ORIGINAL RESEARCH PAPER

Dental Science

CORRECTION OF ROTATION USING MODIFICATION OF ELASTICS – A CASE REPORT

KEY WORDS: Deepbite, rotation, modified derotation technique.

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ABSTRACT

Malocclusion in adolescence affects the patient psychologically but with correct diagnosis And modifications, it is easier to treat malocclusion in mixed dentition. Among malocclusion, rotation is difficult to correct and retain the correction due to the force from fibres of the periodontal ligament. Rotation is a condition caused by intra-alveolar displacement of the tooth on its own longitudinal axis. Rotation of anterior teeth causes cosmetic issues and trauma from occlusion leading to periodontal issues. Correction of rotation can be done using removable or fixed treatment. In this case report, a female patient aged 9 years had a combination of deepbite and rotation. The deep bite was corrected using anterior bite plane. The derotation was achieved using elastics. The arch alignment was achieved using sectional orthodontics.

INTRODUCTION:

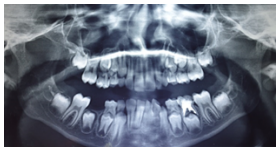
Occlusion is defined as the relationship of the maxillary and mandibular teeth as they are brought into functional contact; while malocclusion is the state of any deviation from the normal or ideal occlusion.[1] Houstan, et al in 1992 stated that " Malocclusion is an appreciable deviation from the ideal occlusion that may be considered aesthetically unsatisfactory." [2] It is caused due to genetic or environmental factors and a common condition in the modern civilization , lack of stimulus of the proper jaw growth due to adoption of soft food.[3] According to Proffit, in 1986 occlusal status of an individual is analysed by two major characteristics: intra-arch relationship, the relationship of the teeth within each arch and inter-arch relationship, the pattern of occlusal contacts between the maxillary and mandibular teeth.[4] Some of the common malocclusal conditions include deep bite, anterior or posterior open bite, proclination, rotation, retroclination, crowding and spacing, of which rotation and deep bite prove to be difficult conditions to correct.[5,6] "Tooth rotation, is defined as mesio lingual or distolingual intraalveolar displacement of the tooth around its longitudinal axis".[7] Factors involved in the rotation of teeth are space inadequacy, abnormal tooth eruption sequence and undesirable forces exerted by the tongue and lips or any combination of the above factors. Biomechanical principles involve application of single or couple of force for correction of rotation.[8] The commonly used treatment modalitites are removable acrylic plate with Z spring, , whip spring, fixed orthodontic appliances and auxillary arch wire.[5] Deep bite is defined as malocclusion in which the mandibular incisor crowns are excessively overlapped vertically by the maxillary incisors when the teeth are in centric occlusion. This could be caused by supra eruption of upper and/or lower incisors or infra eruption of posterior teeth. Methods of deep bite correction are extrusion of posterior teeth, intrusion of anterior teeth, combination of both, proclination of incisors and orthognathic surgical modality.[6]

CASE REPORT:

A 9-year old female patient reported to the Department of Pedodontics and Preventive Dentistry, Thai Moogambigai Dental College and Hospital with a complaint of mal-aligned teeth. On examination the patient was diagnosed with Deep bite, rotated 31, 32, premature loss of 85 and pulpectomy treated 75. There was recession in relation to 31 caused by trauma from occlusion.(Image 1). The radiograph revealed rotation of anterior teeth and bone loss in 31 region (Image 2)

Image 1: Pre-operative photograph

Image 2: Pre-operative OPG



The treatment for the patient was planned under three phases:
Phase 1 – Deep bite correction
Phase 2 – Derotation of 31, 32
Phase 3 – Arch alignment.

Prior to the commencement of the treatment, oral prophylaxis was done .A stainless steel crown with bonded buccal tubes were luted in 75 for placement of arch wires in due course of treatment. For the deep bite correction, patient was advised a removable anterior bite plane appliance. The patient was advised to wear the appliance for the complete day except while eating and brushing for 15 days. There was appreciable difference after the Phase 1 treatment (Image 3). The First phase of treatment lasted upto 20 days.(Image 4)

For derotation of 31 and 32, a modified technique of elastics was used (Image 5). Orthodontic brackets were placed on the labial surface of 31 and lingual surface of 32. Medium force blue colour orthodontic elastic was placed in a "S" shaped manner from the labial surface of 31 to the lingual surface of 32 along the interdental region (Image 6). The patient was called for a review every month. At the end of two months, most of the derotation was achieved.

The third phase of treatment was arch alignment. Orthodontic brackets were placed in 41, 42. The bracket bonded on the lingual surface of 32 was removed and placed on the labial surface. A 0.16 inch Ni-Ti wire was placed on 42,41,31,32 and 75 (Image 7) .The wire was stabilized using modules. The patient was reviewed every month for 3 months. At the end of three months,the arch was

almost aligned and space was required for further alignment (Image 8). An OPG was taken which revealed that the mandibular primary molars are due for exfoliation (Image 9). On Moyer's Model analysis and Huckaba's analysis, the result confirmed the space availability for further alignment of teeth. The arch wire of the anterior segment was retained to avoid relapse and rest of the wire was removed to allow the exfoliation of 75.

Image 3: Anterior Bite plane for correction of bite plane

Image 4: After correction of deepbite

Image 5: Modification of elastics for derotation of 31

Image 6: Placement of brackets for derotation of 31

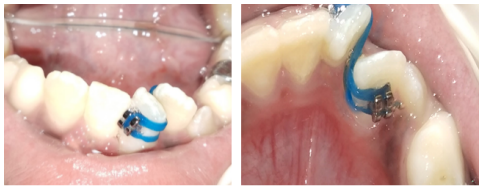
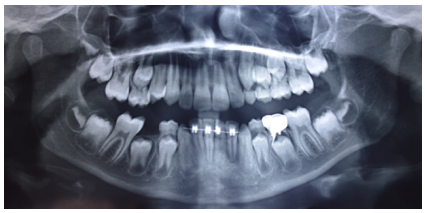


Image 7: Arch alignment using Niti wire

Image 8: Post-operative photograph

Image 8: Post-operative radiograph



DISCUSSION:

During formulation of treatment plan for correction of malocclusion, the comfort of the patient is a major entity to be concentrated on. Thus the treatment plan for this child was divided into phases for ease of the patient. Correction of deep bite was the first phase. Extruding posterior teeth bite is the commonly indicated treatment in horizontal growing patients for correction of deepbite. It is achieved by using removable appliances such as bite planes, sved bite planes modified.In this report, anterior bite plane was used.[6] The second phase of treatment was derotation of the tooth. The treatment usually advised would be 2x4 appliance which includes bonding orthodontic brackets on permanent first molar and incisors. But to avoid discomfort to the patient and also taking the periodontal status of 31 into consideration, a modification of elastics were considered. In a case report by Shastri D et al [5] in 2014, used a technique of twisting e-chains to correct rotation. In that case report, a bracket was cut into two halves and e-chains were placed in a circular pattern. A case report by Hirpara N et al [8] in 2015 used ligature rotation tie onto the arch which acts to bring derotation. It is stretched from one side of the tooth needing rotation across its lingual surface and passed interproximally and finally hooked onto the wire. Any modification that could afford to provide the couple to derotate the tooth can be advised as treatment modality. The third phase of treatment, arch alignment was achieved to adequate level and a latency period was advised as it appeared to be more beneficial than the treatment phase of extracting the primary molars that were required for mastication of food. Hence the space analysis was done and the patient was advised regular checkup until all the premolars erupt.

CONCLUSION:

Derotation achieved by this method is easy, comfortable for the patient and economical. Any treatment that could provide the exactly required couple force will be the treatment of choice for derotation.

REFERENCES

1. John Daskalogiannakis: Glossary of Orthodontic Terms. Publisher: 4. Quintessence, 2000, 1st Ed.
2. Houston W, Stephens C, Tulley W. A textbook of orthodontics. Bristol: Wright Pub Co, 1992.
3. G.Sandeep, G.Sonia. Pattern of dental malocclusion in orthodontic patients in Rwanda: a retrospective hospital based study. RMJ :2012:69(4);13-18.
4. Hassan, Rahimah. Occlusion, malocclusion and method of measurements - an overview. Archives of Orofacial Sciences (2007) 2, 3-9.
5. Shastri D, Tandon P, Singh GP, Singh A. A new rotation correction technique: technique clinic. J Ind Orthod Soc 2014;48(4):566-569.
6. Daokar S, Agrawal G, Deep Bite Its Etiology, Diagnosis and Management: A Review. J Orthod Endod. 2016, 2:4.
7. Baccetti T. (1998) Tooth rotation associated with aplasia of nonadjacent teeth. Angle Orthod. 68, 471–474.
8. N. Hirpara ,S. Jain. Rapid Correction of Rotation with Modified Rotation Tie. J Orthod Endod.2015;1(1;7).