

Management of Temporomandibular Joint Disorders by Arthroscopic Lavage

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Abstract

Introduction: Temporomandibular joint disorders (TMDs) are among the most common disorders in the maxillofacial region which usually present with joint pain, decreased jaw mobility, joint clicking, headache, tinnitus, neck pain etc. There are different modalities of treatment used for the TMDs. These include some conservative and surgical procedures. The main aim is to improve the jaw function and reduction of joint pain. Arthroscopy is a modern diagnostic and effective therapeutic procedure for the TMDs.

Objective: To assess the outcome of arthroscopic lavage of Temporomandibular Joint (TMJ) in terms of improvement of jaw function and joint pain in patients suffering from TMDs.

Materials and Methods: This prospective study was carried out at the department of Oral and Maxillofacial Surgery, Military Dental Centre, Combined Military Hospital of Dhaka Cantonment from 01 October 2014 to 31 March 2016. Patients were selected consecutively having TMDs and unresponsive to conservative nonsurgical therapy. Total thirty patients of TMDs were selected for study and all the patients were treated with arthroscopic lavage. Objective data were collected including, inter incisal opening, lateral excursion, deviation on opening, tenderness on palpation. A questionnaire in the form of visual analogue scale relating to pain, joint clicking and Jaw mobility were completed by each patient at 1 week, 1 month and 6 months post operatively.

Results: Among thirty patients, 10 patients were male and 20 patients were female. Mean age of the patient was 42.6±5.79 years. Maximum patients were in the age group of 41-45 years. There was

statistically significant improvement in maximum incisal opening and pain score. There was also reduction in Joint clicking and tenderness in maximum patients.

Conclusion: The findings of the present study suggested potential utility of arthroscopic lavage in the management of TMDs.

Key-words: Temporomandibular Joint (TMJ), Temporomandibular disorders (TMDs).

Introduction

Temporomandibular disorders (TMDs) represent a wide range of functional changes and pathological conditions affecting the temporomandibular joint (TMJ), masticatory muscles, and other components of the oromaxillofacial region. In recent years, TMD has become a frequent cause for seeking medical assistance. The number of patients with TMDs is increasing, probably due to psychological tension in modern society¹. According to well accepted psychophysiological concepts, occlusal problems and emotional stress are the most serious aetiological factors^{2,3}. However, the causes of TMD are far more complex. A comprehensive understanding requires consideration of the whole masticatory apparatus and the intra-articular situation¹.

TMD is seen most commonly in people between the ages of 20 and 40 years and occurs more often in women than in men^{4,6}. Signs and symptoms of TMDs may be pain, impaired jaw function, malocclusion, deviation or deflection, limited range of motion, joint noise and locking. Headache, tinnitus, visual changes, and other neurologic complaints may also accompany TMDs⁷. TMJ dysfunction is a therapeutic challenge in the oral and

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maxillofacial clinic. Although TMJ pain and dysfunction can be caused by many different aetiological factors, the role played by inflammation as an underlying mechanism of pain and dysfunction of the TMJ has played a major role. TMD patients having pain and tenderness for prolonged period of time will show signs of inflammation biochemically as well as radiographically⁸.

The primary goal in the treatment of TMD is to ease pain or mandibular dysfunction⁹. The treatment options for patients with TMDs can range from conservative to surgical modalities¹⁰. Nonsurgical therapy may include counseling, anti-inflammatory medications, muscle relaxants, habit modification, splint therapy, exercise, physiotherapy (including moist heat, cold laser and ultrasonography) and a soft diet or some combination of these strategies. Surgical therapy ranges from minimally invasive procedures such as arthroscopy to a variety of open-joint procedures^{11,12}.

Arthroscopy has the distinct advantage of allowing direct visualization of the TMJ and fulfills not only a therapeutic role but also a diagnostic one¹³. It also allows for lysis and lavage procedures under direct vision, as well as guided steroid injections^{14,15}. Lysis and lavage of the TMJ were first done using arthroscopy by Ohnishi¹⁶.

Mechanical lysis of adhesions and lavage of the TMJ was often successful in treating various internal derangements¹⁷. Lavage of the upper joint compartment forces the flexible disc apart from the fossa, washes away degraded particles and inflammatory components and decreases the intra-articular pressure whenever the joint is inflamed. Arthroscopic lavage has been reported to reduce joint pain, improve joint function, and reduce clicking. It is most commonly used to treat patients with anterior disc displacement without reduction (closed lock) and disc adhesion. It is also used as a palliative treatment for acute episodes of degenerative or rheumatoid arthritis^{17,18}.

Materials and Methods

This prospective study was carried out at the department of Oral and Maxillofacial Surgery, Military Dental Centre, Combined Military Hospital, Dhaka Cantonment from 01 October 2014 to 31 March 2016. Patients were selected consecutively having TMD and unresponsive to conservative nonsurgical therapy. Total 30 patients were included in the study on the basis of some inclusion and exclusion criteria.

The patients with recent history of pain, limited mouth opening, restricted lateral movement and patients unresponsive to nonsurgical treatment were included in the study. Patients who had masticatory muscle diseases, osteoarthritis, pregnancy, lactation, previous history of arthroscopy and arthrocentesis were excluded from the study. Patients with a history of bony or fibrous adhesion, condylar fractures and with psychological problems were also excluded from the study. Informed consent was taken from all the patients.

The clinical examination was done including the evaluation of the maximal mouth opening measured by the distance between the incisal edges of the upper and lower incisors with the help of a caliper. Determination of the 'range of the lateral and protrusive mandibular movement' measured by the distance between the upper and lower midline on lateral and forward movements by using a caliper.

Pain level and location were determined by the patients self assessment using Visual analogue scale (0=no pain and 10=severe pain)¹⁹. Joint clicking was evaluated by joint score (0=no sound heard even by stethoscope, 1=mild sound heard just by stethoscope, 2=moderate click that can be felt by palpation and 3=severe sound audible by the patient or others)²⁰. After thorough TMJ evaluation and clinical examination, orthopantomogram and cone beam CT scan were done in all the patients. Routine investigations were also done. The diagnosis of TMD was made on the basis of history, clinical and radiological examination as per the norms laid down by Kaplan²¹.

After proper preparation of the target site, external auditory meatus was blocked with cotton soaked in normal saline. Two points of insertion were marked over the skin. A line was drawn from the middle of the tragus to the outer canthus. The posterior entrance point was located along the cantho-tragal line, 10 mm from the middle of the tragus and 2 mm below the line. The exit point was located 10mm further along the line and 10mm below it. After a small stab incision a sharp obturator followed by a dull obturator was inserted in the upper joint cavity from posterior entry point and another sheath was inserted at anterior exit point. With the visualization of joint cavity by arthroscopy machine lactated Ringer's irrigation solution was injected through posterior entry point into the joint space to distend the capsule and it was coming out through anterior exit point (Fig-1 and Fig-2).



Fig-1: TMJ Arthroscopy Machine and Accessories.



Fig-2: Arthroscopic lavage with double puncture technique.

Of 30 patients, 18 patients were treated with general anaesthesia and 12 patients with local anaesthesia as well as intravenous sedation. Depending on the symptom, bilateral TMJ lavage was done in 20 patients and unilateral lavage was done in 10 patients.

Results

The age of the patients ranged from 31 to 55 years with the mean age of 42.6 ± 5.79 years. The mean age of the male patients was 42.4 ± 5.97 years and that of female patients was 42.7 ± 5.85 years. There was no statistically significant difference between age of male and female patients ($p > 0.05$). Maximum patients (40%) were in the age group of 41-45 years (table-I), followed by age group 36-40 years and 41-45 years (20% in each group).

Table-I: Frequency distribution of the patients as per age and sex of patients (n=30)

Age group in years	Sex		Total f (%)	P (between sex)
	Male (n=10) f (%)	Female (n=20) f (%)		
31-35	1 (10)	2 (10)	03 (10)	0.896*
36-40	2 (20)	4 (20)	06 (20)	
41-45	4 (40)	8 (40)	12 (40)	
46-50	2 (20)	4 (20)	06 (20)	
Above 50	1 (10)	2 (10)	03 (10)	
Total	10 (33.3)	20 (66.7)	30 (100)	
Mean\pmSD	42.4\pm5.97	42.7\pm5.85	42.6\pm 5.79	

*Difference between the mean of two sexes is not significant

Table-II: Changes of maximal mouth opening after arthroscopic lavage (n=30)

Group	Maximal mouth opening (mm)		
	Range	Mean	SD
Before the procedure	20-40	29.87	6.263
1 week after	24-45	35.43	5.888
1 month after	33-47	40.43	4.281
6 month after	41-49	44.97	2.942
Comparison	T/F	P	
Before Vs after 1 week	3.547	0.001*	
Before Vs after 1 month	7.629	0.000*	
Before Vs after 6 months	11.953	0.000*	
ANOVA	50.273	0.000*	

* Differences are highly significant

Before starting intervention, the maximal mouth opening was 29.87 ± 6.26 mm with a range of 20-40 mm which was increased to 44.97 ± 2.94 mm ($p < 0.001$) with a range of 41-49 mm after 6 month of arthroscopic lavage (Table-II).

All the patients had restricted lateral movement of mandible before starting the procedure and the mean lateral movement was 6.47 ± 1.06 mm on the right side and 6.50 ± 0.98 mm on the left side. Six months after the arthroscopic lavage, mean lateral movement was increased to 9.50 ± 0.77 on the right side and 9.37 ± 0.78 mm on the left side (Table-III). The differences are statistically highly significant ($p < 0.001$).

Table-III: Change of lateral mandibular movements after arthroscopic lavage (n=30)

Group	Lateral mandibular movements					
	Right			Left		
	Range	Mean	SD	Range	Mean	SD
Before the procedure	5-8	6.47	1.066	5-8	6.50	0.983
1 week after	6-9	7.57	0.796	6-9	7.40	0.747
1 month after	7-10	8.20	1.710	7-10	8.35	0.734
6 month after	8-11	9.50	0.766	8-11	9.37	0.776
Comparison	Right			Left		
	T / F	P		T / F	P	
Before Vs after 1 week	3.993	0.000*		4.528	0.000*	
Before Vs after 1 month	8.275	0.000*		4.711	0.000*	
Before Vs after 6 months	12.54	0.000*		12.657	0.000*	
ANOVA	36.445	0.000*		68.543	0.000*	

* Differences are highly significant

Table-IV: Change in degree of pain after arthroscopic lavage (n=30)

Group	Degree of pain (0-10)		
	Range	Mean	SD
Before the procedure	6-10	7.73	1.413
1 week after	5-9	6.27	1.202
1 month after	2-6	3.87	1.042
6 month after	1-4	1.83	0.986
Comparison	T / F		P
Before Vs after 1 week	4.332		0.000*
Before Vs after 1 month	12.067		0.000*
Before Vs after 6 months	18.762		0.000*
ANOVA	148.235		0.000*

*Differences are highly significant

The mean pain score among the studied patients was 7.73 in visual analogue scale before the procedure and was significantly reduced ($p < 0.001$) six months after arthroscopic lavage (Table-IV). The mean joint clicking score was 1.73 ± 1.13 with a range of 1-3 before procedure and after six months of arthroscopic lavage the mean joint clicking score was reduced to 0.026 ± 0.46 (Table-V). The differences are statistically highly significant.

Table-V: Change in degree of joint clicking after arthroscopic lavage (n=30)

Group	Degree of Joint Clicking(0-3)		
	Range	Mean	SD
Before the procedure	1-3	1.73	0.740
1 week after	0-3	1.43	0.858
1 month after	0-2	0.63	0.669
6 month after	0-1	0.27	0.450
Comparison	T / F		P
Before Vs after 1 week	1.45		0.152
Before Vs after 1 month	6.042		0.000*
Before Vs after 6 months	9.280		0.000*
ANOVA	28.897		0.000*

* Differences are highly significant

Discussion

Temporomandibular joint disorder (TMD) is one of the common but neglected condition in Bangladesh like most of the third world countries. It is one of the most challenging diseases of modern society, diagnostically, prognostically and in terms of treatment.

TMD most commonly occurs in age group between 20-50 years^{22,23}. In this study most common age group observed was 41-45 years (40%), followed by the age group 36-40 and 46-50 (20% in each group) and of the total patients the age ranged from 31 to 55 years. The mean age of the studied patients was 42.6 ± 5.79 years. In the present study male female frequency ratio was 1:2. Similar results were observed by many studies that TMDs occur more frequently in female than male²⁴⁻²⁷.

The role of arthroscopic lavage and accompanying process of arthrolysis has shown excellent success rates in treatment of TMDs. This process has shown to reduce pain and improve joint mobility, sometimes even effective in relief of patients' suffering from advanced stages of degeneration and dysfunction^{17,28,29}. In the present study it was revealed that there was significant improvement of joint pain and jaw mobility ($p < 0.000$). Arthroscopic lavage has been advocated as a potentially more effective than simple arthrocentesis, because the larger diameter portal used in lavage would enable more extensive removal of inflammatory mediators³⁰.

Significant improvement can be achieved by arthroscopic lysis and lavage to treat those patients with painful clicking or popping to release intra-articular adhesions and anteriorly displaced non reducing discs and to confirm

other diagnostic findings that could warrant surgical intervention^{17,31}. In the present study there was also significant improvement of joint function and also significant reduction of joint pain and clicking after arthroscopic lavage ($p < 0.001$).

Conclusion

TMDs are frequent and wide spread in general population. The patients with TMD need surgical intervention only when nonsurgical therapy fails. Arthroscopic lavage is a minimally invasive surgical procedure for the treatment of TMDs. Clinical success of arthroscopy is based on several factors. Lysis and lavage remove intra articular inflammatory and pain mediators. The release of fibrillations and adhesions as well as improvement in discal mobility allows to distribute the functional stresses on the articular tissues and adverse loading on the joints is decreased. The results of current study revealed that there was significant reduction in TMJ pain and joint clicking. There was also significant increase in maximal mouth opening, lateral movements after a period of 6 months follow up and suggested potential utility of arthroscopic lavage in the management of TMDs. Further research involving a larger sample and a longer follow up period is suggested along with extensive work involving specificity of technique and more knowledge on the aetiology of the TMDs.

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