TEMPOROMANDIBULAR JOINT ANKYLOSIS: EXPERIENCE WITH INTERPOSITIONAL GAP ARTHROPLASTY AT AYUB MEDICAL COLLEGE ABBOTTABAD

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Background: Satisfactory surgical correction of temporomandibular joint ankylosis (TMA) is limited by a high recurrence rate, particularly in patients who underwent surgery without use of interpositional material. The present study describes our experience of Interpositional Gap Arthroplasty in patients presenting with primary or recurrent TMA. **Methods:** The study was conducted on 12 patients presenting at the Oral and Maxillo-Facial Surgical Unit of the Ayub Medical College Abbottabad from 1999 to 2004. Interpositioning materials used included Temporalis fascia, Temporalis muscle, Silastic sheet and Cartilage (Costochondral) graft. Pre- and Postoperative assessment of temporomandibular joint (TMJ) mobility was done by clinical assessment of jaw movement and measurement of interincisal distance by vernier calipers; X-rays were done to document complications such as fibrosis and ankylosis. **Results:** Nine of the 12 patients (75%) were new cases of ankylosis, while the remaining 3 (25%) had one, three and four prior operations. Duration of ankylosis ranged from 9 months to 12 years. Ankylosis was bilateral in 8 cases (66.7%) and unilateral in 4 cases (33.3%). Operative findings were simple bony ankylosis in 13/20 jaws (65%), soft tissue fibrosis in 4/20 jaws (20%) and massive bony growth in 3/20 jaws (15%). Preoperative interincisal distances ranged from 0-15mm; immediate postoperative distances ranged from 20-40 mm; one-month and six-month postoperative distances ranged from 25-50 mm. All patients had an uncomplicated outcome till six months follow up; one patient developed reduced mouth opening to 12 mm at one year follow up due to parental noncompliance with mouth exercises; one patient developed infection and extrusion of silastic sheet at 2.5 years follow up. **Conclusion:** Interpositional Gap Arthroplasty is a highly effective and safe surgical management option for TMA with acceptable immediate and long term outcome, particularly when temporalis fascia and muscle are used for adults and costochondral grafts with fascia interposition used for children.

Key Words: Temporomandibular Joint, Ankylosis, Temporal Muscle, Arthroplasty.

INTRODUCTION

The temporomandibular joint (TMJ) is the joint that allows mastication and speech. It is a synovial joint formed between the mandibular condyle below and the articular fossa of the temporal bone above. The joint is liable to suffer from a number of diseases, (commonly fractures of the mandible), some of which predispose to TMJ ankylosis. Ankylosis is defined as loss of joint movement resulting from fusion of bones within the joint or calcification of the ligaments around it.[1]

Typically calcification of the ligaments around the joint is not painful, but the mouth can open only about 1 inch or less. Fusion of bones within the joint causes pain and more severely limits jaw movement. Occasionally, stretching exercises help people with calcification, but people with calcification or bone fusion usually need surgery to restore jaw movement.[1]

Common aetiologies include prolonged maxillary-mandibular fixation, infection, trauma, degenerative joint disease and prior gap arthroplasty.[2,3] Thus TMJ ankylosis may be post-traumatic or post-surgery for TMJ disease in a majority of cases. More unusual causes include Rheumatoid Arthritis,[4] Sickle Cell Anaemia[5] and Fibrodysplasia Ossificans Progressiva. [6]

Surgical options for treatment include Gap Arthroplasty which is still preferred by some[7] and Interpositional Surgery which is the standard procedure.[8-10] A range of materials is used for interpositional surgery including temporalis fascia, temporalis muscle, cartilage grafts, silastic materials, etc.[8-13]

The present study describes our experience with Interpositional Surgery in our setting for TMA on patients with primary or recurrent ankylosis during a five year period.

MATERIAL AND METHODS

The present study was undertaken at the Oral and Maxillo-Facial Surgery Unit of the Ayub Medical College Abbottabad from 1999 to 2004. Majority of patients belonged to Hazara division. Patients selected were those undergoing interpositional surgery for Temporomandibular Joint Ankylosis (TMA) in the unit during the study period and included both fresh cases

of TMA as well as cases with reankylosis following previous surgery on the TMJ.

Assessment of temporomandibular joint (TMJ) mobility was done by clinical assessment of jaw movement and measurement of interincisal distance by vernier calipers; X-rays were done to document complications such as fibrosis and ankylosis.

All patients underwent surgery for TMA; interpositioning materials used during surgery included Temporalis fascia, Temporalis muscle, Silastic sheet and Cartilage (Costochondral) graft. Operative findings regarding the TMA were recorded. Drains were removed on 2nd to 5th post-operative day. Mouth opening exercises were started after drain removal. Patients were discharged after 5-7 days on average. Stitches were removed after 7-10 days.

Follow up recommendations included mouth opening exercises for 6 months. Post operative assessment for jaw movements and complications were performed as in preoperative stage. Follow up assessment was performed at one month, 3 months and 6 months; further follow up was performed for periods up to three years.

RESULTS

A total of 12 patients were included in the study. There was a slight female preponderance; the male to female ratio was 1:1.4, with most patients (58.3%) being in the 11 – 20 years age group (Table 1).

Table-1: Sex and age distribution of patients (n=12)

Variables	Number of Cases	Percentages
Gender		
Males	05	41.7
Females	07	58.3
Age Groups		
< 10 y	02	16.7
11 – 20 y	07	58.3
21 – 30 y	03	25.0

Overall the most common cause of ankylosis was falls of various types accounting for 91.7% of cases with only one case of dislocated TMJ (Table 2).

Table-2: Causes of TMJ ankylosis in subjects (n = 12)

Causes	Number of Cases	Percentages
Falls	05	41.7
Falls from trees	03	25.0
Falls from heights	02	16.6
Fall from roof	01	8.3
Dislocated TMJ	01	8.3

Data regarding features associated with TMA are provided in Table 3. The majority of patients (75%) were undergoing gap arthroplasty for the first time, with three patients having had previous operations. Durations of ankyloses ranged from 9 months to 12 years, with two-thirds being bilateral, providing a total of 20 joints that were operated upon.

Table 3: Features associated with TMJ ankylosis in patients (n = 12).

Features	No. of Cases	Percentages
Type of Case		
First operation	09	75.0
Post op 1-4 ops	03	25.0
Duration of TMA		
< 3 y	05	41.7
3.1 – 6 y	03	25.0
6.1 – 9 yr	Nil	Nil
9.1 – 12 y	04	33.3
Side of ankylosis		
Left	02	16.7
Right	02	16.7
Bilateral	08	66.6

Operative details are given in Table 4. Simple ankylosis was the commonest operative finding, occurring in 50% of joints. Condylectomy plus bone removal was the most frequently performed operation accounting for 60% of cases. Among interpositional materials used, temporalis fascia alone or with temporalis muscle accounted for 80% of cases.

Table 4: Operative data of patients (n = 12).

Operative data	No. of joints (n = 20)	Percentages
Operative findings		
• Massive bony outgrowth	06	30.0
• Soft tissue fibrosis	04	20.0
• Simple ankylosis	10	50.0
Operations done		
• Condylectomy plus bone removal	12	60.0
• Condylectomy plus coronoidectomy	06	30.0
• Removal of fibrosis plus fascia interpositioning	02	10.0
Interpositional materials		
• Temporalis fascia	08	40.0
• Temporalis muscle	01	5.0
• Temporalis fascia and muscle	08	40.0
• Silastic sheet	02	10.0
• Costochondral graft plus genioplasty	01	5.0

Pre- and postoperative measurements of interincisal openings are provided in Table 5. All cases had an uncomplicated outcome till 6 months follow up. One patient developed reduced mouth opening to 12 mm at one year postoperatively, due to parental noncompliance with mouth exercises (? tearing of temporalis fascia). One patient developed infection and extrusion of silastic sheet 2.5 years postoperatively.

The three cases that had previously undergone gap arthroplasty showed massive bony growths, excessive fibrosis and scarring, making surgery more

complex and time consuming. These findings were operationally different from the nine fresh cases in terms of extra bone mass to be removed and time spent on surgery.

Table 5: Pre and postoperative interincisal measurements of patients (n = 12).

Interincisal openings	Number of cases	Percentages
Preoperative		
• 0 – 5 mm	07	58.4
• 6 – 10 mm	04	33.3
• 11 – 15 mm	01	8.3
Intraoperative		
• 20 – 25 mm	03	25.0
• 26 – 30 mm	02	16.6
• 31 – 35 mm	05	41.8
• 36 – 40 mm	02	16.6
At One Month		
• 25 – 30 mm	01	8.3
• 31 – 35 mm	04	33.3
• 36 – 40 mm	05	41.8
• 41 – 45 mm	Nil	Nil
• 46 – 50 mm	02	16.6
At Six Months		
• 25 – 30 mm	01	8.3
• 31 – 35 mm	04	33.4
• 36 – 40 mm	04	33.4
• 41 – 45 mm	01	8.3
• 46 – 50 mm	02	16.6

DISCUSSION

Our patients appear to be fairly typical for those described as high risk for TMA,[2,3] being of a young age group (Table 1) and having suffered post-fall traumatic fractures and ankylosis of the TMJ (Table 2). Of these, a smaller group of three patients reported due to complications of previous gap arthroplasty without interpositional surgery done at the first operation (Table 3). A slight female preponderance was observed with a male:female ratio of 1:1.4 (Table 1).

Moreover over two thirds of patients presented after having TMA for six years or less and about one third had TMA between 9 to 12 years (Table 3). This bespeaks of the lack of awareness in our patients of the importance and role of the TMJ in daily life; all of these patients had small interincisal openings (Table 5) which must have hindered their daily food intake as well as speech.

Regarding operative details (Table 4), the most common finding at operation was simple ankylosis found in 50% of patients, followed by massive bony outgrowth in 30% and soft tissue fibrosis in 20%. The cases with massive bony outgrowth included the three patients (50%) who had undergone previous gap arthroplasty.

All patients responded well to interpositional gap arthroplasty, with good intraoperative interincisal openings achieved; there was further improvement in the interincisal openings at follow up of one month and six months (Table 5).

Our experience, though not on a large case series, indicates that among the various surgical options available for treating TMA, use of interpositional surgery with temporalis fascia and/or muscle provides the most satisfactory results for all age groups.[8, 9, 13] Simple gap arthroplasty appears to be of limited value in TMA surgery, particularly due to the high risk of recurrent joint ankylosis. Silastic sheet interposition carries the risk of infection and extrusion in the long term. Costochondral graft is satisfactory in the young age group (< 12 years) as it provides a growth centre for condylar growth; however two surgical sites are required which can be a source of parental refusal for operation.

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