A New Rotation Correction Technique: Technique Clinic

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ABSTRACT

Tooth rotation is one of the problems among the eruption disturbances which poses greater difficulty for correction. There are various methods for the correction of tooth rotation. For rotation correction, pure couple is required, but till date, none of the mechanics provides pure couple and all have some translatory vector involved in them. Here a newly developed technique for rotation correction, which solely provides pure couple to derotate the tooth, is being discussed, and is based on the natural organization of gingival circular fibers.

Keywords: Rotation correction, Bracket piece, Elastic thread, Pure couple.

INTRODUCTION

Tooth rotation is one of the problem among the eruption disturbances which poses greater difficulty for correction more so, if the tooth in rotation is present with adjacent tooth malposition and inadequate space in the arch. Tooth rotation can be defined as observable mesiolingual or distolingual intra alveolar displacement of the tooth around its longitudinal axis. Many rotations are associated with an element of apical displacement and are difficult to correct with removable appliance. There are various methods for the correction of tooth rotation like, removable plate with Z-spring, modified removable plate, whip spring, auxillary archwire and fixed appliance therapy, etc. For rotation correction, the pure couple is required, but, till date, none of the mechanics provide pure couple, and all have some translatory vector. Here authors discuss the newly developed technique for rotation correction which solely provides pure couple to derotate the tooth, which is based on natural organization of gingival circular fibers. It is well efficient for the management of anterior as well as posterior teeth rotation in both the arches.

PROCEDURE AND TECHNIQUE

1. Bracket was cut into two parts along with its long axis (Fig. 1A), each part was bonded on the two edges of the rotated tooth, one part was at the mesiolabial aspect and another part was distolingual aspect of rotated mandibular left central incisor, depending on the direction of derotation of individual tooth (Fig. 1B). The slots level of the both the halves of the bracket should be at the same height as adjacent brackets to avoid any vertical movement during derotation procedures.

2. The arch should be at least aligned and levelled with 0.018” stainless steel wire. The archwire was fabricated in curved form in adaptation with the rotated tooth to provide fulcrum to derotate at its own axis.

3. Elastic thread* was used as the active element, started tying at the lingual surface of the distal end of bracket and stretched it, took a one and half circle just in a circular manner like the gingival circular fibers (Figs 1C and D). Thread was passed through the slots of the brackets to avoid the creeping or sliding of elastic thread in vertical plane and finally tied at the site of curved wire segment near the fulcrum to prevent any kind of undesirable tooth movement.

CASE REPORT

The impacted left mandibular incisor was made to erupt naturally by its own in 3 months but with rotation of about 80° (Fig. 2A). The new rotation correction technique was applied for the particular tooth (Figs 2B to D). Rotation correction was completed in 3.5 months. Subsequently, the preadjusted bracket was bonded on the labial surface for further detailing and finishing of the mandibular arch (Figs 2E and F). Rotation correction was well seen in IOPA X-ray (Fig. 2G). Finally, the retention was planned with fixed retainer for 3 years after supracrestal fiberotomy.

*Ortho Organizers (San Marcos, California, USA)
DISCUSSION

Several clinical treatment options have been proposed in the literature for correction of rotated tooth, which includes removable and fixed appliances, etc. Initially, Angle’s used soldered eyelet to the edges of the bands, so a separate ligature tie could be used to correct rotations or control the tendency of rotation. Rotation control can also be achieved without necessity for an additional ligature by using either twin brackets or single brackets with extension wings that contact the underside of the archwire to obtain necessary moment in the rotational plane of space. Various springs were used to correct rotation in removable appliance like Z-spring, sectional wire or whip device, fine wire T-spring, couple generation by labial bow and palatal spring, hooked appliance, etc. Using removable appliances in correction of rotated tooth act on one point contact resulting in tipping movements which is less effective for the derotation of tooth than fixed appliance. In fixed appliance, rotating springs were commonly used in the Begg and Tip-Edge techniques, and most preadjusted and standard edgewise brackets do not had the vertical slots needed for such springs, and auxiliary wire was used with such brackets for rotation correction. None of the above methods is efficient to correct the tooth rotation on its own axis, and slightly translatory movement was observed during correction. We developed new technique for rotation correction, by which tooth rotates along its long axis of rotation due to the fulcrum provided by the close adaptation of the 0.018” stainless steel working arch and by the generation of derotatory force in circular fashion as like natural circular gingival fibers. This biomechanical system promotes the derotation of tooth on its own long axis (pure rotation). Result obtained was more stable and reduce the total duration of treatment as compared to previously used methods because of less round tripping.
Figs 2A to G: (A) IOPA X-ray before rotation correction, (B) after eruption rotation correction mechanics has been applied, (C) elastic thread as active element for derotation, (D) frontal photograph, (E) bracket bonded over the labial surface of rotated tooth for final finishing and detailing, (F) mandibular photograph and (G) IOPA X-ray of mandibular left central incisor after its rotation correction
Relapse is commonly seen in rotated teeth and this is due to rebound of elastic fibers in the supracrestal tissues and can be reduced by pericision. The most common technique is the circumferential supracrestal fiberotomy (CSF).\(^\text{13}\)

This technique consists of inserting a surgical blade into the gingival sulcus and severing the epithelial attachment surrounding the involved teeth. The blade also transects the transseptal fibers by interdentally entering the periodontal ligament space. No surgical dressings are required and clinical healing usually is complete in 7 to 10 days. The CSF procedure is more successful for upper anterior teeth. It is not recommended during active tooth movement or where gingival inflammation is present due to unpredictable regeneration of the epithelial attachment in such situations. To avoid possible gingival recession, incising the epithelial attachment is not recommended in the mid labial region of any tooth with a narrow zone of attached gingiva or thin cortical bone, so we have not done CSF in the lower incisor rotation correction. This technique is well efficient for the rotation correction of anterior, posterior tooth single as well as multiple rotated tooth in either arch.

**CONCLUSION**

It is simple, economical, patient friendly and overall predictable system for the management of rotated tooth. It shortens the treatment time by providing controlled pure couple force system to derotate the individual tooth. This newly developed technique might prove to be a valuable tool for rotation correction in the armamentarium of orthodontists.

**REFERENCES**