INTERPOSITIONAL TEMPORALIS FASCIA FLAP: HOW EFFECTIVE IS IT IN TMJ ANKYLOSIS TREATMENT?

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ABSTRACT

The aim of this study was to evaluate the efficacy of interpositional temporalis fascia flap in the management of TMJ ankylosis by assessing the maximal mouth opening prior and after the procedure and prevention of re-ankylosis after interpositioning. This case series study consisted of twenty one patients of TMJ ankylosis, unilateral or bilateral, irrespective of age and gender. It was carried out at the Oral & Maxillofacial Surgery Department, Lahore Medical & Dental College, Lahore from December 2010 to September 2013. OPG and 3-D scan were the standard radiographs and were taken in every case. All the patients were treated surgically by temporalis fascia flap interpositional arthroplasty. Inter-incisal distance (IID) / mouth opening were recorded preoperatively, immediately after completion of operation and postoperatively at follow-up. An inter-incisal distance / mouth opening of at least 35mm was achieved in all cases and showed no recurrence of ankylosis in any of the patients. Interpositional arthroplasty using temporalis fascia flap is an effective and reliable method to prevent re-ankylosis. Temporalis fascia flap is available at the operative site, easy to raise, well vascularized, reliable and shows better long term results.

Key Words: TMJ ankylosis, Interpositional arthroplasty, Temporalis fascia flap.

INTRODUCTION

TMJ ankylosis can be described as a fusion of joint surface that can cause disabling problems in mastication, digestion, speech and oral hygiene.^{1,2,3} When occurs during the growing periods, it leads to varying degrees of facial deformity and psychological problems.^{4,5,6,7}

TMJ ankylosis may be classified by combination of location (intra articular or extra articular), type of tissue involved (bony or fibrous) and extent of fusion (complete or incomplete). Kazanjian⁸ classified ankylosis as true or false. Intra articular ankylosis most commonly occurs after trauma or rarely infection, whereas, extra articular occurs by a large variety of disorders including myogenic, neurogenic, inflammatory process and bone or soft tissue tumors.^{2,8}

Various procedures have been described for the treatment of TMJ ankylosis. These include condylec-

tomy, gap arthroplasty, interposition arthroplasty and total joint reconstruction using alloplastic or autogenous materials. 9

Timing, preference of procedure and policy of treatment varies from one center to another. However, the main principle of management of TMJ ankylosis consists of resection of ankylosed segment, use of interpositional material either autogenous or alloplastic and postoperatively, early and aggressive physiotherapy.^{10,11}

The aim of this study was to evaluate the efficacy of interpositional temporalis fascia flap in terms of preventing the recurrence of TMJ ankylosis and achieving adequate mouth opening in patients operated at Oral and Maxillofacial Surgery Unit of Lahore Medical and Dental College, Lahore.

METHODOLOGY

The current study consisted of twenty one patients and was carried out at Oral and Maxillofacial Surgery Unit of Lahore Medical and Dental College, Lahore from December 2010 to September 2013.

The study involved only confirmed patients of TMJ ankylosis irrespective of their age and gender. Selection criteria included: Patients with restricted or nil mouth opening, radiological evidence of TMJ

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Received for Publication: August 29, 2014
Revision Received: October 4, 2014
Revision Accepted: October 15, 2014

ankylosis. Patients with evidence of fibrous ankylosis, false ankylosis and recurrent cases were excluded.

Preoperative assessment included the clinical history of patients, physical and radiological examination. Data was collected regarding the cause of ankylosis, facial asymmetry, nature of union, side affected and the time of onset of ankylosis. Measurement of maximum inter incisal distance/mouth opening were recorded preoperatively. The radiographic examination included orthopentomogram (OPG) and computed tomography (CT) with 3-D scan to determine the extent and type of ankylosis.

All the patients were treated surgically under general anesthesia with blind or fiberoptic nasotracheal intubation after taking written and informed consent of the procedure. Al-kayat & Bramely incision was used to gain access to the TMJ in all cases and for joint capsule T shaped incision was used (Fig 1) The ankylosed segment was removed using upper and lower osteotomy cuts and a gap of at least 15 mm was created between the roof of glenoid fossa and mandible (Fig 2). It was followed by ipsilateral coronoidectomy and a passive inter incisal opening of at least 35 mm was achieved. Contra lateral coronoidectomy was performed when necessary, in accordance with Kaban's protocol. Finally the temporalis fascia flap of sufficient length was used as interpositional graft material (Fig 3). The flap was rotated and sutured to the medial, anterior and posterior margins of residual tissue at the site of arthroplasty (Fig 4). Layer wise closure was done and suction drain placed.

Inter incisal distance (IID)/mouth opening was noted immediately after completion of the procedure and also recorded postoperatively (Fig 5). Patients were routinely administered antibiotics for minimum of 7-10 days. All the patients were advised and guided for active and passive jaw exercises on second postoperative day for three to five times in a day. Patients were discharged on the third to fifth postoperative day with instructions and giving them wooden tongue spatulas for active and passive jaw physiotherapy. All patients were followed up for at least of six months. Data was analyzed using SPSS version 17. The qualitative variables in the demographic data like gender and etiologies were presented as proportions and percentages and quantitative variables like age were presented as means and standard deviation. No inferential test applied due to descriptive nature of the study.

TABLE 1: CHARACTERISTICS BEFORE AND AFTER TMJ ANKYLOSIS SURGERY

S. No.	Age	Gender	Joint involvement	Mouth opening Preoperatively	Mouth opening Postoperatively	Coronoidec- tomy
01	08	Μ	Bilateral	06mm	$\geq 35 \mathrm{mm}$	Bilateral
02	10	Μ	Unilateral (R)	$05 \mathrm{mm}$	$\geq 35 \mathrm{mm}$	Ipsilateral
03	13	F	Unilateral (L)	$03 \mathrm{mm}$	$\geq 35 \mathrm{mm}$	Ipsilateral
04	18	Μ	Unilateral (R)	06mm	$\geq 35 \mathrm{mm}$	Ipsilateral
05	17	Μ	Unilateral (R)	08mm	$\geq 35 \mathrm{mm}$	Ipsilateral
06	19	Μ	Bilateral	Nil	$\geq 35 \mathrm{mm}$	Bilateral
07	16	\mathbf{F}	Bilateral	Nil	$\geq 35 \mathrm{mm}$	Bilateal
08	18	Μ	Unilateral (L)	06mm	$\geq 35 \mathrm{mm}$	Ipsilateral
09	14	Μ	Unilateral (R)	$05 \mathrm{mm}$	$\geq 35 \mathrm{mm}$	Ipsilateral
10	09	\mathbf{F}	Unilateral (R)	03mm	$\geq 35 \mathrm{mm}$	Ipsilateral
11	15	\mathbf{F}	Unilateral (R)	09mm	$\geq 35 \mathrm{mm}$	Ipsilateral
12	19	Μ	Unilateral (L)	$05 \mathrm{mm}$	$\geq 35 \mathrm{mm}$	No
13	25	Μ	Unilateral (L)	09mm	$\geq 35 \mathrm{mm}$	Ipsilateral
14	10	\mathbf{F}	Unilateral (R)	4mm	$\geq 35 \mathrm{mm}$	Ipsilateral
5	19	Μ	Bilateral	$05 \mathrm{mm}$	$\geq 35 \mathrm{mm}$	Unilateral (R)
16	8	Μ	Unilateral (L)	06mm	$\geq 35 \mathrm{mm}$	Ipsilateral
17	14	\mathbf{F}	Bilateral	06mm	$\geq 35 \mathrm{mm}$	Bilateral
18	13	Μ	Unilateral (L)	08mm	$\geq 35 \mathrm{mm}$	Ipsilateral
19	09	Μ	Unilateral (L)	03mm	$\geq 35 \mathrm{mm}$	Ipsilateral
20	12	Μ	Unilateral (L)	$05 \mathrm{mm}$	$\geq 35 \mathrm{mm}$	Ipsilateral
21	14	Μ	Unilateral (R)	06mm	$\geq 35 \mathrm{mm}$	Ipsilateral



Fig 1: Ankylosed TMJ



Fig 2: Showing gap after resection of ankylosed mass



Fig 3: Elevation of temporalis fascia flap



Fig 4: Interpositioning of temporalis fascia flap



Fig 5: Inter-incisal distance immediately after completion of procedure

RESULTS

Twenty one patients with TMJ ankylosis were included in our study. 15 were males and 06 females. TMJ ankylosis was unilateral in 16 (76.19%) patients and bilateral in 5 (23.81%) patients. Majority of the patients were in 2nd decade of life (15) followed by 1st decade (05) and 3rd decade (01). Trauma/fall was the etiological factor in all the cases (21). All the patients showed inter incisal distance/ mouth opening of at least 35mm postoperatively (Table 1).

DISCUSSION

Early ankylosis of TMJ in children can be a deterrent to normal mandibular growth. Therefore, early diagnosis of TMJ ankylosis and early surgical intervention is important. In the clinical studies, the most common seen cause of TMJ ankylosis is trauma and infection. Although joint infection has decreased nowadays, it is still a cause of disease especially in developing and underdeveloped countries.¹ Trauma is an important cause of the disease both in developing and developed west countries in especially 21-30 age group exhibiting a prevalence of 31-86% more often in males.^{3,4} Management of TMJ ankylosis requires aggressive surgical intervention without compromise. Various techniques for the management of TMJ ankylosis have been described. Moorthy and Finch1 broadly classified the usual treatment of ankylosis of the temporomandibular joint in three groups: a) Condylectomy b) Gap arthroplasty c) Interpositional arthroplasty.

Abul Hassan et al¹² studied the surgical anatomy and blood supply of fascial layers of temporal region. They found that temporalis fascia is supplied solely by the middle temporal artery, which is a branch of superficial temporal artery and arises 1-3 cm below the upper border of zygomatic arch, runs always superficial to the arch and enters the temporalis fascia immediately above that layer's attachment to the zygomatic arch. We have used this temporalis fascia in all the patients included in the current study and found this layer to be substantial with robust blood supply and satisfactory arc of rotation to fill in the defect of ostectomy.

Topazian's¹³ review of gap arthroplasty without interposition reported a recurrence rate as high as 53% pertaining to condylectomy as method of treatment. He narrated that the zone of excision should be sufficiently wide to prevent ankylosis and shall produce insignificant change in the vertical height of mandible. Rajgopal and associates¹⁴ suggested radical condyle and neck removal as well as coronoidectomy in order to reduce reankylosis. Numerous surgeons agree that the recurrent ankylosis is less likely if material is interposed between the divided bone ends. Controversy arises over whether to place alloplastic materials (Proplast, Teflon, Silastic Methyl methacrylate etc.) or autogenous tissues (fascia lata, muscle, full thickness skin or cartilage) into the defect.¹⁵⁻¹⁹ The alloplastic materials have the problems associated with the use of foreign body as well as those of displacement and extrusion. Smith and associates²⁰ reported implant erosion into the middle cranial fossa. The histology of these implants displayed an exuberant giant cell inflammation that erodes bone. Such erosions can be treated with an insert of temporalis fascia over the glenoid fossa. The use of biological materials contains the problems of degeneration and fibrosis with time, resulting in reankylosis. Demir et al²¹ used preserved costal cartilage homograft for the treatment of TMJ ankylosis with good functional results and without donor site morbidity and no recurrence over a 4 years follow up. The reliable supply of optimally preserved homologous costal cartilage might not be possible at all set ups. More importantly, as the cartilage is no longer considered "immunologically privileged", there will be problems of antigen antibody reaction leading

to late resorption of graft that may lead to recurrence of ankylosis in the end. Huang IY et al²² have quoted the results of studies that suggest that grafted cartilage does evoke transplantation antigens and that the rejection response is merely delayed by the physical barrier that the matrix interposes between the chondrocytes and the cells of immune surveillance system of the recipient host. The temporalis fascia flap, however, is an axial flap, which is available at the operative site and is easy to raise and quick to execute. We have used this vascularized flap as it shows fewer chances of subsequent absorption and fibrosis. The follow up of patients did not show relapse or recurrence of ankylosis in the long run.

It is recommended that TMJ ankylosis should be dealt with early aggressive surgical intervention using temporalis fascia flap interpositional arthroplasty with ipsilateral or contralateral coronoidectomy, followed by early mobilization of the joint. It results not only in satisfactory mouth opening and jaw function, but also ensures in reduction of re-ankylosis.

CONCLUSION

Interpositional arthroplasty using the locally available temporalis fascia flap is an effective and reliable method to prevent recurrence of ankylosis. Advantages of this vascularized flap include close proximity to the TMJ without involving an additional surgical site, adequate blood supply, autogenous origin, easy to raise and quick to execute. It obviates the disadvantages of alloplastic materials as well as non vascularized autogenous tissues.

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