

ORIGINAL ARTICLE

EFFICACY OF ARTHROCENTESIS WITH STEROID IN MANAGEMENT OF INTERNAL DERANGEMENT OF TEMPOROMANDIBULAR JOINT

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ABSTRACT:

Background: The aim of this study was to compare the efficacy of arthrocentesis with arthrocentesis plus steroid in the treatment of temporomandibular joint (TMJ) internal derangements. **Materials and Methods:** This study was conducted in Oral maxillofacial department from Jan. 2013 to Dec 2015. A total of 30 patients who had been diagnosed with internal derangements (20 females and 10 males) aged 20-42 years were involved in this study. Arthrocentesis was performed under aseptic conditions. All patients were clinically evaluated before the procedure, and 1 week and 6 months after the procedure. Intensity of TMJ pain and maximal mouth opening, right lateral movements, left lateral movements and protrusive movements were recorded at each follow-up visit. **Results:** Both groups showed reduction in pain scores, improvement in mouth opening, right lateral movements, left lateral movements and protrusive movements; however, the addition of steroid did not improve the overall outcome of the procedure. **Conclusion:** Temporomandibular joint arthrocentesis with steroid should be considered as an effective and efficient alternative to more invasive surgical procedures for a selected group of patients and as a minimally invasive, highly effective procedure in the treatment of patients with internal derangement of the TMJ with closed lock.

Key words: Arthrocentesis, internal derangement, steroid, temporomandibular joint.

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INTRODUCTION

The term temporomandibular disorder (TMD) is defined as “collective term embracing a number of clinical problems that involve the masticatory musculature, the temporomandibular joint and associated structures, or both. Temporomandibular disorders are considered to be a sub-classification of musculoskeletal disorders and are a major source of orofacial pain of non-dental origin.”¹

The term “internal derangement” was introduced by Hey in 1814 as a general orthopedic term for a localized mechanical fault in a joint, but was later

used more specifically to describe displacement of the TMJ disc.²

Internal derangement of the temporomandibular joint (TMJ) is disruption within the internal aspects of the TMJ in which there is a displacement of the disc from its normal functional relationship with the mandibular condyle and the articular portion of the temporal bone.³

Traditionally, internal derangement of the TMJ has been described as a progressive disorder with a natural history that may be classified into four consecutive clinical stages. Stage one has been described as disc displacement with reduction, stage

two as disc displacement with reduction and intermittent locking, stage three as disc displacement without reduction (closed lock), and stage four as disc displacement without reduction and with perforation of the disc or posterior attachment tissue (degenerative joint disease).^{4,5}

Arthrocentesis was introduced by Nitzan *et al*⁶ in 1991 which involves irrigation of the upper joint compartment with a therapeutic substance, releasing adhesions, and flushing out inflammatory substrates, thereby relieving pain and improving function.

Farrar⁷ has estimated that up to 25% of the entire population has an internal derangement, which is usually treated with non-surgical methods initially.

Arthrocentesis has low morbidity, few risks and low cost compared to other TMJ surgical interventions, and may be conducted under local anesthesia in an outpatient clinic setting.

The aim of this study was to compare the efficacy of arthrocentesis with arthrocentesis plus steroid in the treatment of temporomandibular joint (TMJ) internal derangements.

INDICATIONS⁸

1. Dislocation of the articular disc with or without reduction.
2. Limitations of mouth opening originating in the joint.
3. Joint pain.
4. Internal derangements of the TMJ.

MATERIALS AND METHODS

This study was conducted in the oral and maxillofacial department from Jan. 2013 to Dec 2015. A total of 30 patients (20 females and 10 males) aged 20-42 years were involved in this study. A case history proforma was designed and relevant information was recorded. All the patients selected for the study had been diagnosed with TMJ internal derangement with closed lock through clinical and radiographic examination (magnetic resonance

imaging). A written consent was obtained from the patients for treatment and associated complications. The patients were divided into two groups of 15 patients each. First group underwent only arthrocentesis while the other group underwent arthrocentesis followed by a single injection of triamcinolone acetonide (20 mg) into the joint.

TMJ ARTHROCENTESIS

All procedures were done by a single surgeon. Procedures were done under local anesthesia and sedation. Nitzan *et al.*'s (1991)⁶ surgical technique was used. A line was drawn from the corner of the eye - tragus and the first mark was made 10mm from the tragus and 0.5mm below the line. The second point was marked 20mm from the tragus and 1mm below the line. A 40x12 needle was placed on each point. First group underwent only arthrocentesis with about 100 ml of Ringer's lactate while the other group underwent arthrocentesis followed by a single injection of triamcinolone acetonide (20 mg) into the joint. After the lavage was completed, the needles were removed, and the patient's jaw was gently manipulated by the clinician in the vertical, protrusive and lateral excursions to help further release the disc and break the adhesions. The patients were then followed up at 1 week and 6 months. Following parameters were recorded such as mandibular movements (maximum mouth opening, right and left laterality, and protrusion), deviation on maximum mouth opening, pain on mandibular movements, which was catalogued according to the pain visual analog scale. A visual analog scale (VAS) was used to score pain (range 1-10), where 1 denoted no pain at all, and 10 denoted very severe pain. These values were recorded at 1-week, and at 6 months postoperatively.

The results were compared both pre- and post-operatively. Results thus obtained were tabulated and analyzed.

RESULTS

Table I: Comparison of Pain between the two groups

Group	Mean Preoperative Pain	Mean Postoperative Pain	
		1 Week	6 Months
Arthrocentesis only (group 1) (n=15)	5.4	2.8	1.3
Arthrocentesis plus steroid (group 2) (n=15)	5.6	2.9	1.5

Table II: Comparison of maximum mouth opening (mmo) between the two groups

Group	Mean Preoperative Mmo (mm)	Mean Postoperative Mmo (mm)	
		1 Week	6 Months
Arthrocentesis only (n=15)	24	35	43
Arthrocentesis plus steroid (n=15)	24.8	34.4	43.2

Table III: Comparison of right lateral movements between the two groups

Group	Preoperative Lateral Movement To The Right	Postoperative Lateral Movement to the Right	
		1 Week	6 Months
Arthrocentesis only (n=15)	8	10	12
Arthrocentesis plus steroid (n=15)	7	9	11

Table IV: Comparison of left lateral movements between the two groups

Group	Preoperative lateral movement to the left	Postoperative lateral movement to the left	
		1 week	6 months
Arthrocentesis only (n=15)	9	9	11
Arthrocentesis plus steroid (n=15)	9	9.5	10

Table V: Comparison of protrusion movements between the two groups

Group	Preoperative protrusion movement	Postoperative protrusion movement	
		1 week	6 months
Arthrocentesis only (n=15)	9	9	11
Arthrocentesis plus steroid (n=15)	9	9.5	10

Table I indicates pain in two groups. Group 1 had mean preoperative pain 5.4 which decreased to 2.8 in 1 week and 1.3 in 6 months. Group 2 had mean preoperative pain 5.6 which decreased to 2.9 in 1 week and 1.5 in 6 months.

Table II indicates maximum mouth opening (mmo) between the two groups. Group 1 had MMO of 24mm preoperatively, which became 35mm in 1 week and 43mm after 6 months. Group 2 had MMO of 24.8mm preoperatively, which became 34.4mm in 1 week and 43.2mm after 6 months.

Table III shows right lateral movements between the two groups. Group 1 had better postoperative lateral right movements as compare to group 2.

Table IV shows left lateral movements between the two groups. Group 1 had better postoperative lateral left movements as compare to group 2.

Table V shows protrusive movements between the two groups. Group 1 had better postoperative protrusive movements as compare to group 2.

DISCUSSION

TMJ disorders are accompanied by pain, limitation, and deviation in mandibular range of motion, TMJ sounds, headache, and facial pain. Among these, internal derangement and TMJ osteoarthritis are the most common disorders, ranging from normal mouth opening and clicking to varying degrees of pain, restricted mouth opening, and loss of functional activity.⁹

Arthrocentesis is the most recent surgical approach for internal derangement of the TMJ. It is commonly defined as a lavage of the joint and is traditionally accomplished without viewing the joint space. It may be completed under local anesthesia as an office procedure, with or without the addition of sedation, and its primary purpose is to clear the joint of tissue debris, blood and pain mediators that are believed to be byproducts of intra articular inflammation.¹⁰

In the past many cases of anterior displacement of the disc or closed lock that did not improve with medical treatment (bite plates, muscle relaxants, compresses, diet and physical therapy) were initially treated with surgical repositioning of the disc and arthroplasty of the mandibular fossa. Arthrocentesis has an intermediate place between the medical and the surgical forms of treatment. Ease, lower cost of materials and excellent published results so far include this technique in the international protocol for the treatment.¹¹

Efficacy of arthrocentesis in management of internal derangement of the TMJ as recorded by various authors are as Murakami et al¹². (1995) - 70%; Dimitroulis et al¹³. (1995) - 98%; Hosaka et al¹⁴. (1996) - 79%. These studies suggest that arthrocentesis is an efficient method with relatively high success rates.

Lavage of the upper joint space reduces pain by removing inflammation mediators from the joint, increasing mandibular mobility by removing intra-articular adhesions, eliminating the negative pressure within the joint, recovering disc and fossa space and improving disc mobility, which reduces the mechanical obstruction caused by the anterior position of the disc.¹⁵ In our study, VAS was slightly lowered in group 1 as compare to group 2. The results did not support the clear superiority of one treatment protocol over the others to achieve pain management in TMJ inflammatory-degenerative joint disease over a short-term, namely a 6-month follow-up period.

Nitzan has noted the results obtained at three centres (in Japan, Israel and the United States) to determine the efficacy of arthrocentesis in the management of closed lock. Lactated Ringer's solution or normal saline was injected into the upper joint space to increase intra-articular pressure and lavage the joint. The results in 68 patients presenting with symptoms of severe closed lock included a maximal-mouth-opening increase from an average of 25.29 mm to 43.6 mm. Overall, arthrocentesis was successful in 94.1% of patients. The follow-up times ranged from 2 to 36 months, with no reports of relapse.¹⁶

Because the success rates with arthrocentesis are similar to those of arthroscopic lysis or lavage, Nitzan believes that a major part of the success of surgical arthroscopy in the treatment of severe closed lock is attributable to the lavage rather than to the surgical instrumentation.¹⁶ In our study we observed improved movements such as right lateral movements, left lateral movements, protrusive movements. Group 1 showed slight more improvement as compare to group 2. But the addition of steroids does not help to alleviate the symptoms of TMJ derangements.

Complications are rare in arthrocentesis and occur more often with arthroscopy.¹⁷ Nevertheless, potential complications may develop with arthrocentesis, such as damage to capsular tissues and discal tissue, increased risk of the facial nerve injury, preauricular hematoma, middle ear injury, and intra-articular instrument breakage. Redundant injury of the capsule by needles can also aggravate inflammation in the joint and increase the incidence of solution extravasation to neighboring tissues when the arthrocentesis is finally performed.¹⁸⁻²¹

CONCLUSION

Temporomandibular joint arthrocentesis and lavage with manipulation is a simple, less invasive and less expensive technique than TMJ arthroscopy with low morbidity rates. It should be considered as an effective and efficient alternative to more invasive surgical procedures for a selected group of patients and as a minimally invasive, highly effective procedure in the treatment of patients with internal derangement of the TMJ with closed lock.

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