TMJ ANKYLOSIS: MANAGEMENT WITH RECONSTRUCTION AND INTERPOSITIONAL ARTHROPLASTY

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ABSTRACT

Temporomandibular joint (TMJ) ankylosis is a very desolating structural condition that involves fusion of the mandibular condyle to the base of the skull.[1]It causes difficulty in mastication and breathing.Trauma and Infections are usually responsible.If trauma occurs in young age,it leads to disturbance in growth & facial asymmetry.

Treatment of temporomandibular joint (TMJ) ankylosis usually requires adequate excision of the involved ankylotic block (arthroplasty)or interpositional arthroplasty using autogenous or alloplastic materials.[2]Early mobilization, physiotherapy & strict follow up are essential to prevent postop adhesions.[3]

In our cases fascia lata was used as an interpositional grafting material. One case was treated bygap arthroplasty, second case by costochondral graft & third case was managed with titanium condylar prosthesis.

KEY WORDS: Temporomandibular joint ankylosis, costochondral graft, titanium condylar prosthesis, gap arthroplasty

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INTRODUCTION

Temporomandibular joint (TMJ) ankylosis is fusion of the mandibular condyle to the base of the skull. [1]This condition causes severe facial disfigurement that aggravates psychological stress.[3]Because of this it has profound negative influence on psychosocial involvement of an individual. Speech and diet may be affected.

The etiology is Trauma and Infections. Clinical manifestation vary according to: a.) severity of ankylosis b.) Time of onset of ankylosis, and c) duration.

In early joint involvement (less than 15 years), facial deformity is severe with loss of function. In later joint involvement after the age of 15 years, facial deformity is marginal or nil but function loss is severe.

If the ankylosis involves the joint during early childhood it can lead to disturbances in growth, or cause asymmetry and serious difficulties in eating and breathing during sleep.[3]

If the condition is bilateral it leads to micrognathia of mandible. The patient develops typical 'bird face' deformity with receding chin. Impairment of speech, difficulty in mastication, poor oral hygiene, rampant caries and acute compromise of the airway.[4]

A number of techniques have been described for the treatment of this condition in the literature. These include adequate excision of the involved ankylotic block (arthroplasty), without interposing any material (gap arthroplasty) or interpositional arthroplasty using autogenous or alloplastic materials [2].

The management of TMJ ankylosis requires restoration of anatomy, form and function, along with occlusion stability and prevention of re-ankylosis.[4]A variety of interpositional materials have been used, including temporalis muscleand fascia, dermis, auricular cartilage, fascia lata, fat, lyo-dura, silastic, silicone, and various metals.[5,6,7,8,9,10,11,12,13] As far as reconstruction is concerned costochondral grafts are preferred biological material in children because it encourages additional mandibular growth.[2]

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The most frequently reported complications is limited mouth opening and re-ankylosis.To prevent this,aggressive resection of the bony and fibrous attachment especially on medial aspect of TMJ is necessary. Early joint mobilization with postoperative physiotherapy and strict followup has to be maintained if worst sequelae has to be avoided.[3]

CASE REPORT 1:
A 38 year old female patient reported with a chief complaint of restricted mouth opening. She had a history of trauma 8 years back.

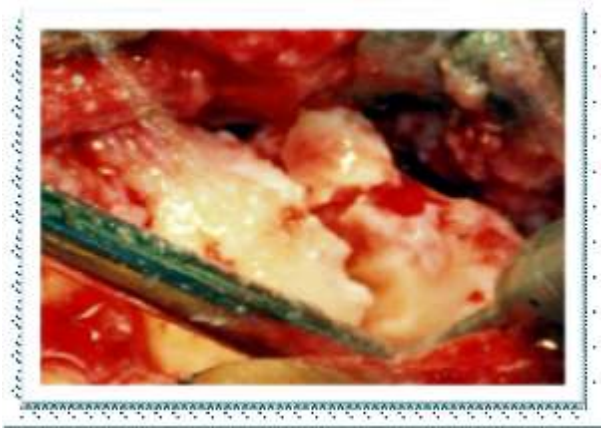
On examination she had scar mark on chin suggestive of subcondylar fracture which has occurred previously.Mouth opening was 5 mm. On palpation no condylar movements on the right side.On opg ankylotic bony mass on right side with prominent antegonial notch was appreciated. On left side fibrous adhesion was evident. The case was diagnosed as TMJ Ankylosis.

Ankylotic mass was exposed through Alkayat Brahmley incision & aggressive resction was carried out by using saw.

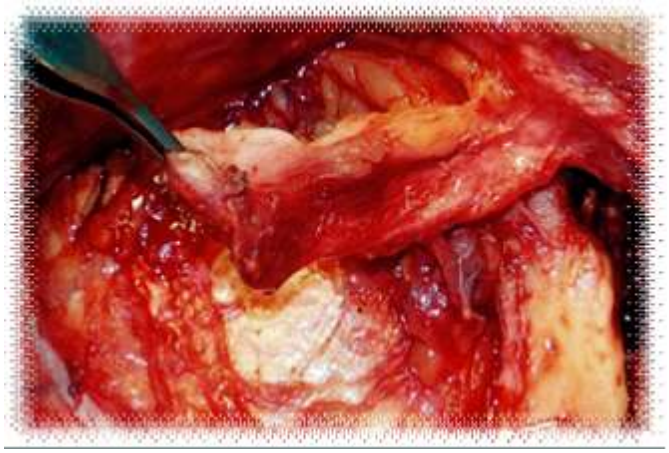
Intraoperative mouth opening was less than 25 mm, so contra-lateral coronoidectomy was carried out through intraoral approach to achieve satisfactory mouth opening.

Inferiorly based pedicled temporalis fascia flap was placed and closure was done. Patient was kept on active physiotherapy to prevent chances of re-ankylosis and followed up for around one and half year.

a) pre-op OPG



b) resection of ankylotic mass



c) temporalis fascia flap
ct scan photo to be added

d) post-op mouth opening

CASE REPORT 2:

A 16 year old girl reported to our department complaining of inability to open the mouth. She had history of RTA 3 years back. There was an injury to the chin since then she could not open her mouth. As she belonged to a low socioeconomic group she did not report to any doctor at that time.

On examination there was reduced vertical height, receded chin & nil mouth opening. Scar on the chin was evident with appreciable bird face deformity, micrognathia & microgenia

On palpation no condylar movements was found with prominent antegonial notch.

Orthopentomogram revealed a dense bony mass at the left TMJ and altered morphology of right condyle.

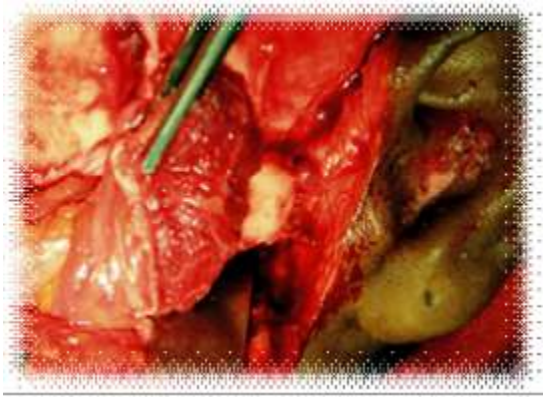
We also appreciated the elongated coronoid process and accentuated antegonial notch.
Fibre optic intubation was done. Ankylotic bony mass was exposed on both the side with bicoronal incision. Aggressive resection was carried out.

Costochondral rib graft was harvested from 6th rib & placed on both the sides. Temporalis muscle flap was planned for left side & Temporalis fascia flap was planned for right side as interpositioning material depending on size of defect. U-shaped pedicled flap was rotated over zygomatic arch inferiorly & sutured with retrodiscal tissue medially, anteriorly & posteriorly. Closure was done with vicryl 3.0 & prolene 4.0.

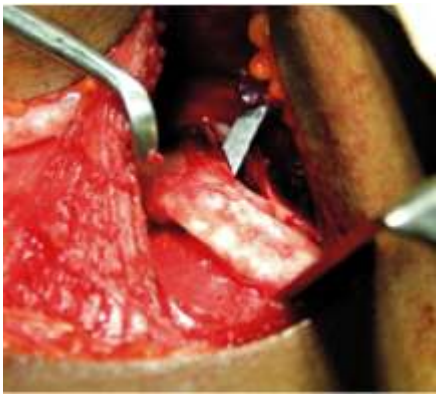
Physiotherapy was started once a day for the first 2 weeks and once every 2 days for the following 2 weeks and patient was followed up on monthly intervals for 2 years.

a) pre-op OPG

b) temporalis fascia flap on right side



c) temporalis muscle flap on left side



d) harvesting costochondral rib graft from 6th rib

e) post-op OPG

f) post-op mouthopening

CASE REPORT 3:
A forty year old male patient with chief complaint of inability to open mouth had reported to our department. He had a history of trauma to chin area due to assault at the age of 16 years and had angle fracture for which he was operated at that time.

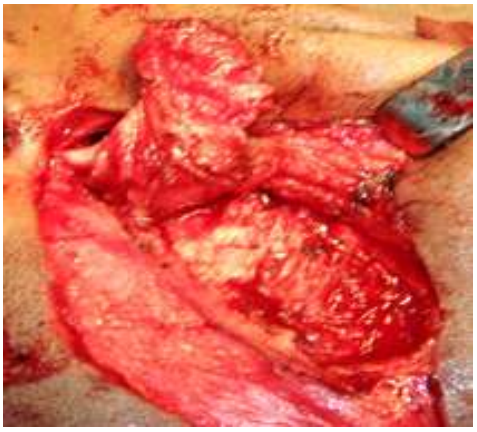
On palpation no condylar movements and bony mass was felt bilaterally.

Intentional elective tracheostomy was carried out for intubation. Bicoronal incision was performed& ankylotic mass of 2cm thickness was resected on both sides. Mouth opening was checked intra operatively which was around 30mm.

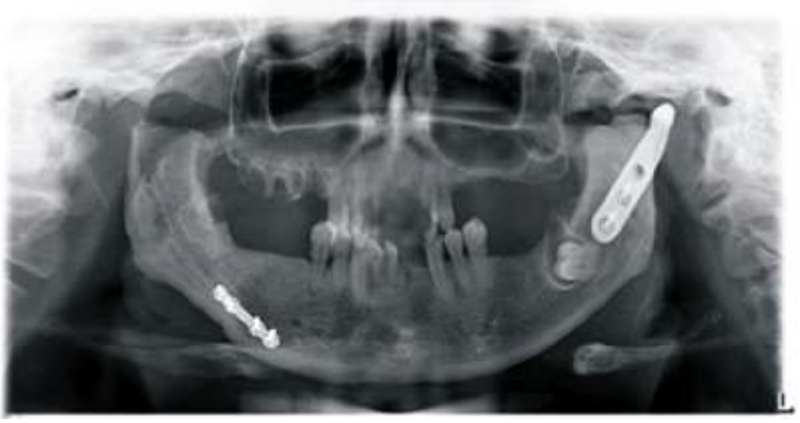
On left side, joint reconstruction was done with prefabricated titanium condylar prosthesis which was stabilized by screw fixation. Temporalis fascia was interpositioned on both sides.

a)pre-op mouth opening & OPG

c) pre-fabricated titanium condylar prosthesis



d)temporalis fascia flap



e)post-op mouth opening& OPG

All the patients were followed up for more than one & half year. No re-ankylosis was found in any of the cases.

DISCUSSION

Various treatment modalities for the management of TMJ ankylosis are given by various authors:

In 2000, PAUL SALINS stated that, although the bony mass represents the pathology responsible for the ankylosis, it is not a neoplastic process capable of continued growth. For this reason excision of this mass is not necessary for the release of ankylosis. An osteotomy performed inferior to the base of the ankylotic mass converts this into a situation akin to that of a subcondylar fracture. He suggested lining of temporalis myofascial flap below ankylotic fragment after osteotomy and demonstrated mouth opening of 30 mm with this protocol.[14]

In 2008, PAUL SALINS advocated morphometric basis for orthomorphic correction in facial asymmetry which results due to unilateral TMJ ankylosis.[15]

In 2009, The KABAN'Srecent protocol in the management of TMJ ankylosis consists of :

1) aggressive excision of the fibrous and / or bony ankylotic mass,
2) coronoidectomy on the affected side,
3) coronoidectomy on the contralateral side, if steps 1 and 2 do not result in a maximal incisal opening greater than 35 mm or to the point of dislocation of the unaffected TMJ,
4) lining of the TMJ with a temporalis myofascial flap or the native disc, if it can be salvaged,
5) reconstruction of the ramus condyle unit with either distraction osteogenesis or costochondral graft and rigid fixation, and
6) early mobilization of the jaw. If distraction osteogenesis is used to reconstruct the ramus condyle unit, mobilization begins the day of the operation. In patients who undergo costochondral graft reconstruction, mobilization begins after 10 days of maxillomandibular fixation. Finally (step 7), all patients receive aggressive physiotherapy.[16]

In 2014, BANSAL et al, described “Transport distraction osteogenesis” as a method of reconstruction of the temporomandibular joint following gap arthroplasty for post-traumatic ankylosis in children. This was based on modified kaban's protocol where reverse 'L' osteotomy is done on posterior border of ramus. Neocondyle formation by transport distraction osteogenesis of this segment was achieved.[17,18]

In 2008,MARX et al presented prospective analysis of 131 cases with long term follow up which showed, Alloplastic replacement of the mandibular condyle with a metallic condyle on natural disc or a soft tissue graft in the temporal fossa after disarticulation for pathology or trauma provides long-term stability with minimal complications (a total complication incidence of 10.6%).[19]

In our all 3 patients, trauma was the maincause of TMJ ankylosis.TMJ ankylosis developed as subcondylar fracture was not surgically intervined at time of trauma.The scar mark suggestive of trauma was present when patient reported to us.

CONCLUSION

In all 3 cases, irrespective of the treatment used, mouthopening was satisfactory after one and half year without any jaw deviation. There was no vertical shortening of ramus and function was satisfactory. In 2nd case costochondral graft of used as reconstruction. Its advantage are its biological compatibility, workability and functional adaptability. The growth potential of the costochondral graft makes it the ideal choice in growing patient.[2] The disadvantages include second surgical site and donor site morbidity.[17]in 3rd case titanium condylar prosthesis was used in reconstruction. These allow closer reproduction of the natural anatomy, avoids donor site morbidity, decreases the risk of re-ankylosis, and reduces operation time. Furthermore, they allow for immediate physiotherapy and rehabilitation with consequent increased benefit to the patient.[20]

As trauma at early age was neglected in our patients ankylosis developed which shows that early diagnosis and treatment are crucial if worst sequelae of this condition has to be avoided.It is also important to note that early postoperative opening exercise, active postoperative physiotherapy, and strict follow-up are essential to prevent postoperative adhesions.

In our experience, all the 3 cases had no postoperative complications and deformity, good mouth opening.

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