SPACE MAINTAINERS LABORATORIES

TIPS AND TECHNIQUES

MOLAR UPRIGHTING

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Written exclusively for dentists.
Designated for one CE Contact Hour.

OVERVIEW

Tooth position plays a vitally important role in the health and maintenance of the dentition -- impacting esthetics, phonetics, occlusion, muscular activity, and temporomandibular joint function. Malposition of any tooth can create a change in the local environment which encourages the onset of caries and periodontal disease.

The mesially inclined 2nd molar is one of the most common dental maladies in adult populations – the result of either childhood extraction or loss in adulthood due to endodontic failure, multiple restorative attempts, decay in the buccal and lingual furcation, and/or advanced periodontal disease. Without timely replacement – or space maintenance, the 2nd molars drift mesially and tip, resulting in compromised arch integrity.

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 Molar Uprighting in the dental office.

UPON COMPLETING THIS COURSE, PARTICIPANTS WILL BE ABLE TO:

- Recognize and evaluate the factors and conditions indicating a need for a molar uprighting treatment plan.
- Understand the health practice potential of uprighting treatment, as well as its importance to your patients' overall health and the final results of your restorative procedures.
- Appreciate the necessity of a detailed patient examination and accurate history.
- Discuss molar uprighting options and tooth positioning procedures with 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; 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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INDICATIONS:

1. Perhaps the most common use of orthodontics to aid in restorative work is the uprighting of a second molar. A tipped molar can have a profound effect on prosthetic therapy.[3]

   Restorative problems associated with a tipped molar include:

   - inadequate parallelism.
   - poor occlusal plane.
   - lack of interproximal space.
   - 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 are more difficult to clean.[1,2]

2. Bruxism and clenching habits may also be initiated by abnormal tooth position. Any alteration in the occlusal pattern such as the location of cusps, fossa, proximal contacts, and marginal ridges, may cause acentric occlusal contacts during function.[1]

3. The patients most likely to benefit from molar uprighting are those with active periodontal disease. One of the primary characteristics of chronic destructive periodontal disease is loss of supporting bone. Teeth with abnormal axial inclination do not properly distribute occlusal forces. Functional or parafunctional forces, which would not move a tooth with adequate support, may cause movement of teeth with reduced bony support. Furthermore, if the malpositioned tooth has a poor clinical crown to root ratio, it will be more susceptible to trauma from occlusion, since there is less alveolar bone to resist the misdirected forces.[1]

4. Tipped teeth are more difficult to clean than teeth that are properly aligned in the dental arch. When prosthetic work is done without first uprighting a molar, oral maintenance becomes even more difficult.

DESCRIPTION OF APPLIANCES:

Molar uprighting can be accomplished using either a fixed or a removable orthodontic approach. Both have their advantages and disadvantages.

Fixed Appliances

A variety of fixed appliances have been proposed to upright tipped molars. Although the design and application may vary slightly, the principals are the same.



This appliance can be separated into an active and stabilizing or anchor unit. To provide appropriate anchorage, all teeth as far forward as the canine in the treatment quadrant should be included. The canine on the contralateral side should also be linked to the anchor teeth by use of a heavy stabilizing lingual arch. This canine-to-canine stabilizing arch not only increases the anterior anchorage but also resists buccal displacement of the anchor teeth.[5]

Although direct bonded brackets are suitable for all the teeth it may sometimes be advisable to band the molar. In the simplest of cases where the premolars and cuspids are only being used for anchorage, the brackets can be placed in the position of maximum convenience where minimum wire bending will be required to engage a passive archwire. A rigid stabilizing wire, .019 x .025 stainless steel, is then placed in the premolars and the canine only.

The molar uprighting is done with a helical uprighting auxiliary spring of .017 x .025 stainless steel wire placed in the auxiliary tube of the molar. The menial arm of the helical spring should be adjusted to lie passively in the vestibule and upon activation should hook over the archwire in the stabilizing segment. It is important that the hook be positioned so that it is able to slide distally as the molar uprights. A slight lingual bend placed in the uprighting spring is needed to counteract the forces that tend to tip the anchor teeth buccally and the molar lingually.[6]

Removable Appliances

The uprighting of mesially inclined molars can often be accomplished with a removable appliance. This appliance should be designed to give you the best retention and anchorage. This is accomplished by having excellent tissue adaptation, two to three clasps and a labial bow to prevent flaring of the anterior teeth. This appliance usually incorporates a spring or an expansion screw to accomplish the desired tooth movement.



In cases where the molar is severely inclined, a fixed component can be added. Here an uprighting spring inserts into a fixed molar bracket which has a tube or slot. The spring then hooks onto the removable appliance, which provides the necessary anchorage and prevents lingual tipping. When using this fixed/removable approach it is essential to place an occlusal rest on the distal aspect of the occlusal surface to prevent extrusion.[2]



While most general practitioners find removable appliances easier to use, these appliances afford much less control over tooth movement. The operator is also completely dependent upon the patient wearing the appliance full time for treatment to be successful.

TREATMENT PROCEDURES:

As always, proper appliance selection and application requires a well thought out and thorough diagnosis and treatment plan. To accomplish this, the following procedures should be performed:

1. A complete medical and dental history.
2. A thorough clinical exam. This should include:
   a. an oral cancer screening,
   b. documentation of any abnormalities in the oral mucosa and gingiva.
   c. radiographic evaluation of all necessary films (FMX, PAN, CEPH)
   d. charting of all existing restorations and carious lesions.
   e. a periodontal evaluation.
3. An orthopedic evaluation of the patient's skeletal pattern should be completed.[2,4]
4. A clinical assessment of the muscles of mastication should also be performed to determine whether the patient's muscles are strong and tight or weak and flaccid.[2]
5. An analysis of the dental arches, tooth position, and occlusal plane should be completed. Modifications to the occlusal plane are sometimes necessary. For example, it is often appropriate to adjust an extruded maxillary molar before reducing the lower molar being uprighted.[1]

   Note - The above analysis (3, 4, and 5) will be helpful in choosing the appropriate uprighting appliance.
6. Remove all caries. Whenever possible, all caries should be removed before placing appliances.
7. Before beginning orthodontic treatment, any tissue inflammation must be eliminated. A thorough root planing and curettage as well as surgery may be necessary.
8. Take alginate impressions and pour up both working and study models.
9. The clinician can now select an appliance to accomplish his objectives.
10. Whether you are using a fixed or removable appliance, the patient should be seen for adjustments once every 3 to 4 weeks.
11. 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 will not be determined by orthodontic adjustments, but by the necessity of keeping the soft tissue free of all inflammation and preventing crestal bone loss during appliance therapy. To achieve this, weekly appointments may be necessary.

12. After uprighting is completed, some form of stabilization must be provided immediately to prevent relapse. If an implant can be integrated to replace the missing molar, an interim partial or a banded space maintainer bridge would be appropriate for stabilization. If a fixed bridge is the treatment of choice, it will act as its own final retainer.

ADJUSTMENT TIPS:



Fixed Appliances

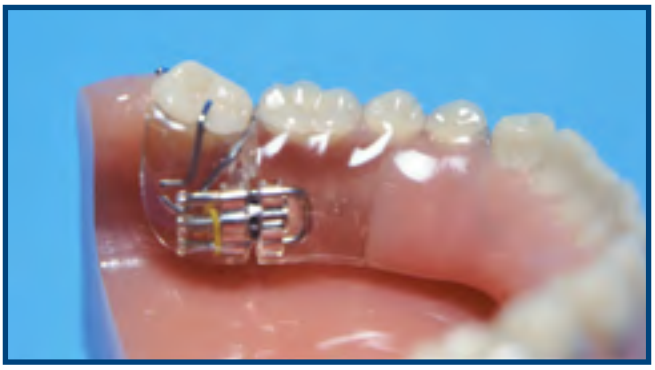
1. Placement of the molar band or bracket should be down the long axis of the tooth and centered in the clinical crown.

2. The placement of pre-molar and cuspid brackets depends on the existing position of the teeth. When teeth are serving as anchor units, the brackets should be placed to passively engage the stabilizing arch wire. If pre-molars need to be repositioned as well, the brackets should be placed ideally (perpendicular to the long axis of the tooth and centered in the clinical crown).[4,5] If you desire, a matrix can be made by the lab to assist you in bracket placement.

3. Once the brackets are in place, try stabilizing the wire to make sure it fits passively.

4. Tie in the stabilizing wire. We recommend elastic ligatures ties over wire ligatures. They are more comfortable and easier to use.

5. Before placing your preformed helical uprighting spring, make sure it has a slight lingual bend in it. This will prevent your anchor teeth from being tipped buccally and the molar lingually.[1,4,6] The mesial arm of the uprighting spring should lie passively in the vestibule before it is engaged. At subsequent appointments, this spring can be reactivated by simply bending it gingivally.



***Removable Appliances*:**

1. When using removable appliances that have an expansion screw, have your patient perform one activation per week. This is equivalent to lmm of movement per month.

2. During the uprighting process, it is important to prevent unnecessary occlusal trauma. This is easily accomplished by doing some selective grinding throughout treatment.

LAB REQUIREMENTS:

1. Accurate casts poured in stone. Air bubbles, holes, excess stone or any other imperfections that will affect the fit of the appliance are unacceptable.

2. Provide a carefully taken occlusal record. This will allow us to fabricate any additional appliances needed for disarticulation purposes.

3. Indicate the appliance desired on the prescription.

CARE FOR THE APPLIANCES:

Removable appliances should only be taken out after meals for cleaning. The appliance should be scrubbed thoroughly with a tooth brush and toothpaste, then rinsed in cool water.

Excellent oral hygiene is essential for patients wearing fixed appliances. Food debris is easily trapped and must be removed after eating.

Fixed appliances can be very irritating to the cheek and tongue, especially when first delivered. I recommend that you give your patient some utility wax or brace relief to protect their soft tissues.

SUPPLY LIST:

Vinyl Mixing Bowl
Wide Blade Spatula
Alginate
Distilled Water
Impression Trays (We recommend a rim-lock design.)

Removable

Acrylic Burs
Acrylic Polishing Burs
Acrylic Repair Kit
Pressure Pot
139 Bird-Beak Pliers
Three-Prong Pliers
Expansion Screw Key
Stiff Robinson Brush
O.A.P. Appliance Cleanser
Sonic Appliance Cleaner
Patient Appliance Care CD
Patient Calendar Booklets
Colored Retainer Cases

Fixed

Etchant
Cheek Retractor and Tongue Blocks
Fluoride-Releasing Band Cement (Regular or Light Cure)
Wet-Field Bracket Bonding Adhesive
Bracket Placement Tool
Elastic Ligatures
Arch Tie Placement Forceps
Comfort Wax
Direct-Bond Bracket Removing Pliers
Interproximal Stripping Tool

CONTRA INDICATIONS AND CONCERNS:

After doing a thorough clinical analysis, you must determine whether an uprighting procedure is appropriate. Some patients have physiologic occlussions where the edentulous areas have remained stable for many years. Others are periodontally resistant and can tolerate tooth malposition. For these patients it is optional whether a mesially inclined molar must be uprighted, unless it is necessary to accomplish optimal restorative treatment.[2]

Inflammation must be controlled in a periodontally involved patient prior to initiating tooth movement. Not doing so can result in irreversible crestal bone loss, probably causing more harm than benefit to the patient.

When uprighting a molar, occlusal interferences are often created which can cause a patient to clench or grind. To prevent this occlusal trauma during tooth movement, one should use a combination of a bite plane for posterior disarticulation and selective grinding of the teeth in trauma.

The decision to use an appliance for disarticulation is dependent upon a thorough understanding of the patient's skeletal and muscular pattern. For example, in the open bite skeletal pattern extrusive mechanics of uprighting can cause an open bite to develop.

It would be contra-indicated to use a bite plane appliance for disarticulation in this pattern. In the deep bite pattern, the opposite is true. Here there may be a problem with trauma to the tooth during uprighting due to the extrusive forces. Trauma can be alleviated by using a simple bite plane appliance.[2]

In the presence of strong musculature, there is a greater chance for trauma to occur to the tooth being uprighted. There is also less of a tendency to create an open bite. In this situation, the use of an anterior bite plane would be appropriate. In the presence of flaccid or weak musculature during uprighting, there is a possibility of extrusion that can be difficult to reverse. This is particularly true when there is both a super-imposed skeletal open bite tendency and a weak musculature. A patient exhibiting these characteristics would not use a bite plane appliance for disarticulation.

Although it is possible to upright both a second and third molar at the same time, it is not always appropriate. Distal positioning of the third molar can move it into a position where hygiene cannot be maintained. Sometimes, uprighted third molars are not in functional occlusion. In these cases, it would be more appropriate to extract the third molar and simply upright the remaining second molar.[5]

A helical uprighting fixed appliance causes considerable occlusal as well as distal crown movement. This type of spring should only be used when a tipped molar has an occlusal antagonist. Alternative uprighting springs can be used, but they are more difficult to use and are not the subject of this article.[5]

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