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Interpositional Gap Arthroplasty using Temporalis Myofascial Flap in the Management of Unilateral Temporomandibular Joint Ankylosis- A Case Report

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Abstract

Temporomandibular Joint (TMJ) ankylosis is a condition characterized by fusion of the mandibular condyle to the glenoid fossa by fibrous(fibrous ankylosis) or bony tissue(Bony ankylosis) or by fibrosseous tissue(fibro-osseous ankylosis). It has also been classified according to site as intra articular and extra articular, according to degree of fusion as complete and incomplete, and according to the number of joints affected as unilateral or bilateral. False or pseudo ankylosis is the one which involves extraarticular structures, muscle hyperactivity or spasm, coronoid hyperplasia or a depressed zygomatic arch fractures. The management of TMJ ankylosis is quite challenging to a surgeon on account of technical difficulties and high rate of recurrences that have occurred, especially with gap arthroplasty. Hence, interpositional gap arthroplasty is considered a better treatment modality. We report a case of unilateral left TMJ ankylosis with bilateral coronoid hyperplasia, which was managed by interpositional

gap arthroplasty using temporalis myofascial flap as the interposing material, followed by bilateral coronoidectomy.

Keywords: Temporomandibular Joint(TMJ), Interpositional Gap Arthroplasty, Temporalis Myofascial Flap

Introduction

Temporomandibular joint (TMJ) ankylosis is a condition where the movements of the mandible are restricted as a result of intracapsular fibrous adhesion or osseous fusion between the condyle and the roof of the glenoid fossa [1]. Temporomandibular joint (TMJ) ankylosis has also been named as the craniomandibular joint (CMJ) ankylosis which in Greek means "stiff joint"[2]. Etiologies of TMJ ankylosis include trauma (13–100%), local or systemic infection (10–40%), systemic diseases (10%), such as ankylosing spondylitis, rheumatoid arthritis, and psoriasis [3,4]. TMJ is most commonly infected by contiguous spread from otitis media or mastoiditis and also from hematogenous spread including tuberculosis, gonorrhea and scarlet fever. Once the ankylosis develops, the patient manifests with trismus, mandibular growth gets limited. Psychological distress occurs when esthetics, oral hygiene, speech and mastication get compromised due to facial deformity and malocclusion[5]. We report a case of long-standing unilateral bony ankylosis of the TMJ, caused by otitis media that had occurred 7-8 years back.

Case Report

A seventeen year old male patient reported to our department with a complaint of difficulty in mouth opening since 7- 8 years. He suffered from fever 7-8 years back and developed limited mouth opening thereafter. Gradually the mouth opening got totally reduced. It was also associated with pain on the left side of the face which was dull, intermittent and spontaneous in nature and relieved on taking medications. Patient also gave history of swelling in the left side of the face and pus discharge from below the chin region at the time he suffered from fever. When he presented to our department, A healed submental sinus opening from where the pus must have escaped(Fig.1).

Extraoral examination revealed facial asymmetry due to flattening of the lower middle third of the face on the right side and fullness on the left side of the face(Fig.2). Chin was deviated towards left side. The patient had convex facial profile with hypoplastic mandible. The antigonial notch was prominent bilaterally and interincisal opening was just 8mm(Fig.3). Lateral excursive and protrusive movements were restricted. Condyle on the left side was non-palpable.

Fig.1:Healed submental sinus opening

Fig.2:Preoperative extraoral view

Fig.3: Preoperative intraoral view showing limited mouth opening.

OPG of the patient showed gross deformity of the mandibular and temporal components of the left TMJ, that had occurred due to the large ankylotic mass extending from the region of the condylar neck till overlying temporal component i.e. glenoid fossa region, pre-glenoid plane and articular crest regions(Fig.4). The coronoid processes on both the sides revealed normal recognizable morphology but appeared to be elongated. To get better detail of the deformity of the left TMJ, Cone Beam Computed Tomography of the patient was also taken that showed the bony ankylotic mass on the intra-articular and medial, lateral and extra-articular aspects of the left TMJ region(Fig.5). The ankylotic bone mass was obliterating the sigmoid notch, glenoid fossa, pre-glenoid plane and the articular eminence. Evidence of fusion could be seen with the presence of a faint radiolucency between the articulating surfaces. The ankylotic mass was approximately 25.7mm anterio-posteriorly and 25.8mm medio-laterally(Fig.6). The coronoid process appeared to be elongated.

Fig.4:Preoperative OPG showing gross deformity of the mandibular and temporal components of the left TMJ joint

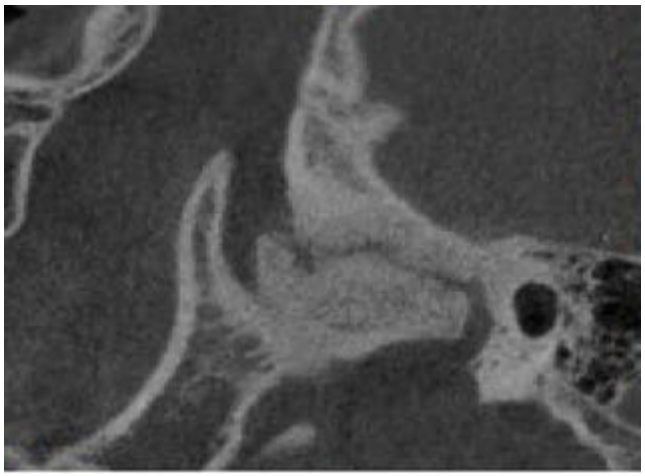

Fig.5: CBCT showing the bony ankylotic mass on the intra-articular and medial, lateral and extra-articular aspects of the left TMJ region

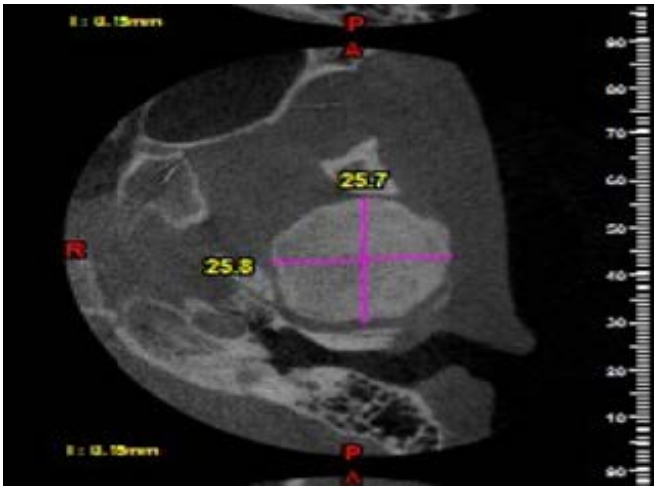

Fig.6: CBCT showing the ankylotic mass which was approximately 25.7mm anterio-posteriorly and 25.8mm medio-laterally

Interpositional gap arthroplasty with ipsilateral coronoidectomy on the affected side was planned to enhance mouth opening, followed by physiotherapy. The patient was planned under general anaesthesia. The left TMJ was exposed surgically by Alkayat-Bramley approach(Fig.7,8). The root of the zygomatic arch was identified and the superior osteotomy cut was marked just below it(Fig.9). Followed by this an inferior cut was marked about 1cm inferiorly so that we could get a good clearance(Fig.9). The osteotomies were carried out with the help of piezoelectric tips(Fig.10), taking care not to damage the internal maxillary artery and its descending branch, the inferior alveolar artery which lies just medial to the condylar neck. Condylar retractors were used for this purpose. After the ankylotic mass was completely released(Fig.11,12), the ipsilateral coroidectomy was performed. The mouth opening was verified on the operating table. Since it was less than 35mm, contralateral coronoidectomy was also performed(Fig.13). Followed by this we achieved an intraoperative mouth opening of 42mm(Fig.14). The raw edges of the bone were smoothened. Thereafter the soft tissue lining for the reconstruction of the TMJ was provided with the help of temporalis muscle myofacial flap that was rotated over the zygomatic arch into the joint and it was sutured anteriorly, posteriorly and medially, with the fascia lining the glenoid fossa and the muscle facing the condyle(Fig.15). Finally the surgical site was closed in layers (Fig.16).

Fig.7: Marking for the root of the zygomatic arch

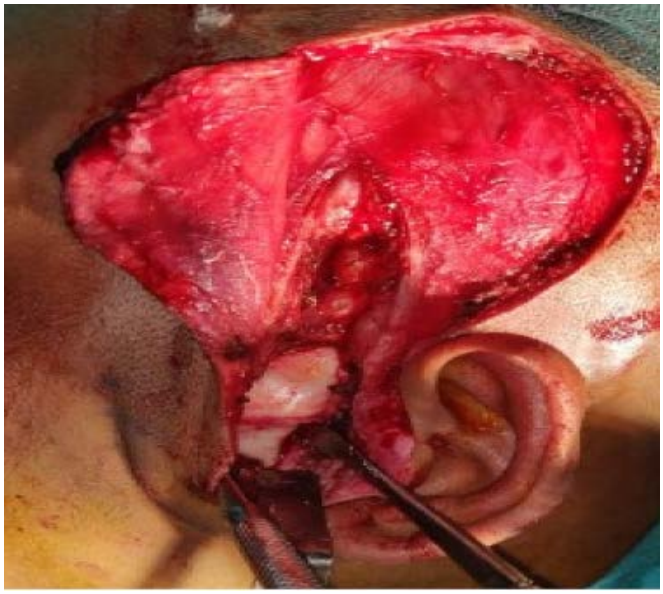

Fig.8: Ankylotic mass exposed by Alkayat-Bramley approach

Fig.9: Markings for the superior and inferior osteotomy cuts

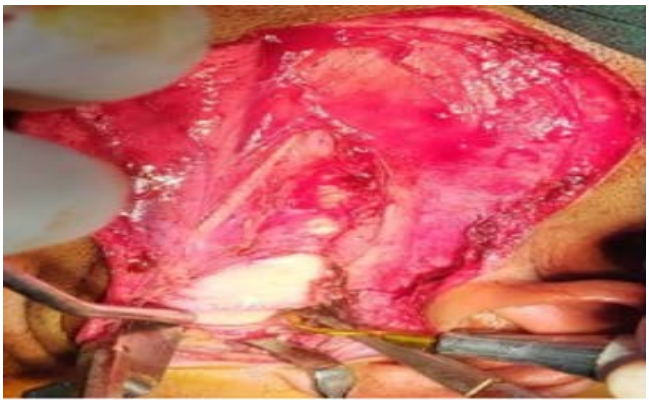

Fig.10: Osteotomy cut being given using piezoelectric tip

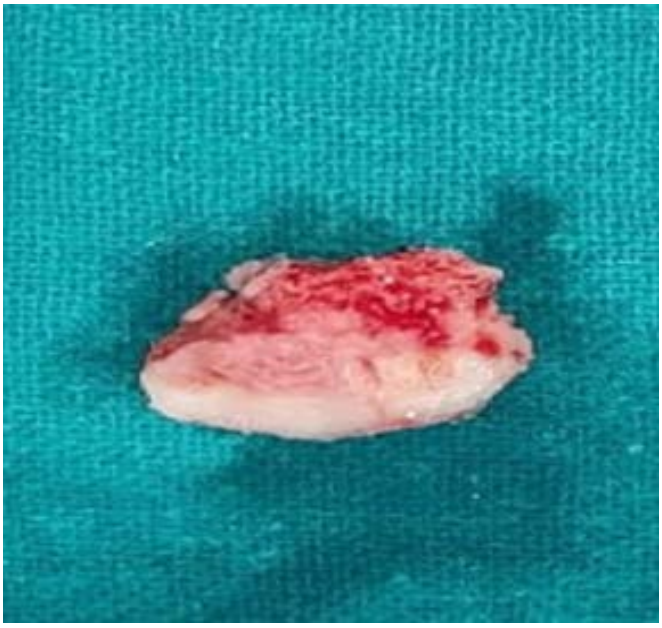

Fig.11: Released ankylotic mass

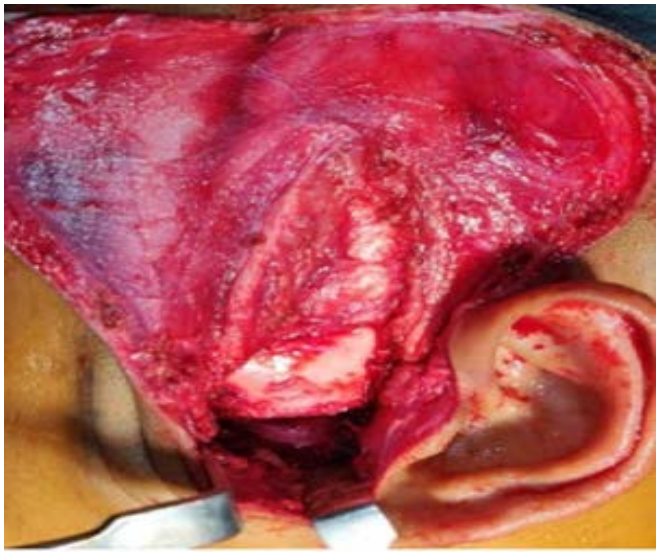

Fig.12: Clearance obtained after the release of

Fig.13: Contralateral coronoidectomy being performed

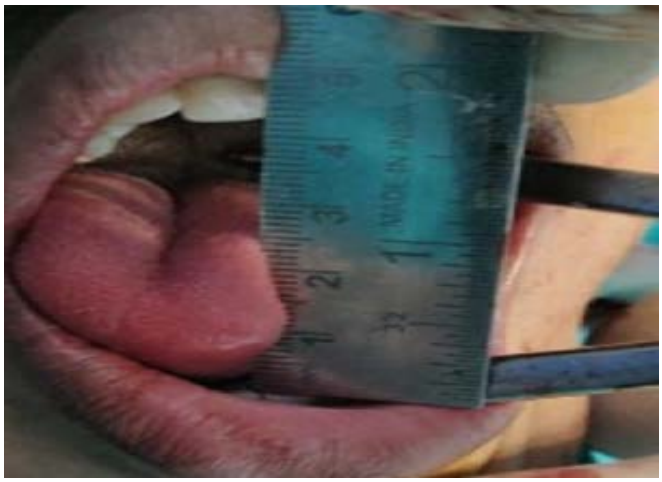

Fig.14: Intraoperative mouth opening of 42mm achieved

The postoperative result was satisfactory and the patient had a very mild deviation of the chin towards left(Fig.17). The immediate postoperative mouth opening was around 20mm(Fig.18). Aggressive physiotherapy was carried out at follow-up visits. By third month, the mouth opening improved to more than 30mm. Transient paresthesia of the left temporal nerve had occurred after the treatment, but it recovered within three months by conservative treatment.

Fig.15: Temporalis muscle myofacial flap being rotated over the zygomatic arch into the joint to provide the soft tissue lining

Fig.16: Sutured surgical site

Fig.17: Postoperative extraoral view showing only minimal deviation of the chin towards left

Fig.18: Immediate postoperative mouth opening of 20mm

Discussion

There are a number of different treatment modalities for TMJ ankylosis, such as gap arthroplasty, interpositional arthroplasty, joint prostheses and distraction osteogenesis, etc[6- 8]. Also, a number of options exist for autogenous or alloplastic replacement of the temporomandibular joint[9-13]. The surgical treatment can result in failure if there is inadequate gap arthroplasty, interpositional material is insufficient, occurrence of fibrous tissue adhesion, elongation of the coronoid process, shrinkage of the muscle and fibrosis, insufficient

bulk of the reconstruction material especially the temporalis fascia, fibrosis and calcification of the auricular cartilage, reaction of the foreign body giant cell specially with alloplastic implants .

Interpositional arthroplasty is always considered better than gap arthtroplasty because the former has reduced chances of recurrence of ankylosis due to insertion of interpositional material after resection of the ankylotic mass[14]. In our patient, we performed interpositional gap arthroplasty using temporalis myofascial flap, for autogenous reconstruction of the soft tissue lining of the TMJ.

The temporalis myofascial flap is an axial pedicled flap that is commonly based on the deep temporal artery. Like in our case, it is usually rotated over the zygomatic arch into the joint, with the muscle facing the condylar surface and the fascia facing the glenoid fossa. No reduction of the zygomatic arch was required to provide rotation of the flap, as only the superficial portion of the muscle was harvested. Some investigators also recommend anteriorly and inferiorly based and even posteriorly based temporalis myofascial flap that is rotated beneath the zygomatic arch into the joint.

Being autogenous, this flap is least immunoreactive unlike alloplastic materials. Also, it provides excellent mobility and coverage of the arthroplasty gap due to close proximity to the joint[15,16]. There is minimal donor site morbidity. There is minimal damage to the temporal branch of the facial nerve. There is adequate blood supply with minimal intraoperative blood loss. Also there is good positional stability with low degree of friction. Chances of recurrence are also very low [15]. However, loss of mouth opening has been reported in the previous studies at late follow-up visits[17].

The use of temporalis myofascial flap as an interpositional material is effective in treating TMJ ankylosis. Satisfactory results are obtained in terms of mouth opening, jaw function and esthetics, with low chances of recurrence.

Ethical: The work done is in accordance with the Code of Ethics of the World Medical Association(Declaration of Helinski)

Patient consent: Written informed consent was obtained.

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