

## Report of Ankylosis of the Temporomandibular Joint: Treatment with a Temporalis Muscle Flap and Augmentation Genioplasty

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### Abstract

A case of true bilateral ankylosis of the temporomandibular joint (TMJ) is presented. A 19-year-old male patient had a life-threatening ear infection at the age of ten resulting in a progressive restriction of his mouth opening. He presented with almost complete lack of mobility of the mandible. Surgical treatment was a resection of the ankylotic mass, interpositional temporalis composite muscle flaps, and early mobilization and aggressive physiotherapy. The functional results of the interpositional arthroplasty were excellent. After a two-year follow up, an augmentation genioplasty was performed in order to improve facial aesthetics.

**Keywords:** Temporomandibular joint ankylosis, interpositional temporalis composite muscle flaps, interpositional arthroplasty

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## Introduction

Temporomandibular joint (TMJ) ankylosis is a structural disease that can cause asymmetry resulting in severe facial disfigurement as well as difficulties in eating, breathing, and speech. Should it occur before facial growth is completed, ankylosis produces micrognathia, especially if the disease is bilateral.

TMJ ankylosis was classified by Kazanjian<sup>12</sup> as either true or false. True ankylosis is a condition that results in osseous or fibrous adhesion between the surfaces of the TMJ, within the limits of the articular capsule. False ankylosis results from diseases not directly related to the joint.

Various factors can cause TMJ ankylosis, including trauma, systemic and local infections, and neoplasms in the area. A higher incidence of post-traumatic ankylosis in children was reported by Laskin.<sup>14</sup>

Management of TMJ ankylosis is through surgical intervention as soon as the condition is recognized. Early surgery can minimize the severity of the restriction of facial growth.

The basic techniques for surgical correction of ankylosis include the gap arthroplasty<sup>16</sup> (resection of the bony mass without interpositional material); joint reconstruction (resection of the bony mass with reconstruction by bone grafts or joint prosthesis); or interpositional arthroplasty (resection of the bony mass with interposition of a biological material<sup>18,21,22</sup>, or non-biological material).<sup>19,20</sup>

Costochondral grafts is the preferred biological material for TMJ reconstruction in children because it may allow additional mandibular growth.<sup>13,15</sup> The interpositional arthroplasty with a temporal muscle flap is indicated by several authors.<sup>2,4,7,22</sup>

According to Laskin<sup>14</sup>, the principles of treatment of TMJ ankylosis are:

- operate as early as possible;
- keep the ramus high;
- prevent recurrence by using an interpositional material in growing patients, to replace the condylar growth center; and
- maintain a post-operative program of active jaw exercises.

## Case Report

A 19-year-old young man was referred for treatment because of his long standing difficulty with opening his mouth. His medical history revealed a life-threatening right ear infection at the age of ten. After recovering from the ear infection, the patient experienced a slowly increasing restriction of his mouth opening. Extra-oral examination revealed a micrognathic mandible with the classic "bird's face" appearance of the patient. Some puctiform scars were visible in the right eye and pre-auricular regions (Figures 1 and 2).



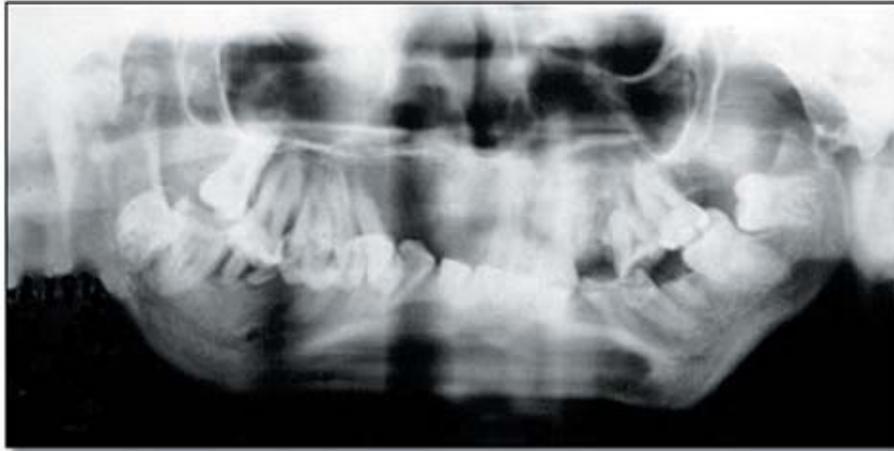
Figure 1.



Figure 2.



Figure 3.



**Figure 4.**

Intra-oral examination revealed 0.5 mm of mouth opening, absence of the upper anterior teeth, and the presence of caries and periodontal disease (Figure 3).

Panoramic and transcranial radiographic examination revealed a lack of structural organization of both right and left joints. Tomograms of the right side revealed a compact bony mass in place of the glenoid fossa and the condyle. On the left side, a less dense bony mass with a remaining condyle-like structure was found (Figures 4 to 8).

A diagnosis of bilateral TMJ ankylosis was made (true bony ankylosis in the right side and true fibrous ankylosis in the left side). Surgical treatment with interpositional temporal muscle flaps was selected. A tracheostomy had been previously performed.

### **Treatment**

A surgical approach consisted of preauricular incisions as reported by Al-Kayat and Bramley.<sup>1</sup> The zygomatic arch was exposed via an incision of the periosteum. On the left side, a condyle-like structure and strong fibrous adhesions were found. The coronoid process was not identified. A gap was created by removing the fibrous/osseous tissue with surgical burs and chisels. A "U-shaped" axial composite flap (fascia, muscle, and periosteum) was obtained from the exposed temporal muscle and rotated inferiorly under the zygomatic arch through the space created by the osteotomy. The flap was sutured medially, anteriorly, and posteriorly with 3-0 Vicryl (Figures 9 to 11).



**Figure 5.**



**Figure 6.**



Figure 7.



Figure 8.



Figure 9.

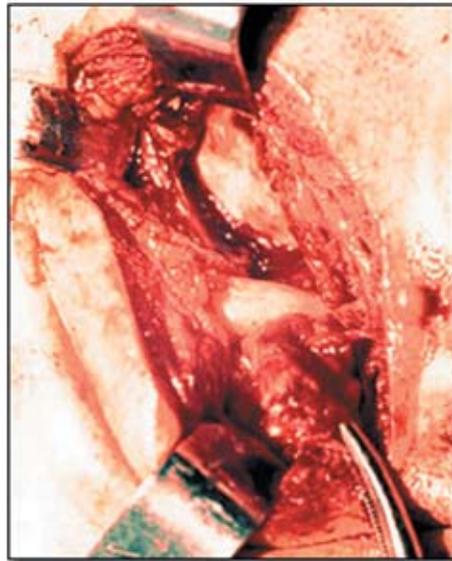


Figure 10.



Figure 11.

In the right side a compact bony mass was found. Removal of the osseous mass required aggressive use of bone burs and chisels in order to create a surgical gap. A more extensive temporal flap was inferiorly rotated under the zygomatic arch (Figure 12). A maximum incisal opening of 50 mm was obtained after the osteotomies (Figure 13).

#### **Post-operative Course**

The post-operative (PO) course was uneventful. Only PO pain medication was prescribed. There was no motor deficit on either side of the face. Vigorous PO physiotherapy was performed to



**Figure 12.**

maintain the mobility and to prevent hypomobility secondary to fibrous adhesions. The patient was followed at six months, one, and two-year intervals, with a maximum mouth opening of 50 mm (Figures 14 and 15). A panoramic radiograph (two years PO) showed no signs of recurrence (Figure 16).

### Genioplasty

After two years, an augmentation genioplasty was performed in order to improve the facial balance of the patient. A 10 x 40 mm block of sculpted solid silicone rubber was adapted and fixed with 1.0 mm wires by intra-oral access (Figure 17).

The final aspect of the patient is shown in Figure 18.

### Discussion

The principal advantages of the temporalis muscle and fascia flap are their autogenous nature, resilience, and adequate blood supply. Its proximity to the joint allows for a pedicled transfer of vascularized tissue into the joint area.<sup>22</sup> In this case a composite (fascia, muscle, and periosteum) axial flap was harvested, as described by Herbosa and Rotskoff.<sup>9</sup>



**Figure 13.**



**Figure 14.**



**Figure 15.**

The axial flaps were easily rotated inferiorly under the zygomatic arch and into the joint space. Rotation under the zygomatic arch prevents bulkiness and avoids the need for surgically reducing the thickness of the zygomatic arch, as suggested by Pogrel and Kaban<sup>18</sup>, when rotating the muscle over the arch.



Figure 16.

### Summary

Regarding the fate of the temporalis muscle graft, Umeda et al.<sup>23</sup> have demonstrated by magnetic resonance imaging the flaps appeared to be viable and the tissue signal was compatible with vital muscle and/or fat as opposed to tissue scarring.

For the two year follow-up observation of this case, the success may be considered excellent based on the increased mobility of the mandible and improvement of function and facial aesthetics.



Figure 17.



Figure 18.

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