Interdisciplinary dentistry improves the quality of patient care and reduces stress.

The purpose of this paper is to encourage and promote interdisciplinary dentistry. Sometimes, what appears to be a rather straightforward case instead becomes a more complex orthodontic case requiring more restorative and surgical treatment. The value of an interdisciplinary team is emphasized in such cases as these. Specific strategies are presented that can be applied to developing and maintaining a high quality and productive interdisciplinary team. Developing such a team, which might include a periodontist, an oral surgeon, and a restorative dentist, not only improves the quality of patient care in your office, but also reduces stress and turns the treatment of complex cases into an enjoyable and workable challenge. It allows you to look at dentistry through the eyes of others and sets up a working situation akin to a "Brain Trust," where the collective wisdom of the group is greater than the additive wisdom of the individuals. There are 3 strategies the dentist can apply to execute interdisciplinary dentistry within a team concept: (1) communication; (2) mechanics of meeting; and (3) strategies to deal with the pitfalls of interdisciplinary dentistry.

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Keywords: Interdisciplinary Team

Print Tag: Refer to original journal article
Small buccal corridors are regarded as more attractive than large buccal corridors when assessing smile aesthetics.

**Background:** Improving smile aesthetics has become a major component of adult orthodontic treatment, and a component of smile aesthetics is the size of the lateral buccal corridors. Which are preferred, larger or smaller buccal corridors?

**Objective:** To determine the amount of buccal corridor and its impact on smile evaluations between orthodontists and dental students.

**Methods:** The study compared the evaluations of 32 orthodontists and 55 dental students who assessed smile aesthetics with different-sized buccal corridors. A computer was used to alter the size of the buccal corridors from 0% up to 25%. Six different images were produced and evaluated by the panelists. A visual analogy scale was used to compare the opinions of the panelists.

**Results:** The results showed that there were no significant differences in judgment between male and female raters for both orthodontists and dental students. In fact, both groups preferred the smile that showed a buccal corridor between 5% and 10%. In addition, both groups rated the buccal corridors that increased between 10% and 25% as gradually less attractive.

**Conclusions:** Both orthodontists and dental students prefer broader smiles compared to narrow smiles.

**Reviewer's Comments:** This study is in agreement with others that have evaluated the size of the buccal corridors. In general, raters prefer broad smiles. However, when treating a patient orthodontically, the creation of a broader smile would require altering the maxillary arch form in many situations. Unfortunately, studies of post-orthodontic stability show that these changes are probably not stable. Therefore, it may be inappropriate to intentionally widen the arch forms in some orthodontic patients. (Reviewer-Vincent G. Kokich, DDS, MSD).

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Keywords: Smile Aesthetics

Print Tag: Refer to original journal article
Prior to the use of compound topical anesthetics for temporary anchorage device placement, it is important to review the patient's history for allergies.

**Background:** With the increased use of temporary anchorage devices (TADs) more and more orthodontists are using compound topical anesthetics (CTAs) prior to the placement of the TADs. It is important that orthodontists who are using CTAs know if there are any health risks or toxicity related to their use.  

**Objective:** The purpose of this guest editorial was to discuss any potential risks associated with the use of CTAs.  

**Methods:** In 2006, the Food and Drug Administration (FDA) issued a warning about possible severe reactions associated with the exposure of high concentrations of local anesthetics in CTA creams that are not approved by the FDA.  

**Results:** In this statement, the FDA reported 2 deaths associated with the use of CTAs, which created concerns among many dental professionals. Unfortunately, in its initial report, the FDA did not explain that these 2 deaths were caused by CTA application to the legs to reduce the pain of laser hair removal and that the 2 patients who died also wrapped their legs in plastic foil to increase the intensity of the anesthetic. Obviously, the health risks of CTAs used prior to the placement of TADs are in no way as high as the risks reported in the first FDA statement. While there can be risks associated with CTAs, particularly those that are available as eutectic oils, the small area of tissue usually covered by topical anesthetics prior to the placement of TADs significantly reduces the risk for potential toxic side effects. Additionally, reviewing the patient's history for allergies or cardiovascular disease prior to the placement of CTAs also reduces the risk of unfavorable side effects.  

**Conclusions:** When CTAs are applied in an orthodontic office prior to the placement of TADs, they pose only minimal risks to patients when applied properly.  

**Reviewer's Comments:** Because of the increasing use of CTAs by orthodontists prior to the placement of TADs, this was a very timely editorial. While there is always the potential of incurring toxic side effects associated with the use of CTAs, it is reassuring to know that their use prior to placement of TADs imposes very minimal risks for our patients. I appreciate Dr. Baumgaertel making it clear that the severe side effects associated with CTAs reported in the 2006 FDA statement were under circumstances that were in no way comparable to their use in orthodontics. Nevertheless, it seems only reasonable to review the patient's health history prior to using CTAs. (Reviewer-John S. Casko, DDS, MS, PhD).
In this study from the United Kingdom, descriptive information gathered for medicolegal assessment is essentially the same from photographs of study models as it is from the study models themselves.

**Background:** Because long-term storage of orthodontic models is costly due to the space required, a low-cost alternative would be beneficial.

**Objective:** To determine whether the information needed for medicolegal assessment could be obtained from 2-dimensional photographs of study models just as well as from the study models themselves.

**Design:** A comparison of specific descriptive information derived from study models to the same information derived from standardized photographs of those models.

**Methods:** 30 sets of orthodontic models that represented a variety of initial malocclusions and finished cases. All models were photographed in a standard manner showing right, left, and anterior views of the teeth in occlusion, and upper and lower occlusal views. A millimetric ruler was present in each photograph for calibration. Three examiners independently assessed the models and the photographs for several parameters needed for a medicolegal description. These included overbite, overjet, midlines, molar and canine relationships, crowding, cross-bites, and teeth clinically present. The assessment done from the models was compared to the assessment of the photographs.

**Results:** The assessments done from the photographs were very similar to those done directly from the models as indicated by high kappa values and high percentages of agreement. The least agreement was seen in judging overbite.

**Conclusions:** The authors conclude that, at least in the United Kingdom, photographs of orthodontic study models can provide the information needed for medicolegal reporting and would suffice for long-term record retention.

**Reviewer’s Comments:** I think everyone agrees that 3-dimensional digital models provide the best method of long-term model storage when retention of the original plaster is too cumbersome. But, it can be an expensive proposition to digitize a few thousand sets of before and after models that will likely never be viewed again. What about hiring a student for the summer and having her or him systematically photograph your archive models according to the protocol demonstrated in this article? It could provide a cost-effective method of long-term retention, but I would suggest consulting with a legal expert before proceeding. (Reviewer-Brent E. Larson, DDS, MS).

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**Keywords:** Study Models

**Print Tag:** Refer to original journal article
Bracket bonding within 24 hours after bleaching results in greater bracket failure in vivo.

Background: Tooth bleaching has become common in adult orthodontic patients. If bleaching is to be performed before bracket bonding, is there a higher risk of bracket failure?

Objective: To determine if enamel bleaching affects the in vivo survival rate of orthodontic brackets.

Participants/Methods: This clinical experiment was performed on humans who were undergoing orthodontic treatment. Thirty-eight subjects were tested. In 2 of the groups, brackets were bonded to the maxillary and mandibular arches within 24 hours after in-office bleaching of the teeth using hydrogen peroxide. In the other 2 groups, the brackets were bonded to the teeth 2 to 3 weeks after the in-office bleaching had occurred. The failure rate was assessed after 6 months.

Results: The results of this study showed that the failure rate of brackets bonded within 24 hours after tooth bleaching was significantly higher than those bracketed after 2 to 3 weeks. In addition, mandibular arch bracket failure was significantly greater than maxillary arch bracket failure after bleaching.

Conclusions: Bonding of brackets within 24 hours after tooth bleaching with hydrogen peroxide produces a significantly high bracket failure rate. The authors recommend waiting 3 to 4 weeks before bonding brackets to teeth that have been bleached.

Reviewer’s Comments: This is good information for those orthodontists who treat adult patients. Many adults tend to undergo bleaching to improve the color of their teeth. This is not a problem as long as the orthodontic bracket placement is delayed for at least 2 to 3 weeks after the hydrogen peroxide bleaching has occurred. (Reviewer-Vincent G. Kokich, DDS, MSD).

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Keywords: Tooth Bleaching

Print Tag: Refer to original journal article
This study reveals the complex changes that occur in dental development, including the fact that arch circumference in the maxilla is unchanged from age 5 to 31 years, while the circumference is reduced in the mandible by 4 mm during the same period.

**Background:** There is still much to learn about the normal course of dental development and its impact on orthodontic treatment planning and stability.

**Objective:** To study tooth widths and arch dimension changes that occur in ideal occlusions between the age of 5 and 31 years.

**Design:** 2 longitudinal samples were combined to produce the equivalent of a single longitudinal sample from age 5 to 31 years.

**Methods:** 426 dental casts of 189 male and 247 female Swedish subjects were utilized. All subjects were judged to have normal, or ideal, occlusions. Tooth widths and arch dimensions were measured in a systematic way on all dental casts. Measurements were made of arch circumference in the anterior and posterior segments, arch widths in several places, and of the depth of the palatal vault. All subjects were orthodontically untreated.

**Results:** The tooth width measurements were not different when compared to a 1946 Swedish sample. The arch dimensions showed continuous changes with time even until age 31 years. A few select highlights of this study are that the lower intercanine width increased until age 10 years and then began to decrease (more in males than females). The arch depth was greatest in the late mixed dentition and then decreased continuously until age 31. The overall arch circumference was unchanged in the maxilla from age 5 to 31, while during the same years, the mandible decreased in circumference by approximately 4 mm. The palatal depth increased by 1.5 to 2 mm between ages 16 and 31 years, indicating continued vertical growth of the dentoalveolar process, a change that could cause problems with implant position.

**Conclusions:** The arch dimension changes are complex and occur in all dimensions. These changes do not cease at adolescence, but continue to some degree into adulthood.

**Reviewer’s Comments:** This is a great review of normal arch dimension changes that occur in untreated ideal dentition over time. The pattern of change is similar to what has been described previously, with a dental arch that widens and decreases in depth. The overall reduction in mandibular arch circumference of 4 mm during the study period makes me wonder what we should expect in terms of long-term stability in patients where we mechanically prevent this reduction from occurring. Will it just occur at a later date? (Reviewer-Brent E. Larson, DDS, MS).

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Keywords: Dentoalveolar Development

Print Tag: Refer to original journal article
Bonding to most provisional crown materials has acceptable shear bond strength.

**Background:** When treating adult patients, orthodontists are often confronted with bonding brackets to plastic provisional crowns. There is always a concern that the bond strength to a provisional crown will be less than ideal. Does the type of provisional crown material have any effect on the bond strength?

**Objective:** To compare shear bond strength between 4 widely and commonly used provisional crown materials and 2 different types of orthodontic brackets, using 2 separate adhesive agents.

**Design:** This in vitro study was performed in a laboratory.

**Methods:** 4 different provisional crown materials were tested (Integrity, Jet, Protemp, and Snap). A stainless steel bracket and a ceramic bracket were tested. The 2 bonding materials consisted of glass ionomer cement and a light-cured composite. Various combinations of brackets and materials were utilized to test all the possibilities using these variables. After 24 hours, the brackets were subjected to a testing machine to determine the shear bond strength.

**Results:** The results showed that the Snap material provided the lowest shear bond strength, while the shear bond strength of the Jet, Protemp, and Integrity were similar. In addition, there were no significant differences between the glass ionomer cement and the light-cured composite.

**Conclusions:** For the most part, bonding metal or ceramic brackets to conventional provisional crown materials used in private practice will produce successful shear bond strength, except for the Snap provisional crown materials.

**Reviewer’s Comments:** This was an excellent article for any orthodontist who treats adult patients. I was not aware of the significant difference between the Snap provisional crown material and the other materials tested in this study. It was also interesting to note that there were no differences between the glass ionomer cement and the light-cured composite adhesive for both metal and ceramic brackets. (Reviewer-Vincent G. Kokich, DDS, MSD).

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Keywords: Provisional Crown

Print Tag: Refer to original journal article
**No Advantage to 2-Phase Tx for Class II Malocclusion**

*Early Treatment for Class II Division 1 Malocclusion With the Twin-Block Appliance: A Multi-Center, Randomized, Controlled Trial.*

O'Brien K, Wright J, et al:


Patients undergoing 1-phase versus 2-phase treatment with a Twin-block appliance have a greater cost of treatment in terms of appointments, length of appliance wear, and costs.

**Background:** There has been considerable debate as to whether there is any advantage to 2-phase treatment for the correction of Class II malocclusion. The 2 major studies that have examined this question have been conducted at dental schools, and concluded that there was no advantage to 2-phase treatment. Would similar studies conducted in a private treatment environment produce similar results?

**Objective:** To evaluate the effectiveness of early 2-phase treatment with the Twin-block appliance.

**Participants:** The sample for this study consisted of 174 children from 8 to 10 years of age with Class II Division 1 malocclusions.

**Methods:** The patients were randomly divided into 2 groups. One group received a first phase of treatment with the Twin-block appliance followed by comprehensive treatment. The second group received only a second-phase of treatment. For both groups, complete orthodontic data were taken at the beginning of the study and at the completion of treatment. At the end of this 10-year study, the results indicated that there was no advantage to having 2-phase treatment with the Twin-block appliance. There were, however, some disadvantages for the patients who received 2-phase treatment, including a greater number of appointments, increased length of appliance wear, and cost. The final occlusal results were also inferior for the group that received the 2-phase treatment.

**Conclusions:** There is no advantage to 2-phase treatment using the Twin-block appliance when compared to 1-phase treatment.

**Reviewer's Comments:** This was a well-designed and controlled research study that had a large sample. It did not surprise me that the results were similar to 2 other major studies that were conducted at dental schools. It did surprise me that the occlusal results were poorer for the 2-phase treatment group. It is hard to explain this result, except for the possibility that the patients in the 2-phase treatment group were burned out at the end of treatment and less cooperative. This is one more study that supports the finding that there is no advantage to 2-phase treatment. (Reviewer-John S. Casko, DDS, MS, PhD).

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Keywords: Malocclusion

Print Tag: Refer to original journal article
Subjects with shortened dental arches are more likely to have functional issues related to chewing than those with complete dental arches or interrupted arches.

**Background:** The use of temporary anchorage devices (TADs) allows the closing of space forward when teeth are missing, without retraction of incisors. However, the functional effects of a shortened dental arch are not well understood.

**Objective:** To measure the oral satisfaction of subjects with shortened dental arches compared to those with complete arches or interrupted arches.

**Design:** Examination and survey of subjects at health centers in Spain who were not requesting dental care.

**Participants:** 624 subjects with an average age of approximately 43 years, and slightly more females than males, were included. All subjects had complete anterior dentitions.

**Methods:** Subjects were examined and classified as: complete dental arch if they had all posterior teeth present or restored; interrupted dental arch if they had missing posterior teeth in front of a terminal tooth; or shortened dental arch if they were missing posterior teeth with no tooth behind the space. All subjects completed a survey about their satisfaction with oral function and noted any complaints they had about their mouth.

**Results:** Approximately 40% of the subjects had complete dentitions and another 40% had interrupted dentitions; <20% had shortened dental arches. Although all groups were generally satisfied with their oral function, the satisfaction declined from complete arches to interrupted arches to shortened arches. The most frequent complaints of those with shortened arches were problems with chewing, smiling, or speech.

**Conclusions:** Subjects with shortened dental arches are approximately twice as likely to have complaints of chewing difficulties or smiling difficulties compared to subjects with complete dental arches.

**Reviewer's Comments:** One of the advantages of TADs is being able to close posterior space forward therefore eliminating the need for replacement of missing posterior teeth. This can result in a shortened dental arch, and I have not heard much discussion of patients' satisfaction with shortened arches from a functional standpoint. Closing the space from 1 missing premolar is not likely to cause problem, but what about moving a lower second molar forward to replace a missing first molar? This study indicates that, at some point, the shortened dental arches may have an impact on a patient's perceived oral satisfaction. (Reviewer-Brent E. Larson, DDS, MS).

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Keywords: Dentate Adults

Print Tag: Refer to original journal article
Missed Orthodontic Appointments--Check Financial Status of Patient

**Influence of Patient Financial Account Status on Orthodontic Appointment Attendance.**

Lindauer SJ, Powell JA, et al:

**Angle Orthod 2009; 79 (July): 755-758**

Patients who have delinquent accounts are much more likely to fail to show up for their orthodontic appointment.

**Background:** A frustrating part of orthodontic treatment is dealing with subjects who continually fail or miss their orthodontic appointment. This problem leads to longer treatment times and complicates the orthodontic mechanics. Are there certain characteristics that exist among those individuals who consistently fail orthodontic appointment attendance?

**Objective:** To determine whether the financial status of a patient's account, among other factors, influences whether he/she is more likely to miss orthodontic appointments.

**Methods:** This study consisted of an overall review of all active orthodontic patients who were scheduled to be seen during a 6-week period at Virginia Commonwealth University Orthodontic Clinic. For each appointment, the patient's financial status relative to his or her orthodontic contract were considered either current, overdue, or in collections. In addition, the authors evaluated the age and gender of subjects who missed their appointments, as well as how the appointment was originally made (either in person, by phone, or by postcard).

**Results:** A total of 530 appointments were scheduled and evaluated. Overall, 87.7% of the appointments were kept, and 12.3% were missed. There were no significant differences in appointment attendance between adults and children. However, males were significantly more likely than females to miss appointments. In addition, appointments made by postcard were more likely to be missed than appointments made in person or by phone. Finally, the authors found that the financial obligations relative to the orthodontic contract had a significant bearing on appointment attendance. Patients who were overdue or in collections were 3 times more likely to miss an appointment compared with patients who were current on their accounts.

**Conclusions:** Patients with delinquent financial accounts are much more likely to miss their orthodontic appointments compared to patients whose accounts are current.

**Reviewer's Comments:** I found this study to be interesting and confirmed what I have seen in my private practice. It is frustrating when patients do not show up for appointments and subsequently prolong their treatment. But, most orthodontists probably experience the same trends, and that is that many of these patients have financial accounts that are overdue. (Reviewer-Vincent G. Kokich, DDS, MSD).

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Keywords: Appointment Attendance

Print Tag: Refer to original journal article
Software programs are available that can significantly enhance traditional 2-dimensional radiographic images.

**Background:** A significant limitation of traditional radiographs is that they provide a 2-dimensional (2D) image of a 3-dimensional (3D) object. It would be nice to know if there are ways to further enhance these 2D images short of buying an expensive 3D cone-beam computer tomography (CBCT) unit.

**Objective:** To investigate the discriminatory ability between ImageIQ computer-generated enhanced 2D rendering of conventional dental radiography in terms of periodontal defect classification.

**Methods:** 20 dentate dried cadaver mandibles were used in this study. A total of 63 periodontal defects on the 20 mandibles were identified and classified as 1-, 2-, or 3-walled defects. Traditional 2D radiographs were taken of each defect. A flatbed scanner was then used to digitize these radiographs. After digitization, a new software program, ImageIQ, was used to further enhance the 2D images. A panel of 2 periodontists and 1 oral pathologist then used both the traditional 2D radiographs and the enhanced radiographs presented in random order to identify the periodontal defects as 1-, 2-, or 3-walled. The results were then compared to the actual classifications made on the cadaver mandibles.

**Results:** When the results of all 3 evaluators were pooled, computer-enhanced radiographs increased the accuracy of identifying the 1-, 2-, or 3-walled defects by approximately 14%.

**Conclusions:** Computer software is now available that can enhance 2D renderings of conventional radiographs.

**Reviewer’s Comments:** I was surprised to learn that a conventional radiograph contains 256 shades of gray and that the human eye can discern only about 32 of them. The new software program used in this study converts all the shades of gray into vertical heights producing an enhanced 2D image. It appears possible that, in some instances, this enhancement of 2D images may provide enough additional diagnostic information to eliminate the need to use expensive 3D CBCT units. It will be interesting to see if the authors perform additional studies in different areas such as pinpointing the location of impacted canines. (Reviewer-John S. Casko, DDS, MS, PhD).

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Keywords: Enhanced Radiographic Imaging

Print Tag: Refer to original journal article
Is RME Effective After Alveolar Bone Grafting in Cleft Patients?

Rapid Maxillary Expansion After Secondary Alveolar Bone Grafting in Patients With Alveolar Cleft.

da Silva Filho OG, Boinani E, et al:

Cleft Palate Craniofac J 2009; 46 (May): 331-338

In a pilot study of 28 patients, RME after secondary bone grafting in cleft patients resulted in sutural expansion about half the time, and in no cases did it disrupt the graft.

**Background:** Rapid maxillary expansion (RME) after secondary alveolar grafting in cleft patients is not a typical protocol. There is some concern that the expansion force could disrupt the graft.

**Objective:** To evaluate the sutural response and the graft integrity in cleft patients who underwent RME after secondary alveolar grafting.

**Design:** Case series of patients requiring expansion after alveolar bone grafting.

**Participants:** 28 cleft patients (unilateral or bilateral) who underwent RME in the early permanent dentition and who had previous alveolar grafting.

**Methods:** All subjects had occlusal radiographs taken before and after expansion to monitor the mid-palatal suture. In addition, periapical radiographs were taken of the bone graft area before and after expansion to observe the integrity of the grafted bone. The occlusal radiographs were subjectively judged by 2 observers for the presence of sutural opening. The periapical radiographs were also reviewed by the same observers to note any change in the bony integrity of the graft.

**Interventions:** All subjects underwent routine RME using a modified Hyrax appliance.

**Results:** Sutural opening was verified in 42% of subjects. There was no evidence of any harm or disruption to the bone graft in any of the subjects following expansion.

**Conclusions:** RME does not appear to be harmful to the integrity of a secondary bone graft, but sutural opening was verified in only half of the subjects.

**Reviewer’s Comments:** There are times when expansion was done prior to alveolar grafting in cleft children yet there is still maxillary transverse deficiency in the early permanent dentition. This preliminary study suggests that no harm is done to the graft by undergoing RME after grafting but that sutural opening is not predictable. Therefore, RME is a reasonable treatment approach to try in these situations, but the maxillary posterior segments should be monitored for excessive buccal tipping.  (Reviewer-Brent E. Larson, DDS, MS).

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Keywords: Rapid Maxillary Expansion

Print Tag: Refer to original journal article
Can RME Improve Ear Function?

Effects of Rapid Maxillary Expansion on the Airways and Ears—A Pilot Study.

Chiari S, Romsdorfer P, et al:


This pilot study showed a trend toward improved middle ear function following RME, but the subjects were within the normal range prior to treatment.

**Background:** There is still debate about the effects of maxillary expansion on nasal airflow and eustachian tube function.

**Objective:** To study subjects undergoing rapid maxillary expansion (RME) for transverse deficiency using orthodontic and ENT monitoring tools to gain insight into the effects of expansion on airflow and middle ear function.

**Design:** Prospective clinical trial with controls.

**Participants:** 9 subjects with maxillary deficiency treatment planned for expansion and 4 controls with normal maxillary dimensions. The subjects and controls were between 8 and 9 years of age.

**Methods:** All participants had testing done at the beginning of the study and 6 months later (after expansion in the study group). The tests consisted of cephalometric analysis, nasal endoscopy, nasal airflow measurement, and tympanometry.

**Results:** 3 patients dropped out of the study. The size of the adenoids on the cephalogram correlated well with the size classified by endoscopy. No change in adenoid size was noted after expansion. There was little correlation between nasal airflow and cephalometric variables, and no improvement was seen in nasal airflow after expansion. Negative pressure was seen in the middle ears of study subjects and controls at the start of the study. The negative pressure tended to improve with expansion, but was not out of the normal range to start.

**Conclusions:** The results of this small pilot study did not help clarify the relationship between maxillary expansion and otorhinological effects. There were some small indications of positive changes, but further study is needed.

**Reviewer's Comments:** This was a reasonable attempt to try to clarify the relationship between maxillary expansion in constricted subjects and ear/nasal function. The problem was that the sample ended up being small with a great deal of variability in airflow and function, so it was impossible to draw any conclusions. At this time, RME should be done because of orthodontic need, not in order to improve nasal airflow or middle ear function. (Reviewer-Brent E. Larson, DDS, MS).

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Keywords: Rapid Maxillary Expansion

Print Tag: Refer to original journal article
The authors demonstrate a method of using an additional labial arm attached to a modified Hyrax expander to encourage midline correction during maxillary expansion.

**Background:** Early loss of an upper primary canine can cause midline shifting in some patients with a constricted maxilla.

**Objective:** To demonstrate a technique to facilitate upper midline correction during rapid maxillary expansion.

**Design:** Technique description and case report of an 8-year-old girl with upper midline deviation and maxillary constriction. **Description of Technique:** The technique starts with construction of a modified Hyrax expander. In this case, the authors used only a single band on each side and a lingual arm up to the canine area. The notable addition is a labial arm from the molar to the central incisor on the side to which you want the upper midline to shift. In the case report, the upper midline needed to shift to the right, so the arm extended to the right central incisor. The arm is micro-etched on the end so that it can be bonded to the surface of the central incisor when the appliance is inserted. The expansion is done in a conventional manner creating a midline diastema. The advantage of this design is that as the diastema spontaneously closes during stabilization, the right central incisor is held by the auxiliary arm and is not allowed to drift back to the left. The result is a preferential shifting of the upper midline to the desired side.

**Conclusions:** The addition of an auxiliary labial arm during maxillary expansion can help correct an upper midline deviation.

**Reviewer's Comments:** The applicability of this technique is likely quite low, but in the right situation it may provide a simple way of obtaining midline correction during early expansion treatment without using fixed appliances. If you were daring, the arm could even be made slightly active to create more lateral dental movement of the incisor. (Reviewer-Brent E. Larson, DDS, MS).

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Keywords: Midline Deviation

Print Tag: Refer to original journal article
Can Lateral Cephalogram Predict OSA Treatment Response With Oral Appliance?

Effects of a Mandibular Advancement Device on the Upper Airway Morphology: A Cephalometric Analysis.

Doff MHJ, Hoekema A, et al:


Although a lateral cephalogram taken with an oral appliance in place shows slight increases in airway dimensions, the measurements are not predictive of treatment response.

**Background:** Predicting which patients will respond to the use of an oral appliance for the treatment of obstructive sleep apnea (OSA) could improve proper application of these devices.

**Objective:** To correlate cephalometric measurements to treatment response when using oral appliances for the treatment of OSA.

**Design:** Prospective clinical trial of patients using oral appliances for the treatment of sleep apnea.

**Participants:** 52 patients with OSA.

**Methods:** All subjects had lateral cephalograms taken before treatment (without the appliance) and again about 3 months later after adjusting to the use of the appliance (with the appliance in place). Cephalometric measures of the changes in airway dimensions were made at several levels in the upper airway. The response to treatment was measured by at-home polysomnography, and treatment success was determined according to Hoekma's definition. The outcome of treatment was compared to the changes in airway dimensions with the appliance in place to determine whether a lateral cephalometric film taken with the appliance in place could predict response to treatment.

**Results:** Treatment success was seen in approximately 80% of patients. The degree of mandibular protrusion or opening did not differ between the successful and unsuccessful cases. There were small increases in posterior airway dimensions on the lateral cephalograms with the appliance in place (1 to 2 mm), but these changes were not predictive of treatment success.

**Conclusions:** Airway dimension changes seen on the lateral cephalogram with an oral appliance in place do not appear to be able to predict treatment success.

**Reviewer's Comments:** The hope was that patients who had success with an oral appliance would show distinct airway changes on the lateral cephalogram with the appliance in place. Unfortunately, this does not appear to be the case, at least when the cephalograms are taken in the upright position, as in this study.

(Reviewer-Brent E. Larson, DDS, MS).

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Keywords: Sleep Apnea

Print Tag: Refer to original journal article
Steroidal and Nonsteroidal Drugs May Affect Tooth Movement

Effects of Steroidal and Nonsteroidal Drugs on Tooth Movement and Root Resorption in the Rat Molar.

Gonzales C, Hotokezaka H, et al:

Angle Orthod 2009; 79 (July): 715-726

Prednisolone and celecoxib suppress orthodontic tooth movement and root resorption.

Background: It has been hypothesized that certain drugs will affect tooth movement because of their effect on inflammation. Since orthodontic tooth movement is considered to involve an inflammation process, the effect of anti-inflammatory drugs on tooth movement and root resorption could be enlightening.

Objective: To provide a quantitative assessment of the effect of steroidal and nonsteroidal anti-inflammatory drugs on tooth movement and root resorption in experimental animals.

Design/Methods: This was an experimental study performed in the laboratory using 60 male rats aged 10 weeks. A continuous force of 50 g using a coil spring was applied to move the maxillary left molar mesially. The rats were randomly divided into 12 groups, with 2 control groups and 10 experimental groups. In their drinking water, the experimental groups received aspirin, acetaminophen, meloxicam, celecoxib, or prednisolone. These drugs in the water were given 2 weeks before any tooth movement. The control groups were not given any of the drugs. The tooth movement was carried out for 2 weeks; after that time, the animals were evaluated histologically to determine the impact of the drugs on root resorption and tooth movement.

Results: Prednisolone and celecoxib suppress orthodontically induced tooth movement and root resorption. High-dosage celecoxib suppressed root resorption significantly more than low dosage.

Conclusions: The administration of anti-inflammatory drugs during orthodontic tooth movement will suppress the amount of tooth movement and root resorption.

Reviewer's Comments: Although this study shows significant effects in experimental animals, I am not certain these same effects would be seen in humans. It would be interesting if studies could be performed in humans that would duplicate the effects seen in these experimental animals. (Reviewer-Vincent G. Kokich, DDS, MSD).

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Keywords: Steroidal/Nonsteroidal Drugs

Print Tag: Refer to original journal article
Effect of Insertion Depth and Predrilling on Mini-Implant Stability

Impact of Insertion Depth and Predrilling Diameter on Primary Stability of Orthodontic Mini-Implants.

Wilmes B, Drescher D:


Higher insertion depths and smaller predrilling diameters result in higher insertion torque and primary stability of mini-implants.

Background: Mini-implants are very popular today to assist in developing anchorage during orthodontic tooth movement. Many orthodontists are placing their own mini-implants. A variety of implant designs and techniques are available to the orthodontist. A chief concern is the primary stability of the mini-implant when it is placed.

Objective: To analyze the impact of insertion depth and predrilling diameter on primary stability of mini-implants.

Design/Methods: This was an animal experiment performed in the laboratory. Twelve ilium bone segments of pigs were embedded in resin. The authors tested 4 different predrilling diameters: 1.0, 1.1, 1.2, and 1.3 mm. In addition, the authors tested 3 different insertion depths: 7.5, 8.5, and 9.5 mm. The mini-screws that were tested were 1.6 x 10 mm. The authors compared the insertion torque and the primary stability using each of these aforementioned parameters.

Results: The higher the insertion depths of the mini-implants, the higher the insertion torque and, therefore, the greater the primary stability. In addition, the authors found that the greater the predrilling diameter, the lower the insertion torque and, therefore, the lower the primary stability.

Conclusions: The authors recommend that the pretreatment drilling diameter be small and that the insertion depth be greater to maximize the insertion torque, thereby creating a greater primary stability of the mini-implant.

Reviewer’s Comments: This was a mechanical study performed in a laboratory. These implants were not tested in vivo; therefore, only primary stability was tested. I have a problem with predrilling the implant hole. In the oral cavity, since these areas are not flapped, it is difficult to irrigate the bone; therefore, the heat created with predrilling can be relatively high. Although there may be primary stability, the heat created during drilling could cause bone necrosis and, therefore, failure of the mini-implant. This study should be duplicated in vivo to determine the long-term effects of the same parameters that were tested in this in vitro evaluation. (Reviewer-Vincent G. Kokich, DDS, MSD).

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Keywords: Mini-Implant Stability

Print Tag: Refer to original journal article
A functional lateral shift of the mandible affects the production of type II collagen and aggrecan of the temporomandibular cartilage.

**Background:** Many orthodontic patients present for treatment with a unilateral crossbite between the maxillary and mandibular posterior teeth. Most of these crossbites are due to bilateral constriction of the maxilla and a lateral centric shift of the mandible. A concern of allowing this shift to persist during growth is that it could cause abnormalities in the condylar cartilage, but is this supposition actually true?

**Objective:** To investigate the effect of functional lateral shift of the mandible on the 2 main condylar cartilage extracellular matrix components: type II collagen and aggrecan.

**Design/Methods:** This experimental study was performed in the laboratory on 40 male Wistar rats aged 5 weeks. They were subdivided into experimental and control groups. A plate was designed to produce a lateral functional shift of the mandible of approximately 2 mm to the left upon closure. In the experimental group, this shift was monitored and evaluated after 3, 7, 14, and 20 days after appliance attachment. These animals were compared to the control animals. Histologic analysis was performed of the condylar cartilage to determine any changes.

**Results:** A functional shift of the mandible affected the remodeling of the condyle through changes in expression of type II collagen and aggrecan in the central region of the contralateral side and the lateral region of the ipsilateral side of the temporomandibular joints in these animals. The condylar cartilage on the contralateral side exhibited adaptive remodeling; on the ipsilateral condyle, there was a tendency toward dysfunctional remodeling with decreasing amounts of type II collagen and aggrecan.

**Conclusions:** A functional lateral shift of the mandible modulates the condylar cartilage extracellular matrix differently on the ipsilateral and contralateral sides.

**Reviewer's Comments:** I liked this study. Perhaps this answers a question many clinical orthodontists have had for years: over time, does a functional shift of the mandible due to a unilateral crossbite cause alterations in the condylar cartilage? This study in animals tends to suggest that this statement is, in fact, true. (Reviewer-Vincent G. Kokich, DDS, MSD).

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Keywords: Functional Mandibular Shift

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How to Identify Patients at Risk of Severe Apical Root Resorption

Identification of Orthodontic Patients at Risk of Severe Apical Root Resorption.

Årtun J, Van t' Hullenaar R, et al:


Treatment duration and time with square wires is not related to root resorption.

Background: The occurrence of severe apical root resorption is a concern for all orthodontists. Is it possible that patients who are prone to severe apical root resorption can be identified early in treatment? If this can be done, adjustments in the treatment plan can be made to reduce the likelihood of greater resorption during treatment.

Objective: To determine the predictive value of identifying the amount of incisor resorption approximately 6 and 12 months after bracket placement for determining the amount of resorption at the time of appliance removal.

Participants: The sample for this study consisted of 267 patients who were consecutively enrolled for orthodontic treatment at 3 different treatment centers.

Methods: Digitally converted periapical radiographs were used to measure the length of the maxillary incisors before treatment, about 6 and 12 months after bracket placement, and at the end of active treatment. Correlation coefficients were used to test the association between the amount of resorption at the 4 different stages of evaluation.

Results: A significant correlation was found between the amount of root resorption occurring at 6 and 12 months after appliance placement with the amount of root resorption at the completion of active treatment. The amount of severe root resorption, defined as at least 1 incisor with >5 mm of resorption, is about 3 times higher in patients with >1 mm of resorption and about 15 times higher in patients with >2 mm of resorption on individual incisors after about 6 months of treatment. It is 6 times higher in patients with at least 1 incisor with >2 mm of resorption and 20 times higher in patients with at least 1 incisor with >3 mm of resorption after 12 months of treatment. Treatment duration and time in square wires was not related to resorption.

Conclusions: Patients with a greater likelihood of having severe root resorption at the end of treatment can be identified based on the amount of root resorption occurring approximately 6 and 12 months after appliance placement.

Reviewer’s Comments: This was an excellent study. It had a large sample of patients and utilized a standardized system of measurement of root resorption. Based on these results, it seems appropriate to take periapical radiographs of the maxillary incisors at 6 and 12 months after the initiation of treatment. I was also happy to learn that a relatively small number of patients actually incur severe root resorption. (Reviewer-John S. Casko, DDS, MS, PhD).

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Keywords: Apical Root Resorption

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Accurately monitoring the amount of time that patients wear retainers could lead to the overall improvement of long-term treatment results.

**Background:** It is standard for all orthodontists to prescribe some form of retention after the completion of active treatment. In many practices, this consists of using some form of removable retainer, and it is important for these retainers to be worn the prescribed amount of time to be effective. Having the ability to accurately document the amount of time these retainers are being worn would be a great help to orthodontists.

**Objective:** The purpose of this guest presentation article was to describe the use of a newly developed appliance to actively monitor the amount of removable appliance wear.

**Discussion:** Because of recent reductions in electronic component sizes and power requirements, it was possible to develop a microprocessor that can be embedded in acrylic retainers to accurately measure the amount of time the retainers are actually being worn. The Smart Retainer microsensor, which was developed by a company in Georgia, automatically and at preset intervals monitors the oral environment around it and stores the data. This data are then interpreted by software in the orthodontists' office at the patient's next visit, providing a readout of the frequency and duration of retainer wear. It is estimated that the Smart Retainer environmental microsensor can last 18 months under typical usage, which should be more than sufficient for getting through the initial post-treatment period of retainer wear that is most critical. In the past, sensors have been used in an attempt to evaluate headgear wear and functional appliance wear. However, these electronic devices have not become popular partially due to the ability of patients to manipulate the readings. Because the Smart Retainer environmental microsensor gathers various environmental data that are cross-validated, it is much less likely to be manipulated by patients compared to previous timing devices.

**Conclusions:** A microsensor is now available that can be embedded into removable appliances to record the frequency and duration of wear.

**Reviewer's Comments:** Documenting the amount of time that patients wear headgears, functional appliances, or retainers would be helpful to the orthodontist. It has been my experience that the most critical time to evaluate compliance with retainer wear is during the period immediately following placement of the retainers. Hopefully, because of the significant reduction in size of recently developed microsensors combined with the ability of the appliance described in this article to reduce the likelihood of patient manipulation, we may now have an effective way to monitor retainer wear. The only concern I have is that this article did not discuss the cost of purchasing and using this system. (Reviewer-John S. Casko, DDS, MS, PhD).

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Keywords: Microsensor

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Elastomeric O rings have a greater tendency to develop plaque during orthodontic treatment than self-ligating brackets.

**Background:** During active orthodontic treatment, bacterial accumulation in plaque surrounding direct bonded brackets can lead to white spot lesions and decalcification. Particularly for patients who have poor oral hygiene, it would be very helpful to know if one type of bracket system was less likely to promote oral bacterial accumulation in plaque than another.

**Objective:** To measure and compare the number of bacteria in plaque surrounding 2 distinct orthodontic brackets. One was a self-ligating bracket, and the other was a traditional bracket tied with elastomeric O rings.

**Participants:** The sample for this study consisted of 14 patients undergoing orthodontic treatment.

**Methods:** This study used a randomized split-mouth design. Half of each arch was randomly assigned to receive the self-ligating bracket, and the opposite side received the traditional bracket retained with an elastomeric ring. For each arch, the left or right lateral incisors randomly received either the self-ligating bracket or the traditional bracket ligated with an elastomeric ring. At 1- and 5-week recall visits, plaque specimens were obtained and evaluated for oral bacteria.

**Results:** In most patients, teeth bonded with self-ligating attachments had fewer bacteria in plaque than did teeth bonded with elastomeric rings. At 1 and 5 weeks after bonding, the mean levels of oral bacteria and oral streptococci were statistically lower for the self-ligating brackets.

**Conclusions:** Compared with traditional brackets tied with elastomeric rings, self-ligating brackets are less likely to accumulate oral bacteria.

**Reviewer's Comments:** Although this study had a very small sample size, I have no logical reason to argue with the results. It has been shown that elastomeric rings have a higher tendency to accumulate plaque and oral bacteria compared with other forms of ligation. This study would be significantly improved if the authors had included a third group consisting of traditional brackets tied with stainless steel ligatures. It is likely that this group would show no significant difference in plaque and bacteria accumulation compared with self-ligating brackets. This is because of the greater tendency for elastomeric rings to attract plaque and oral bacteria. (Reviewer-John S. Casko, DDS, MS, PhD).

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Keywords: Plaque Retention

Print Tag: Refer to original journal article