

## Which Electric Toothbrush Cleans Best Around Brackets?

*In Vitro Tooth Cleaning Efficacy of Electric Toothbrushes Around Brackets.*

Schätzle M, Sener B, et al:

Eur J Orthod 2010; 32 (October): 481-489

In a laboratory study, the Sonicare toothbrush with the standard or compact brush head and the Waterpik SR 800E brush were most effective in cleaning around brackets.

**Background:** Maintaining good oral hygiene during fixed orthodontic treatment is necessary to prevent gingival inflammation and white spot lesions.

**Objective:** To assess the cleaning efficacy of several electric toothbrushes.

**Design:** In vitro study.

**Methods:** 5 different electric toothbrushes (Oral-B Professional Care 9500, Braun Oral-B Sonic complete, Philips Sonicare Elite 9000, Waterpik sensonic, and Waterpik Sensonic SR 800E) with a total of 12 different brush heads were tested. Testing was performed using an automated brushing machine that simulated a horizontal “scrub technique” of brushing. A model of 6 maxillary anterior teeth with bonded brackets (standard Twin Diamond on half of the teeth and Mini Diamond on the other half) was used for testing. Teeth were stained black and then coated with white titanium oxide to simulate 100% plaque accumulation. Teeth were brushed for 1 minute on the incisal side and 1 minute on the cervical side of the brackets. The final model was scanned, and the percentage of black tooth exposed was considered a modified plaque index.

**Results:** The Sonicare toothbrush with the “Compact ProResults” or “Standard ProResults” brush head cleaned the largest percentage of the teeth (81.7% and 80.8%, respectively) These brushes, as well as the sonic Waterpik toothbrush SR 800E (78.2%), showed a statistically significant increase in cleaning efficacy over the other toothbrushes.

**Conclusions:** In vitro cleaning efficacy of electric toothbrushes around incisor brackets varies among different toothbrushes and brush heads. Further work needs to examine the relationship between this in vitro modified plaque index and clinical efficacy.

**Reviewer's Comments:** This seems to be a reasonable way to compare the relative cleaning potential of different toothbrush and brush head combinations. The challenge is determining whether this potential cleaning efficiency measured in the laboratory can be realized when used by a variety of individuals in routine clinical use. (Reviewer-Brent E. Larson, DDS, MS).

Keywords: Tooth-Brushing, Plaque Removal

Print Tag: Refer to original journal article

## Toothbrushing Technique Can Reduce Caries During Orthodontic Treatment

*Modified Fluoride Toothpaste Technique Reduces Caries in Orthodontic Patients: A Longitudinal, Randomized Clinical Trial.*

Al Mulla AH, Kharsa SA, Birkhed D:

Am J Orthod Dentofacial Orthop 2010; 138 (September): 285-291

Mouth rinsing after the application of fluoride toothpaste can reduce its effectiveness.

**Background:** All orthodontists are interested in improving oral hygiene and reducing caries during orthodontic treatment. What is the best way to instruct your patients to brush their teeth to accomplish this goal?

**Objective:** To evaluate the effectiveness of a modified fluoride toothpaste brushing technique to reduce caries during orthodontic treatment.

**Participants:** 100 patients undergoing orthodontic treatment.

**Methods:** The sample was randomly divided into 2 groups. One group was given fluoride toothpaste and standard brushing instructions. The second group, which also used fluoride toothpaste, used a modified brushing technique that consisted of placing toothpaste on the upper and lower arches and using a small amount of water to create a toothpaste slurry, which was then swished between the teeth for 30 seconds before expectorating. The subjects were advised to avoid further rinsing with water and to avoid drinking or eating for 2 hours. The number of decayed and filled tooth surfaces for each group was identified clinically and radiographically at the beginning of treatment and after 2 years, and the difference in the number of decayed and filled surfaces was statistically evaluated.

**Results:** At the end of this study, the group using the modified brushing technique had significantly better Plaque Index Scores than did the control group. Compared with the test group, the control group patients had >7 times the clinical decayed and filled surfaces, >4 times the radiographic decayed and filled surfaces, and >5 times the clinical plus radiographic decayed and filled surfaces.

**Conclusions:** A modified brushing technique can significantly reduce the number of decayed and filled tooth surfaces during orthodontic treatment.

**Reviewer's Comments:** I was impressed by the significant reduction in decayed and filled tooth surfaces in the group using the modified brushing technique. In a way, it makes sense that rinsing out a fluoride toothpaste a number of times after using it would make it less effective. I should note that this study was performed in Saudi Arabia, which has a high caries index; however, I assume the results would be similar in countries with a lower caries index. Unfortunately, for patients with very poor oral hygiene who hardly brush at all, this improved toothbrushing technique would probably have no effect. (Reviewer-John S. Casco, DDS, MS, PhD).

Keywords: Caries, Incidence, Orthodontic Treatment

Print Tag: Refer to original journal article



## Mandibular Set-Back vs Maxillary Advancement in Nasopharyngeal Airway Space

*Effects of Mandibular Repositioning, With or Without Maxillary Advancement, on the Oro-Nasal-Pharyngeal Airway and Development of Sleep-Related Breathing Disorders.*

Demetriades N, Chang DJ, et al:

J Oral Maxillofac Surg 2010; 68 (October): 2431-2436

Mandibular set-back surgery negatively affects pharyngeal airway, while maxillary advancement combined with mandibular set-back surgery has little effect on pharyngeal airway.

**Background:** A common concern for subjects with a Class III malocclusion that will be treated with orthognathic surgery is the potential to create sleep apnea symptoms and reduce pharyngeal airway if the mandible is set back during surgery. Another option for correcting Class III malocclusion is mandibular set-back surgery combined with maxillary advancement. Is there any difference between these 2 types of surgery on airway effects?

**Objective:** To compare the effect on airway between 2 samples of patients. One group underwent mandibular set-back surgery, and the other underwent maxillary advancement and mandibular set-back surgery.

**Design/Methods:** This was a retrospective evaluation of the records of 26 subjects who had undergone jaw surgery for treatment of a Class III malocclusion. Half of the sample was treated with mandibular set-back, and the other half was treated with maxillary advancement combined with mandibular set-back surgery. Cephalometric radiographs were made before and after surgery to assess the pharyngeal airway. After surgery, portable polysomnography units were given to patients to test for sleep apnea symptoms.

**Results:** For mandibular set-back  $\geq 5$  mm, there was a significant reduction in pharyngeal airway and an increase in symptoms of sleep apnea. For those who received 5 mm mandibular set-back in conjunction with maxillary advancement, there were minimal effects on the size of the airway or an increase in sleep apnea symptoms.

**Conclusions:** For subjects who may be susceptible to sleep apnea after jaw surgery for a Class III malocclusion, maxillary advancement combined with mandibular set-back could be the better option.

**Reviewer's Comments:** I liked this study. It was fairly straightforward even though the sample size was small. I would like to see these authors follow up on this study with an increased sample size and perhaps a more professional evaluation of the sleep apnea symptoms in a subsequent study. (Reviewer-Vincent G. Kokich, Sr, DDS, MSD).

Keywords: Jaw Surgery, Airway, Mandibular Repositioning

Print Tag: Refer to original journal article

## Consider Miniscrew Anchorage for Maxillary Expansion, Protraction

*Miniscrew-Supported Class III Treatment With the Hybrid RPE Advancer.*

Ludwig B, Glasl B, et al:

J Clin Orthod 2010; 44 (September): 533-539

Maxillary protraction in an adolescent may still be useful if the dental compensation can be controlled. This case report shows how miniscrews may help control incisor position during protraction.

**Background:** Traditional Class III treatment using an early functional appliance or reverse-pull facemask has been shown to cause skeletal changes, but it also is associated with adverse dental effects.

**Objective:** To describe a technique for Class III treatment using miniscrews to minimize dental effects.

**Design:** Technique description and case report.

**Participants:** A 14-year-old male subject presented with a Class III malocclusion due to maxillary deficiency.

**Methods:** 2 miniscrews were placed in the anterior palate about 8 mm behind the incisive papilla. Maxillary first molar bands were fit, and a pickup impression was taken. A Hyrax expander was then fabricated; the expansion screw was connected to the miniscrews using snap abutments, and the wire segments running along the lingual of the posterior teeth were bent into hooks at the terminal end. The appliance was cemented to the molars with a glass ionomer cement. First, expansion was done at a rate of 3 turns per day for 14 days. Next, a reverse-pull facemask was connected to the hooks on the expander using 1/4", 6-oz elastics. Fixed appliances were used for 12 months to finish the case.

**Results:** A finished result with Class I occlusion was achieved in 12 months. Superimposition of the pretreatment and posttreatment cephalometric radiographs showed maxillary protraction with no substantial tipping of upper or lower incisors. Results were stable after 2 years of retention with removable retainers.

**Conclusions:** Miniscrew-assisted maxillary expansion and protraction can be achieved with a simple technique similar to traditional reverse-pull facemask treatment. More research is needed to examine treatment outcomes with this method.

**Reviewer's Comments:** The case report shows good control of dental compensation during correction of the Class III malocclusion. However, a close look at the superimposition shows a significant portion of the correction came from increasing the vertical dimension and rotating the mandible down and back. This may be a problem for subjects with increased face height to start. As a result, I would recommend trying this only on Class III patients with reduced or normal face height. (Reviewer-Brent E. Larson, DDS, MS).

Keywords: Class III, Maxillary Protraction, Miniscrew

Print Tag: Refer to original journal article

## Does Tooth Intrusion Affect Dental Pulp Parameters?

*Change in Dental Pulp Parameters in Response to Different Modes of Orthodontic Force Application.*

Veberiene R, Smailiene D, et al:

Angle Orthod 2010; 80 (November): 1018-1022

Tooth intrusion in humans causes alterations in various pulpal parameters.

**Background:** A common type of tooth movement in orthodontic patients is tooth intrusion. This type of movement is performed, especially in adults, to compensate for tooth wear and compensatory eruption. However, what happens to the apex of the root when the tooth is intruded? Is there an impingement on the nerve and blood supply that can cause alterations in the pulp?

**Objective:** To evaluate changes in the dental pulp after 14 days of orthodontic intrusion compared with 7 days of intrusion and 7 days of rest.

**Design/Participants:** This was a prospective design that enlisted 13 healthy subjects.

**Methods:** All subjects were about to undergo orthodontic treatment and needed extraction of 2 maxillary premolars. Before extraction, the premolar on one side was intruded for 14 days with a calibrated load. The premolar on the opposite side was intruded for 7 days, and then the tooth was allowed a period of rest for 7 days. Prior to extraction, an electronic pulp tester was used to test pulpal response. After extraction, the dental pulp was evaluated histologically to determine the levels of aspartate aminotransferase, which indicates cell death. The 2 types of intrusion were compared.

**Results:** The electronic pulp test recordings and the levels of aminotransferase found in the dental pulp were similar in both groups. In other words, there was no difference if the tooth was intruded for 14 days or 7 days with a period of rest. The authors did mention that the previous study had shown that the electronic pulp test readings and enzyme levels were higher in intruded teeth than in non-intruded teeth.

**Conclusions:** Different durations of orthodontic intrusion have similar effects on the dental pulp of the teeth involved.

**Reviewer's Comments:** Although the authors have shown no difference between the 2 levels of intrusion, I believe they did not wait long enough to re-evaluate the intruded teeth. As a clinician, I would like to know what the effects are on the pulp long term after tooth intrusion. These teeth should be evaluated after 3 to 6 months. Perhaps the authors will accomplish this investigation in a subsequent study. (Reviewer-Vincent G. Kokich, Sr, DDS, MSD).

Keywords: Intrusion Effects, Dental Pulp Parameters

Print Tag: Refer to original journal article

## Technique Offers More Precise Positioning of Maxilla During Orthognathic Surgery

*CAD/CAM Surface Templates as an Alternative to the Intermediate Wafer in Orthognathic Surgery.*

Bai S, Bo B, et al:

Oral Surg Oral Med Oral Pathol Oral Radiol Endod 2010; 110 (November): e1-e7

This article describes a technique of computer-assisted surgery that improves maxillary positioning during orthognathic surgery, yielding a more predictable outcome.

**Background:** Traditionally, 2-jaw orthognathic surgeries require the use of an intermediate wafer to position the maxilla. Intraoperatively, proper positioning of the maxilla with this technique can be challenging, especially in the vertical dimension.

**Objective:** To demonstrate an alternative to an intermediate wafer using CAD/CAM technology.

**Design:** Technique description and case report.

**Participants:** A single patient undergoing 2-jaw surgery to correct an occlusal cant and midline deviation.

**Methods:** In the preoperative phase, a CT scan was taken and analyzed using Mimics and Geomagic Studio software. In the presurgical model, a 2-mm thick surface template was generated over maxillary bone that would be exposed during surgery. Eight virtual cylindrical holes were placed in each side of the maxilla, representing drill holes. Next, the maxilla was virtually manipulated to the ideal location, which can be done very precisely. Custom postoperative templates were created by virtually connecting drill holes across the osteotomy site. The pre-osteotomy and post-osteotomy surface templates were sent to a stereolithography rapid prototyping machine, invested, and cast by dental cobalt-chromium alloy. During the surgery, traditional flaps were reflected, and then the pre-osteotomy template was used to drill 8 screw holes in each side of the maxilla. Next, the traditional maxillary osteotomy was performed, but the segments were aligned using the post-osteotomy template rather than an intermediate wafer. Conventional titanium plates were placed, and the mandibular surgery was performed as usual.

**Results:** The templates fit well and were simple to use intraoperatively. The maxillary cant and midline deviation were corrected.

**Conclusions:** CAD/CAM techniques are still relatively new in orthognathic surgery but offer the possibility of accurate and precise surgical simulations with minimal errors in template fabrication.

**Reviewer's Comments:** The significant advantage of this technique is not having to use the mandible to position the maxilla during surgery. The mandible does not make an ideal reference because it rotates about the condyles, and an error in vertical positioning is difficult to avoid. Further work is still needed to refine this technique, but it has the promise to improve surgical precision and reduce operating time. (Reviewer-Brent E. Larson, DDS, MS).

Keywords: Orthognathic Surgery, Techniques, Computer-Aided Treatment

Print Tag: Refer to original journal article

## 3-D Radiographic Techniques Offer More Detailed Information

### *Treatment and Posttreatment Skeletal Effects of Rapid Maxillary Expansion Investigated With Low-Dose Computed Tomography in Growing Subjects.*

Ballanti F, Lione R, et al:

Am J Orthod Dentofacial Orthop 2010; 138 (September): 311-317

Rapid maxillary expansion results in a stable transverse increase in the nasal cavity.

**Background:** When you use rapid maxillary expansion in your office, how does the mid-palatal suture open? Would your understanding of how it opens change if you were able to see the results of 3-D versus 2-D radiographic studies?

**Objective:** To evaluate the treatment and post-retention dentoskeletal effects produced by rapid maxillary expansion utilizing low-dose coronal CT scans.

**Participants:** The sample for this study consisted of 17 healthy white children (mean age, 11.2 years) who sought orthodontic treatment and required rapid maxillary expansion.

**Methods:** Multi-slice coronal CT scans were taken before rapid maxillary expansion, at the end of active expansion, and after a retention period of 6 months when the expander was removed. The CT scans were taken at 3 different depths anteroposteriorly: through the anterior nasal spine, through the mid-point between the anterior nasal spine and the posterior nasal spine, and through the posterior nasal spine. The dental and skeletal changes were measured and evaluated statistically.

**Results:** Coronally, the maxillary halves were separated in a parallel manner and not in a triangular shape. Anteroposteriorly, greater separation occurred anteriorly and gradually decreased posteriorly. At the end of active expansion, the roots of the maxillary central incisors were more divergent than the crowns, and between the end of active expansion and the retention period, the crowns tipped toward the mid-line while the roots appeared to stay divergent. A significant amount of expansion of the nasal cavity was observed in all 3 coronal scans, which was stable at the end of the retention period.

**Conclusions:** As a result of rapid maxillary expansion, the maxillary halves were separated in a parallel manner and not in a triangular shape.

**Reviewer's Comments:** This study is an excellent example of the greater amount of more detailed information that is available utilizing 3-D versus 2-D radiographic techniques. The biggest surprise was the finding that the mid-palatal suture opened in a parallel manner and not in a triangular shape with greater opening inferiorly. This finding contradicts many studies that used posteroanterior cephalometric radiographs. Also, this study indicates that if you leave a rapid maxillary expander in for 6 months after the end of active expansion, the mid-palatal suture should be reorganized; however, it does not provide information on whether it would be reorganized with shorter periods of post-expansion retention. (Reviewer-John S. Casko, DDS, MS, PhD).

Keywords: Rapid Maxillary Expansion, Skeletal & Dental Effects, CT

Print Tag: Refer to original journal article

## Gender Differences Found in Destructive Periodontal Disease

*Sex Differences in Destructive Periodontal Disease: A Systematic Review.*

Shiau HJ, Reynolds MA:

J Periodontol 2010; 81 (October): 1379-1389

The prevalence of destructive periodontal disease is 10% higher in males than in females.

**Background:** Orthodontists often treat adult patients. Some of these adults can have underlying periodontal disease. Which gender (males or females) shows a greater prevalence of periodontal disease?

**Objective:** To investigate the literature to determine which gender has a greater prevalence of destructive periodontal disease.

**Design/Methods:** This was a systematic review and meta-analysis of randomized, clinical trials that had studied the prevalence of periodontal disease. Several databases were used to produce articles that had investigated this topic in the past. Sample sizes of these studies had to be graded in 500 subjects. After carrying out extensive exclusion criteria, the authors arrived at 12 studies that could be relied on based on their inclusion criteria.

**Results:** The prevalence of periodontal disease is significantly greater in males than in females; in fact, males have a prevalence of 37.4% compared to 28.1% in females. The authors also found that this difference in prevalence between males and females was similar regardless of the severity of the disease and after adjustment for other risk factors, such as smoking.

**Conclusions:** Men are at greater risk for destructive periodontal disease than are women.

**Reviewer's Comments:** Orthodontists should be aware of this finding. Although perhaps more females than males are treated in most orthodontic offices, especially as adults, males have a higher prevalence of periodontal disease as evidenced in this systematic review. Orthodontists should make certain that adult males are carefully screened before orthodontic treatment is performed. (Reviewer-Vincent G. Kokich, Sr, DDS, MSD).

Keywords: Gender, Periodontal Disease

Print Tag: Refer to original journal article



## Will Autotransplanted Canines Survive Long Term?

### *Long-Term Success and Survival Rates of Autogenously Transplanted Canines.*

Gonnissen H, Politis C, et al:

Oral Surg Oral Med Oral Pathol Oral Radiol Endod 2010; 110 (November): 570-578

Autotransplantation of canines results in long-term success approximately 60% of the time, with the most common reason for loss being progressive root resorption.

**Background:** Autotransplantation of impacted canines can be an option if surgical exposure is too difficult or if orthodontic alignment fails.

**Objective:** To evaluate the long-term success and survival rates of autotransplanted canines.

**Design:** Retrospective clinical study with follow-up.

**Participants:** 59 patients with 73 total autotransplanted canines. On average, patients were treated at 20.7 years of age (range, 11 to 46 years), and the average follow-up was 11 years (range, 6 to 14 years).

**Methods:** The same oral surgeon performed the autotransplantation for all patients. The implantation site was prepared with burs and chisels to be slightly larger than the donor tooth. Next, the donor tooth was extracted with a periosteal elevator as atraumatically as possible and was placed in the socket without any pressure. Fixation was performed with either sutures or orthodontic wire. Information was collected that could potentially influence the outcome: initial position of the canine; previous surgical exposure; stage of root development; condition of the apex; ankylosis; adjacent root resorption; periodontal ligament damage; and placement in infraocclusion. Clinical and radiological evaluation was performed on each canine to assess long-term results.

**Results:** 18 teeth were lost before the follow-up examination, so the long-term survival rate was 75.3%, with progressive root resorption being the most common reason for failure. However, only 42 teeth were deemed clinically successful, so the overall long-term success rate was 57.5%. Success rates were significantly affected by age at time of surgery and by preoperative ankylosis of the donor tooth. All other factors, including stage of root development, were not found to be statistically significant.

**Conclusions:** The long-term survival and success rates for canine autotransplantation are 75.3% and 57.5%, respectively. While these rates are low, autotransplantation can still be indicated for difficult cases in which the only alternative is extraction.

**Reviewer's Comments:** The success rates reported in this study tend to be lower than those from other autotransplantation studies. This may be due to the longer follow-up or the fact that only transplanted canines were included. The success rates indicate that autotransplantation should not be a routine substitution for treatment of an impacted canine, but that it should be reserved for times when orthodontic treatment is not feasible or not successful. (Reviewer-Brent E. Larson, DDS, MS).

Keywords: Transplantation, Impacted Canines, Survival

Print Tag: Refer to original journal article

## Sexual Harassment in the Workplace -- Are You Prepared?

*Sexual Harassment and the Dental Workplace.*

Levin R:

J Am Dent Assoc 2010; 141 (October): 1263-1264

As the head of your practice, you are responsible for providing appropriate sexual harassment prevention training for your employees.

**Background:** Most orthodontists probably consider it very unlikely that an incident of sexual harassment would occur in their office. If an incident were to occur in your office, however, would you be in a position to reduce your liability?

**Objective:** The purpose of this guest presentation article was to discuss your liability if a sexual harassment charge were to occur in your office. **Discussion:** Sexual harassment is a subject that most orthodontists feel uncomfortable talking about, and most orthodontists believe it is not likely to occur in their office. The facts, however, are that 12,696 charges of sexual harassment were filed with the U.S. Equal Opportunity Commission in 2009, resulting in more than \$51 million in damages being paid by employers. It is important to understand that, as the head of your practice, you are not only liable for charges of sexual harassment against you, but you are also liable for incidents of sexual harassment that might occur related to your staff, patients, and vendors. Do you have a formal sexual harassment prevention policy in your office, and do you and your office manager know the applicable federal and state laws regarding sexual harassment? Also, is sexual harassment prevention a part of every new employee's training, and does your practice provide annual training for employees regarding sexual harassment prevention? These are just some of the questions that Dr. Levin lists in this article, and he suggests that if you answer no to any of these questions, you need to re-evaluate the sexual harassment policy in your office. It is important to understand that you, as the head of your practice, can be held liable for the actions of others within your practice, and you are especially liable if an incident of sexual harassment is not addressed and documented formally.

**Conclusions:** To reduce your liability, you should have a formal written policy regarding sexual harassment that is updated on an annual basis.

**Reviewer's Comments:** This is a very practical and timely article. As Dr Levin suggests, sexual harassment is a subject that many of us are uncomfortable talking about, and most of us probably believe it is not likely to occur in our practice. However, if sexual harassment does occur in your practice, you could incur significant liability, which would make it worth the effort (even though it may be uncomfortable) to address this subject and have a formal policy on sexual harassment in your office. (Reviewer-John S. Casco, DDS, MS, PhD).

Keywords: Sexual Harassment, Workplace

Print Tag: Refer to original journal article

## Laser Can Be Effective Adjunct Therapy for Periodontal Inflammation

*A Short-Term Evaluation of Nd:YAG Laser as an Adjunct to Scaling and Root Planing in the Treatment of Periodontal Inflammation.*

Qadri T, Poddani P, et al:

J Periodontol 2010; 81 (August): 1161-1166

Nd:YAG laser therapy in addition scaling and root planing as a part of maintenance therapy improves short-term periodontal health in adults.

**Background:** Adult periodontal patients require routine maintenance on a 3- to 4-month interval. If these subjects also have orthodontic appliances on their teeth, the maintenance visits could be needed more often to help prevent periodontal breakdown during orthodontic therapy. The typical type of maintenance involves scaling and root planing. Today, lasers are being used for different types of periodontal treatment. Could the Nd:YAG water-cooled laser be used as an adjunct to root planing and scaling for periodontal maintenance?

**Objective:** To determine the short-term effect of water-cooled laser therapy as an adjunct to scaling and root planing in the treatment of periodontal inflammation.

**Design:** Split-mouth, single-masked, randomized, controlled clinical trial.

**Participants/Methods:** 30 subjects were involved in the sample. The mandibular arch was studied. On one side in each patient, root planing and scaling was used to maintain the teeth. On the other side, a water-cooled laser was used in addition to root planing and scaling. Prior to the therapy, baseline records including plaque index, gingival index, and probing pocket depth, as well as an analysis of the gingival crevicular fluid contents was performed. These individuals were evaluated again at 1 week and at 3 months, and the laser-treated side was compared with the control side in each subject.

**Results:** The results showed that at both 1 week and at 3 months, the use of a water-cooled Nd:YAG laser produced a reduction in gingival index, plaque index, and probing pocket depth, as well as an improvement in the mediators contained in the crevicular fluid that caused the periodontal inflammation.

**Conclusions:** The Nd:YAG water-cooled laser can be an effective adjunct to root planing and scaling for maintenance of periodontal patients.

**Reviewer's Comments:** This was a very interesting study. This type of technique could have application for adult subjects that orthodontists treat. When we place bands and brackets on teeth, we compromise the patient's ability to maintain their teeth. Perhaps the use of the water-cooled laser could be a useful adjunct when these individuals are seen for routine maintenance by either the general dentist or periodontist. (Reviewer-Vincent G. Kokich, Sr, DDS, MSD).

Keywords: Periodontal Inflammation, Scaling, Root Planing, Nd:YAG Laser

Print Tag: Refer to original journal article

## No Need to Condition Custom Bases With MMM in Indirect Bonding

*Indirect Bonding - Do Custom Bases Need a Plastic Conditioner? A Randomised Clinical Trial.*

Miles P:

Aust Orthod J 2010; 26 (November): 109-112

When using indirect bonding, you can avoid a step in the bonding process by eliminating the need to condition custom bases.

**Background:** Many orthodontists who use indirect bonding condition the custom bases with methyl methacrylate monomer (MMM), but does this step reduce the number of indirect bond failures?

**Objective:** To compare the clinical failure rates over 6 months of indirectly bonded brackets with and without MMM conditioned custom bases.

**Participants:** The sample for this study consisted of 36 subjects who were starting orthodontic treatment and were randomly assigned to 1 of 2 groups.

**Methods:** Subjects in one group had teeth in the maxillary right and mandibular left quadrants conditioned with MMM 10 minutes prior to bonding. In group 2, the maxillary left and mandibular right quadrants were conditioned. In both groups, the brackets in the contralateral quadrants were not conditioned. The number of loose brackets over a 6-month period was recorded for all subjects.

**Results:** Of the 828 brackets placed, 11 brackets came loose during this study. Of these brackets, 6 had MMM applied to the custom bases and 5 brackets were not conditioned. The failure rates for the brackets with conditioned and untreated bases were 1.4% and 1.2%, respectively, which was not a significant difference. When the failure rates were compared by maxillary and mandibular arches, there was also no difference between the brackets that were conditioned and those that were not.

**Conclusions:** When using indirect bonding, the conditioning of custom bases with MMM is an unnecessary step.

**Reviewer's Comments:** This was a good in vivo study that utilized the split mouth technique. The results should be good news for orthodontists who use indirect bonding in that it will allow them to skip a step in the bonding process if they have traditionally been conditioning the custom bases. The failure rates recorded in this study were very low when compared to other studies and this may be due to the fact that occlusal wedges were placed at the time of bonding to eliminate occlusal contacts on the brackets. (Reviewer-John S. Casco, DDS, MS, PhD).

Keywords: Indirect Bonding, Conditioning, Custom Bases

Print Tag: Refer to original journal article

## Benefits of Extraction of Mandibular Second Premolars

*Effects of Orthodontic Treatment and Premolar Extractions on the Mandibular Third Molars.*

Celikoglu M, Kamak H, et al:

Aust Orthod J 2010; 26 (November): 160-164

The extraction of mandibular first premolars improves the inclination of unerupted third molars and the space available for their eruption, but not as much as the extraction of mandibular second premolars.

**Background:** Does the extraction of mandibular second premolars improve the angulation and space available for the eruption of mandibular third molars? You should be able to answer this question if it were asked by one of your patients.

**Objective:** To investigate the effects of orthodontic treatment and premolar extractions on the inclinations of the mandibular third molars and the space available for their eruption and to compare these changes with a nonextraction group.

**Participants:** The sample for this retrospective study consisted of 54 subjects with Class I skeletal and dental relationships and moderate anchorage requirements.

**Methods:** The subjects were divided into 3 groups. Group 1 was treated with the extraction of 4 first premolars, group 2 was treated with the extraction of 4 second premolars, and group 3 was treated by nonextraction. Pretreatment panoramic radiographs were taken within 1 month before the start of orthodontic treatment, and post-treatment radiographs were taken either on the day that active orthodontic appliances were removed or within 2 weeks of debonding. A standardized system for measuring changes in the inclinations of the mandibular third molars and the eruption spaces available was used to compare pre -and post-treatment third panoramic radiographs.

**Results:** In group 1, which had first premolar extractions, the third molars uprighted approximately 4°, while in the second premolar extraction group, they uprighted 10°. In the nonextraction group, the angulations of the mandibular third molars remained unchanged. Only the difference between the second premolar group and the nonextraction group was statistically significant. Extraction of the first premolars resulted in 3 mms of space for the unerupted third molars, extraction of the second premolars provided 5 mms of additional space, and the eruption space in the nonextraction group was <1 mm.

**Conclusions:** The extraction of mandibular second premolars improved the inclinations of unerupted third molars and the space available for their eruption into the arch. These changes in inclination and eruption space were less marked following first premolar extractions.

**Reviewer's Comments:** The results of this study seem to be logical. In interpreting these results, however, it is important to realize that the authors did not measure whether the mandibular third molars actually erupted into the arch or not, which is a more significant consideration than changes in their angulation. Also, because the subjects' ages ranged from approximately 14 to 15 years of age, there could be significant additional changes in third molar angulation and space available after the study was completed. (Reviewer-John S. Casco, DDS, MS, PhD).

Keywords: Mandibular Third Molars, Premolar Extraction, Orthodontic Treatment

Print Tag: Refer to original journal article

## Could Diode Laser Be Easy Solution for Debonding Ceramic Brackets?

*Diode Laser Debonding of Ceramic Brackets.*

Feldon PJ, Murray PE, et al:

Am J Orthod Dentofacial Orthop 2010; 138 (October): 458-462

Because a diode laser is relatively small in size and weight and has a relatively low cost, it may provide an easy solution if you have problems debonding ceramic brackets.

**Objective:** To investigate the effectiveness of debonding ceramic brackets with a diode laser. **Materials:** 60 bovine incisors.

**Methods:** 2 different types of ceramic brackets (Inspire ICE monocrystalline brackets and Clarity polycrystalline brackets) were bonded to the bovine incisors. The teeth in each bracket group were subdivided into 3 groups, one of which was debonded with force only, the second using a diode laser of 2 W/cm<sup>2</sup>, and a third using a diode laser with 5 W/cm<sup>2</sup>. A Universal Testing Machine was used to test the shear bond strengths of the brackets, and changes in pulp temperature were also measured.

**Results:** The diode laser significantly decreased the debonding force required for monocrystalline brackets without increasing the pulp chamber temperature significantly. Diode lasers did not significantly decrease the debonding force required for polycrystalline brackets. The use of the diode laser did not alter the amount of adhesive remaining on the tooth surface after debonding.

**Conclusions:** Using a diode laser significantly decreases the debonding force necessary for debonding monocrystalline brackets, but does not significantly affect polycrystalline brackets.

**Reviewer's Comments:** I was surprised to see the difference in the behavior of the monocrystalline versus polycrystalline brackets. The authors suggest that this difference might be explained by the uniform crystal structure that monocrystalline brackets have thereby allowing higher transmissibility of the laser beam. They also suggest that the polycrystalline brackets used in this study had a stainless steel slot that also could have affected the laser beam. (Reviewer-John S. Casco, DDS, MS, PhD).

Keywords: Ceramic Brackets, Debonding, Diode Laser

Print Tag: Refer to original journal article

## Effect of Partial Le Fort Osteotomy on Face Mask Protraction

*Rapid Maxillary Expansion Compared to Surgery for Assistance in Maxillary Face Mask Protraction.*

Küçükkeles N, Nevzatoglu S, Koldas T:

Angle Orthod 2011; 81 (January): 44-51

Partial Le Fort osteotomy in addition to face mask protraction accelerates maxillary movement compared to palatal expansion and protraction.

**Background:** Maxillary hypoplasia is a common finding in subjects with a skeletal Class III malocclusion. A common treatment for this problem is maxillary protraction; however, to affect a change at the sutures and move the maxilla forward is difficult. Two options exist to accelerate the change: Le Fort osteotomy and protraction or maxillary palatal expansion and protraction. Which of these produces a quicker response?

**Objective:** To compare palatal expansion and face mask protraction with partial Le Fort osteotomy and face mask protraction in a group of young patients.

**Participants/Methods:** A comparative analysis was done on 34 patients who all had maxillary retrognathia. In 18 patients with milder maxillary hypoplasia, the subjects were treated with palatal expansion and face mask protraction. In the other 16 subjects, a partial Le Fort osteotomy was performed followed by face mask protraction. The latter group simulated distraction osteogenesis. Pre- and post-treatment cephalometric radiographs were obtained to compare the differences.

**Results:** First of all, the anterior cross-bites were eliminated in all patients, but there was a significant difference between the 2 groups in terms of maxillary advancement. Higher values of ANB and maximum depth angles were found in the surgery group. The amount of time necessary to correct the cross-bite in the surgery group was 5 months, while it took 9 months to correct the skeletal problem and cross-bite in the palatal expansion group.

**Conclusions:** Le Fort osteotomy and face mask protraction can produce more rapid change and correction of maxillary hypoplasia in growing individuals.

**Reviewer's Comments:** Although the authors reported favorably on the partial Le Fort surgery and face mask protraction, they were quick to admit that this procedure carried more risk. They recommended that in younger individuals where teeth have not fully erupted, it would be disadvantageous to consider a surgical approach. For any patients <10 years of age, the authors recommended palatal expansion and protraction, and only suggested the surgical option for individuals who were older. (Reviewer-Vincent G. Kokich, Sr, DDS, MSD).

Keywords: Maxillary Hypoplasia, Le Fort Osteotomy, Protraction, Maxillary Palatal Expansion

Print Tag: Refer to original journal article

## Bone Graft Could Produce More Stable Condylar Result

*Postoperative Condylar Position After Sagittal Split Ramus Osteotomy With and Without Bone Graft.*

Kang MG, Yun KI, et al:

J Oral Maxillofac Surg 2010; 68 (September): 2058-2064

Bone graft following sagittal split ramus osteotomy to set back the mandible enhances stability in surgeries of >10 mm movement.

**Background:** Although most Class III malocclusions have relatively minor skeletal discrepancies, occasionally one will require significant movement of the mandible using a sagittal split ramus osteotomy (SSRO). This movement tends to produce a gap between the proximal and distal fragments of the mandible as the body of the mandible is moved back. This gap could produce instability in the surgery and cause rotation of the condylar head. What is the impact of grafting this gap?

**Objective:** To determine if a bone graft in subjects requiring SSRO and set-back would improve the stability of the surgical site.

**Participants/Methods:** A retrospective analysis was made of 60 subjects who had mandibular set-back surgery. Half of the sample (n=30) was treated with SSRO and no bone graft. The other half of the sample (n=30) had a bone graft of 2-mm thickness placed between the proximal and distal fragments after SSRO. The patients were evaluated postoperatively to determine the effect of the bone graft on stability.

**Results:** The results of this study showed that for mandibular surgical movement of <10 mm, there were no statistically significant differences found in any of the measurements of the 2 groups. However, when the set-back was >10 mm, the bone graft provided greater stability to displacement of the condyle.

**Conclusions:** For significant mandibular set-back surgery requiring SSRO of >10 mm, a bone graft would help stabilize the outcome.

**Reviewer's Comments:** I had not heard of this type of procedure before. However, if the surgical set-back is significant, a gap occurs between the proximal and distal fragments of the mandible. This study has shown that in significantly difficult cases with large movements of the body of the mandible, a bone graft could be favorable for producing a more stable condylar result. (Reviewer-Vincent G. Kokich, Sr, DDS, MSD).

Keywords: Sagittal Split Ramus Osteotomy, Bone Graft, Condylar Position

Print Tag: Refer to original journal article



## New Alternative Graft Material Shows Big Promise

*A New Method for Alveolar Bone Repair Using Extracted Teeth for the Graft Material.*

Nampo T, Watahiki J, et al:

J Periodontol 2010; 81 (September): 1264-1272

Ground tooth roots may be a potential grafting medium for alveolar defects.

**Background:** Bone grafting is common today to accentuate the alveolar ridge prior to implant placement. Typically, the bone graft material is either alloplastic or autogenous. If autogenous bone is used, the iliac crest is an ideal site to harvest this bone, but, this procedure can result in infection of the site and does have some morbidity for the patient. What about the possibility of using a ground tooth root as the graft material? After all, the dental pulp has stem cells and neural crest cells that could potentially encourage bone formation.

**Objective:** To compare traditional iliac crest bone grafting and tooth root grafting in alveolar defects in experimental animals.

**Design/Methods:** This animal study used Wistar rats in which alveolar defects were created. On one side in each animal, iliac crest bone was used to graft the site, and on the other side, a tooth root had been ground and placed into the alveolar defect. These grafted sites were then evaluated using biochemical analysis, microcomputed tomography, and histologic analyses.

**Results:** The sites that were grafted with the tooth root actually produced a better long-term result than those sites grafted with iliac crest bone. Early on, the graft results were equivocal, but later on it appeared that the tooth grafted sites were more robust.

**Conclusions:** Material made from extracted teeth may have potential as a bone graft material for jaw bone formation because it is highly predictable and shows less resorption after grafting.

**Reviewer's Comments:** I found this to be an intriguing study and decided to include it in this issue of *Practical Reviews in Orthodontics*. I had not thought before of the possibility of grinding a root and using the dentin, cementum, and pulpal remains as a graft material. This study has shown that it is not only possible, but may work better than traditional iliac crest grafting. (Reviewer-Vincent G. Kokich, Sr, DDS, MSD).

Keywords: Alveolar Bone Repair, Graft Material, Ground Extracted Teeth

Print Tag: Refer to original journal article

## Systemic Doses of TX or DX Reduces Orthodontic Root Resorption

*Comparisons of the Effects of Systemic Administration of L-Thyroxine and Doxycycline on Orthodontically Induced Root Resorption in Rats.*

Baysal A, Uysal T, et al:

Eur J Orthod 2010; 32 (October): 496-504

In this animal model, low systemic doses of L-thyroxine or doxycycline appear to reduce orthodontic root resorption without affecting the rate of tooth movement.

**Background:** When it occurs, severe root resorption during orthodontic treatment is a serious issue.

**Objective:** To examine the effects of systemic administration of L-thyroxine (TX) and doxycycline (DX) on orthodontically induced root resorption.

**Design:** Animal study.

**Subjects/Methods:** 28 male Wistar rats (50 to 60 days old) were randomly allocated to 1 of 4 groups (sham, control, TX, and DX). Each group consisted of 7 animals that had a mini-osmotic pump implanted subcutaneously under general anesthesia. The sham group had mini-osmotic pumps implanted, but no intraoral appliances placed. The remaining groups had a 50 g Elgiloy closed coil spring activated from the right maxillary first molar to maxillary incisors and no appliances placed on the left side. These 3 groups differed in what was dispensed by the pump: pumps in the control group were filled with physiological serum; in the TX group pumps dispensed 20 µg TX/kg bodyweight/day; and in the DX group, the pumps dispensed 1.2 mg/kg bodyweight/day of doxycycline. Animals were sacrificed at 14 days and maxillary tooth-bearing segments were processed for histomorphometric analysis and scanning electron microscopy was used to measure resorptive changes.

**Results:** The average percentage of maxillary molar roots affected by resorption was 2.2 in the control group, 0.3 in the TX group, and 0.3 in the DX group. Treatment groups were statistically different from the control group, but no significant difference was seen between the TX and the DX groups. No statistically significant differences were found in the amount of tooth movement among groups.

**Conclusions:** Systemic administration of TX or DX may have inhibitory effects on orthodontically induced root resorption without affecting the rate of tooth movement.

**Reviewer's Comments:** This is preliminary work on what may be an exciting way to prevent or reduce orthodontic root resorption in susceptible patients in the future. (Reviewer-Brent E. Larson, DDS, MS).

Keywords: Root Resorption, Animal Model, L-Thyroxine, Doxycycline

Print Tag: Refer to original journal article

## What Is Best Way to Treat Condylar Fractures?

*Fractures of the Mandibular Condyle: Evidence Base and Current Concepts of Management.*

Abdel-Galil K, Loukota R:

Br J Oral Maxillofac Surg 2010; 48 (October): 520-526

This attempt at an evidence-based review of treatment of condylar fractures identifies a trend at improved outcomes following open reduction and fixation. The long-term impact of this treatment on growing patients needs to be further understood.

**Background:** Fractures of the mandibular condyle can greatly affect oral function, occlusion, and growth. Some controversy exists as to the management of these fractures.

**Objective:** To review the current evidence on the effectiveness of various techniques to manage condylar fractures.

**Design:** Literature review.

**Methods:** 1081 studies were initially identified from a search of multiple electronic databases. After nonrelevant publications were excluded, 233 publications were analyzed. Most of the analyzed publications were case reports, case series, technical notes, letters, and editorials. However, 5 controlled clinical trials, 1 systematic review, and 1 meta-analysis were included.

**Results:** Open reduction and internal fixation demonstrated improved function and occlusion when compared to closed reduction and maxillomandibular fixation. Randomized clinical trial data showed a 22% to 28% higher rate of malocclusion in the closed treatment group. Fractures with >10 degrees of deviation or >2 mm of shortening of the ascending ramus should be treated with open reduction and fixation. Endoscope-assisted open reduction and fixation showed equivalent outcomes to traditional approaches, with some esthetic advantages and a tendency toward lower occurrence of facial nerve damage (although not statistically significant).

**Conclusions:** When treating mandibular condylar fractures, current data show superior functional results with open reduction and fixation. Further research is still needed to examine ideal treatment for condylar head fractures and displaced pediatric fractures.

**Reviewer's Comments:** I am concerned that this evidence does not provide information on long-term growth effects of condylar fracture repair. Most of the studies included follow-up for 6 months or 1 year, which is not sufficient time to judge the impact of treatment on growth. Most condylar fractures in children heal and regenerate without the need for open reduction, and surgical insult may worsen the prognosis. In spite of the trend toward more open reduction, care should be taken not to do this in children without further data. (Reviewer-Brent E. Larson, DDS, MS).

Keywords: Condyle Fracture, Management, Growth

Print Tag: Refer to original journal article

# Zygoma Anchorage System Improves Molar Anchorage During Canine Retraction

*Effects of the Zygoma Anchorage System on Canine Retraction.*

Çetinsahin A, Dinçer M, et al:

Eur J Orthod 2010; 32 (October): 505-513

The use of a zygoma bone anchor for canine retraction limits molar anchorage loss to approximately 0.5 mm, while 1.5-mm anchorage loss is seen without the bone anchors.

**Background:** A surgeon can place zygomatic bone anchors to provide an intraoral method of anchorage reinforcement that does not rely on patient compliance.

**Objective:** To compare the anchorage loss during canine retraction between cases treated with and without zygomatic bone anchors.

**Design:** Prospective clinical trial.

**Participants:** 30 nongrowing patients seeking orthodontic treatment and whose maxillary first premolars were scheduled for extraction were included. Fifteen patients were placed in the bone anchor group because maximum anchorage was required, while 15 patients were placed in the control group because only moderate anchorage was required.

**Methods:** For both groups, 0.018 inch Roth brackets and molar bands were bonded on maxillary canines, second premolars, and first molars. Teeth were aligned using nickel-titanium wires, and then patients requiring maximum anchorage had zygomatic bone anchors placed. One week after surgery, a 0.016 x 0.022 inch stainless steel wire was placed from the bone anchor to the accessory molar tube for indirect anchorage. Retraction of maxillary canines was performed in both groups using a Gjessing retraction spring (0.016 x 0.022 inch stainless steel). Study models and lateral cephalometric radiographs were taken before and after canine retraction.

**Results:** Maxillary molars moved mesially  $0.63 \pm 0.19$  mm in the bone anchor group and  $1.50 \pm 0.28$  mm in the control group. This change was statistically significant ( $P < 0.05$ ). In addition, the bone anchor group showed a significant decrease in intermolar width and significant increase in intercanine width, molar rotation, and canine rotation. No significant differences were found in the canine retraction rate between the 2 groups.

**Conclusions:** Zygomatic bone anchors are effective in reinforcing anchorage during canine retraction.

**Reviewer's Comments:** While the difference between the 2 groups was statistically significant, there are few situations where a <1-mm gain in molar anchorage would be worth the time and expense of bone anchor placement. The use of zygomatic anchors may be more justified for intrusion or distalization. Miniscrews would be my choice for anchorage support for this situation, as it would likely have the same impact on anchorage control at a lower cost and without the surgical procedure. (Reviewer-Brent E. Larson, DDS, MS).

Keywords: Anchorage, Miniplates, Canine Retraction, Zygoma Anchorage System

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