FEATURES SECTION

Relevant research from non-orthodontic journals

This occasional section is designed to draw the attention of readers to papers that have been published in non-orthodontic journals, but which may be of interest. The abstracts have been selected and edited by Jaspal Panesar and Professor Nigel Hunt

Bond Strengths

Effects of buccal versus lingual surfaces, enamel conditioning procedures and storage duration on brackets debonding characteristics
Brosh T, Strouthou S, Sarne O.
Journal of Dentistry 2005; 33: 99–105.

Objectives: To determine the influence of two enamel conditioning techniques on buccal and lingual tooth surfaces at two different times on debonding strength and tooth damage.

Methods: The study included 50 premolars. Buccal and lingual surfaces of 10 teeth were scanned using SEM before (N=4) and after enamel conditioning by either acid etching or sandblasting prior to acid etching (N=6) for their morphology. The remaining 40 teeth were divided into 2 equal groups, differing in enamel conditioning prior to metallic bracket bonding on the buccal and lingual surfaces. Each group was equally subdivided into short-term (48 h) or long-term (12 m) water storage. Debonding strength was measured followed by SEM and EDAX for adhesive remnant index (ARI) and calcium remnant index (CRI) left on bracket bases. ANOVA with repeated measures was applied to the results.

Results: The buccal enamel was rougher than the lingual one. The surface morphology after the two types of conditioning showed a different pattern. A significantly higher debonding strength was needed to debond the buccal brackets compared to the lingual ones ($P=0.05$). A significantly higher ARI ($P=0.002$) and higher CRI ($P=0.005$) were found in the lingual surface compared with the buccal. No differences were found in debonding strength ARI or CRI regarding the different conditioning or storage duration.

Conclusions: Lingual bonding leads to higher ARI and CRI than buccal bonding. Sandblasting prior to etching does not improve bonding strength for lingual or buccal bonding.

Comment: With the recent increase in popularity of lingual orthodontics this paper highlights differences in morphological etch pattern, bond strength and debond for lingual and buccal surfaces.

Periodontal

Reconstruction of the maxillary midline papilla following a combined orthodontic–periodontic treatment in adult periodontal patients.
Cardaropoli D, Re S, Corrente G, Abundo R:
J Clin Periodontol 2004; 31: 79–84.

Objective: The aim of the present study was to evaluate the role of a combined orthodontic–periodontic treatment in determining the reconstruction of the midline papilla lost following periodontitis.

Material and Methods: Twenty-eight patients, with infrabony defects and extrusion of one maxillary central incisor, were treated. At baseline, all patients presented opening of the interdental diastema and loss of the papilla. At 7–10 days after open-flap surgery, the intrusive movement was started. For each patient, probing pocket depth (PPD), clinical attachment level (CAL) and papilla presence index (PI) were assessed at baseline, end of treatment and after 1 year. PI was also evaluated independently in patients with narrow or wide periodontal biotype (NPB–WPB).

Results: All parameters showed statistical improvement between the initial and final measurements, and showed no changes at follow-up time. The mean residual PPD was 2.50 mm, with a decrease of 4.29 mm, while the mean CAL gain was 5.93 mm. Twenty-three out of 28 patients improved the PI score at the end of therapy. No statistical difference was recorded in PI values between groups NPB and WPB.

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Conclusion: The presented clinical protocol resulted in the improvement of all parameters examined. At the end of orthodontic treatment, a predictable reconstruction of the interdental papilla was reported, both in patients with thin or wide gingiva.

Comments: Loss of the interproximal papilla can lead to unsightly black triangles. The authors have outlined a predictable technique for papilla regeneration.

Quality of Life

Quality of Life: How Do Adolescents With Facial Differences Compare With Other Adolescents?
Topolski TD, Edwards TC, Patrick DI.
Cleft Palate–Craniofacial Journal, 2005; 42: 25–32.

Objective: To compare the quality of life (QOL) of youths living with visible facial differences (FDs) with youths living with a visible nonfacial difference (i.e., mobility limitations), an invisible difference (i.e., attention deficit/hyperactivity disorder), or no known difference.

Design: An observational study of perceived QOL among adolescents with FDs (n = 56), adolescents with no diagnosed chronic condition (NCC, n = 116), adolescents with mobility limitations (ML, n = 52), and adolescents with attention deficit/hyperactivity disorder (ADHD, n = 68).

Participants: Adolescents ages 11–18 years with FDs recruited through Children's Hospital, Seattle, Washington, participated in this study. Comparison groups were from a previous study of QOL among youths with and without chronic conditions.

Main Outcome Measures: The main outcome measure was the Youth Quality of Life Instrument—Research Version, a generic instrument that assesses both perceptual and contextual aspects of QOL in four domains: Sense of Self, Relationships, Environment/Culture, and General Quality of Life.

Results: A MANCOVA adjusting for age, gender, and depressive symptomatology revealed that adolescents with FDs, on average, reported significantly lower overall QOL than did the NCC group. Their domain scores were similar to those of the other chronic conditions groups on all but the relationship domain. Reviewing the constituent items of the relationship domain revealed that adolescents in the ML and FDs groups reported higher scores than either the NCC group or the ADHD group on the relationship variables concerning family.

Conclusions: Adolescents with facial differences confront significant challenges to their own self-identity while experiencing higher QOL from relationships, possibly from their need to negotiate and maintain close family support.

Comments: The authors have noted several limitations of this study, however it does highlight the important role played by family support for children with facial differences.

Orthognathic surgery

Non-surgical risk factors for condylar resorption after orthognathic surgery
Hwang S-J, Haers PE, Seifert B, Sailer HF.
Journal of Cranio-Maxillofacial Surgery 2004; 32: 103–111.

Objective: The purpose of this study was to find nonsurgical risk factors for condylar resorption after orthognathic surgery.

Patients: In this retrospective study, 17 patients (Group I) who developed postoperative condylar resorption were selected. These patients were compared with 22 patients (Group II) without postoperative condylar resorption, but who showed mandibular hypoplasia with a preoperative high mandibular plane angle of more than 40°.

Methods: Possible non-surgical risk factors were sought by analysing clinical and radiological data collected preoperatively and immediately, 6 weeks, and 1 and 2 years postoperatively.

Results: There was no significant difference of gender distribution between the two groups. Patients in Group I were significantly younger (P=0.02) than those in Group II. The incidence *(sic)* of temporomandibular joint dysfunction in both groups was similar preoperatively, but was significantly higher (P=0.001) postoperatively in Group I. The posterior inclination of the condylar neck in Group I was also significantly greater (P=0.001). The preoperative mandibular plane angle in Group I (mean value: 49.4°) was significantly greater (P=0.005) than in Group II (mean value: 44.9°). The preoperative SNB angle, overbite, and posterior facial height and ratio (posterior/anterior facial heights) in Group I were significantly smaller (P=0.05).

Conclusion: The present study suggests that the posteriorly inclined condylar neck should be considered as a relevant non-surgical risk factor.

Comments: Condylar resorption following orthognathic surgery has a multifactorial aetiology. This paper identifies a pre-operative risk factor alerting the clinician to possible long term relapse and helps the informed consent process.

Tooth Movement

Local OPG Gene Transfer to Periodontal Tissue Inhibits Orthodontic Tooth Movement

Kanzaki H, Chiba M, Takahashi I, Haruyama N, Nishimura M, Mitani H

Journal of Dental Research 2004; 83: 920–925.

Objective: to test the hypothesis that local OPG gene transfer to the periodontium would neutralize the RANKL activity induced by mechanical compressive force, thereby inhibiting osteoclastogenesis and diminishing tooth movement.

Material and Methods: The upper first molars of six-week-old male Wistar rats were moved palatally by means of a fixed-orthodontic wire. A mouse OPG expression plasmid [pcDNA3.1(+)-mOPG] was constructed, and the production of functional OPG protein was confirmed *in vitro*. The inactivated HVJ envelope vector containing pcDNA3.1(+)- mOPG or PBS was injected periodically into the palatal periodontal tissue of upper first molars.

Results: When this local OPG gene transfer was performed, OPG production was induced, and osteoclastogenesis was inhibited. Local OPG gene transfer significantly diminished tooth movement. The percent inhibition of tooth movement (the OPG-transfection group/the tooth-movement group) was 93.8%, 72.0%, 60.4%, and 52.2% at days 3, 7, 14, and 21, respectively.

Conclusion: OPG gene transfer to periodontal tissue inhibited RANKL-mediated osteoclastogenesis and inhibited experimental tooth movement.

Comments: This rat laboratory study gives us a glimpse of potential future local applications of gene technology to modify tooth movements. It would have been interesting if the experiment allowed a few specimens to live past 21 days in order to assess the long term local effects.