

Treatment of temporomandibular joint ankylosis with gap arthroplasty and temporal muscle/fascia graft: A case report with five-year follow-up

Tratamento de anquilose da articulação temporomandibular com artroplastia e enxerto de músculo temporal: relato de caso com cinco anos de acompanhamento

Abstract

Purpose: Temporomandibular joint ankylosis (TMA) is a highly distressing condition in which the Temporomandibular Joint (TMJ) is replaced by scar tissue. The most commonly surgical approach used to restore normal joint functioning is a gap arthroplasty associated with the temporal muscle flap (TMF) as interpositional material. This paper aimed to present a modification of the conventional vascularized temporal muscle flap, and describe an alternative procedure using a muscle/fascia temporal graft as interpositional tissue for the gap arthroplasty.

Case description: We report a case of TMA treated using a gap arthroplasty and a variation of the TMF technique as interpositional material, performing a temporal muscle/fascia graft. The technique described is associated with adequate bone removal and excellent intraoperative joint mobilization. Physiotherapy was started 2 days after surgery and maintained for 4 months. During the five years of follow-up, no signs of ankylosis recurrence were observed; maximum mouth opening is currently 35 millimeters.

Conclusion: The success in preventing reankylosis after TMJ gap arthroplasty is related primarily to the early postoperative physiotherapy, maintained long-term. A free graft harvested from temporal muscle and used as interpositional material is easy to obtain, reliable, and effective. Another advantage is minimal damage to the temporal muscle and low morbidity.

Key words: Joint ankylosis; TMJ; temporomandibular joint; temporal muscle graft; arthroplasty

Resumo

Objetivo: A anquilose da articulação temporomandibular (AATM) é uma condição altamente angustiante aonde a articulação é substituída por tecido cicatricial. A técnica cirúrgica mais comumente usada é a artroplastia associada a um retalho de músculo temporal como um material de interposição entre côndilo/fossa glenóide. Este manuscrito relata um caso de anquilose da articulação temporomandibular tratada pela técnica da artroplastia com uma variação da técnica do retalho do músculo temporal como material interposicional.

Descrição do caso: Relatou-se um caso de AATM que foi tratada usando artroplastia com enxerto livre do músculo temporal e fásia como material interposicional. A técnica descrita está associada a adequada remoção de osso e excelente imobilização articular transoperatória. A fisioterapia foi iniciada 2 dias após a cirurgia e mantida por 4 meses. Durante os 5 anos de controle não houve sinais de recidiva de anquilose; a abertura máxima bucal atualmente é de 35 mm.

Conclusão: O sucesso na prevenção da recidiva de anquilose após artroplastia da ATM está primariamente relacionado com fisioterapia pós-operatória precoce, mantida por longo período. Um enxerto livre do músculo temporal usado como material interposicional é fácil de ser obtido, confiável e efetivo. Outra vantagem é dano mínimo ao músculo temporal e baixa morbidade.

Palavras-chave: ATM; anquilose; cirurgia buco-maxilo-facial; articulação temporomandibular

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Introduction

Temporomandibular joint ankylosis (TMA) is a highly distressing condition in which the temporomandibular joint (TMJ) is replaced by scar tissue. The TMA can be classified using a combination of location (intra-articular or extra-articular); type of tissue involved (bone, fibrous, or fibro-osseous); and extent of fusion (complete or incomplete). TMA partially or totally prevents the patient from opening his or her mouth (1). This disabling condition causes speech impairment, difficulty with mastication, poor oral hygiene, and abnormalities of facial growth, generating significant psychological stress. TMA is most frequently associated with trauma, but local or systemic infection, tumors, degenerative diseases, intra-articular injection of corticoid, forceps delivery, and complication of previous TMJ surgery have also been implicated (1-4).

A number of surgical approaches have been devised to restore normal joint functioning and prevent reankylosis. Three basic techniques are used: (a) gap arthroplasty, where a resection of bone between the articular cavity and mandibular ramus is created without any interposition material; (b) interpositional arthroplasty, which adds interpositional material between the new sculptured glenoid fossa and condyle; and (c) joint reconstruction, when the TMJ is reconstructed with an autogenous bone graft or total joint prosthesis (2,3).

Surgical intervention for correcting TMA may include autogenous costochondral rib grafts after condylectomy, mainly used for children due to the potential to continuous growth. Gap arthroplasty with tissue interposition between the mandibular ramus and glenoid fossa has been performed mainly in adults. Appropriate interposition materials include: (I) autogenous tissues: meniscus, muscle, fascia, skin, cartilage, fat or a combination of these tissues; (II) allogeneic tissues: cartilage and dura; (III) alloplastic: silastic materials like acrylic, proplast, and silicone; (IV) xenograft tissues: usually of bovine origin (collagen and cartilage) (2,3,5-8). Gap arthroplasty without material interposition has also been performed (9). When preserved, the remaining TMJ disc, which has been displaced medially and anteroinferiorly, can be replaced and used as interpositional tissue for preventing reankylosis, in combination with the gap arthroplasty technique (10). In an alternative intervention described by Salins (11), no bone is removed from the ankylosed bony mass. The approach proposed by Salins (11) to treat TMA is to convert it into a subcondylar fracture and create a pseudoarthrosis, using the temporal muscle flap and a block of autogenous cartilage or silastic as interpositional material. Partial or total prosthesis for TMJ reconstruction has been used with a variable success rate (8,12).

In this report, we present a modification of the conventional vascularized temporal muscle flap, and describe an alternative procedure using a muscle/fascia temporal graft as interpositional tissue for the gap arthroplasty.

Case Description

A 23-year-old female patient sought treatment due to TMA. The patient had a history of mandibular trauma at her left TMJ, addressed by a surgical procedure at the site. Complaints had persisted for three years following a fracture. Pre-operatively, the maximum mouth opening was limited to 15 mm. Facial asymmetry characterized the left side of the face. The 3D computed tomography analysis showed a gross bone mass at the TMJ; coronal CT slices showed that the bony mass extended to the medial cranial base (Fig. 1). Thus, we were able to classify the lesion as true osseous/condyle ankylosis (5).



Fig. 1. Coronal CT slice of the left temporomandibular joint ankylosis.

In some cases, nasofibroscope or tracheotomy requires general anesthesia (2); however, for this particular case, those procedures were not needed. A vaseline gauze was placed gently in the external auditory meatus and a preauricular incision was made as described by Al-Kayat & Bramley (13). An avascular tissue plane along the cartilaginous meatus was established using surgical scissors followed by blunt subcutaneous tissue dissection until reaching the superficial temporal fascia (STF). The STF fascia was then incised and retracted anteriorly to protect the facial nerve branches. The periosteum over the zygomatic was then incised and retracted with the STF, revealing the TMJ which was found fused to the temporal bone (Fig. 2A). The excess of bone was removed with a large round bur and chisel, beginning from the condylar neck at the level of the mandibular notch; the glenoid fossa was sculpted at the same level as the original fossa. The gap between condyle and glenoid fossa was then created, taking care to maintain at least 5 millimeters of distance between the skull base and all faces of the condyle. The mandible was then mobilized and the new sculptured condyle was checked verify complete release. At this point, an ipsilateral coronoidectomy was performed via intraoral approach (14).

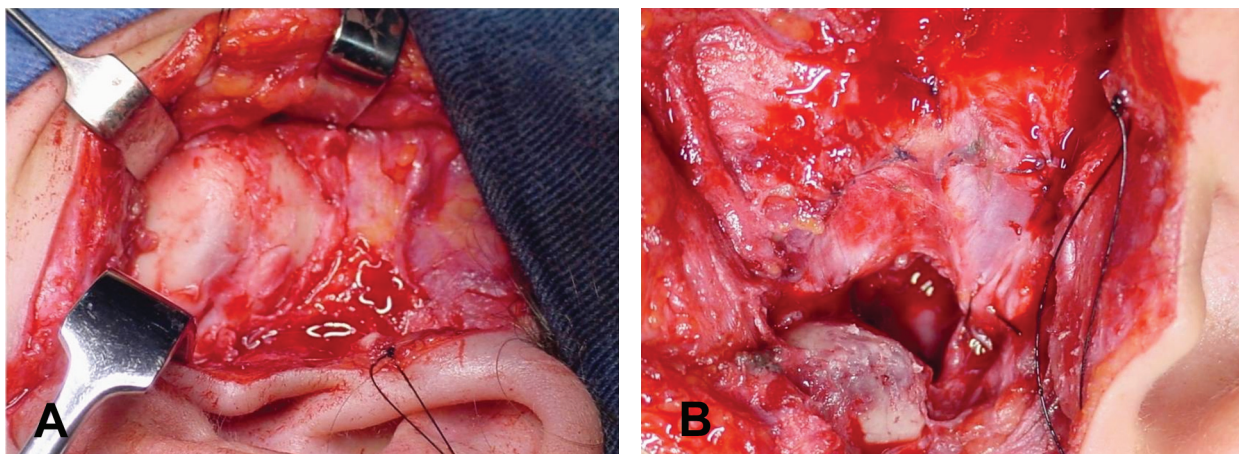


Fig. 2. (A) Intraoperative view of the temporomandibular joint ankylosis. (B) Deep temporal fascia and muscle sutured over the reshaped glenoid fossa. Observe the adequate bone removal and the gap between the skull base and the mandible.

A thin layer of temporal deep fascia and muscle was harvested from an area posterior and superior to the ear in order to avoid any branches of the facial nerve, taking care not to harm the deep temporal muscle blood vessels. The graft was inserted over the glenoid fossa and sutured with the zygomatic periosteum (Fig. 2B). The wound was then closed in layers, and there was no need to use a vacuum pump.

Soon after the procedure, a new CT was performed (Fig. 3); physiotherapy was started 2 days after surgery and maintained for 4 months. During the five years of follow-up, no signs of ankylosis recurrence were observed; maximum mouth opening is currently 35 millimeters.

Discussion

Management of TMJ ankylosis occurs mainly through surgical intervention; several authors agree that it is necessary to use an interpositional material to prevent TMJ re-ankylosis after arthroplasty. This particular aspect of the treatment has been the subject of numerous discussions (2,5). The temporalis muscle flap (TMF) has been used for about 100 years for restorations of the facial and craniofacial area (15); it is also the interposition material most commonly used for correcting TMA due to its ease of handling, proximity to the temporal joint, good functional results, successful clinical results, and minimal complications (2,15). However, the versatility of the TMF technique in supplying interpositional material is not certain and failures may occur. Inadequate removal of bone can result in reankylosis. Success in preventing reankylosis after TMJ reconstruction is dependent upon appropriate surgical technique and long-term patient compliance in undertaking frequent mandibular exercise.

The authors have proposed a slight modification of the temporal muscle flap technique, using a free graft of temporal muscle and fascia. Chossegros et al. (2) compared a total full thickness skin graft with temporal muscle flap as

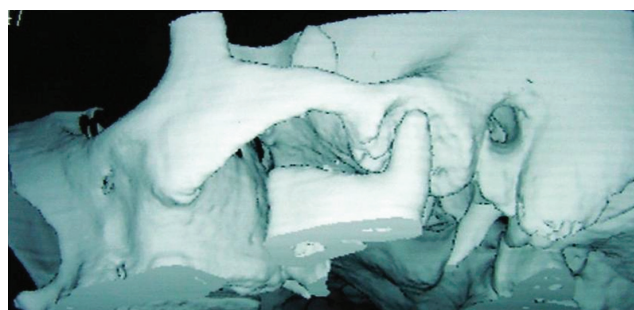


Fig. 3. Postoperative 3D computed tomography of the left temporomandibular joint.

interpositional material for treating temporomandibular joint ankylosis. They obtained better results (92% success) for skin graft compared with the traditional technique (83% success). The primary function of the interpositional material is to prevent re-ankylosis by eliminating contact between bone surfaces. This research suggests that a temporal muscle/fascia graft can be an option for interposition material since it is easy and faster to perform compared with the temporal muscle flap technique. Furthermore, it has the advantage of being harvested from the same surgical site.

In conclusion, the authors agree with the statement that the success in preventing reankylosis after TMJ gap arthroplasty is related primarily to the early postoperative physiotherapy, maintained long-term. The technique described above is associated with adequate bone removal and excellent intraoperative joint mobilization. A free graft harvested from temporal muscle and used as interpositional material is easy to obtain, reliable, and effective. Another advantage is minimal damage to the temporal muscle and low morbidity. Nevertheless, the findings presented here are based on a single case; controlled clinical trials must be performed to confirm this hypothesis.

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