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#### CP01 CONE BEAM COMPUTED TOMOGRAPHY: NEW HORIZONS FOR MULTIDISCIPLINARY TREATMENT OF DILACERATION CASES

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**AIMS:** Cone-beam computed tomography (CBCT), is becoming established as an alternative and, in many aspects, superior radiographic technique. This emerging technology produces images with sub-millimeter spatial resolution with high diagnostic quality and radiation dosages up to 15 times lower than conventional CT scans. It is ideally suited for dedicated dentomaxillofacial CT scanning. The purpose of this article is to report the case of a 10 year old boy with a dilacerated left central incisor which was semi-erupted in the palate.

**SUBJECT AND METHOD:** A dental pantomograph and occlusal radiograph were taken to determine the position of the tooth. The treatment plan was extraction of the tooth.

**RESULTS:** After taking a CBCT, the exact position of the tooth and the crown-root inclination angle were determined. Based on these data the treatment plan was changed to orthodontic movement and reshaping of the tooth.

**CONCLUSION:** Thus CBCT saved a tooth for this patient, and changed an aggressive treatment plan into a more conservative one.

#### CP02 ORTHOGNATHIC SURGICAL TREATMENT OF A SKELETAL CLASS III MALOCCLUSION: A CASE REPORT

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**AIMS:** In non-growing patients, severe skeletal disharmonies are often corrected by orthognathic surgery. Orthognathic surgery can improve morphology and contribute to functional development. The aim of this poster is to present the treatment of a patient with a skeletal Class III malocclusion treated with bimaxillary orthognathic surgery.

**SUBJECT AND METHOD:** An 18-year-old Japanese female with the chief complaint of mandibular protrusion. Clinical examination revealed a concave facial profile and a Class III molar relationship. The overjet was 0.1 mm, and the overbite was -0.5 mm. The treatment objective was to improve the facial profile and to correct the Class III occlusion by orthognathic surgical treatment.

**RESULTS:** A maxillary three-piece LeFort I osteotomy and a mandibular sagittal split ramus osteotomy were carried out. During surgery, extraction of the maxillary right and left first premolars was performed. After 1 year 10 months of therapy, a successful treatment outcome was achieved by correcting the open bite, Class III canine relationship and concave facial profile.

**CONCLUSION:** To correct dentofacial skeletal deformities, treatment planning is important for successful results. Orthognathic surgical treatment offers one of the best approaches for patients with skeletal disharmony, and can contribute to functional development.

#### CP03 PAEDIATRIC ORTHOGNATHIC SURGERY WITH A TWO YEAR FOLLOW-UP AND PETROVIC ANALYSIS: A CASE REPORT

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**AIMS:** To present a case treated by paediatric orthognathic surgery due psychological and social issues, and to evaluate the prediction of mandibular growth according to Petrovic's analysis.

**SUBJECT AND METHOD:** A 14 year old boy referred with a complaint of his facial profile and gummy smile. He had skeletal Class II malocclusion with an ANB angle of 7 degrees due to a retrognathic mandible. According to cephalometric Petrovic analysis, growth prediction of this patient showed an anterior

rotational type for the mandible with a Class I basal base relationship and open bite tendency (A1DOB). Combined orthodontic-surgical treatment was planned. The teeth were aligned after bonding of the appliances sufficiently for orthognathic surgery and a plan for surgical treatment was drawn up an orthodontist and oral and maxillofacial surgeon. A LeFort I osteotomy with 5 mm maxillary impaction and a bilateral sagittal split osteotomy with 7 mm mandibular advancement and maxillo-mandibular fixation was successfully performed. After healing took place, the teeth were further aligned for the best occlusion and dentally a Class I relationship was obtained.

RESULTS: At the 2 year follow-up, the skeletal Class I relationship still remained and the ANB angle was 2.5 degrees. In cephalometric Petrovic analysis, the patient showed a regular rotational type for the mandible with a Class I basal base relationship and an open bite tendency (R1NOB). The anterior rotational type of this patient was changed to regular but the open bite tendency continued.

CONCLUSION: When the two jaws are different in size, shape or position, orthodontics alone cannot align the teeth for a better fit and surgery becomes necessary. In paediatric patients orthodontics combined with orthognathic surgery can be done not only to improve the jaw relationship and to correct the malocclusion but also to restore self-esteem and self-confidence. Further investigations are necessary to evaluate the validity of Petrovic analysis in surgery first patients.

#### CP04 SURGICALLY ASSISTED ORTHODONTICS IN VERTICAL BONE DEFICIENCY: A CASE REPORT

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AIMS: Vertical alveolar bone deficiencies are challenging cases in clinical dentistry. The aim of this report is to present the orthodontic treatment of an adult, prior to prosthetic rehabilitation, with vertical alveolar bone deficiency in the upper anterior region.

SUBJECT AND METHOD: A 46-year-old female referred regarding her dental aesthetics and expectation of fixed prosthesis. Intraoral clinical examination revealed tooth mobility and diastemas. The panoramic radiograph has showed general vertical alveolar bone deficiency, especially around the upper central incisors. Multidisciplinary treatment was planned including orthodontics, surgery and prosthesis. The upper central incisors were extracted and a temporary implant was placed to apply extrusive forces with conventional orthodontic mechanics.

RESULTS: The upper right central and left lateral incisors were extruded using alveolar corticotomies and orthodontic mechanics. The extrusion force was applied to the temporary implant. After maintaining bone apposition in a vertical direction, implants were placed to prevent bone loss in that region. The prosthetic rehabilitation was undertaken after gingival forming and more favourable aesthetic and biomechanical tooth and bone position were provided.

CONCLUSION: Intraoral surgically assisted orthodontics could give the best results in patients with severely resorbed alveolar bone in the vertical dimension.

#### CP05 ORTHODONTIC TREATMENT OF A DILACERATED, OVER PROCLINED AND HORIZONTALLY IMPACTED CENTRAL INCISOR – A CASE REPORT

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AIMS: Impaction of a maxillary permanent central incisor is not frequently reported in dental practice, but its treatment is challenging because of its importance to facial aesthetics. The aim of this case report is to show the orthodontic treatment of patient who had a dilacerated, over proclined and horizontally impacted maxillary central incisor.

SUBJECT AND METHOD: A 12 year 5 month old with the chief complaint of an unerupted upper right central incisor. The child had no history of medical or dental trauma. The tooth was positioned at the level of ANS and UI-SN angle was 192 degrees. It had a one-third root length and the incisal edge of the right impacted incisor was approximately 18.65 mm from the incisal edge of the left incisor. The patient had a concave profile, with a skeletal Class III and dental Class III subdivision malocclusion and an anterior and right posterior crossbite. As the aim was to try erupting the tooth, orthodontic treatment was started with hybrid rapid maxillary expansion. After expansion 0.022 × 0.028 inch slot straightwire appliances were placed and adequate space for aligning the impacted incisor was obtained with open coil springs. Surgical

exposure of the tooth was performed approximately 8 months later. After exposure, a lingual button was applied on the palatal surface. Force was applied in a downward direction with steel ligatures to an additional nickel-titanium archwire with a V-shaped bend.

RESULTS: The eruption and positioning of the impacted central incisor were completed after 15 months. The upper right central was erupted into its correct position and an ideal arch form was achieved. After eruption of the impacted teeth, the vestibular sulcus length was decreased and the patient was referred to the periodontology department.

CONCLUSION: The over proclined and horizontally impacted right maxillary central incisor was successfully aligned in the proper arch position. Both aesthetic and functional results were acceptable at the end of treatment.

#### CP06 THE HERBST APPLIANCE IN CLASS II MALOCCLUSION TREATMENT – CASE REPORT###

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AIM: To present the soft and hard tissue changes of a skeletal Class II female treated with the Herbst appliance.

SUBJECT AND METHOD: A 14 year-old female with complaints of a retruded lower chin and crowding. Clinical and radiographic findings revealed: a skeletal Class II (ANB: 4.5, Wits: 3.3), a dental Class II relationship, overjet 1 mm and overbite –1 mm. U1-SN was 95.4 mm and IMPA 97.4 mm. Hand wrist radiographs indicated that the patient was in the DP3 U period. She was informed about orthognathic surgery, Class II compensation treatment and fixed functional orthopaedic treatment. The patient accepted the fixed functional orthopaedic treatment.

RESULTS: The Herbst appliance was used for 11 months. After a total treatment period of 22 months, U1-SN was 98.7 mm, IMPA 94.2 mm, overjet 1.3 mm and overbite 2.1 mm. At the end of treatment, significant soft tissue changes were observed.

#### CP07 SOFT TISSUE CHANGES IN CAMOUFLAGE TREATMENT OF BORDERLINE CLASS III MALOCCLUSIONS

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AIMS: To examine the changes in soft tissue and facial aesthetics in three young adult dentoskeletal Class III patients. Some of these patients were treated with only fixed orthodontic appliances whereas others were treated with orthopaedically and fixed orthodontic appliances.

SUBJECTS AND METHOD: Cephalometric radiographs, frontal and profile photographs were taken at the beginning and end of treatment. Cephalometric radiographs were examined for soft tissue changes.(E line, S line to upper-lower lip, nasolabial, mentolabial and facial convexity angle). Case 1: A 14-year-old male classified as skeletal Class III (ANB: –4°) hyperdivergent (GoGnSN: 43°) and with a circular crossbite. His growth stage on hand-wrist radiographs was determined as DP3U. According to soft tissue analysis, the upper lip was retruded 4 mm and the lower lip was protruded 2 mm to the S line. Case 2: A 14-year-old female classified as skeletal Class III (ANB: –6°) hyperdivergent (GoGNSn: 40°) with a circular crossbite. Growth stage on hand-wrist radiographs was determined as RU. According to soft tissue analysis, the upper lip was retruded 6 mm and lower lip protruded 1 mm to the S line. Case 3: A 24-year-old male with a dentoskeletal Class III (ANB: –7°) hypodivergent (GoGnSN: 20°) and a circular crossbite. Growth stage according to hand-wrist radiographs was RU. Soft tissue analysis showed that the upper lip was retruded 4 mm and the lower lip was protruded 2 mm to the S line.

RESULTS: At the end of treatment, an Angle Class I relationship with ideal overjet and overbite measurements were achieved. ANB value increased and upper lip protrusion and lower lip retrusion were observed in all patients.

CONCLUSION: Acceptable dental and soft tissue changes can be achieved in Class III patients treated with camouflage orthodontics. Although orthognathic surgery is the gold standard for severe skeletal Class III adult patients, dental camouflage treatment is a successful method.

#### CP08 CAN THE SELF-LIGATING SYSTEM BE AN ALTERNATIVE TO ORTHODONTIC TREATMENT WITH EXTRACTIONS?

**AIMS:** The Damon System is an innovative combination of passive self-ligating brackets, high-tech archwires and minimally invasive treatment protocols that work together as a low-friction, low-force system. Damon passive self-ligating brackets allow freedom of movement and thus faster results with gentler forces. It is the biologically sensible way to improve tooth position and facial aesthetics. The aim of this study was to evaluate treatment results and treatment efficiency of the Damon self-ligating system in three borderline (extraction/non-extraction) patients.

**SUBJECTS AND METHOD:** For all patients arch length discrepancy was measured between a minimum of 6 mm and maximum of 12 mm in the maxilla and/or mandible. The patients were in the permanent dentition with the second molars erupted. Lateral cephalometric radiographic evaluation showed that all patients had a skeleto-dental Class I malocclusion, normal overjet and overbite and a normodivergent growth pattern. Measurements of dental arch lengths and widths were made on casts before and after treatment with digital callipers. These were: intercanine width (3-3), interpremolar width (4-4), (5-5), intermolar width (6-6), anterior arch length and total arch length.

**RESULTS:** The average treatment time was 9 months. An ideal occlusion and arch form was achieved at the end of treatment. Generally, the dental arch widths were increased in all cases. However, the greatest increase was observed for intercanine (3-3) and interpremolar (4,4), (5,5) widths in the maxillary arch. In addition, total arch lengths were increased. A small amount of protrusion, especially of the lower incisors, was observed in all cases.

**CONCLUSION:** Arch length discrepancy was eliminated by expansion and slight incisor protrusion. This system efficiently reduces the need for extractions in fixed orthodontic therapy and supports smile aesthetics.

#### CP09 ORTHODONTIC TREATMENT OF AN ADULT CLASS III PATIENT WITH PALATAL IMPACTED CANINES: A CASE REPORT

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**AIMS:** In orthodontic practice various eruption mechanics are used for traction of impacted canines. The aim of this presentation is to show the traction of palatally impacted canines with a mechanical palatal arch with a soldered spring.

**SUBJECT AND METHOD:** A 20 year old female with the chief complaint of unerupted maxillary canines and an unaesthetic smile. Clinical and radiographic assessment showed persistent primary upper and left lower canines, palatally impacted upper canines, and moderate maxillary retrognathism. Intraorally the posterior occlusion was Class I, the overjet was -4 mm and the overbite -5 mm with severe crowding in the anterior upper dental arch. The primary treatment objectives were to erupt the impacted canines and move them into the correct position in the dental arch, maintain the posterior occlusion and correct the negative anterior bite. To solve the severe space deficiency and expand the maxilla, rapid palatal expansion was planned with an acrylic bonded type expander. After expansion, straightwire appliances were placed on the maxillary teeth and levelling was commenced. Four months later, surgery was planned; full thickness flaps were elevated, bone was removed from the crowns of the impacted canines and brackets were bonded to the lingual surfaces, the flaps were repositioned. Two weeks after surgery a palatal bar with a soldered spring was cemented to the maxillary molars. The springs were activated to deliver a palatally directed eruptive force on the canines.

**RESULTS:** After 2 months the canines were erupted into the palate and at 6 months to the level of the occlusal plane of the maxillary teeth. The canines were then moved into the dental arch.

**CONCLUSION:** Before traction of palatally impacted canines into the arch, initially the aim should be eruption into the palate which is essential to avoid root damage on the lateral and central incisors. A palatal bar and spring mechanics provides a simple way for extrusive force to the canines into the palate.

#### CP10 CASE REPORT: OPEN BITE TREATMENT WITH RAPID MAXILLARY EXPANSION AND NON-EXTRACTION ORTHODONTIC TREATMENT

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**AIMS:** To present the non-extraction orthodontic treatment and rapid maxillary expansion (RME) in an adult with a severe open bite.

**SUBJECT AND METHOD:** An 18-year old female with the chief complaint concerning dental aesthetics and not being able to bite with her front teeth arising from an open bite. Clinical examination showed a maxillary deficiency, a 7 mm open bite and a 0 mm overjet. The space requirement was 12.5 mm in the maxilla and 3 mm in the mandible. The lateral cephalometric radiograph showed an ANB: 5.5°, U1SN: 92.4°, IMPA: 85.8° GoGn-SN: 42.5°. The patient had a vertical growth pattern. The treatment plan was RME and fixed orthodontic treatment without surgical intervention. The RME appliances were activated by one turn of the screw (0.20 mm per turn) for 35 days. Thereafter, the teeth were retained without fixed appliances for approximately 3 months. For the fixed orthodontic treatment 0.022 × 0.030 inch dimension braces were used. Swallowing exercise were given. Box elastics were applied during treatment. The total treatment time was 28 months.

**RESULTS:** The open bite was resolved and an ideal overjet (2.5 mm) and overbite (2 mm) were obtained. With elimination of the severe open bite, the patient's aesthetic and functional expectations were achieved. The dental relationship finished as Class I. While there were no significant changes in SNA, SNB, ANB and GoGn-SN; U1SN increased 6.3 degrees. After treatment the incisor angles were: U1SN: 98.7°; IMPA: 85.3°.

**CONCLUSION:** Satisfactory functional and aesthetic outcomes can be obtained in adult patients with a severe open bite and maxillary deficiency using RME and non-extraction orthodontic treatment. A non-surgical treatment plan is more acceptable and tolerable for patients. Four premolars extractions may be an alternative treatment plan but non-extraction treatment can achieve successful results.

#### CP11 AN INTRAORAL APPLIANCE DESIGN WITH SKELETAL ANCHORAGE FOR RIGID EXTERNAL DISTRACTION DEVICES

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**AIMS:** Directional control of the maxilla and stability of intraoral appliances used with rigid external distraction (RED) devices have been challenging. RED devices tend to rotate the maxilla in an undesired upward position. In addition, instability of the intraoral anchorage appliances and unfavourable dental movements (protrusion of the maxillary teeth) have also been reported. Therefore, the aim of this case report is to introduce a new skeletal anchorage adapted custom-made intraoral appliance and report the effects and 2 year follow-up of maxillary distraction osteogenesis (DO) of an individual with an operated cleft palate.

**SUBJECT AND METHOD:** A 26 year-old female with a recently operated cleft palate, severe maxillary hypoplasia (overjet -10 mm). She had a concave 'dished-in' profile. Although she had pre-surgical orthodontics, the appliances were removed prior to RED surgery and custom designed prosthetics with miniplates were fabricated. Multi-level external traction bars were soldered to the appliance. A LeFort I osteotomy was performed under general anaesthesia, including pterygomaxillary disjunction. Once the osteotomy was completed and the oral mucosa was sutured, the device was fixed to the maxilla between the second premolars and first molars with intermaxillary fixation screws. The head part of the RED device was adapted. The activation period was 2 weeks and the RED remained passive in place during 2 months of retention. Due to overcorrection, no facemask use was needed.

**RESULTS:** Immediately following DO, the average amount of distraction was 14 mm. A significant advancement of the maxilla and correction of the sagittal Class III skeletal relationship was achieved. The negative 8 degree ANB increased to 4 degrees as a result of 2 weeks RED activation. Nperp-A showed an improvement of 11.5 mm (Beginning RED; -4 mm, End RED; 7 mm). Additionally significant forward relocation of the maxilla was achieved without any undesirable posterior rotation of the mandible (SN/GoGn was 31° pre-operatively and remained at 31° post-RED). These results were stable at 2 years.

**CONCLUSION:** The presented intraoral bone-supported and multi-level traction device design enables directional control of the maxilla, vertical control of the mandible and enhances the stability of the appliance through the distraction and consolidation stages of DO with RED.

#### CP12 CORTICOTOMY-ASSISTED CLEAR ALIGNER ORTHODONTIC TREATMENT

**AIMS:** To describe the efficacy of alveolar corticotomy intervention on accelerating orthodontic tooth movement with Invisalign appliances.

**MATERIALS AND METHOD:** A few cases report will be presented to introduce the approach of corticotomy for correction of Class II malocclusion, crowding and transverse discrepancy. The treatment protocol consisted of dental impression procedures for three-dimensional digital model production followed by virtual orthodontic treatment planning with ClinCheck software. Surgical intervention was performed with different techniques of corticotomies depending on the type of malocclusion, bone quality and periodontal biotype. Cone beam computed tomographic images were taken for every treated patient. Immediately after the corticotomies, active Invisalign orthodontic therapy was started. Clear aligners were orientated to be changed every 5 days and, on average, six sets of aligners were used per month with 1.5 mm monthly tooth movement.

**RESULTS:** Invisalign was able to move teeth in three different dimensions with a total tooth movement of 4.5 mm on average obtained after three monthd with accelerating orthodontic therapy. Correct dental movements were achieved following the digital treatment objectives previously determined.

**CONCLUSION:** This current treatment approach considerably reduced treatment time with pre-visible and controlled dental movement. The combination of surgical alveolar procedures with a digital orthodontic treatment plan and clear aligners has been shown to be an efficient alternative for orthodontic treatment for moderate types of malocclusion correction.

#### CP13 ORTHODONTIC CAMOUFLAGE TREATMENT IN A CASE WITH COMPLEX MEDICAL DISORDERS

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**AIMS:** To present the continuing orthodontic camouflage treatment of an operated lip in a cleft patient with complex medical disorders.

**SUBJECT AND METHOD:** A 16 year old male with the chief complaint of 'my teeth are irregular'. He has multiple complex medical problems. Surgery for a right unilateral cleft lip and palate (CLP) was carried out at 2 years of age. He had a concave profile due to nasal malformation. He was blind in the left eye and there was ptosis in this eye. He had generalized muscle weakness that causes a walking deficiency. The patient had a Class II molar and canine relationship on both sides, an anterior edge-to-edge bite, a V shaped maxilla and a supernumerary tooth in the anterior region. Arch length discrepancies were 26 mm in the maxillary and 5 mm in the mandibular arches. His maxillary right lateral was peg-shaped and the left lateral was congenitally missing. The treatment plan was to extract the maxillary right primary canine, the supernumerary tooth and the permanent left second premolar, expand the maxilla and align the arches with fixed orthodontic appliances. Maxillary protrusion by orthognathic surgery was also recommended to the patient but his parents refused this treatment choice.

**RESULTS:** After the extractions, the maxilla was expanded with a quadhelix. MBT brackets (0.22 inch slot) were bonded. The treatment is continuing with fixed orthodontic appliances. The patient will be referred to a plastic surgeon for rhinoplasty after orthodontic treatment.

**CONCLUSION:** Patients with a CLP may have other generalized medical problems. Successful treatment of CLP requires an interdisciplinary approach including orthodontist and maxillofacial surgeon. When the patient refuses orthognathic surgical treatment, orthodontic camouflage treatment can be undertaken. This case shows continuing camouflage treatment of a complex case, which aims to have optimal function and aesthetics for the patient.

#### CP14 USE OF PALATAL MINISCREW ANCHORAGE: A CASE REPORT

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**AIMS:** To examine the success of only one palatal miniscrew to control anchorage instead of two.

**SUBJECT AND METHOD:** The patient had a skeletal and dental Class II malocclusion and an increased overjet. The upper second premolars were extracted before treatment. A palatal miniscrew was used for anchorage. One miniscrew was placed in the anterior palate, about 8 mm behind the incisive papilla. The

appliance, which was prepared in the laboratory, was placed on the miniscrew. The first premolars and canines were distalized on sectional arches. After distalization continuous archwires were used.

RESULTS: Treatment is still ongoing. The miniscrew helped to control anchorage. Despite the use only one miniscrew in the palate, stability of the miniscrew was successful.

CONCLUSION: A miniscrew located in the palate can predictably control not only the maxillary molar position, but also the position of almost every tooth in the mouth. In this case the palatal miniscrew was successful in controlling anchorage.

#### CP15 FACEMASK TREATMENT OF A CLASS III MALOCCLUSION WITH A UNILATERAL CLEFT LIP AND PALATE: A CASE REPORT

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AIMS: Presentation of the treatment of a Class III malocclusion and unilateral cleft lip and palate (UCLP) patient.

SUBJECT AND METHOD: A 12 year old male treated with an orthopaedic facemask, which was adjusted to rest on the forehead and the chin. Elastics, 4 oz 1/2 inch, which were used to deliver a force of 500 g bilaterally, were attached to hooks on an auxiliary arch and a crossbar on the facemask with a downward direction of about 30 degrees. At completion of protraction, the molar and canine relationships were overcorrected to a slight Class II tendency.

RESULTS: After facemask treatment, a 2 mm positive overjet was achieved. The patient's profile changed positively and the maxillomandibular relationship showed significant improvements.

CONCLUSION: Treatment of a Class III malocclusion with a UCLP in growing subjects is a challenging part of contemporary orthodontic practice. Many treatment approaches can be found in the literature regarding orthopaedic and orthodontic treatment in Class III malocclusions, including intra- and extraoral appliances such as a facemask. Successful orthopaedic correction through growth modification has increased the non-surgical correction of the growing Class III patient.

#### CP16 POST-OPERATIVE INFECTION IN AN ORTHOGNATHIC PATIENT – AN UNLIKELY CULPRIT###

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AIMS: A case presentation of orthodontic wax causing orthognathic bone plates to become infected and subsequently require surgical removal.

SUBJECT AND METHOD: A 29 year old female with a Class II division 1 malocclusion had a bilateral sagittal split osteotomy to advance the mandible to correct a retrognathic mandible. She developed post-operative swelling and pain and radiographs revealed infection around the plates, which had to subsequently be surgically removed.

RESULTS: Surgical removal of the plates revealed the migration of orthodontic wax from the oral cavity into the wound and onto the plates, which resulted in post-operative infection and pain. The wax caused a foreign body reaction and the only option was to remove the plates and the wax.

CONCLUSION: Although post-operative infection in orthognathic patients is uncommon, it is vital to establish the cause and treat appropriately, which in many cases, is removal of the plates. It is unusual for orthodontic wax, applied by the patient to prevent soft tissue irritation, to be the cause of such a problem.

#### CP17 MOLAR UPRIGHTING IN ADULTS: A LITERATURE REVIEW

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AIMS: Loss of the first permanent molars without early prosthetic replacement is a frequent problem in adults. As a consequence, the second molar may tip mesially into the edentulous space. Orthodontic treatment to manage mesially tilted molars, often has undesirable side effects such as extrusion or mesial movement of the anchorage teeth. The purpose of this study was to perform a literature review of the range of conventional and latest techniques for molar uprighting, according to the patient's individual condition.

MATERIALS AND METHOD: Database searches were conducted through ScienceDirect and PubMed for journal articles. Different techniques for mesiodistal molar uprighting with coronal and radicular

movements were found. Three case reports of different treatment modalities are presented. These cases include using sectional archwire springs, microscrews and invisible aligners. To show changes after treatment, superimposition of three-dimensional digital models was performed.

RESULTS: Indications of use and clinical techniques for molar uprighting are described.

CONCLUSION: Molar uprighting procedures have become simpler with more predictable results with the use of miniscrews as orthodontic anchorage, In addition, increasing numbers of patients are seeking more aesthetic treatment options, such as thermoelastic appliances. However, most of the newest techniques use the same biomechanical principles as conventional archwire springs.

#### CP18 COMPUTER-AIDED SURGICAL PLANNING AND STEREOPHOTOGRAMMETRIC EVALUATION OF TWO PATIENTS WITH SEVERE MAXILLOFACIAL ASYMMETRY DUE TO HEMIFACIAL MICROSOMIA###

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AIMS: To present the treatment procedures in two patients with severe maxillofacial deformities due to hemifacial microsomia treated with three-dimensional (3D) surgical planning and treatment protocol.

SUBJECTS AND METHOD: Two patients, with underdeveloped right rami, had asymmetrical faces with underdeveloped right sides, asymmetric canting smile lines, and convex profiles. Cephalometric analyses showed Class II skeletal relationships and low angle vertical patterns. The treatment plans for both patients were double jaw surgery comprising differential maxillary impaction and advancement and mandibular asymmetric advancement following orthodontic preparation. Before surgery cone-beam computed tomography (CBCT) images and digital dental models were obtained and composite skull models were created. Skeletal asymmetries were analysed and quantified and surgery was simulated in a computer. 3D intermediate surgical splints were fabricated via stereolithography and the surgery plans were transferred to the patients. Post-operative treatment results were evaluated using stereophotogrammetry.

RESULTS: After treatment, the skeletal discrepancies, including the facial asymmetries and malocclusions, were dramatically improved for both patients, the mandibular asymmetries and cants of the occlusal planes were corrected. Aesthetic profiles with significant facial symmetries were obtained together with favourable occlusal results. Stereophotogrammetric post-operative treatment results showed dramatic improvements of the facial soft tissues.

CONCLUSION: Orthognathic surgery together with new techniques makes orthodontic treatment and orthognathic surgery more efficient for patients with complex maxillofacial deformities and asymmetries.

#### CP19 NON-EXTRACTION TREATMENT OF SEVERE MAXILLARY CROWDING WITH UNILATERAL MOLAR DISTALIZATION

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AIMS: To show the non-extraction treatment of a horizontally placed right first premolar and an unerupted canine with unilateral molar distalization.

SUBJECT AND METHOD: A 10 year old female with the complaint of maxillary crowding. An upper dental midline deviation to the right, a Class I molar relationship on the left and a Class II molar relationship on the right were observed. The horizontal position of the right first premolar and an unerupted right canine was present with 8 mm of upper arch crowding. Non-extraction treatment was planned with the distalization of the right first molar with an intra-oral appliance to gain space for the correction of the horizontal premolar and the unerupted canine.

RESULTS: A Fast-back appliance for unilateral distalization of the right molar was applied. After 5 months approximately 6.5 mm of space was gained. Subsequently, only the bands of 15 and 24 were removed and bonding of the upper arch, except for the right first premolar, was performed. A heat-activated 0.014 inch nickel titanium (NiTi) archwire was used as the initial wire and a coil-spring to distalize the right second premolar was placed. After 2 months the first premolar was bonded and brought into the correct position. At the same appointment the lower arch was bonded and 0.016 inch heat-activated NiTi wires were placed in both arches. With the correction of the first premolar, the canine erupted into the arch without any force application. The canine tooth was bonded and 0.018 inch heat-activated NiTi wires were placed in both arches. The remaining parts of the Fast-back appliance were removed. Subsequently, 0.019 × 0.025

inch heat-activated NiTi and 0.019 × 0.025 inch stainless steel wires were applied to both arches. Treatment was completed within a period of 23 months.

**CONCLUSION:** A healthy occlusal relationship was obtained with unilateral molar distalization in a patient with a horizontally placed first premolar and an unerupted canine.

#### CP20 ORTHODONTIC-SURGICAL TREATMENT OF A SKELETAL CLASS III MALOCCLUSION WITH GLOSSECTOMY

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**AIMS:** To show the results of orthodontic-surgical treatment of a patient with a severe skeletal Class III malocclusion.

**SUBJECT AND METHOD:** A 21 year old patient diagnosed with a skeletal Class III malocclusion, maxillary hypoplasia and mandibular prognathism. The maxillary incisors were normally inclined and the mandibular incisors had a lingual inclination (IMPA: 75°) due to the natural tendency for compensation of a negative step (3 mm overjet). A circular crossbite was present in both anterior and posterior regions due to width disharmony between the upper and lower arches. Extensive orthodontic-surgical therapy was performed in three stages. In the first, pre-surgical stage, the upper jaw was widened with transpalatal arch (TPA) and the inclination of both the upper and lower incisors were corrected. In this way the upper and lower incisors were decompensated, and two almost ideal dental arches were achieved and balance of the dentoalveolar structures with respect to the bone bases was established. In the second, surgical stage, after placement of passive arches for immobilization, bimaxillary orthognathic surgery was performed (LeFort I, bilateral sagittal split osteotomy). Surgery of the tongue with partial glossectomy according to Pichler-Edgerton, central reduction of the elliptical shape of the tongue. After bone healing, the third post-surgical orthodontic stage was performed in order to finely adjust the position of certain teeth and achieve maximum intercuspatation of the surgically repositioned jaws.

**RESULTS:** Both functional and aesthetic aspects were satisfactory. A stable occlusion was obtained, with significant improvement in the skeletal jaw relationship and soft tissue profile.

**CONCLUSION:** Treatment of patients with skeletal Class III malocclusions should, besides bimaxillary orthognathic surgery, include both pre- and post-surgical orthodontic therapy.

#### CP21 SURGERY FIRST TREATMENT OF A PATIENT WITH A SEVERE SKELETAL CLASS III MALOCCLUSION

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**AIMS:** To present the treatment of a patient with a severe skeletal Class III malocclusion using the surgery first approach.

**SUBJECT AND METHOD:** The main complaints of the 29 year old male were an unaesthetic appearance due to severe mandibular prognathism. A 7 mm negative overjet and concave profile were observed on clinical examination. The patient's posterior teeth had been previously extracted in all segments due to caries. Firstly the patient's profile was corrected with a sagittal splint osteotomy. Two weeks post-surgery, it was observed that there was nearly a 2-3 mm relapse in negative overjet. The relapse was treated with fixed orthodontic appliances. After orthodontic treatment, implants were placed for the posterior teeth and the treatment procedure was finished with prosthodontic rehabilitation.

**RESULTS:** Treatment duration was 1 year. The surgery first approach solved the main problem of the patient and the treatment duration was shortened.

**CONCLUSION:** The patient's functional and aesthetic expectations were successfully achieved with surgical, orthodontic and prosthodontic interdisciplinary treatment procedures.

#### CP22 RELATIONSHIP BETWEEN POSTERIOR UNILATERAL CROSSBITE AND FACIAL ASYMMETRY. A CASE REPORT

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**AIMS:** To evaluate the association between a unilateral posterior crossbite and craniomandibular asymmetry and show if early treatment can prevent the development of facial asymmetry.

**MATERIALS AND METHOD:** A literature survey from the Medline database was performed searching for the relationships between a unilateral posterior crossbite and mandibular asymmetry. A clinical case with a unilateral posterior crossbite and functional shift in the mixed dentition is also presented before and after treatment.

**RESULTS:** Self-correction of unilateral posterior crossbite does not occur frequently. A unilateral posterior crossbite produces an asymmetric condylar position, associated with future craniofacial asymmetry

**CONCLUSION:** Several authors have shown that as self-correction does not occur frequently, a delay in treatment is not justified as this increases the possibility of developing craniofacial asymmetry and the chances of more aggressive treatment such as orthognathic surgery. In the presented clinical case the outcome was a right mandibular position, eliminating the functional shift and achieving a functional muscular pattern.

#### CP23 EFFECTS OF RAPID MAXILLARY EXPANSION ON CRANIOFACIAL STRUCTURES USING FINITE ELEMENT ANALYSIS AT DIFFERENT PUBERTAL STAGES

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**AIMS:** To assess the effects of rapid maxillary expansion on craniofacial structures at different pubertal stages using finite element analysis (FEA).

**MATERIALS AND METHOD:** Computed tomographic data obtained of a patient who had transverse maxillary deficiency. The data was transformed into three-dimensional virtual models using Mimics software and prepared for FEA. A tooth-borne Hyrax appliance was designed and mounted on this model. The effects occurring in the craniofacial structures on the virtual model and different ossification of the virtual applications were evaluated.

**RESULTS AND CONCLUSION:** When the suture ossification level increases, displacement of craniofacial structures gradually decreases and Von-Mises stress is gradually increased.

#### CP24 CEPHALOMETRIC EVALUATION OF DENTOFACIAL STRUCTURAL CHANGES IN CHILDREN UNDERGOING SEPTOPLASTY

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**AIMS:** To compare the changes of lateral and posteroanterior cephalometric analysis of children treated with septoplasty.

**MATERIALS AND METHOD:** The archived records of eight orthodontic patients having nasal septum deviation (7 males, 1 female with a mean age of  $10.5 \pm 2.3$  years). Lateral and posteroanterior cephalometric radiographs were taken pre-operatively and after 1 year from septoplasty. Steiner cephalometric analysis on the lateral cephalometric radiographs and Ricketts analysis on the posteroanterior radiographs was performed. The paired *t*-test was used for statistical analysis.

**RESULTS:** There was no statistically significant difference in any measurements of the cephalometric analysis ( $P > 0.05$ ).

**CONCLUSION:** Septoplasty did not directly affect the dentofacial structures in children at the short-term follow-up.

#### CP25 TREATMENT AND ONE-YEAR FOLLOW-UP OF AN ADULT PATIENT WITH A BORDERLINE SKELETAL CLASS III MALOCCLUSION

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**AIMS:** In this case report, the treatment and 1-year follow up of a non-growing patient with skeletal and dental Class III malocclusion and posterior crossbite is presented.

**SUBJECT AND METHOD:** A 16 year-9 month old female patient with the complaint of crowding and mandibular asymmetry. Clinic examination showed a dental Class III malocclusion, local anterior open bite, posterior crossbite and mandibular midline deviation. According to cephalometric analysis, SNA was 79°, SNB 80°, ANB -1° and GoGN/SN 39°. It was noted that chin deviated 3 mm to the right and the patient had

severe facial asymmetry and a narrow maxilla. The treatment plan was fixed orthodontic treatment and orthognathic surgery. As the patient was unwilling to undergo major surgical procedures, it was decided to perform camouflage treatment with rapid maxillary expansion (RME) fixed orthodontic treatment and reduction genioplasty. RME was undertaken with a full acrylic bonded appliance and the patient turned the screw twice a day for 2 weeks. RME protocol along with retention period continued for 7 months. After RME, the lower first premolars were extracted and fixed orthodontic treatment was started. Canine distalization was performed with sectional distalization arches and intermaxillary Class III elastics. Following distalization, a bull loop retraction arch with active lingual root torque used to retract the lower incisors.

RESULTS: The post-treatment lateral cephalometric results were SNA 79.5°, SNB 79°, ANB 0.5° and GoGn/SN 41°. To correct asymmetry of the lower jaw, the patient's chin was relocated 3 mm to the left and upwards with reduction genioplasty. For retention, a lingual retainer was bonded on the lower canines and the patient used Essix appliances. After genioplasty, SNA and SNB angles remained at 79.5 and 79 degrees, respectively, and GoGn/SN angle was reduced to 39 degrees. At the one year follow-up, the dental and skeletal relationships were stable.

CONCLUSION: Although the most ideal treatment results for adult patients with skeletal anomalies are obtained with orthognathic surgery, camouflage treatment can provide satisfactory aesthetic and functional results.

#### CP26 ORTHODONTIC CAMOUFLAGE TREATMENT IN AN ADULT PATIENT WITH A CLASS II DIVISION 1 MALOCCLUSION – A CASE REPORT

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AIMS: To show a non-surgical approach in treating a borderline Class II division 1 malocclusion adult patient.

SUBJECT AND METHOD: Diagnosis was made with on a panorex and cephalograms, study models, and intra- and extraoral photographs. A full mouth fixed edgewise appliance (0.022" slot OPA-K brackets) was used for treatment with a transpalatal arch for anchorage enhancement and vertical control.

RESULTS AND CONCLUSION: Orthodontic camouflage treatment may be an acceptable choice in treating a borderline Class II division 1 malocclusion when the skeletal discrepancy is not severe. When the treatment plan includes premolar extractions, anchorage design and vertical control must be carefully controlled to achieve an ideal treatment outcome. In addition, torque control of the anterior teeth should be taken into consideration.

#### CP27 IMPROVED SUPERELASTIC WIRE FOR TREATMENT OF A CLASS II MALOCCLUSION PATIENT WITH PREMOLAR IMPACTION

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AIMS: A dentoalveolar ankylosed primary tooth sometimes causes impaction of its successor. In this condition, extraction of the ankylosed primary tooth and orthodontic forced eruption of the impacted permanent tooth may be the treatment of choice. This presentation will show the treatment of such a patient.

SUBJECT AND METHOD: A 23 year-old female diagnosed with an Angle Class II malocclusion with the mandibular left second premolar impacted due to ankylosis of the primary tooth. The ankylosed primary tooth was removed then forced eruption of the successor premolar was carried out. Improved superelastic nickel titanium wire (ISW) was selected as main archwire. In order to improve the facial profile, tempoary anchorage devices (TADs) were inserted in the bilateral maxillary molar area in order to preform full arch distalization. After 2 years, orthodontic active treatment finished and the patient began to wear aretainer.

RESULTS: 1. Forced eruption of the impacted premolar was successful. 2. The anterior overjet and overbite reduced and the occlusion improved. 3. The patient's facial profile also improved.

CONCLUSION: In this Angle Class II case with premolar impaction, ISW combined with TADs were effective for forced eruption and full arch distalization. However, long-term follow-up still needed.

#### CP28 MAXILLARY POSTERIOR IMPACTION WITH MINIPLATE ANCHORAGE IN A PATIENT WITH A SEVERE ANTERIOR OPEN BITE

**AIMS:** One of the most difficult malocclusions to treat orthodontically is an anterior open bite (AOB). Intrusion of the molar teeth using traditional orthodontic methods is generally difficult. In adult patients the most effective treatment option requires surgery of the maxilla, mandible or both; 2). One of the other treatment alternative is intrusion of maxillary molar teeth with skeletal anchorage. This report shows the orthodontic management and treatment results of a patient with a Class I skeletal malocclusion and AOB treated through intrusion of posterior teeth with zygomatic miniplates.

**SUBJECT AND METHOD:** A 20 year-old male with the chief complaint of the gap between his upper and lower teeth. His thumb sucking habit ceased at 8 years old. The posterior segments were in a Class I relationship and there was an AOB of 6 mm. The upper and lower incisors were protruded and proclined. Before bonding, two miniplates were inserted surgically in the zygomatic buttress areas. Intrusive force was applied through nickel-titanium closed coils which were checked every four weeks. A transpalatal arch was inserted to avoid buccal tipping of the posterior teeth.

**RESULTS:** Posterior dentoalveolar intrusion was achieved in 8 months. The maxillary posterior teeth were intruded with a force of 300 g on each side. There was no observed radiographic pathology in terms of resorption.

**CONCLUSION:** Skeletal anchorage with miniplates is a reliable and effective method for the treatment of an AOB through intrusion of posterior teeth.

#### CP29 BENEFITS OF EARLY ORTHOGNATHIC SURGERY – A CASE SERIES

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**AIMS:** The use of the ‘surgery-first’ approach to manage combined orthodontic-orthognathic cases is increasingly being demonstrated to achieve stable and successful outcomes. The purpose of this study is to present four cases in which the approach was specifically and successfully used.

**SUBJECTS AND METHOD:** All patients who underwent orthognathic surgery in 2015 prior to the placement of fixed orthodontic appliances were identified. Data was retrospectively analysed to include patient demographics, presenting complaint, diagnosis and surgical movements. All patients were under the care of a single orthodontist and were treated by one of two oral and maxillofacial surgeons. Osteotomies were performed in a standard manner using miniplate fixation, with post-operative steroids and antibiotic therapy, analgesia and hilotherapy mask cooling. Patients were followed up at one, two and four weeks, with subsequent orthodontic review at six weekly intervals.

**RESULTS:** The study sample consisted of one male and three female patients. The mean age was 26.5 years. Three patients underwent a bimaxillary osteotomy to correct a skeletal Class III malocclusion and one had a skeletal Class II malocclusion that was treated with a bilateral sagittal split osteotomy. The reasons for using the surgery-first approach were to avoid the risk of root resorption in a patient who presented with sponastrime dysplasia and concurrent stunted roots, to avoid difficult decompensation, root resorption and pre-surgical orthodontics in a patient with a history of previous lengthy orthodontic treatment, and in the management of two partially dentate patients. There were no immediate surgical complications and the patients achieved a suitable, stable Class I occlusion after their post-operative orthodontic review period.

**CONCLUSION:** The surgery-first approach was specifically indicated and used to successfully treat these cases. However, careful patient selection, treatment planning and continuous communication between the orthodontist and surgeon are essential.

#### CP30 ORTHODONTIC CAMOUFLAGE OF A MILD SKELETAL CLASS III MALOCCLUSION

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**AIMS:** Orthodontic camouflage is defined as performing a less intensive treatment modality in patients with skeletal problems in order to obtain optimal results inside the physiological margins, while retaining the skeletal problem. The aim of this presentation is to show possibility of treatment of mild skeletal disharmony only with orthodontic therapy in patients with mild skeletal Class III malocclusions and an open bite.

**SUBJECT AND METHOD:** An 18 year old patient diagnosed with a skeletal Class III, tete-a-tete incisor relationship and crowding of the upper arch. Since skeletal disharmony was mild, the treatment plan was to perform only dentoalveolar camouflage of the jaw discrepancy (orthodontic compensation of the skeletal malocclusion). Fixed appliances were placed in both arches (SWA Roth 0.22). A protrusion arch in the upper jaw corrected the crowding and the incisors were positioned in mild protrusion (slightly above normal). After the nivelation phase, intermaxillary bands were used to achieve maximum intercuspation. Treatment was finished in 18 months. Retention appliances were placed and since the patient had finished the growth phase no relapse was expected.

**CONCLUSION:** The aim of dentoalveolar camouflage in skeletal Class III is to compensate an unacceptable occlusion caused by skeletal disharmony of the jaws by hypercorrection of anterior teeth. A satisfactory occlusion and soft tissue profile can be achieved (usually by protrusion and retrusion of anterior teeth), while a retaining favourable effect on all orofacial functions.

#### CP31 COMBINED ORTHODONTIC-SURGICAL MANAGEMENT OF A TRANSMIGRATED MANDIBULAR CANINE: A CASE REPORT

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**AIMS:** Transmigration is an unusual phenomenon characterized by migration of an impacted tooth crossing the midline. The canine is the only tooth that can migrate in both arches. The aim of this presentation is to illustrate a rare case of a transmigrated mandibular canine (TMC) successfully treated with combined orthodontic-surgical management.

**SUBJECT AND METHOD:** A 12.9 year old boy in the permanent dentition with a Class II division 1 dental relationship with a right primary canine and impacted TMC in the right lower arch. The panoramic radiograph showed that the TMC was positioned mesio-angularly across the midline, labial to the anterior teeth, with the crown portion between the roots of the left incisors, consistent with type 1 of Mupparapu's classification. The orthodontic-surgical treatment plan included extraction of the primary right canine, TMC surgical exposure and repositioning.

**RESULTS:** A successful aesthetic and functional outcome was achieved through the collaborative efforts of a team composed of orthodontists and oral surgeons. The impacted TMC was correctly repositioned in the dental arch and was normally responsive to vitality testing with minimal gingival recessions.

**CONCLUSION:** The presence of a TMC is one of the most difficult challenges that an orthodontist can meet. Orthodontic treatment is planned on an individual basis. However, when required, the clinical result may be satisfactory with a rewarding outcome for specialists, patient and parents.

#### CP32 THE ROLE OF THE DENTAL ASSISTANT IN PROCEDURES IN CONTEMPORARY DENTAL AND ORTHODONTIC DIAGNOSTICS

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**AIMS:** To present procedures connected with dental case documentation fulfilling, in which the dental assistant has a role to play.

**MATERIALS AND METHOD:** Scientific papers, low publications and the authors' own experience from clinical practice.

**RESULTS:** Presentation of required documentation from the point of view of a dental assistant. How assistants can play a role in collecting diagnostic data and help the practitioner avoid missing elements in the diagnostic process.

**CONCLUSION:** The role of dental assistant in fulfilling of medical documentation is significant and allows the clinician to focus on medical aspect of contact with the patient. It requires knowledge of contemporary legal regulations and guidelines about medical documentation.

#### CP33 CEPHALOMETRIC PARAMETER VALUES: COMPARISON OF PATIENTS WITH ACHONDROPLASIA

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AIMS: To present the cephalometric data collected from a group of patients with achondroplasia

MATERIALS AND METHOD: Eight cephalometric parameters were measured on cephalograms of 18 patients with achondroplasia without a history of orthodontic treatment and analyzed.

RESULTS: The greatest differences between the general norm and measurements in the recent study were observed for N-S-AR angle and N-SP/SP-GN ratio.

CONCLUSION: Cephalometric parameters in achondroplastic patients have values different from others described in the literature.

#### CP34 RAPID MAXILLARY EXPANSION ASSISTED WITH MINISCREWS AND A MODIFIED HAAS EXPANDER IN A SEVERE PROGNATHIC PATIENT – CASE REPORT

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AIMS: To achieve rapid maxillary expansion (RME), assisted with miniscrews and a bone-borne expander, in correcting severe transverse maxillary discrepancy and minimizing dental side effects, avoiding in the future two stage orthognathic surgery, such as surgical assisted rapid palatal expansion (SARPE).

SUBJECT AND METHOD: A 16-year-old female with a concave profile related to severe maxillary constriction with a retrusive maxilla and a protrusive and asymmetric mandible. Dental crowding was mild in both jaws, there was a severe dental Class III, an anterior open bite (AOB) and increased lingual tipping of all lower teeth. Four orthodontic mini-implants were placed in the palate and a precise silicone impression was taken of all maxillary teeth, palate and the collar of all four miniscrews. The expander consisted of a modified Haas with only an acrylic plate well adjusted to the palate, an expansion screw, and four insertion holes for the mini-implants. The activation protocol was twice per day and then changed to once per day after the maxillary suture was opened. One month prior to the expander placement, conventional 0.022 brackets were placed in the lower arch to correct the lingual tipping. Following the activation protocol of twice per day, an occlusal radiograph was taken within two weeks and the maxillary suture was open. Activation was changed to once per day during 3.5 months while following a lower nickel titanium wire sequence of 0.016, 0.016 × 0.022 and 0.019 × 0.025.

RESULTS: There was a slight overcorrection of the maxillary expansion due to possible relapse. The patient's facial aesthetics (middle and lower third) and smile were highly improved with the transverse correction and the AOB was reduced.

CONCLUSION: The skeletal anchorage achieved with mini-implants allows severe transverse corrections with RME in patients after their growth peak, where conventional expansion is harder or impossible to achieve. It also minimizes dental side effects and prevents two-stage orthognathic surgery, avoiding SARPE.

#### CP35 COMBINED ORTHODONTICS AND IMPLANTOLOGY IN AN ADULT PATIENT WITH MANY MISSING TEETH – CASE REPORT

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AIMS: The presentation of combined orthodontics and implantology in an adult with many missing teeth.

SUBJECT AND METHOD: A 40-year old female with the chief complaint of 'many missing teeth' . The patient was concerned about her appearance and the major reason for seeking treatment was to improve her teeth and facial aesthetics. Clinical examination revealed slight hypoplasia of the maxilla (SNA = 76°). The patient was treated with fixed orthodontic appliances in both arches in order to eliminate the dental disorders and prepare for combined implantology and prosthodontics. The orthodontic treatment plan included closing the intradental diastemas and maintenance of space after tooth loss. At the end of treatment the upper incisors were slightly protruded because of the slight maxillary deficiency.

RESULTS: The interdisciplinary treatment allowed the patient to achieve a satisfactory aesthetic smile, a correct occlusion and masticatory function. Extra- and intraoral photographs showed significant aesthetic improvement of the face and teeth.

CONCLUSION: The preparation of the treatment plan before orthodontic therapy involved many specialists from different disciplines of dentistry, which made it possible to achieve the optimal, high level functional and aesthetic success of treatment.

#### CP36 COMBINED ORTHODONTIC-SURGICAL TREATMENT OF CLASS III DENTOFACIAL DEFORMITY – CASE REPORT

AIMS: Presentation of the results of the interdisciplinary treatment using orthodontics and orthognathic surgery.

SUBJECT AND METHOD: A 20-year-old female who required combined surgical-orthodontic correction of a skeletal Class III malocclusion. She complained of an inability to masticate and bite off food. Clinical examination included intra- and extraoral analysis. Cast and cephalometric analysis was performed. The examination revealed a concave profile and an Angle Class III on both sides. Cephalometric measurements were: SNA = 78.2°, SNB = 81°, Wits -9.7 mm, which indicated a skeletal Class III malocclusion. In the upper and lower arch the teeth were crowded. The patient was orthodontically prepared for orthognathic surgery. The first step in the orthodontic treatment was to enlarge maxilla with a quadhelix appliance. The second step required orthodontic preparation in order to align the dental arches and decompensate the anterior teeth. This permits optimal positioning between dental arches after bimaxillary movement. The pre-surgery orthodontics lasted 15 months. In pre-surgery preparation, the casts were made and used in articulation. In the articulator bimaxillary surgery was simulated. The surgical splints were made and used during the bimaxillary osteotomies: a LeFort I osteotomy to advance the maxilla and a bilateral sagittal split ramus osteotomy to set back the mandible. For retention the patient wore a Hawley splint and a retainer in the lower arch.

RESULTS: The post-treatment extraoral photographs showed significant improvement in the facial views. The intraoral photographs revealed a Class I canine and molar relationship on both sides. The Wits was reduced to 2.5 mm.

CONCLUSION: The presented method requires appropriate cooperation between the maxillofacial surgeon and orthodontist to achieve the final success of the treatment.

#### CP37 NON-EXTRACTION TREATMENT OF SEVERE ANTERIOR CROWDING AND MAXILLARY NARROWNESS IN AN ANTERIOR OPEN BITE PATIENT: CASE REPORT

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AIMS: To present the non-extraction treatment of a skeletal Class I anterior open bite patient with severe crowding and maxillary narrowness.

SUBJECT AND METHOD: A 14 year old male patient. Clinical examination revealed a narrow maxilla, unilateral posterior crossbite, V shaped upper arch form and severe anterior crowding. Cephalometric evaluation showed that SNA: was 79 degrees, SNB: 78.5 degrees. UI-PP: 109 degrees, overjet: 6 mm and overbite: -2 mm. Rapid maxillary expansion (RME) treatment was planned initially. A bonded acrylic appliance was cemented and activated one turn a day. A vertical chin cap was also used with the RME appliance to correct the anterior overbite. After the retention period, a 0.018 inch Roth system fixed orthodontic appliance was placed and anterior box elastic were applied with the fixed treatment to strengthening the anterior bite.

RESULTS: At the end of treatment the maxillary transverse deficiency was corrected with the RME appliance. The final cephalometric values were measured as: SNA: 80 degrees, SNB: 79 degrees, UI-PP: 100 degrees. A normal overjet (1.5 mm) and overbite (1 mm) were obtained. Upper anterior crowding was resolved.

CONCLUSION: After 24 months, the occlusion was stable with a Class I canine-molar relationship and aesthetic smile. Two-year post-treatment results were successful and stable for this case.

#### CP38 IMPACTED MAXILLARY CANINE TREATMENT USING COMBINED ORTHODONTIC ARCHWIRE

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AIMS: An impacted tooth is a common finding in oral pathology. It is recommended to start treatment immediately to reduce the possibility of potential complications and injury to otherwise healthy teeth. Treatment of impacted teeth using combined orthodontic archwire for active orthodontic traction to bring the impacted teeth into the dental arch is presented.

SUBJECT AND METHOD: Clinical examination of a 13-year-old patient showed persistent maxillary primary canines. On the panoramic radiograph both maxillary permanent canines were impacted with the crowns

medially positioned. The treatment objectives consisted of bonding a fixed orthodontic appliance followed open surgical exposure and traction to move the impacted teeth into the dental arch with combined orthodontic archwire.

**RESULTS:** The impacted teeth were correctly aligned with the aid of orthodontic traction and surgical assistance, and now the patient possesses the confidence to smile and has enhanced self-esteem. During treatment, no sign of root resorption, vitality impairment, or other damage to the lateral incisors or other teeth was observed. It is important that treatment with a combined archwire results in fewer patient visits to the orthodontist.

**CONCLUSION:** In order to prevent undermining resorption, light forces should be used during orthodontic treatment. The optimum force used in orthodontic treatment with a combined archwire is sufficient to produce tooth movement without tissue damage and with maximum comfort for the patient.

#### CP39 A NOVEL TECHNIQUE FOR REMOVAL OF A SEVERELY IMPACTED TOOTH AND LARGE ASSOCIATED CYST AVOIDING NERVE INJURY AND MANDIBULAR FRACTURE

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**AIMS:** To propose a technique for safe removal of a severely impacted mandibular third molar, associated with a large dentigerous cyst in the mandibular corner region, minimizing the risk of inferior alveolar nerve injury and mandibular fracture.

**SUBJECTS AND METHOD:** A 45 year old healthy female complaining about an unpleasant smell and taste in the mouth and unilateral palpation of a small protuberance in the right side of the face, just below the right corner of the mandible. Clinical examination and panoramic radiograph, followed by restricted field cone beam computed tomography (CBCT), showed a severely impacted third molar, which penetrated the inferior cortical bone of the right mandibular corner, and was associated with a large dentigerous cyst that had resorbed more than 90 per cent of the bone in the region. Two alternatives were proposed to the patient: a) removal of the third molar and the cyst under general anaesthesia, fixation of the jaw using titanium plates and bone augmentation procedures, or b) surgical exposure of the impacted teeth and cyst marsupialization procedures under local anaesthesia, combined with orthodontic traction of the impacted teeth towards the occlusal level to create sufficient bone, and removal of the third molar afterwards.

**RESULTS:** The patient selected the second treatment option, which led to successful bone formation and safe removal of the third molar in a second phase, avoiding inferior alveolar nerve injury and mandibular fracture. Orthodontic traction of the impacted third molar was performed with segmental orthodontic appliances in the right posterior region of the arch, using skeletal anchorage reinforcement. The symptoms gradually alleviated from the first surgery and were eliminated 1.2 years later, when the third molar was removed. Follow-up clinical and CBCT examination 10 months after third molar removal showed good periodontal conditions and adequate bone formation in the mandibular corner area.

**CONCLUSION:** This report describes a safe, conservative approach for the management of severe tooth impaction and bone loss in sensitive regions of the jaws. Proper management minimized the risks of injury to the adjacent tooth and the inferior alveolar nerve, as well as the risk of mandibular fracture.

#### CP40 FOLLOW-UP RESULTS OF A BORDERLINE CLASS III OPEN BITE CASE TREATED BY THE KIM METHOD COMBINED WITH ALTERNATE RAPID MAXILLARY EXPANSION AND CONSTRICTION

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**AIMS:** This case report presents a borderline adult with a skeletal Class III severe anterior open bite (AOB) treated using the modified Kim method combined with the alternate rapid maxillary expansion and constriction (ALT-RAMEC) procedure.

**SUBJECT AND METHOD:** A 16-year-old female with an unaesthetic appearance because of an AOB. In addition to the AOB of 8 mm from molar to molar, transverse maxillary deficiency also existed. She had oral respiration. Lateral and postero-anterior cephalograms, hand-wrist films, panoramic films and orthodontic models were gathered before and after treatment and at a follow-up period of 12 months. ANB was -0.5 degrees, GoGn-SN 28 degrees and lower anterior face height 65.5 mm. The maxillary/mandibular occlusal plane angles were 3 and 19 degrees, respectively before treatment. According to hand-wrist films, skeletal growth maturation was complete. After all third molars were extracted, the maxilla was expanded using a

McNamara type appliance with the ALT-RAMEC procedure, following which fixed orthodontic treatment was started. After levelling and aligning was complete in both arches, 0.016 × 0.022 nickel titanium archwires with an exaggerated Spee were used in the upper arch to correct the maxillary occlusal plane. Bilateral 1/8 inch, 6.5 oz elastics were applied between the upper and lower canines to resolve the posterior space discrepancy by uprighting and slightly intruding the molars. Treatment was ceased after Class I canine and molar relationships and a positive overjet and overbite were achieved. The total treatment time and follow-up period was 20 and 12 months, respectively.

RESULTS: The maxillary transverse deficiency was eliminated. The mandible rotated anteriorly and lower face height decreased. The maxillary occlusal plane angle was corrected by distal tipping and slight intrusion of the upper molars and extrusion of the upper incisors. A positive overbite was obtained. It was observed that results were stable during follow-up period of 12 months.

CONCLUSION: Treatment goals and stable results are obtained with the modified Kim method combined with the ALT-RAMEC procedure in an adult borderline case.

#### CP41 FOLLOW-UP RESULTS OF A CLASS II OPEN BITE CASE WITH MANDIBULAR SKELETAL ASYMMETRY TREATED BY DOUBLE JAW SURGERY

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AIMS: An anterior open bite (AOB) is one of the most difficult malocclusion to treat and maintain stability in orthodontics. The aim of this case report is to present the orthodontic and surgical treatment of an adult patient with skeletal Class II open bite, severe mandibular asymmetry and unaesthetic facial appearance.

SUBJECT AND METHOD: A 20 year old male with the complaints of an AOB, lower facial asymmetry and incompetent bite for mastication. Clinical examination revealed a dolico-facial type with significant sagittal, vertical and transverse discrepancies, while the cephalometric evaluation indicated that he had a severe hyperdivergent skeletal pattern (SNA: 75°, SNB: 70°, ANB: 5°, GoGN/SN: 56°). The mandibular midline did not coincide with the facial midline and the chin was positioned 4 mm to the left side from the facial midline. The treatment objectives were to decrease the maxillary posterior region to control the posterior vertical dimension; to provide mandibular autorotation and to correct the mandibular midline discrepancy. Treatment progress was impaction of the maxilla by LeFort I osteotomy for both autorotation of the mandible and increasing chin projection. After that, mandibular advancement was performed both to arrange the lower facial midline and to establish an overbite and an acceptable facial profile.

RESULTS: The vertical and sagittal discrepancies and mandibular asymmetry were eliminated by double jaw surgery combined with orthodontic treatment. After debonding, cephalometric evaluation showed indicated that ANB was reduced to 4 degrees, GoGn/SN was reduced from 56 to 49.5 degrees and the mandibular midline was coincident with the facial midline. Significant differences were not observed between the post-treatment and 1.5 year follow-up period with respect to post-operative stability.

CONCLUSION: Orthodontic treatment combined with orthognathic surgery in an adult Class II open bite subject is very effective for functional stability and well-established aesthetic results.

#### CP42 THREE-DIMENSIONAL ANALYSIS OF INTRAORAL MAXILLARY PROTRACTION WITH ALTERNATE RAPID MAXILLARY EXPANSION AND CONSTRICTION: A CASE REPORT

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AIMS: Maxillary advancement is simplified if it is combined with expansion. Intra-oral protraction spring (IPS) combined with alternate rapid maxillary expansion and constriction (Alt-RAMEC) is preferred both to eliminate cooperation and to disarticulate the maxilla. The aim of the case report is to show the effects of IPS/Alt-RAMEC using cone beam computed tomography (CBCT).

SUBJECT AND METHOD: An adolescent girl, having a Class III malocclusion combined with maxillary retrusion was treated with IPS/Alt-RAMEC. Alt-RAMEC and IPS took 7 consecutive weeks and 6 months respectively. Then, fixed orthodontic treatment with extraction of the two upper first premolars was undertaken to eliminate the upper arch length discrepancy by 0.018 × 0.025 inch pre-adjusted brackets. Total treatment time was 34 months. Three-dimensional (3D) changes were evaluated by CBCT taken before (T1) and after (T2) orthopaedic therapy, and after fixed orthodontic therapy (T3). 3D surface models of the anatomic region were constructed from T1, T2 and T3 images using 3D modelling software

(Rhinoceros 4.0) and match and quality control software (VRMesh Studio). Cross-sectional images were saved as digital imaging and communications in medicine (DICOM) files and taken to 3D-Doctor program for reconstruction. By interactive segmentation method, Hounsfield values were evaluated and bone tissue was separated. After separation, 3D models were obtained using the 3D-Complex Render technique. 3D models were registered on anterior cranial fossa structures. 3D surfaces were created for all models and loaded into a superimposition program. The initial and registered final models were superimposed, and treatment changes were expressed via colour maps. Changes were compared between the models and non-transparent superimpositions were made. Lateral cephalograms were digitally traced.

**RESULTS:** Outward movement was observed in the anterior and posterior maxillary regions through the inferior border of the zygomatic process. Changes in the anterior/posterior mandibular regions were variable in both magnitude and direction. The surface distance between the left and right condyles was similar to each other. The condyles showed inward change on the anterior surfaces and outward change on the posterior surfaces. The inferior border of mandible showed a positive change. The upper lip and lateral sides of the nasal region showed positive changes; negative changes for the chin and cheeks.

**CONCLUSION:** IPS/Alt-RAMEC affected the naso-maxillary structures.

#### CP43 THREE-DIMENSIONAL EVALUATION OF FACIAL SOFT TISSUE CHANGES AFTER SURGICALLY ASSISTED RAPID MAXILLARY EXPANSION: A CASE REPORT

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**AIMS:** To present the facial soft tissue changes after surgically assisted rapid maxillary expansion (SARME) of a patient.

**SUBJECT AND METHOD:** A 17 year old female whose the main complaint was dental crowding. She had transverse maxillary hypoplasia with a Class I molar relationship. According to the facial midline, there was a maxillary dental midline of approximately 2 mm to the right side and of the mandible 1 mm to the right. Her overjet was -1 mm and overbite -2 mm. The transverse discrepancy was 8 mm. Frontal cephalometric analysis revealed a skeletal maxillary deficiency. SARME and fixed orthodontic treatment were planned for treatment. A tooth-borne distractor (Hyrax) was used for expansion. Three-dimensional (3D) images were acquired via a stereophotogrammetric camera system (3dMDface™). 3D photograph and intraoral scanning data were obtained for the patient before(T0), when expansion was complete (T1) and 14 weeks after expansion (T2). Lateral and frontal cephalometric data were obtained at T0 and T2. Facial morphology at T0, T1 and T2 was calculated and compared.

**RESULTS:** After SARME the transverse discrepancy was eliminated. Skeletal support of the cheeks increased and this situation was reflected in projection of the cheek region. Nasal width, mandibular plane angle and lower face height increased. No evident retroposition of the upper lip was detected.

**CONCLUSION:** SARME is an effective procedure for correcting maxillary transverse deficiency and the soft tissue changes may be beneficial in late adolescents or adult patients.

#### CP44 OUTCOMES AND STABILITY IN A PATIENT WITH AN ANTERIOR OPEN BITE TREATED WITH MINI-IMPLANTS: A CASE REPORT

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**AIMS:** To present outcomes of a patient with an anterior open bite (AOB) treated with mini-implants.

**SUBJECT AND METHOD:** A 17 year-old female with an AOB and protrusive upper and lower incisors. The molar relationship was Class I on the right side and end-to-end Class II on the left side. Her overjet was 3 mm and the open bite was 1.5 mm. Since she had an acceptable incisor display, maxillary intrusion of the posterior teeth without premolar extractions was planned for treatment of the AOB. A mini-implant was inserted between the first molar and second premolar buccally on the right side, while another was inserted palatally on the left side because of lack of space on the buccal side. Rectangular stainless steel archwires were used to prevent bucco-palatal inclination of the upper molars. Class II elastics were also used to correct the Class II molar and canine relationships during the fixed orthodontic therapy.

**RESULTS:** After 17 months, an ideal overjet, overbite and Class I molar relationship were achieved. A positive overbite was maintained at the 18-month post-treatment follow-up.

**CONCLUSION:** Intrusion of the maxillary posterior teeth with buccal or palatal mini-implants provided satisfactory results in a patient with an AOB and adequate anterior dental display.

#### CP45 INTRODUCTION OF AN INTRUSION AND RETRACTION ARCH ON A CASE

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**AIMS:** An anterior bite plane is not preferable in patients with over-erupted anterior teeth as they cause rotation of the mandible and an increase in anterior face length. Intrusion of the lower or upper incisors is the best treatment choice. Reverse arches, bending with intrusive loops and arches can be used for this. There are a limited number of looped arches able to create intrusion of the anterior teeth. Usually they are distorted before creating any effect. Dr Yagci's intrusion arch is a good choice for intrusion of the anterior section and it also allows retraction.

**MATERIALS AND METHOD:** Rectangular steel or TMA wires (0.017 × 0.025 or 0.016 × 0.022 inch) can be used. The arch is placed in a more gingival direction in the anterior section compared to the posterior section so anterior intrusion can be obtained. The placement level should be as much as the intended intrusion amount (3 mm is acceptable). It behaves like an elastic spring through its design. While it provides retraction by its reverse closing loop, it also creates an intrusion of the anterior teeth without harming the teeth and supporting tissues.

**RESULTS:** The anterior section is activated by loops. Retraction forces create a torque on the retracted teeth so the overjet decreases. It may have negative effects on the canine teeth during retraction. This effect can be corrected by tying an elastic chain.

**CONCLUSION:** Advantages; it allows mass intrusion in the anterior region; intrusion will be straighter due to the intrusion loop; root resorption will decrease, minimum pain will occur. It is a multipurpose arch so closing space in the anterior section and intrusion can be obtained at the same time. Effective intrusion can be obtained with lighter forces. Disadvantages: it takes time to prepare and requires skill; the loops can hurt the buccal mucosa; it requires bending to place a straightwire after using the intrusion arch.

#### CP46 CAMOUFLAGE ORTHODONTIC TREATMENT FOR SKELETAL CLASS II WITH AN ANTERIOR OPEN BITE AND FACIAL ASYMMETRY†††

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**AIMS:** Conventional camouflage treatment of an anterior open bite is mainly undertaken by extrusion of the anterior teeth, but there are several limitations especially for skeletal open bite patients.

**SUBJECT AND METHOD:** This case report describes the successful treatment of a 15 year old with mental retardation, a skeletal Class II malocclusion, an open bite and facial asymmetry.

**RESULTS:** By building rapport with the patient, by using skeletal anchorage for molar intrusion, the posterior discrepancy was resolved and autorotation of mandible was induced resulting in flattening of the occlusal plane. After establishing a correct molar key by differential distalization of the maxillary and mandibular dentition, a multiloop edgewise archwire (MEAW) was used in the finishing stage.

**CONCLUSION:** By maintaining the patient's cooperation and oral hygiene, satisfactory results were achieved by applying appropriate force systems for skeletal anchorage and the MEAW. Also, using skeletal anchorage for the active retainer and correcting habitual tongue posture can minimize the relapse tendency.

#### CP47 LONG-TERM PROGNOSIS AND COMPLETE HEALING OF AUTOTRANSPLANTED PREMOLARS TO SUBSTITUTE MISSING MOLARS IN ADULT ORTHODONTIC PATIENTS

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**AIMS:** To illustrate the treatment outcomes and long-term prognosis of autotransplanted premolars to substitute missing molars as a part of orthodontic treatment in adults.

**SUBJECTS AND METHOD:** All three adult had a skeletal Class II malocclusion with crowding and early loss of the mandibular first molar. One of the premolars extracted for orthodontic purposes was replaced as the

missing first molar through autotransplantation. Conventional orthodontic treatment of the transplant was continued after 4-8 weeks of healing. Long-term changes of the transplant were evaluated through serial photographs and radiographs.

**RESULTS:** Orthodontic treatment combined with autotransplantation indicated a stable occlusion with aesthetic improvement. The transplant showed a complete healing pattern with a good long-term prognosis.

**CONCLUSION:** Premolars with complete root form extracted for orthodontic purposes can be a viable donor tooth to replace missing molars when combined with proper orthodontic treatment planning.

#### CP48 CLASS II TREATMENT WITH A GUMMETAL ARCHWIRE: A CASE REPORT

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**AIMS:** Extraction of mandibular teeth is usually considered in a Class II case. Non-extraction approaches to Class II treatment involve either distalization of the maxillary dentition or the use of functional appliances or elastics to achieve a Class I occlusion. The objective of the study was to evaluate the effect of gummetal archwires with elastics in the treatment of a Class II case.

**SUBJECT AND METHOD:** An 11 year 8 month old boy displayed a low angle skeletal pattern, with a severe anterior overbite, overjet and excessive gingival display. After initial levelling, 0.018 × 0.025 gummetal archwires were placed, with anterior triangular elastics engaged in the canine regions and short Class II elastics. Short vertical loops and step bends were incorporated into the gummetal archwires.

**RESULTS:** After 22 months of therapy, correction of the overbite, overjet and Class II molar and canine relationships was achieved. There was a reduction in the overjet and overbite. The excessive gingival display and profile was improved.

**CONCLUSION:** Gummetal archwire is useful to treat severe a Class II malocclusion and excessive gingival display.

#### CP49 CROUZON SYNDROME: A CASE REPORT

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**AIMS:** Crouzon syndrome is characterized by premature synostosis of the coronal and sagittal sutures which begins in the first year of life. Once the sutures become closed, growth potential to those sutures is restricted. However, multiple sutural synostoses frequently extends to premature fusion of the skull base causing midfacial hypoplasia, a shallow orbit, maxillary hypoplasia and occasional upper airway obstruction. This syndrome generally requires LeFort III advancement osteotomies and distraction osteogenesis. The aim of this presentation is to show the treatment of a patient with these characteristics.

**SUBJECTS AND METHOD:** A 15 year old female with Crouzon syndrome who presented with the characteristic triad of cranial deformity, maxillary hypoplasia and exophthalmos. She had midfacial hypoplasia, exophthalmos and a skeletal open bite deformity. She breathed through her mouth because of the upper airway obstruction. The first aim of treatment was to align the teeth in preparation for surgery. Following orthognathic surgical treatment with a LeFort III osteotomy, distraction osteogenesis with a rigid external distraction appliance was planned.

**RESULTS AND CONCLUSION:** Crouzon syndrome generally requires LeFort III advancement osteotomies followed by distraction. Treatment for this patient is ongoing.

#### CP50 A NEW DIGITAL INDIRECT BONDING SOLUTION. TWO CLINICAL CASES

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**AIMS:** The increasing use of straightwire techniques in orthodontics leads practitioners to switch their focus from wire bending to bracket positioning. Hence several techniques for indirect bonding have been developed, the aim of which is to deliver accurate bracket placement with minimal chair time and sufficient bond strength. The aim of this presentation is to illustrate the new 3Shape digital indirect bonding solution using a fully digital workflow, starting from the intraoral scan to the production of transfer trays and their application in patients.

**SUBJECTS AND METHOD:** Two patients with Class I malocclusions and crowded dental arches were treated with fixed appliances. Dental arch intraoral scans of both patients were performed using the Trios 3Shape scanner. The acquired file was immediately sent to the dental laboratory via FTP. Then the technician, in collaboration with the orthodontist, started to define bracket placement with the 3Shape Ortho System. The technician then created a bracket transfer media to make an IDB master model with 'markers' or 'containers' for vacuum press, or to make the design for a directly printed transfer tray.

**RESULTS:** After 3 months of therapy the teeth were moved in the correct way and only one brace encountered bond failure.

**CONCLUSION:** The indirect bonding fully digital workflow by 3Shape combines the benefits of indirect bonding (decreased clinician and patient chair time at bonding, decreased repositioning and detailing requirements, shorter treatment times) with the benefits of digital technology (accuracy, precision, reproducibility, portability, sharing, better communication). A great benefit is inherent in the digital set-up and the immediate visualizations resulting from different brackets positions. Besides this the indirect bonding system permits superimposition of the DICOM data from cone beam computed tomographs to scanned digital models allowing the inclusion of the roots of teeth on the model and thus the ability to recognize precisely the long axis of teeth for individualized bracket position according to correct root alignment into the bone in the three space dimensions.

#### CP51 COMBINED ORTHODONTIC, SURGICALLY ASSISTED RAPID MAXILLARY EXPANSION AND BIMAXILLARY SURGICAL TREATMENT OF A PATIENT WITH FACIAL ASYMMETRY

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**AIMS:** This case report describes the results of orthognathic surgical treatment combined with surgically assisted rapid maxillary expansion (SARME) and bimaxillary surgery [four-piece multisegmental LeFort I and bilateral sagittal splint osteotomy (BSSO)] for an adult with mandibular deviation and a canted occlusal plane.

**SUBJECT AND METHOD:** A 28-year old female referred for assessment of facial appearance, gummy smile and maxillary crowding. Her chief complaints were facial asymmetry and an unaesthetic smile. She had undergone a rhinoplasty. Clinical and radiographic examinations revealed the followings; skeletal Class II (ANB: 9.5° and Wits appraisal: 3.7 mm) with a convex profile, Class II molar and canine relationships, 10.1 mm overjet and 1.8 mm overbite, dolichofacial mandibular morphology (mandibular plane to SN: 54.7°), facial asymmetry, canted occlusal plane, gummy smile and maxillary transverse deficiency. The chin was deviated 4.5 mm toward the right side. Although she had no complaints concerning the temporal mandibular joints and mandibular movements, an alteration was observed in the mandibular condyle and ramus height on the right side. The main treatment modality was to improve dentofacial aesthetic and to obtain optimum functional occlusion. Treatment started with SARME, and then pre-surgical treatment continued with fixed orthodontic treatment. Following pre-surgical orthodontics, she underwent a LeFort I osteotomy and BSSO.

**RESULTS:** The mandible was rotated in a counter clockwise direction and positioned to be compatible with the facial midline. The mandible was also advanced anteriorly. The maxillary segments, especially the upper left segment, were positioned superiorly and the canted occlusal plane was corrected. No avascular complication occurred. The convex profile was improved and Class I canine relationship, a normal overjet, overbite and upper incisor exposure were obtained.

**CONCLUSION:** The combination treatment of SARME and bimaxillary surgery is an effective approach to provide the aesthetic and functional requirements in severe facial asymmetry.

#### CP52 THE THIRD MOLAR AS A RISK FACTOR FOR IMPACTION OF THE SECOND MOLAR

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**AIMS:** To demonstrate the important role of the third molars and their ability of complicating the surrounding soft and hard tissue. One complication could be impaction of the second molars.

**SUBJECT AND METHOD:** A 17 year old girl with skeletal Class I and dental Class II with an impacted lower left second molar. Radiographic and biometric findings were recorded and analyzed. On the panoramic

radiograph the second molar was in the correct position but impacted, with a lack of space for eruption of the second and third molars to the left and with retarded development of the root apices. There was adequate space between the anterior border of the mandibular ramus but the distal end of the mandibular second molar was inadequate.

**RESULTS:** The decision was to perform a germectomy on the lower left third molar and to begin orthodontic treatment. During surgery the germ was extracted and the bone on the second molar was removed to allow an eruptive path. After 8 months the tooth started to erupt on its own without any orthodontic attachments. At 2 months it was fully uncovered and at 3 months it was in occlusion.

**CONCLUSION:** Third molars often results in complications in the surrounding soft tissue, resorption of the second molars or interruption of their eruption path. One of the most critical conditions is disturbance of the eruption of the second molars. It is important to assess the risk of impaction and to attempt early prophylaxis by performing a germectomy of the third molar to allow normal development of the occlusion.

#### CP53 ORTHODONTIC TREATMENT OF AN IMPACTED UPPER CANINE WITH A CLASS III MALOCCLUSION AND MANDIBULAR ASYMMETRY

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**AIMS:** Treatment of adult patients is often complicated because of inability to treat them only orthodontically. A Class III malocclusion is usually treated in association with orthodontics and orthognathic surgery for correction of the occlusion and facial aesthetics. The aim of this presentation is to demonstrate the result of complex orthodontic treatment of an adult patient with surgical exposure of the impacted canine.

**SUBJECT AND METHOD:** A 22-year-old female with a skeletal Class III, normodivergent, with laterodeviation to the left, a crossbite and an upper left impacted canine. After diagnosis and treatment planning, orthodontic treatment commenced with fixed appliances. The primary canine was extracted and sufficient space was freed for the permanent canine. At the same time the crossbite was corrected and the the upper jaw was expanded and protruded in order to correct the skeletal Class III. After improvement of the occlusal contacts, the upper left canine was surgically exposed and moved into the dental arch. Correction of the occlusion and the laterodeviation was accomplished with the assistance of intramaxillary elastics. The cooperation of the patient and the residual growth contributed to the successful correction.

**RESULTS:** At the end of the treatment a functional occlusion, normal overjet and overbite, and adequate intercuspation, with Class I molar and canine relationships and coincident midlines was observed. Mandibular prognathism and asymmetry were eliminated and facial aesthetics were considerably improved.

**CONCLUSION:** When a skeletal problem compromises facial aesthetics, a correct diagnosis and appropriate execution of the treatment plan are determinant factors for successful treatment and long-term stability of the result.

#### CP54 OPEN BITE TREATMENT IN ADULT PATIENTS WITH ORTHODONTIC MINISCREWS

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**AIMS:** An anterior open bite (AOB) in adult patients is one of the most challenging malocclusions for orthodontic treatment. The high incidence of relapse is a major concern. The morphological pattern in AOB is characterized by longer vertical dimensions, an increase in development of the maxillary posterior dento-alveolar structure and a steep mandibular plane. In such cases, molar intrusion would be a good remedy for treatment. It is suggested that an AOB can be reduced successfully with molar intrusion using orthodontic miniscrews without orthognathic surgery. This case report shows the successful treatment and retention of two AOB cases.

**SUBJECTS AND METHOD:** Two females (25 and 27 years of age) who had an open bite, severe high-angle, mild crowding. Orthodontic miniscrews were used for intrusion of the upper molars. One case was accompanied by premolar extraction and the other case was treated without extraction. The mean retention period was 21 months.

**RESULTS:** After 2.5 years of orthodontic treatment, excellent outcomes were achieved. The open bite was completely closed with miniscrews and fixed appliances, which also achieved a normal overjet. A decrease in overbite after the retention period (mean 21 months) was not shown. Pre- and post-treatment,

retention photographs of these patients demonstrated a good occlusion, aesthetically pleasing treatment results and stability

**CONCLUSION:** Intrusion of the maxillary posterior teeth using miniscrews is an effective, non-surgical treatment modality which can reasonably be used to treat an adult open bite.

#### CP55 EFFECTIVE CORRECTION OF A SCISSOR BITE WITH MINISCREWS, DENTAL IMPLANTS, A LINGUAL ARCH, AND OCCLUSAL SPLINT

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**AIMS:** A unilateral scissor bite in the molar segment sometimes causes masticatory dysfunction. A scissor bite also tilts the occlusal plane and may lead to facial asymmetry. Therefore, treatment of a unilateral scissor bite is worthwhile. The aim of this presentation is to show a patient with a unilateral scissor bite treated with an effective method.

**SUBJECT AND METHOD:** A 61 year-old male presenting a unilateral scissor bite with the chief complaint of masticatory dysfunction. The patient exhibited a scissor bite in the right molar segment. Overeruption of the upper and lower posterior teeth was observed on the scissor bite side. The missing first and second molars in the lower left were replaced with dental implants. The overerupted upper and lower right posterior teeth were intruded with miniscrews. A removable lingual arch was set in the lower dental arch with some lateral expansion. Multibrackets were applied in the both jaws. A removable occlusal splint was employed in the lower jaw to raise the bite and release the occlusal contact on the scissor bite side.

**RESULTS:** The scissor bite was corrected and optimal jaw relationships were achieved. The cant of the occlusal plane was also normalized. The subjective masticatory ability of the patient was improved and he was satisfied with the treatment result. The active orthodontic treatment time was 22 months.

**CONCLUSION:** Since the lingual arch was connected to the dental implant, the scissor bite was effectively corrected due to maximum anchorage of the dental implant in combination with miniscrews and an occlusal splint.

#### CP56 CASE REPORT: ANTERIOR TOOTH TORQUE CONTROL IN AN ANGLE CLASS I MALOCCLUSION WITH SPACE DEFICIENCY

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**AIMS:** Torque control is crucial in orthodontic treatment. In the treatment of a skeletal Class I jaw relationship and Angle Class I malocclusion, the ideal way involves four premolar extractions and anterior tooth retraction. During anterior retraction, how to prevent unfavourable tooth movement is important. By means of controlling the crown or root torque, satisfactory results can be achieved.

**SUBJECT AND METHOD:** A 22-year-old Taiwanese female whose chief complaint was crooked teeth. An Angle Class I malocclusion with a 3 mm overbite and 2 mm overjet was noted. Cephalometric analysis showed a skeletal Class I jaw relationship with bimaxillary dentoalveolar protrusion and a hypodivergent facial pattern. The treatment plan involved extraction of four premolars and full mouth fixed appliances. To maintain a Class I molar relationship, a transpalatal arch was used for anchorage control. At the finishing and detailing stage, an anterior root torquing spring over the upper anterior teeth and bilateral lever arms for torque control were used. The total treatment time was 24 months.

**RESULTS:** The changes included anterior tooth retraction and harmonious alignment of the upper and lower arches. A correct overbite and overjet were established. The mandibular plane angle was maintained and the protrusive facial profile was corrected during treatment. The patient was satisfied with the final aesthetics.

**CONCLUSION:** With the correct diagnosis, careful treatment and good anchorage control using different devices, treatment of an Angle Class I malocclusion with space deficiency can result in a satisfactory outcome.

#### CP57 UPRIGHTING MANDIBULAR THIRD MOLARS. TREATMENT PLANS AND BIOMECHANICAL CONSIDERATIONS

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AIMS: The third mandibular molars present, by far, the most eruption problems and therefore are usually extracted. However, the clinical role of the third molars after loss of the first and/or second molars has recently been upgraded. Contemporary biomechanical techniques and devices such as temporary anchorage devices (TADs), have offered orthodontists the ability to move mesially the third molars enabling them to function as adequate occlusal units.

SUBJECTS AND METHOD: Four patients who underwent orthodontic treatment, the goal of which was to upright and move mesially into the extraction sites the third mandibular molars. The first two cases were two adult females with unilaterally extracted mandibular second molars. They were treated with full edgewise appliances in order to achieve mesial parallel movement of the third molars into the second molar sites. The third case was an adolescent male who presented with an ankylosed second mandibular molar. He was treated with extraction of the ankylosed tooth, uprighting and mesial movement of the third molar. The fourth case was an adult female with agenesis of the second mandibular premolars and extracted mandibular second molars. The treatment plan included posterior space closure which was accomplished by anterior movement of the second molars with the aid of TADs.

RESULTS: These cases prove that in situations of extracted posterior teeth the third molars can be used as replacement functional units.

CONCLUSION: The goal of anterior movement and uprighting of third molars can be achieved effectively when the appropriate biomechanics are employed. Nowadays the use of TADs empowers the clinical orthodontist to achieve such treatment objectives.

#### CP58 ORTHODONTIC TREATMENT OF A PATIENT WITH AVULSED MAXILLARY CENTRAL INCISORS. AIMING FOR EXCELLENCE VIA A MULTIDISCIPLINARY APPROACH

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AIMS: To present a multidisciplinary approach for the management of two avulsed upper central incisors.

SUBJECT AND METHOD: An adult female who presented with a Class II division 1 malocclusion and two avulsed upper central incisors after an accident. The treatment plan was to decrease the diastema between the lateral incisors by moving them into the site of the central incisors and to replace the lateral incisors by the canines. Fixed orthodontic edgewise appliances were used and the maxillary teeth were moved to ideal anteroposterior and vertical positions in order to achieve a correct occlusion and appropriate gum line. With the aid of surgical periodontal reconstruction, the supporting tissues were further rearranged in an aesthetic and functional manner. Finally, after tooth whitening, lithium disilicate porcelain veneers were placed on the six maxillary anterior teeth.

RESULTS: The patient was treated with fixed orthodontics followed by periodontal aesthetic crown lengthening and restorative prosthetics in order to achieve an ideal result.

CONCLUSION: In cases of avulsed maxillary incisors the treatment plan must be given great attention due to the high aesthetic importance of this region. If space closure is elected as the ideal treatment a multidisciplinary approach should be adopted in order to accomplish high functional and aesthetic results.

#### CP59 ORTHODONTIC AND ORTHOGNATHIC TREATMENT OF A SKELETAL CLASS III PATIENT – CASE REPORT

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AIMS: To present the orthodontic and bimaxillary surgical treatment adult patient with a skeletal Class III malocclusion.

SUBJECT AND METHOD: A 19-year old male with the chief complaint of a prognathic mandible. On clinical examination, it was observed that the subject had a concave facial profile, a hyperdivergent growth pattern, a dental Class III malocclusion, a posterior crossbite and an anterior open bite. The lateral cephalometric analyses showed a skeletal Class III relationship (ANB:  $-7.5^\circ$ ). The mandibular plane angle was within the normal range (SN/GoGn:  $32^\circ$ ). Based on cephalometric evaluation the maxilla was retruded (SNA:  $85.5^\circ$ , Nperp-A:  $-3.5$ ) and the mandible was protruded (SNB:  $93^\circ$ , Nperp-Pg: 15 mm) according to the cranial base. After these evaluations orthodontic and orthognathic surgery was decided as the treatment

modality. After non-extraction pre-surgical orthodontic preparation, detailed cephalometric and model set-ups were done. As a result of these predictions, 5 mm maxillary advancement with LeFort 1 osteotomy and a 5 mm mandibular setback with bilateral sagittal split osteotomy were performed.

RESULTS: Post-treatment cephalometric evaluation showed that; SNA: 89°, SNB: 90.5°, ANB: -0.5°, NaPerp-A: 1.5 mm, Co-A: 82 mm, NaPerp-Pg: 11 mm and SN/GoGn: 22°. After bimaxillary orthognathic surgery a straight profile, an Angle Class I relationship, a normal overjet and overbite were obtained. As a surgical-orthodontic team, it is preferred to postpone genioplasty until the facial results settle following bimaxillary surgery and this takes approximately 6 to 10 months post-operatively. Although the patient needed an additional genioplasty for symphyseal contouring, he was so satisfied from his surgical result he refused to have a genioplasty.

CONCLUSION: The orthodontic and orthognathic treatment of a skeletal Class III patient was successful.

#### CP60 ORTHODONTIC TREATMENT OF TWIN MESIODENS: TWO CASES

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AIMS: Mesiodens may cause delayed or impaired eruption, displacement, rotation, dilacerations, root resorption, crowding, diastema, cyst formation, infection, or mesiodens pulpitis. Early diagnosis allows early intervention, a more favourable prognosis and minimal complications. Presented here are two cases of bilateral mesiodens treated orthodontically.

SUBJECTS AND METHOD: Twelve and 14 year old boys with the chief complaint of malaligned upper anterior teeth causing an unaesthetic appearance. The first patient was in the permanent dentition with a full complement of teeth in the upper arch and a Class I molar relationship on both sides. He had skeletal pattern characteristics of Class I. In the second patient the right central incisor was impacted and he had a bilateral Class II molar relationship with a skeletal Class II. Panoramic radiograph showed two conical shaped mesidens in the midline with completely formed short roots and no associated root resorption or pathology. The twin mesiodens were extracted and orthodontic treatment was carried out with fixed mechanotherapy.

RESULTS: Acceptable levels of overbite and overjet and Class I molar relationships were achieved. The impacted right maxillary central incisor was successfully aligned into the desired position with no root resorption.

CONCLUSION: Supernumerary teeth, particularly in the maxillary anterior region, may cause delayed or impaired eruption of the permanent teeth resulting in aesthetic concern to the patients and parents. Therefore extractions and orthodontic treatment were applied successfully in a timely manner.

#### CP61 TREATMENT PROGRESS OF A SKELETAL CLASS III SUBJECT FROM ADOLESCENCE THROUGH TO ADULTHOOD: CASE REPORT

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AIMS: In this case report, the treatment progress of a skeletal Class III patient starting from adolescence through to adulthood is presented. A wide range of Class III treatment modalities were performed from rapid maxillary expansion (RME) and mini-maxillary protraction to orthognathic surgery due to an unexpected post-pubertal mandibular attack.

SUBJECTS AND METHOD: The female was 12 years 8 months old when first referred. She was at MP3cap developmental stage. She was a mouth breather with a concave profile. According to maxillary retrusion and mandibular protrusion, the patient was classified as skeletal Class III (SNA: 77.5°; SNB: 82°, ANB: -4.5°) and had SN/GoGn angle of 34.5 degrees. She had Angle Class III molar relationship and a mild anterior and right posterior crossbite. Initially, a banded Hyrax appliance was applied for RME and Class III elastics were used from miniscrews for maxillary protraction. The screws were implanted between the mandibular first premolars and canines. Due to an infection caused by inadequate oral hygiene, the left mandibular screw was lost. Therefore, maxillary protraction was continued with a mini-maxillary protraction device. After achieving a satisfactory overjet and overbite, the maxillary dental arch was aligned with fixed orthodontic appliances and Class III elastics were continued from a mandibular removable appliance. Although the positive overjet was retained, the skeletal Class III relationship relapsed because of an unexpected postpubertal mandibular growth spurt and poor patient cooperation. After relapse of the orthopaedic

treatment and as growth had finished, a LeFort I osteotomy was performed to finalize treatment (pre-surgical measurements: SNA: 77°, SNB: 80°, ANB: -3° and SN/GoGn: 35°).

RESULTS: The post-surgical measurements were SNA: 83 degrees, SNB: 82 degrees, ANB: 1 degree, SN/GoGn: 34.5 degrees. An ideal overjet and overbite, dental and skeletal Class I relationship were obtained with a balanced profile.

CONCLUSION: In the early growth period, a skeletal Class III malocclusion can be treated by orthodontic and orthopaedic appliances. However; if the patient is uncooperative and/or due to a late growth spurt, orthognathic surgery is essential to correct severe skeletal discrepancies.

#### CP62 A MULTIDISCIPLINARY TREATMENT APPROACH FOR A HYPERDIVERGENT PATIENT WITH MULTIPLE TOOTH LOSS

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AIMS: The multidisciplinary treatment of a skeletal Class I patient with a severe hyperdivergent growth pattern is presented. The aim of treatment was to eliminate a severe gummy smile, achieve an acceptable occlusion, a more aesthetic soft tissue profile and to provide sufficient functional ability.

SUBJECT AND METHOD: A 20 year old female referred with the main complaint of tooth loss and chewing dysfunction. As the surgeons were uncomfortable with the extraoral appearance and smile aesthetics of the patient, an orthodontic consultation was sought. According to clinical examination, the patient had a straight-convex profile with an increased lower face height. She also had gummy smile with a hypercontracted mentalis muscle. According to lateral cephalometric analysis, she was classified as skeletal Class I (ANB: 2°; SN/GoGn: 47°). As there was a well aligned maxillary dental arch with many extracted mandibular teeth, no pre-surgical orthodontics was planned. Prior to orthognathic surgery, cephalometric predictions and model set-up were performed. The surgical plan was; LeFort I surgery with maxillary impaction of 7 mm on the right, 8 mm on the left and 3 mm advancement. Three months post-surgery, according to cephalometric and clinical analysis, the patient was skeletal Class I, SN/GoGn angle and vertical dimensions (ANS-Me) were reduced. Six months after surgery, dental implants were placed into the edentulous areas. As a last step of treatment, metal-ceramic crowns over the implants were prepared in order to provide an aesthetic smile with a stabilized occlusion.

RESULTS: The post-surgical cephalometric measurements of the patient were; SNA: 84.5°, SNB: 80°, ANB: 4.5°, SN/GoGn: 39°. An ideal overjet and overbite, dental and skeletal Class I relationship were obtained. The final results showed a dramatic improvement in the patient's smile, profile and frontal view.

CONCLUSION: Patients with severe skeletal and dental problems 'including tooth loss, dysfunctions, malocclusions and aesthetic problems' need multidisciplinary dental care. This type of approach is the key for ideal and stable treatment results.

#### CP63 ORTHODONTIC TREATMENT OF AN ADULT PATIENT WITH AN ANTERIOR CROSSBITE AND FUNCTIONAL SHIFT OF THE MANDIBLE

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AIMS: Adult patients who have an Angle Class III malocclusion and anterior crossbite are generally treated with orthognathic surgery or dental camouflage. As orthognathic surgery is expensive and risky, most patients hesitate to choose this option. However, even in adults with skeletal problems, if an edge-to-edge relationship can be induced at the centric relation (CR) position, which means there is a functional shift, there can be a possibility for successful dental camouflage treatment. This case report presents the non-surgical treatment of an adult with a Class III malocclusion and anterior crossbite using a Class III activator and fixed appliances.

SUBJECT AND METHOD: A 26-year-old female diagnosed with skeletal Class III mandibular protrusion, an anterior crossbite and skeletal and dental asymmetry to the right side. Orthognathic surgery was the treatment plan of choice but the patient refused saying that she was fine about her facial appearance. So the treatment plan was changed to use of a Class III activator and fixed appliances. Although the patient was an adult, a Class III activator was used to eliminate the functional shift of the mandible which was identified by an edge-to-edge relationship at the CR position. After 8 months, the anterior crossbite was

almost corrected with the Class III activator and fixed appliance treatment was initiated. The total treatment period was 32 months.

RESULTS: A normal overbite and overjet of the anterior teeth were established. The results were still stable after 24 months of retention.

CONCLUSION: Adult patients who have an Angle Class III malocclusion and anterior crossbite that can be induced to an edge-to-edge relationship at the CR position can be successfully treated by a Class III activator and fixed appliances as a non-surgical treatment.

#### CP64 ABSOLUTE ANCHORAGE WITH UNIVERSAL T-LOOP MECHANICS FOR DEEP BITE AND MAXILLARY PROTRUSION AND ITS 10-YEAR STABILITY

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AIMS: To present a patient with a severe deep bite and maxillary anterior protrusion who was congenitally missing two mandibular incisors.

SUBJECT AND METHOD: An adult with severe maxillary protrusion and a deep bite who was congenitally missing two mandibular incisors was treated successfully by maximum retraction of the maxillary anterior teeth after extraction of the maxillary first premolars using a moment differential between the anterior and posterior segments created by a universal T-loop. The anterior teeth were moved with controlled tipping, and little anchorage loss of the posterior segments was experienced using the universal T-loop spring. Reduction of the overbite was performed by absolute intrusion of both maxillary and mandibular anterior teeth. With retraction of the maxillary anterior teeth and recontouring of the mandibular canines, a correct overjet and overbite were achieved.

RESULTS AND CONCLUSION: The post-treatment results showed good stability after 10 years. Prevention of extrusion of the posterior teeth by the segmented arch technique and the long retention period with fixed lingual retainers seemed to contribute to this stability.

#### CP65 SURGICALLY COMBINED TREATMENT OF AN IMPACTED INCISOR ASSOCIATED WITH A COMPLEX ODONTOMA

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AIMS: Teeth can be impacted due to insufficient eruption force, root dilaceration, abnormal direction of the path or obstacles. Obstacles that can cause impaction are odontoma or supernumerary teeth. This case report presents a girl with an impacted incisor due to complex odontoma who was treated with surgical and orthodontic treatment.

SUBJECT AND METHOD: A 10 year old girl concerned about an unerupted upper right incisor. Her primary upper right incisor had been extracted two years previously because it had not exfoliated spontaneously. On the panoramic view, impaction of the upper right central incisor was seen with radiopaque material on its eruption path and the eruption path of the upper right canine was abnormal. The teeth were surgically exposed for forced eruption and the complex odontoma was removed at the same time. Forced eruption was undertaken with elastics applied between the impacted teeth and the hook of the labial arch on the lower dentition. To control the direction of the force, three hooks were designed on the labial arch. After exposing the impacted teeth, alignment and detailing was carried out.

RESULTS: The upper right incisor was successfully brought into its right position. The eruption path of the upper right canine was also successfully corrected. The total treatment period was 35 months and the results were acceptable. Side effects such as pulp necrosis or root resorption did not occur during treatment.

#### CP66 CORRELATION OF DENTAL AND POSTURAL SYSTEMS AND MORPHOFUNCTIONAL RESEARCH OF MANDIBULAR MOVEMENTS VIA A KINESIOGRAPH

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AIMS: To provide the precise registration of various movements of the mandible in three planes: sagittal, frontal and horizontal including muscle contraction speed and temporomandibular joint status via Kinesiograph equipment.

SUBJECTS AND METHOD: Two hundred and fifty patients, 18-25 years of age, were examined via the Kinesiograph and optical topography for determination of human body measurements data. Kinesiograms of subjects with a normal occlusion and also various types of malocclusions suggested and introduced (in digital and graphic performance) have previously been obtained.

RESULTS AND CONCLUSION: The parameters obtained during kinesiography coincide with the data received from postural studies. In terms of mandibular maximum lowering and lifting amplitude, by its lateral and protrusive movements, a current postotonic state was estimated. The assessment of occlusion and posture is set simultaneously. The posture graph displaying the cervical, thoracic and lumbosacral areas of the spinal column.

#### CP67 CLOSURE OF AN ALVEOLAR CLEFT BY BONE SEGMENT TRANSPORT USING A MINISCREW SUPPORTED CUSTOM-MADE DISTRACTION DEVICE

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AIMS: This case report describes a miniscrew supported custom-made alveolar distraction device used for alveolar cleft closure and the results of the multidisciplinary treatment.

SUBJECT AND METHOD: An 18 year-old female with a wide unilateral incomplete cleft lip and alveolus. She complained of difficulty in speech and mastication as well as unaesthetic facial appearance and smile. She had rhinoplasty surgery 1 year previously. The upper right incisors were congenitally absent on the cleft side. She had skeletal and dental Class III relationship, a concave profile and circular crossbite. Treatment was started with maxillary expansion and levelling of the lower teeth, and then continued with fixed orthodontic treatment of the upper arch. Two anchor units were prepared using a newly designed miniscrew system (1.6 mm diameter and 9 mm length and racket) that was inserted into the palatal bone. One miniscrew was positioned between the maxillary first molar and second premolar root, and the other between the upper canine and first premolar root 5 mm to the gingival margin on the right side. A half-sectioned Hyrax screw on the upper plaster model and then coupled to the miniscrews. The transport bone segment that included canine and first premolar teeth was mobilized with the surgical procedure. The half-sectioned Hyrax screw was activated a quarter turn twice a day for six weeks. The Hyrax screw was renewed twice during the distraction osteogenesis. After a 3 month consolidation period, a LeFort I osteotomy was performed.

RESULTS: The wide gap was successfully reduced with the newly designed distraction device. A skeletal and dental Class III relationship and crossbite were treated. The total treatment period was 3 years. A full dental arch fixed porcelain prosthesis was selected as a retainer to prevent relapse as well as to improve the aesthetics.

CONCLUSION: The miniscrew supported distraction device is a successful and aesthetic appliance due to the positioning in the palatal region. Multidisciplinary treatment is necessary for adult patients with a severe cleft lip and palate to achieve a correct occlusion and aesthetic outcome.

#### CP68 CASE STUDY OF A PATIENT WITH DI GEORGE SYNDROME UNDER ORTHODONTIC TREATMENT AND SPEECH THERAPY

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AIMS: To present the progress of orthodontic treatment and speech therapy in a boy with Di George syndrome.

SUBJECT AND METHOD: Currently the patient is being treated with an orthodontic trainer for defects in the Class II and for speech therapy.

RESULTS: Despite the frequent recurrent infection characteristics of this syndrome the patient has made significant progress both with the orthodontic treatment and speech therapy.

CONCLUSION: As a result of the trainer and systematic articulatory apparatus exercises increased muscle tone, which along with cognitive therapy contributed to the development of speech.

#### CP69 ORTHODONTIC TREATMENT OF A PATIENT WITH NIJMEGEN SYNDROME

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AIMS: To present a two-year course of orthodontic treatment in a patient with Nijmegen syndrome.

SUBJECT AND METHOD: The patient attended for orthodontic treatment at 15 years of age for his Class II division 1 malocclusion. The patient is under continuous care in the orthodontic, psychiatric and immunology departments. Following consultation it was decided to use a functional removable appliance for treatment.

RESULTS: During treatment an improvement was achieved in the patient's occlusion. Currently, the patient is in retention.

#### CP70 SURGICAL AND ORTHODONTIC TREATMENT OF A DILACERATED IMPACTED PERMANENT CENTRAL INCISOR: A CLINICAL CASE REPORT

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AIMS: Impaction of a maxillary permanent central incisor is rarely reported in dentistry, but its treatment is challenging due to its importance to facial aesthetics. In this case, the impacted incisor was placed into its ideal position by surgical exposure and orthodontic traction.

SUBJECT AND METHOD: A 12 year old male with tooth impaction without a history of medical or dental trauma. The patient had a skeletal and dental Class I malocclusion. Clinical examination showed the presence of all permanent teeth except for the right upper central incisor; the impacted maxillary incisors causing a midline deviation due to drifting of the adjacent teeth. A panoramic radiograph and computed tomograph was taken in order to evaluate the tooth position. It was decided to perform surgical exposure of the impacted tooth and then bond a bracket on the labial surface of the tooth to bring it down to its ideal position. Orthodontic bands were placed on the maxillary first permanent molars. Brackets were bonded on the teeth and a 0.014 inch nickel titanium archwire with an open coil spring in the position of the right central incisor was applied. A modified transpalatal arch which reached anteriorly to the area below the impacted teeth was applied to the lingual sheaths of the molar bands. After the crown of the impacted incisor was surgically exposed, a button was bonded to the exposed incisor. The chain attached to the button was pulled with the support of this modified arch.

RESULTS: The impacted maxillary right permanent central incisor was successfully positioned into its ideal position. An ideal overjet and overbite and resolution of the insufficient space in the maxillary arch was achieved. Ideal facial aesthetics was also achieved.

CONCLUSION: Treatment of an unerupted tooth will depend on its state, position, and presence of sufficient space in the dental arch for it to be accommodated. Impaction of maxillary permanent incisors is not a frequent scenario in dental practice, but its treatment is challenging because of the importance of these teeth in facial aesthetics.

#### CP71 THREE-DIMENSIONAL EVALUATION OF FACIAL ASYMMETRY IN AN ADULT FEMALE ORTHOGNATHIC PATIENT

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AIMS: Three-dimensional (3D) imaging of the facial surface allows improvement in diagnosis, planning the surgical approach and evaluating treatment. The aim of this case report is to demonstrate the post-operative soft tissue changes after orthognathic surgical movement of the underlying hard tissues of a female patient with skeletal facial asymmetry.

SUBJECTS AND METHOD: Clinical examination of the 17 year- old female revealed facial asymmetry in the middle and lower third of the face, with a chin deviation to the right and midline deviation intraorally, a Class I molar relationship on the right and a Class III on the left. She had a skeletal Class III and normal growth type. Interdisciplinary treatment included pre-surgical orthodontics for final editing of the occlusion. According to the appearance of the soft tissues, a bilateral sagittal split osteotomy to rotate the mandible was performed, a LeFort I to incline and advance the maxilla and genioplasty to move the chin part of the mandible. Pre- and post-operative facial surface images were obtained, using

stereophotogrammetry (3dMD system). Each face was mirrored and superimposed on the original, before (T0) and after orthognathic surgery (T1).

RESULTS: The facial soft tissue asymmetry was assessed qualitatively and quantitatively at T0 and T1. The shell to shell differences were measured and the average distances between the observed regions were calculated. A colour deviation map was generated to show shell-shell deviations of the mirrored images. Changes were greatest in the regions where the underlying bones had been moved more. Changes in the nose, cheek and upper lip regions were smaller than those in the lower lip and chin region.

CONCLUSION: In order to correct facial asymmetry in adults and to achieve good aesthetic results, orthognathic surgery in combination with orthodontic treatment is needed. With facial surface images accurate measurements of facial morphology and changes associated with treatment can be obtained. 3D enables objective evaluation of facial morphology before, during and after orthognathic surgery. The main advantage of the method is that it is non-invasiveness.

#### CP72 AN AESTHETIC AND FUNCTIONAL TREATMENT APPROACH IN AN ADULT PATIENT WITH A CLEFT LIP AND PALATE: CASE REPORT

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AIMS: A cleft lip and plate (CLP) is one of the most common congenital malformations that can result in distortion of the dental arches and facial asymmetry. Treatment of this malocclusion requires team work and long-term follow-up. This case report presents the multidisciplinary treatment of an adult patient with CLP.

SUBJECT AND METHOD: A 20-year old male with missing anterior teeth and an abnormal occlusion. Clinical examination showed that he had a prognathic profile and facial asymmetry. Intraoral examination revealed a bilateral Class II canine relationship with a unilateral Class II molar relationship on the left. In this case, the narrow upper arch was expanded with a Hyrax expansion appliance that was turned twice a day for one week and once a day for two weeks by the patient. The expansion appliance was fixed and kept in the mouth for three weeks after the activation period. The appliance was then removed and a temporary fixed prosthesis was made in the same session for the upper arch to avoid relapse. Following orthodontic treatment and the retention periods, the missing teeth were restored with fixed partial dentures by a prosthodontist and the occlusal problems were corrected.

RESULTS: The maxillary expansion obtained with Hyrax appliance was 4-5 mm.

CONCLUSION: Treatment of patients with a CLP requires multidisciplinary team work. In this case, an acceptable occlusion and aesthetic result were achieved at the end of orthodontic and prosthodontic treatment.

#### CP73 ORTHODONTIC TREATMENT IN OSTEOGENESIS IMPERFECTA

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AIMS: To present the process of orthodontic treatment in a girl with osteogenesis imperfecta type III, which is the most severe form of this generalized connective tissue disease.

SUBJECT AND METHOD: A 7 year 6 month old girl with a Class III malocclusion (maxillary retrognathism and mandibular prognathism) and facial appearance. Functional diagnosis revealed a visceral type of swallowing pattern and incorrect tongue posture. Orthodontic treatment commenced with a Fränkel functional appliance to achieve a good anteroposterior position of the incisors in the mixed and early permanent dentition. The treatment process was interrupted several times due to severe bone fractures. In the permanent dentition a straightwire fixed appliance was used. Because of the abnormal dentine associated with dentinogenesis imperfecta, stainless steel crowns with brackets attached on some teeth were used. Careful pre-surgical consultation was indicated with the oral surgeon and paediatrician. The orthodontic treatment plan before surgical intervention was to align and level the dental arches and to establish a good anteroposterior and vertical position of the incisors. A bilateral sagittal split osteotomy was carried out to set back the mandible. With post-surgical orthodontic treatment final detailing of the occlusion was accomplished. To achieve a good and long-term final result implants were planned after extraction of the abnormal teeth.

RESULTS: A skeletal and dental Class I occlusion with a stable overjet and overbite was achieved. The swallowing pattern had already improved with use of the Fränkel appliance.

**CONCLUSION:** Type III is the most severe form of osteogenesis imperfecta in those who survive. There are multiple fractures and growth plate abnormalities that result in progressive limb and spine abnormalities, associated with short stature. Most cases are the result of autosomal dominant inheritance. Eighty one per cent of osteogenesis imperfecta type III patients have dentinogenesis imperfecta. Therefore consultation with a clinical geneticist to determine and understand the type of osteogenesis imperfecta present in a particular patient may be useful. Because of the extreme variability of expression seen in osteogenesis imperfecta each case represents a potentially variable outcome.

**CP74 SEVERE MAXILLOMANDIBULAR SKELETAL DISCREPANCY TREATED ORTHODONTICALLY AND WITH ORTHOGNATHIC SURGERY—A CASE REPORT**

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**AIMS:** Facial asymmetry is a common complaint of patients with maxillofacial deformity. The prevalence of facial asymmetry ranges from 21 to 85 per cent. These patients usually require surgical-orthodontic treatment. With a surgical approach, there may be a major profile improvement.

**SUBJECT AND METHOD:** An 18 year-old Chinese female whose chief complaints were crooked teeth and deviation of the chin point. Treatment was performed in three phases: pre-surgical orthodontic preparation, orthognathic surgery and post-surgical orthodontic treatment. Full mouth fixed appliance therapy was carried out. Teeth 18, 28, 38 and 48 were extracted before treatment. After dental decompensation, an intraoral vertical ramus osteotomy (IVRO) and genioplasty were performed. The post-surgical orthodontic treatment were finishing and detailing. The total treatment course was 1 year 10 months.

**RESULTS:** After treatment, the anterior crossbite and Class III dental relationship were corrected by upper incisor proclination and mandibular posterior movement. The concave profile was improved. Both her occlusion and facial appearance were significantly improved after treatment.

**CONCLUSION:** When patients complain of facial asymmetry and seek treatment, it is important to search for underlying causes. This entails a thorough history, physical examination, and imaging studies. Skeletal, dental and soft tissue components contributing to facial asymmetry should be carefully evaluated. An IVRO offers numerous advantages for treatment of the prognathic patient. These include a lower incidence of damage to the inferior alveolar nerve, technical simplicity, reduced operating time, and the ability to reposition the condyle. Thus, a surgical approach of the jaw using IVRO leads to both morphological and functional improvements.

**CP75 EARLY FUNCTIONAL THERAPY OF HEMIFACIAL MICROSOMIA. THE L.A.1-L.A.2 COMBINED TREATMENT. STABILITY AT A DISTANCE**

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**AIMS:** Pseudo hemimandibular hypoplasia or hemifacial microsomia (HFM) is a type of mandibular hypoplasia that presents a particular mandibular morphology: a condylar-coronoid collapse (ccc) and no soft tissue involment. The objective of this presentation is to introduce a new appliance (L.A.1-L.A.2) for early functional treatment of HFMccc

**MATERIALS AND METHOD:** In the literature different appliances are reported, but protocols and timing for treatment of this pathology are controversial. In this work a new protocol is suggested to treat HFMccc very early (before school age) with two combined appliances: L.A.1 that increases vertical lengthening of the mandibular ramus on the affected side and L.A.2 that allows changes in condylar morphology and creates a new glenoid cavity (which is absent in these deformities).

**RESULTS:** The success of these appliances is shown in the clinical evaluation and radiographic record. After almost 20 months of therapy the asymmetry is corrected. The compliance of patients is low; the appliance is worn only at night. Activation of this functional appliance is during swallowing. Lastly it is very easy to apply and it avoids surgical treatment.

**CONCLUSION:** In HFMccc cases this treatment allows correction of the asymmetry and recreates the function of the temporomandibular joint. A new glenoid cavity, growth of the condyles and changes in the morphology of the coronoid process were observed after therapy.

**CP76 LIMITED ORTHODONTIC TREATMENT IN A FAMILY WITH MYOTONIC DYSTROPHY TYPE II**

**AIMS:** To describe the dental and skeletal patterns and muscular features of the very rare myotonic dystrophy type II in a family and to discuss possible therapeutic strategies.

**SUBJECTS AND METHOD:** Three females from the same family (mother and two daughters) with type II myotonic dystrophy. Besides the medical history and genetic tests, each subject underwent a clinical examination including impression taking, intra- and extraoral photographs and cephalometric analysis.

**RESULTS:** Severe alterations were found the transverse and vertical planes, regardless of the sagittal skeletal pattern. A narrow maxillary arch, incompetent lips, a high angle vertical pattern and weakness of the masticatory muscles was found in the examined patients. These signs, together with the general features of myotonic disorders, greatly influenced treatment planning.

**CONCLUSION:** The findings are fully consistent with the previously reported craniofacial features of patients affected by myotonic disorders and because the disease rules out the possibility of orthognathic surgery, treatment is extremely demanding with limited orthodontic treatment options.

#### CP77 DEVELOPMENT OF AN ALGORITHM FOR AUTOMATION OF AN INDEX FOR SCORING CLEFT LIP AND PALATE OUTCOMES

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**AIMS:** The modified Huddart and Bodenham (MHB) scoring system assesses maxillary arch constriction and surgical outcomes in cleft lip and palate. The aim of this work was to automate the MHB system with three-dimensional (3D) digital models to improve efficiency and reduce random and systematic error resulting in greater reliability of assessments.

**MATERIALS AND METHOD:** An automatic MHB scoring plug-in has been developed in an open 3D development platform, Rhinoceros v5. This comprised a 3D cubic spline curve interpolated to the selected mandibular cusps, a horizontal reference plane best fitted to the mandibular cusps using the least square method, and horizontal and vertical distances subsequently calculated between the maxillary cusps and the mandibular 3D cubic spline curve to automatically calculate MHB scores.

**RESULTS:** Automatic scoring of digital models using the MHB system produced similar results to manual scoring. The automated system facilitated quicker and more reliable outcome assessments by minimizing human errors. By standardising outcome assessment in cleft care, multicentre comparisons for audit and research are simplified allowing centres throughout the world to upload 3D scans of dental study models or intraoral scans of the dental arches for remote scoring. Thereafter, these data can feedback into the global database on orofacial clefting as part of the World Health Organisation's international collaborative research 'Global Burden of Disease' project for craniofacial anomalies.

**CONCLUSION:** The automated system will facilitate quicker and more reliable outcome assessments by minimizing human errors.

#### CP78 ORTHODONTIC-SURGICAL TREATMENT OF A SKELETAL CLASS III MALOCCLUSION WITH FACIAL ASYMMETRY: A CASE REPORT

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**AIMS:** To present the orthodontic-surgical treatment of a patient with a severe skeletal Angle Class III malocclusion and facial asymmetry.

**SUBJECT AND METHOD:** A 16 year old female referred with the main complaint of facial asymmetry and mandibular prognathism. Hearing loss and muscle dysfunction in the cervical region was noted in medical history. The patient developed laterognathia due to unbalanced activity of the cervical region muscles. Pre-treatment evaluation of the lateral cephalometric film showed that SNA was 81 degrees, SNB 93 degrees, ANB -12 degrees, and GoGn/SN 25 degrees. Clinical examination revealed an Angle Class III malocclusion with a -15 mm negative overjet. The skeletal maturation phase of the patient was determined as the Ru level, based on her hand-wrist radiograph. Treatment objectives consisted of combined orthodontic and surgical treatment. For correction of the skeletal Class III and facial asymmetry, tooth levelling, alignment

and decompensation phases were carried out pre-surgically utilizing fixed orthodontic appliances (Edgewise prescription, slot 0.018"). Surgical intervention comprised maxillary advancement of 7 mm and impaction of 3 mm in the left and 1 mm in the right anterior regions. In addition the mandible was set-back 8 mm. In order to treat the asymmetry, maxilla was rotated 2 mm to the right.

RESULTS: A harmonious intermaxillary relationship and functional occlusion with a normal overjet and overbite was obtained post-operatively, and the facial asymmetry was successfully eliminated. Post-operatively, SNA was 85 degrees, SNB 83 degrees, ANB 2 degrees, and GoGn/SN 26 degrees.

CONCLUSION: Although treatment of severe skeletal Class III malocclusions becomes more complicated if combined with facial asymmetry, it is possible to obtain a functional and aesthetic outcome with a correct diagnosis and precise treatment planning. In this case report, orthodontic-surgical treatment was utilized for correcting the skeletal Class III malocclusion and facial asymmetry, providing normal masticatory function and improved facial aesthetics.

#### CP79 TREATMENT OF DENTAL ALVEOLAR ANOMALIES USING MYOFUNCTIONAL APPLIANCES\*\*\*

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AIMS: Dysfunctions such as an atypical sublingual swallow, an unusual positioning of the tongue, oral breathing and other bad habits can cause incorrect development of the teeth and dental arches. The purpose of this presentation is to show that the growth of dental alveolar is directly affected by the proper function of the soft tissues. Since the soft tissues determine the placement of the teeth, they must be taken into consideration, because no further, orthodontic treatment will have consistency unless dysfunctions and bad habits are corrected.

SUBJECTS AND METHOD: Two patients with dysfunctions. The first, aged 10 years, reflected a pseudo-Class III malocclusion, anterior crossbite, negative overjet and overbite and muscular pain in the area of the temporal and masseter muscles. Aetiology: early loss of primary teeth and sublingual swallowing. The treatment should be interceptive, because growth is active and the obstacles should be avoided to allow normal growth. The second patient, aged 17 years, reflected a high overjet and overbite and also light crowding in the anterior mandibular area. Aetiology: mental muscle hyperactivity and lower lip suction habit. Diagnostic Protocol: subjective and objective anamnesis, extra- and intraoral photographs, plaster models, cephalometry, dental pantomographs, examination of orofacial muscles, Gudini and propulsion test, tongue-tie test. Myofunctional appliances of the educator type were used. The patients were instructed to maintain the appliances for 2 hours during the day and all night. The patients were checked once a month.

RESULTS: Analysis made before and after treatment revealed compatibility between the maxilla and mandible in the sagittal, transverse and vertical dimension. Overjet and overbite were improved. Treatment also resulted in a good direction and alignment of the teeth, balance and stabilization of perioral muscles, elimination of habits, correct positioning of the tongue, good functional neutrality and dental intercuspation.

CONCLUSION: The aetiology of malocclusion, correct diagnosis and patient motivation to maintain the appliance correctly makes treatment with myofunctional appliances successful. These appliances effect the removal of obstacles and allow the dentition to be positioned in a neutral zone, achieving normal dental arch development in an ideal individual functional occlusion. These appliances also achieve stability in the permanent dentition.

#### CP80 VITAMIN D RESISTANT RICKETS AND TOOTH DEVELOPMENT

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AIMS: To present the radiographic and intraoral features of a patient with Type I vitamin D resistant rickets and discuss any limitations to treatment.

SUBJECT AND METHOD: A 15 year old male with a Class II division 1 malocclusion. His medical history showed him to have a diagnosis of vitamin D resistant rickets, hypophosphataemia and 1-alpha-hydroxylase deficiency inherited as an autosomal recessive trait from consanguine parents. He has mild thoracic and lumbar scoliosis due to the rickets, microcephaly and delayed general development. His medication is Rocaltrol (a synthetic vitamin D analogue) and calcium supplements.

**RESULTS:** Intra-orally the patient presented with deep striations, pitting and discolouration of the enamel, particularly on the labial surface. Radiographs showed thin irregular enamel which was especially thin in the interproximal regions and very little contrast in mineralisation between the dentine and enamel of the permanent teeth. The first permanent molars showed wide pulp horns. Dental development was delayed with the upper canines and second premolars still erupting. Previous radiographs from the general dentist showed the primary teeth were also severely affected.

**CONCLUSION:** The degree of enamel involvement in vitamin D resistant rickets depends on the onset of the disease, as the crowns of the primary teeth and first permanent molars are completed by 3 years of age and the incisors by 5 years of age. The sensitivity of the teeth, an increased risk of caries and the abnormal enamel contraindicate a bonded appliance. This patient is being treated with reconstruction of the crowns of the most sensitive teeth followed by clear plastic aligners which also facilitates regular oral hygiene prophylaxis.

#### CP81 EARLY TREATMENT OF A CLASS II MALOCCLUSION WITH A MOLAR DISTALIZATION APPLIANCE: A CASE REPORT

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**AIMS:** To present the treatment of a patient with a skeletal Class II malocclusion treated with a fixed position-type upper molar distalization appliance.

**SUBJECT AND METHOD:** A 10-year-old male presented with the chief complaint of second premolar impaction. Clinical examination revealed a straight facial profile, the maxillary right and left first molars were mesially tilted and there was a Class II molar relationship. The treatment goal was to correct the Class II occlusion and to make space for the maxillary second premolars using a molar distalization appliance.

**RESULTS:** After 7 months of therapy, a successful treatment outcome was achieved by correcting the molars to Class I. The maxillary right and left second premolars erupted naturally without any further intervention.

**CONCLUSION:** This case shows that maxillary molar movements can be obtained with molar distalization appliance treatment. Space was created for the permanent teeth, and it is definitely worth attempting in a patient who is in the mixed dentition and has several years until all permanent teeth will erupt.

#### CP82 SURGERY OR ORTHODONTICS: THE FACE AS THE REAL BORDERLINE###

Alessandro Musci, Private Practice, Casamassima, Italy

**AIMS:** To show how the patient's face is the most critical element in the formulation of the treatment plan in orthodontics. Based on the characteristics of the face and on the impact that orthodontic treatment could have on the face, the treatment plan can be set as: non-extraction, extraction or surgical.

**MATERIALS AND METHOD:** A diagnostic checklist of 15 elements has been elaborated to help the clinician in the definition of the type of patient according to four categories: 1) patients for whom orthodontic correction of a malocclusion also implies an improvement of the face; 2) patients for whom orthodontic correction of a malocclusion has no appreciable effect on the face; 3) patients for whom orthodontic correction of a malocclusion contributes to improving some aspects of the face but has a decreasing impact on others (borderline with surgery); 4) patients for whom orthodontic correction of a malocclusion implies/provokes the worsening of the face (surgical patients).

**RESULTS:** This presentation shows four clinical cases as examples of the four categories mentioned above, treated orthodontically (with or without extractions) or surgically according to both the aesthetic needs of the face and the functional requirements of the occlusion.

**CONCLUSION:** In the light of the powerful diagnostic and biomechanical tools available today in orthodontics (skeletal anchorage, low friction, digital planning) the boundary between non-extraction, extraction or surgical orthodontic treatment becomes less closely related to the occlusal features (crowding, molar and canine Class, overbite, overjet). The most significant aim in contemporary orthodontics seems to be the search for the ideal occlusion trying to improve the aesthetics of the lower third of the face. This allows us to define the new limits, which are no longer considered those related to occlusion, and opens up new perspectives in relation to orthodontic treatment aimed at correcting the malocclusion and improving the face.

CP83 A RATIONAL APPROACH TO ORTHODONTICS: REDUCING THE COMPLEXITY OF TREATMENT AND IMPROVING ITS EFFICIENCY BY STARTING FROM THE MIXED DENTITION###

Alessandro Musci, Private Practice, Casamassima, Italy

**AIMS:** To show how a rational approach, based on specific objectives, can make two-stage treatment extremely effective and efficient.

**MATERIALS AND METHOD:** A diagnostic checklist of 15 elements is presented to help the clinician in the definition of the patient in the mixed dentition according to different categories: 1) patients who do not require treatment in the mixed dentition; 2) patients with normal growing features that require treatment in mixed dentition (with or without serial extractions); 3) patients with severely altered growing conditions that require 'early pre-surgical treatment' in the mixed dentition (with or without serial extractions). Four clinical cases are shown characterized by different malocclusions: crowding, biprotrusion, posterior crossbite; crowding, hyperdivergent; crowding, open bite, canine transposition; crowding, upper canine impaction.

**RESULTS:** The occlusal features at the end of therapy in the mixed dentition of the four cases analyzed show more favourable conditions where the second phase of treatment will be limited to achieving better alignment and perfect finishing. The principal issues have been addressed and resolved in the mixed dentition through treatment aimed at achieving specific goals.

**CONCLUSION:** The scientific literature today has established the inefficiency of two phase treatment based on the fact that they are not able to reduce the number of cases that will have to undergo orthognathic surgery or extractions. If the first phase of treatment is set as a facilitation of the second phase, regardless of the fact that this can be non-extraction, extraction or surgical, it is possible to obtain a significant increase in the effectiveness and efficiency of treatments through the use of classical orthodontic tools. A reduction in the time of active treatment associated with an increase in the time of observation and re-evaluation of growth (as recommended by the recent literature) consent to manage the orthodontic problem in a rational and therefore more efficient way. The goal of the first phase of treatment to reduce the percentage of extraction cases or surgery, but to make the second phase of treatment easier.

CP84 TOOTH TRANSPOSITION: CORRECT OR MAINTAIN?

Ioulia-Maria Mylonopoulou, Vasileios Charalampakis, Nikolaos Charalampakis, Private Orthodontic Clinic, Athens, Greece

**AIMS:** Transposition is a dental anomaly manifested by a positional interchange of two adjacent permanent teeth within the same quadrant of the dental arch. The prevalence of transpositions in the general population is 0.4 per cent, and they are more frequently seen in the maxilla, unilaterally, and affecting (in descending order) canines and first premolars, canines and lateral incisors, and lateral and central incisors. Clinical management of transposed teeth comprises different treatment options depending on factors such as dental morphology, occlusion, facial aesthetics, stage of development, alveolar bone width, position of the apices and treatment time. This presentation will show three patients with transpositions treated with different approaches, as well as the factors that were taken into account for each treatment plan.

**SUBJECTS AND METHOD:** Two patients with transpositions in the maxilla (canine-lateral incisor and canine-first premolar) and one in the mandible (canine-lateral incisor). All patients were treated with fixed orthodontic appliances and their treatment was scheduled considering aesthetics and root or periodontal damage.

**RESULTS:** Correction was attempted in two patients due to their age (late mixed dentition) and aesthetic demands. Torque deviation problems were also taken into consideration. The first patient had transposition between 42-43. The canine was impacted buccally so it was considered sufficiently safe to attempt correction. Prolonged total treatment time was the only compromise. The second patient presented with a complete transposition between 23-24. Correction was decided due to aesthetic demands. The third patient had an iatrogenic transposition between 22-23. Maintaining the transposition was chosen for this patient due to her age (adult), risk of excessive tissue damage and lack of gingival display upon smiling.

**CONCLUSION:** Transposition is considered one of the most challenging clinical problems. As presented in these cases, orthodontic correction is possible, but not without risking damage to the supporting and

dental tissues. Alternative options include maintaining the transposition or extracting one of the affected teeth.

#### CP85 AESTHETIC MANAGEMENT OF GINGIVAL MARGINS IN CASES WITH MISSING LATERAL INCISORS AND CANINE SUBSTITUTION

Ioulia-Maria Mylonopoulou, Vasileios Charalampakis, Nikolaos Charalampakis, Private Orthodontic Clinic, Athens, Greece

**AIMS:** To present and describe the orthodontic management of gingival margins in three patients with missing upper lateral incisors.

**SUBJECTS AND METHOD:** Three patients with missing lateral incisors treated with orthodontic space closure and replacement of missing lateral incisors by mesial movement of the canines. To move the canines into the position of the lateral incisors fixed appliances and appropriate biomechanics were utilized. After all posterior teeth were moved mesially, correct axial inclinations were established. Then in order to mimic the lateral incisor size and gingival margins the canines were extruded and reshaped on their mesial, distal, labial, lingual and incisal surfaces. The first premolars now functioning as canines were successfully intruded in order to elevate their gingival margins. After intrusion their crowns were elongated and reshaped by building their labial cusp and by reducing their lingual cusp to simulate maxillary canines. Long-term follow-up of the patients is presented to demonstrate that substitution treatment can achieve superior aesthetic results of functional value.

**RESULTS:** All three patients treated with extrusion and reshaping of canines, intrusion and build-ups of maxillary first premolars had a great aesthetic result similar to the physical full dentition appearance.

**CONCLUSION:** Canine extrusion and premolar intrusion is a viable and rather more preferable option compared to perio-surgery for patients with missing lateral incisors treated with canine substitution, depending on age, occlusion and gingival contours. Careful soft and hard tissue management is of utmost importance.

#### CP86 MAXILLOFACIAL MUSCLE ELECTROMYOGRAPHY DURING FULL TOOTH PRESSURE

Nabi Nabiev, Tatiana Klimova, Anna Rusanova, Natalia Pankratova, Maria Dushenkova, MSMSU, Moscow, Russia

**AIMS:** To determine muscle biopotentials in patients with distal and physiological occlusion.

**SUBJECTS AND METHOD:** Twenty one patients (8-9 years of age) and 23 subjects (16-17 years of age) were examined using the electromyographic method.

**RESULTS:** In our University department comprehensive scientific research is being fulfilled devoted to muscle biopotential evidence in various functional tests. In this present research the discrepancy between two groups in different functional tests was observed.

**CONCLUSION:** When undertaking orthodontic treatment, it is necessary to take into account the biopotential of muscles in patients with different types of occlusion.

#### CP87 MORPHO-FUNCTIONAL DIAGNOSTICS IN PATIENTS WITH DIFFERENT MAXILLOFACIAL AND TEMPOROMANDIBULAR JOINT DYSFUNCTIONS

Nabi Nabiev, Tatiana Klimova, Anna Rusanova, Tatiana Ivanenko, Anna Nikiforova, MSMSU, Moscow, Russia

**AIMS:** To assess various morpho-functional disorders in different body areas according to mandibular movements via diagnostic equipment.

**SUBJECTS AND METHOD:** Three hundred and fifty patients, aged 14-30 years, were examined via the diagnostic equipment (Kinesiograph, Electromyograph, Miostimulator)

**CONCLUSION:** It is necessary to study morpho-functional disorders of maxillo-facial and temporomandibular joint dysfunctions via complex diagnostic methods.

#### CP88 THE CONTRIBUTION OF THE ORTHODONTIST TO THE CORRECTION OF THE NOSTRILS AND COLUMELLA THROUGH GROWTH MODIFICATION

Maria Nasika, Department of Orthodontics, University of Athens, Greece

AIMS: To present the contribution of the orthodontist to the alteration of nostril shape for a patient who had a congenitally missing nostril and to the reconstruction of columella for a second patient who suffered iatrogenic loss.

SUBJECTS AND METHOD: Nasoalveolar moulding is a procedure that is commonly used in many craniofacial centres. This procedure is performed pre-operatively and has a great impact in the cosmetic and functional aspects of the nose and maxilla of cleft lip and palate patients. This technique initially presented by Monasterio (2013) was implemented in two patients. The first was a 3 year old female who presented with right side nostril stenosis due to a congenitally missing 'half nose'. Her treatment focused on expansion of the nostril that was created by a surgeon when she was 1 year old. The second patient was a two-month-old female who lost her columella due to early intubation because of perinatal breathing difficulties.

RESULTS: In treating the first patient a custom fabricated stent was utilized. This stent had the shape of a nose-ring and it was effective in correcting the stenosis. Additionally, it was easily expandable and the expansion direction could be orientated as desired. After successful expansion the stent was substituted with a silicon 'barrel' that was maintained comfortably in position during the daytime. At night the patient used a 'nasal elevator' type of stent. The second patient received a nasal elevator made from a plastic-coated paper clip bent in the desired shape. The tip of this device was covered with steri-strip tape and connected to an orthodontic elastic band secured to the frontal area.

CONCLUSION: The role of the orthodontist in the integrated treatment of patients with nostril shape anomalies can be of substantial significance. The collaboration of an orthodontist, accustomed to performing pre-surgical nasoalveolar moulding, and a surgeon can achieve stable results.

#### CP89 CROUZON SYNDROME – A REPORT OF A COMPLEX INTERDISCIPLINARY TREATMENT CASE

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AIMS: To show the treatment of a patient with Crouzon disease with classical midface hypoplasia and missing teeth in the upper and lower arches.

SUBJECT AND METHOD: Therapy was based on clinical radiographic analysis, cone beam computed tomography and model surgery. Data analysis revealed the need for rapid maxillary expansion and a protraction facemask. Afterwards a conventional bimaxillary operation at the LeFort I level was carried out. After debonding, treatment was completed by replacement of the two missing lower, central and one upper lateral incisors.

RESULTS: Forward displacement of the midface with a stable Class I occlusion was achieved.

CONCLUSION: The presented treatment concept seems to feature desirable results encouraging its use in clinical practice.

#### CP90 CASE REPORT: CROUZON SYNDROME – INTERDISCIPLINARY TREATMENT USING TWO OSTEODISTRACTORS FOR MIDFACE DEVELOPMENT

Tim Noeke<sup>1</sup>, Werner Noeke<sup>1</sup>, Moritz Meyding<sup>1</sup>, Felix Noeke<sup>2</sup>, <sup>1</sup>Private Practise, Meschede, Germany and <sup>2</sup>Danube Private University, Krems, Austria

AIMS: To highlight the interdisciplinary treatment concepts in a patient with Crouzon syndrome. The initial question in these difficult treatment cases is always the decision between conventional surgery at the LeFort I level or distraction of the whole midface using a special screw appliance.

MATERIALS AND METHOD: The therapy was based on clinical radiographic analysis, cone beam computed tomography and model surgery. Data analysis revealed the need for rapid maxillary expansion and a protraction facemask. Afterwards a distraction at the LeFort II level was undertaken.

RESULTS: The distractor enabled advancement of SNA from 80 to 90.7 degrees and led to a significant change in the appearance of the face in the sagittal position. Altogether forward displacement of the midface with a stable Class I occlusion was achieved.

CONCLUSION: The treatment concept seems to feature desirable results encouraging its use in clinical practice.

#### CP91 ORTHOGNATHIC CORRECTION OF SKELETAL ASYMMETRY WITH A CUSTOMIZED LINGUAL APPLIANCE

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**AIMS:** Recently the number of patients interested in undergoing orthognathic surgery for aesthetic and functional purposes has increased. Usually pre- and post-surgical orthodontic treatment are performed with labial appliances. However the patient's aesthetic requirement demands the use of lingual orthodontic appliances instead of the labial approach. Surgery first orthodontics may be an alternative method; not all cases meet the criteria for this type of procedure. Sometimes sufficient decompensation is needed in order to achieve better results. The use of lingual appliances can be one of the solutions to meet the aesthetic desire of the patient.

**SUBJECTS AND METHOD:** This presentation will show the use of customized Incognito™ lingual appliances in orthognathic surgical cases with reports of two 18 year-old females; case 1 diagnosed as a skeletal Class III malocclusion with a prognathic chin and case 2 as a skeletal Class I with facial asymmetry. The treatment modalities were as follows; the two patients were treated with extraction of the two upper first premolars and non-extraction, respectively. The Incognito™ lingual system and orthognathic surgery were used in both cases. The treatment plan was determined on the initial objective which included the amount of anterior decompensation and any other adjustments needed before surgery. The objective was reflected in the set-up model, in that way every correction needed was included in the archwire sequence.

**RESULTS:** Fairly good parallelism of the roots was observed on the panoramic radiographs. Cephalometric analysis showed that the ANB improved, indicating a balanced relationship of the dental bases to each other with pleasing facial profiles. Good retention was observed at 17 and 14 months post-treatment.

**CONCLUSION:** These cases demonstrate that correction of orthodontic problems requiring orthognathic surgery is possible with customized lingual appliances. Lingual appliances in orthognathic surgical cases can be used to achieve the pre-surgical orthodontic goals and maintain aesthetics along with treatment.

#### CP92 LONG-TERM PROGNOSIS OF ORTHODONTIC RETRACTION OF AN AUTOTRANSPLANTED COMPLETE ROOT FORMED PREMOLAR TO REPLACE AN ANKYLOSED MAXILLARY INCISOR

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**AIMS:** To describe the successful treatment and long-term prognosis of an adult with lip protrusion and a previously traumatized maxillary central incisor that had undergone replacement root resorption. An extracted premolar was transplanted into the incisor space and retracted orthodontically.

**SUBJECT AND METHOD:** The patient was diagnosed with skeletal Class I bialveolar protrusion with crowding and replacement resorption of the maxillary left central incisor due to a history of trauma of avulsion and reimplantation. The traumatized incisor was replaced with autotransplantation of one of the extracted premolars. Conventional orthodontic treatment such as space closure and anterior retraction were continued after autotransplantation.

**RESULTS:** The autotransplanted complete root formed premolar indicated an excellent long-term prognosis. The aesthetic outcome and the stability of the overall orthodontic treatment were successful.

**CONCLUSION:** Autotransplantation combined with orthodontic treatment is a viable option to replace a traumatized incisor with replacement root resorption. By recycling a healthy premolar with timely orthodontic tooth movement, an aesthetic smile and a functional occlusion were achieved with an excellent long-term prognosis.

#### CP93 ONE YEAR FOLLOW-UP OF DIFFERENT TREATMENT PROTOCOLS APPLIED TO TRIPLETS WITH CLASS III MALOCCLUSIONS

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**AIMS:** Past studies of population, families and twins have shown that genetic factors play an important role in almost every aspect of craniofacial growth and development. Certain types of malocclusion run in families such as a prognathic mandible. This is a progressive, longitudinal study of the treatment of triplets each with a different orthodontic technique. The opportunity was taken to compare the treatment times,

number of adjustments, results and one-year follow-up when simultaneously treating three non-identical individuals with different Class III treatments.

**SUBJECTS AND METHOD:** Two male and one female triplet siblings with the complaint of mandibular prognathism. The control cephalometric radiograph taken at the initial visit 3 years ago showed all triplets had Class III malocclusions. Two triplets presented maxillary retrusion and all had large mandibles. A further cephalometric radiograph were taken just before fixed orthodontic treatment to evaluate growth. A facemask was used for two siblings who presented maxillary retrusion with extraction of four first premolars for crowding (male) and for bimaxillary profile (female) reasons. T-loops (male) and keyhole loops (female) were used to close the remaining spaces. The other male triplet was treated without any extractions and the upper incisors were proclined with Omega loop arches during treatment. The lower incisors were stripped due to a Bolton discrepancy and retracted. Cephalometric radiographs were renewed at the end of the treatment. One year after orthodontic treatment, the triplets were recalled for a control appointment).

**RESULTS:** The upper and lower incisors were proclined during the control period to camouflage the Class III malocclusion while corpus length increased. Two millimetre forward movement of the maxilla was achieved with facemask treatment. Class I canine relationships were obtained at the end of treatments. Ideal overjets and overbites were established for all triplets. The patients' profiles improved due to forward movement of the upper lip following maxillary protrusion and proclination of the upper incisors. The results achieved with different treatment protocols were maintained during the follow-up period.

**CONCLUSION:** Triplet patients are suitable cases to allow the opportunity for comparison of different treatment protocols.

#### CP94 AUTOGENOUS TOOTH TRANSPLANTATION IN A DENTAL CLASS II PATIENT WITH CONGENITALLY MISSING TEETH

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**AIMS:** Autogenous tooth transplantation is the surgical movement of a tooth from one location to another which is considered as a biological way of managing missing teeth and has many advantages over conventional tooth replacement in growing patients. Although the indications for autotransplantation are restricted, careful patient selection coupled with an appropriate technique can lead to excellent aesthetic and functional results.

**SUBJECT AND METHOD:** A 14 year old female with the chief complaint of crowded teeth. Clinical and radiographic examination revealed a dental Class II malocclusion with congenitally missing lower right and left second premolars. The aim of the treatment was: extraction of the upper second premolars to a correct Class II relationship and autogenic transplantation of the extracted upper teeth in the area of the congenitally missing lower second left and right premolars. The upper right and left second premolars were endodontically treated. Gentle extraction of the endodontically treated teeth was performed under local anaesthesia. The apical third portion of the root was shortened before transplantation. The implantation site was prepared using an implant kit. Cavities of a suitable size were opened in the bone approximating to the roots of the upper premolars. The teeth were fixed with a semi-rigid splint for three months.

**RESULTS:** At the three month follow-up radiographic and clinical examination revealed that the teeth were firm and well encapsulated with healthy bone with pit signs of periodontium inflammation.

**CONCLUSION:** This poster presentation aims to highlight the indications for autogenous tooth transplantation.

#### CP95 COMBINED ORTHODONTIC-SURGICAL TREATMENT OF SKELETAL CLASS III MALOCCLUSION

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**AIMS:** To present the orthodontic and surgical correction of a Class III skeletal malocclusion.

**SUBJECT AND METHOD:** An 18 year old female with an asymmetric face and concave profile. Intraoral examination showed that she had high vestibular 13 with a shifted upper midline to the left by 4 mm, missing 36 and 46, Class III canine relationship with an overbite of +3 mm and an overjet of -4 mm. Cephalometric analysis showed that SNA: 80°; SNB: 85°; ANB: -5°; GOGNSN: 38°; UI/PP:113°; IMPA: 75°. The orthodontic treatment plan included extraction of 15 and 25. Fixed orthodontic treatment followed by

bimaxillary orthognathic surgery (4 mm maxillary advancement , 3 mm mandibular set-back ) was planned. The extraction of 35 was delayed until after surgery.

RESULTS: Treatment lasted 24 months. A Class I molar and canine relationship with an ideal overbite and overjet was achieved. Satisfactory aesthetic results were obtained.

CONCLUSION: Combined orthodontic and bimaxillary orthognathic surgery treatment is an effective approach in severe skeletal Class III malocclusions.

#### CP96 MULTIDISCIPLINARY MANAGEMENT OF A PATIENT WITH MESIODENS

Hatice Kübra Olkun, Gülşilay Sayar Torun, Department of Orthodontics, Istanbul Medipol University, Turkey

AIMS: To present the successful orthodontic and restorative management of a case with mesiodens in the maxillary arch.

SUBJECT AND METHOD: A 45 year old female with the chief complaint of an unaesthetic appearance. Mesiodens was diagnosed in the midline. She had an Angle Class I molar and canine relationship on both sides. The treatment plan was to extract the mesiodens and align the upper and lower arches with fixed orthodontic appliances. After orthodontic treatment the left and right lateral maxillary incisors were restored with composite A fixed retainer was bonded in both arches and debonded after 2 years of active treatment.

RESULTS: An ideal overbite and overjet and a satisfactory aesthetic result was obtained.

CONCLUSION: An aesthetic and functional occlusion can be achieved in adult patients with mesiodens by combining orthodontic treatment with techniques from aesthetic dentistry.

#### CP97 TREATMENT OF A SKELETAL CLASS III PATIENT AND TWO-YEAR FOLLOW-UP

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AIMS: To present the orthodontic camouflage treatment outcomes and 2 year follow up of a patient with a skeletal Class III malocclusion.

SUBJECT AND METHOD: A 15 year-old male whose chief complaint was crowding. According to the clinical examination he had a straight profile, a Class I molar and canine relationship on both sides and a reduced overbite. Arch length discrepancies in the upper and lower arch were -9 mm and -4 mm, respectively. Cephalometric analysis showed that SNA: 80° SNB: 81° ANB: -1° GoGnSN: 37° UI/PP: 107° IMPA: 90°. Fixed orthodontic treatment was planned with the extraction of 1, 2, 34, 44 and the MBT technique was used. The treatment duration was 24 months. Fixed lingual retainers were applied in both arches. In the lower arch, in addition to the fixed lingual retainer, fixed labial retainers were applied between the premolars and canines.

RESULTS: At the end of treatment the crowding was eliminated. Ideal overbite and overjet values and harmonious dentofacial aesthetics were achieved.

CONCLUSION: The skeletal and dental measurement of post-orthodontic treatment and 2 year follow up were compatible.

#### CP98 CAMOUFLAGE TREATMENT OF A SKELETAL CLASS III MALOCCLUSION WITH MBT FIXED APPLIANCES: A CASE REPORT

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AIMS: Skeletal Class III patients can be treated by either orthopaedics, orthodontic camouflage, or orthognathic surgery, depending on the degree of skeletal discrepancy, the skeletal pattern, and the age of the patient. Camouflage orthodontic treatment may be performed in patients with a mild skeletal Class III discrepancy. In this case report the camouflage treatment of a skeletal Class III malocclusion with MBT fixed appliances is presented.

SUBJECT AND METHOD: A 16 year old female whose chief complaint was crowding. Based on evaluation of the lateral cephalogram the following values were obtained: SNA: 72°, SNB: 73°, ANB: -1°, Wits: -8 mm , SN/GoGn: 44°, Mx 1-SN: 102°, IMPA: 85°. Intraoral examination revealed a bilateral Class III molar relationship. The overjet and overbite were 0.5 mm and 0.2 mm, respectively. Considering the findings, non-extraction fixed treatment was planned using 0.018 inch slot, -6 lower incisor torque MBT prescription combined with Class III elastics.

RESULTS: After 12 months, a Class I molar relationship achieved on both sides. Cephalometric analysis showed the following values: SNA 72°, SNB 73°, ANB -1°, Wits: -5 mm, SN/GoGn: 43°, Mx 1-SN: 111°, IMPA: 86°. Overjet and overbite were 2.5 mm and 2 mm, respectively.

CONCLUSION: At the end of treatment, the concavity of the profile reduced. In this case, MBT prescription seems to have an impact in obtaining ideal overjet and overbite values.

#### CP99 TREATMENT OF A SEVERE SKELETAL CLASS III PATIENT WITH EXTERNAL RIGID DISTRACTION AND SAGITTAL SPLIT OSTEOTOMY WITH TWO-STAGE SURGERY

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AIMS: Rigid external distraction (RED) application is often used in syndromes or cleft lip palate patients. This case report presents the successful treatment of a non-syndromic patient with a 23 mm negative overjet before surgery.

SUBJECT AND METHOD: Pre-treatment examination revealed a skeletal Class III malocclusion with a concave profile, a slight mandibular deviation towards the left side and nasal deformity. Intraorally, he had congenitally missing upper laterals and an Angle Class III molar relationship. Pre-operative orthodontic treatment was performed for 11 months. As described by Figueroa *et al.*, a modified headgear facebow, passing from the labial aspects of the maxillary teeth and a palatal archwire were soldered to the molar bands. Maxillary surgery included a high LeFort I osteotomy in combination with an external RED. After a one week latency period, the distraction device was activated 1 mm/day during 11 days. Three months after the consolidation period the patient was prepared for mandibular setback surgery. A sagittal split osteotomy was carried out to set-back the mandible 15 mm.

RESULTS: After active orthodontic treatment, the patient achieved a skeletal Class I relationship with a straight profile. Facial symmetry with symmetric dental midlines was obtained. An ideal overjet and overbite relationship with a normal occlusion was also achieved. Superimposition of the cephalometric tracings showed that the maxilla had been advanced 11 mm without any vertical movement and a 15 mm mandibular set back had been performed with counterclockwise rotation.

CONCLUSION: Although, anterior movement of the maxilla after LeFort 1 osteotomy is limited to 6 to 8 mm in most conditions, the RED could be used in a non-syndromic patient who requires maxillary advancement over limitations.

#### CP100 COMBINED ORTHODONTIC AND ORTHOGNATHIC SURGERY TREATMENT OF A SKELETAL CLASS III CASE: LONG-TERM FOLLOW-UP

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AIMS: Treatment of adult skeletal Class III malocclusions require dentoalveolar compensation or combined orthodontic and surgical procedures. This case report presents the correction of a skeletal Class III malocclusion with orthodontic and orthognathic surgery.

SUBJECT AND METHOD: A 20 year-old female who had a skeletal and dental Class III malocclusion caused by a prognathic mandible. The patient's main complaint was mandibular protrusion and aesthetic disorders. Pre-treatment cephalometric analysis revealed that SNA was 82.5 degrees, SNB 89 degrees, ANB -6.5 degrees and GoGnSN 34.5 degrees. The overjet and overbite were -6.5 mm and 1.5 mm, respectively. Treatment protocol was planned as surgical correction of the deformity, following pre-surgical treatment with fixed orthodontic appliances. During pre-surgical orthodontic treatment, pre-prosthodontic preparation was performed. The surgical procedure for the maxilla included advancement of 3 mm and impaction of 1 mm with a LeFort I osteotomy. For the mandible, set-back of 7 mm was carried out with a sagittal split osteotomy. After debonding, the prosthodontic approaches were achieved and Hawley appliances were used for retention.

RESULTS: At the end of treatment; the Class III malocclusion was eliminated and a Class I molar and canine relationship with an ideal overjet and overbite was obtained. After 2.5 years, the patient was recalled and examined. Clinical and cephalometric evaluation revealed that the pleasing aesthetic results and good functional occlusion was preserved in the retention period.

**CONCLUSION:** Treatment of a Class III malocclusion can be achieved by a combination of orthodontic and surgical procedures. Skeletal deformities and an unaesthetic profile can be improved with a multidisciplinary approach.

**CP101 CLINICAL AND CONE BEAM COMPUTED TOMOGRAPHIC EVALUATION OF CHANGES IN THE MAXILLARY SINUS MEMBRANE FOLLOWING THE USE OF ORTHODONTIC SKELETAL ANCHORAGE DEVICES**  
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**AIMS:** To evaluate the changes of the sinus floor membrane in patients treated with skeletal zygomatic anchorage plates.

**SUBJECTS AND METHOD:** Four patients who needed upper posterior tooth intrusion with excessive vertical growth of the maxillary posterior segments treated with bilateral zygomatic anchorage and acrylic plate appliance combination therapy for the correction of skeletal open bite deformity. Sinus membrane changes and ostium patency before surgery, after two weeks and at the end of orthodontic treatment were analyzed using cone beam computed tomographic images.

**RESULTS:** All patients showed local mucosal thickening at the buccal site of the maxillary sinus two weeks post-surgery. This thickening had decreased at the end of orthodontic treatment. Ostium patency did not change during orthodontic treatment. No signs of sinusitis or obstruction of the ostium were observed.

**CONCLUSION:** During application of bone supported zygomatic anchorage devices, a titanium plate is generally fixed with threads placed at the buccal wall of the maxillary sinus at the zygomatic buttress and the sinus membrane is intentionally perforated during surgery. This perforation may activate a local cellular inflammatory response that may hinder the physiological ciliary activity of the sinus membrane. If the sinus membrane is unable to adapt to these changes created by the threads, mucociliary clearance and sinus drainage may be impaired. Within the limitations of this pilot study, it can be concluded that threads which penetrated into the maxillary sinus, influence sinus membrane thickness following surgery. The sinus membrane seems to adapt to these local changes over time, without showing any pathological conditions such as sinusitis. Thus the zygomatic anchorage plate system, used for skeletal anchorage in orthodontic treatment, is a reliable method in terms of maxillary sinus health.

**CP102 RISK MANAGEMENT AFTER ORTHOGNATHIC SURGERY – FROM THE ORTHODONTIST’S VIEW\*\*\***  
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**AIMS:** To identify and systemize post-operative risks and problems of orthognathic surgery to define the role of the orthodontist in these cases.

**MATERIALS AND METHOD:** Up to 80 cases of orthognathic surgery are treated in the authors’ office per annum. Sometimes post-operative problems appear to be evaluated and treated. Is it possible to systemize these risks in a qualitative way and to define the special roles of the orthodontist and the surgeon? A matrix was constructed with added primary and secondary classification.

**RESULTS:** The matrix of risk management relating to orthognathic surgery is a tripartition one: only orthodontic, combined orthodontic-surgical and only surgical intervention. The theoretical view identified the orthodontist as the gatekeeper to initiate suitable interventions for the patients. The communication among orthodontist and surgeon is the pre-condition.

**CONCLUSION:** In a former survey the part of the orthodontist was verified as the patient’s essential contact in combined therapy. A systematic look at post-surgical risk management proves this role.

**CP103 PROTRACTION FACEMASK THERAPY IN A PATIENT WITH OLIGODONTIA AND A CLASS III WITH MAXILLARY DEFICIENCY: A CASE REPORT**  
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**AIMS:** Oligodontia is the congenital absence of six or more permanent teeth, excluding third molars. It is usually manifested in the incisor-premolar region of the arch. Beside intraarch problems, it also creates alveolar bone reduction with interarch discrepancy such as anterior and posterior crossbite, a Class III

molar relationship and vertical problems. The aim of this study is to present early Class III treatment in a patient with oligodontia and maxillary deficiency.

**SUBJECT AND METHOD:** In 9 year old boy detailed clinical and radiographic examination showed oligodontia with the absence of the upper lateral incisors, second premolars, second molars and lower left second molar, with an anterior crossbite, a deep overbite and delayed eruption of the upper first permanent molars. Cephalometric examination revealed decreased SNA and SNB angles with an ANB angle of  $-2$  degrees, anteinclination of the maxilla and retrusion of the upper incisors. Profile evaluation indicated a concave profile with flattening of the infraorbital rim and nose area. It was decided to use protraction facemask therapy to improve the sagittal position of the maxilla and skeletal jaw relationship. A metallic banded appliance was cemented on the upper primary canines and primary second molars. A force of 300 g per side was used and the patient was instructed to wear the mask for 12 hours a day.

**RESULTS:** After 9 months of treatment, with good patient cooperation, the anterior crossbite was corrected and a positive overjet obtained. The patient continued to wear the mask for a further month during the retention period. Cephalometric examination showed increased SNA and ANB angles. Profile changes were observed with an improvement in the midface.

**CONCLUSION:** Early diagnosis and treatment in patients with oligodontia and skeletal discrepancies prevents further skeletal and dental problems in the permanent dentition and a good base for better prosthetic management in the future.

#### CP104 TREATMENT OF A PATIENT WITH A CLASS III MALOCCLUSION WITH ANTERIOR AND POSTERIOR CROSSBITES: A CASE REPORT

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**AIMS:** A Class III malocclusion is associated with a deviation in the sagittal relationship of the jaws. There are a number of options to treat Class III patients. Camouflage orthodontic treatment is suitable for those who refuse surgery. This case report describes the orthodontic treatment of an adolescent patient with a skeletal Class III malocclusion and an anterior and posterior crossbite.

**SUBJECT AND METHOD:** A 13 year 5 month old subject presenting with a straight facial profile, a severe skeletal and dental Class III relationship, anterior and posterior crossbite and impacted upper canines. The patient was informed about surgery which he refused and was therefore treated with camouflage orthodontics supplemented by extraction of the lower first premolars. The Class III malocclusion was corrected with a rapid palatal expander followed by extraction orthodontic treatment with fixed appliances, combined with short Class III elastics.

**RESULTS:** At the end of treatment, a Class I molar relationship was obtained with an ideal overjet and overbite. Excellent intercuspation was achieved. Following treatment of the impacted canines, a Class I canine relationship was achieved. The profile was improved.

**CONCLUSION:** When treating Class III borderline cases, the patient's opinion about the treatment plan and the patient's demands become very important. Although more aesthetic results can be obtained with surgery, camouflage orthodontic treatment can be used and can make a patient satisfied with the results.

#### CP105 VIRTUAL TREATMENT PLANNING AND MONITORING TREATMENT IN THREE DIMENSIONS: A CASE REPORT

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**AIMS:** To describe the advantages of virtual treatment planning using a three-dimensional (3D) digital set-up in a patient with multiple agenesis, non-syndromic oligodontia, microdontia of the upper lateral incisors and barrel shaped upper central incisors. To monitor treatment, superimposition of 3D digital models was also performed.

**SUBJECT AND METHOD:** An 18 year old female diagnosed at an early age with oligodontia. A follow-up was performed during the transition from the primary to the permanent teeth, waiting for a suitable age to place implants. Bibliographical research was conducted using the following keywords: oligodontia, Mesh terms 'bicanine' and 'anodontia'. It provided six useful articles of case reports. Plaster models were obtained prior to treatment to perform a digital set-up and during treatment to monitor changes. These models were digitized using a 3D laser scanner and Stl files were imported into specialized software. Two

different set-ups were performed to decide whether to close or to open spaces. To visualize treatment changes, the palatal rugae and the medial palatal raphe were used for superimposition of digital models.

**RESULTS:** Digital set-up facilitates diagnosis and taking decisions on the most suitable treatment option. The treatment plan chosen was to distribute the remaining spaces and to replace the missing first premolars and mandibular incisors. At the end of orthodontic treatment, improved aesthetics of the anterior segment will be achieved with cosmetic dentistry.

**CONCLUSION:** A digital 3D set-up offers advantages in diagnosis and treatment planning of complex cases as it permits visualization of several treatment options. Digital model superimposition is a useful tool in assessing tooth movements in three dimensions.

#### CP106 HORIZONTAL TOOTH FRACTURE AND ORTHODONTIC MOVEMENT: CASE REPORT AND LITERATURE REVIEW

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**AIMS:** To report a maxillary central incisor with an horizontal root fracture, in the coronal third of the root, which healed and was moved orthodontically 10 years after the trauma. This presentation will describe the clinical case and literature review about orthodontic movement of root-fractured teeth.

**SUBJECT AND METHOD:** An 18-year-old female with a request to align her teeth. On radiographic examination, a root fracture was observed in the left maxillary central incisor without symptoms. The patient's medical history was unremarkable, but anamnesis revealed a history of trauma 10 years previously. Mobility and pulp testing were normal. Orthodontic treatment was started.

**RESULTS:** Radiographs, every two months, showed that the coronal fragment was moved together with the apical fragment. The mobility of the tooth was within normal limits after six months.

**CONCLUSION:** A horizontal root fracture following trauma should not be considered as an indication for extraction. This case report and the results of previous reports, suggests that significant orthodontic movement might be possible without adverse pulpal effects with a horizontal fracture.

#### CP107 DISTAL MOVEMENT OF THE PERMANENT MAXILLARY MOLARS

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**AIMS:** To create conditions for the movement of the permanent maxillary molars in a distal direction, to provide details of the correct loads on the maxillary permanent molars and to reduce the time of orthodontic treatment for patients with distal occlusion.

**MATERIALS AND METHOD:** Effective distal force generates the screw (Vector 80 maximum), which is installed on the vestibular side of the orthodontic crowns of the first and second molars. To create additional support, the orthodontic crowns on the first and the second premolars and first molars were soldered together using silver-palladium solder. During expansion of the screw between the first and second molars there is a directing force, that affects the second maxillary molar, moving it in a distal direction on account of the additional support of the crown soldered together between the first and second premolars and first molar. As the effect on the maxillary second molar made of 'hard' structure, movement of the second molar occurred.

**RESULTS:** One turn of the screw provides an expansion space between the first and second molars of 0.1 mm. The screw is activated at night until pressure is felt. Within 7 days the distance between the teeth is 0.7-1.1 mm. After using the device for 1 month the distance between the first and second molars is 1.4-4.4 mm. The screw is activated for 1-2 months to achieve the necessary result. Following removal of the device fixed orthodontic treatment is commenced. This method should be used in the permanent dentition when the permanent premolars and molars have erupted.

**CONCLUSION:** The proposed method allows, in a short period of time, the creation of space in the distal part of upper dentition for subsequent displacement of posterior teeth, canines and oral displacement of anterior teeth, thus reducing orthodontic treatment time for patients with distal occlusion.

#### CP108 ALVEOLAR BONE DISTRACTION USING TEMPORARY SKELETAL ORTHODONTIC ANCHORAGE ASSOCIATED WITH AN ORTHODONTIC DEVICE

**AIMS:** Sagittal and vertical alveolar bone insufficiency due to traumatic loss of the upper anterior teeth is a clinical challenge. In addition to aesthetic problem (insufficient lip support), dental prosthetic rehabilitation is often difficult or impossible without an internal osseous distractor combined with interpositional bone grafting. However, definitive results in the vertical dimension are often impaired by bone resorption and keratinized alveolar mucosa insufficiency. The aim of this presentation is to report an original technique, allowing sagittal and vertical alveolar bone distraction,

**SUBJECT AND METHOD:** A 27 year old female, who presented a severe anterior alveolar bone defect in the upper jaw, consecutive to the loss of six teeth after a major car accident. This technique relies on modified miniplates, used as a temporary skeletal orthodontic anchorage, associated with an orthodontic Hyrax® device. The Hyrax® device, attached to four teeth, is modified by adding lateral tubes parallel to the vector distraction. Two metallic rods, 0.6 mm in diameter, were inserted in these tubes and connected to the skeletal anchorage during surgery. One week after the osteotomy, distraction started twice a day at a rate of 0.25 mm per activation during two weeks. Osseous consolidation was allowed for 6 weeks, at which time the two temporary skeletal anchorage devices (TSAD) were removed. After four months of consolidation, final rehabilitation was undertaken with a prosthesis replacing the missing teeth and stabilized by four implants.

**RESULTS AND CONCLUSION:** Despite a few inconveniences, such as the need for a second surgery (under local anaesthesia) to remove the TSAD, this technique has many advantages compared to a traditional TSAD or internal osseous distractor: 1. The possibility to adjust the direction of activation sagittally and/or vertically by bending of the connected rods; 2. no large periosteal flap required; 3. lower cost of the device compared to an internal osseous distractor; 4. oral hygiene easily maintained.

#### CP109 EFFECT OF THE RBJ STIMULATOR ON MAXILLARY ARCH DIMENSIONS IN NEWBORNS WITH COMPLETE BILATERAL CLEFT LIP AND PALATE

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**AIMS:** To present the procedure of RBJ palatal stimulator production and its effects in a newborn male with a bilateral cleft lip and palate (BCLP).

**SUBJECT AND METHOD:** The first RBJ stimulator is produced 24 hours after birth and then weekly in succession. Cast taking is an important phase in stimulator production and is carried out without any anaesthesia. The maxillary arch dimensions in a newborn with a complete BCLP treated with a RBJ stimulator prior to and after lip closure were measured and the significance of the RBJ stimulator in the treatment of anatomical defects of the hard and soft palate were determined. The effects of the RBJ stimulator were evaluated on serially obtained maxillary casts. Measurement of intraoral casts was performed, and statistical analyses were used to compare the differences between measurements pre- and post-therapy.

**RESULTS:** There was a significant reduction of the premaxillary protrusion and deviation and also of the width of the large cleft.

**CONCLUSION:** The RBJ stimulator has significant advantages in the treatment of a BCLP. The RBJ stimulator forces the protruded premaxillary segment into alignment with the dentoalveolar segments, improving the shape of the maxillary arch. As a result, the stimulator helps decrease the complexity of subsequent surgery.

#### CP110 ORTHODONTIC EFFECTS OF THE RBJ STIMULATOR ON CLEFT SIZE IN A NEWBORN WITH A UNILATERAL CLEFT LIP AND PALATE

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AIMS: To present the effect of orthodontic activity of a RBJ stimulator used in the early orthodontic treatment of a female newborn with a unilateral cleft lip and palate (UCLP). The effect that occurred during therapy was studied by monitoring changes in the three-dimensional structure of the damaged upper jaw.

SUBJECT AND METHOD: Consecutive palatal impressions were taken of the female immediately after birth and 1, 3 and 6 months before cheiloplasty and 6 months after cheiloplasty. Using the CEREC 3D in Lab Stack System (Sirona Dental System, Germany) the palatal casts were measured and compared three-dimensionally.

RESULTS: The cleft width decreased significantly during therapy.

CONCLUSION: Positive effects of an orthodontic RBJ stimulator on the size of the cleft in a newborn with UCLP occurs as a result of the screw activation included in the RBJ stimulator and selective grinding of the acrylic stimulator. Highly accurate impressions of the upper damaged jaw are a prerequisite of the orthodontic action of RBJ stimulator.

#### CP111 EARLY TREATMENT OF A UNILATERAL POSTERIOR CROSSBITE – A THREE-DIMENSIONAL EVALUATION

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AIMS: This case report shows the orthodontic treatment of a unilateral posterior crossbite in the primary dentition using three-dimensional (3D) diagnostics.

SUBJECT AND METHOD: A 5-year-old girl with a unilateral posterior crossbite on the left side is presented. She had a persistent thumb sucking habit and an incorrect tongue posture. There was facial asymmetry in the lower third of the face, an intraoral midline deviation and a crossbite of all the primary teeth on the right side, except for the central primary incisor, together with a transverse discrepancy of 3 mm diagnosed by study cast analysis. Palatal expansion with rapid maxillary expansion (RME) was performed and a Delaire protraction mask was worn 16 hours a day. The expander was activated one turn a day (0.20 mm per turn) for 35 consecutive days to achieve an overcorrection on both sides of the arch. 3D facial images were acquired using non-invasive 3D stereophotogrammetric cameras and the facial appearance and soft tissue analysis were assessed quantitatively and qualitatively, before treatment (T0), after orthopaedic expansion (T1) and at the 12 months follow-up (T2).

RESULTS: Maxillary expansion was achieved after 35 days (T1) and the posterior crossbite was overcorrected with reference to the posterior transverse interarch relationship. The same appliance was maintained in place as a retainer during the retention period of 6 months and then removed. A modified Fränkel functional regulator III appliance was used for retention after T2. 3D images were repeated at T1 and T2 and compared to images taken at T0. The result was an improvement of facial symmetry of the lower part of the face and there was no more mandibular shift present.

CONCLUSION: Early treatment of a unilateral posterior crossbite in the primary dentition is necessary to create conditions for normal occlusal and facial development.

#### CP112 ORTHODONTIC PREPARATION FOR ORTHOGNATHIC SURGERY

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AIMS: To describe cases in which the goals of treatment are impossible to achieve by orthodontics alone. The orthodontic preparation for surgery that is different from orthodontic correction alone are analysed.

MATERIALS AND METHOD: The treatment may be divided into four stages: 1) Treatment planning; 2) Pre-surgical orthodontics; 3) Surgical treatment; 4) Post-surgical orthodontics

RESULTS: Orthodontic camouflage might not be a reasonable treatment alternative for some patients.

CONCLUSION: Successful treatment of patients who are candidates for surgery requires close cooperation between the orthodontist and surgeon.

#### CP113 COMBINED ORTHODONTIC AND SURGICAL TREATMENT OF A PATIENT WITH A SKELETAL CLASS III MALOCCLUSION: A CASE REPORT

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AIMS: To present the results of combined orthodontic-surgical treatment of a patient with a skeletal Class III malocclusion.

SUBJECT AND METHOD: A 22 year old female with the chief complaint of a prognathic mandible, an unaesthetic smile and speech impairment. She had a concave facial profile, a bilateral crossbite and a severe narrow skeletal maxilla with a Class III malocclusion and a negative overjet. The upper left canine had previously been extracted. Primarily, surgically assisted rapid maxillary expansion (SARME) with a banded type hyrax appliance was performed. After 4 months retention, fixed orthodontic treatment was started. A deeply impacted right maxillary canine was extracted during the pre-surgical orthodontic decompensation stage. The maxilla was advanced 5 mm with the LeFort I downfracture technique.

RESULTS: After 3 years of treatment, a straight and aesthetic profile with an ideal occlusion were achieved.

CONCLUSION: Combined orthodontic-surgical treatment of a skeletal Class III patient resulted in a good occlusion and aesthetically pleasing results.

#### CP114 TREATMENT OF A SEVERE ANTERIOR OPEN BITE IN AN ADOLESCENT PATIENT USING MINISCREWS AS SKELETAL ANCHORAGE: CASE REPORT†††

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AIMS: To show the successful treatment of a severe anterior open bite (AOB) using miniscrew anchorage.

SUBJECT AND METHOD: A male, 14 years of age, presented with a symmetrical frontal facial appearance, increased anterior face height, a convex profile and incompetent lips. Nonetheless he had transverse maxillary deficiency. The treatment objectives were to correct the AOB with a modified bonded rapid maxillary expansion (RME) appliance in which a Hyrax screw was cemented and miniscrews. Four titanium miniscrews were implanted bilaterally in the maxillary arch between the second premolar and first molar and between the first and second premolars. An intrusion force was applied with nickel titanium closed coil springs over the modified RME appliance for 6 months.

RESULTS: After an active treatment period of 8 months, the maxillary posterior teeth were intruded about 4 mm each and the severe AOB was successfully treated.

CONCLUSION: Miniscrews are very useful in the non-surgical management of adolescent AOB cases.

#### CP115 CRANIOMANDIBULAR DYSFUNCTION THERAPY IN ADDITION TO ORTHODONTIC TREATMENT WITH THE ANDRESEN ACTIVATOR: AN ALTERNATIVE FOR ALL PATIENTS

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AIMS: The orthodontists will be challenged to treat adult patients who not only have malocclusions, but also have other dental problems that complicate the treatment plan. These patients will require interdisciplinary treatment often involving craniomandibular dysfunction (CMD) therapy in addition to orthodontic treatment. How to manage these types of problems with a functional appliance taking the Andresen activator as the alternative appliance with more results will be illustrated.

MATERIALS AND METHOD: CMD is one of the most frequent aetiological factors of malocclusion today. An important goal of functional therapy is the elimination of environmental influences. The Andresen activator leads to stabilized function transferring forces on the facial skeletal components depending on the variation of the construction bite when the appliance is in continuous use of 10 hours at night for a minimum 8 months of treatment.

RESULTS: The activator will produce a neuro-muscular-reflex getting all oro-facial muscles at isotonic and isometric harmony changing its original equilibrium being capable of postural and head adjustments. will work with force application and has an orthopaedic efficacy transferring forces on the facial skeletal components, alveolar process and temporomandibular joint as well, while the mandible is forced in a forward position the time the appliance stays in the mouth (Wolff). Getting functional adaptation (Roux) in all teeth and condylar remodelling.

CONCLUSION: The patient himself has to apply the force of muscles in order for the activator to become active in a way that changes the bite relationship applying muscle forces structure that will be altered. When Andresen introduced the activator almost a century ago it was at that time one of the methods of prevention for malocclusions in Europe now it is also for CMD because the help of the construction bite that will moved out of the fossa the mandible in order to let the cartilage structure of the discus recovers.

#### CP116 TREATMENT EFFECT OF THE MINISCREW SUPPORTED SLIDER FOR DISTALIZATION OF THE MAXILLARY DENTAL ARCH: A CASE REPORT WITH A TWO-YEAR FOLLOW-UP

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**AIMS:** To present a patient with an Angle Class II malocclusion treated by a skeletal anchorage supported intraoral distalization appliance, the 'EZ Slider' with Roth edgewise mechanics.

**SUBJECT AND METHOD:** A female with the chronological age of 13 years 6 months with the chief complaint being the higher position of her upper left canine. According to clinical and radiographic evaluation, the patient had a dental and skeletal Class II relationship, a 5 mm midline shift of the upper midline and 11 mm of crowding. The reciprocal EZ Slider was utilized with fixed orthodontic treatment for distalization of each side with a closed coil spring with a force of 250 g.

**RESULTS:** The sagittal problem in the maxillary dental arch was eliminated with the intraoral distalization appliance, resulting in molar distalization and sufficient space being provided. A Class I canine and molar relationship was achieved while overjet and overbite were idealized.

**CONCLUSION:** A bone supported distalizer which does not require patient cooperation might be recommended for controlled distalization. The miniscrew supported EZ Slider approach can be regarded as an alternative method to extraction therapy.

#### CP117 BOTOX INJECTIONS FOR A GUMMY SMILE AFTER ORTHOGNATHIC SURGERY

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**AIMS:** To describe the treatment of a patient with a skeletal open bite and skeletal Class III malocclusion treated orthognathically and with an injection of BotulinumtoxinA (Botox) for a gummy smile. The 13 months retention results are also shown in this case report.

**SUBJECT AND METHOD:** A 16 year old female with the main complaint of an anterior open bite. Extraorally she had a straight profile, the facial midline did not coincide at menton and she had an asymmetric gummy smile. The patient was a mouth breather without any temporomandibular joint symptoms. Intraorally, she had an Angle Class III on the right side and Class I molar relationship on the left side. She had a unilateral posterior crossbite on the left side. The dental midline in the lower arch was 4.5 mm deviated to the left side. The patient an overjet of -1.5mm overjet and and overbite of -4 mm. A hand-wrist radiograph showed that the patient's skeletal age was 18 years according to Greulich-Pyle hand wrist atlas with a RU skeletal growth stage. Bimaxillary orthognathic surgery was planned (6 mm impaction and 5 mm advancement of the maxilla, with a 6 mm set back of the mandible). The mandibular setback was planned assymmetrically to coincide the dental and facial midlines. The remaining gummy smile after orthognathic surgery was treated with a Botox injection for the depressor septi nasi, levator labii superior aleque nasi, zygomaticus major and zygomaticus minor muscles.

**RESULTS:** Post-treatment intra- and extraoral photographs show that the dental and facial midlines were coincident. Intraorally an Angle Class I molar and canine relationship was obtained with an overjet of 1.5 mm and an overbite of 2 mm. After a Botox injection, the remaining gummy smile was eliminated.

**CONCLUSION:** Orthognathic surgery is an effective treatment method for the closure of an anterior open bite with skeletal characteristics. Botox application for the correction of a gummy smile provides effective results and satisfaction.

#### CP118 MOLAR DISTALIZATION WITH ZYGOMATIC ANCHORAGE – A CASE REPORT

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**AIMS:** To present the treatment efficiency of miniplates and segmented archwires for upper molar distalization. An alternative treatment plan would be distalization by a molar slider/pendulum which both have unwanted side effects.

**SUBJECT AND METHOD:** A 26-year old female with the chief complaint of upper anterior arch crowding and a slightly convex profile with competent lips. The upper dental midline was 1 mm to the left and lower dental midline was on with the face. The patient had a Class II molar and canine relationship on both sides.

According to cephalometric analysis she had Class II skeletal relationship due to mandibular retrognathism with decreased upper and increased lower incisor inclination. The maxillary molar distalization procedure started 4 weeks after miniplate placement surgery. The patient was seen every 4-5 weeks to monitor progress, while the system was reactivated either by shifting the sliding lock towards the distal or by placing a longer open coil spring. The upper third molars were extracted prior to the start of distalization.

**RESULTS:** Molar distalization with overcorrection was achieved efficiently in approximately 6 months without any anchorage loss. Treatment proceeded with continuous archwires in the upper and lower arches.

**CONCLUSION:** Skeletal anchorage for molar distalization is an efficient treatment option for upper molar distalization with no side effects such as anchorage loss or excessive protrusion of the anterior segment.

#### CP119 MOLAR DISTALIZATION WITH ZYGOMATIC ANCHORAGE POST-FAILURE OF MOLAR SLIDER TREATMENT

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**AIMS:** To present the treatment efficiency of miniplates and segmented archwires for upper molar distalization. The initial treatment plan consisted of distalization with a molar slider which resulted in anchorage loss and proclination of the upper anterior teeth.

**SUBJECT AND METHOD:** A 19-year old female with the chief complaint of anterior crowding. She had a convex profile with competent lips. The upper and lower dental midlines were coincident with the face. The molar and canine relationship was Class II on both sides. According to cephalometric analysis she had a Class II skeletal relationship due to a prognathic maxilla with decreased upper and increased lower incisor inclination. Initially the patient was treated with a molar slider for a few months. Unfortunately the outcome was no molar distalization but anchorage loss and protrusion of the anterior segment. This led to the decision to use zygomatic miniplates for distalization with bone anchorage. Maxillary molar distalization started 4 weeks after miniplate placement surgery. The patient was seen every 4-5 weeks to monitor progress, while the system was reactivated either by shifting the sliding lock towards the distal or by placing a longer open coil spring. The upper third molars were extracted prior to the start of initial distalization.

**RESULTS:** Molar distalization with overcorrection was achieved efficiently in approximately 6 months.

**CONCLUSION:** Skeletal anchorage for upper molar distalization is a very efficient method, offering the patient an alternative treatment option without unwanted side effects.

#### CP120 EVALUATION OF A PATIENT WITH UNILATERAL MAXILLARY DEFICIENCY TREATED WITH UNILATERAL SURGICALLY ASSISTED RAPID MAXILLARY EXPANSION\*\*\*

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**AIMS:** To make treatment more efficient for a patient with unilateral maxillary deficiency by unilateral surgically assisted rapid maxillary expansion (SARME).

**SUBJECT AND METHOD:** A 29-year old female referred for orthodontic treatment. After clinical and radiographic examination, a skeletal Class I and dental Class I occlusion on the right side was determined. However, on the left side, a posterior crossbite and unilateral maxillary narrowness was observed. The patient had a straight profile and upper lip asymmetry. SARME and fixed orthodontic treatment was planned. A rapid maxillary expansion (RME) appliance, which covered all the upper teeth, bonded acrylic hyrax-type, was fabricated. The right side of the RME appliance was then locked with self-cure resin material in centric occlusion to prevent unwanted tooth movements on the right side. The surgical procedure included a unilateral LeFort I type of osteotomy only on the left side with a midline osteotomy without pterygoid disjunction. After a latency period of five days, the patient started to activate the RME appliance once per day (0.25 mm) and continued until the appropriate expansion was achieved on the left side. Measurements were done on cone beam computerized tomographic images. The first image was taken at the pre-operative examination and the second two months after the RME appliance was removed. Both skeletal and dental measurements were performed.

**RESULTS:** The measurements revealed that the expansion was larger on the left side (osteotomized side) but the right maxilla was also expanded. The expansion values on the right side were less than the left side.

Clinically, while improvement of the left side was adequate, the changes of the right side were not noticeable.

**CONCLUSION:** In patients with unilateral maxillary deficiency, a unilateral osteotomy may not be sufficient. It is recommended to add an occlusal locking mechanism to the RME appliance on the non-deficient side for more efficient treatment.

#### CP121 BILATERAL ASYMMETRIC HEMIFACIAL MICROSOMIA WITH AN UNUSUAL EXPRESSION: REPORT OF TWO CASES†††

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**AIMS:** Hemifacial microsomia is the second most common cause for facial asymmetry. The usual expression is a deficient mandible deviated to the more dominantly involved side of the face due to the smaller mandibular ramus and body length.

**SUBJECTS AND METHOD:** Two patients are described with mandibular deviation to the less severely affected side because of the special geometry of the mandible and different muscular tonicity on the contralateral sides.

#### CP122 CROHN'S DISEASE IN A PATIENT WITH MULTIPLE APLASIA

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**AIMS:** To describe the clinical features of a young patient with Crohn's disease and multiple missing teeth.

**SUBJECT AND METHOD:** A 12 year old female with Crohn's disease who complained of pain in the upper anterior region when biting. Clinically she presented with a severely reduced lower face height, a straight profile and missing upper lateral incisors, lower central incisors and all second and third molars. She also had general microdontia and facial characteristics often observed in ectodermal dysplasia patients. The occlusion was Class I with a deep bite and gingival impingement.

**RESULTS:** Crohn's disease is a chronic inflammatory disease, which affects different parts of the gastrointestinal tract. Medical treatment is aimed at reducing the inflammation with anti-inflammatory medication and bringing relief of the symptoms, but cannot cure the disease. The occurrence of Crohn's disease alongside multiple dental aplasia has rarely been reported in the literature. The only published case involving impaired dental development was related to ectodermal dysplasia with idiopathic thrombocytopenic purpura as an additional feature. This patient was in pharmacological treatment with vitamin D3, anti-inflammatory drugs, corticosteroids and growth hormones. The latter influence bone metabolism by reducing its turnover and hence the tooth movement rate.

**CONCLUSION:** The orthodontic treatment of a patient with Crohn's disease is particularly challenging. The side effects from the medication must be considered when planning orthodontic treatment in such patients. The slower tooth movement rate and the higher risk for root resorption call for a treatment plan considering the shortest tooth movement. Moreover, the slower growth rate and the lack of vertical development of the alveolar bone require maximum allowance for posterior tooth eruption.

#### CP123 COMBINED ORTHODONTIC AND SURGICAL TREATMENT IN A PATIENT WITH LONG FACE SYNDROME AND OPEN BITE – CASE REPORT

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**AIMS:** To show that patients with long face syndrome and open bites can be successfully treated with combined surgical-orthodontic treatment.

**SUBJECT AND METHOD:** A 16 year old in the permanent dentition with a skeletal open bite treated with upper and lower fixed appliances. Clinical examination, study cast analysis, a dental pantomogram and lateral cephalogram were obtained before treatment. The lateral cephalogram showed backward facial rotation (Björk: 406°), increased basal angle (B: 37°) and retroclination of the lower jaw (SN/MP: 50°). The patient wore appliances for 27 months following which surgery was carried out. Control lateral cephalograms were obtained before and after surgical treatment.

RESULTS: After treatment, the lateral cephalogram showed decrease of basal angle and a change in the vertical position of the lower jaw. The patient is now in retention, without signs of relapse and wears splints every night.

CONCLUSION: Combined surgical-orthodontic treatment of a long face syndrome and open bite gave stable therapeutic results, stable occlusion, correct orofacial functions and good facial aesthetics without relapse.

#### CP124 TEENAGER WITH ORTHODONTIC PROBLEMS IN THE ANTERIOR REGION – CASE REPORT

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AIMS: To resolve crowding in both arches, to translate the maxillary lateral incisors from an overbite to a normal bite, bring the ectopic canines down into the arch, and to synchronize the arches.

SUBJECT AND METHOD: A 12.5-year old boy with the following issues: a) Crowding in the anterior segment with a risk of caries due to the inability to maintain good hygiene, and the risk of gingivitis; b) Overbite of the lateral incisors positioned palatally without space for their normal positioning; c) Ectopic maxillary canines with the right more pronounced; Crowding of the mandibular incisors and canines and lingual angulation of the incisors; e) Poor aesthetics resulting in the boy's dissatisfaction with himself. Fixed appliances were used as the therapeutic method. Wires of different size, springs and rubber bands were used.

RESULTS: Treatment resulted in a neutral occlusion, harmony of function and aesthetics and a very nice smile.

CONCLUSION: Early orthodontic prevention is a must for potential orthodontic patients in order to avoid complications and more problems.

#### CP125 TREATMENT OF AN OPEN BITE WITH BALTERS' BIONATOR TYPE II – CASE REPORT

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AIMS: To show that an open bite can be successfully treated with Balters' bionator type II.

SUBJECT AND METHOD: A 13 year old with an anterior open bite and persistence of an infantile swallow pattern, treated with the Balters' bionator type II. Clinical examination, study cast analysis, a dental pantomogram and lateral cephalogram were obtained prior to the start of treatment. Complete analysis, considering age and gender, indicated the necessity for treatment with the Balters' bionator type II. A construction bite was taken in an incisal edge-to-edge relationship without vertical activation. The patient wore the appliance day and night for 18 months during the active phase of treatment.

RESULTS: At the end of active treatment a correct overbite and overjet were achieved, with extrusion of the anterior teeth and posterior placement of the tongue. The patient wore the appliance during the night for 20 months, to preserve the achieved therapeutic results and prevent relapse.

CONCLUSION: An open bite can be successfully treated with the Balters' bionator type II. The results of treatment were stable, with a good occlusion, correct orofacial functions and acceptable facial aesthetics.

#### CP126 ORTHODONTIC TREATMENT OF A LATE ADOLESCENT SKELETAL CLASS III PATIENT WITH A DEEP BITE: A CASE REPORT

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AIMS: To present the orthodontic treatment of a patient with a skeletal Class III malocclusion who refused surgical treatment.

SUBJECT AND METHOD: A 17 year-old male with a severe skeletal Class III malocclusion with an anterior functional crossbite, negative overjet and deep bite. Clinical examination showed a 2 mm negative overjet, a 9 mm overbite and a 7 mm bilateral Angle Class III canine and molar relationship. Cephalometric analysis showed a skeletal Class III malocclusion (SNA: 83°, SNB: 89.6°, ANB: -6.6°, Wits: -8.9 mm), the upper incisors were proclined (U1-SN: 110.2°, U1-PP: 116.1°) and the lower incisors retroclined (IMPA: 77.3°). Non-surgical treatment was planned. Roth 0.018 inch slot type brackets were used for 27 months. Class III elastics were used for 12 months.

**RESULTS:** The anterior crossbite and sagittal discrepancy were corrected without extractions. A Class I molar and canine relationship, normal overjet and overbite were achieved. Cephalometric evaluation showed that SNA was slightly increased to 84.3 degrees, SNB was slightly decreased to 87.2 degrees and ANB was slightly decreased to -3.8 degrees. The Wits appraisal decreased to -4.7 mm. The upper incisors were significantly proclined (U1-SN: 120.1°, U1-PP: 123°) and the lower incisors slightly retruded (IMPA: 75.7°).

**CONCLUSION:** The patient was successfully treated by non-extraction and non-surgical orthodontic treatment. At the end of treatment, the occlusion was improved, a normal overjet and overbite were achieved and the aesthetics were improved. The stable occlusion was maintained at 6 months after treatment.

#### CP127 MILD OBSTRUCTIVE SLEEP APNOEA TREATED WITH A MANDIBULAR ADVANCEMENT APPLIANCE: A CASE REPORT

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**AIMS:** Treatment with a mandibular advancement device (MAD) is recommended for mild obstructive sleep apnoea (OSA) cases. The purpose of this case report is to assess the effectiveness of the MAD appliance in a patient with mild OSA.

**SUBJECT AND METHOD:** A 32 year-old male with a skeletal retrognathic mandible and maxilla referred with a diagnosis of mild OSA. The pre-treatment apnoea-hypopnoea index (AHI) was 14.3. Before use of the MAD, the main complaint of the patient was interrupted breathing during sleep. The main objective was moving the mandible forward to relieve the patient's breathing. The MAD was fabricated twice in 6 months for patient comfort and to gradually advance the mandible. The first device was made from acrylic resin and manufactured in an orthodontic laboratory. The appliance was constructed using a wax bite with the mandible protruded in an edge-to-edge incisor relationship. After 3 months, a second MAD was manufactured in order to protrude the mandible an additional 3 mm more than the first MAD. A polysomnography test was carried out and lateral cephalometric radiographs taken before and after use of the devices were evaluated.

**RESULTS:** After 3 months treatment with the first MAD evaluations showed that the patient's AHI index decreased from 14.3 to 9.4. With the MAD in the patient's mouth the posterior airway linear measurement increased from 6 to 10 mm. After an additional 3 months of treatment with the second MAD the patient's AHI index had decreased from 9.4 to 6.2. When the MAD was in the patient's mouth the posterior airway linear measurement increased from 10 to 12 mm.

**CONCLUSION:** The MAD device achieved substantial success. After 6 months of treatment, the AHI index was normal and the patient's sleep disorder symptoms had been corrected.

#### CP128 SPONTANEOUS CORRECTION OF A CLASS II DIVISION 2 MALOCCLUSION WITH SEVERE CROWDING

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**AIMS:** Eliminating functional aetiologic factors often leads to spontaneous forward movement of a retruded mandible in Class II division 2 malocclusions to provide a spontaneous and normal inclination of retroclined upper incisors.

**SUBJECT AND METHOD:** A 13 year-old female with a Class II division 2 malocclusion. She had a mild convex profile with a retrognathic mandible and a Class II molar relationship. The upper midline was shifted to the right side (4 mm), the lower was normal relative to the facial midline, and there was severe maxillary crowding (8 mm). Cephalometrics showed the maxilla in a normal position and the mandible retrognathic. Roth 0.018 inch slot type braces were used.

**RESULTS:** The transverse, sagittal and vertical dimensions were corrected and were stable. The midline shift was corrected and a normal overjet and overbite were achieved. A Class I molar relationship was achieved simply by spontaneous movement of the mandible.

**CONCLUSION:** In selected cases with Class II division 2 relationships due to retroclined upper incisors, eliminating functional aetiologic factors has proven to be an effective method of treatment to provide spontaneous forward movement of the mandible. This type of treatment is comfortable for the patient because of its short duration and cost effectiveness.

## CP129 CAMOUFLAGE TREATMENT OF PATIENTS WITH SKELETAL CLASS III MALOCCLUSIONS: CASE SERIES

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**AIMS:** For skeletal Class III patients, a combined treatment strategy must be followed which includes either dentoalveolar compensation or orthognathic surgery following decompensation of the teeth. This presentation will show three cases of subjects with skeletal Class III malocclusions treated by dentoalveolar camouflage.

**SUBJECTS AND METHOD:** Three subjects, aged 17, 13 and 20 years, who had not undergone previous orthodontic treatment. They had dental and skeletal Class III malocclusion features. To resolve the problems, orthodontic camouflage involving proclination of the upper incisors, and extrusion of the molars and premolars was carried out. The patients were treated orthodontically for an average of 2.5 years. Cephalometric tracing was done with the NemoCeph software program by same investigator. Ricketts, Tweed and Steiner cephalometric analyses were used.

**RESULTS:** At the beginning of treatment, ANB angles were  $-1$  and  $-0$  degrees. These values did not show any change post-treatment. The upper incisor inclinations increased forward, while the lower incisor inclinations decreased backward. Optimal dental correction and occlusal relationships were achieved, with a normal overbite, overjet and acceptable profile.

**CONCLUSION:** Dentoalveolar camouflage treatment is a successful option for borderline cases.

## CP130 ORTHODONTIC MANAGEMENT IN MEDICALLY COMPROMISED PATIENTS

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**AIMS:** Orthodontic therapy is no longer reserved for only healthy patients. Orthodontists are confronted with an increasing number of medically compromised patients who require correct alignment for aesthetics and oral rehabilitation. With better management of serious medical problems, increased quality of life expectations, and greater ambulation, medically compromised individuals are now regular visitors to orthodontic practices.

**MATERIALS AND METHOD:** This presentation gives valuable information regarding the current knowledge of the most common systemic and local diseases on the outcome of orthodontic treatment. This article examines aspects of some of the conditions that are of relevance to orthodontic practice. Various systemic diseases, serious medical conditions and their effect on orthodontic treatment are presented. Medical conditions commonly encountered in orthodontic patients include: risk of infective endocarditis, hypertension, bleeding disorders, asthma, sickle cell anaemia, leukaemia, cystic fibrosis, epilepsy, multiple sclerosis, viral hepatitis, diabetes, renal disorders, eating disorders, osteoporosis and allergies to materials used during orthodontic treatment. As a rule, general medical problem can affect orthodontic treatment and care should be taken while managing medically compromised patients as it is not an absolute contraindication. While orthodontic therapy has been considered to be completely non-invasive, specific orthodontic procedures may place some patients at risk for serious sequelae.

**RESULTS:** The presentation focuses on the difficulties faced when orthodontic treatment is provided and will make recommendations to avoid potential problems that may arise. This study reviews the management of medically compromised patients during orthodontic treatment. The orthodontic treatment considerations are also discussed.

**CONCLUSION:** Various medical conditions and their impact on treatment procedures must be recognized by orthodontists. With appropriate management, successful orthodontic treatment can be carried out with minimal physical damage and maximum treatment outcome.

## CP131 ORTHODONTIC AND SURGICAL TREATMENT OF SKELETAL CLASS III OPEN BITE MALOCCLUSION: A CASE REPORT

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**AIMS:** An Angle Class III malocclusion with severe maxillary and mandibular basal bone discrepancy is thought to be more difficult to treat orthodontically. This case report presents the combined orthodontic-surgical treatment of an adult with severe mandibular protrusion and an anterior open bite (AOB).

**SUBJECT AND METHOD:** A 29-year-old male with the chief complaint of an AOB, unaesthetic smile and lip incompetence. In clinical examination, protrusion of the mandible, a concave profile, a Class III canine relationship, AOB, reverse overjet, and transverse maxillary deficiency were observed. The maxillary dental midline was in place and mandibular dental midline 2 mm to the left of the facial midline. Radiographic examination showed seven missing teeth (#18, 26, 28, 37, 38, 46 and 47). Cephalometric evaluation revealed that ANB was  $-1$  degree, overjet  $-1$  mm and the AOB 5 mm; the patient had a vertical growth pattern (GoGnSN:  $45.4^\circ$ , FMA:  $32.7^\circ$ ); retrusive lower incisors (IMPA:  $70^\circ$ ); increased lower anterior face height (90.5 mm) and increased gonial angle ( $132.5^\circ$ ). Pre-surgical orthodontic treatment was performed for maxillary expansion, relief of anterior crowding and dental decompensations. Maxillary advancement and posterior impaction with a LeFort I down fracture procedure, and mandibular set-back were planned to correct the mandibular protrusion and AOB. Post-surgical orthodontic treatment was undertaken for final detailing of the occlusion.

**RESULTS:** The severe skeletal discrepancy was successfully corrected after a total treatment time of 40 months. A dental Class I canine relationship with an ideal overjet and overbite was achieved.

**CONCLUSION:** A combined orthodontic-surgical treatment approach in adult Class III open bite cases may be helpful to achieve adequate functional and aesthetic results.

#### CP132 SKELETAL CLASS III MALOCCLUSION SURGICAL AND ORTHODONTIC TREATMENT: CASE REPORT

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**AIMS:** To present the orthodontic and surgical treatment of an adult with a Class III malocclusion, poor facial aesthetics and a severe open bite malocclusion.

**SUBJECT AND METHOD:** An 18 year 2 month old female with complaints of chin protrusion and ineffective chewing of food. Clinical examination revealed significant anteroposterior and vertical discrepancies, and poor facial aesthetics; while the cephalometric evaluation indicated that she had a severe Class III malocclusion (SNA:  $76^\circ$ , SNB:  $83.5^\circ$ , ANB:  $-6.5^\circ$ , GoGN/SN:  $38.5^\circ$ ). The surgical procedure (bimaxillary orthognathic surgery) was planned to correct the existing skeletal problem. The treatment objectives were to decrease the vertical dimension of the maxilla with 2 mm impaction and to fix mandible in an anterior rotated position to correct the open bite malocclusion. To improve the facial profile; 6 mm maxillary advancement and 2.5 mm mandibular set-back was performed. As the patient's soft tissue thickness was very thin, dermal filling was suggested to improve her upper and lower lip projections.

**RESULTS:** The existing vertical and anterioposterior maxillary discrepancies and mandibular protrusion were eliminated by performing bimaxillary orthognathic surgery combined with orthodontic treatment (SNA:  $80^\circ$ , SNB:  $80^\circ$ , ANB:  $0^\circ$ , GoGN/SN:  $37^\circ$ ).

**CONCLUSION:** These multidisciplinary procedures were very effective in producing good function and a pleasing facial aesthetic result for a skeletal Class III patient.

#### CP133 INFLUENCE OF UNILATERAL PREMOLAR EXTRACTION ON THE DENTAL MIDLINE: A CASE REPORT

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**AIMS:** To observe the effect of unilateral maxillary second premolar extraction on the dental midline in a Class II subdivision malocclusion case.

**SUBJECT AND METHOD:** A 12 year old female presenting a Class II malocclusion. The patient's upper dental midline was in harmony with the face. Unilateral permanent premolar extraction in the upper arch was performed to resolve crowding and to establish a Class I canine relationship both sides. The first premolar and canine were distalized using sliding mechanics to the extraction space. The intermolar arch length was preserved with helical loops bent to the mesial side of the molars. Interproximal reduction was performed of the lower anterior teeth to relieve the Bolton discrepancy. Lateral cephalograms were taken before and after treatment and superimpositions were made to evaluate the changes.

**RESULTS:** The extraction space of the upper second premolar was closed without causing any upper dental midline shift. A canine guided occlusion was established. The smile aesthetics were improved due to

protrusion of the upper incisors. Examination of the soft tissues revealed anterior displacement of the upper and lower lips towards the aesthetic line.

**CONCLUSION:** Unilateral premolar extraction in Class II subdivision cases may shorten treatment time without damaging the midline aesthetics and soft tissue profile.

#### CP134 A MULTIDISCIPLINARY TREATMENT APPROACH IN A PATIENT WITH A MISSING AND A PEG-SHAPED MAXILLARY LATERAL INCISOR: A CASE REPORT

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**AIMS:** Missing and peg-shaped maxillary lateral incisors create an aesthetic problem with specific orthodontic and prosthetic considerations. The two major alternatives, orthodontic space closure or space opening for prosthetic replacements, can both compromise aesthetics, periodontal health, and function. The purpose of this case report is to present the comprehensive management of a missing left maxillary and a peg-shaped right lateral incisor using a multidisciplinary treatment approach.

**SUBJECT AND METHOD:** A 16 year old female in the permanent dentition, with a congenitally missing and a peg-shaped maxillary lateral incisor. Clinical examination showed an Angle Class I molar relationship; a 1.5 mm overjet and 2 mm overbite were observed. Cephalometric evaluation showed a low ANB angle (0.5°) and retrusive lower incisors. A multibracket straightwire fixed appliance was used to open the space for dental implant placement and to correct the occlusion.

**RESULTS:** The major objectives of treatment were achieved. Orthodontic treatment was completed in one year. A Class I molar and canine relationship was achieved with the overjet and overbite within the norm. The panoramic radiograph showed good radicular parallelism and no signs of root resorption. Clinical examination of the masticatory muscles and temporomandibular joints did not show any pathological signs or symptoms on completion of treatment. At the end of orthodontic treatment, the peg-shaped maxillary lateral incisor was built up and implant placement was undertaken for the congenitally missing lateral. The missing lateral incisor were substituted with a fibre crown because of the patient's age. Essix appliances were used for retention.

**CONCLUSION:** The missing lateral incisor could be substituted by a fibre crown as the patient was younger than 18 years. Ideal aesthetic and function were provided at the end of treatment. A multidisciplinary treatment approach usually presents broader management options to the clinician and provides more satisfactory aesthetic results for the patients.

#### CP135 ASYMPTOMATIC VITAMIN D DEFICIENCY - A CASE REPORT

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**AIMS:** To describe the radiological findings in a patient with vitamin D deficiency and an increased level of parathyroid hormone, and to discuss the implications for orthodontic treatment.

**SUBJECT AND METHOD:** A 36.9 year old female from an Asian ethnic background presented for orthodontic treatment. Nothing significant was found in her medical history at that time. Her chief complaint was protrusion of the upper anterior teeth. Routine diagnostics including a dental pantomogram were undertaken, with additional full mouth periapicals. A normal periodontal space between the root and bone could not be detected. It was therefore decided to refer the patient to an endocrinologist for further investigations.

**RESULTS:** A blood test showed a significant vitamin D deficiency, which indicated that this was a chronic condition. In addition the parathyroid hormone levels were elevated. The low vitamin D levels could indicate a borderline secondary hyperparathyroidism, which was likely to be the cause of the bone pathology. Before orthodontic treatment could commence the patient received an intensive vitamin D supplement every 2 weeks for 2 months.

**CONCLUSION:** Careful radiographic examination is essential to exclude metabolic disease even in the absence of symptoms. Since orthodontic tooth movement is dependent on bone metabolism, it is essential that normal bone function can be maintained. In this specific case, a simple oral supplement of vitamin D, restored normal blood levels of this vitamin which then allowed the parathyroid hormone to stabilise and normal bone metabolism to resume.

#### CP136 CORTICOTOMY ASSISTED MAXILLARY PROTRACTION WITH A FACEMASK – TWO CASE REPORTS

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**AIMS:** To present the results of corticotomy assisted maxillary protraction with a facemask performed on patients who missed the optimal time for conventional facemask therapy.

**SUBJECTS AND METHOD:** Two female patients (both 12 years old) with the chief complaint of maxillary deficiency. Cephalometric evaluation showed a normal vertical pattern, a dental and skeletal Class III malocclusion due to maxillary retrusion and normal upper but retroclined lower incisors. An acrylic cap Hyrax with hooks at the level of the canines was bonded a few days prior to corticotomy. Under general anaesthesia an incomplete Le-Fort I osteotomy was performed to release the maxilla. On the third day following corticotomy, the patients were asked to start expansion twice a day for one week. After this period, they were instructed to use elastics with an initial force of 800 g per side for 24 hours a day for 3 months. One of the patients continued to use the elastics with the same force just in the evenings and at night until achievement of a Class II canine relationship, while the other patient immediately changed to retention with an elastic force of 300 g per side for 6 months. After completion of retention, the Hyrax appliances were debonded and treatment proceeded with fixed appliances. Cephalometric radiographs and photographs were taken before protraction and after the retention period.

**RESULTS:** Class II canine relationships were achieved in 4.5 and 3 months of active treatment. The maxillae moved forward 5.1 and 5.3 mm, respectively. SNA increased by 3 and 4 degrees while SNB decreased by 2 and 1 degrees, which resulted in a 5 degree increase in ANB and transformed the Class III profile to a Class I in both patients. Wits value decreased by 7.1 mm and 3.9 mm while upper incisor inclinations increased by 8 and 5 degrees, respectively. The palatal plane rotated 2 degrees in a counterclockwise direction.

**CONCLUSION:** The treatment protocol was successful in establishing skeletal and soft tissue improvements for the patients who had almost completed growth and missed the chance of earlier orthopaedic correction of the maxillary deficiency.

#### CP137 A THREE-DIMENSIONAL FINITE ELEMENT ANALYSIS IN ALIGNER TREATMENT

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**AIMS:** Many patients require aesthetic orthodontic treatment. Thermoplastic appliances such as Invisalign® have recently become widely used in such cases. However, the mechanism of tooth movement with an aligner-type appliances is not yet clear. Orthodontic treatment with aligners occasionally causes unexpected tooth movement, called the bowing effect.

**MATERIALS AND METHOD:** Finite element analysis (FEA) was used to mechanically simulate the tooth movement produced by a thermoplastic appliance. The computational results showed that crown morphology affected the tensile force and tipping moment associated with the bowing effect.

**RESULTS:** Tensile force and tipping moment increased with increasing crown morphology and decreased with decreasing width of the aligner connection region.

**CONCLUSION:** This study proposes a new aligner design to prevent the bowing effect and demonstrates its validity with computer simulation. In the present study, FEA analysis was performed with two tooth crown models. The simulation explained the bowing effect. Computer simulations that use the actual tooth size and shape will be necessary in future applications of this method.

#### CP138 TREATMENT OF A CLASS II MALOCCLUSION WITH A MODIFIED BONDED RAPID MAXILLARY EXPANDER AND OCCIPITAL HEADGEAR COMBINATION: A CASE REPORT

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**AIMS:** To present a Class II skeletal malocclusion treated with a modified acrylic bonded rapid maxillary expander and occipital headgear combination in a growing child.

**SUBJECT AND METHOD:** A 14-year-old boy diagnosed with a skeletal Class II malocclusion with a retrognathic mandible and vertical growth pattern. He had Class II division 1 malocclusion with a 6 mm overjet and a 2 mm overbite. Crowding of 7 mm was found in the maxillary arch and 2.5 mm in the mandibular arch. The treatment objectives were to correct the posterior rotation of the palatal plane and

sagittal advancement of the mandible to achieve a Class I relationship and acceptable facial balance. A modified acrylic bonded rapid maxillary expander (RME) was used with a Hyrax screw and embedded headgear tubes cemented to maintain the space and increase the width of buccal corridors on smiling. Activation of the Hyrax screw was performed twice a day, one turn at a time. The patient used occipital headgear for 16-18 hours a day, in combination with the RME to alter the palatal plane and to control the vertical dimension. Treatment was followed by fixed orthodontic appliances.

**RESULTS:** After 5 months of good patient compliance, a Class I skeletal relationship was achieved with slight clockwise rotation of the palatal plane. Thus, the unfavourable vertical growth pattern and the retrognathic mandible were corrected by counter clockwise mandibular growth.

**CONCLUSION:** A modified acrylic bonded RME expander and an occipital headgear combination can be used to correct Class II malocclusions in growing patients with clockwise rotational tendencies.

#### CP139 LONG-TERM MANAGEMENT OF CLASS III MALOCCLUSION IN DIZYGOTIC TWINS: A CASE REPORT

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**AIMS:** To evaluate the effects of long-term management of Class III malocclusions including the first and second phases of orthodontic treatment in dizygotic twins.

**SUBJECT AND METHOD:** Dizygotic female twins aged 7 years 9 months with mild Class III malocclusions and anterior crossbites in the early mixed dentition stage of development, which is regarded as an appropriate time for the first phase of orthodontic treatment. The anterior crossbite was corrected by a protraction facemask applied by an intraoral appliance (one with and the other without an expansion screw), in 7 months. Subsequently the growth observation period started with night-time chin cap therapy and continued until the beginning of the permanent dentition. After the observation period, the twins underwent comprehensive fixed appliance treatment to achieve final functional occlusions which is one of the most important objectives of the second phase of orthodontic treatment.

**RESULTS:** The anterior crossbite was successfully corrected in both cases. A more favourable environment was provided for normal craniofacial growth. Cephalometric analysis showed that a skeletal Class I relationship had been achieved with maxillary orthopaedic advancement with a clinically insignificant backward rotation of the mandible. Facial aesthetics were significantly improved. At the end of treatment, a final functional occlusion was established.

**CONCLUSION:** Early correction of an anterior crossbite is crucial to provide a more favourable environment for normal craniofacial growth. Long-term and early management of mild Class III malocclusions, including orthopaedic and orthodontic treatment periods, is essential in growing patients.