

Case Report

Multidisciplinary management of a bilateral cleft lip and palate patient

ABSTRACT

Cleft lip and palate (CLP) is the most commonly occurring congenital facial anomaly, in which Bilateral CLP is the least common among the different types of CLP. CLP correction requires a proper diagnosis and stage-wise treatment planning with a multidisciplinary approach which involves orthodontic and surgical correction of dental malocclusion and skeletal discrepancies, respectively. This case report emphasizes the need for multidisciplinary treatment which includes orthodontic treatment, orthognathic surgery, secondary lip revision and rhinoplasty performed in an 8-year-old patient with bilateral CLP to achieve a balanced and pleasing profile with good functional occlusion. The multidisciplinary approach performed by the orthodontists and oral surgeons brought stupendous results and showed good retention at 2-year posttreatment.

Keywords: Bilateral cleft lip and palate, genioplasty, LeFort 1 surgery, orthodontics

INTRODUCTION

Cleft lip and palate (CLP) is the most commonly occurring congenital facial anomaly. In India, the number of infants born every year with CLP is 28,600, which means 78 affected infants are born every day, or three infants are born every hour.^[1] Bilateral CLP (15.7%) is the least common among the different types of CLP.^[2] The etiology of CLP is multifactorial in which the genetic and environmental factors are the most common etiological agents for nonsyndromic CLP.^[1]

CLP is usually associated with abnormalities in the dentition such as hypodontia and supernumerary teeth.^[3] CLP patients get affected psychologically due to the unattractive appearance which leads to low self-esteem, and they face difficulties in social interactions. CLP correction requires a proper diagnosis and stage-wise treatment planning with a multidisciplinary approach which involves orthodontic and surgical correction of dental malocclusion and skeletal discrepancies, respectively.

This case report emphasizes the need for multidisciplinary treatment which includes orthodontic treatment, orthognathic surgery, secondary lip revision, and rhinoplasty for a patient

with bilateral CLP to achieve a balanced and pleasing profile with good functional occlusion.^[4]

CASE REPORT

An 8-year-old female patient reported with a repaired bilateral CLP with a descent premaxilla. On extraoral examination, the patient had a concave facial profile, obtuse nasolabial angle, lip scar, and asymmetrical nose. Intraoral examination revealed that the patient had mixed dentition with a severely collapsed maxillary arch which led to anterior crossbite. Molar relationship showed Angle's Class I molar occlusion with reverse overjet of 3 mm and overbite of 8 mm. Panoramic radiograph showed unerupted permanent

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Access this article online

Website:

www.orthodrehab.org

DOI:

10.4103/ijor.ijor_42_17

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How to cite this article: Aravindan S, Ramachandran UM, Vijayalakshmi RD. Multidisciplinary management of a bilateral cleft lip and palate patient. *Int J Orthod Rehabil* 2018;9:36-40.

maxillary and mandibular canines and premolars and congenitally missing maxillary lateral incisors. The bilateral CLP was evident in the panoramic view. Lateral cephalometric findings showed skeletal Class III pattern with retroclined maxillary incisors [Table 1]. The labially positioned roots of the maxillary incisors influence the contour of the anterior maxillary vestibule which increases the ANB angle and masks the maxillary hypoplasia [Figure 1].

Treatment protocol

- Expansion of the maxillary arch
- Secondary alveolar bone graft in the bilateral cleft site
- Presurgical orthodontic treatment
- Orthognathic surgery
- Postsurgical orthodontic treatment.

Table 1: Cephalometric analysis

Parameters	Pretreatment values	Posttreatment values
SNA (°)	78.8	81.7
SNB (°)	77.9	80.2
ANB (°)	0.9	1.5
Maxillary length ANS-PNS (mm)	42.6	47.1
Mandibular length (Go-Me) (mm)	60.1	69.4
UI-SN (°)	91.2	101.2
IMPA (°)	92.8	90.4
Interincisal angle (°)	159.4	130.6
Palatal plane (°)	11	7.6
Mandibular plane angle (°)	34.3	32.6
Nasolabial angle (°)	133.8	97.4
Chin depth (mm)	3.6	6.5

The initial procedure consisted of maxillary expansion with a removable quad helix appliance at 9 years of age. Bilateral alveolar bone grafting with premaxillary repositioning was performed in the cleft area at the age of 12 years to promote bony union of the alveolar segments and closure of the bilateral clefts and to facilitate eruption of the impacted canines. According to Aburezq *et al.* in 2006, bilateral alveolar bone grafting with premaxillary repositioning unifies the maxillary segments, so that if a significant skeletal problem persists at skeletal maturity, it can be corrected through a one segment LeFort I osteotomy.^[5] Following which fixed orthodontic treatment for the upper and lower arches were started at the age of 16 years until which regular follow-up of the patient was maintained [Figure 2]. The lower arch was decompensated by extracting 34 and 44 due to the tooth material arch length discrepancy caused by the congenitally missing maxillary lateral incisors. The wires used during orthodontic treatment are 0.016 NiTi, 0.017 × 0.025 NiTi, 0.019 × 0.025 NiTi, and 0.019 × 0.025 stainless steel with teardrop loops for space closure and 0.014 stainless steel wire for final settling. Arch coordination was done, and the patient was ready for orthognathic surgery at the age of 18 years. The surgical treatment plan was:

- LeFort I Maxillary impaction and advancement
- Advancement genioplasty [Figure 3].

Postsurgical settling was done to achieve Class I molar relation considering the maxillary canines as maxillary lateral incisors and maxillary 1st premolars as maxillary canines. One year after orthognathic surgery, the collapse of the alar cartilage was repaired with rhinoplasty procedure, and a

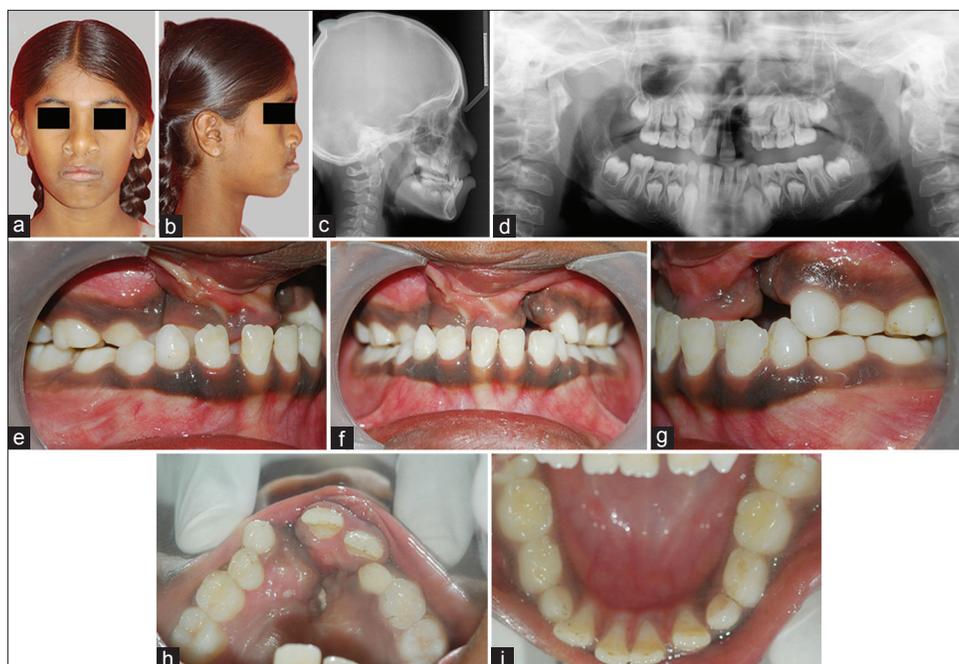


Figure 1: Pretreatment records (a and b) Extra oral photographs (c and d) Radiographs (e-i) Intra oral photographs

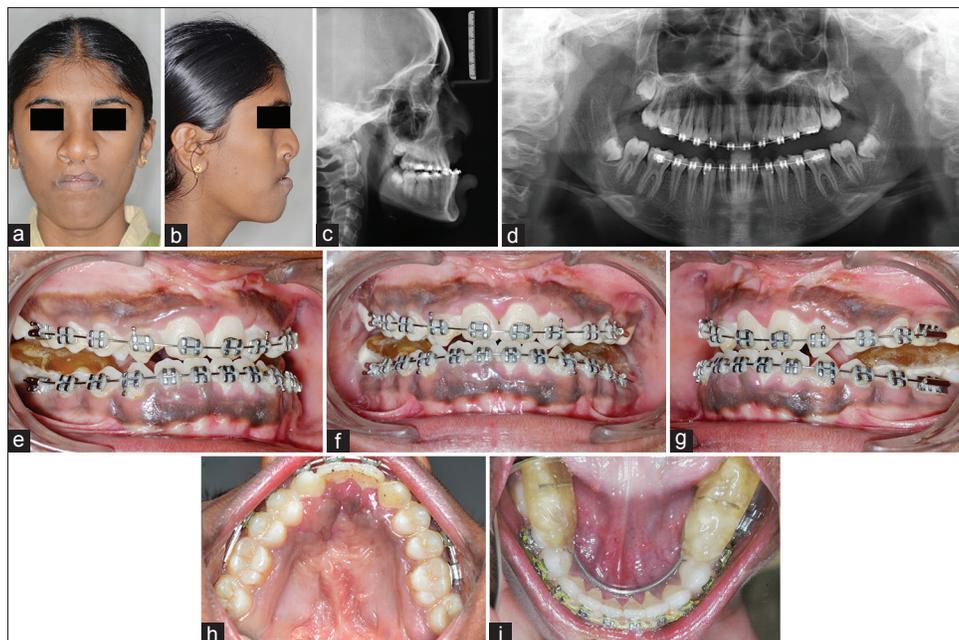


Figure 2: During treatment records (a and b) Extraoral photographs (c and d) Radiographs (e-i) Intra oral photographs



Figure 3: Postorthognathic surgery records (a-c) Extraoral photographs (d-f) Intraoral photographs

secondary lip scar revision was done to enhance esthetics and appearance of the patient.

TREATMENT RESULTS

At the end of the treatment, the patient's profile improved from a concave profile to a straight profile with a balanced chin. The cephalometric superimposition demonstrates that the maxilla was anteriorly uplifted and advanced which caused autorotation of the mandible in an anti-clockwise direction [Figure 4]. Intraorally, the arches were well aligned with good interdigitation. The patient had a balanced, functional occlusion with normal overbite and overjet. 13 and 23 replaced the 12 and 22 which

were congenitally missing. The dental midlines were coincident with each other. Following rhinoplasty and secondary lip revision surgery the patient had a pleasing appearance around the nasal bridge, nostrils, and upper lip, respectively. Finally, the speech assessment revealed no changes in the patient's velopharyngeal function after surgery. Two-year postorthognathic surgery follow-up showed a stable, functional occlusion with enormous changes in the facial features [Figure 5].

DISCUSSION

Patients with CLP have multiple functional and esthetic problems. A team approach is required to provide a comprehensive

treatment for them. These patients have both skeletal and dental problems. Maxillary constriction, posterior crossbite, and tooth anomalies are the common findings in CLP patients. Since the patient was a growing individual, slow orthodontic expansion was done in the upper arch before bone graft surgery. Hall and Posnick in 1983 stated that the ideal timing of alveolar bone grafting is when the canine root is about half developed, i.e. 8–10 years of age. Grafting at that time allows the canine to erupt into bone, thereby solidifying the bone graft.^[6,7] Fixed appliances were used to obtain dental alignment and leveling, and to correct the retroclined maxillary incisors.

Alyamani and Abuzinada in 2012 stated that the patients with a severe maxillary hypoplasia of 6 mm or more and excessive palatal scarring are successfully treated with distraction

osteogenesis. Conventional LeFort I is reserved for patients with less severe maxillary hypoplasia.^[8] In this case, LeFort I maxillary impaction and advancement surgery was done due to the presence of minimal anteroposterior discrepancy and absence of hypernasality. Anterior pitch up of 4 mm and advancement of 4 mm was done to correct the maxillary discrepancy followed by 3 mm of advancement genioplasty to achieve a straight profile.

Stabilization of maxillary osteotomies in cleft individuals during orthognathic surgical procedures plays an important role. Four bone plates were used, with two on each side, to secure the maxilla and two plates in the mandible for stabilizing advancement genioplasty. Finally, nasal reconstruction and secondary lip revision surgery were performed 1 year after orthognathic surgery.

CONCLUSION

Correction of CLP requires meticulous stepwise planning and treatment to obtain functional and esthetic results. The treatment done by orthodontists and oral surgeons brought stupendous results and showed good retention at 2 years' posttreatment. With no anticipated growth, the results are expected to be stable, although a long-term follow-up is necessary to maintain the skeletal and dental correction.

Acknowledgement

We would like to acknowledge the Department of Orthodontics and Orthopedics and Department of Oral and Maxillofacial Surgery, Meenakshi Ammal Dental College and Hospitals, MAHER University.

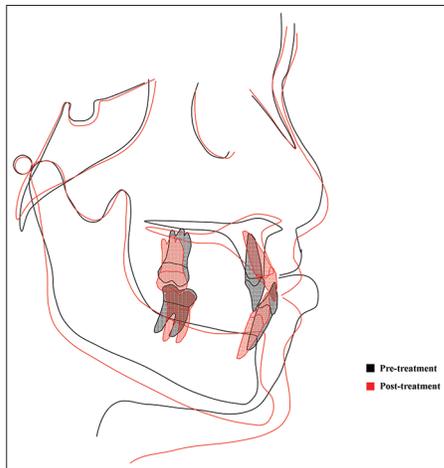


Figure 4: Cephalometric superimposition

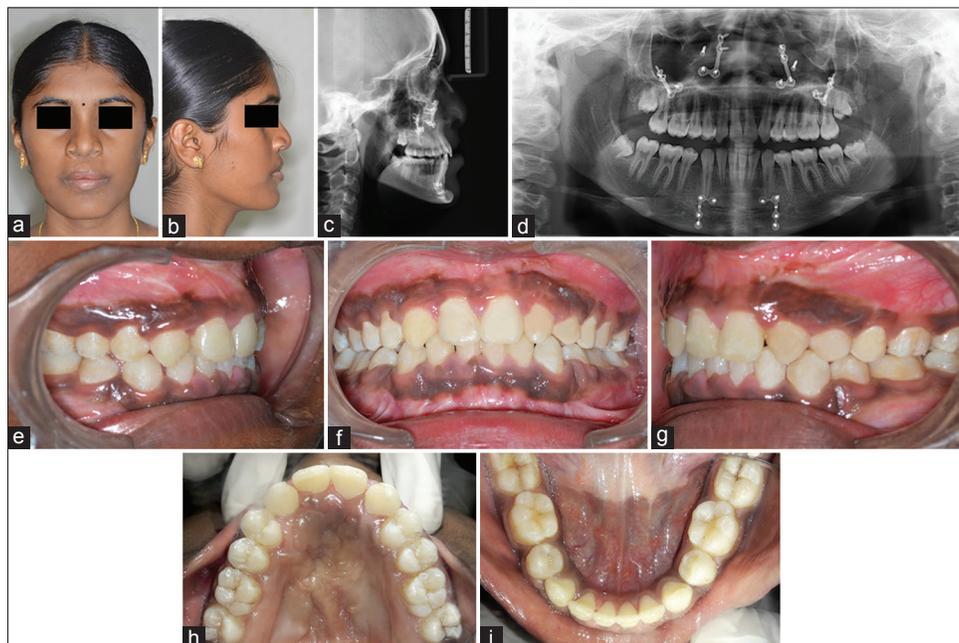


Figure 5: Two-year follow-up records (a and b) Extraoral photographs (c and d) Radiographs (e-i) Intraoral photographs

Declaration of patient consent

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

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest

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