Case Report

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Interpositional arthroplasty with temporalis myofascial flap reconstruction in a case of temporomandibular joint bony ankylosis: a case report and review of literature

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ABSTRACT

The report describes the treatment of a 30 year old female patient having unilateral right temporomandibular joint (TMJ) bony ankylosis whose mouth opening was restricted to 5 mm and had additional mandibular retrognathism causing severe mastication problems besides speech difficulties and low morale. The ankylosis had resulted in facial asymmetry due to bony hard swelling in front of right tragus. The patient was taken up for right interpositional arthroplasty with temporalis myofascial flap reconstruction by pre auricular approach and left coronoidectomy by intraoral approach as a preferred technique. A satisfactory mouth opening of 33 mm was achieved in immediate post-operative. Patient was followed up with aggressive mouth opening exercises in postoperative period.

Keywords: TMJ bony ankylosis, Interpositional arthroplasty, Temporalis myofascial flap, Coronoidectomy

INTRODUCTION

Temporomandibular joint (TMJ) ankylosis is a fusion of the mandibular condyle to the base of the skull, which causes problems in speech, mastication, facial appearance and sleep-disordered breathing. TMJ ankylosis occurs primarily in the first and second decades of life (35-92%) and is commonly associated with trauma (13-100%), local or systemic infection (0-53%), systemic diseases such as ankylosing spondylitis, rheumatoid arthritis, psoriasis and previous TMJ ankylosis surgery. Trauma to chin is the most common cause.

When TMJ ankylosis occurs at a young age, it can have devastating effects on the future growth and development of the jaws and teeth. However, in a young patient, a joint

injury may not be noticed immediately. The first sign of a significant problem may be limitation in jaw opening.

Treatment options for TMJ ankylosis aim at restoring joint function, restoration of proper mandibular length and form, improving the patient's aesthetics and quality of life, preventing re-ankylosis and achieving normal growth and occlusion in the child. Preservation of this joint or construction of an artificial one that functions properly is of prime importance. ^{2,3}

A number of surgical approaches have been devised to restore normal joint functioning and prevent reankylosis. Three basic techniques used are gap arthroplasty, interpositional arthroplasty and condylectomy with joint reconstruction.⁴

Treatment usually requires adequate excision of the involved ankylotic block (arthroplasty). This arthroplasty may be gap arthroplasty were resection of bone in the ankylosis region is done and a surgical gap is created without interposing any material, with a minimum distance of 1 cm to prevent reankylosis. If interposing any material between the refashioned glenoid fossa and ramus is known as interpositional arthroplasty. Sometimes condylectomy is done followed by joint reconstruction. In this procedure TMJ is reconstructed with an autogenous bone graft or total joint prosthesis. In adults, the main objective of condylar reconstruction is to restore lost function and symmetry of the TMJ. In children, there is an added objective of using a graft (costochondral) that has an adequate growth potential.

In the reported case the authors performed an ipsilateral interpositional arthroplasty after resection of the bony ankylosis with temporalis myofascial flap reconstruction by pre-auricular approach and contralateral coronoidectomy by intraoral approach. A satisfactory mouth opening of 33 mm was achieved in immediate post-operative. Patient was followed up with aggressive mouth opening exercises in postoperative period.

CASE REPORT

A 30-year-old female patient presented with the chief complaint of an inability to open mouth, decreased jaw movement, and poor mastication following a history of road traffic accident 6 years back (Figure 1). Thorough clinical and radiographic examination revealed the case of unilateral right side bony TMJ ankyloses (Figure 2). Her feeding was characterised by an inability to masticate food, limiting intake to liquids or semisolids. Intraoral examination revealed mouth opening restriction of less than 5 mm.



Figure 1: Preoperative images showing decrease mouth opening.

She had a severely retrognathic mandible, bilateral maxillary protrusion, facial asymmetry due to bony hard

swelling in front of right tragus. The condition had led to a low level of self-esteem and confidence.

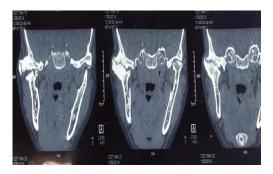


Figure 2: CT scan showing right bony TMJ ankylosis.

Treatment was planned in following stages as surgery in which interpositional arthroplasty and using temporalis myofascial flap through preauricular approach, physiotherapy, psychological counselling and orthodontist consultation for dental aesthetics.



Figure 3: Fibre optic nasal intubation.



Figure 4: Marking of incision.

After taking preoperative consent patient was taken under general anaesthesia using fibre optic naso endotracheal intubation (Figure 3). The lateral side of TMJ and ankylotic mass was exposed through Al-Kayat and Bramleys incision (Figure 4).⁸ It is a modification of preauricular approach to increase the TMJ exposure. It is question mark shaped, begins anterosuperiorly within the hairline and curved backwards and downwards posteriorly till it meets root of helix than follows natural in a crease anterior to tragus.

Subperiosteal blunt dissection with cotton pledgets was performed anterior, posterior and medial to ankylotic and

sub-ankylotic region to completely expose it and a condylar retractor was placed medial to the site of osteotomy to prevent injury to internal maxillary artery. After exposure, adequate excision of the bony mass was done with a round bur and chisel till the mandibular movement was achieved (Figure 5, 6).



Figure 5: Drilling of bony ankylosis.



Figure 6: Chiseling.



Figure 7: Minimum 1 cm gap osteotomy.



Figure 8: Contralateral coronoidectomy.



Figure 9: Temporalis myofacial flap harvested and interpositioned.



Figure 10: Intra op mouth opening.

Minimum gap of 1 cm (between two horizontal osteotomies is recommended (Figure 7). Next the glenoid fossa was refashioned and temporalis myofascial flap was interposition successfully (Figure 10). 10,111

A contralateral coronoidectomy was done and satisfactory maximal interincisal mouth opening was achieved (Figure 8). These procedures allowed the maximum opening to increase to 33 mm (Figure 9).

After surgery extensive physiotherapy plays a crucial role in restoring normal TMJ function. Patient was asked to use a Heister's jaw stretcher six times a day regularly. To stimulate normal mastication chewing a small rubber tube was recommended. Aggressive use of continuous passive movement was employed. After 1 month follow up a satisfactory mouth opening of 3.8 cm was achieved.

After seven days patient was discharged and was sent for psychosocial counselling. An orthodontist consultation was also done for dental aesthetics.

The result of this technique was acceptable both clinically and physiologically.

There was no temporary or permanent facial nerve palsy. An acceptable interincisal mouth opening immediate post-operative of 33 mm and 38 mm after 1 month of aggressive physiotherapy was obtained.

The procedure also had a profound positive influence on the psychological development, self-esteem, and selfconfidence of the patient.

DISCUSSION

The causes and treatment of TMJ ankylosis have been well documented, with trauma and infection identified as the 2 leading causes. ¹² Mandibular hypomobility resulting from TMJ ankylosis is classified according to location (intracapsular or extracapsular), type of tissue involved (bony, fibrous or fibro-osseous) and extent of fusion (complete or incomplete). If the cause is trauma, it is hypothesized that intra-articular hematoma, along with scarring and formation of excessive bone, leads to the hypomobility.

Many methods using autogenous (temporalis, auricular cartilage, fascia lata, skin-dermis, native disc, buccal fat pad, human amniotic membrane, costochondral, sternoclavicular, coronoid process, fibula, metatarsal, clavicle, iliac crest and cranial bone) and alloplastic (acrylic, synthetic, ulnar head prosthesis, compressible silicone rubber and total joint systems) materials have been reported for interposition arthroplasty and condyle. 13,14 reconstruction of the mandible Interpositional arthroplasty decreases risk of re-ankylosis and facilitates reconstruction of the ankylotic joint. Temporalis muscle and fascia has been used widely as interposition material in TMJ Ankylosis. 15,16 Kaban et al in their protocol suggested lining of the TMJ with temporalis myofascial graft.¹⁷ In this case also temporalis myofascial pedicle flap was used as an interpositional material. The flap best simulates the articular disc in reconstruction of the ankylosed TMJ. Use of the composite temporalis muscle flap with its associated and pericranium provides a soft tissue interpositional lining within the TMJ to prevent fibrous or bony union, along with low degree of friction and good joint stability. 18 The principal advantages are their autogenous nature, absence of donor-site morbidity, resilience, adequate blood supply and proximity to the joint, allowing for a pedicled transfer of vascularized tissue into the joint area. Thus makes it a preferred choice over other TM Joint lining materials. 16,17

Among the autogenous tissue, the most common method for treating TMJ ankylosis, in children, is arthroplasty and reconstruction of the Ramus condyle unit with autogenous costochondral grafts mainly because of their biological similarities and their capacity to regenerate and grow. ^{19,20} Potential problems with the costochondral graft

include fracture, reankylosis, graft overgrowth and donor site morbidity. Sternoclavicular grafts have similar properties to costochondral graft, but they produce a prominent scar which can be a disadvantage.

Postoperatively mouth opening exercises help in superior repositioning of muscles dissected from ramus of mandible and help in distracting the bare bony surfaces which further increases mouth opening and prevents reankylosis. Physiologically, these muscles (on severe postoperative exercises along with gravitational forces) have the tendency to start completely relaxing increasing further mouth opening.⁹

CONCLUSION

Thus concluding that the treatment of TMJ ankylosis includes aggressive resection of the ankylotic segment, coronoidectomy when necessary, reconstruction with autogenous graft early mobilization and aggressive physiotherapy, psychosocial counselling, orthodontic treatment (if required). Temporomyo fascial flap in adults stays the preferred mode of reconstruction due to several advantages as discussed above. In children costochondral grafts can be used due to growth potential.

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