

Correction of Palatally Displaced Maxillary Lateral Incisors Using a Tube System

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In young patients with severe maxillary crowding, the buds of the permanent lateral incisors are often in crossbite with the adjacent teeth. If insufficient space is available for these incisors to erupt, palatal displacement can occur.

Treatment usually involves creating adequate space and then aligning the teeth with a removable or fixed appliance. If the palatally displaced maxillary lateral incisors cause occlusal interference with the opposing teeth, a bite-opening device such as a biteplane or composite bonded to the posterior teeth may be used temporarily to provide vertical clearance for tooth movement. Although such bite-opening devices are more often indicated for older patients,¹ they can also be used in children with deep overbites. Removable bite plates require patient cooperation, however, and bonding composite to the molars can cause pain in occlusion.

At the Ewha Womans University dental clinic, a system referred to as Ewha Tubing Mechanics

(ETM) is routinely used to correct such anterior crossbite. The ETM consists of three commercially available .022" × .025" auxiliary tubes* and a segment of small, round nickel titanium wire. The system not only corrects palatal tipping, but can also achieve significant intrusion, avoiding the need for additional bite-opening devices (Fig. 1).

Procedure

1. Prepare three auxiliary tubes (Fig. 2) by micro-etching the bonding surfaces with an orthodontic sandblaster.**
2. Etch, rinse, dry, and seal the surfaces of the teeth to be bonded.
3. Apply a light-cured adhesive*** to each tube,

*Ormco/"A" Company, 1717 W. Collins Ave., Orange, CA 92867; www.ormco.com.

**MicroEtcher II, Danville Materials, 3420 Fostoria Way, Suite A-200, San Ramon, CA 94583; www.daneng.com.

***Transbond XT, trademark of 3M Unitek Orthodontic Products, 2724 S. Peck Road, Monrovia, CA 91016; www.3Munitek.com.

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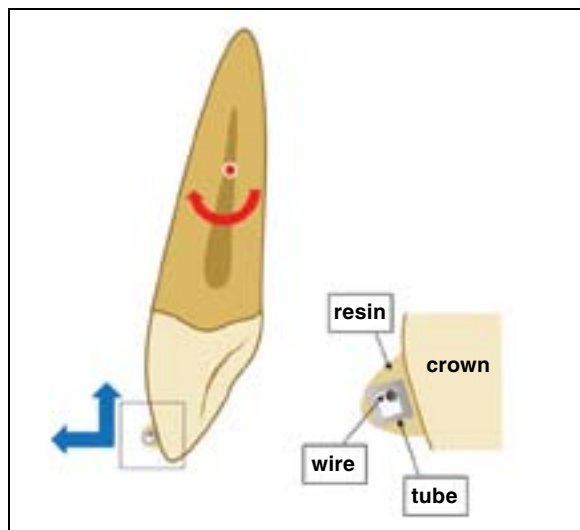


Fig. 1 Biomechanics of Ewha Tubing Mechanics (ETM) system.



Fig. 2 Preparation of .022" x .025" auxiliary tubes for ETM system.

position the tube on the appropriate tooth, and cure the adhesive. Tubes on the central incisors and canines should be positioned gingival to the brackets, and those on the palatally displaced lateral incisors should be placed near the incisal edges to facilitate intrusion (Fig. 3).

4. Insert an .012" nickel titanium wire through the tubes (Fig. 4).
5. Bend back the ends of the wire, or cover them with composite to prevent lip and cheek impingement (Fig. 5).

Case Report

A 13-year-old male presented with the chief complaint of upper anterior crowding (Fig. 6). He had a Class II molar relationship and severe crowd-



Fig. 3 Placement of tubes on palatally displaced lateral incisor and adjacent teeth.



Fig. 4 Wire segment inserted through tubes.



Fig. 5 Ends of wire bent back or covered with composite to prevent lip and cheek impingement.

ing in the maxillary arch; the maxillary lateral incisors had erupted palatally.

The treatment plan involved creating space for the malpositioned lateral incisors and then moving the teeth into their proper positions. The patient wore straight-pull headgear to correct the molar relationship, and space was gained by means of the headgear and .012" nickel titanium coil springs.* After space opening (Fig. 7A), the left lateral incisor could be tied into the main archwire simply by bonding a tube instead of a bracket. Because the right lateral incisor was more severely extruded, the ETM system was used on the right side (Fig. 7B).

After eight months of treatment, the maxillary lateral incisors had been brought into the arch and significantly intruded (Fig. 8). The tubes were replaced with conventional brackets for final

adjustments (Fig. 9). The final outcome was satisfactory, with no evidence of root resorption, although gingival inflammation due to poor oral hygiene was noted (Fig. 10A). The patient was



Fig. 6 13-year-old male patient with severe anterior crowding and palatally displaced maxillary lateral incisors before treatment.



Fig. 7 A. After leveling and space opening. B. Placement of ETM system on right lateral incisor.



Fig. 8 Treatment progress. A. Three months after ETM placement. B. Five months after ETM placement. C. Eight months after ETM placement, with tubes removed from central incisor and right canine.

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given oral-hygiene instructions and showed healthy gingivae four months after debonding (Fig. 10B).

Discussion

Palatally displaced maxillary lateral incisors



Fig. 9 Tubes removed and conventional brackets placed to control root torque.

are almost always extruded, with the roots often positioned lingual to the crowns. The alignment process involves creating adequate space for the lateral incisors, intruding the lateral incisors, and adding labial root torque. Occlusal interference must be minimized during the bite-jumping phase.

The ETM system has several advantages over conventional edgewise brackets. Its small tubes are easier to place on crowded teeth than brackets. Moreover, friction between the wire and the tubes is much less than with elastomeric or metal ligatures.² This allows the use of lighter forces to move the malpositioned teeth, reducing the risk of root resorption.³ Another alternative is to use self-ligating brackets for simultaneous space gaining and tooth alignment.

Once the crowns of the palatally displaced

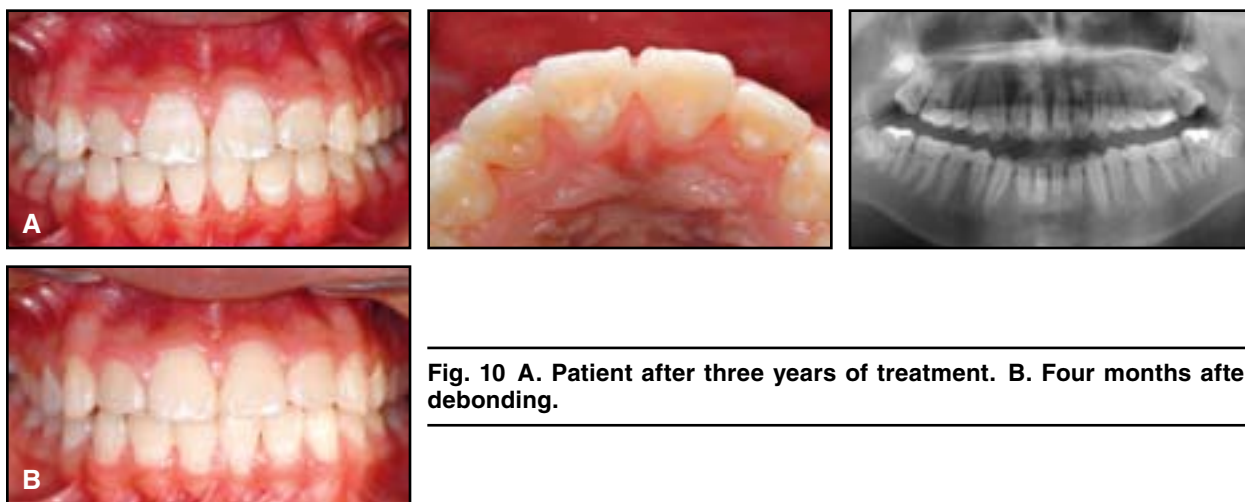


Fig. 10 A. Patient after three years of treatment. B. Four months after debonding.

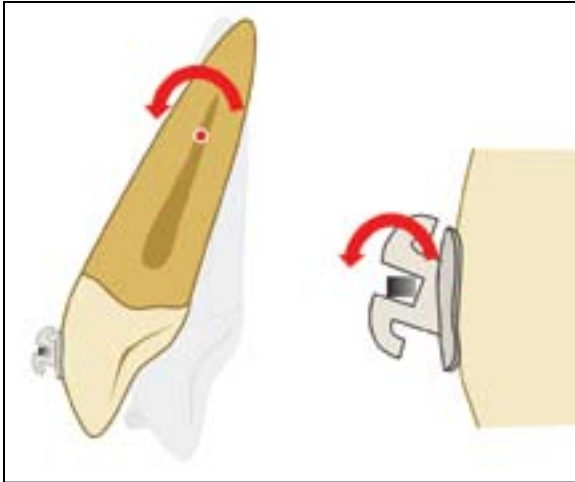


Fig. 11 Labial root torque produced by inverted bracket positioning.

teeth have been correctly positioned, the roots must be aligned. At this stage, the ETM tubes can be replaced with conventional brackets (Fig. 9), which can be positioned upside down on the lateral incisors to gain labial root torque⁴ (Fig. 11).

Labial root torque can also be added by using a full-size rectangular wire in the ETM tubes (Fig. 12). With the development of copper nickel titanium wires that produce extremely light forces, it may not be necessary to replace the tubes with conventional brackets for root torquing and final alignment.⁵

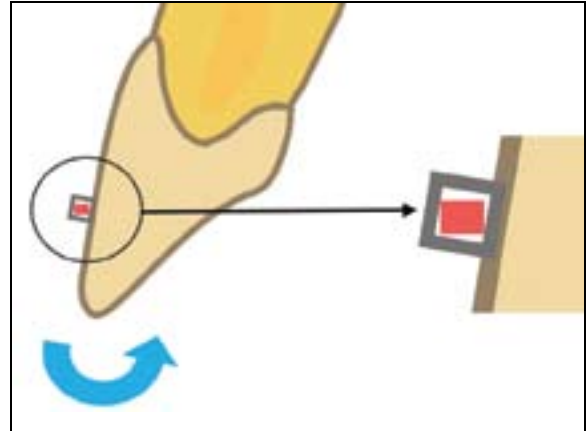


Fig. 12 Full-size rectangular wire used in ETM tube to apply labial root torque to palatally displaced tooth.

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