



Treatment of a Severely Rotated Maxillary Central Incisor in a Cleft Lip and Alveolar Patient with Whip Appliance: A Case Report

Batoolalsadat Mousavi-fard¹, Mehrdad Shahsavari-pour^{2*}

¹Postgraduate student, Department of Orthodontics, Kerman Dental School, Kerman University of Medical Sciences, Kerman, Iran

²Postgraduate student, Department of Endodontics, Yazd Dental School, Shahid Sadoughi University of Medical Sciences, Yazd, Iran

DOI: 10.24896/jrmds.2018615

ABSTRACT

Fixed appliance is a routine treatment for rotated maxillary incisor, but in some cases the use of this method is impossible. In addition, removable appliance is applicable in only limited cases of rotation. The aim of this case report is to introduce an appliance for correcting severe rotation of anterior teeth in pre-adolescent children. In this study an 8-year-old Iranian girl with a mixed dentition class I malocclusion with lip and dentoalveolar cleft, complained of a severely rotated upper right central maxillary incisor was referred to Kerman dental school. A whip device including removable plate, a cantilever spring and bonded tube on rotated tooth was utilized. After 1 month, the upper right central incisor was orthodontically brought into proper alignment. After overcorrection of the tooth, circumferential supracrestal fiberotomy was performed. One week after surgery, by removing the appliance, the retention was started. Whip device is a removable appliance that can be used successfully for the correction of rotated anterior teeth.

Keywords: Maxillary Incisor, Tooth Rotation, Whip Appliance

HOW TO CITE THIS ARTICLE: Batoolalsadat Mousavi-fard, Mehrdad Shahsavari-pour, Treatment of a Severely Rotated Maxillary Central Incisor in a Cleft Lip and Alveolar Patient with Whip Appliance: A Case Report, J Res Med Dent Sci, 2018, 6 (1): 22-24, DOI: 10.24896/jrmds.2018615

Corresponding author: Mehrdad Shahsavari-pour

e-mail ✉ mehrdad.shpour@gmail.com

Received: 22/09/2017

Accepted: 10/12/2017

INTRODUCTION

In patients with cleft lip and permanent dentition, the central superior incisors are usually rotated. The central incisors adjacent to the cleft may be missing, rotated, or hypoplastic [1, 2]. Moreover, they usually erupt in an abnormal position, rotated or severely deviated from the perceived normal inclination [3]. The rotation of the central incisors is more likely due to the lack of space at the end of the alveolar segment, with other factors representing the sequelae of the malformation [4]. The permanent central incisors adjacent to the cleft were rotated in 78.1% of the teeth in children with UCLP (unilateral cleft lip and palate) and 95.9% of the teeth in children with BCLP (bilateral cleft lip and palate), and most of the teeth

were disto-buccally rotated with the palatal surface facing the cleft region [5]. A removable appliance with minimal force can be used to correct a rotated upper incisor in mixed dentition; however, multiple and severe rotations need fixed appliance [6].

The aim of this case report is to introduce a combined fixed-removable appliance, which can be prescribed for patients with severe rotated anterior teeth.

Appliance design

The device consists of a removable appliance, a cantilever spring and bonded tube that can be used successfully for the correction of severely rotated anterior teeth in a short period. The removable device was made of acrylic base plate, circumferential clasps on the upper primary canines and Adams clasps on the maxillary first permanent molars. All the clasps were made of

orthodontic 28 mil (0.7mm) stainless steel wires, except the 24 mil (0.6 mm) wires which were used for fabricating C clasps on primary canines. Whip spring was made with orthodontic 14mil stainless steel wires by bending a vertical loop near the canine area and a posterior perpendicular to the first one which was attached to the Adams clasp on the first permanent molar(Fig. 1). On the labial surface of rotated tooth Bonded tube was directly bonded.



Figure 1: Whip appliance

The mesial end of the spring was bended toward the gingiva and the hook at the end of the spring was engaged to the first permanent maxillary molar Adams clasp.

CASE REPORT

An 8-year-old girl was referred to the Orthodontic Department of Kerman Dental School, Iran, with the chief complaint of severe rotation of the upper right central incisor. The patient had lip and dentoalveolar cleft (Fig. 2).



Figure 2: Radiographic view of patient before treatment

Extraoral examination revealed a straight facial profile and symmetric face (Fig. 3).



Figure 3: profile view before treatment

Intraoral examination showed class I malocclusion with anterior dental crossbite due to upright maxillary incisors and severe rotation of right central maxillary incisor (Fig. 4).



Figure 4: Intraoral examination of patient before treatment

A class I skeletal pattern with no vertical discrepancy was confirmed by routine cephalometric analysis. From upper jaw an alginate impression was taken. The guidance of placing and removing the removable appliance was explained to the patient. The patient visited after 2 weeks. After one month the upper right central incisor was corrected (Fig. 5).



Figure 5: Intraoral photograph of patient after treatment

According to high frequency of relapse, after overcorrecting the tooth, circumferential supracrestal fiberotomy was done by a periodontist. One week after fiberotomy, retention period was started using a Hawley retainer.

DISCUSSION AND CONCLUSION

One of the most common causes of severe rotation of upper incisors is the presence of cleft [1]. The typical fixed appliance for correcting tooth malpositions in mixed dentition is "2*4" appliance (2 bands on the first molars and 4 brackets on incisors). By using a fixed appliance, arch wire spans are longer, larger moments are created and the wire becomes springier and weaker [6]. Furthermore, because only the first permanent molar can be used as anchorage unit, anchorage control is so critical [7]. Difficult oral hygiene management is another disadvantage of the fixed appliance and high risk of decalcification of banded and bonded teeth. Another choice for correction of tooth rotation is a removable orthodontic appliance with a labial bow and a palatal spring. In this appliance, the reactive forces are decreased and the anchorage problem is resolved. This appliance might only modify mild rotations (< 45°). Furthermore, by using the removable appliances for the treatment of rotations there is a high chance of relapse so excellent patient compliance is needed.

The whip appliance advantages for using in mixed dentition [6, 8, 9]:

1. suitable for correcting the problem in mixed dentition
2. Adequate anchorage control
3. Simple force system
4. Better oral hygiene management
5. Good patient cooperation

During treatment phase, the mucosa might wound with the whip spring so, some modification of the whip spring as mentioned by Parisay et al, might be needed.

The whip appliance is a fixed-removable device for correcting severe rotation of anterior teeth. By utilizing this appliance, tooth rotation can be corrected in the mixed dentition. This improves patient's self-confidence by enhancing smile esthetics in the preadolescent stage.

Conflicts of interests

Authors have no conflict of interest.

Acknowledgments

This work is attributed to the Orthodontic Department of Kerman Dental School. We would like to thank Dr. Hosnieh Ziaaddini.

REFERENCES

1. Böhn A. Dental anomalies in harelip and cleft palate. *Acta Odontologica Scandinavica*. 1963; 21: (1)101-9.
2. Nicholls W. Dental anomalies in children with cleft lip and palate in Western Australia. *European Journal of Dentistry*. 2016; 10(2): 254-58.
3. Hayashi I, Sakuda M, Takimoto K, Miyazaki T. Craniofacial growth in complete unilateral cleft lip and palate: a roentgenoccephalometric study. *Cleft Palate J* 1976; 13: 215-37.
4. Šmahel Z, Müllerová Ž, Nejedlý A. Effect of primary repositioning of the nasal septum on facial growth in unilateral cleft lip and palate. *The Cleft Palate-craniofacial Journal*. 1999; 36(4): 310-3.
5. Lai MC, King NM, Wong HM. Abnormalities of maxillary anterior teeth in Chinese children with cleft lip and palate. *The Cleft Palate-Craniofacial Journal*. 2009; 46(1):58-64.
6. Isaacson KG, Muir JD, Reed RT. *Removable Orthodontic Appliances*. London: Wright, 2003.
7. Jahanbin A, Baghahi B, Parisay I. Correction of a severely rotated maxillary central incisor with the Whip device. *The Saudi dental journal*. 2010; 22(1):41-4.
8. Houston W, Isaacson K. *Orthodontic Treatment with Removable Appliances*. New York: John Wright and Sons, 1980.
9. Burton-Douglass J. Management of unerupted central and lateral incisors complicated by a mesiodens: report of a case. *Saudi Dent. J*. 1993; 5: 73-6.