbide multi-lamina-

ted high-rotation drill. To assess the color of buccal enamel surface, spectrophotometry (SpectroShade) was used at room temperature under natural light before the cementation of the bracket, after the bracket removal and after the removal of cement. The spectrophotometer was calibrated before each color measurement for every tooth. The data was analyzed statistically (p < 0.05).

Results: the changes in the tooth color were not affected significantly neither by the cementation mode with the materials tested, independent of the separate etching step, nor with different cement removal techniques (p > 0.05).

Conclusions: the cementation of orthodontic brackets, as well as their removal does not seem to influence the change in tooth color at baseline.

COORDINATION OF ORTHODONTIC-ORTHOGNATHIC SURGERY TO DENTOFACIAL DISHARMONIES: A REVIEW

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Aim: the review aims to evaluate the collaboration and interaction between orthodontists and surgeons in the treatment of orthodontic-orthognathic surgical patients with dentofacial disharmonies. The study evaluates the current concepts of orthognathic surgeries and the current pre-surgical approaches.

Methods: the study was performed in PubMed, ScienceDirect and EMBASE. Have been selected only articles in English published in the literature in the last 10 years relevant to the subject of this review. Keywords: orthodontics, surgery, computer-assisted, orthognathic surgery, dentofacial deformities, review, virtual surgery planning.

Results: the review investigated 28 articles in total. From the presurgical orthodontic planning, there is a recent movement to the surgery-first approach in coordination with orthodontic-orthognathic cases with dentofacial disharmonies. Virtual planning is an accurate method to orthodontic-orthognathic

treatment planning. It is a non-invasive procedure, which uses digital clinical database for the clinical data. The technique includes 3D data acquisition, 3D stereophotogrammetry, 3D cone-beam CT scans, etc. Surgical results and the treatment planning showed that both in the maxilla and mandible, there is a great accuracy in virtual planning in bimaxillary orthognathic surgery.

Conclusions: inclusion of 3D virtual planning with other diagnostic analysis such as cephalometric radiography allows to surgeons and orthodontists to obtain comprehensive evaluation of maxillofacial structure. Virtual planning provides an interactive manipulation in real time with 3D virtual environment, and the best possible outcome. In conclusion, the review reveals that 3D virtual planning gained a popularity in clinical practice by helping to reduce surgical difficulty and eliminating intraoperative problems.

DIFFERENCES BETWEEN LINGUAL AND LABIAL FIXED ORTHODONTIC APPLIANCES

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Aim: in recent years the higher aesthetic demands in orthodontic treatment have led to the development of lingual fixed appliances. The purpose of this study was to evaluate orthodontic treatment outcome in patients treated with a lingual appliance versus patients treated with a labial appliance.

Methods: the search was conducted through the PubMed browser database using the following keywords: (lingual) AND (labial) AND (fixed) AND (orthodontics). Only studies from the last 10 years were considered. The search produced 51 results, but only 14 were selected for relevance to the topic.

Results: there was no differences in the finishing quality of orthodontic treatments and in root resorption between lingual and labial devices. Compared with labial appliances,

lingual appliances were associated with an increase of overall oral discomfort, speech impediment and plaque deposition, and a decrease of intermolar width. On the other hand, lingual appliances reduced the extent of post-orthodontic enamel damage, incisal protrusion and anchorage loss, and increased intercanine width. Lastly the cytokine levels were higher in lingual fixed appliance compared with the labial appliance.

Conclusions: both devices have been shown to be effective in terms of treatment and with comparable results. There is insufficient evidence to make robust recommendations for lingual fixed orthodontic appliances regarding their therapeutic or adverse effects.

OPEN BITE TREATMENT WITH TADS: A LITERATURE REVIEW

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Aim: to evaluate dental and skeletal effects of open bite correction using temporary anchorage devices (TADs).

Methods: the research was made on PubMed (Medline) using the keywords (open bite treatment) AND (tads OR miniscrew OR mini implants), with no limit in terms of publications date. Inclusion criteria were: methodological reliability and reproducibility studies, papers in which patients were treated with bone anchorage, records published in English language. Exclusion criteria were: non pertinent records, case reports, reviews and opinion articles, studies with a sample size inferior to 10.

Results: the amount of records identified through database searching were 111. After applying inclusion and exclusion criteria the eligible papers were 9. TADs insertion sites were hetero-

geneous in the articles considered, moreover 7 studies used latero-lateral cephalograms to assess the open bite correction while 2 used CBCT. Six articles considered patients in permanent dentition, while the other 3 studies included also patients in mixed dentition. Despite the differences in the structure of the studies analyzed, all the authors found open bite correction, molars intrusion and decrease of anterior facial height. Seven studies examined mandible position after the open bite correction and found a counterclockwise rotation of the mandible due to molar intrusion.

Conclusions: the use of TADs in open bite correction seems to be effective, however since the heterogeneity of studies and the small sample size, further investigations are needed.

EFFECTIVENESS OF RAPID PALATAL EXPANSION IN PATIENTS WITH OSAS: A LITERATURE REVIEW

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Aim: Rapid Palatal Expansion (ERP) is an orthopedic therapeutic procedure used in the treatment of skeletal contraction of maxilla. This treatment has been used successfully in patients affected by Obstructive Sleep Apnea Syndrome (OSAS), a pathology related to an upper airway obstruction which can be partial (hypopnea) or complete (apnea) and manifests itself with hypoxia, hypercapnia and increased respiratory stress during sleep. This review aims to evaluate improvements of respiratory parameter after use of Rapid Palatal Expansion in children and adolescent patients with OSAS.

Methods: a search was performed on PubMed using keywords: "Rapid Palatal Expansion", "Orthodontics", "OSAS". The eligibility criteria were: type of study (Randomi-

zed Clinical Trials, Controlled Clinical Trials, systematic review, retrospective and prospective studies), language (only English), period of publication (after January 2000), age of patients (only children and adolescents).

Results: starting from 70 articles found, only 5 studies have been selected for our review. The article analyzed showed the efficacy of treatment with Rapid Palatal Expansor in increasing nasal cavity volume and pharyngeal airway and reducing daytime and nighttime respiratory symptoms and suggested a significant reduction in AHI (Apnea Hypopnea Index), leading to a normal value (< 5).

Conclusions: this review confirmed that early orthodontic treatment is essential to avoid the severe consequences of OSAS.

EFFECTIVENESS OF CLASS III MALOCCLUSIONS TREATMENT WITH SKELETAL ANCHORAGE: A LITERATURE REVIEW

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Aim: the purpose of this review is to evaluate the efficacy of class III malocclusions treatment by using skeletal anchorage.

Methods: the research was conducted using PubMed database, from 1998 to 2022. The following keywords were used: class III AND skeletal anchorage OR miniplate. The criteria for eligibility were class III skeletal anchorage treatments. Studies of patients with craniofacial deformities were excluded. Articles were evaluated qualitatively using PICO format.

Results: 213 Articles were identified: 182 were removed according to criteria. 31 were included: 11 demonstrate a greater maxillary protraction without dentoalveolar effects like upper anterior teeth proclination and extrusion of upper molars with bone-borne facemask than the traditional one. 11 show how elastics tractions on miniplates create 24 h pure bone-

borne forces avoiding dentoalveolar compensations. 2 demonstrate a greater vertical control with elastics traction on miniplates than bone-borne facemask. 1 shows more maxillary growth, fewer dental changes and less skeletal plane rotation than tooth borne facemask. 1 shows reduction of facial concavity without dentoalveolar changes with upper miniplates and lower resin plate teeth bonded. 5 reviews demonstrate that maxillary protraction without dental changes is better with skeletal anchorage and miniplates have better vertical control.

Conclusions: skeletal anchorage class III treatment is a revolution. Although more studies are needed, elastics traction on miniplates are better than bone-borne facemask because of vertical control and sagittal improvement.

COMPARISON OF RAPID VS SLOW MAXILLARY EXPANSION ON PROMS: A SYSTEMATIC REVIEW

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Aim: the objective of this systematic review was to compare patient-reported outcome measures (PROMs) in rapid maxillary expansion (RME) vs slow maxillary expansion (SME) in growing patients.

Methods: electronic search in PubMed (MEDLINE), Cochrane Library, Scopus, Embase, Web of Science, and OpenGrey was conducted. Only RCTs were included. Two independent reviewers extracted data. Risk of bias was assessed using the Version 2 of the Cochrane risk-of-bias tool for randomized trials (RoB 2). GRADE statement was performed. The mean of the differences (MD) and the risk ratio (RR) were used for the aggregation of data. A random effect model was applied.

Results: after removing duplicates, 6477 records remained. Two articles with a total of 157 patients were finally included in this systematic review. Pain presence was less, though not statistically significant, in SME patients (RR = 2.02, 95%CI from 0.55 to 7.49, $P = 0.29$, $I^2 = 95\%$, 2 studies, GRADE very low). Pain intensity was significantly lower in SME appliance in the first week of treatment (pooled MD = 0.86 favoring SME, 95%CI from 0.47 to 1.26, $P < 0.0001$, $I^2 = 6\%$, 2 studies, GRADE moderate). There were no significant differences between the two groups in difficulty in speaking, difficulty in swallowing, hypersalivation, difficulty in hygiene, and patient and parent satisfaction. **Conclusions:** pain intensity was significantly lower in SME compared to RME during the first week of treatment.

CLASS III TREATMENT WITH FACEMASK WITH AND WITHOUT SKELETAL ANCHORAGE: A SYSTEMATIC REVIEW

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Aim: to compare the effects and the patient-reported outcome measures (PROMs) produced by facemask with or without skeletal anchorage for treatment of Class III malocclusion in growing patients.

Methods: PubMed (MEDLINE), Cochrane Library, Scopus, Embase, Web of Science, and OpenGrey were used for the electronic search. Only RCTs were included. Two independent reviewers extracted data. Risk of bias was assessed using the Version 2 of the Cochrane risk-of-bias tool for randomized trials (RoB 2). A random effect model was applied.

Results: two articles with a total of 82 subjects were included in this systematic review and meta-analysis. One article was at low risk of bias while one was at high risk of bias. There were

no significant differences between the two groups in ANB angle, Wits, SNA angle, SNB angle and SN-MP angle. The U1-SN angle was significantly reduced in the skeletally anchored facemask at the end of treatment (pooled MD = -5.91 favoring miniscrew, 95% CI from -7.64 to -4.27, $P < 0.00001$, 2 studies, GRADE moderate). There were significantly less complications in tooth-anchored facemask (pooled RR = 7.98 favoring No miniscrew, 95% CI from 1.04 to 61.27, $P = 0.05$, 2 studies, GRADE low).

Conclusions: facemask with skeletal anchorage determined a reduced inclination of maxillary incisors compared to dental anchored facemask. However, no significant differences were recorded in the skeletal effects produced by the 2 protocols.

TREATMENT TIMING OF THIRD CLASS MALOCCLUSION: AN UPDATED ANALYSIS REVIEW OF THE LITERATURE

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Aim: the aim of the study is to analyse recent protocols for treatment timing of III class malocclusion in growing patients.

Methods: a research on PubMed was conducted by using keywords: "treatment timing III class malocclusion". Eligibility criteria: RCT, NRS and CCT, syst. Rev., RS, PS; publication after January 2017; children and adolescents patients. A total of 15 articles were included.

Results: there are reliable indicators for predicting skeletal maturity such as radiographic hand-wrist maturational, third finger, middle phalanx (MPM), cervical vertebral maturational (CVM), dental maturation and emergence. CVM and HWM are reliable, but the dental parameters don't. CS1 and CS2 are prepubertal, CS3 and CS4 circumpubertal, CS5 and CS6 postpubertal. Interceptive orthopaedic treatment of Class III

is recommended in children (8-12 yrs) in deciduous or early mixed dentition to reduce the worsening in adult age. Early attempts to stop mandibular growth in children rarely succeed due to late growth, while modification of maxillary growth is successful. Efficient early treatment protocols for class III are RME/FM and modified SEC III. They produced similar effects in children, but higher vertical control is achieved with the second one.

Conclusions: treatment timing is crucial for a successful outcome of class III treatment. The CVM isn't always reliable because occasionally vertebrae don't develop notching at all, or they do lately. When staging the CVM isn't possible should be considered all the developmental factors such as age, stature and dental development, the MPM can be used efficiently.

CLINIC AND RADIOGRAPHIC FEATURES IN MANDIBULAR CANINE IMPACTION. REVIEW OF THE LITERATURE

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Aim: the aim of the work was to investigate, through a literature review, the incidence and etiology of impacted mandibular canines and their correlations with clinical and radiological anomalies.

Methods: a computerized search was conducted using the following databases: PubMed, Cochrane Central Register of Controlled Clinical trials, ISI Web of Knowledge, and Scopus. To identify any relevant publications not included in this list, we manually searched the references lists of the selected articles.

Results: in total, 600 articles were identified after the removal of duplicates. A total of 15 studies published between 2001

and 2018 met all the eligibility criteria and were included for the final analysis.

Conclusions: according to the findings from our review, the incidence of canine impaction in the mandible ranges from 0.31 to 1.35 per cent, while that of canine transmigration ranges from 0.1 to 0.31 per cent. Men and women are equally affected. The vestibular site of inclusion is the most commonly represented. Persistence of the deciduous canine is often related to canine inclusion. Usually subjects with maxillary canine inclusion present skeletal class I of Angle. Various etiologies may play a role, including odontomes (up to 20 per cent) and lateral incisor anomalies (16 per cent).

MINISCREWS IMPLANT SUPPORTED MAXILLARY CANINE MANAGEMENT: A REVIEW OF THE LITERATURE

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Aim: the permanent maxillary canine is the second most commonly impacted tooth with an incidence of 0,92% to 1.7%, most often with palatal path of eruption and presents a variety of challenges for orthodontic treatment. Canine impaction can result in root resorption of neighbouring teeth. The aim is to evaluate whether surgical treatment with the use of orthodontic miniscrews can minimize the risk of root resorption.

Methods: the research was made on PubMed (Medline) database using the keywords: “impacted” AND “canine” AND “miniscrews” AND “TAD’s”. Studies from 2018 to 2022 were considered. Inclusion criteria: studies which showed a strict correlation between treatment with miniscrews and root resorption. Exclusion criteria: non pertinent records and case reports. An amount of 7 studies was examined.

Results: all the reviewed articles described the protocol for impacted canine management with the use of miniscrews at

the beginning of the treatment. Most of the authors agree that the use of miniscrews provides biomechanic advantages and improve the patient’s comfort and decrease adjacent teeth resorption: this is the most serious complication, and it occurs most frequently on the lateral incisor when the canine has palatal displacement, and it can only be accurately appreciated on CBCT exams. Only Heravi et Al. have performed a quantitative study: it showed a lower amount of root resorption with the use of tad’s. Only two of the examined articles showed a mild resorption of the adjacent teeth.

Conclusions: the use of orthodontic miniscrews seems to result in a more controlled movement of teeth and a reduction in total treatment time, so that the clinical management of the case reduce the risk of root resorption on adjacent teeth. Additional research is necessary to establish clear indications and contraindications, as well as precise treatment protocols.

ORTHODONTIC EXTRUSION: A MINIMALLY INVASIVE STRATEGY TO IMPROVE A POTENTIAL IMPLANT SITE

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Aim: periodontal disease often results in severely bony defects around the teeth that can lead to potential extraction. Alveolar bone development can be accomplished through the slow orthodontic extrusion, before the placement of an endosseous implant. The aim of the study is to investigate the effects of orthodontic extraction and to evaluate the soft and hard tissue response to implant site development.

Methods: a research on PubMed was conducted by using the following keywords: “implant site development AND orthodontic”, “Orthodontic extrusion AND implant”. The eligibility criteria were: (i) the type of study – case report and case series; (ii) the language – only English articles were included; (iii) the period of publication – articles published after January 2010 were included. Articles that describe cases treated without the

subsequent insertion of the implant have been excluded, as well as articles describing the use of other bone and soft tissue growth techniques. Starting from 195 articles found, 13 were included in the review.

Results: extrusive movement produces forces resulting in soft tissue volume increase and new bone apposition. All inserted implants showed adequate stability. However, a non-significant increase was noted in minimum percentage in both buccal and palatal proximal bone.

Conclusions: compared with other surgical augmentation procedures, this technique is more time consuming but entails no risk of postoperative pain or inflammatory complications. Furthermore, indications for orthodontic extrusion are limited to moderate bone defects.

EPIDEMIOLOGICAL ANALYSIS ON BIOTYPELOGICAL ASPECTS OF A SAMPLE OF ORTHODONTIC PATIENTS FROM MILAN

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Aim: the goal of this study is to verify the prevalence and distribution of various types of malocclusions in a cross-section of patients in the province of Bergamo. A comparison will also be presented with two studies: one conducted 13 years earlier in the same location, and a new one which is in place now in Milan.

Methods: an initial general patient evaluation was made by a study of the orthodontic case with cephalometric analysis. The study has been conducted on a sample of 441 patients from the Bergamo area in treatment in the Alzano Lombardo Hospital. The most recent one is in place now at the Niguarda Hospital in Milan and is set out to reach a sample of 500 patients. The following indices has been reported: sex, age, SNA, SNB, ANB, intermaxillary angle, SNP-A, Go-Me, Wits index, OVJ, OVB and gonial angles (total, upper and lower).

Results: skeletal class: 49.21% class I, 44.9% class II and 5.9% class III. Divergence: more than 50% normodivergence, 8.54% hypodivergent and 39.76% hyperdivergent. Only 39.23% have a correctly positioned maxilla. Only 30.61% of

patients presented correct mandibular positioning. A normo-mandible is present in about one third of patients. Presence of maxillary deficit is found in 48% of patients. An analysis of skeletal bite data demonstrates that only 17% of patients has a normo bite. 40.82% of patients present a negative Wits appraisal. By Analyzing overbite data we can summarize that 71% of patients have a normo-overbite: 12% have a diminished overbite and 16% present an increased overbite. Comparing this study with the one conducted previously in the same hospital with a sample of 342 patients 13 years earlier and with the most recent one conducted in Milan, some significant differences can be noticed.

Conclusions: in this study the distribution of different types of malocclusions in children originating from different ethnic groups was also analyzed. However, it was not possible to obtain relevant statistical data. As the patient sample of the Niguarda hospital is more ethnically heterogeneous, it will be possible to obtain more relevant data.

TELE-ORTHODONTICS: EXPANSION OF THE TERRITORIAL DENTISTRY NETWORK OF THE UNIVERSITY OF MILAN-BICOCCA

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Aim: Dental Clinic of the University of Milan-Bicocca, with the purpose of implementing and improving healthcare for the population, has enhanced the Organization of the Dental Activities Network on the territory. This initiative was born following the very recent agreement of new dental structures with the University and is based on a pre-existing project, with appropriate innovations. Tele-Orthodontics program uses streaming connections to coordinate orthodontic clinics in distant places and to increase the exchange of data. In doing so it is possible to normalize the feedback to the different needs of different patients. The secondary objective was to carry out epidemiological studies and to assess their compliance with local health policies.

Methods: teleconference connection and online database with encrypted access (privacy). Access to the orthodontic database is restricted to authorized staff only. Everybody has an ID and a relative secret code: they can open a list where each patient is specified by a personal code. It gives permission to

access the patient dossiers of all connected facilities online. The benefit of this procedure is that the orthodontist can instantly view all patient data even during a teleconference, without transmitting heavy files.

Results: tele-epidemiology gave a sampling of 1501 patients, 354 of whom received telediagnosis; for 322 of them there was a teleconsultation and 188 obtained teletherapy. The partition of malocclusion was: I class ($ANB \geq 2$) 7%; II class ($ANB < 0$) 36%; II class ($ANB > 4$) 57%. The Needs of Orthodontic Treatment Index (IOTN) in the sampling was ≤ 3 in 23% of patients and ≥ 3 in 77%.

Conclusions: Tele-Orthodontics encourages public consciousness campaigns to carry out screening in the pediatric population and to accordingly lowering the incidence and prevalence of malocclusions recorded in patient samples. Patients no longer need to come to a central facility. They can receive high quality therapies in even a smaller one.

A CORRELATION BETWEEN ATYPICAL SWALLOWING, MALOCCLUSIONS AND POSTURE: DOES IT EXIST?

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Aim: atypical swallowing is a very common dysfunction, which might be related to malocclusions and anomalies of craniofacial development. Its etiology is multifactorial, but oral breathing appears to be one of the most frequent causes. For this reason, atypical swallowing and oral breathing should be evaluated and treated at the same time. This study aims to clarify the controversial correlation among this dysfunction, malocclusions and postural alterations.

Methods: in order to consider the theme of atypical swallowing from a holistic approach, the most recent scientific literature has been deeply analyzed.

Results: the correlation among atypical swallowing and ma-

locclusion can be defined as one-to one. In fact, as the first one can effect dento-skeletal development, anatomical alteration of stomatognathic apparatus can lead to unusual swallowing. Regarding the connection between posture and atypical swallowing, the latter forces muscles to work abnormally and, at the same time, postural alterations could cause dysfunctions of stomatognathic system.

Conclusions: in a patient with malocclusion and atypical swallowing, orthodontics alone could not guarantee a long-term success. Therefore, a multidisciplinary approach, which pays attention to respiratory and postural patterns, seems to be more effective.

ASSESSMENT OF UPPER RESPIRATORY AIRWAYS MORPHOLOGY IN OSAS PATIENTS USING CONE-BEAM C. T. (CBCT)

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Aim: the purpose of this study is to evaluate the morphology of the upper airways in patients with OSAS through the reconstruction of 3D images obtained through CBCT.

Methods: five subjects (3 males and 2 females, average age $53,6 \pm 9,2$) with OSAS (OSAS GROUP = OSG) diagnosed by polysomnographic examination have been compared with five healthy subjects (3 males and 2 females, average age $53,6 \pm 12,7$) (CONTROL GROUP = CG). The parameters evaluated on the 3D images obtained by CBCT were in both groups: the "Critical Point" (the anatomical level of greater narrowing of the airways) and its anteroposterior (AP) and lateral (L) diameter, its localization above or below the occlusal plane (UO or LO) and the shape, the maximum length and the maximum anteroposterior diameter of the soft palate, the upper, middle and lower pharyngeal spaces, using a median sagittal multiplanar (MPR) reconstruction. Cephalometric values such as SNA and SNB were also analysed to evaluate the anteropos-

terior position of the maxillary and mandible and the BMI (Body Mass Index).

Results: OSAS patients present: the elliptical shape of the "Critical Point", a reduced anteroposterior diameter (AP) located in most cases below the occlusal plane, mandibular retrusion, increased length and increased diameter of the soft palate, more significant narrowing of the middle pharyngeal space. BMI is also higher in OSAS patients than in the control group. High BMI values are associated with a more significant reduction of AP.

Conclusions: the use of 3D images obtained by CBCT is an indicator of the risk for a patient to incur obstructive respiratory diseases; analysing several morphostructural parameters can provide a multidisciplinary therapeutic response that allows directing the patient towards the most suitable treatment, such as the use of oral devices, maxillo-facial or otorhinolaryngological surgery.

UNERUPTED PREMOLARS ORTHODONTIC DISINCLUSION: CASE REPORT

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Aim: the aim of this case report is to elucidate the potential of light orthodontic biomechanics in facing even difficult cases such as multiple impacted teeth managing.

Methods: a 14-year-old patient comes at the department of dentistry of San Raffaele Hospital. After an accurate anamnesis and clinical evaluation, radiographic investigations are carried out. The patient presents a malocclusion caused by maxillary impacted premolars. Both premolars are surgically disin-

cluded and orthodontic forces are applied by using twin arches and elastic wires.

Results: this case of malocclusion is successfully treated by applying light orthodontic biomechanics and a class I occlusion is obtained.

Conclusions: the applied orthodontic biomechanics are valuable choices in treating cases of malocclusion correlated to the unfavourable position of impacted upper premolars.

SPACE CLOSURE BY MESIALIZATION OF A THIRD MOLAR WITH MINISCREW AND PARTIAL FIXED APPLIANCE

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Aim: this case report shows the complete space closure of an upper third molar by means of mesialization using skeletal anchorage and a sectional fixed multibracket appliance.

Methods: a 30-year-old male patient requested to restore the edentulous site after extraction of the UR7, asking for a non-implant solution. A good initial occlusion was highlighted. The UR8 crown was mesially tipped towards the UR6. A partial vestibular fixed appliance with miniscrew anchorage was proposed as treatment option. Brackets and molar tubes were bonded to UR4, UR5, UR6 and UR7. A NiTi archwire was engaged, whereas a Stainless Steel (SS) partial archwire was bonded at the palatal side to increase anchorage. At the end of levelling phase, SS archwire was placed buccally whereas a

miniscrew was inserted in the palatal side between UR5 and UR6 roots. Its head was connected to the UR6 palatal surface with a SS wire. A metal button was placed on the lingual side of the UR8; its mesial bodily translation was obtained using elastic chains on both vestibular and palatal sides. After 4 months, the residual 1.5 mm space was closed using only a chain from UR6 to UR8.

Results: after 15 months of treatment, the edentulous space was totally closed with the mesial bodily translation of UR8; good final occlusion was observed.

Conclusions: skeletal anchorage combined with conventional methods can provide a successful treatment option in challenging cases.

DIGITAL PLANNING OF SPACE MANAGEMENT IN GROWING PATIENT: CASE REPORT

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Aim: the aim of this case report was to evaluate the management of Class II malocclusion in growing patient by using Invisalign Teen System and an intraoral scanner to obtain a tridimensional imaging of the dental arches.

Methods: a 11-year-old female presented to the Department of Orthodontics at the University of Rome "Tor Vergata" with a Class II malocclusion and severe deep bite. Pretreatment cephalometric evaluation confirmed a skeletal Class II relationship associated with mandibular retrusion, excessive overbite and severe hyperdivergent skeletal pattern. Lower and upper incisors were well positioned respect to their basal bones. The main objectives of the treatment were: the expansion of maxillary and mandibular arches to obtain a recovery of the proper symmetric transverse di-

mension; the leveling of the curve of Spee through the intrusion of inferior-anterior teeth in order to realize an ideal overbite; the correction of Class II dento-skeletal relationship, using the correct management of leeway space, through eruption compensation.

Results: a reduction of 2° in ANB was achieved. The severe hyperdivergent skeletal pattern was reduced. Also, normal overjet and overbite were obtained.

Conclusions: clear aligners proved to be very effective in the management of leeway space of resolution of Class II malocclusion association with deep bite. The digital planning allows to the orthodontist to view a 3D model that can be "virtually" manipulated and modified, assisting to improve the treatment plan of the orthodontist.

THE STABILITY OF TREATMENT WITH HERBST MINISCOPE: CASE REPORT

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Aim: the class II malocclusions are most often skeletal and due to mandibular retrusion. The functional devices as Herbst MiniScope seem to have a good effect on the growth of the jaw. This device, in virtue of its biomechanical characteristics, is able to determine a remodeling of the glenoid cavity in a lower and advanced position, in order to correct the skeletal Class II. The long-term maintenance of the results achieved is essential for the therapeutic success of an orthodontic treatment.

Methods: a female, 9,8 years old, patient convex profile and mandibular retrusion. The cephalometric analysis shows a skeletal class II. The first phase involved the use of Herbst MiniScope appliance. After 2,10 years the positioning of a fixed

orthodontic appliance was carried out. The photos of the end of treatment show an important improvement in the profile a full class I ratio of molar and canine teeth was achieved. The result is occlusally and profilometrically stable after 14 years.

Results: the maintenance of a stable orthodontic result over time is the result not only of a correct and physiological occlusion but also and above all of a correct diagnosis. Functional devices associated to an orthodontic fixed finishing and a correct retention phase were necessary to archive a good therapy and to keep the case stable over time.

Conclusions: this case report shows how it is possible to correctly treat a second class whose result remains stable even 14 years after the end of therapy.

CONSERVATIVE-ORTHODONTIC TREATMENT IN PATIENTS WITH MICRODONTIA: ENAMEL RESHAPING

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Aim: this work demonstrates how a conservative intervention performed with composite materials can be usefully integrated with the orthodontic treatment.

Methods: 38 composite restorations performed on 28 conoid lateral incisors, 8 upper canines and 2 microdontic central incisors were taken into account. All reconstructions were performed with conservative technique, by the same team, and they were evaluated on the basis of structural integrity and color in a time frame of 24 months. Fractures and marginal infiltrations were reported. The color was assessed through the use of a spectro-photometer. The degree of satisfaction of the procedure was measured on a scale from 0 to 10.

Results: in the first 2 months 2 peg-shaped lateral incisors reported an incisal fracture attributable to the presence of pro-

trusive or laterality interferences. 12 months after the restoration 2 elements showed chromatic variations which were probably caused by lifestyle habits (foods, drinks, tobacco use). However, the degree of satisfaction of the adopted solution was 9.2.

Conclusions: the direct reconstructive technique with composite materials proved to be particularly useful and reliable in the integrated orthodontic-conservative rehabilitation of cases of microdontia taken into account. An advantage of using composite materials in this method was to allow an easy repair and functional reintegration of the restorations made in the event of material failures. The use of recent composite materials resulted in less polymerization shrinkage, better adhesion and color stability for extended periods.

ORTHODONTIC TREATMENT WITH ALIGNERS IN A PATIENT WITH SEVERE PERIODONTAL DISEASE

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Aim: the aim of this case report is to present a clinical case of a patient treated with orthodontic-periodontal combined therapy.

Methods: patient was 64 years old with diagnosis of generalized stage III grade B periodontitis with widespread horizontal resorption, FMPS 20% and FMBS 26%. From an orthodontic point of view, the patient presented skeletal Class II, mesodivergent pattern, molar class I relationship, lower anterior crowding and crossbite on 4.3. The treatment plan included initial etiological therapy followed by a resective surgery and regenerative surgery. Due to severe periodontal impairment, the upper arch was not considered suitable for orthodontic treatment; orthodontic therapy was programmed only on lower arch and it consisted of 43 aligners. The tooth 4.2 was ex-

tracted for crowding resolution and IPR was executed in the lower anterior sector in order to obtain space to reduce the proclination of the incisors and their intrusion.

Results: the resolution of the lower crowding and the reduction of the incisal proclination was obtained, keeping the periodontal situation stable.

Conclusions: clear aligner treatment could be indicated in orthodontics in patients with compromised periodontal tissues as it permits better oral hygiene procedures thanks to their removable nature and the reduced amount of plaque retentive surfaces. Patients are also encouraged to take more care of their teeth and to maintain the result obtained as an effect of the aesthetic improvement.

USE OF INVISALIGN® SYSTEM IN A PATIENT WITH AUTISM SPECTRUM DISORDER WITH A CLASS I MALOCCLUSION

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Aim: the purpose of this case report is to present the case of a male patient, 13 years old, with autism spectrum disorder who attended the orthodontic department of dental school of Turin. The treatment of the Class I malocclusion was based on clear aligner treatment (CAT) without auxiliary forces.

Methods: the patient presented a skeletal Class I, meso-divergent with a Class I malocclusion, deviated midlines, contracted palate, increased overjet (OVJ) and overbite (OVB), upper incisors pro-inclination, generalized diastemas in the upper and lower arch and altered Spee curve. The family reported a previous orthodontic treatment with germectomy of the 4 first premolars due to the amount of crowding. The objective of the proposed treatment plan was to align and level the teeth, reduce OVJ and proclination of upper incisors,

close diastemas in upper and lower jaw and intrude the lower incisors. The aligners were used 22 hour a day, revision appointments were fixed once a month and aligners were changed every 7 days.

Results: at the end of the treatment the patient presented the resolution of the class I malocclusion with OVJ and OVB in in physiological range except for small residual diastemas in the anterior sector; an acceptable compromise due to the patient's limits of collaboration.

Conclusions: the case management proved to be relatively easy given the patient's special needs and available therapeutic alternatives. This case shows how the treatment with CAT is a valid alternative in the management of patients with cognitive disorders.

DIGITAL WORKFLOW FOR REALIZATION OF DIPROM: A CUSTOM-MADE FACEMASK FOR CLASS 3 ORTHOPAEDIC TREATMENT

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Aim: the purpose of this work is to describe the full-digital workflow aimed at producing DIPROM, a custom-made face mask created to implement the effectiveness of orthopedic treatment in growing patients with skeletal class III.

Methods: the first step is the creation of a model of the patient's face, acquired by a 3D scanning camera. Secondly, a Shell Mask is virtually drawn and finished to guarantee 22 support zones on the forehead, cheekbones and chin. Then the mask is prototyped by SLA using biocompatible resins. The inner surface is lined with a certified, soft, antibacterial and washable material, while the outer surface can be customized with ideographic printing.

Results: the matching of facial scan with lateral cephalometric radiograph or CBCT allows to precisely define the point of ap-

plication and the direction of the protraction force, to reduce maxillary anterotation. The facial anchorage can be modulated to increase the support surface at the fronto-zygomatic level and reduce mandibular post-rotation. The perfect adhesion to the soft tissues and the use of special resins tested for prolonged contact with the epidermis ensure greater comfort for the patient, reducing the appearance of dermatitis and skin reactions; finally, the special shape based on facial morphology allows sleep in supine, prone and side positions.

Conclusions: this full digital workflow makes it possible to implement therapeutic effectiveness and to improve patient comfort, as well as to minimize the adverse effects of protraction therapy.

CLASS II TREATMENT WITH A SINGLE BONE-BORNE APPLIANCE AND HYBRID CLEAR ALIGNER APPROACH

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Aim: this case report describes the successful orthodontic treatment of a 22-years-old female patient affected by Class II malocclusion, maxillary skeletal transverse deficiency, ectopic maxillary left lateral incisor and mild mandibular crowding.

Methods: due to her adult skeletal maturity, a single bone-borne expander and distalizing appliance was applied in order to obtain both purely skeletal rapid maxillary expansion and bilateral molar distalization. As a result of an accurate matching between the pretreatment cone-beam computed tomography scan and digital models, a miniscrew-assisted palatal appliance (MAPA) surgical guide was created to safely guide the insertion of 4 miniscrews. After the first phase of active expansion, 0.032-inch TMA distalizing springs were inserted bilaterally in order to achieve maxillary molar distalization efficiently. Finally, the hybrid clear aligner (CA) approach

was used to obtain alignment, levelling and arch coordination, with the use of a partial lingual fixed appliance on the maxillary incisors.

Results: after 14 months of treatment, the bone-borne appliance allowed to obtain both transverse skeletal expansion and maxillary molars distalization reducing buccal corridors, leading to a bilateral molar and canine Class I relationship. Finally, the hybrid CA approach resolved the incisor's misalignment and good light contact had been achieved. The posterior marginal ridges had been levelled.

Conclusions: in specific and well diagnosed cases, a single bone-borne appliance can efficiently achieve a skeletal expansion and bilateral molar distalization, even in patients with advanced skeletal maturity. The subsequent use of the hybrid CA approach met the aesthetic demands of the patient.

EFFECTS OF THE MBT APPLIANCE ON II CLASS THERAPY: A TRIDIMENSIONAL STUDY

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Aim: the study aimed to observe the effectiveness of a fixed orthodontic therapy with MBT-type brackets in solving the malocclusion of an II class individual.

Methods: this is a case report study of a Caucasian 8 years old (at the first observation) female. The treatment has been an

initial phase of functional therapy with a Frankel V succeeded by the MBT protocol and II Class elastics.

Results and Conclusions: the II class was solved before the therapy, showing that the MBT appliance effectively achieves a I class norm occlusion in a development age patient.

MULTIDISCIPLINARY TREATMENT OF A PATIENT AFFECTED BY ECTODERMAL DYSPLASIA: A CASE REPORT

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Aim: ectodermal dysplasia is a rare genetic disease, and it can be observed for the presence of many agenesis. A male patient of 13 years old, with non-syndromic phenotype, required a visit with specialists for an orthodontic evaluation. A genetic evaluation was requested because of the high number of agenesis. The dentist can be the first medical figure to suspect any kind of associated syndromes and that is why he needs to learn how to recognize them.

Methods: the patient was treated with fixed multibracket vestibular appliance on both arches to level and align them. Also, two temporary anchorage devices (TADs) were positioned on the palate to manage anchorage and enhance mesial movement of upper teeth. At the end of the orthodontic treatment, direct composite restorations were made on lateral incisors

because of their conoid conformation. When the patient finishes his skeletal development, he will undergo an implant-prosthesis treatment on the posterior sectors, where the patient does not have any molars.

Results: the therapy has been concluded in 22 months with the alignment and level of the arches and the removal of palatal temporary anchorage devices. Coronoplasty by direct composite restorations has been performed on 1.2 and 2.2 because of their conoid form. The aesthetics of the smile has increased.

Conclusions: ectodermal dysplasia has not always clear manifestations of itself except in the oral cavity. Patients can come to dentists to ask for dental treatments, and the specialist has to intercept the oral manifestations of this pathology and has to be able to direct the patient to a specific genetic visit.

VOLUMETRIC EVALUATION OF FACIAL MODIFICATIONS AFTER RAPID PALATAL EXPANSION: A CASE REPORT

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Aim: facial aesthetics is a key objective in modern orthodontics. 3D stereophotogrammetry offers new tools for clinicians to assess the treatment outcome. The aim of this report is to evaluate facial soft tissue modifications in a patient treated with Rapid Maxillary Expansion (RME), using a 3D scanning device.

Methods: the patient, a 13-year-old girl with a surgically treated cleft palate, presented missing upper lateral incisors, a contracted maxilla with impacted upper left canine. This maxillary defect was treated with a hyrax expander bonded on the first upper molars.

Using the Vectra M3 Imaging System (Canefield), 3D volumetric images were captured before (T0) and at the end of the palatal expansion, 24 days later (T1). Using the Vectra integrated software, the images were matched and compared.

Results: significant changes in the nose's alar width were reported. The maxillary expansion also produced a noticeable soft tissue distension in the maxillary and zygomatic areas.

Conclusions: RME produces significant soft tissue modifications in patients and these effects should be taken into consideration in the development of a comprehensive treatment plan.

TADS AND HERBST: IS IT POSSIBLE TO CONTROL THE PROCLINATION OF THE LOWER INCISORS?

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Aim: the aim of this case report is to show how to avoid the proclination of the lower incisors with the use of 2 tads in the mandibular arch in a patient with skeletal class 2 treated with Herbst miniscope.

Methods: a 14-year-old patient in skeletal class II, brachifacial, on e.o. intraoral class II division II was highlighted in a CS3 vertebral staging. The therapeutic choice was to use herbst miniscope, in 2 stages. The upper part was mounted first to procline the upper incisors with a fixed methodical 4x2, once the correct OVJ was reached, the lower part and the telescopic arm for mandibular advancement were mounted. To avoid the proclination of the lower incisors, 2 tads were inserted (one between 36 and 37 and one between 46 and 47). Once ele-

ments from 33 to 43 were bonded and a sectional 0.017x0.025SS with 2 helix loops distal to the canines was inserted, tads were tied to the loops of the sectional by means of a double ligature. Finally, finishing with MBK therapy (prof W. Roth extratorque technique).

Results: the patient has reached a molar and canine class I, clear improvement of the profile, cephalometrically it is noted how the Herbst device has helped the mandibular growth, avoiding however, thanks to the tads, the proclination of the lower incisors, which goes from 6 to 7.1 ° Knosel et al. 2020.

Conclusions: the use of herbst miniscope associated with the vestibular tads has shown in this case to be very useful in order to avoid the proclination of the lower incisors.

CLINICAL STUDY ON NEW ORTHODONTIC THERAPIES USING ALIGNERS IN DYSFUNCTIONAL PATIENTS

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Aim: a 25-year-old patient comes to our observation with a moderate dental crowding and joint clicks, recurrent headaches and shoulder muscle pains and neck. The patient, based on the anamnestic data and clinical signs detected, turns out to be a locker.

Methods: to solve the clenching and, therefore, the pain resulting from protracted contraction of the chewing muscles, the patient is given a pair of passive aligners. The upper aligner, to wear during the night, and the lower one, to be used during the day, combining it with an exercise of biofeedback to be carried out 3 times a day. After 5 months, the patient tells us that she had not had any headache episodes in the previous months. To stabilize the new neuromuscular situation and preserve the

results achieved with the association of passive aligners and the anti-lock protocol, it was decided to start orthodontic treatment with active aligners.

Results: treatment associated with passive and active aligners are effective in improving the patient's quality of life, eliminating painful episodes e improving dental aesthetics. The patient reports that she has never had problems related to clenching during the treatment period with active aligners.

Conclusions: based on the data collected, we can affirm clinically that orthodontic therapy with active aligners was effective in stabilizing the neuromuscular balance achieved with the previous treatment with passive aligners and blocking the recurrence of joint pathology and manifestations painful related to it.

ORTHODONTIC-RESTORATIVE TREATMENT IN A PATIENT WITH MICRODONTIA AND AGENESIS MULTIPLE

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Aim: the aim of this case report presents multidisciplinary treatment plan (orthodontic-restorative approach) to rehabilitate function and morphology in a patient's masticatory system with an altered Bolton index.

Methods: the Patient is a 14 years old female and presented: agenesis of ten dental elements, microdontia of 1.2, 2.2 and 2.5, cross bite of 2.2, 3.2, diastemas in the incisors, narrow palate, skeletal Class I, molar and canine class III malocclusion. In order to correct right posterior cross-bite, intermaxillary elastics were used from the palatal side of the elements 1.5 and 1.6 to the vestibular side of 4.6. A finishing phase was also carried out with 23 aligners in order to prepare the teeth for the conservative restoration phase of the anterior sector using ve-

neers. The deciduous elements 7.1, 8.1 and 5.5 were maintained until the end of the growth and replaced by implants.

Results: the treatment led to the correction of the cross bite and closure of the diastemas. With the aid of veneers from 1.3 to 2.3 it also improved the esthetic smile line which entailed on the patient's satisfaction.

Conclusions: the multidisciplinary treatment has proven to be the best approach to give a pleasant smile to a young patient. Orthodontic and Conservative treatments were complementary to each other. The orthodontic treatment has prepared the bases for a correct conservative treatment which permitted the restoration of aesthetics not achievable without for anatomical reasons.

IN SILICO EVALUATION OF MANDIBLE CUSTOMIZED DISTRACTION OSTEOGENESIS

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Aim: current literature is lacking about data on the post-distraction mandibular volume compares to a normal control population. Our aim was to investigate a computer-aided design and manufacture (CAD/CAM) method of mandibular symphyseal distraction osteogenesis.

Methods: the plan for mandibular distraction osteogenesis was designed using CT-based 3-dimensional visible software. Computed tomography scan images data analysis was carried out comparing the pre-distraction (CT1) to the early (CT2) and late (CT3) post-distraction dataset. Bone assessment aimed to evaluate direction and length of the actual distraction. Any positional change was assessed virtually moving the pre-distraction object to superimpose on the post-distraction one: the roto-translational matrix obtained expresses the 3D movement performed. Three cases were considered: the distraction device attached to the first molar and the first premolar (tooth borne), to the canine and basal bones (hybrid), or only to the basal bone (bone borne). The nominal aperture of

each device was 2 mm. Mandibular displacements in the mastication phase were analyzed in the case of unilateral occlusion on the second premolar.

Results: tooth-borne and hybrid devices allow orthodontists to better control the effective displacement transferred to the mandible by the distractor. Displacements of the mandibular arch were closer to the nominal aperture of the distractor than in the case of the bone-borne device. Hybrid devices were more stable under functional loads. The planning system also gave a precise prediction of the height of the ramus after mandibular distraction osteogenesis. These influencing factors should be considered when the planning system is refined.

Conclusions: considering the promising outcome obtained in this study, the authors believe that these devices should be used for further investigation. Post distraction 3D analysis should be encouraged to assess the mandibular modifications; the development of dedicated software could be useful to collect data for multicentric-research.

CBCT ANALYSIS OF THE MANDIBULAR ASYMMETRY IN A GROWING PATIENT

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Aim: the purpose of this study was to evaluate the development and the compensation mechanisms of the mandibular asymmetry in a growing male patient, using Cone Beam Computed Tomography (CBCT). In this case, the menton deviated on the right, a rare condition, which may be the consequence of a disorder in the mandibular growth.

Methods: the patient was treated with Rapid Palatal Expander (RPE) and Fränkel Functional Regulator III (FR-3). The initial CBCT was acquired at the beginning of therapy when the patient was 8 years old (yr.); the final CBCT was developed at the end of the treatment when the patient was 12 yr. The patient's CBCT was performed with the head oriented according to the Natural Head Position (NHP); the NHP is a physiological and

reproducible posture defined for morphological analysis. The 3D image of the skull was oriented in the Dolphin software according to NHP posture; the cephalometric measurements were performed in frontal, laterolateral right and left, postero-anterior and submentovertex views in the software as mentioned above.

Results: the therapy lasted 3.8 years and ended with significant regression of the mandibular asymmetry from moderate grade (4.2 mm) to slight grade (1.3 mm).

Conclusions: the left hemi-mandible has grown more than the right side, by the literature, which affirms that in case of deviation of the menton greater than 4 mm, the bone volume increases on the no deviated side.

EARLY FUNCTIONAL TREATMENT OF HEMIFACIAL MICROSOMIA

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Aim: this paper aims to describe the outcome of early functional treatment in a young patient with Hemifacial Microsomia using an asymmetrical functional activator (AFA).

Methods: a 2-year-old girl was referred to the Department of Oral and Maxillofacial Surgery and Department of Orthodontics of Parma University to evaluate and treat a facial deformity. The diagnosis was Hemifacial Microsomia, type IIa (Kaban's classification). Early functional treatment with an asymmetrical functional activator (AFA) was planned to improve both sagittal and vertical mandibular growth, allow vertical maxillary growth, correct occlusal plane canting and enhance facial symmetry. The AFA was built blending two different functional appliances, a bionator on the healthy side and a Fränkel I appliance on the malformed side. Therapy with AFA started

when the patient was 4 years old and lasted 30 months; the patient wore the appliance almost full time with good compliance. This treatment was prolonged for another 6 months, reducing the wearing time only at night. Follow up was settled twice a year. No additional orthodontic or surgical procedures were performed.

Results: several positive outcomes were obtained: correct growth of the maxillary-mandibular complex, good vertical dimension on the affected side; enhanced chin symmetry; no canting of the occlusal plane; levelled oral commissure; improved global facial symmetry.

Conclusions: early functional treatment with AFA can be an interesting strategy in HM therapy, especially at a very young age, with the right timing and good patient compliance.

ORTHODONTIC AND SURGICAL MANAGING OF A MESIODENS AND TRAUMATISED CENTRAL INCISOR

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Aim: the aim of this case report is to elucidate the orthodontic management of a complex case of supernumerary element and dental trauma.

Methods: a 9-year-old patient comes at the department of dentistry of San Raffaele Hospital. After an accurate anamnesis, clinical evaluation and radiographic investigations are carried out. The patient presents a class II normal divergent malocclusion caused by a mesiodens and mixed dentition with high overjet. Both the supernumerary and the deciduous ele-

ments are surgically extracted. After surgery the orthodontic bonding is applied.

Results: the traumatised central incisor is restored and after completing the orthodontic treatment the incisal protrusion, which led to a labial detachment and aesthetic disharmony, is corrected.

Conclusions: thanks to a surgical-orthodontic managing of the case, the treatment finally results in a successful correction of the malocclusion

DIGITAL WORKFLOW IN MULTIDISCIPLINARY PATIENT: CASE REPORT

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Aim: the aim of this case report was to realize a virtual planning and a digital management in a surgical Class III malocclusion, using Invisalign System combined with orthognathic surgery.

Methods: a 18-year-old female presented to the Department of Orthodontics at the University of Rome "Tor Vergata" with a surgical Class III malocclusion. Pretreatment cephalometric evaluation confirmed a skeletal Class III relationship associated with maxillary retrusion, anterior cross bite and hyperdivergent skeletal pattern. Lower and upper incisors were respectively retroclinate and proclination to their basal bones. The upper dental midline was coincident with the facial midline, whereas the lower was deviated to the right. The treatment objectives were: level the curve of Spee, normalized inclination of

the compensated teeth, prepare the patient to the orthognathic surgery. The aim of this case report was to treat the patient using a virtual planning, with design and construction of devices in a totally digital way, using an intraoral scanner.

Results: a increase of SNA and a decrease of SNB were achieved. The severe hyperdivergent skeletal pattern was reduced. Normal overjet and overbite were obtained.

Conclusions: clear aligners proved to be very effective in the management of pre-surgery patient. The digital planning allows to the orthodontist to view a 3D model that can be "virtually" manipulated and modified in the correct occlusion of Class I at the beginning of the treatment, assisting to improve the treatment plan of the orthodontist.

PREVALENCE AND RISK FACTORS OF PERIODONTITIS IN PATIENTS WITH INFLAMMATORY BOWEL DISEASE

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Aim: the primary aim of this study is to explore the prevalence of periodontitis in patients suffering from inflammatory bowel disease (IBD), specifically in patients with Chron's disease (CD) and ulcerative colitis (UC) compared to a control group without IBD matched for age and gender.

Methods: a case-control study was conducted recruiting 150 IBD affected patients (86 with CD and 64 with UC) and 147 healthy patients. Periodontitis was diagnosed using CDC/AAP case definition and assessed via a full-mouth examination protocols. Confounding factors were explored using logistic regression models.

Results: evidence was found for a significantly higher prevalence of periodontitis in IBD patients compared to healthy group (76.09% vs 56.54%, $p < 0.001$), specifically concerning

severe periodontitis (32.87% vs 23.25%, $p < 0.001$). The differences were magnified in the < 65 years age group, whereas no significant difference was detected between patients with CD and UC. In the multivariate models, IBD patients presented a 3.4-fold higher risk of moderate/severe periodontitis. Moreover, old age, IBD diagnosis and higher full-mouth plaque score were variables highly related to periodontitis in the whole sample. When focusing on IBD patients only, male gender, IBD duration and localization, as well as IBD-associated surgery were proven to be relevant predictors for periodontitis.

Conclusions: a significant risk association between IBD and periodontitis was found, raising important prevention and therapeutic opportunities along the gum-gut axis in patients with IBD.

CASE REPORT: ORTHO-PERIO INTEGRATED TREATMENT IN A PATIENT WITH PERIODONTITIS

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Aim: the close relationship between periodontal tissues and tooth movement processes suggests that adjunctive orthodontic therapy may play an important role in overcoming problems of reduced periodontal support in compromised dentitions.

Methods: a 43-year-old patient is diagnosed, by clinical and radiographic examination, with a vertical 8 mm mesial defect to the element 11 and the presence of a diastema between the elements 11 and 21. The first procedure is a non-surgical periodontal treatment hygiene sessions. Subsequently after three months periodontal regeneration is performed with modified papilla preservation technique (MPPT). After the cleaning and removal of the granulation tissue of the defect, deproteinized bovine bone (DBB, Bioss S Geistlich) and derivative of the

enamel matrix (EMD, Emdogain Straumann) have been applied. Primary closure was achieved with a 5/0 EPTFE suture. Six months later, orthodontic treatment is performed, with the aim of promoting bone remodeling and improving aesthetic function. A bone gain of 4 mm was obtained 7 months after the MPPT surgery with the current orthodontic treatment. A treatment of 14 clear aligners (Invisalign®) of the upper arch only has been selected as suitable for the patient.

Results: the therapy has given the desired results. The prognosis of element 1.1 is favorable thanks to the quarterly supportive periodontal care program (SPC) and the home oral hygiene instructions explained to the patient.

Conclusions: multidisciplinary therapies optimize quality of the final result in an increasing number of patients.

SURGICAL REGENERATION OF A 3 WALLS ANGULAR DEEP DEFECT: CASE REPORT

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Background: while treating a tooth with uncertain prognosis the clinician is often debated between extraction and preservation of the dental element. Often, following a well performed causal therapy, surgery could solve large periodontal defects. The purpose of this work is to describe the regenerative of the dental element over time.

Case presentation: a 42-year-old patient is diagnosed with stage "III" grade "A" periodontitis and present a deep distal infrabone defect of 3 walls to tooth 3.7, diagnosed by clinical examination and radiography. We proceeded to the treatment of the site through subgingival causal therapy with mechanical and sonic instruments. After 2 months, at revaluation of the site, the pocket persisted, so we decided to switch to re-

generative chirurgic therapy. An incision in the distal crest of 3.7 has been performed and then the flaps were elevated full thickness to be able to directly access the bone defect. The subsequent regenerative periodontal therapy was performed after degranulation of the defect and grinding of root surface. The grafting material used was a spongy and cortical bone of equine origin inserted into the defect. No membrane has been used.

Conclusions: after 1 year from the regenerative surgery, the bone defect is completely filled of regenerated bone and periodontal tissue and it's appreciable by endo oral radiography. Clinically, no pathological probing is detectable using periodontal probe.

EXTENSIVE MULTI-DISCIPLINARY REHABILITATION IN A PATIENT WITH VITAMIN D ABSORPTION DEFICIT

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Aim: the aim of this work is to explain how a well-thought-out, multi-disciplinary approach based on a strict scientific method that considers the high restorative potentials of the organism can resolve a highly compromised situation in a patient with severe periodontitis associated with a vitamin D absorbency deficit, malocclusions and diastemas.

Methods: since the patient did not respond well to the initial periodontal therapy, we suspected that they had a vitamin D absorbency deficit; a chemical test for vitamin D absorbency was performed and confirmed our suspicions of this deficit.

The team programmed the following therapeutical plan:

- full mouth disinfection;
- normalise the blood serum levels of vitamin D;

- periodontal surgical restorative therapy;
- orthodontic therapy and fixed prosthetics rehabilitation.

Results: the results for this clinical case were extremely satisfying, we were able to:

- bring the periodontal illness under control;
- rehabilitate the patient both functionally and aesthetically.

Conclusions: vitamin D deficiencies are common in population, as is periodontal disease. It should be remembered that sometimes, failures of correctly performed local therapies could depend on systemic clinical conditions that must be investigated. Thanks to the collaboration and communication between specialists from different sectors of dentistry, the clinical case has been solved with absolutely satisfactory results.

SURGICAL TREATMENT OF PERI-IMPLANTITIS: 1 YEAR FOLLOW-UP CLINICAL CASE REPORT

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Aim: the purpose of the present case report is to describe the surgical treatment of a peri-implantitis lesion associated with a reconstructive approach.

Methods: a 56-year-old female nonsmoker patient presented signs of peri-implantitis on an implant in 3.6 position. Bleeding on probing (BoP) was positive in all sites, probing depth (PD) was up to 10mm and an intrabony defect was visible on radiograph. Non-surgical treatment was consequently practiced. Since PD was still up to 10mm and BoP still positive 6 months after non-surgical therapy, the implant was treated with surgical treatment consisting in open flap mechanical debridement associated with chemical decontami-

nation with chlorhexidine; the defect was filled with collagenated bovine-derived xenograft, covered with autogenous connective tissue graft (CTG) and the flap sutured. The patient received post-operative instructions and follow-up visits and supportive therapy were scheduled every 3 months up to 1 year of follow up.

Results: at 12 months after surgery PD was reduced and BoP or suppuration was absent in all sites. Moreover, a radiographic bone fill was observed.

Conclusions: the present case report showed the positive effects at 12 months of a reconstructive surgical treatment with the addition of a CTG for an implant with a peri-implantitis.

LATERAL CLOSED TUNNEL TECHNIQUE AND CGF MEMBRANE IN THE TREATMENT OF GINGIVAL RECESSIONS

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Aim: this work demonstrates how it is possible to restore the physiological festooning of the gingival margin in the presence of gingival recessions by means of a minimally invasive surgical-parodontal approach, using an autologous CGF membrane obtained from the patient's own peripheral venous sampling.

Methods: a 20-year-old male patient with a thin biotype presented with Miller class I and II gingival recessions from 23 to 26 following orthodontic treatment and with dentinal sensitivity problems. After adequate preparation of the exposed root surfaces, a full-thickness flap was made from 23 to 26 by the tunnelling technique, using autologous CGF membranes,

obtained by centrifugation of the patient's peripheral venous blood, as a graft to be placed directly on the bone surface. Suturing with 4-0 Vicryl was then performed.

Results: within 30 days there was complete healing of the mucosal tissues with restoration of a correct level of the gingival margin festooning.

Conclusions: in the treatment of medium-sized gingival recessions, the use of a minimally invasive periodontal surgical technique combined with autologous membrane grafting rich in growth factors results in greater control of inflammatory processes and rapid tissue healing.

MANAGEMENT OF PERI-IMPLANT DEHISCENCE IN ESTHETIC AREA: A CASE REPORT

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Aim: the incidence of a peri-implant soft tissue dehiscence/ deficiency (PSTD) isn't a rare finding. Incorrect implant placement, lack of buccal bone or mucosal thickness and diameter of the implant platform, act as predisposing factors specifically leading to a mucosal recession on implants.

Methods: a 59-year-old woman was referred to the Department of Periodontology at the University of Milan, Italy, for diagnosis and treatment of peri-implant soft tissue dehiscence/ deficiency (PSTD) in maxillary central and lateral right implant. The apical shift of the gingival margin revealing the greyish color of the implant is unacceptable to the patient. The central implant was diagnosed as a class IVc PSTD by Zucchelli, the lateral implant as a IVb. The central implant was removed, a platform technique has been performed in order to

manage a class III ridge defect. Meanwhile the lateral implant was treated with CAF + CTG.

A temporary pontic was screwed onto the lateral implant abutment and was reduced to allow the postsurgical soft tissues to mature without interference by the prosthetic material. After 10 months from the surgical procedure, the final restorations were delivered.

Results: at the 3 months follow-up visit, the patient presented with a complete coverage of the previous PSTD. Inter-proximal papillas were not fully represented, but the clinical condition was considered more than acceptable by the patient.

Conclusions: correct diagnosis and treatment planning are crucial for the correction of PSTD and the provisional prosthetic management had a critical role in the successful outcome.

MODIFIED LIP-REPOSITIONING TECHNIQUE (MLRT) FOR GUMMY SMILE

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Aim: the aim of this study was to compare the various surgical treatments for gummy smile presented in scientific literature with particular focus on Modified Lip-Repositioning Technique (MLRT).

Methods: the study was conducted by researching medical publications from several scientific databases, such as PubMed, Scopus, Embase, Cochrane Database of Systematic Reviews (CDSR), and ISI Web of Knowledge. The core keywords used in this work were: management of gummy smile, lip repositioning, vertical maxillary excess.

Results: this study focusses on reviewing a recent technique for repositioning the lip treatment of gummy smile: the MLRT. This novel technique adopts a numerical calculation to define how much tissue should be eliminated to avoid recurrence of gummy smile. Moreover, based on input parameters, the formula can be exploited to determine the average width of the mucosal band to be eliminated. The input variables to be used

in the calculation are: quantity of keratinized tissue band in millimeters, total supracrestal space in millimeters, location of the cemento-enamel junction (CEJ) of the teeth to be treated, maximum papilla display (MPD) measured in millimeters, maximum smile exposure (MSE) in millimeters (from the incisal edge of the central incisors to the free labial border line of the upper lip).

Conclusions: treatment for Excessive Gingival Display (EGD) by esthetic crown lengthening is possible with or without osseous resection. Orthognathic surgery is associated with significant morbidity and requires hospitalization. Muscle severance techniques provide stable results with a timeframe of at least 12 months from full recovery. Therefore, lip repositioning presents itself as a valid alternative treatment for EGD. MLRT is indeed a minimally invasive procedure in managing gummy smile; however, more studies are necessary to fully assess the technique and its stability over time.

EFFECTIVENESS OF RECONSTRUCTIVE PROCEDURE IN THE TREATMENT OF PERI-IMPLANTITIS

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Aim: this case report presents the efficacy of the treatment of an implant showing signs of peri-implantitis with a severe vertical bone defect.

Methods: a 69-years old male patient, non-smoker, without systemic diseases was diagnosed with peri-implantitis on an implant placed in 2.3 position. Probing depth (PD) was 15mm in all the 6 sites examined with bleeding on probing (BoP), and suppuration (PUS). First, non-surgical debridement was performed. After 6 months BoP and PUS were still present, with no reduction in PD, so surgical procedure was scheduled. After local anesthesia, a buccal flap was elevated and mechanical debridement of the defect was performed using titanium

curettes in addition with 0.2% chlorhexidine, the defect was filled with a bovine-derived xenograft and the flap sutured. The patient was included in a 3 months based supportive therapy. Healing was followed up to 24 months, when presence of plaque, pus, recession and PPD were analyzed.

Results: at 24 months following the surgical procedure plaque, BoP and PUS weren't found, PD was < 4 mm in all sites. Furthermore, a significant radiographic bone level gain was detected.

Conclusions: this case report shows the effectiveness of surgical debridement and reconstructive treatment in reducing inflammation, modifying bone morphology and reducing peri-implant probing depth.

DE-EPITHELIALIZATION BY ABRASION OF FREE CONNECTIVE GRAFT TAKEN FROM THE PALATE: CASE REPORT

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Aim: periodontal plastic surgery includes surgical procedures aimed at correcting or eliminating developmental or traumatic anatomical deformations of the gingiva or alveolar mucosa. The most used technique is the de-epithelialized connective graft taken from the palate. The purpose of this article is to show a clinical case where the de-epithelialization of the connective graft removed from the palate was performed by abrasion technique

Methods: the patient shows up with a recession on 4.1, previously treated but never recovered. Periodontal plastic surgery is performed with a connective graft taken from the palate, associated with coronally advanced flap (CAF). The de-epithelialization of the graft is done through abrasion technique

Results: performing periodontal surgery with connective graft taken from the palate and de-epithelialized with abrasive technique, allowed a complete recovery of the patient's problem and, at the same time, facilitated the intervention for the operator, compared to the de-epithelialization technique with cold blade.

Conclusions: in terms of histological composition of the tissue, the two methods have shown no significant difference. On the other hand, the abrasion technique with a high-speed diamond bur, associated with irrigation, allows greater ease and intraoperative precision. It is therefore, considering what we found out during our clinical practice, more appropriate to use this type of intervention, especially for operators with little experience.

CORONALLY ADVANCED FLAP ASSOCIATED WITH CONNECTIVE TISSUE GRAFT: A CASE REPORT

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Aim: the purpose of this case report is to solve aesthetic and functional problems related to the presence of recessions by the execution of a coronally advanced flap. Due to the lack of keratinized tissue, a bilaminar technique was performed.

Methods: the treatment plan consists primarily of performing professional hygiene and educating the patient in the use of an atraumatic brushing technique. A mucogingival surgery is performed through the creation of an advanced coronal flap associated with the graft.

Results: clinically, after five months of follow up, the keratini-

zed tissue on the vestibular-apical side of the elements 45,44 remained stable over time, leaving no scarring outcomes and allowing good camouflage of the treated area in terms of color and thickness.

Conclusions: when occurs a marked symptomatology associated with multiple recessions and a lack of keratinized tissue, root coverage performed with a bilaminar technique may be considered a procedure that provides satisfactory results by increasing the likelihood of achieving greater root coverage than coronal advanced flap.

ORTHODONTIC TREATMENT AND GINGIVAL HYPERPLASIA: A CASE REPORT

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Aim: this case report shows a case of gingivectomy performed in a young adult patient undergoing fixed orthodontic therapy, suffering from generalized plaque-related hyperplasia. Since the patient's oral hygiene was poor, the orthodontic treatment had to be interrupted.

Methods: in this case, 15-year-old patient who developed gingival hypertrophy during orthodontic treatment, was treated firstly by removing the causal factors such as plaque and the orthodontic appliance that prevented the patient from maintaining proper oral hygiene. Subsequently, after bone sounding,

a gingivectomy was chosen as treatment. The multidisciplinary approach that involved the orthodontist and periodontist was fundamental to achieve the clinical result.

Results: the follow-up at one month highlights good soft tissue healing, with no inflammation or pathologic probing depth, leading to oral hygiene improvements.

Conclusions: in this case the gingivectomy was a valid therapeutic choice to solve the gingival hyperplasia and restore a physiological probing depth with resolution of inflammation, achieving satisfactory aesthetic result.

THE USE OF VOLUMETRICALLY STABLE COLLAGEN MATRIX IN ASSOCIATION WITH MCAF: A CASE SERIES

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Aim: the primary aim of this study is to evaluate the efficacy of a xenogenic volumetrically stable collagen matrix (Geistlich Fibro-Gide®) in adjunct with multiple coronally advanced flap (MCAF) in obtaining root coverage. The secondary objective of this study is to evaluate the changes in width and thickness of keratinized tissue.

Methods: 9 patients referring to the department of periodontology of San Raffaele Hospital were diagnosed with RT1 recessions. A total of 28 recessions were found. Patients were treated by an experienced clinician by mean of MCAF with the adjunct of Fibro-Gide®. Periodontal probing depth (PPD), bleeding on probing (BOP), plaque index (PI), gingival thickness (GT), gingi-

val recession (REC), keratinized tissue width (KTW) were evaluated at baseline, 6 and 12 months by a blinded operator.

Results: at the 12 months evaluation a complete root coverage was obtained in the 60.7% of the recessions. The mean root coverage was $76.5 \pm 34.02\%$ with a recession reduction of $1,71 \pm 0,98\text{mm}$. No statistically significant changes in KTW were found ($0.04 \pm 0.69\text{mm}$, $p = 0.814$). The difference of GT between baseline and 12 months was $0.36 \pm 0.56\text{mm}$.

Conclusions: within the limits of this study, it is possible to conclude that the combination of MCAF and Fibro-Gide® can be considered when attempting to obtain a root coverage and an increase in GT.

IONOMIC ANALYSIS OF SALIVA IN PERIODONTAL HEALTH AND DISEASE

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Aim: the aim of this cross-sectional study was to investigate the relationship between salivary ionic profile and periodontal status in patients with untreated and treated periodontitis compared to periodontally healthy individuals.

Methods: unstimulated whole saliva was collected from 75 non-smoking and systemically healthy individuals (48 males and 27 females, aged 30 to 69 years), divided into three groups according to the periodontal status (25 untreated severe periodontitis, 25 treated severe periodontitis, and 25 periodontally healthy). The levels of twelve metal ions were determined using inductively coupled plasma mass spectrometry (ICP-MS) and inductively coupled plasma optical emission spectroscopy (ICP-OES).

Results: all the target elements were detectable in saliva. Copper (Cu), sodium (Na), iron (Fe), manganese (Mn) and rubidium (Rb) were significantly increased in saliva of periodontitis subjects compared to treated periodontitis and healthy controls. With the exception of zinc (Zn) and lithium (Li), no differences were detected between treated periodontitis patients and periodontally healthy controls. Cluster analysis was able to correctly separate patients with untreated periodontitis from periodontally healthy individuals. Interestingly, treated periodontitis individual and periodontally healthy controls were classified into the same group.

Conclusions: our promising results suggest that it might be possible to discriminate periodontal health and disease according to the concentration of mineral elements in whole saliva.

A STUDY ON PERIODONTAL PATHOGENS IN ASCVD PATIENTS AND IN FAMILIAL HYPERCHOLESTEROLAEMIA

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Aim: the purpose was to evaluate whether there was a correlation between oral *Porphyromonas gingivalis* (Pg) and *Fusobacterium nucleatum* (Fn) quantity and previous ASCVD in very high-risk patients, with or without heterozygous familial hypercholesterolaemia (HeFH).

Methods: 40 patients with previous ASCVD (10 with HeFH and 30 without FH) and 31 healthy controls were selected. Pg and Fn dosages were performed through qPCR. Oral health status and a full clinical examination were also scored.

Results: in the whole cohort, BMI was correlated positively with Pg abundance and negatively with Fn abundance. Compared to

controls, patients with previous ASCVD showed higher Pg (1101.3 vs 192.4, $p = 0.03$), but similar Fn abundance. HeFH patients with ASCVD had even greater Pg abundance than non-HeFH patients and controls (1770.6 vs 758.4 vs 192.4, respectively; $p = 0.048$). No differences were found in Pg and Fn abundance in HeFH subjects in primary prevention, compared to controls.

Conclusions: higher oral Pg abundance is present in very high-risk patients with previous ASCVD, with or without HeFH, suggesting a potential relationship with CV events. The link between periodontopathogenic bacteria and dyslipidemia deserves further investigation.

PERIODONTITIS PREDICTS HBA1C LEVELS AND GLUCOSE VARIABILITY IN TYPE 1 DIABETIC PATIENTS

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Aim: the PARODIA (*PAROdontite and DIAbete*) Project is an observational study aimed at investigating the extent and severity of Periodontal Disease (PD) in patients with type 1 diabetes (T1DM) and the possible association between PD and systemic markers of glucose control and variability.

Methods: patients were consecutively enrolled in a Diabetic Unit. A full-mouth periodontal evaluation was performed, and data on systemic markers of diabetes were collected. Descriptive statistics and logistic and linear models were performed.

Results: a total of 136 T1DM patients (mean age: 45.5 ± 14.6 years) were examined. Periodontitis was detected in 62% of cases (mean CAL: 3.0 ± 0.9 mm); stage III periodontitis was

diagnosed in 32% of patients while stage IV in 8%. Mean level of glycated hemoglobin (HbA1c) was $7.5\% \pm 1.4$. Among the investigated factors, mean CAL ($p = 0.040$) was associated with $HbA1c \geq 7\%$; 93% of patients with mean CAL > 6 mm showed $HbA1c \geq 7\%$. Mean CAL ($p = 0.004$), mean PPD ($p = 0.005$), mean FMPS ($p = 0.030$), and stage III/IV periodontitis ($p = 0.018$) predict glucose coefficient of variation (CV).

Conclusions: periodontitis showed a relevant prevalence in the present, well-controlled T1DM population and predicts poor glycemic control ($HbA1c \geq 7\%$) and higher glucose variability. The present findings suggest that periodontal infection may have systemic effects also in T1DM patients.

IMPACT OF KERATINIZED TISSUE AUGMENTATION AROUND IMPLANTS: A RANDOMIZED CONTROLLED TRIAL

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Aim: the aim of this clinical trial was to evaluate the effect of increasing keratinized tissue (KT) on implants affected by mucositis in achieving peri-implant health.

Methods: 15 patients with one implant with signs of mucositis (Bleeding on Probing, BoP) with less than 2mm of keratinized mucosa were included in this randomized controlled trial. First, all implants were treated with non-surgical therapy and oral hygiene instruction were provided to patients. Following this phase, patients were randomly assigned to one of the three treatment groups: oral hygiene instruction solely (control group); apically positioned flap (APF) with free gingival graft (FGG) or APF with porcine-derived collagen matrix (CM, Mucograft®). Clinical measurements were performed, at baseline

and at 6 months after treatment. The primary outcome was BoP reduction. Keratinized tissue width (KTW) and discomfort during toothbrushing, assessed using a visual analog scale (VAS) were considered as secondary outcomes.

Results: at 6 months BoP reduction was found to be $46.7 \pm 38\%$ at control group, $66.64 \pm 25.6\%$ at FGG group and $53.3 \pm 44.7\%$ at CM group. KTW gain amounted to 3.6 ± 2.3 mm at FGG group and 1.6 ± 1.1 at CM group. VAS scores were 4 ± 3 in the control group, 2.8 ± 2 and 3 ± 1 in FGG and CM groups, respectively.

Conclusions: the present results show that increased KT around implants could be an effective treatment option to obtain reduction of inflammatory clinical parameters.

PERIODONTITIS AND ALZHEIMER: A LINK BETWEEN *PORPHYROMONAS GINGIVALIS* AND NEURODEGENERATION

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Aim: in the last decade, several observational studies have suggested that there exists an association between periodontal disease (PD) and Alzheimer's disease (AD). Periodontal disease is characterized by chronic inflammatory processes that are initiated by microorganisms of the "Red complex" organized in a dysbiotic biofilm. Among the main ones, *Porphyromonas gingivalis* (Pg) and its virulence factors (i.e., gingipains and LPS-Pg) are detectable in brain samples from people with AD. Deficiency in neuronal G protein-coupled receptor kinase 5 (GRK5) has been associated with the early development of AD, favoring the hyperphosphorylation of the tau protein. In this study, we evaluated the role of GRK5 in the relationship between PD and AD.

Methods: we used SH-SY5Y cells either unstimulated or sti-

mulated with LPS-Pg (10 ng/mL) for 12 hours. Protein expression was evaluated with immunoblotting.

Results: our data demonstrate that LPS-Pg resulted in a marked decrease in GRK5 expression levels accompanied by a significant increase in tau phosphorylation compared to untreated cells. Significant increase in tau phosphorylation reflect in the disruption of the association of tau with microtubules, promoting neurodegeneration.

Conclusions: These data show that Pg represents a target for the fight against periodontitis and supports its role in the onset and progression of AD. Future developments could lead to the use of Grk5 as a possible therapy to resolve or prevent neurodegeneration.

Grateful to Marco Cioce for helping with the data management.

ANODIZED SURFACES AFTER TREATMENT WITH ULTRASONIC SCALING AND AIR-ABRASIVE POWDERS

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Aim: in literature emphasis has focused on the damage of implant surfaces after the use of sodium bicarbonate powder and ultrasonic steel scalers. Anodized surfaces are covered with a thin layer of oxides which prevents corrosion and increases the surface energy. The purpose of the study is to evaluate the influence of decontamination procedures on anodized surfaces from a micro- and nanoscopic point of view.

Methods: three machined and anodized titanium surfaces (RS smooth surface, XA Threaded Microsurface and UTM Ultrathin Threaded Microsurface) were decontaminated with bicarbonate powder and ultrasonic scaling. The topographical analysis of the native and decontaminated surfaces was carried out at 4000x and 1000x magnifications. A surface roughness analysis was performed using a 3D optical profilometer.

Results: the UTM and XA samples exhibited several damages in the form of indentations and irregularities, distributed both on the top and the bottom of the ridges with almost total loss of the anodized layer. RS samples showed the formation of pores and the total loss of anodization. In UTM and XA there is a considerable decrease in roughness (Sa = -60.45%) while the RS sample has a roughness (Sa) greater than 439%.

Conclusions: the study demonstrates how grooved surfaces subjected to an aggressive decontamination treatment resulted in a decrease in roughness while smooth surfaces tend to roughen forming a different nanotexture. Future studies will be needed to understand what could be the most effective way to decontaminate a surface without modifying its topography.

PERIODONTAL LIGAMENT TISSUE ENGINEERING – STUDY OF PDLSCS CULTURED UNDER CYCLIC STRETCH

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Aim: the abilities of periodontal ligament (PDL) in absorbing forces due to mastication deteriorate in periodontitis, which leads to the loss of PDL and supporting alveolar bone. Thus, enhancing the regeneration ability of PDL-derived staminal cells (PDLSCs) is one of the goals of treating periodontitis. We investigated the biological response of hPDLSCs cultured on a flexible substrate (FS) and exposed to cyclic stretch (CS) within a previously developed automated bioreactor.

Methods: FS were optimized by finite element analyses (FEA). Once the best design was defined, the corresponding mold was designed and 3D printed, and FS was made by casting polydimethylsiloxane (PDMS). Digital image correlation (DIC) method was adopted to characterize the FS mechanical behavior under uniaxial stretch and to validate the simulation outcomes. hPDLSCs were seeded on FS and

cultured under static or CS conditions (within bioreactor, 15% uniaxial strain, 1 Hz, 90s/6h for 3d). The expression of osteogenic markers was assessed (ALP, COL I, OCN and RUNX2).

Results: FEA and DIC analysis confirmed that the FS design allows uniform strain distribution at the FS bottom. While biological analysis confirmed that CS increases the expression of osteogenic markers (ALP, COL I, OCN).

Conclusions: FEA and DIC analysis allowed the optimization of FS, while biological tests confirmed that CS influences hPDLSCs behavior. Further experiments and investigations are still ongoing, such as, bioprinting of 3D PDLSCs-laden constructs, which will be characterized via nanoindentation. The development of a new bioreactor, for culturing 3D printed constructs under different cues, is in progress.

SALIVARY MARKERS OF OXIDATIVE STRESS IN PATIENTS WITH PERIODONTITIS AFTER THE GASEOUS OZONE THERAPY

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Aim: the purpose of this trial was to determine the effects of gaseous ozone therapy on the oxidative stress in patients with moderate periodontitis.

Methods: a total of 87 patients were included in the study and were randomly divided to receive standard periodontal treatment plus the gaseous ozone therapy (Test Group, n = 43) or conventional periodontal therapy alone (Control group, n = 44). A two-tailed Mann-Whitney two-sample rank-sum test was conducted to examine whether there were significant differences in parameters of oxidative stress between the levels of treatment. A Spearman correlation analysis was conducted the parameters of oxidative stress and periodontal parameters

was conducted. Cohen's standard was used to evaluate the strength of the relationship.

Results: the result of the correlation was examined based on an alpha value of .05. There were significant correlations between any pairs of variables. Serum activities of GSH and MDA concentrations were comparable between the study groups at baseline ($p > 0.05$). A significant decreased levels of NO and MDA were registered at 3 months and the concentration of GSH were found to be significantly increased in test group when compared with control group.

Conclusions: short-term supplementation with ozone therapy mitigates salivary oxidative stress in patients with periodontitis.

GAS OZONE THERAPY FOR THE ERADICATION OF *CANDIDA SPP.* IN THE PERIODONTAL POCKET OF DIABETIC PATIENTS

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Aim: *Candida spp.* are commonly detected in the oral cavity of diabetic patients, and *Candida albicans* is the most common single species isolated. The aim of this study was twofold: firstly, to estimate the prevalence of *Candida spp.* in periodontal pockets of patients with type 2 diabetes mellitus; then, to detect the occurrence of *Candida spp.* after non-surgical periodontal treatment plus gaseous ozone therapy vs conventional periodontal therapy.

Methods: a double blinded, randomized, controlled trial was conducted between May 2020 and February 2021. Eighty-seven diabetic patients diagnosed periodontitis were enrolled. PCR-based method was used to direct detection and identification of *Candida spp.* Patients with positive culture for *Candi-*

da spp. were randomly divided into two groups, to receive the standard periodontal treatment plus gaseous ozone therapy (Group A, n = 38) or periodontal treatment (Group B, n = 38).

Results: out of 87 positive PCR specimens, 76 showed positive cultures for *Candida* species. *C. albicans* was the most prevalent species (48%) 27 of which showed a colony count of $\geq 1 \times 10^3$ and 12 with a colony count of $\geq 1 \times 10^3$ colony forming units (CFU)/mL, followed by *C. tropicalis* (11.5%), and *C. glabrata* (14.5%). The group A and gaseous ozone therapy showed a statistically significant reduction of colony count of *Candida spp.*

Conclusions: the gaseous ozone therapy may be effective to reduce the count of *Candida spp.* in periodontal pockets of diabetic patients.

THREE DIFFERENT APPROACHES ABOUT THE HEALING OF PALATAL WOUND. A RANDOMIZED CLINICAL TRIAL

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Aim: compare which approach could guarantee the best healing of palatal wound in terms of postoperative pain, after epithelialized gingival graft harvesting. A healing index was created by the authors in order to have a tool to assess the healing process in future studies.

Methods: the total sample is formed by 60 patients. Three groups were defined: the control group treated with sponge of fibrine and sutures, the first test group with sponge of fibrine and cianoacrilate, and the second test group with only cianoacrilate. After surgery, patients were given a questionnaire to complete during the first postoperative week. The healing index analyzes: pain, early healing index, epithelializa-

tion, bleeding, colour match, sensation loss and necrosis, and it was filled out at 7th, 14th, 21nd, 28th days and at 3rd month.

Results: 26 patients were analyzed so far. The questionnaire has shown a greater pain reduction in cianoacrilate group than the others. No statistically differences from the three groups were found by the healing index.

Conclusions: the study is currently ongoing. Preliminary analysis shows a clearer pain reduction in patients treated with cianoacrilate. Despite this result isn't statistically significant, cianoacrilate could be a valide alternative to traditional techniques even for the reduced time of application.

IMPACT OF BMI ON GLYCATED HEMOGLOBIN CHANGE AFTER NON-SURGICAL PERIODONTAL THERAPY. A MULTIVARIATE

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Aim: to evaluate systemic inflammation after non-surgical periodontal treatment in obese patients.

Methods: a total of 40 obese patients affected by periodontitis, were randomly allocated to either Full Mouth Scaling Root Planing (FM-SRP) group or Quadrant SRP (Q-SRP), respectively. Periodontal parameters, vital signs and inflammatory biomarkers were collected. A multivariate regression model was built to evaluate the predictive ability of BMI on HbA1c change after periodontal treatment at Day90. The complete model encompassed the following predictors: Age; Gender; Smoking; HbA1c; High Blood Pressure (HBP); Group. Afterwards, linear predictions of HbA1c change based on baseline BMI were plotted together with the selected predictors in the final model.

Results: periodontal treatment was successful in terms of periodontal parameters independently of the technique used. Reduction in HbA1c and insulin levels were observed at 3-months ($p < 0.05$ and $p < 0.01$, respectively) in the Q-SRP group, whereas in the FM-SRP group a reduction in insulin level was observed at 3-months ($p < 0.01$). Multivariate regression model revealed that high body mass index (BMI), FM-SRP approach, age > 60 years, smoking, and high systolic blood pressure levels are negative predictive factors for HbA1c change 3-months after treatment in obese patients.

Conclusions: FM-SRP significantly impacts the HbA1c change after periodontal treatment. Q-SRP is recommended in patients with comorbidities to minimize potential risk for cardiovascular events and/or metabolic disruptions.

IMPACT OF POST-OPERATIVE C REACTIVE PROTEIN ON BLOOD PRESSURE AFTER PERIODONTAL TREATMENT

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Aim: to evaluate systemic inflammation after non-surgical periodontal treatment (NST) in hypertensive patients.

Methods: 40 hypertensive patients affected by periodontitis were enrolled in the study. Patients were randomly assigned to FM-SRP or Q-SRP group. Periodontal parameters and BP values were measured at baseline, 1 and 90 days after the NST. Blood collection was performed at each timepoint to assess the level of C-reactive protein (CRP). A multivariate regression model was built to evaluate the predictive ability of Relative CRP increase at day1 on systolic blood pressure (SBP) change after periodontal treatment at Day90. The complete model encompassed the following predictors: Pre/Diabetes; Group; Age; Smoking. Afterwards, linear predictions regarding SBP based on CRP increase at day1 were plotted

together with the selected predictors in the final model.

Results: periodontal treatment was successful in both treatment groups, exhibiting improvements in all periodontal parameters. Statistically significant difference between groups was found in CRP levels increase 24-h after the treatment, with the FM-SRP group presenting remarkably higher values ($p < 0.05$). Mean BP values showed a significant decrease 3-months after the treatment. Multivariate regression model revealed Pre/Diabetes; Group; Age; Smoking are predictive factors for SBP 3-months after treatment in hypertensive patients.

Conclusions: FM-SRP determines a robust postoperative acute systemic inflammation which significantly impacts the SBP change after periodontal treatment.

RCT FOR THE TREATMENT OF SINGLE RECESSIONS WITH INTERDENTAL ATTACHMENT LOSS (RT2): 10-YEAR FOLLOW-UP

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Aim: the aim of the present randomized controlled trial was to assess root coverage outcomes 10 years after Connective Tissue Graft (CTG) plus Coronally Advanced Flap (CAF) or CAF alone at single RT2 single maxillary gingival recession

Methods: twenty-one of the original 29 patients, 11 treated with CAF + CTG and 10 with CAF, were available at the 10-year follow-up. Measurements were performed by blind and calibrated examiners. Outcome measures included complete root coverage (CRC), recession reduction (RecRed), Root coverage Esthetic Score (RES) and Keratinized Tissue (KT) Gain. Visual Analogue Scale (VAS) was used to

evaluate patient satisfaction.

Results: complete root coverage was maintained in 64% of test group and 20% of the control group after 10 years, with a significant difference favoring the CAF + CTG ($p = 0.030$). Furthermore, add of CTG was associated with higher KT gain ($p = 0.0002$) and higher papilla tip recession ($p = 0.023$) than CAF at the last follow-up. No differences were detected in terms of RecRed, RES and patient satisfaction.

Conclusions: add of CTG under CAF improved the probability to maintain complete root coverage 10 years after the treatment of single maxillary RT2 recession.

SURGICAL TREATMENT OF CLASS II FURCATION DEFECTS: ARE THERE NEW REGENERATIVE TECHNIQUES?

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Aim: complex anatomical features and limited accessibility to the furcation area make the periodontal management of multi-rooted teeth challenging. The aim of this study is to investigate a new surgical approach in periodontal regeneration of class II furcation defects.

Methods: 20 subjects diagnosed with a stage III grade B periodontitis with class II furcation defects, homogenous for defect and furcation anatomical characteristics, were selected. The test group ($n = 10$) underwent a new surgical approach, consisting in Piezosurgical Roof Furcation Contouring (PRFC), grafting and Coronally Advanced Flap (CAF). The control group ($n = 10$) was treated with Open Flap Debridement (OFD). Clinical and radiologic variables, such as bleeding on probing (BoP), probing depth (PPD), vertical and horizontal bone level,

gingival recession, root trunk length, radicular separation, and furcation perimeter, were evaluated at baseline, 180 days and 1 year after surgery (FU).

Results: in the test group a CAL gain (6.00 ± 1.15 vs 3.00 ± 0.66 mm), horizontal probing attachment level gain (6.00 ± 1.56 vs 3.10 ± 0.73 mm) and PPD reduction (4.20 ± 0.92 vs 2.70 ± 0.48 mm) were observed, comparing baseline to FU data. Test group showed greater radiographic reduction of furcation perimeter (5.42 ± 1.38 vs 2.67 ± 0.98 mm).

Conclusions: this new surgical technique has shown greater clinical improvement at FU compared to the baseline. Regenerative surgery carried out with PRFC and CAF led to better clinical outcome compared to the control group, with better closure and healing of the class II furcation defects.

EFFICACY OF A NUTRACEUTICAL AGENT AS A COADJUVANT IN NON-SURGICAL PERIODONTAL THERAPY

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Aim: growing evidence suggests to nutraceutical agents being effective in the treatment of chronic inflammatory diseases. In this context, the efficacy of a new nutraceutical agent, with Bromelain, Baicalin, and Palmitoylethanolamide (PEA), as a coadjuvant to scaling and rootplaning (SRP) versus SRP alone in the treatment of periodontitis was evaluated.

Methods: 66 patients diagnosed with moderate periodontitis were enrolled in the randomized clinical trial and divided into two groups: test group, SRP + nutraceutical, and control group, SRP alone. In each patient, periodontal clinical parameters (PD, BOP, CAL, GR, and PI), inflammatory mediators in the crevicular fluid (GCF) and the visual analogue scale (VAS) were compared at baseline and after 15, 30, 60 and 180 days.

Results: both treatments demonstrated an improvement in periodontal parameters compared with baseline. After 6 months of treatment, compared with the control group, the test group determined a significant probing depth (PD) ($p = 0.003$) and BOP reduction ($p < 0.001$), while CAL gain was significantly obtained at 30 and 60 days after treatment ($p < 0.05$). In the test group, the level of inflammatory mediators was significantly reduced compared with the control group ($p < 0.05$). In the test group, a significant influence on VAS at 6, 12, 24, and 48 h after treatment ($p < 0.05$).

Conclusions: the nutraceutical agent, when combined with SRP, was shown to be effective in reducing periodontal parameters and controlling the levels of inflammatory mediators and pain in patients with periodontitis.

EVALUATION OF EFFICACY OF A LIPO-CURCUMIN-GEL AS AN ADJUNCT TO SRP

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Aim: curcumin is a naturally occurring anti-inflammatory agent with various biologic and medicinal properties. The aim of the present study was to evaluate the efficacy of the adjunctive use of a lipo-curcumin-gel with SRP as compared with SRP alone in the treatment of chronic periodontitis.

Methods: 23 patients, aged 30 to 60, affected by periodontitis, stage3 gradeA, participated in the study. In each patient 3 sites per tooth were selected. 276 sites were examined, and they were divided into 4 groups: SRP+LipoCurcuminGel; SRP+LipoGel; SRP+WhiteGel; SRP. Full mouth SRP was performed followed by the application of the experimental gel at each single site. The experimental sites were randomly assign-

ned to each group, and then the experimental gel was applied by the same expert clinician who did SRP. After gel application, the site was sealed by cyanoacrylate (histoacryl). Assessment of FMBS, PPD, REC and CALs were done at baseline and 12 weeks after treatment.

Results: the results showed a significant greater reduction in all parameters in test sites following SRP and LipoCurcuminGel application, when compared with SRP alone in control group.

Conclusions: the local application of curcumin in conjunction with SRP is able to significantly improve all periodontal health parameters with beneficial effect in patients with chronic periodontitis.

USE OF ENDOSCOPY IN THE SUBGINGIVAL INSTRUMENTATION TRAINING OF DENTAL HYGIENE STUDENTS

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Aim: the difficult access to the submarginal area is one of the main limitations for an effective non-surgical periodontal therapy. The periodontal endoscope represents an innovative opportunity for a direct visualization of this area. Its use offers a self-assessment by the clinician, who can potentially improve the technical ability. This pilot study aimed to evaluate if an endoscopic self-assessment could boost the instrumentation quality of dental hygiene students.

Methods: study and control group were both formed by a "trained operator", attending the third and final year of course, and an "untrained operator", attending the second year. Participants worked with standardized ultrasonic tip (model, power, irrigation) on commercial jaw models with periodontal disease (Typodont®). Elements #41 and #47 with submarginal standardized root deposits were treated and examined. Only for the

study group, the initial instrumentation (T0) was followed by a self-assessment through periodontal endoscope (DV2 Dental-View®). A second instrumentation (T1) was then performed. At the end of both instrumentations, the submarginal residual deposits were analyzed by means of a specific software (ImageJ®). The effect of group, operator and tooth on root deposits were statistically evaluated.

Results: the amount of residual deposits decreased between T0 and T1 for all study group members (mean -8,58%). Tooth #41 showed a stronger decrease than #47 ($p = 0.01$). Increase of instrumentation effectiveness of the most apical areas was significantly associated to the endoscopic self-assessment ($p = 0.04$).

Conclusions: the use of a periodontal endoscope during non-surgical periodontal training seems to enhance the students' performance. Further analyses are strongly required.

ASSOCIATION BETWEEN CHRONIC KIDNEY DISEASE AND PERIODONTITIS. A SYSTEMATIC REVIEW AND METANALYSIS

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Aim: aims of this SR were to assess the association of Periodontitis (PD) with Chronic Kidney Disease (CKD) and with different CKD stages.

Methods: a protocol was designed according to the PRISMA Statement guidelines. Electronic searches were performed on Medline, Cochrane Central Register of Trials and Embase, up to April 4th 2021. RCTs, prospective and retrospective cohort studies, case-control studies and cross-sectional studies were considered. JBI's Critical Appraisal Tool for risk of bias assessment was used. The risk of PD was calculated using the Mantel-Haenszel odds ratios (MH-OR). Weighted mean difference for clinical attachment level (CAL) and periodontal probing depth (PPD) were also evaluated. The five GRADE considerations were used to assess the certainty of the body of evidence.

Results: out of 1949 titles screened, 142 full-texts were evaluated and 17 studies were included. Among them, 9 were at

high risk of bias while for 8 studies the risk of bias was unclear. CKD was associated to higher risk of PD (MH-OR = 2.36, [95% C.I. 1.25, 4.44]; $p = 0.008$), higher mean CAL (WMD = 0.41 mm [95% C.I. 0.22, 0.60]; $p < 0.0001$) and mean PPD (WMD = 0.25 mm [95% C.I. 0.03, 0.47]; $p = 0.02$) compared to healthy individuals. Severe CKD patients (stages 4-5 vs 2-3) resulted at higher risk of PD (MH-OR = 2.21, [95% C.I. 1.07, 4.54]; $p = 0.03$). The overall strength of evidence was low due to study limitations and heterogeneity, even if a low heterogeneity was found concerning the studies comparing patients with different CKD stages.

Conclusions: an association between PD and CKD was found, so it could be appropriate to consider PD as a possible CKD comorbidity. Further studies are needed to better understand especially the effects of periodontal therapy on kidney function in CKD patients.

ALVEOLAR SOCKET PRESERVATION: BIOMATERIAL DEPLOYED

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Aim: the purpose of the study is to discuss the techniques of alveolar socket preservation and biomaterials of possible use.

Methods: an online search was conducted in two databases (PubMed, Cochrane library) for articles from the last 10 years using socket preservation biomaterials as keywords. The summary focuses on the description of biomaterials used and techniques employed.

Results: socket preservation is a procedure that reduces bone and soft tissue loss after tooth extraction. It is performed immediately after tooth extraction and is indicated in cases where it is not possible to place a post-extraction implant, when primary stability cannot be achieved or in adolescent pa-

tients. In literature the evidence is that with socket preservation we need 4 months for a predictable healing, usually before an implant surgery. The basic technique involves inserting biomaterial within the alveolar site that may or may not be covered by a membrane or graft.

Biomaterials: Autograft; Allograft; Xenograft; Alloplast; Hydroxyapatite (HA); Tricalcium phosphate (TCP); Bioactive glass; Dicalcium phosphates (DCP); Calcium polyphosphate (CPP); Calcium sulphate.

Conclusions: to date, there is still no technique that univocally guarantees success more than others. What is certain, is that the different socket preservation techniques are indeed able to limit horizontal and vertical resorption.

NON-SURGICAL PERIODONTAL THERAPY: USE OF ERYTHRITOL AND GLICINE

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Aim: accumulation of bacterial deposits on teeth is the primary cause of periodontitis. Bacterial deposits can be removed by "air-polishing". The purpose is to evaluate the effectiveness of repeated air-polishing with glycine powder or with a new erythritol powder during maintenance therapy.

Methods: the original material used in air polishing was sodium bicarbonate which could cause severe gingival erosion and substantial root damage. Contrarily, the more recent glycine has shown immunomodulatory, anti-inflammatory and cytoprotective effects on periodontal tissues, which makes it an excellent material for periodontal air polishing. Erythritol containing 0.3% chlorhexidine can also be used instead of glycine powder. This newly introduced powder has a finer

grain size and might be even more tissue friendly than glycine. Erythritol, a sugar alcohol (polyol), is a non-toxic, chemically neutral and water-soluble agent that is used as a food additive.

Results: no signs of inflammation, complications or allergic reactions in form of swellings or redness of the surrounding soft tissues has been reported.

Conclusions: supra- and sub-mucosal debridement was accomplished using glycine and erythritol powder, which turned out to be less abrasive to soft tissues than sodium bicarbonate. It must be emphasized that air polishing wasn't associated with any collateral effects (e.g. emphysema formation), thus demonstrating clinical safety for debridement in mucositis and peri-implantitis sites.

COMPARISON BETWEEN BIOMATERIALS WITH OR WITHOUT BARRIERS IN FURCATION REGENERATION

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Aim: the aim of the study was to compare the application of biomaterials with or without barriers in furcation defects and to evaluate the reduction of furcation involvement using Hamp classification. In addition, a comparison between bioresorbable and nonresorbable barriers was conducted.

Methods: a literature review was performed using PubMed, Cochrane Database, Embase and Scopus. 23 randomized controlled trials were selected: a total of 774 class II furcation defects were treated in 761 patients. 202 defects were treated with biomaterial without barrier. 108 defects were treated with biomaterial with barrier (bioresorbable or nonresorbable). An evaluation of the furcation involvement was carried out after 6 or 12 months. In addition, a statistical analysis comparing the use of

bioresorbable versus nonresorbable barriers was performed.

Results: the statistical analysis showed that the improvement from Class II to Class 0 was as follows:

- biomaterial without barrier at 6 months: 66.11% of cases;
- at 12-month: 78.57% of cases;
- biomaterial with barrier at 6 months: 60% of cases;
- at 12 months: 90% of cases.

As regards the membranes, better results were reached using resorbable membranes.

Conclusions: the best outcomes, in terms of reducing the furcation involvement, are those related to the use of barriers. In addition, the more predictable results are achieved when resorbable membranes are used.

THE EFFECT OF KERATINIZED MUCOSA ON PERI-IMPLANT HEALTH AND PATIENT-REPORTED OUTCOMES

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Aim: the aim of this systematic review was to analyze the effect of keratinized mucosa (KM) on different peri-implant health-related parameters and on patient-reported outcome measures (PROMs).

Methods: randomized controlled trials, cohort, cross-sectional and case-control human studies with a follow-up period of at least 6 months comparing two groups of patients with KM < 2 mm or ≥ 2 mm were included. Primary outcomes were implant failures, PROMs and bleeding (BoP/mBI). Additional outcomes were PPD, plaque accumulation (mPI/PI), gingival inflammation (GI/mGI), marginal bone loss (MBL), soft tissue recession (REC) and biological complications.

Results: fifteen studies were included (one RCT, two cohort prospective and twelve cross-sectional). Results reported no evidence of any statistical significant difference between groups in PPD, BoP and MBL, while a statistical significant difference in GI/BI, PI and REC was present in favor of the group with KW ≥ 2 mm. A consistent trend toward worst pain/discomfort during brushing in KM < 2 mm was observed.

Conclusions: no clear evidence was found supporting the role of KM on peri-implant health and PROMs, even if more plaque and marginal inflammation were present in the KM < 2 mm group.

ALTERNATIVE APPROACH TO TREATMENT OF PERIODONTAL DISEASE: PROBIOTICS AND NUTRACEUTICALS

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Aim: considering that antibiotics and antimycotics are used with the causal approach, which can result in the reduction of both the microorganisms that caused the infection and the beneficial ones, the scientific world is moving towards an alternative approach to periodontal disease treatment, introducing probiotics (living microorganisms that when taken correctly have beneficial effects on human health, including oral health, allowing the reduction of halitosis, candidiasis, caries, gingivitis and periodontitis) and nutraceuticals (healing nutrients taken through food) as adjuvant therapy and prevention.

Methods: the method used to reach this conclusion was the review of several studies reported in different scientific database (PubMed via Medline, Scopus, Embase, Cochrane, LI-

LACS), through which it was shown that the use of probiotics and nutraceuticals, in addition to conventional not surgical therapy (SRP), is useful for the prevention and treatment of periodontal disease.

Results: the innovation is in the fact that these are active microorganisms that are competing in the creation of a microbiome promoting oral health, regardless of the genetics of the individual, permitting a reduction in the use of antibiotic therapy or surgery.

Conclusions: nutraceuticals and probiotics cannot currently fully replace causal therapy, although they have been shown to have beneficial effects on the patient, as there is a gap in studies to verify the direct effects of nutritional supplements on periodontal disease outcomes.

SOFT TISSUE CHANGES AFTER TISSUE GRAFT PLACEMENT IN IMPLANT SITES: A DIGITAL EVALUATION

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Aim: soft tissues around implant are a key point to the long term success of the implant therapy. The present study aimed at evaluating the amount of buccal gingiv thickness after the execution of a bilaminar technique around implants using the one-abutment-one-time concept.

Methods: a total of 10 patients received an implant in edentulous zone. Two STL files obtained with intraoral scanner were matched and the buccal gingival thickness around the implant site was evaluated. First of them was taken before the surgical phases. Then implant was placed and a definitive abutment (Connect, MIS, Israel) was connected. Afterwards, a connective tissue graft was taken from the palate, sutured on the implant site and covered with the flap. Implant was immediately loaded with a provisional crown. A second intraoral scan was taken after 6 months, before the re-

alization of the definitive crown. Digital analysis were made using a dedicated software (MSOFT, MIS implant technology, Israel). Measures were taken at the level of the implant neck, 1,5mm coronal and 3mm coronal.

Results: the mean difference in thickness (ΔT), evaluated at the center of the implant, was 0.42mm measured at the level of the implant neck, 0.99mm and 1,83mm respectively measured at 1,5mm and 3mm coronal to the implant neck.

Conclusions: combination between connective tissue graft and a definitive abutment, both placed at the same time of the implant, seemed to have a good amount of gingival thickness augmentation. The increasing of gingival thickness was a key factor for a biomimetic approach, in order to minimize and compensate the physiological decrease of bone volume due to the tooth loss.

VERTICALLY AND CORONALLY ADVANCED FLAP VS LATERALLY CLOSED TUNNEL IN THE LOWER INCISORS

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Aim: the comparison between two surgical techniques in the treatment of single lower incisors recessions is assessed analyzing both primary outcome (percentage of radicular coverage) and secondary outcomes (soft tissue thickness, keratinized tissue height, PPD, CAL, PI, increase of vestibular depth, professional aesthetic rate, patient satisfaction regarding aesthetic and post-operative discomfort).

Methods: a multicenter non randomized controlled trial is carried out analyzing the efficacy of the two surgical techniques; 40 patients are included, 20 treated in Bern by Professor A. Sculean with LCT technique, 20 treated in Bologna by

Professor G. Zucchelli with V-CAF technique. The patients and their outcomes are evaluated at 7-14-30-90-180-270-365 days and a self-assessment survey is submitted at 7 and 365 days.

Results: by now, only 5 patients were included, 3 of them treated at the University of Bologna and 2 of them treated at the University of Bern; they still don't have a complete follow-up of 365 days and they will be evaluated over time.

Conclusions: preliminary data are not conclusive and further studying needs to be performed in order to obtain statistical relevance.

ECTODERMAL DYSPLASIA AND PERIODONTIUM: A FIRST ATTEMPT TO IDENTIFY TYPICAL FEATURES

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Aim: Ectodermal Dysplasia (ED) represents a vast and heterogeneous group of rare genetic disorders inducing anomalous development of two or more structures of ectodermal origin. No description of the periodontal anatomy in ED-affected people is reported in the literature. This study aims to clinically analyze periodontal anatomy in young adults affected by ED.

Methods: dental and periodontal parameters (plaque index, gingival index, probing depth, bleeding on probing, and tooth mobility) were collected on 11 individuals affected by ED. After that, all subjects underwent a session of professional oral hygiene, which included specific motivational instructions. The biometric parameters were re-evaluated after 7-10 days, and standardized analysis of the periodontal phenotype

thickness was carried out using specific chromatic probes (Colorvue® Biotype Probes, HuFriedy).

Results: all biometric parameters underwent a statistically significant improvement, functional to the following periodontal analysis. A strong prevalence of thin phenotype was recorded: 105 sites out of the 114 examined. A peculiar feature of the keratinized tissue was identified, a very smooth surface with vessels in transparency and particular laxity of the gingival margin are just some of the observed characteristics.

Conclusions: based on the etiopathogenesis of ED and therefore of the embryogenetic process of oral tissues, the results obtained seem to confirm a characteristic feature of the periodontal complex. Future investigations supported by specific histological considerations are strongly recommended.

MINIMALLY INVASIVE APPROACH FOR THE TREATMENT OF DEEP INFRABONY DEFECTS

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Aim: the aim of the present study is to describe through a case series an approach to non-surgical therapy that combines the use of ultrasound with local antibiotics in the presence of deep infrabony defects in the aesthetic area, eliminating bleeding on probing and minimizing recession increase, thus proceeding with regenerative periodontal surgery.

Methods: ten patients diagnosed with periodontitis were included in the study, with at least one interproximal site in the aesthetic area characterized by a PPD value > 5 mm and presence of BOP+ associated with a defect with radiographic infrabony component > 3 mm. A series of measurements were performed at baseline and at three months, including full mouth plaque score, full mouth bleeding score, PPD, REC, CAL, and BOP. Periodontal non-surgical therapy was performed except at the infrabony defect site, where the following ultrasonic tips were used incrementally: tip A up to 4 mm

subgingival, tip P up to 7 mm, tip PS up to 11 mm. Hence, a 14% doxycycline-based antibiotic delivered by a controlled-release biodegradable carrier was applied locally. The treated subjects were then recalled monthly for the first three months in order to perform a supra-gingival plaque control and to verify oral hygiene compliance before proceeding with regenerative surgical therapy.

Results: in all patients an improvement in PPD value was observed in the absence of REC increase; BOP value was negative, indicating suitability for regenerative periodontal surgery.

Conclusions: non-surgical therapy with a minimally invasive approach, using incremental ultrasonic tips associated with a local 14% doxycycline antibiotic, appears to be able to reduce parameters of inflammation such as PPD and BOP, without leading to increased recession, in order to perform regenerative surgery that is predictable.

IDIOPATHIC GINGIVAL ENLARGEMENT IN A CAUCASIAN MAN WITHOUT RISK FACTORS: A CASE REPORT

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Aim: gingival enlargement may be associated to a multitude of causes, such as drug assumption, systemic factors or genetic syndromes. Aim of this paper is to report a case of idiopathic gingival hypertrophy in an adult man without any risk factors.

Methods and Results: a 48-years-old Caucasian man was visited at the Oral Medicine Department of the Policlinico A. Gemelli, referring tooth mobility and gingival swelling. Medical history was non-contributory. The clinical examination revealed a generalized gingival enlargement. Blood count excluded any hematopoietic diseases; thus, an incisional biopsy was performed, revealing an a-specific gingival inflammation with an infiltrate rich in plasm-cells. Non-surgical periodontal therapy was performed, together with a systemic (methylprednisolone 16

mg) and topic (betamethasone local injections) corticosteroid therapy without any improvement. Finally, the laser surgical excision of the gingival tissue was performed. The lesions did not recur at the 12 months follow-up. Thus, a diagnosis of "idiopathic gingival hypertrophy" was finally settled.

Conclusions: the differential diagnosis was complex and required the exclusion of several systemic diseases such as neoplastic conditions -leukemia or lymphoma- and rarer disorders such as hereditary gingival fibromatosis, inflammatory pseudotumours and IgG4-related diseases -a rare chronic immune-mediated fibro-inflammatory disorder that may have isolated or multi-organ manifestations characterized by swellings mimicking malignant, infectious, and inflammatory diseases.

AN UNUSUAL CASE OF LANGERHANS CELL HISTIOCYTOSIS IN AN OLD WOMAN

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Aim: Langerhans Cell Histiocytosis (LCH) is a rare disorder characterized by intense and abnormal proliferation of bone marrow-derived immature myeloid dendritic cells-Langerhans cells in several organs. LCH commonly occurs in children with a male predilection. Birbeck granules and positive immunohistochemistry for S100 and CD1a are the histological features of LCH. The aim is to describe an unusual case of LCH in the oral cavity in an old woman.

Methods: a 69-year-old female patient came to our observation complaining of pain, burning sensation and swelling situated in the posterior hard palate over the past two months. Medical history revealed diabetes insipidus. Intraoral examination revealed erythematous ulcerated lesions in the posterior hard palate bilaterally. The lesions were flat, with an uneven surface

and painful to palpation; no tooth mobility was observed. Orthopantomography showed no bone destruction areas. Cold blade incisional biopsy was performed, and one specimen was taken on each side.

Results: histological examination evidenced diffuse infiltration by of immune-positive histiocytoid elements for S100, CD1a, Langerin and CD68 (-/+). According to these findings, the patient was diagnosed with LCH.

Conclusions: our case is an example which proves that LCH is not only confined to the pediatric age group but also occurs in adults. It is important to highlight how the clinical and radiographic manifestations are unusual to the general characteristics of LCH: the patient is female, typical signs such as dental mobility and radiological signs of bone destruction are absent.

A RARE CASE OF ORAL MYOFIBROSARCOMA IN A YOUNG PATIENT

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Aim: oral myofibrosarcoma (MFS) is an exceedingly rare malignant tumor which originates from myofibroblasts. It can occur at any age, including the first decades. MFS are infiltrative tumors, arising in soft tissues or bone, with a predilection for head and neck region. Low-grade MFS can recur but rarely metastasize. Here we report a case of I MFS of the hard palate in a young male patient.

Methods: a 10-year-old male, was referred to the Department of Oral Medicine and Surgery of the University of Parma for a nodular, ulcerated and painful lesion of about 2x3cm, localized in the midline of the palate. Systemic diseases and medications were disclosed at anamnesis. According to parents' report, the lesion occurred about 2 weeks before. Epistaxis was observed at extraoral examination. CT scans showed a reabsorption of the cortical bone of the pa-

late and extension beyond the floor of nasal cavity. An incisional biopsy was performed.

Results: histological examination highlighted the presence of a population of possibly malignant fusate cells with mild atypia. Also on the basis of immunohistochemical evaluation, a probable diagnosis of myofibrosarcoma was rendered. The patient was referred to the Section of Maxillofacial Surgery of the University Hospital of Parma where the lesion was removed. A reconstruction of the palate was performed through the use of a re-vascularized free-flap from the forearm. No recurrence has been observed after an admittedly short follow-up time of one year.

Conclusions: rapidly growing masses on the palate should be promptly diagnosed, as they can, in some cases, be malignant tumors originating from connective tissues (e.g. fibrous or bone tissues), salivary glands and lymphoid adnexes.

PECULIAR ONSET OF A MIESCHER CHEILITIS: A CASE REPORT

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Aim: we would like to present a particular case of Miescher cheilitis (MC) and to perform a small review of the literature.

Methods: a 95-year-old man came to our attention with a recurrent non-painful swelling of the lip from about 5 months (4 episodes). Previous test ruled out allergic reaction. He told us he had received Sars-Cov-2 vaccination about 3-4 days earlier from the first episode. We suspect a MC maybe triggered by the vaccination. We prescribed topic corticosteroids twice a day for 7 days. For the review we used Google Scholar and PubMed. We chose articles in English published in these last 10 years. We used as keywords "Granulomatous Cheilitis", "Miescher Cheilitis", "Orofacial Granulomatosis".

Results: after topical therapy we noticed a complete resolution of the lip granulomatosis. MC is a rare chronic inflam-

matory disease of unknown aetiology affecting oral and facial tissues. It can also present as a monosymptomatic form of Melkersson-Rosenthal Syndrome, defined by edema of the lips, facial palsy and fissured tongue. First described as a single entity, in 1985 MC was included in Orofacial Granulomatosis group, encompassing non-well understood granulomatous processes to the soft tissues of the head-and-neck. It shows clinically as a recurrent, non pitting and not of hard consistency lip swelling with rapid onset. The patient does not claim pain unless it coincides with sores or erythema. The first attack usually lasts less than a day, then it can flare up with episodes of longer duration and more pronounced.

Conclusions: we assume our patient suffers from MC.

ORAL BACTERIA GENOMIC RATE IN BLACK HAIRY TONGUE TISSUES, A NEW LABORATORY APPROACH

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Aim: Black Hairy Tongue (BHT) is a benign condition, characterized by hypertrophy of filiform papillae due to the lack of adequate desquamation of keratin and discoloration of the dorsum (black, brown, yellow, green), this is the result of porphyrin-producing chromogenic bacteria or yeasts. The prevalence of BHT may be as high as 11.3% with three times increased rates in men. In this work, we speculate that the particular BHT tissue structure could modify the microbiota in the tongue body. For this reason, we have compared the periodontal bacteria titer in BHT and normal tongue tissue.

Methods: a 55-year-old male patient with a black hairy tongue with 6 mm of filiform papillae length was enrolled in this study. He not used antibiotics within a month preceding sampling, and mouthwashes for two days before. Nine different tongue

swab samples were collected by scraping the tongue dorsum with a cytobrush. Three were sampled in BHT tissue and six in the tongue normal epithelia. The DNA extract from each sample was performed to detect e quantify by real-time qPCR: *P. gingivalis*, *T. forsythia*, *T. denticola*, and *F. nucleatum*.

Results: among these anaerobic bacteria, *T. forsythia* showed a significant difference ($p < 0.01$) between normal and BHT tissues. In fact, the titer of this periodontal pathogen increased 36 folds in the tongue body center. In addition, we have observed a gradual decrease of *F. forsythia* from the dorsum (in BHT zone) to the tip.

Conclusions: these preliminary results suggest that BHT could be an unusual reservoir of some periodontal pathogens, this could be due to different oxygen rate along its tissue surface.

GIANT FOLLICULAR CYST WITH MAXILLARY SINUS AND PTERYGOMAXILLARY EXTENSION: A CASE REPORT

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Aim: follicular cysts are odontogenic cysts of epithelial origin associated with an impacted tooth. Cysts around the upper third molar are less frequent than those around the lower third, but their complications in the antral/orbital areas are not rare. They are often asymptomatic and diagnosed accidentally. The paper wants to describe the characteristics of a giant follicular cyst with antral and pterygomaxillary extension associated with an included upper third molar.

Methods: a 76-year-old woman presented to our observation for an osteolytic neoformation of the right upper maxilla. The patient reported right V2 paraesthesia, sinusitis, purulent rhinorrhea and swelling. The intraoral examination shows expan-

sion of the buccal cortex with obliteration of the buccal vestibule. OPT showed unilocular radiolucency involving the right maxillary sinus along with the impacted third molar on the floor of the maxillary sinus. The lesion was surgically removed with the included tooth.

Results: at 4-months, healing of the bone and mucous tissues is evident. Microscopically, fragments of fibrous connective tissue are covered by non-keratinizing compound pavement epithelium, without atypia.

Conclusions: enucleation is the elective treatment. Radiographic examinations are needed for preoperative evaluation. The histological diagnosis is conclusive.

LONG-TERM SUCCESS IN A CASE OF OLP TREATED WITH PDT REFRACTORY TO CONVENTIONAL THERAPIES

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Aim: Lichen Planus (LP) is a chronic inflammatory disease involving skin and mucous membrane, with a neoplastic evolution rate of 1.40%. The most widely administered therapy is corticosteroid drug; however, its long-term use can lead to the onset of adverse effects such as candidiasis, dysgeusia and inhibition of the hypothalamus-pituitary-adrenal axis. Photodynamic therapy (PDT) is a non-invasive therapy, based on the local application of a photosensitizer, which absorbs light of the appropriate wavelength, initiating the activation processes that lead to the selective destruction of the injured cells. Therefore, the aim of the present work is to illustrate a case of refractory OLP with risk of tongue cancerization to both topical and systemic steroid treatment with PDT.

Methods: a 57-year-old woman presented to our observation for suspected lingual carcinoma arising from erosive lesions from

OLP. Anamnesis was also positive for Hashimoto's thyroiditis. The patient underwent immunosuppressive therapy with tacrolimus and systemic corticosteroids without any improvement and reported pain equal to 10 on the VAS scale. PDT was performed with LED at 450-470 nm and 7 watts of power, combined with 3% H₂O₂+*Curcuma Longa* based photosensitizer. 10 sessions of PDT were performed, once a week. Each session included 20 spots of 3 second on each mucosa involved, with particular focus on the lingual one. The light has been emitted by a long blunt tip of 8 mm at a distance of 0.5 cm from the lesion.

Results: after only 8 sessions the lesions underwent complete healing with a significant reduction in the VAS scale.

Conclusions: this case confirms that PDT is a valid alternative therapy for OLP without side effects in refractory cases to conventional therapies.

RARE MANDIBULAR OSTEOLYTIC LESION PRESENTING AS AN INITIAL MANIFESTATION OF ACUTE MYELOID LEUKEMIA

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Aim: the present work reports a rare case of early mandibular osteolytic lesion associated with Acute Myeloid Leukemia (AML).

Methods: a 7-year-old patient reported mandibular pain, gingival bleeding with no history of trauma and weakness before hospitalization. Radiographic examinations showed an osteolytic lesion at the left mandibular angle. Intraoral examination revealed no petechia or sign of infection, element 36 had lingual tilt, lack of mobility and pericoronal swelling. A needle biopsy was performed, and blood count revealed anemia and thrombocytopenia. Microscopy showed a neoplastic proliferation of atypical pleomorphic cells, with vesicular nuclei arranged diffusely and in infiltrative pattern in the fibrovascular background; atypical mitoses were present. The immunohistochemistry revealed positivity for myeloid markers.

Bone marrow aspiration revealed cell hyperplasia with 90% blasts and absence of megakaryocytes. Cytochemical staining with myeloperoxidase revealed 95% positivity, and PAS 41% diffuse positivity. Molecular analysis revealed at (8;21) translocation with AML1/ETO rearrangement. The diagnosis of AML-M2 type was made according to FAB classification.

Results: the patient subjected to the AIEOP LAM 02/01 protocol showed remission of leukemia. Lesion's evolution was valued with CT at the end and three months after chemotherapy. A lesion's progressive reduction, mandibular swelling disappearance and a spontaneous repositioning of the 36 were observed.

Conclusions: the dentist's role is primary in the recognition of signs and symptoms of systemic pathologies that often present early oral manifestations.

ORAL METASTASIS FROM COLON ADENOCARCINOMA: A CASE REPORT OF A RARE CLINICAL MANIFESTATION

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Aim: oral metastasis from adenocarcinoma in an extremely rare clinical manifestation. Aim of this paper is to present a clinical case of this disease in a young subject.

Methods and Results: a 37-year-old woman affected by colon adenocarcinoma was visited at the Oral Medicine Department (Head and Neck Department, “Fondazione Policlinico Universitario A. Gemelli – IRCCS”). The patient had previously received diagnosis of lung, brain, spinal cord and bone metastasis. The patient reported the onset of hypoesthesia of the lower lip and swelling on the gum, associated with the sudden mobility of the right posterior mandibular teeth. The clinical examination confirmed the presence of a swollen lesion, with no ulceration, affecting the vestibular gingiva of the fourth quadrant, vestibular to the second premolar and the first molar, associated with the grade III mobility of the second

premolar. The analysis of the radiographic examination (Orthopantomography and Cone Beam Computed Tomography) showed a radiolucency apically to the first molar and second premolar, associated with root resorption of these elements. An incisional biopsy of the lesion was performed, and the pathology reported the following diagnosis: fragments of adenocarcinoma with mucinous aspects; morphology and immunophenotype compatible with metastatic location with origin from known primary intestinal tumor.

Conclusions: although metastases from colon adenocarcinoma to oral cavity are very uncommon (31 previously reported cases), they should be considered, since many osteolytic lesions are included in the differential diagnosis and the dissemination to the oral cavity might be the first expression of the disease.

RITUXIMAB AS A TRIGGER OF ULCERATIVE LESIONS IN THE ORAL CAVITY

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Aim: Rituximab is an anti-CD20 chimeric monoclonal antibody targeting CD20 antigen in B cells. Rituximab, intravenously, has revolutionized the treatment of malignant tumors of B cells, such as follicular lymphoma. However, during treatment some patients may experience burning mouth and ulcers formation. The aim is to describe a case of oral ulcers caused by rituximab treatment in patients with follicular lymphoma.

Methods: a fifty-four-year-old male patient, in combined treatment with rituximab and bendamustine, came to our observation. The patient reported a burning sensation, with severe spontaneous pain and difficulty drinking and eating. Intraoral examination showed the presence of ulcers, on the anterior portion of the tongue (4 x 1 cm) and at the level of the right re-

trocommissural region (2.4 x 0.7 cm). The ulcers were treated with photobiomodulation-analgesic program (Low Level Laser Therapy), two times/week for one month.

Following a decrease in pain, it was decided to treat the tongue ulcer with an intralesional injection of triamcinolone acetonide 0,8 ml (kenacort) and lidocaine 0,2 ml.

Results: at two-week follow-up, after the triamcinolone acetonide injection, the lesion was reduced by 50%, resulting in less difficulty for the patient to drink and eat.

Conclusions: a therapeutic approach to solving side effects following rituximab administration in patients with follicular lymphoma should be the subject of scientific investigation, in order to improve the quality of life in these patients.

MEDICATION-RELATED OSTEONECROSIS OF THE MAXILLA BONE DURING SARS-COV-2 PERIOD: A CASE REPORT

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Aim: medication-related osteonecrosis of the jaws (MRONJ) is a rare complication following antiresorptive therapy (ARDs). The aim of this case report is to show the influence that the SARS-COV-2 pandemic had in managing a case of MRONJ.

Methods: an 84 y.o. woman was sent by her dentist to our specialized center "Progetto Bifosfonati - PB", at Fondazione IRCSS Ospedale Maggiore Policlinico, to evaluate a painful maxillary bone exposure extended from 2.3 to 2.5. It was probably caused by the mucosal compression of a poorly adapted total mobile denture. No systemic pathologies and a 10-year long Ibandronate therapy were reported. A CBCT and a maxillofacial surgeon consultation were prescribed in association with local therapies to reduce plaque and pain. Surgical treatment was scheduled for July 2021. Due to the fear of

SARS-COV-2 infection, the patient didn't undergo surgery.

Results: in the pandemic period, the PB follow-up was performed remotely by telephone and pictures. The clinical situation from February 2021 to February 2022 worsened until there was a complete exposure of the maxillary bone with increasing pain and difficulty eating.

Conclusions: osteoporotic patients on ARDs therapy should be cautiously evaluated, especially in the presence of systemic health disorders. This report shows the importance of prevention, diagnosis, and prompt surgical treatment of such complications. In this case, due to pandemic, the patient chose to be followed remotely, resulting in a progression of the present MRONJ. Palliative therapies were used to improve appetite and quality of life.

CEMENTO-OSSEOUS DYSPLASIA IN SOMALI WOMAN: A CASE REPORT

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Aim: the aim of this case report is the correct outpatient management mandibular lesion of mixed aspect.

Methods: a 43 y/o Somali patient was referred to the maxillofacial surgery department of the A.O.U. Città della Salute e della Scienza to evaluate a left hemimandibular neoformation of hard consistency deforming the two cortexes at teeth 3.3 - 3.4 and surmounted by a mucosa of normal aspect, not painful on palpation. All the teeth apparently involved tested positive to the vitality test. The OPG and the CBCT show both a radiolucent and radiopaque lesion at the apexes of the teeth from 4.3 to 3.5, with a mixed remodeling of the bone structure. This is characterized by a variable hyperdense component surrounded by a hypodense valvulus, which is mainly referable to foci of periapical dysplasia of the cement with variable ma-

turation phase. A similar image can be seen at the teeth 2.1, 2.2 and 2.4. A bone biopsy is performed in region 3.1-3.3 (semlunar incision, full-thickness flap, removal of a bone plug of a 3x3x4 mm, interrupted suture 3-0 silk).

Results: the histological examination shows a morphological aspect of bone dysplasia.

Conclusions: florid cemento-osseous dysplasia mainly occurs mainly in African female patients aged between 40 and 60 years. Usually randomly discovered, it is associated with bone expansion. Both jaws can be affected with multiple localizations. No therapy is indicated and surgical trauma should be avoided being these patients at risk for osteomyelitis, bony sequestrum and the development of intraosseous cyst without an epithelial wall.

COULD SELENIUM REPRESENT A NEW THERAPEUTIC STRATEGY IN PATIENTS WITH EROSIONAL ORAL LICHEN PLANUS?

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Introduction: the role of selenium deficiency in the pathogenesis of different oral conditions, such as pemphigus vulgaris and oral lichen planus (OLP), has been already unraveled. For these reasons Selenium has recently been considered as a possible therapeutic approach, based on its antioxidant properties.

Aim: we describe a case report of a patient affected by erosive OLP treated successfully with a topical formulation containing Selenium.

Methods: a 63 year-old female was admitted to the Oral Medicine and Pathology Unit of Ospedale Maggiore (Trieste, Italy) due to referred oral pain (5 out of 10 according to NRS). On oral examination, extensive lesions compatible with OLP were detected. Moreover, some erosive lesions were present especially on the maxillary gingiva and on the buccal mucosa. Using the REU scale to stage oral lesions, we recorded a value of 14.

The patient was prescribed the application of Selenium in Hydrogel formulation 3 times a day for 6 weeks. Two follow up recalls were arranged 3 and 6 weeks later.

Results: at 3 weeks a considerable improvement in both pain and clinic was highlighted: the patient referred a pain score of 1 (NRS scale), while on oral examination OLP lesions were less evident related to a REU score of 5. At 6 weeks the pain referred had a score of 1 (NRS scale), while on oral examination OLP lesions related to a REU score of 4.

Conclusions: the antioxidant properties of Selenium could represent an effective therapeutic alternative for patients with symptomatic OLP. Compared to topical formulations containing corticosteroids, Selenium is also associated with lower risk of developing secondary candidiasis due to its antimicrobial properties.

EOSINOPHILIC ULCER OF THE ORAL MUCOSA

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Aim: Eosinophilic Oral Mucosal Ulcer (EUOM) is a rare, self-limiting oral condition manifesting clinically as an isolated ulcer with elevated hardened margins, yellowish fibrinous background affecting the tongue, buccal mucosa or lip. It can be asymptomatic or associated with mild to severe pain. This lesion must be inserted in the differential diagnosis with traumatic ulcer, neoplasm and infectious diseases. Histologically, granulation tissue and inflammatory infiltrate consisting of abundant polymorphonuclear eosinophils, small round lymphocytes and other inflammatory cells. The aim is to present a clinical case of eosinophilic ulcer of the oral mucosa.

Methods: fifty-year-old male patient, with lesion on the tongue/oral floor for about 1 month, came to our observation. The patient in the medical history reported suffering from

rheumatoid arthritis and being a smoker (2 cigarettes/day).

Clinically showed the presence of an isolated painful ulcer surrounded by a peripheral erythematous halo, raised margins, and a yellowish fibrinous bottom (1 x 1.5 cm). Given the persistence we proceeded with an incisional biopsy.

Results: the histological examination indicates: "keratosis without dysplasia associated with a chronic fibro-inflammatory reaction with eosinophilic granulocytes". The etiology of this lesion is not entirely clear and trauma is believed to play an important role in its development.

Conclusions: biopsy is the gold standard and must be performed to make a differential diagnosis with cancer. Eosinophilic ulcer of the oral mucosa tends to resolve spontaneously within a few weeks.

EFFECTS OF PROBIOTIC MOUTHWASH IN PATIENTS WITH COMPLICATING SYSTEMIC DISEASES

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Aim: probiotics are “good” bacteria able to resist the action of gastric juice and bile secretion and to settle in the intestine by adhering to epithelial cells and thus counteracting the adhesion of some pathogenic germs. Their presence in the intestine would result in a better quality of the intestinal bacterial flora and a possible positive influence on the immune system. The aim of this study was therefore to evaluate the impact on periodontal health, using a mouthwash formulation containing probiotics (Biocult strongâ dissolved in neutral mouthwash).

Methods: 42 patients suffering from complicating systemic diseases including diabetes and cardiovascular disease were selected and the following indices were evaluated at time 0 and at 2 weeks: Plaque Record (PCR) Bleeding on Probing (BOP). The patients were divided into a study group and a

placebo group. A patient food diary was also performed for 3 days.

Results: the following indices were evaluated in the two groups after a statistical analysis. BOP decreased in the study group ($p = 0.15$). CRP also decreased in the study group ($p < 0.01$). After food diary analysis it was found that simple carbohydrates were correlated with BOP in patients who received a positive control, rather than with PM, indicating a lack of influence of food on BOP and PCR in GI.

Conclusions: the treatment with probiotics from the statistical analysis showed a reduction in the indices of periodontal disease. Therefore, probiotics represent a valid aid in maintaining periodontal health but do not replace the normal home and professional hygiene maneuvers.

PLATELET-RICH PLASMA CONCENTRATED SPRAY FOR TREATMENT IN PATIENTS AT HIGH RISK OF BRONJ

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Aim: bisphosphonates are drugs indicated in the treatment of osteoporosis, multiple myeloma and metastatic bone carcinoma. The widespread use of these drugs is related to a complication, known as osteonecrosis of the jaw (BRONJ). The measurement of CTX serum level is an index for evaluating bone turnover and it's been used in oral surgery to assess the risk of osteonecrosis in patients taking bisphosphonates. The aim of this study is to evaluate the efficacy of platelet concentrates for prevention in patients at high risk of BRONJ, since they seem to stimulate healing.

Methods: a patient in therapy with alendronic acid, who needed a full mouth extraction was selected. Serum CTX was performed and a value of 30 pg/mL emerged. Therefore, in collaboration with the hematology clinic, a Platelet-Rich Plasma

Growth Factor Concentrated Spray and an operative prophylaxis was performed. Once the extractions have been carried out, an accurate alveolar curettage was performed and the previously produced platelet spray was applied to the alveolus. Then a resorbable suture was performed.

Results: the 7-day check-up showed complete epithelialization and wound healing, and monthly checks were performed to evaluate and examine possible onset of necrosis. There were no complications even in subsequent checks.

Conclusions: PRF, containing white blood cells in combination with neutrophils and platelets, is able to enhance tissue wound healing, improve angiogenesis, and enhance tissue formation. Therefore, this procedure could be a valuable aid for the treatment in patients at high risk of BRONJ.

IN-VIVO USEFULNESS OF OCT IN THE DIAGNOSIS OF TRAUMATIC, INFLAMMATORY AND MALIGNANT ULCERS

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Aim: optical coherence tomography (OCT) is a non-invasive diagnostic technique providing cross-sectional images of biologic structures based on the differences in tissue optical properties. The aim of this study is to compare the healthy buccal mucosa to the diseased tissue, in order to identify the main ultrastructural changes in the epithelial and subepithelial connective tissue during malignant, inflammatory and traumatic ulcers.

Methods: from October 2019 to January 2021, we selected 27 patients with buccal mucosa ulcers. Each patient had been submitted to a scan and then compared to the histological examination. Previously to perform the biopsy, it was used a variant of a commercial Swept Source OCT dermatological instrument (SS- OCT, VivoSight® Michelson Diagnostics Ltd,

version 2.0) to obtain a scan of the lesion. We detected 5 traumatic ulcers; 15 ulcers caused by Oral Lichen Planus (OLP) and 7 ulcers caused by Squamous Cell Carcinoma (SCC).

Results: compared to healthy buccal mucosa scan, we observed that the lamina propria remained unchanged in the traumatic ulcers, whereas it was hardly to identify it in the OLP ulcers. The basal membrane persisted undamaged in the image of traumatic ulcers while on the contrary it was not observable in case of OLP. Regarding SCC, each layer was not distinguishable anymore.

Conclusions: the OCT can be a dominant aid in the diagnosis of oral diseases, chiefly in ulcerative diseases as a differential diagnostic. However, several *in-vivo* studies are needed to confirm his usefulness.

SURGICAL APPROACH AND MANAGEMENT OF A RARE MANDIBULAR SQUAMOUS ODONTOGENIC TUMOUR

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Aim: Squamous Odontogenic Tumour (SOT) is a rare benign odontogenic epithelial tumour of the jaws, which originates from epithelial rests of Malassez. It can present as an intraosseous solitary or multiple lesions, the development of the neoplasm is asymptomatic, but in an advanced stage the displacement and mobility of teeth can be observed. The neoplastic cells show a squamous differentiation, as numerous islands of squamous epithelium invading connective tissue. SOT radiographically appears as unilocular radiolucency, with clearly defined margins, rarely multilocular. Conservative surgical approach is the gold standard, recurrences are not frequent. The aim of this paper is to describe surgical approach to a rare mandibular case of SOT.

Methods: the lesion, referred in a 29-year-old male, was observed radiographically as radiolucent, involving the adja-

cent teeth and well circumscribed. Clinically the adjacent teeth had increased mobility but were vital on the cold test. Incisional biopsy gave histological finding of SOT, with p40 positive neoplastic cells and 8% ki67 score. Then a complete excision of the lesion was performed under general anaesthesia.

Results: surgical approach was conservative, with enucleation of the entire lesion, from the bone plane and the extraction of the two involved teeth. The patient will be followed up for relapses and to evaluate healing.

Conclusions: even in the presence of benign lesions, an early detection and a sound approach allow avoidance of overtreatment and relapses. Lesion enucleation and extraction of involved teeth seem to be the more indicate approach, for this rare odontogenic tumour.

ORAL MANIFESTATION OF IGG4-RELATED DISEASE

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Aim: IgG4-Related Disease (IgG4-RD) is a systemic immune-mediated condition described by Mikulicz-Radecki in the late 1800s. Potentially affecting any organ, it is characterized by tissue inflammation and fibrotic outcome. It can present with both insidious or acute manifestations and lead to end-stage organ disease if left untreated. IgG4-RD includes a spectrum of clinical manifestations, such as type I autoimmune pancreatitis, retroperitoneal fibrosis, Riedel's thyroiditis, Mikulicz's disease, and hypertrophic pachymeningitis.

Methods: we report a case of a 47-year-old woman with an asymptomatic swelling of the left buccal mucosa, hard to palpation, about 20 mm in size. This swelling presented about 6 months before and was accompanied by the sensa-

tion of paresthesia. Her medical history revealed the presence of multinodular goiter.

Results: histological examination revealed angiolymphoid hyperplasia with eosinophilia; furthermore, there was presence of many plasma cells, in particular IgG and IgG4. The same histological aspect was found in several lymph nodes of the neck, removed together with the thyroid. The patient was treated with systemic steroids.

Conclusions: the oral cavity represents a rare localization for IgG4-RD. However, even when it presents with a single localization in the oral cavity, it should be approached as a systemic disease. Therefore, the most adequate strategy should include clinical, serological, radiological, and histopathological studies assessed by a multidisciplinary team.

BLUE NEVUS OF ORAL MUCOSA: A CASE REPORT

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Aim: Oral Melanocytic Nevi (OMNs) are uncommon benign tumors of melanocytes. They are divided into four main types: subepithelial nevus, blue nevus, compound nevus and junctional nevus. They are mainly diagnosed in subjects over the age of 38, women and mainly on the palate; the most frequent histological type is the common blue nevus whose diagnosis is made after a biopsy. The aim of the present study is to describe a case of a 39-year-old woman with a blue nevus on the hard palate and to compare our data with the literature.

Methods: we searched recent databases including MEDLINE (PubMed) by analyzing the clinical and histological manifestation of OMNs and their pathogenesis. Subsequently, the most suitable diagnostics and the methods of treatment and

follow-up of the affected patients were identified. An excisional biopsy of the 0.3 cm pigmented lesion on the hard palate of the patient was made and sent to the pathologist.

Results: microscopically, a pigmented fasciculate chorion nevus is observed, extended to the margins of resection; immunohistochemical staining "Melan A" has been performed to identify the presence of cells of melanocytic origin. Histopathological diagnosis is Nevus Blue of the oral mucosa.

Conclusions: despite the fact that the blue nevus is a rare lesion on the oral mucosa, its diagnosis is increasing as suggested from various case reports. Our case has the same principal characteristic as the ones reported in the literature: the lesion is found on the hard palate of a 39-year-old woman and the diagnosis was possible only after a biopsy.

OCCASIONAL FINDING OF PROSTATIC CANCER BONE METASTASES IN A PATIENT AFFECTED BY MRONJ

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Aim: Medication-related osteonecrosis of Jaws (MRONJ) is defined as a drug-related adverse reaction, leading to a progressive necrosis of jaw bone in patients not exposed to radiant treatment and with positive history of treatment with drugs impairing bone reactivity. We report a case of MRONJ, characterized by bilateral mandibular osteonecrosis and prostatic cancer bone metastases.

Methods: a 66-years-old male with history of prostatic carcinoma with bone metastases with positive history of parenteral administration of Denosumab, was referred to our department. Panoramic radiograph and Computer Tomography showed bilateral areas of mandibular bone rearrangement. Intraoral physical examination revealed a bilateral painful non-odontogenic origin mandibular bone exposure with suppuration. Firstly, antibiotic and antiseptic therapy were prescribed for about 20 days, not gaining symptoms resolution. Considering the wide and bilateral osteolytic mandibular involvement and

the patient general condition, a marginal resective surgery was performed, in general anaesthesia.

Results: during surgery, bone samples were collected and, at the histopathological examination, bone invasion by prostate cancer was observed as fragments of necrotic bone tissue showed foci of infiltration by poorly differentiated carcinoma, with prostatic immunophenotypic profile, as immunohistochemical analysis showed pan-CK, PSA and NKX3.1 positive neoplastic cells. Surgery was able to solve painful symptoms, leading to an improved quality of life.

Conclusions: surgery is indicated to treat MRONJ, but its usefulness in managing bone metastases is under debate. In the present case, pre-surgical assessments consistent with MRONJ lead to active surgical treatment. We are not able to assess the long-term results of surgery, but it was able to improve the patient's quality of life solving at least temporarily painful symptoms.

ORAL MANIFESTATIONS OF AMYLOIDOSIS: A CASE REPORT

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Aim: amyloidosis includes a group of diseases with extracellular deposition of fibrillar proteins in organs and tissues. Deposition of amyloid can also occur in oral tissues with different clinical forms: bullous, macroglossia, multiple soft nodules of the tongue, lip and buccal mucosa.

Methods: two patients were referred to the Department of Oral and Maxillo Facial Sciences, Sapienza University of Rome for macroglossia. First patient was a 61-year-old male, suffering from type 2 diabetes, chronic renal failure, arterial hypertension and HCV positive was sent from the dental ER. An intraoral examination was performed: macroglossia with displacement of the lower anterior teeth and some bullous forma-

tions on the lingual surface were observed. The second was a 50-year-old male patient with macroglossia and a normal lingual surface sent by a hematologist treating him for monoclonal gammopathy. A scalpel incisional biopsy of the lingual surface was performed on both patients.

Results: the pathology examination using Congo red stain showed extracellular amyloid deposits, confirming the diagnostic suspect of amyloidosis of the tongue.

Conclusions: although amyloidosis of oral cavity frequently occurs as localized disease, patients with macroglossia must be evaluated for systemic amyloidosis or systemic disease i.e. haematological disorders.

PARTICULAR PIGMENTED LESION WITH CHARACTERISTICS OF MALIGNANCY: A CASE REPORT

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Aim: oral pigmentations are common and can be physiological or pathological. Amalgam tattoo (AT), the most common oral pigmentation, is an iatrogenic lesion caused by traumatic implantation of dental amalgam into soft tissue. AT is common and clinically present as isolated blue, grey or black macule on the soft tissues. The diagnosis is usually based on clinical findings associated with presence or history of amalgam fillings removal. Sometimes, biopsy is required in order to exclude neoplastic origin. The aim of this paper is to present a case with atypical clinical characteristics and to reinforce the importance of a correct DD.

Methods: a 41-year-old woman comes to us for a pigmented le-

sion that has been present for 3 months. Intraoral examination revealed a brownish spot (measuring 1 cm) with irregular borders on right upper labial fornix. There are no radiographic signs of amalgam restorations, however, the right maxillary incisors appear devitalized. Nevus, melanoacanthoma and oral melanoma were considered in DD. Biopsy was performed and analyzed.

Results: histologic examination shows no epithelial cell dysplasia. Connective tissue includes blackish interstitial deposits that do not cause an inflammatory response. The diagnosis is AT.

Conclusions: AT can occur in the absence of an obvious cause, so histological diagnosis is crucial.

DIGITAL DENTISTRY FOR DIAGNOSIS OF MAXILLARY MALIGNANCY: A CASE REPORT

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Aim: large radiopacities have a wide range of differential diagnosis: from benign tumor to malignancy. In this study authors report digital aid from pre-operative diagnosis to follow up visits of an asymptomatic, not bleeding, painless, net margins radiopacity maxillary lesion.

Methods: a male patient of 74 years old came to U.O.C. of Odontostomatology of Policlinic of Bari. Digital exams were performed: OPT presented a wide maxillary radiopacity, TC Cone Beam showed a direct communication between oral cavity and nasopharyngeal cavities, RMN to assess entity of relation with nasopharyngeal soft tissue. Finally, was executed an Ultrasonography HD with a dedicated linear probe to evaluate lesion vascularization. Patient was subjected to excisional surgery, after been classified as ASA IV from an-

esthesiologist. Oral and neck ultrasonography was used every month to detect a possible recurrency, with semestral radiograph images.

Results: histologic exam confirms digital diagnostic hypothesis: squamous cell carcinoma treated with a complete excision. Patient's total removable prosthesis was used as a tray of surgical cement to permit wound healing, then was modified with a conditioning tissue material to rehabilitate functionally and aesthetically this oncological patient. Every follow up ultrasonography shows a remained oral-nasal communication, free from neoplastic recurrency confirmed also by nasal endoscopy.

Conclusions: digital imaging could represent an important help from first pre-operative diagnosis to recurrency detection in oncological patients.

CHRONIC DIFFUSE SCLEROSING OSTEOMYELITIS: WHEN BISPHOSPHONATES ARE THE SOLUTION

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Aim: chronic diffuse sclerosing osteomyelitis of the mandible is a relatively rare disease with an estimated prevalence of 1/200.000. There is no standard treatment protocol, and the management can be challenging and frustrating. Differential diagnosis includes Osteosclerotic dysplasia, Paget's disease and other conditions.

Methods: we present a case of a 44-year-old male patient, referred for chronic facial pain. The patient complained intense nightly pain in the left mandible, which was progressively increasing and required the consumption of pain killers on daily basis. Clinically, there was a slight swelling of the mandibular soft tissue and a palpable increase in volume of the left horizontal ramus. Mouth opening was not limited, and no sensory deficits were found. Odontogenic cause was excluded.

Results: a panoramic radiograph demonstrated a marked homogenous osteosclerosis that extended from the premolar region to the ascending branch. CT scan showed extensive sclerotic changes of the trabecular structure and a thickening with marked periosteal reaction. Histological evaluation showed compact lamellar bone with necrotic areas without signs of bacteria or inflammatory infiltrate. Scintigraphy showed an intense uptake. Blood count and bone turnover markers were within normal ranges, while and C-reactive protein and erythrocyte sedimentation rate were increased.

Conclusions: based on previous studies, treatment options include both conservative and surgical approaches. The patient was treated with systemic antiresorptive therapy with complete remission of symptoms.

NEUROPATHIC PAIN: REVIEW OF LATEST EVIDENCE AND USE OF EMF AS ADD-ON THERAPY CASE REPORT

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Aim: Orofacial Neuropathic Pain (ONP) is a painful condition that develops from damage to the Central Nervous System or trigeminal nerve. The aim of this abstract is to briefly review the latest evidences about the effectiveness of the local administration of Electro-Magnetic Field (EMF) as add-on-therapy. A significative clinical case treated in our Orofacial Pain Center is further described.

Methods: comprehensive search was performed through PubMed, Scopus and WoS. 10 articles out of 1221 were selected. These studies demonstrated that Low-frequency Electro-Magnetic Field (EMF) therapy is safe and noninvasive in the treatment of neuropathic pain disorders. No side-effects have been observed. Such techniques work changing the magnetic fields to increase or decrease neuronal activity.

Results: we verified those scientific evidences by the case of a 61 years old woman affected by ONP since 2015, refractory to common drugs. Pain level was rated 7/10 in a VAS (Visual Analogue Scale). In January 2018, the patient was prescribed with a new nanotechnology-based device delivering constant low-frequency EMF, HO-ONP: a small patch applied 24/24hs on the painful area. After 1-month, symptoms significantly improved. In March pain was rated 1/10 in a VAS. As acquired by scientific literature, analgesic effect of EMF is long lasting: after three years the patient was still free from pain.

Conclusions: further well-designed studies should be made to improve evidence about the promising clinical use of this therapy.

IMMUNOHISTOCHEMICAL DETECTION OF STAT6, CD34, CD99 AND BCL-2 CAN BE A USEFUL MARKER FOR DIAGNOSING

D'Aurelio A.

Background: Solitary Fibrous Tumors (SFT) are a rare neoplastic disease originating from mesenchymal cells rather than epithelial cells. These tumors are characterized by the presence of tumefactions in the oral cavity with non-specific symptoms, capsular, well circumscribed and of elastic consistency; they tend to have a benign course and only in 10-15% of cases take a malignant course. The objective of this study is an update in the literature on the phenotypic, histologic, and behavioral characteristics of solitary fibrous tumors.

Methods: the various studies were researched on sites such as PubMed, Google Scholar, Scopus, Cochrane Central, Embase, CINAHL, Lilacs, Medline, and Web of Science between August 2019 and March 2022. Keywords used were "oral solitary fibrous tumor," "oral cavity SFT," "STAT6," "NAB2-STAT6," "SFT date," "oral fibrous tumor".

Results: 81 publications with a total of 185 cases were considered. Analysis revealed that the most frequent location is the buccal mucosa, with a higher incidence in females. The association of the NAB2- STAT6 genes was confirmed, and three fusion variants NAB2ex2-STAT6int1, NAB2ex6-STAT6ex16, and NAB2ex4-STAT6ex2 were detected. There were only 23 published cases of SFT at the level of the tongue, of which 22 were benign

and 1 malignant lingual SFT is the most frequent malignant form, followed by the palate and sublingual gland. In the chin region, only one case of 0.8 cm size has been reported in a middle-aged woman. A 2021 review that considered 7 surgically removed Solitary Fibrous Tumors found that none presented signs of recurrence. One malignancy case presented multiple recurrences and metastasis to the meninges and lungs. Some features of the tumor may indicate an increased risk of malignant evolution, among them there may be margin infiltration, pleomorphism, hypercellularity, increased mitosis and nuclear atypia.

Conclusions: immunohistochemical (CD34, Bcl-2, CD99 and STAT6) and molecular genetic methods can be used to effectively confirm the diagnosis of SFT. Therapeutically, cases of SFT extending into the infratemporal space can be treated orally to reduce neurological, glandular and hemorrhagic complications. Radiation therapy and chemotherapy have been ineffective, so increasing our understanding of the biological behavior of solitary fibrous tumors allows for better focused treatment options. A promising drug in the treatment of advanced SFT could be Pazopanib, which has reduced toxicity and only easily residue adverse effects such as diarrhea, hypertension and fatigue.

USEFULNESS OF NATURAL BIOACTIVE COMPOUNDS IN ORAL DISEASES OF NEPHROPATHIC PATIENTS

Campolattano V.

Aim: the oral diseases and chronic kidney disease (CKD) are related to each other, in a reciprocal cause/effect relationship. The mechanisms underlying this correlation have not yet been defined. The aim of this abstract is to evaluate the possible correlations between oral diseases and CKD and the possible beneficial effects induced by natural bioactive compounds (NBCs) in CKD patients oral diseases.

Methods: we selected the studies according to research online items of "oral disease" and "chronic kidney disease" and "natural bioactive compounds" in association with "polyphenols" and/or "oral microbiota" and/or "oral inflammation". The databases used were PubMed and Web of Science up to January 2022.

Results: CKD patients have an increased risk of developing oral diseases compared to the general population. In particu-

lar, CKD patients may present changes in soft tissues, bone tissues, teeth, saliva and exhalation. Furthermore, CKD patients are more susceptible to oral infections. Several *in vitro* and *in vivo* studies suggest that NBCs seem to exert numerous beneficial effects both local, at the level of the oral cavity, and systemic. Among NBCs, the most important are the polyphenols that are able to modulate the oral microbiota composition, to exert an antioxidant, anti-inflammatory and antitumor action, and to counteract the demineralization of the alveolar bone during periodontal disease.

Conclusions: in the light of these evidences, the NBCs could represent a valid adjuvant therapy, in combination with standardized therapy in the management of oral diseases in CKD patients.

THE IMPORTANCE OF SALIVARY BIOMARKERS OF DEMYELINATING AND NEURODEGENERATIVE DISEASES

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Aim: the aim of this work is to highlight the most important findings about salivary biomarkers related to neurodegenerative and demyelinating diseases. We also aim to describe some innovative biosensors able to detect these salivary biomarkers.

Methods: we consulted three different databases (PubMed via Medline, Cochrane and Embase) up to April 2021 and selected the most relevant papers related to the topic. After the selection, we proceeded with the analysis of the studies and we then divided them into five different groups: Alzheimer's disease (AD), Parkinson's disease (PD), Huntington's disease (HD), Multiple Sclerosis (MS) and Amyotrophic Lateral Sclerosis (ALS).

Results: although cerebrospinal fluid is still the gold standard

for biomarkers' detection, saliva analysis is drawing the attention of researchers and several biomarkers have been discovered in saliva (such as amyloid beta peptides for AD or alpha-synuclein for PD). For this purpose, the use of wearable biosensors could allow performing non-invasive, easily repeatable and stress-free analysis, thus increasing patients' compliance, and evaluating the circadian rhythm of the analyzed biomarkers.

Conclusions: the lack of standardized methods and clear ranges still limits the use of salivary biomarkers in clinical practice, but their potential future applications are broad and stimulate further research in both technological and clinical fields.

ORAL CANCER DETECTION AND SALIVARY BIOMARKERS: A REVIEW OF LITERATURE

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Aim: the main goal of this study is to present an overview of literature regarding the importance of salivary biomarkers of oral cancer and their detection through biosensors.

Methods: two databases (PubMed and Google scholar) were searched up to June 2021 to find the related articles using the search string: "oral cancer" AND "biomarkers" AND "saliva" OR "salivomics". Second research was carried out to pick out biosensors and bioelectronic platform for the detection of oral cancer biomarkers in saliva.

Results: oral cancer is the 16th most common malignancy which numbers are rising due to an increase in alcohol and tobacco consumption, an early diagnosis is crucial for reducing

mortality. A readily available fluid, such as saliva, could allow stress-free, rapid and non-invasive analysis thanks to bioelectronic platforms. More than 100 potential salivary biomarkers for the early detection of oral squamous cell carcinoma (OSCC) have already been detected: among these there are tumor cells, microRNA and Cell Free DNA. However, the lack of clinical validation and of a specific disease biomarker limit their application. For the time being there are no salivary biomarkers routinely used in clinical practice.

Conclusions: future specific studies are required to evaluate the biological and technical variability related to salivary biomarkers and to implement them in the diagnosis of OSCC.

OSTEONECROSIS OF THE JAWS RELATED TO NON-ANTIRESORPTIVE DRUGS: A SYSTEMATIC REVIEW

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Aim: the aim of this systematic review is to evaluate the characteristics of Medication-Related Osteo-Necrosis of the Jaws (MRONJ) not related to antiresorptive drugs and its differences with MRONJ related to antiresorptive drugs.

Methods: this systematic review was conducted following the PRISMA guidelines. Electronic search was conducted using the PubMed, Ovid Medline and Cochrane databases and was limited to human and English-language studies. Case series, cohort studies and clinical trials were included as study designs. Systematic reviews of literature, editorials and letters to the editor were excluded.

Results: after full-text analysis, a total of 55 articles were eligible for inclusion in this systematic review. The studies described 69 cases of MRONJ not related to antiresorptive drugs in 67 patients. MRONJ equally occurred in both genders, at a

mean age of 61.2 years. The predominant diseases were breast cancer (11,6%), renal cell carcinoma (10,2%) and rheumatoid arthritis (8,7%). MRONJ development was mainly associated with bevacizumab (21,7%) and aflibercept (7,3%) administration. Stage II had the highest occurrence (46,4%). The mandible was affected in the majority of cases (72.5%). Pain associated to MRONJ was reported in 68.1% of cases. The main triggering event was dental extraction (42%). In 53.6% of cases patients recovered completely and the mean healing time was 6.6 months.

Conclusions: an increasing number of patients, particularly cancer patients, appears at risk of developing MRONJ associated with non-antiresorptive drugs, although with a better prognosis and a shorter healing time. Pain and swelling represent an important index for the early diagnosis of the disease.

A NON-INVASIVE MOLECULAR TEST FOR PERIODICAL MONITORING OF ORAL CANCER TREATED PATIENTS

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Aim: no clinically validated tests for early detection of recurrence during the follow up after Oral Squamous Cell Carcinoma (OSCC) treatment currently exists. In the present study we applied 13-gene DNA methylation analysis from oral brushing at different timepoints during the oncologic follow-up of these patients. Aim of this study was to assess the prognostic role of our procedure in the periodical monitoring of OSCC treated patients.

Methods: 74 patients surgically treated for OSCC were enrolled in the present nested case-control study. Baseline brushing samples were collected after 4-10 months from OSCC resection surgery. Subsequent samples were collected at intervals of 4-10 months, unless relapse or death occurred. Quantitative DNA methylation level of a pre-selected 13-gene panel was

evaluated and a positive or a negative score was calculated for each brushing sample based on a predefined cut-off value.

Results: 19 secondary events occurred in the population study in a mean follow-up period of 19 ± 11.3 months. 13-gene DNA methylation analysis detected all positive scores in 24/74 patients, all negative scores in 26 patients and mixed scores (both neg. and pos.) in 24 patients. As compared with patients who tested negative, those testing positive and mixed had ~19-fold (OR = 18.7, $p < 0.001$) and ~8-fold (OR = 7.9, $p = 0.04$) increase in likelihood of relapse respectively. Among relapse cases, 17/19 tested positive before occurrence.

Conclusions: data of the present study suggest a potential role of our procedure as a surveillance tool for patients treated for OSCC.

ITALIAN PATIENTS WITH ORAL LICHEN PLANUS: A CROSS-SECTIONAL STUDY FROM THE SIPMO

SIPMO (Italian Society of Oral Pathology and Medicine)

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Aim: Oral Lichen Planus (OLP) is an immune-mediated inflammatory chronic disease of the oral mucosa, with different patterns of clinical manifestations. The aim of the study was to analyze the differences in the clinical and psychological profile of keratotic oral lichen planus (K-OLP) and non-keratotic oral lichen planus (nK-OLP) patients from the North vs Central-South regions in Italy.

Methods: OLP patients were recruited in 15 Italian universities joined with the Italian Society of Oral Pathology and Medicine (SIPMO- Società Italiana di Patologia e Medicina Orale). The Numeric Rating Scale (NRS), Total Pain Rating Index (T-PRI), Hamilton Rating Scales for Depression and for Anxiety (HAM-D and HAM-A), Pittsburgh Sleep Quality Index (PSQI), and Epworth Sleepiness Scale (ESS) were administered.

Results: a total of 540 participants were included, 270 OLP patients from the North Italian area and 270 OLP patients from the Central-South. Both groups were equally composed of 135 K-OLP and 135 nK-OLP patients. The Central-South K-

OLP (CS-K-OLP) patients reported a higher frequency of pain/burning compared with the K-OLP patients of the North (N-K-OLP) (NRS and T-PRI p-values < 0.001). The CS-OLP patients showed higher levels of anxiety, depression and a poor quality of sleep compared to the Northern patients (HAM-D, HAM-A, PSQI, p-value < 0.001). Regression analyses revealed that the NRS and T-PRI showed the greatest increase in the R2 value for the CS-K-OLP (DR2 = 9.6 %; p-value < 0.001**); DR2=9.7% p-value < 0.001; respectively) and that the oral symptoms and PSQI showed the greatest increase in the R2 value for the CS-nK-OLP (DR2 = 5.6 %; p-value < 0.001; DR2 = 4.5 % p-value < 0.001).

Conclusions: OLP patients from the Central-South regions present higher levels of pain and a greater impact of mood disorders compared to patients coming from the North. Clinicians should consider that the geographical living area may explain the differences in oral symptoms and psychological profile in OLP.

SEXUAL DESIRE IN BMS FEMALE PATIENTS: A CROSS-SECTIONAL STUDY

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Aim: the aim of this study is to investigate sexual desire in women with Burning Mouth Syndrome as compared to general female population.

Methods: a cross-sectional study with BMS patients and healthy controls was performed. Patients were investigated through physical examination and routine laboratory tests. We evaluated pain through Numeric Rating Scale (NRS) and Total Pain Rating Index (T-PRi), anxiety and depression through Hospital Anxiety and Depression Scale (HADS-A/D), sleep disturbances through Pittsburgh Sleep Quality Index (PSQI) and sexual desire using Sexual Desire Inventory (SDI).

Results: a total of 50 BMS sexually active premenopausal women (mean age: $45,68 \pm 6,70$) and 50 healthy controls (mean age: $44,56 \pm 7,10$) were enrolled. Compared with the controls, BMS

patients showed higher scores in the NRS ($7,81 \pm 1,71$ vs $0,14 \pm 0,40$; $p < 0.0001$), TPR-I ($10,50 \pm 4,86$ vs $0,36 \pm 1,06$; $p < 0.0001$), HADS-A ($11,86 \pm 2,85$ vs $3,90 \pm 2,81$; $p < 0.0001$), HADS-D ($8,04 \pm 3,18$ vs $1,42 \pm 1,86$; $p < 0.0001$) and PSQI ($9,04 \pm 2,62$ vs $4,64 \pm 3,27$; $p < 0.0001$). As for SDI, the mean global sexual desire score in BMS women was significantly lower compared to controls ($32,36 \pm 14,45$ vs $69,70 \pm 19,94$; $p < 0.0001$). In BMS group, no correlation was found between SDI and other items explored.

Conclusions: anxiety, depression and sleep disturbances are more common in BMS patients. The reported data demonstrate, for the first time, an association between BMS and sexual dysfunction with a lower global, dyadic and solitary sexual desire in BMS females compared to controls. Further studies are needed to corroborate our results.

ELISA TEST VS MODIFIED NIKOLSKY'S SIGN IN ORAL AUTOIMMUNE DISEASES DIAGNOSTIC PATHWAY

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Aim: the aim of this study was to compare the efficacy of modified Nikolsky's sign and ELISA test in patients with oral vulgar pemphigus (PVO) and mucous membrane pemphigoid (PMM).

Methods: 6 patients with a clinical diagnosis of oral autoimmune vesiculobullous diseases were enrolled. Modified Nikolsky's sign was performed: it consists of rubbing in the perilesional area with a blunt tool and insufflation of air at low pressure. If the bulla roof rises, the test was positive. Then, patients underwent for ELISA test and a sample for histological examination and direct immunofluorescence.

Sensitivity, specificity, negative and positive predictive value (VPN and VPP), accuracy and Choen's k of both analyzed methods were calculated.

Results: twenty-three patients (57,5%) were positive for Nikolsky's sign.

Modified Nikolsky's sign showed: sensibility of 84,6%, specificity of 92,9%, VPP of 95,7%, VPN of 76,4%, accuracy of 87,5%. Choen'K was 0,73: good agreement.

ELISA test showed: sensibility of 57,7%, specificity of 92,8%, VPP of 93,7%, VPN of 54,2%, accuracy of 62,5%. Choen'K was 0,43: modest agreement.

Conclusions: modified Nikolsky's sign can be useful in the early evaluation of PVO and PMM. This test is not expensive, minimally invasive, repeatable and easy to perform. Therefore, its execution should be encouraged in the routine dentist practice.

PAIN CATASTROPHIZING IN BURNING MOUTH SYNDROME PATIENTS

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Aim: burning mouth syndrome negatively affects patients' QoL. The pain catastrophizing (PC) influences experience and intensity of pain. The aims of this study were: i) to assess the level of PC, anxiety, depression and sleep disturbances, and ii) to evaluate the correlation between pain intensity and PC.

Methods: patients undergone clinical interview, oral inspection, laboratory tests and fill out the following questionnaires: Numeric Pain Rating Scale (NPRS), Total Pain Rating Index (T-PRI), Hospital Anxiety and Depression Scale (HADS), Pittsburgh Sleep Quality Index (PSQI), Pain Catastrophizing Scale (PCS).

Results: a total of 50 female BMS patients were recruited. The average age was $45,68 \pm 6,70$ years. The majority of patients showed high score in NPRS ($7,73 \pm 1,70$) and TPRI ($10,50 \pm$

$4,80$). Pathological scores were found in HADS-A ($11,54 \pm 2,94$), HADS-D ($8,04 \pm 3,18$) and PSQI ($9,04 \pm 2,63$). To regard PCS, the mean score was $25,70 \pm 10,69$. There were no significant correlations between PCS and other outcomes.

Conclusions: BMS is associated with alterations in the psychological profile (Anxiety, Depression, Sleep disturbances). There are no data about the patients' response to pain, such as PC. In our study group, high PC scores were found higher value was independent of pain intensity and other potential confounders, such as mental health and sleep disturbances, and can affect mental status and sleep. PC could also affect therapeutic results. Further studies are needed to investigate other possible correlations of PC in BMS patients and its therapeutic implications.

CAN PREVENTIVE DENTAL INTERVENTIONS REPRESENT POTENTIAL TRIGGERS FOR MRONJ ONSET?

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Aim: Medication-Related Osteonecrosis of the Jaws (MRONJ) is a serious adverse drug reaction in patients taking bone modifying agents, and major clinical research efforts are dedicated to the development of effective preventive measures and protocols. The aim of this retrospective study is to define whether preventive dental interventions may represent potential triggers for MRONJ onset.

Methods: the study included patients candidate to antiresorptive therapy with bisphosphonates or denosumab, referred at the University of Trieste Dental School who underwent a preliminary dental evaluation and preventive interventions.

Results: among 305 subjects included, 15 developed MRONJ (4,92%). Age, gender, underlying disease and type of medication were not associated significantly to an increased risk of

MRONJ. Preventive extractions ($p = 0.03062$; OR 3,17), the type of preventive protocol ($p = 0.0419$) and extractions during therapy at risk ($p = 0.0001291$; OR = 10,49) were significantly associated variables. All MRONJ cases caused by preventive extractions were related to a post-extraction waiting time ≤ 4 weeks.

Conclusions: although the importance of maintaining oral health is not questionable, there is need for a better definition of indications for tooth maintenance or extraction in the preventive phase. Time between preventive extractions and initiation of the therapy at risk seems to be of crucial importance to minimize risk for early MRONJ onset. Our results may represent an interesting point of view to be taken into consideration for further improvement of present guidelines.

SYNCHROTRON PHASE CONTRAST μ -CT: AN IMAGING METHOD FOR ORAL CANCER MICROENVIRONMENT STUDY

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Aim: the study aims to set up a protocol analyzing the 3D organization of the tumor stroma of oral tongue squamous cell carcinoma (OTSCC) surgical samples by Synchrotron Phase Contrast μ -CT to evaluate the tumor microenvironment (TME) rearrangement.

Methods: the study included 4 primary OTSCC surgical specimens selected from the archive of Institute of Pathology, Marche Polytechnic University, Italy, and stratified according to the pathological staging. A cylindrical section was carried out from each block of each sample from the most invasive area with the highest percentage of desmoplastic stroma. The high resolution (900nm) μ -CT was performed at the SYR-MEP beamline, ELETTRA Synchrotron Facility, Trieste, Italy. The collagen specific volume (ColIV/TV), the anisotropy degree index (DA), the connectivity density (Conn.D), and the

fractal dimension (FD) of peritumoral stroma were morphometric evaluated by the DragonFly 2022.1 Software, using the “Frangi 3D” filter to highlight the preferential orientation of collagen bundles.

Results: advanced OTSCCs showed a lower ColIV/TV, DA, Conn.D, and FD compared to early OTSCCs, suggesting a gradual decrease of collagen bundles organization and the impairment of physiological structural function and morphological integrity during the cancer progression.

Conclusions: these preliminary data provide a significant contribution to understand the TME rearrangements of OTSCC. The μ -CT provide to reliably reconstruct the 3D organization of connective stroma during the malignant tumor progression and invasion and its linking with neoplastic epithelial cells, offering a new methodology for the study of the TME.

IMPACT OF COVID-19 PANDEMIC ON THE EARLY DETECTION OF ORAL CANCER: A SINGLE CENTER STUDY

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Aim: the outbreak of SARS-CoV-2 pandemic has challenged healthcare systems across the world and hindered many cancers screening services. This situation also affected oral cancer patients preventing their access to health care screening services and specialistic cares. The study aims to retrospectively evaluate the impact of the SARS-COV-2 pandemic on the early detection of oral squamous cell carcinoma (OSCC) in relation to the different phases of the pandemic, comparing the results with the data referring to the same period of the previous year.

Methods: all patients subjected to biopsy for oral lesions from 01/01/19 to 30/04/21 were included in the study and a “pre-pandemic period” (01/01/19-23/02/20) and “pandemic period” (24/02/20 to 30/04/21) were considered. The latter was further divided into time intervals corresponding to the various “wa-

ves” to assess the impact of the pandemic on diagnostic activity. Differences among groups were established by Chi-square and Fisher exact tests. A $p < 0.05$ was accepted as statistically significant.

Results: a total of 805 of oral biopsies were included and a 107 OSCCs and in-situ carcinoma were diagnosed. The total number of oral biopsies performed during the first “wave” and the respective interval of the previous year results statistically significant (38 vs 140; $p < 0.05$). However, the number of OSCCs diagnosed in these periods is almost similar (16 vs 12; $p > 0.05$).

Conclusions: although these results must be confirmed by multicenter studies, it is possible to state the impact of the pandemic on early diagnosis of OSCC is strongly linked to the pandemic and healthcare local situation.

IMMUNOISTOCHEMICAL EXPRESSION OF PODOPLANIN IN ORAL LICHEN PLANUS

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Aim: podoplanin has been proposed as prognostic and predictive marker in oral cancer and Oral Leukoplakia. However, only one study evaluated the role of podoplanin in Oral Lichen Planus (OLP). The present study investigated the clinical and histological variables capable of influencing the immunoistochemical expression of podoplanin in patients with OLP.

Methods: sixty consecutive biopsies from patients with OLP constituted the basis of the present study. OLP with podoplanin expression in the suprabasal layer of the epithelium (pattern 2 in Kawaguchi classification) were considered overexpressed. The relationship between Podoplanin overexpression and the following clinical and histological variables: age, gender, smoking habits, site of incisional biopsy, clinical aspect,

number of lesions, lichen classification, degree of dysplasia, previous diagnosis of oral cancer, inflammatory infiltrate intensity was analyzed.

Results: multilevel mixed logistic regression analysis revealed that only presence of dysplasia ($p < 0.05$) and intensity of inflammatory infiltrate ($p < 0.05$) significantly influenced Podoplanin expression in OLP.

Conclusions: the present paper revealed for the first time that Podoplanin expression is influenced not only by presence of dysplasia but also by chronic inflammation. Further investigations will be necessary to evaluate the role of Podoplanin in the inflammatory process and the usefulness as marker to evaluate the risk of malignant transformation in OLP patients.

THE PROGNOSTIC ROLE OF TUMOR BUDDING IN EARLY ORAL TONGUE SQUAMOUS CELL CARCINOMA

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Aim: Oral Tongue Squamous Cell Carcinoma (OTSCC) represents the most common malignancy of the oral cavity. Despite the improvements in prognostic stratification of the current staging system, personalized treatments are still not used in the clinical practice. Accumulating evidence suggested tumor budding (TB) is a reliable prognostic factor in OTSCC. However, a standardized scoring system is still necessary to improve assessment replicability and interobserver agreement. The study aims to evaluate the prognostic role of TB in 190 early OTSCC patients treated with curative intent at the "Ancona General Hospital", Ancona, Italy, between 1997-2018.

Methods: TB was evaluated on haematoxylin and eosin-stained sections in the hotspot area of the tumoral infiltrative front under $\times 200$ magnification. TB was scored as a continuous variable and using the two-tier system proposed by Wang et al.

(cut-off: 5buds/field). Univariate and multivariate Cox regression analyses of disease-free survival (DFS) were performed. A p -values < 0.05 was considered as statistically significant.

Results: on multivariate analysis, TB resulted an independent prognostic factor of worst DFS, both considering TB as continuous variable ($P > 0.0005$) and using the two-tier system ($P > 0.0005$). High-risk group had a 5.7 times-increased probability of poor DFS compared to low-risk group.

Conclusions: these data confirm the prognostic value of TB in predicting DFS in early OTSCC. Classifying patients in two groups using the 5-buds cut-off significantly discriminates their survival outcomes. The identification of TB as a reliable prognostic marker in early OTSCC could improve the selection of patients could be benefit from elective neck dissection or adjuvant radiation therapy.

DNA METHYLATION PATTERNS ASSOCIATED WITH MALIGNANT TRANSFORMATION OF ORAL LICHEN PLANUS

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Aim: Oral Lichen Planus (OLP) is a chronic inflammatory disease of unknown etiology involving T lymphocytes with cytotoxic activity against the epithelial cells. It belongs to Oral Potential Malignant Disorders (OPMDs) with a transformation rate in Squamous Oral Cell Carcinoma (OSCC) around 1.4%. Purpose of the present study was to analyze methylation levels in a group of 12 OLPs-associated OSCC and in a second group of 25 OLPs that did not develop an OSCC.

Methods: two distinct brushing samples from 12 patients with OLPs-associated OSCC were collected: one on the tumor mass (GROUP 1a) and one on the distant mucosa diagnosed as OLP (GROUP 1b). As control group, one sample from 25 consecutive patients with OLP who did not develop OSCC after 60 months of follow-up (GROUP 2) was collected. The DNA

methylation level of 273 CpGs islands of 15 genes previously described as altered in OSCC (*ZAP70*, *KIF1A*, *LRRTM1*, *PARP15*, *FLI1*, *NTM*, *LINC0059*, *EPHX*, *ITGA4*, *miR193*, *GP1BB*, *miR296*, *TERT*, *miR137* and *PAX1*) was investigated by bisulfite Next Generation Sequencing, according to a previously described method.

Results: CpGs of *NTM*, *miR296*, *miR137* and *ZAP70* showed similar methylation levels in OSCCs (GROUP 1a) and in their respective OLPs (GROUP 1b), whereas a significantly distinct methylation profile was found in OLP group that did not develop OSCC (GROUP 2).

Conclusions: data from this preliminary study identify a specific methylation profile of OLP associated with OSCC. Future investigations will be necessary to evaluate the predictive value of these genes in OLP patients.

ORAL CANDIDA CHANGES DURING FIXED ORTHODONTIC TREATMENT: A SYSTEMATIC REVIEW

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Aim: to evaluate the changes in oral *Candida* colonization during Fixed Orthodontic Treatment (FOT).

Methods: the search for articles was carried out in PubMed, Scopus and Web of Knowledge, including articles published in English until February 2022. The search identified every human study report potentially relevant to the review, applying the search terms “orthodontic” OR “orthodontics” OR “fixed appliance” OR “bracket” AND “Candida” OR “Candidiasis” OR “Candidosis”. After duplicate study selection and data extraction procedures according to the PICOS scheme, the methodological quality of the included papers was assessed by the Swedish Council on Technology As-

essment in Health Care Criteria for Grading Assessed Studies (SBU) method.

Results: the initial search identified 533 articles, 152 of which were selected by title and abstract. After full-text reading, eleven articles were selected. The evidence quality for all the studies was moderate.

Conclusions: according to the SBU tool, this review could draw conclusions with a limited level of evidence. Contrasting results have been reported on the possible increase in *Candida* counts during FOT. However, FOT promotes the oral *Candida* colonisation of non-*albicans* species, although the most prevalent species is *Candida albicans*.

ORAL SQUAMOUS CELL CARCINOMA AND PATIENTS DELAY: A SYSTEMATIC REVIEW

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Aim: Oral Squamous Cell Carcinoma (OSCC) is still one of the most common cancers in the world, with global estimates indicating that there are approximately 354,864 new cases per year. Diagnostic delay is a known factors related to a worst prognosis of OSCC, one of the main causes of delay may be attributed to patient delay. The aim of this research is to analyze those studies relating to patient delay in the literature in order to consider the role of the fear related to OSCC.

Methods: guidelines reported in the PRISMA statement have been followed in order to perform the study. Inclusion and exclusion criteria were applied. In particular, we included studies published in the last 10 years reporting at least 25 patients affected by OSCC and defining the patient's delay (in days or months).

Results: searching through the various databases yielded 179 articles; a total 5 of articles included in this review. The systematic review included 1436 patients. The patient delay ranged from 60 days to 7.4 months with an average diagnostic delay of approximately 3 months.

Conclusions: patient delay, and probably fear, plays a key role in patient's prognosis. This phase of uncertainty, linked to the development of oral lesions of unknown origin, may cause moments of fear in the decision-making processes. The authors believe that awareness campaigns should include the knowledge regarding OSCC and related risk factors, but also consider the role of fear and its impact on patient delay.

IMPACT OF SARS-COV-2 INFECTION AND VACCINATION ON ORAL LESIONS OF IMMUNE ORIGIN: A REVIEW

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Aim: SARS-CoV-2 causes COVID-19, which is characterized by immune dysregulation and production of pro-inflammatory cytokines. This pathogenetic mechanism is common to various lesions that may affect the oral cavity. Moreover, cutaneous and mucosal lesions have been reported after Covid-19 vaccination. This review aims to investigate on the influence of SARS-Cov-2 infection or Covid-19 vaccination on the rise or exacerbation of lesions of immune origin in the oral cavity.

Methods: a literature review was performed in order to identify cases of association between Covid-19 and immune-mediated diseases of the oral cavity. Articles were searched by PubMed, using a combination of "covid-19", "covid-19 vaccination", "lichen planus", "erythema multiforme", "aphthous stomatitis" and "pemphigus" as keywords. Letters to the edi-

tor, case reports and case series were included. Studies without cases reporting an oral involvement were excluded.

Results: aphthous lesions are the most common oral lesions associated with Covid-19. Rare cases of oral lichen planus, erythema multiforme and pemphigus in Covid-19 patients were reported. Cutaneous lesions in conjunction with Covid-19 vaccination were described, sometimes with a mucosal involvement: studies report 5 cases of oral lichen planus, 4 cases of erythema multiforme and 3 cases of pemphigus.

Conclusions: recent articles describe oral lesions of immune origin in conjunction with Covid-19 or following Covid-19 vaccines. The pathogenetic mechanism is unclear and further studies are required to investigate on this possible association. Oral examination should be performed in patients with Covid-19, in order to identify early these lesions.

PROGNOSTIC VALUE OF MIR-155 FOR SURVIVAL OUTCOME IN HNSCC: REVIEW, METANALYSIS AND TSA

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Aim: the head and neck squamous cell carcinoma are among the most common neoplasms; in fact, it is among the top six neoplasms with an incidence of about 370,000 new cases per year. The 5-year survival, despite chemotherapy, radiotherapy and surgery for stages 3 and 4 of the disease, is low. MicroRNAs are a large group of small single-stranded non-coding endogenous RNAs approximately 18-25 nucleotides in length that play a significant role in the post-transcriptional regulation of genes. Recent studies investigated the tissue expression of miR-155 as a prognostic biomarker of survival. The purpose of this systematic review is therefore to investigate and summarize the results in the literature concerning the potential prognostic expression of tissue miR-155 patients with HNSCC.

Methods: the revision was written following the indications of the PRISMA, 3 database PubMed, Scopus and Cochrane databases were consulted through the use of keywords relevant to the topic of the revision, 765 bibliographic references identified, and 8 studies were included in the meta-analyses.

Results: OS, HR = 1.40, 95% CI: [1.13, 1.75]; DFS, HR = 1.36, 95% CI: [0.65 2.83]; PFS, HR = 1.09, 95% CI: [0.53 5.15]; Trial sequencing analysis (TSA) Curve crosses the line $Z = 1.98$ and Crossing of the monitoring boundary before reaching the information size provides for firm evidence of effect. The APIS graph shows that for an RRR of 38% alpha 5% and for a power of 80% the number of optimal patients is 475.

Conclusions: miR-155 could be a promising prognostic biomarker of survival for HNSCC.

PROGNOSTIC VALUE OF MIR-31 FOR SURVIVAL OUTCOME IN HNSCC: REVIEW, METANALYSIS AND TSA

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Aim: among the most common neoplasms, HNSCC is in 6th place with 370,000 new cases per year, the incidence rates vary according to gender with a ratio of 2 to 1 for the male and the survival rate despite the progress of chemotherapy, radiotherapy and surgery is extremely low for the advanced stages of the disease, in fact at 5 years it is 30% (stage 3 and 4) and is characterized by the presence of squamous carcinomatous cells of the multi-layered epithelium lining the oral cavity, larynx, and pharynx. The different expression of miRs can be used as a prognostic biomarker in HNSCC, and the main microRNA proven as a bioindicator described in the scientific literature for HNSCC is miR-21, other microRNAs have been investigated to a lesser extent (miR-99a, miR-99b, miR-100, miR-143, miR-155, miR-7, miR-424, miR-183) but among the-

se the one that has caught the most interest is the miR-31.

Methods: the present systematic review was performed based on PRISMA. A search was carried out in the PubMed, Scopus and the Cochrane databases with the use of keywords. This search produced 721 records and 4 included studies.

Results: the results of the meta-analysis report aggregate HR for OS between high and low miR-31 expression of 1.59 [1.22 2.07], $\text{Chi}^2 = 5.04$ $\text{df} = 3$ ($P = 0.17$) and $I^2 = 40$; $Z = 3.44$ ($P = 0.00006$). The TSA Curve crosses the line Z and Crossing of the monitoring boundary before reaching the information size provides for firm evidence of effect.

Conclusions: the data resulting from the meta-analysis suggest that elevated miR-31 expression could predict a poor prognosis.

RITUXIMAB AND PRP BEFORE MUCOGINGIVAL SURGERY IN A CASE OF RECALCITRANT ORAL PEMPHIGUS

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Aim: Pemphigus Vulgaris (PV) is a blistering disease characterized by the presence of oral/skin erosions and desquamative gingivitis. Oral lesions, often unresponsive to therapy, can increase the risk of periodontitis. Periodontal treatment may be very difficult in the active phase as minimal trauma tends to induce new erosions. Very few data exist regarding surgical management of periodontitis in patients with PV. Additionally, the success of surgical therapy for gingival recessions is unknown. In this case report we describe a case of a recalcitrant PV patient with deep gingival recessions successfully treated with muco-gingival surgery after disease control was achieved.

Materials and Methods: 1 female patient affected by PV and gingival recessions in the lower incisors was enrolled. Previous

therapies for PV with local/systemic corticosteroids and mycophenolate mofetil sorted no effect. Patient was scheduled to receive intravenous rituximab and Platelet Rich Plasma (PRP) topical applications. Scaling and root planing was planned as pre surgical preparation before Coronally Advanced Flap (CAF) in case of PV remission.

Results: the combination of Rituximab and PRP successfully achieved a complete and stable remission of PV lesions. This allowed to successfully perform CAF without PV relapses. Clinical improvement of recessions remained stable at 6 months.

Conclusions: in PV patients, disease control is crucial before considering periodontal surgery. Rituximab and PRP were effective for recalcitrant oral PV lesions allowing the success of mucogingival therapy.

ASSOCIATION BETWEEN PERIODONTITIS AND COGNITIVE IMPAIRMENT IN BMS PATIENTS: A CASE CONTROL STUDY

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Aim: this is the first case-control study which evaluates the periodontal status in BMS patients analyzing differences in three groups differentiated after a cognitive assessment. Secondly, this study evaluates the association between Cognitive Impairment (CI) and periodontal disease in BMS patients.

Methods: 60 patients have been recruited from oral medicine department in Federico II University of Naples. After administering MoCa and MMSE tests for cognitive screening, these patients have been divided into three groups: 20 patients were considered in BMS without cognitive impairment group (MMSE > 26, MoCa > 24), 20 patients in BMS with cognitive impairment group (MMSE < 26, MoCa < 24) and 20 patients as healthy controls. Full periodontal charting has been performed on each subject and also a laboratory examination of a blood sample (TC, LDL, HDL, TG, Folate, Vitamin B12, Vita-

min D3, Hcy) has been analyzed for cases and controls.

Results: the three groups do not show any statistical differences about the sociodemographic profile, consumption of alcohol and smoking status. Comparing periodontal status throughout the staging and grading evaluations, 65% of BMS with CI patients were in 3/4 staging level, while in BMS without CI group it was only the 15% (p: 0.03). In BMS with CI group there were a 50% of grading B and 20% of grading C, while BMS patients without CI have a higher percentage (75%) of grading A.

Conclusions: BMS patients with Cognitive Impairment have worst periodontal status versus BMS patients without Cognitive Impairment. This confirms the association between cognitive decline and alteration in the periodontal assessment. The BMS or the Cognitive Impairment should be considered, also simultaneously, as predictive of periodontitis.

OPTICAL COHERENCE TOMOGRAPHY (OCT) PATTERNS FOR ORAL LEUKOPLAKIA AND LICHEN PLANUS

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Aim: Oral Leukoplakia (OL) and Oral Lichen Planus (OLP) are the most frequent oral potentially malignant disorders, characterized by extreme clinical variability. Optical Coherence Tomography (OCT) has been proposed as valuable diagnostic support, although so far there are no standardized OCT patterns to clinically assess OL and OLP lesions. In this context, the aim of this study was to conduct a critical review of the literature on potential specific OCT patterns for preliminary OL and OLP evaluation.

Methods: the research, updated to January 2022, was performed considering original articles on *in vivo* OCT diagnostic patterns of histologically confirmed OL and OLP in humans.

Results: 6 studies were eligible for a total of 114 OL and 54 OLP cases. Compared with healthy mucosa, the following po-

tentially discriminatory OCT patterns were detected. For OL, OCT showed an increased reflectiveness of the epithelium with a less clearly detectable lamina propria; if dysplasia was present, it was reported a loss of epithelial layers stratification and absence of basal membrane. For OLP, OCT showed a reduction of epithelial thickness with a hyper-reflective sub-epithelial area and poor visualization of basal membrane and lamina propria.

Conclusions: the OCT discriminatory pattern reported for preliminary OL and OLP evaluation should be oriented towards the epithelial thickness and the integrity of lamina propria, respectively. Due to the limited data available, further studies should be conducted to validate these preliminary reports.

SUBCLINICAL CANDIDIASIS AND ORAL MUCOSITIS IN HNC RADIOCHEMOTHERAPY: A LONGITUDINAL STUDY

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Aim: Oral Mucositis (OM) is an early side effect of radiochemotherapy (RTCT) of the Head and Neck district. The aims of this prospective observational study were (i) to investigate a correlation between the presence of *Candida* spp. (OC) in the oral cavity before the start of RTCT and the onset of severe OM (grade 3/4) during RTCT and (ii) between OC and an early development of severe OM (EOM).

Methods: the protocol was approved by the ethical committee of the 'Università Cattolica del Sacro Cuore' (Ref. 22858/18) and was registered on ClinicalTrials.gov (ID: NCT04009161). An oral swab was taken before RTCT to assess the presence of OC.

A severe OM that occurred before the dose of 40 Gy was defined as an EOM.

Results: the final sample included 152 patients. No patients developed G4 OM and only 36 patients (23.7%) showed a G3 OM. Patients with different tumors sites showed different severe OM incidence (χ^2 Test — $p < 0.05$), being nasopharynx the most affected one (9/19 patients; 47.4%). A correlation between the presence of *Candida* spp in the oral cavity and EOM (χ^2 Test — $p < 0.05$) was retrieved. Patients with OC developed severe OM at a mean dose of 38.3 Gy (range: 28-58; SD: 7.6), while patients with negative oral swab developed severe OM at a mean dose of 45.6 Gy (range: 30-66; SD: 11.1).

Conclusions: the presence of OC appears to be a predictive factor for EOM. Thus, a preventive treatment could be useful to reduce its incidence. Further clinical trials are needed to confirm these data.

GUM HYDRAL MOUTHWASH IN THE MANAGEMENT OF RADIOTHERAPY-INDUCED XEROSTOMIA OF HEAD AND NECK CANCER

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Aim: the aim of this retrospective observational study was to evaluate the reduction of patients' xerostomia symptoms due to RT after the utilization of Hydral, by using a modified version of the XQ and to assess the improvement of QoL by using EORTC QLQ-C30 and QLQ-H&N35 questionnaires.

Materials and Methods: the protocol was approved by the ethical committee of the 'Università Cattolica del Sacro Cuore'. (Ref. 22858/18). A retrospective evaluation of the clinical charts of HNC patients attending the Oral Medicine, Head and Neck Department – Fondazione Policlinico Universitario A. Gemelli - IRCCS, was done and the scores of the above-mentioned questionnaires of patients who received a pre-

scription of Hydral Mouthwash to reduce xerostomia symptoms were collected, at baseline and after one month of treatment.

Results: thirty-four patients were included in the final analysis. The modified XQ is the questionnaire which presented, at the end of the study, the more remarkable reduction of the mean score: 10.05% of improvement (ANOVA test, $p < 0.05$). Both the QLQ-C30 and the QLQ-H&N35 questionnaire showed a slight decrease, although not statistically significant.

Conclusions: hydral mouthwash seems to be clinically effective in reducing symptoms related to RT-induced xerostomia. No adverse events were reported in this study.

EVALUATION OF THE ORAL HEALTH STATUS OF A COHORT OF PATIENTS AFFECTED BY GVHD

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Aim: the aim of this prospective study was to examine subjects who have manifested Graft Versus Host Disease (GvHD) post hematopoietic stem cell transplantation (HSCT) to evaluate oral cavity health and salivary glands impairment.

Methods: the severity of oral GvHD was assessed according to the Oral Mucosal Score. Oral health and salivary function parameters were analyzed, respectively: DMFt, BoP, PI, PSR and salivary pH, basal/stimulated salivary flow and xerostomia. Each patient underwent professional oral hygiene (POH) and individual oral hygiene instructions were provided (OHI).

Results: ten patients with a history of HSCT were visited at the Oral Medicine department of Policlinico A. Gemelli between 17/05/2021 and 04/10/2021: 6 patients presented oral GvHD, mostly affecting the tongue and the buccal mucosa. The 90%

of these patients received peripheral blood stem cells transplant. The risk of GvHD was higher if the donor was of the opposite gender than the receiving. The 33% of these patients showed an increase in the extent of the lesions and in the severity of the symptomatology. Xerostomia was present in the 60% of the sample and hyposalivation in the 30%. After 3 months, oral health indices improved after POH and OHI in 90% of patients.

Conclusions: the results confirm what is retrievable from the available literature. Creating a follow up is crucial to monitor primary complications that could compromise the success of the HSCT. Ensuring good oral health is necessary to reduce the incidence of secondary complications of oral GvHD and increase the quality of life.

DECELLULARIZED DENTAL PULP: A NEW TOOL FOR ENDODONTIC REGENERATION

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Dental pulp is a major component of the dental body, contained in the pulp chamber, that serves to maintain the tooth life and function. The aim of the present work was to develop a system that functions as a growth-permissive microenvironment for dental pulp regeneration using a decellularized dental pulp (DDP) matrix, 5-Aza-2'-deoxycytidine (5-Aza), and Extracellular Vesicles (EVs) derived from human Dental Pulp Stem Cells (hDPSCs). Human dental pulps extracted from healthy teeth, scheduled to be removed for orthodontic purpose, were decellularized and then recellularized with hDPSCs. The hDPSCs were seeded on DDP and maintained under dif-

ferent culture conditions: basal medium (CTRL), EVs, 5-Aza, and EVs+-5-Aza. Immunofluorescence staining and Western blot analyses were performed to evaluate the proteins' expression related to dentinogenesis, such as ALP, RUNX2, COL1A1, Vinculin, DMP1, and DSPP. Protein contents found in the DDP recellularized with hDPSCs were highly expressed in samples co-treated with EVs and 5-Aza compared to other culture conditions. This study developed a DDP matrix loaded by hDPSCs in co-treatment with EVs, which might enhance the dentinogenic differentiation with a high potentiality for endodontic regeneration.

THE MOLECULAR MECHANISMS BEHIND C-MYC/HIF-1 α GENE EXPRESSION IN OSCC

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In the current manuscript we evaluated the biological roles and regulatory mechanism of c-myc in the pathogenesis of oral squamous cell carcinoma (OSCC). C-myc is expressed in multiple types of cancer, comprising head and neck squamous cell carcinoma (HNSCC), where it plays a fundamental role in the tumor prognosis and in the self-renewal of tumor stem cells. In the present paper, we found that c-myc, c-jun, Bcl-2, hypoxia inducible factor-1 α (HIF-1 α), vascular endothelial growth factor (VEGF), matrix metalloproteinase-9 (MMP-9), ERK and p-ERK were overexpressed in a cellular model of squamous cell carcinoma, Cal-27. Cal-27 cells treated with Doxorubicin (Doxo), a

common chemotherapeutic agent, inhibited cell invasion, hypoxia, angiogenesis, inflammation as indicated by downregulation of MMP-9, VEGF, ERK and p-ERK as well as promoted apoptosis as evidenced by downregulation of Bcl-2 protein. This work aimed at underlying the functional relevance of c-myc in OSCC and in the HIF-MYC collaboration by integrating the knowledge on this molecular link in OSCC tumor microenvironment. The results obtained evidenced for the first time the vital role of c-myc in Cal-27 in cell survival/proliferation and tumor growth as well as the inhibitory effect of Doxo downregulating the signalling pathway activated by c-myc.

MRNA COVID-19 VACCINE AND ORAL LICHEN PLANUS: A CASE REPORT

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Aim: the present case report aimed to describe the onset of oral lichen planus (OLP), following anti-COVID-19 vaccination with Comirnaty.

Methods: in June 2021, a 40-year-old male complained the appearance of bilateral lesions in buccal mucosa, one month after the second dose of Comirnaty vaccine. The patient underwent intraoral exam, appropriate hematochemical tests and an incisional biopsy, on the most significant area of the lesions.

Results: clinical examination revealed a good oral hygiene, two dental amalgam fillings on the upper first molars and the presence of keratotic reticular patches and erythematous and erosive lesions on the buccal mucosa of both cheeks, suggesting the diagnosis of OLP; however, laboratory tests resulted negative, while histopathological findings were suggestive of

OLP. The amalgam fillings were replaced, and a follow-up was scheduled. No clinical improvement of the oral lesions was observed after 6 months, excluding the possibility that amalgam could represent the causative antigen.

Conclusions: considering the immune-mediated pathogenesis of OLP, it may be hypothesized that the inoculation of the second dose of vaccine could have triggered, secondary to the loss of the immunological tolerance, a cell-mediated reaction against an unknown keratinocyte antigen, no longer recognized as self and may be, therefore, responsible for the genesis of the lesions described. Further clinical observations and wider studies with higher scientific evidence are needed to validate such a finding and the putative role of m-RNA vaccines in OLP pathogenesis.

ROLE OF TP53 AS THERAPY PREDICTIVE BIOMARKER IN PATIENTS WITH HEAD AND NECK CARCINOMA

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Aim: this study aimed to exploratory investigate TP53 role as therapy predictive biomarker in patients with head and neck squamous cell carcinoma (HNSCC) and to test the usefulness of two classification systems of TP53 mutational landscape.

Methods: clinical and genomic data of 110 HNSCC cases were retrieved by The Cancer Genome Atlas Database and processed in SPSS 21.0 for the statistical analysis. TP53 mutations were categorized as reported by two previously published classification models (Model 1 and Model 2).

Results: 98 were eligible for analysis in this study, 79 reported one single mutation in the TP53 gene, 19 patients held wild-type TP53 gene. From our analysis, emerged that high-risk mutations predicted over two-times higher risk of evidence of

disease after treatments compared to wild-type while no statistically significant difference emerged between low-risk mutations and TP53 wild-type tumors.

Conclusions: the impact of TP53 mutations on therapeutic outcomes is still controversial probably due to the different kind of mutational events that may characterize TP53. We provided the first evidence that TP53 mutations classified according to our model represent a useful tool in predicting therapy response of HNSCC patients. The present retrospective study improves current evidence of the role of TP53 mutations in prognosis and treatment response in patients with HNSCC. Well-designed prospective studies are needed to confirm the role of TP53 mutations in HNSCC before this biomarker can be used to inform clinical decision making.

PDT ON A REFRACTORY GUM PEMPHIGOID IN A NON-HODGKIN'S LYMPHOMA PATIENT, WITH MRONJ RISK

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Aim: mucosal pemphigoid is a group of chronic immune-mediated blistering conditions. The most affected area is the gum. The lesions may present as simple erythema and ulceration following the rupture of the vesicles. Systemic and topical corticosteroids are the treatment of choice to achieve symptomatic control and delay disease progression. Non-Hodgkin's lymphomas (NHL) are cancers that originate from lymphocytes (B and T). Monoclonal antibodies, used to treat NHL, can put patients at risk of developing osteonecrosis of the jaw (MRONJ). The aim of this work is to report the management of a gingival pemphigoid in a patient with non-Hodgkin's lymphoma refractory to drug therapy.

Methods: a 49-year-old female patient with diagnosis of gingival pemphigoid went to our observation. Anamnesis was

positive for previous NHL, treated also with Rituximab. Treatment with topical steroids (Clobetasol 0,05%) and systemic Prednisone were prescribed without any improvement. PDT sessions with Toluidine Blue produced only a little relief but had not effect on blisters. PDT with indocyanine green (0,2%), laser light 810 nm (Gaia evo, Garda laser, Negrar, Italy), at a power of 0.30 W for each interested area for 30 seconds, was performed (5 sessions, once a week).

Results: the patient had not pain after PDT with indocyanine green and the blisters were reduced.

Conclusions: the use of PDT can be considered a safe and successful treatment for the management of refractory oral pemphigoid and to reduce pathogen microorganism invasion, in order to prevent MRONJ.

A CASE REPORT OF 2 METACHRONOUS ORAL SQUAMOUS CELL CARCINOMAS AND 1 RECURRENCE IN 7 YEARS

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Aim: the concept of field cancerization describes the increased risk of cancer development in the epithelial cells adjacent to the primary tumor, after prolonged exposure to carcinogens due to the occurrence of genetic alterations in histologically normal-appearing tissues. Our aim is to describe a case of field cancerization in a woman that developed 2 metachronous oral squamous cell carcinoma (OSCC).

Methods: we report a case of a patient who was referred to our sector of Oral Medicine (AOUP P. Giaccone Palermo, Italy) for the presence of white and red oral lesions one year after a diagnosis of OSCC.

Results: in 2016, a 54-year-old woman with a recent history of OSCC on the left lateral border of the tongue came to our attention. Clinical examination revealed the presence of

a hyperkeratotic-erosive lesion on the masticatory mucosa of the 4th sextant. The incisional biopsy confirmed the presence of a new primary OSCC. The patient was then referred to Oncology Unit for staging and management. Although a periodic follow-up, the patient developed in 2021 a recurrence on the left lateral border of the tongue; and, in 2022, one new primary OSCC on the masticatory mucosa of the 3rd sextant.

Conclusions: field cancerization is characterized by the occurrence of genetic alterations in histologically normal-appearing tissues, and it leads to an increased risk for synchronous or metachronous primary tumors. Therefore, a frequent very strict follow-up is necessary to early diagnose new lesions and improve the patient's prognosis.

LUNG CANCER METASTASES TO THE ORAL CAVITY: CASE SERIES AND SYSTEMATIC REVIEW OF LITERATURE

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Aim: Lung Cancer (LC) is the most frequent cause of cancer-related death worldwide. Metastases of LC to the oral and maxillofacial region are rare. The aim of the present manuscript is i) to describe three cases of LC metastases to the oral cavity, and ii) to perform a systematic literature review on LC metastases to the oral cavity occurrence and treatment.

Methods: three cases of lung cancer metastases to the oral cavity were described. A literature search was performed on PubMed, EMBASE, and Cochrane Library. A systematic review was performed in order to assess the clinical and radiologic characteristics, treatment options, recurrence and survival rate of LC metastases to the oral cavity

Results: three patients, a 78-year-old male, a 70-year-old ma-

le, and a 62-year-old female, were referred for the development of a lesion to the mandible and the mandibular gingiva respectively. Incisional biopsies of the lesions were suggestive of metastasis from lung primary. All patients were treated with chemotherapy and adjuvant radiotherapy. The literature search retrieved 156 cases of LC metastases to the oral cavity, mostly involving the mandible and the mandibular and maxillary gingiva. The management of primary lung cancer metastases most frequently involved chemotherapy and adjuvant radiotherapy.

Conclusions: metastases of LC to the oral and maxillofacial region are rare. Thus, the diagnosis of a metastatic lesion in the oral cavity is challenging, both to the clinician and to the pathologist.

MEDICATION-RELATED OSTEONECROSIS OF JAW IN A REGIONAL NETWORK SINCE 2004: EXPERIENCE OF 856 CASES

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Aim: the aim of this work is to describe MRONJ cases observed at main hospital oral care centers in Piedmont and Valle d'Aosta territory in 15 years.

Methods: data were retrospectively collected from Oral Medicine, Oral Surgery and Oral Maxillofacial Surgery Units, from 01/01/2004 to 31/12/2018. The main parameters collected were disease for which involved drugs (bisphosphonates, denosumab, others) had been prescribed, sex, age of patients, and localization of MRONJ.

Results: data from 856 patients were acquired; 71% were females; mean age was 71 (32-91) years; 90.8% received one only antiresorptive (or antiangiogenic) drug, 9.2% patients were treated with >2 agents. The most administered bisphosphonates were zoledronic acid, alendronate and ibandronate; 35 patients received denosumab, 8 antiangiogenics only. Un-

derlying disease was neoplasm in 691 (80.7%) patients, with prevalence of breast cancer, followed by multiple myeloma and prostate cancer. Non-malignant disease was registered in 165 (19.3%) patients, most frequent was osteoporosis. Sites of ONJ were mandible, maxilla or both.

Conclusions: MRONJ appeared to be not rare in our two regions during the examined 15 years among patients affected by bone metastases or bone metabolic disorders, with predilection for mandible site, elderly (>70 years) and female patients. MRONJ cases related to denosumab are increasing in recent years.

Further collection and analysis of this large population database is ongoing, including evaluation of cancer patient survival after start of antiresorptive treatment and after MRONJ diagnosis.

GINGIVAL LESIONS IN PATIENTS AFFECTED BY MUCOUS MEMBRANE PEMPHIGOID

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Aim: Mucous Membrane Pemphigoid (MMP) is a rare autoimmune vesiculobullous disease. Desquamative gingivitis is often the early, or the only sign, of this condition. Much evidence suggest that the gingival microbiota can modulate the intensity of inflammation. The aim of this study was to investigate a topographic contiguity between the MMP gingival lesions and the presence or absence of teeth or fixtures.

Methods: the inclusion criteria were: histological diagnosis of MMP, presence of desquamative gingivitis as the only sign of disease, absence of topical and/or systemic therapy for MMP. The gingiva of each MMP patient was divided in 56 sites (28 vestibular and 28 lingual). For each site, the presence or absence of dental elements or fixtures and pemphigoid lesions

(erosions, erythema, bullae) were recorded. Chi-squared test was used for the statistical analysis.

Results: 20 patients were enrolled (3, male, 17 female, mean age 73,5), for a total of 1120 sites (678 sites with tooth, 384 edentulous sites, 58 sites with fixture). MMP lesions were more frequent in sites with teeth, when compared with edentulous sites ($P = 0.000$) or with sites with fixture ($P = 0.002$). MMP lesions were more frequent in sites with fixture if compared with edentulous sites ($P = 0.000$). All differences were statistically significant.

Conclusions: MMP seems to affect gingiva with higher frequency where teeth or fixtures are present, if compared with edentulous mucosa. The reason is not clear but gingival microbiota could play a role.

HYBRID ODONTOGENIC LESIONS IN PEDIATRIC PATIENTS: CASE SERIES AND SYSTEMATIC REVIEW OF LITERATURE

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Aim: Hybrid Odontogenic Lesions (HOL) are rare conditions with histological characteristics of two or more odontogenic cysts and/or tumours. Clinical and radiographic presentation is variable, and definitive diagnosis relies on the histological pattern. Therapeutic approach is determined on the basis of the most aggressive lesion detected on histology.

Methods: two cases of HOL occurring in pediatric patients are described. Literature search was performed to retrieve the cases of HOL reported in patients below 21 years of age. In total, 125 cases reported in 87 articles were found

Results: in case 1, a lesion preventing tooth 3.3 eruption was described in a 14-year-old boy. On histology, an odontoma with ghost cell and follicular cyst was diagnosed. In case 2, a 14-year-old boy presented following the failure of orthodontic

treatment to guide mandibular left molars eruption. Histology revealed the presence of a complex odontoma associated with neurofibroma.

According to the literature, HOL most frequently occurs in females, at a mean age of 13.87 years. Symptoms include facial asymmetry and asymptomatic swelling. Radiographic appearance recognizes mixed radiolucent and radiopaque pattern. Surgical enucleation is the treatment of choice, and relapses are very rare.

Conclusions: although of rare occurrence, HOL are pathologic entities which require careful diagnosis. However, diagnosis is often performed when manifestations such as the absence of permanent teeth and/or the development of swelling bring the patient to the attention of the clinician.

GAF VS FORMALIN, ORAL TISSUE PRESERVATION WITH A NEW FORMALIN FREE FIXATIVE

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In histopathology Formaldehyde in its buffered aqueous form known as “NBF” (Neutral Buffered Formalin) has been used as a fixative for hundreds of years. Formalin is widely used due to its convenience in handling, high degree of accuracy and extreme adaptability but on the other hand it is known that this volatile reagent is carcinogenic and mutagen (category 2/1B; EC Regulation n.605/2014). To replace this toxic reagent, a histological fixative is required which then acts in a chemical reaction such as formalin, but without its toxicity, and has a comparable effect on proteins and nucleic acids. The solution proposed by ADDAX Biosciences is a novel formalin-free fixative named as GAF (Glyoxal Acid-Free).

This project includes 3 different studies carried out since 2017 in which two histological fixatives (GAF vs NBF) were compared.

In the first was evaluated (morphological, structural, and genomic preservation) endoscopic biopsies from colon; the second is an open, controlled, multicentric and blinded Clinical Trial that involved 3 important European Centers; the third one was focalized on conservation of oral tissue biopsies (scanned slides will be shown).

The results show that the tissue fixation achieved in GAF is not inferior to NBF in all common diagnostic practices tested in these studies. The main applications investigated were EE, IHC, HC, FISH, DNA/RNA extraction and amplification. The first study was published on PLOS ONE and the other two are on writing.

For the first time in history, these studies prove a non-carcinogenic fixative that is not inferior to NBF.

EVALUATION OF LGALS3BP AS A POTENTIAL TARGET FOR OSCC IMMUNOTHERAPY

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Aim: Antibody-Drug Conjugates (ADCs), consisting of a cytotoxic drug conjugated to a monoclonal antibody targeting antigens expressed on tumor cells, are the new frontier in cancer medicine. Lectin-galactoside-binding soluble 3 binding protein (LGALS3BP) is a multifunctional protein highly expressed in cancer cells, playing a role in neoplastic progression. We previously demonstrated that targeting LGALS3BP with a selective ADC can halt tumor growth and metastatic spreading in preclinical models of melanoma and neuroblastoma. In this work, we focused on the evaluation of the potential role of LGALS3BP as a novel ADC target in Oral Squamous Cell Carcinoma (OSCC), which treatment remains challenging.

Methods: LGALS3BP expression was evaluated in a cohort of 53 OSCC patients and in a panel of OSCC cell lines. mRNA,

cytoplasmatic, and secreted protein levels were measured by qPCR, Western Blotting, and ELISA, respectively.

Results: LGALS3BP was highly expressed and secreted, though heterogeneously, in a panel of OSCC cell lines. Fifty out of 53 (95.5%) cases showed a cytoplasmatic expression of LGALS3BP. To dichotomize LGALS3BP expression, a cut-off value of 79% - 50th percentile value - was chosen; tumors with a percentage of stained cells $\leq$ 79% were considered as “low” LGALS3BP, while the others as “high”. LGALS3BP expression was not significantly correlated with any of the clinicopathological variables evaluated.

Conclusions: LGALS3BP is highly expressed in OSCC and represents a potential target for ADC-based therapy. Therapeutic studies are ongoing to confirm LGALS3BP as a promising target for cancer immunotherapy in OSCC.

IS CBD SAFE? AN *IN VITRO* STUDY OF ACUTE AND CHRONIC ADMINISTRATION ON ORAL CELL POPULATION

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Aim: Cannabidiol (CBD), due to trade of Cannabis light products, is increasingly used in healthy population. The aim of this work is to investigate biological effects of CBD, *in vitro*, on healthy oral cells populations, simulating the most frequent intake modalities.

Methods: Human keratinocyte (BSCL 143) and Human gingival fibroblast (BSCL 138) was treated with CBD at different concentration for 24 and 72h, with single administration (acute) or 30 minutes administration every 8h (chronic). Viability was determined by MTT assay, cell morphology with SEM (500X, 2500X e 5000X), cell migration by Scratch assay, apoptosis and cell cycle with flow cytometry.

Results: CBD caused a significant increase in apoptosis and cytotoxicity ($p < 0.01$) with 6 μ M in acute treatment, 50 μ M in

chronic treatment and significantly inhibited migration at 50 μ M in both keratinocytes and gingival fibroblast. SEM analysis confirmed datas, showing raised cell edges, changing in cell shape and in the number of lamellipodia and filopodia. In keratinocytes, however, there was an increase in wound repopulation at 7h and significant reduced apoptosis at 72h with 25 μ M.

Conclusions: CBD showed differences between chronic and acute treatment, it was toxic on oral cells at high doses, while appears biocompatible at low doses. Intermediate concentrations, such as 25 μ M, showed less cytotoxicity and improved wound closure, especially in chronic administration. The results may be used for further studies to understand the mechanisms in these changes.

IDENTIFICATION OF SALIVARY MIRNAS IN WOMEN AT HIGH RISK OF BREAST AND OVARIAN CANCER DEVELOPMENT

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Aim: the present pilot study aims to evaluate the effect of nutritional and lifestyle interventions on salivary and blood miRNA expression in women with Breast Cancer (BRCA) 1-2 genes mutations. Such are highly predisposed to develop ovarian cancer (about 40%) and breast cancer (about 60%). Here we report the preliminary results of a comparison of miRNA profiles in saliva and blood.

Methods: twenty-five females, aged between 18 and 40 years, with a germ mutation of the gene BRCA1-2 were included in the study. The experimental intervention involved a preliminary evaluation which included recording of medical history, general diagnostics (e.g., blood pressure and heart rate), dental evaluation, salivary and blood collection, questionnaire on the quality of life and a nutritional counselling. Patients un-

derwent periodic follow-up at 3, 6, 11, 17 and 23 months from enrollment. Dental and periodontal health were assessed through DMFT, PSR, plaque and bleeding indexes. 2 mL of whole saliva were collected into a sterile tube. Presence and concentration of 84 selected miRNAs were evaluated through real-time polymerase chain reaction (RT-qPCR).

Results: preliminary results revealed a peculiar pattern of salivary miRNAs in women with BRCA 1 and 2 mutations. The result of the present study may be an important starting point for further research: healthy but predisposed subjects have already a changed miRNA pattern, different from healthy and not predisposed subjects.

Conclusions: salivary diagnostics is revolutionizing the concept of early diagnosis and monitoring of oral and systemic diseases.

A NATURAL PHOTOSENSITIZER AGAINST ORAL CANDIDA MDR STRAINS IN PHOTODYNAMIC THERAPY

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Aim: the emergence of multidrug-resistant (MDR) strains of *Candida spp* stresses the need for the development of new antimycotics. Photodynamic therapy (PDT) is an established treatment for various oral infections, and it involves the presence of 3 elements: (i) a photosensitizer that adheres specifically to microbial cells; (ii) light with a specific wavelength for each photosensitizer; (iii) the presence of oxygen. The reaction between these three elements determines the formation of singlet oxygen and free radicals which selectively kill the microbial cells. The aim of this *in vitro* study is to evaluate activated olive oil as a new type of photosensitizer in PDT against *Candida spp*.

Methods: oral MDR isolates of *C. albicans*, *C. kruseii* and *C. glabrata* were assayed by Kirby Bauer test, performed in accordance with EUCAST protocols. For each strain, four diffe-

rent combinations were evaluated: (i) 100 µl EVOO oil, (ii), 100 µl EVOO oil previously activated with 3% H₂O₂ (EVOO-H), (iii) 100 µl EVOO oil + 5 minutes of polarized light (480-3400 nm, 25 Watt), and 100 µl of (EVOO-H), dish plate irradiated with the same light. The Petri dishes were incubated in air at 37°C for 48 h.

Results: the clinical isolates of *Candida spp*. have shown different behavior with the different assayed experimental groups. While *C. glabrata* resulted sensitive with all combinations, with a 50% increase of inhibition halos by using polarized light. *C. kruseii* was insensitive. *C. albicans* resulted inhibited only with (EVOO-H) light-activated.

Conclusions: olive oil alone or activated with H₂O₂ could be considered a very performant photosensitizer against drug-resistant *Candida spp*. if illuminated by polarized light.

SALIVARY METABOLITES IN PATIENTS WITH ORAL LEUKOPLAKIA

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Aim: the pilot study aims to report preliminary results on the identification of salivary metabolites in patients with dysplastic and non-dysplastic oral leukoplakia (OL), in comparison to salivary metabolic profile of healthy controls (HC).

Methods: whole saliva of 23 patients with OL and 21 HC was collected before surgical procedures (biopsy for patients with OL or routine oral surgery for HC). Demographic variables, anamnestic and clinical data (e.g. size, location, clinical aspects of lesions), risk factors and oral health status (DMFT, PSR, plaque and bleeding scores) were recorded for each patient. Biopsy were performed in the most suspicious area of OL. Histopathological evaluation was performed in all cases and results were classified into OL with and without dysplasia. Salivary samples were centrifuged, filtered, frozen, lyophilized

and finally analyzed by H-NMR. Metabolite identification and quantification were carried out using Chenomx NMR suite 7.6 software. The Variable Importance in Projection (VIP) scores estimates the importance of each metabolite in the groups' aggregation.

Results: scores plot showed three distinct clusters. The clusters of HC and dysplastic OL were the most separated, with no overlapping between groups. An overall of 55 metabolites were identified, the most representative being isoleucine, glycerol, taurine, lactose, putrescine and 3-hydroxybutyrate.

Conclusions: the preliminary data from exploration of salivary metabolome in OL through H-NMR, returned a panel of metabolites able to aggregate well distinguished clusters of cases and controls.

GENE EXPRESSION ANALYSIS OF OSCC CORE AND MARGINS: SOX2 AS A BIOMARKER OF POOR PROGNOSIS

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Aim: cancer stem cells (CSCs) accounts for cancer initiation and progression. Here, we characterized CSCs in tumor core and margins of oral squamous cell carcinoma (OSCC).

Methods: qRT PCR was used to analyze *KLF4*, *BMI1*, *UBE2C*, *CD44*, *ALDH1A1*, *NANOG*, *SOX2*, *OCT4*, *CD133*, *CXCR4*, *FAM3C*, *RRM2*, *IGF1-L* in tumor (T), clinical margin (CM) and health mucosa (H) of samples. TCGA database was used to confirm clinical correlations. 2D motility and 3D spheroid *in vitro* assays were performed to analyze the effects of SOX2 knockdown in CAL 27 and SCC-15 OSCC cell lines.

Results: 72 tissue samples taken from 24 OSCC patients were analyzed. *BMI1*, *UBE2C*, *CD44*, *NANOG*, *SOX2*, *OCT4*, *CXCR4*, *FAM3C* were significantly up-regulated in T vs H ($p < 0.01$); *KLF4*, *CD133* and *ALDH1A1* were significantly down-

regulated ($p < 0.05$). *CD44*, *SOX2* and *CXCR4* were up-regulated also in CM vs H ($p < 0.05$). *SOX2* expression in T samples correlated with advanced TNM stage ($p = 0.0007$) and lymph nodes invasion ($p = 0.0036$). High *SOX2* expression in CM correlated with lymph nodes invasion ($p = 0.0093$). TCGA analysis confirmed that high *SOX2* levels correlate with poor OS ($p < 0.05$). Finally, *SOX2* knockdown revealed a reduction of cell motility at 24, 48 and 72h and a breakdown of tumor spheroid generation ability of CAL 27 e SCC-15 OSCC cell lines. In parallel, *SOX2* knockdown led to the downregulation of stemness (*KLF4*, *BMI1*, *UBE2C*, *CD44*, *NANOG*, *OCT4*, *CXCR4*) and EMT (*VIM*, *SNAIL*, *SLUG*) markers.

Conclusions: the study emphasizes the potential role of *SOX2* as a predictive biomarker of poor clinical outcome in the tumor bulk and margins of OSCC.

DESIGN OF NEW QUESTIONNAIRES FOR EVALUATION OF HYPOSALIVATION

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Aim: the aim of this work is developing new questionnaires to perform an efficient screening for identification of xerostomic patients with potential hyposalivation.

Methods: selection of different types of questionnaires led to their division into five groups: biographical, general and salivation-specific anamnestic, oral health-related quality of life and a new hyposalivation diagnostic questionnaire. Surveys were administered to patients with evident xerostomia, by an operator. Sialometry was performed twice by spitting method.

Results: in this pilot study, the questionnaires assessed the frequency of hyposalivation-related diseases in patients and relatives, as well as the intensity and frequency of symptoms

associated with xerostomia. Oral health-related quality of life is generally worse in patients with hyposalivation, as well as anxiety and depressive disorders are more frequent. The score and positivity of the main criteria achieved in the diagnostic questionnaire would provide an indication of the seriousness of hyposalivation in patients with xerostomia.

Conclusions: questionnaires recording pathological and pharmacological history are needed to collect data about the presence of the etiopathogenic causes and symptoms perceived by the patient. Semi-quantitative clinical hyposalivation score would assess the severity of hyposalivation and allows to compare the disease severity and the response to treatment.

“IO POSSO” (PAZIENTI ONCOLOGICI E SUPPORTO SALUTE ORALE): A FOCUS GROUP FOR CANCER PATIENTS

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Aim: a focus group is a research methodology that allows for acquisition of data during meetings dedicated to a specific topic (1,2). Aims of this study are to share our experience of focus group, Io POSSO to support cancer experience of patients, side effects and relapses on life quality, and to assess home oral hygiene habits.

Methods: our focus group manages many meetings at the Oral Medicine Unit, focusing on different topics supported by specialists, i.e. psychologist, nutritionist, orthopedic, dental hygienist and oral pathologist. The effectiveness of meetings is estimate by a Decisions Meeting Feedback Score after few questions – “How would you rate this meeting?”, “After this meeting, has your outlook for the future changed? Was this meeting helpful?”. The oral health self-assessment test eval-

uates oral hygiene procedures, gingival bleeding, smoking, removable denture, dental problems.

Results: 56 patients have diagnosis of oral squamous cell cancer (82%), and other patients other forms of cancer. 11 are men and 45 women. Effectiveness of meetings is very high, with top level of scoring. The oral health self-appraisal questionnaire shows: 81.8% brushes teeth at least twice a day, 32,1% removable dentures, 3% smokes > 5 cig/day, 30.9% calls a dentist for emergency and 41.8% resolved by phone.

Conclusions: in our focus group, meetings and interviews have allowed patients to clarify beliefs and doubts about cancer therapy and its lapels. Our data seems to confirm effectiveness of this approach in order to improve quality of life and to clarify and encourage treatment pathway.

OZONIZED WATER FOR TREATMENT OF ORAL MUCOSITIS IN CHILDREN: A PILOT STUDY

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Aim: Oral Mucositis (OM) is a common side effect of chemotherapy that affects approximately 80% of paediatric cancer patients. Management of OM is still controversial. Among non-pharmacological therapies, exposure to low ozone (O₃) concentrations has a therapeutic effect in many diseases. The aim of this pilot study was to investigate the effectiveness of ozonized water in the treatment of OM in childhood.

Methods: patients 4 to 18 years old, undergoing cancer therapy and presenting OM (grade²) were enrolled and randomized into two treatment groups. All patients received conventional hyaluronic coating gel treatment. In addition, patients from group A received ozonized water treatment as 4-minute oral rinses (double-distilled ozonized water), for 4 consecutive

days. Patients from group B received placebo treatment (double-distilled water rinses) following the same protocol. OM WHO grade and VAS 0-10 pain evaluation were performed at day 1 (at diagnosis - T₀), day 4 (at the end of the treatment - T₁) and at day 7 (T₂).

Results: a total of 19 patients were included in the study (group A: n = 10; group B: n = 9). Both groups showed a decline of OM grade, being greater in group A, but the difference between groups was not statistically significant (p > 0.05). VAS pain score was significantly lower in group A both at T₁ and at T₂ (p < 0.05).

Conclusions: ozonized water treatment seems to be effective in reducing OM-related pain in children.

INCIDENCE OF DYSGEUSIA IN PATIENTS UNDERGOING HEMATOPOIETIC STEM CELL TRANSPLANTATION

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Aim: dysgeusia is an alteration in taste perception, often resulting from medication intake. This study aims to verify the incidence of dysgeusia in patients undergoing hematopoietic stem cell transplantation (HSCT), secondarily assessing a higher prevalence in cases where HSCT has most affected the quality of life of the patients.

Methods: we asked a sample of 39 patients who had undergone HSCT in the past 2 years whether they had dysgeusia, then we administered them an OHIP (Oral Hygiene Impact Profile) quality-of-life questionnaire, rating with a higher index those who suffered a greater impact on their quality of life. Furthermore, by excluding the 13 patients who died as a result of HSCT and dividing the sample into a group with

dysgeusia and one without, we compared the mean OHIP.

Results: the results show a 39% incidence of dysgeusia in the analyzed patients. Moreover, in the group with dysgeusia the mean OHIP is 6.6 with a standard deviation of 7.3, while in the other the mean OHIP is 4.9 and the standard deviation is 3.3. The p value obtained is 0.38, which is not statistically significant.

Conclusions: these results show a link between incidence of dysgeusia and HSCT. Furthermore, they confirm a higher mean OHIP value, thus a greater association in patients with a worse quality of life. Although the study is not statistically significant because of the small number of patients included, more research in this regard could clarify the link between HSCT and dysgeusia.

SURGERY VERSUS WAIT AND SEE APPROACH FOR THE MANAGEMENT OF ORAL LEUKOPLAKIA

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Aim: evaluation of the efficacy of oral leukoplakia's surgical excision to reduce the occurrence of oral carcinoma (ClinicalTrials.gov Identifier: NCT04858100).

Methods: in this randomized controlled trial (RTC), patients having histopathological diagnosis of oral leukoplakia are enrolled. They are randomized into two groups: a test group and a control group. In the test group, the patient receives complete excision of the lesion. Further follow-up is scheduled after 14 and 30 days from surgery when the operator assesses the healing at the surgical site and the patient receives the result of the histopathological examination. The patient then continues with the routine follow-up, every 3, 4 or 6 months according to the histological findings (presence/absence of dysplasia). In the control group, patient receives a "wait and

see" management with the periodical follow-up scheduled every 3-, 4- or 6-months, according to the histological findings of the incisional biopsies. The incisional biopsies are also periodically repeated every four visits, unless important changes arise first, for which it is necessary to anticipate the diagnostic assessment.

Results: the expected results will indicate whether the surgical excision can reduce the development of oral cancer in patients with oral leukoplakia, in comparison to the wait and see approach.

Conclusions: data obtained will be the first ones coming from an RCT, which evaluates whether excisional surgery is effective in preventing the development of oral cancer in patients affected by oral leukoplakia.

ULTRASONIC SCALING AND AIR-ABRASIVE POWDERS DECONTAMINATION ON 9 IMPLANT-ABUTMENT SURFACES

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Aim: the purpose of this study was to examine an investigation through SEM of the efficacy of bicarbonate air-abrasive powders associated with ultrasonic instruments on nine different implant surfaces contaminated with biofilm. The second outcome was to evaluate the ability of fibroblasts to integrate around implant-abutment surfaces.

Methods: nine types of surfaces (zirconia surfaces, titanium sandblasted and acid etched surfaces, titanium machined surfaces, titanium anodized surfaces, titanium grade 5 surfaces) were strewed with withdrawal's patient oral biofilm. Later was examined surfaces' wettability by means of SEM. All the surfaces were decontaminated with bicarbonate air-abrasive powders and ultrasonic instruments. Fibroblasts were cultured on the native and decontaminated surfaces. The results obtained were analyzed with MathLab software.

Results: after the decontamination processing, all surfaces were damaged from the topographical point of view. Residual particles of sodium bicarbonate were noted on all surfaces. While the surfaces of grade 5 titanium are stronger, the other surfaces tend to lose their peaks. Anodized surfaces appear to have a higher number of fibroblasts after decontamination.

Conclusions: the decontamination of the surfaces led to the formation of a surface nanotexture. The presence of salts deriving from the bicarbonate powders used have created surface nanostructures that seem to improve the quantity of fibroblasts present on the surface compared to the control group. The more bioactive surfaces (anodized and grade 5 titanium) have a significantly higher number of fibroblasts after decontamination and this could improve clinical outcomes. Future studies will be needed to understand how bioactive surfaces and cells react to decontamination phenomena.

ORDINARY AND EXTRAORDINARY HYGIENIC MAINTENANCE IN DIFFERENT IMPLANT PROSTHETIC SCENARIOS

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Aim: to present hygienic protocols in different implant prosthetic scenarios. Two levels of implant maintenance are described: ordinary and extraordinary.

Methods: the ordinary hygiene session, performed by dental hygienist, includes clinical evaluation and individual instructions for oral hygiene. Scaling and root planning procedures are achieved with curettes, ultrasonic tips, polishing cup or air polishing. Extraordinary maintenance, carried out by both dentist and hygienist, involves the removal of the prostheses to evaluate the state of implant and soft tissues. The same instruments for ordinary hygiene are used. The clinician must calibrate cadence and type in relation to the different implant-prostheses and clinical situations.

Results: in single crown cases, ordinary hygiene should be

performed every 4-6 months and extraordinary hygiene is needed just in case of inflammatory condition. If there are fixed partial prostheses, ordinary protocol should be performed every 4 months and extraordinary protocol should be repeated once a year or in case of inflammation. In case of fixed full-arch prostheses, ordinary hygiene should be performed every 4 months and extraordinary maintenance should be repeated every 6 months or if inflammation occurs. In the event of overdentures, ordinary maintenance should be performed every 4 months and extraordinary maintenance should be repeated only in case of inflammation.

Conclusions: within all the limitation of this study, a maintenance hygienic protocol was proposed in order to prevent peri-implants.

INFORMATION AND COMMUNICATION TECHNOLOGIES TO IMPROVE COOPERATION IN AUTISM

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Aim: children with autism spectrum disorders (ASD) often present inadequate access and cooperation to dental procedures with high frequency of intervention under general anesthesia even for professional hygiene sessions (PHs). Recent papers support use of a multidisciplinary approach by combining behavioral and information and communication technologies (ICT: tablets, mobile phone) to enhance compliance and improve oral health¹.

Methods: patient with ASD were involved in the study. Questionnaire for evaluation of patient cooperation was employed at each visit. ASD patients were assessed at T0, T1, T2. T0: first appointment with patient and caregiver with an attempt to perform PHs without ICT. Materials such as photos, videos and videogames were then given together with instructions for

domestic oral hygiene procedures and information regarding operative procedures of following appointments. T1: PHs with ICT. T2: completion of PHs and questionnaire. Mean score retrieved from questionnaire were calculated to evaluate variation in cooperation (higher score = better compliance).

Results: 13 patients were recruited, 9 males and 4 females: the mean age was 14.7. Variations of the cooperation score were T0: 4,92 T1: 11,31 T2: 17,00.

Conclusions: ICT were recently employed in dental management of ASD patients with good results. We observed good response in terms of cooperation with ICT use in support of specific behavioral approach for ASD children. This confirms value of this specific protocol to enhance access to dental care and reduce necessity of dental procedures under general anesthesia.

EVALUATION OF AEROSOL DISPERSION DURING DENTAL PROCEDURES WITH DIFFERENT METHODS OF ASPIRATION

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Aim: the aim of this clinical study was to evaluate the production of aerosol and droplets in a dentistry environment during the use of various devices. At the same time, the ability to contain aerosol of different aspiration systems was evaluated.

Methods: a voluntary patient has been recruited as study subject through an experimental model. Some agar plates have been placed at equal distance from the patient's headrest and on the operator's visor, to gather dispersed droplets. The handpiece, the scaler, the turbine and the air-flow were chosen as devices. Among the containment methods, on the other hand, the standard aspirator, the high-volume aspirator (HVE) and the Oral Bio Filter (OBF) were evaluated.

Results: after 72 hours of plate isolation, the device that resulted

in the largest growth of colony forming units (CFU) was the air-flow, followed by the handpiece, then the turbine and, lastly, the scaler. The HVE and the OBF have determined a significant reduction in CFUs with respect to the sole use of the standard aspirator. The areas in which the majority of the contaminating droplets deposited were in correspondence of the assistant and the operator and were detected at hour 3 and 9.

Conclusions: the data gathered confirmed the major risk to which dentistry staff is exposed. It was demonstrated that the air-flow caused the biggest production of aerosol. The use of the HVE and the OBF has been crucial for the containment of the droplets. Moreover, some specific areas have been recognized to be those in which larger concentrations of CFUs deposit.

PEDIATRIC NUTRITION & ORAL HEALTH SURVEY BETWEEN AN ITALIAN AND A CANADIAN SAMPLES

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Aim: the survey aims to assess the pediatric nutrition of two sample groups while associating it with their parents' self-perception of their oral health and comparing the given results between the two different populations with dissimilar cultural habits.

Methods: an anonymous questionnaire was administered to the parents of children aged 3 to 12 years of Italian and Canadian nationalities, concerning their frequency of food consumption, therapeutic drugs and supplements intake, carrier of extra-odontostomatological pathologies related to oral health, and their physical activity level and oral hygiene habits.

Results: Canadian sample consists of 51 respondents while the Italian sample consists of 106 respondents. The Canadian children show a more variegated diet than Italian children. Al-

most all children consume more cariogenic foods than protective ones. In the Canadian sample, the consumption of liquid cariogenic foods is higher in preschool age (3-6 years old), with 96% of them having high consumption of fruit juices. Meanwhile, in the Italian sample, the consumption of liquid cariogenic foods is higher in school age (7-9 years old), with 77% of them consuming fruit juice and 71% drinking sweetened tea. Both groups have a high consumption of snacks (100% of Canadian group and 95% of Italian group).

Conclusions: it is necessary to emphasize the need to increase awareness of the importance of healthy eating from an early age, which presents as the optimal period to set up the promotion of the development of healthy habits.

ORAL AND GUT MICROBIOTA IN CHILDREN WITH CARIES AFTER PROBIOTIC TREATMENT: NGS APPROACHES

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Aim: the study aims to evaluate the effect on gut and oral microbiota composition of children with carious lesions treated with *Streptococcus Salivarius* M18 DSM 14685 (Carioblis) at phylum, family and species level.

Methods: the dmft/DMFT and ICCMS™ indexes were used to evaluate carious lesions: 10 children with high dmft/DMFT (higher than 3) and 9 caries-free children were enrolled in case and control group, respectively. We considered patients that did not have gingivitis, systemic or oral diseases and did not receive an antibiotic, probiotic, symbiotic or fluoride treatment in the past three months. Four samples from different oral niches and faeces samples from each patient were collected by

trained operator and analyzed with 16s Microbiota rDNA sequencing by S5 Ion Torrent (NSG).

Results: probiotic administration showed a positive effect on oral dysbiosis. In children with active caries, in tooth, saliva and oral vestibular regions, and in faeces there were changes in the microbiota composition.

Conclusions: according to the Literature, oral dysbiosis is affected by dental caries and in this study we observed an increase in two gastrointestinal bacterial species, *Bifidobacterium adolescentis* and *Ruminococcus torques*, which are linked to other diseases. Furthermore, *Streptococcus Salivarius* M18 DSM 14685 caused a shift to a healthier microbiota composition.

ORAL HEALTH-RELATED QUALITY OF LIFE AND OBESITY RISK: A CROSS-SECTIONAL STUDY IN ELDERLY

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Aim: the aim of this study is to assess, through a cross-sectional analysis, if any correlation may be observed between the GOHAI (Geriatric Oral Health Assessment Index) and OHRQoL (Oral Health-related Quality of Life) indices, and the risk of developing obesity.

Methods: 205 subjects (mean age 70 years) were investigated. At baseline (T0), anthropometric data, eating habits, oral health indices and numerous haematological parameters (glycemia, HbA1c, insulin, cholesterol, creatinine, hepatic and thyroid markers) were collected. All subjects completed the OHRQoL, under the supervision of two dental hygienists.

Results: the population analyzed (205 subjects) reported values compatible with the obesity in 26.90% of cases (N = 56). In this sub-population as well, a poor perception of the quality of life associated with oral health, and a worse oral health condition, were observed.

Conclusions: this study has highlighted how the oral health in the elderly population may correlate with eating habits. Furthermore, the condition of obesity is likely to be correlated with a poor perception of the quality of life associated with oral health. In conclusion, we may speculate that a greater risk of obesity correlates with a greater risk of oral diseases.

THE ASSESSMENT OF ORAL HEALTH STATUS IN PREGNANT WOMEN

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Introduction: periodontal disease can be compared to an outbreak of infection, so that the bacteria that mediate inflammation may not remain confined only to the gum tissue, but can enter the bloodstream and spread, thus spreading the infection and having a whole-body effect. Therefore, periodontal status is fundamental during pregnancy, in particular to prevent adverse pregnancy outcomes.

Aim: the aim of the present study was to assess the periodontal condition of a population of pregnant women.

Methods: pregnant women between 18 and 40 years at the 12th or 20th week of pregnancy presenting at the Gynecology Department of Vercelli Hospital between May and October 2021 were included. Patients with diabetes, neoplasms, haematological diseases, and hypertension were excluded. All included patients underwent a clinical dental examination including the registration of DMFT, PCR, GBI, OHI-S, WTCI and the assessment of past medical history. Then, all the included patients were administered three questionnaires: the OHIP-14 (Oral Health Impact Profile) questionnaire, the OIDP INVENTO-

RY (Oral Impacts on Daily Performances) test, and a questionnaire including questions about the use of toothbrush and oral hygiene habits.

Results: a total of 50 pregnant patients were included. Mean age was 30 years: 62% (n = 31) was in the 12th week of pregnancy, whereas 38% (n = 19) was at 20th week. As for DMFT, 34% of women had a value of 8 or less. As for OHIP-14, physical pain and psychological discomfort were the domains with most unfavourable values. Statistically significant association were observed between PCR index and type of toothbrush used ($p < 0,0005$; $RR = 0,0001$; $IC95\% = 0,0001-0,052$), between PCR index and the use of dental floss ($p < 0,0005$; $RR = 11,27$; $IC95\% = 2,44 - 55,26$), and between OHI-S index and the use of dental floss ($p < 0,01$; $RR = 7,97$; $IC95\% = 1,42 - 79,60$).

Conclusions: oral hygiene condition among pregnant women has to be improved. The role of dental hygiene practitioners is fundamental to inform such patients and to maintain a good periodontal health in order to avoid possible complications.

PREVENTION AND TREATMENT OF WHITE SPOT LESIONS: REVIEW

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Aim: white spot lesions (WSL) are white/brown spots found on the tooth surface as a consequence of local and systemic factors that cause demineralization of the enamel. On the market there are several products for their prevention and treatment. This work aims to help the clinician choose the most suitable protocol for solving this problem.

Methods: this review was conducted on articles published in PubMed from 2010 to 2020, mainly considering human studies compared to *in vitro* and animal studies.

Results: the constant use of fluorine-based products favors the transformation of hydroxyapatite into fluorapatite, which is more resistant to acid dissolution. Topical use was the most suitable for the prevention of enamel demineralization, while systemic intake proved to be less effective.

Casein phosphopeptide amorphous calcium phosphate (CPP-ACP) is a material deriving from milk proteins which, alone, or in association with fluoride (CPP-ACFP), has a bacteriostatic effect and is able to maintain the saturation of calcium, fluoride and phosphate ions on the tooth surface, hindering demineralization and promoting remineralization. The infiltration of the microporosities of the decalcified enamel with a low viscosity resin has proved to be an effective technique in improving the aesthetics of WSL.

Conclusions: some substances can be applied at home by the patient, others only by the dentist. A correct anamnesis to understand hygiene and food habits, and the degree of collaboration of the patient is essential to choose the most suitable product.

ORAL HYGIENE INSTRUCTIONS AND MOTIVATION. WHAT HAS BEEN DONE? A QUESTIONNAIRE-BASED SURVEY

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Aim: the management of correct oral hygiene allows to prevent the onset of caries and periodontitis and represents an essential tool to ensure the long-term success of any dental treatment. The aim of the study is to inquire patients' home oral hygiene habits and the perception of the importance they give to the daily plaque removal. Another objective is to assess whether dental professionals have conveyed to patients the importance of maintenance care and whether they have provided adequate oral hygiene instruction.

Methods: a questionnaire was administered to 42 adult patients who access the dental clinic of the Policlinico Umberto I in Rome for the 1st time. Exclusion criteria was the inability to understand the questions. The data was collected and analyzed through an online survey using Google form platform.

Results: 42 subjects were enrolled. 95% had a history of caries, 50% had dental prosthesis, 85% independently chose oral hygiene devices. 70% do not use interdental hygiene tools. 61% had never received oral hygiene instructions. 83% bled when brushing their teeth and 81% of these patients did not think that bleeding was a valid reason to see a dentist.

Conclusions: this survey showed that little importance is still attached to oral hygiene instructions and maintenance care for the treatment received. There's a need for dental professionals in future to draw up with patient a personalized protocol for the management of home and professional oral hygiene with scheduled check-ups and teach him to recognize the alarm signals coming from the oral cavity such as gum bleeding.

STRATEGY TO INTERCEPT AND TREAT ORAL ANOMALIES RELATED TO A PROFESSIONAL WINE CONSUMPTION

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Aim: daily wine intake for a long period could trigger the reduction in the levels of salivary calcium and phosphate ions, and a lowering of the pH values, which can increase the risk of oral diseases.

The purpose of the study is to verify what are the clinical effects of wine intake in the oral cavity of oenologists who have been working for more than five years.

Methods: the data relating to a group of 30 patients are reported. Patients have been allocated into two subgroups:

- Test group A: professional oenologists who have been taking a minimum of 35g of wine per day for at least 5 years (n = 20).
- Control group B: non-professional oenologists (n = 10).

The study design is of an observational case-control type, with a 1:2 ratio.

The main indices of oral health have been detected, such as PI, DMFT, BEWE, Air Blast Test, salivary test, PTC status, PSR, GBI, VSC.

Results: the comparative analyses have shown in the subjects/tests, who have reported the intake of ≥ 35 g of wine/day, numerous oral alterations compared to the control group. Specifically, the following parameters have shown a worsening: salivary pH, presence of halitosis, alterations of the structure of the lingual papillae, recurrent aphthae, altered perception of taste, and xerostomia.

Conclusions: on the basis of such preliminary clinical findings, it would be necessary to set up a personalized preventive and / or therapeutic plan able to allow the maintenance of oral health in such specific category of patients.

PTDM: CORRELATIONS WITH PERIODONTAL HEALTH IN PATIENTS WAITING FOR KIDNEY TRANSPLANTATION

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Aim: Posttransplantation diabetes mellitus (PTDM) is a serious and frequent complication after renal transplantation. Onset is related to anti-rejection immunosuppressive therapy. New evidence suggests that individuals at risk of developing Diabetes Mellitus 2 (DM2) have a higher risk of developing PTDM. Bidirectional correlations between periodontal disease and DM2 may suggest that patients with periodontitis waiting for transplantation are at increased risk of developing PTDM.

Methods: the periodontal health status of 90 patients waiting for renal transplantation or already been transplanted was assessed at the time of the visit for the clearance for transplantation. Patients already diabetic, edentulous or with insufficient data to make a diagnosis according to the 2017 classification

were excluded. The presence of renal insufficiency, pathologies favorable to the onset of PTDM, periodontal records, status and OPT were therefore considered.

Results: 94% of the patients evaluated had renal insufficiency and 70% had arterial hypertension. 8% of patients had hepatitis C and less than 2% had cytomegalovirus. 5% and 12% of cases were localized periodontitis and gingivitis, respectively. 83% of cases were generalized periodontitis with a majority of stages III or IV and grades B and C.

Conclusions: the presence of severe cases of periodontitis among patients waiting for renal transplantation is a serious problem. Currently there are no studies in literature that correlate periodontal health status and PTDM however its similarities with DM2 make this link plausible.

EVALUATION OF SALIVARY PH AFTER TAKING COFFEE WITH AND WITHOUT SUCROSE

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Aim: the aim of this study is to evaluate the salivary pH trend in a sample of people who consume coffee with or without sucrose, having performed or not the usual home oral hygiene.

Methods: a sample of 14 patients in good oral health was selected (PSR = 2 and DMFT = 0). The oral pH was measured for a total duration of 40 minutes with the aid of a pH Day2® pH meter. Five minutes after the base pH procedure, the subject was given an espresso (Nescafé Dolce Gusto, Espresso Intenso, Nestlé, S.A Vevey), with or without sucrose, and the pH measurements continued for another 35 minutes. The sample was divided into who take coffee with sugar and who do not, and into who maintained classical oral hygiene and who stopped it the evening before.

Results: in all subjects there was a clear reduction in salivary pH about four minutes after finishing coffee.

Subsequently, in those who had taken coffee without sucrose, there was an immediate increase in salivary pH.

In those who had taken coffee with sucrose, pH increased slowly.

In the group of subjects who maintained oral hygiene a clear decrease in pH could be observed with a subsequent sudden increase. In who stopped oral hygiene the night before, pH levels were lower than in the other side.

Conclusions: this study shows that in order to maintain a basic pH of the oral cavity it is advisable to drink coffee without sucrose, and carrying out proper oral hygiene.

ZINC-L-CARNOSINE MOUTHWASH FOR THE TREATMENT OF RADIO AND CHEMOTHERAPY ORAL MANIFESTATIONS

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Aim: the study aims to evaluate the therapeutic efficacy of a Zinc-L-Carnosine mouthwash (Hepilor®) in the treatment of oral mucositis in cancer patients treated by radiation and/or chemotherapy.

Methods: the study included 42 patients, randomly allocated to the Test Group (TG) (n. 22) or to the Control Group (CG) (n. 20), hospitalized to the SOD of Medical Oncology, Ancona General Hospital, Italy. The oral mucositis and its adverse events were evaluated by the National Cancer Institute Common Toxicity Criteria scales. To TG was administered Hepilor®, 4 rinses per day with 10 ml of pure product, for 3 minutes, for 30 days. To CG was prescribed 2 daily rinses with water and sodium bicarbonate, for one minute, for 30 days. Each evaluation was performed at the time of patient enrol-

ment (t0), after 15 days (t1) and 30 days (t2) from the beginning of the treatment.

Results: two patients were excluded from the study. In TG, the moderate mucositis (t0: 62%), its related symptoms (t0: 5-57%), and the use of analgesics (t0: 62%) were considerably reduced, both at t1 (28%; 0-14%; 14%) and at t2 (14%; 0-5%; 0%). In CG, the patients with severe mucositis (t0: 10%) and oral symptoms (t0: 0-56%) notably increased, especially at t2 (33%; 11-78%), as well as the use of analgesics (t0: 33%; t2: 68%).

Conclusions: these data confirm the clinical efficacy of Hepilor® in the treatment of oral mucositis in cancer patients. Together with an adequate oral hygiene, it reduced the severity of oral mucositis and its related symptoms, improving patients' quality of life.

SELF-PERCEPTION OF THE SMILE AND INFLUENCE ON ORAL HYGIENE: A MULTI-PARAMETER ANALYSIS

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Aim: to evaluate how important a person considers his smile and how this self-perception affects his oral hygiene practices at home, considering gender, age and geographical provenience.

Methods: submission of an anonymous multiple-choice survey with questions concerning gender, age, native nationality, perception of the smile and oral hygiene attitude; additional data such as PI (plaque index) and BOP (bleeding on probing index) were collected by a dental hygienist. The only condition of recruitment was to be above the age of 14; parameters such as health status, diseases, drugs intake or smoking habits were not considered limitation in order to take place into the study.

Results: 231 people replied to the survey. The analysis of the data revealed subjects from various ages and with several ge-

ographical origins (Europe, America, Africa, Asia). The data were collected to see if there were relations between them, and, to be considered statistically significant, a p-value $\leq 0,05$ was needed. Gender resulted related to smile importance and PI; age resulted related to PI, BOP, daily use of aids and dental control frequency; geographical provenience resulted related to self-appreciation of the smile, daily use of aids, daily brushing times and dental control frequency.

Conclusions: this study shows that population's age, gender and geographical provenience influence significantly the self-perception of the smile and the quality of daily oral hygiene practices. Moreover, the average PI and BOP indexes in the male sex is lower than the female one; females also consider the smile more important than males.

HYDROXYAPATITE VS FLUORIDE FOR REMINERALIZING AND DESENSITIZING WHITE SPOT LESIONS

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Biomimetic hydroxyapatite-based toothpastes have been studied recently for their remineralizing potential on teeth. The aim of the present study was to evaluate a toothpaste containing biomimetic hydroxyapatite compared to a conventional 1450 Ppm fluoride one on white spot lesions. The following indexes were considered: remineralization (Basic Erosive Wear Examination, BEWE), desensitization (Shiff Air Index, SAI), pain (VAS score), and patients' perspective. 40 patients were randomly assigned to two different domiciliary oral hygiene treatments: toothpaste containing 1450 Ppm of fluoride (Colgate® Protection Caries - control group) and toothpaste containing biomimetic hydroxyapatite (Biorepair® Advanced Sensitive - experimental group). For outcomes as-

essment the following timeline was considered: baseline (T0), 15 (T1), 30 (T2), and 90 (T3) days. Data were submitted to statistical analysis. SAI significantly decreased after 3 months (T3) of treatment only in the Trial group and VAS values resulted significantly decreased already at T2 in the trial group with a further significant reduction at T3. Conversely, BEWE scores and patients' perspective did not significantly vary during the follow up in neither group. Therefore, the use of the tested toothpaste containing hydroxyapatite could be effective for the domiciliary management of dental white spots with a reduction on pain and hypersensitivity higher than a conventional fluoride toothpaste and with the same appreciation by the patients.

PARAPROBIOTICS IN NON-SURGICAL PERIODONTAL THERAPY: CLINICAL AND MICROBIOLOGICAL ASPECTS

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Aim: periodontal disease represents a progressive destruction of tooth-supporting tissues. Recently, paraprobiotics are regarded as an adjunctive therapy to the non-surgical Scaling-and-Root-Planing (SRP). The aim of this study is to evaluate the efficacy of two new formulations of paraprobiotics, a toothpaste and a mouthwash for the domiciliary hygiene.

Methods: a total of 40 patients were randomly assigned to the following domiciliary treatments: control group (SRP + Curasept Intensive Treatment 0.2% chlorhexidine) and trial group (SRP + Biorepair Peribioma toothpaste + Biorepair Peribioma Mousse mouthwash). Periodontal clinical and microbiological parameters were recorded at baseline (T_0) and after 3 and 6 months (T_1 - T_2).

Results: the use of these products resulted in a significant reduction of most of the clinical indices assessed, which occurred at a major degree with respect to the conventional chlorhexidine considered as control. Additionally, after 6 months of use, the abovementioned products significantly decreased the percentage of pathological bacteria and the counts of those bacteria constituting the "Red Complex", more related to the periodontal disease.

Conclusions: the paraprobiotics-based products tested in this study seem to represent a valid support to SRP with a benefit on both clinical indices and on specific periodontal pathogens.

EFFICACY OF PLAQUE DISCLOSURE IN ORTHODONTIC PATIENTS: PRELIMINARY RESULTS

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Aim: to evaluate the effectiveness of a plaque disclosing agent (PDA) as visual guide for biofilm removal in patients with fixed orthodontic appliances.

Methods: 32 adult patients systematically and periodontally healthy (with PI $\geq$ 25%) with fixed orthodontic appliances at upper and lower jaw have been enrolled. After screening and informed consent signature patient have been divided in test and control group according to a randomization process. In the test group PDA was applied before and after the non-surgical periodontal therapy, while in the control one PDA was applied only at the end of the treatment. The residual plaque area has been detected by using standardized pictures analyzed by Image-J software.

Results: these preliminary results have been calculated analyzing data by the first 13 patients. All the frontal photos have been elaborated to avoid the residual area covered by plaque disclosing agent percentage (RPA) assessment.

In test group RPA was 3,58% (1,8% - 5,38%) while in control group was 18,38% (14,12% - 22,63%), with a statistically significant difference of 14,8% (10,2% - 19,3%) and a P-value $> 0,001$.

Conclusions: results show a significative benefit in plaque disclosing agent appliance at the beginning of non-surgical periodontal therapy, helping dental hygienist in biofilm careful detection and accurate removal in patients with fixed orthodontic appliance.

NEW DIGITAL HOME MOTIVATION TECHNIQUES IN CHILDREN

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Aim: during childhood, behaviors are learnt which promote oral health, these influence children's growth and development. It is important to sensitize parents since their habits determine those of their children. The purpose of this literature review is to evaluate the effectiveness of new technological devices in motivating oral hygiene in patients under 12 years of age.

Methods: an electronic search on PubMed was performed by entering appropriate Keywords. Only studies published between 2011 and 2021 were selected, and inclusion and exclusion criteria were established.

Results: apps would seem to be the first choice for the improve-

ment of oral hygiene habits in the home, offering the child motivation in the form of entertainment. However, no app has yet been found with all the necessary features to ensure adequate health care. A new frontier of digitalization is represented by virtual reality, which increases awareness and interest in oral health. Digital tools can help parents make proper habits part of their children's daily routines. However, in low developed countries, traditional motivation techniques remain more effective.

Conclusions: the new digital tools would seem to be a valuable support for dentists and dental hygienists in the motivational interviewing of pediatric patients.

TECHNOLOGICAL INNOVATIONS IN SUPPORT OF THE DENTAL SECTOR DURING THE COVID PANDEMIC

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Aim: the pandemic caused economic and psychological problems for both the patient and the practitioner; the world of technology was supportive for the whole health sector.

Methods: an electronic search was performed on PubMed and Eureka by entering specific key words.

Results: 12806 articles were found, according to the inclusion criteria 39 articles were selected. 8 papers underlined the economic consequences caused by the pandemic in dental facilities, highlighting a mark-up loss of more than 100%. 7 papers addressed the issue of reduced employment. 3 papers highlight the change between pre- and post-pandemic in the use of digital instruments. 8 papers highlight an increase in

protective measures taken to cope with the emergency. The last 13 addressed psychosocial issues caused by lockdown in both health care workers and patients.

Conclusions: technological innovations present throughout the patient pathway have made it possible to minimize the risk of SARS-CoV-2 infection. In particular, the use of telemedicine, of innovative tools both in the administrative and procedural spheres, and of disinfection, sanitization and sterilization protocols have led to an increase in the patient's confidence in the structure and in the professional, as well as to economic savings also in terms of oral health prevention.

CONTAMINATION AND DAMAGES OF AIR POLISHING: LITERATURE REVIEW AND *IN VITRO* EXPERIMENTATION

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Aim: the aim of the study is to investigate the effect that air polishing dusts have on the operator, continuously exposed to them, and on the surrounding environment; secondly to provide practical advice to minimize the risk of contamination to the operator and the environment

Methods: 5-minute air polishing sessions were performed on mannequins by two operators. A 50% mixture of glycine and bicarbonate powder with sodium fluorescein tracer was used. Several patches were placed on the face, arms and body of the operators and in the surrounding environment, 1m and 2m from the mannequin respectively, to observe the presence of trace amounts of fluorescein in the dental office. Various protective devices (goggles, FFP1/2/3 masks, gowns, face-shields) were tested to observe material deposition.

Results: the study found that there was 100% contamination of the samples under gowns, smocks, face-shields, goggles and also under all types of filtering face masks. This is because some powders have extremely fine particle size (< 30µm). The validity of the data collected was confirmed by the positive result of the Kruskal-Wallis test.

Conclusions: the presence of sodium fluorescein tracer detected in the various body districts and environment shows that there is a strong possibility that molecules of dust released by the air-polishing device and droplets coming from the oral cavity of the patient are transported with it. To reduce this contamination risk, all equipment and protective devices should be always used, and the dental office should be equipped with fume hoods.

EFFICACY OF INSTRUMENTS FOR PROFESSIONAL ORAL HYGIENE ON DENTAL IMPLANTS: A SYSTEMATIC REVIEW

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Aim: professional oral hygiene is fundamental to prevent peri-implant disease. Appropriate instruments should be used in patients with restorations supported by dental implants: they should be effective in deposits removal without damaging the implant components surface. The aim of the present study is to investigate and summarize the results regarding the efficacy of oral hygiene techniques described in the literature in the last 10 years in patients rehabilitated with dental implants not affected by perimplantitis.

Methods: the present systematic review was conducted according to guidelines reported in the indications of the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA). The focused question was: "Which are the most effective instruments for professional oral hygiene on implants not affected by perimplantitis?". The initial database search

yielded a total of 934 entries found in PubMed®/MEDLINE and Cochrane Library. The risk of bias of included studies was assessed using the Newcastle Ottawa scale (NOS) and the Cochrane Handbook for Systematic Reviews of Interventions.

Results: after full text review and application of the eligibility criteria, the final selection consisted of 19 articles. Curette, scalers and air polishing were the devices most frequently investigated in the included studies. The application of the more recent erythritol powder air polishing also yielded good clinical outcomes.

Conclusions: glycine powder air polishing appeared to be significantly effective in reducing peri-implant inflammation and plaque around implants. Further studies are needed to improve the knowledge on the topic in order to develop standardized protocols and understand the specific indications for different types of implant-supported rehabilitations.

MARKETING STRATEGIES IN THE RELATIONSHIP BETWEEN PATIENT AND DENTAL HYGIENIST

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Aim: digital communication has spread over time thanks to continuous progress in the world and technologies, until it became fundamental in social relations, in economic activities and in everyday life. The purpose of this review is to draw up a valid protocol for the dental hygienist for patient education, motivation and awareness about oral hygiene.

Methods: a literature search was conducted on the PubMed database with the relevant keywords. The search field was restricted selecting only studies performed from 2011 to 2021 and articles not available in full version were excluded.

Results: 35 articles were found, 21 of which are included within the review. Among the included studies, 12 deal with

social media in oral health communication as the main topic: 6 tele-dentistry; 1 marketing for the dental hygienist and 1 communication between doctor and patient. The results show that 74% of dentists and 44% of patients consider it inappropriate for dentists and patients to be friends on social media.

Conclusions: communication and marketing strategies between the patient and the dental team are implemented by the new technological and social aids. The analysis of these articles shows that most patients feel more supported if the teleconsultation is combined with traditional oral hygiene procedures. Further studies will be needed to be able to demonstrate the long-term effectiveness of telemedicine.

HYGIENE PROTOCOLS AFTER SURGICAL BONE REGENERATION: A REVIEW OF THE LITERATURE

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Aim: to find evidence of the best hygiene protocol to be adopted after surgical bone regeneration in angular defects or furcations.

Methods: the study is based on a review of the literature. For the choice of the hygiene protocol were considered number of days without brushing teeth, concentration of CHX used by number of days, type of toothbrush used, any interdental devices suggested and recall to professional oral hygiene procedures, both in terms of timing and methods used.

Results: 7 articles among case reports and clinical trials about the therapy after surgical bone regeneration have been selected and analyzed; everyone of which suggest a different

post-surgical hygiene protocol. Each of these protocols, however, present limitations because they don't provide clear and exhaustive post-surgical indications. In order to provide for it, additional 7 articles about post-operative hygiene protocols in case of clinical advanced flap surgery has been taken into account. The statistical analysis of these articles shows that the best protocol is the one proposed by Zucchelli et al.

Conclusions: even though Zucchelli's hygiene protocol was created for mucogingival surgery, it could be the best also after surgical bone regeneration, since it proposes professional and domestic oral hygiene instructions that support optimal healing of the surgical site.

THE EFFECTS OF CETYLPYRIDINIUM CHLORIDE (CPC) ON GINGIVITIS AND PERIODONTAL DISEASE

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Aim: to evaluate the effects of mouthwashes containing cetylpyridinium chloride (CPC) in subjects suffering from gingivitis and periodontal disease.

Methods: a search in the MEDLINE-PubMed database was conducted, which identified 6 full-text articles, with publication dates from 2008 to 2020, with data relating to CPC, gingivitis and periodontitis. The quality of the methodology of the five included studies was assessed based on a quality rating scale, the Jadad Scale. In the Jadad Scale, the methodological quality of studies is assessed by assigning points and having a range of scores from 0 to 5. Three studies scored 3, while the remaining two studies scored 4. From the selection of papers that met the criteria, data were extracted regarding the efficacy of products (toothpastes and mouthwashes) containing

CPCs compared with treatments containing other products (most frequently chlorhexidine and essential oils) or compared with a control rinse.

Results: analyses and comparisons are made between products containing CPC and products containing essential oils, chlorhexidine or others. Mouthwashes containing CPC were found to have an anti-gingivitis effect and are able to maintain plaque composition in a healthy and immature state. This effect ultimately prevents or slows the progression of gingivitis.

Conclusions: existing studies in the literature support that CPC provides benefits in reducing plaque and gingival inflammation as well as reducing certain bacterial species, i.e. *S. oralis* and *T. denticola*, *P. gingivalis* and *T. forsythia*, in periodontal disease.

CHILDREN&CARIES: CARIES RISK ASSESSMENT

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Abstract: Childhood caries (ECC) remains the most common chronic disease in children, with a significant impact on society. The key factors that cause caries in adults and children are similar, but there are some UNIQUE risk factors present in young children. In addition, defective dental surfaces may present hypoplastic prevention to date supported by scientific literature. However, as shown in the literature, risk factors have increased over time.

Methods: the book ChildrenandCaries is a useful tool to identify the main risk factors of caries and contains advice and food recipes, instructions for home hygiene, pediatric deconstruction maneuvers, safe cutting of food, Coloring pages and stories to help the child get closer to the prevention of this disease. childrenandcaries.com calculates the real risk of caries and based on the scientific evidence that this factor represents, shows on a web diagram of a spider and offers a specific result and treatment plan that depends on the result that can be low, medium or high. The framework is designed to contain the following risk factors: DMFT and Caries Activity,

the presence of enamel defects, erosions, wearers of orthodontic equipment, diet, quality and quantity of saliva, whether or not supplementation with fluoride or fluorine substitutes, eating disorders and gastroesophageal reflux, quality of oral hygiene, socioeconomic status and oral health of the family, radiation therapy, systemic dysfunction.

Results: Childrenandcaries provides a dedicated functional chart for dental hygienists, dentists and pediatricians to categorize their patients into different groups and record data to have a better method of monitoring their patients. Patient risk assessment for caries recurrence can be evaluated according to a variety of clinical conditions. The full spectrum of risk factors and indicators should be assessed simultaneously.

Conclusions: each parameter has its own scale for minor, moderate and high risk profiles. A complete assessment of the functional chart will provide an individualized total risk profile and determine the frequency and complexity of visits. Modifications to the functional chart may be made if additional factors become important in case of new evidence.

PROLONGED BREASTFEEDING AND ECC? KNOWLEDGE OF DENTAL HYGIENISTS AND MIDWIVES

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Aim: the aim of the study is to assess the knowledge of Dental Hygienists and Midwives about prolonged breastfeeding as a risk factor or protection for ECC (Early Childhood Caries), related to scientific evidence, OMS references and ministerial guidelines. Appetite for multidisciplinary approach and collaboration have been assessed too.

Methods: two difference and anonymous questionnaires were proposed to Dental Hygienists (15 questions) and Midwives (13 questions) through social networks, email and SMS.

Results: analyzing collected data most of Dental Hygienists showed a lack of knowledge about positive effects of prolonged breastfeeding on mouth evolution, and they also didn't know the relationship between short duration of breast feeding (< 6 Months) and higher risk of ECC. The answers also showed

gaps in training during University and some Dental Hygienists claimed to recommend stop breastfeeding to prevent or combat ECC, totally disagree with scientific evidence.

Questionnaires of Midwives showed a lack of knowledge about ECC and any link with breastfeeding, gaps in training during university also emerged from questionnaires. Most of Midwives affirmed they never read "National guidelines for oral health promotion and oral disorders prevention in childhood".

Conclusions: it is clear and obvious that gaps at university must be filled and the relationship between Dental Hygienists and Midwives must be based on training, information, and cooperation. Health care professionals could train each other, could collaborate, solve case, and inform parents and caregivers.

DENTAL HYGIENIST: NEW MEMBER OF CLEFT TEAM FOR MANAGING PATIENTS WITH CLEFT LIP AND PALATE

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Aim: the aim of the study is to evaluate the awareness of patients and families regarding the importance of oral hygiene and knowledge of the figure of the Dental Hygienist. Furthermore, the drafting of a home-hygiene protocol shared with the Cleft Team is proposed in order to improve the oral health conditions of patients.

Methods: a questionnaire with 44 queries was developed and proposed through social networks, that has been filled in completely anonymously both by patients with cleft lip and palate (> 18 y) and by their parents. The questions mainly concerned the quality of oral hygiene, the use of home aids and nutrition.

Results: from the analysis of the answers obtained with the survey, a significant lack of quality of home oral hygiene and the privation of knowledge of the Dental Hygienist figure emerged

in 25% of the completed questionnaires. 44.7% of attendees don't perform regular dental checks, 23.6% of them are unaware of the figure of the Dental Hygienist. The shortage of quality of good brushing combined with the non-use of interdental aids by 46% of participants and the use of a good toothpaste certainly leads the subject to develop plaque-related gum disease and carious lesions.

Conclusions: families and patients with cleft lip and palate are rarely aware of the role of the Dental Hygienist in maintaining oral health and in counseling regarding tools for home oral hygiene. It would be desirable to include specific courses for the management of patients with cleft lip and palate in the training course of the professional figure of the Dental Hygienist.

ACCURACY'S COMPARISON IN INTRAORAL DIGITAL SCANNING *IN VIVO* AND *IN VITRO*: CLINICAL STUDY

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Aim: this study aims to evaluate the accuracy of two intraoral scanners (Carestream 3600 and Medit i-500) by comparing them both *in vivo* and *in vitro* and assessing their differences. The aim is to highlight the importance of *in vivo* studies and to analyze the impact of oral factors in order to have a clear and complete idea of a device that is changing operative and clinical methods.

Methods: impressions of the arches were taken, using the PVS, to send them to the laboratory and obtain plaster models for the *in vitro* study. Each model was scanned 5 times, using both scanners, obtaining a total of 20 scans, which were converted into STL files. The *in vivo* part started by scanning the arches, 5 times each, using the two scanners, obtaining a total of 20 scans, which were converted into STL files. We exported

the files to the Medit Compare program and overlapped the files, to compare the results obtained *in vitro* and *in vivo*. From each overlay we obtained the following statistical variables: Minimum Distance, Maximum Distance, AVG, ABS AVG, RMS, SD, Variance and $(90^\circ-10^\circ)/2$.

Results: using Student's t-test, we compared the statistical variables between upper *vivo*, upper *vitro*, lower *vivo* and lower *vitro* for each scanner. The accuracy of the *in vitro* scanner is significantly better than that of the *in vivo* scanner.

Conclusions: the presence of saliva and tongue cause inaccuracies in the *in vivo* scan. Posterior mandibular areas are more difficult to scan due to space limitation. When scanning from left to right, there are more errors in the right posterior areas.

COMPARATIVE ANALYSIS USING FEM OF STRUCTURES FOR TORONTO BRIDGE ANCHORED ON 3 FIXTURES

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Aim: the aim of this study was to investigate by FEM analysis the behaviour of a 3 implants Toronto framework made by 3 different materials, with 2 abutment systems and 2 loading conditions.

Methods: three implants were inserted in a mandible epoxy resin model in positions 3.6, 4.1, and 4.6. Three frameworks with the same design and dimension but using different materials (fiberglass reinforced resin, Cobalt-Chrome, Titanium alloy -TiAl6V4) were designed. For each framework, 2 models using 2 abutment systems (MUA/OT-Bridge) were created. The framework tension and deformation, and the influence of the abutment system were assessed using FEM analysis in 2 different loading conditions: a 500N concentrated load between two implants and a 400N load applied uni-

laterally on a 7 mm distal cantilever.

Results: in the first condition, the load was distributed over an extended area, especially for OT-Bridge system, and Cr-Co and TiAl6V4 frameworks performed better than resins. In the second condition, Cr-Co and TiAl6V4 frameworks reported higher tension values than reinforced resin framework. The OT-Bridge exhibited better performances than MUA system and framework's deformation is more susceptible to its material than to its abutment system.

Conclusions: from this FEM analysis, Cr-Co and Titanium alloy framework exhibited a better mechanical behavior than resin frameworks. The OT-Bridge system, due to its structural characteristics, allows a better stress distribution on all types of framework than MUA system.

ROTATIONAL TOLERANCES IN ABUTMENT-IMPLANT CONNECTION FOR ORIGINAL AND COMPATIBLE ABUTMENTS

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Aim: the importance of rotational tolerance on the stability of the screw joint has been proven. Nowadays, several non-original abutments are available, often lacking experimental background. The aim of this study is to investigate the rotational freedom in a conical abutment-implant connection of original and compatible abutments in as-received condition and after several screw tightenings.

Methods: thirty titanium abutments and AnyRidge implants were selected. Ten were original EZ Post abutments (Group 1) and twenty were compatible abutments of two different manufacturers (Group 2 and Group 3). The rotational tolerance of the connection was measured using a tridimensional optics system in as-received condition (Time 0), after

tightening the screw at 35 Ncm (Time 1), after tightening 4 times at 35 Ncm (Time 2), after tightening one more time at 45 Ncm (Time 3), and after tightening 4 more times at 45 Ncm (Time 4).

Results: original abutments showed the lowest values of rotational tolerances (min 0.2°, max 1,48°), while the Group 3 showed the highest values, reaching 3° in Time 4 experiment. After screw tightenings, the difference in results between original and non-original abutments become significant ($p < 0.05$) for each experimental condition.

Conclusions: non-original compatible abutments may cause increased rotational tolerance, especially after multiple screw tightenings, undermining connection stability.

DENTAL 3D DIGITAL WORKFLOW USING AN OPEN-SOURCE 3D SOFTWARE PROGRAM

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Aim: digital field applied to dentistry is characterized by rapid growth. Dental practitioners and technicians intervention in terms of a correct drafting of the operations to achieve the project and then the product is fundamental both from a qualitative and quantitative point of view. There are several ways to obtain good results, but the right sequence in the use of suitable tools and selection of “simple” steps can significantly reduce computational effort. In fact, an incorrect operational sequence often returns incorrect results that fail or otherwise generate altered files. The purpose is to provide a more schematic and practical guide to the use of open-source software.

Methods: the Autodesk Meshmixer open-source software program was used. After examining and comparing several

procedures available in literature and/or scientific websites, we outlined the workflows by illustrating the most suitable tools that require less effort from the computer. They permit to create temporary pre-milled crowns, gnathological night guards, rather than an individual tray or a diagnostic wax-up.

Results: after an accurate analysis of methods, time and tools used, we reached a new operational sequence that is certainly more schematic and contains advantages such as simplicity, speed, and less computational effort.

Conclusions: this work outlined a procedural and instrumental work-flow that allows clinicians to start and finish a 3d design using simple steps with time spare and good results.

ANALYSIS OF COST FOR REMOVABLE DENTURES FABRICATION PERFORMED WITH CONVENTIONAL AND DIGITAL WORKFLOW

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Aim: the use of removable complete dentures is widely diffused and can be considered an intervention of social utility. The introduction of digital technologies is revolutionizing several fields of dentistry. The purpose of this study is to compare the clinical and laboratory costs of complete removable dentures fabrication performed with Conventional (C), Mixed (M) and totally Digital (D) workflows.

Methods: detailed costs of each investigated approach were collected from 10 private Italian dental practitioners and technicians. The included variables were manufacturing time, costs of materials, labor, packaging, and shipping. For D and M protocols, capital and fixed costs for software and hardware were also considered. Cost-minimization and sensitivity

analysis were performed, and break-even points calculated.

Results: from laboratory point of view, workflows M and D permitted a significant reduction of working time, compared to workflow C. The variable costs saving for workflow M was estimated to be between 70,2 and 147 EUR, while Digital workflow saved additional 29,9 EUR. The break-even point related to the capital investment in case of workflows M and D, could be reached with production of a number of dentures between 170 and 933 for workflow M and between 73 and 534 for workflow D, depending on the manufacturing options adopted.

Conclusions: totally and partially Digital workflows resulted to be more cost-effective than conventional method for fabrication of removable complete dentures.

MICRO-CT EVALUATION OF ENAMEL AND DENTIN TISSUE REMOVAL FOR INDIRECT RESTORATIONS

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Aim: to evaluate the effects of different finishing lines on enamel and dentin tissue removal and residual adhesion surface (RAS) areas for indirect partial restorations (IPR).

Methods: a molar was scanned using a micro-CT and the STL file (F_0) obtained was utilized to print 50 replicas. Standardized preparations for IPR were performed by a trained operator. The replicas were randomly assigned to 5 groups (N = 10) according to the tooth finishing line and to the location of the maximum contour line of the dental equator (DE): 1) Rounded shoulder above the DE (SA); 2) Hollow chamfer above the DE (CA); 3) Butt joint above the DE (BJ); 4) Rounded shoulder below the DE (SB); 5) Chamfer below the DE (CB). After scanning the sample, their STL files were superimposed and compared to F_0 to evaluate the volume of enamel and dentin removed

with the different preparations (One-way ANOVA). The RAS area for enamel and dentin was also calculated (Kruskal-Wallis test). The level of significance was set at $p < 0.05$ for all the statistical analyses.

Results: no significant differences in both enamel and dentin tissue reduction were found between SA, CA, and BJ ($p > 0.05$). CB was significantly more conservative in enamel than SB ($p < 0.05$) showing the highest RAS among the tested preparation groups ($p < 0.05$).

Conclusions: among the tested finishing lines, CB was the most conservative approach and it provided the higher residual adhesive surface area available for adhesion of IPR. No differences were found between the different margins when located above the dental equator.

NEW BIO-MECHANICAL CHARACTERIZATION OF PMMA FOR CAD/CAM PROSTHESES: BRILLOUIN'S TECHNIQUE

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Aim: the study aims to compare the mechanical and biological characteristics of a polymethylmethacrylate (PMMA) disc for CAD/CAM prostheses (TG) with a traditional resin (CG).

Methods: mechanical analysis was performed using Dynamic Mechanical Analysis (DMA) and Brillouin's micro-spectroscopy. Human keratinocyte morphology and adhesion were analyzed by scanning electronic microscopy (SEM), cytotoxicity by the MTT assay, apoptosis by flow cytometry and p53, p21 and bcl2 gene expression by Real time PCR (3 h and 24 h).

Results: TG exhibited a higher elastic modulus than CG (range 5100–5500 ± 114.3 MPa vs 3000–3300 ± 99.97 MPa). The Brillouin frequency was found at $\omega_B = (15.50 \pm 0.05)$ GHz for TG and at $\omega_{B_1} = (15.50 \pm 0.05)$ GHz and $\omega_{B_2} = (15.0 \pm 0.1)$ GHz for CG where two peaks were always present indepen-

dently of the sample point. SEM analysis revealed that keratinocytes on TG disks appeared to be flattened with lamellipodia. MTT viability data showed TG was significantly less cytotoxic than CG ($p < 0.001$). No significant differences emerged in apoptosis. Real time PCR showed p53 expression increased both after 3 h (9-fold) in cells on TG ($p < 0.001$) and on CG (5-fold) ($p < 0.001$). High p53 expression persisted after 24 h on both disks.

Conclusions: TG were more rigid, leading to major clinical implications. Brillouin micro-spectroscopy provided microscale mechanical properties, showing that CG materials were elastically heterogeneous. TG showed greater biocompatibility than CG. Neither material was associated with a significant increase in apoptosis, despite greater p53 expression.

EFFECTS OF PREPARATION DESIGNS ON THE MARGINAL AND INTERNAL GAPS IN PARTIAL RESTORATIONS

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Aim: the marginal and internal discrepancy (MID) of lithium disilicate (LiSi) CAD/CAM ceramic partial restorations after different finishing margin lines (FML) was evaluated with 3D micro-computed tomography (μ CT).

Methods: forty human molars were prepared to receive LiSi overlays (IPS e.Max CAD, Ivoclar) and randomly grouped ($n = 8$), according to the type of FML and locations to the dental equator (DE): G1: Rounded shoulder above the DE (SA); G2: Chamfer above the DE (CA); G3: Rounded shoulder below the DE (SB); G4: Chamfer below the DE (CB). Restorations were luted with a universal resin cement (RelyX Universal+Scotchbond Universal Plus, 3M). The MIA was evaluated with μ CT. The marginal discrepancy (MD), absolute marginal discrepancy (AMD) axial

space (AS) and occlusal space (OS) were calculated with 2D analyses. Three-D images were used to calculate the volumetric internal gap. Data were statistically analyzed ($p < 0.05$).

Results: the MID and 3D internal gaps differed between groups ($p < 0.05$). CB showed significantly greater AMD and MD than the other preparations ($P < 0.05$). Preparations below the DE (CB and SB) resulted in significantly greater AS and OS than the groups above DE ($P < 0.05$). CA showed significantly smaller 3D internal gaps than SB and CB ($p < 0.05$).

Conclusions: the marginal adaptations obtained with the tested finishing line preparations achieved clinically accepted values. Preparations located above the DE might results in restorations with smaller internal gaps.

ELDERLY PEOPLE ORAL HEALTH AND COGNITIVE FUNCTIONS

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Aim: to investigate the relationships among the edentulous condition in elderly people, cognitive decline, pathological oral conditions, and neurodegenerative diseases such as Alzheimer's.

Methods: 218 edentulous patients were enrolled. They underwent the administration of GOHAI test, PFEIFFER test, Evaluation of nutritional items according to BRADEN index, TRAIL MAKING TEST, and oral visit.

Results: among 218 patients (95 males, 123 females, mean age $75 \pm \text{SD}$), only 33 had no cognitive impairment. The difference between subjects without cognitive impairment and patients with moderate-severe cognitive impairment was statistically significant ($p < 0.05$). All variables studied affected the diagnosis of cognitive impairment, only sex, and medications taken were not statistically significant. Patients with severe cognitive impairment ($n = 185$) compared to cognitively intact patients or those with mild cognitive impairment showed a higher

mean age and a higher rate of cognitive impairment: a higher mean age and a higher frequency of several parameters of poor oral health (reduction in the vertical dimension, muscle coordination and inversion of fit); a reduction in the integrity of the mucous membranes as well as a greater prevalence of Newton's stomatitis and oral candidiasis; a higher prevalence of diabetes and stroke, moreover a higher use of sedative drugs, anticoagulants, and bisphosphonates and a worse nutritional status; a score lower than 51 in the GOHAI test.

Conclusions: the prevalence of moderate-to-severe cognitive impairment was 84.9%. They presented, compared with cognitively intact or mild cognitive impairment patients, higher mean age, and higher frequency of several parameters of poor oral health and/or a reduction in the integrity of the mucous membranes and/or a higher prevalence of Newton's stomatitis and candidiasis.

METROLOGICAL TEST OF ACCURACY OF THREE METHODS FOR FABRICATING DIGITAL COMPLETE DENTURES

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Aim: to compare different manufacturing techniques of complete dentures, by investigating the accuracy (as trueness and precision) of the intaglio surface.

Methods: starting from the same Standardized Tessellation Language (STL) file of the metal model of an edentulous maxilla, three groups ($n = 20$) of complete dentures fabricated using three different technologies (milling-monolithic, milling-bonded and injection-molding) were tested to evaluate the trueness and precision of the intaglio surface. Eight areas of interest (AOI) were defined at the intaglio surface of the denture base (right and left edentulous crest, right and left buccal flange; central palate; post-dam; right and left tuberosity) and a new reference geometry approach was used to compare the intaglio surface to the CAD design. This approach was based on reference geometry landmarks and it was compared to the gold standard (best-fit). The minimum number of points for each AOI necessary to describe the error

was calculated using sensitivity analysis.

Results: three levels of analysis (inter-groups, intra-group and inter-AOI) evaluated the Δ -mean error value. The inter-groups comparison showed a minimum $12 \mu\text{m}$ (DS $28 \mu\text{m}$) trueness value of milling-monolithic group, with other groups well under the clinically significant limit of tolerance ($300 \mu\text{m}$). The intra-group analysis confirmed the best Δ -mean error value ($4 \mu\text{m}$) of the monolithic group at the left flange. The inter-AOI analysis showed the worst results for the injection-molding group at the left ($149 \mu\text{m}$) and at the right ($168 \mu\text{m}$) flange. All measures performed with the superimposition demonstrated to be underestimated respect to those determined using the reference geometry approach.

Conclusions: all Δ -mean error values of the trueness were not superior to $168 \mu\text{m}$, confirming a level of the accuracy of digitally manufactured complete dentures well under of the clinical tolerance.

TRUENESS AND PRECISION OF DIGITALLY MANUFACTURED FRAMEWORKS FOR REMOVABLE PARTIAL DENTURE

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Aim: to evaluate the accuracy of removable partial denture frameworks manufactured with different production methods and materials.

Methods: starting from the same digital design, 80 frameworks were manufactured (group: n = 20): group 1, Titanium (Direct Metal Laser Sintering); group 2, Co-Cr (Direct Metal Laser Sintering); group 3 calcinable resin (Fused Deposition Modeling); groups 4, Co-Cr casting by lost-wax technique from digitally manufactured calcinable resin. All frameworks were scanned and compared to the Standard Tessellation Language (STL) file of the initial project design. The distance (Δ -error value) between the corresponding points of the frameworks and the digital design was measured in 8 different areas of interest (AOI). To test the repeatability (precision) of the measurement protocol, measurements of ten consecutive scans were performed using the reference geometry approach. Data were collected after the sensitivity analysis, that allowed determi-

ning the minimum necessary number of AOI points to analyze. All values were considered as relative values, to better represent the over- or under-contouring determined by the manufacturing.

Results: the inter-group analysis showed a total 6.3 μm Δ -mean error value for Ti, 41.4 μm for Co-Cr, 36.6 μm for calcinable resin, and 24.2 μm for Co-Cr metal casting. Intra-group analysis showed a 6.2 μm minimum Δ -mean error value for the vestibular component of the Bonwill clasp of Titanium frameworks, and a maximum Δ -mean error value (42.4 μm) for occlusal rest of circumferential clasp of Co-Cr frameworks. Inter-group analysis documented the occlusal rest of circumferential clasp as the worst Δ -mean error value for Ti and for Co-Cr, and the lingual component of the Bonwill clasp for metal castings.

Conclusions: all digital workflows produced clinically acceptable values of accuracy, although the Titanium DMLS manufacturing showed the highest level of trueness.

CARTILAGE REGENERATION: INNOVATIVE MOLECULES AND SYSTEMS TO IMPROVE HEALING AND COUNTERACT ARTHRITIS

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Temporo-mandibular joint (TMJ) is a crucial part of the stomatognathic system. Excessive or prolonged overload and some mechanical factors leads to matrix components degradation with the destruction of the joint's articular cartilage. Recently, the use of Gellan Gum (GG) as scaffold for cartilage regeneration is increased exponentially thanks to its easy preparation, low price and editable biological properties. The goal of this study is to biologically characterize different GG-based hydrogels filled with several molecules to assess GG versatility in cartilage regeneration. Materials' cytocompatibility has been evaluated, after the establishment of a 3D model, by means of metabolic activity by using the alamar blue assay whilst chondrogenesis has been evaluated by histological analysis and

Real time PCR; The protective effects of molecules on cells against bacteria has been done by using the innovative cells/ bacteria co-culture in which the number of cells and bacteria is estimated by using the trypan blue and the CFU respectively. Results demonstrated how the incorporation of different molecules didn't interfere with materials' cytocompatibility and at the same time how it can significantly increase materials' mechanical properties. This last parameter has been demonstrated to be crucial during chondrogenesis. Moreover, the incorporation of some molecules has been demonstrated to have a protective role on cells against pathogenic bacteria often present in septic arthritis. According to these results, we can assume its ability to efficiently sustain cartilage regeneration.

CLINICAL PERFORMANCE OF IMPLANT-SUPPORTED FIXED PROSTHESES WITH ANGULATED SCREW CHANNELS

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Aim: the aim of this prospective cohort clinical study was to assess the mechanical complication and crestal bone loss in posterior monolithic zirconia implant-supported fixed dental prostheses with angulated screw channels.

Methods: participants with good general health, sufficient residual bone height and thickness were choosing. All implants were placed according to the same protocol. After 4 months of healing, a conventional impression was taken and the monolithic zirconia FDPs with ASC were designed by CAD software program and mechanically attached to a titanium base. During the follow up at 6, 12, 24, 36 months CBL and mechanical complication were checked. CBL was measured from radiographs, considering the mesial and the distal sides of the implant. The mechanical complication re-

corded included fracture or chipping of the fixed dental prostheses, fracture of the implant and loosening or fracture of the screw. Also implant diameter, screw channel angle (angle ≤ 15 degrees versus > 16 degrees), prosthetic type (single or multiple crowns) and antagonist type (natural dentition or prosthesis) were noted as implant and prosthetics characteristics.

Results: the analysis included 49 implants and screw loosening was recorded in two participants. The effect of the angle of ASC, implant diameter, implant length, prosthetic type, and antagonist on the CBL was not statically relevant.

Conclusions: posterior monolithic zirconia implant-supported FDPs with ASC did not increase neither CBL nor mechanical complication during the first 3 years of placement.

CONOMETRIC CONNECTION BETWEEN ABUTMENTS AND PROSTHESES: REVIEW OF THE LITERATURE

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Aim: the conometric design was proposed as a possible connection between the abutment and the prosthetic coping. This study aimed to review the characteristics and possible clinical uses of this connection in implant-supported prosthesis.

Methods: a search was done on electronic databases for the keywords: dental implant and (conometric connection or conometric prosthesis); articles published in English after 2010 were considered and the research gave 17 results. 6 parameters were analyzed: advantages due to the absence of cement or screw, retention force, bacterial seal, digital approach, follow-up and types of prostheses.

Results: this connection eliminates the possibility of cement residues in the sub-gingival region, reducing the risk of inflammation of peri-implant support tissues; having not to remove

the cement residues, it is possible to place the margins in more apical portions, improving the aesthetics. It is also known that the retention by means of a screw causes a weakening of the restoration. The retentive force is adequate for fixed rehabilitation even after a high number of insertion-disengagement cycles; *in vitro* studies have also shown a high bacterial seal. Implant rehabilitation using preformed components, such as conometric hoods, is helpful for CAD/CAM design. Single rehabilitation, fixed partial dentures, complete prostheses were presented: they all demonstrated adequate clinical performance in the follow-up.

Conclusions: this type of connection seems to be suitable to support fixed implant rehabilitations, but long-term clinical studies are needed.

MASTICATORY FUNCTION AND NUTRIENTS INTAKE IN THE INDEPENDENT ELDERLY: A SYSTEMATIC REVIEW

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Aim: impaired masticatory performance of ageing patients has been considered associated with nutrients deficiency. The aim of the study was to investigate the association between masticatory function and nutrients intake in independent elderly.

Methods: PubMed, Web of Science, Cochrane Library e Tripdatabase were searched for eligible studies published between 1991 and 2020. The search comprised articles written in English, selected using the key words “denture” OR “mastication” AND “nutrition” OR “elderly”. Samples of patients with age not inferior to 65 years and independent life conditions were considered.

Results: among 1362 studies, 10 articles referred to 4 randomized controlled trials and 8 observational studies fulfilled the inclusion criteria. Three RCT comparing different prosthetic

treatments found no difference in the nutrients intake between the two study groups. One RCT suggested some improvement of the nutritional intake only when the prosthetic treatment was associated with proper dietary advice. The overall results of the observational studies suggested that a better masticatory performance provides the elderly with a higher nutrients intake.

Conclusions: improved masticatory performance alone can't assure adequate nutrients intake in the elderly, but the influence of other factors is suggested, including socio-economical, psychological and pharmacological factors: nutritional counseling seems an important factor to improve nutrients intake and it's recommended to be associated with the prosthetic rehabilitation.

DENTAL IMPRESSION THERMO ACCELERATOR; COMFORT, EFFICIENCY AND SAVINGS

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Aim: one of the most troublesome procedures reported by dental patients is the taking of a conventional impression. Dental scanners currently represent an innovation that can greatly reduce this discomfort. However, some limitations related to procedure and accuracy remain. The reduction of the discomfort of a conventional impression must go through the reduction of the setting times of the impression material during which the patient must remain immobile enduring a discomfort given by the size of the impression tray. The ideal solution is a device that reduces setting times without changing the precision, workability and impression instruments used in daily clinical practice. A device called “Impression Heater” (EU application No. 3.769.716) consisting of a disposable self-heating adhesive plaster with an exothermic chemical reaction to be placed on the tray with activation decided by the dentist. The aim of the study was to evaluate the effective-

ness of a thermal impression accelerator in reducing the setting time of different elastomers.

Methods: for 3 samples of 5 different elastomeric materials (width 6 mm x length 50 mm x depth 3 mm) the hardening of the material was evaluated at intervals of 15 seconds using an ASTM 2240 Shore-A durometer. The same procedure was replicated 3 times and reproduced, after positioning on a Impression Heater at temperatures of 35 °C, 50 °C and 65 °C, for each type of each material.

Results: the increase in temperature during impression taking at 50 °C reduces the setting time between 38.1% and 45.8%. At 65 °C the reduction in setting time is between 52.4% and 66.9%.

Conclusions: Impression Heater is a quick, economical and easy-to-use device that can reduce the discomfort caused by long times for taking dental impressions without shortening the working time for the operator.

A NOVEL CONICAL DENTAL IMPLANT CONNECTION: FEM AND VON MISES INVESTIGATION

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The finite element technique (FEM) allows to study the structural phenomena related to the rigidity, resistance and elastic stability of the bodies. The FEM analysis in the design method allows us to study complex physical phenomena and identify any problems even before the prototype is built, then to review the project. In addition to identifying malfunctions, the structure can be optimized by removing excess material and improving weight distribution. These investigations are of great help in the prosthetic and dental field to evaluate the stress of dental implants on the different biome-

chanical forces present in the oral cavity. The methods used are FEM and Von Mises to study how forces of different magnitudes (430N-800N) are discharged on the prosthetic abutment with different angles at 0 ° and 30 °.

In the results it was noted that at 0 ° the stresses in the bone are localized around the implant with maximum tension in the cortical bone, at 30 ° the stress is concentrated on the side of the implant. To date, therefore, the prostheses are examined by the FEM before production to verify the correspondence with biomechanical criteria that they must face once implanted.

TRAD. VS INNOVATIVE IMPRESSION METHOD TO RESTORE A MAXILLOFACIAL DEFECT: A CLINICAL CASE

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Aim: processing a facial prosthesis is a complex procedure. Conventional extra oral impressions can be used to record the characteristics of defects. In recent years, advanced digital processing methods have been used, in an attempt to remedy some of the clinician's difficulties in the rehabilitation of facial defects. In this case report we want to investigate traditional techniques limits and advantages that can be obtained through the introduction of a CAD/CAM method in extra oral maxillofacial prosthetics. To do this we will describe the construction of nasal epithesis of an oncological patient, which has been rehabilitated using a traditional method of impression and an impression obtained with ConeBeamCT method.

Methods: a stone model was obtained from traditional impression; from virtual processing of CBCT data with Materialise Mi-

mics® Medical software was obtained a ABS plastic model, printed with a 3d printer. Two noses prostheses were modeled, tested on patient, printed in silicone and delivered to the patient.

Results:

- reduction of work sessions and more comfort for the patient;
- absence of significant differences in the fitting of the two epitheses;
- radiation dose supplied to carry out the CBCT must always be taken into consideration before prescribing the examination.

Conclusions: there are no methods in literature to quantify the greater efficacy of one impression over another. The different characteristics with which defects occur require a specific approach, both in materials choice and in impression techniques.

CLINICAL ADVANTAGES OF SECTORAL ALIGNERS IN AESTHETIC REHABILITATIONS: INVISALIGN GO

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Aim: improving the aesthetic of teeth and smile has become the main request of all patients who are approaching dental treatments today. The introduction of sectoral aligners, such as Invisalign Go, allowed the clinicians to propose multidisciplinary treatment plans that are based on faster, cheaper, and less invasive pre-restorative phases.

Methods: a 54-year-old woman asked for consultation because she was unsatisfied with her smile. Clinical evaluation revealed discolored and worn upper incisors in presence of unpleasant pre-existing composite restorations, a cross-bite on the upper right canine and a head-to-head interocclusal relationship on the upper right lateral incisor. No signs of temporomandibular disorders were detected. The treatment plan aimed at correcting, by means of clear aligner therapy, the cross-bite and misalignment from 1.3 to 2.3, in order to optimize the subsequent prosthetic re-shaping with adhesive veneers. The clear aligner therapy was performed with Invisalign

Go (Align Technology, San Jose, Calif) a system specifically designed for general practitioner involved in restorative dentistry, which allows tooth movements from second premolar to second premolar in both arches.

Results: the patient was highly satisfied for the aesthetic result achieved. Thanks to the preliminary correction of the anterior sector misalignments and to the subsequent optimization of the interocclusal relationship on frontal teeth, which was successfully achieved while maintaining a pre-operatively verified occlusal balance on posterior sectors, the delivered esthetic treatment was extremely conservative and its long-term prognosis may be considered definitely predictable.

Conclusions: the newly introduced Invisalign Go could be extremely useful for clinicians involved in multidisciplinary treatment plans, especially in a pre-restorative phase, as it may definitely simplify a minimally invasive approach based on adhesive restorations.

DIGITAL APPROACH TO IMPLANT SUPPORTED REHABILITATION: A CASE REPORT

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Aim: challenging rehabilitations presents multiple difficulties on both surgical and prosthetic sides: a digital approach can support the workflow in these situations. This case report illustrates how a digital approach can help in the management of these clinical cases.

Methods: surgical guides were used for the placement of the implants on both arches. In the jaw an immediate load was possible while, in the upper maxilla, extensive bone ridge augmentation was required and therefore loading was delayed. After four months second surgery and contextual soft tissue augmentation were carried out and a 3D printed interim restoration was placed. After two months, new dental and facial scans, smile design and bite registrations were obtained. Both

metal bars were passivated and cemented to the coping in one session; in the following session aesthetics and occlusal checks took place and, on the third appointment, both prothesis were screwed in.

Results: careful planning of the case and the production of a screwed 3D printed temporary prosthesis were conducted through the application of digital techniques. Smile design and facial scans paired with traditional bite registration methods provided means to create acceptable aesthetics and function in few sittings with minimal discomfort for the patient.

Conclusions: the presented digital protocol can bring advantages in the surgical and prosthetic phases of the rehabilitation. Further studies are needed to validate this protocol.

TISSUE CONDITIONING AND IMPRESSION ON POST-EXTRACTION IMPLANTS WITH IMMEDIATE LOAD

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Aim: to draw attention to the importance of the provisional prosthesis and of the impression to obtain a definitive product that replicates accurately the morphology of the conditioned tissues.

Methods: two case reports of post-extraction implant with immediate loading and screw technique. In specific a male patient of 42 y with post-extraction implant in position 21 and a female patient of 38 y with post-extraction implant in position 14. After the achievement of the tissutal conditioning we can proceed to the registration of the precision impression with the customization of the transfer with flow composite to guarantee the accuracy of the registration of the trans-mucosal path and

of the gingival margin adequately conditioned by the provisional prosthesis.

Results: the provisional prosthesis conditioned adequately the gingival tissues and the customization of the transfer with flow composite permits to reply accurately the morphology of the provisional restoration. This technique permits the realization of a definitive prosthesis that guarantees a long-term success.

Conclusions: with these reports it's highlighted the importance of the correct morphology of the provisional restoration to guarantee a long term success and an optimal esthetic result of the definitive prosthesis with a precise analogic impression and the customization of the transfer with flow composite.

FIXED FULL-ARCH REHABILITATION OF A 7 YRS CHILD WITH ECTODERMAL DYSPLASIA

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Aim: Ectodermal Dysplasia syndromes (EDs) are a heterogeneous group of inherited diseases characterized by abnormal development of tissues of ectodermal origin. Oligo-Anodontia is one of the most severe impairment affecting chewing, speech, aesthetics and social relation so early prosthetic rehabilitation is essential. Insufficient retention and stability of conventional dentures are an indication for implant-supported prostheses in these patients. The present article describes a case of an edentulous 7 yrs old patient rehabilitated with a fixed lower full-arch implant prosthesis.

Methods: three implants were placed in the interforaminal area, an OT Equator low-profile attachment was placed on each of them, and a digital impression was performed. In order to follow and avoid any alteration of the mandibular growth, a

sliding bar was applied as framework. Then, an acrylic resin fixed full-arch implant prosthesis was delivered. A 12-months follow-up period was reported.

Results: following the protocol "OT Bridge", the OT Equator was used as a multi-unit abutment allowing the anchorage of the prosthesis, achieving a functional monoblock and guaranteeing its passivation. This function is performed by two elastic rings called Elastic Seeger placed into the abutment. This specific sliding framework allows transversal and sagittal growth but, at the same time, guarantees the stability and the support of the prosthesis.

Conclusions: after 12 months of follow-up no implant failure nor prosthetic fracture were documented. The diet and the quality of life of the patient are improved.

PERI-IMPLANT MUCOSITIS POTENTIALLY LINKED TO BIMETALLISM: A CASE REPORT

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Aim: peri-implant diseases are defined as inflammatory lesions of the surrounding peri-implant tissues and include peri-implant mucositis and peri-implantitis. The aim of this case report is to describe the excision and the treatment of a peri-implant mucosal hypertrophic lesion.

Methods: 72-year-old male patient came to our attention referring bleeding and swelling in the left upper palatine area. Radiographic examination showed six osseointegrated implants in the upper arch and a mild peri-implant osteolysis. Clinically, there was an incongruous fixed implant prosthesis with the presence of horizontal and vertical over-contour and closure of the interproximal spaces with compression of the interdental papillae. The presence of an exophytic, slightly ulcerated, epulis-like lesion associated with the implants in the left

4-5-6th region, with detectable extensive perimucositis at probing, requires as treatment the surgical excision of the lesion and subsequent realization of a new and well designed prosthesis metal-free based on the same implants.

Results: histological analysis showed mucosal fragments with fibro-inflammatory epulide-like features with a high content of plasma cells and microcalcifications; and, a fragment of plurifocally eroded-ulcerated mucosa with reparative giant cell granuloma-type alterations.

Conclusions: patient's medical history excluded medical conditions or drug regimens that might account for the mucosal reaction observed. The anatomical-pathological picture provided appears to be compatible to electrogalvanic current lesions linked to the bi-metallic nature of the implant-prosthesis.

REPLACE AN EXISTING MAXILLARY OBTURATOR WITH NO IMPRESSIONS. POWER OF DIGITAL PROSTHODONTICS

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Aim: maxillary defects resulting from tumours, trauma, congenital deformities may require prosthodontic obturators (PO) to seal oroantral communications and restore function and aesthetics. PO are often made with same methods of conventional removable prosthodontics. CAD-CAM techniques have been recently employed to simplify in office procedures and reduce patient discomfort.

Case report: a 64 y.o. woman with an acquired class II following maxillectomy for Pindborg tumour in 2003 received several PO at DDOS during time. In autumn 2021 because of discomfort and unsatisfactory aesthetics the patient requested a new PO. Since the existing one was still functional with no apparent fluid or solid leakage, it was scanned with a dental CAD-software and duplicated to obtain a master stone cast

without necessity of impression of defect. Then a new acrylic resin PO was manufactured and delivered. Patient was satisfied for functionality and aesthetics at 4 months follow-up with no necessity to reline the bulb portion of PO.

Conclusions: PO are customized devices effective in restore maxillary defects. However, their construction requires complex and uncomfortable in office procedures for both patient and clinician. This may represent an important issue considering improved survival of patients and frequent necessity for modifications or replacing of PO. In this case the combination of dental CAD techniques and conventional manufacturing resulted in an easy two-appointment procedure for delivering a new PO with optimal functionality and aesthetics and very little discomfort for the patient.

LIP BUMPING EFFECT: LIP VOLUME AUGMENTATION USING INCREMENTING THICKNESS VENEER MOCK-UPS

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Aim: this study was conducted to evaluate if the volume of upper and lower lips tissue changes after the application of incremental thickness veneer mock-ups.

Methods: the study was conducted on 7 patients, 1 male and 6 females. Profile photographs were taken using a repeatable method for each patient in a natural position and after the application of each mock-up, with a standard increasing thickness of 0.5mm each, starting from 0.5mm, up to 2mm. As a cephalometric reference for photographs, a Natural Head Position (NHP) plane was used. KeyNote software was used in order to measure horizontal distances between an arbitrary reference point, which goes from the glabella to the tip of the chin, and the tangential line to the upper lip (A0-A) and the one to the lower lip (B0-B). Also the vertical distance between tangential lines to the upper and lower lip (A-B) was calculated. Data were collected in an Excel table and were

analyzed with a IBM SPSS statistics software.

Results: the mean value of A0-A (upper lip) increased from 4.93mm in a natural condition up to 6.68mm with a veneer increment of 2.0mm ($p = 0,781$), while the mean value of B0-B (lower lip) increased from 2.50mm in a natural condition up to 3.71mm ($p = 0,777$). The main value of A-B augmented from 9.96mm in a natural condition up to 10.68mm with a veneer thickness of 2.0mm. However, it was noticed that A-B mean value only increased when mock-up thickness is $> 1,5$ mm. In fact, it even decreased immediately after the application of the first 0,5mm mock-up and then it stabilizes between 0,5mm and 1,5mm of mock-up thickness.

Conclusions: a directly proportional ratio between the progressive veneer mock-up thickness augmentation and a lip volume increase emerged, even though the significance levels were not entirely satisfied.

ACCURACY AND PRECISION OF NEW MEDIT I700 INTRA-ORAL SCANNER: *IN VITRO* EVALUATION

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Aim: the objective of this *in vitro* study is to evaluate the precision and accuracy of the new Medit i700 Intra-oral Scanner, comparing it to an industrial Alicona scanner model Inspect Professional.

Methods: an implant abutment, custom-made, simulating a mandibular right first molar, was taken as a reference model for the study. The same operator executed a single scan with Alicona industrial scanner model Inspect Professional, which was used as a control group, and a total of 9 scans were performed with Medit i700 intra-oral scanner, which were used as a test group. At each of these 9 scans, a pairing with the control scan was performed to perform the comparison. Comparisons were

performed, and 10 measurements were taken in the vestibular-lingual and mesial-distal directions, on the axial walls, at the margin and on top of the abutment. Descriptive analysis was performed using the mean, standard deviation, and median to determine the discrepancy values between the 2 scanners.

Results: the Medit i700 demonstrated excellent results in terms of precision and accuracy, but in agreement with the literature, angle reproduction remains critical.

Conclusions: with this study we can understand how it is of primary importance the accuracy and precision of an intraoral scanner to obtain prosthetic manufactures that are as precise as possible.

INFLUENCE OF DIFFERENT ADHESIVE CEMENTS IN CERAMIC CEMENTATION: EVALUATION OF AGING EFFECTS AFTER TH

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Aim: the aim of this study is to compare *in vitro* tensile bond strength values of the cement-ceramic interface following thermocycles, by comparing lithium disilicate with zirconia, using four different resinous cements

Methods: this study compares the adhesive cement-ceramic interfaces which were obtained by adhesion of two ceramics, among the most used in the prosthetic field (lithium and zirconia disilicate), with four different resinous cements. Starting from a single CAD project 48 samples were made, 24 in zirconia and 24 in lithium disilicate to obtain 12 pairs for both category of ceramic. These were equipped with a 3 mm cylindrical connector. The cements used in the study are: Variolink Esthetic DC, SpeedCem Plus, Panavia V5, Relyx Ultimate. Cementation: Zirconia group provides: sandblasting of the surfaces with 50 μ m aluminum dioxide, decontamination in an ultrasound tank, drying the surface with air. Lithium disilicate group does not require any mechanical surface treatment. Thermocycling: In this study the dynamic climatic chamber used is the BINDER model MKT 115. The samples were stored for 150 days in distilled water at 37 ° C interrupted by 37,500 thermocycles between 5 ° C and 55 ° C with a dwell time of 30 seconds. Tensile test: Using the vertical dynamometer to carry out the tensile tests, an increasing force was applied at a feed speed of 1 mm/

min until detachment of the two samples was determined to verify the adhesion force between the two interfaces.

Results: from the traction performed on the samples we obtained 24 values of tensile bond strength, of which 12 were for lithium disilicate and 12 for zirconia. For each ceramic pair, the same cement was used and three tensile tests were carried out to obtain statistically comparable results in Mega pascal (MPa), and the mean of the values was calculated. Afterwards, all the ceramic surfaces were analyzed by evaluating the type of fracture (adhesive, cohesive or mixed) using ambient scanning electron microscopy (ESEM) at a magnification from 50x to 2000x. A careful evaluation of the images showed adhesive fractures in all samples. The different spectra of chemical composition, at the level of the ceramic interfaces, have been analyzed by EDX spectroscopy for a more correct interpretation of the images.

Conclusions: from the high bond strength results obtained on zirconia and the relative fracture of the 4 cements, with the exception of Panavia V5, it is possible to see that the cementation on polycrystalline ceramic is not only micromechanical but also adhesive. The intrinsic strength of resin cements is the key factor in achieving maximum adhesive cementation potential.

BIOMECHANICS OF PASSANT SCREWS IN IMPLANT-PROSTHETIC REHABILITATIONS: AN *IN VITRO* STUDY

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Aim: dental implants are alloplastic devices, so they are not free from biomechanical complications, especially in the case in which the connections are complex and involve several components. In this study, the passing screws of the abutments of the dental implants were evaluated with a scanning electron microscope, in order to highlight what could be surface alterations using different screwing torques, or simply by repeating the screwing process several times.

Methods: the samples were examined under a Zeiss EVO LS 10 scanning electron microscope, operating with an accelerating voltage of 20 kV. Tested screws are Osstem®, South Korea Dental Implant Ebony Gold® passant screws. The analysis of the samples was performed by comparing the surface altera-

tions of the screw after regular screwing with 30 N torque, screwing with maximum torque, double screwing with 30 N torque and unscrewed control screw.

Results: the results showed that the screw undergoes structural alterations when it is subjected to a higher torque than indicated by the manufacturer or when it is unscrewed and screwed back a second time.

Conclusions: inadequate adaptation can lead to a microgap, thus increasing the risk of biological complications, i.e. microbial colonization, bone loss and loss of osseointegration of the implant, but also mechanical complications, such as loosening or fracture of the screw, the prosthesis or the abutment.

A DIGITAL WORKFLOW TO MAXIMISE COST EFFECTIVENESS IN IMPLANT-FIXED COMPLETE DENTURES

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Aim: this work aims to present a protocol for the realization of a full-arch, implant-fixed complete dentures in monolithic zirconia and titanium using digital tools in order to obtain a satisfactory result at a more affordable cost.

Methods: implant-fixed complete dentures can be expensive. To reduce costs, monolithic zirconia and titanium can be milled using CAD-CAM methods, reducing labor and therefore costs. Moreover, zirconia, compared to other materials such as metal-resin prostheses, undergoes less wear and despite an higher costs, it undergoes fewer complications making it preferable and less expensive in the long-term. Lastly in case of complications, it enables the monolithic zirconia to be milled again, and to be re-cemented onto the titanium bar. Whether it was necessary to modify the titanium bar, due to the loss of an

implant, it would be enough to re-mill it, this time preserving the zirconia part, since, once cemented, the two components can be separated using heat.

Results: the presented protocol represents an effective, low-cost solution, easily and quickly repairable, which leads to complete restoration of the masticatory function and an excellent aesthetics compromise.

Conclusions: the presented protocol offers different advantages, in terms of cost sustainability, minimal wear risk for the prosthesis and its antagonists and ease of re-intervening. However, the lack of pink orthopedic component and the absence of stratification, mean that this technique finds its main indication in patients with limited economic possibilities and without great aesthetics demands.

A METHOD FOR RECORDING AND TRANSFERRING CLINICAL DATA TO COMPLETE DENTURE DIGITAL DESIGN

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Aim: to propose the combination of a simplified method for complete denture with the digital laboratory workflow. With the uptodate S.E.T. method (Simplified Edentulous Treatment) and the scanning of the obtained information it is possible to proceed with all CAD-CAM procedures.

Methods: the S.E.T. clinical procedure allows to obtain, through a single clinical session, a block containing all clinical data necessary for the realization of the complete denture, in respecting basic traditional principles: final impressions, intermaxillary relationships, definition of neutral zone and lip support and esthetics. This clinical procedure is followed by laboratory scanning, digital design, and digital manu-

facturing (CAD-CAM milled or printed).

Results: the method allows to give the laboratory all and reliable clinical data after just one clinical session. The clinician can ask for a try in prototype or go through the process until the delivery, but no other records or clinical procedures are needed.

Conclusions: the efficacy of the method has been already documented in the literature with a traditional laboratory workflow. The possibility to use it with a digital laboratory process allows to further reduce not only the clinical but also the laboratory timings. Furthermore, the digital design allows to have a simulation of the final prosthesis and to store all the information on a digital database.

INFLUENCE OF VEP TECHNIQUE AND CHAIR-SIDE TEMPORARY RESTORATION ON THE GINGIVAL MARGIN

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Aim: the purpose of this retrospective study was to quantify the influence of Vertical Edgeless Preparation on the stability of the gingival margin.

Methods: the evaluation was carried out by comparing intraoral scans acquired before the patient was treated, after the preparation of the tooth and one month after the placement of the provisional restoration. The data collected were obtained thanks to the use of overlap and distance calculation algorithms, able to estimate the displacement of the gingival margin in space, even broken down into its three dimensions (bucco-lingual, mesio-distal and apico-coronal). In particular, the possible alterations occurred between the first and second scans, and between the second and third scans, were observed in th-

ree points of the gingival margin: one on the mesial side, one central and one on the distal side.

Results: from the descriptive statistical analysis of the measurements carried out in the different comparison groups, it appears that on average the variation following the dental preparation is 0,19mm – 0,24mm vertically in apical direction and after the healing of the tissues one month after the placement of the temporary restoration is 0,15mm – 0,18mm vertically in coronal direction.

Conclusions: the small variation observed can be considered clinically negligible, which is why it can be concluded that the techniques used are suitable for maintaining the stability of the gingival margin.

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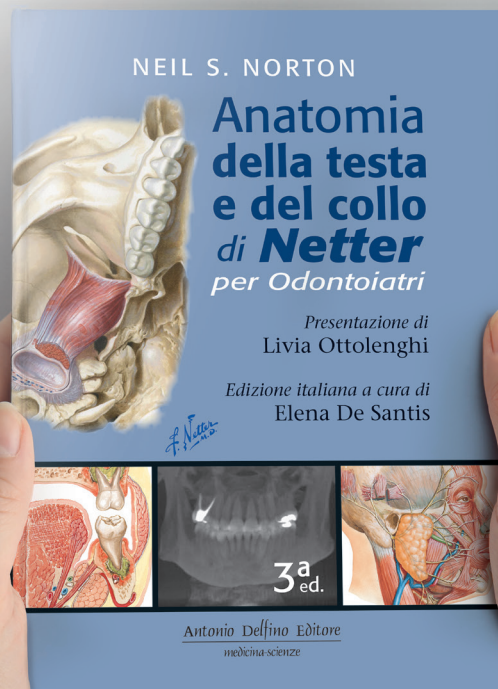


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