

Orthodontic Derotation of Upper Premolar: A Case Report

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Abstract

The tooth rotation is a dental anomaly of position, in which there is a displacement of the tooth within the alveolar bone around its longitudinal axis. The routine treatment for rotated teeth is a fixed appliance, but in some instance the use of this method is impossible. In addition, in only limited cases of rotation, removable appliance is applicable. In this report, the use of a semi-removable appliance is used for the corrections of about 90° rotation of the upper premolar were performed, which has additional benefits over the other methods.

Keywords: Maxillary upper premolar, Nance appliance, De-rotation.

Introduction

According to Bacetti (1998) tooth rotation is defined as observable mesiolingual or distolingual intra-alveolar

displacement of the tooth around its longitudinal axis¹. Many rotations are associated with an element of apical displacement and cause difficulty in finishing fixed orthodontic treatment. In Begg’s technique rotation springs are used to correct tooth rotations. These springs are engaged into the vertical slot of the bracket. In case of preadjusted edgewise technique and edgewise technique brackets doesn’t have a vertical slot². So alternative methods are used for de-rotations. Various methods include engaging NiTi arch wire into the bracket slot, off centering the bracket, using rotation wedges etc. If de-rotation is carried out on Ni-Ti wires during the levelling phase, it causes undesirable force and unwanted tooth movement of neighbouring teeth. A special Nance palatal arch was designed to prevent undesirable effects³. Use of this modified nance appliance creates a couple without

loss of anchorage on the rotated tooth, by using ligature ties.

Case Report

A 20 year old Male patient came to the Department of Orthodontics and Dentofacial Orthopedics, Coorg institute of dental sciences, Virajpet complaining of irregularly placed front tooth. On extra oral examination (Figure 1) patient presented with concave profile, leptoprosopic facial form, and with competent lips. Intraorally (Figure 2,3) patient presented with mutilated malocclusion with negative overjet of 1mm ,rotated 15, missing 16, grossly decayed 24 , partially erupted 18 and collapsed maxillary arch width.



Figure 1: Extra oral photographs



Figure 2: Intra oral photographs



Figure 3: occlusal photographs

Diagnosis

Class III skeletal base due to Retrognathic maxilla and mandible, Vertical growth pattern, mandibular assymetry, mutilated malocclusion, rotation i.r.t 14, missing 16,

partially erupted 18,crowded anteriors, proclined upper anteriors, retroclined lower anteriors , collapsed intermolar width , negative overjet of 1mm and unilateral chewing habit.

Treatment objectives

- To achieve good facial profile
- To achieve normal inclination of upper and lower anteriors before surgery
- To achieve ideal overjet for surgery.
- To achieve proper occlusion after surgery.

Treatment plan

Patient was treated according to surgical treatment plan (Lefort I maxillary advancement and asymmetric BSSO mandibular set back). Fixed orthodontic Treatment with MBT. 022” appliance was carried out for a period of 10 months prior to surgery to correct dental problems. Alignment and levelling of upper and lower arches was carried out after extraction of 24 and gingival exposure and banding of 18. Modified Nance button was used (Figure 4) for anchorage maintenance and premolar derotation .



Figure 4: modified Nance appliance: premolar derotation.

Wire sequence

Upper: 0.012 NiTi (15 not engaged), 0.016 NiTi(after derotation) 0.016×0.022 Niti 0.017×0.025 Niti,

0.019×0.025 SS Lower: 0.016 NiTi, 0.016×0.022Niti, 0.017×0.025 Niti, 0.019×0.025 SS(Figure 5).



Figure 5: Treatment progress, correction of collapsed arch (presurgical phase)

Fabrication

Modified Nance button for anchorage maintenance, premolar de-rotation as well lingual button were bonded on the buccal and lingual aspect of rotated premolar. Couple forces were given for correction of rotation from palatal aspect of 15 to modified nance appliance. Forces on the buccal side were applied with the help of elastic chain from the molar tube to the lingual button for distolingual rotation of the 15. Another force was applied on palatal side with the help of elastomeric chain from lingual button to modified nance button. The wire projection in nance appliance is covered with composite for patient comfort. The advantages of this Modified Nance button was anchorage maintenance, premolar de-rotation .

Discussion

Tooth rotation is considered subjectively as any evident (at least 20°) mesiolingual or distobuccal intra-alveolar displacement of tooth around its longitudinal axis^{4,5}.

The rotation of permanent teeth can be divided into two groups based on etiologic factors:

1. Rotation of permanent teeth due to pre-eruptive disturbances. Among these factors are the injury of the pre-maxillary region in childhood, that displaced and misaligned the developing tooth bud. In addition, the presence of an adjacent pathology such as cyst, tumor, odontoma, supernumerary tooth (mesiodens) can interfere with eruption of the tooth

2. Those caused by post-eruptive disturbances, such as habitual, mechanical, local, or environmental factors. In a dental arch with crowding, rotations are often present, but in cases of space excess rotations might also occur. Environmental factors such as space availability for tooth alignment, path of tooth eruption and functional effects produced by tongue and lips, should also be recognized in the etiology of tooth rotations, along with a multi-factorial model in the origin of tooth malpositions.

The treatment of maxillary anterior permanent teeth with rotation can be performed by several methods. De-rotation of tooth is easier to correct and difficult to retain so it should be over corrected and often accompanied by supracrestal fibrotomy or pericision. De-rotated teeth have a strong tendency to relapse and so should be retained full time for at least 6 months⁶. A fixed modified nance palatal button was fabricated for anchorage and simultaneously de-rotation as well as alignment of teeth altogether. The fourth key to normal occlusion is that the teeth should be free of undesirable rotations. A rotated molar or bicuspid occupies more space than normal. A rotated premolar occupies more space than normal. In a couple system of de-rotation elastics are attached on lingual side and buccal side to correct de-rotation. The treatment objectives set for this case, were achieved due to the good compliance by the patient.

Conclusion

The modified Nance appliance is an efficient method of anchorage reinforcement along with posterior teeth de-rotation.

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