

Case Report

Orthodontic Intervention in Bilateral Cleft Lip and Palate

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Abstract: The case report depicted the orthodontic management of a 14 years old male patient with bilateral cleft lip and palate who underwent cleft lip surgery, palatoplasty and came to seek orthodontic treatment for an esthetic and pleasing smile. The patient came with an anterior crossbite, unilateral posterior crossbite on the left side, collapsed maxillary arch with malformed central incisors, supernumerary tooth and missing lateral incisors. Arch expansion achieved in the patient with a modified quad helix followed by fixed orthodontic treatment without any surgical intervention. Prosthetic support at the end gave remarkable results showing the improved appearance in conjugation with the boosted confidence of the patient. The patient was satisfied with the outcome of the treatment.

Keywords: cleft lip; cleft palate; quad helix; expansion.

INTRODUCTION

Cleft lip and palate are common congenital anomaly of the head and neck region. This anomaly represents one-third of all congenital abnormalities of the head and neck region with a worldwide incidence of 1 in 700 (Pisek, P. *et al.*, 2013). Unsuccessful fusion of lateral nasal process and maxillary process results in cleft lip and failure in fusion of palatal processes cause cleft palate (Gandhi, P. G. 2017).

Several reasons are cited for the development of a cleft lip and palate which are broadly classified into genetic and environmental factors such as late pregnancy, smoking by the mother during pregnancy, alcohol consumption by mother during pregnancy, failure of withdrawal of the face from the chest during embryonic development and plenty of other factors. Cleft lip and palate are related to varied syndromes like Down's syndrome (Leiva Villagra, N. *et al.*, 2014; & Chung, K. C. *et al.*, 2000). Patients with CLCP have typical characteristics like midface deficiency, class III, oronasal fistulae, small ANB angle, malformed incisors, supernumerary teeth and having reverse overjet in many cases. Abnormal functions such as speech difficulties, nasal regurgitation, esthetic compromise and problem in mastication and swallowing are associated with CLCP

(Likikulthanaporn, A. 2017). A multidisciplinary approach is required right from the birth of the child. Such children are shy, having low self-esteem and are under a lot of psychological stress. They have to bear the staring, pity and sometimes bullying from the surroundings. They also face problems in academics, making friends and obtaining jobs (Chainta, D. *et al.*, 2018). Timely managed surgeries and treatments will acquire superior results. Orthodontic management of CLCP patients helps in better cosmetic results either conservatively or with a surgical approach (Vagdevi, H.K. *et al.*, 2015). The present case report demonstrated the conservative orthodontic management of patient who had bilateral cleft lip and palate.

CASE REPORT

The present case report shows the conservative orthodontic treatment approach. A patient with initials RV, age 14 years born with cleft lip and palate congenital deformity (complete bilateral cleft lip and palate) came to our department for dental and esthetic improvement. The patient undergone surgeries for cleft lip by the Bosky method at the age of 6 months, palatoplasty was done at the age of 1 year, tongue flap detachment was done for the palatal reconstruction when he was 7 years old. The patient was given a

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removable appliance with an expansion screw at 7 years of age.

When examined extra orally, scar marks present indicating the surgical repair of cleft lip and

palate with a deviated nasal septum and facial asymmetry were present.



Fig.1 Pre-Treatment Photographs & Radiographs

Intraoral examination showed missing lateral incisors with malformed central incisors. Tongue graft was used for palatal reconstruction and fistula was present. As compared to the maxillary arch, the mandibular arch was undisturbed. Class I molar relation present on the right side and unilateral crossbite present on the left side. The patient was having a reverse overjet of 4mm and anterior crossbite. Pretreatment extraoral lateral

cephalogram and orthopantomogram are shown in the figure 1

Functional examination revealed the problem of lisping and has a lower positioned tongue. Cephalometric analysis (Table 1) indicates a vertical growing patient with proclined lower incisors, class I ANB angle, retroclined and backwardly positioned upper incisors and acute nasolabial angle.

A. Cephalometric Readings

Serial No.	FINDINGS	PRETREATMENT	POSTTREATMENT
1.	U1-A Pog	-5 mm	3 mm
2.	ANB (in degrees)	0	2
3.	Mx 1 to NA(in mm)	-4	4
4.	Mx 1 to NA (in degrees)	13	23
5.	Nasolabial Angle (in degrees)	86	95
6.	E-line (upper lip)	-5	-1

mm: millimeter

TREATMENT PLAN AND PROGRESS

Expansion of the anterior and posterior region is planned with a modified quad helix as it helps in anterior expansion as compared to conventional ones. For disocclusion, a posterior bite plate was given. The

patient was advised to do tongue exercise for correcting tongue position (figure 2). After achieving sufficient expansion, fixed appliance 0.022"X0.028" MBT prescription was bonded along with the passive quad helix to stabilize the expansion achieved (figure 2)

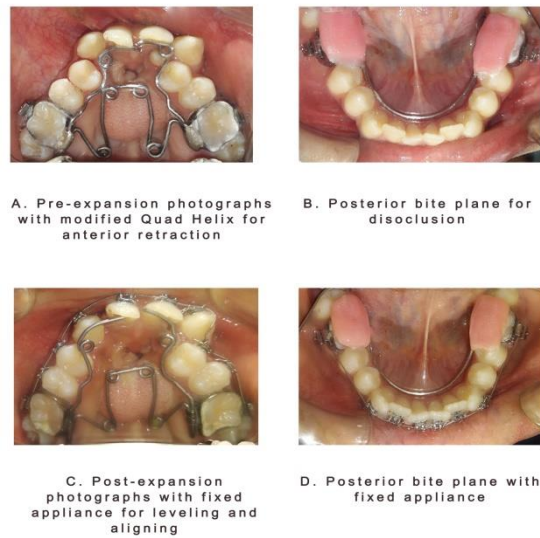


Fig.2 Pre & Post Expansion Photographs

Models analysis (Table 2) indicated that expansion occurred in maxillary canine, premolar and molar region.

B. Model analysis

	PRETREATMENT	POSTTREATMENT
Canine to canine width	26 mm	31 mm
1 st Premolar to premolar width	25 mm	34 mm
Molar to molar width	46 mm	52 mm

mm: millimeter

After achieving leveling and aligning with co-axial wire in the maxillary arch, protraction arch was fabricated and ligated in the upper arch for the maxillary dental protraction. Similarly, 0.016” NiTi

archwire ligated in lower arch followed by 0.019”X0.025” NiTi and 0.019”X0.025” SS archwire to achieve desired tooth movements.

Stage records showed significant changes in the patient’s profile [figure 3].

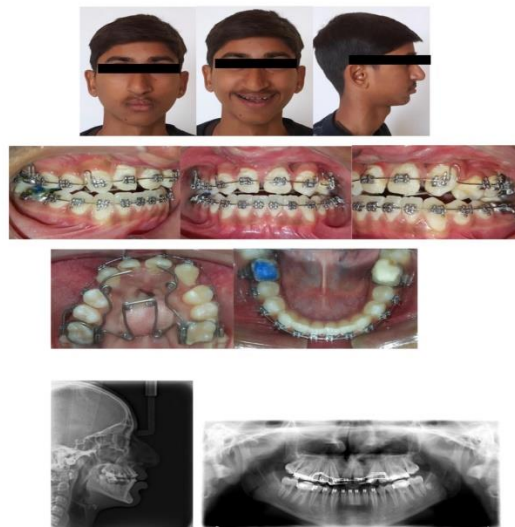


Fig.3 Mid- Treatment Photographs & Radiographs

ANB angle became normal. The patient's upper incisors were proclined and forwardly placed and the nasolabial angle was normal (Table 1). Open coil springs were used to create enough space for prosthetic rehab of missing lateral incisors. The quad was

removed and post treatment records were taken [figure 3]. The retention appliance was given along with fixed appliance (Figure 4) as for stability until prosthetic rehab was done; the patient was referred to the prosthodontics department for the needful.

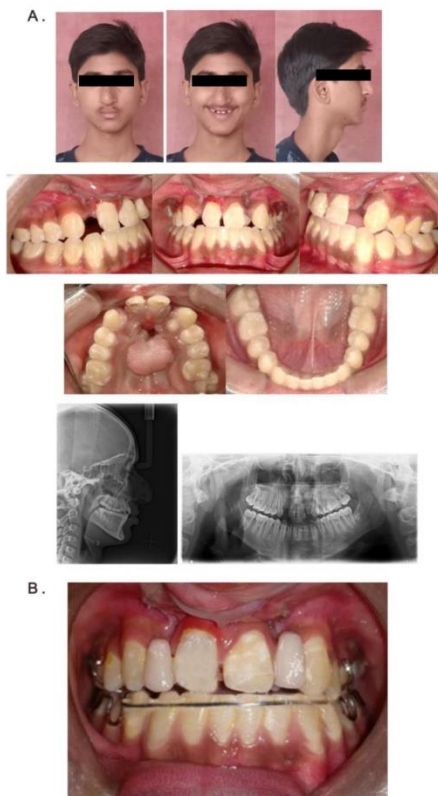


Fig.4 A. Post- Treatment Photographs & Radiographs
 B. Post-prosthesis photograph along with retainers

DISCUSSION

Patient of cleft lip and palate compelled to bear innumerable surgical interventions and therapies right from the birth. Scheduling and sequencing of the treatment are the crucial factors for the treatment of cleft patients (Pisek, P. *et al.*, 2013; & Likikulthanaporn, A. 2017). Treatment if initiated during the growth period deliver better results and leads to a correction in all three planes sagittal, vertical and transverse (Likikulthanaporn, A. 2017). The orthodontic management aims to align the teeth for preparing enough space and support the prosthesis in addition to arch expansion and thus facilitates in improving esthetic and function. According to the past literature, maxillary expansion should be performed before secondary alveolar bone grafting for better positioning of the cleft arch segments (Rocha, R. *et al.*, 2012). Secondary bone grafting should be done before the canine eruption in order to provide sufficient bone support for canine to erupt through the grafted region. The erupting canine stabilizes the graft and improves the alveolar bone height (Rocha, R. *et al.*, 2012; & Shaw, W. C., & Semb, G. 1990). In the presented case report the patient was 14 years old with nongrafted cleft, erupted canines with

constricted upper arch, retrusive upper incisors, anterior crossbite and unilateral posterior crossbite. The expansion was planned to achieve improved arch form before the fixed orthodontic appliance.

Arch expansion can be attained with slow maxillary expansion, rapid maxillary expansion, surgically assisted expansions. As the patient and his guardians had been reluctant to any surgical procedures, slow maxillary expansion with modified quad helix was planned to attain sufficient anterior expansion along with posteriors (Chainta, D. *et al.*, 2018) After achieving the desired expansion, a fixed orthodontic appliance was bonded and leveling aligning was done. On completion of the treatment, we were successful to achieve ideal overjet and overbite, normal lip position and better facial profile. The priority here was to prevent any root movement anteriorly as the teeth in the anterior region lack sufficient bone support. Fixed retention was given to ensure the stability of the anteriors. A further prosthetic replacement was done for better esthetic and there were remarkable changes in patients' behavior and confidence which was reflecting in the smile of the patient.

CONCLUSION

For patients with CLCP, comprehensive orthodontic treatment should be performed in collaboration with other departments. In the present case we utilized a modified quad helix for expansion of maxillary arch and prosthetic replacement of missing teeth was accomplished. The occlusion and facial aesthetics of this patient were substantially improved and he showed high satisfaction at the end of the treatment.

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