



Using the Silastic as Interpositional Material in the Management of Left Temporomandibular Joint Ankylosis

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Mandibular condylar trauma is the most common cause of temporomandibular joint (TMJ) ankylosis. The pathogenesis of this condition is typified by fibrous or bony tissue replacement of the two articular surfaces, resulting in an inability to open the mouth. Treatment includes joint interpositional arthroplasty to remove the ankylosed tissue and meniscus. After smoothing the ankylotic joint surface, autogenous or alloplastic material is used to replace the meniscus. We present a case of TMJ ankylosis treated with interpositional arthroplasty and a Silastic graft. The patient suffered joint trauma that was treated with intermaxillary fixation and insufficient instruction for mouth opening exercise. The patient subsequently developed Type II bony ankylosis in left TMJ, which was diagnosed on clinical examination, and computed tomography. Interpositional arthroplasty with a Silastic autopolymerizing membrane was performed through a preauricular approach. Postoperatively, mouth opening improved significantly from an interincisal distance of 3-28 mm. Surgical and physical therapy accomplished good wound healing without re-ankylosis after two years of follow-up.

Key words: Interpositional arthroplasty, silastic, temporomandibular joint ankylosis

INTRODUCTION

Temporomandibular joint (TMJ) ankylosis affects joint movement, speech, mastication, and oral hygiene. The pathogenesis of TMJ ankylosis remains unclear,¹ but there are several hypotheses,² such as intra-articular hematoma,³ extracapsular hematoma,⁴ distraction osteogenesis,⁵ hypertrophic nonunion,⁶ hypercoagulability,⁷ and genetic predisposition.⁸ After a condylar fracture, intra-articular hematoma with prolonged immobility induces intracapsular hematoma, and bone can form as a result of metaplasia in nonosteogenic connective tissue. This period of immobility is the agent promoting ankylosis.

The Sawhney classification⁹ for TMJ ankylosis describes four disease types. In Type I disease, the articular surface is flattened and deformed with minimal bony fusion. In Type II,

bony fusion is present at the outer edge of the articular surface with limited areas of fusion. In Type III, a block-like, bony bridge traverses the ramus and zygomatic arch, but the medial side of the upper ramus lacks bony fusion. In Type IV disease, the most severe form of ankylosis, the bony block encompasses the ramus and zygomatic arch.

Joint ankylosis should be initially treated nonsurgically, followed by surgical intervention if necessary. Gap arthroplasty, interpositional arthroplasty, and total joint reconstruction are options depending on the severity of joint ankylosis and the meniscus deformity.

The therapeutic goal in the present case was to achieve jaw function. Treatment comprised gap arthroplasty, removal of the deformed meniscus and condylar fragment, and replacement of interpositional material with alloplastic material of Silastic. After undergoing physiology therapy, the patient was able to maintain an acceptable interincisal distance without complaint.

CASE REPORT

A 71-year-old male presented to our hospital reporting an inability to open his mouth. The open-mouth interincisal distance was approximately 3 mm on physical examination [Figure 1]. He suffered a left mandibular subcondylar fracture in a traffic accident four years previously. A closed reduction

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was performed by intermaxillary fixation three weeks later at a local hospital. Malocclusion was observed postoperatively; therefore, the intermaxillary fixation was maintained an additional two weeks. Three years after the accident, he experienced progressive trismus and discomfort in the left TMJ region. Plain radiography of the TMJ revealed limited joint movement bilaterally [Figure 2a]. Computed tomography (CT) of the region indicated that he had Type II TMJ ankylosis based on the Sawhney classification [Figure 2b-d].⁹ Gap arthroplasty and interpositional arthroplasty under general nasotracheal anesthesia was subsequently recommended.

A preauricular approach was selected to ensure visibility intraoperatively. We carefully dissected the temporoparietal fascia, making sure to preserve the facial nerve, and then dissected the temporalis fascia to expose TMJ capsule. The capsule was incised to expose the meniscus and joint [Figure 3a]. Bony fusion and fibrous tissue were observed between the condyle and lateral glenoid fossa [Figure 3b and c]. The meniscus was also displaced anterior-medially. The previous fracture in the sagittal condylar head was pulled medially and anteriorly by the lateral pterygoid muscle [Figures 3d and 4a]. A gap arthroplasty was performed to a separate the bony fusion between the condyle and lateral glenoid fossa [Figure 4b]. An interpositional arthroplasty was then performed using a Silastic implant that was cut matching the glenoid fossa. The implant was fixed with four numbers of 12 wires [Figure 4c]. The capsule was closed with 3-0 polysorb and the subcutaneous tissue with 5-0 nylon [Figure 4d], followed by skin closure. Postoperative antibiotics were prescribed.

The patient underwent intensive physiotherapy beginning three days postoperatively. Opening mouth movement and rehabilitation were performed. On the 5th postoperative day, the patient was discharged and educated on physiotherapy at home



Figure 1: (a) Initial examination of a 71-year-old male patient. The facial profile revealed trismus, but was normal without any deformity. (b-c) The interincisal distance was measured only 3 mm when opening mouth

[Figure 5a]. He continued regular follow-up with the outpatient department [Figure 5b and d]. After two years of follow-up, there was no limitation in joint movement, and the interincisor distance was 28 mm [Figure 5c]. Plain and panoramic radiographs of the TMJ confirmed full joint mobility [Figure 6a and b].

DISCUSSION

TMJ ankylosis is a pathologic condition affecting joint movement. It is classified to as either fibrous or bony ankylosis though fibrous ankylosis will subsequently progress into bony ankylosis.¹⁰ The most common etiology is trauma,¹¹ which can be categorized according to severity, the pattern of the condylar fracture, duration of immobilization, and disk location. Severe trauma,⁸ comminuted condylar fracture,¹² sagittal fracture,¹³ medially dislocated condylar fracture,¹⁴ and prolonged immobilization of the mandible⁸ can all result in TMJ ankylosis. In our case, the patient suffered a sagittal condylar head fracture, and the mandibular immobilization induced by intermaxillary fixation was quite prolonged at five weeks. These factors placed him at high risk of developing TMJ ankylosis.

TMJ ankylosis is diagnosed by clinical examination combined with imaging studies, including plain radiography, orthopantomography, CT, magnetic resonance imaging, and three-dimensional reconstruction. In the present case, CT was essential in identifying the bony fusion area. The images revealed bony fusion primarily in the lateral joint,¹⁵ and the glenoid fossa was fused with the condyle via osteosclerosis in the presence of a decreased or absent bone marrow

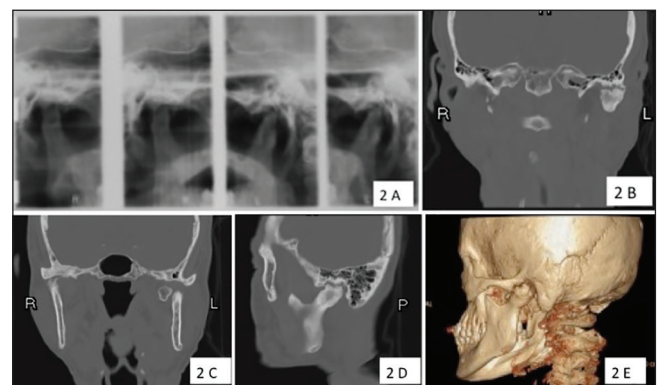


Figure 2: Initial radiography and computed tomography. (a) Plain radiography of the temporomandibular joint revealed the limitation of the joints bilaterally, and the shapes of the condylar heads differed. The left condylar head of the mandible exhibited erosion. (b-d) Computed tomography in coronal (b and c) and sagittal (d) views show flattening and deformity of the left condyle. (c) The previous sagittal fracture of the left condylar head is evident. (d) Bony fusion is present at the outer edge of the articular surface, but there is no fusion in the remainder of the left condylar joint. (e) The erosive condylar head was adhered to the glenoid fossa

Successful treatment of TMJ ankylosis treated with interpositional arthroplasty

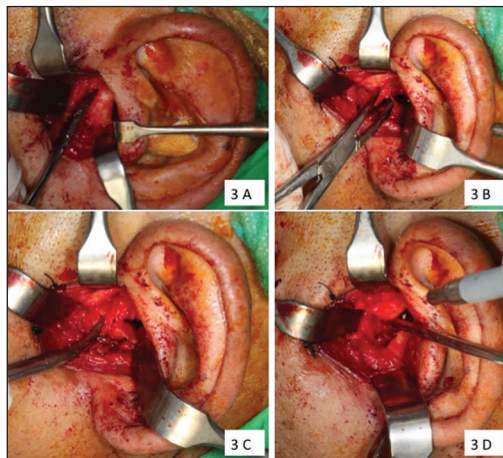


Figure 3: Surgical procedure. (a) A preauricular incision was made, and blunt dissection was used to expose the left temporomandibular joint. (b) Fibrous adhesions were observed between the condyle, meniscus, glenoid fossa, and eminence. (c) The meniscus was dislocated anterior-medially, and Type I complete ankylosis was present. (d) The fibrous tissue and ankylosed meniscus were removed

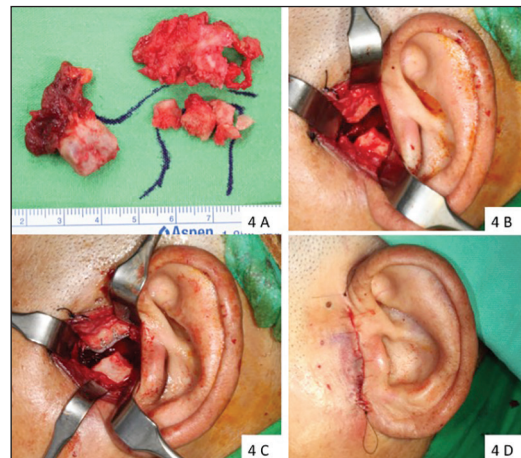


Figure 4: (a) Removal of the left mandibular subcondylar, meniscus, and eminence. (b) A subcondylar osteotomy was performed, and the joint surface was smoothed, followed by arthroplasty of the left temporomandibular joint. (c) The fabricated preformed allogenic graft was adjusted and fixed to the glenoid fossa. (d) The preauricular incisional line was sutured in multiple layers

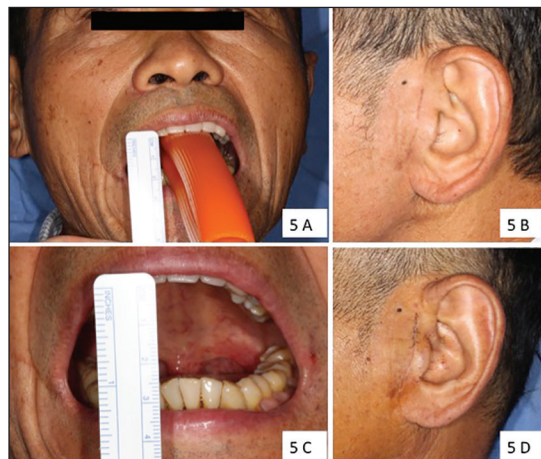


Figure 5: (a) Postoperative rehabilitation of opening mouth was performed using a plastic tube. (b) The preauricular incisional line immediately postoperatively, and after two years (d) healed well with no scarring. (c) After two years of follow-up, the interincisal distance was 28 mm

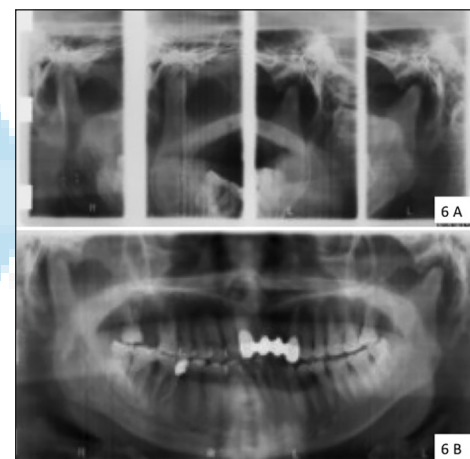


Figure 6: (a) Plain radiography of the temporomandibular joint revealed the absence of erosion and full mobility bilaterally in the condylar head of the mandible after two years. (b) On panoramic radiographs, the cortical surface of the left mandibular condylar head is smooth

cavity. The condyle and glenoid fossa became flattened and deformed as a result. Based on our previous experience, we used the temporomandibular views on the tomographic and orthopantomographic images to make the initial diagnosis. The CT images revealed a high-density region indicative of bony fusion at the lateral glenoid fossa.

The primary therapeutic goal when treating TMJ ankylosis is to increase functionality during mouth opening. Correction of facial asymmetry and speech, reduction of pain, and prevention of re-ankylosis are secondary goals. Multiple surgical techniques are available, including gap arthroplasty, interpositional arthroplasty, and total joint reconstruction.

Gap arthroplasty is performed to remove the fibrous or bony tissue between the articular surfaces. In interpositional arthroplasty, the meniscus is replaced with a graft. Grafts can be sourced from autogenous tissue or alloplastic material.¹⁶ Autogenous tissues are acquired from the ear cartilage, temporalis muscle, dermis, and fat while alloplastic materials include Proplast-Teflon and Silastic. Alloplastic grafts risk foreign body reaction, bone degeneration, excessive fibrous adhesion, infection, and implant displacement and tearing. In contrast to other alloplastic materials, Silastic does not induce adverse tissue reaction. We used wire fixation to enhance the stability of the graft in the present case. On long-term follow-up, the patient did not suffer additional symptoms or re-ankylosis.

Conflicts of interest

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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