

Comprehensive Management of Cleft Lip And Palate

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Abstract

The Orthodontist plays a vital role in the comprehensive management of cleft lip and palate cases for optimum results. Close co-ordination among team members is mandatory. This interactive team approach and patient centered care should provide the basis for a rational approach to diagnosis and treatment planning. This case report describes the comprehensive management of a patient with bilateral cleft lip and palate. The Patient presented with wide alar base of the nose,

constricted maxilla with a maxillary length proportional to the cranial base, a retroclined premaxilla and deficient chin. Patient was explained about the benefits and outcome of the treatment. After appropriate expansion of the maxilla, lip revision and intermediate bone grafting was done by harvesting iliac bone graft, meanwhile orthodontic treatment was continued and genioplasty was done to address the chin deficiency. Finally, rhinoplasty was done after the completion of soft tissue growth to achieve optimum esthetics and functional results.

Key Words: Cleft lip, Cleft palate, Maxilla, Mandible, Genioplasty, Rhinoplasty.

Introduction

Children born with clefts of the lip and palate constitute only a minority of those suffering congenital deformity of one sort or another. Yet this condition engages continuing interest of many professions from a variety of disciplines. The infant with cleft palate, is potentially at a disadvantage in his ability to communicate and also brings with it directly or indirectly associated problems¹. Thus, team approach for comprehensive care requires the Orthodontist to work collaboratively to determine the appropriate timing and sequencing of treatment in context of the patient's oral health care needs². Orthodontists are crucially involved in a case of cleft lip and cleft palate (CLCP) as they rarely escape dental and occlusal complications. Initially the role may be more concerned with facilitation of feeding and preliminary realignment of maxillary segments. However, it is more likely that, such children will remain under orthodontic care often through to adolescence and perhaps even later. This case report illustrates one such case from adolescence to adulthood under Orthodontist's care in comprehensive management.

Case report:

A female patient aged 13 years, reported with bilateral cleft lip repaired and cleft palate of the premaxilla with class II skeletal jaw bases, class II molar and canine relation bilaterally, retroclined maxillary central incisors, missing maxillary lateral incisors and deficient chin. (fig1 a&b)



Fig. 1 : Pre treatment extra-oral

Treatment objectives:

- As the patient reported after primary lip correction procedures, patient required secondary lip correction to reduce the scarring of lip.
- Maxillary expansion and pre-maxillary protrusion to level align the maxillary teeth and bone grafting in the bilateral missing maxillary lateral incisor region followed by prosthesis.
- To address the chin deficiency to improve the profile
- To correct the nasal deformity.

Treatment progress:

Initially, the patient was started with maxillary expansion using NiTi palatal expander (fig 2) for 6 months.

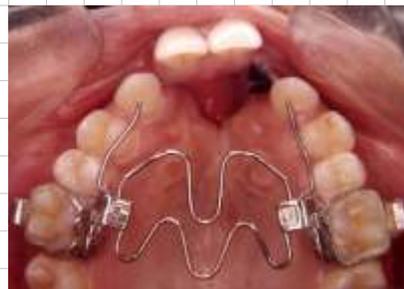


Fig. 2 : Pre treatment intra-oral

Then maxillary central incisors were bonded and Jockey archwire made using blue elgiloy was inserted to protrude the premaxilla for nine months (fig3).



Fig. 3 : NiTi palatal expander

After expansion of maxilla and protrusion of premaxilla there was a huge cleft in the anterior region of the palate. To cover the cleft, bone grafting was done using iliac bone graft (fig4 a&b) and also secondary lip revision was done at the same time (fig4 c). Grafting was successful, but a small cleft remained in the anterior region of maxilla (fig5).

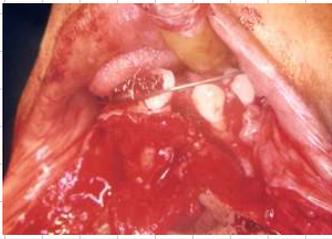


Fig. 4 A : Cleft surgery

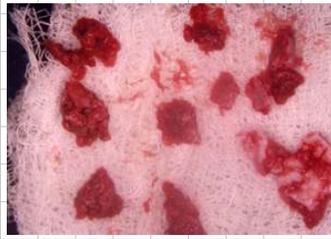


Fig. 4 B : Iliac bone grafts



Fig. 4 C : Lip revision



Fig. 5 : Residual cleft

After 14 months, Gradually remaining teeth of the maxillary arch were bonded to level align.(fig5) Once the stainless steel wire (0.019X0.025) was reached, missing lateral incisors were replaced with removable prosthesis so as to cover the remaining cleft by acrylic denture to prevent the flow of fluids.. Further, the patient was subjected to genioplasty to address the chin deficiency. Finally rhinoplasty was done to correct the wide alar base of the nose after the completion of soft tissue growth.

Discussion

Formation of lip and palate takes place by the fusion of frontonasal processes and maxillary nasal processes. Frontonasal processes grow out to form the paired medial nasal and lateral nasal processes which surrounds the bilateral nasal pits. These fuse anteriorly with maxillary processes to form the upper lip, alveolus and primary palate, farther posteriorly, the maxillary process fuse to form the secondary palate. Any failure in the process of fusion with their respective structures results in cleft.

Most commonly CLCP patients present with hypomaxilla resulting in class III jaw bases. Studies also shows that maxillary retrusion to be the most common cause of class III malocclusion 3,4. This case report is a unique bilateral CLCP presenting with maxillary constriction, retroclined premaxilla, and deficient chin.

Palatal expansion:

Rapid maxillary expansion appliances/screws are used to increase the width of maxilla in a short span of time. Most of the appliances

available to expand maxilla are tooth borne. As there was a lack of midpalatal suture due to bilateral CLCP NiTi palatal expander was used for 6 months. Studies have shown maxillary expansion to be a stable procedure that does not compromise the periodontal supporting tissues⁵. Besides correcting the jaw discrepancy, maxillary expansion creates space for the eruption of developing dentition and alleviates potential crowding of the permanent dentition.

Bone grafting:

The challenge to restore the missing tissue at cleft site was resolved with the advent of intermediate or secondary alveolar bone grafting in 1970's^{6,7,8}. This bone grafting procedure provides the Orthodontist with one of the most important milestones in managing the cleft site, that is, restoration of uninterrupted, continuous alveolar ridge which allows for eruption of teeth into the graft and orthodontic movement of teeth into the cleft site. Additionally, placement of osseointegrated implants is now possible with prosthetic replacement of missing teeth. Primary alveolar bone grafting has been discontinued in United States following a five year post-treatment outcome study⁹. Intermediate bone grafting was done in this case at the age of 15 years by harvesting iliac crest (fig4 a & b). Oslo study also supports the intermediate period as the most appropriate time for grafting¹⁰. Along with grafting, secondary lip revision was also done to avoid repeated surgeries (fig4 c).

Six months after grafting remaining teeth were bonded to level and align. When the stainless steel arch wire (0.019X0.025) was inserted, missing maxillary lateral incisors were replaced with removable acrylic prosthesis to cover the residual cleft (fig6).



Fig. 6 : Removable prosthesis for maxillary lateral incisors

At this stage patient was aged 17 years and was kept under observation for late mandibular growth. Clinical and cephalometric evaluation at the age of 18 years 6 months showed no improvement in chin deficiency. To address the chin deficiency, augmentation genioplasty was done (fig7).



Fig. 7 : Genioplasty

Finally after the completion of soft tissue growth rhinoplasty was done to correct the nasal deformity (figs 8A,B, 9a & b).



Fig. 8A : Post treatment extra-oral



Fig. 8B : Post treatment intra-oral



Fig. 9A :
Post treatment lateral ceph

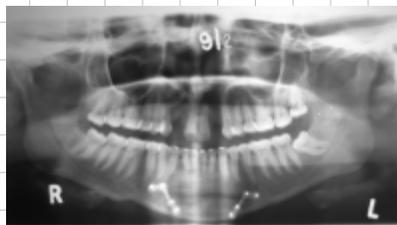


Fig. 9B :
Post treatment OPG

Critical appraisal / Treatment alternative

After intermediate bone grafting, there was a residual cleft in anterior region of maxilla. Late secondary bone grafting could have been done to eliminate this residual cleft and to provide provision of good bone support to implant prosthesis/ fixed partial denture with respect to missing lateral incisors and teeth adjacent to the cleft. It would have also helped in construction of continuous arch form, alveolar ridge and achieve stabilization of the premaxilla. Patient was explained about the procedure and benefits, but, the patient was "burnt out" and did not agree with any more surgical procedures. Considering the minimal visibility of maxillary incisors during speech and smile, the patient was given removable prosthesis with respect to missing lateral incisors which covers the

residual cleft and also prevents the entry of fluids through the same.

Follow Up:

The present case was reviewed for 3 years after successful comprehensive management of CLCP. All the clinical results of treatment achieved were maintained. (fig 10 a&b).



Fig. 10A : 3Years Post treatment extra-oral



Fig. 10B : 3 Years Post treatment intra-oral

Conclusion:

Comprehensive management of CLCP patient requires the Orthodontist to work collaboratively with CLCP management team, to determine the appropriate time and sequence of the treatment in context of the patient's oral health care needs. Such patients will remain under orthodontist's care often through to adolescence and perhaps even later.

TREATMENT TIMELINE:

DATE	TREATMENT PROCEDURE	AGE ON DATE
09-09-2002	NiTi palatal expander	13 years
18-03-2003	Jockey arch wire	13 years 6 months
22-12-2003	Lip revision and bone grafting	14 years 3 months
09-03-2005	Complete maxillary arch bonding	15 years 6 months
12-04-2006	Prosthesis wrt 12, 22 & lower arch bonding	16 years 7 months
19-01-2008	Genioplasty	18 years 5 months
18-03-2009	Rhinoplasty	19 years 7 months
21-07-2009	Debanding	20 years

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