DO THE MATERIAL AND DIAMETER OF MINISCREWS AFFECT THEIR BENDING AND MAXIMUM LOAD?

Gjini E., Ricchio S., Nardi M.G., Rizzi C., Sfondrini B., Gandini P., Scribante A., Sfondrini M.F.

Unit of Orthodontics and Paediatric Dentistry, Head Professor P. Gandini, Section of Dentistry, Department of Clinical, Surgical, Diagnostic and Paediatric Sciences, University of Pavia, Pavia, Italy

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?

Nardi M.G., Rizzi C., Sfondrini B., Gjini E., Ricchio S., Sfondrini M.F., Scribante A., Gandini P.

Unit of Orthodontics and Paediatric Dentistry, Head Professor P. Gandini, Section of Dentistry, Department of Clinical, Surgical, Diagnostic and Paediatric Sciences, University of Pavia, Pavia, Italy

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.

Doi: 10.19256/abstract.cduo.13.2022

METAL SPLINT *VS* FRC FULL BONDING *VS* FRC SPOT BONDING: BRUSHING EFFECTS

Sfondrini B., Gjini E., Nardi M.G., Ricchio S., Rizzi C., Viola A., Gandini P., Sfondrini M.F., Scribante A.

Unit of Orthodontics and Paediatric Dentistry, Head Professor P. Gandini, Section of Dentistry, Department of Clinical, Surgical, Diagnostic and Paediatric Sciences, University of Pavia, Pavia, Italy

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

Alicchio F.[1,2], Falsarone F.[1,2], Mosca A.[1,2], Pipi L.[1,2], Vimercati I.[1,2], Gallo B.[1,2]

[1]Department of Biomedical, Surgical and Dental Sciences, University of Milan, Milan, Italy
[2]Odontostomatology, Head: Prof. L. Francetti, IRCCS Galeazzi Orthopedic Institute, Milan, Italy

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 micro-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 COMPLIACE

Avantario P., Ceci S., Patano A., Inchingolo A.D., Malcangi G., Ciocia A.M., Inchingolo A.M., Di Palma G., Rapone B., Pezzolla C., Di Venere D., Cardarelli F., Inchingolo F.

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: 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, overject 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

Azzollini D., Cirulli N., Ceci S., Patano A., Inchingolo A.D., Malcangi G., Barile G., Piras F., Settanni V., Inchingolo A.M., Dipalma G., Pezzolla C., Rapone B., Di Venere D., Inchingolo F.

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: 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 clears aligners and lower arch corticotomy was proposed. The attachments were placed before the surgical procedure. Lower 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

Cappella G., Dell'Oro A., Fracci L., Gervasoni A., Gigante L., Marini F., Martani F., Pasqual G., Bagatta S., Bazzini E.

University of Milan, Milan, Italy

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

Ceci S., Patano A., Inchingolo A.D., Marinelli G., Malcangi G., Inchingolo A.M., Dipalma G., Rapone B., Di Venere D., Cardarelli F., Inchingolo F.

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: 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

Ciocia A.M., Cirulli N., Barile G., Ceci S., Patano A., Inchingolo A.D., Marinelli G., Malcangi G., Inchingolo A.M., Dipalma G., Rapone B., Di Venere D., Cardarelli F., Inchingolo F.

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: 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 intraoral 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 hemiarchies 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

Coloccia G., Ceci S., Patano A., Inchingolo A.D., Malcangi G., Inchingolo A.M., Dipalma G., Rapone B., Di Venere D., Cardarelli F., Inchingolo F.

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: 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 crossbite 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

Ferrara I., Ceci S., Patano A., Inchingolo A.D., Azzollini D., Malcangi G., Inchingolo A.M., Dipalma G., Rapone B., Di Venere D., Cardarelli F., Inchingolo F.

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

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

Fracci L., Cappella G., Dell'Oro A., Gervasoni A., Gigante L., Marini F., Martani F., Pasqual G., Femia M., Bazzini E.

University of Milan, Milan, Italy

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 disostosys, 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

Garibaldi M., Ceci S., Patano A., Inchingolo A.D., Azzollini D., Malcangi G., Inchingolo A.M., Dipalma G., Rapone B., Di Venere D., Cardarelli F., Inchingolo F.

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: 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

Latini G., Netti A., Ceci S., Patano A., Inchingolo A.D., Piras F., Malcangi G., Settanni V., Inchingolo A.M., Dipalma G., Rapone B., Di Venere D., Cardarelli F., Inchingolo F.

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: 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

Laudadio C., Ceci S., Patano A., Inchingolo A.D., Malcangi G., Dipalma G., Garofoli G., Rapone B., Di Venere D., Cardarelli F., Inchingolo F.

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: 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®

Lombroni L.G., Parisi F.M.R., Garagiola U., Cigni L., Cressoni P.

Department of Biomedical, Surgical and Dental Sciences, Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico, University of Milan, Milan, Italy

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 multibracket 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

Izzo M., Parisi F.M.R., Cressoni P., Marino S., Spadari F., Garagiola U.

Department of Biomedical Surgical and Dental Sciences, University of Milan, Milan, Italy

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 teleradiography, 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 (OrthoPulse) 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

Colangelo G., Marino S., Mainardi E., Parisi F.M.R., Patianna G.A., Dell'oro A., Carloni P., Donelli M., Roner M., Colangelo B., Cressoni P., Spadari F., Giannì A.B.

Department of Biomedical Surgical and Dental Sciences, University of Milan, Milan, Italy

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 quality 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° ± 5.498 was found in JIA against 15.789° ± 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

Martani F., Macrì A., Vaninetti M., La Mura G., Caizzi M., Coppola L., Angileri C., Malerba A.

G. Vogel Dental Clinic, Department of Pediatric Dentistry, University of Milan, Milan, Italy

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

Montenegro V., Ceci S., Patano A., Inchingolo A.D., Malcangi G., Garibaldi M., Inchingolo A.M., Dipalma G., Rapone B., Di Venere D., Cardarelli F., Inchingolo F.

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: 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 episodes. 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

Palmieri G., Cirulli N., Ceci S., Patano A., Inchingolo A.D., Di Pede C., Malcangi G., Inchingolo A.M., Dipalma G., Rapone B., Di Venere D., Cardarelli F., Inchingolo F.

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: 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, multibrackets 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

Patano A., Ceci S., Montenegro V., Malcangi G., Inchingolo A.D., Dipalma G., Rapone B., Inchingolo A.M., Di Venere D., Cardarelli F., Inchingolo F.

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: 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

Settanni V., Ceci S., Patano A., Inchingolo A.D., Malcangi G., Marinelli G., Inchingolo A.M., Dipalma G., Rapone B., Di Venere D., Cardarelli F., Inchingolo F.

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: 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-Kurol 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

Garofoli G., Ceci S., Patano A., Inchingolo A.D., Malcangi G., Inchingolo A.M., Dipalma G., Rapone B., Di Venere D., Cardarelli F., Inchingolo F.

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: 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. Because 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

Ambrosi G.[1], Faccioni P.[1], Sinigaglia S.[1], Marchiori M.[1], Bazzanella S.[2], Pancera P.[2], Facco A.[1], Montini E.[1], Albanese M.[1], De Santis D.[1], Nocini P.F.[1]

[1]Department of Surgery, Dentistry, Paediatrics and Gynaecology, University of Verona, Verona, Italy
[2]Private Practice

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 mm^3, $p = 0.0008$) and in the Total Volume (3396 mm^3, $p = 0.013$) unlike the Retro-glossal Volume (279 mm^3, $p = 0.08$). 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

Ciampa E.[1], Bencivenga M.S.[1], Ferraioli M.G.[1], Inchingolo A.D.[2], Nucci L.[1]

[1]Postgraduate Orthodontic Program, University of Campania Luigi Vanvitelli, Dir. Prof. Letizia Perillo, Naples, Italy
[2]Interdisciplinary Department of Medicine, University of Bari Aldo Moro, Bari, Italy

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

Romito M., Massetti G., Barbini M., Coppo C., Mazzoleni F., Ferrini F.

Department of Dentistry, IRCCS San Raffaele Hospital, Milan, Italy. Dental School, Vita-Salute San Raffaele University, Milan, Italy

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 measurements, 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

Fiegna I., D'Alessandro A.C., Zanarini M., Incerti Parenti S., Alessandri-Bonetti G.

Section of Orthodontics, Department of Biomedical and Neuromotor Sciences (DIBINEM), Alma Mater University of Bologna, Bologna, Italy

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 inclination 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 sorrounding 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

Macrì S., Contessa L., Festa F.

Department of Innovative Technologies in Medicine & Dentistry, University of Chieti-Pescara, Chieti, Italy

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 kynesiography). 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

Foti G., Alessandri-Bonetti A., Ossani F., Guglielmi F., Gallenzi P.

Orthodontics Residency Program: Director Prof M. Cordaro, A. Gemelli Foundation IRCCS, Catholic University of Sacred Heart, Rome, Italy

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

Dell'Oro A.[1], Nardi M.[2], De Martino F.[1], Magistrelli A.[1], Pini D.[1], Roner M.[1], Barenghi A.[1], Barenghi L.[1], Spadari F.[1]

[1]Maxillo-Facial and Odontostomatology Unit, School of Orthodontics, Head: Prof. F. Spadari, Department of Biomedical Surgical and Dental Sciences, Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico, University of Milan, Milan, Italy
[2]Section of Dentistry, Department of Clinical-Surgical, Diagnostic and Pediatric Sciences, University of Pavia, Pavia, Italy

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 Giannì. A literature review was conducted and the following points of reference have been selected: subnasal point, labiale superior/inferior, crista philtri left/right, cheilion 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 ± 0,9 μ (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

Dell'Oro A.[1], Nardi M.[2], De Martino F.[1], Marino S.[1], Magistrelli A.[1], Pini D.[1], Roner M.[1], Barenghi A.[1], Barenghi L.[1], Spadari F.[1]

[1]Maxillo-Facial and Odontostomatology Unit, School of Orthodontics - Head: Prof. F. Spadari, Department of Biomedical Surgical and Dental Sciences, Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico, University of Milan, Milan, Italy
[2]Section of Dentistry, Department of Clinical-Surgical, Diagnostic and Pediatric Sciences, University of Pavia, Pavia, Italy

Aim: in the past, the goal of orthodontic treatment was only to improve balance and function of the stomathognatic system. Now the patients request is to achieve the same result with an excellent aestethics. 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 identified 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

Aiello D., Finamore A., Dieni A., Sirianni D., Paduano S.

Department of Health Sciences, Magna Graecia University of Catanzaro, Catanzaro, Italy

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

Parmeggiani L., Cassi D., Kaleci S., Bellini P., Generali L., Consolo U.

School of Dentistry, Department of Surgical, Medical, Dental and Morphological Science with Interest in Transplant Oncological and Regenerative Medicine, University of Modena and Reggio Emilia, Modena, Italy

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

Calza M.[1], Deppieri A.[1], Vanella V.[2], De Zorzi C.[3], Maina G.[3]

[1]Dental School, Department of Medicine and Surgery, University of Insubria, Varese, Italy
[2]Private Practice, Calatafimi Segesta, Italy
[3]Postgraduate Program in Orthodontics, Department of Medicine and Surgery, University of Insubria, Varese, Italy

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

Carrafiello M.V., Cassi D., Kaleci S., Generali L., Bellini P., Consolo U.

School of Dentistry, Department of Surgical, Medical, Dental and Morphological Science with interest in Transplant Oncological and Regenerative Medicine, University of Modena and Reggio Emilia, Modena, Italy

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 $\chi 2$ 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)

Ciancio E., Bellocchio A.M., Barbera S., Maio A., Portelli M., Nucera R., Militi A.

Department of Biomedical and Dental Sciences and Morphofunctional Imaging, University of Messina, Messina, Italy

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 according 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

Correra A., Carfora M., Auriemma A., Perrotta F., Rotolo R.P.

Postgraduate Orthodontic Program, Dir. Prof. Letizia Perillo, University of Campania Luigi Vanvitelli, Naples, Italy

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

Deppieri A.[1], Vanella V.[2], Marmo G.[3], Scali J.J.[3], Abbate L.[3]

[1]Dental School, Department of Medicine and Surgery, University of Insubria, Varese, Italy
[2]Private Practice, Calatafimi Segesta, Italy
[3]Postgraduate Program in Orthodontics, Department of Medicine and Surgery, University of Insubria, Varese, Italy

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

Ferraris F.[1], Vanella V.[2], Saran S.[3], Persano R.[3], Carganico A.[3]

[1]Dental School, Department of Medicine and Surgery, University of Insubria, Varese, Italy
[2]Private Practice, Calatafimi Segesta, Italy
[3]Postgraduate Program in Orthodontics, Department of Medicine and Surgery, University of Insubria, Varese, Italy

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

Ferraris F.[1], Calza M.[1], Manni M.[2], Kozokic J.[2], Marullo F.[2]

[1]Dental School, Department of Medicine and Surgery, University of Insubria, Varese, Italy
[2]Postgraduate Program in Orthodontics, Department of Medicine and Surgery, University of Insubria, Varese, Italy

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

Galdi M., Caggiano M., Di Spirito F., Spirito F., Pisano M., Martina S.

Department of Medicine, Surgery and Dentistry, Scuola Medica Salernitana, University of Salerno, Salerno, Italy

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

Parisi F.M.R., Cressoni P., Marino S., Lombroni L.G., Izzo M., Spadari F., Garagiola U.

Department of Biomedical Surgical and Dental Sciences, University of Milan, Milan, Italy

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

Morin E., Palone M., Siciliani G., Lombardo L.

Postgraduate School of Orthodontics, University of Ferrara, Ferrara, Italy

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° of initial prescription hypercorrection of 2,4° is required for incisors; canines need 2,1° of hypercorrection above a 10,1° prescription. *Angulation.* The hypercorrections are < 1°. *Rotation.* Prescriptions ≤ 17,5° needs a hypercorrection from 2° to 3,5° 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 > 0,9mm. *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

Preite C., Palone M., Lombardo L.

Postgraduate School of Orthodontics, University of Ferrara, Ferrara, Italy

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, followed 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 ≤ 8mm is the principal factor for premature failure. For miniscrews > 8mm, 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 ≤8mm and MIT values < 10Ncm, even with longer miniscrews.

PERCEPTION OF PATIENTS DURING TREATMENT WITH DIFFERENT DEVICES: BRACKETS, ALIGNERS, BFO

Cascone A., Caggiano M., Di Spirito F., Spirito F., Scelza G., Amato A., Martina S.

Department of Medicine, Surgery and Dentistry, Scuola Medica Salernitana, University of Salerno, Salerno, Italy

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

De Leonardis N., Ceci S., Patano A., Inchingolo A.D., Marinelli G., Malcangi G., Inchingolo A.M., Dipalma G., Rapone B., Pezzolla C., Di Venere D., Cardarelli F., Inchingolo F.

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: 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

Calza M.[1], Deppieri A.[1], Ferraris F.[1], Vanella V.[2], Bocchieri S.[3]

[1]Dental School, Department of Medicine and Surgery, University of Insubria, Varese, Italy
[2]Private Practice, Calatafimi Segesta, Italy
[3]Postgraduate Program in Orthodontics, Department of Medicine and Surgery, University of Insubria, Varese, Italy

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

Cancelliere F., Pacilio F., Puzo R., Gallotti A., Verrone M., Michelotti A., Rongo R.

Department of Neuroscience, Reproductive Sciences and Dentistry, University of Naples Federico II, Naples, Italy

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 Ω strain-gauge sensor (015LW by VPG Inc., strain gauge factor (G) of 2.095 ± 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

Bellocchio A.M., Barbera S., Ciancio E., Ciraolo L., Portelli M., Militi A., Nucera R.

Department of Biomedical and Dental Sciences and Morphofunctional Imaging, University of Messina, Messina, Italy

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 region. 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

Grasso L.[1], Grasso S.[2]

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

Papi G., Bazzani M., Drago S., Silvani M., Gjini L., Imenpour S., Biondi G., Migliorati M.

Orthodontic Department, Department of Surgical Sciences (DISC), University of Genoa, Genoa, Italy

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-bone 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°; 2.6 = +11°). Instead, in BB patient, molar torque didn't improve or even decreased (1.6 = -1,3°; 2.6 = -3°).

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 dentoaolveolar 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

Aiello D., Scire' Scappuzzo G., Ambroggio A., Distefano M.L., Paduano P.

Department of Health Sciences, Magna Graecia University of Catanzaro, Catanzaro, Italy

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 manouevre) 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 (dentoalveolar) 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

Conte E., Pozzan L., Ulian G., Zentilin G., Contardo L.

Department of Medicine, Surgery and Health Sciences, University of Trieste, Trieste, Italy

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

Altilia S., Danesi C., Balboni A., Chiavaroli A., Loberto S.

Department of Orthodontics, University of Rome Tor Vergata, Rome, Italy

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 qualitative 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 presence 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

Balboni A., Altilia S., Cretella E., Bisceglia M., Lione R.

Department of Orthodontics University of Rome Tor Vergata, Rome, Italy

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 TayMap software for the 3D analysis. Then, SEM analysis of enamel 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

Esposito R., Tersigni F., Arcuri E.C., Chimenti C., Tepedino M.

Department of Biotechnological and Applied Science, University of L'Aquila, L'Aquila, Italy

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

Carillo M., Loberto S., Palmacci D., Chiavaroli A., Mucedero M.

Department of Orthodontics, University of Tor Vergata, Rome, Italy

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 corridor) 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

Della Corte M.A., Trotta I., Verrone M.G., Nitsch G., Somma M., Valletta R., Rongo R.

Department of Neurosciences, Reproductive Sciences and Oral Sciences, University of Naples Federico II, Naples, Italy

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

Trotta I., Gallotti A., Puzo R., Nitsch G., Pacilio F., Valletta R., Rongo R.

Department of Neurosciences, Reproductive Sciences and Oral Sciences, University of Naples Federico II, Naples, Italy

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 years± 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 ± 1.8; $P < 0.001$) and AL_L (Z-axis + 2.8 ± 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 ± 1.7; $P < 0.001$) and LS (Z-axis + 1.3 ± 2.3; $P < 0.001$), similarly both the crista philtra points moved forward CPH_R (Z-axis + 1.3 ± 2.3; $P < 0.001$) and CPH_L (Z-axis + 1.7 ± 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?

Bazzucchi P., Epifani A., Masoero S., Fogliato E., Parrini S., Sanna F., Piancino M.G., Deregibus A., Castroflorio T.

Department of Surgical Sciences, Orthodontics, CIR Dental School, University of Turin, Turin, Italy

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

Schiavon G., Gaja P., Cattozzo A., Fioretti A., Favero L.

Department of Neuroscience, Institute of Clinical Dentistry, University of Padua, Padua, Italy

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 potential. 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

Stefanelli F., Favero R., Zanetti T., Scantamburlo D., Favero L.

Department of Neuroscience, Institute of Clinical Dentistry, University of Padua, Padua, Italy

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

Macrì M., Esposito A., Palombo C., Di Santantonio G., Festa F.

Department of Innovative Technologies in Medicine & Dentistry, University of Chieti-Pescara, Chieti, Italy

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 conducted 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

La Torre A., Curro' G., Caradonna C., Scardina G.A., Bilello G.

Department of Surgical, Oncological and Oral Sciences, University of Palermo, Palermo, Italy

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

Sertori F.[1], Acconciaioco S.[1], Imbesi E.[1], Viti G.[1], Levrini L.[4], Lucchese A.[2,3]

[1]Department of Dentistry, Dental School, Cattedra di Ortodonzia, CLOMPD - Pres. Prof. O. Cremona, IRCCS San Raffaele Hospital Vita-Salute San Raffaele University, Milan, Italy
[2]Unit of Orthodontics, Division of Dentistry IRCCS San Raffaele Scientific Institute, Milan, Italy
[3]Unit of Dentistry, Research Center for Oral Pathology and Implantology, IRCSS San Raffaele Scientific Institute, Milan, Italy
[4]Post graduate of Orthodontics, School of Dentistry, Department of Human Sciences, Innovation and Territory, University of Insubria, Varese, Italy

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 clears 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

Barbera S., Bellocchio A.M., Ciancio E., Portelli M., Militi A., Nucera R.

Department of Biomedical and Dental Sciences and Morphofunctional Imaging, University of Messina, Messina, Italy

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

Arcidiacono L., Santagostini A., Vaienti B., Di Blasio M., Segu' M.

Department of Medicine and Surgery, University of Parma, Parma, Italy

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 apea", "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

Arcidiacono L., Santagostini A., Vaienti B., Di Blasio M., Segu' M.

Department of Medicine and Surgery, University of Parma, Parma, Italy

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

Maio A., Bellocchio A.M., Barbera S., Ciancio E., Portelli M., Nucera R., Militi A.

Department of Biomedical and Dental Sciences and Morphofunctional Imaging, University of Messina, Messina, Italy

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, adenotonsiilar hypertrophy, signs and symptoms of OSA, with an AHI > 1 at polysomnography, that underwent an otolaryngoiatric evaluation and no previous treatment 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

Viti G.[1], Acconciaioco S.[1], Maspero C.[3], Imbesi E.[1], Cicala P.[1], Lucchese A.[2,3]

[1]Department of Dentistry, Dental School, Cattedra di Ortodonzia, CLOMPD - Pres. Prof. O. Cremona, IRCCS San Raffaele Hospital Vita-Salute San Raffaele University, Milan, Italy
[2]Unit of Orthodontics, Division of Dentistry IRCCS San Raffaele Scientific Institute, Milan, Italy
[3]Unit of Dentistry, Research Center for Oral Pathology and Implantology, IRCSS San Raffaele Scientific Institute, Milan, Italy

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-analyzes, case reports and expert opinion were excluded.
Results: 36 articles satisfied our parameters and were included. 26 studies found no difference in facial vertical dimension 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

Zanetti T., Favero R., Carraro B., Bonvento G., Favero L.

Department of Neuroscience, Institute of Clinical Dentistry, University of Padua, Padua, Italy

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 af the efficacy between different types of OSAS surgery treatment: phase I and phase II.
Results: best results were obtained with maxillofacial bimaxillary 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 complicances. 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

Falconi V., Cremonini F., Pellitteri F., Lombardo L.

School of specialization in Orthodontics, University of Ferrara, Ferrara, Italy

Aim: the aim was to asses 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 exanimated: 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?

Ricchio S., Gandini P., Gjini E., Nardi M.G., Rizzi C., Scribante A., Sfondrini B., Sfondrini M.F.

Section of Dentistry, Unit of Orthodontics and Paediatric Dentistry - Head: professor P. Gandini, Department of Clinical-Surgical, Diagnostic and Pediatric Sciences, University of Pavia, Pavia, Italy

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

Cagnotti F., Lombardo L., Sicca N., Duva S., Disderi D., Ventura F., Tortarolo A., di Benedetto L., Castroflorio T., Deregibus A., Piancino M.G.

Department of Surgical Sciences, Dental School, University of Turin, Turin, Italy

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

Lombardo L., Matacena G., Cagnotti F., Sicca N., Duva S., Disderi D., Ventura F., Tortarolo A., di Benedetto L., Castroflorio T., Deregibus A., Piancino M.G.

Department of Surgical Sciences, Dental School, University of Turin, Turin, Italy

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 telerX 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 sided 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

Picco G.[1], Troiano A.[1], Olivero V.[1], Tomatis E.[1], Leiva Ramirez E.[1], Tortarolo A.[1], di Benedetto L.[1], Tonni I.[2], Castroflorio T.[1], Deregibus A.[1], Piancino M.G.[1]

[1]Department of Surgical Sciences, Dental School, University of Turin, Turin, Italy
[2]Department of Surgical-Medical Specialties, Radiological Sciences and Public Health, University of Brescia, Brescia, Italy

Aim: a study of bolus hardness preferences in relation to craniofacial structure.

Methods: a total of 108 patients (M = 44, 14,3 ± 3.9 [yr,mo]; F = 64, 16,9 ± 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° ± 5°); mesodivergent ME (20° ± 5°); hyperdivergent HE (30° ± 5°). 3 structured questionnaires (Q) were administered, evaluating bolus consistency perception (between hard and soft boluses) (Q1), habitual dietary preferences (Q2) and preference between similar 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

Tortarolo A., Olivero V., Tomatis E., Picco G., Troiano A., Leiva Ramirez E., di Benedetto L., Vallelonga T., Castroflorio T., Deregibus A., Piancino M.G.

Department of Surgical Sciences, Dental School, University of Turin, Turin, Italy

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 ± 2,6 [yr,mo]) and 10 controls (C; 10,3 ± 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

Pipitone R.[1], Migliore F.[1], Caroccia F.[2], Moscagiuri F.[1], D'Attilio M.[1]

[1]Department of Innovative Technologies in Medicine & Dentistry, University G. D'Annunzio Chieti-Pescara, Chieti, Italy
[2]Department of Experimental and Clinical Medicine, Orthodontics, University of Florence, Florence, Italy

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 applying 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

Bertoldo S., Mariani A., D'Ettorre G., Gasparri C., Teodoli R., Mezio M.

Department of Oral and Maxillofacial Sciences, Sapienza University of Rome, Rome, Italy

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, though 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 latters it emerges that, compared to traditional transfer trays, 3D digital printed treys 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: is it 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

Benedetti G., Guiducci D., Cremonini F., Paolone M., Lombardo L.

School of Specialization in Orthodontics, University of Ferrara, Ferrara, Italy

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

Vasic D., Savin S., De Stefani A., Bruno G., Crivellin G., Gracco A., Stellini E.

Department of Neuroscience, School of Dentistry, University of Padua, Padua, Italy

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?

Braga C.[1], Pozzan L.[1], Perinetti G.[2], Contardo L.[1], Primozic J.[3]

[1]Department of Medicine, Surgery and Health Sciences, University of Trieste, Trieste, Italy
[2]Private Practice, Nocciano, Italy
[3]Department of Dental and Jaw Orthopaedics, Medical Faculty, University of Ljubljana, Ljubljana, Slovenia

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 6 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

Moretti S., Bisceglia M., Altilia S., Danesi C., Lione R.

Department of Orhodontics, University of Rome Tor Vergata, Rome, Italy

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

Nugnes C., Papa G., Trotta I., Solazzo L., Verrone M., Bocchino T., Rongo R.

School of Orthodontics, Department of Neurosciences, Reproductive Sciences and Oral Sciences, University of Naples Federico II, Naples, Italy

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

Gamberini S.[1], Fiordelli A.[2], Incerti Parenti S.[1], Paganelli C.[2], Alessandri-Bonetti G.[1]

[1]Section of Orthodontics and Dental Sleep Medicine, Department of Biomedical and Neuromotor Sciences (DIBINEM), University of Bologna, Bologna, Italy
[2]Dental School, University of Brescia, Brescia, Italy

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

Piras F., Ceci S., Patano A., Inchingolo A.D., Malcangi G., Inchingolo A.M., Dipalma G., Rapone B., Di Venere D., Cardarelli F., Inchingolo F.

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: 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

Vella M., Tripicchio C., Donelli M., Marcolongo L., Carloni P., Falsarone F., Alicchio F., Bruni G., Gaffuri F.

Department of Biomedical, Surgical and Dental Sciences, University of Milan, Milan, Italy

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 results 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 restention 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

del Rosso C.[1], Boccalari E.[2], Cigni L.[3], del Rosso E.[2,4], Spadari F.[2]

[1]Facultad de Odontología, Universidad Europea de Madrid, Madrid, Spain
[2]Department of Biomedical, Surgical and Dental Sciences, University of Milan, Milan, Italy
[3]U.O. Odontoiatria, ASST Valtellina, Sondrio, Italy
[4]U.O. Odontostomatologia, ASST Rhodense, Rho, Italy

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 agenesia 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

Gulotta C., Incerti-Parenti S., Stipa C., Cameli M., Bortolotti F., Alessandri-Bonetti G.

Section of Orthodontics and Dental Sleep Medicine, Department of Biomedical and Neuromotor Sciences (DIBINEM), University of Bologna, Bologna, Italy

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?

Tripicchio C., Vella M., Donelli M., Marcolongo L., Falsarone F., Mosca A., Carloni P., Bruni G., Serafin M.

Department of Biomedical, Surgical and Dental Sciences, University of Milan, Milan, Italy

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 establishment 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

Carloni P.[1], Nobili A.[2], Iannotti L.[1], Bruni G.[1], Falsarone F.[1], Alicchio F.[1], Dolci C.[1], Boccalari E.[1], Gaffuri F. [1]

[1]Department of Biomedical, Surgical and Dental Sciences, University of Milan, Milan, Italy
[2]Department of Aesthetic Dentistry, Istituto Stomatologico Italiano, University of Milan, Milan, Italy

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?

Iannotti L., Cavallotti E., Fornarelli G., Carloni P., Boccalari E., Alicchio F., Mosca A., Donelli M., Marcolongo L., Dolci C., Tumedei M.

Department of Biomedical, Surgical and Dental Sciences, University of Milan, Milan, Italy

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

Nucci L.[1], Minervini G.[1], Inchingolo A.D.[2], D'Apuzzo F.[1], Grassia V.[1]

[1]Postgraduate Orthodontic Program, University of Campania Luigi Vanvitelli - Dir. Prof. Letizia Perillo, Naples, Italy
[2]Interdisciplinary Department of Medicine, University of Bari Aldo Moro, Bari, Italy

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

Rodella C., Audino A., Laffranchi L., Bonetti S., Tonni I., Salgarello S., Dalessandri D., Visconti L.

School of Dentistry, Department of Medical and Surgical Specialties, Radiological Sciences, and Public Health, University of Brescia, Brescia, Italy

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

Tersigni F.[1], Esposito R.[1], Arcuri E.C.[1], Laurenziello M.[2], Chimenti C.[1], Tepedino M.[1]

[1]Department of Biotecnological and Applied Clinical Sciences, University of L'Aquila, L'Aquila, Italy
[2]Department of Clinical and Experimental Medicine, University of Foggia, Foggia, Italy

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. Dentinal 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

Cordaro M., Alessandri-Bonetti A., Mollo A., Nuzzo B., Gallenzi P.

Orthodontics Residency Program: Director Prof. M. Cordaro, Department of Dental Clinic and Maxillofacial Surgery, Catholic University of Sacred Heart, Rome, Italy

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

Horodynski M., Jamshir D., Bozbay B., Loli D., Giarmanà L., Scordino S.

Department of Oral and Maxillo-Facial Sciences, Director Prof. E. Barbato, Sapienza University of Rome, Rome, Italy

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

Jamshir D., Horodynski M., Bozbay B., Loli D., Villani E., Bendaj A.

Department of Oral and Maxillo-Facial Sciences, Director Prof. E. Barbato, Sapienza University of Rome, Rome, Italy

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

Nuzzo B., Alessandri Bonetti A., Ossani F., Foti G., Gallenzi P.

Orthodontics Residency Program: Director Prof M. Cordaro, A. Gemelli Foundation IRCCS, Catholic University of Sacred Heart, Rome, Italy

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

Malgioglio A.P., Moschitto S., Isola G., Ronsivalle V., Ruiz F., Polizzi A., Santonocito S., Leonardi R., Lo Giudice A.

Orthodontic Clinical and Research Unit, Department of General Surgery and Medical-Surgical Specialties, University of Catania, Catania, Italy

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 synchndrosis 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

Ronsivalle V., Malgioglio A., Moschitto S., Ruiz F., Isola G., Polizzi A., Santonocito S., Leonardi R., Lo Giudice A.

Orthodontic Unit, Director: Prof. R. Leonardi, Department of General Surgery and Medical-Surgical Specialties, University of Catania, Catania, Italy

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 $p \leq .05$.

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

Gorini T., Bortolotti F., Stipa C., Cameli M., Incerti-Parenti S., Alessandri-Bonetti G.

Section of Orthodontics, Department of Biomedical and Neuromotor Sciences (DIBINEM), University of Bologna, Bologna, Italy

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

Macrì M., Rendina F., Perella G., Festa F.

Department of Innovative Technologies in Medicine and Dentistry, University G. D'Annunzio of Chieti-Pescara, Chieti, Italy

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.

OCCLUSAL PLANE MODIFICATION IN ADULT PATIENTS, TREATED WITH CLEAR ALIGNERS

Fanelli C., Lorusso M., Guida L., Suriano C., Ciavarella D.

School of Dentistry, Department of Clinical and Experimental Medicine, University of Foggia, Foggia, Italy

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 counterlockwise 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

Maci M., Cazzolla A.P., Laurenziello M., Illuzzi G., Ciavarella D.

School of Dentistry, Department of Clinical and Experimental Medicine, University of Foggia, Foggia, Italy

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

Cannavale M., Mignogna E., Ruggiero G., Somma M., Patanè P., Michelotti A., Bucci R.

Department of Neurosciences, Reproductive Sciences and Oral Sciences, University of Naples Federico II, Naples, Italy

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 after 24 hours. Nine aluminum foils (range 8-72μm) 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

Bisceglia M., Danesi C., Balboni A., Altilia S., Lione R.

Department of Orthodontics, University of Rome Tor Vergata, Rome, Italy

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 g/cm^3 ± 0.02) and inorganic percentage residue (41%) than the CNC (respectively 1.95 g/cm^3 ± 0.01 and 23%). Significant differences in terms of decrement of stress values, elastic modulus (1,114.12 ± 91.39 MPa), and stress relaxation rate (24.39% ± 3.23) were observed for the CNC when compared to the FNC (respectively 835.04 ± 184.73 MPa and 40.19% ± 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

Paganelli F., Florenzano F., Mancuso E., Mazzitelli C., Maravic T., Breschi L., Mazzoni A., Alessandri Bonetti G.

Section of Orthodontics, Department of Biomedical and Neuromotor Sciences (DIBINEM), Alma Mater University of Bologna, Bologna, Italy

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% H_3PO_4 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-laminated 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-ORTHOGNATIC SURGERY TO DENTOFACIAL DISHARMONIES: A REVIEW

Bozbay B., Horodynski M., Jamshir D., Giarmana L., Scordino S., Bendaj A.

Department of Oral and Maxillo-Facial Sciences, Director Prof. E. Barbato, Sapienza University of Rome, Rome, Italy

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

Carrieri M., Sturabotti G., Motta C.

Department of Oral and Maxillofacial Sciences, Sapienza University of Rome, Rome, Italy

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

Musone L., Carreri C., Valentini L.M., Grenga C.

Department of Oral and Maxillofacial Sciences, Sapienza University of Rome, Rome, Italy

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 e 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 heterogeneous 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

Palmigiani R., Filetici M.T., Bertoldo S., Grenga C., D'Ettorre G.

Department of Oral and Maxillofacial Sciences, Sapienza University of Rome, Rome, Italy

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) o 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 (Randomised 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

Vompi C., Germanò F., Squillace F., Podda R., Imondi F.

Department of Oral and Maxillo-facial Sciences, Sapienza University of Rome, Rome, Italy

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

Rutili V., Giuntini V., Marino Merlo M., Caroccia F., Franchi L.

Department of Experimental and Clinical Medicine, University of Florence, Florence, Italy

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

Rutili V., Giuntini V., Paolini E., De Meo E., Franchi L.

Department of Experimental and Clinical Medicine, University of Florence, Florence, Italy

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

Filetici M.T., Palmigiani R., Mariani A., Imondi F., Grenga C.

Department of Oral and Maxillofacial Sciences, Sapienza University of Rome, Rome, Italy

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

Germanò F., Squillace F., Vompi C.

Orthognathodontics, Department of Oral and Maxillo-facial Science, Sapienza University of Rome, Rome, Italy

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

Cipollone A., Usyk Y., Ciappina F.

Orthognathodontics, Department of Oral and Maxillo-facial Science, Sapienza University of Rome, Rome, Italy

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 examinated.

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 examinated 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

Toraldo B., Delcuratolo M.V., Galluccio G., Filetici M.T.

Department of Odontostomatological and Maxillofacial Sciences, Sapienza University of Rome, Rome, Italy

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 BIOTYPOLOGICAL ASPECTS OF A SAMPLE OF ORTHODONTIC PATIENTS FROM MILAN

Caccianiga P., Bader A.A., Baldoni M.

School of Medicine and Surgery, University of Milano-Bicocca, Monza, Italy

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 normomandible 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

Caccianiga P., Bader A.A., Baldoni M.

School of Medicine and Surgery, University of Milano-Bicocca, Monza, Italy

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 2 ± 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?

Rizzi C., Sfondrini B., Ricchio S., Nardi M.G., Gjini E., Gandini P., Sfondrini M.F., Scribante A.

Unit of Orthodontics and Paediatric Dentistry, Section of Dentistry, Department of Clinical, Surgical, Diagnostic and Paediatric Sciences, University of Pavia, Pavia, Italy

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 malocclusion 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 stomatognatic 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)

Macrì M., Pisanelli E.L., Lauriola S., Festa F.

Department of Innovative Technologies in Medicine & Dentistry, University G. D'Annunzio of Chieti-Pescara, Chieti, Italy

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 ± 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 ± 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 anteroposterior 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

Bergami A., Rizzuto S., Viti S., Pera S., Demonte L., Maverna R., Gastaldi G.

Department of Dentistry, Vita-Salute San Raffaele University, IRCCS San Raffaele Hospital, Milan, Italy

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 disincluded 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

Carrioli M., Guiducci D., Palone M., Lombardo L.

Postgraduate School of Orthodontics, University of Ferrara, Ferrara, Italy

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 bondend 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

Chiavaroli A., Gazzani F., Balboni A., Bisceglia M., Pavoni C.

Department of Orthodontics, Head: Prof. P. Cozza, University of Rome Tor Vergata, Rome, Italy

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 dimension; 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

Aiello D., Ambroggio A., Lavigna I., Dieni A., Paduano S.

Department of Health Sciences, Magna Graecia University of Catanzaro, Catanzaro, Italy

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 retenction 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

Du L., Orlando B., Torres S., Maddalone M.

Department of Dentistry, School of Medicine, University of Milano-Bicocca, San Gerardo Hospital, Monza, Italy

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 protrusive 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

Epifani A., Masoero S., Fogliato E., Bazzucchi P., Parrini S., Sanna F., Piancino M.G., Deregibus A., Castroflorio T.

Orthodontics, Department of Surgical Sciences, CIR Dental School, University of Turin, Turin, Italy

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 extracted 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

Fogliato E., Masoero S., Epifani A., Bazzucchi P., Parrini S., Sanna F., Piancino M.G., Deregibus A., Castroflorio T.

Orthodontics, Department of Surgical Sciences, CIR Dental School, University of Turin, Turin, Italy

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

Garrisi L.[1], Boggio A.[1], Caldara G.[1], Quaglia A.[2], Scagliotti C.[2]

Department of Dentistry, Director Prof. E. Gherlone, Vita-Salute San Raffaele University, Milan, Italy
[1]School of Specialization in Orthodontics, Director Prof. G. Gastaldi, Vita-Salute San Raffaele University of Milan, Milan, Italy
[2]Master's Degree Course in Dentistry and Dental Prosthetics, President Prof. O. Cremona, Vita-Salute San Raffaele University of Milan, Milan, Italy

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 application 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

Gasperoni I., Palone M., Pellitteri F., Lombardo L.

Postgraduate School of Orthodontics, University of Ferrara, Ferrara, Italy

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

Macrì M., Giansiracusa S., Ceran L., Comparelli U., Festa F.

Department of Innovative Technologies in Medicine & Dentistry, University of Chieti-Pescara, Chieti, Italy

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

Gobbo F., Canello A., Bruno G., De Stefani A., Crivellin G., Gracco A., Stellini E.

Department of Neuroscience, University of Padua, Padua, Italy

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 multibracktet 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

Hatami Alamdari S., Barone M., Zalunardo F., Bruno G., De Stefani A., Crivellin G., Gracco A., Stellini E.

Department of Neuroscience, School of Dentistry, University of Padua, Padua, Italy

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 expansor 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?

Aiello D., Lavigna I., Finamore A., Romeo M., Paduano S.

Department of Health Sciences, Magna Graecia University of Catanzaro, Catanzaro, Italy

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 elements 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

Macrì M., Lombardi L., Fiore V., Festa F.

Department of Innovative Technologies in Medicine & Dentistry, University of Chieti-Pescara, Chieti, Italy

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

Masoero S., Epifani A., Fogliato E., Bazzucchi P., Parrini S., Sanna F., Piancino M.G., Deregibus A., Castroflorio T.

Department of Surgical Sciences, Orthodontics, CIR Dental School, University of Turin, Turin, Italy

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 veneers. 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

Motta A.[1,2], Del Dot L.[2], Cantore S.[3], Boccaccio A.[4]

[1]Dentistry Section, Department of Neurosciences, University of Padua, Padua, Italy
[2]Operative Unit of Oral Surgery for Special Needs and Dentistry, Borgo Valsugana, Trento, Italy
[3]Department of Basic Medical Sciences, Neurosciences and Sensory Organs, University of Bari Aldo Moro, Bari, Italy
[4]Polytechnic University of Bari, Bari, Italy

Aim: current literature is lacking about data on the post-distracted 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 osteogeneisis 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

Macrì M., Rendina F., Perrella G., Festa F.

Department of Innovative Technologies in Medicine & Dentistry, University of Chieti-Pescara, Chieti, Italy

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, posteroanterior 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

Vaienti B., Di Blasio M.

Department of Medicine and Surgery, University of Parma, Parma, Italy

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 Frankel 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

Viti S., Bergami A., Rizzuto S., Pera S., Demonte L., Maverna R., Gastaldi G.

Department of Dentistry, Vita-Salute San Raffaele University, IRCCS San Raffaele Hospital, Milan, Italy

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 elements 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

Gazzani F., Chiavaroli A., Moretti S., Danesi C., Pavoni C.

Department of Orthodontics, Head: Prof. P. Cozza, University of Rome Tor Vergata, Rome, Italy

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.