

Unilateral TMJ Ankylosis Release with Distraction of Mandible as A First Option - A Case Report

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Abstract

Purpose: The primary purpose of treating any TMJ ankylosis is to restore function and secondarily correction of aesthetics if needed.

Methods: TMJ ankylosis treated with distraction on the left side of mandible before ankylotic mass release and reconstructing with the Interpositional gap with autogenous bilateral coronoid graft for maintaining TMJ function.

Results: The result of this report suggest that distraction osteogenesis should be considered before gap arthroplasty as a surgical treatment option with restoring the esthetic form and function

Keywords: TMJ ankylosis, Distraction Osteogenesis, Arthroplasty, Ramal Condylar unit Reconstruction.

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I. Introduction

Temporomandibular joint (TMJ) ankylosis may be defined as the fusion of joint surfaces by bone or fibrous tissue leading to restricted mouth opening. It may be classified according to the site (intra or extra-articular), type of tissue involved (bony, fibrous or fibro-osseous tissue), and the degree of fusion (complete or incomplete)[1]. Earlier the age of ankylosis, more severe the facial deformity, malocclusion, and poor oral hygiene with multiple impacted and decayed teeth. It restricts mouth opening which leads to difficulty in mastication and impairment of speech. The normal growth and development of jaws are also impaired in the growing stage.

Etiology of temporomandibular joint (TMJ) ankylosis is described to be multifactorial, but trauma (intracapsular and subcondylar fractures) in children is the most common cause. Prolonged immobilization of comminuted intra-capsular fractures in children leads to excessive mineralization and bone formation [2]. Successful treatment requires comprehensive counseling and psychological rehabilitation and vigorous prolonged physiotherapy with periodic encouragement of both patients and parents postoperatively.

II. Case Presentation

A 21-year-old woman presented with a complaint of facial asymmetry and limitation of mouth opening since childhood post left ear infection. There was no history of trauma during or after birth. Clinical examination showed maxillary canting and deviation of chin towards the left. The inter-incisal opening (IIO) was limited to 11mm. Radiological examination showed a fish tail condyle-coronoid process on OPG. The 3D computed tomography analysis showed a gross bone mass at the TMJ, a sharp sagittal antegonial notch, and broad bony mass extending to the medial cranial base. Basis on these clinical findings and relevant history the lesion was diagnosed as unilateral fibro-osseous TMJ ankylosis of the left side.

The Radiological study revealed the need for 8mm mandibular lengthening on the left side, it was planned to distract 10 mm to compensate for relapse. The treatment plan was to perform surgery in two stages. In the first stage, the surgery was performed under general anesthesia with nasotracheal intubation assisted by a fiber-optic scope. The ankylotic joint was exposed via a retromandibular approach. A reverse L-shaped osteotomy line was marked and made on the outer cortex of the ramus bone, distractor fitted and removed. The osteotomy was completed while maintaining the soft tissue attachment of the medial side of the proximal ramal segment. The distractor was refixed and its function was tested via the trial run. After 5 days of the latency period, the distractor was activated 1mm/day for 10 days to achieve 10 mm mandibular lengthening. The second stage surgery had to be delayed for 1 year due to pregnancy and hence the consolidation period was one year. The distractor was subsequently removed and the ankylotic mass was released followed by an interposition arthroplasty with the medial pterygoid muscle and reconstruction of the ramus unit with the autogenous bilateral coronoid process. The inter-incisal opening achieved intra-operatively was 45mm. Post-operative recovery was uneventful and the patient showed no signs of facial paresis or anterior open bite. Mouth

opening physiotherapy exercises were commenced one week post-operatively. At the end of a follow-up period of 1 year, the patient achieved a 40mm passive mouth opening.

III. Discussion

Traditionally, orthognathic surgeries have been the more common and preferred technique after TMJ ankylosis release. However, there are some failures or shortcomings of orthognathic surgery such as facial asymmetry and soft tissue deficiencies. Post-operatively, the behavior of the graft may be unpredictable.

To overcome these difficulties, distraction osteogenesis has emerged as a more comprehensive, predictable, and stable treatment modality, as the bone formed by distraction is of the same morphology as the surrounding untouched bone. Esthetic mandibular soft tissue adaptation is achieved as the soft tissue associated with the distraction zone also undergoes remodeling. (Histogenesis) Distraction osteogenesis is an alternative technique to lengthen a bone or segment of bone. The concept behind distraction osteogenesis is to produce tensional force at the site of surgically produced disruption. The principles of distraction were defined by Ilizarov [3]. The factors that are important for the formation of new bone are:

1. Maximum preservation of extraosseous and medullary blood supply
2. Stable fixation
3. Latency period
4. Distraction rate of 1mm/day in rhythm
5. Period of consolidation.

Ilizarov in his experiment found that a distraction rate of 1mm/day led to the best result for bone, fascia, skeleton muscles, smooth muscles, blood vessels, nerves, and skin. He also concluded that the best results were obtained with the preservation of peri-osseous tissue, bone marrow, and blood supply at the time of osteotomy, the stability of the distractor, and a rate of 1mm/day with a rhythm of four turns per day [4]. The sequential treatment of temporomandibular joint ankylosis with distraction osteogenesis has been described under three heads.

1. Distraction osteogenesis and arthroplasty procedure done together.
2. Transport distraction technique for neocondyle (after arthroplasty).
3. Distraction osteogenesis first, followed by arthroplasty.

If Distraction osteogenesis and arthroplasty are performed together, the proximal bone segment would inevitably move backward and neutralize the effect of distraction. Thus, the actual distraction distance would be less than the previously designed distance and this could lead to facial asymmetry and shortage of bone. Furthermore, interference may exist between physical exercise and distraction. The reduced length of the mandibular body had an adverse impact on mouth opening and occlusion.

In the transport distraction technique, the stability and height of the neocondyle are less desirable and stable. It may require a consolidation period of over 24 months for the stability of the neocondyle [5].

To overcome the above complications, distraction osteogenesis is done first for restoring the length and location of the mandible and then arthroplasty, to recover maximal incisal opening and occlusion. This treatment has an advantage over the other two treatments. The ankylosed bone segments can act as an anchor to restrict the proximal segments in moving backward [6].

In our case, the patient had a 5mm discrepancy between the mandibular ridge height on the left and right side along with significant cant in the occlusal plane. Also, the mandibular midline has deviated to the left side. The distractor we placed was a single vector distractor that was directed inferiorly and anteriorly. The coronoid process is corticocancellous in nature. This makes it much stiffer than CCG and helps to resist heavier force and facilitate rigid fixation and allows the jaw movement immediately after surgical procedure. Another advantage is that it shows less bone resorption due to its membranous origin and thus lesser decrease in the height of mandible ramus and deviation of mouth. Bilateral coronoid process adds the volume of graft.

Thus, if the coronoid process is not a part of the ankylotic mass, it can be removed and use as an acceptable graft for condylar reconstruction.

IV. Conclusion

Positive results in terms of aesthetics and function were achieved with our technique. Without distraction osteogenesis first and arthroplasty later, we would not have been able to achieve desirable mandible body length and maximal mouth opening. Thus, we recommend distraction osteogenesis as the initial stage and arthroplasty as the second to manage or restore function, aesthetics, and improve maximal incisal opening.

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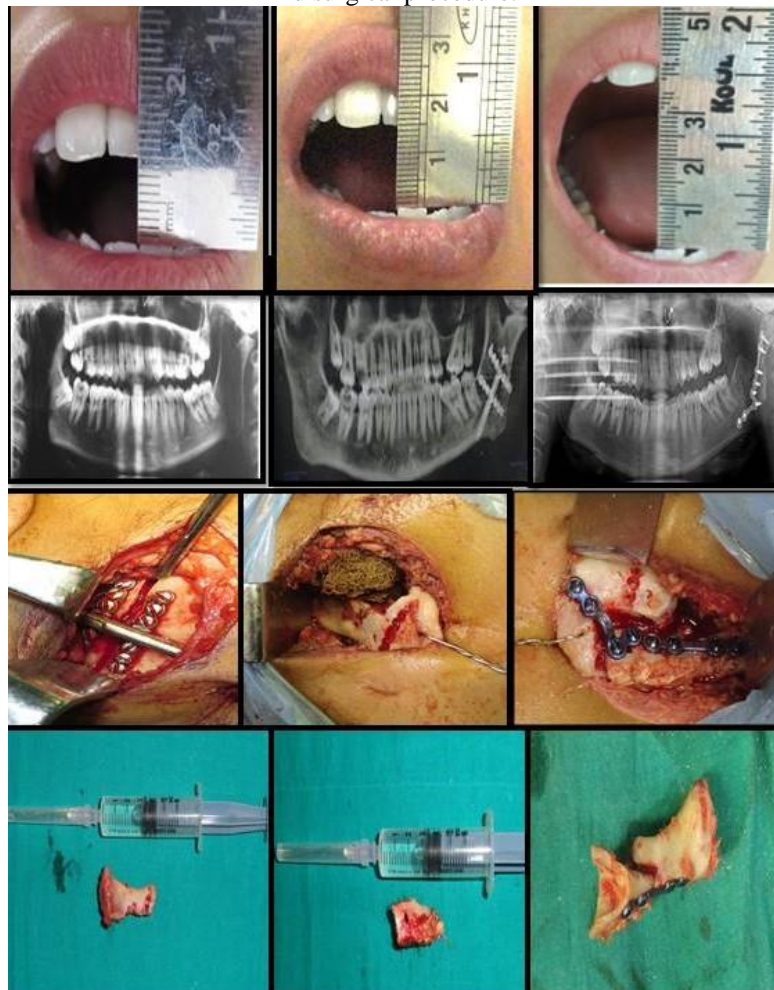
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FIGURES

Fig 1. Preoperative and Post Operative profile picture



Fig 2. Stages of mouth opening preoperative, during distraction and aftersurgery.
And surgical procedure.



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