Abstracts

**Evaluation of the cytotoxicity of elastomeric ligatures after sterilisation with 0.25% peracetic acid**
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**Introduction:** Sterilisation using peracetic acid (PAA) has been advocated for orthodontic elastic bands. However, cane-loaded elastomeric ligatures can also become contaminated during processing, packaging, and manipulation before placement in the oral cavity and are therefore susceptible, and possible causes, of cross-contamination.

**Aim:** To test the hypothesis that 0.25% peracetic acid (PAA), following the sterilisation of elastomers, influences the cytotoxicity of elastomeric ligatures on L929 cell lines.

**Materials and methods:** Four hundred and eighty silver elastomeric ligatures were divided into 4 groups of 120 ligatures to produce, Group TP (latex natural, bulk pack, TP Orthodontics), Group M1 (Polyurethane, bulk pack, Morelli), Group M2 (Polyurethane, cane-loaded, Morelli) and Group U (Polyurethane, cane-loaded, Uniden). Of the 120 ligatures in each group, 100 were sterilised in 0.25% PAA at time intervals (N = 20) of 1 hour, 2 hours, 3 hours, 4 hours and 5 hours. The 20 remaining elastomeric ligatures in each group were not sterilised and served as controls. Cytotoxicity was assessed using L929 cell lines and a dye-uptake method. Analysis of variance (ANOVA), followed by the Tukey post hoc test (p < 0.05) determined statistical relevance.

**Results:** There was a significant difference between TP, Morelli and Uniden elastomerics (p < 0.05), but no difference between the two types of Morelli elastomerics at the 1 hour time interval. In addition, there was a significant difference between Group CC and the other groups assessed, except between Groups CC and TP at the 1 hour time interval. The non-sterilised elastomeric ligatures showed similar cell viability to that observed after 1 hour of standard sterilisation.

**Conclusion:** PAA did not significantly influence the cytotoxicity of elastomeric ligatures after a sterilisation time of 1 hour and is therefore recommended for clinical use.

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The impact of spur therapy in dentoalveolar open bite
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Aim: A longitudinal case-control study, designed to analyse the isolated effect of attached palatal spurs in patients displaying a dentoalveolar anterior open bite, is presented.

Methods: Thirty-one patients (mean age of 13.3 years ± 3.17 years) underwent a standardised treatment protocol with fixed anterior spurs for 8.3 months. Lateral cephalograms and plaster casts were analysed before (T1) and after spur therapy (T2). The data were tested using paired t-tests with a significance level of p < 0.05.

Results: The cephalometric analysis showed significant elongation of the height of the maxillary (mean +1.22 mm) and the mandibular (mean +1.39 mm) alveolar processes, as well as uprighting of the lower anterior teeth. The plaster cast analysis showed an increase in maxillary intermolar width (mean +0.98 mm) and a decrease in intercanine distance (mean -0.96 mm). The mandibular anterior width and dental arch length reduced. Overall, spur therapy resulted in a significant increase in overjet and overbite.

Conclusion: The use of spurs produced a resolution of the open bite in all patients. Therefore, spurs could be considered an effective mechanism for the management of anterior open bite in selected adolescent patients.

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Mesiodistal tooth dimensions and anterior and overall Bolton ratios evaluated by cone beam computed tomography

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Aim: The mesiodistal widths of the maxillary and mandibular teeth and anterior and overall tooth size ratios were measured by CBCT and conventional orthodontic plaster methods, compared, and correlation coefficients for both methods determined.

Material and methods: The records of 26 patients (14 males and 12 females) between the ages of 18 and 28 years were randomly selected from the archives of the Oral Diagnosis, Radiology and Orthodontic Departments at the Karadeniz Technical University. The mesiodistal diameters of the maxillary and mandibular permanent teeth from first molar to first molar were measured on the patient’s plaster models and also on CBCT arch renditions. Anterior and overall Bolton ratios were calculated for each method. Comparisons were performed using Pearson’s correlation coefficient (PCC).

Results: The measurements of the mesiodistal widths of most maxillary and mandibular teeth were similar and consistent between the conventional and CBCT methods. PCC values ranged from 0.637 (mandibular right second premolar) to 0.916 (maxillary right canine). PCC values for anterior and overall ratios were 0.756 and 0.781, respectively, indicating that correlations between conventional and CBCT methods were acceptable.

Conclusion: Dental measurements and anterior and overall Bolton ratios calculated on CBCT showed acceptable PCC values indicating that CBCT measurements could be used instead of those obtained from conventional plaster models.

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Measuring tooth widths is a key component of orthodontic treatment planning. Over recent decades, many methods have been proposed to achieve this purpose. The current review highlights and describes the initial techniques. The evidence behind their use is presented along with a brief discussion of their benefits and shortfalls. With knowledge and understanding of the accuracy and limitations of the various measurement methods, the clinician may be better informed and therefore able to select the most appropriate method for clinical practice.

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Digital models and intra-oral scanners are gaining increasing popularity in orthodontic diagnosis and treatment planning by allowing clinicians to store and ‘virtually’ analyse dental casts. The present paper reviews the various digital model programs and available intra-oral scanners and presents the research which has tested their accuracy. With this information, clinicians may be better informed to adopt the most appropriate system.

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**2013 Survey of Australian Orthodontists' procedures**
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**Aim:** This survey of Australian orthodontists was conducted to assess treatment preferences.

**Methods:** Email invitations to participate in an online survey were sent to a total of 433 Australian Society of Orthodontists (ASO) members and 158 replies were received (36% response).

**Results:** For Class II treatment, most practitioners preferred to wait and treat later but when early treatment was performed, the Twin Block was the most popular appliance. For fixed appliance treatment, the 0.022 inch slot was the most commonly used (73%) and the median treatment time was 20 months. The median extraction rate was 23% which was similar to that reported in a 2008 USA survey. Sequential plastic aligners were used by 73% of respondents and Temporary Skeletal Anchorage Devices were used by 77%. The most common research question clinicians would like answered related to retention.

**Conclusion:** The responses were similar Australia-wide but some areas of difference were revealed and discussed.

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Effects of four premolar extractions on vermilion height and lip area during a posed smile in patients with bimaxillary protrusion
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Objective: The purpose of this study was to evaluate the effects of four premolar extractions and orthodontic treatment on changes to the lips and vermilion height during a posed smile.

Methods: Fifteen female patients who were diagnosed with bimaxillary protrusion and treated with four premolar extractions were selected. The control group consisted of 25 female volunteers with a normal occlusion. Frontal photographs of the patients during a posed smile were taken before and after orthodontic treatment. Thirty-five landmarks on the upper and lower lips were identified and used to generate measurements of lip area and vermilion height. Linear and angular cephalometric measurements were also obtained.

Results: The mean values for vermilion height and lip form before orthodontic treatment were significantly larger in the treatment group compared with those of the control group. Following treatment, values significantly decreased to the extent that there was no significant difference in the vermilion height and lip form between the post-treatment and control groups. Only three and four significant correlations were found between the changes in incisor position and changes in vermilion height and lip area for the upper and lower lips, respectively.

Conclusions: The vermilion height and lip area in patients with bimaxillary protrusion approached comparative and normal values as a result of four premolar extractions and orthodontic retraction.

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Paediatric sleep-disordered breathing due to upper airway obstruction in the orthodontic setting: a review

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The essential feature of paediatric sleep-disordered breathing (SDB) is increased upper airway resistance during sleep presenting clinically as snoring. Paediatric SDB is a continuum ranging from primary snoring (PS), which is not associated with gas exchange abnormalities or significant sleep fragmentation, to obstructive sleep apnoea (OSA) with complete upper airway obstruction, hypoxaemia, and obstructive hypoventilation. Adenotonsillar hypertrophy, obesity and craniofacial disharmonies are important predisposing factors in the development and progression of paediatric SDB. Clinical symptoms are significant and domains affected include behaviour, neurocognition, cardiovascular morbidity and quality of life. Overnight polysomnography is the current diagnostic gold standard method to assess SDB severity while adenotonsillectomy is the recommended first line of treatment. Other treatments for managing paediatric SDB include nasal continuous airway pressure, the administration of nasal steroids, dentofacial orthopaedic treatment and surgery. However, there are insufficient long-term efficacy data using dentofacial orthopaedics to treat paediatric SDB. Further studies are warranted to define the characteristics of patients who may benefit most from orthodontic treatment.

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Bilateral missing lower permanent incisors: a case report
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Aim: This case report describes the treatment of a patient of African descent with bilateral congenitally missing mandibular incisors and a 10 mm overjet.

Methods: The article discusses the incidence of tooth agenesis and the different approaches to treating patients with bilateral congenitally missing lower incisors. The current treatment involved lower canine substitution for the lower lateral incisors and upper premolar extractions because of malformation. Temporary micro-implants were placed to augment anchorage and to resolve the excessive overjet by the retraction of the upper anterior teeth while preserving a Class I molar relationship.

Results: The Bolton disharmony created by the incisor agenesis and the extraction pattern proved to be a challenge and although an acceptable result was achieved, it was expectedly less than ideal.

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Long term stability of intra-oral maxillary distraction in unilateral cleft lip and palate: a case report
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Objective: This case report presents short and long term treatment results of a unilateral cleft lip and palate patient treated with a modified intra-oral tooth-bone borne distraction appliance.

Materials and methods: The chief complaints of a 16-year-old, unilateral cleft lip and palate patient were poor facial aesthetics, crowding and a fistula. Severe maxillary retrognathism was treated via distraction osteogenesis of the maxilla and performed using an intra-oral tooth-bone borne appliance. Treatment continued to completion with a multibracket system. At an eight-year review following the distraction procedure, the short and long term results were determined cephalometrically.

Results: Following the distraction, A-point advanced 7 mm, 2 mm of which relapsed during fixed appliance treatment. At the end of the active treatment, the patient’s skeletal and dental Class III relationship improved to Class I, which was preserved at the long-term review. The profile was markedly improved by the distraction osteogenesis.

Conclusion: In cases of severe maxillary retrognathism as a result of a cleft lip and palate, maxillary distraction osteogenesis provides a viable alternative to orthognathic surgery.

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Management of unilaterally impacted multiple posterior teeth: a case report
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Introduction: The impaction of permanent teeth poses a challenge to orthodontists, especially when posterior teeth are involved. Multiple impacted posterior teeth without associated with systemic conditions/syndromes is an uncommon clinical occurrence which leads to a posterior open bite and severely compromised function.

Aim: The present article reports the clinical management of an impacted maxillary second premolar, mandibular premolars and mandibular first and second molars on the right side.

Method: The premolars were guided into occlusion by orthodontic traction. Disimpaction and uprighting of the mandibular first molar were achieved using a Begg uprighting spring while a T-loop was used to correct the second molar. Absolute anchorage in the form of miniscrews was not required as anchorage demands were minimal. The total treatment time was 24 months.

Results: Orthodontic mechanics resolved a demanding clinical problem and eliminated the need for prosthetic replacements. An acceptable occlusion with a Class I molar relationship, normal function and a healthy periodontium were achieved.

Conclusion: The results indicated the benefits of uprighting multiple impacted teeth through orthodontic treatment.

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