CASE REPORT

Distraction osteogenesis with periodontal rehabilitation: A Case Report

Asif Iqbal Khan, M.D.S.,[1] Ashok Utreja, M.D.S.,[2] Roobal Behal, M.D.S.[3]

[1]Tutor, Government Dental College and Hospital, Srinagar; [2]Professor and Head, Oral Health Sciences Centre, PGIMER, Chandigarh; [3]Roobal Behal, Lecturer, Government Dental College and Hospital, Srinagar.

ABSTRACT

Distraction osteogenesis is one of the latest treatment modalities in correcting skeletal discrepancies in the craniofacial region. Maxillary retrusion is a common problem when deformity of the face is concerned, especially in cleft lip and palate patients. Distraction osteogenesis utilizing internal or external has an enormous role in future as an alternative method of skeletal correction in patients with severe maxillary hypoplasia. In addition, periodontal rehabilitation in these patients is of utmost importance especially at the end of treatment. This case report presents one such case of severe maxillary retrusion treated successfully by distraction osteogenesis. JMS 2012;15(1):78-81.

Key words: Distraction osteogenesis, cleft lip and palate, maxillary hypoplasia.

Distraction osteogenesis is one of the latest treatment modality in correcting skeletal discrepancies in the craniofacial region in which an iatrogenic fracture is made in jawbones, which are then splinted by expansion screw, and the fractured ends are opened at a rate of 1mm, so as to allow bone formation in a physiological manner.[1] The technique had been propagated first on the leg bones and later on jaw bones.[2]

Maxillary retrusion is a common problem when deformity of the face is concerned especially in cleft lip and palate patients. The maxilla is not only retro positioned but is deficient also.[3,4] Maxillary retrusion with early intervention does not respond to orthodontic treatment in many cases. In these cases advancement by Le Fort I osteotomy with or without bone graft is often successful. However in some cases it is difficult to mobilize the maxilla due to scar tissue.[4] Distraction osteogenesis is an alternative procedure for maxillary advancement in these cases, which leads to marked forward movement of maxilla.[4] Distraction osteogenesis can utilize devices that can be internal or external.[5-7]

Correspondence:
Dr. Asif Iqbal Khan
Bismillah Braces Center,
Airport Road, Hyderpora,
Srinagar Kashmir - 190014.
Phone no.: 01942438300, 9906665017

Case Report

A 20 year male with bilateral repaired group III cleft reported to Oral Health Sciences Centre, Post Graduate Institute of Medical Education and Research (PGIMER), Chandigarh with a complaint of Smid face deficiency (Figure 1). He had skeletal class III malocclusion mainly due to maxillary retrusion, The angle ANB was –40. The maxillary length was 38mm, which was



FIGURE 1. Pretreatment extraoral photograph

approximately 10-12 mm less than the normal value, and the mandibular length was near normal. The treatment was divided into three phases: Phase 1 was the presurgical phase .It consisted of alignment and leveling of both upper and lower arches by orthodontic treatment (Figures 2,3,4). Surgical splint consisting of custom designed face bow and acrylic occlusal bite plane was prepared Face bow alongwith the surgical splint was cemented to the maxillary teeth (Figure 5) . Phase II was the surgical phase It was carried on the maxilla to mobilize the segment. A rigid extra oral distractor was attached to intra oral splint followed by a lag phase of 5 days. During this lag phase, the patient recovered from facial edema Distraction was commenced with a rate of 1mm per day till a positive over jet was achieved (Figures 8,9,10). This was followed by consolidation period for 8 weeks and after that the distractor was removed (Figure 12).



FIGURE 2, 3. Pre Distraction Intraoral photograph

FIGURE 4. Pre Distraction extra oral photograph



FIGURE 5. Intraoral Splint

FIGURE 6, 7. Intraoperative Distraction Device Placement

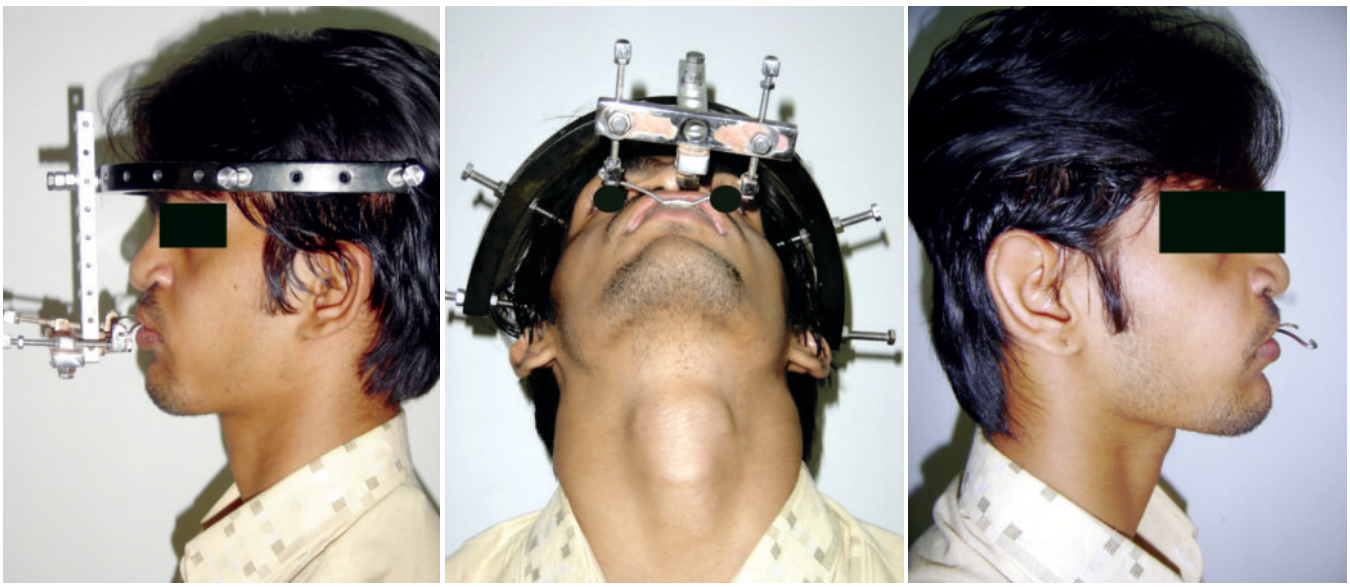


FIGURE 8, 9, 10. Post Distraction Extra oral Photographs



FIGURE 11, 12. Post Distraction Intraoral Photographs

The pre and post distraction Cephalometric radiographs showed a tremendous change (Figure 13, Table 1). Phase III consisted of post distraction phase in which settling and good intercuspation of teeth was achieved (Figure 14).In this patient, the periodontal rehabilitation was of utmost importance as the splint in place had done iatrogenic damage to the gingiva (Figure 11), So periodontal therapy in the form of scaling and root planing was carried out and the patient was prescribed 0.2% cholorhexidene mouthwash The patient was asked to continue it for four weeks The patient showed obvious signs of improvement in the gingival condition after 4 weeks (Figure 14).

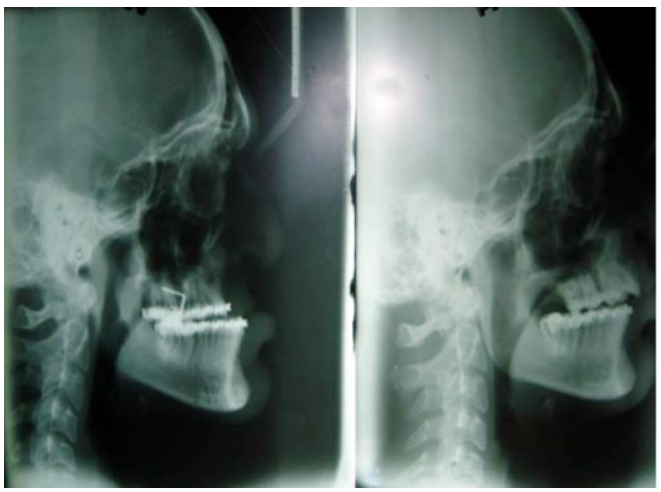


FIGURE 13: Pre distraction and Post Distraction Lateral Cephalometric Radiographs

TABLE 1. Comparison of pre and post-distraction Cephalometric values

Cephalometric values	Pre-Distraction Values	Post-Distraction Values
SNA degrees	75	79
SNB degrees	78	78
ANB degrees	-3	+1
Wits mm	-5	+1
Maxillary Length mm	38	48
Upper Incisor to palatal plane	64	67
Lower Incisor to mandibular plane	89	95
FMA degrees	23	25
SNMP degrees	30	33



FIGURE 14. Post treatment Intraoral Photographs

Discussion

Maxillary advancement with Distraction Osteogenesis improves facial profile by reducing the facial concavity, increasing nasal projection and moving upper lip forward in a range greater than conventional orthognathic surgery as described by Molina.[3,4] The amount of maxillary advancement by the procedure was about 10-11 mm which corrected the anterioposterior discrepancy (Table 1). In addition, periodontal therapy after the distraction device is removed provides good improvement in overall rehabilitation of these cleft patients. Advantages of Distraction Osteogenesis include brief operating time, distraction histogenesis, maintenance of vascularity and neurosensory integrity of bone, no need for bone grafts, greater stability, single jaw surgery instead of two-step jaw surgery, Pre-surgical orthodontics is optional in many cases.

In conclusion, the amount of maxillary advancement in the above mentioned case was significantly greater in



FIGURE 15. Post treatment Extra oral Photographs

distraction as compared to conventional orthognathic surgery alone. Distraction osteogenesis can induce significant soft tissue changes thus, improving the facial esthetics Periodontal rehabilitation improved the gingival health as well as micro aesthetics.

References

1. McCarthy J, Williams JK. Osteodistraction: The present and the future. Textbook of Maxillofac Surg, Section; Craniofacial deformity.953-71.
2. Illizaro GA. The tension-stress effect on the genesis and growth of tissues: Part 11. The influence of rate and frequency of Distraction. *Clin Orthopaed and Related Research* 1989; 239: 263-85.
3. Molina F, Monasterio F. Maxillary Distraction: Aesthetic and Functional benefits in Cleft lip and Palate patients during mixed dentition stage. *Plast Reconstruc Surg* 1998;101:951-63.
4. Molina F. Combined maxillary and mandibular Distraction Osteogenesis. *Semin Orthod* 1999; 5:41-45.
5. Polley JW, Figuora AA. Maxillary Distraction Osteogenesis with rigid external distraction. *Atlas of the Oral and Maxifac Surgery Clinics of North America* 1999; 7(1):15-28.
6. McCarthy J *et al*. Distraction Osteogenesis of the mandible: A ten-year experience. *Semin Orthod* 1999; 55:3-8.
7. Chin M, Toth BA. Distraction Osteogenesis in Maxillofacial surgery using internal devices :Review of five cases. *J Oral Maxillofac Surg* 1996; 54:45-53.