Short Communication

Correction of bilaterally rotated premolars in bilateral cleft lip and palate patients: An innovative approach

ABSTRACT

Maxillary hypoplasia is a constant feature among patients with cleft lip and palate (CLP), more pronounced in sagittal and transverse dimensions. Transverse maxillary deficiency is first addressed using various expansion appliances. Due to the excessive scarring on the palatal tissue, there is a high chance of relapse of the expansion achieved, and the challenge is to hold the results achieved. Palatal arch holding appliance is commonly used to prevent relapse and to maintain the achieved expansion. Management of difficult cases like bilateral CLP (BCLP) demands speeding up the pace of treatment by innovations in the appliance structures or treatment procedures to shorten the treatment period. This article attempts to address the reduction in the total treatment time in BCLP patients with a clinical modification of conventional treatment modality.

Keywords: Cleft palate, de-rotation, palatal arch holding appliance

INTRODUCTION

Facial clefts are common congenital anomaly of the head-and-neck region, characterized by the incomplete formation of structures separating oral and nasal cavity. They are associated with series of functional and esthetic problems, which include impairment of speech, hearing, and dental development.[1] Among the various congenital defects, cleft lip and palate (CLP) is reported to be 1.09/1000 live births in India.[2] Orthodontic management of patients with bilateral CLP (BCLP) is a challenge in clinical practice. Patients with repaired lip and palate report with maxillary hypoplasia resulting from surgical scarring and the alteration of the growth expression of maxilla, more pronounced in transverse and sagittal dimensions. Growth is first completed in the transverse dimension; maxillary constriction is addressed first. Maxillary expansion is achieved employing various expansion appliances. Palatal arch holding appliance is required to hold the results obtained and prevention of replacing in transverse planes.

Several dental anomalies are featured among patients with CLP; rotation of dental units is one of these features. Correction of these rotations is generally attempted after the placement of fixed orthodontic appliances. Due to the complex nature of the problems associated with patients with CLP, there is always a demand for speeding up the pace of treatment.[3] With an objective to reduce the total treatment time and to initiate the derotation of the rotated dental units, a modification has been suggested in the palatal arch holding appliance for synchronized arch holding (after maxillary expansion) and derotation of bilaterally rotated premolars, the same has been discussed in this article.

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Figure 1: (a) Modified palatal arch holding appliance marking. (b) Modified palatal arch holding appliance with soldered molar bands and stainless steel wire hooks. (c) Finished modified palatal arch holding appliance with hooks end covered by composites

FABRICATION OF THE MODIFIED PALATAL ARCH HOLDING APPLIANCE

1. Molar bands with buccal tubes on the maxillary first molars were picked up in an impression using irreversible hydrocolloid material, and the dental cast was poured using dental plaster. The design of the modified palatal arch holding appliance was marked on the dental cast [Figure 1a]
2. 1-mm stainless steel wire was used to fabricate the well-adapted palatal arch holding and soldered to the molar bands. Small stainless steel wire hooks were then soldered at specific locations to act as attachment of force application during rotation corrections [Figure 1b]
3. The modified palatal arch was finished and polished, and open ends of wire hooks were protected with light cure composite material to prevent the soft-tissue injury [Figure 1c]
4. The finished and polished modified palatal arch was then cemented in patient's mouth [Figure 2 b].

DISCUSSION

CLP is the most common type of the orofacial cleft. The ratio of clefts is more in males as compared to females, with cleft palate alone is more common among females. Overall, unilateral clefts were more common than bilateral clefts.[1] The patient with BCLP presents with more complex problems as compared to patients with unilateral CLP. The most challenging problem with these patients is the hypoplasia of the maxilla, which is renowned in all three planes of space and is more marked in transverse and sagittal planes. Moreover, results of the repeated maxillary surgeries will contribute to the constriction of the maxillary arch, and the expansion of narrow arch is the treatment prerequisite.[4] Retention of the expansion achieved is a real challenge among patients with repaired CLP.[5] Palatal arch holding appliance is commonly used to retain the expansion achieved. Fixed orthodontic appliance therapy is initiated after alveolar grafting and consolidation of the graft. The treatment duration is much prolonged for patients with these complex dental and skeletal problems and to speed up the treatment has always been the requirement.

Figure 2: (a) Pretreatment intraoral photograph. (b) Modified palatal arch holding appliance *in situ* with derotating elastics for premolars. (c) Derotation of premolars completed

Dental anomalies are more frequently noted among patients with CLP[6] when compared with healthy patients, rotation of dental units is a common feature among these patients. Simple modifications/innovations in the clinical procedures may reduce the total treatment duration considerably.

The case presented is a 21-year-old male with BCLP managed with slow expansion using NiTi palatal expander for the transverse constriction; and in the retention phase, for the expansion achieved palatal arch holding was planned. In the maxillary dentition, bilateral rotations of the premolars were noted [Figure 2a]. To initiate the derotation of these premolars early in the treatment during retention phase, a modification was planned in conventional palatal arch holding to provide an attachment for force application [Figure 2b]. The derotation of maxillary rotated premolars was achieved in 5 weeks when the patient was on retention phase of the expansion achieved [Figure 2c].

The present modification of the palatal arch holding appliance is a novel method saving clinical treatment time by utilizing modified attachment for elastomeric chain placement which helps the clinician to apply couple for derotation of premolars.

CONCLUSION

The modified palatal arch holding appliance is a simple innovative method which is easy to fabricate and is helpful in accomplishing early leveling and alignment by derotation of premolars or any other teeth, thereby reducing the total treatment time with a better patient comfort.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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