

## MANAGEMENT OF OBSTRUCTIVE SLEEP APNEA THROUGH DISTRACTION OSTEOGENESIS OF THE MANDIBLE: A CASE REPORT.

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### ABSTRACT

The underlying pathophysiology of obstructive sleep apnea is beginning to be unraveled better in recent years. Mandibular hypoplasia is now considered to be a significant reason for this disorder. Mandibular hypoplasia can result from a variety of causes including congenital like, mandibulofacial dysostosis, and acquired conditions like TMJ ankylosis. The use of

*distraction osteogenesis for the maxillofacial skeleton is a relatively new concept. We present a case of obstructive sleep apnea syndrome due to mandibular hypoplasia resulting from a TMJ ankylosis, treated with distraction osteogenesis of the mandible.*

**Key words:** Distraction Osteogenesis, Sleep Apnea, Hypoplasia of Mandible, TMJ Ankylosis, case report

### INTRODUCTION

Obstructive sleep apnea [OSA] has been identified as a significant health risk in recent times. Obstructive apnea is the absence of airflow despite respiratory effort. C.S.Burwell first used the term Pickwickian syndrome describing an obese patient with respiratory acidosis, heart failure and sleepiness [1].

Airway obstruction has been noted to occur in seven different sites in the upper airway. Retrognathism or repositioning of the jaw is beginning to be appreciated as a significant risk factor in the development of OSA. Maxillomandibular advancement to increase the airway space was the logical treatment for these conditions. Large advancements of the jaws through traditional orthognathic surgery were accompanied with a high rate of relapse. Distraction osteogenesis is a technique that offsets these problems.

Distraction osteogenesis was first developed by the Russian surgeon Ilizarov for correction of various extremity deformities. It was adapted to the maxillofacial region in the early 1990's to treat congenital and developmental hypoplasias of the maxilla and mandible [2]. It involves gradual separation of the osteotomised bone edges resulting in the formation of new bone.

### CASE REPORT:

A 19-year-old male patient reported to the oral and maxillofacial surgical department with a primary complaint of an unaesthetic retruded lower jaw. His additional complaints included excessive daytime somnolence, loud and obnoxious snoring and decreased cognitive function during waking hours. History revealed that the patient was operated for bilateral temporomandibular joint ankylosis

10 years back. On examination patient had a short stature, was obese with a stout neck and had a very small chin



Fig 1

throat angle, exhibiting all the features of the bird face deformity. [Fig 1]. Lateral cephalogram revealed a severely



Fig 4

retruded mandible, decreased pharyngeal airway shadow and evidence of previous surgery [arthroplasty] in the temporomandibular joint [Fig 4]. The diagnosis of obstructive sleep apnea syndrome due to upper airway redundancy secondary to a hypoplastic mandible was confirmed through a overnight four channel polysomnogram which revealed apnea of over hundred with significant oxygen desaturation and resting tachycardia. To increase the upper airway space it was decided to advance the hypoplastic mandible by 20 mm. through osteodistraction. Under general anesthesia an osteotomy was performed in the bilateral angle region of the mandible transorally.

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Fig 2

Two indigenously sourced extra oral unifocal distractors were placed percutaneously in both the osteotomy sites [Fig 3]. After a latency period of one week, the mandible was advanced daily by incremental distraction of 1 mm a day



Fig 3

for 20 days. After 2 months of consolidation of the distracted segment the distractors were removed under local anesthesia.



Fig 5

Complete elimination of the defect was evidenced both clinically and radiographically in a lateral cephalogram [Fig 5].

A repeat polysomnogram revealed an improvement in the respiratory distress index. The surgical results were stable at the last follow up of 9 months [ Fig 2].

## DISCUSSION

Several modalities of treatment for OSA have evolved over the years. Non-surgical management includes weight loss, oral devices, Continuous Positive Airway Pressure [CPAP]. Medical management is plagued by poor patient compliance and can be employed only in moderate cases of OSA. A protocol developed by the university of Alabama recommends Maxillomandibular advancement and uvulopalatopharyngoplasty for respiratory distress index greater than 40<sup>3</sup>. In our case the respiratory distress was very high and hence the only treatment option was surgical. Since the etiology of respiratory obstruction was retrognathic and hypoplastic mandible, advancement was planned and achieved through distraction osteogenesis. The results were evidenced by the decrease in respiratory distress index in the polysomnogram, as well as an increase in the pharyngeal airway shadow in the lateral cephalometric radiographs [Fig 5].

Distraction osteogenesis is an emerging treatment modality used for correction of severe hypoplasia of the jaws. It carries with it the advantages of minimal relapse and added stability. In our case the mandible had to be advanced by 20 mm. Conventional osteotomies cannot achieve this magnitude of movement without bone grafting which has additional donor site morbidity. Though distraction osteogenesis of the jaws has been used to treat congenital hypoplasias in children, very few reports in the literature describe this as a definite modality in compromised airway following ankylosis of the temporomandibular joint. Further case studies in this regard will help in expanding our understanding of this complex deformity.

## CONCLUSION

The use of distraction osteogenesis for the treatment of obstructive sleep apnea is a novel and groundbreaking concept. It simultaneously advances both the soft and hard tissues, in the process corrects the functional as well as the esthetic aspects of the deformity. In our case it has proved to be a successful alternative to other surgical options.

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