Jaw Muscle Soreness After Tooth-Clenching Depends on Force Level.
Farella M, Soneda K, et al:
J Dent Res 2010; 89 (July): 717-721

Lower force levels of tooth-clenching over a longer period of time produce greater muscle soreness than high force levels over a short period of time.

**Background:** Masticatory muscle soreness is a common sequela of tooth-clenching. The force levels that occur during tooth-clenching can be either high or low. Which levels would produce the greatest pain in the muscles of mastication long term?

**Objective:** To clarify if prolonged tooth-clenching performed at different force levels induces pain or soreness in the masticatory muscles.

**Design:** Prospective study designed to determine the relationship between force levels that occur during tooth-clenching and the degree of muscle soreness after tooth-clenching.

**Participants/Methods:** The sample for this study consisted of 10 healthy, adult females with normal occlusions and no temporomandibular symptoms. These subjects were asked to clench their teeth at varying percentage of their maximum force level. These percentages included 7.5%, 10%, 15%, 25%, and 40% of maximum bite force. They were asked to endure this level of clenching at each of these percentages for as long as possible, until pain occurred. Their pressure-pain response in the masseter and temporalis muscles was evaluated before, immediately after, and 1 day after each of these various levels of bite force were assessed.

**Results:** Results showed that high levels of bite force produced significant immediate pain in the masseter muscle after approximately 1 to 1.5 minutes of clenching. However, 1 day later, there was no increase in muscle pain after maximum clenching. On the other hand, the low level force of 7.5% could be endured for 157 minutes, on average. The day after this experiment, there was still a painful response in the muscles.

**Conclusions:** Prolonged low-level clenching in healthy individuals induces fatigue and decreased pressure/pain thresholds of the masseter and temporalis muscles.

**Reviewer's Comments:** I like this study. The authors did state that a possible explanation for the occurrence of jaw muscle soreness after prolonged low-level contraction is the continuous activation of several low-threshold motor units. These motor units may become overloaded and damaged leading to inflammation and eventually to muscle pain and/or tenderness. (Reviewer-Vincent G. Kokich, Sr, DDS, MSD).

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**Keywords:** Tooth-Clenching, Muscle Soreness

**Print Tag:** Refer to original journal article
This study provides solid evidence, supported by the use of a standardized scale, to document the improvement in quality of life for patients undergoing surgical-orthodontic treatment.

**Background:** Many patients have skeletal discrepancies that are severe enough to require combined surgical orthodontic treatment. Unfortunately, many insurance companies are reducing coverage for orthognathic surgery. Is there evidence that combined surgical-orthodontic treatment actually improves the quality of life for patients?

**Objective:** To evaluate the impact of oral health-related problems on quality of life in young adults with dentofacial deformities.

**Participants:** The sample for this study consisted of 3 different groups of patients. The first group included 20 patients who had been consulted regarding orthognathic surgical treatment. The second group included 70 patients who were currently in presurgical orthodontic treatment. The third group was comprised of 27 patients who had completed orthognathic surgery and presurgical orthodontic treatment but were still in postsurgical orthodontic treatment.

**Methods:** The Oral Health Impact Profile (OHIP) subscale, consisting of 14 questions, was used to compare the oral health impact profile of the 3 different groups.

**Results:** When the scores for the 3 groups were statistically analyzed, patients who needed orthognathic surgical treatment but had not begun it and those who were in the presurgical phase of treatment were 6.48 and 3.14 times, respectively, more likely to experience a negative impact of their oral condition compared to patients in the postsurgical phase.

**Conclusions:** Orthognathic surgery has a positive effect on a patient's quality of life.

**Reviewer's Comments:** This was a well-conducted research study utilizing a widely accepted standardized instrument for measuring the impact of oral health problems and their treatments. It did not surprise me that the postsurgical group demonstrated the least negative impact. Hopefully, more studies like this one, using standardized evaluation instruments, will provide a solid evidence-base for the positive effects of surgical-orthodontic treatment that can be used to convince insurance companies to continue coverage for orthognathic surgery. (Reviewer-John S. Casko, DDS, MS, PhD).

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Keywords: Orthognathic Surgery, Quality of Life

Print Tag: Refer to original journal article
Approximately 30% of traumatic injuries to primary teeth involve partial or total intrusion, and up to 50% of these intrusive injuries may impact the permanent successor tooth in some way.

**Background:** Childhood dental trauma occurs at a frequency of 4% to 30% and can lead to injury of the primary teeth as well as disruption of the succedaneous teeth.

**Objective:** To determine the prevalence and sequelae of intrusive luxation in primary anterior teeth and to establish whether the age of injury alters the sequelae.

**Design:** Retrospective study.

**Participants:** 169 boys and 138 girls (age range, 0 to 10 years) who presented with trauma to anterior primary teeth between March 1996 and December 2004 at the Dental Trauma Center of Rio de Janeiro State University were included.

**Methods:** The dental records of these 307 children were examined for age at injury, complications in the primary and permanent teeth, and the type of trauma.

**Results:** Children from 1 year to 4 years of age were most affected, with "falls" being the most common cause. The most common type of trauma was intrusive luxation (221 teeth; 29.3%), with 57.9% totally intruded into the gingival tissue and 42.1% partially intruded. The most common complications in primary teeth were pulp necrosis/premature loss and color change; 78.9% of the totally intruded teeth underwent pulp necrosis and were prematurely lost. The most common changes to permanent teeth were color change or enamel hypoplasia, which occurred in 20% of the total intrusion cases and nearly 30% of the partial intrusion cases. No significant correlation was found between the child's age at injury and any following complications.

**Conclusions:** Intrusive luxation of primary anterior teeth is relatively common and often results in complications to both the affected primary tooth and its permanent successor.

**Reviewer's Comments:** This is a difficult study to do because of the time needed between the traumatic injury of the primary incisor and the ultimate eruption of the permanent successor. These injuries are difficult to prevent because most happen as a result of falls at home rather than during some planned activity. It was interesting that, according to these data, there appears to be more risk to the permanent successor with a partial intrusion compared to a total intrusion. This difference may be related to the way the 2 injuries were treated, which is something not examined in this study. (Reviewer-Brent E. Larson, DDS, MS).

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Keywords: Trauma, Incisor Intrusion, Outcomes

Print Tag: Refer to original journal article
Immediate Orthodontic Loading Possible Without Fear of Implant Failure

Long-Term Follow-Up of Dental Single Implants Under Immediate Orthodontic Load.

Palagi LM, Sabrosa CE, et al:

Angle Orthod 2010; 80 (September): 807-811

Traditional restorative implants can be placed, restored, and loaded immediately for orthodontic purposes without concern about implant failure.

**Background:** Occasionally, orthodontists will be challenged to treat adult patients who are missing several critical posterior teeth. Without posterior teeth, anchorage requirements are difficult. Some of these adults will be restored with conventional restorative implants after treatment. These restorative implants can be placed before or during orthodontics and used for anchorage. How long should these implants be allowed to integrate before placing an orthodontic load?

**Objective:** To evaluate the success of osseointegrated implants under immediate prosthetic and orthodontic loading.

**Design/Participants:** Clinical trial where restorative implants were placed in a group of 13 patients.

**Methods:** 20 total implants were positioned. All implants received prosthetic crowns that were placed at the same appointment that the implants had been inserted. Then the implants were randomly divided into 2 groups. In the control group, the implant was allowed to integrate for 4 months before an orthodontic load was started. In the experimental group, the orthodontic load of 200 grams was started immediately. After 6 months, and then after 2 years, the success of the implants was compared.

**Results:** The results of this study showed that only 1 implant failed in each of the groups (control and experimental). Therefore, the authors conclude that immediate loading of restorative implants is possible without concern about potential failure of the implant.

**Conclusions:** Immediate orthodontic loading of conventional restorative implants is possible without fear of causing failure of that implant.

**Reviewer's Comments:** Although the sample size for this study was small, the data are convincing. It makes sense that these implants can be loaded immediately. After all, when an implant is loaded, it stimulates the formation of bone on the pressure side. Researchers have shown this biologic response in the past in animal experimental studies, and this same process occurs around mini-implants or mini-screws. If the implant is placed properly, without overheating the bone, and the implant is not lost due to infection, immediate loading, whether the implant is a small mini-implant or a traditional restorative implant, can be performed immediately with a high degree of success. (Reviewer-Vincent G. Kokich, Sr, DDS, MSD).

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Keywords: Implant Loading

Print Tag: Refer to original journal article
This case reports demonstrates a situation where a tongue stud was repeatedly placed between the upper teeth with enough force and frequency to create a large diastema.

**Background:** Currently, tongue piercings are relatively common (between 4% and 16% of college students have them) despite many known risks such as chipped teeth, periodontal problems, infection, and nerve damage.

**Objective:** To describe another possible risk from tongue piercings—opening a midline diastema.

**Design:** Case report and literature review. **Case Report:** A 26-year-old woman who was previously treated orthodontically presented with a large midline diastema. The patient had a tongue piercing placed 7 years earlier. She admitted that the metallic, barbell-shaped stud was habitually placed between the maxillary central incisors. The resulting force was apparently sufficient to open the space by pushing teeth apart. The tongue piercing was removed, and the patient was treated orthodontically. A standard 0.018” preadjusted bracket was used, and space closure was performed on a 0.016” round stainless steel arch wire. The diastema was closed, and a good final occlusion was obtained. Removable retainers were provided for retention.

**Conclusions:** Tongue piercings, if habitually placed between the central incisors, can open a midline diastema. This can be treated orthodontically following removal of the tongue piercing.

**Reviewer’s Comments:** The authors quoted a study of high school students indicating that 75% of those with oral piercing admitted to playing with them. Like any other habit, this constant playing can change the oral environment and the forces on teeth. This in turn can result in unwanted tooth movement. In my experience, the most effective way to influence young adults to give up their tongue piercings is with information. I tell them about the risk of tooth fracture and gingival recession while trying not to be judgmental. This article, and the photos in it, will be an effective way to communicate an additional risk of piercings to these individuals. (Reviewer-Brent E. Larson, DDS, MS).

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Keywords: Tongue Piercing, Diastema, Orthodontics

Print Tag: Refer to original journal article
The primary motivating factor for adult patients undergoing orthognathic surgery is concern about occlusion or function rather than facial appearance.

**Background:** Several studies in the past have been performed to evaluate a patient's motivation for undergoing orthognathic surgery. The primary motivating factor seems to be appearance or the patient's desire to improve their appearance. However, the sample sizes for these studies are relatively small. What would be the results of assessing a sample of 500 subjects who were being evaluated for orthognathic surgery?

**Objective:** To determine the primary motivation for adult subjects seeking surgical consultation for orthognathic surgery.

**Design/Participants:** Retrospective evaluation of a questionnaire that had been given to patients who were seeking evaluation for orthognathic surgery. The sample consisted of 500 subjects.

**Methods:** 57% of the 500 subjects were female, and 43% were male. Each was asked a series of questions about their age and gender, whether their problem affected their appearance, speech or swallowing, what their primary motivation for seeking orthognathic surgery was, and whether they were able to show an appropriate understanding of their facial deformity.

**Results:** When patients were asked whether their problem affected their appearance, 76% said yes. When subjects were asked whether their problem affected their speech, 33% noted they had speech difficulty. When subjects were asked what their primary motivation was for seeking treatment, the primary motivating factor was the patient's bite. This was followed by appearance, pain, smile, and speech.

**Conclusions:** The primary motivating factor for a large sample of subjects who are undergoing orthognathic surgery is to improve their bite rather than their facial appearance.

**Reviewer's Comments:** Although this study presents some interesting information, I am not certain of the quality of the data. This questionnaire was given to the subjects prior to the treatment. I am wondering whether or not these patients emphasized improvement in their bite just so they would make certain that they would qualify in terms of insurance coverage for this surgery. Perhaps they would not state that they were motivated to change their appearance if they believed that this would disqualify them from having their surgical procedure paid for by an insurance company. (Reviewer-Vincent G. Kokich, Sr, DDS, MSD).

© 2010, Oakstone Medical Publishing

Keywords: Orthognathic Surgery, Evaluation, Motivating Factors

Print Tag: Refer to original journal article
To avoid damage to adjacent teeth, many patients with impacted maxillary canines should be treated in 2 stages.

**Background:** Most orthodontists believe that the treatment of impacted maxillary canines is a difficult procedure that incurs additional risks during treatment and usually extends treatment time. As an orthodontist, it would be helpful to know the most common causes of failures in treating maxillary impacted canines.

**Objective:** To examine the records of patients with an impacted tooth whose original orthodontic treatment did not resolve the impaction.

**Participants:** 28 patients (10 males, 18 females; age, 17.4 years ± 4.3 years) with 37 maxillary impacted canines who were referred after a failed attempt to resolve the impactions were included.

**Methods:** Data from the patient’s record were gathered in regard to the initial treatment and the second orthodontic treatment. The specific cause of the failed treatment for each patient was analyzed and corrective treatment was initiated.

**Results:** The major reasons for failure were inadequate anchorage, mistaken location and directional traction, and ankylosis. The mean duration of the corrective treatment was 14.4 months, while the mean duration of the initial failed treatment was 26.2 months. Because an accurate location of an impacted canine was a major factor in the failed treatment group, the authors recommended greater use of cone beam computed tomography (CBCT) for diagnosing maxillary impacted canines.

**Conclusions:** Inaccurate 3-dimensional diagnosis of the location and orientation of impacted maxillary canines and failure to appreciate anchorage demands were the major reasons for failure of treatment.

**Reviewer's Comments:** This was an excellent study. Based on the evaluation of failed treatment, it is obvious that greater use of CBCT in diagnosing the exact location of impacted maxillary canines would be very helpful. The practical question becomes, “When is plain radiography adequate, and when is CBCT required?” My conclusion after reading this article is that anytime you are not very confident of the exact location of an impacted maxillary canine, CBCT is indicated. (Reviewer—John S. Casko, DDS, MS, PhD).

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Keywords: Impacted Maxillary Canines, Treatment Failure

Print Tag: Refer to original journal article
Using Heat-Activated Ni-Ti to Create an Internal Distractor

The Study of Distraction Osteogenesis With Nitinol Shape Memory Alloy Spring Controlled by Infrared Light.

Wang, Zeng R-S, et al:


A unique method of distraction osteogenesis is demonstrated in rabbits using distractors made from shape memory nickel-titanium and activated by infrared light allowing for a completely internal distractor design.

**Background:** Current distraction osteogenesis (DO) techniques are effective, but manual advancement of a screw requires the device to be placed through the tissue, leading to possible scarring and infection. A smaller device that could be placed completely internally would be more esthetic and more easily tolerated.

**Objective:** To examine a new internal distractor using a nickel-titanium shape memory alloy (Ni-Ti SMA) spring that is controlled by infrared light.

**Design:** Animal study involving 20 New Zealand white rabbits.

**Methods:** At 4 months of age, each rabbit was anesthetized and a 10-mm x 15-mm bone defect was created on the inferior border of the mandible on each side. On one side, a 10-mm x 8-mm segmental osteotomy was done to free a bone segment to transport across the defect. A distractor was placed, consisting of a metal bar spanning the defect and an Ni-Ti coil to move the bone segment. The Ni-Ti coil was specially designed with a transformation temperature >37°C. After a 2-day latency period, the distractor was activated daily for 9 days using infrared light. Radiographs were taken at 2, 5, 8, and 11 days to assess transportation of the bone segment, as well as at 4, 8, and 12 weeks to assess healing. Two animals were sacrificed at 8 weeks and 2 at 12 weeks to examine the bone histologically.

**Results:** The rabbits initially had reduced interest in food and had swelling in the mandible following infrared heating. The mandibular defect filled in with bone on the DO side, while not healing on the control side. The bone mineral density of the filled defect was not significantly different than normal bone.

**Conclusions:** Fully internal DO devices using shape memory Ni-Ti coils are feasible, although further work on controlling movement of the bony segment is needed to improve bone quality.

**Reviewer's Comments:** This is a very unique method of creating a completely internal distractor, but it may be difficult to develop with adequate control in humans. Classic DO requires a latency period with no activation, but this distractor becomes slightly active immediately due to tissue temperature. Other methods of delivering heat, such as ultrasound, may ultimately be more useful and comfortable in humans. (Reviewer-Brent E. Larson, DDS, MS).

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Keywords: Distraction Osteogenesis, Nickel-Titanium

Print Tag: Refer to original journal article
Temporomandibular joint disc repositioning surgery is highly successful when evaluated with magnetic resonance imaging.

**Background:** A common problem for adults is internal derangement of one or both temporomandibular joints (TMJs). In this situation, the temporomandibular disc is displaced, often anteriorly. The most common symptom for this disorder is clicking or popping of the TMJ. In severe cases, the displaced disc actually causes locking or restriction of opening of the mandible. How can this be managed?

**Objective:** To evaluate the efficiency of an arthroscopic suturing technique for stabilizing anteriorly displaced discs in patients with internal derangement of the TMJ.

**Design:** Retrospective evaluation of a large series of patients who had been treated with this surgical technique. The sample consisted of 639 patients, and 764 TMJs were operated on. All subjects had MRI performed before surgery and also between 1 and 7 days after the operation. All subjects had internal derangement that was deemed restrictive and limiting to the patient's function. When the authors evaluated the postoperative MRIs, they scored them based upon the position of the disc in 3 different sagittal planes (lateral, central, and medial). If the discs were properly positioned in all planes, it was scored excellent, in 2 planes, it was scored good, and in 1 plane only, it was scored poor.

**Results:** The results of this study showed that 95% (729 of 764) of the joints were excellent, 3% (24 of 764) were good, and only 2% (11 of 764) were poor.

**Conclusions:** The authors conclude that arthroscopic surgery to reposition a displaced disc using a special technique for suturing produces a high degree of success at recapturing the disc in its proper position.

**Reviewer's Comments:** Although this study showed some impressive results at surgery, I would be interested in 2 further questions. How did these patients function after the surgery, and what were the long-term effects? I would like to see these researchers report on this sample from 1 to 5 years after the surgery to determine if this type of procedure is predictable long term. (Reviewer-Vincent G. Kokich, Sr, DDS, MSD).

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Keywords: Internal Derangement, Disc Repositioning, TMJ

Print Tag: Refer to original journal article
Efficacy of a Filled-Resin Sealant in Preventing Decalcification During Orthodontic Treatment.
Leizer C, Weinstein M, et al:

Am J Orthod Dentofacial Orthop 2010; 137 (June): 796-800

Unfilled non–fluoride-releasing sealants are less expensive and just as effective as filled fluoride-releasing sealants in preventing decalcification.

Background: All orthodontists are concerned about preventing decalcification during orthodontic treatment. Filled fluoride-releasing sealants have been developed in an attempt to reduce decalcification. Are they any more effective than nonfilled, non–fluoride-releasing sealants?

Objective: To compare the effect of a fluoride-releasing enamel sealant with that of an unfilled, non–fluoride-releasing control in reducing decalcification during orthodontic treatment.

Design: In vivo study.
Participants: 22 consecutively treated patients who were about to undergo comprehensive full 1-phase orthodontic treatment were reviewed. Eighteen of these patients were used for the final evaluation.

Methods: The patients served as their own controls in a split-mouth study design. Half of the individual teeth from canine to canine in both the maxillary and mandibular arches were alternatively treated with Pro Seal, a fluoride-releasing filled resin sealant, or Transbond MIP. Photographic evaluation was used to determine the levels of decalcification over a 12- to 18-month treatment period. Twelve orthodontic professionals randomly evaluated all photographs and graded them on a 3-point scale related to the amount of decalcification. The scores for the 2 groups were then statistically evaluated.

Results: There was no statistical or clinical difference between the 2 groups. There was no advantage to using the filled fluoride-releasing sealant.

Conclusions: The additional time and expense required to apply Pro Seal does not appear to contribute to the prevention of decalcification.

Reviewer's Comments: This was a well-controlled in vivo study conducted under circumstances that closely resemble what would occur during orthodontic treatment. Because of the multiple factors that contribute to decalcification during orthodontic treatment, the results did not surprise me. It was nice to find out that increased cost and time do not necessarily lead to better results. (Reviewer-John S. Casko, DDS, MS, PhD).

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Keywords: Orthodontic Treatment, Decalcification, Filled-Resin Sealant

Print Tag: Refer to original journal article
Miniscrew-Supported Transitional Tooth Replacement: An Esthetic Alternative.

Paquette DE:


Detailed, step-by-step instructions are provided demonstrating how to place a miniscrew-supported pontic for the transitional replacement of a missing incisor.

Background: Congenitally missing lateral incisors are relatively common, and plans are often made for an implant replacement when the patient is old enough. Until this point, however, traditional temporary replacement after orthodontics is done using a flipper or Maryland bridge, which is not ideal in terms of esthetics and prevention of ridge atrophy.

Objective: To describe a technique for the use of miniscrew-supported pontics as a temporary tooth replacement. Description of Technique: A plastic denture tooth is chosen with a proper size and shade. The denture tooth should then be adjusted to ideal length, hollowed out at the base for the screw head, and made slightly concave at the interproximal contacts to help prevent rotation. Once the patient is anesthetized, the denture tooth can be strongly pressed into the tissue at an ideal orientation. This provides a reddened circle to guide the miniscrew placement. Dr. Paquette recommends a 12-mm VectorTAS miniscrew, because the length helps promote lateral stability, and the gold color is esthetic. If a Vector miniscrew is used, orientate a flat surface of the head facially to prevent the color from showing through the crown. Next, cut a small hole in a mylar strip and place over the miniscrew to form a smooth gingival surface. Apply plastic primer to the interior of the crown and petroleum jelly to the outside. Fill the crown with a light cured composite, press firmly on top of the miniscrew while pulling the mylar band up to contour the gingival, and then cure. Finally, clean the flash and adjust the occlusion as needed. A clear, vacuum-formed retainer is recommended for at least 1 month while eating so the miniscrew becomes stable.

Conclusions: A relatively simple, esthetic technique for temporary replacement of a missing lateral is presented.

Reviewer’s Comments: This is an intriguing technique because management of missing incisors after orthodontics but before final restoration is a challenge. The author advocates this technique as a promotior of ridge stability, but there are currently no data to support it. If fact, there are those who believe putting in a vertical miniscrew may actually inhibit further vertical alveolar development, but, again, there are not enough data either way at this point. I like the novel ideas of a slight concavity in the interproximal areas to enhance rotational stability and the use of a mylar strip gingivally to smooth the surface during curing. (Reviewer-Brent E. Larson, DDS, MS).

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Keywords: Missing Tooth, Pontic, Miniscrew

Print Tag: Refer to original journal article
Self-Ligating vs Standardized Edgewise Brackets

Randomized Clinical Trial of Orthodontic Treatment Efficiency With Self-Ligating and Conventional Fixed Orthodontic Appliances.

Fleming PS, DiBiase AT, Lee RT:

Am J Orthod Dentofacial Orthop 2010; 137 (June): 738-742

Treatment efficiency should not be the basis for choosing between self-ligating and conventional orthodontic brackets.

Background: There have been claims that self-ligating brackets are more efficient than standard edgewise orthodontic brackets. Is this true? This is a question that you should be able to answer.

Objective: To determine if self-ligating brackets reduce the duration of orthodontic treatment and the number of visits required compared to traditional edgewise brackets.

Participants: The sample consisted of 66 consecutive patients.

Methods: The patients were randomly divided into 2 groups. One group was treated with a self-ligating bracket system (SmartClip), and the second group was assigned to treatment with conventional orthodontic brackets (Victory). The duration of treatment and the number of visits required were recorded. Additionally, the initial and final peer assessment rating scores were recorded. The differences between the 2 groups for the duration of orthodontic treatment, number of visits, and peer assessment rating (PAR) scores were statistically evaluated.

Results: No statistically significant differences were found between the 2 groups related to treatment duration or required visits. There was also no statistically significant difference in the percentage of PAR score reduction during treatment.

Conclusions: The self-ligating bracket systems used in this study neither improved the efficiency of fixed appliance orthodontic treatment nor resulted in fewer treatment visits.

Reviewer’s Comments: I did not find these results surprising. When new treatment appliances such as self-ligating brackets are initially marketed, many positive claims are usually made about them. Too often, these claims are anecdotal in nature and are related to people or companies who have a self-interest in the new product that is being promoted. It is for this reason that independent scientific research studies, similar to the present trial, are needed to provide objective evidence by which the practicing orthodontist can evaluate the claims made for specific products. (Reviewer-John S. Casko, DDS, MS, PhD).

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Keywords: Orthodontic Appliances, Self Ligating, Conventional Fixed, Treatment Efficiency

Print Tag: Refer to original journal article
The challenges of owning a new practice are often great, but the rewards can be even greater.

**Background:** What are the practice options for new dentists graduating from dental school, and how is the debt they have accumulated likely to affect their practice options? Understanding the advantages and disadvantages of different practice options is important if new dentists are to make informed choices.

**Objective:** The purpose of this guest presentation article was to describe the advantages and disadvantages of 4 practice options available to graduating dentists. **Discussion:** These options include becoming an associate, working for a dental service organization or dental corporation, joining the military, or opening a solo practice. Currently, >60% of dentists are in solo practice. However, with new dentists graduating from dental school with an average of $241,849 in debt, practice options may change. Most dentists begin their careers as an associate, which is an excellent way to improve their understanding of clinical treatment and practice management. The downside of becoming an associate is that you are working for someone else. Working for a dental service organization or large corporations usually reduces the need to become involved with the administration of a practice and eliminates the need to incur additional debt. However, these practices can often be high volume and can be very stressful. Joining the armed services provides an opportunity to gain additional training along with significant financial assistance. However, this often requires a long-term commitment. Opening a solo practice requires incurring an even greater level of debt. New practice owners could easily be $1 million in debt before seeing their first patients. The higher level of debt incurred by graduating dental students may not prevent them from entering solo practice but may well increase the length of time before they do so.

**Conclusions:** It may take longer, but most dentists are likely to choose a solo practice setting.

**Reviewer's Comments:** Although the practice options discussed in this article focused on general dentists, I think many considerations apply to orthodontists as well. I believe the appropriate practice setting for each graduating orthodontist depends a great deal on his or her individual personality. Some graduates are happy learning the ropes from an experienced orthodontist, while others can't wait to be their own boss. Additionally, there are graduates who are proud to be a member of the military and enjoy the security and lifestyle presented by this option for practice. (Reviewer-John S. Casko, DDS, MS, PhD).

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Keywords: Practice Options, New Dentists

Print Tag: Refer to original journal article
Arch Changes for Class I Patients -- Premolar Extraction vs Air-Rotor Stripping

Arch-Width and Perimeter Changes in Patients With Borderline Class I Malocclusion Treated With Extractions or Without Extractions With Air-Rotor Stripping.

Germec-Cakan D, Taner TU, Akan S:

Am J Orthod Dentofacial Orthop 2010; 137 (June): 734.e1-734.e7

Air-rotor stripping can be a treatment option for Class I borderline patients with mild to moderate crowding.

**Background:** Moderate crowding in Class I patients can be treated by either 4 premolar extractions or air-rotor stripping. Are there significant differences in arch width and perimeter changes if one versus the other of these techniques is used?

**Objective:** To compare dental arch width and perimeter changes in patients with borderline Class I occlusion treated with extractions or without extractions with air-rotor stripping.

**Methods:** The sample for this study consisted of 26 sets of pretreatment and posttreatment dental models of patients with borderline Class I occlusion; 13 patients were treated with 4 premolar extractions, and 13 patients were treated without extractions but with air-rotor stripping. Pretreatment and posttreatment cast measurements, arch width, and perimeter changes were recorded and statistically compared between the 2 groups.

**Results:** No difference was found between intercanine widths after treatment when the 2 groups were compared. The mean maxillary intermolar widths were significantly decreased in both groups. The maxillary arch perimeter was significantly decreased in the extraction group. The mandibular intercanine width was significantly increased in the extraction group.

**Conclusions:** In Class I borderline patients with moderate crowding, extraction therapy with minimal anchorage did not result in narrower dental arches.

**Reviewer's Comments:** I did not find these results surprising. While it has long been accepted that increasing canine width leads to a greater tendency for relapse, it is important to differentiate between an increase in canine width simply from expanding the canines versus an increase in canine width due to retracting the canines into a wider part of the arch in extraction cases to relieve anterior crowding. The key to successful treatment is maintaining arch form, which can result in width changes for both the canines and molars if the canines are moved distally or the molars are moved mesially, which often happens in extraction cases. (Reviewer-John S. Casko, DDS, MS, PhD).

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Keywords: Extraction vs Air-Rotor Stripping Arch Changes

Print Tag: Refer to original journal article
Sagittal split ramus osteotomy and mandibular setback cause narrowing of the pharyngeal airway in both males and females.

**Background:** The treatment for mandibular prognathism in adults involves sagittal split ramus osteotomy (SSRO) of the mandible and mandibular setback. What effect does this have on the pharyngeal airway after surgery?

**Objective:** To compare changes in the pharyngeal airway between male and female patients after mandibular setback surgery.

**Design:** This was a retrospective evaluation of the records of 57 subjects who had Class III malocclusions and who had undergone SSRO to set back the mandible and correct the malocclusion. The sample was divided into 30 males and 27 females.

**Methods:** Lateral cephalometric radiographs were made and measured at 3 time periods: before surgery, 2 months after surgery, and 12 months postoperatively. The pharyngeal area was measured at 3 levels on the cephalometric radiographs: at the uvula tip, at the lower level of the second cervical vertebrae, and at the midlevel of the third cervical vertebrae on each of the cephalograms. The distance was compared at each of these levels between males and females.

**Results:** The average length of the mandibular setback was 8.61 mm in men and 7.82 mm in women; this difference was not statistically significant. When the authors evaluated the reduction in the pharyngeal airway, they found that, compared to the preoperative measurement, the pharyngeal airway became narrow at all 3 levels postoperatively, specifically at 2 and 12 months postoperatively for both males and females. When the authors correlated the amount of mandibular setback with the narrowness of the pharyngeal airway, they found that male patients did not show any significant correlation; however, the correlation coefficient was much greater for women, specifically at 12 months’ postoperatively.

**Conclusions:** The size of the pharyngeal airway after SSRO in Class III subjects becomes narrower proportionate to the amount of the mandibular setback in female patients but not in male patients.

**Reviewer’s Comments:** Although this study makes some interesting observations, the assessment of pharyngeal airway was made only on 2-dimensional lateral cephalometric radiographs. In the future, I believe these types of assessments will need to be made using 3-dimensional imaging techniques, which will have the ability to show the volumetric change rather than simply the area and linear change in the pharyngeal airway.

(Reviewer-Vincent G. Kokich, Sr, DDS, MSD).

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Keywords: Pharyngeal Airway, Jaw Surgery

Print Tag: Refer to original journal article
Effects of Resin-Modified Orthodontic Band Adhesives on Cytotoxicity to Cells In Vitro

Cytotoxic Effects of Resin-Modified Orthodontic Band Adhesives: Are They Safe?
Malkoc S, Corekci B, et al:

Angle Orthod 2010; 80 (September): 890-895

Resin-modified orthodontic band adhesives show significant cytotoxicity in cell cultures in vitro.

Background: Orthodontic materials are commonly tested to determine their efficiency at producing a desired effect during orthodontic treatment. One of the most often used materials is band cement. Currently, resin-modified cements are commonly used to adhere bands to teeth. Are these materials toxic to cells?

Objective: To evaluate the cytotoxic effects of 3 different resin-modified orthodontic band adhesives in vitro.

Design: This was a laboratory study.

Methods: 3 resin-modified orthodontic band cements were tested: Bisco Ortho Band Paste LC™; Multi-Cure Glass Ionomer Band Cement™; and Transbond Plus Light Cure Band Adhesive™. Test specimens were prepared according to the manufacturer's instructions. These specimens were made into discs measuring 5 mm in diameter, 1.5 mm in thickness, and 2 mm in height. Cells were harvested from newborn calf serum and were prepared into a culture medium. Each of the adhesive discs was cultured in the cell medium for a specified period of time. Next, cell survival was analyzed to determine if the adhesive materials had been toxic to the cells.

Results: All tested materials showed significantly decreased cell survival percentage compared to a control group. The multi-cure glass ionomer cements had a statistically significant smaller effect on cell survival and growth compared to the 2 other adhesive systems and the control group.

Conclusions: All 3 orthodontic resin-modified band adhesives cause significant cellular alterations in vitro.

Reviewer's Comments: I am not certain how to interpret this study. The fact that these band adhesives were cytotoxic to cells in culture medium is a bit disturbing. However, these materials have been used intraorally for many years. I think we would have noted some problems intraorally from these materials with time if this toxicity were clinically significant. Perhaps the method used in this experiment exaggerated the impact of this material compared to how it is used beneath bands in clinical subjects. (Reviewer-Vincent G. Kokich, Sr, DDS, MSD).

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Keywords: Cytotoxicity Effects, Dental Materials

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Immediate Loading of Dental Implants in Periodontally Infected Sites -- Will It Work?

Immediate Loading of Dental Implants Placed in Periodontally Infected and Non-Infected Sites: A Four-Year Follow-Up Clinical Study.

Crespi R, Capparè P, Gherlone E:

J Periodontol 2010; 81 (August): 1140-1146

Dental implants placed and immediately loaded in periodontally infected sockets show no significant differences compared to implants placed in uninfected sites.

**Background:** Dental implants are commonly used to replace missing teeth. One of the reasons that teeth are missing is often because of periodontal disease and destruction of bone secondary to periodontal inflammation. A common way of placing implants is to extract a tooth and place an implant immediately after tooth extraction. However, what happens if the tooth socket has an existing periodontal infection?

**Objective:** To compare the outcome of immediately loaded implants placed in sites with chronic periodontal lesions.

**Design:** This prospective trial was conducted between February 2005 and October 2005.

**Participants:** 37 patients (23 women and 14 men) who ranged in age from 32 to 71 years, were selected for this study.

**Methods:** A total of 275 implants were placed in extraction sockets. Of these, 197 implants were placed in periodontally infected sites, and 78 implants were placed in noninfected sites. After implant placement, all patients received immediate temporary abutments and prosthetic restorations. All temporary crowns were in full contact in centric occlusion. Follow-up visits were performed every 6 months after implant placement. Radiographs were taken at baseline and then at 1 year, 2 years, and 4 years after implant placement. Five months after implant insertion, definitive final restorations were placed. Success rates were compared after 4 years.

**Results:** After 48 months of follow-up, the survival rate of implants placed in noninfected sites was 100%. The survival rate of implants placed in the infected sites was 98.9%, because 2 implants were lost 1 month after placement, and were replaced 2 months later. When the authors evaluated the radiographic response, both the infected and noninfected implant sites showed good maintenance of bone levels, which resulted in a similar mean bone loss at 48 months of <1 mm. There were no statistically significant differences between the infected and noninfected sites with respect to bone loss.

**Conclusions:** Immediate placement of implants in tooth sockets that had suffered from chronic periodontal infection may not necessarily be contraindicated. This study has shown a high degree of success when immediate implants were placed in periodontally infected sockets.

**Reviewer's Comments:** This interesting study compared the effects of healing around implants placed in infected and noninfected sites of patients with periodontal disease. I was surprised at the lack of significance between these sites. Obviously, the authors performed careful debridement of all sockets to eliminate some of the infection, and they probably used antibiotics, which would help control any infection that occurred during the healing of the implant surgeries. (Reviewer-Vincent G. Kokich, Sr, DDS, MSD).

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Keywords: Implant Loading, Periodontal Health

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Maxillary Protraction Does Not Affect Airway Dimensions

Treatment and Post-Treatment Effects of Facemask Therapy on the Sagittal Pharyngeal Dimensions in Class III Subjects.

Baccetti T, Franchi L, et al:


The treatment of maxillary protraction resulted in significant skeletal improvement for Class III subjects compared to untreated controls, but no increase in airway dimensions.

**Background:** Maxillary protraction with a facemask can produce favorable orthopedic changes in young Class III patients, yet conflicting evidence exists on what effect this treatment has on the airway.

**Objective:** To evaluate skeletal and pharyngeal dimensions in Class III patients treated with a facemask compared to untreated Class III controls.

**Design:** Cephalometric study.

**Participants:** 22 consecutive Class III patients (Wits ≤2 mm, anterior crossbite, and Class III molar relationship) who were treated with a facemask and lower removable bite-block appliance. Patients started treatment at 8.9 ± 1.5 years of age; 14 untreated Class III subjects were selected as controls from the records at the University of Florence.

**Methods:** Lateral cephalograms were obtained before facemask treatment (T1), at the end of active treatment (T2), and 2 years after active treatment (T3). Cephalograms were available for the control subjects at corresponding time points. The facemask treatment group was treated with a reverse-pull facemask worn to a double-arch structure cemented to the first maxillary molars. Patients were instructed to wear the facemask with a 600-g force for at least 14 hours a day. A removable Schwarz plate was also delivered for the lower arch to act as a bite block and provide expansion as needed. Cephalometric analysis was performed to measure changes in cranial base flexure, sagittal changes in the maxilla and mandible, vertical changes, and changes in sagittal pharyngeal dimensions.

**Results:** No significant differences were found between the facemask group and the control group at baseline. Facemask treatment produced significant positive maxillary skeletal changes at T2 and T3 (A-point to N-perpendicular, Wits appraisal, and maxillomandibular and unit differences). Treatment also produced a significant increase in the mandibular plane to palatal plane angle at T2, but this was not seen at T3. No significant changes were found in airway dimensions.

**Conclusions:** Facemask treatment produced favorable skeletal changes in Class III patients, but no significant changes in airway dimensions were found compared to untreated Class III controls.

**Reviewer's Comments:** The strength of this study is the use of an untreated control sample and the 2-year posttreatment follow-up. Even though the controls were not perfectly age matched, they helped provide a reference against which to judge the treatment results. Several previous studies have shown changes in airway dimensions with maxillary protraction treatment, but they did not have an untreated control to know whether the measured change was treatment related or growth related; this study suggests that the airway changes are growth related and happen both to those who are treated and untreated. (Reviewer-Brent E. Larson, DDS, MS).

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Keywords: Class III, Maxillary Protraction, Airway

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Bolton Tooth Size Ratios in Polish Orthodontic Patients

*Overall and Anterior Bolton Ratio in Class I, II, and III Orthodontic Patients.*

Wedrychowska-Szulc B, Janiszewska-Olszowska J, Stepień P:

Eur J Orthod 2010; 32 (June): 313-318

The average Bolton ratios for this combined malocclusion group of Polish subjects differs from Bolton's ideals, and about one-third had a clinically significant tooth size discrepancy.

**Background:** A common method to determine tooth size discrepancies is the Bolton ratio. Evaluation of this ratio in different malocclusion groups and populations is still being performed.

**Objective:** To compare anterior and overall Bolton ratios between different malocclusion groups in a Polish population.

**Design:** Retrospective cast analysis involving 600 pretreatment casts (262 males and 338 females) selected from the models of 3088 patients who had records taken between 2003 and 2006 at various orthodontic offices in Poland. Cases were between 12 and 25 years of age, had a full permanent dentition (first molar to first molar), and had no interproximal restorations. Cases were divided into Class I (n=162), Class II division 1 (n=144), Class II division 2 (n=155), and Class III (n=139) groups based on molar relationship, ANB angle, and overjet.

**Methods:** Mesiodistal dimensions of all maxillary and mandibular teeth from first molar to first molar were measured to the nearest 0.1 mm with digital calipers. Anterior and overall Bolton ratios were calculated and compared between malocclusion groups.

**Results:** The average overall Bolton ratio was 91.8%, and the average anterior Bolton ratio was 78.8%—both higher than the Bolton standard. Class I and Class III patients showed significantly higher Bolton ratios. Nearly one-third of the population studied (31.2%) showed >2 standard deviations (SD) from the Bolton norm.

**Conclusions:** The Polish population studied showed higher Bolton ratios than the Bolton norm. Significant differences were also found in the malocclusion group.

**Reviewer's Comments:** If a limit of 2 SD is used to define a clinically significant tooth size issue, then one-third of this population had a clinically significant tooth size discrepancy. This is similar to estimates in other populations. Ideal tooth size ratios can also vary based on tooth thickness, marginal ridge prominence, and incisor inclination. It would be interesting to see a Bolton-like series of ideal Polish cases measured to determine whether the ratio difference in this study was malocclusion related or population related. This article also contains a good summary table of published tooth size ratio studies for reference. (Reviewer-Brent E. Larson, DDS, MS).

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Keywords: Tooth Size, Bolton Ratio

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Is Microleakage a Problem With Indirect Bonding?

Microleakage Under Orthodontic Brackets Bonded With the Custom Base Indirect Bonding Technique.

Yagci A, Uysal T, et al:

Eur J Orthod 2010; 32 (June): 259-263

No difference in microleakage was found when comparing direct and indirect bonding techniques under the same conditions.

Background: Microleakage underneath orthodontic brackets can lead to white spot lesion formation and lower bond strengths.

Objective: To compare microleakage between directly bonded brackets and indirectly bonded brackets.

Design: In vitro study.

Methods: 40 extracted human premolars were randomly assigned to a direct bonding group or an indirect bonding group. The premolars in the direct bonding group were bonded according to the manufacturer’s recommendations (37% phosphoric acid gel etch for 15 seconds, Transbond XT primer, and composite). For the indirect bonding group, the adhesive resin was again Transbond XT, but a chemical cure primer (Sondhi Rapid Set A/B Primer) was used, with the Primer A applied to etched enamel and the Resin B to the bracket bases. After bonding, each tooth was sealed with varnish, except for the area directly around the bracket base. Teeth were then immersed in 0.5% basic fuchsine for 24 hours. The teeth were rinsed, dried, and sectioned into 4 slices for examination. Microleakage was measured using an electronic digital caliper.

Results: No significant differences in microleakage were found between direct and indirect bonding. No microleakage was found at the occlusal margin in either group, but a small amount of microleakage was present at the gingival margin in some samples (not statistically significant).

Conclusions: Indirect bonding does not significantly alter the amount of microleakage compared to direct bonding.

Reviewer’s Comments: This in vitro study found, in general, very little microleakage with either technique. The small leakage that was seen, however, was at the gingival margin. This gingival leakage could increase in the clinical situation in which bonding is done near the gingival margin and some moisture may be present. Overall, microleakage does not seem to be a problem when bonding orthodontic brackets, but care should be taken to ensure cleaning at gingival margins to avoid decalcification. (Reviewer-Brent E. Larson, DDS, MS).

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Keywords: Indirect Bonding, Microleakage

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