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Is aggressive gap arthroplasty essential in the management of temporomandibular joint ankylosis?—a prospective clinical study of 15 cases

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Abstract

The purpose of this three-year, prospective, follow-up study was to evaluate whether aggressive gap arthroplasty is essential in the management of ankylosis of the temporomandibular joint (TMJ). Fifteen patients were treated by the creation of a minimal gap of 5–8 mm and insertion of an interpositional gap arthroplasty using the temporalis fascia. Eleven patients had unilateral coronoidectomy and 4 bilateral coronoidectomy based on Kaban's protocol. Preoperative assessment included recording of history, clinical and radiological examinations, personal variables, the aetiology of the ankylosis, the side affected, and any other relevant findings. Patients were assessed postoperatively by a surgeon unaware of the treatment given for a minimum of 3 years, which included measurement of the maximal incisal opening, presence of facial nerve paralysis, recurrence, and any other relevant findings. Of the 15 patients (17 joints), 12 had unilateral and three had bilateral involvement, with trauma being the most common cause. The patients were aged between 7 and 29 years (mean (SD) age 20 (8) years). Preoperative maximal incisal opening was 0–2 mm in 8 cases and 2–9 mm in 9. Postoperatively adequate mouth opening of 30–40 mm was achieved in all cases, with no recurrence or relevant malocclusion during 3-year follow up. However, patients will be followed up for 10 years. Aggressive gap arthroplasty is not essential in the management of ankylosis of the TMJ. Minimal gap interpositional arthroplasty with complete removal of the mediolateral ankylotic mass is a feasible and effective method of preventing recurrence.

Keywords: Temporomandibular joint ankylosis; Minimal gap arthroplasty; Interpositional arthroplasty; Temporalis fascia

Introduction

Ankylosis of the temporomandibular joint (TMJ) is a disabling condition that causes problems in mastication, digestion, speech, function, cosmesis, and maintenance of oral hygiene.[1] It can also cause disturbances of facial growth and acute compromise of the airway, which invariably results in physical and psychological disability.[2] It usually results from injury (13–100%); local or systemic infection (10–40%); or systemic disease (10%) such as ankylosing spondylitis, rheumatoid arthritis, and psoriasis[3]; but can also result from operation on the TMJ. The hypothesis has been proposed for traumatic cases that intra-articular haematoma, scarring, and formation of excessive bone gives rise to hypomobility.[1–4]

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Ankylosis of the TMJ may be classified by using a combination of site (intra-articular or extra-articular), type of tissue involved (bony, fibrous, or fibro-osseous), and extent of fusion (complete or incomplete).[3] Tripathy et al. have classified ankylosis as true or false.[5] In true ankylosis there is bony or fibrous adhesion between the surfaces of the joint within the capsule, whereas in false ankylosis the problems lie in the surrounding structures.[3,5]

The aims of treatment are to establish movement of the joint with adequate mouth opening, maintain functional occlusion, reconstruct the joint using biological material, and to prevent recurrence.[5–13] There is no published consensus about the best treatment.[3] Several techniques have been described,[6–20] but there are three basic surgical techniques that have been developed.

The first is gap arthroplasty, in which the osseous mass between the articular cavity and the mandibular ramus is resected without interpositional material being inserted. Secondly, interpositional arthroplasty in which a gap is created by resecting the osseous mass into which biological material is interposed, such as a temporal muscle flap, or a non-biological material such as acrylic, or silastic.[6–13] Lastly, the joint can be reconstructed. The osseous mass is resected and the joint reconstructed by autogenous bone grafts or a total joint prosthesis.[11–14]

The most commonly followed protocol for the management of ankylosis is that given by Kaban et al.,[12–13] This includes early surgical intervention, aggressive resection (1.5–2.0 cm), ipsilateral coronoidectomy (if mouth opening less than 35 mm), contralateral coronoidectomy (if mouth opening less than 35 mm after the ipsilateral coronoidectomy), lining of the TMJ with temporalis fascia or cartilage, reconstruction of the ramus with a costochondral graft or distraction osteogenesis, rigid fixation, early mobilisation and aggressive physiotherapy, regular long term follow up, and finally cosmetic surgery after growth has been completed.

Various disadvantages have been noted after aggressive resection of the ankylotic mass, among which the most important is reconstruction of the created gap.[15,20] Most authorities also agree that ankylosis is less likely to recur when something is interposed between the cut ends of bone, irrespective of the size of the gap arthroplasty (interpositional arthroplasty).[15]

We therefore organised the present prospective clinical follow-up study to find out whether aggressive gap arthroplasty is essential in the management of ankylosis of the TMJ and how effective minimal gap interpositional arthroplasty with temporal fascia is in its management.

Patients and methods

After we had obtained approval from the ethics and research committee, we organised a prospective observational follow up clinical study in the private hospitals of Bangalore, Puducherry and Hassan City. Fifteen patients (18 joints) with ankylosis of the TMJ were treated, all by minimal gap interpositional arthroplasty using temporal fascia (5–8 mm vertically) with emphasis on complete lateral to medial excision to permit mobilisation.

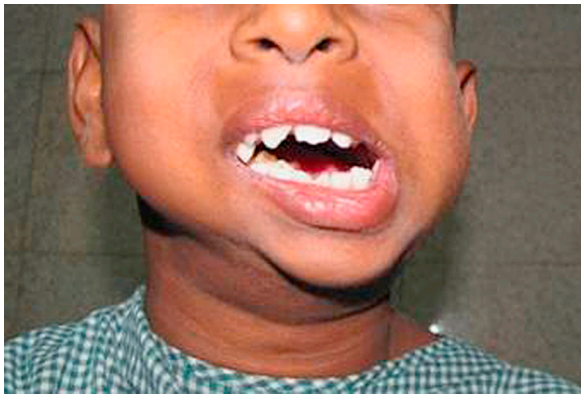

Fig. 1. Preoperative mouth opening of 5 mm in a patient with ankylosis of the left temporomandibular joint.

Preoperative assessment included the patient's history, and physical and radiographic examinations. We recorded age, sex, aetiology of ankylosis, the side affected, preoperative (Fig. 1) and postoperative maximal incisal opening, recurrence rate, the presence of facial nerve paralysis, and any other relevant findings. The radiographic examination included panoramic radiographs and computed axial tomographic scans with emphasis on the lateral and medial extent of the ankylotic mass (Figs. 2 and 3), and the classification of ankylosis based on Sawhney's criteria (types 1–4).[21]

All patients were given cefotaxime 2 g intravenously half an hour before the procedure and were operated on under general anaesthesia with nasoendotracheal intubation. Access to the TMJ was through a preauricular incision with temporal extension, and dissection through the superficial temporal fascia (Fig. 4). The facial nerve was protected by retracting the fascia anteriorly. The capsule was incised and the ankylotic mass exposed. The ankylotic mass was excised with burs and osteotomes to create a gap of 5–8 mm (Fig. 4) with the channel retractor on the medial aspect to prevent injury to vital structures. Trial mouth opening was then attempted. Ipsilateral and (if required) contralateral coronoidectomy was based on the protocol reported by Kaban et al,[12,13] and adequate mouth opening was achieved. A pedicled finger-shaped piece of temporal fascia (Fig. 4) was placed in the gap, and secured by sutures to the adjacent soft tissue. The incisions were closed and a pressure dressing was applied. A vacuum suction drain was left in place for 2–3 days.

Immediate postoperative care included analgesics and antibiotics. Intermaxillary fixation with arch bars was used for 7–10 days to reduce postoperative pain, to improve healing within the region of the new joint, and to maintain satisfactory occlusion. This was followed by professional and home physiotherapy for 4–6 weeks in all cases after release of the interemaxillary fixation. The physiotherapy included encouraging patients to move the mandible