Have you ever had a day in the office when the patients moved through smoothly, according to schedule, and then other days when you see the patient list and know it is not going to be the best of days? Understanding the birth order of your patients can let you know right from the initial examination what to expect in the way of cooperation during treatment. This will allow you to adjust your fees and treatment plans well in advance of any problems and help you be more efficient. Birth order can also improve staff harmony. Hire an individual with the correct birth order for each position, and you will save yourself time and effort rather than waste resources training the wrong person for the job. This guest lecture will provide a basic understanding of the characteristics of different birth orders. The author describes how he has used this information in his private practice over the past 35 years.

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Keywords: Birth Order, Patient Compliance, Treatment Results

Print Tag: Refer to original journal article
Using an animal model, no difference was found in the stability of miniscrew implants loaded immediately versus those with delayed loading.

**Background:** The loading protocols for placement of miniscrews for orthodontic anchorage could be improved with better scientific evidence.

**Objective:** To determine the effect of loading time and loading force on the stability of orthodontic miniscrew temporary anchorage devices (TADs).

**Design:** Animal study using mature beagle dogs and a randomized, split-mouth design. **Subjects:** 7 dogs were used, with 8 miniscrews placed in each animal.

**Methods:** A total of 56 miniscrews were studied, of which 28 were placed as controls without orthodontic force. The loaded miniscrews in the maxilla were loaded either immediately or after 28 days. The loaded miniscrews in the mandible were loaded with 25 or 50 grams of force. The animals were monitored for 110 days and then sacrificed for study. After sacrifice, the miniscrews were classified for mobility, and the percentage of bone-to-implant contact (BIC) at the miniscrew surface was measured using histologic sections. Comparisons were made between immediate loading and delayed loading, as well as between the force levels of 25 and 50 grams.

**Results:** Only 3 of the 56 miniscrews were classified as mobile and all 3 of these were unloaded controls. All stable miniscrews had some BIC, but the variation was extreme, ranging from 2% to 100%. There was no difference found in miniscrew stability whether the miniscrew was loaded immediately or after 28 days. In addition, no difference in stability was seen between miniscrews loaded with 25 or 50 grams.

**Conclusions:** Only small amounts of BIC may be necessary for miniscrew stability, and the BIC does not appear to be related to loading time or loading force.

**Reviewer’s Comments:** The extreme variation in BIC measurements makes finding differences between groups difficult. So, it is possible that there are some differences that this study design was not able to uncover. A surprise finding for the authors was that there was a trend to see greater BIC in the middle and apical regions of the miniscrew when the belief was that the coronal area with cortical bone was likely the area of most stability. (Reviewer-Brent E. Larson, DDS, MS).

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Keywords: Miniscrew Implants, Force/Timing/Location

Print Tag: Refer to original journal article
Predict Mandibular Growth by Measuring IGF-1 Levels

Relationship Between Blood-Spot Insulin-Like Growth Factor 1 Levels and Hand-Wrist Assessment of Skeletal Maturity.
Masoud MI, Masoud I, et al:


Measuring IGF-1 levels may eliminate the need for hand-wrist radiographs to predict mandibular growth.

Background: If you are treating an adolescent patient with a Class II division 1 malocclusion, it would be helpful to know how much remaining mandibular growth the patient has in order to make your treatment decision. For this reason, many orthodontists take hand-wrist radiographs. Is there another way to estimate remaining mandibular growth that does not require a radiograph?

Objective: To establish the relationship between insulin-like growth factor 1 (IGF-1) levels collected from blood-spot samples and hand-wrist radiographs at various skeletal stages.

Participants: 84 subjects between 5 and 25 years of age were included in this study. Each subject had personal information, a hand-wrist radiograph, and a blood-spot sample collected on the same day.

Interventions: The levels of IGF-1 were determined from the blood-spot samples and correlated with Fishman's Skeletal Maturity Index stages, which were determined from the hand-wrist radiographs.

Results: IGF-1 levels were highest at the hand-wrist radiograph skeletal stages that have been associated with the greatest amount of mandibular growth. IGF-1 levels were significantly higher at the peak mandibular growth stages than they were at the prepubertal and postpubertal stages.

Conclusions: Measuring the IGF-1 blood level has the potential to provide a way to predict future mandibular growth that does not require radiographs.

Reviewer's Comments: Wouldn’t it be interesting if doing something as simple as taking a blood-spot sample could provide information that would allow us to more accurately predict mandibular growth? Before getting too excited about this prospect, it is important to realize that this is only an initial step. The IGF-1 levels were correlated with a skeletal maturity index and not actual mandibular growth. Because IGF-1 levels are directly related to growth hormone, I would not be surprised if a longitudinal study showed a high degree of predictability related to mandibular growth. (Reviewer-John S. Casko, DDS, MS, PhD).

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Keywords: Growth Factor 1 Levels, Hand-Wrist Assessment

Print Tag: Refer to original journal article
Bonded maxillary and mandibular lingual retainers allow greater tooth settling and facilitate an increase in the number of occlusal contacts compared to removable Hawley retainers after orthodontic treatment.

**Background:** When orthodontic appliances are removed, orthodontists know that there will be some occlusal settling as the posterior teeth tend to erupt. Tooth eruption will result in an increase in the number of occlusal contacts between maxillary and mandibular posterior teeth. But is this occlusal settling affected positively or negatively by the type of orthodontic retention?

**Objective:** To evaluate the number of contacts in centric occlusions during a 1-year retention period with bonded and removable retainers.

**Participants/Methods:** This was a prospective evaluation of the number of occlusal contacts among 3 groups of subjects. One group of 20 subjects had not had orthodontic treatment. A second group of 25 subjects had orthodontic treatment and were retained with maxillary and mandibular Hawley retainers. These were worn for 6 months full-time and then at night. A third group of subjects had orthodontic treatment and their retainers consisted of maxillary and mandibular lingual bonded wires between the canines to stabilize the anterior teeth. Using an impression technique that permitted measurement of the number of posterior occlusal contacts between the teeth, the authors compared and counted the number of contacts at 2 time intervals. In the control group, the number of contacts was determined over a 1-year interval. In the treated groups, the number of posterior occlusal contacts was counted at the time of bracket removal and again after 1 year of retention. The authors determined if there were any differences in the number of contacts between these groups.

**Results:** Results showed that there were no changes in the number of occlusal contacts in the control group. In both of the treated groups, the number of occlusal contacts increased during the 1-year retention period. Subjects who had lingual bonded retainers had a greater increase in the number of occlusal contacts compared to subjects who had maxillary and mandibular Hawley retainers.

**Conclusions:** Although both methods of retention allowed eruption or settling of posterior teeth, the increase in the number of occlusal contacts was greater in the bonded retainer group compared to the Hawley retainer group.

**Reviewer's Comments:** Most orthodontists are aware that the posterior teeth will tend to erupt into occlusion as tooth settling occurs after bracket removal. However, I was personally not aware that there would be a significant difference between a Hawley retainer and a bonded lingual retainer relative to the amount of tooth settling or the increase in occlusal contacts. This study would suggest that for patients who require a greater amount of tooth eruption or settling after orthodontics, it may be wise to use a bonded lingual retainer instead of a Hawley retainer. (Reviewer-Vincent G. Kokich, DDS, MSD).

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Keywords: Retainers, Removable/Bonded, Occlusal Contact Changes

Print Tag: Refer to original journal article
This study found much greater stresses induced in bone when miniscrews were placed at 45° rather than perpendicular to the surface.

**Background:** Certain clinicians recommend placing miniscrews at an angle to the bone surface to help avoid root damage. The effect of this placement technique on the bone is not well understood.

**Objective:** To measure the bone stresses induced by miniscrew placement at 2 different angles.

**Materials/Methods:** Laboratory testing was done on a human cadaver skull. Strain gauges were glued to the bone surface in 2 locations, the midpalatal area and the maxillary buccal area distal to the canine. In each of these locations, two 8-mm miniscrews were placed, 1 perpendicular to the bone surface and 1 at 45°. The stress on the bone was recorded during placement and again during miniscrew removal. Before removal, all miniscrews were tested for mechanical failure up to 15 pounds.

**Results:** The bone stress in the midpalatal area was 5 times greater when the screw was inserted at 45° compared to perpendicular. A similar finding was observed in the maxillary alveolar area. This stress difference was also apparent during screw removal. All miniscrews were stable up to the 15-pounds testing limit.

**Conclusions:** There is considerably more bone stress induced when miniscrews are inserted at an angle compared to perpendicular insertion. This stress could induce inflammation leading to miniscrew failure, so it is recommended that screws be inserted perpendicular to bone whenever possible.

**Reviewer's Comments:** This is an interesting theory, that increased bone stress induced by miniscrew insertion could induce inflammation and, therefore, lead to miniscrew failure. The authors demonstrated the increased stress when screws were inserted at an angle, but the increased inflammation is still just speculation. This theory is worth further investigation since it could possibly help to explain the higher failure rate of miniscrews in the mandible compared to the maxilla. (Reviewer-Brent E. Larson, DDS, MS).

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Keywords: Miniscrews, TADs, Placement Technique

Print Tag: Refer to original journal article
Rough Surface May Provide Better Overall Mini-Implant Surface

Rotational Resistance of Surface-Treated Mini-Implants.

Angle Orthod 2009; 79 (September): 899-907

Sandblasting and acid etching of a mini-implant surface provides partial integration and therefore resistance to counterclockwise rotation during orthodontic tooth movement.

**Background:** Mini-implants are popular in orthodontics today. However, most implants have a smooth or machined titanium surface. Although this will provide excellent resistance to certain types of movement, these smooth surfaces can cause counterclockwise rotation during force application. Would surface treatment of the implant by sandblasting and acid etching reduce the tendency for counterclockwise rotation?

**Objective:** To determine the effect of surface treatment on osseointegration and the resistance of mini-implants to rotational movement. **Design/Subjects:** This was an experimental study performed in laboratory animals.

**Methods:** 2 types of implants were used that were similar in size and shape and measured 1.8 mm in diameter and 8.5 mm in length. One group of implants had a smooth, machined titanium surface. The other group of implants had a titanium surface that had been sandblasted and acid etched to produce a rough texture. Both of these implants were placed in experimental animals and allowed to set for 3 weeks. Then, rotational force was placed on these mini-implants to determine if there was any movement during counterclockwise rotation. In addition, the authors measured the torque removal value when the implants were removed at the end of the experiment.

**Results:** The results showed that the rough surface implant had greater resistance to counterclockwise rotation. In addition, the rough surface implant had a higher torque removal value, indicating partial integration of this surface implant with the bone.

**Conclusions:** Sandblasted and acid-etched implant surfaces partially integrate with the bone and thus provide greater resistance to counterclockwise rotation and greater torque removal value than smooth, machine-surfaced mini-implants.

**Reviewer's Comments:** This study shows an interesting aspect of implant dentistry. Although mini-implants are designed to be temporary anchorage devices, thereby having a smooth surface that can be easily removed, in order to provide certain types of forces on the implant, partial integration may be desirable. This study has clearly shown that a rough surface may provide a better overall mini-implant surface, because it can resist rotational counterclockwise movement. Orthodontists should be aware of these differences between smooth and rough surface implants and select the appropriate mini-implant to use in each specific situation. (Reviewer-Vincent G. Kokich, DDS, MSD).

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Keywords: Mini-Implant, Surface Treatment

Print Tag: Refer to original journal article
No Benefit Seen With Silane Coupling

Should Silane Coupling Agents Be Used When Bonding Brackets to Composite Restorations? An In Vitro Study.

Eslamian L, Ghassemi A, et al:

Eur J Orthod 2009; 31 (June): 266-270

These authors found that, at least in the laboratory, there is no advantage to using a silane coupling agent when bonding an orthodontic bracket to a composite surface.

**Background:** The use of silane coupling agents, commonly used when bonding to porcelain, is a benefit in restorative dentistry when bonding composite to composite. This suggests that it may improve bond strength when bonding orthodontic brackets to composite surfaces.

**Objective:** To test the bond strength of orthodontic brackets bonded to composite surfaces with and without a silane coupling agent.

**Design:** Laboratory study.

**Materials/Methods:** 60 composite surfaces were fabricated and polished. All bonding surfaces were acid-etched and rinsed in a standard manner. Thirty of the surfaces were treated with a silane coupling agent and then all 60 surfaces had orthodontic brackets bonded to them with a light-cured composite material. After 1 week, all specimens were tested for shear bond strength (SBS) in a universal testing machine, and the site of failure was scored with the Adhesive Remnant Index (ARI).

**Results:** The average SBS for brackets bonded with a silane coupling agent was 13.1 MPa compared to 19.4 MPa for those with no silane bonding. Most failures occurred at the composite-bracket junction or within the composite itself.

**Conclusions:** The use of a silane coupling agent when bonding orthodontic brackets to composite surfaces actually slightly decreased the SBS. There does not appear to be any advantage to the routine use of a silane coupling agent when bonding to a composite surface in orthodontics.

**Reviewer's Comments:** Bonding to a composite veneer or a composite-restored incisor can occasionally provide a challenge where the bracket repeatedly fails. This study would not support the general use of a silane coupling agent for these situations; however, the composite surface that has been in the oral environment for years may be different than the fresh surfaces prepared for this study. It may be worth trying a silane coupler in situations where repeated failure is seen, but it probably is not worth doing for all composite surfaces. (Reviewer-Brent E. Larson, DDS, MS).

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Keywords: Bond Strength, Composite Resin, Silane

Print Tag: Refer to original journal article
Measuring soft-tissue relationships on a profile photograph can predict underlying skeletal problems.

**Background:** Parents who have Class III malocclusions and particularly those who required surgery to correct them are usually very concerned about the likelihood of their children developing skeletal Class III malocclusions. In evaluating these children, most orthodontists would usually take full orthodontic records including a lateral cephalometric radiograph. However, if the parents were strongly opposed to exposing their child to additional radiation, could you look at a profile photograph of the child to make an estimation of the underlying skeletal relationship?

**Objective:** To assess the validity of using profile photographs to identify persons with a Class III discrepancy.

**Participants:** The sample for this study consisted of 42 young white men, 29 of whom had Class III malocclusions and 13 who had Class I occlusions. All 42 participants had profile photographs and lateral cephalometric radiographs available.

**Methods:** Numerous hard tissue measurements were identified on cephalometric radiographs and soft-tissue measurements were made on the profile photographs. Statistical analysis was then used to correlate the relationship of the skeletal measurements on the cephalometric radiograph with the soft-tissue measurements from the profile radiographs.

**Results:** The authors found strong correlations between the soft-tissue photograph measurements and the skeletal relationships of the skeletal Class III subjects. The highest correlation was with the soft-tissue ANB angle. Based on these measurements, it was determined that subjects who had an ANB soft-tissue angle ≤6° were likely to have a Class III skeletal relationship.

**Conclusions:** A simple measurement on a profile photograph may enable the orthodontist to decide whether there is a skeletal Class III discrepancy in a young adult with a Class III malocclusion.

**Reviewer's Comments:** This was an interesting study. I was surprised to find that there was a high correlation between the soft-tissue ANB angle and an underlying Class III skeletal relationship. In spite of this information, I would still prefer to take complete records including a lateral cephalometric radiograph for young adults who have a Class III occlusion and whose parents are concerned about developing a Class III skeletal relationship. I believe it is important when evaluating this type of patient to determine the amount of dental compensation present to evaluate the likelihood of the patient developing a true Class III skeletal relationship. Additionally, I believe soft-tissue thicknesses vary considerably from patient to patient and it is important to understand how much the soft tissue contributes to the profile. However, if I encountered parents who strongly opposed additional radiation for their child, it would be nice to tell them that you can take a somewhat educated guess of likelihood of their child to develop a Class III skeletal relationship based on their profile radiograph. (Reviewer- John S. Casko, DDS, MS, PhD).

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Keywords: Class III Skeletal Discrepancies, Detection, Facial Photographs

Print Tag: Refer to original journal article
Silver solder is extremely cytotoxic, causing lysis and cell death of fibroblasts.

**Background:** For years, orthodontists have used silver solder to adhere or place attachments onto orthodontic archwires. In addition, silver solder is used to attach the internal and external parts of the facebow in headgear treatment. Some silver solder is used to attach brackets to bands. Does this silver solder have any toxic effects to cells within the oral cavity?

**Objective:** To analyze the cytotoxic effect of silver solder on fibroblasts.

**Design:** Laboratory experiment.

**Materials/Methods:** Mice fibroblasts in tissue culture were used to test whether or not certain materials are cytotoxic. In this experiment, a control solution of mice fibroblast tissue culture was used as the baseline. Then a solution of the fibroblast cell culture was exposed to a stainless steel archwire. In a third solution, the fibroblast cell culture was exposed to silver solder. These experimental solutions were incubated for 24 hours to determine the effects of these materials on the proliferation of, and the viability of, the fibroblasts.

**Results:** The results showed that stainless steel archwires had no effect on fibroblasts in the tissue culture. They continued to grow and proliferate similar to the control solution. However, the solution that contained the silver solder showed severe effects including lysis and cell death of the fibroblasts.

**Conclusions:** The authors conclude that silver solder is extremely cytotoxic to fibroblasts in tissue culture.

**Reviewer's Comments:** This is an interesting study. Silver solder has been used for many years in orthodontics. It has been used to place attachments on archwires and other types of appliances that are used in the oral cavity. Although this study shows that silver solder is toxic to fibroblasts, one would think that this cytotoxicity would have become more apparent over the years in clinical situations if it were a significant problem. I believe that the authors should do further studies to determine which specific metal ions in the silver solder actually cause the cytotoxicity so that perhaps a more specific analysis can be obtained. (Reviewer-Vincent G. Kokich, DDS, MSD).

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Keywords: Silver Solder, Cytotoxicity

Print Tag: Refer to original journal article
In this series of 23 patients undergoing mandibular setback, the disc position remained the same in most subjects, while some improved and a few worsened.

**Background:** Although several studies have shown some change in condylar position after mandibular surgery, the effect of surgery on temporomandibular joint (TMJ) disc position is not clear.

**Objective:** To compare the TMJ disc position before and after surgery using MRI.

**Design:** Prospective study of subjects undergoing mandibular surgery for prognathism.

**Participants:** 23 subjects who agreed to participate and were undergoing bilateral sagittal split ramus osteotomy (BSSRO) surgery for mandibular prognathism were included. The average age was approximately 22 years, and there were slightly more females than males.

**Methods:** All subjects had MR imaging completed just before surgery and again 3 months after surgery. The disc position was measured relative to the condyle before and after surgery. In addition, the disc position was classified as normal, displacement with reduction, or displacement without reduction. The amount of surgical change was measured to correlate with changes in disc position.

**Interventions:** All subjects had BSSRO setback surgery done by the same surgeon. No condylar positioning device was used during surgery. Resorbable rigid fixation was used and the patients were in intermaxillary fixation for 2 weeks after surgery.

**Results:** There was a measurable forward disc position of <1 mm on average after surgery. Overall, there was no change in the number of subjects with disc displacement following surgery; however, a few patients with normal disc position before surgery had displacement after surgery, and a few had normal position after surgery when having displacement before.

**Conclusions:** There is some change in disc position after mandibular setback surgery, but this change is small and does not affect the joint function in most cases.

**Reviewer's Comments:** It is always difficult to get concrete answers when examining TMJ issues. As usual, this study showed that most subjects stayed much the same after surgery, but a few got better and a few got worse. There was no detailed collection of patient symptoms or complaints regarding jaw function or pain, so it is hard to know whether the patients had any joint problems as a result of the surgery. (Reviewer-Brent E. Larson, DDS, MS).

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Keywords: TMJ, Orthognathic Surgery, Mandibular Setback, Disc Position

Print Tag: Refer to original journal article
Placing miniscrews for orthodontic anchorage as low as possible in the maxillary buccal soft tissue increases long-term stability.

**Background:** Miniscrews are being used more and more to provide orthodontic anchorage. If you are planning to use miniscrews for orthodontic anchorage, it is important to know the likelihood of survival of these screws at 6 or 12 months and what you can do to increase the likelihood of long-term survival.

**Objective:** To evaluate the long-term stability of miniscrews placed for orthodontic anchorage in the maxilla and the factors that influence stability.

**Participants:** The sample for this study consisted of 49 patients who had 97 surgical miniscrews placed in the maxilla.

**Interventions:** All the miniscrews were placed in the maxilla between the second premolar and the first molar. After placement of orthodontic forces to either distalize the maxillary molars or retract the maxillary anterior teeth, the 6-month and 12-month survival rates for the miniscrews were determined. Different factors that influenced the survival rate were evaluated.

**Results:** The cumulative survival rates of the miniscrews were 85% at 6 months and 57% at 1 year. Three factors positively influenced the long-term stability of the miniscrews. These factors included: the use of a 1-stage placement technique; placing the implant at the lowest possible level in the buccal tissue; and controlling inflammation. There was no advantage in delaying loading of the implants, and there was also no significant difference related to sex, age, length of the miniscrew, or time of activation.

**Conclusions:** When utilizing miniscrews for orthodontic anchorage, 3 factors influenced the survival rate of the miniscrews; namely, surgical technique, level of miniscrew placement, and tissue response.

**Reviewer's Comments:** This was a good study. Because most retraction procedures would not take >6 months, I thought a 6-month survival rate of 85% was very acceptable, particularly with the understanding that this level of success could be significantly improved by following the suggestions in this article, all of which made sense to me. A disadvantage of this study was that all miniscrews were placed in the maxilla. I hope the authors will do a follow-up study for miniscrews placed in the mandible, which I suspect will have a lower success rate. (Reviewer-John S. Casko, DDS, MS, PhD).

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Keywords: Orthodontic Anchorage, Surgical Miniscrews

Print Tag: Refer to original journal article
Energized and focused patients prior to treatment tend to be more satisfied with treatment outcomes.

**Background:** A common problem for orthodontists is dealing with teenage patients who are reticent about having orthodontic treatment. These patients tend to be uncooperative, and at the end of treatment, they may be dissatisfied with the outcome. If patients are energized about orthodontics prior to placing brackets, will that have an effect on their perception of the treatment outcome?

**Objective:** To determine if adolescents’ satisfaction with orthodontic treatment outcomes is correlated with the degree to which they were energized about focusing on their treatment outcome prior to beginning orthodontic therapy.

**Design/Participants:** Retrospective evaluation by questionnaire of a group of adolescent patients and their parents.

**Methods:** The questionnaire was designed to determine the patient’s energy level and focus prior to orthodontic treatment and to compare that with their satisfaction about the treatment outcome. A series of specifically determined questions were used to elicit responses that would provide this information.

**Results:** Communicating with patients about their possible aesthetic outcome prior to their treatment allowed them to become more energized and focused during the treatment, which ultimately led to higher satisfaction with the orthodontic treatment.

**Conclusions:** The more energized and focused the patients are prior to treatment, the more satisfied they are with the treatment outcome. Furthermore, the more the parents perceive that their child has been energized and focused on their post-treatment outcome, the more satisfied the parents are with the treatment results.

**Reviewer’s Comments:** I liked this study. I believe that the outcome of this investigation is absolutely correct. Young individuals want to look better. This study clearly shows that when the orthodontist and his/her staff motivate each patient by having them focus on how much more aesthetically pleasing their teeth will look at the end of treatment, these patients and their parents are the most satisfied with treatment. This task is not difficult to do. It simply means that the office staff and the doctor must be more positive in their discussion and influence with both parents and patients about the aesthetic outcome before and during the orthodontic treatment. According to the study, it will pay back rewards at the end of treatment in terms of the satisfaction of both parents and patients. (Reviewer-Vincent G. Kokich, DDS, MSD).

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Keywords: Adolescents, Patient Motivation/Satisfaction

Print Tag: Refer to original journal article
Although some statistical differences are found between digital and manual cephalometric measurements, the magnitude of the differences is small and not likely to be clinically significant.

**Background:** Digital tracing software not previously tested for accuracy (FACAD®) was investigated. **Objective:** To compare digital tracing software measurements to manual tracing measurements and to compare the repeatability of each method. **Design:** Laboratory study using previously acquired cephalograms. **Participants:** 30 adult subjects who underwent orthognathic surgical treatment and had pre- and postsurgical cephalograms available were included in this study. **Methods:** The 60 cephalometric films were measured, using both digital and manual methods, by the same investigator. The manual method was traditional acetate tracing and measurement using a pencil, ruler, and protractor. The digital method consisted of scanning the film to create a digital image and then measurement of the image using a software tool designed for this purpose (ie, FACAD). All measurements for each method were repeated a second time to test repeatability. The digital measurements were compared to the manual measurements to look for differences. **Results:** Small differences were found between digital and manual methods in the location of soft-tissue gnathion, labrale inferius, mentolabial sulcus, and lip thickness. These differences were all <1 mm or 1°. In general, there was more variability in repeated measurements with the digital measurements than with the manual measurements. **Conclusions:** The digital cephalometric measurements are essentially the same as manual measurements with some small differences that would be of little clinical significance. **Reviewer’s Comments:** These results reinforce others that have shown digital measurements to be essentially the same as manual measurements. It is interesting to note that digital measurements tend to be a bit less repeatable than the manual ones, and this finding has been seen before. Further development of digital software tools may eventually help reduce this variability by using technological assistance to make landmark selection more consistent. (Reviewer-Brent E. Larson, DDS, MS).
Is a Soft Occlusal Splint Effective for Short-Term Tx of TMD Pain?

Short-Term Treatment of a Resilient Appliance in TMD Pain Patients: A Randomized Controlled Trial.


In this 10-week study, night time wear of a soft occlusal splint was effective for reducing pain in TMD patients, but no more effective than a nonoccluding palatal splint.

Background: Soft occlusal splints have been suggested as short-term treatment for temporomandibular disorder (TMD) pain since they are inexpensive and easy to fabricate. However, questions remain regarding their effectiveness.

Objective: To compare the short-term outcome of a soft occlusal splint with that of a nonoccluding control appliance in patients with TMD pain.

Design: Prospective, randomized, clinical trial.

Participants: 80 TMD patients who met inclusion criteria.

Methods: The patients were all examined using standard research diagnostic criteria, and they rated their pain using a visual analog scale. Each subject was then randomly assigned to the treatment or the control group. The examiner was blinded to the treatment allocation. The treatment group was given a soft occlusal splint and instructed to wear it at night for 10 weeks. The control group was given a palatal acrylic plate that did not affect the occlusion, and they were instructed to wear it in the same manner as the treatment group. The subjects were re-examined at 6 and 10 weeks to measure the treatment effects using pain reduction as the primary outcome measure.

Results: The groups were statistically the same prior to treatment. Seven subjects did not complete the study. Both the treatment and control group showed significant improvement at 6 and 10 weeks. There was no difference in outcome between the treatment group and the control group.

Conclusions: The soft occlusal splint was effective at reducing pain in TMD patients after 10 weeks, but no more effective than a palatal control appliance that did not affect the occlusion.

Reviewer's Comments: This was a well-designed and controlled clinical trial that was unable to demonstrate any effect of the soft occlusal splint beyond that of the control appliance. The effect of short-term appliance therapy seemed to be due to some factor other than changing the occlusion since the control appliance had essentially the same effect. The mechanism of action of oral appliances in reducing TMD pain is still unknown, but it could be alteration of muscle activity (bruxism), a placebo effect, or just the normal course of the disease. The good news is that most of these subjects get much better with intervention of any kind, and we do not have to know exactly why in order to help them feel better. (Reviewer-Brent E. Larson, DDS, MS).

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Keywords: TMD Pain, Splint, Soft Splint

Print Tag: Refer to original journal article
In this study from Denmark, patients seeking orthognathic surgery in recent years were less severely affected than those seeking treatment 20 years earlier as judged by profile measurements.

**Background:** Since many patients seek orthognathic treatment based on aesthetic profile issues, it would be interesting to know whether the more recent societal focus on facial aesthetics has changed the severity of patients seeking surgery.

**Objective:** To compare the hard- and soft-tissue profiles of patients undergoing orthognathic surgery treatment in 2000-2002 with those of patients who underwent similar treatment in 1982-1986.

**Participants:** 35 patients underwent surgery in the earlier time period, and 56 patients were treated in the later period. Subjects in both groups tended to be in their mid-20s.

**Methods:** Pretreatment lateral cephalograms were obtained for all patients in both groups. Hard- and soft-tissue profile assessments were performed, and the subjects were classified as orthognathic, retrognathic, or prognathic. The distribution and severity of the profile types were compared between time periods.

**Results:** More patients were classified as retrognathic or prognathic in the earlier group than in the recent group. The retrognathic profiles and prognathic profiles were more extreme in the earlier group.

**Conclusions:** The pretreatment profiles of those seeking orthognathic surgery 20 years earlier tend to be more severely affected than the profiles of those seeking treatment recently. The authors suggest this may be due to a change in what society deems acceptable between the 2 time periods.

**Reviewer's Comments:** The issue of whether a patient seeks to have orthognathic surgery as part of treatment depends on many factors. In Denmark, where this study was performed, there is no cost to the patient for orthognathic treatment, which makes it much more accessible. In the United States today, many decisions on whether to undergo surgical treatment are affected by insurance coverage. It is possible that if this same study were done in the United States, a different result may be found, whereas only the most severe cases are now being treated. (Reviewer-Brent E. Larson, DDS, MS).

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Keywords: Orthognathic Surgery, Aesthetics, Decision Making

Print Tag: Refer to original journal article
The condylar path inclination angle increases with age.

**Background:** The path the condyle travels along the articular eminence plays an important role in occlusal function. What happens to this condylar path inclination angle with age? Does it increase, decrease, or stay the same as an individual matures?

**Objective:** To determine the difference between children and adults with regard to the condylar path inclination angle on right and left sides.

**Design:** Retrospective, population-based study.

**Methods:** The test group was comprised of 2 major groups. The first group involved 80 children from 6.0 to 10.9 years of age. This group was further subdivided according to their chronological age into 5 subgroups. The second group involved 40 randomly selected adults ranging in age from 18 to 44 years with an average age of 27.4 years. All adults had complete permanent dentitions. Before starting the experiment, a functional analysis was made of the TMJs to confirm that no children or adults had any functional disorders. The condylar path inclination angle was measured using a Jaw Motion Analyzer. This ultrasonic registration system is based on measurement of real-time latency of subsequently transmitted ultrasound pulses between the sending device mounted on the lower jaw and a receiver mounted on the forehead. The accuracy of this method has been verified in previous publications. The condylar path inclination angle was compared in children and adults.

**Results:** There is a significant difference in the condylar path inclination angle of the children's group compared to the adult group. The condylar path inclination angle increases with age in children. This was shown in the 5 subgroups, and the oldest child subgroup had a condylar path inclination angle that reached 81.87% on the right side and 78.85% on the left side. Furthermore, the authors found the greatest condylar path inclination angle in the adult group.

**Conclusions:** The condylar path inclination angle increases with advancing age.

**Reviewer's Comments:** I found this to be an interesting study. I was not aware that such a substantial change occurred in the condylar path inclination angle with time as subjects grow from childhood to adulthood. The methodology employed in this study is unique and appears to be valid. It would be interesting to follow these adult patients even further to determine what happens morphologically to individuals with advanced age. (Reviewer-Vincent G. Kokich, DDS, MSD).

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Keywords: Condylar Path Inclination, Children vs Adults

Print Tag: Refer to original journal article
**Self-Tapping vs Self-Drilling—Which Mini-Implant Has Better Anchorage?**


Su YY, Wilmes B, et al:

Int J Oral Maxillofac Implant 2009; 24 (May-June): 404-411

Self-tapping implants have smaller peak insertion torque values compared to self-drilling implants, but the implants have comparable skeletal anchorage.

**Background:** Mini-implants have been used extensively in the past 5 years as an adjunct to orthodontic treatment. These mini-implants can be categorized into either self-tapping or self-drilling, depending on their thread designs. Self-tapping mini-implants have a tapered design and a blunt tip. In contrast, self-tapping mini-implants have a sharper conical tip. However, is there any difference between these 2 implant systems with respect to their clinical usefulness?

**Objective:** To compare the skeletal anchorage of self-tapping and self-drilling mini-implants by simulating orthodontic forces.

**Design:** Experimental laboratory study.

**Methods:** The implants were placed into bone segments from the iliac bodies of country pigs. Fifty-four titanium-aluminum-vanadium orthodontic mini-implants of 1.6 mm in diameter and 8 mm in length were placed. This included 27 self-tapping implants and 27 self-drilling implants. Each implant was loaded perpendicular to its long axis with increasing levels of force. The force-displacement of the implant was measured.

**Results:** No mini-implants were broken by torsion or force. No significant difference was found in skeletal anchorage between groups when the same magnitude of force was applied.

**Conclusions:** Both self-tapping and self-drilling implants have comparable skeletal anchorage with no statistically significant differences between these 2 types of mini-implants.

**Reviewer's Comments:** I found this to be an interesting study. Some manufacturers claim that self-tapping mini-implants are better than self-drilling implants. However, this study has conclusively shown that, in a laboratory setting, the force applied to these 2 different types of mini-implants has basically no effect on orthodontic outcome when these mini-implants are used as anchorage. (Reviewer-Vincent G. Kokich, DDS, MSD).

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Keywords: Mini-Implants, Self-Tapping, Self-Drilling

Print Tag: Refer to original journal article
Antibiotic prophylaxis prior to mandibular third molar extraction ameliorates postoperative pain and reduces analgesic consumption.

**Background:** At the end of orthodontic therapy, clinicians are often required to make a decision about whether to extract mandibular third molars. If these teeth have the potential to become impacted, most orthodontists would recommend extraction at that time. However, when mandibular third molars are in their early crown formation, the morbidity of surgery can be significant, including swelling and significant pain. Would prophylactic antibiotic therapy prior to extraction have any impact on postoperative pain and swelling?

**Objective:** To evaluate the efficacy of antibiotic prophylaxis in preventing postoperative complications such as swelling, pain, and wound infection after removal of mandibular third molars in young patients.

**Design:** This was a prospective, randomized, clinical trial.

**Methods/Participants:** 59 mandibular third molars were extracted from 59 patients with a mean age of 15 years. The surgery was performed when only the crown of the tooth germ had been formed. The sample was randomly divided into 2 groups. The test group received amoxicillin tablets 1 hour before surgery, and the control group received no antibiotic therapy. These groups were then evaluated for postoperative complications using a questionnaire that was completed 1 week after extraction.

**Results:** Swelling was always present in the control group and test group in the postoperative week. However, in the prophylactic antibiotic group, the swelling was minor. Pain was present in 8 extractions in the control group and 1 extraction in the test group. Regarding pain, the difference between the control and test groups was statistically significant. The mean postoperative consumption of analgesics was higher in the control group than in the test group. The difference between the test and control groups relative to wound infection was statistically significantly different, with only 1 patient in the test group having a wound infection.

**Conclusions:** The use of prophylactic antibiotics prior to mandibular third molar extraction ameliorates postoperative pain and reduces the amount of analgesic consumption, as well as wound infection, after surgery.

**Reviewer's Comments:** I found this to be valuable information. There is a general tendency in medicine and dentistry to avoid prophylactic antibiotics, with the reason being to avoid resistant strains of bacteria from developing. However, this study convincingly showed that the use of prophylactic amoxicillin resulted in a substantial benefit in reducing pain, swelling, and infection in the test group. But is this reduction in pain important enough to justify prophylactic antibiotics in all patients who undergo mandibular third molar extraction? Further research will be necessary to answer that question. (Reviewer-Vincent G. Kokich, DDS, MSD).

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**Keywords:** Prophylactic Antibiotics, Postoperative Infection, Third Molar Extraction

**Print Tag:** Refer to original journal article
Increased Risk of GERD Seen With Class III Malocclusions

Gastroesophageal Reflux Symptoms in Adults With Skeletal Class III Malocclusion Examined by Questionnaires.

Togawa R, Ohmure H, et al:


When presenting patients with a treatment plan that involves surgical correction of a Class III skeletal malocclusion, you can advise them that if they have GERD, there is a likelihood their symptoms will improve.

**Background:** Patients with severe skeletal Class III relationships usually require surgery to improve occlusal function and facial appearance. In discussing a treatment plan with these patients, can you advise them of any other benefits related to correction of their malocclusion?

**Objective:** To examine gastroesophageal reflux disease (GERD) symptoms, occlusal contact area, maximal voluntary bite force, and salivary flow rate in patients with skeletal Class III malocclusion.

**Participants:** The sample for this study consisted of 19 adults with severe Class III malocclusion who were diagnosed as needing orthognathic surgery for mandibular setback. Twenty patients with normal occlusion were used as a control group.

**Methods:** A self-administered standardized questionnaire was used to evaluate the frequency of GERD symptoms. Occlusal contact area and maximal voluntary bite force were measured with pressure-sensitive sheets. Salivary flow rate was also measured.

**Results:** The incidence of GERD was significantly higher in the Class III group than in the control group. Both the occlusal contact area and maximal voluntary bite force were significantly smaller in the Class III group. No significant difference was found in the salivary flow rate.

**Conclusions:** Patients with skeletal Class III malocclusion have a higher frequency of GERD symptoms than patients with normal occlusion.

**Reviewer's Comments:** This was an interesting study. I had not thought of discussing a potential decrease in GERD symptoms for patients who are considering a surgical correction for a skeletal Class III malocclusion. I will mention this in the future. It did not surprise me that both the occlusal contact area and maximal voluntary bite force were significantly smaller in the Class III group. While the results of the GERD evaluation were based on a self-administered questionnaire, I saw no basis to question the validity of the results. (Reviewer-John S. Casko, DDS, MS, PhD).

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Keywords: GERD, Symptoms, Skeletal Class III Malocclusion

Print Tag: Refer to original journal article
The accuracy of CBCT scan measurements is not affected by skull orientation.

**Background:** The use of cone-beam CT (CBCT) is becoming more popular in orthodontics. CBCT has the advantage of providing a 3-dimensional (3D) image of the craniofacial complex, which is an advantage to orthodontists. If you decide to use CBCT for your patients, will any cephalometric measurements that you use be accurate and reliable?

**Objective:** To determine the accuracy and reliability of 3D craniofacial measurements obtained from CBCT scans of a dry human skull.

**Methods:** One dry human skull was used to evaluate cephalometric measurements; 17 landmarks were identified on the skull and compared with the same measurements from 2 CBCT scans made at different orientations. The linear measurements made on the CBCT scans were compared with caliper measurements made directly on the dry human skull and were statistically evaluated for accuracy and reliability.

**Results:** The measurements recorded by the CBCT unit used in this study were accurate and reliable. No statistically significant difference was found between any of the 29 linear measurements when comparing the 2 CBCT scans. Skull orientation during scanning did not influence the accuracy of the linear measurements.

**Conclusions:** CBCT scans provide accurate and reliable 3D linear measurements of the craniofacial complex, and skull orientation does not influence the accuracy of these measurements.

**Reviewer's Comments:** I was very impressed by the results of this study. It is nice to know that measurements are not only accurate but also that they are not affected by skull orientation when taking the CBCT scan. I am not sure that CBCT scans will become a routine part of orthodontic records; however, in situations such as accurately locating impacted canines or evaluating craniofacial asymmetries, having a 3D image can be very valuable, and it is nice to know these images are accurate. Before you buy a CBCT unit for your office, however, you should be aware that you are responsible for identifying any pathology on the scan, which can increase your liability. *(Reviewer: John S. Casko, DDS, MS, PhD)*

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Keywords: Cone-Beam CT, Accuracy/Reliability, Human Skull

Print Tag: Refer to original journal article
Cone-beam CT can eliminate the need to use study models to make dental arch measurements.

**Background:** The use of cone-beam CT (CBCT) is becoming more common in orthodontics. If you had the need to take a CBCT scan for one of your patients, could you use information from the scan to make accurate dental measurements that you would ordinarily make on diagnostic models?

**Objective:** To evaluate the accuracy of linear dental measurements generated on a CBCT scan compared with the true anatomic dimensions.

**Methods:** The sample for this study consisted of 30 human skulls. The 30 human skulls were scanned with a dental CBCT, and 3-dimensional reconstructions of the dentitions were generated. Ten dental measurements were made on the dentitions of the skulls with a high-precision digital caliper and on the digital reconstructions with commercially available software. The accuracy of the digital measurements was evaluated statistically.

**Results:** Both the CBCT and the caliper measurements were shown to be very reliable. Although the caliper measurements on the dry skull and the digital measurements on the CBCT scan were shown to be reliable, the CBCT measurements had a tendency to underestimate the actual measurements from the skull. This tendency became significant only when combining several measurements.

**Conclusions:** CBCT scan measurements proved to be reliable and accurate when measuring the dentition on a human skull.

**Reviewer's Comments:** CBCT scans are valuable in that they allow the orthodontist to evaluate the craniofacial complex in 3 dimensions compared to the 2-dimensional view provided by traditional cephalometric radiographs. However, the majority of the diagnostic and treatment decisions that an orthodontist has to make can be made using traditional cephalometric radiographs. Also, digital casts have been shown to have the ability to accurately make dental measurements. Even though I believe it is unlikely that we are going to see a great increase in CBCT units in orthodontic practices in the near future, I believe the research that is being done to evaluate the accuracy and reliability of CBCT scans to measure both dental and skeletal relationships is an important first step in evaluating the potential for CBCT scans to be used on a regular basis in orthodontics. (Reviewer-John S. Casko, DDS, MS, PhD).

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Keywords: Cone-Beam CT, Dental Measurements, Accuracy

Print Tag: Refer to original journal article