Maxillary Molar Movement with a New Treatment Auxiliary and Palatal Miniscrew Anchorage

SEBASTIAN BAUMGAERTEL, DMD, MSD, FRCD

When buccal miniscrews are used as direct anchorage for maxillary molar distalization or mesialization,[1-3] they are usually placed between the roots, which may interfere with the planned tooth movement. Indirect anchorage from palatal miniscrews is more reliable,[4,5] but has traditionally required a laboratory-fabricated auxiliary such as a transpalatal arch.[6,7] This article describes a new treatment auxiliary that eliminates the laboratory work, allowing immediate miniscrew loading.

The T-Wire Auxiliary

The tomas T-wire auxiliary* is a prefabricated auxiliary device that can be adapted for an individual patient. It consists of two straight .021" × .025" stainless steel wire segments welded together at a 90° angle in a "T" shape (Fig. 1). The T-wire is designed for use with a miniscrew head that has an appropriately sized single slot or cross slot.

Before the anchorage device is placed, the patient should be adequately prepared for the mechanics of anteroposterior tooth movement. This includes complete leveling and alignment, correction of all rotations, sufficient root parallelism, and satisfactory incisor torque. A rigid, continuous stainless steel archwire should be in place.

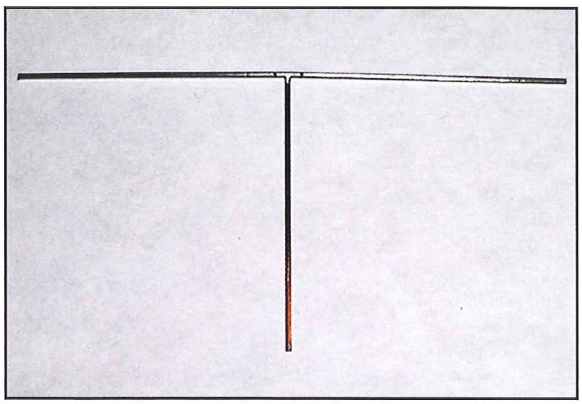

Fig. 1 Tomas T-wire auxiliary.*

After palatal insertion of the miniscrew, the crossbar of the T-wire is adapted to the lingual contour of the maxillary incisors, and the stem is adapted to the contour of the palate. The customized T-wire is then inserted into the slot of the implant and secured. In the case illustrated here, a 6mm tomas self-drilling miniscrew* was placed, and the T-wire was secured with composite** only (Fig. 2). The crossbar of the T-wire is securely bonded to the lingual surfaces of the maxillary incisors with flowable light-cured composite,*** so that it resembles a lingual retainer. The maxillary incisors and the palatal miniscrew thus form a stable unit for indirect anchorage.

Dr. Baumgaertel is an Assistant Clinical Professor, Department of Orthodontics, School of Dental Medicine, Case Western Reserve University, 10900 Euclid Ave., Cleveland, OH 44106; dr.b@us-ortho.com. Dr. Baumgaertel is a lecturer for Dentaurum.

*Dentaurum USA, 10 Pheasant Run, Newtown, PA 18940; www.dentaurum.com. Tomas is a registered trademark.

**Heliosit, Ivoclar Vivadent, 175 Pineview Drive, Amherst, NY 14228; www.ivoclarvivadent.us.

***FlowTain, Reliance Orthodontic Products, P.O. Box 678, Itasca, IL 60143; www.relianceorthodontics.com.

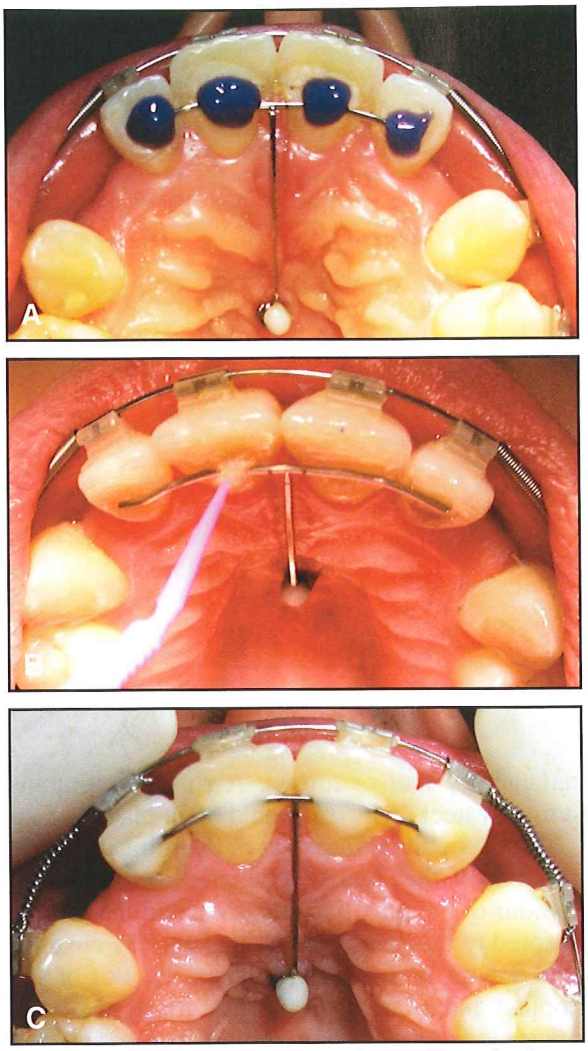

Fig. 2 A. Lingual surfaces of maxillary incisors etched with T-wire in place. B. Primer applied to lingual surfaces. C. Crossbar of T-wire bonded to incisors.

Protraction/Mesialization

The T-wire auxiliary can be used for protraction of single molars or entire buccal segments. The most common applications are canine substitution in cases of lateral incisor agenesis, molar protraction in patients with missing premolars, and molar protraction in patients with Class III tendency in whom proper overjet and overbite have already been established (Fig. 3). The simplest way to achieve anteroposterior movement of buccal segments is by placing a continuous, molar-to-molar elastomeric chain.

Retraction/Distalization

Although the T-wire auxiliary was originally designed for molar protraction, it has recently been used for successful maxillary molar distalization. The setup is similar to that for molar protraction, but open-coil springs are used to drive the buccal segments distally. This procedure is especially useful in cases involving impacted canines and mesial migration of the buccal segments. If the treatment plan requires subsequent retraction of the incisors, the T-wire can be replaced with a transpalatal arch made from an .021" × .025" stainless steel wire segment that has been adapted to the palate and bonded to the lingual surfaces of the premolars. This provides absolute anchorage of the buccal segments, allowing the anterior teeth to be retracted against them.

Potential Complications

Movement of entire tooth segments with the

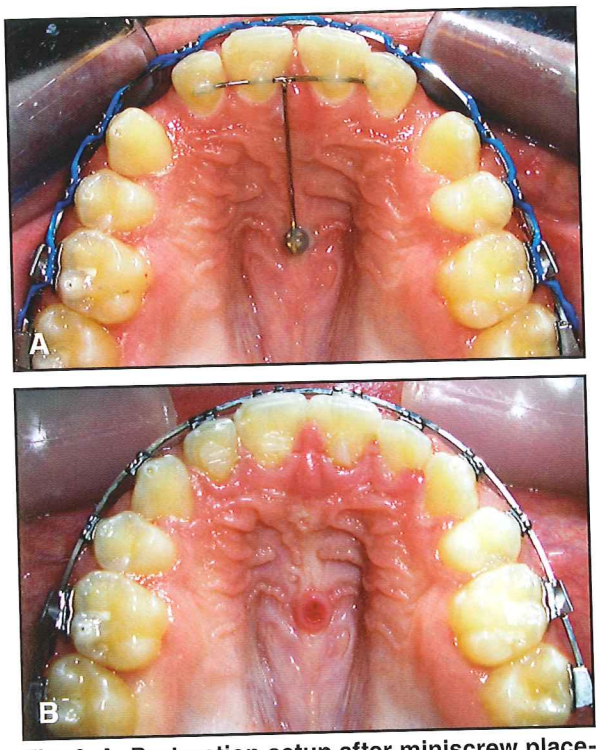

Fig. 3 A. Protraction setup after miniscrew placement and T-wire installation. B. Miniscrew and T-wire removed after protraction.

T-wire auxiliary may be delayed or impeded if the occlusion is tightly interlocked. Occlusal bite elevators can be useful in such cases, as well as in deep-bite patients where there is insufficient clearance for installation of the T-wire.

Another potential complication is breakage of the auxiliary. Relatively long spans increase wire strain and thus the risk of fracture. Patients should be instructed to watch for loosening of parts and to report any suspected fracture immediately. If breakage goes unnoticed, loss of anchorage may occur, possibly increasing treatment time or compromising the final result.

Conclusion

The T-wire auxiliary is a convenient method of using palatal miniscrew anchorage for anteroposterior tooth movement. It can be used instead of a protraction facemask for molar protraction and also appears to be useful for molar distalization. Installation is simple, and complications are rare.

REFERENCES

1. Lim, S.M. and Hong, R.K.: Distal movement of maxillary molars using a lever-arm and mini-implant system, Angle Orthod. 78:167-175, 2008.
2. Yao, C.C.; Lee, J.J.; Chen, H.Y.; Chang, Z.C.; Chang, H.F.; and Chen, Y.J.: Maxillary molar intrusion with fixed appliances and mini-implant anchorage studied in three dimensions, Angle Orthod. 75:754-760, 2005.
3. Harzer, W.; Schneider, M.; and Gedrange, T.: Rapid maxillary expansion with palatal anchorage of the hyrax expansion screw: Pilot study with case presentation, J. Orofac. Orthop. 65:419-424, 2004.
4. Baumgaertel, S.; Razavi, M.R.; and Hans, M.G.: Mini-implant anchorage for the orthodontic practitioner, Am. J. Orthod. 133:621-627, 2008.
5. Wilmes, B.; Bowman, S.J.; and Baumgaertel, S.: Fields of application of mini-implants, in *Mini-Implants in Orthodontics: Innovative Anchorage Concepts,* ed. B. Ludwig, S. Baumgaertel, and S.J. Bowman, Quintessence Publishing Co., London, 2008.
6. Wehrbein, H.; Merz, B.R.; Diedrich, P.; and Glatzmaier, J.: The use of palatal implants for orthodontic anchorage: Design and clinical application of the orthosystem, Clin. Oral Implants Res. 7:410-416, 1996.
7. Gelgör, I.E.; Büyükyilmaz, T.; Karaman, A.I.; Dolanmaz, D.; and Kalayci, A.: Intraosseous screw-supported upper molar distalization, Angle Orthod. 74:838-850, 2004.