

## Anterior Maxillary Distraction for the Correction of Cleft Maxillary Hypoplasia: Case Report

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### Abstract

### Case Report

Surgical repair of the cleft lip and palate is usually done in infancy and early childhood to improve the facial appearance and function. Distraction osteogenesis has been reported to be very promising in management of mid face hypoplasia. A 14-year-old male patient was brought to the department by their parents with a chief complaint of forwardly placed a lower jaw. A 3 mm reverse over jet was observed intraoral and class III malocclusion was noted on clinically and radio graphically. Anterior maxillary distraction was done to correct the retrognathic maxilla. Tooth born type of hyrax device is used for the distraction and stability of anteriorly distracted maxillary segment.

**Keywords:** Anterior maxillary distraction, Hyrax, Maxillary hypoplasia, Stability, Cleft Lip and Palate.

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### INTRODUCTION

Surgical repair of cleft lip and palate is usually done during infancy and early childhood to improve facial appearance and function. However, these surgical interventions have an effect on maxillary growth that gradually leads to maxillary hypoplasia [1]. The hypoplastic maxilla in these conditions can be treated using conventional Lefort I advancement with or without bone grafting. In some cases with severe palatal scaring it is not an easy task to advance the maxilla as there is an increased risk of relapse. On a bright side, distraction osteogenesis has been reported to be very promising in the management of midface hypoplasia. It was first reported in mandible by McCarthy *et al.* [2]. Later Polly and Figueroa [3] reported on maxilla of cleft lip and palate patients which gave very good results related to maxillary hypoplasia. In this paper, we report our experience with a case of cleft lip and palate patient with maxillary hypoplasia who underwent surgical correction using maxillary distraction osteogenesis. Anterior movement of the premaxillary segment was generated by a tooth-borne distractor that was individually constructed. Hyrax appliance is from Leone Company, with a length of 11mm. The distractor screw was embedded closer to the shifting side.

### CASE REPORT

A 14-year-old male patient was referred from department of orthodontics with a chief complaint of

forwardly placed a lower jaw class III malocclusion with a 3 mm reverse over jet was noted on clinical and radio graphical examination.

The patient gives a history of previous surgery for left unilateral cleft lip and palate, cheiloplasty was done in 5<sup>th</sup> month, palatoplasty at 1 year and secondary alveolar bone grafting at 12 years. Patient under orthodontic treatment from the last 2 years (Figure1).

Under general anesthesia. A horizontal incision was made approximately 5 mm above the attached gingiva from right first molar to the left first molar and mucoperiosteal flap was reflected on either side. Vertical osteotomy lines were marked between the canines and the premolar and horizontal osteotomy lines above the apices of the premolar to the pyriform aperture with No: 702 carbide bur the osteotomy was performed. Interdental, palatal and nasal surface osteotomies were completed using an osteotome. The osteotomy lines were all joined to ensure the anterior segmental mobilized, hyrax appliance is placed in position and activated for 4.5mm to check for mobility. Then hyrax is deactivated and removed and then bonded with luting cement on to the tooth (Figure 3,4). The wound was closed with 3-0 vicryl.

### Distraction Protocol

- One day after surgery, the distractor was cemented onto the teeth and activation began following 7 days latency.

- The screw was activated with a rate of 0.25mm and rhythm of 4 times per day at 6 hourly intervals. (1 mm per day)
- The duration of the distraction was determined according to the requirements of each case considering the occlusal relationship overjet and spacing.

The distraction was continued for three more days for over-treatment after obtaining the essential overjet and space for correcting the teeth. Following a consolidation period of 8 weeks, the distractors were removed and the treatment was continued with straight wire orthodontic mechanics (Figure 2).

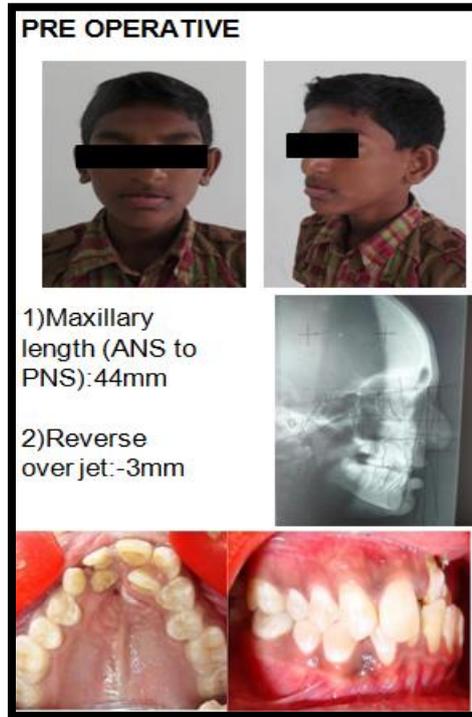


Fig-1

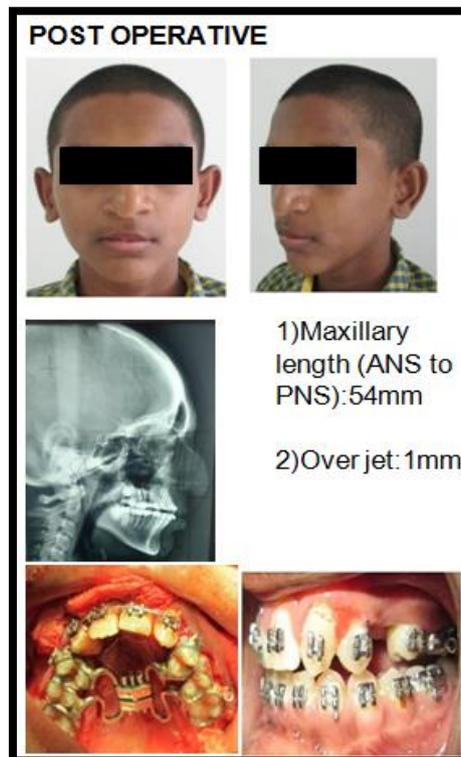


Fig-2



Fig-3

### Intra operative



Fig-4

## DISCUSSION

Maxillary hypoplasia is the most common secondary problem in cleft lip and palate patients. Orthognathic surgery has been the mainstay in correcting deformities. Distraction osteogenesis [DO] is a recent addition to the treatment modalities for reconstructing mild to moderate facial deformities. Distraction osteogenesis is a biological process of new bone formation between the surfaces of the osteotomized bone segment that are separated gradually by incremental traction. Several advantages have been reported with DO in maxilla in comparison to the conventional Le Fort I and segmental osteotomy. At regular intervals, distraction of bone segments of 0.5 to 1 mm/day was done [4]. DO not only allow bone lengthening but also lengthening of the soft tissue over the bone. Cheung and Chua [5] preferred to DO rather than conventional osteotomy for younger cleft lip and palate patients with more severe deformities. Recently, for maxillary advancement, adjustable rigid external devices are used that were designed and reported by Polley and Figueroa [6]. However, with current external devices significant physical and social inconvenience is caused to the patient whom stands as a major problem. For this reason, various internal devices that will be tolerated easily by patients were developed by various companies [7]. To date, clinical applications included total advancement of the maxilla or midface. Altuna *et al.* [4, 8] examined for the first the maxillary anterior segmental DO in cynomolgus primates experimentally, and Dolanmaz *et al.* [9] in a 42-year-old man with a Class III pattern, used a tooth-borne device for

maxillary anterior segmental advancement. To the best of our knowledge, maxillary anterior segmental DO was first used in a cleft patient to advance the hypoplastic maxilla by Karakasis and Hadjipetrou[10].

The advantages of distraction more than conventional orthognathic are many but specifically in cleft palate operated patients it helps in two ways. They are avoidance of relapse due to scar tissues. Greater advancement, more stable and reliable long term result is achieved. Disadvantages of AMD are a relative high risk of root injury, fistula formation, and anterior maxilla segment necrosis.

## CONCLUSION

In this patient, the maxillary arch length increased and sufficient space was created for the maxillary canines. There was an improvement in the profile of the patients and adequate overjet was obtained after the treatment. AMD is suitable for the management of mild to moderate cleft maxillary hypoplasia.

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