

Management of Severely Rotated Anterior Teeth Using Different Techniques in Mixed Dentition - A Report of Two Cases

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ABSTRACT

One of the most prevalent issues in orthodontics is severe tooth rotation, which is thought to be a developmental phenomenon. Gingival recession, traumatic occlusion, and cosmetic issues can all result from these rotations. Early treatment of these malpositioned teeth could enhance the appearance of the teeth, which would improve the behaviour and self-confidence of the youngsters. This case report shows two cases with anterior teeth rotated roughly by 70 to 90 degrees corrected using fixed appliances at various stages of mixed dentition using two different techniques.

Keywords: *Fixed orthodontics, removable appliance, rotation.*

INTRODUCTION

Mixed dentition, is when permanent and primary teeth both exist in the jaw at a time. During this phase, number of malocclusions are observed, including anterior and posterior crossbites, crowding, rotations, spacing, etc.¹ Repositioning teeth into proper alignment can be difficult and ignorance might result negative impact on dentition.²

Simple techniques using tongue blade, an inclination plane of composite or glass ionomer cement, Catlan's appliance and a removable Hawley's appliance with a z-spring, can be used to fix minor alignment issues in teeth.³ But, may not be sufficient to correct severely malpositioned teeth.

Two cases of malaligned and rotated permanent teeth in mixed dentition are discussed where first case treatment involved two-by-four appliance and second case included

a series of different modalities of correction, feasible at each period of dentition starting from lingual buttons using couple mechanism followed by a removable Hawley's appliance with z spring for correcting the anterior crossbite.

CASE 1

A 10-year-old female child, presented to the Department of Pediatric and Preventive Dentistry, Kathmandu University School of Medical Sciences, Dhulikhel Hospital, with the chief complain of irregularly placed teeth in upper anterior teeth region. There was no history of trauma and medical history was non- significant. Clinical examination revealed slight convex facial profile and symmetric face. Intra-oral examination revealed class I molar relationship with approximately 90° mesiobuccal rotation with respect to 12 and 22. In radiographic examination, completion of 3/4th of root was confirmed, and no pathology such as supernumerary teeth was observed. Figure 1 (a, b) After discussing the treatment modalities with the parents, keeping in mind the severity of rotation, 2x4 appliance therapy was considered. Orthodontics brackets of 0.022" slot size (MBT) were bonded on teeth 12, 11, 21 and 22 with buccal tubes bonded on 16, 26. Lingual buttons were bonded on buccal surface of 55, 65 and on palatal surface of 12, 22 to facilitate the engagement of elastomeric chain. 3 unit medium elastomeric power chains were extended from respective lingual buttons. The archwire sequence was

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initiated from 0.012" NiTi, gradually increasing to 0.014", 0.016" to 0.018" NiTi. Subsequently power chains were also changed in each visit. The archwire and elastomeric chain will create the necessary couple for derotation of 12 and 22. Figure 1 (c, d) Lastly consolidation was done after

complete derotation of 12 and 22. 0.018 inch SS archwire in combination with ligatures on incisors were used for consolidation and retention period was considered for 4 weeks. Figure 1 (e, f)

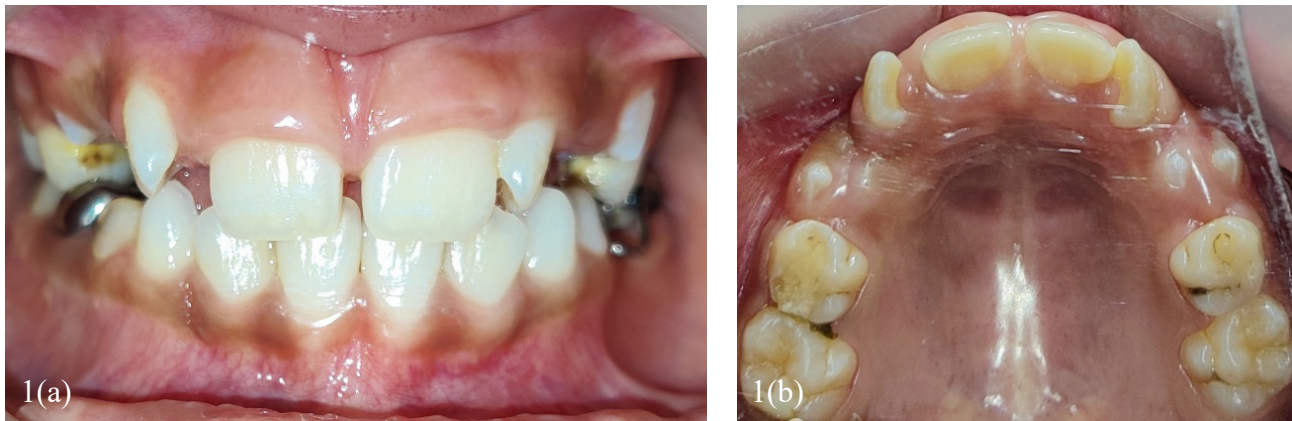


Figure 1 (a, b). Pre-treatment showing 90° rotation of 12, 22.

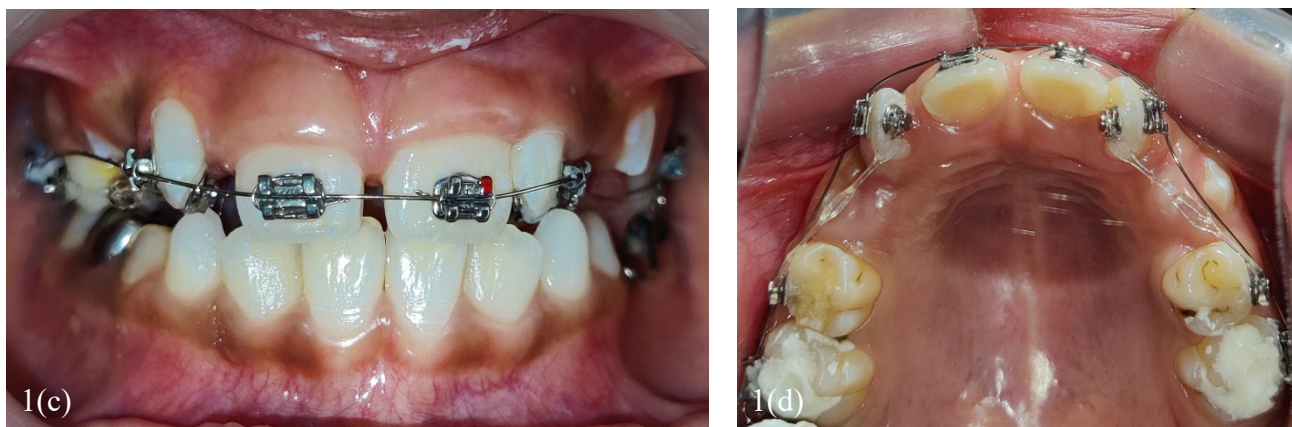


Figure 1 (c, d). 2x4 appliance with lingual buttons.

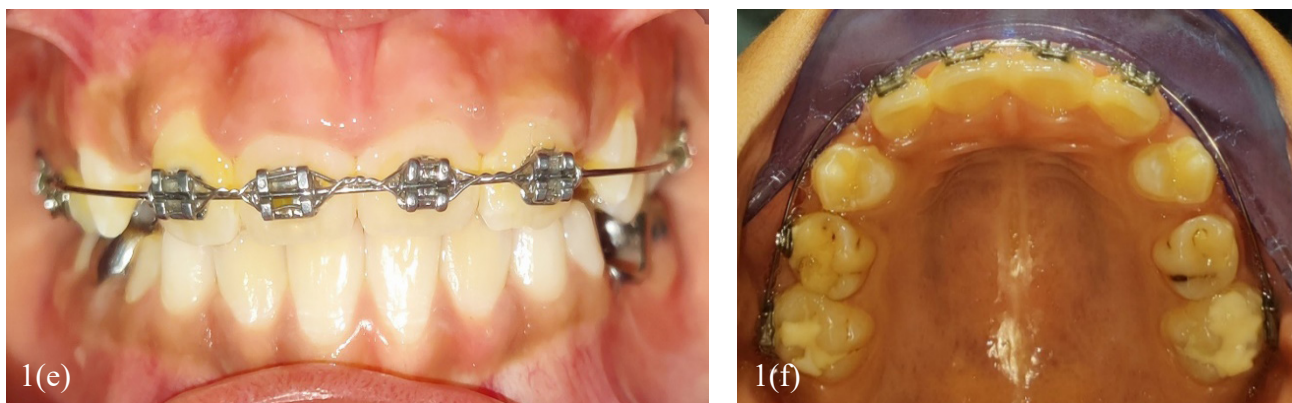


Figure 1 (e, f). Post treatment after 5 months showing corrected 12 and 22.

CASE 2

A 9-year-old male child presented to the Department of Pediatric and Preventive Dentistry, Kathmandu University School of Medical Sciences, Dhulikhel Hospital with the chief complain of irregularly placed upper anterior tooth. He presented with neither a major medical history nor a history of trauma. Clinical evaluation indicated a symmetric face with a modest convex facial profile. Intra-oral examination showed class I molar relationship and approximately 85 degree mesiolingually rotated 21 with crossbite to left mandibular lateral incisor. Figure 2(a) The first stage of treatment was to derotate 21. For this, extraction of 52 and 62 was done, then two lingual buttons were bonded on labial and mesial marginal surface of 21 respectively and two buttons were bonded on 53 and 63. A 6 unit medium power chain was extended from 53 to

mesial surface button of 21 and 4 unit medium power chain was extended from 63 to labial surface button of 21 to act force by coupling technique. Posterior bite was raised with glass ionomer cement on 36 and 46. Figure 2(b) On subsequent visits, the power chain was changed. In 3 months period, 21 was derotated but was in crossbite to 31 and 32. Therefore in second stage of treatment, removable hawleys appliance with z spring was inserted for crossbite correction. Figure 2(c, d)

After 1.5 months of z spring activation, position of 21 was corrected. Figure 2(e) Midline diastema of 3 mm was present, for which the patient has been kept under observation for self-correction following the eruption of permanent lateral incisors and canines. If not corrected future orthodontic treatment may be required.



Figure 2 (a). Pre-treatment showing 85 ° rotation of 21.



Figure 2 (b). Bonding of lingual buttons and power chain placement.



Figure 2 (c). Hawleys appliance with z spring for anterior crossbite correction (frontal view).



Figure 2 (d). Hawleys appliance with z spring for anterior crossbite correction (occlusal view).



Figure 2 (e). Post- treatment showing corrected position of 21.

DISCUSSION

Tooth rotation is defined as intra-alveolar movement of tooth around its longitudinal axis, either mesiolingually or distolingually. The quantity or direction of the rotations are mentioned in comparatively few studies on tooth rotation.⁴ Three categories were created by Gupta et al. to categorise the rotation: $<45^\circ$, $45-90^\circ$, and $>90^\circ$. According to his research, rotations accounted for 10.24% of all anomalies in the study group, with the bulk of tooth rotations falling between 45° and 90° and then $<45^\circ$. Mandibular second premolars were the most often rotated teeth, followed by mandibular first premolars and maxillary central incisors with the same incidence.⁵ If left untreated, malpositioned teeth can cause issues for the developing dentition that could be harmful to the appearance or functionality of teeth. Common difficulties involve space loss, trauma on the opposing teeth causing gum recession and tooth mobility, erosion of the opposing teeth's enamel surfaces.⁶ Concerns like treatment compliance, parental expectations, and appliance selection might be problematic for young patients. Dentists frequently wait to treat malaligned teeth until late to correct with orthodontics. However, late orthodontic treatment takes longer to complete.⁷

When one or more maxillary anterior teeth are in lingual relationship to the mandibular teeth, this is known as anterior cross bite. Anterior crossbites should be addressed early and, as is not a self-correcting condition, if left untreated, can develop into skeletal malocclusion necessitating extensive orthodontic as well as surgical operations.⁸ It is the responsibility of paediatric dentists

to reduce the harm that these early malocclusion causes in developing dentition making it simple for orthodontics to take over treatment afterward.⁹ Orthodontists and paediatric dentists should collaborate to maximise the potential of interventional orthodontics during the dentition's growth phases and will be able to creatively solve treatment plans for the difficulties that arise when a removable appliance is used to its maximum potential.¹⁰

In the situations mentioned, 2x4 fixed orthodontic appliance was the better option as 16 and 26 had already erupted and patient compliance could be achieved by using fixed appliance and lingual buttons with coupling technique were utilized to regulate tooth alignment. In second case, as per patient compliance lingual buttons with couple force technique was utilized to regulate tooth alignment, and later removable Hawley's appliance with z spring was used for correcting the single tooth anterior crossbite as it was beyond the correction ability of tongue blade therapy and Catalans appliance at that given point of situation. With the use of these treatment options, patients were able to become accustomed to orthodontic care, from straightforward to complicated treatment as well. Rotations are easy to treat, but difficult to retain. For this a period of 4 weeks consolidation for the first case was considered and as corrected anterior crossbite requires no retention, second case is kept under close observation.

CONCLUSIONS

The highlighted cases demonstrated that 2x4 orthodontic appliance can be used, in cases where all four maxillary

incisors and first molars are erupted and lingual buttons with coupling technique can be used in cases where lateral incisors are not erupted yet, to treat anterior crossbite and provide an alternative treatment option.

Conflict of Interest: None.

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