

Indirect Fabrication of a Transpalatal Arch Supported by a Temporary Anchorage Device

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Because of their versatility, palatal temporary anchorage devices (TADs) can be used for various types of orthodontic tooth movement. This article describes a method for precise indirect transfer of the position of a palatal TAD to a study cast for fabrication of a TAD-supported transpalatal arch (TPA).

Appliance Fabrication

1. Customize a T-wire accessory* by shortening all three wire extensions to 15-18mm and then bending the extensions upward and inward (Fig. 1). This prevents impingement of the device on intraoral tissues.

2. During the impression appointment, fully seat the three arms of the customized T-wire accessory into the perpendicular .022" slots on the head of the previously inserted palatal TAD* (Fig. 2). Stabilize the accessory with a small amount of light-cured orthodontic resin in the center of the screw head, but do not allow any adhesive to flow into the undercuts.

3. Take an alginate impression with the T-wire accessory in place. As the set impression material is removed, it will pull the accessory away, leaving the TAD in place. The accessory will be embedded in the set alginate impression, with the intersection

*Dentaurum USA, 10 Pheasant Run, Newtown, PA 18940; www.dentaurum.com.

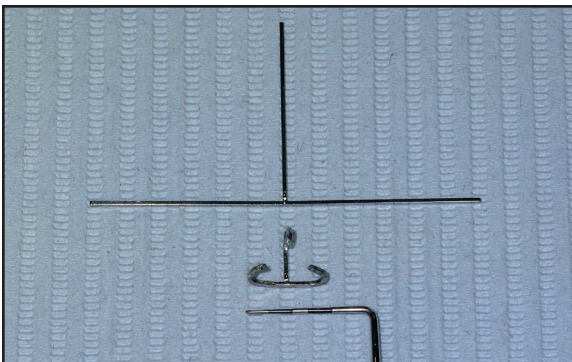


Fig. 1 T-wire accessory customized by shortening wire extensions to 15-18mm and bending them upward and inward.



Fig. 2 Customized T-wire accessory fully seated into slots of miniscrew head.

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of its three arms at the center of the screw-head imprint (Fig. 3).

4. Carefully place another miniscrew, identical to the one in the patient's mouth, in the alginate impression so that the two slots of the analog TAD are fully seated into the three arms of the embedded accessory. Stabilize the analog TAD with sticky wax (Fig. 4), then pour the impression. The cast will thus contain the analog TAD in the exact location and orientation of the miniscrew in the patient's mouth.

5. Adapt a TPA from .021" × .025" stainless steel wire. Using a black alcohol-based marker, delin-

eat the 2-3mm section of the wire that will be seated into the slot on the screw head, so the TPA can be accurately placed after repeated insertion and removal during fabrication. Ensure that the wire will not impinge on the oral tissues as it is passively adapted to the lingual surfaces of the abutment teeth (Fig. 5).

6. At the delivery appointment, pumice, rinse, and dry the abutment teeth, then apply a self-etching bonding agent. After ligating the TPA with dental floss for safety, fully seat it into the slot on the miniscrew head, and verify the positions of the extensions at the abutment teeth (Fig. 6).

7. Secure the TPA to the palatal screw head with a light-cured adhesive, ensuring that the resin flows into the undercuts of the screw head to provide adequate retention (Fig. 7).

8. Bond the extensions of the TPA to the abutment teeth with light-cured adhesive (Fig. 8).

9. Remove the floss from the TPA, and smooth out any irregular or rough composite. If desired, leave a short length of TPA wire extending from the resin on the abutment tooth to allow attachment of an elastomeric chain (Fig. 9).

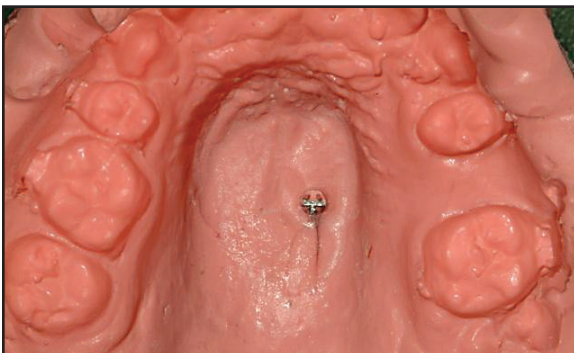


Fig. 3 T-wire accessory embedded in alginate impression.

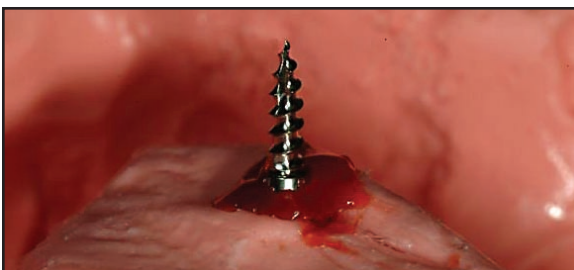


Fig. 4 TAD analog fully seated on customized T-wire and stabilized with sticky wax.

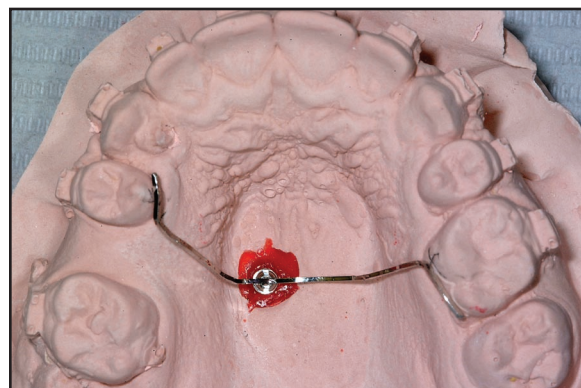


Fig. 5 TPA adapted on cast and seated in TAD slot.

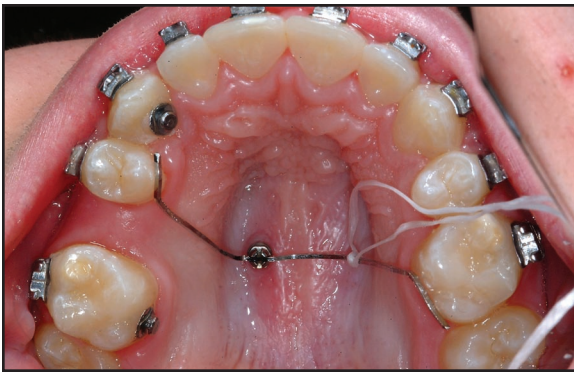


Fig. 6 TPA seated in palatal TAD.

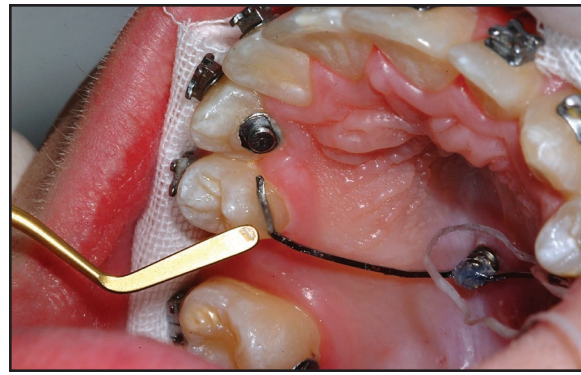


Fig. 8 TPA bonded to abutment tooth.

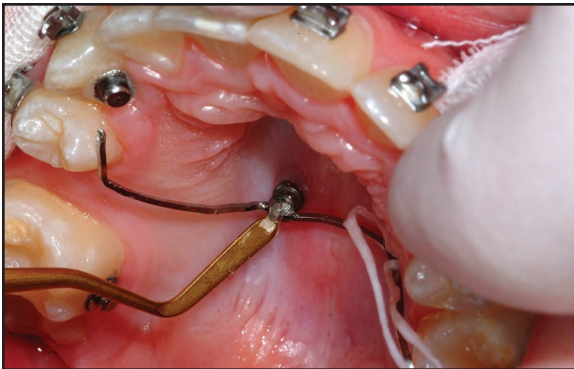


Fig. 7 Light-cured adhesive used to attach TPA to TAD.

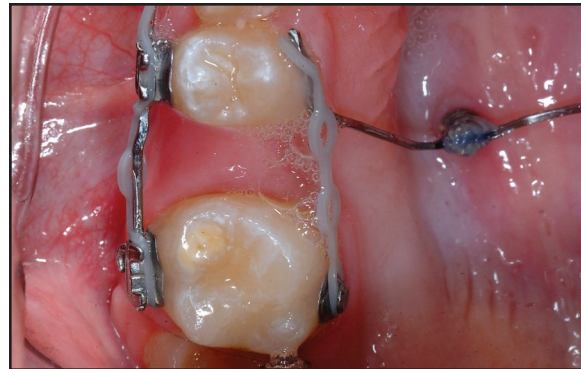


Fig. 9 Finished TPA with elastomeric chain attached to lingual button on first molar.

Discussion

This procedure is similar to the method used to index and transfer the position of a conventional dental implant to a study cast. Benefits include reduced chairtime and minimal need for adjustments at the delivery appointment. Although one manufacturer has included components for transferring the exact location of its palatal implant to a study cast,¹ our system can be used with any miniscrew that has .022" perpendicular slots in the head.

In the example shown here, indirect fabrication facilitates construction of a passive, properly adapted TPA. This method can be used in virtually any situation requiring palatal implants, but we have found it particularly useful in cases requiring maxillary space closure. The indirect skeletal anchorage provided by the TPA auxiliary stabilizes the abutment teeth and provides additional anchorage while maintaining the transverse dimension of the maxillary archform.

Palatal TADs have several advantages over those placed buccally or labially. Because root proximity is rarely an issue, the same palatal TAD can be used for several TPA configurations, and the TPA can be altered to anchor different teeth during treatment as needed. Palatal TADs also

carry a lower risk of soft-tissue complications, since they are entirely located within attached gingiva.

We were initially concerned that the .021" × .025" stainless steel wire used to fabricate the TPA is smaller than has traditionally been used. Wehrbein and colleagues reported anchorage loss at the first molars in patients who had undergone extraction of maxillary first premolars, due to bending of an .0315" × .0315" stainless steel TPA supported by an endosseous palatal implant.² We have not observed clinically significant anchorage loss in our patients with the use of .021" × .025" stainless steel TPAs. Further research to evaluate the performance of TAD-supported TPA wires of various dimensions would be useful.

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1. Wilmes, B. and Drescher, D.: A miniscrew system with interchangeable abutments, *J. Clin. Orthod.* 42:574-580, 2008.
2. Wehrbein, H.; Feifel, H.; and Diedrich, P.: Palatal implant anchorage reinforcement of posterior teeth: A prospective study, *Am. J. Orthod.* 116:678-686, 1999.