The Interpositional Dermis Fat Graft in the Management of Temporomandibular Joint Ankylosis: A Case Report

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INTRODUCTION

Ankylosis means stiff joint and denotes hypomobility or no mobility. Ankylosis is a chronic hypomobility or immobility of a usually movable articulating structure. Temporomandibular joint (TMJ) ankylosis is a union of the articular surface of the temporal bone to the disc-condyle complex that restricts mandibular movements. Ankylosis of the mandible can be intracapsular or extracapsular. Intracapsular ankylosis is caused by pathologic changes within the joint capsule whereas extracapsular ankylosis is caused by pathologic changes outside the joint capsule. Pure extracapsular ankylosis is very uncommon. In unilateral ankylosis cases, facial asymmetry is the classic feature. The chin deviates toward the affected side. When compared the vertical height of the affected side is shorter than the unaffected side. Typical characteristics of a bilateral ankylosis are the recession of the chin and absence of mouth opening. Many techniques have been described for treatment. However, none of them achieved uniformly successful results. It had previously been treated primarily with condylectomy and false joint formation, which has the problem of recurrence. In this article, a new method is introduced to treat TMJ traumatic ankylosis that releases the remainder of the disc and restores the structure of TMJ for the purpose of preventing recurrence of TMJ ankylosis.

CASE REPORT

A 65-year-old male patient, attended at the Department of Oral and Maxillofacial Surgery, MA Ragoonwala College of Dental Science and Research Centre, with condylectomy and false joint formation, which has the problem of recurrence. In this article, a new method is introduced to treat TMJ traumatic ankylosis that releases the remainder of the disc and restores the structure of TMJ for the purpose of preventing recurrence of TMJ ankylosis.
complaining of limited mouth opening inability to eat and difficulties in oral hygiene procedures. Presented condition was evolved slow and progressively since last 6-8 months with a history of trauma due to a road traffic accident 8 months back in the TMJ region as according to the patient.

On examination, clinically the patient presented a mouth opening of 15 mm (Figure 1) with limited joint activity on the right side. After computerized tomography (CT) and panoramic radiography analyses, the abnormal bone formation was seen at the right condylar head of the mandible. On the right TMJ, rearrangement of the condyle can be seen in the coronal slice. It also shows an effect on the glenoid fossa, remodeling in a flat shape to accommodate the abnormal condyle (Figure 2). An axial slices of CT shows the fusion of the right mandibular condyle to the base of the skull, which is represented by a radiopaque image. Irregular articulating surfaces

![Computed tomography (CT) scan coronal slice showing abnormal appearance of right temporomandibular joint due to fibrosis](image2)

![An axial slice of computed tomography showing fusion of the right mandibular condyle to the base of the skull](image3)

![Dissection was done above the superficial temporoparietal fascial plane](image6)

![Articular disk](image7)
can be seen. The condyle shows an abnormal position, which may be due to erosion of articular eminence (Figure 3). The transcranial view is suggestive of loss of joint space, sclerosis of the bony surfaces, and limitation of movement on the right TMJ (Figure 4). These features are suggestive of fibrous ankylosis.

Surgery was initiated by placing an Al-kayat–Bramley (pre-auricular) incision (Figure 5) on the right side to expose the ankylotic mass. Dissection was done above the superficial temporoparietal fascial plane (Figure 6). Joint cavity was exposed taking linear incision. Ankylosed mass exposed. Then, gap arthroplasty was performed by resection of ankylosed mass with 701 and 702 fissure burs. Condylectomy was done, and the articular disc was sutured to the fascia (Figures 7 and 8). Dermal graft was harvested from the right thigh (Figures 9 and 10) and was sutured to the articular disc with 3-0 silk to avoid reankylosis (Figure 11). Flap was closed in two layers. The surgical access was closed with a 3.0 vycril suture. The skin surface was closed with 5.0 nylon (Figure 12). Immediate post-operative mouth opening was 30 mm.

Coming day after surgery patient underwent physiotherapy for mouth opening to avoid reankylosis. Mouth opening and facial expression were evaluated 7 days, 1 month, and 3 months post-operative (Figure 13). The patient has attended the post-operative sessions showing good mouth opening and wound healing aspects, as well as healthy rehabilitation.
DISCUSSION

The causes for development of traumatically induced TMJ ankylosis include:
1. Fracture of the mandibular condyle (especially sagittal intracapsular fractures)
2. Associated fracture of the body or symphysis of the mandible
3. No or inadequate reduction of associated fracture(s) leading to an increase in the intercondylar distance (or inter-ramus distance at the level of the stump)
4. Fractured surface of residual ramus or lateral pole of condyle displaced laterally and possibly superiorly to the glenoid fossa.²

Kazanjian classified ankylosis as true and false. Any condition that gives rise to osseous or fibrous adhesion between the surfaces of the TMJ is a true ankylosis.³ Ankylosis of the TMJ is a rare phenomenon that results in chronic and severe limited mouth opening.⁴ The pathogenesis of bone formation after trauma is thought to be secondary to a hemarthrosis. Trauma to the mandible can cause disruption of the capsular ligament and articular surfaces with adjoining periosteum, resulting in hemarthrosis. When the hematoma organizes, bone formation can occur from the disrupted periosteum or from metaplasia of non-osteogenic connective tissue elements, and eventually bony ankylosis develops.⁵ TMJ ankylosis management has to address the problems as enumerated by Rowe, which includes restoration of mobility and function, prevent re-ankylosis.⁶ Three basic techniques have been developed for the surgical correction of TMJ ankylosis.

1. Gap arthroplasty: Resection of the osseous mass between the articular cavity and the mandibular ramus, without interpositional material
2. Interpositional arthroplasty: Creation of gap by resecting the osseous mass followed by interposition of a biological (e.g. temporal muscle flap) or non-biological material (acrylic, silastic)
3. Joint reconstruction: Resection of the osseous mass and reconstruction by autogenous bone grafts or by total joint prosthesis.⁶

Success in ankylosis relies not only on the judicious judgment of bone resected, but also on the partition placed between the two resected surfaces. To aid in the establishment of “functional pseudoarthrosis,” it is essential to consider an autogenous interpositional graft.⁷ The widely followed protocol is the one described by Kaban et al. which include aggressive resection, ipsilateral coronoidectomy, contralateral coronoidectomy when necessary lining with temporalis fascia or cartilage and re-construction with costochondral graft and early mobilization and aggressive physiotherapy.⁸ Topazian advised the use of interpositional arthroplasty instead of gap arthroplasty to prevent recurrence.⁹ At present, there is no ideal interpositional graft. There are certain limitations of using present grafts such as: Fascia lacks bulk, cartilage tends to fibrose and calcify, while alloplastic implants under functional loads disintegrate and cause foreign body giant cell reactions and muscle shrinks and fibroses.⁵

Regardless weather TMJ is reconstructed using alloplastic, allogenic or autogenous material the following should be the goal of treatment:
1. Improvement of various form and function
2. Reduction of disability and suffering
3. Containment of excessive treatment and cost
4. Prevention of further morbidity and recurrence.

Early treatment is recommended to avoid secondary alteration of the facial middle third, psychological impairment and growth problems because of undernourishment.¹⁰

CONCLUSION

The approach described in this case suggests the following principles required to overcome the TMJ ankylosis: (1) Complete and wide resection of bone; (2) use of interpositional material; (3) early and long-lasting aggressive post-operative physiotherapy.

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