Condylar Displacement -- Symptomatic vs Asymptomatic Patients

Condylar Displacement Between Centric Relation and Maximum Intercuspation in Symptomatic and Asymptomatic Individuals.

Welfort SYK, de Fantini SM:

Angle Orthod 2010; 80 (September): 835-842

Statistically significant differences in condylar displacement occur between asymptomatic and TMD symptomatic individuals.

**Background:** A common concern for orthodontists is whether there is a shift of the condyle and mandible from centric relation to maximum intercuspation. Typically, most orthodontists check for this at their examination appointment. Do these shifts of the condyle have any relationship to TMJ symptoms?

**Objective:** To measure condylar displacement between centric relation and maximum intercuspation in symptomatic and asymptomatic individuals with TMD.

**Design/Participants:** This prospective study evaluated condylar displacement in 70 subjects.

**Methods:** The sample was divided into 2 groups. One group was asymptomatic, and the other group was symptomatic for TMD. These symptoms were based on the Research Diagnostic Criteria for TMD that has been published previously. Dental casts of both groups were mounted on adjustable articulators. Bite records were taken that denoted maximum intercuspation and centric relation positions. The shift in condylar position was noted in 3 directions (anteroposteriorly, transversely, and vertically). Asymptomatic and symptomatic individuals were compared.

**Results:** Greater differences occurred in the vertical plane in symptomatic and asymptomatic individuals; however, the asymptomatic group showed more differences in the transverse plane and also toward the mesial direction. The authors also found the presence of bilateral condylar displacement in an inferior and distal direction, which occurred significantly to a greater extent in symptomatic individuals than in asymptomatic subjects.

**Conclusions:** Statistically significant differences between centric relation and maximum intercuspation could be identified at the condylar level between asymptomatic and symptomatic subjects.

**Reviewer’s Comments:** This study was performed on adjustable articulators. I am not certain how accurately the authors could measure the tenths of a millimeter that they were describing in the differences between symptomatic and asymptomatic groups using their methodology. However, it was a good attempt, and perhaps better methods could be used in future studies to verify the findings of these researchers. (Reviewer-Vincent G. Kokich, Sr, DDS, MSD).

Keywords: Condylar Displacement, Symptoms

Print Tag: Refer to original journal article
Maxillary Anterior Crowding Related to Self-Esteem

Evaluation of the Effects of Malocclusion and Orthodontic Treatment on Self-Esteem in an Adolescent Population.

Jung M-H:


The correction of maxillary anterior crowding with comprehensive orthodontic treatment can significantly improve the self-esteem of girls.

**Background:** When parents ask you about the benefits of comprehensive orthodontic treatment for their child, what do you tell them? Do you suggest that an increase in self-esteem is a benefit? If so, do you have a valid basis for making this comment?

**Objective:** To evaluate the effect of malocclusion and orthodontic treatment on adolescents' self-esteem.

**Participants:** The sample for this study consisted of 4509 Korean adolescents between the ages of 12 and 15 years.

**Methods:** Each subject underwent a clinical examination by an orthodontist and completed Rosenberg's self-esteem scale. The subjects were subdivided based on having maxillary anterior crowding, protrusive lips, or a combination of both. They were also identified as undergoing comprehensive orthodontic treatment, having completed comprehensive orthodontic treatment, having received removable orthodontic treatment only, or having had no orthodontic experience. The correlation between their occlusal and profile conditions and their self-esteem status was then statistically evaluated.

**Results:** Girls who had crowding of their maxillary anterior teeth and completed comprehensive orthodontic treatment demonstrated a significant increase in self-esteem. Boys who had completed orthodontic treatment did not show a significant increase in self-esteem, and neither boys nor girls exhibited an increase in self-esteem during comprehensive orthodontic treatment. In addition, subjects who underwent removable orthodontic treatment did not show an increase in self-esteem, and there was no increase in self-esteem for patients who demonstrated protrusive lips.

**Conclusions:** Adolescent girls who have maxillary anterior crowding and undergo fixed orthodontic treatment demonstrate an increase in self-esteem.

**Reviewer’s Comments:** I was impressed by the very large size of the sample used in this study. I was not surprised that adolescent girls with maxillary anterior crowding demonstrated a significant increase in self-esteem after completing fixed orthodontic treatment, but I was a little surprised that boys did not also demonstrate an increase in self-esteem. However, if you had told me ahead of time that only 1 of the 2 groups demonstrated an increase in self-esteem, I certainly would have picked the girls. Hopefully, the results of this study will provide an additional justification for fixed orthodontic treatment. (Reviewer- John S. Casko, DDS, MS, PhD).

Keywords: Malocclusion, Orthodontic Treatment, Adolescents, Self-Esteem

Print Tag: Refer to original journal article
Creating Retainers Without Impressions

Comparison of Intraoral 3D Scanning and Conventional Impressions for Fabrication of Orthodontic Retainers.

Vasudavan S, Sullivan SR et al:

J Clin Orthod 2010; 44 (8): 495-497

This pilot project, comparing retainers made from direct oral scanning to those made from alginate impressions, demonstrated that orthodontists preferred the fit of the retainers made from the direct digital scans.

Background: New technologies, such as intraoral scanners and cone-beam scanners, may eventually replace traditional impressions in orthodontics.

Objective: To compare retainers fabricated using intraoral 3D scanning with those fabricated using conventional alginate impressions.

Design: Prospective, crossover design.

Participants: A convenient sample of 30 patients (24 female, 6 male) from the offices of 2 private practice orthodontists.

Methods: The Lava Chairside Oral Scanner was used to capture a maxillary and mandibular digital impression of each patient. Teeth were isolated, titanium oxide powder was applied, and scans were taken by trained dental assistants. A stereolithographic model was produced from the scan. In addition, conventional alginate impressions were taken and poured in dental stone. Maxillary and mandibular Hawley retainers were fabricated from each set of models. Orthodontists delivered each set of retainers, were blinded to the method of fabrication, and were asked to evaluate the clinical acceptability of each retainer.

Results: No significant differences were found between the clinical acceptability of retainers fabricated using intraoral scans and those made from conventional alginate impressions. Orthodontists deemed 52 of 60 retainers fabricated from digital scans acceptable and 53 of 60 retainers fabricated from alginate impressions acceptable. However, when clinicians were asked to choose their preferred set of retainers, the retainers fabricated from digital scans were chosen 66% of the time. Scan times ranged from 16 minutes to 46 minutes, but 77% of patients still preferred the procedure over conventional impressions.

Conclusions: Clinically acceptable retainers can be fabricated from current intraoral scanners, but scan times are still long.

Reviewer’s Comments: I am very surprised by the findings regarding patient preference. I use a SureSmile Orascanner and find that most patients do not like the procedure very much. Therefore, I wonder about possible bias when 77% of these subjects indicate a preference for the scanning technique. In addition, the long scan times are still a challenge. There is no doubt that, as the technology matures, we will all be making appliances in this way. (Reviewer-Brent E. Larson, DDS, MS).

Keywords: Retainers, Digital, Scanning

Print Tag: Refer to original journal article
Effect of Rapid Maxillary Expansion on Pulpal Blood Flow

_Pulpal Blood Flow Changes Due to Rapid Maxillary Expansion._
Babakan H, Doruk C, Bicakci AA:

_Angle Orthod 2010; 80 (November): 1136-1140_

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Pulpal blood flow of anchor teeth increases 2-fold during initial expansion but reverses to a normal rate after 3 months.

**Background:** Palatal expansion has been used for many years to correct maxillary constriction. Typically, the anchor teeth for expansion are the premolars and molars. What happens to the blood flow in these teeth as a large expansion force is placed on these teeth? Pulpal response is sometimes measured by changes in pulpal blood flow. What happens to pulpal blood flow during palatal expansion through the end of retention?

**Objective:** To evaluate the pulpal blood flow changes in human dental pulp from the beginning of rapid maxillary expansion through to the end of retention.

**Design:** Prospective study.

**Participants/Methods:** 21 subjects had palatal expansion performed with an aligner that contained a maxillary expansion device. Palatal expansion was performed at 0.25 turn or 0.25 mm per day. A laser Doppler flow meter was used to measure pulpal blood flow. The teeth that were analyzed were the central incisor, canine, and maxillary first molar. These teeth were evaluated before expansion, after 1 week, after 2 weeks, then after 3 weeks, 7 weeks, and 12 weeks.

**Results:** Pulpal blood flow doubled in rate after the first week of palatal expansion. The change was similar among the central incisor, canine, and first molar. Next, the pulpal blood flow reversed its trend and decreased after the second week but was still slightly elevated compared to the pretreatment level. When the authors evaluated blood flow after 12 weeks, it had returned to its normal rate compared to the pretreatment level.

**Conclusions:** Pulpal blood flow changes significantly during the initial phases of orthodontic therapy to expand the maxilla, but this trend is reversible, and blood flow reaches its normal rate after retention.

**Reviewer's Comments:** Orthodontists have known for years that palatal expansion does not cause any undesirable, long-term effects on the dental pulp. However, it was interesting to know how much the pulpal blood flow increases in its rate, especially during the initial phase of palatal expansion. Thankfully, the body accommodates to this change, and blood flow approaches its normal rate without any long-term damage to the pulp. (Reviewer-Vincent G. Kokich, Sr, DDS, MSD).

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Keywords: Rapid Maxillary Expansion, Pulpal Blood Flow

Print Tag: Refer to original journal article
Errors Possible When Superimposing Serial CBCT Images

Sensitivity Analysis for Plane Orientation in Three-Dimensional Cephalometric Analysis Based on Superimposition of Serial Cone Beam Computed Tomography Images.

Lagravère MO, Major PW, Carey J:

Dentomaxillofac Radiol 2010; 39 (October): 400-408

This analysis demonstrates that landmark-based superimposition methods for CBCT images could lead to clinically significant errors when assessing growth or treatment outcomes.

**Background:** Methods for superimpositions of traditional 2D cephalometric images are well known. However, the reliability of superimposing 3D cone beam CT (CBCT) images for serial cephalometric analysis is not well documented.

**Objective:** To evaluate potential errors when superimposing serial CBCT imaging using reference planes based on cranial base landmarks.

**Design:** Laboratory study using previously obtained images.

**Participants:** 62 patients participated in a maxillary expansion clinical trial with CBCT images (NewTom 3G Volumetric Scanner; Aperio, Verona, Italy) taken at baseline, 6 months, and 12 months.

**Methods:** NewTom 3G scans were converted to DICOM format and then examined using AMIRA software (Mercury Computer Systems, Berlin, Germany). Four landmarks were used to determine a 3D coordinate system: the left and right external auditory meatus, the dorsum foramen magnum, and ELSA (the midpoint between the right and left foramen spinosum). Landmarks were located 3 times on each image to determine reliability. After landmark identification, a set of transformations was performed to move all points onto the newly defined coordinate system. Additionally, a sensitivity evaluation was performed by introducing 0.25 mm, 0.5 mm, and 1 mm of error into one axis of the new coordinate system and examining the impact on the results.

**Results:** Intra-reliability values for landmark identification were excellent: the lowest value was 0.965. However, the sensitivity evaluation showed that introducing 0.25 mm of error in the identification of ELSA can cause up to 1 mm of error in other cranial base landmarks and result in 4 to 6 mm of error in distant landmarks (menton and infraorbital landmarks).

**Conclusions:** Large errors in superimposition can be generated by relatively minor errors in cranial base landmark identification.

**Reviewer's Comments:** This study clearly demonstrates that landmark-based superimposition is not appropriate for superimposing CBCT images. This is important to know since landmark superimposition is the easiest and fastest way for software to superimpose serial CBCT volumes. This is really not different from what we have found for 2D image superimposition, but the error gets magnified as the third dimension is added. Some method of best-fit surface superimposition of cranial base structures will likely be our most reliable superimposition method going forward. (Reviewer-Brent E. Larson, DDS, MS).

**Keywords:** CBCT, Superimposition, Error

**Print Tag:** Refer to original journal article
Long-term patient satisfaction depends on the stability of the orthodontic result 5 years after appliance removal.

**Background:** One of the key factors in maintaining a referral source for a private practice is patient referrals. Patient referrals depend on satisfaction by previous orthodontic patients. This satisfaction must last for at least 5 to 10 years. What makes patients happy or satisfied with their orthodontic treatment 5 years after appliance removal?

**Objective:** To identify factors associated with patient satisfaction at least 5 years after orthodontic appliance removal.

**Design:** This retrospective study evaluated the records of 209 orthodontic patients who had completed orthodontic treatment and had records available a minimum of 5 years later.

**Methods:** Dental casts were taken pretreatment, at the end of orthodontics, and a minimum of 5 years after orthodontic treatment. These dental casts were measured and compared using the Peer Assessment Rating (PAR) Index. Then, the PAR scores were compared to the severity of the malocclusion before treatment, the gender of patients, the age at the beginning of treatment, whether teeth were extracted, and the stability of the orthodontic results.

**Results:** Neither gender, age at beginning of treatment, extractions, nor severity of initial orthodontic treatment correlated with patient satisfaction 5 years after appliance removal. The authors did find a statistically significant correlation between the stability of the orthodontic result (as measured by the PAR score a minimum of 5 years after treatment) and patient satisfaction.

**Conclusions:** Patient satisfaction is associated with long-term stability of the treatment result when measured 5 years after orthodontic appliance removal.

**Reviewer's Comments:** I liked this study. I guess what it demonstrates is the need to maintain the stability of the orthodontic treatment result if one expects to have satisfied patients long term. Perhaps this points to the more routine use of fixed orthodontic retainers rather than removable retention devices. (Reviewer-Vincent G. Kokich, Sr, DDS, MSD).

Keywords: Patient Satisfaction, Orthodontic Treatment

Print Tag: Refer to original journal article
If you have a patient with an impacted canine that is difficult to locate on standard radiography, a CBCT scan can be very helpful.

**Background:** An increasing number of orthodontists are using CBCT scans in their practice. If you are considering the use of CBCT scans in your practice, you should be aware of the specific advantages of these scans for orthodontic treatment.

**Objective:** The purpose of this guest presentation article was to discuss the practical applications of CBCT related to comprehensive orthodontic treatment. **Discussion:** The authors suggest that, when compared to traditional radiology, CBCT scans provide more detailed information related to dental development, limits of tooth movement, airway analysis, craniofacial morphology, and superimpositions. Conventional cephalometric imaging is limited by a number of factors, including x-ray beam geometry, resulting in image magnification, left- and right-side differences, and head positioning. There are no magnification issues with CBCT because the 3D object is reconstructed from raw data by means of a mathematical algorithm that has the ability to calculate and eliminate the magnification factor, even though the x-rays are not parallel. An additional advantage of using CBCT reconstructed lateral cephalograms is the ability to digitally re-orient the head position in cases in which the patient did not undergo scanning with the proper head position. It also has the ability to improve image quality by removing extraneous superimposing skeletal structures and providing a clear image of the specific area in which you are interested. Recently, a method for superimposition of CBCT images has been developed that is accurate, fast, and automatic. Because CBCT images have increased radiation compared to standard radiographic images and because, at the present time, the cost of obtaining images or purchasing a CBCT machine is very high, the decision to routinely use CBCT or to purchase a machine is complicated.

**Conclusions:** CBCT offers specific advantages for imaging in orthodontics.

**Reviewer’s Comments:** If you are interested in gaining a better understanding of CBCT technology, I strongly recommend you read this special supplement to the October 2010 issue of the *Journal of the American Dental Association*. There is no question that CBCT can provide more accurate images of craniofacial anatomy and the relationship of individual structures such as impacted canines and adjacent teeth. The question you must decide if you are considering the use of CBCT in your practice is whether the advantages it provides offset the greater radiation, cost, and possible legal complications related to its use. My personal experience with CBCT has been limited to the precise location of impacted canines that were difficult to diagnose on traditional radiographs; for this purpose, CBCT has been a great help. (Reviewer-John S. Casko, DDS, MS, PhD).

**Keywords:** CBCT, Orthodontics

**Print Tag:** Refer to original journal article
Can Orthodontic Tx Affect Systemic Health Through Inflammation?

Does Orthodontic Tooth Movement Cause an Elevation in Systemic Inflammatory Markers?

MacLaine JK, Rabie ABM, Wong R:


Inflammatory markers are not found to be elevated during orthodontic treatment, indicating no potential for negative systemic immune effects.

**Background:** Certain oral conditions, such as periodontal disease, can cause systemic effects. Systemic inflammatory reactions have been associated with significant health issues, in particular, cardiovascular disease. Can the inflammatory reaction to orthodontic tooth movement cause a systemic response?

**Objective:** To determine if orthodontic tooth movement increases levels of systemic inflammatory markers.

**Participants:** 17 patients (11 females, 6 males; mean age, 13.1 years) being treated with fixed appliances and a distalizing headgear at the University of Hong Kong were evaluated. Patients with any systemic illness or who were routinely taking medication were excluded.

**Methods:** Blood was drawn from each subject at baseline and at 2 months, 4 months, and 6 months into treatment to measure the levels of circulating inflammatory markers. Fixed orthodontic appliances were placed shortly after baseline, and each successive blood draw was taken 1 week after an orthodontic adjustment appointment. Quantitative enzyme immunoassays were used to look for the presence of C-reactive protein, interleukin-6, and tumor necrosis factor-α.

**Results:** No significant elevation was found for any systemic inflammatory marker over the study period.

**Conclusions:** No systemic immune response is associated with conventional orthodontic treatment.

**Reviewer's Comments:** Systemic inflammatory markers have been associated with an increased risk of cardiovascular disease as well as other conditions such as obesity and depression. Periodontal disease is one condition that has been shown to cause an increase in these inflammatory markers. The concern that the inflammatory response that occurs with orthodontic tooth movement could result in a systemic effect was refuted by this study. At this point, it appears that inflammatory response to orthodontic tooth movement is not a general health concern. (Reviewer-Brent E. Larson, DDS, MS).

Keywords: Inflammation, Tooth Movement, Systemic

Print Tag: Refer to original journal article
Background: Demineralization is a common problem in orthodontic patients with poor oral hygiene. Unfortunately, attempts to have these patients use mouth rinses and/or fluoride-containing toothpastes meets with little success because patients are not cooperative. What about putting sodium fluoride in elastomeric ligatures that remain on the teeth between orthodontic appointments?

Objective: To incorporate fluoride into polyethylene elastomeric ligatures to determine if these ligatures could produce a controlled release of fluoride over time.

Design: Experimental laboratory study.

Methods: Polyethylene elastomeric ligatures were embedded with sodium fluoride at different concentrations. In addition, some of these elastomeric ligatures were also hand dipped and coated with sodium fluoride. Samples of all of these different concentrations and varieties were immersed in buffered solution. The fluoride release was measured every 5 minutes for 2 hours, and then daily for 45 days.

Results: With the polyethylene elastomeric ligatures that had been hand dipped in the higher concentration of sodium fluoride, fluoride release occurred gradually in the laboratory solution over the 45-day experimental period. However, the authors admit that the oral environment is much different because of chewing, trauma, saliva, food, and other factors that influence these elastomeric ligatures. The authors will continue to perform further experimentation and eventually hope to use these elastomeric ligatures in human studies.

Conclusions: Gradual fluoride delivery from an elastomeric ligature coated with sodium fluoride is possible in a laboratory setting.

Reviewer's Comments: This is an interesting line of research. I hope the authors continue to determine if this means of providing protection against demineralization is feasible in patients. It would be a nice adjunct for orthodontists to prevent demineralization in their noncompliant patients. (Reviewer-Vincent G. Kokich, Sr, DDS, MSD).

Keywords: Fluoride Release, Delivery System

Print Tag: Refer to original journal article
Mothers should be advised that the prolonged use of pacifiers can lead to unilateral posterior cross-bite.

**Background:** If a mother asks if it is ok to have her infant or young child use a pacifier, what do you tell her? Since this is a frequently asked question, it is important to have a valid basis for your response.

**Objective:** To evaluate the association between posterior cross-bite, sucking habits, orofacial functions, and otolaryngologic findings in the deciduous dentition.

**Participants:** The sample for this study consisted of 60 children who were approximately 5.5 years of age; 30 children had posterior cross-bites in the primary dentition, and 30 children did not have a cross-bite.

**Methods:** The mothers were interviewed and given a questionnaire eliciting information about their child's nutritive and non-nutritive sucking behaviors. The subjects in the study were also evaluated by an orthodontist and an otolaryngologist, and study models were obtained from all children. Anteroposterior and lateral measurements were obtained for the study casts, and the correlation between posterior cross-bite and habits was statistically evaluated.

**Results:** When comparing the cross-bite and non-cross-bite patients, no statistically significant difference was found for the duration of breast feeding and bottle feeding. However, a statistically significant difference was found between the 2 groups in the duration of pacifier habit, with the occurrence of posterior cross-bite being significantly greater with a longer duration of pacifier use. A longer duration of pacifier use also led to smaller intermolar arch widths in the maxilla. Additionally, short lingual frenums were found only in children with a posterior cross-bite.

**Conclusions:** Prolonged pacifier use results in a more frequent appearance of posterior cross-bite.

**Reviewer's Comments:** The authors noted that, when pacifier use exceeded 18 months, there was a significant increase in the occurrence of unilateral posterior cross-bites. They also emphasized that, when clinically examining a child with non-nutritive sucking habits, you should also make an assessment of the length of the lingual frenum and the resulting tongue posture. I found this to be a very practical suggestion. Unfortunately, for many working mothers who have excessive demands on their time, it is not possible to continue breast feeding for an extended period of time, which often creates an additional need for pacifier use. (Reviewer-John S. Casko, DDS, MS, PhD).

Keywords: Posterior Cross-Bite, Primary Dentition, Sucking Habits

Print Tag: Refer to original journal article
A definite short-term improvement in psychosocial measures was seen in this group of adult patients undergoing orthodontic treatment for esthetic improvement.

**Background:** Esthetic improvement is a common reason that patients seek orthodontic care. How does this esthetic improvement affect psychosocial well-being?

**Objective:** To assess psychosocial changes in adult patients who had undergone orthodontic treatment.

**Design:** Prospective study.

**Participants:** 69 adult patients (61 females, 8 males, mean age, 33.4 ± 9.5 years) seeking orthodontic treatment for crooked teeth, spaced teeth, or a protruding jaw.

**Methods:** The Psychosocial Impact of Dental Aesthetics Questionnaire (PIDAQ) was given to all patients before the start of orthodontic treatment. This questionnaire tests 4 different factors: dental self-confidence, social impact, psychological impact, and esthetic concern. Buccal or lingual fixed appliances were placed for 6 to 14 months, with the main goals being tooth alignment, crowding alleviation, or space closure. All patients were treated in a single private practice setting by the same orthodontic team. Shortly after treatment, the PIDAQ was again completed by all patients. Pretreatment and posttreatment scores were compared for statistically significant changes.

**Results:** All 4 esthetic factors improved after treatment. This change was statistically significant. Age, marital status, education, and gender were not found to be related to the positive psychosocial impact seen in this study.

**Conclusions:** Orthodontic treatment can have a positive psychosocial effect on a wide range of adult patients.

**Reviewer's Comments:** This study design used each subject as his/her own control, but it did not actually include a control group to measure the change in psychosocial impact in similar subjects who did not have treatment. The time of administration for the post-treatment assessment was not well defined ("shortly after") and could introduce variation into the results. The results are very positive for orthodontics, but it would be reassuring to reproduce these findings in a different setting and with a stronger study design. (Reviewer-Brent E. Larson, DDS, MS).

Keywords: Esthetics, Quality of Life, Orthodontics, Psychosocial
Effect of Developing Third Molars on Angulation of Lower Posterior Teeth

Mesiodistal Angulations of the Mandibular Canines, Premolars and Molars With or Without the Presence of Third Molars.

Cuoghi OA, Sella RC, et al:

In this study comparing subjects with and without third molars, the presence of third molars did not have a significant effect on the mean angulation of mandibular teeth.

Background: The influence of mandibular third molars on the mandibular dentition has frequently been examined due to the commonly seen mesial orientation of these teeth.

Objective: To examine the differences in mesiodistal angulation of mandibular posterior teeth between untreated subjects with and without mandibular third molars.

Design: Case-control study.

Participants: 40 untreated Brazilian Caucasians (21 females, 19 males; mean age, 22.4 years); 20 subjects had agenesis of the mandibular third molars, and 20 subjects had mandibular third molars present. Third molars that were present were deemed to have a high eruption potential based on root development.

Methods: Panoramic radiographs were taken on each patient, and an internal reference line was set by connecting the mandibular foramen. Mesiodistal angulations of all mandibular teeth from the lower canines to the second molars were measured relative to the reference line. Mean values were compared between groups by Student t-tests.

Results: No statistically significant differences were found in the mean angulations of posterior teeth between the group with third molar agenesis and the group with third molars present. When compared to previously reported data on 42 control subjects with “normal” occlusion, both groups in this study were found to have increased mesial crown tip in the premolar and molar region. This could be due to existing malocclusions.

Conclusions: The presence of third molars was not found to have a significant effect on the mean angulation of mandibular teeth in untreated individuals.

Reviewer’s Comments: Although I have some questions about the methodology of measuring the angulations of the posterior teeth on the panoramic films, this study confirms the assertion that developing lower third molars has no significant effect on the position of the lower teeth. (Reviewer-Brent E. Larson, DDS, MS).

Keywords: Third Molars, Tooth Position

Print Tag: Refer to original journal article
Orthodontic Extrusion of Third Molars May Minimize IAN Trauma

Orthodontic Extrusion of the Lower Third Molar With an Orthodontic Mini Implant.

Park W, Park J-S, et al:


Two cases are presented that demonstrate the use of orthodontic extrusion, supported by miniscrews, to reduce the risk of nerve damage when extracting a high-risk third molar.

Background: Paresthesia of the inferior alveolar nerve (IAN) is a risk during surgical removal of mandibular third molars.

Objective: To describe a method of orthodontically extruding third molars to minimize IAN trauma.

Design: Case reports.

Participants: 2 cases are described. Case Reports: The first case was that of a 32-year-old woman with partially erupted mandibular third molars. CT images showed the IAN running between the buccal and lingual roots of the lower left third molar. The second case was that of a 21-year-old woman with partially erupted third molars. CT images showed the lower left third molar had 4 roots, with the IAN running between the buccal and lingual roots.

Methods: In both cases, brackets were placed from the lower left second premolar to the lower left third molar. A 0.16-inch nickel titanium wire was first used for leveling, followed by a 0.16- x 0.22-inch stainless steel wire with a loop spring. To control side effects of this extrusion, a miniscrew (Orlus; 7 mm in length with a 1.8-mm diameter) was placed between the mandibular left second premolar and first molar and indirectly anchored to both teeth.

Results: Extrusion took 6 months for case 1 and 9 months for case 2. The third molars were extracted after extrusion with no long-term paresthesia, although case 1 did report numbness of the lower lip for 3 months. In both cases, the IAN could be visualized following extraction, but there was no evidence of tearing or bleeding.

Conclusions: Orthodontic extrusion of third molars may cause less trauma to the IAN and, therefore, less long-term paresthesia in high-risk cases.

Reviewer’s Comments: This is an interesting approach to a difficult surgical problem. Although this seems like a complex solution, it is much simpler and more predictable than trying to do an alveolar nerve repair later. This article would make for a good discussion with your local oral surgeons as it provides another opportunity to work together for a better outcome. (Reviewer-Brent E. Larson, DDS, MS).

Keywords: Third Molars, Orthodontic Extrusion, Inferior Alveolar Nerve Damage, Mini-Implant

Print Tag: Refer to original journal article
In this retrospective study, the use of early gingivoperiosteoplasty appears to reduce the forward growth of the maxilla as measured at age 5 years.

**Background:** Gingivoperiosteoplasty (GPP) is a technique for primary alveolar repair in cleft lip and palate patients. In this procedure, periosteal flaps are used to connect well-aligned segments of alveolar bone at the time of lip repair (typically at 3 to 6 months of age).

**Objective:** To assess the effects of GPP on facial growth.

**Design:** Retrospective study.

**Participants:** 62 consecutive patients with unilateral cleft lip and palate were included. All patients underwent nasoalveolar molding (NAM) to align the alveolar segments within 3 mm. The same surgeon performed the lip repair between 3 and 6 months of age, and all patients had a 2-flap palatoplasty at 1 year of age.

**Methods:** 26 patients (18 boys and 8 girls) received GPP at the time of lip repair, while 36 patients (24 boys and 8 girls) only had the lip repair. Lateral and posterior-anterior (PA) cephalograms were taken at 5 years of age. Images were taken in the natural head position and in centric occlusion. Nine linear and 7 angular measurements were made to examine facial growth both sagittally and transversely.

**Results:** Patients who received GPP showed a reduction in forward maxillary growth. In the GPP group, the average maxillary length (posterior maxillary point-anterior nasal spine) was reduced 2.15 mm, and the average maxillary sagittal position was reduced 3.04°. When comparing the 2 groups, no statistically significant differences were found in the mandibular sagittal position, the vertical relationship, or the transverse dimension.

**Conclusions:** GPP at the time of lip closure appears to adversely affect the sagittal length and position of the maxilla.

**Reviewer's Comments:** The benefit of the GPP is that approximately 60% of these patients do not require later alveolar bone grafting. The debate has been over whether the additional early surgery has an impact on facial growth. This study would indicate that the effect on growth is negative, but this study does suffer from selection bias since the surgeon was making a decision on GPP based on the segment approximation. This bias indicates some possible difference between groups prior to surgery and makes interpretation of the results more difficult. (Reviewer-Brent E. Larson, DDS, MS).

Keywords: Cleft, Surgery, Molding

Print Tag: Refer to original journal article
Determining Optimal Sites for Mini-Implants

Optimal Sites for Orthodontic Mini-Implant Placement Assessed by Cone Beam Computed Tomography.

Fayed MMS, Pazera P, Katsaros C:

Angle Orthod 2010; 80 (September): 939-951

Cone beam computed tomography can be used successfully to identify optimal mini-implant sites.

**Background:** Mini-implants have become a popular way for anchoring orthodontic mechanics. However, not all sites in the maxilla and mandible are ideal for mini-implant placement. Where are the most ideal sites for mini-implant placement in the human skull?

**Objective:** To determine the optimal sites of mini-implant placement in the anterior and posterior maxilla and mandible based on mapping of the dimensions of the interradicular spaces and cortical bone thicknesses using cone beam computed tomography (CBCT).

**Design/Participants:** This experimental study was performed on 100 patients (46 males and 54 females), with an average age of 20 years.

**Methods:** CBCT scans were made of all individuals, and distances were calculated between teeth and in various parts of the maxilla and mandible using the CBCT images. By accomplishing this, the authors found the most ideal areas to place mini-implants.

**Results:** In the anterior maxilla, the highest buccolingual thickness was found between the right central and lateral incisors at the 6-mm level. The lowest buccolingual thickness was between the central incisors at the 2- and 4-mm levels. In the posterior maxilla, the highest buccolingual thickness was found at the 6-mm level between the first and second molars. The highest mesiodistal distances both buccally and palatally were between the second premolar and first molar. In the anterior mandible, the highest buccolingual thickness was found between the lateral incisor and canine at the 6-mm level. In the posterior mandible, the highest buccolingual thickness was between the first and second molars. The highest mesiodistal distance on the buccal side was between the second premolar and first molar. In the anterior maxilla, males had significantly higher buccolingual thickness than females. Posteriorly, males had greater buccolingual thickness as well.

**Conclusions:** The optimal sites for mini-implants have been identified in this study.

**Reviewer's Comments:** This was an interesting study. CBCT provided a useful measure for determining thickness of the bone. (Reviewer-Vincent G. Kokich, Sr, DDS, MSD).

Keywords: Mini-Implant Sites, Cone Beam CT

Print Tag: Refer to original journal article
A CO₂ laser reduces the shear bond strength of ceramic brackets bonding to enamel.

**Background:** A common problem after orthodontic treatment is removal of the remaining composite after bracket removal. With traditional metal brackets, much of the bonding material remains on the tooth. This is good because an abrasive disk or burr can be used to gradually remove the composite. However, with ceramic brackets, some of the bonding material becomes adhered to the back of the ceramic bracket, which can result in fracture of the enamel during debonding. What can be used to reduce the shear bond strength with ceramic brackets?

**Objective:** To determine the effectiveness of CO₂ laser debonding of ceramic brackets on the mechanical properties of tooth enamel.

**Design:** Laboratory study.

**Methods:** Human premolars were used to test the system. Ceramic brackets were bonded with a light-cured composite to a series of premolars. The brackets were then divided into groups. A CO₂ laser was used at various output settings (3, 4, 5, and 6 Watts). The shear bond strength after laser debonding was recorded using a testing machine. In addition, during the laser application, the temperature rise in enamel was recorded.

**Results:** The results of this study showed that with the lower laser settings, the temperature increase in enamel was between 100°C and 150°C. With the higher settings of the laser, the temperature increased by 200°C. The CO₂ laser was successful at reducing shear bond strength by approximately one-third at the lower settings. The shear bond strength was lowered by approximately 50% when higher settings of the laser were used. There were no negative effects on the surface of the enamel using the laser.

**Conclusions:** The authors conclude that the CO₂ laser can be used successfully to reduce shear bond strength and not affect the mechanical properties of enamel.

**Reviewer's Comments:** Although this study did show that shear bond strength was reduced, this reduction was minimal for lower settings of the CO₂ laser. I would be concerned about increasing the temperature of the enamel to 200°C during the use of the laser. It would seem to me that this could produce some pulpal problems. I am not certain that the laser has been tested thoroughly enough to be used in humans to reduce shear bond strength with ceramic brackets. (Reviewer-Vincent G. Kokich, Sr, DDS, MSD).

**Keywords:** Ceramic Brackets, Enamel, Laser Debonding

**Print Tag:** Refer to original journal article
Hydrophilic bonding systems are better than hydrophobic systems when blood and water are present.

**Background:** It is ideal to bond orthodontic brackets in a dry field, and this can be accomplished in most situations. However, from time to time, the field of bonding is difficult to make completely dry. This is especially true when impacted teeth are uncovered or when mandibular second molars have been bracketed. Occasionally, blood and saliva fill these areas. Is there any advantage to using hydrophilic rather than hydrophobic bonding materials in these situations?

**Objective:** To compare a hydrophilic versus a hydrophobic bonding material made by the same company to determine shear bond strength.

**Design:** Laboratory study comparing 2 Transbond bonding systems.

**Methods:** One of the systems was hydrophobic and the other was hydrophilic using a self-etching primer. Various combinations of the 2 methods were employed. Brackets were bonded to bovine teeth and then thermocycled in a laboratory for 500 cycles. A testing machine was then used to debond the brackets. In some of the groups, blood and/or saliva were used to contaminate the area.

**Results:** The hydrophilic bonding materials demonstrated the greatest shear bond strength in all moisture conditions. However, these hydrophilic materials had the lowest shear bond strength under dry conditions. In both hydrophobic and hydrophilic systems, the presence of blood had the lowest mean bond strength. However, the hydrophilic materials worked better in a situation where blood was present.

**Conclusions:** Hydrophilic materials should be utilized in moist or blood-contaminated situations during bracket bonding.

**Reviewer's Comments:** I liked this study. I think most orthodontists keep a supply of hydrophobic and hydrophilic bonding materials present so that when the field is moist they can use hydrophilic materials. It was interesting to note in this study that the hydrophilic materials performed poorly in a dry environment. (Reviewer-Vincent G. Kokich, Sr, DDS, MSD).

Keywords: Bond Systems, Hydrophilic, Hydrophobic, Shear Bond Strength

Print Tag: Refer to original journal article
If you have a patient with an unerupted ankylosed maxillary incisor, distraction osteogenesis may be indicated.

**Background:** What would you do if you had a 12-year-old female present to you who had previous trauma on the maxillary incisors causing the maxillary left central incisor to ankylose and be significantly apically displaced? Would you consider the possibility of intraoral alveolar bone distraction osteogenesis to treat this patient?

**Objective/Design:** This case presentation article discusses the treatment of a 12-year-old girl who had damaged her maxillary incisors when she bumped into a desk at 7 years of age. **Case Report:** The incisors were reimplanted, but the left central incisor eventually became ankylosed and severely displaced apically creating an open bite in the anterior. Because the central incisor was severely displaced apically, restoring it prosthetically was not an option, and if it was extracted, it would have resulted in a significant loss of bone and recession of the periodontal support on the adjacent teeth. To avoid the unfavorable prosthetic and surgical side effects, the authors decided to design an intraoral alveolar bone distraction osteogenesis appliance to extrude the ankylosed central incisor, which needed to be repositioned incisally approximately 8 mms. However, prior to starting distraction, the authors used the ankylosed central incisor as anchorage to distalize the maxillary posterior occlusion, which was slightly Class II. After the occlusion was corrected, an interdental osteotomy and subapical osteotomy around the ankylosed central incisor were performed under local anesthesia. During the distraction process, the central incisor was slightly overcorrected vertically in an attempt to accommodate for future vertical growth. The final esthetic and occlusal results were excellent.

**Conclusions:** If you have to treat a patient with a severely apically displaced ankylosed maxillary incisor, intraoral alveolar bone distraction osteogenesis is a viable option.

**Reviewer’s Comments:** The patient presented in this case report had a very difficult problem to correct. Intraoral alveolar bone distraction osteogenesis provided a treatment alternative that was able to avoid the significant negative side effects of either prosthetic replacement or surgery. Because of the significant distance that the central incisor had to be moved incisally, a surgical osteotomy was not a viable alternative. If you have a patient with a significantly displaced ankylosed maxillary incisor, I would suggest that you read this article in its entirety. (Reviewer-John S. Casko, DDS, MS, PhD).

**Keywords:** Ankylosed Maxillary Incisor, Distraction Osteogenesis

**Print Tag:** Refer to original journal article
When deciding to use self-ligating or conventionally ligated brackets, your decision should not be based on the efficiency of initial alignment.

**Background:** There have been claims that self-ligating brackets are more efficient to achieve initial tooth alignment when compared with conventionally ligated brackets. Is this true? You should know the answer to this question before making a decision on what type of bracket to use.

**Objective:** To compare the efficiency of self-ligating and conventionally ligated brackets during the first 20 weeks of extraction treatment.

**Participants:** The sample for this study consisted of study models of 50 consecutive patients who had premolar extractions in the maxillary and/or mandibular arch.

**Methods:** 44 arches were ligated with self-ligating brackets and 40 arches had conventional ligation. Study models were taken at pre-treatment, 10 weeks after the start of treatment, and at 20 weeks after the start of treatment. All study models were evaluated by using Little's irregularity index to quantify the alignment of the 6 anterior teeth. The passive closure of extraction spaces was also measured from the models. The differences in changes in Little's irregularity index and extraction space closure were statistically evaluated.

**Results:** There were no significant differences between the self-ligating and conventionally ligated groups at 20 weeks in irregularity score changes. There was also no significant difference in passive extraction space closure between the 2 groups.

**Conclusions:** Self-ligating brackets are no more efficient than conventionally ligated brackets in achieving anterior alignment or passive extraction space closure during the first 20 weeks of treatment.

**Reviewer's Comments:** This was a well-conducted in vivo study. Based on the results of this study, it is reasonable to conclude that there are a number of valid reasons to choose between self-ligating or conventionally ligated bracket systems, but the initial efficiency of alignment and passive extraction space closure is not one of them. There are many factors that contribute to the efficiency of initial arch alignment and extraction space closure, so it is not surprising to me that only 1 factor (ie, type of bracket ligation) would make a significant difference. (Reviewer-John S. Casko, DDS, MS, PhD).

**Keywords:** Tooth Alignment, Self-Ligating Brackets, Conventionally Ligated Brackets, Efficiency
Lasers Can Improve Debonding of Ceramic Brackets

Debonding of Ceramic Brackets by a New Scanning Method.

Oztoprak MO, Nalbantgil D, et al:


If you have difficulty removing ceramic brackets, laser scanning can soften the adhesive.

**Background:** Debonding ceramic brackets is more difficult than debonding metal brackets and can sometimes result in pain or enamel loss. It would be helpful to know if laser scanning can improve the effectiveness of debonding ceramic brackets.

**Objective:** To develop a new method to debond ceramic brackets by scanning with an Er:YAG laser.

**Methods:** The sample for this study consisted of 60 bovine mandibular incisors. The 60 incisors were randomly divided into 2 groups of 30 each. Ceramic brackets were placed on the labial surface of each of the incisors. For one group, an Er:YAG laser was used to scan the ceramic brackets before debonding. The second group was a control group in which no laser scanning was used prior to debonding. A universal testing machine was used to measure shear bond strengths at the time of debonding, and the adhesive remnant index was used to evaluate the specific area of cement breakage. At debonding, the shear tests showed significantly lower shear bond strengths in the laser group compared to the control group. When the adhesive remnant index scores were evaluated, the laser group had twice as many samples with adhesive remaining thus decreasing the risk of enamel fracture. The shear bond strengths for the control group were twice as high as those for the laser group.

**Conclusions:** Using a scanning laser prior to debonding can make it easier and safer to remove ceramic brackets.

**Reviewer's Comments:** There is no question that the laser scanning in this study made it easier to remove ceramic brackets. Assuming that you have a laser in your practice, the question that you have to ask yourself is whether it is worth the extra time using the laser (9 seconds per bracket) prior to debonding ceramic brackets. If you are having problems with pain or enamel loss when debonding ceramic brackets, the extra time with the laser may well be worth it to achieve greater patient comfort and safety. (Reviewer- John S. Casko, DDS, MS, PhD).

Keywords: Ceramic Brackets, Debonding, Er:YAG Laser

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