FEATURES SECTION

Evidence-based orthodontics

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Physical properties of root cementum: Part 5. Volumetric analysis of root resorption craters after application of light and heavy orthodontic forces. *Am J Orthod Dentofac Orthop* 2005; 127: 186–5
Chan E, Darendeliler MA

Objectives: To evaluate the effect of the amount of orthodontic force on the volume of root resorption (RR) craters and identify sites that might be predisposed to RR.

Design: A split-mouth randomized controlled trial.

Setting: Sydney, Australia.

Participants: Sixteen patients (36 teeth) requiring extraction of at least bilateral first premolars for orthodontic treatment.

Interventions: Teeth were bonded with SPEED brackets (TMA; Ormco, Glendora, California, USA). A buccally directed force of either 25 or 225 g was applied by beta-titanium molybdenum alloy springs (Strite Industries, Cambridge, Ontario, Canada) to one premolar for 28 days. No force was applied to the contralateral premolar. The teeth were extracted and underwent laboratory examination.

Outcome measures: The site and volume of resorption craters in the cementum measured by a scanning electron microscope.

Results: The mean volume of resorption was 3.5 times greater for the 25 g group ($p>0.05$) and 11.6 times greater for the 225 g group than the control group ($p<0.001$). The 225 g group had 3.3 times more resorption than the 25 g group ($p<0.001$). The buccal cervical and lingual apical regions of the experimental groups (25 and 225 g) had significantly more resorption than other areas.

Conclusions: There was significantly more resorption in the 225 g group than the 25 g or control groups. The buccal cervical and lingual apical regions of the experimental groups had more resorption than other areas.

Implications: This study alerts us to the adverse effects of heavy forces in orthodontics and suggests that the areas of the root that are subject to high pressures are more prone to root resorption.

Failed appointments in an orthodontic clinic. *Am J Orthod Dentofac Orthop* 2005; 127: 355–7
Bos A, Hoogstraten J, Prahl-Anderson B

Objectives: To test the hypotheses that sending a reminder would reduce the failure to attend (FTA) rate and that the form of reminder was did not matter.

Design: A randomized controlled trial.

Setting: Academic Centre of Dentistry, Amsterdam, Netherlands.

Participants: All booked patients over a 3-week period.

Interventions: Three groups received a reminder the day before the appointment by telephone, mail or a short-message service (Text) via a mobile phone. The control group did not receive a reminder.

Outcome measures: Attendance at patients' booked appointment.

Results: The overall FTA rate was 4%. There was no statistically significant difference between the groups in the FTA rate ($p>0.05$). Of those patients who favoured a reminder the majority preferred a letter ($p<0.01$).

Conclusions: The results of this study imply that the hypothesis that reminders would reduce the FTA rate was not confirmed. The hypothesis that the form of the reminder did not matter is accepted.

Implications: It appears that when the overall FTA rate is low, sending patients a reminder does not affect their FTA rate irrespective of the form of the reminder.

European Journal of Orthodontics

A comparison of the Twin Block and Herbst mandibular advancement splints in the treatment of patients with obstructive sleep apnoea: a prospective study. *Eur J Orthod* 2005; 27: 82–90
Lawton HM, Battagel JM, Kotecha B

DOI 10.1179/146531205225021123

Objectives: To determine the efficacy and clinical acceptance of the Twin block (TB) compared to the Herbst as a mandibular activation splint (MAS).

Design: A cross-over randomized controlled trial.

Setting: London teaching hospital, UK.

Participants: Sixteen adults (12M, 4F) with a diagnosis of mild, moderate or severe obstructive sleep apnoea (OSA), a mean age of 44.8 years and BMI of 29.2 K/g^2.

Interventions : Twin-block or Herbst MAS made to a position of maximal comfortable mandibular protrusion worn in a random order with a 2-week wash out period between appliances.

Outcome measures: Questionnaires, visual analogue scale (VAS) to assess daytime sleepiness, quality of life (QOL) and snoring. Domiciliary overnight sleep monitoring.

Results: There was a significant difference in the VAS sleepiness score ($p=0.04$) between the two appliances indicating that patients felt less sleepy whilst using the Herbst appliance. No significant difference was found when sleepiness was assessed with the Epworth Sleepiness Scale ($p=0.41$). There were no significant differences between the two groups in the SF-36 QOL questionnaire ($p=0.21$–1.0 depending of the domain assessed), the snoring VAS ($p>0.05$), the apnoea hypopnoea index ($p=0.71$), snores per hour ($p=0.49$) or arterial oxygen saturation ($p=0.97$). Fifty-six per cent of patient preferred the Herbst, 31% the TB and 13% had no preference.

Conclusions: This study suggests that there is very little difference between the TB and Herbst as MAS but that slightly more patients preferred the Herbst appliance.

Implications: It appears that the TB may be a cheaper alternative to the Herbst appliance for treating OSA. However, this was a small study and the results should be treated with caution. A larger, longer study would be valuable.

Angle Orthodontist

Long-term dental arch changes after rapid maxillary expansion treatment: a systematic review. *Angle Orthodont* 2005; 75: 155–61

Lagravere MO, Major PW, Flores-Mir C

Objectives: To evaluate the long-term dental arch changes after rapid maxillary expansion (RME).

Design: A systematic review.

Data sources: Several databases were searched using appropriate MeSH terms. Reference lists were examined to identify publications not identified by the electronic searches.

Study selection: Studies were included if they were controlled clinical trials (CCTs) reporting on the dental arch measurements of patients treated with RME who did not have surgery during the evaluation period.

Data extraction: Two reviewers independently assessed the titles and abstracts for potential inclusion and three reviewers assessed the full papers of selected articles for final inclusion. Data were extracted on the sample and size, control group, error and evaluation methods.

Data synthesis: No formal data-synthesis was undertaken.

Results: The search strategy identified 164 potentially eligible studies of which 41 were thought to be eligible. Following review of the full papers 35 were rejected due to methodological problems and 2 because they did not present long-term (>1 year) data. Four studies were included in the review. Three of these studies were retrospective and the fourth had data from a growth study as a control group. 3.7–4.8 mm of maxillary molar and 2.2–2.5 mm of maxillary canine width increase was found following treatment with RME. Six millimetres of maxillary and 4.5 mm of mandibular arch perimeter increase was found in adolescents treated with RME and edgewise appliances.

Conclusions: No RCTs or prospective CCTs were found that assessed the use of RME. It appears that RME does produce worthwhile increases in maxillary arch width, and maxillary and mandibular arch perimeter.

Implications: The use of RME may be considered if increase in transverse dimensions are required to correct a malocclusion. There is a need for a prospective RCT in this area.

Changes in head posture after rapid maxillary expansion in mouth-breathing girls: a controlled study. *Angle Orthodont* 2005; 75: 171–6

Tecco S, Festa F, Tete S, Longhi V, D'Attilio M

Objectives: To evaluate RME treatment outcomes, especially head posture and craniocervical angulation, compared with untreated controls.

Design: A randomized controlled trial.

Setting: Chieti, Italy.

Participants: Fifty-five girls of European origin with cephalometrically demonstrated reduced nasopharyngeal

airway adequacy and mouth breathing. Fifteen out of 23 (65%) participants in the treatment group and 13 out of 22 (59%) of the control group had and anterior or posterior crossbite.

Interventions: Participants were randomly allocated to either start treatment with RME immediately or delay treatment for 8 months during which time they did not receive any orthodontic treatment.

Outcome measures: Postural changes measured cephalometrically.

Results: There was a significant increase in the dimension of the nasopharyngeal airway ($p<0.001$) and cervical lordosis ($p<0.001$); a backward inclination of the upper cervical column ($p<0.001$) and significant reductions in the flexion of the head ($p<0.001$) and craniocervical angles ($p<0.001$) in the treatment group compared to the control group.

Conclusions: This study suggests that improvements in the nasopharyngeal airway, brought about by RME, is associated with a decreased craniocervical angle, increased cervical lordosis and a flexion of the head.

Implications: It appears that treatment with RME does affect nasopharyngeal dimensions and posture in patients with a previously impaired nasopharyngeal airway. Whether this is clinically obvious is not clear from this study.

Pain control during fixed orthodontic appliance therapy
***Angle Orthodont* 2005; 75: 214–15**
Polat O, Karaman AI

Objectives: To evaluate the efficacy of commonly used non-steroidal analgesics for the management of orthodontic pain.

Design: A randomized controlled trial.

Setting: Turkey.

Participants: One-hundred-and-fifty-five patients scheduled to receive fixed orthodontic treatment.

Interventions: Participants were randomly allocated to one of six groups. (1) Lactose placebo capsule; (2) 400 mg ibuprofen; (3) 100 mg flurbiprofen; (4) 500 mg acetaminophen and 550 mg naproxen sodium; and (6) 300 mg asprin. One tablet was taken an hour before the appointment and the other 4–6 hours after bonding.

Outcome measures: Questionnaire containing 10 cm visual analogue scales (VAS) to record their degree of discomfort when performing various biting tasks at indicated time periods up to 7 days after bracket placement.

Results: Of the 150 patients who agreed to participate, 128 returned their questionnaires. Of these, eight were over 30 years and excluded. Data from 120 patients were analysed. The peak pain was at 24 hours after bracket placement and initial archwire ligation. The pain then gradually decreased over the next 7 days. At 6 hours patients who had taken acetaminophen; naproxen sodium or asprin felt less pain on chewing than those in the control group ($p<0.05$). This pattern of pain relief was similar when performing other biting tasks and at other time periods.

Conclusions: This study suggests that preoperative administration of analgesics eliminated pain at 2 hours and that naproxen sodium and asprin gave the best pain relief for all biting tasks at all time periods.

Implications: It appears that pre-emptive and post-treatment naproxen sodium or asprin gave the most effective pain control following bracket placement and initial archwire ligation. It may be worth discussing the use of analgesics with patients before they have their appliances fitted. However, clinicians must be aware of and consider the side effects of analgesics when advising patients to take them.