

OPTIMUM ORTHODONTICS FOR THE 5 TO 12 YEAR-OLD BY COMBINING REMOVABLE AND FIXED APPLIANCES WITH THE USE OF THE NITE-GUIDE® AND OCCLUS-O-GUIDE® APPLIANCES

INTRODUCTION:

Early intervention of common orthodontic problems seen developing in the late deciduous dentition as the mandibular incisors begin to erupt is frequently made more efficient by a combination of appliances. For example, the Nite-Guide® technique is an efficient means of preventing overbite, increasing arch development and correcting overjet. There often develops, however, a shortage of arch size for cases where, (a) the maxillary canines erupt in a mesial direction, (b) there is a bi-lateral constriction of the upper arch, (c) where the upper permanent molars are positioned too far mesially or have been rotated mesio-lingually; due to loss of arch length from deciduous molar loss or decay, (d) where there is insufficient arch development for the incoming (upper and/or lower) incisors, (e) where persistent thumb or finger sucking is preventing the full eruption of permanent incisors, and (f) incomplete eruption, rotation and torque corrections of the permanent teeth.

These six examples of problems can be associated with the use of the Nite-Guide® technique and can also occur in the mixed dentition when the Occlus-o-Guide® would be used. These six problems are usually easily rectified by various forms of limited fixed appliance methods and associated appliances such as the quad-helix, cervical head-gear, and maxillary and/or mandibular bumpers, rapid palatal expanders, anti-thumb sucking appliances as well as various other removable appliances. Each of these methods is often rather specific for certain problems and each will be discussed as to its appropriateness and its relative success in these cases.

CLINICAL INDICATIONS WITH SPECIFIC CASES.

A. QUAD-HELIX APPLIANCE

The "Quad-Helix" as illustrated in Figure 1, is a very simple and dependable method of gaining expansion in the maxilla. It consists of a soldered wire to two bands, most often cemented to the upper first permanent molars. Whatever degree of expansion between the posterior segments is required, the Quad-Helix is activated prior to cementation by simply separating the two halves. The Quad-Helix is very efficient in obtaining minor expansions where anterior crowding is not a major problem. For example, if there is constriction of the maxilla and the mandible displaces to one side or the other, the upper arch can be widened 3 or 4mm, which is often enough for the lower jaw to center itself. The Quad-Helix is an ideal appliance for this correction. As a result, the indicated cross-bite caused by the mandibular displacement automatically corrects itself. The Quad-Helix is left in place for about 3 to 6 months, and then removed. At the same time, the Nite-Guide® continues to be worn while sleeping while the Quad-Helix is in place. Once the Quad-Helix is removed, the expansion stays extremely well since it is being done at such a young age (5-8 years of age). The advantage of the Quad-Helix is that it is very simple and easy to use. It is simply cemented to place and it does its job of expansion without adjustment. The primary disadvantages are that it is hard to make further adjustments after cementation and it is inefficient in providing any distalization of the posterior arches and cannot be used in the lower arch. Although one form of Quad-Helix can be made to be removable from the cemented upper molar bands for future adjustments of expansion, other forms of expansion techniques that provide distalization at the same time are usually more versatile when this might be a requirement. The Quad-Helix is constructed close to the tissue on the lingual of the teeth so the Nite-Guide® can be worn at the same time without interference.

B. RAPID PALATAL EXPANSION APPLIANCE.

This form of expansion is usually reserved for those cases having bilateral maxillary constriction requiring expansion combined with more than moderate crowding of the upper incisors needing usually more than 3mm of space. In order to have the convenience of combining the use of the Nite-Guide® and Occlus-o-Guide® with the rapid palatal expansion device, it is advisable to use a wire-construction (Hyrax type) style rapid palatal expander (RPE), rather than the occlusal-bonded type. Slight trimming of the plastic is often required so that contact of the wires with the Nite-Guide® or Occlus-o-Guide® does not occur. Most expansion with the RPE requires over-activation of about 2-3mm per side and at least 3 to 6 months of prolonged cementation to guarantee sufficient bone apposition in the midline suture. This expansion at young ages such as 6-8 years of age will usually retain after this 3-6 month period quite well with the Occlus-o-Guide® type appliance (including the Interim G) as the only form of retention. It is recommended, however, that close observation be maintained so that if any unacceptable relapse does occur, an acrylic palate type retainer can be fitted quickly to guarantee acceptable retention. After age 8, it is highly recommended that an acrylic palate always be placed to guarantee satisfactory retention. This palate can be combined alternately in use with Occlus-o-Guide® or Nite-Guide® appliances.

Therefore, if there is considerable incisal crowding and there is a question of obtaining sufficient room for the upper teeth, it is better in these cases to insert a rapid palatal expander, which will open the midline maxillary suture and provide extra room in the midline for the upper incisors. Since the rapid palatal expander is a more invasive appliance and involves separating the two palatal processes of the maxilla, it is reserved only for those cases where the severity of the crowding is too severe to be properly corrected in any other way. The Quad-Helix is a more desirable appliance since it is a conservative approach to expansion and involves only simple tooth movement. It, however, can only obtain 1 to 2mm of space in the upper arch, but cannot be expected to get 4 to 6mm, which a rapid palatal expander can get. The Nite-Guide® or Occlus-o-Guide® can be used at the same time if the rapid palatal expander is of the Hyrax variety and does not involve occlusal coverage of the posterior teeth.

C. BUMPER OR HEADGEAR WITH MOLAR LINGUAL EXTENSIONS.

This form of appliance is more appropriate when moderate space requirements are needed in either the upper or lower arch together with the possibility of expansion. This technique can be used effectively in either the upper or lower arches. Molar bands are fitted and an alginate impression is taken. The molar bands are waxed into the impression prior to it being poured up in plaster. Steel wire of about .036" (1.25mm) diameter is adapted to the lingual posterior segment and can either be terminated at the mesial of the canine or be wrapped around the mesial of the canine. The wire that passes around the mesial surface of the canine is thinned by a stone so that it is like a ribbon, simply to tie the posterior segment together as a unit. This method of wrapping the canine with a lingual wire extension is most often used in the lower arch. Prior to taking the impression, the lower deciduous canines are usually generously stripped (2mm each) on the mesial to aid in providing additional anterior space and to facilitate placing the wrapped ribbon-wire around this surface. A bumper is then placed into the molar (.045") gingival tubes for distalization and expansion. This method of gaining arch length is extremely efficient in that it provides space in the anterior segment where it is most often needed. To get maximum success it is recommended that the bumper is tied in.

One must be cautious not to impact the lower second permanent molars when using distalization forces in the lower arch during the mixed dentition. It is important to check intra-oral radiographs (not a panoramic film) to verify that there is 1 or 2mm of space between the mesial of the erupting crown of the second molar and the root surface or crown of the first permanent molar on each side. Usually every month, the bumper is advanced 1mm on each side and it is quite routine to provide 2 to 3mm of space on each of the left and right side in 3 to 4 months of wear. The advantage of this technique is that the

distalization is accomplished outside the dentition and does not tax the anchorage or the anterior segment as long as the shield of the bumper is kept as low as possible below the crowns of the incisors.

The same technique can be used in the upper arch, however, it is not advisable to strip the upper deciduous canine, since if the permanent canine is the last tooth to erupt after the eruption of the two premolars it often might be short of space particularly if the mesio-distal width of the deciduous tooth has been reduced. For this reason, it is best to strip the mesial of the upper first deciduous molar in order to wrap the ribbon portion of the lingual extension around this tooth. Either an upper bumper can be used if bilateral action is desirable or a headgear, if a unilateral action is required. The primary disadvantage of the bumper is that it cannot be used unilaterally, while the headgear is quite efficient as a unilaterally activated appliance. This is accomplished by widening the outer bow on the side that greater distalization is required. The friction of the neck strap is what creates an unequal and greater force on the side where the outer bow has been widened away from the face.

With either the bumper or headgear used in the upper arch, the adjustment of the bayonet bend just mesial to the .045" tube of the first molar can be altered so that the mesio-buccal cusp of the molar can be rotated buccally and distally to obtain additional room when this tooth has previously rotated this way in a mesial position. The expansion in the upper arch can also be varied by the way in which this bayonet bend is altered. If simple expansion without distalization is required, usually a simple .045" (1.5mm) round accessory labial wire is used with stops to prevent it from slipping distally and rubbing into the incisal gingival tissue or into the crowns of the upper incisors. If expansion of the entire posterior segment on each side is desired, this wire is widened so that both distal portions that insert into the molar tubes on each side are parallel with each other. If the expansion is to primarily be in the molar areas, the ends of the wire are tapered away from each other slightly. If the expansion is to take place in the canine area, the opposite configuration is made where the wire ends taper towards one another slightly while the wire portion closer to the stop will place a force to widen the lingual extension buccally only in the area towards the canines on both sides.

It is recommended that a bumper becomes much more efficient when tied in so that the patient cannot remove it. It, therefore, is an extremely efficient method of distalization, while the cervical headgear depends on patient cooperation and is frequently not an appealing appliance due to its appearance.

These various distalization appliances are also useful also if the need arises to place a few brackets on either the upper or lower teeth for rotations, torque, or for distalizing upper canines. Since the molar bands are already in place it makes it easy to convert the case into any combination of fixed therapy.

All of these various expansion techniques can be used in combination with either the Nite-Guide[®] or Occlus-o-Guide[®] appliances with only adjustments usually in the area of the molar bands. The Nite-Guide[®] or Occlus-o-Guide[®] appliance is trimmed with a sharp acrylic bur so that any contact with the bands (or brackets if present and any portion of the wires) is eliminated. The bumper or expansion wire is positioned to be gingival to the margins of the Nite-Guide[®] or Occlus-o-Guide[®] to reduce contact and displacement between the two appliances. In order to obtain molar distalization, the headgear is placed beyond the front margin of the plastic of the Nite-Guide[®] or Occlus-o-Guide[®] by about 3mm to avoid distalization of the whole maxilla.

D. OTHER FORMS OF EXPANSION AND DISTALIZATION.

Other forms of expansion devices such as Schwartz plates, Crozat appliances, Bionators, Frankels, etc. can be combined in usage with the Nite-Guide[®] or Occlus-o-Guide[®] and are worn alternately at times when the Nite-Guide[®] or Occlus-o-Guide[®] are not being worn. Distalizing techniques such as sagittals and reverse magnets can also be combined in their use. Any portion of the Occlus-o-Guide[®] can be removed, although it is usually recommended that the upper labial and lower lingual margins be maintained as much as possible if mandibular advancement is required. In order to trim the appliance for wire or bracket

interference in the upper incisal area, it is recommended that the inner portion of the margin facing the labial surface of the teeth be removed instead of reducing the superior surface of the margin.

E. THUMB SUCKING APPLIANCES.

Any type of fixed thumb sucking device can be used in combination with the Nite-Guide® or Occlus-o-Guide® appliance. Usually the anterior cross-bar is located between the canines and whether a crib, spikes, or roller is used, the Nite-Guide® or Occlus-o-Guide® is usually trimmed slightly on the upper lingual section of the anterior area so the thumb sucking device will not interfere with normal wear of the plastic appliance. It is very important that the Nite-Guide® or Occlus-o-Guide® is worn at the same time since the overjet will be corrected while the natural unimpeded eruption of the incisors will be limited vertically when the ideal overbite is achieved. If this is not done, existing excessive overjet will allow the incisors to overerupt into a deep overbite when the thumb habit is corrected. Therefore, a combination of both the thumb sucking device and the Nite-Guide® or Occlus-o-Guide® appliance is a distinct advantage in such cases.

F. OTHER TYPES OF DEVICES IN COMBINATION WITH NITE-GUIDE AND OCCLUS-O-GUIDE APPLIANCES.

The most frequent removable appliance to be used with the Nite-Guide® or Occlus-o-Guide® is the Hawley appliance. It is advisable that the alginate impression for the Hawley or any other removable to be used in conjunction with the Nite-Guide® or Occlus-o-Guide® be taken after about 3 months of wear so that the two appliances will fit coordinately with each other in the same occlusion. If the impression for the removable is taken immediately, every time this appliance is worn, it will feel like it does not fit the occlusion especially after the Occlus-o-Guide® is worn actively (with biting force).

There are many uses of the Hawley appliance in conjunction with the Nite-Guide® and Occlus-o-Guide® such as:

1. **To aid in the correction of overbite with relatively uncooperative or resistant patients.** A bite shelf is provided in the anterior segment to prevent collapse of the corrected overbite when the Occlus-o-Guide® is not being worn during the daytime. This will speed up the correction when patients might only wear the Occlus-o-Guide® actively an hour or less each day.
2. **To aid in cases that heavily brux at night.** These patients frequently grind through the anterior segment of the Occlus-o-Guide® within a few weeks or months of wear. When this happens, a Hawley with an anterior bite shelf is constructed and worn at night to separate the posterior teeth so that grinding and wearing of the posterior teeth cannot take place. This protects the overbite correction taking place during daytime wear from relapsing at night while grinding.
3. **To aid in severe overjets accompanied by heavily spaced upper incisors with anterior tongue-thrust swallowing patterns.** Most of these types of cases will correct without the help of a Hawley, but when there is no incisal retraction for a couple of months with satisfactory wear of the Nite-Guide® or Occlus-o-Guide® (especially the Occlus-o-Guide®), a Hawley can be used during the day alternately with active Occlus-o-Guide® wear to aid in overcoming the activity of the tongue. This will enable the incisors to properly retract and help to reduce the excessive overjet.

If a tongue-thrust is suspected (and it often is present in these resistant cases of overjet) small wires can be made to protrude from the plastic palate of the Hawley in the area lingual to the incisors. This will aid in reminding the patient to keep the tongue in the proper position

while swallowing. Another technique is to cut a circular depression about 4mm in diameter in the same area in the palate (without going completely through the plastic).

4. **To aid in correcting a cross-bite in the canine or incisor area.** The Hawley used to aid in the treatment of these cross-bites, usually will also have an anterior bite shelf to separate the occlusion to enable the cross-bite to more easily be corrected. A finger spring or springs are placed lingual to the tooth or teeth involved in the cross-bite. If a complete anterior cross-bite is present, usually an occlusal overlay shelf has to be constructed to gain proper separation of the jaw to enable the teeth in cross-bite to jump the bite. The advantage of combining a Hawley with the Occlus-o-Guide[®] (or Nite-Guide[®]) to aid in cross-bite corrections is that the Occlus-o-Guide[®] and Nite-Guide[®] will perfect the occlusion better than a Hawley can do by itself while the Hawley is good at correcting the cross-bite since it can be worn easily for many hours during the day. For example, the overbite, overjet, crowding in the lowers, and midlines can be corrected with the Occlus-o-Guide[®] which the Hawley cannot usually do by itself.
5. **To aid in the rotation of incisors.** This is of great help in cases where incisors (upper and lower) erupt severely rotated (80° or more) and can be aided by placing a finger spring in the Hawley to exert very minor pressure (less than 1oz or 30gms) prior to fiber formation while the tooth is erupting. Finger springs can also be used to rotate severely rotated incisors during the cross-bite since it can be worn easily for many hours during the mixed dentition after eruption is complete. This is particularly helpful for upper permanent laterals that are severely rotated towards the lingual at the distal margin due to an improper or incomplete distal incisal edge. At times rotations of permanent canines or premolars can be aided by rotation springs on Hawley appliances as well.
6. **To aid in the lateral movement of displaced teeth.** This is most frequent in the lower incisal segment where the premature loss of a deciduous canine has taken place. Although labio-lingual wires can be placed in the Nite-Guide[®] or Occlus-o-Guide[®] to shift several adjacent incisors laterally, up to 5mm, the Hawley is particularly helpful in moving an individual tooth that has erupted or is erupting in an unusual position.
7. **To aid in the initial movement of severely displaced erupting incisors.** This is often helpful for a severely lingually displaced lower lateral incisor that is beyond the range of being guided by the lingual margin of the Nite-Guide[®] or Occlus-o-Guide[®]. Once the tooth is within the area of the socket, the Nite-Guide[®] or Occlus-o-Guide[®] can easily guide the tooth to its proper position, so that the use of the Hawley can be discontinued.
8. **To aid in the closure of large diastemas (greater than 3mm).** Sometimes this closure is easier with the use of a Hawley with finger springs than constantly changing labio-lingual wires in the Occlus-o-Guide[®] appliance.
9. **To create space for an erupting canine.** The labio-lingual wires in an Occlus-o-Guide[®] are difficult to use in shifting posterior teeth mesio-distally and the Hawley can be used to distalize a mesially erupting premolar and at the same time upright a mesially or labially erupting canine.
10. **To aid in the distalization of a molar(s).** This is done by providing a finger spring to engage the mesial surface of the tooth to move it posteriorly for poorly erupting molars or where distalization of a molar must be made to aid in gaining proper space for a premolar.
11. **To aid in the healing of TMD problems.** In closed-lock type TMD problems, with an anterior displaced disc can initially use a splint full time for about 4 to 6 months after reducing or recapturing the disc. Following partial healing of the ligaments, the Nite-Guide[®] or Occlus-o-Guide[®] can be used to correct the problems of the occlusion such as the overbite,

overjet, and intercuspation with eruption of the posteriors in combination with the mandibular advancement that occurs as the overjet is corrected.

Many other functional appliances that are not particularly efficient at aligning teeth can be aided significantly by combining the use of the Occlus-o-Guide® in finishing details that are impossible to obtain with functionals such as the Twin-Block appliance, Bionator, Crozat, Frankel, activator, Stockfish, Planer, etc. The functional is used initially while the Occlus-o-Guide® can be used alternatively during the same time or frequently following these appliances to perfect the occlusion.

G. USE OF FIXED APPLIANCES DURING THE USE OF THE NITE-GUIDE AND OCCLUS-O-GUIDE®.

At times it is very useful to use the Occlus-o-Guide® while using fixed appliances for correction of the overjet, correction of posterior premolar cross-bites, crowding and/or rotations of mandibular or maxillary incisors, and to coordinate the arches. Often the Occlus-o-Guide® can be used to retain a corrected malocclusion while incisors are being torqued or posteriors are being uprighted, etc. It should be recommended that for the Occlus-o-Guide® to correct an overbite in the mixed or permanent dentition, the posterior teeth on the upper and lower arches must not be attached to archwires; otherwise, these teeth are not able to freely erupt to establish an improved vertical dimension. Therefore if it is desirable to correct an overbite, the Occlus-o-Guide® should be used initially before any posterior brackets are placed and tied to archwires.

The Nite-Guide® and Occlus-o-Guide® are perhaps the most versatile of all functional-type removable appliances in that they can correct major problems such as, overbite and overjet, as well as, crowding and rotations, intercuspate teeth, and coordinate the arches and generally idealize a malocclusion. This enables these appliances to frequently be used in conjunction with other functionals as well as with fixed appliance therapy. The Nite-Guide is most advantageously used to simplify complicated developing malocclusions and if some limited fixed appliances are needed, they usually are for class I “touch-ups” to simply perfect minor problems. The Occlus-o-Guide® is most useful in correcting the most difficult and time-consuming problems of a malocclusion. These problems consist of deep overbites and severe overjets, multiple posterior cross-bites of the “telescoping” kind where the lower teeth fit completely lingual to the uppers or complicated rotations and crowding of up to 4mm in the mixed dentition. Simple cases that are easily corrected with fixed appliances are not very efficient for the Occlus-o-Guide® to correct. These type of cases with minimal crowding; minimal or no overbite and overjet; bilaterally constricted maxilla; and those cases only requiring torque are all easily corrected by a limited number of brackets, rapid palatal expansion and torqueing appliances with a reduced total treatment time of 6 months or less. The Occlus-o-Guide® on the other hand can correct the most difficult overbite and/or overjet in less than one year’s time in about 20% of the time it would take with fixed appliances.