The use of temporary anchorage devices is becoming increasingly common.

Are you using micro-implants in your practice for orthodontic anchorage? Hopefully, the answer is yes, but if not, why not? This presentation will suggest some clinical applications in which the use of temporary anchorage devices (TADs) is becoming increasingly common. As our techniques continue to improve, orthodontists can place TADs themselves. This gives orthodontists the ability to determine the best possible location for the TAD to get the best mechanical advantage in every case. The use of micro-implants can simulate the results of orthognathic surgery in certain clinical situations. In addition, the use of micro-implants can eliminate extractions in some cases, or turn borderline extraction cases into non-extraction cases. This presentation will also discuss the atraumatic insertion protocol, which makes the procedure take <60 seconds. In addition, it will help you identify criteria for your "first case" and, hopefully, get you moving forward with this exciting new technology.

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Keywords: Temporary Anchorage Devices

Print Tag: Refer to original journal article
Can BRONJ Be Treated Surgically?

Outcome of Surgical Management of Bisphosphonate-Related Osteonecrosis of the Jaws: Review of 33 Surgical Cases.

Stanton DC, Balasanian E:


Surgical debridement and sequestrectomy can be successful in the management of bisphosphonate-related osteonecrosis of the jaws.

Background: In recent years, researchers have determined that bisphosphonates, which are taken to reduce the possibility of osteoporosis, can cause osteonecrosis of the jaws following oral surgical procedures. The incidence of this osteonecrosis problem is very low, and usually occurs in patients who are taking IV bisphosphonates for cancer or multiple myeloma. When this problem occurs, what's the possibility of healing the osteonecrosis?

Objective: To assess the outcome of surgical management of patients who experienced osteonecrosis of the jaws secondary to oral surgical procedures while the patients were taking bisphosphonates.

Design/Methods: This was a retrospective analysis of the records of 33 subjects who were taking bisphosphonates for osteoporosis, cancer, or multiple myeloma. Bisphosphonate therapy reduces the pain for cancer patients. In most cancer patients, the drug is given intravenously. Of the 33 subjects, a combination of either debridement or sequestrectomy was performed to eliminate the defect. In nearly all cases, these 2 procedures were successful at healing the osteonecrosis. However, in a small number of patients, the debridement and sequestrectomy had to be performed at a follow-up visit if the defect had not healed completely.

Conclusions: Surgical debridement and sequestrectomy can be successful in treating bisphosphonate-related osteonecrosis of the jaws (BRONJ).

Reviewer's Comments: Although most orthodontists do not treat patients who are taking IV bisphosphonates because these patients are very ill, orthodontists do treat patients who are taking oral bisphosphonates. Oral bisphosphonates, on occasion, can produce osteonecrosis after oral surgery. The information contained in this article can be helpful to orthodontists to at least understand that there are surgical methods of healing these osteonecrosis sites by managing them with debridement and/or sequestrectomy. (Reviewer-Vincent G. Kokich, DDS, MSD).

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Keywords: Bisphosphonate Osteonecrosis

Print Tag: Refer to original journal article
Female sex and TMD in adolescence are the only predictors of TMD in young adulthood.

**Background:** Over the years, some clinicians have suggested that orthodontic treatment is a causative factor in temporomandibular disorder (TMD), and others have suggested that orthodontic treatment can correct TMD. Does current research support either of these positions?

**Objective:** To evaluate the relationship between orthodontic treatment and TMD.

**Design/Participants:** This was a prospective cohort study that was initiated with a sample of 1018 children aged 11 to 12 years.

**Methods:** The initial sample was evaluated in 1981, and follow-up investigations were performed in 1984, 1989, and 2000. On the follow-up visits, it was determined if the children had received orthodontic treatment, and the Helkimo index was used to determine if the children had TMD. Psychological tests were also used to evaluate self-concept and self-esteem.

**Results:** Orthodontic treatment neither causes nor prevents TMD. Participants with a history of orthodontic treatment did not have a higher risk of new or persistent TMD. Female sex and TMD in adolescence were the only predictors of TMD in young adulthood. The prevalence of TMD in young adults and adolescents is the highest at age 19 to 20 years and is higher in females than in males.

**Conclusions:** Orthodontic treatment neither causes nor prevents temporomandibular disorder.

**Reviewer's Comments:** Some previous trials have reached the same conclusions as this study; however, in most cases, they could be validly criticized for having a small sample. This long-term study with a very large sample should put to rest once and for all the question of whether TMD is related to orthodontic treatment. While I am sure it is comforting for most orthodontists to now have research clearly documenting that orthodontic treatment does not cause TMD, it is important that they also understand it is not appropriate to suggest that orthodontic treatment will correct TMD. (Reviewer-John S. Casko, DDS, MS, PhD).

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Keywords: Orthodontic Treatment, TMD

Print Tag: Refer to original journal article
Factors That Predict Prognosis of Impacted Maxillary Canines

Assessment of Radiographic Factors Affecting Surgical Exposure and Orthodontic Alignment of Impacted Canines of the Palate: A 15-Year Retrospective Study.

Motamed MHK, Tabatabaie FA, et al:


In this retrospective study, factors associated with successful impacted canine treatment were less angulation, reduced overlap of lateral incisor, and lack of root anomalies.

**Background:** The decision of whether to attempt orthodontic movement of a palatally impacted canine can be a difficult one.

**Objective:** To discover factors that may help predict the successful orthodontic alignment of palatally impacted maxillary canines.

**Design:** Retrospective clinical study using existing patient charts and radiographs.

**Participants:** 80 patients with a total of 146 palatally impacted canines. Ages ranged from 12 to 24 years.

**Methods:** The records of the 80 patients were reviewed to determine the age and sex of the subject, as well as treatment outcome. Pre-treatment radiographs were used to determine the angulation of the canine to the midline, the overlap of the canine with the lateral incisor, and the presence of root abnormalities. Correlations were used to determine which factors were significant in predicting outcome.

**Interventions:** All canines were surgically exposed and packed open, and orthodontic traction was applied.

**Results:** 103 (71%) of the impacted canines were successfully treated; 43 canines did not respond to treatment and were removed after no movement was seen in 9 months. The successful cases were predicted by a canine to midline angulation of <45 degrees, overlap of the lateral incisor root by less than one-half the root, and no root anomalies. In this group, age and sex had no impact on treatment success.

**Conclusions:** In this group, age was not a factor in the success for treating impacted maxillary canines, but the angulation, overlap of lateral incisor and presence of root anomaly were important.

**Reviewer's Comments:** The fact that almost 30% of the canines didn't respond to treatment in these patients who were all <25 years of age seems incredibly high. It makes me wonder about the surgical technique that was used, or whether enough bone was removed to allow the enamel crown to progress. This patient population from the Middle East could respond differently, but the high rate of failure makes me question the usefulness of the predictors that were discovered. (Reviewer-Brent E. Larson, DDS, MS).

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Keywords: Impacted Canines, Prognosis

Print Tag: Refer to original journal article
Plaque and bacterial adhesion is greater on self-ligating and ceramic brackets than on conventional metal brackets.

**Background:** With advances in orthodontic materials, new bracket systems are available to orthodontists. Ceramic brackets are popular for adults, self-ligating brackets can be used in adults and children, and conventional brackets are still popular. As bracket types change, there can be more areas for plaque and bacteria to adhere to the bracket, especially in individuals who do not clean their teeth well. Which brackets attract greater amounts of bacteria?

**Objective:** To compare early microbial adhesion to different brackets in vitro.

**Design/Methods:** This was a laboratory study that tested bacterial adhesion in 7 commercially available orthodontic brackets. Twenty-five samples of each bracket were bonded to a flat surface at the bottom of a box with light-cured composite. Next, saliva samples as well as bacteria were harvested from 2 human volunteers. These samples were cultured and then placed in a solution that covered the bottom of this box containing the brackets. This was incubated for 72 hours. Each bracket was then removed and placed in a separate vial. These vials were sonicated to release the bacteria, and the bacteria amounts were counted as well as identified relative to their type. The brackets that were tested were Damon, Clarity, Mystique, Speed, Victory MBT, Micro-loc, and Generus.

**Results:** In general, the self-ligating and ceramic brackets attracted the greatest number of aerobic bacteria, the highest number of anaerobic bacteria, and the most unfavorable biofilm. The conventional brackets attracted lesser amounts of aerobic bacteria, anaerobic bacteria, and biofilm.

**Conclusions:** There are differences in microbial adhesion to brackets. Those with more parts and areas that are difficult to clean as well as a rougher surface would cause greater amounts of bacteria and plaque to accumulate.

**Reviewer's Comments:** This was an excellent laboratory study. It was well done and accurate. I found it interesting that, in our attempt to simplify orthodontics by using self-ligating brackets and/or aesthetic brackets that are made out of ceramic, we actually complicate the cleaning process for our patients by producing systems that attract more bacteria and biofilm. However, we have to realize that, in most patients, this is not a problem. If patients have good oral hygiene, they can remove this biofilm and these bacteria. The problem always occurs in individuals who do not clean their teeth adequately. (Reviewer-Vincent G. Kokich, DDS, MSD).

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Keywords: Bacterial Adhesion, Brackets

Print Tag: Refer to original journal article
In this small pilot study, there was a low correlation between the color-change indicator incorporated in clear aligners for monitoring wear and the patient's record of wear. A much higher correlation would be desirable to make it clinically useful.

**Background:** Color-changing indicators are incorporated into some clear aligners to monitor patient compliance. It is unclear whether these are accurate in assessing the amount of aligner wear.

**Objective:** To compare color change in the compliance indicators with patients' reports of hours worn.

**Design:** Prospective clinical study.

**Participants:** 14 teenage patients (5 females, 9 males).

**Methods:** The subjects were recruited from 4 private practices and given aligners to wear that had color indicators incorporated. Each set of aligners was worn for 2 weeks, and the color change was recorded by the orthodontist and a second blinded examiner. The patient recorded the wear time in a daily log provided for the study. The color change was plotted against the reported hours worn to look for a correlation. The study was conducted over a 12-week period.

**Results:** The 14 patients wore a total of 84 sets of aligners during the 12 weeks; 34 sets were excluded from the data due to incomplete patient recording on the daily log. The authors report a correlation between the color change and reported hours of wear, but the correlation is very low (R² <0.1). The plotted data show wide scatter and variation, with 23 hours of wear per day resulting in anywhere between little color change and complete color change.

**Conclusions:** The low correlation and individual variation make the clinical use of the color-change indicator questionable on an individual basis, but the authors believe it "has considerable promise."

**Reviewer's Comments:** Although the prospect of having an accurate wear indicator is intriguing, this pilot study demonstrates considerable limitations. The female patients actually appeared to have a negative correlation, indicating a very small tendency to have less color change with more wear time. It may be possible, as the authors' suggest, to calibrate each case so you know the relative wear over time to monitor changes in compliance. As appealing as this concept is for monitoring cooperation, I have a hard time sharing the authors' enthusiasm based on the evidence presented in this paper. (Reviewer-Brent E. Larson, DDS, MS).

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**Keywords:** Clear Aligners, Cooperation

**Print Tag:** Refer to original journal article
The presence of unerupted mandibular third molars creates a 2.5 times increased risk of an angle fracture of the mandible after a traumatic injury to the face.

**Background:** Often at the end of orthodontic treatment, orthodontists must make a decision regarding the fate of maxillary and mandibular third molars that are unerupted. The decision of whether to extract these teeth depends on the amount of space as well as the potential for causing periodontal problems or posterior arch crowding. However, another reason for extracting these teeth could be their potential to jeopardize the integrity of the mandible in the area of the angle during a traumatic situation.

**Objective:** To systematically analyze the relationship between the status and position of third molars and angle fracture in a group of patients treated for mandibular fractures.

**Design/Methods:** This was a retrospective study that assessed the presence of third molars in a large population of patients who had mandibular fractures over a 10-year period.

**Results:** The authors identified 2033 patients who had 3142 mandibular fractures. The age range of the sample was from 15 to 69 years, with a mean age of 29.8 years. The most frequent cause of the mandibular fracture was a road traffic accident that occurred in about 64% of the sample. Of 2033 patients, 1466 had a third molar present, and 532 had an angle fracture (26.1%). Therefore, the authors found that patients with third molars were 2.62 times more likely to have an angle fracture than patients without third molars. In addition, the risk of angle fracture in patients with unerupted third molars was statistically greater than in patients with partially erupted third molars. Of 341 patients with unerupted third molars, 77.7% sustained an angle fracture.

**Conclusions:** There is an increased risk of angle fractures in the presence of a lower third molar, erupted or unerupted.

**Reviewer’s Comments:** This is good information for orthodontists who must make decisions at the end of orthodontic treatment about the fate of third molars and whether they should be extracted. This information can be added to the list of other criteria that the orthodontist uses when assessing whether to recommend extraction of mandibular third molars. (Reviewer-Vincent G. Kokich, DDS, MSD).

© 2009, Oakstone Medical Publishing

Keywords: Impacted Third Molars, Angle Fractures

Print Tag: Refer to original journal article
Developing excellent patient service and care is the best way to market your practice.

**Background:** Almost every dental professional has been negatively affected by the recent severe downturn in the economy. What can you do in your practice to offset the negative effects of the economy?

**Objective:** The purpose of this guest presentation article was to emphasize the importance of developing and updating efficient systems in your practice. **Discussion:** Dr. Levin, who is a well-known practice management consultant, suggests that developing effective systems in your practice is the best way to protect yourself against the effects of a severe down-turn in the economy. To build a high-performance practice, he suggests 3 steps: (1) evaluate and redesign outdated systems; (2) document all systems; and (3) implement robust systems to achieve superior patient service. Change is usually difficult for orthodontists and their staffs; however, maintaining outdated systems in your practice can result in greater inefficiencies that will be even harder to change. Developing systems in your practice to achieve outstanding patient service is the key to achieving a long-term successful practice. Using external marketing such as newspaper, radio, or television ads can result in a short-term positive effect; however, while it takes longer to develop excellent patient service and treatment, it will have a more long-lasting positive effect on your practice.

**Conclusions:** Long-term practice success depends heavily on effective systems.

**Reviewer’s Comments:** I found the suggestions in this article to be very timely and practical. While it is never appropriate to allow systems in your practice to become outdated, it is even more critical to avoid this problem in a very negative economy. It is natural for orthodontists and their staffs to be somewhat resistant to change; therefore, it is easy to allow current practice systems to become outdated. I very much agree with Dr. Levin’s conclusion that providing outstanding patient service and care is the key to developing a long-term successful practice. (Reviewer-John S. Casko, DDS, MS, PhD).

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Keywords: Effective Practice Systems

Print Tag: Refer to original journal article
In this group of young adult patients seeking orthodontic retreatment, good tooth alignment was seen to be very important to overall facial aesthetics. These patients rated themselves as more motivated for retreatment than for first-time treatment.

**Background:** The characteristics of patients seeking orthodontic retreatment are not well understood.

**Objective:** To determine which patients seek retreatment and why, and to measure whether they objectively need treatment.

**Design:** Prospective clinical study of consecutive patients seeking retreatment.

**Participants:** 100 individuals seeking retreatment at a university orthodontic clinic.

**Methods:** Patients were initially asked to complete a questionnaire that subjectively assessed their motivation for treatment and their expectations for retreatment. They also reported information about previous treatment. Those proceeding with orthodontic records then had an objective assessment done using the Index of Complexity, Outcome, and Need (ICON) to determine treatment need. A matched control group of patients seeking treatment for the first time was also assessed with the ICON.

**Results:** The average age of those seeking retreatment was approximately 27 years, and two-thirds of the group were female. Those seeking retreatment had a high appreciation for the role that dental alignment plays in overall facial aesthetics. The motivation for seeking treatment was judged to be primarily from the family dentist for the first treatment but almost exclusively from the subject themselves for retreatment. The retreatment group did have an ICON score indicating treatment need (45), but it was less than that of the control group (57). Subjects seeking retreatment perceived their motivation level at that time to be higher than at the time of their original treatment.

**Conclusions:** Subjects seeking orthodontic retreatment tend to be young adults with dental irregularity who are self-referred and have a high appreciation for the role of the smile in overall facial aesthetics.

**Reviewer's Comments:** It was interesting to see that the patients rated their motivation much higher for the retreatment than for the initial treatment. This high motivation level along with the generally less complex malocclusions seem to indicate a potential for excellent outcomes in this patient group. Of note was that about one-third of the subjects reported that no retention was used after the initial treatment, a possible reason for the increased irregularity seen in early adulthood. (Reviewer-Brent E. Larson, DDS, MS).

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Keywords: Retreatment, ICON

Print Tag: Refer to original journal article
Background: Several orthodontic appliances contain nickel. Some individuals are acutely allergic to nickel and cannot wear orthodontic appliances. However, other patients who have nickel allergy have a low-grade reaction during orthodontic treatment. How are these patients affected by the wearing of orthodontic appliances?

Objective: To determine the prevalence of nickel allergy in a population of orthodontic patients, and to longitudinally compare the periodontal status of these individuals to a group of nonallergic patients.

Design: This was a prospective, randomized, clinical trial that tested the presence of nickel allergy and its relationship to gingival health in a sample of orthodontic subjects.

Participants: The sample consisted of 96 individuals who were undergoing orthodontic treatment.

Methods: All subjects had stainless steel orthodontic brackets placed on their teeth, and these brackets contained about 10% to 14% nickel. Prior to bracket placement, the health of the gingiva was assessed using a periodontal probe, and the color and health of the tissue were registered. This assessment was performed every 3 months for 1 year. At 9 months, a skin-patch test was used to determine if any of the subjects had a nickel allergy. This test showed that 16 individuals were allergic. The authors then compared the gingival health of the allergic subjects to a randomly selected sample of 16 subjects from the rest of the orthodontic population who were not allergic.

Results: The individuals with nickel allergy had gingival reactions characterized by gingival hyperplasia, changes in color, and gingival bleeding upon probing. These abnormalities were consistently higher and more common in subjects who were allergic to nickel compared to the nonallergic group.

Conclusions: The prevalence of nickel allergy could be as high as 17%, and there is a cumulative effect of nickel throughout orthodontic treatment that can cause significant periodontal abnormalities.

Reviewer’s Comments: This is a fascinating study. In my private practice, from time to time I have had patients who appear to be cleaning their teeth properly but still have inflammation and gingival hypertrophy. Could this be due to the nickel in the brackets and arch wires causing a low-grade allergic reaction? A simple patch test could be used in these individuals to determine whether a nickel allergy has occurred. Perhaps we, as orthodontists, should recommend this patch test for some individuals who seem to have unexplained gingival inflammation during orthodontic treatment. (Reviewer-Vincent G. Kokich, DDS, MSD).

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Keywords: Nickel Allergy

Print Tag: Refer to original journal article
Background: How effective is combined surgical orthodontic treatment? How long does treatment usually take? How would you answer these questions if they were asked by one of your patients? To appropriately inform the patient, it is important to have valid research data to support your response.

Objective: To evaluate the effectiveness of surgical orthodontic treatment provided in the northwest region of England.

Participants: The sample for this study consisted of 131 patients who were anticipating receiving combined surgical orthodontic treatment, 94 of whom completed treatment.

Methods: Cephalometric radiographs were used to evaluate the skeletal and profile changes, and the peer assessment rating index was used to evaluate occlusal changes. In addition, the number of treatment visits and the duration of treatment were recorded.

Results: Based on the data collected, the authors concluded that surgical orthodontic treatment is effective in successfully correcting the dental and skeletal relationships of patients. They also believe that the effectiveness of treatment was influenced by the severity of the pre-treatment skeletal discrepancy and that there was no difference in stability based on the patient's initial type of malocclusion. Because overall treatment lasted almost 33 months, they concluded that the overall length of treatment is usually underestimated by most orthodontists and oral surgeons.

Conclusions: Surgical orthodontic treatment is effective in successfully correcting dental and skeletal relationships.

Reviewer's Comments: This was a very interesting study. It was performed at 13 different maxillofacial clinics in the United Kingdom, and the patients were treated by 24 orthodontists and 20 maxillofacial surgeons. I admire the authors for attempting this study because it is extremely difficult to coordinate a study that is undertaken at a number of different institutions. The authors speculated that one of the reasons for the extended treatment time might have been the delay between the completion of pre-orthodontic treatment and the scheduling of surgery. I believe this assumption could be valid because it is my understanding that it sometimes takes a year after the completion of pre-surgical orthodontic treatment to have surgery scheduled in the United Kingdom. The bottom line of this study, however, appears to be that, on the whole, surgical orthodontic treatment is effective. (Reviewer-John S. Casko, DDS, MS, PhD).

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Keywords: Effectiveness, Surgical Orthodontic Treatment

Print Tag: Refer to original journal article
The shear bond strength when bonding to amalgam was not affected by the specific adhesion enhancer used, but it was found to be less than half the bond strength to enamel.

**Background:** The best combination of adhesion enhancer and resin for bonding brackets to amalgam is not known.

**Objective:** To test several combinations of resins and enhancers to see which one performs best when bonding orthodontic brackets to amalgam.

**Design:** Laboratory testing using prepared amalgam surfaces and bovine enamel.

**Methods:** Orthodontic brackets were bonded to amalgam surfaces and bovine enamel using 2 resins: a no-mix chemical cure (Unite) and a resin-modified glass ionomer (Resinomer). All the amalgam surfaces were microetched for 3 seconds prior to bonding. Two adhesion enhancers were tested with Unite and one with the Resinomer for bonding to amalgam. After bonding, the specimens were thermocycled and then tested for shear bond strength in a universal testing machine. The site of fracture was classified using the standard ARI.

**Results:** The bond strength when bonding to amalgam was 6 to 7 MPa, and there was no difference between the different combinations of resins and adhesion boosters. The bond strength to enamel was about 20 MPa, which was significantly higher than bonding to amalgam. All the amalgam specimens failed at the amalgam surface, leaving no adhesive on the amalgam. The enamel specimens failed, leaving a combination of resin on the tooth and on the bracket.

**Conclusions:** When bonding to a microetched amalgam surface, the particular combination of resin and adhesive does not seem to make a significant difference in terms of the resulting bond strength.

**Reviewer’s Comments:** I wish the authors had tested amalgam samples with microetching only—without using a bond enhancer—to know whether the enhancer adds to the strength. I typically do not use a bond enhancer or metal primer when bonding to amalgam but rely on the microetching for retention. It would have been nice to know whether I would benefit from an enhancer. Bonding to restored surfaces is common in adults, and having predictable ways of bonding is important to minimize problems during treatment. This study tells us it is likely that microetching makes the biggest difference, not the selection of a specific adhesion enhancer. (Reviewer-Brent E. Larson, DDS, MS).
MRI Not Adequate for Diagnosing TMJ Adhesions

Magnetic Resonance Imaging in the Diagnosis of Intra-Articular Adhesions of the Temporomandibular Joint.

Zhang SY, Yang C, et al:

Using arthroscopic examination as the gold standard, MRIs of the TMJ are not able to diagnose many adhesions in the joint.

**Background:** The ability of MRI to diagnose adhesions in the temporomandibular joint (TMJ) is not clear. **Objective:** To determine the ability of MRI to visualize adhesions in the TMJ. **Design/Participants:** Prospective clinical trial involving 27 consecutive patients with a diagnosis of internal derangement of the TMJ (total of 33 joints). The mean patient age was 35 years, and there were twice as many women as men. **Methods:** All subjects had MRI of the TMJ using a specific imaging protocol. The images were blindly viewed by a surgeon and a radiologist, and each joint was classified as positive, suspicious, or negative for the presence of adhesions. All 33 joints then underwent arthroscopic treatment, and the presence of adhesions was noted during the procedure. The findings from the MRI were then compared to the gold standard findings (arthroscopy). **Results:** Of the 11 joints classified as "positive" from the MRI, 7 were classified as true positives and 4 as false positives. Four joints were classified as "suspicous," and 3 of those had adhesions at the time of arthroscopy. Of 18 joints classified as "negative," 8 results were found to be false negatives. **Conclusions:** MRI is not a good substitute for arthroscopy for the diagnosis of TMJ adhesions. **Reviewer’s Comments:** Although patients may wish to substitute noninvasive MRI for the arthroscopic procedure, it is clear that it is not a good choice to diagnose adhesions in the TMJ. Additionally, during arthroscopic surgery, the adhesions can be released without an additional procedure in most cases. Adhesions detected by MRI would require further intervention for release. (Reviewer—Brent E. Larson, DDS, MS).

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Keywords: Adhesions, MRI

Print Tag: Refer to original journal article
Can Aesthetics of Repaired Cleft Faces Be Measured Objectively?

Correlation Between Facial Morphology and Esthetics in Patients With Repaired Complete Unilateral Cleft Lip and Palate.

Russell KA, Tompson B:

Cleft Palate Craniofac J 2009; 46 (May): 319-325

Although some statistically significant relationships were found in this study, it is not possible to assess the aesthetics of the repaired cleft nose and face through the use of morphologic measurements.

**Background:** Assessing the aesthetic outcome of cleft repair surgery would be easier if it could be done with morphologic measurements of the nose and face.

**Objective:** To determine whether morphologic measurements could be identified that would assess the aesthetic outcomes of cleft reconstruction.

**Design:** Comparison of panel ratings of aesthetics with morphometric measurements.

**Participants:** This study involved 28 subjects with repaired unilateral cleft lip and palate undergoing orthodontic treatment and 20 matched controls without cleft also being treated orthodontically.

**Methods:** All subjects had facial photographs taken from 4 standard views, a lateral cephalometric film taken within 1 year, and a nasal cast made from an alginate impression. Many objective measurements were made from the photos, lateral cephalograms, and nasal casts. A judging panel of orthodontists rated the facial aesthetics of each patient from the photographs and the nasal cast. A best and worst aesthetic group was selected using these ratings. The morphometric measurements were compared between the best and worst groups and between the cleft and non-cleft groups to find significant differences that may be predictive of aesthetic outcome.

**Results:** The best and worst groups differed in measurements of columellar width, nose base angle, and nasolabial angle. There were also small differences detected between cleft and non-cleft subjects, particularly in nasal tip deviation and nose base angle.

**Conclusions:** Some differences were found between the best and worst groups and between the cleft and non-cleft groups, but these differences were not enough to explain the differences in the panel ratings of aesthetics.

**Reviewer’s Comments:** This is another demonstration of how difficult it is to try to quantify aesthetics. In the absence of objective morphologic measures of aesthetics, we will continue to rely on rating panels to judge aesthetic outcomes. It is difficult to believe that the use of new 3D photographs will do much to solve this problem unless innovative methods are found to describe facial balance and proportion. (Reviewer-Brent E. Larson, DDS, MS).

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Keywords: Aesthetics, Nose Repair

Print Tag: Refer to original journal article
When removed orthodontic bands were viewed under SEM, a biofilm was found subgingivally on only 4% of the subgingival surface.

**Background:** The nature of the biofilm that accumulates on orthodontic bands, especially subgingivally, is not well understood.

**Objective:** To measure the biofilm-covered area on removed orthodontic bands and to distinguish between the supragingival and subgingival areas.

**Design:** Scanning electron microscopy (SEM) study of bands removed following orthodontic treatment.

**Participants:** 10 subjects (5 males, 5 females) ranging in age from 14 to 32 years. The subjects had been undergoing fixed appliance treatment for about 2 years.

**Methods:** 28 orthodontic bands were removed from the 10 patients using the supragingival attachment only. The bands were rinsed and dried and imaged by SEM using a procedure to make the biofilm visible. Six weeks previously, a plaque and bleeding index was used, and an impression was made to allow measurement of the gingival margin on each band. The 8 images of each band were analyzed to determine the surface covered by biofilm in the supragingival area and subgingival area.

**Results:** Approximately 80% of the band surfaces were supragingival, and 20% were subgingival. There was significantly more biofilm supragingivally (16.1% of the area) compared with subgingivally (3.6%). The biofilm was largely seen near the gingival margin and around attachments on the bands. There was a clear demarcation of the gingival margin defined by the biofilm.

**Conclusions:** Very little subgingival biofilm was seen on the orthodontic bands (significantly less than the supragingival biofilm).

**Reviewer's Comments:** The authors were clearly surprised by the findings of so little subgingival biofilm on bands that had been in place for 2 years. There is little explanation for the finding other than possible inhibition by crevicular fluid or immunologic responses within the sulcus. Perhaps bands are not as bad for plaque accumulation as once thought. (Reviewer-Brent E. Larson, DDS, MS).

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Keywords: Periodontal Disease, Bacteria, Biofilm, Bands

Print Tag: Refer to original journal article
Consider Fluoride-Releasing-Recharging Adhesive System in Poor-Hygiene Patients

Shear Bond Strength of Brackets Rebonded With a Fluoride-Releasing and -Recharging Adhesive System.

Endo T, Ozoe R, et al:

Angle Orthod 2009; 79 (3): 564-570

The shear bond strength of a fluoride-releasing-recharging adhesive system is adequate for clinical use.

Background: An occasional outcome of orthodontic treatment is decalcification that can occur around brackets, especially in young patients who do not adequately clean their teeth. Even with repeated efforts to educate these patients in proper oral hygiene measures, it is difficult to overcome the decalcification problem. Therefore, adhesives have been developed that release fluoride to minimize the bacterial effect. However, most fluoride-releasing adhesives dispense the fluoride early in treatment. Recently, a fluoride-recharging adhesive system has been developed, but will this system have a strong enough shear bond strength?

Objective: To evaluate the effects of repeated bonding on the shear bond strength of orthodontic brackets bonded with a fluoride-releasing-recharging adhesive system.

Design: This was a laboratory study.

Methods: Extracted premolars were used to bond brackets. Three different types of adhesives were used: Transbond XT, Transbond Plus, and Beauty Ortho Bond, which is the new fluoride-releasing-recharging adhesive system. With the latter material, a self-etching primer was also used. A total of 16 brackets were bonded with each adhesive in each group. After 24 hours, the brackets were removed, and the shear bond strength was tested. The brackets were then rebonded a second time. They were again debonded after 24 hours, and the shear bond strength was measured. Next, they were rebonded a third time, and again the shear bond strength was tested. The authors wanted to determine the initial shear bond strength as well as the shear bond strength of repeated bondings.

Results: The initial bond strength of the Transbond XT and Transbond Plus were significantly higher than with the Beauty Ortho Bond. However, the Beauty Ortho Bond had a shear bond strength in the range of 6 to 8 MPa. This was above the 6 MPa level, which is considered clinically acceptable. In addition, the authors found that repeated bonding of all systems did not result in a significant decrease in the shear bond strengths of these materials.

Conclusions: The authors found that this fluoride-releasing-recharging adhesive, Beauty Ortho Bond, had an acceptable shear bond strength at initial bonding and also on 2 repeated bondings.

Reviewer's Comments: This was an interesting study highlighting a material that could be useful in some of our patients who have poor oral hygiene. This is particularly a problem in some young individuals, and, despite our attempts to improve their oral hygiene, they can still have tooth decalcification. It seems this recharging adhesive that continues to dispense fluoride during orthodontic treatment could be an improvement. I look forward to future studies that document the actual use of these materials in active orthodontic patients. (Reviewer-Vincent G. Kokich, DDS, MSD).

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Keywords: Fluoride-Releasing Adhesive

Print Tag: Refer to original journal article
Favorable dentoskeletal outcome can be produced with mandibular cervical headgear followed by fixed appliances in Class III malocclusions.

**Background:** One of the most problematic clinical aspects of dentofacial orthopedics is the management of Class III malocclusions. Over the years, the authors have utilized jaw surgery, maxillary protraction, and mandibular chin cup to overcome skeletal malrelationships. Another option to reduce mandibular growth could be the use of a cervical headgear directly on the mandible, but will this actually work to redirect mandibular growth?

**Objective:** To evaluate the stability and outcome of mandibular cervical headgear along with fixed appliances in Class III patients 5 years after treatment.

**Design/Methods:** This was a retrospective analysis of the records of 20 patients with a dentoskeletal Class III malocclusion who were treated consecutively with mandibular cervical headgear followed by fixed appliances. A control group of 18 untreated subjects with dentoskeletal Class I and II malocclusions was identified from 2 universities. A cephalometric analysis was performed before and after treatment.

**Results:** At the post-treatment time interval, the group treated with cervical headgear had significantly smaller values for condyliion-gnathion, SNB angle, and molar relationship. Compared to controls, at post-treatment, the treated patients exhibited greater values for ANB angle and overjet. It was interesting that the authors reported that all of these differences remained statistically significant long term with the addition of significantly smaller values for the distance from pogonion to gnathion perpendicular. The authors found no significant changes in dentofacial variables from post-treatment to long term, which indicated an absence of a relapse tendency in the transition from post-treatment to long term.

**Conclusions:** Significant dentoskeletal outcomes in terms of improvement in mandibular prognathism, overjet, and molar relationship can be induced by mandibular cervical headgear and fixed appliances. This change can be maintained up to 5 years after orthodontic treatment.

**Reviewer's Comments:** This was an interesting study. Mandibular cervical headgear is not a new technique; it has been tried before. This group has shown a favorable outcome using this technique, which indicates that a distal force on the mandible during growth and development (similar to a chin cup), which would produce a more vertical force, can have a direct effect on maxillomandibular relationships that can be maintained long term. However, the patient has to wear the cervical headgear. This can be a problem in terms of cooperation in some individuals. (Reviewer-Vincent G. Kokich, DDS, MSD).

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Keywords: Mandibular Cervical Headgear

Print Tag: Refer to original journal article
How Does Pulse US Stimulation Affect Condylar Growth?

Low-Intensity Pulsed Ultrasound Stimulation of Condylar Growth in Rats.
Oyonarte R, Zarate M, Rodriguez F:

Angle Orthod 2009; 79 (5): 964-970

Low-intensity pulsed ultrasound application affects the mandibular growth pattern, resulting in an alteration in the histological arrangement of condylar bone and cartilage.

Background: For years, researchers have attempted to either increase or decrease condylar growth. The purpose would be to use these methods to correct malocclusions in which the mandible is either over- or under-developed. A recent series of studies have focused on the use of low-intensity pulsed ultrasound (US) stimulation of condylar growth. Could US result in a stimulation of condylar growth?

Objective: To qualitatively and quantitatively assess the effect of low-intensity pulsed US stimulation on mandibular condylar growth for either 10 or 20 minutes daily.

Design/Methods: This was an experimental animal study performed in the laboratory. A sample of 35 Sprague-Dawley rats was used as the experimental group. On one side, for 10 or 20 minutes each day, low-intensity pulsed US was used to stimulate the temporomandibular joint. On the opposite side, no stimulation was performed. The animals were evaluated after 20 days with histological assessment of the condylar cartilage and the trabecular bone in the area of the condyle.

Results: There was no increase in the thickness of the condylar cartilage, nor was there any increase in the length of the ramus on the affected side. However, the authors did find that low-intensity pulsed US may alter histological arrangement of the trabeculae in the condyle during application of the treatment. On the experimental side, the chondrocytes were more hypertrophic in the maturation zone of the cartilage compared to the control group. In addition, in the subchondral bone, the trabecular perimeter was greater in the experimental group, and the animals that were treated for 20 minutes displayed a significantly greater effect on trabecular perimeter than those that were pulsed for 10 minutes.

Conclusions: Low-intensity pulsed US may affect mandibular growth in rats by altering the trabecular pattern in the subchondral bone and affecting some of the layers of the condylar cartilage in experimental animals.

Reviewer's Comments: This was an interesting study. Although the US stimulation did not result in increased length of the mandible or ramus on the affected side, it did show some rearrangement of the trabeculae of the bone. Would increasing the time of stimulation produce a greater effect? Perhaps these investigators will continue their research and report more in the future on these questions. (Reviewer-Vincent G. Kokich, DDS, MSD).

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Keywords: Ultrasound Stimulation of Growth

Print Tag: Refer to original journal article
Newer Orthodontic Bonding vs Traditional Etching Systems

Bracket Bond Strengths of New Adhesive Systems.

Minick GT, Oesterle LJ, et al:

Am J Orthod Dentofacial Orthop 2009; 135 (June): 771-776

Self-etching primer bonding systems appear to have lower bond strength than traditional bonding systems.

**Background:** Newer bonding systems are being developed that incorporate either a 1-step etching and sealing system or substances that claim to reduce caries. Do these improvements or changes tend to reduce bond strength?

**Objective:** To compare the orthodontic bond strengths of 4 newer bonding systems (Aegis Ortho, Clearfil Protect Bond, iBond, and Clearfil S3 Bond) with a more traditional multi-step bonding system (Transbond XT).

**Methods:** The sample for this study consisted of 200 bovine teeth. The 200 teeth were divided into 10 sample groups of 20 each. Four different bonding systems (Aegis Ortho, Clearfil Protect Bond, Clearfil S3 Bond, and iBond) were used to bond brackets to 20 bovine teeth. Transbond XT was used to bond the fifth group of teeth and acted as a control. A testing machine was used to measure the bond strength of half of the teeth in each group at 30 minutes and the other half at 24 hours.

**Results:** All 4 of the new bonding systems tested achieved bond strengths that were significantly lower than Transbond XT at both 30 minutes and 24 hours. The iBond system produced the lowest shear strength, which might be lower than an acceptable bond strength for clinical use.

**Conclusions:** 4 newer bonding systems incorporating either a self-etch primer or an agent to increase resistance to caries all demonstrated a lower bond strength than that of a traditional bonding system.

**Reviewer's Comments:** I should emphasize that this was an in vitro laboratory study, and the results could be significantly different clinically. It is important to test new bonding systems as they become available, and it does not surprise me that the new bonding systems tested in this study produced a lower bond strength than a traditional bonding agent. It seems logical that adding materials into the bonding system to increase characteristics other than bond strengths, such as producing a 1-step etch and primer or reducing caries susceptibility, could lower overall bond strength. The decision that the orthodontist has to make is whether the benefits of these new systems outweigh the reduced bond strength, which still may be clinically acceptable.

(Reviewer-John S. Casko, DDS, MS, PhD).

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Keywords: Bond Strengths

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Differences in Skin Color Affect Degree of Tooth Whitening

Assessing the Influence of Skin Color and Tooth Shade Value on Perceived Smile Attractiveness.

Sabherwal R, Gonzalez J, Naini FB:

J Am Dent Assoc 2009; 140 (June): 696-705

Smile attractiveness is determined by both tooth shade and skin color.

Background: Many orthodontists prescribe tooth-whitening procedures after treatment to improve smile attractiveness. Does skin color influence the degree of tooth whitening that would produce an aesthetic smile?

Objective: To determine, for a given tooth shade value, whether variations in skin color influence perceptions of smile attractiveness.

Participants: The subjects for this study consisted of 70 dentists and 70 lay people.

Methods: Computer manipulations were used to develop 24 different smile images. The images incorporated 6 different tooth shade values ranging from the brightest to darkest and were combined with 4 different skin color categories: fair, fair/medium, medium/dark, and dark. Each of the images was rated on a 10-point scale for smile attractiveness by the 70 dentists and 70 lay people.

Results: Variation in skin color for a given tooth shade value influenced perceived smile attractiveness. Dentists and lay people did not perceive the brightest tooth shade to be the most attractive. As the brightness of teeth decreased, subjects rated fair skin images most poorly. For the darkest tooth shade value, participants preferred the medium/dark and dark skin images over the fair and fair/medium skin images. Dark skin with bright white teeth and fair skin with dark teeth were thought to be relatively unattractive.

Conclusions: Dentists need to educate patients that the brightest tooth color is not necessarily attractive and that tooth color is related to skin color.

Reviewer's Comments: This was a very interesting study. From my own experience, I have concluded that the brightest tooth color is not always the best; however, I did not think the attractiveness of a specific tooth shade color could be related to skin color. Computer-manipulated images reduced to only the lips and teeth are not necessarily reflective of a patient's smile attractiveness from a full-face view. However, in order to remove extraneous variables, the authors had to limit the smiles that were viewed. This is a good study to share with your restorative dentists. (Reviewer-John S. Casko, DDS, MS, PhD).

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Keywords: Skin Color, Tooth Shade, Attractiveness

Print Tag: Refer to original journal article
Between 1995 and 2006, the numbers of orthodontists increased in all 9 regions in the nation.

**Background:** In order to anticipate the future direction of growth in your practice, it would be helpful to know if the number of youngsters of treatment age in your area is increasing or decreasing. It would also be helpful to know the likely changes in the orthodontist-to-patient ratio for your state.

**Design/Objective:** The purpose of this review article was to determine if the number of private-practicing orthodontists from 1995 to 2006 has kept pace with the increasing number of children. **Discussion:** Between 1995 and 2006, despite a national increase of >4 million children between 5 and 17 years of age, there were marked variations at the regional and state levels. Eighteen states had decreases in the number of youngsters, with the greatest decreases in West Virginia and Louisiana. On the other hand, there were significant increases in the number of youngsters in Georgia, Florida, Texas, and California. The information in this article is based on the American Dental Association (ADA) Report, "Distribution of Dentists in the United States by Region and State 2006." Between 1995 and 2006, the number of orthodontists increased in all 9 regions in the nation, with the greatest increases occurring in the Pacific region and the south Atlantic region. Between 1995 and 2006, the number of orthodontists decreased in 7 states and the District of Columbia. Between 1991 and 1995, the national orthodontist-to-child population ratio decreased from 18.1 to 16.9 orthodontists per 100,000 children in the 5- to 17-year age group. Between 1995 and 2006, there was a total increase of 1315 professionally active orthodontists (1109 in private practice and 206 professionally active non-private-practice orthodontists).

**Conclusions:** There are significant differences from state to state and region to region related to both the orthodontic practitioner-to-child population ratios and also increases and decreases in the total number of children.

**Reviewer's Comments:** This ADA survey presents an excellent database to evaluate changes in your state or area that might affect the future of your practice. If your practice has been increasing or decreasing in the number of patients, the data from this study may help explain that change. However, it is important to understand that there are many factors that affect both the size and location of orthodontic practices. Also, I believe it is inappropriate to assume that, because orthodontist-to-patient ratios may be decreasing in some areas of the country, this will necessarily have a negative effect on orthodontic patient care. With all the increases in treatment efficiency as a result of improvements in both materials and treatment techniques, orthodontists are able to accommodate higher patient loads. (Reviewer-John S. Casko, DDS, MS, PhD).