

Interpositional Arthroplasty With Custom Made Silicon Spacer For Temporomandibular Joint Ankylosis

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A modified interposition arthroplasty technique for Temporomandibular Joint ankylosis is presented. Standard Pre-auricular Sub Fascial approach to the ankylosed joint was used. Partial excision of the ankylosed joints was performed. After excision of the ankylosed joints an interpositional cap was carved out of a silicone block. This custom made cap was applied and fixed over the stump of the mandibular condyle. This procedure was performed in 26 Joints (20 Patients) over a period of 2 ½ years i.e. Feb 94 to Aug 96. Age ranged from 12-32 years. 6 (30%) patients had bilateral ankylosis while 14 (70%) patients had one side affected. Two joints (7.5%) had postoperative complications. Postoperative rehabilitation was done for all patients. We achieved good functional outcome in all patients.

Key Words: Temporomandibular joint Ankylosis, Interpositional arthroplasty, and Alloplastic arthroplasty.

The cause of ankylosis of Temporomandibular joint may be within or external to the joint. Mouth opening may be reduced (in mild unilateral ankylosis). The aetiological factors causing ankylosis of the Temporomandibular Joint includes Trauma, Infection, Birth (forceps) injury and Idiopathic¹. Younger patients have a greater tendency towards post- traumatic ankylosis mostly before the age of 10 years². Often the trauma to the lower Jaw is neglected or treated improperly. Fibrous ankylosis develops initially which leads to ossification of the Joint structures. The continued neglect may cause the secondary ankylosis of the other Temporomandibular joint. Sometimes the inability to mouth opening is so severe that patients have lower incisors teeth extracted to be able to insert the drinking straw through the opening .

Treatment of established ankylosis of the Temporomandibular joint consists of excision of the damaged joint with interpositional arthroplasty. We used Silicon cap for interposition. The pre-formed prosthesis are difficult to obtain and are expensive. The Custom made Silicone cap used by us can be carved out of Silicone block (supplied by Koken, Japan) which is easily available and relatively inexpensive.

The outcome of this modified technique has been very satisfactory from patient's point of view as they were able to open their mouth completely and were able to eat and drink in the normal way.

Complication rate has been low when compared with similar studies⁴.

Patients and Methods

Total number of ankylosed temporomandibular joints operated by this modified interpositional arthroplasty technique were twenty-six joints in 20 patients. 14 patients had unilateral joint involvement . Age of the

patients was between 12-32 years. Male to Female ratio was 1:1.5 (8 male patients).

The patients presented with complaints of inability to open mouth. The duration of inability ranged from 8 months to 5 years. The degree of severity is depicted in table 1.

Table 1- Degree of severity of inability to mouth opening.

Degree	No. of Patients
Grade I	2 (Two finger mouth opening)
Grade II	8 (One finger mouth opening)
Grade III	10 including 2 with unilateral (No mouth opening) ankylosis

Patients with bilateral joint ankylosis had severe i.e. Grade III inability to open mouth. Only two patients with unilateral ankylosis had Grade III , while the rest had less severe form of inability. Two patients had one or both of the lower incisors extracted to be able to insert the drinking straw and were surviving only on liquids or liquidized diet. (Picture 1). Majority of the patients (14 out of 20) was referred by the dental out patient, rest (4 patients) were self-referrals. After having seen the result of the procedure 6 patients (30 %) had recurrent ankylosis and had Surgery performed in the past elsewhere.

All patients after clinical assessment underwent X-ray of facial skeleton i.e. AP views and orthopantomogram (OPG) to assess the extent of ossification. All patients were admitted two days prior to the surgery and underwent general investigations like full blood count, blood electrolytes. All patients were assessed by the anesthetist pre operatively with a view to do the blind endonasal intubation. One patient who had recurrent disease and had been operated elsewhere with tracheostomy underwent tracheostomy again.

Pre auricular incisions and Subfascial technique was used to approach the joints as this approach is considered to be the safest for the Frontal branch of Facial nerve which is liable to sustain injury^{5,6}. Capsule of the joints opened and extent of the ossification is assessed. Head of the mandible including superior 1 cm of the condyle is excised using high-speed burrs and bone cutters. Mobility of the joints is checked and a cap is carved out of soft silicone block (supplied by Koken, Japan). The internal diameter of the cap is made to fit the ostectomized condyle snugly. In addition the cap is secured with 2/0 Prolene suture through small drill holes made in the condyle. The lower jaw is manipulated to check the mouth opening and the stability of the interpositional cap. the joint capsule is closed and the wound closed in layers over vacuum drain. Compression bandage is applied to the face and patient nursed in upright position.

Active mouth opening is encouraged within 12-24 hours post operatively. Postoperative physiotherapy is instituted with the help of wooden spatulae the number of which is increased as the mouth opening improves progressively.

Results

Outcome is shown in table 2

Table 2

Outcome	n=	Percentage
Excellent	10	50 %
Good	5	25 %
Satisfactory	3	15 %
Poor	2	10 %
Recurrence	2	10 %

One patient had clinical signs of superficial infection in the operation site, which settled with antibiotics. One patient had partial exposure of the prosthesis, which was taken out. We had two recurrences in the follow up 1 1/2 years post operatively. One of these patients is the one whose prosthesis had to be taken out.

Discussion

Temporomandibular Joint is a freely mobile synovial joint, its affliction fall within the province of numerous specialities, each with his own special interest. The causes of hypomobility or ankylosis may be within the joint or external to it. Cases of "true or intra-articular" ankylosis usually occur unilaterally and most frequently secondary to trauma although secondary ankylosis may result in the contralateral joint when the condition is untreated. The untreated ankylosis is progressive and the joint structures ossify which may proceed beyond the joint area to involve the cranial bones, zygoma, external ear canal etc. the surgical approach for release of extensive

area of ankylosis may be submandibular, pre auricular⁶ or occasionally temporal⁸.

Treatment of the more usual ankylosis may be broadly classified into three main groups.

- Condylectomy (rare)
- Gap arthroplasty
- Interpositional arthroplasty
(Biological and Alloplastic)

Condylectomy alone is rarely done now because of very high incidence of recurrence. Gap arthroplasty is in essence more extensive Condylectomy or ostectomy, also carry high incidence of recurrence⁹.

Most surgeons tend to agree that ankylosis tends to recur unless some biological or Alloplastic material is interposed between two bony surfaces. Biological material like skin, fascia, muscles, and cartilage from rib or metatarsal has been used^{10,11,12}. The most commonly used alloplastic material has been silicone rubber and proplast. In addition to the pseudoarticulation the vertical dimension of the ramus is maintained¹³. Silastic sheets, split silicone tubing, silicone ulnar head prosthesis have all been used¹⁴. Human grade silicone in the form of soft silicone block is easily available in Pakistan and is relatively inexpensive (supplied by Koek, Japan). About 8 to 10 interpositional caps can be carved out of one silicone block which costs from Rs 6,000 to Rs 7,000.

The use of alloplastic materials some inherent problems like increased incidence of infection and chances of extrusion. Careful surgical technique e.g. minimization of tissue trauma, tailoring into appropriate shape and size and proper fixation of implant reduces the incidence of complications.

Early postoperative active mobilization of the newly constructed joint is an important factor in reduction of recurrence. The mobile pseudoarthrosis develops with the fibrous capsule formed around the alloplastic material i.e. silicone. During the period maximum mouth opening is achieved to overcome the secondary shortening of the muscles of mastication which develops due to fixation of the joint as a result of ankylosis. Use of progressively increased number of wooden spatula (tongue depressors) is a simple and cheap method of re-gaining maximum mouth opening.

Patient education and with regular post operative follow up is important part of the treatment. Scheduled and aggressive physiotherapy program is the key to re-gain the mouth opening and to reduce the incidence or recurrence¹⁵.

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