FEATURES SECTION

Relevant research from non-orthodontic journals

This occasional section is designed to draw the attention of the 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 Professor Nigel Hunt.

Curve of Spee

The curve of Spee and craniofacial morphology: a multiple regression analysis

Farella M, Michelotti A, van Eijden TMGJ, Martina R

European Journal of Oral Science, 2002; **110**: 277–281

Objective: This study investigated the relationship between the curve of Spee and skeletal facial morphology.

Study design: A retrospective analysis of patient records.

Method: Pre-treatment study casts and lateral cephalometric radiographs of 59 Caucasian patients with complete permanent dentitions (except third molars) were examined. Exclusion criteria included previous orthodontic treatment, posterior crossbites, periodontal disease or restorations, morphological tooth anomalies, or lower arch crowding posterior to the canine. The curve of Spee was measured from standardized photographs of the left side of the dental casts. The cusps tips from canine to second molar were digitized and the concavity of the curve of Spee calculated by second-order quadratic interpolation. The cephalometric analysis evaluated the sagittal and vertical craniofacial dimensions, and the condylar position relative to the occlusal plane. These variables were then used in a multiple regression model.

Results: The variables above explained 34 per cent of the total variance of the curve of Spee. The amount of the curvature was significantly related to (1) the horizontal position of the condyle with respect to the dentition, (2) the sagittal position of the mandible with respect to the anterior cranial base, and (3) the ratio between the posterior and anterior facial height. No significant relationship was found between the curve of Spee and any of the other cephalometric variables. The curve of Spee was not influenced by the age or gender of the subjects investigated.

Conclusions: The curve of Spee is highly variable between individuals and is only influenced to a minor extent by craniofacial morphology. Of the variables considered, the horizontal position of the condyle in relation to the occlusal plane provided the greatest contribution, but the curvature was weakly influenced by the vertical craniofacial dimension and by the position of the mandible with respect to the anterior cranial base.

Bond Strengths

Bond strength for orthodontic brackets contaminated by blood: composite versus resin-modified glass ionomer cements

Reddy L, Marker VA, Ellis E

Journal of Maxillofacial Surgery, 2003; **61**: 206–213

Objective: The objective of the study was to evaluate and compare the shear bond strengths of a self-cured glass ionomer versus composite cement for bonding of stainless steel buttons with various enamel surface and setting conditions.

Study design: A laboratory investigation.

Material and methods: Stainless steel orthodontic buttons were bonded using composite material under three different enamel and setting conditions: (1) conditioned and dried enamel surface; (2) conditioned enamel surface, but pre-contaminated with blood prior to bonding; (3) non-conditioned enamel, but immediately contaminated with blood following bonding. Buttons were bonded to 109 recently extracted teeth and subsequently tested in shear mode in a universal testing machine. The maximum bond strength, the site and location of the bond failure were studied and recorded.

Results: Composite sustained greater shear force than resin-modified glass ionomer materials. The effect of contamination was similar for both materials with the decrease in bond strength of similar proportion. The post-contamination values were not significantly different from the uncontaminated bond strength for either material. The type of bond failure was significantly

different for the different materials, and there were significant differences among the treatment conditions.

Conclusions: Composite resin had significantly greater shear bond strength than resin-reinforced glass ionomer cement. Both materials showed a significant decrease in bond strength when pre-contaminated with blood. The post-contamination values were not significantly different from the uncontaminated bond strength for either material.

Comments: This study is relevant to bonding in surgical situations. However, as recognized by the authors, the lack of uniform distribution of the different teeth used in the study may have confounded the results.

Oral Biology

Growth of the mandible after replacement of the mandibular condyle: an experimental investigation in *Macaca mulatta*

Ellis E, Schneiderman ED, Carlson DS

Journal of Oral and Maxillofacial Surgery 2002; **60**: 1461–1471

Objective: The aim was to investigate the growth of the mandible after temporomandibular joint reconstruction in juvenile monkeys.

Study design: A prospective controlled animal cohort investigation.

Material and Method: Sixteen juvenile monkeys were allocated to four experimental groups based on the method of temporomandibular joint reconstruction after bilateral condylar excision. Group condyle had their condylar segments immediately replaced to serve as surgical controls. Group bone animals were reconstructed with a bony strut. Group sternoclavicular joint animals were reconstructed with the sternal end of their clavicles. Group costochondral junction animals were reconstructed with the costochondral junction of the ribs. Standardized lateral cephalometric radiographs with the aid of tantalum bone markers were used to evaluate mandibular growth. Twenty animals acted as controls and were allowed to grow undisturbed for an 18-month period.

Results: All animals showed good mandibular function and a Class I molar relationship after an 18-month follow-up. Statistical and graphic comparisons showed no significant difference in mandibular growth among any of the groups.

Conclusions: Within the limits of this model, the choice of autograft for condyle replacement may be irrelevant.

Orthognathic surgery

The accuracy of video imaging prediction in soft tissue outcome after bimaxillary orthognathic surgery

Lu CH, Ko EWC, Huang CS

Journal of Oral and Maxillofacial Surgery 2003; **61**: 333–342

Purpose: The purpose of the present study was to evaluate the accuracy of the outcome in soft tissue prediction through use of a computer imaging system after bimaxillary orthognathic surgery.

Study design: A retrospective investigation of patient records.

Materials and Methods: The study sample consisted of 30 adults who had undergone orthognathic surgery that included the Wassmund and Köle procedures, and optional genioplasty to correct bimaxillary protrusion. All the patients had lateral cephalometric radiographs and profile photographs taken within 6 months before surgery, and at least 6 months after surgery. The computer-generated soft tissue image and the actual post-surgical profile were compared. The accuracy of this computer-generated profile image was evaluated.

Results: The results indicated that the nasal tip, soft tissue A point, and upper lip presented the least predicted errors in the sagittal plane. While the nasal tip presented higher reliability, lower lip prediction was found to be the least accurate region, and it tended to be located anterior to the actual position. In the vertical plane, most of the predictions revealed higher accuracy than those in the sagittal plane. There were no statistically significant differences between the predictions of the groups with and those without genioplasty.

Conclusions: Computer-generated image prediction was suitable for patient education and communication. However, efforts are still needed to improve the accuracy and reliability of the prediction programme, and to include the consideration of changes in soft tissue tension and muscle strain. The accuracy of this system in soft tissue prediction should be carefully interpreted.