Open Bite Correction Made Easy

TADs and a TPA can help orthodontists solve this clinical problem in 6 months

Anterior open bites can be the result of a digit, or tongue-thrust habit, leading to the undereruption of the maxillary and mandibular incisor teeth. They can also be due to a vertical maxillary excess, where the posterior teeth have overerupted, creating a premature stop in the hinge motion of mandibular closure. Treatment of the former requires correction of the habit, followed by the extrusion of the undererupted incisors. The latter has traditionally been treated through orthognathic surgery to impact the posterior maxilla, but with the popularity of miniscrew implants, it is only natural to look at these devices as an alternate treatment option for the correction of anterior open bites.

Miniscrews have been used with limited success to aid in molar intrusion in the past. Application of an intrusive force, away from the center of resistance, from miniscrews placed in the buccal bone in maxilla leads to a force couple and labial crown tipping, resulting in plunging of the palatal molar cusps and an increase in the anterior open bite. Placing...
miniscrews in the buccal posterior maxilla has also been associated with deviations in placement angle, impingement of the PDL space, and potential cementum contact. Furthermore, the posterior maxilla and maxillary tuberosity region have reduced cortical bone thickness, and provide inferior primary stability, which leads to premature loss of miniscrews.

The palate, on the other hand, provides a site of thick, dense cortical bone that provides significant screw retention. The purpose of this article is to describe palatal anchorage using the Unitek™ TAD system (Figure 1, page 20) to control the vertical dimension and correct anterior open bites.

**Treatment Considerations**

Prior to initial bonding, a modified transpalatal arch (TPA) as described by Cope (Figure 2, page 20) should be fabricated to be delivered at the time of appliance placement. The TPA should be designed such that the bar does not proximate the palatal tissue. Ideally, the TPA, made of .036 stainless steel wire, should be 5 mm away from the depth of the palate and 3 mm away from the palatal walls (Figure 3, page 20). The distal extensions must be soldered to the TPA such that they extend distally toward the second molars (Figure 4, page 20). For treatment efficiency, the TPA should be placed on the day of initial bonding, so that the leveling and aligning stage of treatment can progress with the molar bands in place.

Once initial leveling is complete and full-sized rectangular wires are in place, the miniscrew can be inserted into the palate to initiate maxillary molar intrusion. Local anesthesia is generally necessary to prepare the miniscrew placement site, since the palatal tissue is often too thick to achieve full anesthesia using compound topical anesthetics.

A 6-mm miniscrew should be placed at the level of the first molars, 1 to 2 mm lateral to the midpalatal suture. The placement angle must be 15º to 20º toward the anterior to resist the vertical forces applied during molar intrusion. The miniscrew can then be activated by securing two 3-mm nitinol coils to the head of the implant using a .010 stainless steel ligature, then attaching the other end of the spring to the distal extensions of the TPA (Figure 5, page 20). The Unitek TAD head design, with its .075-gauge cross-cut hole, allows for ligation of this ligature to the miniscrew.

The extent and complexity of the anterior open bite will determine the amount of molar intrusion time that is necessary for successful treatment. In general, most open bites can be treated within 6 months following miniscrew placement and activation. Figures 6 and 7 present the treatment progress of two patients who underwent orthodontic treatment for closure of their anterior open bites using palatal skeletal anchorage in 6 and 7 months, respectively.

Activation springs, along with the miniscrew and the TPA, can be removed once you have achieved sufficient increase in overbite. It is important to avoid extrusive mechanics, such as intermaxillary elastics, during the finishing phase of treatment. Such mechanics often extrude molars and increase the vertical dimension, and can result in the recurrence of the anterior open bite during the final finishing phase of treatment.

**Advantages of this Technique**

The palate has proven to be an effective site for miniscrew implant placement for movement of dentition in the anteroposterior dimension using indirect anchorage mechanics. It provides a site of thick, dense cortical bone that provides significant miniscrew stability. Furthermore, the bone is covered with ample keratinized tissue, making it resistant to tissue irritation and inflammation.
Other than the incisive foramen, the palate is also a site where there is limited potential for nerve and blood-vessel damage from miniscrew placement. The main advantage of the indirect anchorage system provided through a palatal miniscrew attached to a transpalatal arch is that it seldom requires any alterations in treatment mechanics.

Consequently, the clinician can use familiar, conventional orthodontic mechanics for en-masse retraction of anterior teeth, distalization of the entire maxillary arch, or protraction of the maxillary posterior segments. The above-described protocol outlines how the palate can also provide means for movement of the dentition in the vertical dimension. Using careful treatment mechanics, this method can be a predictable alternative to orthognathic surgery for the treatment of anterior open bites.

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References for this article are available with Orthodontic Products’ digital edition.

Figure 8: This is a superimposition of Patient 1’s final cephalometric radiograph (green) on the initial cephalometric radiograph (black).

Figure 9: This is a superimposition of Patient 2’s final cephalometric radiograph (green) on the initial cephalometric radiograph (black).

Figures 7A-7D: Patient 2’s open bite was corrected over a period of 7 months.