Correction of Single-Tooth Rotations with Rotating Springs

ALDO GIANCOTTI, DDS, MS
PAOLA COZZA, MD, DDS, MS
GAIA ROMANINI, DDS

Rotations often cause difficulty in finishing fixed orthodontic treatment. Although rotating springs[1] are commonly used in the Begg[2-5] and Tip-Edge*[6] techniques, most preadjusted and standard edgewise brackets do not have the vertical slots needed for such springs. This article shows how a rotating spring can quickly and easily correct a single-tooth rotation.

Appliance Design

The tooth to be derotated must be bonded with a bracket that has an .018" or .020" vertical slot. The rotating spring is made from an uprighting spring,[7] which is normally used in Phase III (root correction) of Begg therapy or to support anterior anchorage in the protraction of posterior teeth with the bidimensional technique. A spring of .016" Australian wire is used with an .018" vertical slot; with an .020" vertical slot, the spring is made of .018" Australian wire.

To modify the force vector of an uprighting spring, it is only necessary to change two elements: the orientation of the spiral, which directly influences the vector direction, and the vertical arm, which determines the direction of force application. A rotating spring is produced by first bending the spiral in a perpendicular rather than parallel relationship to the principal arm, which should be at a 60-70° angle to the main archwire (Fig. 1A).

Once the spring has been inserted into the vertical slot of the bracket, it is activated by turn-

*Registered trademark of TP Orthodontics, Inc., 100 Center Plaza, LaPorte, IN 46350.

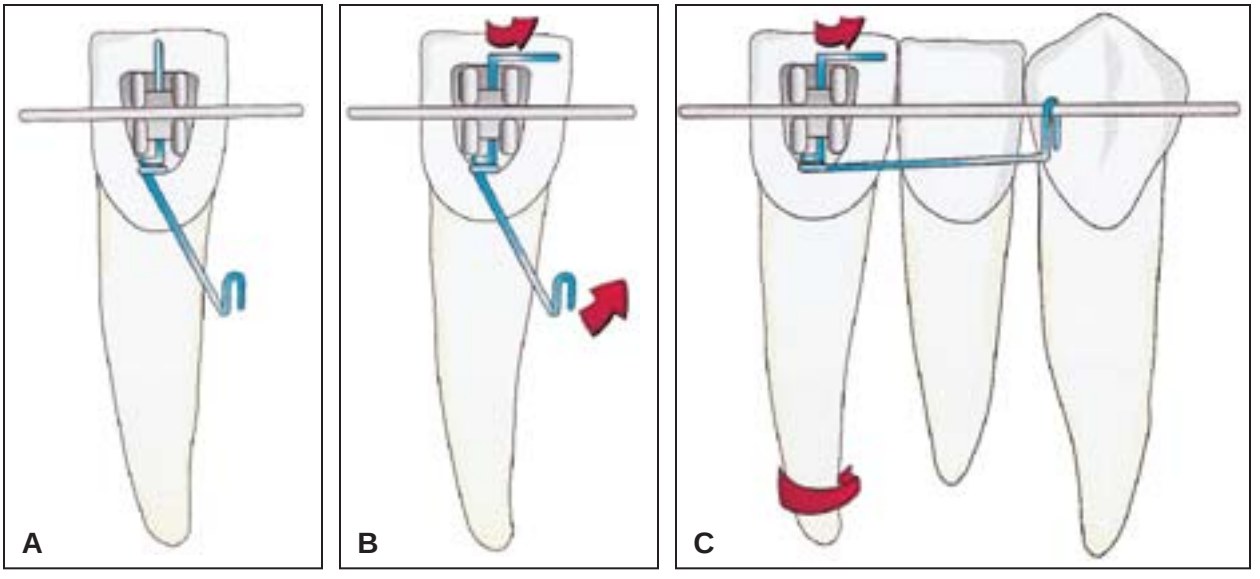

Fig. 1 Construction of rotating spring. A. Uprighting spring inserted into vertical bracket slot with spiral bent perpendicular to principal arm, which is at 60-70° angle to main archwire. B. Spring activated by turning vertical arm in direction of desired rotation. C. Principal arm hooked to archwire in same direction.

Dr. Giancotti is an Assistant Professor, Department of Orthodontics, University of Rome "Tor Vergata", Ospedale Fatebenefratelli, Isola Tiberina, Via Ponte Quattrocapi, No. 34, 00184 Rome, Italy. Dr. Cozza is an Assistant Professor and Dr. Romanini is a postgraduate resident, Department of Orthodontics, University of Rome "Tor Vergata", Istituto di Cura Calvary Hospital, Rome. Dr. Romanini is also in private practice in Rome.

Dr. Giancotti

Dr. Cozza

Dr. Romanini

ing the vertical arm in the direction of desired rotation, so that it lies as close as possible to the tooth surface (Fig. 1B). The principal arm is then hooked to the archwire in the same direction: distally in relation to the slot to produce a distal rotation, mesially for a mesial rotation (Fig. 1C).

Once the spring has been activated, its spiral controls the derotation. The rotating spring exerts a light, continuous force that can perfectly align a rotated tooth within several weeks.

Case Report

A 12-year-old male presented for orthodontic correction of a Class II malocclusion. The mandibular anterior region was moderately

Fig. 2 A. 12-year-old male Class II patient with mandibular anterior crowding and rotations before treatment. B,C. Left lateral incisor rotation persists in finishing phase.

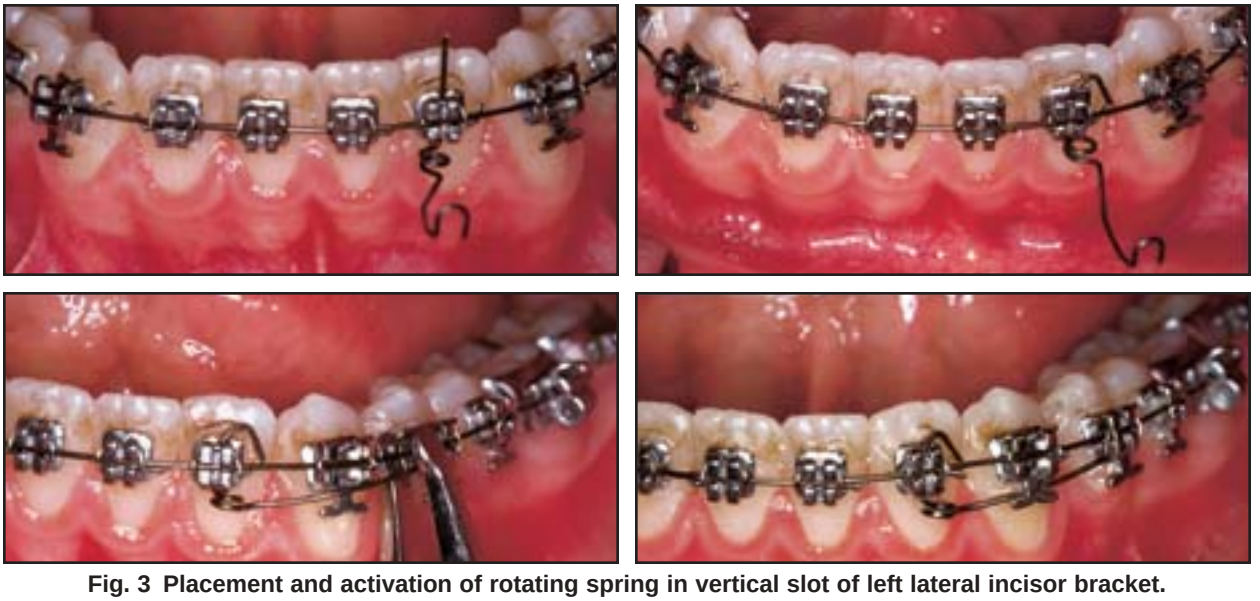

Fig. 3 Placement and activation of rotating spring in vertical slot of left lateral incisor bracket.

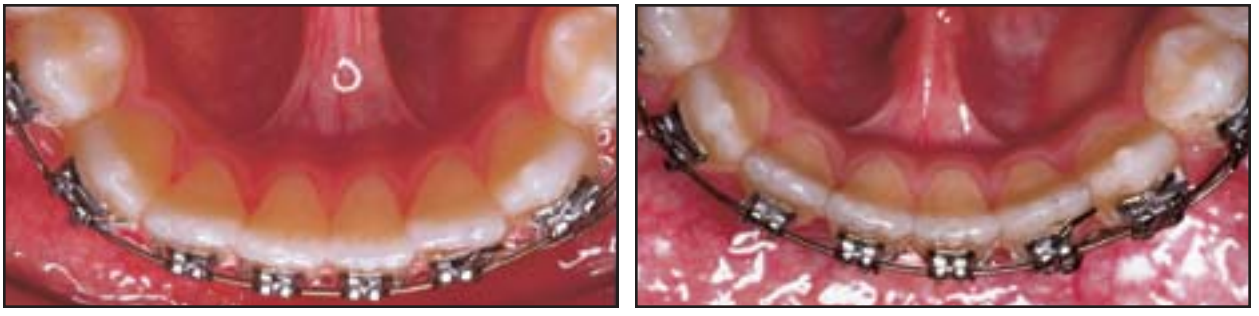

Fig. 4 Alignment of rotated incisor in three weeks.

crowded. The mandibular arch was treated first with a nickel titanium leveling archwire and later with an Australian archwire.

During the finishing phase of treatment, the mandibular left central incisor showed a persistent rotation (Fig. 2). We decided to resolve the problem with a rotating spring.

The spring was inserted in the vertical slot of the lateral incisor bracket and attached to the archwire distal to the canine bracket (Fig. 3). After three weeks, the rotated incisor was completely aligned (Fig. 4).

Upon completion of active therapy, a mandibular lingual 3-3 retainer was bonded to maintain the result (Fig. 5).

Fig. 5 Placement of bonded lingual retainer after completion of active treatment.

Conclusion

The rotating spring, although little used, is a simple and easy-to-fabricate auxiliary that can efficiently resolve a moderate tooth rotation during the finishing phase of orthodontic treatment.

REFERENCES

1. Technique Clinic: Rotating springs for mandibular incisors, J. Clin. Orthod. 10:304-305, 1976.
2. Begg, P.R.: *Begg Orthodontic Theory and Technique*, W.B. Saunders Company, Philadelphia, 1965.
3. Swain, B.F.: Non-extraction treatment with the Begg technique, J. Clin. Orthod. 3:67-81, 1969.
4. Miller, A.E. Jr.: Root control methods with the Begg technique, J. Clin. Orthod. 3:14-21, 1969.
5. Yen, P.K.: A lingual Begg lightwire technique, J. Clin. Orthod. 20:786-791, 1986.
6. Kesling, P.: Dynamics of the Tip-Edge bracket, Am. J. Orthod. 96:16-25, 1989.
7. Gianelly, A.A.; Smith, J.B.; Bednar, J.R.; and Dietz, V.S.: Asymmetric space closure, Am. J. Orthod. 90:335-341, 1986.