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SPACE MAINTAINERS LABORATORIES

TIPS AND TECHNIQUES

COSMETIC TOOTH MOVEMENT FOR ADULTS

DR. ROB W. VEIS, D.D.S.

Written for dentists, hygenists and dental assistants, this course is designated for one CE Contact Hour.

OVERVIEW

It's a fact that most adults are unwilling to undergo complete orthodontic care – yet many of them would love for their dentist to do something to improve the way their teeth look.

There are many minor tooth movement procedures that you can perform for your patients that will give them the esthetic result they seek. This CE course will share some of the more common procedures in common practice today.

EDUCATIONAL OBJECTIVES

The overall objective of this course is to provide the participant with an evidence-based guide to the advantages, applications and proper procedural protocols for adult cosmetic tooth movement.

UPON COMPLETING THIS COURSE, PARTICIPANTS WILL BE ABLE TO:

- Recognize and evaluate the factors and conditions indicating a need for a cosmetic tooth movement.
- Understand the health practice potential of cosmetic tooth movement, as well as its importance to patients' overall health.
- Appreciate the necessity of a detailed patient examination and accurate history
- Discuss cosmetic tooth movement, procedures and after-care with adult patients



About the Author:
ROB VEIS, DDS.

Dr. Veis began practicing in 1984 as a solo general dentist and has been a part of both solo and group practices since then.

A graduate of USC Dental School, he taught for 12 years at the University of Southern California as a Clinical Professor in Restorative Dentistry. Dr. Veis is an internationally renowned lecturer (at locations including UNLV, Columbia University, Loma Linda University and NYU) on the topics of Dental Sleep Medicine, Orthodontics for the General Practice and Appliance Therapy and has served on the faculty of the Las Vegas Institute of Advanced Dental Studies.

He is the co-author of The Principles of Appliance Therapy for Adults and Children – considered one of the definitive texts on the subject – and has lectured extensively for the Academy of General Dentistry-sponsored mastership program.

AUTHOR DISCLOSURE:

Dr. Veis discloses that he is the CEO of SML™ Space Maintainers Laboratories.

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DESCRIPTION:

Unraveling Upper Anteriors Prior to Place Veneers

A typical example of adult minor tooth movement: overlapping centrals and two peg laterals that are lingually placed. After a diagnostic wax up was completed, it became clear that the patient had two choices. He could choose to have his teeth prepared for four crowns (and possibly need intentional root canal therapy,) or he could undergo some minor tooth movement to realign and evenly space out the anteriors (prior to placing some veneers). The patient chose the less invasive orthodontic approach. In this case, a simple Hawley retainer with distal kickers used to move the centrals distally - and finger springs used to move the laterals labially - was enough to complete the orthodontics. Total treatment time prior to placing veneers: less than three months.

After the veneers were completed, a Talon™ splint was used as a final retainer. This type of retention was chosen because the patient had a previous bruxism problem. The Talon™ splint was used because its internal layer is made from a soft thermoplastic material.[1] This material protects against the possibility of an abnormal acrylic pressure point being placed on the porcelain veneers by the splint.



Facial view of overlapping centrals and peg laterals prior to treatment.



Facial view after minor tooth movement and veneer placement.



Occlusal view showing the labial position of the central

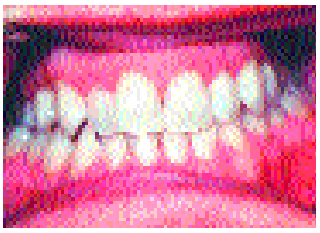
Minor Tooth Movement for Esthetics vs. Comprehensive Orthodontic Care

This female patient presented with a bilateral posterior crossbite due to an underdeveloped maxilla that was not treated at an earlier age. She also had a blocked-out lingually placed lateral incisor. After a thorough examination by an orthodontist, it was recommended that because of her age, she undergo maxillary surgery and complete orthodontic care to correct her skeletal cross-bite. Although this was an excellent treatment plan, it did not take into consideration the patient's desires. All she wanted was to straighten out the one blocked-out lateral to improve her smile. Because her cross-bite was not causing any functional problems (e.g. TMJ dysfunction, improper mastication) and her periodontal health was excellent, a minor tooth treatment procedure was performed to give her the esthetics she desired.

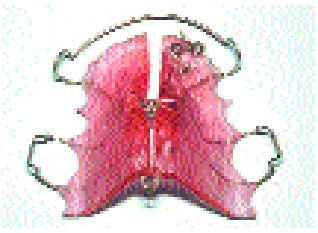
A combination fixed/removable swing-lock retainer was used. This appliance allowed the cuspid to be brought back distally using an elastic force into a space created by a small amount of enamel re-contouring. Once that was accomplished, the rest of the space required to move the lateral into position was gained by opening the swing lock expansion screw and (enamel) re-contouring the mesial of the cuspid, mesial and distal of the lateral, and the distal of the central. This combination of movements allowed the space to be gained for the blocked-out lateral without disturbing the occlusion or removing an excessive amount of enamel from the adjacent anterior teeth. The lateral was then moved into position using a re-curved spring.

This minor tooth movement took less than four months to complete. Then, the active appliance was used as a final retainer.

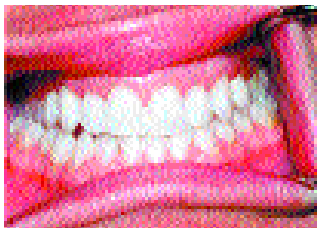
*The patient has bleached her teeth. It is not uncommon for patients who have under-gone a minor tooth movement procedure to follow it up with bleaching.



Facial view of an adult patient with a bilateral posterior crossbite and a blocked out lateral.



The appliance used was a swing lock retainer with a recurved spring.



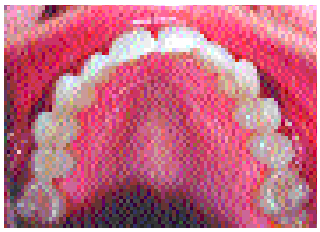
Facial view of the completed treatment.



Occlusal view clearly shows the blocked out lateral that is the patient' s main



Occlusal view in treatment. Space has been gained and the lateral was guided labially.



Occlusal view of the completed treatment.

Written by: Rob W. Veis, DDS

Correcting Lower Anterior Crowding

One of the most common complaints of adult patients is crowding of the lower anteriors. Correcting this problem can be easy if you take time to carefully evaluate the severity of the crowding… and the relationship of the upper and lower anteriors to each other in occlusion.

In the clinical case shown here, a minimum amount of lower anterior crowding occurred because the patient did not wear his final retainers after completing his orthodontic treatment. Although this crowding may not appear serious, once the interproximal contact points have been broken, the drifting and crowding will only worsen over time if left untreated.

When crowding of the lower anteriors is $1^{1/2}$ mm or less, it can usually be corrected by recontouring the interproximal enamel of each tooth from cuspid to cuspid and placing a Spring Hawley Retainer.

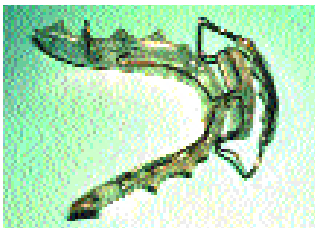
To accomplish this, you must first send an accurate set of upper and lower dental casts to the lab. The lab will then reset the lower anteriors, aligning them in their ideal position. The Spring Hawley Retainer is then made to this pre-set ideal position.[3] On the day of delivery appliance, and not before, the enamel re-contouring is done. This will allow the teeth to be guided into the ideal position pre-set by the appliance.

If the patient's bite relationship is too deep and the lower anteriors already make contact with the upper anteriors, you will not be able to move them - regardless of the amount of re-contouring performed or force exerted by the appliance. So it is critical that you evaluate the relationship of the upper and lower anteriors to each other prior to selecting this treatment approach.[3]

In this case, however, there was enough clearance with the opposing arch to allow the teeth to move back into alignment. Once this was accomplished, an indirect matrix was used to bond a retention wire to each individual tooth. This retainer is called an E-Z Bond.



Lower anterior crowding often re-occurs after orthodontic treatment.



The Spring Hawley Retainer made to ideal anterior position.



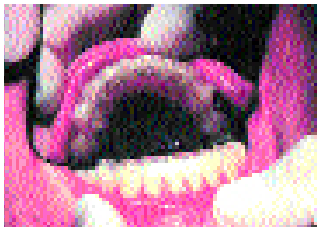
Post treatment - lower anteriors re-aligned and etched for placement of EZ Bond.



Lab resets the lower anterior teeth in their orthodontic treatment.



Occlusal view of the Spring Hawley retainer in place.



Placement of a final retainer called the EZ Bond.

Forced Eruption Prior to the Placement of an Esthetic Restoration

Today it is not uncommon to see patients with severely broken down teeth that appear unrestorable. Fractures that are below the crest of the bone and teeth that have extensive recurrent decay are just a few of the problems we face daily.[4]

There are several common methods available to manage a tooth that is severely broken down. These include extraction of the remaining root followed by a prosthetic replacement, and techniques to expose sound tooth structure such as osseous surgery.[4]

Surgical exposure of sound tooth structure is fraught with compromise. Gingival and osseous surgery cannot be limited to the involved tooth and must be extended to adjacent teeth in order to blend the gingival and osseous contours. The ultimate result is a sacrifice of supporting bone on several uninvolved teeth. This can cause root sensitivity, expose furcation, and, in some cases, can involve the maxillary sinus.[4] When crown lengthening is done in an anterior region, it can result in unaesthetic open embrasures and long clinical crowns.[5]

Extracting a tooth may appear to be a simple solution. But tooth extraction can cause a decrease in the height and thickness of the alveolar bone. This makes it much more difficult to achieve an esthetic restorative result regardless of whether you utilize an implant or place a fixed partial denture.[5] Whether you plan to do an osseous surgery or extract a tooth, forced eruption is often an important first step to help achieve the best esthetic result.

Forced eruption can be defined as an orthodontic movement in a coronal direction through the application of gentle, continuous forces.[2] Specifically, when a root segment is forcefully erupted, the forces stretch the gingival and periodontal fibers producing a coronal shift of gingiva and bone. If done slowly, the gingiva and supporting bone will follow to a position that is further coronal than the adjacent teeth. These gingival and osseous changes can be used to manage many restorative problems.

In the example shown, tooth #8 is missing and tooth #9 has a vertical fracture - making it unrestorable. Just extracting tooth #9 would cause a decrease in the height and thickness of the alveolar bone, making it impossible to achieve an esthetic result without performing ridge augmentation surgery. Instead a removable forced eruption appliance (that included a tooth to replace tooth

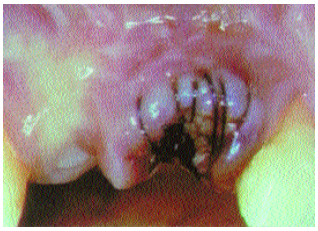
#8) was used to coronally shift the gingiva and bone until it esthetically matched the existing pontic site. Once this was accomplished, #9 was extracted and the area was allowed to heal. This cosmetic orthodontic procedure was finished in six weeks.



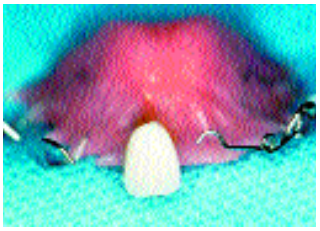
Facial view of an esthetically compromised anterior ridge.



Forced Eruption in progress. Slowly extruding the tooth will improve the bony ridge.



Active interim partial used to erupt tooth #9 , while maintaining esthetics.



Forced Eruption completed. This tooth has almost been completely erupted.



Forced Eruption completed. This tooth has almost been completely erupted.



After healing, the ridge is nicely shaped and ready for placement of an esthetic bridge.

Molar Uprighting to Enhance Restorative Result

Perhaps the most common use of orthodontics to aid in restorative work is the uprighting of a tipped molar. All of us see mesially tipped molars on a daily basis. The typical clinical picture consists of extrusion and migration of teeth, accelerated mesial drift, uneven marginal ridges, angular bony crests, altered coronal to gingival form, food impaction, caries, periodontal disease, and ultimately posterior bite collapse with loss of the occlusal vertical dimension.[6]

Why then is treatment so often ignored? Worse yet, why are we tempted to place a bridge before returning this tipped tooth to its normal occlusal position? Leaving a molar in the tipped position can have a profound effect on your prosthetic therapy.

It leads to:

- Inadequate parallelism of bridge abutment teeth
- A poor occlusal plane
- A lack of interproximal space between teeth
- Adverse root proximity
- Faulty occlusal landmarks
- Excessive tooth preparation with potential pulpal involvement
- Inadequate pontic space
- Hard and soft tissue deformities of the periodontal structures
- Teeth that are more difficult to clean7
- Bruxism and clenching habits
- Occlusal trauma

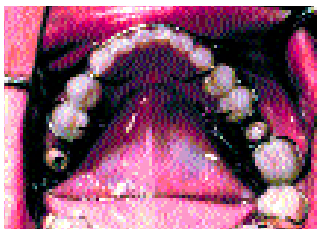
In this unique clinical example, the patient has had an implant placed ideally in the lower first molar position. Unfortunately the implant space was not properly maintained with an interim bridge or partial. In less than eight months, the second molar drifted and tipped mesially making it impossible to restore the implant. To correct the problem a removable appliance with an expansion screw was used to distalize and upright the molar. In four months, the second molar was back into its normal position and the space necessary to restore the implant was regained.



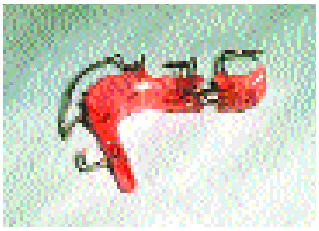
Second molar is impinging upon the space necessary to restore the implant.



Buccal view of the space lost due to the second molar drifting forward.



Occlusal view of the appliance in place during treatment.



A saggital appliance tipped the molar back to its original position, regaining the lost space.



Occlusal view of the treatment completed.

CHOOSING COSMETIC TOOTH MOVEMENT APPLIANCES:

Most esthetic tooth movement procedures can be accomplished with either fixed or removable appliances. In cases where either appliance will accomplish the same result, the following checklist will help you decide which approach may be best suited for your patient

Fixed appliances are best used when:[8]

1) Bodily movement of the teeth is needed.

2) Wearing anterior brackets and wires are acceptableto the patient.

3) The patient has excellent oral hygiene-making the possibility of decay minimal.

4) Patient cooperation in wearing a removable appliance is doubtful.

5) There are enough teeth present to create a proper anchorage unit.

Removable appliances should be used when:[8]

1) Bodily movements of the teeth are not required, as removable appliances mainly provide a tipping action.

2) Esthetics is important. The patient needs an inconspicuous appliance that can occasionally be removed.

3) Bracketing teeth is inappropriate. For example, placing brackets on porcelain veneers or crowns is contraindicated. The bonding process will damage their finish.

4) The patients do not have enough teeth to use as an anchor. A removable appliance allows you to use the soft tissue, teeth and the appliance to form an anchor against your active tooth movement.

5) The patient is cooperative and responsible; i.e. they will wear the appliance as prescribed and will guard against loss or breakage.

CARE FOR APPLIANCES:

Both fixed and removable appliances need special care. Some of the most common problems are addressed below:

1) Fixed orthodontic appliances demand special oral hygiene care. We highly recommend the use of fluoride to help prevent caries activity.

2) It is often a good idea to give your patient some Brace Relief (a medicated orthodontic wax) to protect their tissues from being irritated by the braces and wires.

3) Never allow a removable appliance near high temperatures or allow it to dehydrate for more than 24 hours.

4) All appliances should be kept moist when not in use. A retainer case works nicely. The patient should simply place the appliance in the case with a small piece of wet paper towel.

5) All appliances should be cleaned every day. A soft brush and toothpaste, (or a cleaner like OAP™) is all that is needed.

6) Removal of an appliance is best accomplished by using equal pressure on both sides of the mouth. This will minimize the chance of damage to the resilient portion of the appliance.

CONTRAINDICATIONS AND CONCERNS:

1) Careful diagnosis and treatment planning are the key elements to success. Before starting a minor tooth movement procedure, the patient should be informed of all the possible treatment options and the total treatment required including periodontal, orthodontic and prosthetic therapy.

2) During tooth movement, the clinician must accept responsibility for keeping this area free of inflammation. This will require regular maintenance throughout treatment. In fact, the frequency of visits during tooth movement is not determined by the orthodontic adjustments. Instead it is determined by the necessity to keep the soft tissue free of all inflammation and to prevent crestal bone loss during appliance therapy.[6] To achieve this, weekly appointments may be necessary.

3) All new or recurrent caries should be treated prior to the fabrication of an appliance because wearing orthodontic appliances can often exacerbate an existing problem. Prophylactic measures such as the regular use of fluoride can help to prevent decalcification and caries in the teeth contacted.

4) When initiating a cosmetic tooth movement procedure, occlusal interferences are often created which can cause a patient to clench or grind.[9] To prevent this occlusal trauma during tooth movement, one can use a combination of a bite plane for posterior disarticulation and selective grinding of the teeth in trauma.

5) When performing adult orthodontics on a patient, who has never experienced orthodontic care, it is important to inform them that their teeth are going to be uncomfortable during therapy.

6) Appliances can only be effective when they are properly designed to adhere to the principles of retention, force application and anchorage. Therefore, it is very important that some form of retention be placed as near as possible to the active components of the appliance.

7) When using clasps for retention care should be taken not to interfere with the patient's normal occlusal pattern. Occlusal interferences will usually cause the patient not to wear the appliance.

8) A removable appliance must never be unilateral. A unilateral appliance offers a definitive hazard because the patient may swallow or aspirate the prosthesis.

9) When using a fixed appliance where teeth need to be banded, we recommended that the bands for these appliances be lab provided. Only in this way can we assure that proper contours and embrasure spaces will be respected in the appliance fabrication.

LAB REQUIREMENTS:

Our goal is to give you the best service possible. To help us provide you with the best appliances in a timely manner, we need the following:

1) Fill out a detailed prescription. If you are having a problem designing an appliance, have a look at the Practice Building Bulletin called The Appliance Therapy Worksheet. After a little practice using this sheet you should have no problem designing an appliance. If you are still unsure if your appliance design is correct, please give one of our designers a call.

2) Always provide the date wanted and, when appropriate, the patient's appointment date. If there is a problem in meeting the due date, the lab will call.

3) Send us accurate upper and lower casts poured in stone that capture all the teeth and land areas (do not use die stone). Air bubbles or holes on tooth surfaces are unacceptable as they can negatively affect the fit of the appliance. Unfortunately, we can only guarantee that your appliance will fit the model. Making sure that your casts are accurate before you send them to the lab will save you chair time and a lot of money.

4) For any appliance that requires an occlusal surface, always provide a carefully taken construction bite that represents the exact vertical and AP position that you desire in the finished appliance. Then carefully wrap the bite separately for shipment.

SUPPLY LIST:

Whether you have been practicing for one month or forty years, you will find that you already have almost everything on this supply list. Be sure to take a moment and review it.

- ☐ Appliance Therapy Design Worksheet
- ☐ Alginate
- ☐ Mixing bowl and spatula
- ☐ Dental stone
- ☐ Vibrator
- ☐ Impression trays
- ☐ Tray tree
- ☐ Bite registration material
- ☐ Bite sticks
- ☐ Elastic separators
- ☐ Articulation paper
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- ☐ Fluoride-releasing band cement
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- ☐ Cotton pliers or bracket placement tool
- ☐ Elastic ligatures
- ☐ Needle nose hemostat or ligature tie placement forceps
- ☐ White utility comfort wax or brace relief
- ☐ Direct bond bracket removing plier
- ☐ High-speed finishing burs
- ☐ Abrasive polishing discs
- ☐ Interproximal stripping tool
- ☐ OAP™ Appliance Cleaner

REFERENCES:

1) Talon® Laboratory Technique Manual: Thermoplastic Resilient Polymer for Interocclusal Dental Appliances.

2) Veis, Salzer, Christian, Manual of Appliance Therapy for Adults and Children, 1994. Chapter 8, pp. 8-2 & 8-3.

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9) Brown, S: The Effect of Orthodontic Therapy on Certain Types of Periodontal Defects, J. Periodontal., Dec 1973, Vol. 44, #12, pp. 742-756.

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