Four patients are presented who developed significant anterior open bite malocclusions following the regular use of an oral appliance for the treatment of OSA.

**Background:** Mandibular advancement devices (MADs) can be a useful treatment for obstructive sleep apnea (OSA). They are indicated for mild to moderate OSA, or severe OSA patients who are intolerant of continuous positive airway pressure (CPAP) and refuse surgery. While MADs have some known disadvantages (ie, temporomandibular disorders [TMDs], gingival irritation, tooth discomfort, and minor occlusal changes), no previous studies have reported major occlusal side effects.

**Objective:** To provide examples of severe malocclusions resulting from MAD use.

**Design:** Case reports.

**Results:** 4 cases were reported where a soft-acrylic Herbst-like MAD was used for the treatment of OSA. The 4 cases ranged from moderate to severe OSA, and showed improvement both subjectively and by polysomnography. However, the cases showed a mean reduction in overbite of 3 mm and a mean reduction of overjet of 3.1 mm. All cases showed a circular dental open bite with occlusion only on the most posterior molar. Of the 4 cases, 2 could not tolerate the CPAP and continued to wear the device against the author’s recommendation, 1 stopped the use of the device and had partial closure of the open bite after 2 years, and 1 decided on a surgical option to close the open bite. Two of the cases did not have occlusal coverage over the most posterior molar.

**Conclusions:** Severe dental malocclusion with MAD use is rare but possible. Bite changes that occur will likely not spontaneously correct fully after use is discontinued. Patients often do not realize these changes. Occlusal coverage is needed on all erupted teeth.

**Reviewer’s Comments:** Although this report is not a scientific sample, these 4 cases represent approximately 1% of the cases treated in this particular clinic. It is important to review the possibility of these severe occlusal changes with the patient so that they present for evaluation before reaching the severity reported here. General dentists should be reminded to carefully examine patients who regularly use an MAD device for occlusal changes and are also advised to provide occlusal stops for all posterior teeth if they are using this type of appliance. (Reviewer—Brent E. Larson, DDS, MS).

© 2010, Oakstone Medical Publishing

Keywords: OSA, Mandibular Advancement Devices, Malocclusion

Print Tag: Refer to original journal article
Fixed retainers appear more effective than removable retainers in maintaining the space for maxillary lateral incisor implants after completion of active orthodontic treatment.

**Background:** Patients with congenitally missing maxillary lateral incisors are often treatment planned to have maxillary lateral incisor implants placed. Because of the need to wait for the completion of growth in many of these patients, there is often a significant time period between the completion of active orthodontic treatment and implant placement. Does the space that was achieved for implant placement relapse during this period?

**Objective:** To evaluate postorthodontic root approximation adjacent to congenitally missing maxillary lateral incisors during retention.

**Participants:** 94 patients who had at least 1 congenitally missing maxillary lateral incisor, 80 of whom were consecutively treated in 1 periodontal practice, were included.

**Methods:** Panoramic and periapical radiographs were used to measure intercoronal and interradicular distances between the central incisor and the canine adjacent to the missing lateral incisor before orthodontic treatment, after the completion of orthodontic treatment, and at implant placement. The subjects were subdivided into 2 groups, one of which had maintained adequate space for implant placement and the other which had not. The effectiveness of removable versus fixed retainers was compared between the 2 groups, and the accuracy of panoramic versus periapical radiographs to make the measurements was also evaluated. The minimum interradicular and intercoronal space required for successful implantplacement was also estimated.

**Results:** 11% of the patients experienced relapse that was significant enough to prevent implant placement. Panoramic radiographs were determined to be less accurate than periapical radiographs in measuring intercoronal and interradicular space and tended to overestimate the available space at the end of orthodontic treatment. Fixed retainers appear to be more effective in maintaining space between the completion of orthodontic treatment and implant placement. For successful implant placement, the authors recommended that at least 6.3 mms of intercoronal space and at least 5.7 mms of interradicular space between the adjacent central incisor and canine be established for successful implant placement.

**Conclusions:** A small percentage of patients with congenitally missing maxillary lateral incisors for whom future implant placement is planned will experience some intercoronal and interradicular relapse during the retention phase of treatment.

**Reviewer's Comments:** The sample size achieved for this study is impressive, particularly the fact that 80 of the patients were consecutively treated in 1 practice. It was not surprising that panoramic radiographs were less accurate than periapical radiographs to measure intercoronal and interradicular space. Based on the results of this study, it appears prudent for orthodontists to use fixed retention after the completion of active orthodontic treatment for patients who are planning to receive maxillary lateral incisor implants. (Reviewer- John S. Casko, DDS, MS, PhD).

© 2010, Oakstone Medical Publishing

Keywords: Implant Placement, Root Approximation

Print Tag: Refer to original journal article
With proper presurgical and postsurgical protocol and antibiotics and antimicrobials, necrosis of the jaw can be prevented following tooth extraction in patients taking IV bisphosphonates.

**Background:** In recent years, researchers have reported that tooth extraction in subjects who are taking intravenous (IV) bisphosphonates has a high likelihood of producing necrosis of the jaw. However, some patients who are taking IV bisphosphonates do need to have teeth extracted. Is there a protocol that can be followed to limit jaw necrosis in subjects who require extraction and are taking IV bisphosphonates?

**Design/Objective:** This prospective study reports on the outcomes of dental extractions performed in patients who are taking IV bisphosphonates.

**Methods:** This study included a group of consecutive patients who had been taking IV bisphosphonates and underwent tooth extraction between May 2006 and January 2009. An extraction protocol was designed for these subjects. Three weeks prior to the extraction, subjects rinsed once daily with 0.2% chlorhexidine. Three days before surgery, the patients began taking antibiotics every 8 hours; this antibiotic regimen lasted for 2 weeks after the surgery. During the surgery, the extraction socket was meticulously debrided to remove all granulation tissue. For 2 weeks after the surgery, subjects applied 1% chlorhexidine on the surgical wound 3 times a day.

**Results:** The results showed that after 1 year, there were no reports of any case of bisphosphonate-related osteonecrosis of the jaw. In other words, the protocol was successful for the 23 subjects who had undergone this procedure.

**Conclusions:** Extractions can be performed in a sample of patients taking IV bisphosphonates, if a specific system and local infection control process is performed.

**Reviewer’s Comments:** Although orthodontists do not typically treat patients who are taking IV bisphosphonates, it could be a possibility, and some patients may need tooth extraction. This study shows that it is possible, with strict local and systemic infection control, to prevent osteonecrosis of the jaw. (Reviewer-Vincent G. Kokich, Sr, DDS, MSD).

© 2010, Oakstone Medical Publishing

Keywords: IV Bisphosphonates, Tooth Extraction, Jaw Osteonecrosis

Print Tag: Refer to original journal article
How Does the Mandible Really Move in Young Healthy Subjects?

Anatomical Location of Various Condylar Points for Jaw Movement Analysis in Japanese Women.

Tokiwa H, Nakazawa F, et al:

J Oral Rehabil 2010; 37 (April): 235-241

In this group of healthy females, the kinematic axis of mandibular movement is located outside of the condyle in the majority of cases.

**Background:** The kinematics of TMJ movement can be very important in the diagnosis and management of temporomandibular joint disorders (TMD), as it can help distinguish between problems with occlusion, the neuromuscular system, and the TMJ itself. Common reference points are the following: terminal hinge axis (HP) - the axis of rotation in a retruded position; kinematic axis (KP) - corresponding to border movement in the sagittal plane; and lateral condylar pole (RP) - the anatomic point found by palpating the skin over the lateral pole of the condyle. Current jaw tracking systems allow calculation of these points by tracking mandibular movement with 6 degrees of freedom.

**Objective:** To determine the anatomical location of HP, KP, and RP on a lateral cephalogram.

**Design:** Observational.

**Participants:** 18 Japanese women (19 to 25 years of age) with Class I occlusion, no asymmetry, and no signs or symptoms of TMD.

**Methods:** Jaw movements were tracked using an optoelectronic jaw-tracking system (Gnathohexagraph®). The porion, infra-orbitale, and RP were marked using a paint-stick, and the position was recorded with a light-emitting diode (LED) pointer. After a small lead ball was attached to the porion, orbitale, and RP, a lateral cephalogram was taken. Using Frankfort horizontal as the X-axis, the Gnathohexagraph data were superimposed on the lateral cephalogram, and positions of HP, KP, and RP were recorded.

**Results:** HP, RP and KP were located in somewhat different places, with KP located outside of the condyle the majority of the time.

**Conclusions:** Using a rotational axis point centered in the condyle for simulation of movements or for mounting models on an articulator may introduce unintended error due to the complex movements observed even in healthy jaws.

**Reviewer’s Comments:** The importance of these results is that the movement of the condyle is complex and trying to represent the movement about a single point or axis may be a simplification that is unable to represent actual jaw movement. Many simulations of mandibular movement use a cephalogram to locate the condyle for determination of a rotational axis, but this study is further evidence that the actual kinematic axis in most subject is actually outside the condyle creating error as tooth contacts are represented. (Reviewer-Brent E. Larson, DDS, MS).

© 2010, Oakstone Medical Publishing

Keywords: Jaw Movement, Kinematics

Print Tag: Refer to original journal article
An association exists between static occlusion and dynamic occlusion in untreated subjects.

**Background:** During orthodontic finishing, orthodontists typically assess 2 aspects of a patient’s occlusion, static occlusion and dynamic occlusion. A goal for orthodontists is to achieve a Class I molar and canine relationship in static occlusion. It is typical that orthodontists are taught to achieve canine guidance in lateral excursion and incisal guidance in protrusive position. But, is there any association between static occlusion and dynamic occlusion?

**Objective:** To determine which type of dynamic occlusion is associated with which type of static occlusion.

**Design/Participants:** Descriptive analysis of 94 dental students between the ages of 21 and 30 years.

**Methods:** None of the subjects had received previous orthodontic treatment, and all subjects had a fully permanent dentition. Each of these subjects was classified initially with respect to their static occlusion (Class I, Class II, or Class III). Then, the subjects were asked to move their mandible 0.5 mm right and left to determine which teeth contacted. Then they moved 3 mm right and left to determine which teeth were in contact. Finally, they were asked to move their mandible anteriorly in order to determine which teeth contacted in protrusive position.

**Results:** The results of this study showed that in static occlusion, 49 subjects had a Class I relationship, 27 subjects had a Class II relationship, and 18 subjects had a Class III occlusion. When the authors evaluated the dynamic occlusion, approximately 24% had bilateral group function at 0.5 mm lateral guidance, and 18% had mixed canine guidance and group function. However, at the 3-mm position, the guidance pattern changed predominantly to canine guidance. Fifty percent of subjects at that position had bilateral canine guidance. The authors compared the static and dynamic occlusion, and they found an association between Class I occlusion and bilateral canine protected occlusion at the 0.5 mm lateral excursion. However, at the 3 mm lateral guidance, only 50% of the Class I and 11% of the Class III subjects had bilateral canine protected occlusion. On the other hand, 70% of the subjects with Class II relationships had bilateral canine protected occlusion at 3 mm.

**Conclusions:** The authors conclude that there is an association between static occlusion and dynamic occlusion, and that at the 3 mm lateral excursion, bilateral canine protected occlusion was only predominant in subjects with a Class II relationship.

**Reviewer’s Comments:** This was an interesting comparison. Although, we as orthodontists typically try to achieve a Class I relationship for our patients, often, if subjects finish with a slight Class II molar and canine position, they do have better canine guidance in lateral excursion. (Reviewer-Vincent G. Kokich, Sr, DDS, MSD).
Using Laser Levels to Record Natural Head Position for CBCT Imaging

Simple Technique to Achieve a Natural Position of the Head for Cone Beam Computed Tomography.

Damstra J, Fourie Z:

Br J Oral Maxillofac Surg 2010; 48 (April): 236-238

The authors describe a technique that uses 2 inexpensive laser levels to accurately record natural head position and allow transfer of that head position to the CBCT image.

Background: As orthodontists look closer at facial esthetics to determine treatment objectives, natural head position is becoming a more popular reference line, as it indicates a patient's appearance in everyday life. While natural head position has been shown to be stable and reproducible, it can be difficult to achieve with cone beam computed tomography (CBCT). This is due to the long scan time with CBCT and the resulting need to fix the head with some sort of restraint.

Objective: To describe an effective means of achieving natural head position with CBCT.

Methods: Prior to obtaining the CBCT, the patient was asked to stand 1.5 m from a wall-mounted mirror and look straight ahead into their own eyes to achieve natural head position. A tripod with a laser level was used to cast a horizontal reference line just above the upper lip, and a second laser level mounted above the subject cast a vertical reference line at the broadest part of the nose. Six glass spheres were placed as markers on these reference lines, and the CBCT was taken with the spheres attached to the skin. The glass spheres appear in the image, but produce less scatter than metallic markers. This process of orienting the patient and placing the spheres takes the authors approximately 15 minutes. After the CBCT scan is loaded into analysis software, it then takes about 3 minutes to use the visible reference spheres to orientate the image to the natural head position.

Conclusions: A relatively inexpensive and consistent method is described to obtain natural head position with CBCTs.

Reviewer's Comments: The need to reorient to natural head position may be greater for CBCT than for traditional cephalometry because of the restraints needed to hold the head still and minimize motion artifact. Traditional 2-dimensional photos could be used to do a subjective orientation of the CBCT volume, but I liked the innovative ideas these authors provide for a more reproducible method. You may want to read the safety instructions on any laser levels you buy for this purpose to make sure there is no danger to the patients and their eyes from the lights shining on their face. (Reviewer-Brent E. Larson, DDS, MS).

© 2010, Oakstone Medical Publishing

Keywords: CBCT, Natural Head Position, Facial Esthetics

Print Tag: Refer to original journal article
Most Common Form of Retention in the United States

Results of a Survey-Based Study to Identify Common Retention Practices in the United States.

Valiathan M, Hughes E:

Am J Orthod Dentofacial Orthop 2010; 137 (February): 170-177

Most orthodontists using Hawley retainers prescribe an initial full-time daily period of wear.

**Background**: What is the standard retention protocol in your office and how does it compare with other orthodontists in the United States? This is a question that you should be able to answer.

**Objective**: To identify the most common orthodontic retainers and retention protocols used in the United States by members of the American Association of Orthodontists.

**Participants**: 2000 active members of the American Association of Orthodontists stratified by region of the country were sent a 20-question survey about the type of retention protocol used in their office; 658 of these orthodontists returned the survey.

**Methods**: The results of the 20-question survey related to type of retainers used, period of retention, amount of wear, duration of retention checks, and protocol differences by area of the country were tabulated.

**Results**: Maxillary Hawley retainers at 58% and mandibular fixed lingual retainers at 40% were the most commonly used retainers. Most orthodontists prescribe <9 months of full-time wear for removable retainers. Orthodontists in the South, Midwest, and West prescribed fixed lingual retainers approximately 43% of the time, whereas orthodontists in the Northeast prescribed fixed lingual retainers only approximately 26% of the time, which significantly differed from the other 3 regions of the country. Larger practices and practices in which the orthodontist had practiced <16 years schedule longer intervals between retention appointments. The most common retention check schedule was 1 to 2 months after debonding, the second appointment 3 to 5 months later, and the third and fourth retention appointments 6 to 11 months later. By the fifth retention appointment, 46% of the patients had been dismissed.

**Conclusions**: The 2 most commonly used retainers in the United States among active American Association of Orthodontists (AAO) members are the maxillary Hawley retainer and mandibular fixed lingual retainers.

**Reviewer’s Comments**: This was an excellent article and I suggest that you read it in detail if you want to get a better understanding of how your retention protocol compares with other members of the AAO. The biggest question that came to my mind after reading this article is whether there is any scientific basis for the different protocols that are being used or whether these different protocols are based on economic and practice management decisions. It would also be interesting to know why a much lower percentage of orthodontists in the Northeast use fixed lingual retainers. (Reviewer—John S. Casko, DDS, MS, PhD).

© 2010, Oakstone Medical Publishing

Keywords: Retainers, Retention Protocols

Print Tag: Refer to original journal article
Effect of Mandibular Setback Surgery on Pharyngeal Airway

Changes of Hyoid, Tongue, and Pharyngeal Airway After Mandibular Setback Surgery by Intraoral Vertical Ramus Osteotomy.

Hwang S, Chung CJ, et al:

Angle Orthod 2010; 80 (March): 302-308

Mandibular setback surgery results in a long-term reduction in pharyngeal airway space as measured on lateral cephalometric radiographs.

**Background:** A relatively common treatment for adult patients with skeletal Class III malocclusion is mandibular setback surgery. However, when the mandible is moved posteriorly, the tongue is also moved posteriorly. In addition, there is an impact or change in the pharyngeal airway. Is this change long-lasting or is there accommodation by the body following mandibular setback surgery?

**Objective:** To assess changes in hyoid, tongue, and pharyngeal airway in patients who had mandibular setback surgery.

**Design/Participants:** This was a retrospective analysis of 60 patients who underwent mandibular setback surgery and orthodontics to correct their Class III skeletal and dental relationships. In addition, 45 of these subjects had additional maxillary impaction surgery via Le Fort I osteotomy.

**Methods:** Cephalometric radiographs were made of each subject before treatment, immediately after surgery, 1 month after surgery, and at least 1 year after surgery. The radiographs were measured to determine the position of the hyoid, tongue, and the size of the pharyngeal airway at each time interval.

**Results:** The results of this study showed that the tongue and hyoid bone moved posteriorly and inferiorly with surgery. However, after 1 year, the tongue and hyoid bone gradually moved superiorly and anteriorly almost to the original position prior to surgery. The pharyngeal airway space was greatly reduced during the surgery. However, this reduction did not increase after 1 year.

**Conclusions:** The authors conclude that a side effect of mandibular setback surgery is that the pharyngeal airway becomes narrower compared to its presurgical width as measured on 2-dimensional cephalometric radiographs.

**Reviewer's Comments:** There are 2 issues of importance with this study. First of all, we realize from this study that the airway narrows as measured on lateral cephalometric radiographs with mandibular setback surgery. However, does the volume of the airway change? This could only be assessed with different types of radiographs, such as cone beam radiography. The second aspect that is of importance is whether or not the surgery has an impact on a patient's breathing. If patients have a tendency for sleep apnea prior to surgery and mandibular setback, the clinician should be aware of this and perhaps an adjustment of the treatment plan may be necessary for these patients. (Reviewer-Vincent G. Kokich, Sr, DDS, MSD).

© 2010, Oakstone Medical Publishing

Keywords: Mandibular Setback Surgery, Pharyngeal Airway

Print Tag: Refer to original journal article
Part-Time Wear of Vacuum-Formed Retainers Is Effective

A Randomized Clinical Trial of Thermoplastic Retainer Wear.

Thickett E, Power S:

Eur J Orthod 2010; 32 (February): 1-5

In this randomized clinical trial of vacuum-formed thermoplastic retainers, part-time wear from day 1 is as effective as full-time wear to maintain alignment and arch dimensions.

**Background:** Keeping great orthodontic results stable can be very frustrating. Many forms of fixed and removable retainers are being used, with widely varying protocols for use. While a great deal of research has gone into examining orthodontic relapse, few randomized clinical trials have been performed to compare different retention protocols.

**Objective:** To assess whether a limited period of full-time thermoplastic retainer wear is needed following fixed appliance treatment or if part-time wear is sufficient.

**Design:** Randomized clinical trial.

**Participants:** 62 patients with no previous orthodontic treatment and requiring comprehensive treatment with premolar extraction were included. Participants were randomly allocated to a full-time wear group (30 patients; mean age, 13.6 years) or a part-time wear group (32 patients; mean age, 13.8 years).

**Methods:** All patients were treated by the same clinician with full fixed appliances, and an upper and lower thermoplastic retainer was made at debond. No patients received treatment with functional appliances, extra-oral force, or orthognathic surgery. Study models were obtained prior to treatment, at debond, after 6 months of retention, and after 1 year of retention. The following measurements were made by a single clinician at each time point: irregularity index; intercanine width; intermolar width; arch length; overbite; overjet; and Peer Assessment Rating (PAR) score. For the first 3 months following debond, the full-time wear group wore thermoplastic retainers full-time, while the part-time group wore them only 10 hours/day. Following the first 3 months, both groups had 3 months of part-time wear (10 hours/day), then 3 months of wear on alternate nights, and finally, 3 months of wear 1 to 2 times per week.

**Results:** Patient groups were well-matched prior to treatment and good correlation was found for the measurement method. The only statistically significant differences between full-time and part-time wear were found in the overbite measurements 6 months and 1 year after debond, indicating equal effectiveness for most measures of relapse. Although not statistically significant, the patients with the greatest increases in PAR score were in the part-time wear group.

**Conclusions:** Part-time wear of thermoplastic retainers directly following fixed appliances may be sufficient for most patients.

**Reviewer’s Comments:** The protocol for the 2 groups was the same after the first 3 months of treatment. The study was designed to detect a difference of 2 mm in irregularity, which may be more than is acceptable to most patients. Clinically, I have used a part-time retainer protocol in the upper arch for some time with good success, but I have less success with a part-time protocol in the lower arch. (Reviewer-Brent E. Larson, DDS, MS).

© 2010, Oakstone Medical Publishing

**Keywords:** Retention Time, Thermoplastic Retainers, Tooth Position

**Print Tag:** Refer to original journal article
By helping employees focus on solutions rather than playing the blame game, you can help to resolve staff conflict in your office.

**Background:** Almost every orthodontist at some point or another has had to deal with staff conflict in their practice. If staff conflict arises in your office, how do you deal with it?

**Objective:** To present some basic principles for managing staff conflict that can have a very serious negative effect on your practice. As a first step, Dr. Levin suggests that you decide whether the conflict is minor or major. Minor conflicts that are simply based on a difference of opinion can often be easily resolved and have a positive effect on the practice. On the other hand, major conflicts can have a very negative effect on your practice and need to be addressed as soon as possible to prevent the problems from becoming worse. As the office leader, it is the responsibility of the orthodontist to schedule a meeting that should involve all staff members who are participants in the conflict; the meeting should be scheduled after working hours. In this article Dr. Levin presents a brief statement that can be used to start this meeting that presents the problem in a positive way and emphasizes that the purpose of the meeting is to find a way to resolve the conflict. After discussing the conflict, each staff member should be asked how they would suggest solving the problem. It is important to try and gain agreement from all the staff members involved and also to hold a follow-up meeting to confirm that the conflict has been resolved.

**Conclusions:** By helping employees focus on solutions rather than playing the blame game, you can help to resolve staff conflict in your office and avoid a very negative effect on your practice.

**Reviewer's Comments:** This is a very practical article that deals with the problems that every orthodontist has either faced or will face in their practice. Dealing with staff conflict can be very uncomfortable, and there can be a natural tendency to just avoid it hoping it will resolve. This rarely works. If you are having staff conflict in your office, I would strongly suggest that you read this article in its entirety. (Reviewer- John S. Casko, DDS, MS, PhD).

© 2010, Oakstone Medical Publishing

Keywords: Staff Conflict, Management

Print Tag: Refer to original journal article
For certain types of malocclusions, distraction osteogenesis has greater stability and fewer complications than sagittal split osteotomy of the mandible.

**Background:** Surgical correction of Class II malocclusion is common among adult patients. For Class II malocclusions, the most popular surgical procedure is a sagittal split osteotomy. However, this procedure does have drawbacks, which include the potential for relapse and the occurrence of complications. Another surgical procedure that could be employed to lengthen a mandible is distraction osteogenesis. Although this procedure is not popular, could it have fewer complications and greater stability?

**Objective:** To perform a meta-analysis of the existing literature and identify the articles that evaluated mandibular stability and complications following either sagittal split osteotomy or mandibular distraction osteogenesis.

**Design/Methods:** This was an evidence-based review of the existing literature on sagittal split osteotomy and distraction osteogenesis. After an exhaustive search, the authors identified 49 articles that contained their inclusion criteria. After further analysis, they reduced the number of articles to the studies that discussed stability and complications. Then the authors compared the 2 procedures to determine the answers to their research questions.

**Results:** The results of this meta-analysis showed that when comparing stability, sagittal split osteotomy and mandibular distraction osteogenesis were comparable, with a relapse percentage of 15% and 17%, respectively. However, the authors further noted that for patients with high mandibular plane angles, the relapse potential for sagittal split osteotomy increased to 29% compared to 11% for patients with normal mandibular plane angles. As far as complications, there was clearly a difference between sagittal split osteotomy and distraction osteogenesis. The authors found greater persistence of inferior alveolar nerve disturbance and condylar resorption with sagittal split osteotomy patients compared to those who had distraction osteogenesis.

**Conclusions:** The authors conclude that, although stability between sagittal split osteotomy and distraction osteogenesis of the mandible is comparable, there are advantages to distraction osteogenesis when it compares complications between the 2 procedures.

**Reviewer's Comments:** This was an interesting evidence-based review. However, I would like to comment on certain aspects of this study. First of all, there were a very low number of articles that evaluated distraction osteogenesis. This procedure simply has not been studied adequately. In addition, this procedure requires that a patient wear a distractor during the time that the advancement of the mandible is being performed, also during the time that the bone is healing, and then it requires a second surgical procedure to remove the distractor. So, although there may be fewer postoperative complications, distraction osteogenesis is not a simple procedure for a patient to endure. (Reviewer-Vincent G. Kokich, Sr, DDS, MSD).

© 2010, Oakstone Medical Publishing

Keywords: Mandibular Surgery, Risks, Complications

Print Tag: Refer to original journal article
Effects of Mandibular Third Molars on Periodontal Disease

Third Molars and Periodontal Pathologic Findings in Middle-Age and Older Americans.

Moss KL, Oh ES, et al:


The presence of a visible third molar is significantly associated with more severe periodontal disease in teeth more anterior in the mouth.

Background: After orthodontic treatment, orthodontists are commonly faced with a question of whether or not to recommend extraction of maxillary and/or mandibular third molars. Often, these teeth are unerupted. The question that the orthodontist faces is whether or not these third molars will cause problems in the future. If they are obviously impacted, they should be extracted. But, if they tend to erupt, will they still cause problems in the mouths of elderly individuals?

Objective: To document the presence or absence of visible third molars and assess the association between the visible presence of third molars and the severity of periodontal pathologic findings on teeth more anterior in the mouth.

Methods: This study utilized dentate participants from the Dental Atherosclerosis Risk in Communities Study. These individuals were between 52 and 74 years of age and had undergone an oral examination that included probing of pocket depths. The mean age of the sample was 62 years. The sample consisted of 54% women, of which 80% were white and 19% were black. Most of the subjects had seen a dentist within the previous year. Of the participants, 30% had at least 1 visible third molar, 14% had only 1 third molar, 7% had at least 3 visible third molars, and 4% had 4 third molars. The authors compared the periodontal health of individuals who did not have third molars with those who did have a visible third molar.

Results: Those individuals with a visible third molar had a significantly greater mean extent of pocket depths of ≥4 mm compared to those who did not have visible third molars. The results for the mean extent of a pocket depth of ≥4 mm were similar for first and second molars in the affected group.

Conclusions: For middle-age and older participants, at least 1 visible third molar detected in one-third of the subjects was significantly associated with more extensive periodontal disease as assessed by commonly accepted measures, including pocket depth on teeth anterior to the third molar.

Reviewer's Comments: This is another study that comes out of the University of North Carolina that has assessed the relationship of third molars and different parameters of oral health. It was interesting to note that if third molars were present, it consistently showed that these individuals had a greater incidence of periodontal disease in areas anterior in the mouth. This is another potential reason for recommending extraction of third molars earlier on in subjects, perhaps at the end of orthodontic treatment. (Reviewer-Vincent G. Kokich, Sr, DDS, MSD).

© 2010, Oakstone Medical Publishing

Keywords: Third Molars, Periodontal Disease

Print Tag: Refer to original journal article
Masticatory performance is related to chewing cycle kinematics.

**Background:** One of the objectives of orthodontic treatment is to produce occlusal contacts between all teeth. It is assumed that if all teeth contact, a patient's chewing performance would be enhanced. However, mastication involves movement of the mandible relative to the maxilla during the chewing cycle. Is the ability to chew properly related to the dynamics of the chewing cycle?

**Objective:** The purpose of this study was to evaluate differences in chewing cycle kinematics between subjects with better and poorer masticatory performance.

**Design/Participants:** This cross-sectional study included 30 subjects (15 males and 15 females) chosen from a series of dental students. These were all young adults between 22 and 32 years of age, and all had Class I molar relationships. Initially, the masticatory performance of each individual was tested using an artificial test food. After chewing for 30 cycles, the subjects expectorated the test food into a container that was then filtered to determine the size of the chewed particles. Those individuals with smaller particles were classified as good chewers, and those with larger particles were classified as poor chewers. Then, the chewing cycle kinematics of each individual was recorded with computer hardware and software that measured the path of the mandible during the chewing cycle. The chewing cycles of each individual were then compared with whether or not they were good or poor chewers.

**Results:** The results of this study showed that related to the chewing cycle, males had significantly longer opening duration, but females had a significantly longer closing duration of the cycle. With respect to performance-related differences, poor performers consistently had greater cycle-to-cycle variability of their chewing than did better performers. Significant group differences in variability were found for closing, opening, and total durations. The better performers at chewing showed a more horizontal path of closure.

**Conclusions:** The authors conclude that differences in chewing cycle shape suggest slightly greater lateral movement to the working side and a more horizontal path of closure in better chewing performers. Poorer chewing performance appeared to have more posterior movement of their mandibles.

**Reviewer's Comments:** This was an interesting study that I had not encountered in the past. It was fascinating the way the authors compared the dynamics of the chewing cycle with the performance of mastication. The authors seemed to be very careful about their analysis, and I, therefore, trust their data. It would be interesting to use this methodology to determine changes in mastication and/or in the chewing cycle before and after the correction of a major malocclusion. (Reviewer-Vincent G. Kokich, Sr, DDS, MSD).

© 2010, Oakstone Medical Publishing

Keywords: Chewing Cycle Kinematics, Masticatory Performance

Print Tag: Refer to original journal article
Patients requiring orthognathic surgery have lower levels of happiness with their dentofacial appearance compared to control subjects.

**Background:** What motivates individuals to have orthodontic treatment that involves jaw surgery? Are they concerned about their occlusion? Are they concerned about their facial appearance? Are they concerned about the esthetics of their anterior teeth?

**Objective:** To examine the self-perception of dental and facial attractiveness among patients requiring orthognathic surgery and to determine if the type of skeletal discrepancy (skeletal Class II or skeletal Class III) influences the perception of attractiveness.

**Methods:** A questionnaire was presented to 162 patients who required orthodontic treatment and orthognathic surgery. A group of 157 matched control subjects also received the same survey. The surgical group was broken down into 2 categories, either skeletal Class II or skeletal Class III. The questionnaires consisted of visual analog scales that subjects used to record their happiness with their dental and facial appearance.

**Results:** The results of this study showed that orthognathic patients were less happy with the appearance of their face, teeth, and profile when compared with controls. Class II surgical patients reported a higher level of unhappiness with their dental appearance and were also more likely than Class III patients to want to change their overall appearance. Older subjects and female subjects were more unhappy with their dentofacial and profile appearance.

**Conclusions:** Patients who undergo orthognathic surgery for either Class II or Class III malocclusion typically are less happy with their self-perception of their facial attractiveness.

**Reviewer's Comments:** This was interesting information. Over my clinical career, I suppose that I have found that one of the motivating factors for a patient to undergo orthognathic surgery is to improve their facial appearance. Although this is not a general statement that can be made for all segments of the population, it seems to be true for a large number of the patients that we treat. (Reviewer-Vincent G. Kokich, Sr, DDS, MSD).

© 2010, Oakstone Medical Publishing

Keywords: Patient Self-Perception, Dentofacial Attractiveness, Orthognathic Surgery

Print Tag: Refer to original journal article
The measured changes after maxillary expansion using a rapid expansion or semi-rapid expansion protocol are the same.

Background: Posterior cross-bites are commonly encountered in orthodontics, and many different appliances and protocols have been developed to treat this malocclusion. Both rapid maxillary expansion (RME; 2 turns/day, approximately 0.5 mm/day) and semi-rapid maxillary expansion (SRME; 1 turn every other day, approximately 0.1 mm/day) protocols have been suggested.

Objective: To investigate the effects of RME versus SRME in the mixed dentition.

Design: Randomized clinical trial.

Participants: 35 Caucasian patients (22 females, 13 males) with a functional unilateral or bilateral posterior cross-bite were included. Subjects were randomly divided into an RME group (17 patients; mean age, 8.8 years) and an SRME group (18 patients; mean age, 8.6 years)

Methods: A splint type bonded RME appliance was fabricated for patients in both groups. Both groups activated the appliance 2-quarter turns a day for the first week. The RME group then continued 2 turns a day until the cross-bite was overcorrected by 2 mm. The SRME turned the screw 1 turn every other day after the first week until the same overexpansion was achieved. In both groups, the expander was kept in place for 14 days after activation stopped and then replaced by a removable appliance. Lateral and frontal cephalometric radiographs were taken before and after expansion. These radiographs, along with dental casts, were analyzed to determine differences between the 2 groups during expansion.

Results: Both groups showed increases in the maxillary base, nasal cavity width, intercanine width, and intermolar distance. The inferior movement of the posterior nasal spine showed a statistically significant difference between the 2 groups, but all other measurements were not statistically significant.

Conclusions: RME and SRME produce similar short-term effects on the dentition and maxillary structures.

Reviewer's Comments: This study looked only at the dental and skeletal effects during the expansion time. The advocates of slower expansion feel that the expansion may be more easily maintained because of less residual stress in the skeletal structures, but longer follow-up will be required to answer that question. In general, this supports the majority of evidence suggesting the speed of expansion is not critical to the outcome. (Reviewer-Brent E. Larson, DDS, MS).

© 2010, Oakstone Medical Publishing

Keywords: Posterior Cross-Bite, Maxillary Expansion, RME, Mixed Dentition

Print Tag: Refer to original journal article
After mandibular setback, the condyle was initially in a more posterior, but concentric, position and then returned to a slightly more anterior position by the time of long-term follow-up.

**Background:** Condylar position, although a controversial issue, is important for orthodontists because it may affect skeletal relapse and long-term stability. Additionally, some advocate an ideal condylar position to reduce the risk for temporomandibular joint disorder (TMD). Examination of surgical cases is especially important, because large skeletal changes are being made. However, most previous studies have only examined changes in the condylar long axis and not other assessments of condylar position.

**Objective:** To compare the short-term and long-term changes in condylar position following sagittal split ramus osteotomy (SSRO).

**Design:** Retrospective.

**Participants:** 26 adult patients (15 men, 11 women; mean age, 22.3 ± 3.2 years) with mandibular prognathism who underwent SSRO surgery with rigid fixation were included. All patients were healthy, with no severe asymmetry or TMD symptoms.

**Methods:** Condylar position was assessed using cone-beam computed tomography (CBCT). A CBCT was obtained for each subject prior to surgery, at 6 months after SSRO surgery, and during retention (18 months postoperative). Changes in the condylar axis were examined in 3 planes of space. Condylar position within the glenoid fossa was also measured.

**Results:** The mean setback for the SSRO surgery was 7.5 mm, with an average relapse of 1.6 mm. Right and left condylar angles were significantly different in the axial plane (rotated inwards) but not in the other planes of space. The condyles also tended to be in an anterior position prior to surgery, have a more concentric position 6 months postoperative, and return to a more anterior position by the post-retention period. No signs or symptoms of TMD were found in any patient.

**Conclusions:** SSRO with rigid fixation can alter condylar position shortly after surgery, and changes still occur between 6 and 18 months post-surgery. Patients in this study all adapted well to the new condylar position.

**Reviewer's Comments:** It was interesting to note that the condylar position was altered after surgery, but by the time of long-term follow-up the position was nearly back to the presurgical position. Since this happened between 6 and 18 months after surgery, it was likely due to a combination of remodeling and mandibular positioning changes. (Reviewer-Brent E. Larson, DDS, MS).

© 2010, Oakstone Medical Publishing

Keywords: TMJ, Condylar Position, Orthognathic Surgery, CBCT

Print Tag: Refer to original journal article
The normal increase in posterior contacts, or settling, after orthodontic treatment is not seen with full-time wear of thermoplastic retainers.

**Background:** Many clinicians are currently using thermoplastic retainers for retention due to the ease of fabrication, low cost, aesthetic appearance, and high level of patient acceptance. However, since these retainers typically have full occlusal coverage, they have been criticized because they may not allow settling of the posterior occlusion.

**Objective:** To examine the effect of thermoplastic retainer wear on occlusal contacts.

**Design:** Prospective clinical study.

**Participants:** 15 Class I patients (5 males, 10 females; mean age, 17.2 years) who required extraction of 4 first premolars and comprehensive orthodontics with fixed appliances were included. Control data were obtained from 15 untreated dental students with Class I occlusions (6 males, 9 females; mean age, 17.1 years).

**Methods:** Records were taken following treatment, after 9 months of retention (full-time retainer wear for 6 months and night-time wear for 3 months), and after 2.5 years of retention (no further retainer wear after 9 months). Records consisted of alginate impressions for study models, a bite registration taken in maximum intercuspation, and a second bite registration taken within 15 minutes to test for reliability. Each bite registration was viewed against a light box by the same orthodontist, and contact locations were recorded.

**Results:** No significant differences were found between the repeated registrations. No changes in posterior contacts were observed during the first 9 months of retention while the thermoplastic retainer was being worn. Once retainer wear ceased, an increase in the number of contacts on the second premolars and second molars was found.

**Conclusions:** Thermoplastic retainers did not show the same increase in occlusal contacts that has been reported with Hawley retainers.

**Reviewer's Comments:** I would have preferred if they compared the tooth contacts after treatment with a similar treatment group that was retained with a Hawley retainer. Such a comparison would have told me more about the various changes seen with different retainer types. This study does indicate, however, that vertical settling may be inhibited by full-time wear of thermoplastic retainers with occlusal coverage. (Reviewer-Brent E. Larson, DDS, MS).

© 2010, Oakstone Medical Publishing

Keywords: Retention, Occlusal Contacts, Thermoplastic Retainers

Print Tag: Refer to original journal article
RME Does Not Influence Long-Term Maxillary Anterior Alignment Stability

Influence of Rapid Palatal Expansion on Maxillary Incisor Alignment Stability.
Canuto LFG, de Freitas MR, et al:

Am J Orthod Dentofacial Orthop 2010; 137 (February): 164.e1-164.e6

The decision to use RME should not be based on long-term maxillary incisor stability.

Background: Rapid palatal expansion is commonly used to expand the maxillary dentition. Does this expansion result in more or less stability of the maxillary incisors after treatment?

Objective: To compare the long-term stability of maxillary incisal alignment in patients treated with and without rapid maxillary expansion (RME).

Participants: The sample for this study consisted of 48 subjects with Class I and Class II malocclusions treated without extractions with fixed edgewise appliances.

Interventions: The subjects were subdivided into 2 groups. Group 1 had 25 patients who had RME during orthodontic treatment, and Group 2 had 23 patients who did not have RME during orthodontic treatment. Dental casts were obtained pretreatment, immediately after treatment, and a mean of slightly >5 years after treatment. Little’s Irregularity Index was used to measure incisor alignment at the 3 different periods, and the differences in alignment were statistically analyzed.

Results: As might be expected, the RME group had greater maxillary arch width increases when compared with the non-RME group. There was no significant difference in the amount of maxillary crowding relapse between the 2 groups.

Conclusions: RME does not influence long-term maxillary anterior alignment stability.

Reviewer's Comments: This was an interesting study. It is easy to speculate that maxillary arches that underwent RME would help to resolve crowding and therefore might result in better long-term stability of maxillary anterior incisor alignment. However, based on the results of this study, this assumption was not supported. The bottom line is that the decision to use RME should be based on a skeletal constriction of the maxillary arch and not an assumption of better long-term alignment stability of the maxillary anterior teeth.
(Reviewer-John S. Casko, DDS, MS, PhD).

© 2010, Oakstone Medical Publishing

Keywords: Rapid Palatal Expansion, Maxillary Incisor, Alignment Stability

Print Tag: Refer to original journal article
Confirming primary failure of eruption genetically can help you avoid treatment mistakes, such as using a continuous archwire to level.

**Background:** Primary failure of eruption (PFE) is characterized by nonsyndromic eruption failure of permanent teeth in the absence of mechanical obstruction. By confirming the presence of PFE, the likelihood of negative treatment effects can be reduced.

**Objective:** To investigate how genetic analysis can be used with clinical diagnostic information for improved orthodontic management of patients with PFE.

**Participants:** The participants in this study consisted of a family of 12 people from 11 to 72 years of age.

**Methods:** 5 male and 4 female members underwent clinical and molecular testing. A comprehensive clinical examination was performed to determine a positive diagnosis of PFE. Additionally, skeletal relationships, angle classification, and anomalies in growth or stature were documented. All the subjects in the study were evaluated genetically. The relationship between the clinical and genetic information for each patient was then analyzed.

**Results:** In this family, PFE segregated with a novel mutation on the \(PTH1R\) gene. The \(PTH1R\) mutation was found to be strongly associated with failure of orthodontically assisted eruption or tooth movement.

**Conclusions:** By genetically testing patients to document the presence of PFE, orthodontists can avoid futile attempts to extrude teeth orthodontically thereby sparing these patients excessive costs and protracted treatment time.

**Reviewer's Comments:** This is the second article I have read in the past 3 months that has documented a genetic mutation related to PFE. If PFE is not diagnosed, it is easy to use traditional leveling procedures that negatively affect the teeth not involved with the PFE. By confirming the presence of a genetic mutation, an initial orthodontic treatment plan can be modified to reduce overall treatment time and provide better treatment results. To be tested genetically, a patient simply needs to provide a sample of saliva for analysis. (Reviewer—John S. Casko, DDS, MS, PhD).

© 2010, Oakstone Medical Publishing

Keywords: Treatment Planning, Genetic Diagnosis, Primary Failure of Eruption

Print Tag: Refer to original journal article
When placing miniscrews, you should advise your patients of the increased risk of failure related to smoking.

**Background:** Smoking has been documented to have negative periodontal effects and to also increase the likelihood of implant failure. Does heavy smoking have a negative effect on the failure rate of miniscrews?  

**Objective:** To investigate the effect of cigarette smoking on the failure rates of orthodontic miniscrews.  

**Participants:** The sample for this study consisted of 88 patients with a total of 110 orthodontic miniscrews.  

**Methods:** Based on statements from the patients regarding their smoking habits, the sample was subdivided into 3 groups; light smokers (≤10 cigarettes/day); heavy smokers (>greater than 10 cigarettes a day), and nonsmokers. All of the miniscrews were inserted into the attached gingiva at the buccal areas of the maxilla and mandible and interradicularly in the premolar and molar regions. Stability of the miniscrews was documented on a regular basis.  

**Results:** The average follow-up period was 9 months, and the overall failure rate was 18.2%. There was no significant difference in the failure rate of the light smoker (11.1%) and the nonsmoker (9.6%) groups. However, the failure rate for the heavy smoker group was 57.9%, which was significantly higher than the other 2 groups. Nine failures occurred within the first 4 months among the heavy smokers and 2 more during the 5 to 8 months after insertion.  

**Conclusions:** Heavy smoking has a detrimental effect on the success rates of orthodontic miniscrews.

**Reviewer’s Comments:** Smoking has been shown to have a negative periodontal effect and also to reduce the stability of implants; therefore, I was not surprised by the results of this study. I was, however, surprised by the very large difference between the failure rate of the heavy smokers and the other 2 groups. The results of this study support the importance of both documenting smoking habits with your patients and advising them that their smoking habits could have a negative effect on the stability of miniscrews. (Reviewer-John S. Casko, DDS, MS, PhD).  

© 2010, Oakstone Medical Publishing

Keywords: Miniscrews, Failure Rates, Smoking

Print Tag: Refer to original journal article