

ARTIFICIAL INTELLIGENCE AS A COGNITIVE AID IN DIGITAL ORTHODONTIC TRAINING: EFFECTS ON INTRAORAL SCANNING LEARNING

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Aim: to evaluate the impact of intraoral scanners with and without artificial intelligence support across different technological generations on learning experience and performance during digital orthodontic training.

Methods: dental students at different clinical stages performed intraoral scans of both arches and interocclusal registration using scanners with and without artificial intelligence support. Learning perception was assessed through a questionnaire evaluating ease of use, intuitiveness, confidence, cognitive effort, and preference. Scanning time was recorded as a secondary outcome. The influence of clinical experience was also explored.

Results: artificial intelligence and advanced technologies were associated with reduced perceived cognitive effort and improved confidence during digital skill acquisition, with statistically significant differences between the three scanner types ($p < 0.05$). Performance outcomes showed heterogeneous trends related to operator experience, with no statistically significant differences related to clinical experience ($p > 0.05$).

Conclusions: artificial intelligence-integrated systems may reduce cognitive effort and enhance learning efficiency during digital orthodontic skill acquisition.

ELASTODONTIC TREATMENT OF UNILATERAL POSTERIOR CROSSBITE IN A PEDIATRIC PATIENT: A CASE REPORT

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Aim: to present the clinical management of a 6-year-old patient with unilateral posterior crossbite treated with an elastodontic appliance and to evaluate changes after 10 months.

Materials and methods: a 6-year-old girl with right unilateral posterior crossbite was treated with a Class I elastodontic device. The appliance was worn daily, mainly at night, with follow-ups every 4-6 weeks. Functional exercises were included to improve nasal breathing and tongue posture. Clinical re-

cords included intraoral photographs, study models, and radiographs when available.

Results: after 10 months, progressive correction of the transverse discrepancy and improvement in occlusion and masticatory function were observed. Good patient compliance contributed to the positive outcomes. Treatment is still ongoing.

Conclusions: elastodontic therapy may be an effective interceptive approach for unilateral posterior crossbite in pediatric patients.

THE DIFFERENT PERCEPTIONS OF GUMMY SMILES AMONG PATIENTS AND CLINICIANS

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Aim: smile analysis is vital in orthodontics, especially for vertical skeletal discrepancies. Excessive gingival display (EGD), or “gummy smile” (>2-3 mm exposure), results from factors like vertical maxillary excess, altered passive eruption, or lip hyperactivity. While not pathological, EGD is a major aesthetic concern. This study evaluated the perception threshold of gingival exposure and compared aesthetic judgments between dental professionals and laypeople.

Methods: a 12-item online questionnaire was distributed to a diverse sample. Standardized frontal smile photographs were digitally modified to show increasing levels of gingival exposure while keeping dentolabial proportions constant. Participants rated attractiveness on a Likert scale and indicated their tolerance thresholds. Data were analyzed to compare dental

professionals and non-professionals, assessing correlations between demographics and aesthetic scores.

Results: 314 participants (mean age 37.9) completed the survey. A significant inverse correlation was found between gingival display and aesthetic ratings. Smiles with 0-2 mm of exposure received the highest scores; attractiveness significantly decreased at ≥ 4 mm ($p < 0.05$). Dental professionals showed significantly lower tolerance thresholds than laypeople. No significant gender-related differences were observed.

Conclusions: gingival exposure >2-3 mm negatively impacts smile aesthetics. The gap between professional and lay perceptions highlights the need to balance objective clinical parameters with patient expectations for optimal treatment planning.

REPRODUCIBILITY OF AI IN CEPHALOMETRIC LANDMARK DETECTION

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Objectives: to evaluate the reproducibility of artificial intelligence (AI) in identifying cephalometric landmarks, compared with manual tracing by an experienced orthodontist.

Methods: a high-quality lateral cephalogram of a 26-year-old female was selected. Eighteen landmarks were identified using WebCeph (v1500) under three conditions: AI without image modification (Alnocut), AI with modification (AI-cut), and manual tracing. Each method was repeated 10 times. X and Y coordinates were recorded, and reproducibility assessed using coefficient of variation (CV) and centroid distance. Statistical analysis included one-way ANOVA and Bonferroni tests ($p < 0.05$).

Results: alnocut showed the highest reproducibility, with the lowest CV values. Both AI methods were more consistent than manual tracing, especially for Menton (Me) and Pogonion (Pog). Gonion (Go) showed the greatest variability. Significant differences were found for Posterior Nasal Spine (PNS) ($p = 0.001$), with AI outperforming manual tracing. Variability was higher along the X-axis.

Conclusions: AI demonstrated greater reproducibility than manual tracing. While some landmarks were highly reliable, others (PNS, Go) remained challenging. AI appears to be a reliable tool in cephalometry, though further studies on larger samples are needed.

SELF-LIGATING APPLIANCE IN FRICTIONAL MECHANICS: A CASE REPORT

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Aim: to evaluate the use of self-ligating systems in frictional mechanics, analyzing their clinical behavior during orthodontic treatment, particularly in relation to friction control and archwire sliding, through a clinical case.

Methods: a 14-year-old patient with malocclusion was treated using a passive self-ligating multibracket appliance (Smart-Clip, 3M Unitek) with MBT prescription (0.022×0.028 mm slot). The system uses a nickel-titanium clip for archwire engagement without conventional ligatures. Treatment involved frictional mechanics with conventional and thermoactivated NiTi archwires for alignment and leveling, followed by rectangular stainless steel archwires for finishing. Biomechanics followed MBT principles with lacebacks, bendbacks, and tiebacks.

Clinical management and occlusal outcomes were evaluated.

Results: after 12 months, treatment objectives were achieved. Extraoral evaluation showed improved skeletal relationships and upper lip support. Intraoral findings included proper alignment, correct occlusion with normal overjet and overbite, and resolution of crowding. Results were functionally and aesthetically satisfactory, with good stability. Retention was prescribed.

Conclusions: self-ligating appliances proved effective, allowing achievement of treatment goals with good biomechanical control. Their main advantages concern clinical management and early treatment phases, while no significant reduction in overall treatment time can be attributed solely to the appliance. They represent a valid option in frictional mechanics.

IMPACTED MAXILLARY CANINES: TREATMENT OUTCOMES ACROSS DIFFERENT LEVELS OF IMPACTION WITH SELF-LIGATING BRACKETS

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Aim: to assess the importance of impaction grade severity on biomechanical management, treatment duration, and clinical outcomes in the orthodontic traction of impacted maxillary canines using self-ligating appliances.

Methods: two female patients with impacted maxillary canines were selected: a moderate case (17 y.o.) and a severe case (15 y.o.). Inclusion criteria included: 1-2 impacted maxillary canines, skeletal Class I or II, normal periodontal phenotype and no dental anomalies or pathology. Clinical and radiographic evaluation (panoramic and CBCT when indicated) and standardized photographic and cephalometric records were obtained. Both cases were treated with surgical exposure and orthodontic traction using self-ligating Damon appliances, which allow low-friction mechanics with enhanced torque control. In the severe case, initial TAD traction failed and was replaced by a custom removable appliance with an auxiliary arm.

Results: the moderate case required controlled traction without auxiliary anchorage; the severe case required complex three-dimensional control and multiple anchorage strategies. Overall treatment duration was comparable between cases (~2 years). Perhaps the use of TADs throughout the entire traction process would have partially reduced the overall treatment timescale. Both cases achieved functional and aesthetic outcomes, successful alignment and improved dentoalveolar relationships without adverse skeletal effects.

Conclusions: the impacted canine's severity grade primarily affects the biomechanical management, necessitating more advanced traction techniques and accurate three-dimensional movement planning in severe cases, rather than extending the overall treatment length. Self-ligating systems with adaptable biomechanics enable predictable outcomes even in severe cases.

ANCHORAGE PREPARATION IN THE MANDIBULAR ARCH: BIOMECHANICAL PRINCIPLES OF THE TWEED TECHNIQUE-A REVIEW

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Aim: the present review aims to investigate the biomechanical rationale of anchorage preparation within the Tweed technique, focusing on the controlled distal inclination of the mandibular terminal molar. This procedure is intended to counteract the mesializing forces generated by Class II intermaxillary elastics, level the curve of Spee, eliminate compensatory malocclusion curves, and promote posterior disclusion. Its correct execution is considered a prerequisite for achieving stable therapeutic endpoints.

Methods: a structured search was conducted on PubMed using the terms "anchorage" AND "orthodontics", retrieving 4,351 articles. Inclusion criteria: publication between 1968-2015, English or Italian language. Studies unrelated to mandibular anchorage preparation were excluded.

Results: anchorage preparation is achieved through a second-order bend in the archwire, calibrated on an initial malocclusion "read-out". This bend generates a predictable vestibular tipping of the mandibular incisors which, if uncontrolled, causes clockwise rotation of the occlusal plane and anterior open bite. A counterforce of equal magnitude and opposite direction must therefore be applied to the anterior segment. The "toe-in" adjustment additionally counteracts rotational forces produced by Class II elastic traction.

Conclusions: precise control of both applied and reactive forces is biomechanically indispensable for vertical dimension stability. Anchorage preparation must be considered a prerequisite — not an adjunct — for achieving defined therapeutic endpoints.

CORRELATION BETWEEN CRANIAL STRUCTURE AND PREFERENCE FOR SOFT OR HARD FOOD BOLUSES

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Aim: to assess whether craniofacial morphology and vertical growth patterns are associated with a preference for hard or soft alimentary boluses in a sample of orthodontic patients.

Methods: this cross-sectional study included 121 orthodontic patients (69 females, 52 males; mean age, 12.3 ± 3.3 years). Before-treatment, lateral skull x-rays were collected and lateral cephalometric analysis performed, considering variables SpP[^]GoGn, SN[^]GoGn, SpP[^]CoOr, and AN[^]B. Each patient was asked to chew a standardized soft bolus (chewing gum) followed by a standardized hard bolus (wine-gum) in a flavor of their choice, and to express a preference for one of the two boluses. To assess the association between bolus hardness preference and cephalometric variables, multiple linear regression analyses were performed,

controlling for sex and age.

Results: soft bolus was preferred by 64% of subjects (n = 77) and hard bolus by 36% (n = 44). Increased SpP[^]GoGn angle was significantly associated with soft-bolus preference ($P < 0.05$), as well as being female, but was independent of age. SN[^]GoGn increased with age ($P < 0.05$) but did not correlate with bolus preference or sex. No significant associations were observed for SpP[^]CoOr and AN[^]B.

Conclusions: soft bolus preference was significantly associated with increased intermaxillary divergence but not with cranial divergence, mandibular rotation, or sagittal skeletal relationship, suggesting that patients with intermaxillary hyperdivergent patterns may self-select softer boluses, due to a compensatory functional-structural feedback loop.

CEPHALOMETRIC ANALYSIS OF THE EFFECTS OF TREATMENT OF UNILATERAL POSTERIOR CROSSBITE WITH THE FUNCTION GENERATING BITE APPLIANCE

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Aim: to evaluate the effects on craniofacial growth of unilateral posterior crossbite (UPXB) correction with the functional appliance Function Generating Bite (FGB).

Methods: 102 age- and gender-matched patients were included in this retrospective study: 51 with UPXB (M = 19; F = 32; mean age $\pm$ SD = 7.6 $\pm$ 1.4 [yr.mo]) and 51 controls (C; M = 19; F = 32; mean age $\pm$ SD = 7.9 $\pm$ 1.3). UPXB was corrected with the FGB appliance. Lateral cephalometric tracings were analyzed in UPXB patients before the beginning of treatment (T0), and during follow-up after the correction of the malocclusion (T2). Lateral cephalometric tracings were also analyzed in control patients at T0. The following cephalometric values were considered: SpP[^]GoGn, SpP[^]Oc, Oc[^]GoGn, SN[^]GoGn, SpP[^]CoOr, CoGo[^]GoGn, A-Po, A[^]NB.

Results: before treatment (T0), cephalometric analysis showed that mandibular clockwise rotation was significantly increased ($p < 0.01$) in the UPXB group (SpP[^]CoOr T0 = $-3.5^{\circ} \pm 4.4$) compared to controls (SpP[^]CoOr T0 = $-1^{\circ} \pm 4$). During follow-up after the correction of the malocclusion (T0/T2), the UPXB group showed a significant reduction in mandibular ($p < 0.001$; SpP-CoOr T0 = $-3.5^{\circ} \pm 4.4$, T2 = $-1.1^{\circ} \pm 4$) and occlusal plane ($p < 0.01$; SpP-Oc T0 = $11.4^{\circ} \pm 3.9$, T2 = $9.9^{\circ} \pm 3.8$) clockwise rotation, as well as inter-maxillary divergence ($p < 0.01$; SpP-GoGn T0 = $27.8^{\circ} \pm 5.4$, T2 = $26.6^{\circ} \pm 5.5$).

Conclusions: treatment of UPXB with the FGB appliance controlled the vertical dimension, significantly reducing intermaxillary divergence, and was associated with a significant improvement in both mandibular clockwise rotation and occlusal plane orientation.

ORTHODONTIC TREATMENT OF SKELETAL AND DENTAL CLASS III MALOCCLUSION USING A CUSTOMIZED LINGUAL APPLIANCE WITH BUCCAL SHELF MINISCREW FOR DENTOALVEOLAR COMPENSATION

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Aim: this case report presents the management of a skeletal and dental Class III malocclusion using a Complete Clinical Lingual Appliance (CCLA) combined with Buccal Shelf Miniscrew (BSM) for dentoalveolar compensation

Methods: a post-growth patient presented with skeletal Class III malocclusion with right mandibular asymmetry, a left-side Angle Class III relationship, a 1 mm rightward deviation of the upper midline, a 3 mm rightward deviation of the lower midline, and spacing in the lower arch. The patient opted for orthodontic camouflage, consenting to the persistence of the skeletal asymmetry. The treatment plan included dentoalveolar compensation of the skeletal Class III malocclusion and dental asymmetry, correction of the dental midlines, correction of the left-side Angle Class III relationship using buccal shelf minis-

crew (mushroom head, slot hole 2.0 x 12 mm), closure of spaces in the lower arch, and germectomy of teeth 3.8 and 4.8. During treatment, the following archwires were used: 0.14 NiTi upper and lower archwires; 0.16 x 0.22 NiTi; 0.18 x 0.25 NiTi; 0.16 x 0.24 stainless steel (SS) (13° extra-torque upper; standard lower), miniscrew were introduced from this treatment phase onward; and 0.18x0.18 TMA. The case was completed with aesthetic composite restorations.

Results: CCLA combined with BSM achieved the planned objectives, providing a socially discreet treatment. BSM facilitated more efficient and effective tooth movement.

Conclusions: orthodontic treatment with a CCLA and BSM produced excellent functional and esthetic results, fully aligned with the patient's expectations.

THE ROLE OF TIMING IN THE TREATMENT OF CLASS II MALOCCLUSION WITH MANDIBULAR RETRUSION USING TWIN-BLOCK AND FIXED APPLIANCES IN GROWING PATIENTS

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Aim: to evaluate the effect of treatment timing on Class II malocclusion with mandibular retraction treated with Twin Block (TB) followed by fixed appliances (FA).

Methods: forty-one patients (22 females, 19 males) with Class II malocclusion were treated with TB followed by FA and divided according to the cervical vertebral maturation (CVM) method. The Prepubertal Group (GPre) included 21 patients (mean age 10.8 ± 2.1 years) treated before puberty (CS1-CS2), while the Peak Group (GPeak) included 20 patients (mean age 12.4 ± 1.1 years) treated during the pubertal growth peak (CS3-CS4). Dentoskeletal parameters were assessed on lateral cephalograms at baseline (T0) and post-treatment (T1, after FA; mean age 15.2 ± 1.5 years for GPre and 15.5 ± 1.9 years for GPeak). Intergroup comparisons were performed using in-

dependent samples t-tests, while Fisher's Exact Test analyzed gender and CVM distribution.

Results: at T0, significant differences between GPre and GPeak were found for SNB, Co-Gn, Co-Go, overbite, and age. At T1, significant differences were observed in total mandibular length (Co-Gn: 115.7 ± 7.1 mm vs 120.7 ± 8.3 mm; $p = 0.048$), mandibular ramus length (Co-Go: 56.7 ± 4.5 mm vs 60.4 ± 4.0 mm; $p = 0.009$), and chin projection (Pog'-TVL SN10: -11.6 ± 3.4 mm vs -8.9 ± 4.6 mm; $p = 0.039$).

Conclusions: treatment initiated at the pubertal growth peak produced greater mandibular growth, with increases of about 5 mm in Co-Gn and 3.7 mm in Co-Go, together with improved chin projection compared with treatment started before puberty.

ELECTROMYOGRAPHIC EVALUATION OF MASTICATORY FUNCTION IN UNILATERAL CROSSBITE PATIENTS TREATED WITH RAPID PALATAL EXPANSION

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Aim: to evaluate neuromuscular changes in masticatory function in patients with unilateral posterior cross-bite treated with rapid palatal expansion (RPE) using surface electromyography (sEMG).

Methods: a longitudinal study was conducted on 7 growing patients (7-12 years) with unilateral posterior cross-bite treated with RPE. Patients were recruited at the University of Milano-Bicocca (San Gerardo Hospital, Monza). sEMG recordings (Teethan system) of masseter and temporalis muscles were performed at three time points: before treatment (T0), during active expansion (T1), and after stabilization (T2). Muscle symmetry and coordination indices were analyzed.

Results: at T1, a transient increase in muscular asymmetry was observed, likely related to mechanical forces and occlusal changes induced by RPE. At T2, a significant improvement in muscle symmetry and coordination was recorded, indicating functional neuromuscular adaptation. Overall, EMG values showed a trend toward normalization after treatment.

Conclusions: RPE induces not only skeletal and dentoalveolar changes but also promotes neuromuscular rebalancing. Despite temporary alterations during active expansion, masticatory function improves after stabilization. sEMG is a reliable, non-invasive tool for monitoring functional outcomes in orthodontic treatment.

SPLINT RETENTION FIXED WITH DIRECT ADHESIVE TECHNIQUE: A 15-YEAR FOLLOW-UP

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Aim: orthodontic stability is often challenged by the elastic memory of periodontal fibers. This study evaluates the long-term reliability (over 15 years) of 0.37 mm braided wire lingual retainers, focusing on detachment rates, periodontal health, and patient satisfaction.

Methods: 50 patients were assessed using the Loe and Silness index and clinical records to monitor debonding, caries, decalcification, and thermal hypersensitivity. Patient-reported outcomes were recorded using a Visual Analogue Scale (VAS 0-10) to estimate comfort and acceptance.

Results: after the follow-up period, 46 patients (92%) still had the retainer in place. Among those with the retainer, 32 (70%) never required repair, while 14 (30%) experienced partial debonding,

mainly at the enamel-composite interface. In rare instances, debonding led to subtle shifts in tooth position. No significant differences in gingival indices were found between splinted teeth and control areas. No caries were associated to the appliance, though 4 patients (8%) showed demineralization in areas affected by debonding. Thermal sensitivity remained unaffected. Overall satisfaction was high, with a mean score of 9.16/10.

Conclusions: fixed lingual retention is highly reliable and bio-compatible over long periods. Although partial debonding may increase the risk of enamel alterations, regular follow-up can limit these effects. The absence of periodontal complications and positive feedback establish this method as a gold standard for post-treatment maintenance.

WHITE SPOTS AND CLEAR ALIGNER THERAPY: SYSTEMATIC REVIEW

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Aim: white spots are among the most frequent complications in orthodontics, with a reported prevalence after treatment ranging from 23% to over 70%. This study aimed to analyze, through a literature review, the incidence, risk factors and preventive strategies in patients with clear aligners compared to fixed appliances.

Methods: a systematic review was conducted using electronic databases including PubMed, Scopus and Web of Science, and focused on the development of white spots during orthodontic treatment. 72 articles were selected based on inclusion criteria, such as relevance to the topic, study design and full-text availability. Data on etiology, oral hygiene conditions, salivary factors and differences between fixed appliances and clear aligners were analyzed. Attention was given to factors

such as compliance, hygiene habits, and treatment duration.

Results: white spots are early signs of enamel demineralization and occur more frequently with fixed appliances due to plaque retention. Clear aligners allow better hygiene thanks to their removability and show lower incidence of lesions. However, white spots may still occur due to poor oral hygiene, reduced salivary flow and prolonged aligner wear. The microenvironment created by aligners favors bacterial activity, acid production and demineralization processes.

Conclusions: clear aligners reduce but do not eliminate the risk of white spots compared to fixed appliances. Proper oral hygiene, patient compliance and preventive strategies, including fluoride use and professional monitoring, remain essential to limit lesion development.

EFFICACY OF A SPECIFIC CURVE OF SPEE FLATTENING PROTOCOL FOR DEEP BITE CORRECTION WITH CLEAR ALIGNERS: A RETROSPECTIVE CONTROLLED STUDY

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Aim: vertical control represents a critical limitation in clear aligner therapy for deep bite correction. This study aimed to evaluate the effectiveness and predictability of deep bite correction using clear aligners by comparing a specific staging protocol (PIR: Proclination-Intrusion-Retraction) with a non-sequenced treatment approach.

Methods: a retrospective controlled study was conducted on 30 patients (mean age: 30 years) treated with Invisalign, divided into two groups: 15 treated with the PIR protocol and 15 without a specific staging strategy. Inclusion criteria were permanent dentition, non-extraction treatment, overbite of 3-8 mm, and availability of digital scans. Patients requiring orthognathic surgery or with craniofacial anomalies were excluded. Digital models (pre-treat-

ment, post-first aligner series, and planned ClinCheck) were analyzed to assess overbite reduction and lower curve of Spee leveling. Treatment efficacy was calculated as the ratio between achieved and planned movements.

Results: the PIR group showed higher efficacy in overbite correction (79% vs 62%) and curve of Spee leveling (100% vs 54%) compared to the control group. Differences between groups were statistically significant ($p < 0.05$).

Conclusions: sequential staging of incisor movements appears to improve the predictability of vertical corrections with clear aligners. The PIR protocol enhances biomechanical efficacy, representing a more effective strategy for deep bite correction, although further prospective studies are needed.

BANDED VS BONDED RAPID PALATAL EXPANDERS: EFFECTS ACROSS THE THREE PLANES OF SPACE

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Aim: this study evaluated cephalometric changes across three planes of space using two different appliances: the banded rapid palatal expander (RPE) and the bonded resin-splint expander. It aimed to determine which appliance is more suitable for specific clinical situations involving maxillary hypoplasia.

Methods: the study involved 60 patients aged 6-15 years with lateral-posterior crossbite. They were divided into two groups of 30: one treated with a Hyrax-type banded RPE and the other with a bonded RPE. A standard expansion protocol of 0.5 mm per day was applied for 15 days, followed by a six-month retention period. Cephalometric parameters (SNA, SNB, ANB, SN-SNP, SNA, and SN-GoGn) were measured using lateral cephalograms before and after treatment.

Results: both appliances were equally effective in achieving transverse expansion.

The banded RPE group showed a significant increase in the cranio-spinal plane angle due to posterior rotation. In contrast, the bonded RPE group exhibited a significant increase in the SNB angle, indicating mandibular advancement, and a significant decrease in the cranio-mandibular plane angle (SN-GoGn), thus exerting a bite block effect.

Conclusions: while both appliances effectively correct transverse deficits, the bonded RPE is more suitable for patients with an increased vertical dimension due to its superior vertical control. Early treatment is essential to restore proper stomatognathic development and to optimize both respiratory and dental functions.

OBSTRUCTIVE SLEEP APNEA WITH PSYCHIATRIC COMORBIDITY: 6-MONTH OUTCOMES OF MANDIBULAR ADVANCEMENT DEVICE THERAPY

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Aim: to evaluate the clinical effectiveness and psychological impact of a mandibular advancement device (MAD) in a patient with moderate obstructive sleep apnea (OSA) and comorbid major depressive disorder (MDD) who was intolerant to continuous positive airway pressure (CPAP) therapy.

Methods: we report the case of a 58-year-old woman diagnosed with moderate OSA (Apnea-Hypopnea Index, AHI: 24 events/h) and MDD. The patient refused CPAP due to severe psychological discomfort and claustrophobia. Consequently, a custom-made MAD was prescribed. Respiratory parameters, including AHI and oxygen saturation (SpO₂), and depressive symptoms (via standardized scales) were monitored over a 6-month follow-up period. No adjustments were made to the patient's stable pharmacological antidepressant regimen during

the study to isolate the effects of the MAD intervention.

Results: treatment with the MAD resulted in a significant reduction of the AHI to 7 events/hour and improved mean oxygen saturation. The patient reported a substantial increase in sleep quality and a reduction in daytime sleepiness. Notably, depressive symptoms showed marked improvement, with enhanced mood, higher energy levels, and better daily functioning.

Conclusions: the MAD is an effective alternative for OSA patients intolerant to CPAP, particularly those with psychiatric comorbidities. These findings highlight how effectively managing sleep-disordered breathing can positively influence the course of depressive disorders, underscoring the necessity of an individualized, multidisciplinary approach in clinical practice.

FUNCTIONAL EVALUATION OF MAXIMAL OCCLUSAL FORCE IN GROWING PATIENTS TREATED WITH THREE BITE PLANE APPLIANCE

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Aim: this study aimed to assess how treatment with a Three-Bite Plane (TBP) appliance influences changes in maximal occlusal force (MOF) in growing patients presenting various types of malocclusion.

Methods: this prospective investigation included 135 children aged between 9 and 11 years who exhibited a deep bite and a normodivergent growth pattern. The participants were equally distributed into three groups based on skeletal malocclusion type (Class I, Class II, and Class III). MOF was measured at baseline (T0) and after 12 months of treatment with the TBP appliance (T1) using a standardised multibite protocol. Within-group comparisons were carried out using paired t-tests or Wilcoxon tests, while differences in MOF changes between

groups were analyzed through Welch's ANOVA followed by Games-Howell post hoc tests.

Results: significant modifications in MOF were observed in all groups after treatment. Specifically, Class I patients showed a marked decrease in occlusal force ($\Delta = -135.8$ N; $p < 0.001$), while those in Class II ($\Delta = 118.62$ N; $p < 0.001$) and Class III ($\Delta = 150.7$ N; $p < 0.001$) experienced a significant increase. Between-group analysis revealed notable differences between Class I and the other two groups ($F = 46.97$; $p < 0.001$), whereas no statistically significant differences emerged between Class II and Class III.

Conclusions: TBP-driven functional changes are malocclusion-specific, reinforcing the clinical importance of customized treatment planning for pediatric populations.

CLINICAL DECISION-MAKING ALGORITHM FOR THE MANAGEMENT OF DENTAL TRAUMA ASSOCIATED WITH MANDIBULAR FRACTURES: A CASE REPORT

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Objectives: to propose a decision-making algorithm for the clinical management of dental trauma associated with mandibular fractures, based on current scientific evidence.

Methods: an electronic search was conducted using the PubMed database, including clinical studies and systematic reviews. The search strategy involved the following keywords: “mandibular fracture”, “condylar fracture”, “mandibular ramus fracture”, “mandibular body fracture”, “mandibular angle fracture”, “symphysis fracture”, “coronoid process fracture”, “maxillofacial trauma”, “traumatic dental injuries”, “dental trauma”, “dentoalveolar injuries”, “dentoalveolar fracture”, “intermaxillary fixation”, and “open reduction internal fixation”.

Results: Traumatic dental injuries (TDIs) occur in approxi-

mately 43% of cases involving mandibular fractures and significantly influence treatment strategies, requiring dental screening aimed at identifying time-sensitive lesions, such as luxation injuries. The clinical algorithm emphasizes the priority management of urgent TDIs, such as extrusions and intrusions, through repositioning and flexible splinting prior to mandibular stabilization. Intermaxillary fixation, when performed using orthodontic brackets with passive archwires, allows simultaneous mandibular stabilization and splinting of teeth affected by traumatic luxation.

Conclusions: the implementation of structured algorithms may improve clinical decision-making by promoting early diagnosis, coordinated treatment, and long-term follow-up.

COMPARISON BETWEEN PLANNED AND ACHIEVED POSITIONS OF PALATAL MINISCREWS USING 3D-PRINTED GUIDES: A RETROSPECTIVE STUDY

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Aim: the aim of this retrospective study was to conduct an *in vivo* evaluation of the accuracy of 3D printed surgical guides in transferring the digitally planned position and orientation of palatal miniscrews.

Methods: twenty-four Caucasian subjects with permanent dentition were selected for CBCT imaging to plan the placement of two miniscrews in the anterior palate region. Following the guided clinical procedure, a specific software function was employed to identify the radiographic scans displaying the maximum discrepancy between the planned and the final positions.

Results: descriptive and inferential statistical analyses revealed an average discrepancy of 2.95 degrees (SD $\pm$ 1.13 degrees) between the planned and final insertion axes. These measurements were obtained using miniscrews with a standard length of 10 millimeters.

Conclusions: 3D-printed surgical guides for palatal miniscrews placement demonstrate satisfactory clinical accuracy with an average deviation of less than three degrees from the planned position. However, the results suggest that there are still opportunities for technological optimization to further reduce discrepancies and enhance the overall predictability of the final positioning.

SKELETAL ANCHORAGE FOR THE MANAGEMENT OF MAXILLARY TRANSVERSE DEFICIENCY AND ASYMMETRY: A CLINICAL CASE TREATED WITH SA-MARPE

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Aim: skeletal anchorage has expanded the treatment options for transverse maxillary discrepancies, improving control of intra-arch symmetry and vertical dimension. This case report describes the management of a 25-year-old male patient with unilateral left posterior crossbite, mild maxillary asymmetry, and a marked maxillary cant treated with skeletal anchorage.

Methods: the diagnostic records included clinical examination, photographs, digital models, and CBCT at T0 and T1, with a 2-year follow-up. Since major surgery was not feasible, a camouflage treatment was planned using a unilateral approach with MSE and two minimally invasive vertical corticotomies to achieve controlled transverse correction.

Results: treatment achieved correction of the unilateral posterior crossbite and improved transverse coordination of the upper arch. The 13-23 distance increased from 38 to 43 mm, while the 16-26 distance increased from 52 to 56 mm, resulting in 5 mm intercanine and 4 mm intermolar expansion. Orthodontic finishing was completed, with diastema closure, achievement of Class I occlusion, and correction of the maxillary cant. Overall outcomes were consistent with the treatment objectives.

Conclusions: this technique proved to be an effective and reliable option for selected cases in which major surgery is not feasible, allowing adequate control of maxillary symmetry and transverse discrepancy. Further follow-up is needed to evaluate long-term stability.

ASSOCIATION BETWEEN ANATOMICAL NASAL OBSTRUCTION AND MAXILLARY CONSTRICTION: STUDY ON POSTERO-ANTERIOR CEPHALOGRAMS IN ADOLESCENTS

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Aim: identification of nasal obstruction and oral breathing is crucial for interceptive orthodontic planning. This study aimed to investigate the association between anatomical nasal obstruction and maxillary constriction using postero-anterior (PA) cephalograms in untreated adolescents.

Materials and methods: this retrospective observational study analyzed initial PA cephalograms of 92 subjects (49 males, 43 females) in permanent dentition, aged 12-17 years, with or without maxillary transverse deficiency. Linear and angular measurements were used to assess nasal obstruction due to turbinate hypertrophy or septal deviation. Prevalence within gender groups was estimated using the Clopper-Pearson method (95% CI). Fisher's exact test evaluated

associations between variables and maxillary constriction.

Results and conclusions: a higher percentage of females showed maxillary constriction (55.81%), with no significant gender differences. The association between turbinate hypertrophy and maxillary constriction was not significant ($p = 0.27$). Nasal septal deviation showed a borderline result ($p = 0.06$), indicating significance at 10% but not 5%. The hypothesis was rejected: turbinate hypertrophy and septal deviation are not directly correlated with reduced maxillary transverse dimensions on 2D PA cephalograms. However, a tendency toward reduced transverse dimension with septal deviation was observed. Further studies with larger samples and 3D imaging are needed to clarify this relationship.

VIRTUAL IPR IN ORTHODONTIC TREATMENTS OF CLASS II MALOCCLUSIONS WITH ALIGNERS: A RETROSPECTIVE STUDY

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Aim: the aim of the current retrospective observational study is to evaluate the influence of virtual IPR over the control of lower incisors proclination.

The study was conducted among patients undergoing an orthodontic treatment with removable aligners for the correction of Class II malocclusions with the use of elastic forces.

Methods: the study targeted 54 participants.

First, lateral cephalometric radiographs were analyzed, considering specific parameters, IMPA as the most important one.

Subsequently, participants were divided into two groups: in the first one, a specific amount of IPR was planned and afterwards implemented; while, in the second one, a greater amount of IPR was planned but was not actually applied during the procedure.

Additionally, post-treatment cephalometric radiographs were taken and evaluated, according to the same initial parameters.

Results: when a smaller amount of IPR than the one planned in the ClinCheck is applied, aligners result in being slightly tighter, having positive effects on the torque control on lower incisors.

Furthermore, for each tenth of millimeters of IPR planned but not clinically enacted, there is approximately one degree less proclination of the lower incisors, measured as IMPA.

Conclusions: to conclude, it can be stated that the current procedure has an influence on the control of incisor proclination in orthodontic treatments of Class II malocclusions with removable aligners.

CORRECTION OF CLASS III MALOCCLUSION IN AN ADULT PRE-PROSTHETIC PATIENT USING GEAW TECHNIQUE

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Aim: to evaluate the effectiveness of Gummetal archwires combined with the GEAW technique and Class III elastics in controlling the occlusal plane in an adult pre-prosthetic patient with anterior crowding.

Methods: a 41-year-old male presented with left Class III molar and canine relationships, mesialization of 47 due to premature loss of 46, reduced overjet (0.5 mm), mandibular anterior crowding, and a hypodivergent pattern. Initial cephalometrics: SNA 86°, SNB 84°, ANB 2°, FH-MP 21°. Treatment included alignment followed by a 0.017 × 0.025-inch Gummetal archwire, Class III elastics (3/16", 6 oz) worn 22 h/day, and tip-back and step-up/down bends. Treatment time: 18 months.

Results: overjet increased to 2.5 mm. Left Class I molar and canine and right Class I canine relationships were achieved, with prosthetic space recovery. Vertical control and transverse coordination were obtained. Final cephalometrics: SNA 86°, SNB 85.5°, ANB 2°. Improvement derived from elimination of molar interferences and vertical increase in the premolar area.

Conclusions: Gummetal combined with GEAW is effective in adult patients for occlusal plane control and vertical space gain. Success depends on compliance and accurate biomechanical planning, particularly anchorage and torque control and elastic wear.

ORTHODONTIC EXTRUSION WITH RECTANGULAR LOOP IN AN ADULT PATIENT STRUCTURALLY WEAKENED INFERIOR PREMOLAR

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Aim: to evaluate the effectiveness of segmented rectangular loop combined with fiberotomy and root planning in an adult patient inferior premolar with root canal treatment and sub-crestal caries lesion

Methods: a 45-year-old male presented with a subcrestal carious lesion on the mesial aspect of tooth 35. To preserve the tooth, treatment comprised early mesial reconstruction of the interproximal wall combined with a surgical flap and mesial osteotomy. Two weeks postoperatively, a segmented rectangular loop extrusion lever fabricated from 0.017 × 0.025-inch TMA wire was placed, was applied to tooth 35, anchored to tooth 46, which was splinted to tooth 47. Follow-up visits were carried out every 15 days, during which fiberotomy and distal root

planning were performed as needed. Total treatment length was two months.

Results: following 2 months of orthodontic extrusion, was obtained 2 mm of extrusion tooth movement, creating enough coronal exposure of the mesial margin to isolate with a rubber dam and perform the structural restoration. Furthermore, was obtained a mesial migration of periodontal tissues following tooth extrusion.

Conclusions: segmented rectangular loop combined with selected fiberotomy and root is effective in adult patients to gain dental extrusion movement and periodontal tissues migration. Success depends on compliance and accurate biomechanical planning.

EFFECTS OF RAPID MAXILLARY EXPANSION ON UPPER AIRWAY PATENCY: A PILOT STUDY IN GROWING PATIENTS

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Aim: this study evaluates the impact of rapid maxillary expansion (RME) on upper airway patency in growing patients through pre- and post-treatment otolaryngologic assessment.

Methods: fifteen patients, male and female, aged 7-13 years, in mixed dentition, with both ogival palate and crossbite, were included. Patients with craniofacial syndromes or systemic conditions affecting craniofacial growth were excluded. All participants underwent RME using a rapid expander anchored by two palatal mini-screws. ENT evaluations were performed before and after treatment, assessing tonsillar hypertrophy (Brotsky 0-4), oropharyngeal crowding (Modified Mallampati I-IV), Friedman Tongue Position (I-IV), adenoid hypertrophy (1-4), nasal septum deviation, and inferior turbinate hypertrophy. Descriptive statistics were performed.

Results: all patients showed improvement in airway-related parameters. A reduction was recorded in both the Modified Mallampati Classification and the Friedman Tongue Position after expansion. No significant changes were observed in tonsillar grade, adenoid hypertrophy, nasal septum deviation, or turbinate hypertrophy.

Conclusions: this pilot study indicates that RME has a positive impact on upper airway patency, as shown by improvements in Modified Mallampati and Friedman Tongue Position scores. No significant changes were seen in tonsillar or adenoidal size or nasal anatomical structures. Given the limited sample size, further studies with larger cohorts and expanded parameters are essential to validate these preliminary results.

TREATMENT OF ASYMMETRIC MOLAR CLASS WITH EQUI-C TYPE HEADGEAR

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Aim: to present the use of the Function Generating Bite (FGB) functional appliance, followed by Equi-C extraoral traction, in growing patients for the correction of asymmetric molar relationships.

Methods: two clinical cases are presented: an 8-year-old patient (Case A) and an 11-year-old patient (Case B). For both patients, medical history and cephalometric data were collected, revealing a skeletal Class II pattern.

Results: in Case A, a pre-treatment masticatory cycle analysis was performed, showing a higher percentage of reverse cycles on the side presenting a Class II molar relationship compared to the contralateral Class I side. In this case, treatment was initiated with a functional appliance (FGB/PCFM) to correct the deep bite and to improve the masticatory function. After com-

pletion of the first treatment phase in Case A and during the initial phase in Case B, both patients were treated with Equi-C extraoral traction, indicated for skeletal and dental Class II malocclusion. The protocol initially involved symmetrical traction (8 oz per side), followed by asymmetrical traction with an increase to 16 oz on the Class II side.

Conclusions: the initial use of the functional appliance resulted in improved masticatory function and a favorable effect on skeletal growth. The subsequent use of Equi-C extraoral traction allowed correction of molar class asymmetry, achieving a bilateral Class I relationship and good occlusal stability. This combined approach proved effective in the early management of sagittal and transverse discrepancies in growing patients.

CLINICAL EFFICACY OF THE FUNCTIONAL APPLIANCE IN THE TREATMENT OF DEEP BITE

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Aim: this case series aimed at illustrating the effects of Function Generating Bite (FGB) treatment on craniofacial bone growth in young patients presenting with deep bite malocclusion.

Methods: the sample consisted of three patients (two males and one female), all aged 10 years at the start of treatment. Demographic and clinical data were collected for each subject. Classification of the malocclusion was performed on stone cast models. Skeletal and dentoalveolar parameters were assessed using lateral cephalometric and postero-anterior radiographs. All patients were treated with the Function Generating Bite (FGB) appliance, incorporating an anterior bite plane, aimed at leveling the Curve of Spee and correcting the vertical component of the malocclusion. Treatment progress was monitored

through periodic clinical and radiographic evaluations.

Results: the initial mean overbite across all cases was 5 mm, indicative of a deep bite condition. Correction was achieved within 6-9 months of treatment, resulting in a final mean overbite of approximately 2 mm, within normal physiological limits. In addition to the correction of the malocclusion, patients also showed improved masticatory function.

Conclusions: within the limitations of this small case series, FGB therapy appears to be effective not only in correcting dental malocclusions and associated functional impairments but also in promoting favorable skeletal adaptation. These findings suggest a potential role of FGB in stimulating physiological bone remodeling and contributing to increased bone volume during growth.

COMPARATIVE EVALUATION OF DENTAL AND SKELETAL EFFECTS INDUCED BY TWO DISTINCT RAPID PALATAL EXPANSION APPLIANCES IN THE CORRECTION OF ASYMMETRIC TRANSVERSE MAXILLARY DISCREPANCIES

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Aim: to evaluate and compare dentoskeletal effects of a modified Hyrax RME with vestibular extension *versus* a traditional Hyrax in growing patients with asymmetric transverse maxillary deficiency and upper midline deviation.

Methods: fifty children (27 girls, 23 boys, 6-9 years) in early mixed dentition were randomly assigned: 25 treated with modified Hyrax, 25 with conventional Hyrax. Dental casts and posteroanterior cephalograms were analyzed at T0 and after six months (T1). Variables: intermolar width (IM-W), intercanine width (IC-W), arch length (AL), arch perimeter (AP), lateral incisor drift (ILD), distance I-IMS, and upper midline deviation.

Paired t-tests were used ($p < 0.05$).

Results: both appliances significantly increased IM-W, IC-W, AL, and AP ($p < 0.0001$) with no transverse skeletal difference. Modified Hyrax showed greater reduction in lateral incisor displacement (-5.15 mm), gain in canine region space (+6.4 mm), and midline correction (~5-6 mm), allowing 7-9 mm for permanent canines.

Conclusions: both appliances effectively correct maxillary transverse deficiency. The modified Hyrax is preferred for managing midline deviation and restoring dental symmetry, potentially reducing the need for later fixed orthodontics.

INFLUENCE OF GROWTH PHASE ON SKELETAL AND AIRWAY ADAPTATIONS FOLLOWING FUNCTIONAL TREATMENT IN CLASS II MALOCCLUSION

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Aims: to assess skeletal and upper airway changes produced by the Twin Block appliance in patients with Class II malocclusion due to mandibular retrusion, using two-dimensional imaging, and to compare these modifications between the pre-pubertal and pubertal stages, including the growth peak.

Materials and methods: twenty patients (9 males, 11 females) with Class II malocclusion treated with the Twin Block appliance were included in the study. Lateral cephalometric radiographs taken at the start of treatment (T0) and at the end of treatment (T1) were analyzed. The sample was divided into two groups of 10 subjects each: a Pre-Peak group and a Peak group, based on skeletal maturity at T0, assessed using the cervical vertebral maturation (CVM) method.

Patients were instructed to wear the appliance full-time (24 hours/day), except during meals and oral hygiene procedures, and were monitored every 4 weeks.

To evaluate the skeletal effects of Twin Block therapy and its influence on upper airway dimensions, lateral radiographs obtained at T0 and T1 were traced and analyzed with cephalometric software (DeltaDent). Statistical analysis was carried out using IBM SPSS Statistics version 20, M-DEAP version 2, and Microsoft Excel 365. Differences in cephalometric variables were tested using the t-test.

Results: the findings revealed evident differences between pre-treatment and post-treatment values in several cephalometric measurements. The comparison between the Pre-Peak and Peak groups showed no statistically significant differences, except for H-C3a1 and Height (th), which reached statistical significance ($p < 0.05$).

Conclusions: twin Block functional therapy proved effective not only in improving mandibular and dental relationships, but also in exerting a positive effect on upper airway development.

PREVALENCE OF MALOCCLUSION AND OSA IN PATIENTS WITH RARE SYNDROME

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Aim: this retrospective observational study evaluated the prevalence of dental malocclusions and obstructive sleep apnea (OSA) symptoms in patients with rare genetic syndromes (ADNP, Smith-Magenis, Pallister-Killian, Koolen-de Vries, Noonan, CTNNB1, Beckwith-Wiedemann). The objective was to identify syndrome-specific phenotypic markers and analyze the influence of craniofacial morphology on nocturnal respiratory parameters.

Methods: orthodontic diagnosis was based on intraoral and extraoral photographs and digital scans, classifying malocclusions according to Angle and skeletal profile. OSA risk was assessed using the Pediatric Sleep Questionnaire (PSQ) in children and the STOP-BANG questionnaire in adults. The sample was analyzed using descriptive and multivariate statistics to explore correlations among variables.

Results: 71 patients were analyzed (37 males, 34 females; mean age 9.4 ± 4.2 years). The orthognathic profile was most frequent (68%), peaking in CTNNB1 (100%) and Smith-Magenis (82%). Pallister-Killian showed a concave profile (55%) and deep bite (44%). Class III malocclusion occurred in 35%, and midline discrepancy in 62%. Smith-Magenis syndrome exhibited the most severe respiratory pattern (snoring 100%, apneas 88%). Macroglossia was linked to open bite and snoring in Beckwith-Wiedemann syndrome. Bruxism was noted in >50% of CTNNB1 and Pallister-Killian cases.

Conclusions: each syndrome displays a distinctive “orofacial signature”. Smith-Magenis shows greater respiratory and behavioral impairment, while others present structural variations. A multidisciplinary approach is recommended for diagnosis and management.

THIRD MOLAR EXTRACTION AND ORTHODONTIC DISTALIZATION: A NARRATIVE REVIEW OF SCIENTIFIC EVIDENCE

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Aim: this review analyzes the role of third molar extraction in orthodontic distalization, evaluating anatomical limitations, molar eruption stage, and treatment effects on second molars. It also considers differences between upper and lower arches, the use of CBCT, and compares distalization with extraction-based therapies, questioning the need for prophylactic extraction.

Methods: PubMed databases were searched using the keywords “orthodontic distalization” and “third molars extractions.” Systematic reviews, cross-sectional studies, case reports, and retrospective comparative clinical studies were included.

Results: orthodontic distalization is strongly influenced by anatomical limitations, especially in the mandible, where retro-molar space is often reduced; therefore, CBCT is important for treatment planning. In the maxilla, the presence or eruption

stage of second and third molars has only a marginal impact, although their absence may improve movement control. Overall, evidence does not support routine prophylactic extraction of asymptomatic third molars, which should be based on specific clinical indications.

Conclusions: third molars extraction is not routinely indicated in orthodontic distalization but should be evaluated case by case based on anatomy, dental development, and treatment planning. In adolescents, especially in the maxilla with skeletal anchorage, developing third molars generally do not require germectomy. Even when fully erupted, maxillary third molars are not considered a primary etiological factor for anterior crowding.

Treatment decisions should be individualized and based on a careful risk-benefit assessment, supported when necessary by three-dimensional imaging.

RELIABILITY OF A 3D CLASSIFICATION SYSTEM FOR MANDIBULAR SECOND MOLAR IMPACTION: A COMPARATIVE STUDY BETWEEN EXPERT AND NOVICE CLINICIANS

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Aim: Mandibular second molar (M2M) impaction is a significant eruption disorder. The aim of this study WAS to validate the clinical reproducibility and accuracy of the 3D classification system for M2M impaction difficulty proposed by Barone *et al.* (BMC Oral Health, 2024), comparing assessments between experienced clinicians and novice examiners.

Methods: a total of 34 M2M cases, previously analyzed by expert clinicians, were independently re-evaluated by two novices following the 3D classification criteria. The protocol involves 7 parameters: 4 surgical and 3 orthodontic. Each case was scored to categorize impaction severity into three levels (Simple, Moderate, Complicated). Intra-operator (5-day interval) and inter-operator agreements were calculated. The agreement between novices and experts was evaluated for individ-

ual items and the final severity grade, reporting absolute and percentage frequencies.

Results: the analysis of the 7 individual items showed high concordance. Surgical items ranged from 94% to 100%, while orthodontic items ranged from 79% to 97%. Intra-operator agreement was 83% for novices and 97% for experts. The overall concordance for the final severity grade (Total Score) was 32/34, achieving an overall accuracy of 94% for the novice assessment compared to the expert.

Conclusions: the 3D classification system demonstrated high accuracy and reliability. This tool is valid across different clinical experience levels, providing a standardized and reproducible method for assessing M2M impaction severity and improving treatment planning.

DENTOSKELETAL CHARACTERISTICS IN CLASS II ASYMMETRIC MALOCCLUSIONS

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Aim: this study evaluated the characteristics of Class II subdivision patients in permanent dentition, to address the better strategy to manage this common malocclusion.

Methods: thirty-two Caucasian patients (10 m, 22 f, 23 ± 9 years) were enrolled. Inclusion criteria were permanent dentition, vertebral maturation ≥ CS4, Class II subdivision (Class I or Class II edge-to-edge on one side, full-cusp Class II on the other), midline deviation, no previous orthodontic treatment/facial asymmetry/dental or periodontal diseases. Digital dental casts with Viewbox analysed arch width and length, sagittal symmetry and Bolton Index.

Results: a transverse interarch discrepancy was found in 18 patients (56%). A deepened curve of Spee was recorded in 27 patients (84%). Two asymmetric patterns were identified. Type

1, with distal position of lower first molar on the Class II side, and mandibular midline deviation toward the Class II side (53%, 17 patients). Type 2, with mesial position of upper first molar on the Class II side, and maxillary midline deviation away from the Class II side (34%, 11 patients). 4 patients (13%) presented both conditions. 20 patients showed a Bolton discrepancy (63%). Anchorage loss, associated with upper first molar mesiorotation, was observed in 10 patients (31%).

Conclusions: two distinct asymmetric patterns were found, with mandibular asymmetry being the predominant finding. The identification of the underlying dental asymmetry at the diagnostic stage is essential to select the most appropriate treatment strategy and achieve optimal outcomes.

TREATMENT OPTIONS FOR COMPLETELY IMPACTED MAXILLARY CANINES: A RADIOGRAPHIC EVALUATION

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Aim: this study evaluated the effectiveness of orthodontic treatment in erupting impacted maxillary canines, focusing on inclination, root length, and apical development, and comparing surgical-orthodontic vs orthodontic-only approaches based on initial inclination.

Methods: fifty-four patients (100 impacted canines) were analyzed using panoramic radiographs before and after treatment (Sidexis). Measurements were performed by a single examiner. Patients were divided by initial inclination: $<56^\circ$ treated with a surgical-orthodontic approach, $>56^\circ$ mainly with orthodontics. Variables included inclination, tooth length, apical status, age, and treatment duration.

Results: orthodontic treatment significantly improved canine incli-

nation (61.59° – 80.96°). Both approaches achieved similar final inclination and apical closure (86.6%), with no significant differences. However, root length increased more in the orthodontic-only group (+7.49 mm) than in the surgical-orthodontic group (+6.60 mm), likely due to more favorable initial conditions. Surgical-orthodontic cases ($<56^\circ$) required longer treatment and involved older patients, indicating greater complexity. Overall success was 97%, with 3% extractions mainly in adults with severe inclination and closed apices.

Conclusions: both approaches are effective and safe, with similar outcomes. Orthodontic-only treatment may favor root growth in selected cases. Age, inclination, and apical status influence duration and success, and early treatment improves prognosis and reduces extractions.

ELASTODONTIC THERAPY IN GROWING PATIENTS: EFFECTS ON THE HYPERDIVERGENT PATTERN AND AIRWAY SPACE

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Aim: to evaluate the effects of elastodontic therapy with AM-COP devices in growing patients with a hyperdivergent pattern, analyzing changes in cephalometric parameters and upper airway dimensions compared to an untreated control group.

Methods: a retrospective study was conducted on 60 subjects in mixed dentition: 30 treated (mean age 8.67 ± 1.3 years) with AMCOP bioactivators and 30 untreated controls (mean age 9.19 ± 0.8 years). Cephalometric analyses were performed on lateral cephalograms at T0 and T1. Dento-skeletal parameters (SNA, SNB, ANB, SN-GoGn, FMA, Ans-Pns^Go-Gn, Co-Me, overjet, overbite) and airway dimensions (SPAS, MAS, IAS) were assessed. Data were subjected to statistical analysis. For all statistical purposes, a p-value <0.05 was considered indicative of statistical significance. The study database

was created using Microsoft Excel® (version 16.88), and all statistical analyses were performed using StataMP17®.

Results: the treated group showed an overall improvement in cephalometric parameters, with a trend toward better vertical growth control and enhanced occlusal relationships; however, no statistically significant reduction in divergence angles was observed. Airway dimensions (SPAS, MAS, IAS) increased compared to the control group, suggesting improved airway patency.

Conclusions: elastodontic therapy in growing patients shows a favorable effect on occlusal relationships and on increasing upper airway dimensions. However, despite a trend toward vertical growth control, it does not produce statistically significant changes in the hyperdivergent pattern. Therefore, it represents a valid interceptive functional approach, particularly for its respiratory and neuromuscular benefits.

RELATIONSHIP BETWEEN HYOID BONE POSITION AND ATYPICAL SWALLOWING: A COMPARATIVE STUDY USING CEPHALOMETRIC ANALYSIS

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Aim: atypical swallowing is a common dysfunction during developmental age and is associated with alterations of the stomatognathic system. The hyoid bone, which serves as the attachment site for several muscles involved in swallowing, may assume an altered position. This systematic review aimed to evaluate the relationship between hyoid bone position and atypical swallowing.

Methods: a systematic review was conducted according to PRISMA 2020 guidelines and the PICOT model by searching PubMed, Scopus, and Embase. Using the keywords “hyoid bone” and “atypical swallowing”, observational studies published between 2007 and 2012 were selected. These studies evaluated hyoid bone position (H-MP, H-T) through cephalometric analysis on lateral cephalometric radiographs in pediatric subjects with a clinical diagnosis of atypical swallowing and a control group. Four studies met the inclusion criteria and were included in the qualitative analysis.

Results: in subjects with atypical swallowing, the hyoid bone tended to show a more inferior and posterior position compared with controls, with increased distance from the mandibular plane and the tuber. No significant correlation was found between hyoid bone position and airway space.

Conclusions: atypical swallowing appears to be associated with a lower and more posterior position of the hyoid bone, likely related to neuromuscular adaptations of the tongue and suprahyoid and infrahyoid muscles. Cephalometric evaluation of the hyoid bone may represent a useful diagnostic support in the assessment of swallowing disorders.

SURVEY ON CLEAR ALIGNER PRACTICE AMONG ITALIAN ORTHODONTISTS: PRELIMINARY RESULTS

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Objective: to assess the use of clear aligner therapy (CAT) among orthodontists of the Italian Society of Orthodontics (SIDO).

Design: Cross-sectional online survey.

Methods: an electronic questionnaire was distributed to SIDO members (2025-2026), collecting data on demographics, CAT usage, appliance selection, treatment planning, case selection, protocols, and perceived clinical challenges.

Results: a total of 377 orthodontists responded (11.85%), 56.5% female. Most practiced in Lombardia (18%) and Campania (17.2%). CAT was used by 93.4%, with 56.9% treating 10-50 cases annually. Most (94.9%) relied on commercial aligner systems, while 5.1% used in-house production. About

64.2% reported 1-3 modifications to digital setups, mainly for final tooth positioning and movement protocols. Premolar extractions with CAT were rarely or never performed by most respondents. Additionally, 25.5% frequently combined CAT with other appliances. Over half (53.1%) never initiated treatment with fixed appliances before switching to CAT. Median treatment duration for non-extraction cases was 15 months. Regarding effectiveness, 45.7% did not consider CAT superior to fixed appliances, while 17.6% did. Among non-users (6.6%), main concerns included poor compliance and limits in complex movements.

Conclusions: CAT use is widespread but heterogeneous, with preference for mild, non-extraction cases.

EVOLUTION OF ORTHODONTIC INFORMATION FROM MULTIPLE CHATBOTS OVER TIME: A TWO-YEAR COMPARATIVE ANALYSIS

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Aim: the widespread use of Large Language Models (LLMs) in generative AI across medical and dental fields, particularly orthodontics, has raised concerns about their accuracy. This study evaluates longitudinal changes in the quality and accuracy of Chatbot responses to orthodontic-related questions over a two-year interval.

Methods: eight standardized questions on malocclusion (heredity, headache, speech/swallowing, temporomandibular disorders (TMDs), worsening over time, chewing, posture, and third molar eruption) were submitted 20 times to five chatbots (ChatGPT, Claude, Gemini, Copilot, DeepSeek) at two time-points. Responses were assessed using a binary (Yes/No) approach and the Global Quality Score (GQS). Differences were analyzed using independent t-tests.

Results: all chatbots demonstrated a statistically significant increase in GQS: ChatGPT ($p = 0.024$), Claude ($p = 0.022$), Gemini ($p < 0.001$), Copilot ($p = 0.001$) and DeepSeek ($p = 0.002$). The greatest improvements were observed in Gemini and Copilot. Performance on well-established topics (heredity, worsening over time, chewing) remained stable. The most notable changes occurred in controversial topics (headache, TMDs, posture, third molars), with fewer unsupported causal claims and better alignment with current scientific evidence. Binary analysis confirmed increased consistency and greater interpretative caution.

Conclusions: chatbots demonstrate significant improvement in response quality and reliability in orthodontics. However, persistent inter-model variability supports their cautious use in clinical decision-making.

ORAL APPLIANCES FOR OBSTRUCTIVE SLEEP APNEA SYNDROME: 3D VOLUMETRIC ANALYSIS OF UPPER AIRWAYS

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Aim: Obstructive Sleep Apnea Syndrome (OSAS) involves recurrent upper airway collapse during sleep, characterized by snoring and excessive daytime sleepiness. While Oral Appliances (OA) are recognized as effective treatments, this study utilizes Cone Beam Computed Tomography (CBCT) to quantify 3D volumetric changes in the upper airways induced by OA therapy.

Methods: a prospective evaluation was conducted on 50 patients (22 males, 28 females) with a polysomnography-confirmed diagnosis of OSAS, defined by an Apnea-Hypopnoea Index (AHI) > 5 and pathological daytime sleepiness. Therapeutic success was defined as an AHI < 10 or a reduction of over 50%. Patients were treated using either Mandibular Advancement Devices or Twin Block Appliances, set at 60-70% of maximum protrusion. CBCT imaging was performed to conduct comparative 3D volumetric reconstructions of the air-

way spaces in both the presence and absence of the devices.

Results: volumetric analysis demonstrated a significant expansion of the mean upper airway 3D reconstructions during OA wear compared to baseline ($p < 0.01$). This morphological improvement correlated with a significant reduction in AHI ($p < 0.01$). Findings confirm that OA therapy is a reliable intervention for managing mild to moderate OSAS cases.

Conclusions: the application of CBCT for 3D airway evaluation provides precise visual evidence of regional morphological changes, potentially enhancing patient compliance and treatment motivation. Given the inherent complexity of OSAS management — which may involve CPAP, surgery, or weight loss — a multidisciplinary approach incorporating otolaryngologists, neurologists, sleep specialists, and dentists remains essential for optimizing therapeutic outcomes.

REDUCTIONS IN THE ANTERIOR AND POSTERIOR DIAMETERS OF THE UPPER ARCH: COMPARISON BETWEEN PATIENTS WITH DYSLALIA AND SUBJECTS WITH CORRECT PHONETICS

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Aim: this research was conducted as a systematic literature review, with the aim of identifying and comparing scientific studies on the correlation between phonetic alterations, malocclusions, and tongue posture.

Methods: the methodological approach, following the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) criteria, was conducted through a systematic search of the following databases: PubMed, Scopus, Embase, and Medline (PubMed).

By typing keywords such as "speech disorder," "palatal dimension," and "dental arch width," observational studies (2020-2026) that correlated transverse skeletal malocclusion and phonetic-phonological disorder were selected. The studies evaluated involved pediatric subjects, clinical trials, and

English-language studies; *in vitro* studies, case reports, and irrelevant articles were excluded. The study also followed the PICOT (Participant, Intervention, Comparison, Outcome, Time) model to ensure rigor, transparency, and reproducibility in the selection and evaluation of sources.

Results: there is a significant link between maxillary deficits and phonetic alterations. Posterior crossbite alters tongue posture and is a key risk factor for dyslalia. Children with phonetic disorders have a short maxillary arch length.

Conclusions: scientific evidence suggests that a transverse developmental deficit of the upper jaw reduces intraoral space for tongue posture, compromising the correct articulation of sounds. Early treatment is crucial not only to ensure harmonious craniofacial growth but also to prevent or correct speech disorders.

SECTOR CLASSIFICATION OF UNERUPTED MAXILLARY CANINES: A DEEP LEARNING-BASED AUTOMATED FRAMEWORK USING PANORAMIC RADIOGRAPHS

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Aim: effective orthodontic planning requires precise localization of unerupted maxillary canines (UMCs), which is often limited by subjective assessment. This study aimed to develop a deep learning framework for automated UMC sector classification, evaluating its accuracy and reliability compared to human practitioners.

Methods: 1,528 UMCs from digital panoramic radiographs (PRs) were selected from the "San Giovanni di Dio e Ruggi d'Aragona" Hospital, Salerno. Six practitioners classified a 20% random sample (T0) into three sectors according to Kim's sector classification system. The process was repeated after four weeks (T1). Human accuracy and reliability were assessed via Cohen's K, measuring agreement with the trainer and intra-examiner consistency. Simultaneously, various AI models

were trained on the full dataset. The best-performing architecture was selected based on sensitivity and precision metrics, with subsequent assessment of its accuracy and repeatability.

Results: the agreement between examiners and the trainer was 0.78 (95% CI: 0.77-0.80), while the overall intra-examiner agreement was 0.85 (95% CI: 0.83-0.87). DenseNet121 emerged as the most effective model for UMC allocation, achieving an overall accuracy of 76.8% and a repeatability of 95.3%.

Conclusions: the developed framework offers a standardized automated approach for UMC sector classification. While its accuracy is comparable to human performance, the AI demonstrates significantly higher reliability, suggesting its potential to reduce subjective variability in orthodontic diagnostic workflows.

COMPARISON BETWEEN PERSONALIZED AND STANDARD FACEMASKS FOR EARLY TREATMENT OF CLASS III MALOCCLUSION: A CROSSOVER RANDOMIZED CONTROLLED TRIAL

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Aim: to compare a personalized facemask (FM) and the standard FM in Class III patients, using a randomized crossover design.

Methods: twenty-four patients between 5 and 12 years of age wore one type of FM for 2 months, followed by the other type for the subsequent 2 months in random order. Participants were recruited from September 2024 to May 2025 and the study was completed in September 2025. Patients were asked which one of the two facemasks they preferred. A questionnaire including Visual Analogue Scale (VAS) for pain and difficulty in sleeping was administered to the patients. Complications with both FMs were registered. A Theramon sensor was used to monitor the FM wear time.

Results: seventeen out of 24 patients preferred the personal-

ized FM (71%, 95% CI: 49% to 87%; $P = 0.063$). Pain at 2 weeks was significantly lower with the personalized FM (difference -0.9; 95% CI: -0.1 to -1.8; $P = 0.034$). No differences in pain at 2 months (difference 0.4; 95% CI from -0.6 to 1.3; $P = 0.413$), difficulty sleeping at 2 weeks (difference 0.0; 95% CI from -0.7 to 0.7; $P = 1.0$) or 2 months (difference -0.2; 95% CI from -0.8 to 1.5; $P = 0.583$), and wearing time (difference 0.2; 95% CI from -0.3 to 0.8; $P = 0.394$). No differences in skin irritation at 2 weeks ($P = 0.0625$, McNemar exact test), at 2 months ($P = 1.0$) and in complications ($P = 1.0$, McNemar test).

Conclusions: the personalized FM is preferred by of Class III patients aged 5–12 years and it is significantly less painful after 2 weeks than standard FM.

MANDIBULAR 3D VOLUMETRIC SEGMENTATION STUDY: JUVENILE IDIOPATHIC ARTHRITIS PATIENTS VS HEALTHY PATIENTS

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Aim: to evaluate morphometric and volumetric differences of the mandible in patients with juvenile idiopathic arthritis (JIA) compared to healthy subjects using three-dimensional (3D) volumetric segmentation from CBCT.

Methods: this retrospective study included 113 JIA patients (22 males, 91 females; mean age 12.6 years) and 50 healthy controls (22 males, 28 females; mean age 12.2 years). All JIA patients underwent clinical and radiological evaluation of the temporomandibular joint (TMJ). CBCT images were analyzed using Mimics software to obtain 3D reconstructions and volumetric segmentations of the mandible and its components (condyle, ramus, body, hemisymphysis). Volumes were compared between affected and unaffected sides in unilateral cases, between sexes, and between JIA and control groups.

Results: in unilateral JIA, significant volumetric differences were found between affected and healthy sides at the condyle, ramus, and hemimandible, with reduced volume on the affected side. No significant differences were observed for the mandibular body and hemisymphysis. Compared to controls, JIA patients showed a significant reduction in total mandibular volume, particularly in cases with bilateral TMJ involvement.

Conclusions: TMJ involvement in JIA significantly affects mandibular growth, especially at the condyle and ramus. CBCT combined with 3D analysis enables early, accurate, and quantitative assessment of mandibular alterations, even without symptoms. Early detection of joint damage is essential to prevent craniofacial deformities and guide appropriate treatment in growing patients.

MULTIDISCIPLINARY MANAGEMENT OF A PERIO-ORTHO PATIENT USING SURGICALLY ASSISTED RAPID PALATAL EXPANSION AND CLEAR ALIGNERS: A CASE REPORT

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Aim: this case report describes the orthodontic management of a 52-year-old patient with dental Class I malocclusion, upper and lower crowding, negative lateral overjet, Class II skeletal pattern, hyperdivergence, and maxillary transverse deficiency (MTD). The patient also presented chronic periodontitis with significant loss of support. Due to refusal of invasive surgery and concerns about fixed appliances, a combined approach with surgically assisted rapid palatal expansion (SARPE) and clear aligner therapy (CAT) was selected.

Materials and methods: diagnosis was based on panoramic and lateral cephalometric radiographs, intraoral scans, and CBCT. A multidisciplinary plan included SARPE supported by two mini-screws to correct MTD. Due to periodontal compromise, tooth 31 was extracted to relieve mandibular crowding.

The second phase involved CAT with interproximal enamel reduction (IPR) in both arches. A total of 33 aligners plus 13 refinement aligners were used. Periodontal status was carefully monitored throughout treatment.

Results and conclusions: esthetic outcomes were satisfactory, with improved smile harmony. Radiographs showed good root parallelism without resorption. A bilateral Class I molar relationship was maintained, with normalized overjet and overbite, improved alignment, and coordinated arches. Skeletal relationships improved, and periodontal conditions showed slight enhancement. CAT combined with IPR and SARPE is an effective approach for complex cases, providing functional and esthetic benefits when supported by careful planning and multidisciplinary management.

CLINICAL MANAGEMENT OF IMPACTED CANINES: DIAGNOSTIC WORK-UP AND TREATMENT STRATEGIES IN AN ORTHODONTIC COHORT

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Aim: the aim of this study is to describe impacted canine management in an orthodontic cohort through standardized diagnostic work-up and tailored treatment strategies.

Materials and methods: a total of 241 orthodontic patients were evaluated. Patients with impacted canines underwent standardized diagnostic assessment including dental, functional, periodontal, temporomandibular, and aesthetic evaluation. Records included panoramic radiograph, lateral cephalogram, study models with space analysis, bite registration, and extra- and intraoral photographs. Canine position was assessed using a angle, cusp-to-occlusal plane distance, and Lindauer sector. CBCT was performed when needed to define three-dimensional position and severity and guide treatment planning. Three clinical cases were selected to

illustrate interceptive management, surgical exposure with orthodontic traction, and extraction in unfavorable impactions.

Results: of 241 patients examined, 22 had impacted canines; 16 unilateral and 6 bilateral. Regarding treatment, 3 underwent interceptive treatment, 15 surgical-orthodontic recovery, and 4 extractions. The three clinical cases showed that treatment choice depended on impaction severity, relationship with adjacent teeth, and feasibility of orthodontic recovery.

Conclusions: impacted canine management should be based on early diagnosis, careful radiographic and clinical assessment, and tailored treatment planning. Timely diagnosis may improve predictability, reduce treatment complexity, and support favorable functional and aesthetic outcomes.

ESTHETIC EVALUATION OF THE GINGIVAL TISSUES AFTER UPPER FIRST PREMOLAR EXTRACTION

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Aim: this retrospective case-control study aims to evaluate the posterior smile esthetics in patients treated with and without upper first premolar extractions, focusing on gingival margin relationships and the occurrence of gingival clefts.

Methods: a retrospective case-control study was conducted on 48 patients (24 extraction, 24 non-extraction). Digital 3D intraoral scans were analyzed to measure crown length ratios between maxillary canines and adjacent premolars. Gingival cleft formation was assessed from standardized intraoral photographs. Statistical comparisons were performed using independent-samples t-tests, with effect sizes and 95% confidence intervals calculated.

Results: extraction cases showed significantly lower crown length ratios (0.67 ± 0.08) compared with controls (0.86 ± 0.10 , $p < 0.001$). Gingival clefts were detected in 95.7% of extraction sites but absent in controls. These findings indicate that the extraction of first premolars alters posterior gingival margin harmony and strongly predisposes to cleft formation.

Conclusions: first premolar extraction significantly increases posterior gingival display and tends to always be associated with gingival clefts. Clinicians should evaluate posterior smile visibility in treatment planning and consider adjunctive measures to preserve esthetics.

SURGICAL AND ORTHODONTIC MANAGEMENT OF BUCCALLY IMPACTED MAXILLARY CANINE: A MULTIDISCIPLINARY APPROACH

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Aim: the aim of this study is to highlight the importance of an accurate clinical and radiological diagnosis of impacted maxillary canines, particularly in relation to the position of the lateral incisor crown, in order to select the most appropriate surgical and orthodontic approach and ensure long-term stability of the outcome.

Materials and methods: a 15-year-old female patient with skeletal Class I, deep bite, and mild upper and lower crowding presented with prolonged retention of the primary maxillary canine due to unilateral buccal impaction of the permanent canine. Initial orthopantomography was used to evaluate specific angular and linear predictive parameters, including the canine angulation (α), the distance of the cusp tip from the occlusal plane (d), and the medial position of the crown according to the Ericson and Kurol sector classification.

Treatment involved the application of low-friction brackets, in-

itial alignment with 0.14 CuNiTi archwires, extraction of the primary canine, and surgical exposure through an osseous window, followed by bonding of the impacted canine. Orthodontic traction was performed using auxiliary 0.13 CuNiTi wires, with progression to 0.14 $\times$ 0.25 CuNiTi for anchorage control, until optimal alignment and occlusion were achieved.

The initial measurements showed a mesial inclination of 12°, a distance of 21 mm from the occlusal plane, and a crown position in sector 1, indicating favorable conditions for orthodontic traction and long-term stability.

Conclusions: early diagnosis and interceptive management of impacted maxillary canines are essential to reduce treatment complexity, duration, and costs, while improving predictability and stability. In the present case, radiographic assessment played a key role in guiding treatment planning and achieving a successful and stable clinical outcome.

MANAGEMENT OF A CLASS II MALOCCLUSION THROUGH MANDIBULAR ADVANCEMENT USING OFF-LABEL FORSUS SPRINGS: CASE REPORT

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Aim: to correct malocclusion by shifting from maxillary distalization to mandibular advancement, improving facial profile and achieving stable Class I occlusion.

Materials and methods: after pendulum appliance removal, fixed .018" slot brackets (Ricketts) were bonded to the maxilla. Deep bite correction used a bonded utility arch for mandibular incisor intrusion. After leveling, .017" x .025" stainless steel archwires were placed. Forsus™ springs (3M) were installed off-label with longer-than-conventional sizes to function as mechanical end stops, reproducing a Herbst-like action to encourage mandibular advancement.

Results: after ~6 months of Forsus therapy, super Class I molar and edge-to-edge incisor relationships were achieved. Two months of nighttime Class II elastics stabilized correction. Final treatment at 20 months showed stable Class I occlusion with proper overjet/overbite. Fixed lingual retainers (.0195" three-strand wire, flame-softened) were bonded to both arches.

Conclusions: unconventional Forsus use produced dentoalveolar effects similar to a Herbst appliance and favorable mandibular advancement, despite the patient being beyond peak growth. Further investigation with larger samples is needed to validate broader clinical applicability.

SUCCESS AND FAILURE IN THE AUTOTRANSPLANTATION OF PERMANENT CANINES: A SCOPING REVIEW

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Aim: impacted permanent canines represent a significant challenge in orthodontics. Although orthodontic traction is the first-line treatment, it is time-consuming and not always successful. This scoping review aims to evaluate the survival rate and complications of autotransplanted permanent canines, as well as pulp vitality and the need for endodontic treatment.

Materials and methods: a systematic search was conducted up to July 15, 2025, in PubMed, Scopus, Web of Science, EMBASE, and Cochrane Library, following PRISMA-ScR guidelines. Randomized, prospective, and retrospective studies were included. Eligibility required patients with impacted canines, pre- and post-operative radiographs, detailed surgical

procedures, and a minimum 4-year follow-up. Reviews, case reports, animal studies, and patients with systemic conditions or trauma were excluded.

Results: eight studies were included, with 716 autotransplanted canines. Eighty-five teeth were lost, resulting in an overall survival rate of 88%. Follow-up ranged from 4.4 to 21 years. Pulp vitality was maintained in 52% of cases, while the remaining teeth required endodontic treatment or showed complications.

Conclusions: autotransplantation is a reliable, biologically conservative, and potentially definitive treatment for impacted canines in selected cases where orthodontic traction is ineffective, contraindicated, or high-risk.

RELATIONSHIP BETWEEN SELLA TURCICA BRIDGING AND SAGITTAL SKELETAL MORPHOLOGY IN SUBJECTS WITH THIRD MOLAR AGENESIS

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Aim: this study aimed to evaluate whether sella turcica bridging (STB) is associated with different skeletal malocclusion patterns in orthodontic patients with third molar agenesis (TMA).

Methods: panoramic and lateral cephalometric radiographs of subjects aged 8-18 years (March-June 2023) were analyzed to assess third molar absence. The sample was divided into two groups: agenesis (AG) and control (CG), each including 200 subjects. Cephalometric variables were compared using the Mann-Whitney U test. Sella turcica morphology was assessed according to Leonardi's classification. Linear regression analyses were performed to evaluate relationships among STB, agenesis, cephalometric variables, age, and sex ($P < 0.05$).

Results: third molar agenesis was associated with greater sella turcica depth, especially in mandibular agenesis. Lower ANB and Wits values were observed in AG, though without clinical relevance. A reduced intermaxillary angle suggested a hypodivergent pattern. Slight increases in articular and gonial angles were noted. Posterior/anterior facial height ratio was higher, and mandibular body length was significantly shorter in AG.

Conclusions: no meaningful association emerged between third molar agenesis and the skeletal characteristics of the sella turcica. Nevertheless, the findings suggest a potential link between TMA and skeletal malocclusion patterns, with a predominance of Class III tendencies.

EVALUATION OF MOLAR SKEW AS A PREDICTOR OF LOWER THIRD MOLAR INCLUSION: RETROSPECTIVE STUDY IN A COHORT OF ORTHODONTIC PATIENTS

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Aim: inclusion of the mandibular third molar is a frequent and multifactorial condition. The initial inclination of the germ has been proposed as a predictive parameter, but the optimal cut-offs remain debated.

Materials and methods: retrospective study on 121 patients (90 orthodontics, 31 controls) with two orthopantomographies 3-5 years apart. Two angles were measured: between the third and second molar (8° - 7°) and between the third molar and the occlusal plane (8° -PO). Inclusion was defined as the absence of functional eruption with formed roots.

Results: inclusion occurred in 74.4% of cases in the orthodontic group and 22.6% in controls ($p < 0.001$). Both groups showed sig-

nificant uprighting over time ($p < 0.05$), with no differences by sex or quadrant. Initial inclinations $\geq 27^\circ$ were associated with increased risk of inclusion (76%), but the 35° threshold showed the highest specificity (OR = 20.22; $p < 0.001$). The 8° -PO angle strengthened the predictive capacity. Orthodontic treatment did not significantly change the uprighting dynamic.

Conclusions: the initial inclination of the third molar is a radiographic parameter useful for estimating the risk of inclusion. The threshold of 35° between the third and second molar is the most specific criterion for identifying patients at risk and guiding the clinical choice between monitoring and prophylactic extraction.

EFFICIENCY OF ORTHOPEDIC TREATMENT IN SKELETAL CLASS III MALOCCLUSIONS IN YOUNG PATIENTS: FROM RAPID MAXILLARY EXPANSION (RME) WITH FACEMASK VS TSME

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Aim: to compare, via cephalometric analysis, the sagittal and vertical effects of two early orthopedic protocols for skeletal Class III malocclusion with maxillary retrusion: the transverse sagittal maxillary expander (TSME) and rapid maxillary expansion (RME) combined with a facemask.

Methods: a retrospective study of 104 patients aged 5-9 with skeletal Class III due to maxillary hypoplasia was conducted. Fifty-two received TSME, 52 RME with facemask. Lateral cephalometric tracings were analyzed before treatment (T0) and after retention (T1). Paired t-tests assessed changes in cephalometric parameters.

Results: both protocols produced forward maxillary displacement and improved sagittal relationships. The RME/facemask group showed greater maxillary advancement, posterior and downward mandibular rotation, and increased anterior vertical dimension. TSME mainly produced dentoalveolar effects with favorable sagittal improvement and a non-significant vertical increase.

Conclusions: facemask therapy is suitable for patients with horizontal growth patterns, while TSME may be preferred for those with anterior open bite. Both appliances are effective for early correction of skeletal Class III malocclusion with maxillary retrusion.

IMPACT OF A STANDARDIZED OROFACIAL ASSESSMENT MODEL FOR THE EARLY IDENTIFICATION OF OROFACIAL MYOFUNCTIONAL DISORDERS IN PEDIATRIC ORTHODONTIC PATIENTS

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Aim: Orofacial Myofunctional Disorders (OMDs) influence craniofacial development, acting as co-factors in the etio-pathogenesis of malocclusions. Early diagnosis necessitates a structured synergy between orthodontists and speech-language pathologists (SLPs). This study evaluates the diagnostic ability of 29 postgraduate orthodontic residents (PORs) in identifying OMDs through the implementation of the adapted Interdisciplinary Orofacial Examination Protocol for Children and Adolescents (aIOEPCA).

Methods: PORs from the University of Pavia initially assessed (T0) a pediatric sample, assigning a Diagnostic Score (DS 1-10) regarding the necessity for myofunctional therapy. Subsequently, the aIOEPCA protocol, comprising 15 clinical items covering occlusion, tongue mobility, swallowing, breathing,

and phonation, was introduced for a second evaluation (T1). Results were validated by comparison with the gold standard provided by an expert SLP. Wilcoxon and Dunn's post hoc tests were performed ($p < 0.05$).

Results: significant discrepancies between the PORs' DS values and those of the SLP at T0 were found ($p < 0.05$). The aIOEPCA protocol enhanced clinical sensitivity, eliminating the statistical divergence between orthodontists and the SLP at T1.

Conclusions: the adoption of structured protocols, such as the aIOEPCA, addresses the possible deficit of knowledge in OMDs and promotes cohesive diagnostic pathways. Integrated interprofessional education should be considered an essential and indispensable element of the postgraduate orthodontic curriculum.

SKELETAL CLASS II MALOCCLUSIONS DUE TO MANDIBULAR DEFICIENCY: CEPHALOMETRIC ASSESSMENT OF GROWTH FOLLOWING DIFFERENT ORTHOPEDIC TREATMENTS

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Aim: this research examined the skeletal effects of three functional orthodontic appliances – Herbst, Twin-Block, and Invisalign with Mandibular Advancement (MA) – in the treatment of skeletal Class II malocclusions caused by mandibular retrusion.

Material and methods: the study involved a sample of pubertal patients (N = 44), selected according to skeletal maturation stage (CVM2) and divided into four groups, including an untreated control group. G1 = Herbst, G2 = 2 Twin Block, G3 = Invisalign MA (Mandibular Advancer), G4 = Control.

Treatment effectiveness was assessed by cephalometric analysis of the Condylion-Gnathion (Co-Gn) parameter, considered a reliable indicator of mandibular growth.

Statistical evaluation was performed using ANCOVA to adjust for potential confounding variables and initial group differences.

Results: the findings showed greater mandibular growth in the treated groups compared to the control group, with noticeable differences among the appliances in terms of skeletal impact and variations in response between male and female patients. These results support the clinical efficacy of functional appliances when applied during the appropriate stage of skeletal development. (*Herbst, Twin-Block, MA*).

Conclusions: the study provides clinicians with valuable guidance for selecting the most suitable treatment based on the patient's individual growth patterns and compliance potential.

FLAP MANAGEMENT IN LABIALLY IMPACTED MAXILLARY CANINES: CLOSED ERUPTION TECHNIQUE VS APICALLY POSITIONED FLAP

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Aim: to compare closed eruption technique and apically positioned flap (APF) techniques in the management of labially impacted maxillary canines, evaluating aesthetic outcomes, periodontal health, and clinical predictability.

Methods: a narrative literature review was conducted using PubMed with no publication date or language restrictions. Clinical studies and systematic reviews on surgical management of labially impacted maxillary canines were included, focusing on the comparison between closed eruption and APF.

Results: seven studies were selected, including systematic reviews, clinical trials, and case series. A qualitative synthesis was performed.

The closed eruption technique is associated with superior aesthetic outcomes and better preservation of gingival architecture, with minimal, clinically negligible recession. However,

predictability may decrease in complex cases requiring precise orthodontic control.

In contrast, the apically positioned flap (APF) provides direct surgical access, enhancing orthodontic traction and treatment predictability. Nevertheless, it may lead to more apically located gingival margins, increased clinical crown length, and visible scarring.

Technique selection should be guided by anatomical factors such as depth of impaction, angulation and root development stage.

Conclusions: neither technique is universally superior. The current literature on labially impacted maxillary canines is limited, and further prospective studies are needed.

Accurate preoperative assessment remains essential to optimize results and minimize complications.

CLINICAL OUTCOMES AND EFFICIENCY OF THE INDIVIDUAL PRESCRIPTION (IP) SYSTEM: AN EVOLUTION OF THE STRAIGHT WIRE TECHNIQUE

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Aim: the IP system develops the programming concept of the standard Straight Wire technique by allowing customization of tip, torque and rotation for each tooth according to treatment goals. The aim of this study was to evaluate the advantages of the IP system compared with the standard Straight Wire technique.

Methods: this study included 10 adult patients treated with the IP system. Each case was planned using a dedicated software, allowing guided selection of bracket material (stainless steel or ceramic) and size (standard or reduced). More than 18 archwires and 250 bracket types were available for each tooth, with different prescription values.

Results: in all cases, an optimal Class I occlusion was achieved. Pre-programmed brackets allowed early correc-

tion of dental rotations during the initial alignment phase, reducing the need for bracket repositioning or manually bent compensatory archwires. Individualized archwires and tooth-specific brackets enabled faster space closure and more efficient resolution of severe crowding, shortening overall treatment time.

Conclusions: the IP system represents a significant advancement toward personalized orthodontic treatment. Digital planning helps prevent unnecessary tooth movements and “round-tripping,” preserves periodontal tissue health, reduces clinical time, and improves outcome stability. Treatment customization is a key tool for predictable, effective, and long-term outcomes.

ORTHODONTIC-SURGICAL PROTOCOLS IN CLEFT TREATMENT: ANALYSIS OF THE MARCHE REGION REGIONAL HEALTHCARE NETWORK OVER THE LAST 15 YEARS

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Aim: to evaluate the effectiveness of orthodontic-surgical protocols in patients with cleft lip and palate and to analyze the organization of the regional healthcare network in Marche over the past 15 years, and to assess its impact on long-term clinical outcomes.

Methods: thirty-one patients born between 2009 and 2020 in Marche with CLP were identified; only ten underwent clinical examination at Torrette Hospital, including collection of medical history regarding intra- and extra-regional care and analysis of orthodontic records, as the remaining patients could not be traced.

Results: all patients underwent cleft repair outside the region except for one treated at Salesi Hospital in Marche. Interceptive orthodontic therapy was provided in different settings: four patients at Torrette Hospital in Ancona, four in private prac-

tices, and two in out-of-region hospitals. Nine patients presented skeletal Class III malocclusion due to maxillary deficiency, and one Class II; four cases had associated lateral crossbite. In nine patients, treatment was initiated with rapid palatal expansion (RPE), combined with facemask therapy in two cases, and always followed by multibracket therapy. One patient with Binder syndrome did not receive early treatment and was scheduled for orthognathic surgery at the completion of growth.

Conclusions: these data highlight the need for a structured regional network to ensure continuity of care and reduce healthcare migration. The majority of patients were successfully managed with interceptive orthodontic treatment, without requiring orthognathic surgery.

MANDIBULAR RESPONSE IN CLASS II DIVISION 1 MALOCCLUSION GROWING PATIENTS: CLEAR ALIGNERS VS RAPID MAXILLARY EXPANSION. A CONTROLLED PILOT STUDY

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Aim: to assess the mandibular response in two groups of Class II division 1 growing patients treated with Clear Aligners (CA) and with Rapid Maxillary Expansion (RME), compared with an untreated control group.

Methods: 33 subjects were recruited. The inclusion criteria were Caucasian ancestry, early mixed dentition with fully-erupted first permanent molars, Class II division 1, transverse interarch discrepancy <5 mm, CSV1-2, no previous treatment/missing or extracted teeth/craniofacial syndromes. The CA Group (AG = 13; 6 m, 7 f, 9.2 ± 0.8 y) was treated following a standardized sequential expansion protocol "molars move first" without extractions and other auxiliaries than attachments; the RME Group (RG = 10; 5 m, 5 f, 9.6 ± 0.7 y) was treated with RME on second primary molars; the Control

Group (CG = 10; 6 m, 4 f, 9.6 ± 0.9 y) was followed-up for 1 year without treatment. Panoramic and lateral x-rays were collected pre-treatment (T0) and post-treatment (T1) (T1-T0 = 14 ± 1 months). Kruskal-Wallis one-way test was used for the T0 baseline analysis and for T1-T0 differences ($p < 0.10$).

Results: no sagittal post-treatment differences were found. On the vertical plane, SN^GoMe demonstrated a better adaptation in AG ($p < 0.05$). AG demonstrated an improvement in the molar relationship, although this value was not fully significant ($p = 0.07$).

Conclusions: dentoalveolar expansion did not affect the mandibular spontaneous advancement. CA provided a dentoalveolar expansion contemporary to a good control of the clockwise mandibular rotation and slight improvement of interarch molar relationship.

IMPACT OF COLLAR DIAMETER AND SIMULATED AGING ON THE RESISTANCE OF ORTHODONTIC MINI-SCREWS TO ORTHOGONAL LOADS

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Aim: the use of mini-screws as temporary skeletal anchorage devices (TSADs) has enabled complex tooth movements by dissipating unwanted forces at the bone level and preventing displacement of adjacent teeth, therefore requiring high fracture resistance. This study aims to evaluate the resistance to orthogonal forces of miniscrews with different diameters, considering new samples and aged miniscrews, subjected to *in vitro* thermocycling and autoclaving to simulate 3- and 6-month exposure to the oral environment.

Materials and methods: a total of 105 miniscrews were tested, divided into 7 groups based on endosseous diameter. For each group, new samples, 3-month and 6-month miniscrews were analysed using an Instron Universal testing machine,

which was used to measure deflection at 0.1 mm and 0.2 mm, as well as maximum fracture load.

The collected data were analysed with Kolmogorov-Smirnov test for normality assessment, ANOVA followed by Tukey's test for multiple comparisons and linear regressions (significance: $p < 0.05$).

Results: miniscrews responded differently to shear forces; resistance to orthogonal loads increased with diameter. Linear regression analysis showed a significant influence of the independent variables "diameter" and "thermocycling" on the shear force 0.1 mm, 0.2 mm and maximum load as dependent variables ($p < 0.05$).

Conclusions: aging up to 6 months did not significantly reduce resistance to shear forces at equal diameter, while a slight but significant reduction in resistance to orthogonal loads was observed.

SKELETAL AND DENTAL EFFECTS OF MINISCREW AND MINIPLATE ANCHORAGE IN GROWING CLASS III PATIENTS

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Aim: this scoping review aims to map and summarize current evidence on the skeletal and dentoalveolar effects of miniscrew (MS) and miniplate (MP) anchorage systems for orthopedic correction of skeletal Class III malocclusion in growing patients.

Methods: a comprehensive search was conducted in PubMed, Scopus, Embase, Cochrane, and Web of Science without restrictions. Randomized and non-randomized clinical trials on MS or MP anchorage in prepubertal or pubertal Class III patients were included. Data were charted according to PRISMA-ScR guidelines, focusing on cephalometric and dental outcomes.

Results: both MS and MP systems improve maxillary advancement and sagittal skeletal relationships compared with conventional or untreated controls. MP shows stronger skeletal effects and fewer dentoalveolar side effects. MS is associated with greater dental changes, including upper incisor proclination and protrusion, upper molar mesialization, and increased dentoalveolar compensation. Vertical skeletal changes are limited and variable.

Conclusions: MP may be preferred when maximizing skeletal correction with minimal dental effects, while MS represents a less invasive option suitable for moderate orthopedic correction.

BIONATOR APPLICATION FOR CLASS II TREATMENT IN ADOLESCENT PATIENT

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Aim: this case report aims to assess the outcomes of using the Bionator appliance in an adolescent patient.

Methods: the patient, a 13-year-old girl, underwent a comprehensive oral and dental examination, including intraoral and extraoral radiographs and study models. A diagnosis of dental and skeletal Class II was made, leading to the decision to use the Bionator appliance. The Bionator functions through a combination of mechanical and muscular actions to induce changes in the position of the teeth and jaws.

Results: the Bionator applies gentle pressure on the teeth and jaws, promoting gradual and natural changes in their po-

sition. The appliance stimulates the oral and facial muscles, encouraging proper jaw development and improved chewing function. The Bionator is generally more comfortable compared to other fixed orthodontic appliances. After 5 months, the patient's teeth showed perfect interdigitation, now in Class I.

Conclusions: this device is designed to correct dental and skeletal issues characteristic of Class II malocclusion. Its ability to induce both passive and active changes through muscular stimulation makes it a popular choice among orthodontists for the treatment of adolescent patients.

NEUROFIBROMATOSIS TYPE 1 AND MALOCCLUSION: IS THERE A DISTINCT OCCLUSAL PHENOTYPE? A SYSTEMATIC REVIEW

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Aim: to systematically review the evidence on malocclusion traits and directly assessed occlusal findings in children and adolescents with neurofibromatosis type 1 (NF1), and to evaluate whether a distinctive occlusal phenotype can be identified.

Methods: a PRISMA 2020 systematic review was performed by searching PubMed and Web of Science for English-language studies (2011-2025). Eligible studies were comparative investigations including pediatric patients with clinically and/or genetically confirmed NF1, matched healthy controls, and direct assessment of occlusal outcomes. Two reviewers independently selected studies, extracted data, and assessed risk of bias using an adapted Newcastle-Ottawa Scale.

Results: twenty-five records were identified, and three Italian case-control studies (530 participants) were included.

Two studies found a significantly higher frequency of Class III malocclusion or Class III molar relationship in children with NF1 than in controls. One also reported significantly more unilateral posterior crossbite and reverse overjet in NF1. A third study found no significant difference in overall malocclusion prevalence, although Class III malocclusion, posterior crossbite, and crowding tended to be more common in the NF1 group. All included studies showed good methodological quality.

Conclusions: the available evidence suggests that NF1 is associated with a non-random occlusal pattern, mainly characterized by a tendency toward Class III malocclusion and posterior crossbite. Early orthodontic assessment may therefore be advisable in pediatric patients with NF1.

THREE-DIMENSIONAL AI- BASED ANALYSIS OF THE CORRELATION BETWEEN PALATAL MORPHOLOGY AND THE MAXILLARY CANINE IMPACTION: AN OBSERVATIONAL STUDY

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Aim: this study aimed to conduct a three-dimensional analysis using CBCT to evaluate the correlation between palatal morphology and the maxillary canine impactions.

Methods: a retrospective study was conducted selecting CBCT scans of patients with at least a maxillary impacted canine and an age-matched control group. DICOM files were imported into "3D Slicer" software for: automated standardized orientation, automatic placement of cephalometric landmarks and automatic acquisition of linear measurements (interincisive distance, interpremolar distance and intermolar distance). Statistical analysis was performed setting $\alpha = 0,05$.

Results: the sample included 85 CBCT scans: 43 CBCT scans presenting impacted maxillary canines and an age-matched control group of 42 CBCTs with physiologic eruption. The mean interincisal distance of the study group was significantly lower compared to the control group ($p < 0.05$). No significant differences were found for the interpremolar and intermolar distances, indicating similar latero-posterior morphology between the groups ($p > 0.05$).

Conclusions: the findings indicate that the anterior palatal morphology can be altered in patients with maxillary canine impaction. This condition can influence the transverse dimension.

AI-ASSISTED CEPHALOMETRIC ANALYSIS: A COMPARATIVE STUDY BETWEEN ARTIFICIAL INTELLIGENCE AND HUMAN PERFORMANCE

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Aim: the aim of this study is to compare cephalometric analysis performed using an IA-based software, with that carried out by human operators with different levels of experience, in order to assess its reliability.

Methods: WebCeph software (free version) was used. A distortion-free lateral cephalometric radiograph with clearly visible anatomical structures was selected. Cephalometric tracing was performed by the integrated AI system and a sample of dental students (40) and orthodontists with at least 10 years of experience (20). The parameters SNA, SNB, ANB, Wits Index, FMA, Overjet, Overbite, U1 to SN, IMPA, and Interincisal Angle were analyzed for quantitative comparison between AI and human operators. In addition, par-

ticipants completed a questionnaire to assess their level of confidence in AI.

Results: human measurements showed overall good agreement with those generated by AI. Among professionals, most parameters showed statistically significant differences ($p < 0.05$), except FMA, IMPA, and U1 to SN. In students, most parameters were not statistically significant ($p > 0.05$), except FMA and IMPA. More than 80% of participants reported a positive attitude toward the use of AI in clinical practice.

Conclusions: AI can provide valuable clinical support, proving to be a reliable tool for cephalometric analysis, thus contributing to standardization and reducing operator-dependent variability. However, clinical experience still influences accuracy.

MANAGEMENT OF ANTERIOR OPEN BITE ACROSS DIFFERENT DENTITION STAGES: A DESCRIPTIVE REVIEW

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Aim: this review aims to analyze the etiological factors, diagnostic considerations, and treatment strategies for Anterior Open Bite (AOB) across different stages of dentition.

Methods: a descriptive review of the literature was performed to evaluate current evidence on AOB. Scientific studies addressing etiology, clinical features, and therapeutic approaches in deciduous, mixed, and permanent dentition were analyzed, with particular attention to interceptive and multidisciplinary management.

Results: AOB is a multifactorial condition associated with oral habits, tongue dysfunction, altered craniofacial growth patterns, and genetic predisposition. Early stages often show dentoalveolar components related to functional habits, while

skeletal discrepancies may develop during growth. In deciduous dentition, management focuses on elimination of oral habits and functional re-education. During mixed dentition, interceptive orthodontic treatment can guide craniofacial development and limit progression of the malocclusion. In permanent dentition, treatment may require fixed orthodontic appliances, skeletal anchorage devices, or combined orthodontic-surgical approaches in severe skeletal cases.

Conclusions: early diagnosis and interceptive treatment are essentials for effective management of AOB. Timely intervention during growth can reduce malocclusion severity and improve long-term functional stability, often limiting the need for complex orthodontic or surgical procedures.

COMPARISON OF TWO METHODS FOR CROSS-SECTIONAL DISCREPANCY DIAGNOSIS: CAC VS CBCT

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Background-Aim: the study aims to compare the model-based method (CAC) and the CBCT method to determine if they lead to an underestimation or overestimation of the expansion required for orthodontic patients.

Methods: a retrospective study was conducted on 32 patients (11 females, 21 males) with a transverse deficit without cross-bite. They were treated with a Haas expander. A total of 64 CBCTs were analyzed using Bluskyplane software.

CAC METHOD: Evaluation based on points on the occlusal surfaces of the first permanent molars.

CBCT METHOD: Calculation of the distance between points on the inner cortical bone at the upper molar roots and the center of resistance of the lower molars.

The Bland-Altman test was used to verify the concordance between the two diagnostic methods.

Results: the findings obtained are as follows:

the CBCT method for transverse discrepancy analysis is repeatable and reproducible.

The CAC method assesses dental discrepancy, while CBCT assesses skeletal discrepancy.

The CAC method underestimates the calculation of transverse diameters.

The CAC method underestimates the expansion needed by an average of 6 mm.

Mandibular transverse changes are associated with the molars, not skeletal changes.

Conclusions: further studies are needed to relate model analysis to the CBCT method, aiming to improve assessments using models alone and limit CBCT use in growing patients.

COMBINED ORTHODONTIC AND ORTHOGNATHIC SURGICAL MANAGEMENT OF SEVERE ANTERIOR OPEN BITE: A CASE REPORT

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Objective: to describe the combined orthodontic-surgical management of a severe anterior open bite in an adult patient with skeletal Class III malocclusion, highlighting diagnosis, treatment phases, and functional and aesthetic goals.

Materials and methods: a 34-year-old patient presented with an anterior open bite (overbite -8 mm), overjet of 3 mm, maxillary transverse discrepancy, occlusal plane cant (2 mm to the right), and dental compensations, including lingual inclination of the mandibular posterior teeth. The treatment plan included a pre-surgical orthodontic phase with oral hygiene, speech therapy, extractions (third molars, maxillary first premolars, mandibular second premolars), bonding, and progression from round to rectangular archwires for alignment and decompensation,

with focus on lower incisor torque. After space closure, SARME was performed to correct the transverse discrepancy, followed by bimaxillary orthognathic surgery with anterior rotation. Treatment ended with a finishing orthodontic phase.

Results: correction of the anterior open bite, improved sagittal and transverse relationships, and achievement of stable functional occlusion were obtained. Facial aesthetics improved, with better profile harmony, chin balance, and reduced gingival display.

Conclusions: combined orthodontic-surgical treatment is effective in complex cases. Proper interdisciplinary planning and pre-surgical decompensation are essential for stable long-term functional and aesthetic outcomes.

PERCEPTION OF AESTHETIC OUTCOMES: ORTHODONTIC TREATMENT VERSUS DIGITAL SMILE DESIGN SIMULATION

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Aim: Digital Smile Design (DSD) is an innovative tool for orthodontic treatment planning that enables visualization of treatment outcomes and integrates patient preferences into decision-making. This study assesses aesthetic perception in laypeople and dental/aesthetic professionals, comparing orthodontic outcomes with an AI-assisted DSD multidisciplinary simulation.

Methods: at the Department of Dentistry of San Raffaele Hospital, a 34-item questionnaire on smile aesthetics was administered, including extraoral images (pre-treatment, post-orthodontic, and digital simulation via SmileCloud) presented in color and black-and-white. A total of 127 responses were collected from lay individuals ($n = 78$) and dental/aesthetic professionals ($n = 54$). Preferences were analyzed using 2×3 ordinal matrices with χ^2 tests (stratified by group), while extraoral and intraoral aesthetic variables were assessed using the Student's t-test.

Results: statistical analysis demonstrated variability in smile aesthetic perception depending on image type and patient. For the first patient, the post-orthodontic smile was most preferred in black-and-white images, while in color images the DSD simulation was favored over the final outcome. For the second patient, the initial smile was most frequently preferred across both image formats. Significant differences emerged between professionals and non-professionals in overall assessment and specific aesthetic parameters, particularly intraoral features.

Conclusions: these findings show that smile aesthetic perception varies according to context and patient characteristics. While the DSD simulation was not always the most preferred, it remains a valuable tool for planning. Differences between professionals and non-professionals highlight the need for a shared aesthetic treatment approach.

BITE FORCE IN GROWING PATIENTS WITH POSTERIOR CROSSBITE: A CASE-CONTROL STUDY

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Aim: this study aimed to evaluate occlusal force in patients with posterior crossbite and the force asymmetry between the crossbite and contralateral sides.

Methods: a total of 120 patients (60 with posterior crossbite and 60 with normal occlusion; mean age 11 ± 0.5 years) were enrolled into the study. The measurements were performed with the Innobyte medical device. Occlusal force in patients with crossbite was measured and compared with the force of patients with normal occlusion. The assessment of the preferred chewing side was performed, and patients presenting a unilateral masticatory preference were excluded. Since data showed a non-normal distribution, the Wilcoxon signed-rank test was used for intra-group comparisons, and the Mann-Whitney test for inter-group comparisons. The Mann-Whitney test

was additionally applied, using a symmetry index, to compare occlusal force between the two sides.

Results: in the crossbite group, occlusal force was significantly higher on the crossbite side than on the contralateral side ($p < 0.001$). No significant side differences were found in controls ($p = 0.101$). Total occlusal force was significantly lower in crossbite patients compared to controls ($p < 0.001$). The symmetry index confirmed greater asymmetry in the crossbite group ($p < 0.001$).

Conclusions: posterior crossbite is associated with reduced overall occlusal force and significant functional asymmetry, with force on the affected side. These findings highlight the importance of addressing neuromuscular imbalance before and during orthodontic treatment.

ODONTOMA ASSOCIATED WITH IMPACTED INCISOR: SURGICAL-ORTHODONTIC MANAGEMENT OF A CASE

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Aim: to present a surgical-orthodontic approach for the management of an impacted maxillary incisor associated with an odontoma, evaluating the role of rapid maxillary expansion (RME) in promoting spontaneous eruption and preventing space loss.

Methods: a patient undergoing pharmacological treatment for epilepsy presented with skeletal Class III malocclusion due to maxillary retrusion, anterior rotation tendency, and labially inclined upper incisors. An odontoma prevented eruption of a maxillary incisor. Radiographic and cephalometric analyses were performed. Treatment included selective extractions, surgical removal of the odontoma, and subsequent RME to facilitate spontaneous eruption.

Results: RME following odontoma removal promoted spontaneous eruption within 6-7 months. Literature reports a success rate of approximately 82% with RME, compared to 39% without expansion, where space loss is more frequent. In the present case, RME contributed to functional and aesthetic improvement, allowing proper alignment of the impacted incisor.

Conclusions: RME represents an effective adjunctive therapy in cases of odontoma-related impaction, increasing the likelihood of spontaneous eruption and reducing orthodontic complications. An interdisciplinary approach improves clinical outcomes and may limit the need for more invasive treatments.

THE ROLE OF RAPID MAXILLARY EXPANSION IN THE EARLY MANAGEMENT OF DISPLACED MAXILLARY CANINES: A RETROSPECTIVE COMPARISON OF THREE EXPANSION PROTOCOLS

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Aim: to compare the effectiveness of three maxillary expansion protocols in promoting physiologic eruption and reducing the risk of impaction of displaced maxillary canines in mixed dentition.

Methods: seventy patients (34 males, 36 females; mean age 9.1 ± 1.5 years) in early mixed dentition with displaced maxillary canines, transverse maxillary deficiency >6 mm, and skeletal stage CS1-CS2 were included. Patients underwent orthopedic maxillary expansion and were assigned to three groups: Haas ($n = 29$), Butterfly ($n = 31$), and MARPE ($n = 27$). Inclusion criteria were absence of canine bulge, canine inclination $>25^\circ$, and overlap with the lateral incisor root (sectors 2-5). A total of 87 canines were analyzed. Panoramic radiographs at T1 and T2 were evaluated using Viewbox 4.0. Changes were

analyzed using ANOVA with Tukey's post hoc tests.

Results: at baseline (T1), no statistically significant differences were observed among the three groups for any of the angular measurements (α , β , σ , η , π) (all $p > 0.05$). Regarding treatment changes (T2-T1), all groups showed improvements in both canine and premolar position. However, no statistically significant differences were detected among the three groups for any of the evaluated variables (all $p > 0.05$).

Conclusions: maxillary expansion, regardless of the appliance used, was effective in improving the position of displaced maxillary canines. These findings support expansion as a reliable interceptive treatment, with outcomes driven by expansion itself rather than the specific device.

PHARYNGEAL AIRWAY CHANGES AFTER MANDIBULAR ADVANCEMENT WITH AMCOP®, TWIN BLOCK, AND RPE IN GROWING PATIENTS WITH CLASS II SKELETAL MALOCCLUSION

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Aim: evaluation of pharyngeal airway changes following mandibular advancement achieved with different orthodontic devices, AMCOP®, Twin Block and RPE, in growing patients with class II skeletal malocclusion.

Methods: this single-center, retrospective observational study included 50 patients aged 6 to 12 years treated at the University of Bari “Aldo Moro”. All patients had latero-lateral telerradiographs performed before (T0) and after treatment (T1). Skeletal, dentoalveolar, and retropharyngeal cephalometric parameters were analyzed, with particular attention to SPAS, PAS, and MAS as indicators of airway patency.

Results: AMCOP® elastodontic therapy resulted in a signifi-

cant increase in pharyngeal airway size, associated with dentoskeletal and functional improvements due to mandibular advancement and neuromuscular rebalancing. The Twin Block produced the greatest increase in pharyngeal airway size, however, AMCOP® represents a less invasive and better tolerated approach. The RPE showed limited sagittal skeletal effects but significant improvements in airway size.

Conclusions: mandibular advancement achieved with orthodontic appliances can improve pharyngeal airway patency in growing patients. Treatment with AMCOP® represents a valid therapeutic option for both correcting malocclusion and improving respiratory function.

EFFECT OF PRINTING ANGLE AND RESIN TYPE ON THE FLEXURAL STRENGTH OF 3D-PRINTED DENTAL MATERIALS

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Aim: to evaluate the influence of printing orientation and resin type on the flexural strength of 3D-printed photopolymerizable dental resins.

Methods: seven photopolymerizable dental resins (Keyguide, C&B, Ivory, Vertysguide, Bite, Tera, NextDent Cast) were printed using a digital light processing (DLP) 3D printer (Moon Night). For each material, 15 rectangular specimens (2 × 2 × 25 mm) were fabricated using three different printing orientations (0°, 45°, 90°). Standardized bar-shaped specimens were designed using 3D Builder, MeshMixer, and Chitubox software. After printing and post-processing (MoonWash 2 and MoonLight 2), all specimens were tested by a three-point bending test using a universal testing machine. Flexural strength and maximum load were recorded

using Bluehill software and statistically analysed using one-way analysis of variance (ANOVA), followed by Tukey’s post hoc test for multiple comparisons, and linear regression analysis. The level of significance was set at $p < 0.05$.

Results: printing orientation did not significantly influence flexural strength. Conversely, differences were observed among the tested materials, indicating variability in mechanical performance depending on resin composition.

Conclusions: the results showed that material selection plays a key role in determining the flexural strength of 3D-printed dental resins, while printing orientation appears to have no significant impact. These findings may help optimize material selection in clinical and laboratory workflows.

SLEEP MATTERS: ASSESSING THE IMPACT OF SLEEP QUALITY ON BEHAVIOR AND LEARNING IN PRIMARY SCHOOL CHILDREN

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Introduction: sleep plays a fundamental role in the physical, cognitive, and emotional development of children.

Aim: this study aimed to evaluate the impact of sleep quality on behavioral and learning outcomes in school-aged children. The research involved participants aged 6 to 10 years attending primary schools in Abruzzo (Italy) and nearby areas.

Materials and methods: data were collected through an online questionnaire administered to mothers, focusing on their children's sleep patterns, nocturnal behaviors, and daytime functioning. Out of 501 distributed questionnaires, 411 were correctly completed and included in the statistical analysis. The results revealed that children experiencing poor or irregular sleep showed higher levels of irritability, difficulty concentrating, and decreased academic performance compared to peers with regular sleep patterns. Moreo-

ver, symptoms suggestive of sleep-disordered breathing — such as snoring or frequent night awakenings — were significantly correlated with behavioral dysregulation and emotional instability.

Results: these findings emphasize the importance of sleep hygiene as a determinant of cognitive efficiency and behavioral adaptation. Promoting consistent sleep routines, limiting screen exposure before bedtime, and enhancing parental awareness about sleep-related problems could contribute to improving children's learning abilities and emotional well-being.

Conclusions: this research supports previous evidence indicating that insufficient or disturbed sleep can have long-term neurobehavioral consequences. Early identification and intervention are essential to prevent potential developmental and educational impairments.

CONE BEAM COMPUTED TOMOGRAPHY (CBCT) AID IN THE MANAGEMENT OF APICAL ROOT RESORPTION OF IMPACTED MAXILLARY CANINES AND PHYSIOLOGICALLY ERUPTED MAXILLARY CANINES AFTER ORTHODONTIC TREATMENT

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Aim: the purpose of this study is to evaluate via CBCT external apical root resorption in impacted maxillary canines treated with surgical exposure and traction using light forces (25 g), compared to a control group (erupted teeth) undergoing conventional fixed orthodontic therapy.

Methods: study at IRCCS San Gerardo (2021-23) on 52 patients: 26 experimental (impacted canine, mean age 12.9 ± 1.2 at start of treatment) and 26 controls (erupted canine, 13.9 ± 1.2) in fixed orthodontic treatment. Subjects with syndromes or systemic pathologies were excluded. Pre- and post-treatment digital panoramic radiographs and pre-treatment CBCTs were analyzed using apex, cemento-enamel junction, and occlusal plane landmarks to calculate root and crown length.

Results: in the impacted group, 38.46% showed resorption (0.95-1.09 mm), while 61.54% completed root development with lengthening (mean 0.5 mm). Severity varied by root shape: from 0.75 mm (blunt) to 1.27 mm (pipette). In the control group, all teeth showed resorption (F: 0.87 ± 0.24 mm; M: 0.76 ± 0.34 mm). Impacted canines showed slightly higher mean resorption (1.01 ± 0.33 mm) vs controls (0.81 ± 0.29 mm), with a significant difference of 0.2 mm (p = 0.04). Treatment duration (p = 0.27), sex, and root shape (p = 0.07) showed no significant differences.

Conclusions: light forces allow root completion in immature canines. Resorption in impacted subjects is clinically comparable to controls (0.2 mm difference, root shortening ≈ 4.5% of the total length of impacted canine), without compromising structure or function. Periodic radiographic monitoring is recommended.

MANAGEMENT OF ROOT TORQUE OF A DILACERATED INCISOR USING A BEGG TECHNIQUE AUXILIARY SPRING: A CASE REPORT

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Aim: to describe the orthodontic-surgical management of a severely dilacerated maxillary central incisor and to evaluate root torque control using a Begg auxiliary during orthodontic recovery.

Methods: a 10-year-old patient presented with failure of eruption of tooth 2.1 and a history of trauma to the primary dentition. OPT and CBCT revealed severe dilaceration, with the crown rotated about 90° vestibularly and the root axis oriented palatally. The treatment plan included orthodontic space opening, surgical exposure, and traction of the impacted tooth into the arch. After eruption, root inclination was corrected to ensure proper positioning within the alveolar bone. For this purpose, a Begg auxiliary spring made of 0.012 high-resilience Australian wire was used.

Results: progressive eruption and alignment of the incisor were achieved. Root torque control allowed correct repositioning of the dental axis without evidence of cortical fenestration or root resorption at clinical and radiographic follow-ups. A satisfactory, stable aesthetic and functional outcome was obtained.

Conclusions: in growing patients, the attempt at conservative recovery of severely dilacerated incisors is, according to the authors, a highly recommended choice. Control of root torque is crucial due to the frequent angulation that occurs at the root level of these elements. Among the biomechanical alternatives available, the auxiliary springs typical of the Begg technique offer numerous advantages that the authors highlight. A typical clinical case completed with this approach is presented.

OCCLUS-O-GUIDE® VERSUS ANDRESEN ACTIVATOR APPLIANCE: A NEUROMUSCULAR ANALYSIS

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Aim: the study aims to assess possible electromyographic variations of the anterior temporalis and masseter muscles during treatment with the Occlus-o-Guide® and the Andresen activator appliance.

Methods: the sample consisted of 82 patients aged between 8 and 12 years, of whom 50 were treated with the Occlus-o-Guide® and 32 with the Andresen activator. The inclusion criteria were skeletal and dental Class II malocclusion and deep bite, carpal growth index in the pubertal spurt, and absence of temporomandibular disorders and periodontal disease. For each patient, the electromyographic parameters analyzed were the POC (Percent Overlapping Coefficient) of the anterior temporalis and masseter muscles and the contraction values of the right and left anterior temporalis and masseter muscles.

These parameters were recorded at three time points: at appliance insertion (T0), after 6 months (T1) and after 12 months (T2) of treatment.

Results: the results showed a maximum muscular inhibition at time T0 and a gradual recovery during treatment between T1 and T2. At appliance insertion (T0), all patients showed neuromuscular balance that did not correspond to orthognathic occlusion. Responses to treatment were similar for both appliances, with greater instability and a slower recovery of orthological balance observed with the Andresen activator compared to Occlus-o-guide®.

Conclusions: both masticatory muscles responded positively to treatment, suggesting a progressive transition from a compensatory neuromuscular balance toward a more physiological orthological balance.

CLINICAL EVALUATION OF THE EFFECTIVENESS OF THE CERVERA PLATE IN THE INTERCEPTIVE CORRECTION OF SKELETAL CLASS II WITH DEEP BITE

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Aim: to describe the clinical efficacy of the Cervera plate in a 9-year-old male patient with skeletal Class II with mandibular retrusion and a deep bite, treated for 11 months. The appliance, which has no active components, promotes neuromuscular relaxation and mandibular release, allowing spontaneous mandibular advancement and improved muscular balance.

Methods: the patient presented with a convex profile, a reduced lower third, mental hypertonicity, a deep bite, increased overbite and overjet, and skeletal Class II with a brachyfacial pattern. The therapeutic goal was to reduce bite depth, stimulate mandibular propulsion, and rebalance the perioral and lingual muscles, promoting harmonious arch development.

The Cervera plate used consisted of an anterior junction plane and two lateral resin plates designed to reduce pressure on the buccinator muscles. It did not include expansion screws or active mechanical elements, basing its effectiveness on neuro-

muscular self-regulation. The device was worn approximately 14 hours a day, primarily at night.

Results: after 11 months, a reduction in overbite and overjet was achieved, with improvement in the molar and canine jaws. Mandibular advancement and an increase in vertical dimension were observed. Clinically, an aesthetic improvement in the profile occurred, with greater chin projection and harmony in the lower third. Functionally, swallowing normalized, with predominantly nasal breathing and bilateral muscle relaxation. Adaptation to the device was rapid, without irritation or difficulty speaking or chewing; the patient's cooperation was excellent.

Conclusions: interceptive treatment with the Cervera plate resulted in significant clinical and functional improvement in a 9-year-old patient with Class II dentures and a deep bite, even in the absence of mechanical forces.

ORAL HEALTH AND ORTHODONTIC TREATMENT IN PATIENTS WITH NEURODEVELOPMENTAL DISORDERS: A CLINICAL PROTOCOL WITHOUT SEDATION

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Objective: to develop a safe and personalized clinical approach enabling patients with neurodevelopmental disorders (NDD) to undergo orthodontic treatment, providing clinicians with tools to manage behavioral and biological challenges. The study also evaluated the impact of cooperation and biological factors on treatment and oral hygiene.

Materials and methods: participants aged 8-14 years with a confirmed NDD diagnosis and moderate-to-high cooperation were recruited at the Orthodontics Department of the University of Campania Luigi Vanvitelli. Patients with complex craniofacial syndromes, uncooperative behavior, or contraindicating medical conditions were excluded. Before treatment, each patient attended three preliminary visits (about one hour each) to build trust and familiarity with the clinical setting and team.

Results: most patients showed good cooperation during preliminary visits, allowing accurate assessment of oral health and orthodontic needs. Difficulties emerged in oral hygiene management, tolerance to appliances, and maintaining attention during procedures. The familiarization phase was crucial in reducing anxiety, improving compliance, and planning safe, individualized treatments.

Conclusions: a preliminary phase of observation and familiarization is essential for successful orthodontic care in NDD patients. Individualized evaluation of cooperation and biological needs supports tailored protocols, reducing complications and improving oral hygiene. This approach offers practical guidance for safe, effective, patient-centered orthodontic management.

FIXED ORTHODONTIC TREATMENT WITH CONVENTIONAL AND SELF-LIGATING TECHNIQUES: A COMPARATIVE EVALUATION OF THE POST-TREATMENT ROOT PARALLELISM INDEX

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Aim: to evaluate the effectiveness of fixed orthodontic treatment with conventional and self-ligating techniques in terms of treatment duration, number of archwires used, and post-treatment root parallelism index.

Methods: twenty patients with dental crowding and misalignment were included and divided into two groups: conventional technique (n = 10) and self-ligating technique (n = 10). Treatment duration, number of archwires, and number of appointments divided into the three treatment phases were recorded. At ≥ 6 months post-treatment, panoramic radiographs were obtained to assess root resorption (presence/absence) and root parallelism index. Data were analyzed using Student's t-test ($p < 0.05$).

Results: treatment duration was significantly shorter in the

self-ligating group ($p < 0.001$). Statistically significant differences were also observed in the duration of each treatment phase: alignment and leveling ($p = 0.023$), space closure/molar relationship ($p = 0.024$), and finishing ($p = 0.020$). The root parallelism index was significantly better in the self-ligating group ($p = 0.033$). No significant differences were found in the number of archwires used ($p = 0.760$). One case of root resorption was observed in the self-ligating group.

Conclusions: self-ligating techniques allow a significant reduction in treatment time and improved root parallelism, without differences in the number of archwires used. These findings suggest a clinical advantage of self-ligating systems, despite the limitations related to two-dimensional radiographic evaluation.

CORRELATION BETWEEN SPINAL COLUMN POSTURE AND CRANIAL STRUCTURE IN PROFESSIONAL ATHLETES: A PILOT STUDY

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Aim: this observational study aimed to analyze the correlation between cephalometric variables and spinal posture in two samples of professional athletes.

Methods: 28 elite male athletes, 16 soccer players (17 ± 1 years), and 12 skiers (16 ± 1 years) were recruited. All included subjects underwent lateral-lateral telerradiography and cephalometric analysis, as well as spinal posture evaluation in the sagittal and frontal plane with the Spinal Mouse® device.

Results: the results showed a significant difference in the value $SpP^\wedge CoOr$, the angle between the maxilla (SpP : plane between anterior and posterior nasal spine) and the Frankfort horizontal (plane between orbitalis and porion), between the

two groups ($p < 0.001$). Spinal posture analysis in the frontal plane showed a more accentuated column curvature in skiers than in soccer players ($p < 0.01$); in the sagittal plane, the forward inclination of the spine was increased in skiers compared to soccer players ($p < 0.001$). A significant correlation was found between the Frankfort horizontal and column inclination (Inc) in the sagittal plane in soccer players ($p < 0.01$) and between the Frankfort plane and the thoracic tract in skiers ($p < 0.05$).

Conclusions: these results indicate that cranial structure, which is correlated with spinal posture, may be among the predisposing factors for greater success in one sport rather than another.

OPEN VS CLOSED TECHNIQUES IN THE MANAGEMENT OF PALATALLY IMPACTED MAXILLARY CANINES: PERIODONTAL OUTCOMES

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Aim: palatally impacted maxillary canines occur in approximately 1–3% of the population and represent a common clinical challenge in orthodontic and surgical management. This narrative review aims to evaluate open eruption (including operculectomy) and closed eruption techniques in the management of palatally impacted maxillary canines, focusing on periodontal outcomes.

Methods: a literature search was performed using the PubMed database. Only studies on palatally impacted canines treated with open (including operculectomy) or closed techniques were included. Periodontal parameters assessed included probing depth, clinical attachment level, gingival recession, and keratinized tissue.

Results: the analyzed literature suggests that the open technique is sometimes associated with greater surgical simplicity and improved access, whereas the closed technique requires

more precise orthodontic control. Clinical evidence indicates that the closed approach is generally associated with better preservation of periodontal conditions; however, overall periodontal outcomes appear comparable between the two techniques, with no clinically significant differences observed when compared to the open protocol. These findings suggest a slight trend in favor of the closed technique in terms of periodontal outcomes. Nevertheless, this narrative review does not demonstrate a clear superiority of either approach, as both open and closed techniques show similar results in periodontal health and surgical-orthodontic management.

Conclusions: despite the slight favorable trend for the closed technique, both approaches represent valid options for the management of palatally impacted maxillary canines. Treatment choice should be individualized based on patient-specific factors.

EFFECT OF CANNABIDIOL ON MAXIMUM PAIN INTENSITY IN PATIENTS WITH MYOFASCIAL TEMPOROMANDIBULAR DISORDERS

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Aim: to evaluate the efficacy of cannabidiol (CBD) oil, administered as an adjunct to standard care, in reducing maximum pain intensity in patients with temporomandibular myofascial disorders, as measured by the Visual Analogue Scale (VAS).

Materials and methods: this prospective, single-center clinical study included 32 patients, randomized into two groups ($n = 16$ per group): a treatment group receiving standard care plus CBD oil and a control group receiving standard care plus placebo (olive oil). CBD was administered with an escalating dosage regimen. Maximum pain intensity was assessed using the VAS at baseline (T0), after one month (T1), and after two months (T2).

In the treatment group, the mean maximum VAS score decreased from 6.5 (SD 1.59) at baseline to 3.38 (SD 3.05) at T1, and remained stable at 3.81 (SD 2.48) at T2. In the placebo

group, values decreased from 9.19 (SD 1.11) at baseline to 6.75 (SD 1.44) at T1 and 6.0 (SD 0.89) at T2. Statistical analysis using ANOVA showed strong significance ($p < 0.0001$), with Tukey's post-hoc test confirming significant intra- and inter-group differences at T1 and T2.

Conclusions: CBD oil demonstrated a significant and clinically relevant reduction in maximum pain intensity compared to placebo. The treatment group showed a marked and early decrease in peak pain, maintained over time, whereas the placebo group exhibited a less pronounced improvement. Given that maximum pain represents the most disabling component of myofascial disorders, these findings suggest a meaningful benefit of CBD in improving patient quality of life. Further studies with larger sample sizes are needed to confirm these results and better define its role in pain management.

COMPARISON BETWEEN TRADITIONAL AND CUSTOMIZED RAPID PALATAL EXPANDERS: ANALYSIS OF BOND FAILURES, CHAIRSIDE TIME, AND TOLERABILITY IN 30 GROWING PATIENTS

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Introduction: the introduction of digital technology in orthodontics has enabled the fabrication of increasingly precise and customized appliances.

Aim: this study aimed to compare the clinical performance of a traditional rapid palatal expander (RPE) with a CAD/CAM customized expander, focusing on bond failures, chairside application time, and patient tolerability in growing subjects.

Materials and methods: thirty patients (mean age 9.2 ± 1.1 years) requiring rapid palatal expansion were divided into two groups: 15 treated with a traditional soldered RPE and 15 with a fully customized CAD/CAM RPE. The number of bond failures during treatment, the total chairside application time (from try-in to cementation), and subjective tolerability were recorded using a 0-10

Visual Analogue Scale (VAS) at 24 hours, 7 days, and 14 days.

Results: the customized RPE group showed a significantly lower number of bond failures (0.2 ± 0.4 vs 1.1 ± 0.8 ; $p < 0.05$) and a shorter application time (12.4 ± 2.1 min vs 24.6 ± 3.8 min; $p < 0.001$) compared with the traditional group. Patients treated with the customized appliance reported better initial comfort, with lower VAS scores after 24 hours (4.1 ± 1.0 vs 6.3 ± 1.2 ; $p < 0.05$).

Conclusions: the CAD/CAM customized expander demonstrated superior clinical efficiency and patient comfort compared with the traditional RPE. The digital workflow allows for greater precision, reduced chairside time, and improved appliance adaptation, representing a meaningful advancement in the orthodontic management of growing patients.

HYRAX VERSUS TRANSVERSE SAGGITAL MAXILLARY EXPANDER

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Aim: to compare the maxillary arch modifications produced by the Hyrax Palatal Expander (HPE) and the Transverse Sagittal Maxillary Expander (TSME) in growing patients presenting maxillary hypoplasia. Both transverse and sagittal changes were assessed on dental casts in the short- and medium-term.

Methods: a retrospective analysis was carried out on 40 patients (20 females, 20 males; mean age 9.2 ± 2.6 years) treated at the University of Milan. Group 1 ($n = 20$) received treatment with HPE for transverse maxillary deficiency, while group 2 ($n = 20$) was treated with TSME to correct both transverse and sagittal deficiencies. Measurements on dental casts were collected at three time points: T0 (before treatment), T1 (appliance removal), and T2 (6-month follow-up). The following parameters were evaluated: intermolar width, distance between first de-

ciduous molars or premolars, intercanine width, palatal depth, palatal length, and arch perimeter.

Results and conclusions: both groups showed a statistically significant increase in all variables between T0 and T1. A slight decrease was observed between T1 and T2; however, this reduction was not clinically relevant and the values at T2 remained significantly higher than baseline. The comparison between appliances revealed no significant differences in transverse expansion. Overall, HPE and TSME demonstrated similar effectiveness in transverse maxillary expansion and stability after 6 months. However, TSME provided superior sagittal development and greater arch perimeter gain with clinically noticeable differences, making it a preferable option when three-dimensional maxillary arch development is required.

PROFESSIONAL USE OF MUSICAL INSTRUMENTS: IMPLICATIONS FOR THE DEVELOPMENT OF MALOCCLUSIONS, TMD AND POSTURAL ISSUES

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Aim: the aim of this study was to assess musicians' awareness of dental and musculoskeletal disorders associated with instrumental practice, the role of information provided by healthcare professionals or music teachers, and the adoption of preventive exercises. A secondary aim was to investigate the association between reported conditions and the type of instrument played.

Methods: a questionnaire was administered to wind and string musicians to evaluate knowledge, self-reported symptoms, and preventive strategies related to orofacial and musculoskeletal disorders.

Results: a total of 152 musicians were enrolled, including 125 wind and 27 string players. Ninety-four subjects (61.8%) reported musculoskeletal or joint symptoms. Back pain was the most frequent complaint (46.8%), followed by neck pain (34%), hand and oral discomfort (33%), temporomandibular disorders (16%), and foot pain (2.1%).

Conclusions: most musicians demonstrated limited awareness of disorders associated with instrumental practice. Only a minority had received guidance on preventive exercises, and an even smaller proportion performed them regularly, underscoring the need for increased education and preventive strategies.

DIAGNOSTIC ASSESSMENT OF PERIODONTAL AND DENTOALVEOLAR COMPLICATIONS FOLLOWING MINI-SCREW ASSISTED RAPID PALATAL EXPANSION IN ADULTS AND LATE ADOLESCENTS: A SYSTEMATIC REVIEW

Frenna B

Aim: this systematic review evaluated the effectiveness of current diagnostic and monitoring methods for skeletal, dental, and soft tissue changes, and the adequacy of follow-up protocols, in late adolescents and adults treated with MARPE.

Methods: following PRISMA guidelines, a search of PubMed, Scopus, Embase, Cochrane, and Web of Science identified prospective and retrospective studies on dental, periodontal, and alveolar outcomes. Study selection, data extraction, and risk of bias (ROBINS-I, RoB 2) were performed by two reviewers. Evidence certainty was assessed using GRADE. Due to heterogeneity, a qualitative synthesis was conducted.

Results: twenty studies were included. Adverse events were mainly assessed with CBCT, clinical and periodontal examinations, radiographs, and digital casts. Dental tipping was frequently reported. Alveolar bone loss was observed in 11 studies, buccal dehiscence in 3, and failure of palatal suture opening in 6. Follow-up was often limited or not reported.

Conclusions: MARPE appears effective for transverse maxillary expansion in late adolescents and adults. However, potential periodontal and alveolar adverse effects require integrated diagnostic evaluation. Evidence is low to very low due to bias, heterogeneity, and limited follow-up; therefore, results should be interpreted with caution and further high-quality long-term studies are needed.

THE IMPACT OF INCISORS POSITION ON PROFILE ESTHETICS IN CLASS I ADULTS: A RETROSPECTIVE STUDY

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Aim: soft tissue evaluation is key in modern orthodontics; however, treatment planning still relies on traditional analyses with limitations, including unstable references and poor consideration of individual variability. The relationship between dental positioning and facial attractiveness, therefore, remains unclear.

This study aims to evaluate the correlation between cephalometric incisor position and profile attractiveness in skeletal Class I normodivergent patients.

Materials and methods: a total of 41 patients (mean age 25.6 ± 6.2 years) with skeletal Class I and normodivergent pattern were included in this STROBE-guided study. Incisor positions were assessed relative to ANS, soft tissue B-point (B'), and pogonion (Pg). Profile photographs were evaluated by four orthodontists using a 5-point Likert scale.

Results: profile attractiveness was rated on average as neutral, with poor inter-examiner agreement (Kappa = 0.017), confirming high subjectivity. No significant correlation was found for maxillary incisors, while a weak inverse correlation emerged for mandibular incisors relative to Pogonion ($R^2 = 0.152$). Increased proclivity was associated with reduced attractiveness.

Conclusions: cephalometric variables alone are insufficient to predict facial esthetics.

While maxillary incisor position showed poor relevance, the mandibular incisor proclination and chin relationship may influence profile attractiveness.

The poor inter-examiner agreement highlights the strong subjectivity of esthetic perception, challenging the reliability of the "clinical eye" and emphasizing the need to share esthetic objectives with the patient.

EXPLORING THE BODY DYSMORPHIC TRAITS AS MODERATORS OF THE IMPACT OF MALOCCLUSION ON ORAL HEALTH-RELATED QUALITY OF LIFE: A CROSS-SECTIONAL STUDY AMONG YOUNG ADULTS

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Aim: malocclusion is not a disease per se but a condition that may affect Oral Health-Related Quality of Life (OHRQoL). Evidence suggests that its impact is more closely related to self-perceived dental aesthetics than to objective severity. Body dysmorphic disorder (BDD), characterized by a distorted self-image, may influence this relationship. This study aimed to evaluate whether body dysmorphic traits moderate the association between malocclusion severity and OHRQoL in young adults.

Methods: a cross-sectional study was conducted on 98 subjects aged 18–30 years seeking orthodontic treatment. Malocclusion severity was assessed using the Index of Orthodontic Treatment Need (IOTN). OHRQoL was measured using the Psychosocial Impact of Dental Aesthetics Questionnaire (PI-

DAQ), and body dysmorphic traits using the Body Dysmorphic Disorder Questionnaire (QdC). Moderation analysis was performed using multiple regression models including an interaction term between malocclusion severity and QdC scores.

Results: PIDAQ scores differed significantly across IOTN categories ($p < 0.001$). Overjet >6 mm and interincisal diastema >2 mm were associated with greater impact on OHRQoL. QdC scores were positively correlated with PIDAQ ($p = 0.530$, $p < 0.001$). The interaction between malocclusion severity and QdC was significant ($\beta = 0.28$, $p < 0.05$), indicating that the impact of malocclusion on OHRQoL increased with higher levels of body dysmorphic traits.

Conclusions: psychological factors should be integrated into orthodontic assessment and treatment planning.

FUNCTIONAL APPLIANCES AND AIRWAY IN CLASS II MALOCCLUSION: AN UMBRELLA REVIEW AND META-ANALYSIS RE-ANALYSIS

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Aim: this umbrella review with meta-analysis evaluated the impact of functional appliances on upper airway area and volume as the primary aim, and patient-reported outcomes as the secondary aim.

Materials and methods: the protocol was registered in PROSPERO (CRD42024540778). Systematic reviews and meta-analyses including prepubertal or circumpubertal growing patients were selected. These patients were in mixed or early permanent dentition (CVM stages II–IV) with Class II malocclusion treated using removable or fixed functional appliances. Non-interventional studies, craniofacial syndromes, major comorbidities, or obstructive sleep apnea were excluded. A comprehensive search was conducted in MEDLINE, Cochrane, Scopus, Web of Science, LILACS, and Ovid following PRISMA guidelines; grey literature was screened via OpenGrey. Risk of bias was assessed using ROBIS, and study overlap using CCA and GROOVE indices. A quantitative re-analysis of three

CBCT-based meta-analyses was performed using random-effects models.

Results and conclusions: nine reviews were included; eight showed low risk of bias and moderate-to-high overlap (CCA = 10.97%). Functional appliances significantly increased oropharyngeal volume, particularly Herbst (up to 7759 mm³) and Twin Block (up to 1727 mm³). Meta-regression showed a 0.36 mm decrease in posterior airway space per year of age, while each treatment month increased the superoposterior space by 0.12 mm and the inferior space by 0.29 mm. Re-analysis showed a large effect for the oropharynx (SMD = 1.41) and a moderate effect for total airway volume (SMD = 0.71). No studies reported patient-reported outcomes. Functional appliances consistently increase oropharyngeal volume, but study variability highlights the need for standardized protocols and adequate follow-up.

ORTHODONTIC MANAGEMENT OF ANTERIOR OPEN BITE IN AN ADULT PATIENT: A CLINICAL CASE REPORT

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Aim: the aim of this study is to describe the orthodontic treatment with multi-brackets therapy of an adult patient with an anterior open bite and atypical swallowing. The treatment lasted 24 months, with the aid of elastics and speech therapy.

Materials and methods: the patient was treated with multi-brackets for 24 months, using elastics to correct the anterior open bite, accompanying the treatment with speech therapy to improve atypical swallowing. The treatment was monitored through regular check-ups to assess its effectiveness and make any changes to the therapy, based on the clinical progress observed.

Discussion: treatment with multi-brackets therapy resulted in significant correction of the anterior open bite and improved masticatory function. The use of elastics 22 hours a day in conjunction with speech therapy helped to stimulate an improvement in swallowing, correcting the atypical component.

Conclusions: orthodontic treatment with multi-bracket therapy and the use of elastics was effective in correcting the anterior open bite and atypical swallowing in an adult patient, with positive aesthetic and functional results and long-term stability.

CORRECTION OF CLASS II DIVISION 2 IN A GROWING ADOLESCENT PATIENT USING CLEAR ALIGNERS AND INTERMAXILLARY ELASTICS WITH DEEP BITE

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Aim: to evaluate the effectiveness of clear aligner therapy combined with Class II elastics in correcting sagittal discrepancy in a growing adolescent with deep bite during the pubertal growth phase.

Materials and methods: a 12-year-old male at cervical vertebral maturation stage (CVM) 2–3 presented with bilateral Class II molar and canine relationships, 4 mm overjet, mild-to-moderate maxillary crowding, convex profile, and hypodivergent pattern. Initial cephalometrics showed SNA 86°, SNB 79°, ANB 7°, and FMA 19°. Treatment consisted of 0.75 mm clear aligners changed weekly (88 total, including refinement). Premolar attachments were used for anchorage and optimized incisor attachments for torque control. Class II elastics (3/16",

4.5 oz) were worn ~20 hours/day with planned overcorrection. Total treatment time was 22 months.

Results: overjet was reduced from 4 mm to 2 mm, achieving bilateral Class I molar and canine relationships. Facial profile improved, vertical dimension was controlled, and transverse coordination was achieved. Final cephalometrics showed SNB 79° and ANB 0.5°, indicating significant sagittal improvement. Changes were mainly dentoalveolar, supported by favorable mandibular growth, without significant side effects.

Conclusions: clear aligners with Class II elastics are effective for mild-to-moderate sagittal discrepancies in growing patients. Success depends on compliance and precise biomechanical planning, especially for anchorage, torque control, and elastic wear.

CORRECTION OF CLASS II MALOCCLUSION IN A GROWING PATIENT USING HERBST APPLIANCE, QUAD-HELIX, AND FIXED ORTHODONTIC THERAPY

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Aim: to assess the effectiveness of Herbst appliance therapy combined with quad-helix expansion and fixed orthodontic treatment in a growing patient with Class II malocclusion.

Methods: a 15-year-old female presented with bilateral Class II molar and canine relationships, constricted palate, left posterior crossbite, 4.5 mm overjet, 3.5 mm overbite, mild-to-moderate maxillary and mandibular crowding, convex profile, and hypodivergent growth pattern. Initial cephalometric values were SNA 85°, SNB 78.5°, and ANB 6.5°. Treatment consisted of 9 months of Herbst therapy combined with a quad-helix appliance, followed by fixed straight-wire therapy and Class II elastics (3/16", 4.5 oz) worn 20 hours/day. Total treatment time was 27 months.

Results: overjet decreased from 4.5 mm to 2 mm. Bilateral Class I molar and canine relationships and dental midline correction were achieved. The left posterior crossbite resolved, transverse relationships improved, and the facial profile became more balanced. Final cephalometric values were SNA 84.8°, SNB 79.5°, and ANB 5.3°.

Conclusions: in growing patients, Herbst appliance combined with a quad-helix appliance, followed by fixed orthodontic therapy, represents an effective approach for the correction of Class II malocclusion, mainly through dentoalveolar changes supported by mandibular growth. A fixed mandibular lingual retainer was bonded at the end of treatment to improve post-treatment stability.

MAGNETOELECTRIC NANOPARTICLES COATING OF RESINS FOR 3D PRINTED ALIGNERS: AN EXPERIMENTAL PROTOTYPE PREPARATION AND IN SILICA EVALUATION OF THE MAGNETOELECTRIC ELICITED EFFECT

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Aim: magnetic nanoparticles are being investigated in dentistry for their antibacterial role and as stimulators of specific cellular activities. Our aim was to test the feasibility of a surface coating for direct printed orthodontic devices loaded with nanoparticles sensitive to magnetic fields.

Methods: ten TC-85 samples were prepared in the form of parallelepipeds measuring 30 mm x 10 mm x 2 mm, following the manufacturer's instructions. A 0.016% solution of magnetic CFO-BTO nanoparticles in isopropyl alcohol was prepared and mixed with the TC-85 monomer. Five samples were immersed in the solution, then received a 20 min curing in the dedicated unit. Scanning electron microscopy (SEM) and energy dispersive X-ray spectroscopy (EDX) analysis of the samples was performed through a Thermo Scientific Phenom ProX G6 scanning electron microscope. A finite element meth-

od-based simulation tool, COMSOL Multiphysics, was used to characterize the magnetoelectric behavior of the obtained samples on a target cell put in direct contact with the material.

Results: SEM images of the coated samples at 500 and 50000 magnifications revealed the presence of opaque spheroidal agglomerates in the range of 0.5-1 micron. The presence of Cobalt at a 2.88%, Barium at a 0.21% and Titanium at a 0.20% atomic concentration was confirmed by the EDX analysis. Based on these density characterisation, the finite element method-based simulation computed an electric field norm of 10 V/m in the proximity of the cellular membrane.

Conclusions: the described surface coating of TC-85 samples with nanoparticles resulted as a procedure capable of conveying magnetoelectric nanoparticles on the surface of 3D printed orthodontic devices.

AUTOMATIC METAL-FREE MAXILLARY EXPANSION IN PEDIATRIC PATIENTS: CLINICAL EVALUATION OF THE PA12 ZEROEXPANDER® DEVICE – A PILOT STUDY

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Aim: this study evaluates the clinical effectiveness of the ZeroExpander® device in maxillary expansion treatment in pediatric patients with transverse deficiency. It is a metal-free, fully digital device, belonging to a new generation of automatic orthodontic appliances, designed to deliver a constant and controlled expansion force without the need for manual activation or home compliance.

Methods: five patients in mixed dentition with maxillary transverse deficiency were included. Devices were designed using a CAD-CAT digital workflow and manufactured in PA12. Transverse measurements were obtained from pre-treatment (T0) and post-treatment (T1) intraoral scans at the level of canines (C), first primary molars (D), second primary molars (E), and

first permanent molars (6°). Statistical analysis was performed using paired t-tests ($p < 0.05$).

Results: mean expansion was +2.93 mm at the intercanine level, +3.52 mm at the first primary molars, +3.65 mm at the second primary molars, and +0.91 mm at the first permanent molars. Intermolar changes (D, E) were statistically significant ($p < 0.01$), whereas intercanine and permanent molar changes were not significant.

Conclusions: the ZeroExpander® device in PA12 demonstrated clinical effectiveness and stability in treating transverse maxillary deficiency in pediatric patients. Its metal-free design and digital workflow make it an innovative, biocompatible solution, also suitable for patients with special needs.

EFFECTS OF ORTHODONTIC THERAPY ON HYOID AND OCCIPITAL MOBILITY: A 140-SUBJECT CROSS-SECTIONAL STUDY

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Aim: this blind cross-sectional study evaluated the influence of fixed orthodontic appliances on the mobility of the cranio-cervical junction— specifically the C0 - C1 and C1 - C2 segments and on the mobility of the hyoid bone.

Methods: the cohort involved 140 females aged 20 to 25 years, divided into two groups: 70 subjects in the retention phase post-orthodontic therapy and 70 untreated controls. Groups were matched for age, BMI, medication and medical history. Generalized pain was assessed using the Fibromyalgia Impact Questionnaire Revised (FIQR). Mobility of the C0–C1 and C1–C2 joints, plus the hyoid bone, was manually evaluated by two experienced osteopaths. Both examiners were blinded to group allocation and study aims, assessing subjects in a randomized sequence. Data were recorded by a

third blinded operator using anonymized alphanumeric codes.

Results: the orthodontic group showed significantly higher FIQR scores than the control (14.51 vs 11.13; $p = 0.02$), indicating greater perceived pain. Treated subjects exhibited a markedly higher prevalence of movement restrictions across all regions: C0 – C1: 76% vs 19% ($p < 0.001$); C2 – C3: 86% vs 37% ($p < 0.001$); Hyoid bone: 90% vs 40% ($p < 0.001$). Total prevalence of at least one restriction reached 100% in the orthodontic group compared with 47% in the non-orthodontic group ($p < 0.001$).

Conclusions: fixed orthodontic therapy may induce medium-term modifications in mandibular-cranial relationships, potentially influencing the biomechanics of the upper cervical spine and hyoid bone. Further longitudinal research is needed to clarify clinical relevance.

EFFECT OF FUNCTIONAL THERAPY ON AIRWAY DIMENSIONS IN PEDIATRIC PATIENTS WITH OBSTRUCTIVE SLEEP APNEA (OSAS): A SYSTEMATIC REVIEW

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Introduction: pediatric obstructive sleep apnea (OSA) is a significant respiratory disorder often linked to craniofacial anomalies, particularly mandibular retrognathism in Class II malocclusions. Functional appliances (FAs) are non-invasive tools used to modulate growth and increase upper airway dimensions, reducing OSA symptoms.

Aim: to evaluate FAs effectiveness in inducing structural upper airway changes in pediatric OSA patients.

Methods: following PRISMA guidelines, this systematic review analyzed literature from 2004 to 2024 using PubMed, Scopus, Web of Science, Embase, and Cochrane. Inclusion criteria: subjects ≤ 14 years with OSA and skeletal Class II malocclusion treated with FAs.

Results: of 1,298 articles, 4 met the criteria. All showed a significant increase in upper airway dimensions (~21%) post-treatment. Cephalometric and tomographic analyses revealed a ~0.5 mm increase in superior posterior airway space, associated with respiratory improvement. Discrepancies remain regarding soft palate and hyoid bone measurements, likely due to methodological differences.

Conclusions: FAs effectively improve upper airway dimensions and OSA symptoms in children. However, the limited number of studies, small samples, and short follow-ups necessitate further research to confirm long-term efficacy and standardize protocols.

TREATMENT OF CLASS II SUBDIVISION TYPE 2 VIA ASYMMETRICAL CARRIERE MOTION APPLIANCE: A CASE REPORT

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Aim: the aim of this case report is to describe the orthodontic treatment of a Class II subdivision left type 2 malocclusion, improving both occlusion and smile aesthetics in an end-growth patient.

Methods: a 17-year-old male patient at the end of growth presented to the UOC of Dentistry at "San Giovanni di Dio e Ruggi D'Aragona" Hospital, Salerno. His chief complaint was an ugly smile. Extraoral examination revealed an orthognathic profile. Intraoral examination identified a Class II subdivision left type 2 malocclusion, with the mandibular dental midline deviated 1 mm to the left relative to the maxillary and facial midlines. Cephalometric assessment indicated a hypodivergent growth pattern and skeletal Class I with proclined lower incisors. The patient was treated with a non-extractive orthodontic approach combined with a Carriere Motion device.

Results: application of the Carriere Motion device on 2.3 and 2.6 led to the successful resolution of the Class II malocclusion. The mandibular midline deviation was corrected, enhancing facial aesthetics and the smile. Additionally, correcting mandibular incisor proclination contributed to achieving optimal occlusal stability and a functional interincisal relationship.

Conclusions: the Carriere Motion appliance proved to be an excellent solution for Class II malocclusion. It represents a viable alternative to extractive treatments or distalization with miniscrews, improving patient compliance. This clinical success was achieved despite the device being employed during a later stage of treatment.

COMPARATIVE ANALYSIS OF MANUAL AND AI AUTOMATED CEPHALOMETRIC TRACING

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Aim: to assess the accuracy and clinical reliability of fully automated artificial intelligence (AI) systems in cephalometric landmark detection and skeletal analysis compared with human operators.

Methods: thirty lateral cephalograms from the AAOF Legacy were analyzed. Two calibrated operators (Dahlberg' error) traced each image using Dolphin, while three AI systems processed the same radiographs. Twelve landmarks were recorded as x- and y-coordinates, and SNA, SNB, ANB, and U1-SN angles were calculated. Agreement was assessed using ICC, MAE, and RMSE. Clinical relevance was evaluated using standard deviation thresholds.

Results: no significant differences were found among opera-

tors except for the anteroposterior position of Orbitale. Highest agreement was observed for Point A and the lower incisal edge (AP), and lowest for the vertical position of the upper incisal edge. One AI system showed the best agreement and lowest errors. Although angular values differed significantly, clinical impact was minimal. Only SNA remained significantly different when applying clinical thresholds. Skeletal classification was consistent across operators.

Conclusions: fully automated AI systems show accuracy comparable to human operators in cephalometric analysis. Despite minor statistical differences, clinical outcomes are largely unaffected, supporting AI as a reliable diagnostic tool.

RAPID MAXILLARY EXPANSION: DENTO-SKELETAL EFFECTS OF THE SURPE PROTOCOL

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Aim: the aim of this study was to evaluate through three-dimensional CBCT analysis the effects of rapid maxillary expansion (RME) performed according to the Super Rapid Palatal Expansion (SURPE) protocol, characterized by the concentration of screw activations within a short time interval.

Materials and methods: sixteen adolescent patients showing transverse maxillary deficiency were treated with a tooth-borne Hyrax expander anchored to the maxillary first permanent molars. CBCT scans were acquired before treatment and one month after the expansion. Dental variables (tipping, intermolar width), alveolar parameters (buccal, mesial, distal, palatal bone thicknesses; CEJ–buccal alveolar bone distance), and skeletal variables (intraforaminal width, anterior and posterior midpalatal suture opening) were analyzed. Statistical analysis included the Shapiro–Wilk test, paired t-test, or Wilcoxon signed-rank test, with significance set at $p < 0.05$.

Results: a significant increase in intermolar width was observed, along with a fan-shaped opening of the midpalatal suture. Buccal tipping of posterior teeth was detected, consistent with findings reported for conventional RME protocols. Alveolar changes included a limited reduction in buccal cortical thickness and mesial and distal bone thickness in molar regions, along with a significant increase in palatal bone thickness. Significant increase in the CEJ–buccal alveolar bone distance was only observed at one molar site.

Conclusions: SURPE protocol produces dentoalveolar and skeletal effects comparable to conventional tooth-borne RME, without increasing short-term biological risk. Therefore, it may represent an alternative to traditional protocols, allowing treatment duration and improved control of the expansion with acceptable periodontal safety in adolescent patients.

INTEGRATED DIAGNOSIS AND MANAGEMENT OF DEEP BITE AND GUMMY SMILE: A CLINICAL CASE REPORT

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Deep bite and gummy smile are frequently associated conditions that affect both function and smile aesthetics. Their etiology may involve dental, skeletal, and soft tissue components, requiring careful differential diagnosis. Deep bite is defined as excessive vertical overlap of the anterior teeth, while gummy smile refers to excessive gingival display during smiling. When combined, these conditions present a therapeutic challenge, as vertical control must be achieved without compromising fa-

cial harmony. Orthodontic treatment strategies include anterior intrusion, posterior extrusion, or their combination, often supported by temporary anchorage devices (TADs). In more complex cases, an interdisciplinary approach involving periodontal or surgical procedures may be required. This poster highlights diagnostic principles, emphasizing the importance of individualized planning to achieve optimal functional and aesthetic outcomes.

EVALUATION OF THE EFFICACY OF AN EPTAMED SERIES 2 ELASTODONTIC DEVICE WITH NASAL BALANCER IN THE TREATMENT OF OSAS

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Aim: the aim of this study is to compare two intraoral device-based treatments in adult patients affected by mild to moderate obstructive sleep apnea syndrome (OSAS), diagnosed by polysomnography.

Methods: this prospective, randomized, controlled, single-center pilot trial includes adult patients with OSAS confirmed by polysomnography, randomized 1:1 into two groups. At baseline, all participants undergo an orthodontic examination, intraoral digital scan for device customization and complete the Berlin Questionnaire. Group A receives a customized Eptamed Series 2 elastodontic device with a nasal balancer, whereas Group B receives the device alone. Respiratory and sleep parameters are assessed at baseline and at 1, 3, and 6 months using the WatchPAT 300 home sleep apnea testing

device with longitudinal smartwatch-derived data for exploratory analysis.

Results: the combination of the Eptamed Series 2 elastodontic device and a nasal balancer is expected to improve Apnea-Hypopnea Index (AHI), oxygen desaturation index (ODI), peripheral oxygen saturation (SpO₂), and other sleep-related parameters. In addition, the study will explore the association between craniofacial and orthodontic characteristics and treatment response.

Conclusions: the effectiveness of Eptamed Series 2 combined with a nasal balancer is evaluated as a non-invasive treatment for mild to moderate OSAS, with the aim of improving nocturnal oxygenation and respiratory stability. The results may support elastodontic devices as an alternative or adjunct to conventional OSAS therapies.

FROM TWEED MECHANICS TO CLEAR ALIGNERS: A RETROSPECTIVE PILOT STUDY ON THE EFFECTIVENESS AND LIMITATIONS OF MANDIBULAR INCISOR EXTRACTION SPACE CLOSURE

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Aim: this retrospective pilot study compared the biomechanical effectiveness of conventional fixed appliances with Tweed mechanics and clear aligner therapy in closing extraction spaces after mandibular incisor extraction, focusing on crown-root angulation, incisor inclination, and sagittal relationships.

Methods: sixteen adult patients were divided into two groups: Tweed mechanics (n=8) and clear aligners (n = 8). Panoramic and lateral cephalometric radiographs and study models at baseline (T0) and post-treatment (T1) were analyzed. Mesiodistal angulation (TIP) and apical position (APEX) were assessed using Levandoski analysis, while incisor inclination was measured through IMPA. Overjet was evaluated on models. Statistical analysis used a non-parametric Brunner-Langer model with ANOVA-type statistics.

Results: both treatments effectively controlled tooth move-

ment. The Tweed group showed stable TIP values, indicating consistent angulation control, whereas the aligner group displayed greater variability. APEX values remained stable overall, with APEX 2 significantly decreasing ($p = 0.033$). IMPA significantly decreased ($p = 0.025$), indicating general incisor retroclination. Overjet increased in the Tweed group and decreased in the aligner group, with no significant differences after treatment. Correlations between crown angulation and apical position were observed.

Conclusions: both approaches achieved clinically acceptable outcomes. Tweed mechanics ensured more consistent crown-root control, while aligners showed greater variability despite satisfactory results. Aligners may be a valid option in selected cases, though fixed appliances remain more predictable for precise biomechanical control.

ASSOCIATIONS BETWEEN PSYCHOLOGICAL FACTORS AND DISEASE PERCEPTION IN JUVENILE IDIOPATHIC ARTHRITIS: THE ROLE OF CATASTROPHIZING AND DEPRESSION

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Aim: to investigate the role of psychological factors in children with Juvenile Idiopathic Arthritis (JIA) and their parents in shaping disease perception, with a focus on patient-reported outcomes (PROs).

Methods: a total of 130 patients with JIA (96 females, 34 males; aged 6–17 years) and one parent per patient were recruited. Parents completed orofacial questionnaires, the parent version of the Juvenile Arthritis Multidimensional Assessment Report (JAMAR), and the Pain Catastrophizing Scale for Parents (PCS-P). Children completed self-report measures of catastrophizing (PCS-C), perceived stress (PSS-C), anxiety and depression (RCADS-SV), as well as questionnaires assessing quality of life, disease status (JAMAR), and jaw functional limitation (JFLS-8). Clinical data were collected at baseline, and all participants were assessed according to DC/TMD criteria. A subgroup of 22 patients was reassessed at 12 months.

Results: children reported a low disease burden with favorable JAMAR scores, consistent with parental reports. Significant associations were observed between children's JAMAR scores, parental JAMAR scores, and psychological variables. In multivariable analyses, child catastrophizing (PCS-C) emerged as the strongest predictor across JAMAR domains, while depressive symptoms were associated with poorer quality of life and greater disease impact. At follow-up, changes in depressive symptoms predicted quality of life, whereas changes in catastrophizing predicted both quality of life and disease perception.

Conclusions: catastrophizing and depressive symptoms significantly influence disease perception and overall well-being in JIA, supporting the integration of psychological assessment into multidisciplinary care.

CORRECTION OF THE CURVE OF SPEE WITH CLEAR ALIGNERS: A SYSTEMATIC REVIEW

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Aim: this systematic review aimed to evaluate the effectiveness of clear aligner therapy (CAT) in reducing the curve of Spee (CoS) in adult patients with permanent dentition, given its role in overbite correction, occlusal balance, and overall treatment outcomes.

Materials and methods: a comprehensive electronic search was performed in PubMed, Scopus, Cochrane Library, Embase, and Web of Science, supplemented by grey literature. Clinical studies assessing CoS changes with CAT were included. Two independent reviewers conducted data extraction and risk of bias assessment using ROBINS-I. The certainty of evidence was evaluated with the GRADE approach.

Results: seven retrospective clinical studies met the inclusion criteria. All showed CoS flattening after CAT, with mean reductions ranging from 0.01 mm to 2.2 mm, comparable to fixed appliances. Vertical control was mainly achieved with attachments and bite ramps, while posterior extrusion was inconsistent. No studies used temporary anchorage devices or reported long-term stability. Evidence quality ranged from low to moderate.

Conclusions: CAT is effective in reducing CoS depth; however, limitations in vertical control and long-term predictability persist. Further well-designed prospective studies are needed.

RAPID MAXILLARY EXPANDER AND ERUPTION GUIDANCE APPLIANCE THERAPY IN SKELETAL

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Class II: cephalometric considerations

Aim: to assess the skeletal and vertical impacts of rapid maxillary expansion (RME) followed by eruption guidance appliance (EGA) therapy in growing patients with skeletal Class II Division 1 deep bite, and to compare these results with cases treated with RME only.

Methods: a retrospective controlled cephalometric study of 91 growing subjects with maxillary transverse hypoplasia and skeletal Class II deep bite was performed. Group 1 (n = 47, mean age 9.65 years) received RME plus an EGA, and Group 2 (n = 44, mean age 9.34 years) received RME only. Lateral cephalometric radiographs were taken at T1 (before treatment)

and T2 (after treatment). Parameters included SNA, SNB, ANB, SN-PNS, ANS, SN-Go, GN, anterior facial height (N-Me), and posterior facial height (S-Go).

Results: Group 1 showed greater reduction in SNA (-0.71° vs $+0.43^\circ$, $p < 0.0001$) and ANB (-2.37° vs -1.85° , $p < 0.01$), indicating improved sagittal relationship. Vertical changes were greater in Group 1: anterior facial height ($+7.95$ mm vs -0.32 mm) and posterior facial height ($+6.13$ mm vs $+0.46$ mm, $p < 0.0001$). Mandibular and palatal plane inclinations showed no significant differences.

Conclusions: RME followed by EGA therapy provides greater sagittal and vertical skeletal improvement compared with RME alone.

WHITE SPOT LESIONS IN FIXED ORTHODONTIC TREATMENT: PREVENTION AND MANAGEMENT

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Aim: to evaluate the most effective preventive and therapeutic strategies for the management of white spot lesions associated with fixed orthodontic treatment.

Methods: an analysis of recent literature was conducted, focusing on the most recent systematic review and network meta-analysis (2026), to compare preventive and therapeutic approaches for WSLs associated with fixed orthodontic treatment.

Results: WSLs are early carious lesions related to plaque accumulation around orthodontic brackets, leading to subsurface enamel demineralization, which may result in cavitation. Prevention is based on remineralizing agents combined with effective mechanical biofilm control. Fluoride varnish showed the highest efficacy in reducing lesion prevalence, enhancing enamel resistance through fluorapatite formation, while CPP-

ACP supplies calcium and phosphate ions promoting subsurface remineralization.

For established lesions, the most effective treatments act within the lesion. Self-assembling peptides promote biomimetic remineralization by creating a three-dimensional scaffold that guides hydroxyapatite deposition, while NovaMin, nano-agents, and CPP-ACP enhance mineral deposition through ion release. Resin infiltration occludes enamel porosities, providing immediate aesthetic improvement but lacking remineralizing effects.

Conclusions: WSLs are strongly associated with impaired oral hygiene. Prevention with fluoride-based strategies is essential. When lesions occur, treatment should focus on remineralization or aesthetic masking. Early, minimally invasive management is key to optimize outcomes.

ORTHOPEDIC-FUNCTIONAL TREATMENT WITH SANDER'S BITE JUMPING APPLIANCE IN A GROWING CLASS II PATIENT: CASE REPORT

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Aim: the Sander's Bite Jumping Appliance (BJA) is a functional-orthopedic device used to treat skeletal Class II malocclusions, especially those due to mandibular retrusion. By advancing the mandible during the pubertal growth peak, it supports skeletal correction and may reduce the need and duration of subsequent fixed multibracket therapy. This case report evaluates the effectiveness of the BJA in a growing patient with skeletal Class II malocclusion caused by mandibular retrusion.

Materials and methods: at the initial clinical evaluation of the 12-year-old male patient, a convex facial profile, increased overjet (+9 mm) and overbite (+4 mm), generalized spacing (ALD +5 mm), and proclination of the incisors were observed. Cephalometric analysis revealed a Class II dentoskeletal malocclusion (ANB = 4.4°), associated with a normodivergent growth pattern and CS3–CS4 vertebral maturation stage. The

primary objectives were to improve facial and smile aesthetics, occlusal function, and oral hygiene. A non-extraction, two-phase therapy was adopted. Treatment began with mandibular advancement using a BJA appliance, to maximize residual pubertal growth, and improve patient's convex facial profile. After 14 months of orthopedic-functional treatment, new radiographs were acquired before starting the fixed multibracket therapy to close the spaces, associated with the use of Class II elastics for anchorage.

Results: the functional-orthopedic therapy was effective in the correction of the Class II dentoskeletal malocclusion. Superimposition analysis revealed overjet reduction, from 9 mm to 5 mm. Treatment enabled proper incisor repositioning and correction of sagittal and transverse discrepancies.

Conclusions: the non-extraction BJA protocol promoted functional and esthetic harmony.

THE IMPACT OF ORTHODONTIC TREATMENT ON ADOLESCENTS' QUALITY OF LIFE: A LONGITUDINAL STUDY

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Aim: to assess the impact of orthodontic treatment on adolescents' psychosocial perception of dental aesthetics, oral health-related quality of life (OHRQoL), and self-esteem.

Methods: patients were recruited during their first consultation at the Orthodontic Clinic of the University of Naples Federico II. Eligible participants were healthy patients aged 10–18 years, able to understand the questionnaires, willing to participate. Patients with previous or ongoing orthodontic treatment, craniofacial anomalies, genetic syndromes, neurological diseases, history of maxillofacial surgery or facial trauma were excluded. Three validated questionnaires were administered before starting orthodontic treatment (T0) and after 6 months (T1): the Psychosocial Impact of Dental Aesthetics Question-

naire (PIDAQ), the Oral Health Impact Profile-14 (OHIP-14) and the Rosenberg Self-Esteem Scale (RSES).

Results: the final sample included 101 patients: 93 underwent multibracket fixed therapy, 4 clear aligner therapy, 4 orthopedic/functional therapy. A significant reduction was observed in the PIDAQ total score at T1, compared to T0. In contrast, the OHIP-14 total score increased significantly, with significant changes in the Physical Pain and Physical Disability domains. No significant differences were found in the RSES scores.

Conclusions: these findings suggest that orthodontic treatment in adolescents after 6 months improves the psychosocial perception of dental aesthetics but is associated with a decline in OHRQoL. Self-esteem remained unchanged in the early stages of treatment.

LIMITATIONS OF 2D LATERAL CEPHALOGRAMS IN PREDICTING TRACTION TIME FOR IMPACTED MAXILLARY CANINES

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Aim: palatally impacted maxillary canines are a frequent orthodontic challenge. This retrospective study aimed to investigate whether specific angular and linear parameters on pretreatment lateral cephalograms could predict the duration of orthodontic traction for forced eruption.

Methods: the study included 50 palatally impacted canines in 40 patients aged 11–17 years. All were treated with fixed multi-bracket appliances (MBT) using a standardized protocol: surgical exposure followed by elastic traction with a dedicated anchorage system. Pretreatment records included panoramic radiographs and lateral cephalograms analyzed via the Milan School approach. Specific angular and linear parameters were measured to determine canine position.

Results: statistical analysis showed no significant correlation between traction duration and the variables investigated. Traction time was not influenced by patient sex, age at surgery, or the angular and linear parameters measured on panoramic and lateral images.

Conclusions: lateral cephalometric analysis lacks prognostic value for predicting treatment duration in canine impaction. Radiographic measurements provide initial spatial orientation, but eruption time depends on operator experience and individual biological variables.

Periradicular bone density, higher around impacted teeth and increasing with age, slows eruption regardless of 2D radiographic position.

3D EVALUATION OF MAXILLARY ARCH MORPHOLOGY IN PEDIATRIC PATIENTS WITH OBSTRUCTIVE SLEEP APNEA: A CROSS-SECTIONAL STUDY

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Aim: to evaluate maxillary morphology in pediatric patients with maxillary constriction undergoing rapid palatal expansion (RPE) and explore its association with sleep-disordered breathing (SDB) parameters.

Methods: twenty-five children with maxillary constriction and possible posterior crossbite were enrolled. Maxillary morphology was assessed by intraoral scanning and anterior Bolton index calculation. SDB was evaluated through overnight home polygraphy measuring the apnea–hypopnea index (AHI). In a subgroup, the Mallampati Index and Pediatric Sleep Questionnaire (PSQ) were also performed.

Results: twenty-two patients showed AHI ≥ 1 , consistent with mild

to moderate SDB. The anterior Bolton index ranged from 68.5% to 99.5% (mean 81.6%), showing a weak positive correlation with AHI ($r \approx 0.22$). In the Mallampati subgroup ($n = 10$), scores ranged I–IV (20% III–IV), mean AHI 3.37 (0.5–5.7), with no meaningful correlation ($r \approx 0.05$). Post-RPE data ($n = 5$) showed heterogeneous results: two children improved (AHI reduction up to 60%), while three remained stable or worsened (mean change -0.78).

Conclusions: children with maxillary constriction present heterogeneous craniofacial and respiratory patterns. Integrating orthodontic and sleep assessments is essential. RPE may improve respiratory function in selected patients, but larger prospective studies are required to confirm these findings.

CLINICAL FACTORS INFLUENCING THE PRECISION OF ATTACHMENT REPRODUCTION IN CLEAR ALIGNER TREATMENT

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Aim: the aim of this study was to evaluate some of the clinical variables that influence the accuracy of reproducing the planned attachment shape. The following clinical variables were considered: the template material, type of composite, and pressure application on the template during attachment curing.

Methods: the evaluated materials for the thermoplastic transfer template construction are Erkolen 0.8 (polyethylene: PE) and Erkodur 0.8 (polyethylene terephthalate glycol—PET-G), and two types of composite resins: Enaflow (lightcuring low-viscosity composite resin) and Enamel plus dentina HRI (light-curing high-viscosity composite resin). The 26 models included were imported into the 3 Shape Ortho System 2022 (ver. 85.0.20 3 Shape, Denmark), and attachments were virtually placed on the dental elements of the first premolar and on both sides of the first upper molars. The accuracy of the at-

tachment reproduction was evaluated through linear and angular evaluations against the reference model (MCAD). Three physical models were obtained: model A, which was printed with attachments; model B with attachments made with a PE template; and model C with attachments made with a PET-G template.

Results: the results showed statistically significant differences ($p < 0.05$) between the PE and PET-G templates with greater precision using the PET-G template. Statistically significant differences ($p < 0.05$) were found among the high-viscosity composite and low-viscosity composite with pressure curing.

Conclusions: in light of the obtained data, using a PET-G template is recommended. The pressure application during composite curing reduces the reproduction accuracy with a low-viscosity composite.

SURGICALLY ASSISTED RAPID PALATAL EXPANSION (SARPE) IN TWO CLEFT PATIENTS: A CASE SERIES

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Aim: to describe the interdisciplinary management of two skeletally mature patients with bilateral cleft lip and palate, severe maxillary transverse deficiency, posterior crossbite and skeletal Class III malocclusion, focusing on the role of surgically assisted rapid palatal expansion (SARPE) as preparation for definitive orthognathic surgery. In skeletally mature patients, conventional expansion is ineffective due to midpalatal suture ossification; SARPE is therefore required to achieve transverse skeletal expansion. In cleft patients, maxillary transverse deficiency tends to relapse despite expansion treatment during growth, because of scar tissue contraction.

Methods: two adult patients with bilateral cleft lip and palate were selected for SARPE. Both had previously undergone cleft-related orthodontic and surgical treatment, including pal-

atal expansion and homologous bone grafting. In both cases, a CAD/CAM-designed bone-borne palatal expander with four palatal screws (two paramedian and two interradicular in the molar region) was used.

Results: in both patients, SARPE was indicated because of severe transverse discrepancy and posterior crossbite. Pre- and post-operative dental models showed increased intercanine and intermolar widths. Model analysis suggested skeletal expansion without dentoalveolar side effects.

Conclusions: in selected adult cleft patients, SARPE with a bone-borne palatal expander may be a useful preliminary step for managing transverse maxillary deficiency and simplifying subsequent orthognathic management of skeletal Class III malocclusion.

ACCURACY OF 3D-PRINTED SURGICAL GUIDES FOR PALATAL TADS PLACEMENT IN ORTHODONTIC TRACTION OF IMPACTED TEETH: A CLINICAL STUDY AND CASE REPORT

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Aim: the primary objective of this study is to evaluate the clinical reliability and accuracy of 3D-printed surgical guides for the guided placement of Temporary Anchorage Devices (TADs). The work presents a clinical case report of a 13-year-old patient with an impacted maxillary central incisor, where computer-guided surgery was employed to position palatal TADs to facilitate orthodontic traction through a precise and controlled biomechanical approach.

Materials and methods: the digital workflow began with a preliminary assessment involving an intraoral scan and Cone Beam Computed Tomography (CBCT). These data sets were integrated via virtual matching to plan the ideal 3D positioning of two TADs (Spider Screw system) in the palatal vault. A tooth-supported surgical template was designed using CAD software and manufactured via 3D printing. The clinical procedure was performed in two stages: first, the guided insertion of

the miniscrews (1.8 mm and 2.0 mm in diameter); and second, the surgical exposure of the impacted tooth using a closed-eruption technique, connecting it to a palatal cantilever anchored to the TADs. Accuracy was evaluated by superimposing the post-operative CBCT data onto the initial virtual plan using dedicated analysis software.

Conclusions: the use of 3D-printed surgical guides significantly enhances the predictability and precision of TAD placement compared to free-hand techniques, minimizing the risk of anatomical damage to roots or neurovascular bundles. This approach provides a stable skeletal anchorage for the management of complex cases, such as impacted teeth, ensuring superior periodontal outcomes and aesthetic results through a standardized digital protocol. Despite the higher initial planning time and costs, the method offers a safer and more efficient clinical solution for modern orthodontics.

ORTHODONTIC SPACE MANAGEMENT IN A PATIENT WITH TOOTH AGENESIS AND DIASTEMAS: AN INTERDISCIPLINARY CASE REPORT

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Aim: this case report describes the orthodontic management of a patient with agenesis of upper and lower lateral incisors, Class II malocclusion, and generalized diastemas. The aim was to redistribute spaces for a prosthetic-driven rehabilitation while improving function and aesthetics.

Methods: treatment started with bonding of the upper arch and alignment using 0.016 NiTi followed by 0.019×0.025 NiTi archwires. Space control was achieved with elastic chains and coil springs. A prosthetic-oriented plan was defined: in the upper arch, camouflage of canines and premolars; in the lower arch, space opening and maintenance in the incisor area (32 and 41) for future rehabilitation.

After preliminary restorative procedures of the upper canines and premolars, the upper arch was rebonded and treatment

continued with progressive wires. The lower arch was bonded with 0.016 NiTi, followed by 0.019×0.025 NiTi and 0.019×0.025 stainless steel archwires. Space opening in the lower arch was performed with coil springs and stabilized with composite stops. Tie-backs, elastic chains, and intermaxillary elastics were used for space control and occlusal finishing.

Final detailing and root control were obtained using rectangular NiTi archwires.

Results: treatment was completed with good alignment, control of diastemas, and proper space redistribution in both arches, allowing definitive prosthetic rehabilitation.

Conclusions: an interdisciplinary orthodontic-prosthetic approach enabled effective space management and satisfactory functional and aesthetic outcomes in a complex agenesis case.

COMBINED ORTHODONTIC-SURGICAL APPROACH FOR IMPACTED MAXILLARY INCISORS

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Aim: to highlight the effectiveness of a combined orthodontic-surgical approach in managing impacted maxillary anterior teeth and restoring both esthetics and psychological well-being in a patient at the end of growth.

Methods: a 12-year-old female presented with absence of maxillary central and lateral incisors (11, 12), causing significant esthetic and psychosocial concerns. Radiographic evaluation (OPT and CBCT) revealed complete bony impaction with unfavorable positioning and fully developed roots. Treatment involved fixed orthodontic appliance placement followed by surgical exposure using a diode laser (2–3 W, continuous mode) via a vestibular approach. Brackets were bonded to the exposed teeth during the same procedure,

and orthodontic traction was initiated to guide eruption into the arch.

Results: initial tooth movement was observed within three months. After approximately ten months, both incisors were successfully aligned in the dental arch with proper occlusion. The laser-assisted procedure ensured optimal visibility, hemostasis, and enhanced healing, contributing to treatment efficiency and patient comfort.

Conclusions: the interdisciplinary orthodontic-surgical approach proved effective in resolving complex incisor impaction. Beyond functional and esthetic rehabilitation, the treatment significantly improved the patient's psychological condition, underscoring the importance of timely and comprehensive management.

ASSESSMENT OF CORRELATIONS BETWEEN STRABISMUS AND MALOCCLUSIONS IN A PAEDIATRIC COHORT: PILOT STUDY

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Aim: the aim is to evaluate the association between strabismus, and dental malocclusions in a pediatric population. Secondary objectives include identifying possible patterns between specific types of strabismus and occlusal alterations, as well as assessing the influence of demographic, functional factors and oral habits.

Methods: an observational, cross-sectional study is being conducted on 50 children aged 6–12 years diagnosed with strabismus. Patients are recruited at the Orthoptics Unit of Santa Maria della Misericordia Hospital in Perugia and evaluated at the University Dental Clinic (COU). Subjects with latent or manifest strabismus are included, while those with previous orthodontic or ophthalmologic treatment or systemic diseases are excluded. After informed consent from parents, partici-

pants undergo a dental examination performed by a single operator. The evaluation includes intra- and extra-oral examination, Angle classification, assessment of overjet, overbite, and crossbite, oral habits questionnaire, intraoral scanning, and photographic documentation. Descriptive statistics and inferential analyses will be used to explore associations between variables.

Results: recruitment is currently on going.

Conclusions: this study aims to provide preliminary epidemiological evidence on the relationship between strabismus and malocclusions. The findings may contribute to a better understanding of the interaction between the visual and stomatognathic systems and support the importance of an interdisciplinary care in pediatric patients.

MANDIBULAR ADVANCEMENT DEVICES IN OSA PATIENTS WITH TMD: IMPACT ON QUALITY OF LIFE

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Aim: to evaluate changes in temporomandibular disorder (TMD)-related symptoms and health-related quality of life in patients with obstructive sleep apnea syndrome (OSAS) and pre-existing TMD treated with mandibular advancement devices (MAD). The study investigates whether mechanical mandibular protrusion exacerbates temporomandibular joint (TMJ) dysfunction or pain.

Methods: this retrospective study analyzed 26 patients (aged 40–65 years) with polysomnography-confirmed OSAS and baseline TMD symptoms. Participants were treated with a custom-made monobloc MAD. Clinical outcomes assessed at baseline (T0) and at a 6-month follow-up (T1) included the Apnea-Hypopnea Index (AHI), Epworth Sleepiness Scale (ESS), Fonseca Anamnestic Index, and the SF-36 quality of life questionnaire.

Results: MAD therapy yielded a significant reduction in AHI (30 ± 13.76 at T0 vs 10.87 ± 3.9 at T1) and daytime sleepiness

(9.31 ± 3.53 at T0 vs. 3.38 ± 1.77 at T1; $p < 0.00001$). Notably, TMD symptom severity significantly decreased (Fonseca Index: 33.85 ± 17.74 at T0 vs. 10.00 ± 8.94 at T1; $p < 0.00001$). Significant improvements were also documented across all SF-36 domains (41.15 ± 9.52 at T0 vs. 65.38 ± 5.82 at T1; $p < 0.00001$). Linear regression analysis revealed no significant association between the magnitude of AHI reduction and changes in TMD symptoms, suggesting the benefits are independent of respiratory improvement.

Conclusions: within the limitations of this retrospective study, MAD therapy did not exacerbate TMD symptoms in OSAS patients; rather, it was associated with clinical improvement in both TMD severity and perceived quality of life. These findings support the clinical safety and tolerability of MADs for patients with concomitant OSAS and TMD.

ELECTROMYOGRAPHIC ASSESSMENT OF MASTICATORY MUSCLE FUNCTION IN GROWING SUBJECTS WITH DIFFERENT CRANIOFACIAL PATTERNS

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Aim: this study assessed electromyographic (EMG) activity of masticatory muscles in growing subjects with different sagittal and vertical craniofacial patterns using standardized surface EMG (sEMG), to evaluate whether malocclusion influences muscle symmetry and activation in static and dynamic conditions.

Materials and methods: a total of 179 subjects (100 females, 79 males; aged 6–18 years) attending orthodontic consultations at the University of Naples Federico II were included. Participants were categorized according to sagittal (Class I, II, III) and vertical (deep bite, normal bite, open bite) relationships. Bilateral sEMG recordings of the anterior temporalis and masseter muscles were obtained using Ag/AgCl electrodes during maximal voluntary clenching on teeth and cotton rolls, following Ferrario's normalization method. The following indices were calculated: Percentage Overlapping Coefficient (POC),

Asymmetry Index (ASIM), Activity Index (ATTIV), and Torque Index (TORQUE). Statistical analysis included ANOVA and cluster analysis (hierarchical and K-means; SPSS v22).

Results: moderate asymmetry and greater temporalis activity compared to masseter activity were observed. No significant differences were found among sagittal malocclusion groups. For vertical patterns, only masseter POC differed significantly, showing greater asymmetry in deep bite subjects ($p < 0.05$). Cluster analysis revealed multiple activation profiles without clear association with malocclusion; patterns were mainly linked to developmental variability.

Conclusions: sagittal and vertical malocclusions in growing subjects do not significantly affect muscle symmetry or activity, except for mild masseter asymmetry in deep bite cases. Functional patterns appear more related to growth and neuromuscular maturation than to occlusal features.

EFFECT OF RPE ON UPPER AIRWAYS IN PEDIATRIC PATIENTS WITH OSAS: A CASE CONTROL STUDY

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Aim: pediatric Obstructive Sleep Apnea (OSA) is a respiratory disorder characterized by partial or complete upper airway obstruction during sleep. Major risk factors include adenotonsillar hypertrophy, obesity, and craniofacial anomalies such as maxillary constriction. Although adenotonsillectomy is the first-line treatment, it is not always curative. Rapid Palatal Expansion (RPE) is an orthopedic therapy used to correct transverse deficiency and reduce nasal resistance by widening the oropharyngeal space.

Methods: this study evaluated airway and skeletal changes in children with OSA treated with RPE compared to untreated controls. A case-control study included 37 children (6.26 ± 1.26

y.o.) treated with RPE (0.25 mm/day) and 9 months retention, and 39 untreated subjects. Lateral cephalograms at baseline (T0) and follow-up (T1) were analyzed (Kirjavainen method).

Results: results showed significant airway increases in the treated group: ad1-PNS +3.48 mm ($p < 0.001$), ad2-PNS +1.67 mm ($p = 0.003$). The PP-MP angle decreased by 1.14° ($p = 0.043$), indicating counter-clockwise mandibular rotation. No significant changes were found in controls.

Conclusions: RPE improves airway dimensions and skeletal patterns in pediatric OSA, supporting its role in multidisciplinary treatment.

FAILURE OF ERUPTION MECHANISM OF THE MANDIBULAR SECOND MOLAR: DIAGNOSIS AND MANAGEMENT OF A CLINICAL CASE

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Aim: to describe the diagnostic pathway and therapeutic strategies for mandibular second molar impaction through a clinical case managed with a minimally invasive approach.

Methods: a 14-year-old female orthodontic patient presented with impaction of tooth 4.7. Diagnosis was established through clinical examination and radiographic evaluation (panoramic radiograph and CBCT when necessary), revealing a mesially inclined impacted mandibular second molar and the developing third molar (4.8) acting as a mechanical obstacle. Considering the patient's age, root development stage, and tooth position, germectomy of 4.8 was planned as the only in-

tervention to eliminate the obstruction and facilitate eruption.

Results: after removal of the third molar germ, spontaneous eruption of the mandibular second molar was observed, without the need for orthodontic traction or additional surgical procedures. This approach reduced treatment time and invasiveness.

Conclusions: mandibular second molar impaction requires early diagnosis and careful treatment planning. In young patients with adequate eruptive potential, removal of the mechanical obstacle — such as third molar germectomy — can be an effective and conservative option, promoting spontaneous eruption and avoiding more complex treatments.

IMPACT OF POST-TREATMENT RELAPSE AND ECONOMIC PERCEPTION ON ORTHODONTIC PATIENT SATISFACTION: A MULTIVARIATE ANALYSIS IN A DENTAL STUDENT SAMPLE

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Aim: in the current landscape of Patient-Reported Outcome Measures (PROMs), understanding patient perception is a priority. This study investigates the influence of relapse, treatment duration and economic perception on global satisfaction.

Methods: 124 dental and dental hygiene students (22.99 ± 2.95 years) were enrolled. Data were analyzed using χ^2 test and multivariate logistic regression. Model stability was confirmed by calculating the Variance Inflation Factor (VIF).

Results: the multivariate model identified relapse as the primary risk factor for dissatisfaction (OR = 14.35; $p = 0.012$). Higher satisfaction was associated with female sex ($p = 0.002$) and younger age ($p = 0.008$). Despite the statistical weight of relapse, a paradox emerged: 79.2% of patients with relapse expressed positive global satisfaction. Although clinical failure

correlated with a higher perceived cost ($p = 0.006$), 59.7% of relapsed subjects rated the economic investment as fair. Treatment duration >24 months showed a trend towards association with relapse ($p = 0.052$), but did not influence final satisfaction ($p = 0.416$).

Conclusions: the evidence delineates a perceived outcome resilience: although clinical parameters remain fundamental, variables such as economic burden and therapeutic latency are integrated into the patient's experience without impairing the professional evaluation. Satisfaction is a multidimensional construct influenced more by perceived quality than by temporal or financial sacrifice, suggesting a hierarchy of values were aesthetics and the clinical relationship mitigate the failure of relapse.

3D EVALUATION OF DIAGNOSTIC AND PROGNOSTIC FACTORS IN THE TREATMENT PLANNING OF IMPACTED MAXILLARY CANINES: A CASE SERIES

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Aim: the management of impacted maxillary canines represents a significant challenge in orthodontic practice, requiring precise localization and a clear understanding of the surrounding anatomical structures. Traditional two-dimensional radiography often falls short in providing the necessary spatial detail for complex cases. This study aims to evaluate the fundamental 3D diagnostic and prognostic factors that influence the selection and success of orthodontic-surgical treatment plans.

Methods: a retrospective evaluation was conducted on a series of clinical cases involving patients with impacted maxillary canines. Each case was analyzed using Cone Beam Computed Tomography (CBCT) to assess key volumetric parameters,

including the alpha angle, the distance from the mid-sagittal plane, and the proximity to adjacent root structures.

Results: the three-dimensional analysis of multiple cases allowed for a more accurate categorization of impaction severity. Factors such as the follicular space volume and the precise buccolingual position were found to be decisive in predicting treatment duration and potential risks, such as root resorption of neighboring teeth.

Conclusions: the integration of 3D diagnostic tools is essential for formulating a predictable treatment plan. By evaluating these prognostic factors across a variety of clinical scenarios, clinicians can optimize biomechanical strategies and improve overall outcomes for impacted canine recovery.

STRUCTURAL AND FUNCTIONAL CORRELATES OF VERTICAL CRANIOFACIAL DEVELOPMENT AND MASSETER MUSCLE IN PEDIATRIC SUBJECTS

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Aim: to investigate, in growing subjects, the association between vertical growth pattern and masseter muscle morphology by integrating cephalometric analysis and ultrasonography.

Materials and methods: eighteen prepubertal patients (7 females, 11 males; mean age 9.78 years), in mixed or permanent dentition, were enrolled and divided into a mesofacial group (FMA 22°–28°; n = 11) and a dolichofacial group (FMA >28°; n = 7). All subjects underwent lateral cephalometric radiography and bilateral ultrasonographic evaluation of the masseter muscle at rest and during maximum clenching using a 9-MHz linear probe. Muscle thickness, length, cross-sectional area, and volume were recorded. Statistical analysis included Student's

t-test, Pearson's correlation, and linear regression.

Results: dolichofacial subjects showed lower masseter thickness and volume values than mesofacial subjects. An inverse relationship emerged between cephalometric indices of vertical divergence, particularly FMA, and muscle parameters, suggesting that greater facial divergence is associated with reduced masseter development.

Conclusions: masseter morphology appears to be associated with vertical growth pattern in growing patients. The integration of ultrasonography and cephalometry may provide a useful diagnostic approach for a more comprehensive functional assessment and for individualized orthodontic treatment planning.

"CANINE FIRST APPROACH" IN MAXILLARY IMPACTED CANINE: CASE REPORT

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Aim: the canine is the second most commonly impacted tooth after the third molar.

In the maxilla it is generally found displaced in a palatal position rather than a vestibular one. The aim of this case report is to illustrate the successful management of maxillary impacted canines through the "canine first approach" treatment plan.

Materials and methods: the patient was 15 years old female with a dentoskeletal class I malocclusion, biretrusive and flat profile and persistence of one maxillary deciduous canine 5.3 in the dental arch.

The panoramic X-Ray evaluation showed a unilateral permanent canine impaction in sector five and the alpha angle of 50° by Ericson and Kurol classification, thereby establishing a high difficulty index of treatment.

The use of CBCT imaging permitted the determination of the palatal position of the displacement.

The "canine first approach" treatment plan was selected as the

selected therapeutic strategy: the procedure was initiated by the surgical exposure of the canine tooth crown via a full-thickness mucoperiosteal flap. Consequently, after the etching of the exposed cusp, an orthodontic button connected to a wire chain, was bonded to the canine.

Orthodontic traction was applied, specifically in the form of a cantilever TMA 0.19 x 0.25, which was inserted into a TAD measuring 10 mm in length and 1.8 mm in diameter within a palatal safe zone. The cantilever was activated in palatalization, extrusion and distalization in order to ward off the canine from the incisors roots.

Results: after 4 months, the palatal bump appears and another surgical time is performed exposing the canine crown through an operculum.

Conclusions: this technique facilitates the eruption of the canine adjacent to the alveolar ridge, offering several clinical advantages, including enhanced aesthetic outcomes and increased patient comfort.

PARENTAL PERCEPTION OF ORAL HEALTH-RELATED QUALITY OF LIFE IN ADOLESCENS: THE ROLE OF SOCIOECONOMIC STATUS

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Aim: oral health is a fundamental component of quality of life. The World Health Organization (WHO) recognize it as an integral part of overall well-being. Parents' education and personal beliefs can influence their children's oral health.

Methods: an observational study was conducted on adolescents aged 10 to 18 years attending their first visit at the Orthodontics Department of the University of Naples Federico II. Inclusion criteria were good general health and parents or caregiver with good fluency in Italian and who had consented. Subjects with syndromes or medical conditions that could interfere with the questionnaire results or already undergoing orthodontic treatment were excluded. Information on education and occupation was collected to calculate socio-economic

status (SES) using the Hollingshead index and parents or caregivers completed the Parental caregiver Perception Questionnaire (PCPQ-16).

Results: the final sample consisted of 289 participants of both genders, aged between 10 and 18 years and who satisfied all the inclusion criteria. The outcomes showed that SES values were slightly below average for both parameters. No significant associations were identified between SES and either the total or domain scores of the PCPQ-16.

Conclusions: in this sample, parents' perceptions of their children's oral health-related quality of life did not appear to be influenced by socioeconomic status. The limited variability of the study population may have contributed to the absence of association.

ORTHODONTIC TREATMENT IN ELDERLY PATIENTS

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Aim: to evaluate the role of orthodontic treatment in elderly patients within a multidisciplinary rehabilitative approach, considering common age-related biological and clinical limitations.

Methods: three female patients aged 62–66 with malocclusion, reduced vertical dimension, functional alterations, and TMD symptoms were analyzed. Orthodontic treatment followed periodontal therapy and maintenance care. Fixed appliances were applied to both arches with light, continuous forces to correct occlusion, align teeth, and prepare for prosthetic rehabilitation. Clinical, radiographic, and functional assessments were completed before and after treatment.

Results: all patients showed improved occlusion, overjet and

overbite, restored vertical dimension, and aligned teeth. Functional assessment revealed better mandibular coordination and resolution of TMD symptoms. Periodontal condition remained stable, with some bone apposition after uprighting. The multidisciplinary approach allowed successful prosthetic rehabilitation and enhanced facial aesthetics.

Conclusions: orthodontic treatment in elderly patients is feasible and effective when general health is adequate and periodontal stabilization is ensured. Using light forces and a multidisciplinary approach helps overcome age-related limitations, achieving satisfactory aesthetic and functional outcomes, improved oral health, nutrition, and quality of life.

ORTHODONTIC FEATURES AND MANAGEMENT IN PEDIATRIC PATIENTS WITH SPINAL MUSCULAR ATROPHY: A CASE SERIES

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Aim: spinal muscular atrophy (SMA) is a genetic neuromuscular disorder characterized by hypotonia and progressive muscle weakness, often associated with orofacial alterations, respiratory impairment, and poor oral hygiene. This study aimed to assess orthodontic features, functional implications, and therapeutic strategies in pediatric SMA patients.

Methods: five pediatric patients (7–14 years) with SMA (4 with type I and 1 with type II) were analyzed. All underwent medical history collection, dental and orthodontic examination, radiographic assessment, photographic documentation, intraoral scans, and study model analysis, followed by orthodontic treatment planning.

Results: all SMA type I patients showed severe respiratory impairment, poor oral hygiene, oral breathing, skeletal Class II

malocclusion, severe hyperdivergent pattern, anterior open bite, maxillary constriction, and lip incompetence. Three were treated with rapid maxillary expansion, with favorable effects on respiratory function and occlusion; one was not treated due to poor compliance. The SMA type II patient showed a milder condition and good compliance, with skeletal Class I, hypodivergent pattern, and mild dentoalveolar protrusion, and was treated with clear aligners.

Conclusions: orthodontic treatment may improve oral function in SMA patients. In type I, management is limited by poor compliance and requires a multidisciplinary hospital-based approach. In type II, treatment can be performed in an outpatient setting due to better compliance and dentofacial features comparable to the general population.

ELASTODONTIC DEVICES AND SLEEP DISORDERS: A PROSPECTIVE STUDY ON ORAL RESPIRATORS, 6-MONTH FOLLOW-UP

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Aim: this study evaluated the Eq. Eptamed Universal elastodontic device in 20 pediatric patients (6–12 years) with Class II malocclusion and oral breathing due to untreated adenotonsillar hypertrophy. The goal was to assess improvements in sleep quality and respiratory parameters.

Methods: patients at the University Dental Clinic of Perugia wore the device nightly for six months. Baseline data included clinical exams, radiographs, and the Berlin Questionnaire. Exclusion criteria: previous orthodontic treatment, systemic diseases, or periodontal pathology. Sleep parameters (SpO₂, heart rate, and quality) were monitored using a MORELLATO M-04 smartwatch, with follow-ups at 1, 3, and 6 months.

Results: after 1 month, snoring and awakenings decreased

($p = 0.043$), with SpO₂ rising from 95.75% to 97.25%. By the 3rd month, significant gains were seen in total sleep time ($p = 0.005$), nocturnal awakenings ($p = 0.0025$), and palatal cusp distance ($p = 0.003$).

Bruxism disappeared, and symptoms like morning headaches and oral dryness improved. The 6-month follow-up confirmed a steady positive trend, reinforcing the respiratory and clinical gains observed earlier.

Conclusions: Eq. Eptamed Universal showed promising effects on sleep quality, respiratory parameters, and palatal expansion. The device and smartwatch were well-tolerated, enhancing patient compliance. Larger studies are needed to confirm these preliminary findings.

MANAGEMENT OF DENTAL AGENESIS USING CLEAR ALIGNERS: A CASE REPORT

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Aim: orthodontic treatment of dental agenesis represents a complex clinical challenge, particularly when associated with tooth shape anomalies. This report aims to describe the management of a unilateral agenesis case with microdontia treated with clear aligner therapy (CAT), highlighting its predictability and effectiveness.

Methods: a 12-year-old female patient with agenesis of tooth 1.2 and microdontia of 2.2 was selected. Treatment involved CAT supported by digital planning. Key steps included: digital setup of final arch form from 1.4 to 2.3 to achieve a high-low-high arrangement; orthodontic redistribution of pre-prosthetic spaces for camouflage of 1.3 and 1.4 as 2.2 and 2.3; torque overengineering of 1.3 to mask canine prominence; and palatal positioning of 2.2 for conservative camouflage. The treatment consisted of four phases with intermediate reassessments and multidisciplinary restorative integration.

Results: after 2 years and 5 months, all treatment objectives were achieved, ensuring proper orthodontic, functional, and aesthetic rehabilitation. Virtual planning combined with biomechanical control optimized final tooth positioning and space redistribution, particularly through mesiodistal root control without corono-radicular tipping. Effective canine camouflage was obtained via palatal root torque of 1.3 and controlled in-out of 2.2. CAT demonstrated satisfactory second-order control, especially in extrusion, enabling proper gingival contouring and CEJ leveling.

Conclusions: this case demonstrates that CAT can be applied in complex orthodontic scenarios. The integration of advanced digital planning and controlled biomechanics allows predictable functional and aesthetic outcomes, supporting aligners as a valid alternative to fixed appliances in cases involving agenesis and aesthetic camouflage.

CONTROLLED ORTHODONTIC UPRIGHTING OF A MESIALLY TIPPED MANDIBULAR SECOND MOLAR: A SUCCESSFUL CASE REPORT

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Aim: this report presents the clinical management and follow-up of orthodontic uprighting of the mandibular second molar (element 37), correcting mesially tipped molars and restoring occlusal function.

Methods: a 17-year-old female patient presented with a mesially inclined mandibular second molar that prevented physiological eruption due to its unfavorable angulation relative to the first molar. The condition was managed using a fixed orthodontic appliance with cantilever-based mechanics to achieve controlled molar uprighting. Clinical and radiographic follow-up was performed from the beginning to the end of treatment. Evaluated parameters included molar angulation, periodontal health, occlusal stability, and patient comfort. Outcomes were interpreted in light of literature reporting high suc-

cess rates and favorable periodontal outcomes when controlled uprighting mechanics are applied.

Results: complete uprighting of element 37 was achieved. Radiographic follow-up confirmed alignment and root integrity. Periodontal evaluation showed stable probing depths and healthy gingiva. Occlusion was restored. At follow-up, the tooth remained stable with no signs of relapse, consistent with literature reporting success rates above 95% and minimal periodontal complications.

Conclusions: orthodontic molar uprighting is predictable and stable, restoring optimal angulation, maintaining healthy periodontal conditions, and enabling prosthetic rehabilitation. Careful planning, controlled biomechanics, and regular follow-up ensure long-term stability.

ORTHODONTIC RETENTION PHASE: EVALUATION OF DIFFERENT APPLIANCES IN RELATION TO THEIR PERIODONTAL EFFECTS

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Aim: to evaluate, through a narrative review of recent clinical literature, how the main orthodontic retention devices (fixed retainers, removable acrylic retainers, and vacuum-formed/thermoplastic retainers) affect oral and periodontal health parameters, in order to support an individualized clinical choice.

Methods: clinical studies on post-orthodontic patients were narratively reviewed, focusing on plaque index, gingival index, calculus accumulation, bleeding on probing, and probing depth. Studies with follow-up ranging from 6 months to 4 years were summarized in comparative tables by retainer type, duration of use, and dental arch.

Results: across studies, prolonged retention was associated with increased plaque and calculus deposits compared with non-retained sites. Fixed retainers—especially multistranded canine-to-canine designs—showed higher plaque, calculus, and

bleeding indices, generally without clinically meaningful attachment loss. Removable acrylic and vacuum-formed retainers tended to show more favorable periodontal indices, but their effectiveness strongly depended on patient compliance. Overall differences among systems were modest and influenced by heterogeneous study designs.

Conclusions: orthodontic retention is essential for long-term stability but should be planned according to individual periodontal risk. Fixed retainers are effective when combined with strict plaque control and professional hygiene recalls; in patients with poor oral hygiene or higher periodontal susceptibility, removable retainers may be preferred despite their compliance dependency. Further long-term controlled studies are needed to define evidence-based retention protocols.

DIGITAL WORKFLOW FOR THE CREATION OF A DENTAL RESIN CAST: A STEP-BY-STEP PRACTICAL GUIDE FOR CLINICIANS

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Aim: orthodontic resin models are accurate reproductions of dental arches, obtained from digital scans of the patient's mouth or from physical, then digitalized, impressions, used for diagnosis, treatment planning, and documentation throughout orthodontic care. This study aims to describe the workflow for processing, designing and producing squared 3D resin models to assist clinicians in self-manufacturing.

Methods: digital impressions of upper and lower arches and occlusion are captured and converted into STL files, then processed using dedicated software (e.g. Orthoanalyzer). After entering patient demographic data, files are prepared in a "Virtual Gypsum Room". The next step is to configure the Occlusal Plane using reference points (mesiobuccal cusps of teeth 16 and 26, and the

midpoint between teeth 11 and 21), followed by the definition of the Sagittal Plane, passing through teeth 11 and 21. A virtual base is then created by trimming unnecessary areas and selecting standard bases from a digital library. According to standard BOARD guidelines, the distance between the bases and the offset values is defined. The model is centered, merged with the base, and refined with sculpting tools if needed. Once the model is generated, the file is ready to be sent to a 3D printer for the production of physical models.

Results: resin models are durable, resistant to breakage and mouldable, lightweight, and easily reproducible.

Conclusions: digital workflows and 3D printing are increasingly valuable tools in modern orthodontic daily practice.

EFFICACY OF MAXILLARY EXPANSION USING INVISALIGN PALATAL EXPANDER (IPE) IN A GROWING PATIENT

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Aim: maxillary transverse deficiency is common in mixed dentition. Although the rapid maxillary expander (RME) remains the gold standard for orthopedic expansion, the Invisalign Palatal Expander (IPE) system is proposed as a less invasive alternative. This study evaluates the clinical efficacy of the IPE system in correcting transverse deficiency in mixed dentition.

Methods: the protocol was applied to a 7-year-old female patient with early mixed dentition and bilateral crossbite. The workflow included:

- initial radiographic assessment (OPG and lateral cephalogram) to evaluate skeletal structures and dental eruption.
- High-precision intraoral scanning for digital planning at T0 (baseline) and T1 (end of treatment).
- Implementation of a personalized guided expansion protocol.
- Use of 26 IPE devices (0.25mm expansion each).
- Monitoring compliance and oral hygiene over the 38-day treatment period.

Results: the clinical outcomes included:

- complete resolution of the bilateral crossbite.
- Increase in transverse diameters.
- Posteriorly, an increase in intermolar width of +5.3 mm was achieved (from 34.8 mm to 40.1 mm).
- Anteriorly, an increase in intercanine width of +4.1 mm (from 28.6 mm to 32.7 mm).
- Palatal width achieved: +2.4 mm (measured from the two higher and most external points of the palatal vault, on the line connecting the E's palatal cusps).
- Excellent patient compliance due to the absence of metal components and ease of hygiene.

Conclusions: both RME and IPE are effective for resolving transverse deficiency. The IPE system effectively corrected the bilateral crossbite while ensuring superior comfort and hygiene. While large-scale studies are necessary, these results suggest that IPE represents a valid alternative to fixed expanders, giving clinical predictability associated with good tolerability and lower invasiveness.

ACCURACY OF DIRECT PALATAL MINISCREWS PLACEMENT: INFLUENCE OF OPERATOR EXPERIENCE COMPARED TO CBCT-GUIDED PLANNING

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Aim: to evaluate the accuracy and variability of direct palatal miniscrew placement by experienced and inexperienced operators compared with CBCT-guided planning (gold standard).

Methods: seven experienced and forty inexperienced operators digitally placed a miniscrew in a paramedian position in the left hemipalate on 40 models using Meshmixer, following established clinical landmarks (T-zone). Placements were compared with CBCT-based planning by an expert orthodontist. Deviations were measured along anteroposterior and transverse axes. Statistical analysis included normality tests and paired t-tests ($\alpha = 0.05$).

Experienced orthodontist: >15 years. Inexperienced orthodontist: 2–5 years.

Results: significant differences were found between CBCT planning and operator placements, except for experienced operators along the anteroposterior axis. Experienced operators showed higher accuracy, placing miniscrews closer to the reference (0.6 mm posterior, 0.6 mm lateral) than inexperienced ones (1.5 mm posterior, 0.3 mm lateral). Both groups tended to place miniscrews more posteriorly. Variability was higher in inexperienced operators (± 2.1 mm AP; ± 1 mm transverse) than in experienced ones (± 1.7 mm; ± 1 mm).

Conclusions: direct placement by inexperienced operators shows significant deviations from CBCT planning. Clinical experience improves accuracy, especially along the anteroposterior axis, supporting its role when using anatomical landmarks.

CLINICAL, ANATOMICAL, AND TECHNICAL DETERMINANTS OF ORTHODONTIC MINISCREWS FAILURE: A SYSTEMATIC REVIEW

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Aim: orthodontic miniscrews are Temporary Anchorage Devices (TADs), this review aims to identify the key clinical, anatomical, and technical determinants of failure, in order to improve the predictability and long-term clinical reliability of skeletal anchorage.

Methods: a systematic review was conducted according to PRISMA guidelines. PubMed/MEDLINE and Scopus were searched for English full-text clinical studies on humans (2016–2026) reporting miniscrew success and failure rates and related risk factors. Non-clinical studies, those lacking clinical outcomes or quantitative failure data, and reviews, case reports, or studies on genetic, microbiological, or purely technical aspects were excluded. A total of twenty-eight studies were included.

Results: success rates ranged from 80% to 95%. The most consistently reported risk factors for failure were root proximity, reduced cortical bone thickness, unfavorable insertion sites, shorter screw length (≤ 8 mm), low insertion torque, reinsertion after primary failure, and peri-implant inflammation.

Conversely, higher success rates were associated with anterior palatal placement, greater cortical thickness, and optimal biomechanical conditions.

Conclusions: miniscrew failure is a multifactorial phenomenon resulting from the interaction of anatomical, biological, and biomechanical variables. Careful site selection, avoidance of root contact, and thorough evaluation of cortical bone characteristics are critical to minimize failure risk and optimize clinical outcomes in orthodontic practice.

TOOTH TRANSPOSITION: A CLINICAL CASE

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Aim: to present the clinical management of a mandibular transposition between the lateral incisor and canine in a pediatric patient, focusing on therapeutic approach and functional-aesthetic outcomes.

Materials and methods: a 9-year-old patient was referred to the Department of Pedodontics and Orthodontics, University Hospital of Bari, for the abnormal eruption of the mandibular lateral incisor. Clinical and radiographic examination revealed a mandibular transposition between the permanent canine and lateral incisor, with persistence of deciduous elements and a skeletal Class II open-bite pattern.

The treatment plan included extraction of retained deciduous teeth, placement of a lower soldered arch with elastic

traction to disengage the lateral incisor, followed by a fixed multibracket appliance (slot 0.22 x 0.28) using progressive archwires, open-coil springs, and elastic chains to achieve proper alignment and mesialization. A removable retention plate was provided after active treatment to preserve the outcome.

Results and conclusions: the treatment achieved complete correction of the transposition and restoration of a stable Class I occlusion, confirmed at 12-month follow-up.

This case highlights the importance of early diagnosis and individualized orthodontic planning for conservative resolution of mandibular transpositions, ensuring stable functional and aesthetic results.

SAFE CLINICAL PROTOCOLS FOR TEMPORARY ANCHORAGE DEVICES (TADS): RISKS, COMPLICATIONS, AND MANAGEMENT IN ORTHODONTICS

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Aim: this review aims to define safe clinical protocols for the use of temporary anchorage devices (TADs) in orthodontics by analyzing studies investigating their risks, complications, prevention strategies, and management approaches.

Methods: a systematic search was conducted in PubMed, Medline, and Scopus up to May 2024, identifying 14 relevant randomized and controlled clinical trials. Each study was assessed for risk of bias, followed by data extraction and descriptive analysis, along with an evaluation of methodological quality and strength of evidence.

Results: the findings confirm that TADs improve anchorage control without relying on patient compliance, although they present certain risks. Some situations requires device removal to allow spontaneous healing; Minor injuries may heal sponta-

neously, although pharmacological therapy may sometimes be indicated. Maintaining at least a 2 mm distance reduces the risk of damage. Small maxillary sinus perforations (<2 mm) tend to heal spontaneously, whereas larger ones require removal. Soft tissue inflammation can be managed with proper oral hygiene and 0.2% chlorhexidine for two weeks. Fractures due to excessive forces require removal; slight mobility may be tolerated, while significant instability requires repositioning.

Conclusions: safe and effective use of TADs depends on careful treatment planning, appropriate radiographic evaluation, and continuous monitoring. Adhering to these principles helps minimize complications and ensures proper management, improving orthodontic outcomes and patient satisfaction.

PREDICTORS OF ERUPTION TIME IN IMPACTED MAXILLARY CANINES: CEPHALOMETRIC AND PANORAMIC ANALYSIS

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Aim: the aim of this study is to assess the relationship between cephalometric parameters on lateral cephalometric radiographs and angular measurements on orthopantomograms, and the time required for orthodontically guided eruption of impacted maxillary canines.

Methods: this retrospective study included 50 impacted canines in 40 patients (11–17 years) treated with fixed multi-bracket appliances. All subjects underwent the same surgical exposure and elastic orthodontic traction protocol. Pre-treatment orthopantomograms and lateral cephalometric radiographs (from CBCT) were analyzed. Angular and linear meas-

urements were recorded to determine canine position.

Results: no significant correlation was found between eruption time and patients' age or sex. Cephalometric parameters measured at baseline (T0) showed weak correlation with traction duration.

Conclusions: lateral cephalometric analysis has limited prognostic value in predicting treatment duration for impacted canines. The average movement rate was about 1 mm/month. Treatment time is influenced by clinical and biological factors, including traction mechanics, operator experience, bone density, cortical thickness, and residual eruptive potential.

ORTHODONTIC CAMOUFLAGE OF SKELETAL CLASS II MALOCCLUSION IN AN ADULT PATIENT USING CLEAR ALIGNERS AND CLASS II ELASTICS

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Aim: to describe the orthodontic camouflage of skeletal Class II malocclusion in an adult patient using clear aligners, Class II elastics, and interproximal reduction.

Methods: a 25-year-old female presented with skeletal Class II malocclusion, increased overjet, and mild mandibular anterior crowding. A non-extraction approach (excluding third molars) was performed using clear aligners. Class II elastics were worn full-time for approximately 20 months. Interproximal enamel reduction (0.4 mm) was performed on mandibular incisors. Total treatment time was 23 months.

Results: at treatment completion, overjet was normalized and a Class I occlusion achieved.

Mandibular anterior crowding was resolved with proper alignment and intercuspation. Facial aesthetics improved with a more harmonious profile. No premolar extractions or surgery were required.

Conclusions: orthodontic camouflage with clear aligners, Class II elastics, and interproximal reduction is an effective option in selected adult patients. Patient compliance is essential for successful outcomes.

CEPHALOMETRIC ANALYSIS OF CRANIOFACIAL STRUCTURES IN THE DIAGNOSIS OF OBSTRUCTIVE SLEEP APNEA SYNDROME

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Aim: Obstructive Sleep Apnea Syndrome (OSAS) affects about 1–4% of the population and is characterized by recurrent apnea and hypopnea during sleep with oxygen desaturation. These alterations may cause excessive daytime sleepiness, reduced quality of life, and cognitive impairment. This study aimed to evaluate whether cephalometric parameters obtained from lateral cephalograms can identify craniofacial features associated with OSAS and support its early diagnosis.

Methods: thirty-six dentate Caucasian subjects were recruited from the Department of Orthodontics of the Milan Clinic in collaboration with the Neurology Department of the Città di Milano Clinic. Participants were divided into two groups: 26 patients with OSAS confirmed by polysomnography (Group A)

and 10 healthy controls (Group B). All subjects underwent lateral cephalometric radiographs. Fifteen landmarks were identified, generating six angular and nine linear measurements. Analyses followed the Milan School method for skeletal bases and Riley's soft tissue analysis (PAS, MP-H, PNS-P).

Results: significant differences were found in BMI and several cephalometric variables. OSAS patients showed reduced posterior airway space (PAS), a more inferior hyoid bone position, increased soft palate length, facial retrusion, posterior mandibular rotation, and greater overjet. No differences were observed in the middle and lower facial height.

Conclusions: cephalometric evaluation may represent a useful, non-invasive tool for early OSAS detection and severity assessment.

INTEGRATED MYOFUNCTIONAL AND CLEAR ALIGNER THERAPY IN THE INTERCEPTIVE MANAGEMENT OF SKELETAL CLASS II WITH DEEP BITE

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Aim: to evaluate the effectiveness of a combined functional orthopedic and clear aligner approach in the correction of severe skeletal Class II malocclusion in a growing patient.

Methods: an 11-year-old hyperdivergent male presented with skeletal Class II malocclusion, convex profile, deep bite, bimaxillary retrusion, dental crowding, and right-deviated midline. Treatment included an 18-month Twin Block phase followed by 24 months of clear aligner therapy (Invisalign®) with Class II elastics and aligner change every 10 days. Orthopantomography, cephalometric analysis, digital scans, and photographs were collected at each stage.

Results: at phase transition, a Class I relationship was achieved, with ANB reduction from 6.1° to 3.5° and transient

bite opening. SN-GoGn increased, indicating mild clockwise mandibular rotation, consistent with hyperdivergent growth. Despite this, sagittal correction was obtained. After treatment, overjet decreased by 5.6 mm and overbite by 5 mm, with improved soft tissue profile.

Conclusions: twin Block effectively promotes mandibular advancement even in hyperdivergent patient during the growth period. Clear aligner therapy facilitated control of the vertical dimension through posterior dental intrusion, resulting in a bite-closing effect and improved the dental arch form. It represents a valid alternative to fixed appliances, ensuring effective outcomes with improved comfort and compliance.

DOUBLE IMPACTION IN THE MAXILLA: CLINICAL MANAGEMENT THROUGH COORDINATED SURGICAL AND ORTHODONTIC TREATMENT

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Aim: impaction of permanent maxillary teeth in growing patients has a reported prevalence of 1–3%. This case describes an 11-year-old patient with vestibular impaction of tooth 1.3 and palatal impaction of a conoid 1.2, treated through a surgical–orthodontic approach. The treatment aimed to restore function and aesthetics through early diagnosis and multidisciplinary management.

Methods: panoramic radiograph and CBCT confirmed vestibular impaction of 1.3 and palatal impaction of 1.2. Surgery included an open-flap procedure, osteotomy, exposure, and selective enamel etching for bonding of a button with chain. A 4-mm palatal punch allowed chain passage. Tooth 1.3 was tractioned vestibularly through a steel arm attached to an ERP appliance cemented on 1.6 and 2.6; tooth 1.2 was tractioned

palatally using a removable TMA. Orthodontic alignment aimed to position 1.2 in the arch, stabilize through bonding, using posterior bite raisers, and proclining the upper anterior teeth to gain space.

Results: tooth 1.3 responded positively to vestibular traction and is approaching the occlusal plane. Tooth 1.2 has been guided into the arch through controlled palatal traction. No periodontal alterations or root resorption were noted.

Conclusions: accurate planning and a multidisciplinary approach enabled recovery of teeth with different impaction patterns. Distinct traction systems effectively managed their positions. Orthodontic treatment continues toward full alignment and functional occlusion.

FROM TRAUMA TO ESTHETICS: MULTIDISCIPLINARY DIGITAL APPROACH. CASE REPORT

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Aim: this case report describes a multidisciplinary digital approach for the conservative management of a complex dental trauma. A 24-year-old male presented with a complicated subgingival fracture of the maxillary left lateral incisor, aiming to achieve predictable esthetic and functional rehabilitation.

Methods: following endodontic treatment, the tooth underwent a controlled orthodontic extrusion. In order to optimize anchorage and limit esthetic impact, a reduced number of brackets was used; additionally, a digitally designed custom splint was placed. Provisional restorations were maintained and progressively adjusted during extrusion to preserve appearance. After achieving coronal repositioning of the fracture margin, laser gingivectomy was performed to improve perio-

dontal contour. Afterwards the tooth was restored with a fiber post, which was crucial to support and enable the realization of the prosthetic coronal restoration, both with a direct composite abutment restoration and a definitive crown.

Results: orthodontic extrusion enabled conservative restoration with an adequate ferrule effect, improving biomechanical support. The final outcome showed favorable esthetic and functional results with good soft-tissue integration.

Conclusions: the combination of controlled orthodontic extrusion, digital planning, and conservative restorative rehabilitation provides a predictable approach for managing complex dental trauma, enhancing structural integrity, esthetic outcomes, and functional performance.

MULTIDISCIPLINARY APPROACH TO A PATIENT WITH MULTIPLE DENTAL INCLUSIONS AND ODONTOMA: A CASE REPORT

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Aim: to present the interdisciplinary management of a patient who presented with multiple impacted teeth, enamel hypomineralisation and a simple odontoma.

Methods: a 15-year-old patient with horizontal impaction of tooth 11, in conflict with the roots of teeth 12 and 21, impaction of 43 and the presence of a simple odontoma in conflict with the crown of the impacted 43 and the apex of 44. Root resorption was noted in teeth 14, 15, 24 and 25. Spontaneous eruption of tooth 12 into the position of 11 and of 13 into the position of 12. Symmetrical oval face, hyperdivergent; skeletal class II, dental class I; reduced overjet and dental deep bite. The treatment plan involved the surgical extraction of the impacted teeth 11 and 43 and the odontoma, followed by compensatory extractions of teeth 24 and 34 to maintain the occlusal symmetry. Fixed orthodontic treatment was then applied to the upper and lower arches, to achieve a correct

overjet and overbite, and restore aesthetic and functional harmony, utilising the natural repositioning within the arch of the quadrant 1 teeth.

Results: at the end of treatment, complete alignment and levelling of the arches was achieved, with closure of the extraction spaces and restoration of a balanced occlusion. The anterior root conflict was resolved and the occlusion stabilised.

Conclusions: this case demonstrates the effectiveness and efficiency of a multidisciplinary approach based on straightforward choices in the management of complex dental inclusions associated with odontoma. The integration of surgery, orthodontics and restorative dentistry has made it possible to restore function and aesthetics, whilst minimising adverse effects on adjacent teeth. A correct diagnostic assessment and individualised treatment planning are essential for achieving functional, aesthetic and long-term stable results.

AGE-RELATED CHANGES IN DENTOLABIAL RELATIONSHIPS: A THREE-DIMENSIONAL ANALYSIS IN SUBJECTS WITH HEALTHY DENTITION

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Aim: to investigate age-related differences in dentolabial vertical spatial relationships among individuals with healthy dentition and to assess potential sex-related differences using a non-invasive three-dimensional (3D) protocol.

Materials and methods: thirty-eight healthy subjects were divided into two groups: a younger group (21-34 years; n = 22) and an older group (45-65 years; n = 16). Dental and labial stone casts were obtained and digitally reconstructed using a validated 3D protocol. The facial axis of the clinical crown (FACC) of maxillary anterior teeth and the percentage of crown height above the labial commissure line (% upper FACC) were calculated. Statistical analyses included descriptive statistics and two-way ANOVA to evaluate age and sex effects.

Results: mean FACC values were similar across age groups and sexes. However, % upper FACC showed a significant age effect ($p < 0.001$), with higher values in older subjects, indicating greater upper lip coverage of maxillary anterior teeth at rest.

Sex had no significant main effect on most measures, although a significant age-sex interaction was found for central incisors.

Conclusions: age significantly alters dentolabial relationships, with progressive upper lip leading to increased maxillary anterior tooth coverage at rest.

These findings underscore the need to account for age-related soft-tissue changes in orthodontic, prosthetic, or surgical treatment planning.

EARLY DETECTION OF OBSTRUCTIVE SLEEP APNEA USING A HOME-BASED WEARABLE DEVICE INTEGRATED WITH A MOBILE APP

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Aim: Obstructive Sleep Apnea Syndrome (OSAS) affects about 27% of adults in its moderate-to-severe form, yet only 4% are diagnosed and 2% treated. This study evaluated the effectiveness of a mandibular advancement device (MAD) and the role of wearable monitoring integrated with a mobile app.

Methods: a male patient (BMI 29.7 kg/m²) with moderate-to-severe OSAS underwent baseline polysomnography and overnight monitoring with a wearable device (O2Ring, Wellue®). Snoring was recorded using the SnoreLab app. The Berlin Questionnaire and Epworth Sleepiness Scale were administered before and after treatment. A custom MAD was fabricated after digital intraoral scanning. Mandibular advancement was progressively collected every 20 days based

on symptoms and data from the wearable device and app. All assessments were repeated with the MAD in use.

Results: baseline polysomnography showed an apnea-hypopnea index (AHI) of 31.3 events/h and an oxygen desaturation index (ODI) of 35.6 events/h, with a minimum SpO₂ of 79%. After treatment, desaturation events were eliminated, with stable SpO₂ values between 94% and 97%.

Conclusions: MAD therapy effectively reduced apneic events and snoring. Wearable monitoring of oxygen saturation, heart rate, and snoring enables personalized treatment, reducing the need for repeated polysomnography. This approach offers a low-cost, repeatable, and patient-friendly monitoring strategy.

RELIABILITY OF INTRAORAL PHOTOGRAPHS IN THE TRANSVERSE MEASUREMENT OF THE WALA RIDGE: COMPARISON WITH CBCT AND DICOM-STL MODELS

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Aim: to assess the agreement and correlation between intraoral photographic measurements of the WALA Ridge and those obtained from DICOM and DICOM+STL datasets.

Methods: a retrospective study was performed on 30 untreated subjects (mean age 21.9 ± 6.2 years). Transverse WALA Ridge widths were measured on intraoral photographs (JPEG), CBCT images (DICOM), and integrated DICOM+STL models. Paired t-tests were used to evaluate mean differences, while Pearson's correlation coefficient assessed linear relationships. Statistical significance was set at $p < 0.05$.

Results: photographic measurements showed higher mean val-

ues and greater standard deviation compared to 3D methods. No statistically significant differences were found between photographs and DICOM+STL ($p > 0.05$), whereas small but consistent differences emerged with DICOM alone. Strong positive correlations were observed across all comparisons ($r > 0.88$; $p < 0.001$), indicating high agreement and consistency between methods.

Conclusions: intraoral photographs show strong correlation and acceptable agreement with 3D measurements, supporting their use as a reliable adjunct for transverse WALA Ridge evaluation. However, due to residual variability, they cannot replace CBCT in comprehensive diagnostic assessment.

DENTOSKELETAL EFFECTS OF CLEAR ALIGNER VS TWIN BLOCK-A SHORT-TERM STUDY OF FUNCTIONAL APPLIANCES

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Aim: the aim of this retrospective study was to compare the dentoskeletal changes resulting from treatment using the Mandibular Advancement (MA) and the Twin Block (TB) compared with an untreated control group with the same type of malocclusion.

Methods: the records of 56 class II patients treated with the TB ($n = 35$) or the MA ($n = 21$) were compared to a control sample of 15 untreated class II subjects (UC2). Inclusion criteria were overjet > 5 mm, bilateral full class II or end-to-end molar relationships, ANB $> 4^\circ$, improvement in facial profile when the lower jaw was postured in a forward position, CS3 in cervical vertebral maturation. Lateral cephalograms were analyzed at baseline (T1) and post-treatment (T2). Statistical analy-

sis was performed using ANOVA with Tukey post hoc test.

Results: both TB and MA showed significant ANB reduction versus controls (-1.5° vs $+0.2^\circ$). Mandibular length (Co-Gn) increased significantly in treated groups (TB $+8.4$ mm; MA $+8.3$ mm). The Pg-TVL distance showed greater advancement in TB ($+3$ mm) compared to MA ($+0.9$ mm) and controls (-1.6 mm). Both appliances reduced overjet, overbite, and palatal-mandibular plane angle.

Conclusions: treatment with the MA and TB appliances produced a significant elongation of the mandible with an improvement in sagittal relationship, overjet, and vertical overbite and with good control of the vertical relationship. TB subjects showed a greater advancement of the soft tissue chin.

COMPARISON OF THE DENTOSKELETAL EFFECTS OF TWO TYPES OF ANCHORAGE FOR RAPID PALATAL EXPANSION IN PATIENTS WITH UNILATERAL CROSSBITE

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Aim: to compare the dento-skeletal effects of two different anchorage systems for rapid maxillary expansion in patients with unilateral crossbite, and to evaluate their impact on the preservation of permanent teeth.

Methods: patients with unilateral posterior crossbite were treated with rapid maxillary expanders using two different anchorage protocols. Clinical and instrumental evaluations were performed before and after treatment. Intermolar width and other dento-skeletal parameters were measured and statistically analyzed to assess differences between the two groups.

Results: both anchorage systems produced effective maxillary expansion, with a significant increase in transverse dimensions. No statistically significant differences were found between the two groups regarding intermolar distance. However, the group treated with E-band anchorage showed better preservation of permanent teeth, with reduced risk of enamel demineralization, caries, and periodontal damage.

Conclusions: both anchorage approaches are effective for the treatment of unilateral crossbite. Nevertheless, the use of E-band anchorage allows better protection of permanent teeth, representing a more conservative and preventive option in growing patients.

RETROSPECTIVE EVALUATION OF POSTERIOR “GREEK-KEY” PATTERN SPLINT FOR PERIODONTAL STABILITY: A SURVIVAL ANALYSIS

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Aim: this study aims to evaluate the survival rate for restorative repairs and debonding of an innovative design of posterior periodontal splint, the Greek key configuration and to analyse whether the length of the splints influences their breakage.

Methods: 48 patients with stage IV periodontitis, grade B/C and Ramfjord level 2-3 tooth mobility received 0.16”x0.22” steel alloy splints shaped in a Greek-key pattern and bonded to posterior teeth with composite. The data were analysed retrospectively over a follow-up period of 4 years from splint placement, considering as outcomes: minor repairs (Intervention 1) and complete debonding. A survival analysis was performed using the Kaplan-Meier method and the log-rank test ($p < 0.05$) compared different splint lengths.

Results: 14 events (29.2%) of intervention 1 and 7 cases (14.6%) of debonding were recorded. Kaplan-Meier analysis showed survival rates for periodontal splints with a Greek key pattern of 83% at 1 year and 73% at 4 years. No statistically significant differences were found regarding the potential influence of splint length on survival ($p = 0.5$).

Conclusions: Greek key splints provide high clinical stability for periodontally compromised posterior teeth, reducing interface stress by increasing the submerged wire surface, while minimizing the free portion to preserve rigidity. Surpassing traditional systems (survival rates of 50% at 1 year and 31% at 4 years) this design ensures superior predictability, easier cleaning and enhanced psychological comfort during the 12-month maximum duration of active periodontal therapy.

ELECTROMYOGRAPHIC ASSESSMENT OF MASSETER MUSCLE ACTIVITY OVER 24 HOURS: A COMPARATIVE STUDY OF FIXED APPLIANCES VERSUS CLEAR ALIGNERS

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Aim: the goal of this research was to investigate the impact of initiating orthodontic therapy on parafunctional masseter muscle activity. The study compared fixed orthodontic appliances and clear aligners using continuous 24-hour electromyographic (EMG) monitoring to track changes in muscle behavior.

Methods: the study was conducted at the University of Naples Federico II with 15 subjects (9 males, 6 females; mean age 20 ± 5.5 years): 8 receiving fixed appliances and 7 utilizing clear aligners. A wireless EMG device recorded masseter activity over 24 hours at two intervals: before treatment (T0) and immediately after bracket positioning or delivery of the first aligner (T1). Analysis focused on frequency, amplitude, and duration of contractions during wakefulness and sleep. Data were processed using Student's t-tests ($p < 0.05$).

Results: following treatment start, a significant decrease in masseter contraction frequency was recorded during wakefulness ($p = 0.023$), while amplitude and duration remained stable. During sleep, only contraction amplitude decreased significantly ($p = 0.019$). Group-specific analysis revealed that the fixed appliance group had a higher baseline frequency than the clear aligner group ($p = 0.020$) and showed a significant reduction at T1 ($p = 0.013$); the clear aligner group showed no significant changes.

Conclusions: these findings suggest that fixed appliances may briefly suppress parafunctions, while clear aligners did not induce substantial changes. Sleep-related modifications were minor and comparable across both groups. Larger samples and extended follow-ups are needed.

CORRELATION ANALYSIS OF CLINICAL AND ANATOMICAL FACTORS AND RELIABILITY OF THE INSERTION GUIDE FOR PALATAL TADS

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Aim: this study aimed to identify the factors influencing digital planning reliability and their impact on discrepancies between planned and clinically achieved positions during insertion of Temporary Anchorage Devices (TADs) at the palatal level using a guide.

Methods: the sample consisted of 46 subjects requiring orthodontic treatment with palatal mini-screw-supported appliances (126 TADs). Intraoral scan and CBCT were acquired for planning, followed by a second scan after insertion. Planned and achieved TAD positions were compared by measuring the distances between heads and tips and miniscrew inclinations. Discrepancies were then correlated with clinical and anatomical factors, using linear-quantile mixed-effects model analysis to evaluate their influence on positioning accuracy. Bicortical screw planning accuracy was also analyzed.

Results: the analysis showed that when two and four TADs were placed, no significant differences were observed in the distance between the tips and heads of the planned and clinically placed screws. Cortical width significantly affected the axial angle, leading to an increase in distortion of 1.16° per mm. Miniscrews planned as bicortical were accurate in 93.8% of cases.

Conclusions: in cases with two and four miniscrews, no significant differences were observed in the distance between the tips and heads of the planned *versus* clinically achieved TADs. Cortical thickness significantly increased the angle between the axes of planned and achieved TADs. In 93.8% of cases, the planned bicortical TADs (BI) remained bicortical in the post-surgical phase.

PREDICTABILITY OF TRANSVERSE CHANGES IN PATIENTS TREATED WITH MONOLAYER VS. MULTILAYER CLEAR ALIGNERS: A RETROSPECTIVE CLINICAL COHORT STUDY

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Aim: to compare the predictability of transverse expansion between a multilayer copolyester-thermoplastic elastomer (TPE) aligner material (CA® Pro) and a monolayer PETG foil (Duran®).

Methods: adult non-extraction cases were treated with clear aligners made from CA Pro or Duran. Two cohorts were analyzed: Duran (46 patients; 78 models: 40 maxillary, 38 mandibular) and CA Pro (46 patients; 90 models: 46 maxillary, 44 mandibular). STL models at T0 (baseline), T1 (virtual plan), and T2 (end of first series) were superimposed. Nine transverse variables were measured at gingival and cusp levels. Group homogeneity and between-material differences in predictability were tested using Mann–Whitney U and Benjamini-Hochberg correction ($\alpha = 0.05$).

Results: prescribed movements were comparable between

groups (adjusted $p > 0.05$). No significant differences in predictability were found between CA Pro and Duran (adjusted $p > 0.05$). Predictability was higher at the cusp level (upper: 51.2–73.2%; lower: 62.1–76.9%) than at the gingival level (upper: 27.6–49.0%; lower: 44.6–64.7%). The most predictable parameters were upper first-premolar inter-cusp width (Duran: 68.9%; CA Pro: 77.5%) and lower intercanine cusp width (Duran: 73.3%; CA Pro: 80.4%). The least predictable were upper and lower intermolar widths at the gingival margin (27.6% and 44.6%, respectively).

Conclusions: in adult non-extraction cases, transverse expansion was achieved but under-expressed relative to the plan. Predictability was higher at the cusp level, with no significant differences between aligner materials.