

CREATION OF DIGITAL POST-TOOTH PREPARATION TEMPORARY CROWNS ON TEETH PREPARED WITH VEP

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Aim: this work describes the original method for constructing immediate post-tooth preparation temporary prosthesis, prepared with the VEP technique and produced with an entirely digital workflow. The described method intends to demonstrate how the positioning of the prosthetic margin of the temporary crown at the level of the gingival margin using the design software, although the preparation extends deeper into the sulcus, and how it allows undisturbed healing of the gingival tissue.

Methods: the original method is described through the presentation of a clinical case in which the treatment plan involved rehabilitating an upper left central incisor with the application of a post-tooth preparation temporary prosthesis and definitive prosthetic rehabilitation with a single crown in zirconia layered with feldspar ceramic.

Results: the employment of a post-tooth preparation temporary prosthesis produced through an entirely digital workflow allows us to achieve an excellent clinical result, exploiting all the advantages of digital technologies: precision of the finishing line of the prosthesis, creation of an ideal emergence profile, materials used for the provisional prosthesis is more respectful of periodontal tissues, the possibility of personalizing the dental anatomy, better occlusion control and fewer sessions.

Conclusions: a chair-side post-tooth preparation temporary prosthesis produced using an entirely digital workflow allows you to achieve the objectives of a provisional prosthetic device: marginal precision, biological integration, function, and aesthetics.

NEW DIGITAL TECHNOLOGIES FOR THE FUNCTIONAL ANALYSIS OF MANDIBULAR MOVEMENTS

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Aim: the purpose of this study is to evaluate the ability to simulate the patient's real protrusive and lateral movements in the three planes of space by comparing the data obtained from a mechanical articulator, a virtual articulator and a digital axiograph with real movements recorded in the oral cavity.

Methods: the entire workflow was based on Zirkozahn instruments. The analogue and digital data useful for the creation of a virtual patient on the one hand and for mounting the models on an adjustable articulator correctly set digital and non-digital were collected. The comparison between analog articulator, virtual articulator and digital axiograph is based on the possibility of these instruments to replicate this occlusion relationship. The occlusion scan of the oral cavity was overlapped with the occlusion scan of the plaster models mounted in the articulator, measuring the discrepancy between the analog articulator and the real situation in repro-

ducing the lateral and protrusive movements in terms of distance in mm between grooves of the opposing teeth. The same comparison was carried out between real occlusion and virtual models that move in three dimensions following the paths recorded with the digital axiograph. Each procedure was carried out on 5 patients without functional limitations in mandibular dynamics or painful symptoms during the execution of movements.

Results: to obtain more accurate results, the performance of the different methodologies in the 3 movements (protrusive, right lateral and left lateral) was considered. MPA (Plane Analyzer II) is the technique that gave the best results.

Conclusions: from the results of the analyzes it can be seen that the dynamic recordings of the Plane Analyzer II proved to be more accurate in reproducing real lateral and protrusive movements.

MULTIDISCIPLINARY ADHESIVE REHABILITATION WITH 10-YEAR FOLLOW-UP: ABOUT A CASE REPORT

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Modern dentistry, thanks to adhesive techniques, is increasingly conservative towards dental tissues, such as the aesthetic needs of patients have increased. Veneers are ceramic layers applied to teeth in order to correct shape and color, which guarantee durability and aesthetics, being extremely conservative compared to dental crowns.

Aim: this is a multidisciplinary case with 10-year follow-up, on a patient previously treated with orthognathic surgery and orthodontics to correct a skeletal class III, that aims to improve the aesthetics of the anterior group due to the canting of the upper jaw, the diastemas and the triangular teeth, through treatment with feldespathic veneers from 1.4 to 2.4 and subsequently lengthening of crown of 1.2 and 1.3.

Methods: an initial mock-up is made as a guide for the crown elongation. After 4 months, a new mock-up is made for the preparation of the veneers; final impressions are taken, and

teeth are provisionalized using a mock-up. After two weeks, the feldespathic veneers are cemented according to the chemical adhesion protocol, so the veneers are etched first with 9.6% hydrofluoric acid and then with 37% orthophosphoric acid; the silane and the adhesive are applied, and a resin-based light-curing cement is used. The teeth are prepared with 37% orthophosphoric acid and the adhesive is applied. Annual follow-ups are carried out for 10 years.

Results: aesthetic is restored thanks to the multidisciplinary work. The patient's concerns are corrected through the crown lengthening and the preparation of feldespathic ceramic veneers. The annual follow-ups are satisfactory, and no complications have ever been recorded.

Conclusions: adhesive dentistry offers excellent long-term results thanks to the chemical properties of the adhesion process, when it occurs on enamel and not on dentin.

ERBIUM:YAG LASER-ASSISTED CROWN LENGTHENING FOR VERTICAL DIMENSION AUGMENTATION

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Aim: crown lengthening is a technique finalized at the exposure tooth surface by gingivectomy alone or with cortical bone remodeling for aesthetic purposes, mostly in the anterior maxilla. The erbium:YAG laser-assisted crown lengthening is a less invasive technique which also leads to faster clinical outcomes in contrast to the traditional surgical technique by scalpel incision, flap elevation and osteoplastic. We report a case of gingival recontouring performed by erbium-doped yttrium aluminum garnet (erbium:YAG) laser, with immediate provisional positioning.

Methods: in January 2024 a male patient referred to our attention with no relevant medical history for a prosthetic rehabilitation of the maxilla. Under local anesthesia, by erbium:YAG laser (not in contact free beam tip, 180 mJ/10 Hz, water emis-

sion) a multiple crown lengthening in the anterior maxilla was performed (gingival remodeling with transgingival cortical bone osteoplasty) to redefine a new marginal gingiva profile for provisional fixed rehabilitation, contextually performed.

Results: at 15 days follow-up gingival tissues healed, and teeth prepared for the following prosthetic restoration by cemented metal-ceramic crowns.

Conclusions: clinical benefits of erbium:YAG laser allows flapless simplified crown lengthening with total absence of laser-related thermal damage to the oral hard and soft tissues, an important characteristic for aesthetical treatment. Eventually, a good knowledge of laser and general and basic guidelines of oral/periodontal surgery are mandatory to achieve predictable results.

PRESENTING A PROTOCOL FOR DENTAL IMPLANTS RESTORATIONS

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Aim: the case report aims to highlight how a protocol already used to rehabilitate areas with low esthetic value can also be applied to esthetic areas, such as the anterior sectors.

Methods: the clinical case describes the rehabilitation of a 38-year-old patient with agenesis of the lateral incisors using fiber-reinforced composite Maryland bridges for provisional restoration, Osstem TSIII implants (Osstem®, Seoul, South Korea), zirconia abutments, and lithium disilicate crowns for definitives.

Results: the importance of materials, types of dental implants, surgical techniques for soft tissue enhancement, and prosthetic and impression techniques are also covered. Accurate impressions are crucial for seamlessly integrating prosthetic rehabilitation into the oral environment.

At the same time, periodontal health is underscored as critical in the long-term success of implants.

Managing provisional restorations is important to ensure emergent contours and control of gingival contours.

Conclusions: the methodology has demonstrated its effectiveness in achieving optimal results, minimizing stress on soft tissues, and improving patient comfort and satisfaction.

This case report underscores the importance of a patient-centered approach, providing evidence-based techniques and ensuring optimal results in terms of aesthetics, function, and overall patient well-being.

By prioritizing the patient's needs and preferences, successful aesthetic restorations on dental implants are possible.

PROSTHETIC DEVICES IN THE MANAGEMENT OF THE ONCOLOGICAL PATIENT UNDERGOING RADIOTHERAPY

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Aim: the advances in high-dose VMAX (Volumetric Modulated Arc Therapy) IGRT (Image-Guided RadioTherapy) conformational radiotherapy techniques have reduced unwanted effects. Among the adverse effects, oral mucositis is still the most impacting on tolerance and quality of life during treatment. Intra-oral positional devices (RD) for RT can reduce radiation doses in healthy tissues and can minimize radiation damage.

Methods: the patient (L.B., 79 years) edentulous was sent by the GIC ORL of Our A.O. with the diagnosis of squamous Carcinoma of the oral floor operated pT4a pN1, R+ right margin. His medical history shows consumption of more than 20 cigarettes per day. It was decided to intervene by structuring, after taking the imprint in alginate, a prosthetic device with mucosal support that would increase the DVO of the patient by moving the labial tissue from the maximum dose field during the RT/VMAT.

Results: the degree of dose saving was evaluated by re-centering which confirmed a significant dose saving to lower lip tissue. Following the delivery of the RD despite the occurrence of G2 grade mucositis and superimposed candidiasis (treated with vea lipogel lipstick and mucosyte), the patient was able to continue treatment without mucosal complications leading to the suspension.

Conclusions: the dose distribution with and without the use of an intraoral stent was compared and the average radiation doses were found to be lower, especially in the subsite distant from the carcinoma. Therefore, we can conclude that despite the progress in dose saving already achieved with the development of VMAT IGRT in some situations also the use of RD can significantly impact the dose saving to healthy tissues of the oral cavity with benefit to the patient.

IMPLANT-SUPPORTED NASAL PROSTHESIS: A CASE REPORT

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Aim: head and neck cancer can significantly impact a patient's facial appearance. Thankfully, advancements in implant technology have greatly improved facial reconstruction in these cases. Implants, surgically placed in the jawbone, offer a reliable and long-lasting solution for rebuilding lost facial structures.

Methods: the patient underwent a partial rhinectomy, including the tip. The anterior margin of the upper maxilla remained free of cancerous tissue. Following surgery, the patient received radiation therapy. Three months later, an impression of the patient's mouth was taken using a Carestream CS 3600 intraoral scanner. A custom impression tray was then fabricated based on this scan, which was used to take a single-stage, bi-material precision impression. Transfer copings were placed on the implants and secured with dental floss. Using the digital

scan, the dental laboratory milled a titanium bar. This bar was positioned and screwed onto the implants to verify their proper placement and passive fit during insertion. An aesthetic wax try-in was created based on the pre-surgery digital scan, incorporating the patient's skin tone. Finally, the nasal prosthesis, designed according to the chosen aesthetics, was fabricated from silicone.

Results: the presented rehabilitation allows patients to return to social life and rapidly improve their quality of life in just four appointments.

Conclusions: The use of implant-supported nasal prostheses enhances the stability of the prosthesis, while the integration of digital technology improves aesthetics and reduces patient discomfort.

LAPPING IN REMOVABLE PROSTHESIS

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Aim: the study aims to evaluate and verify bacterial adhesion both *in vitro* and *in vivo*, with and without the use of lipstick in the lapping phase of a resin prosthesis.

Methods: *In vitro study.* A resin specimen was divided into two parts (A and B), both polished in the traditional way, part B lapped using a common lipstick. A saliva sample from a patient wearing a removable prosthesis was placed on both parts. The specimen was analyzed 7 days later by electron microscope.

In vivo study. The upper total removable prosthesis of a patient was examined. A plaque sample was taken from the prosthesis. It was immediately analyzed by electron microscope. In the same session a salivary sample was taken from the pa-

tient's oral cavity and analyzed. The same area of the prosthesis was than lapped with commercial lipstick. 7 days later a second plaque sample was taken from the same area and subjected to microscope analysis.

Results: the two analyses performed on the acrylic resin specimens show little difference in bacterial adhesion. Otherwise, the area of the prosthesis lapped with lipstick shows a significant reduction in bacterial adhesion compared with the prosthesis polished only by the traditional method.

Conclusions: simple lapping using a common cosmetic lipstick could promote less adhesion by oral bacteria on the acrylic resin used for making dentures.

THE INTERACTION WITH ORAL STRUCTURES AS THE KEY FACTOR FOR THE PALATAL OBTURATORS' SUCCESS

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Aim: palatal obturators are designed to close defects in the hard and soft palate. Maxillectomies, orofacial clefts, cocaine abuse and gunshot injuries can cause this type of lesions. The effective closing of the defects is crucial in order to rehabilitate the patients' oral functions. This work suggests a different method of creating these devices, in which the obturator's interaction with oral tissues, structures and functions is the priority. A classification based on the type of defect is proposed (Mascolo-Eramo classification).

Methods: a series of clinical cases of palatal defects is shown. The clinician considers the defect's etiology, which affects the tissues' aspect and motion. Bulbs or large prosthetic elements added to be introduced in the defect are avoided, since

they facilitate food stagnation and unpleasant foreign body sensations. The obturator's part in direct contact with the defect is realized in softer materials, in order to reduce the compression on the lesion and therefore stabilize the lesion's dimensions.

Results: the first tests show that the patients are satisfied with their obturators, since their shapes and materials differ according to the individual needs. The obturators are lighter and more comfortable since they do not press on the lesion.

Conclusions: prioritizing the device's interaction with oral tissues, structures and functions leads to effective obturators that restore the patients' ability to eat, drink and speak, bringing significant benefits for their physical and mental well-being.

DIGITAL DENTAL WORKFLOW

Del Vecchio G

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Aim: the digital workflow is transforming our profession in all its fields, from surgery to prosthetics to orthodontics. Appropriate training is needed, but the results that can be achieved can only improve the quality of our profession.

Methods: the workflow begins with digital impression taking, which can be recorded either on natural teeth or on pre-existing abutments, implants, or plaster models. The recorded files are sent to the laboratory, which can design and fabricate the specific prosthetic artifact.

The digital diagnostic analysis gathers the information necessary to subject the patient to guided implant surgery and is given by matching the intra-oral optical impression with the preoperative radiographic examination (CBCT). The innovative

technique of "digital smile design" allows the prosthetic design to be pre-visualized virtually and provide the patient with a preview of the future smile.

In addition, digitalization can help the orthodontist in setting up more complex treatment plans in a safe and predictable manner, improving communication with the laboratory for making orthodontic devices, such as skeletal-anchored, in a manner that is maximally safe for patient and operator.

Conclusions: the benefits of going digital are many. The ability to offer fully digital dentistry, makes it possible to reduce chair time and certainly patient discomfort, reduce materials, improve doctor-patient and doctor-dental technician communication, and plan treatments safely and predictably.

DENTAL COLOUR MATCHING ABILITY: COMPARISON BETWEEN VISUAL DETERMINATION AND TECHNOLOGY

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Aim: the aim of the study was to investigate the reliability of a recently introduced colorimeter and to compare its color matching ability with human vision. In addition, possible variables influencing color matching by the human eye were analysed.

Methods: 18 disc-shaped composite samples with identical size and shape were produced by a composite flow system (Enamel plus HriHF, Micerium): 9 were considered as control samples (UD 0-UD 6) and 9 were the test samples with a flow composite shade identical to the control samples. A reliability test of a colorimeter (Optishade® Styleitalian) was performed by comparison with the spectrophotometer to assess the accuracy of ΔE_{94} . In parallel, 70 people (dental students and professionals) were individually instructed to sit in a dark room illuminated with D55 light and visually match the shades between the control and test discs. An error matrix containing ΔE_{94} between the control and test discs was generated, with

four matching clusters according to perceptibility and acceptability thresholds. The frequency and severity of errors were examined for both the colourimeter and test subjects, considering variables such as age, gender, experience. The Folded F-test was calculated to capture any differences in the number of matches and the Satterthwaite t-test was used to identify differences between Optishade and visual determination.

Results: the ΔE_{94} was not significantly different between the colourimeter and spectrophotometer ($p > 0.05$). The colourimeter obtained a 100% perfect match, whereas the individuals obtained only 78%. A statistically significant difference was found between Optishade matching and visual determination.

Conclusions: in an *in vitro* experimental context, instrumental shade matching proved to be significantly more reliable than the human visual system.

FUNCTIONAL REHABILITATION IN HEMIMANDIBULECTOMY NON RECONSTRUCTED PATIENTS

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Aim: the aim of this study is to evaluate the achievability of an acceptable occlusal restoration in patients who have undergone hemimandibulectomy without the reestablishment of mandibular continuity. The main demanding task is the laterodeviation that occurs in these patients since this causes an unbalanced and uncoordinated occlusal plane.

Methods: 10 out of 20 patients initially identified met the inclusive criteria: reconstruction modality and denture status. Since these patients have not gone through the defect reconstruction, the main issue was the jaw shift, that depends on 3 major factors: teeth's presence, defect's extension and presence/lack of the coronoid process. Although the best treatment remains the restoration of mandible continuity through bone grafts, almost all patients were initially reha-

bilitated with a partially/totally removable prosthesis to recover both function and aesthetic. The first prosthesis allowed to minimize the natural laterodeviation. 4 patients decided to continue treatment with a final implant retained prosthesis.

Results: after three years, patients with retained prosthesis reported higher satisfaction with adequacy, functionality and aesthetics compared to those with removable ones.

Conclusions: this study proves that restoration of proper occlusion shape is possible and can be achieved in patients without mandibular continuity after hemimandibulectomy when the gold standard of rehabilitation with bone flap is not viable in elderly/with comorbidity patients, counterbalancing the limitation of the mandible laterodeviation.

PRELIMINARY EVALUATION OF THREE PROSTHETIC MATERIALS IN SINGLE IMPLANT REHABILITATION

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Aim: the aim of the present RCT was to compare the clinical outcomes of single implant rehabilitation using three different prosthetic crown materials.

Methods: patients requiring single implant rehabilitation in the posterior area underwent implant surgery following the one-stage technique. 3-month after the surgery, a digital impression was acquired. Each patient was then randomly allocated into a group based on the different materials used for the crown: group 1 (G1): metalceramic; group 2 (G2): metal-composite; group 3 (G3): monolithic zirconia. Marginal bone loss (MBL) was evaluated on periapical x-rays at the moment of the crown delivery (T_0), and after 3 (T_3) and 6 (T_6) months. Implant survival rate, peri-implant probing depth (PPD), plaque index (PI) and bleeding index (BI) were evaluated at T_3 and T_6 .

Results: in total, 15 patients were enrolled in the present study ($n = 5$ patients per group). At the last follow-up (T_6), an implant

survival rate of 100% was observed for all the groups. No prosthetic nor biological complications were noted. In regard to MBL, at T_6 a MBL of 0.85 ± 0.55 mm, 0.87 ± 0.45 mm and 0.84 ± 0.50 mm was recorded respectively for G1, G2 and G3. At the 6-month follow-up, a mean PPD of 1.3 ± 0.23 mm, 1.31 ± 0.31 mm and 1.3 ± 0.31 mm was recorded respectively for G1, G2, and G3. At the same follow-up, PI was of 0.59 ± 0.52 for G1, of 0.6 ± 0.50 for G2, and of 0.59 ± 0.50 for G3, while BI was of 0.48 ± 0.46 for G1, of 0.47 ± 0.41 for G2, and of 0.47 ± 0.45 for G3. No statistical significance difference ($p > 0.05$) was recorded regarding MBL, PPD, PI and BI at any of the time points considered.

Conclusions: based on the preliminary results and within the limits of the study, all the three prosthetic materials used produced acceptable and similar clinical results. However, further studies with longer follow-ups are required to confirm the result.

PATIENT SATISFACTION WITH COMPLETE DENTURES: A RETROSPECTIVE EVALUATION

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Aim: this study aims to retrospectively assess the satisfaction of patients treated through the Regional Public Dentistry Program of Friuli-Venezia-Giulia, using removable prosthetic devices, and to examine the impact of this treatment on their quality of life.

Methods: two validated questionnaires, the Geriatric Oral Health Assessment Index (GOHAI) and the Oral Health Impact Profile (OHIP), were utilized to evaluate oral health-related quality of life. Data were analyzed using statistical tests comparing questionnaire scores obtained from a sample of 34 patients rehabilitated with the same prosthetic protocol, including 19 females and 15 males; 68% of the sample were aged over 65 years, with 91% being carriers of total removable dentures in both arches, of which 76% had been in use for over 30 months.

Results: patients reported a mean score of 37.67 ± 12.4 on the GOHAI and 16.67 ± 13.33 on the OHIP-14. Significant correlations were found between questionnaire scores and variables such as gender, age, education level, and number of prostheses used. A low quality of life related to oral health and a moderate impact on the use of removable prostheses were observed.

Conclusions: the results indicate a discrepancy between the dentist's and patient's perceptions regarding prosthetic therapy, with 25% of patients dissatisfied with their complete dentures. Considering the mean questionnaire scores, there is potential for improvement in satisfaction and quality of life among patients treated with removable prostheses.

CAD/CAM COBALT-CHROMIUM ALLOY POSTERIOR SINGLE CROWNS: 10-YEAR PROSPECTIVE STUDY

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Aim: to evaluate the 10-year clinical outcomes of ceramic veneered CAD/CAM Co-Cr single crowns supported by natural teeth in posterior regions.

Methods: 89 patients were provided with 120 ceramic veneered CAD/CAM Co-Cr single crowns. Tooth preparations were standardized and performed by 2 expert prosthodontists. CAD/CAM Co-Cr frameworks were fabricated and layered with a dedicated veneering ceramics. The restorations were cemented using a self-etching, dual-cure resin luting agent. The patients were included in a 10 year follow up program. The survival and success of the restorations were evaluated. The technical and esthetic outcomes were examined using the United States Public Health Service criteria. The biologic outcomes were analyzed at abutment and contralateral teeth and descriptive statistics were performed.

Results: 3 SCs were lost at follow-up. Cumulative Survival and Success Rates of 99.2% and 92.5% were recorded re-

spectively. As regards failures, 1 root fracture occurred on a maxillary first premolar. As to technical drawbacks, 2 losses of retention were noticed but the SCs were luted back onto the abutment teeth and were still in service at the 10-year follow-up. Furthermore, 6 chippings of the veneering ceramics were observed; none of them impaired function and consequently the SCs were carefully polished intraorally and remained in situ. 112 restorations were rated Alpha in all the measured parameters. Apart from episodic cases of gingivitis, that recovered after professional oral hygiene maintenance, no significant differences between the periodontal parameters of the test and control teeth were observed.

Conclusions: CAD/CAM Co-Cr single crowns proved to be a valid treatment option and a viable alternative to noble metal-ceramic restorations in posterior regions after 10 years of clinical service.

DIGITAL VERSUS TRADITIONAL PROTOCOLS IN FULL-ARCH REHABILITATIONS: A PROSPECTIVE STUDY

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Aim: the study aims to evaluate the effectiveness of a digital workflow for the design and fabrication of extended prosthetic rehabilitations on all-on-four or all-on-six method, and to compare it with the traditional method.

Methods: a total of 43 patients needing an extensive rehabilitative treatment on implants were selected and were divided into two study groups, analog or digital, based on their gag reflex during impression-taking.

All patients underwent the same surgical protocol, including the insertion of 4 or 6 implants by all-on-four and all-on-six method.

Following surgery, the immediately loaded provisional prosthesis was delivered within 24h. Provisional and final prosthetic design and fabrication was performed differently according to the study group.

Clinical, radiographic, and patient satisfaction parameters were considered for the evaluation of the two workflows.

All parameters were evaluated at the time of surgery, at 3 months, 6 months and 12 months.

Results: surgical and prosthetic survival rate was 100%. The results obtained showed a smaller gingival recession width and a greater keratinized mucosa width in the digital group. Digital impression taking highlighted greater comfort and lower presence of gag reflex. The other clinical parameters analyzed were not statistically significant.

Conclusions: the digital workflow was comparable to traditional methods in both functional and aesthetic terms in all-on-four or all-on-six prosthetic restorations. Impression-taking with the digital method was a valid alternative to traditional one in patients with gag reflex.

MATHEMATICAL AND PHYSICAL LAWS USED IN MECHANICS APPLIED TO DENTAL PROSTHETICS

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Aim: the purpose of this review is to demonstrate that mathematical and physical laws used in mechanics are applicable and useful for the design of a dental prosthesis.

Methods: scientific works found in Scholar and even non-indexed journals concerning Mohr's Diagram laws for calculating stress and strain on rigid structures, Inclined Plane laws for calculating the resultant of forces present in inclined structures, physical laws of compression (Hooke's Law, Compressibility of Materials, Resilience of Materials) were selected and considered to understand how materials react under stress.

Results: the data reported from the scientific papers reviewed

show that the application of laws used in the field of mechanics and in technology, had an important implication in the choice of prosthetic structure construction and prosthesis design with respect to dental tissues.

Conclusions: the increase in the mechanical properties of some materials used in dentistry and the study of the application of physical laws show how fracture resistance and patient aesthetics can improve in the prosthetic or implant prosthetic head. Such laws if incorporated systematically into design software would also allow the operator to choose the position or inclination of the teeth to minimize stress on oral tissues (periodontium, alveolar bone).

VERTICAL DIMENSION REHABILITATION WITH DIGITAL WORKFLOW: VERTICAL BOX TECHNIQUE

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Aim: the Vertical Box technique aims to provide a simple, easily applicable and monitorable procedure to recover correct inter-arc ratios and Vertical Dimension of Occlusion (VDO) through the patient's neuromuscular proprioception, with a fully digital therapeutic protocol.

Methods: following the creation of a virtual model of the patient, with digital impression from intraoral scanner and facial scans from facial scanner, PMMA shells of selected elements with average dimensions were prescribed to the laboratory. After insertion of the shells, the VDO was customized performing aesthetic and phonetic tests, obtaining a point contact with Jig function, resulting in neuromuscular activity deprogramming, and three-dimensional mandibular repositioning. To complete the virtualization of the patient, it was

necessary to record the individual mandibular dynamics through a detection scanner.

Results: through this technique, a multitude of information is obtained that allows the laboratory to realize the Rebalance, a provisional manufacture that integrates with the patient's function. This device allows the clinician to test and fit, in a reversible way, the rehabilitation project together with the patient. Following clinical checks, the final prosthesis is manufactured.

Conclusions: the application of the Vertical Box technique has been shown to provide a predictable and repeatable protocol in the restoration of VDO through an all-digital workflow that enables the design of dental prosthesis that perfectly match the patient's individual dynamics, improving function and aesthetics together.

MULTIDISCIPLINARY PRE-PROSTHETIC FUNCTIONAL REHABILITATION WITH PMMA MILLED SHELLS

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Aim: the purpose of the research is to evaluate the reliability of pre-prosthetic rehabilitation on dysfunctional patient of muscular nature, and to test whether this non-invasive but stable technique over time can be easily tolerated by the patient.

Methods: a gnathological evaluation of the enrolling subjects was performed to study any dysfunction present. Four dysfunctional patients were included in the study. Subsequently, 3D scanning of the arches and face was performed, and mandibular movements were recorded with the support of Cyclops systematics (ITAKA Way Med). The comfort position, representing the myocentric position, was measured. A modeling of PMMA milled shells (Rebalance) that would restore the occlusion was performed, reestablishing Spee and Wilson curves, using the principle of Monson's Sphere and considering as the

correct intermaxillary relationship the one indicated by the comfort position. A clinical evaluation supported by electromyographic readings with Teethan was then carried out to assess the evolution of muscle status.

Results: with electromyographic evaluation, it was found that milled PMMA shells as pre-prosthetic rehabilitation can restore the proper balance of the masticatory muscles by resolving the symptomatology that characterizes patients with muscle dysfunction.

Conclusions: rebalance can be considered a valuable pre-prosthetic procedure in patients with temporomandibular pathologies or who need to increase the vertical dimension of occlusion to assess the clinical situation noninvasively and also reversibly.

DIGITAL WORKFLOW OF TOTAL EDENTULOUS PATIENTS: A PRELIMINARY STUDY

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Aim: the aging population has increased the number of edentulous patients. The use of CAD/CAM in dentistry has improved clinical protocols and outcomes. The primary aim of this study was to evaluate working time of a digital workflow in patients with a fully edentulous arch respect to the conventional technique. The secondary aim was to verify quality of life and satisfaction of patients after the realization of a digital complete denture.

Methods: 10 patients with a digital complete denture were included in this study. Psychological, gastroenterological and the OHIP-14 questionnaires were administered to all patients in relation to their new prosthesis. The digital workflow included a digital impression scanned by Trios3 intraoral scanner.

Results: one month after delivery of the prosthesis, the data

collected from the 10 patients was averaged. The results from the OHIP-14 are encouraging because the average is 19.50. The average is closer to the score 0 than 56 which indicates an optimal quality of life for patients. In addition, the psychological questionnaires showed an improved confidence in patients while the gastroenterological ones need to be reassessed after few months.

Conclusions: the study has shown that the digital workflow can improve patient's experience measured by overall preference and comfort. It is able to provide reliable prosthodontic outcomes, reduce procedure working time from 5 appointments to 3 and to achieve a reduction of costs for the patients. For this reason, digital workflow is generally preferred by patients over conventional technique.

NEW SKIN REFERENCES IN REMOVABLE DENTAL PROSTHESES

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Aim: in order to restore balance and harmony in prosthetic rehabilitation, this study aims to demonstrate that the distance between the lateral ocular canthus and the unilateral labial commissure of a patient could be useful references in the creation of total removable prostheses.

Methods: 148 patients were selected, of which 74 males and 74 females, aged between 50 and 85, whether or not wearing partial or total removable prostheses. The following skin points were considered for the measurements: point A (skin projection of the metopic suture at the level of the glabella), point B (skin projection of the menton), point C (ocular lateral canthus), point D (labial commissure), point B1 (vertical projection of point C onto the perpendicular segment passing through B).

Results: from the measurements taken, data standardization was performed: it appears that 95% of patients have a measurement of the A-B segment between 13.74 and 14.3 cm, the right C-D segment between 6.87 and 7.4 cm, the left between 6.89 and 7.38 cm, the right C-B1 segment between 10.76 and 11.39 cm and the left between 10.79 and 11.39 cm.

Conclusions: from the data collected, there is a repeatability of the measures taken into consideration in a sample, even if small, representative of the population. These measures, if systematically inserted into prosthetic design software, would allow the operator to maintain and not alter the balance and harmony of the patient's face after prosthetic rehabilitation.

PRIMARY RESPIRATORY MECHANISM AND SKELETAL PROSTHESIS

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Aim: craniosacral rhythm, also known as "Primary respiratory mechanism", is an inherent, involuntary, rhythmic movement of flexion and extension of the cranial bones that does not vary with body movement and emotions. Craniosacral therapy is a gentle manipulation technique of the musculoskeletal system, membranes, and soft tissues of the head and neck, aiming to rebalance and release tensions in the body, improving the circulation of cerebrospinal fluid and the individual's health. In dentistry, patients with fixed prostheses on multiple teeth (such as circular prostheses) or removable partial dentures (skeletal prostheses) perceive musculoskeletal tensions despite correct procedures being used for prosthesis fabrication. This work proposes a new rehabilitation method for a skeletal prosthesis that does not interfere with the primary respiratory mechanism.

Methods: the materials used for the prosthetic device are the same as those for a classic removable partial denture, and the technique referred to for its fabrication is "lost-wax", but the device is made in two separate parts that are then joined by a central connection.

Results: the result obtained is a stable prosthetic structure with a small central thickening corresponding to the junction area of the two pieces.

Conclusions: with this prosthetic device, we should have an improvement in the primary respiratory mechanism because its metal structure is hyperstatic towards intrusion movements (or maximum craniosacral expiration) in the midline direction, and dynamic towards extrusion movements of craniosacral inspiration.

ULTRA-THIN POSTERIOR OCCLUSAL VENEER RESTORATIONS: EVALUATION OF TWO CAD-CAM MATERIALS

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Aim: ultra-thin bonded posterior occlusal veneers are considered a conservative alternative to traditional overlay for addressing severe erosive lesions. This study aims to examine the impact of thermomechanical loading on the fracture strength of minimally invasive occlusal veneer restorations made from different CAD/CAM materials.

Methods: twenty extracted maxillary molars were divided into two groups: one receiving zirconia-reinforced lithium silicate (Celtra Duo, Dentsply Sirona) restorations (CD), and the other Polymer Infiltrated Ceramic-Network (PICN) (Enamic, Vita) restorations (EN). The teeth underwent preparation for a conservative full-coverage occlusal veneer, with a 1-mm reduction of the cusps and a chamfer finishing line. Restorations were fab-

ricated using the CEREC chair-side system (CEREC MC X), bonded with a two-step self-etch adhesive system (Clearfil SE, Kuraray), and a dual resin cement (Variolink II, Ivoclar-Vivadent). After thermomechanical aging (240,000 cycles, 50 N load, 5°C-55°C thermocycling, CS-4.4 chewing simulator), specimens underwent fracture testing with universal testing machine.

Results: all specimens survived the fatigue test. EN showed the higher mean fracture load value (3391±693 N) with statistically significant differences than CD (2352±772 N).

Conclusions: within this study's limitations, EN showed the highest values of fracture resistance after thermomechanical loading, supporting its use for occlusal veneers.

FINITE ELEMENT ANALYSIS ON PERIIMPLANTITIS AFFECTED DENTAL IMPLANTS

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Aim: the research underscores the significance of dental implants in oral rehabilitation, highlighting physiological and pathological conditions of dental implants. This study evaluates the behaviors of bone and dental implant materials under loading with a 0 and 1.5 mm bone offset.

Methods: the study utilized the "Patent™" dental implant model from Zircon Medical® in two configurations - without offset (Test I) and with a 1.5 mm offset (Test II) within the cortical bone - to assess the mechanical performance under a 400 N compression load. The FEA involved comprehensive modeling and simulation processes using advanced CAD and Ansys Workbench software. Material properties of dental implants and the bone (cortical and cancellous) were considered, with the former depicted as homogeneous and isotropic and the latter as orthotropic.

Results: the analysis revealed significant insights into stress distribution under masticatory loads. Test I (no offset) demonstrated a preferable stress distribution on the bone, suggesting that the offset configuration (Test II) may induce higher stress levels, particularly in the cortical bone, which could harm implant success and lead to bone resorption.

Conclusions: the study concludes that dental implants correctly distribute forces to their components, particularly those without an offset. This is not the same for bone, where the presence of a simulated periimplantitis could lead to a self-sustaining phenomenon. However, the nuances of stress distribution and the material's long-term behavior under physiological conditions warrant further investigation.

MARGINAL FIT OF LITHIUM DISILICATE CROWNS MADE WITH MILL&PRESS AND PRINT&PRESS TECHNIQUES

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Aim: to evaluate the marginal fit of crowns made in lithium disilicate with both mill&press and print&press procedures on two abutments with vertical and horizontal tooth preparation geometries.

Methods: two abutments of a standard maxillary first premolar were designed using CAD software with vertical and horizontal preparation geometries. These were printed in resin. 40 crowns in lithium disilicate were made for these abutments: 20 with a mill&press procedure divided into 10 for the vertical abutment and 10 for the horizontal one; the other 20 crowns were made by using a print&press procedure which, in the same line of the previous case, 10 crowns were for the vertical geometry and 10 for the horizontal one. Both crowns and abutments were scanned to make 4 experimental groups ($n = 10$). The scans were imported into metrological software to evaluate the marginal fit of these restorations in μm . In addition

to descriptive statistics (95% C.I.), the independent sample test was run to analyze group differences ($\alpha = 0.05$).

Results: the independent sample test didn't report statistically significant differences between the horizontal and vertical geometries and between the manufacturing procedures. The mean values of the experimental groups were Mill&Press Vertical 126.04 (97.53-154.54); Print&Press Vertical 116.76 (109.15-124.36); Mill&Press Horizontal 116.06 (111.06-121.06); Print&Press Horizontal 79.63 (71.02-88.23); the post hoc analysis reported differences only between the print&press horizontal and the other groups ($p < 0.05$).

Conclusions: the marginal fit values are clinically acceptable for lithium disilicate crowns created using the mill&press and print&press methods on abutments with horizontal and vertical preparation geometries. There are no differences between the crown's production methods and the abutment's geometries.

INTRAORAL SCANNER ON HORIZONTAL DEEP SUBGINGIVAL MARGINS: 3D ANALYSIS AND ACCURACY

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Aim: the present study aimed to evaluate the accuracy of an IOS (Medit i700) on horizontal tooth preparations at different depth levels below the gingival margin and assess if the IOS detects the surface beyond the finish line of this preparation geometry.

Methods: two abutments of a standard maxillary first molar were designed using a CAD software with horizontal preparation geometry 1 and 2 mm deep in the gingival margin. These abutments were printed in resin and placed on a reference typodont. Twenty scans were made with the IOS on each abutment to obtain 2 experimental groups. The scans were named "H-1" (horizontal preparation at 1 mm under the gingival margin) and "H-2" (at 2 mm). The scans were imported into a metrologi-

cal software to evaluate trueness and precision in μm . In addition to descriptive statistics (95% C.I.), the independent sample test was run to analyze differences between groups ($\alpha = .05$).

Results: about the trueness, statistically significant differences were not found for the experimental groups ($p = .053$). As regards the precision, significant differences were detected between H-1 and H-2 ($p < .001$). In the case of horizontal preparations, it was not possible to record the surface beyond the finish line.

Conclusions: although it was not possible to record the area beyond the finish line with the tested IOS, the mean accuracy values for horizontal geometries were clinically acceptable at both 1 and 2 mm below the gingival margin.

ACCURACY OF FULL-ARCH IMPLANT SCANS USING A NOVEL DENTAL STEREOPHOTOGAMMETRY

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Aim: to assess the accuracy of novel StereoPhotoGrammetry device (SPG) for complete-arch digital implant impressions.

Methods: an edentulous mandibular model with 4 analogs was digitized using a desktop scanner to obtain 10 reference files. Ten consecutive scans were conducted with SPG and the resulting test files were aligned with the reference files. The superimpositions have been analyzed by a software to

identify the three-dimensional (3D) deviations between the tested devices. One-Way ANOVA test was used to compare the data.

Results: no significant overall 3D discrepancy were noted between the test and reference files ($p < 0.05$).

Conclusions: despite study limitations, SPG appears to be a reliable device for complete-arch digital implant impressions.

RESISTANCE WEAR OF INTERIM RESIN MATERIALS: 3D- PRINTED VS CAD/CAM MILLED

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Aim: the purpose of this *in vitro* study was to investigate the wear resistance of two different materials used to create interim prosthesis for complete-arch-implant supported fixed prosthesis.

The null hypothesis was that there were no significant differences between wear resistance of the two materials.

Methods: two interim resin materials were evaluated: three-dimensional (3D) printed resin material (Varseo Smile Crown plus-VSC) (Test-1) and CAD/CAM milled resin material (Huge PMMA Block), (Test-2).

A total of 22 specimens were prepared (N = 11 each). After thermomechanical aging (240,000 cycles, 50 N load, 5°C-55°C thermocycling, CS-4.4 chewing simulator), the two interim res-

in materials were scanned with a confocal microscope Sensofar S Neox 3D profilometer to generate 3D models of the surfaces. The specimens were compared, considering the Area (mm^2), the Volume (mm^3) and Max h/d (μm) of the impression for each specimen. The statistical analysis was performed with One-Way Anova and Dwass-Steel-Cristchlow-Fligner pairwise comparisons.

Results: there was no statistically significant difference between the tested materials.

Conclusions: in this *in vitro* investigation, 3D printed interim resin showed comparable mechanical behavior to traditional CAD/CAM milled resin material for complete-arch-implant supported fixed prosthesis.

EVALUATING THE INFLUENCE OF PREPARATION DESIGNS ON LITHIUM-DISILICATE OVERLAY ADAPTATION

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Aim: to assess whether the type and location of tooth preparation can influence the marginal adaptation of lithium-disilicate CAD/CAM overlays.

Methods: two preparation designs (rounded shoulder and chamfer) at two different locations (above or below the dental equator) were performed on 40 human molars (n = 8). Lithium-disilicate (eMax) CAD/CAM blocks were milled to obtain 40 overlays that were cemented with a universal resin cement. After 24 h of storage at 37 °C, the specimens were submitted to thermomechanical chewing simulation (1.200.000 cycles; 5-55

°C). A μ CT was used to observe the overlay adaptation before and after aging. Data were statistically analyzed (p <0.05).

Results: in general, aging significantly reduced the marginal overlay adaptation, irrespective of the type and location of tooth preparation (p <0.05). Chamfer above the dental equator exhibited the better adaptation among groups (p <0.05) while chamfer below the dental equator the worse (p <0.05).

Conclusions: preparations with finishing margins below the dental equator were connected to the least favorable adaptation of the ceramic overlays.

3D FEA OF ULTRASHORT IMPLANTS PLACEMENT AT VARIOUS BONE LEVELS WITH TI OR PEEK ABUTMENTS

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Aim: the study aims to investigate the stress distribution and mechanical integrity of ultrashort dental implants using different abutment materials (Titanium vs PEEK) at various bone levels.

Methods: a 3D FEA model of a 5.2 mm by 5 mm single-unit short dental implant was constructed for three distinct placements: sub-crestal, crestal, and supra-crestal. These models supported either Ti or PEEK conical abutments. Using ANSYS software, the models were subjected to a static axial load of 500 N to simulate occlusal forces, and stress distribution was analyzed in the implant, abutment and surrounding bone.

Results: the results indicated homogeneous stress distribution across both abutment materials; however, sub-crestal placement showed a preference due to reduced strain in bone tis-

sue, enhancing peri-implant health. Supra-crestal placement was beneficial for reducing stress on the implant screw. Titanium abutments generally resulted in lower stress in the bone compared to PEEK, which showed higher stress under similar conditions, particularly at crestal and supra-crestal levels. The stress peaks in titanium abutments were 220.53 MPa at sub-crestal, 219.88 MPa at crestal and 221.77 MPa at supra-crestal placements, while for PEEK the stress peaks were higher across all placements.

Conclusions: ultrashort implants with sub-crestal placement are mechanically advantageous, reducing the risk of peri-implantitis and implant failure. The choice of abutment material also significantly impacts stress distribution, with titanium presenting a more favorable biomechanical profile than PEEK.

EVALUATION OF WATER CONTACT ANGLE IN POLYMETHYL METHACRYLATE *VERSUS* PEEK DENTURE BASE MATE

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Aim: the number of adults with incomplete dental arches is rising, potentially more than anticipated, along with an increasing need for dental prostheses. The efficacy and longevity of denture base materials are heavily influenced by their wettability and water contact angle. Proper moisture distribution is critical for optimal wettability, affecting both comfort and oral health. This study aimed to determine if advancements in PolyEther Ether Ketone (PEEK) offer greater benefits compared to existing materials.

Methods: conducted *in vitro*, this study involved a single operator who handled all fabrication and processing. Materials were grouped into three categories with 20 samples each: Group A used modified polymethylmethacrylate (Bredent Polyan), Group B utilized polyoxymethylene acetal resin (Bio-

dentaplast), and Group C employed PEEK. Contact angles were measured using an Ossila Goniometer across three different liquids: distilled water, natural saliva, and a mouth wetting solution (Wet Mouth Liquid, ICPA India). Human saliva was collected from an individual with normal health and salivary secretion.

Results: results showed varying mean water contact angles across the denture materials, with Polyan exhibiting the highest and Biodentaplast the lowest contact angles in various testing liquids. Significant differences were noted between PEEK and Polyan, as well as between Biodentaplast and Polyan.

Conclusions: based on the available data and materials, Polyan, Biodentaplast, and PEEK are all viable options for use in the framework of cast partial dentures.