FEATURES SECTION

Relevant research from non-orthodontic journals

This 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 Jamie Gwilliam and Professor Nigel Hunt.

Implants

Retrospective evaluation of mandibular incisor replacement with narrow neck implants. *Clin Oral Implants Res* 2006; 17: 730–35
Cordaro L, Torsello F, Mirisola Di Torresanto V, Rossini C

Objective: To retrospectively evaluate the clinical results of mandibular incisors replaced with narrow neck implants (NNI).

Patients and methods: Thirty-one patients treated consecutively for single or multiple lower incisor replacement with NNI with a mean follow-up of 23 months (range 18–42 months) were included in the study and were divided into three groups: single tooth, multiple unit restoration and restorations on adjacent implants.

Outcome measures: Survival and success rates, and soft tissue parameters, such as modified plaque index (mPI), peri-implant probing depth (PPD), bleeding on probing (BOP) and the papilla index, were analysed. Subjective evaluation was performed by patients and clinicians on visual analogue scales.

Results: The implants and prostheses showed a survival rate of 100% and an overall success rate of 94%. The adjacent implant group showed a statistically significant increase in PPD. The papilla index showed a better outcome distribution in single-tooth and multi-unit groups. Patients' evaluation of treatment outcome was satisfactory in all groups, even though the best aesthetic and functional results were found in single-tooth and multi-unit groups. The professional evaluation showed good outcomes for the single-tooth and multi-unit groups and statistically significant poorer results in the adjacent implants group.

Conclusions: The replacement of lower incisors with NNI leads to favourable functional and aesthetic results in cases of single-tooth or multiple-unit replacement. Less favourable results were achieved if two adjacent mandibular incisors were replaced with adjacent implants.

Comment: This study suffers from an inherent fault as it is retrospective and the number of patients treated is low, especially of patients in the 'adjacent implants' group. However, all implants were placed by one operator and recall of these patients was good. This evidence does support the notion that not only do aesthetics suffer when implants are too close, but gingival and periodontal health are also jeopardized. Further prospective work in this area will support these tentative conclusions.

Periodontology

Bio-Oss collagen and orthodontic movement for the treatment of infrabony defects in the esthetic zone. *Int J Periodontics Restorative Dent* 2006; 26: 553–59
Cardaropoli D, Re S, Manuzzi W, Gaveglio L, Cardaropoli G

Objective: To evaluate whether it is possible orthodontically to move migrated teeth into infrabony defects augmented with a biomaterial.

Research Design: Case series

Method: Three adult patients suffering from chronic periodontitis were treated. Each of the patients presented with an infrabony defect adjacent to a migrated maxillary central incisor. The defects were filled with a collagen bovine bone mineral; after two weeks, an orthodontic device was activated using light, continuous forces. Orthodontic treatment time varied from four to nine months; during this period, patients were enrolled in an oral hygiene recall program.

Outcome measure: At baseline and six months after the end of therapy, probing pocket depths (PPD) and clinical attachment levels (CAL) were assessed. In

DOI 10.1179/146531207225022041

addition, the vertical and horizontal dimensions of the defects were measured on standardized radiographs.

Results: Residual mean PPD was 3.33 mm, with a mean reduction of 3.67 mm. Mean CAL gain was 4.67 mm. Radiological vertical and horizontal bone fills were, on average, 3.17 and 2.0 mm, respectively.

Conclusions: The case series shows the effectiveness of a combined periodontal-orthodontic approach for the treatment of infrabony defects. Reduction of PPD to physiological values, CAL gain and radiological defect resolution were obtained. No detrimental effects from the orthodontic movement were observed on the augmentation material.

Comment: The paper examines the effectiveness of a periodontal-orthodontic approach in the treatment of infrabony defects adjacent to migrated teeth. The use of intrusion mechanics (with bioprogressive techniques) demonstrates the potential to reduce recession and improve clinical attachment levels. However, there was little information on the orthodontic mechanics used and there was a varied treatment time in fixed appliances. The authors note that a need for histological evidence of periodontal regeneration is required. This small case series highlights a need for prospective trials in this field.

Orthognathic surgery

Bite force, occlusal contact area and masticatory efficiency before and after orthognathic surgical correction of mandibular prognathism. *Int J Oral Maxillofac Surg* 2006; 35: 1102–27
Iwase M, Ohashi M, Tachibana H, Toyoshima T, Nagumo M

Objective: To evaluate bite force, occlusal contact area and masticatory efficiency, before and after sagittal split ramus osteotomy in 27 patients with mandibular prognathism, in comparison with 27 control subjects with normal occlusion.

Method: Bite force and occlusal contact area were simultaneously measured with a computerized occlusal analysis system. Masticatory efficiency was estimated by a low-adhesive colour-developing chewing-gum system. The data were collected at initial medical consultation, immediately before surgery, and at six weeks, three months, six months, one year and more than two years after surgery.

Results: Both bite force and occlusal contact area of the patients before surgery was significantly less than those of the controls. Although all three parameters had improved after orthognathic surgery, the bite force and occlusal contact area did not reach the values of the controls within two years postoperatively. Masticatory efficiency at two years after surgery drew near to control levels. Bite force correlated with occlusal contact area in the patients postoperatively, whereas masticatory efficiency did not correlate with either of the other two parameters.

Conclusions: Bite force, occlusal contact area and masticatory efficiency increased for the experimental group, but still fell short of the controls, even after two years.

Comments: An intriguing paper that attempts to examine aspects of masticatory efficiency using novel approaches. This article looks at only Class III patients and their matched controls and extrapolating the data to Class II patients undergoing orthognathic surgery may not be prudent. Disappointingly, the paper fails to elucidate whether patients reported deficiencies in their function, with consequent improvements post-surgery. Should we be advising our orthognathic patients of the possibility of not achieving full bite force in those who complain of a lack of it?

Growth

Remodelling the dentofacial skeleton: the biological basis of orthodontics and dentofacial orthopedics. *J Dent Res* 2007; 86: 12–24
Meikle MC

Aims: One author discusses the significance of numerous well-documented animal studies and the extent to which they can be utilized clinically in the correction of skeletal malocclusion.

Discussion: The author looks at:

1. facial sutures and their patency in comparison to cranial sutures;
2. remodelling of the maxilla in animal experiments compared with clinical remodelling involving headgear or protraction headgear;
3. experimental remodelling and clinical remodelling of the TMJ, with information about some of the genetic markers suggested to have important growth implications.

An assessment of some of the errors incurred in previous studies is also put to the reader.

Conclusions: The author is careful not to draw conclusions from the literature review, instead posing

questions to the orthodontic mind. However, a suggestion to use the term 'growth remodelling', rather than 'growth stimulation' is suggested.

Comment: This highly readable article catalogues some of the evidence concerning maxillary and mandibular growth and remodelling. With a focus predominantly on animal experiments the author suggests that we may be underestimating the orthopaedic changes to the mandible during functional appliance wear, particularly those appliances thought to 'jump the bite'. With some useful commentary on previous work this paper poses interesting questions for those studying orthodontics in this controversial topic.

Implants

Load-related bone modelling at the interface of orthodontic micro-implants. *Clin Oral Implants Res* 2006; 17: 714–22

Buchter A, Wiechmann D, Gaertner C, Hendrik M, Vogeler M, Wiesmann HP, Piffko J, Meyer U

Objective: To determine the interface reaction of two different titanium micro-implant systems activated with different load regimens.

Research design: Animal experiment

Method: A total of 200 micro-implants (100 Abso Anchor and 100 Dual Top) were placed in the mandible of eight Gottinger minipigs. Two implants each were immediately loaded in the opposite direction by various forces (100, 300 or 500 cN) through tension coils. Bone tissue responses were evaluated by histology, histomorphometry and scanning electron microscopy after 22 and 70 days of loading.

Results: Implant loosening was present in the groups where the load reached 900 cN mm. No movement of implants through the bone was found in the experimental groups, for any of the applied loads. Ultrastructural analysis confirmed the clinical and histological finding that implants (except when loaded at 900 cN mm) were well osseointegrated after 22 days.

Conclusions: Micro-implants may not only be loaded immediately without impairment of implant stability, but may enhance bone formation at the interface when the load-related biomechanics do not exceed an upper limit of tip moment at the bone rim.

Comment: This animal experiment using monocortical screws with immediate loading adds important histological evidence to the use of these devices. A good level of osseointegration was shown for all but excessive forces, although the long-term results are more uncertain.