

ABSTRACTS

OF LECTURES AND SCIENTIFIC POSTERS

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Orals

1 CANDIDATE GENES ASSOCIATED WITH NON-SYNDROMIC HYPODONTIA

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AIMS: To investigate the association between non-syndromic hypodontia and single nucleotide polymorphisms (SNPs) of candidate genes paired box 9 (PAX9), msh homeobox 1 (MSX1), axis inhibition protein 2 (AXIN2), and ectodysplasin A (EDA).

SUBJECTS AND METHOD: Eighty-nine subjects with two specific phenotypes were recruited: (1) individuals with one or more missing permanent lateral incisors; and (2) individuals with one or more missing permanent premolars. These cases were frequency-matched to 253 controls (patients with no missing teeth, excluding the third molars). Self-reported data from both the participants and their mothers were collected, while DNA samples were collected from each participant. Both environmental and genetic data were analysed using conventional descriptive methods.

RESULTS: The sample had a mean chronological age of 16.6 years (standard deviation = 7.3), with most participants being female (59.6%), and of New Zealand European origin (75.4%). Using multiple logistic regression analyses, it was found that the T-allele of rs12853659 (EDA) and the G-allele of rs2428151 (EDA) were both associated with a higher risk of hypodontia [odds ratio (OR) = 2.79, $P = 0.029$; and OR = 2.87, $P = 0.043$, respectively], when adjusted for gender and ethnicity. For PAX9, the A-allele of rs2073242 was associated with a high odds (1.49, 95% CI = 1.01-2.21) of having hypodontia ($P = 0.045$); however, this attenuated after adjusting for gender and ethnicity. No statistically significant associations were found with the AXIN2 and MSX1 genes.

CONCLUSION: Hypodontia is a complex condition that is influenced by both genetic and environmental factors. The present study reveals some evidence that polymorphisms of the EDA and PAX9 genes are associated with specific phenotypes of non-syndromic hypodontia. However, larger samples are needed to investigate the association further, as well as to confirm the genetic variants associated with hypodontia.

2 THE EFFECTS OF FIXED VERSUS REMOVABLE ORTHODONTIC RETAINERS ON STABILITY AND PERIODONTAL HEALTH: 4-YEAR FOLLOW-UP OF A RANDOMISED CONTROLLED TRIAL

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AIMS: To compare the stability of treatment and periodontal health with fixed versus removable orthodontic retainers over a 4-year period.

SUBJECTS AND METHOD: A 4-year follow-up of participants randomly assigned to either a mandibular fixed retainer from canine to canine, or removable vacuum-formed retainer was undertaken. Irregularity of the mandibular anterior segment, mandibular intercanine and intermolar widths, arch length and extraction space opening were recorded. Gingival inflammation, calculus and plaque levels, clinical attachment level and bleeding on probing were assessed. The outcome assessor was blinded where possible.

RESULTS: Forty-two participants were included in the analysis, 21 per group. Some degree of relapse occurred in both treatment groups at the 4-year follow-up; however, after adjusting for confounders, the median between-groups difference was 1.64 mm higher in participants wearing vacuum-formed retainers ($P = 0.02$; 95% CI: 0.30, 2.98 mm). No statistical difference was found between the treatment groups in terms of intercanine ($P = 0.52$; 95% CI: -1.07, 0.55) and intermolar widths ($P = 0.55$; 95% CI: -1.72, 0.93), arch length ($P = 0.99$; 95% CI: -1.15, 1.14) and extraction space opening ($P = 0.84$; 95% CI: -1.54, 1.86). There was also no statistical difference in relation to periodontal outcomes between the treatment groups, with significant gingival inflammation and plaque levels a common finding.

CONCLUSION: This prolonged study is the first to suggest that fixed retention offers the potential benefit of improved preservation of alignment of the mandibular labial segment in the long term. However, both types of retainers were associated with gingival inflammation and elevated plaque scores.

3 IMPACT OF ORTHODONTIC TREATMENT ON THE INTEGRITY OF ENDODONTICALLY TREATED TEETH

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mm Class III occlusions were rated most and least acceptable, orthodontists' and parents' perception of treatment outcomes differed significantly for four out of the seven malocclusions investigated. No significant difference was found between perceptions of treatment outcomes at 18 months versus 24 months. For all cases, except 2 mm Class III and 3 mm Class III, parents were willing to extend treatment duration significantly longer than orthodontists ($P < 0.05$) to achieve a better result. Also orthodontists were significantly more likely than parents to prefer terminating treatment within 3 months for all of the imperfect finishes evaluated except for the 2 mm Class III occlusion ($P = <0.0001-0.02$).

CONCLUSION: Orthodontists and parents viewed most treatment outcomes in the AP dimension differently. However, both rated Class I as the most acceptable outcome. For most imperfect results, parents were willing to extend treatment longer than orthodontists to achieve improvements and were less likely to prefer terminating treatment without achieving better results.

36 RELIABILITY OF THE SURGERY FIRST APPROACH FOR SKELETAL CLASS III MALOCCLUSION

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AIMS: With the accuracy of orthodontic simulation and the application of implant anchorage after surgery, the occlusal relationship is more stable and easy to control after orthognathic surgery. The aim of this study was to establish the 'surgery first' approach for correction of a skeletal Class III malocclusion and to explore the effect of the approach for improvement of facial appearance, overjet and overbite.

SUBJECTS AND METHOD: Eighty patients with a skeletal Class III malocclusion were selected, 40 were treated with the traditional 'orthodontics first' approach and the others with the surgery first approach. Lateral cephalograms were obtained before surgery, immediately after surgery and after treatment, and cephalometric measurements were taken. The changes of the soft and hard tissue markers in the two groups were compared. A paired *t*-test and Kruskal-Wallis test were used for statistical analysis.

RESULTS: There were 49 females and 31 males with an average age of 21.20 years. Treatment time ranged from 8 to 19 months (average 14.2 months). Patients treated with the surgery first approach achieved similar results to those treated with the traditional orthodontics first approach. Statistical analysis showed that there was no significant difference between the two groups of cephalometric and mandibular bone tissue markers at any time point. However, there was a significant difference between the two groups of dental markers before and after surgery, but not post-treatment. Therefore, orthodontic decompensation of the upper and lower teeth can be achieved after surgery in the surgery first cases, and the clinical results of the two groups were similar.

CONCLUSION: Treatment of skeletal Class III patients with the surgery first approach can quickly and effectively achieve satisfactory occlusal function and facial profile.

37 CORRELATION BETWEEN GINGIVAL BIOTYPE, WIDTH OF KERATINIZED GINGIVA AND DIFFERENT DENTAL MALOCCLUSIONS: A CLINICAL STUDY

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AIMS: Gingival biotype is considered as an important factor in the success of periodontal and orthodontic treatment. The aim of this study was to assess the prevalence of the gingival biotype and the width of keratinized gingiva in a group of patients with different types of Angle classification of malocclusion.

SUBJECTS AND METHOD: A total of 82 periodontally healthy volunteers (44 females, 38 males, mean 13.9 years). Gingival biotype was assessed by evaluation on the translucence of a periodontal probe through the gingival margin of the tooth during probing at the midfacial aspect of both maxillary central, lateral incisors and canine. Moreover, on each patient, Angle's classification of malocclusion was also recorded. In order to assess the association between gender, gingival biotype and Angle classification of malocclusion (categorical variables) a Chi-square test was used. For continuous variables a Student's *t*-test was performed in order to consider gender and the gingival biotype (thin or thick type).

RESULTS: The prevalence in the whole sample of a thin gingival biotype was 44.8 per cent, and of a thick gingival biotype 55.2 per cent. The frequency of the female gender with a thin gingival biotype was significantly less than for males (41.9% and 58.1%, respectively) while the frequency of a thick gingival biotype was higher in females compared to males (56.4% and 43.6%, respectively; $\chi^2=1.329$, $P = 0.237$). In the whole sample, Angle's classification was: Class I malocclusion = 42.8 per cent, Class II = 29.4 per cent and Class III = 27.8 per cent. There was no significant difference in the distribution of malocclusion between genders ($\chi^2 = 1.725$; $P = 0.445$). There was no significant association between type of malocclusion and gingival biotype ($P = 0.143$). However, there was a prevalence for a thick gingival biotype in patients with a Class II malocclusion and a slight prevalence for a thin gingival biotype in a patient with Class I malocclusion.

CONCLUSION: The findings show that even if there was a prevalence of a thin gingival biotype in female patients and a thick gingival biotype in patients with a Class II malocclusion, no relationship was found between gingival biotypes and dental malocclusion in the whole analyzed sample.

38 EFFICACY OF ORAL PROBIOTICS IN MANAGING BIOFILM FORMATION IN ORTHODONTIC PATIENTS: A TRIPLE-BLIND RANDOMISED PLACEBO-CONTROLLED TRIAL

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AIMS: Biofilm accumulation is a common problem in patients undergoing orthodontic treatment with fixed appliances. Probiotic bacteria may inhibit the growth of pathogenic microbes in these biofilms. This study investigated the effects of the oral probiotic *Streptococcus salivarius* M18 on dental biofilm, gingival inflammation, and oral malodour in patients wearing fixed orthodontic appliances.

SUBJECTS AND METHOD: The study was designed as a prospective, randomised, triple-blind, two-arm parallel group, placebo-controlled trial. Sixty-four patients undergoing fixed orthodontic treatment were randomly allocated to a probiotic (n = 32) or a placebo intervention group (n = 32). The oral probiotic or placebo intervention consisted of lozenges of identical shape, colour, smell and taste. Patients were asked to consume two lozenges per day for 1 month. Assessments were made at baseline, at the end of intervention, and after a 3 month follow-up. The outcome measures were plaque index (PI), gingival index (GI) and halitosis-causing volatile sulphur compounds (VSC) levels. The taxonomic profiles of dental biofilm before and after intervention were analysed utilising next-generation sequencing of bacterial 16S rRNA genes.

RESULTS: PI and GI scores were not significantly influenced by the probiotic intervention (intervention × time: $P > 0.05$). The level of VSCs decreased significantly in both the probiotic group (VSC reduction = -8.5%, $P = 0.015$) and the placebo group (VSC reduction = -6.5%, $P = 0.039$) after 1 month. However, at the 3-month intervention-free follow-up, VSC levels of the placebo group returned to baseline levels whereas those of the probiotic group decreased further compared to baseline readings (-10.8%, $P = 0.005$). The relative abundance of bacteria genera in dental plaque was not influenced by the intervention.

CONCLUSION: Oral probiotic *S. salivarius* M18 can reduce the VSC levels in patients with fixed appliances but effects on PI and GI or dental biofilm composition are minimal.

39 ASSOCIATION BETWEEN MAXILLARY ANTERIOR SUPERNUMERARY TEETH AND IMPACTED INCISORS IN THE MIXED DENTITION

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AIMS: To investigate the relationship between supernumerary teeth and impacted incisors in the maxillary anterior area in the mixed dentition.

MATERIALS AND METHOD: A total of 417 supernumerary teeth (from 294 patients; age range 6-12 years; 220 boys, 74 girls) diagnosed using cone-beam computed tomography. The number, morphology, growth orientation and position of supernumerary teeth were recorded along with the presence of impacted incisors. *t*-, Wilcoxon and chi-square tests were used for assessment of the imaging data.

RESULTS: Of the patients 23.1 per cent (n = 68; age 8.5 ± 1.6 years) had supernumerary teeth and impacted incisors. Morphology (molariform and odontome-like), growth orientation (normal and no orientation), and position (coronal) of the supernumerary teeth were significantly associated with impacted incisors ($P < 0.05$ for all). An increase of 1 year in age was associated with a decreased risk of having supernumerary teeth accompanied by impacted incisors [odds ratio (OR) 0.76; 95% confidence interval (CI) 0.63 to 0.92]. An increase of one supernumerary tooth more than doubled the risk of having an impacted incisor (OR 2.39; 95% CI, 1.44 to 3.96).

CONCLUSION: In this population, the number, morphology, growth orientation, and position of supernumerary teeth as well as patient age were associated with impacted incisors in the maxillary anterior area during the mixed dentition. The presence and morphology of supernumerary teeth should alert the clinician to the increased likelihood of having impacted incisors and the need for early diagnosis and appropriate treatment.

40 HOW DO CLEAR ALIGNERS PERFORM WHEN TREATMENT RESULTS ARE EVALUATED WITH THE PEER ASSESSMENT RATING INDEX?

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AIMS: The Peer Assessment Rating (PAR) Index in its weighted modification has been established internationally for more than 28 years. It allows objective evaluation between clinicians and therapies. The aim of this research was to determine the efficiency of Invisalign treatment results evaluated using the PAR Index.

MATERIALS AND METHOD: Forty two consecutive cases treated by two Invisalign experts were identified. A calibrated examiner determined the PAR Index scores for the dental casts in a random order on two different days. The mean of both analyses was the final value. If the discrepancy between both evaluations was ≥ 6 PAR