

# EFFECTIVENESS OF ARTHROCENTESIS IN TREATMENT OF TEMPOROMANDIBULAR JOINT DISORDERS: A DOUBLE BLIND, RANDOMISED CONTROLLED TRIAL

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## ABSTRACT

*Many surgical and non-surgical treatment modalities have been used to reduce pain in patients with temporomandibular joint disorders (TMDs). This study was conducted to assess the effectiveness of arthrocentesis in relieving pain in patients with TMDs in a sample of Pakistani population.*

*Both male and female of age above 18 years with complaint of pain in TMJ as diagnosed by history, clinical examination and radiographic examination were included in the study. One hundred & four patients were included in the study through random sampling technique and divided into two groups. Patients in group A were treated with conservative measures and arthrocentesis procedure. Patients in group B were only treated with conservative measures. The pain scores were recorded at pre-intervention and 1st day, 7th day and 14th day after intervention in both groups using visual analogue scale.*

*The mean age of patients was recorded in both groups. 42.3 percent of patients in group A were males while group B had 36.5% males. A reduction in pain was seen in both groups, with a statistically significant difference on 7th and 14th day.*

*TMJ arthrocentesis can be an effective treatment modality when conservative measures alone fail to relieve the TMJ pain. It can also prove to be an effective adjunct to the conservative measures for treating the patients with temporomandibular disorders.*

**Key Words:** *Temporomandibular disorders, Arthrocentesis, TMJ Internal Derangement (ID).*

## INTRODUCTION

Temporomandibular joint disorders (TMDs) are a variety of related disorders which involve diseases of the temporomandibular joint (TMJ).<sup>1</sup> The etiology of this disorder is thought to be derived from multiple factors. Internal derangement (ID) of the TMJ constitutes a major portion of patients affected by TMDs. Internal derangement can manifest in different clinical forms such as disc displacement with or without reduction and anchored disc phenomenon etc.<sup>2</sup> Other common disorders include myofascial pain syndrome &

osteoarthritis.<sup>3</sup> First line of treatment for most of these cases is by non-surgical measures including behavioral modification, physical therapy, pharmacotherapy and intra oral appliances.<sup>4</sup>

Many patients with TMDs improve with reversible non-surgical treatment, however, when conservative measures fail to correct the problem, surgical methods are used to improve pain and masticatory function of the patients.<sup>5</sup> Surgical treatments for TMJ include recontouring of articular disc, repositioning of disc and in cases of end stage TMDs, replacement of entire joint.<sup>6</sup> Surgical intervention in patients with this disorder bears many risks and possible long term sequelae.<sup>7</sup> Arthrocentesis has been successfully used to treat the TMDs. It is defined as aspiration of fluid from a joint or lavage of the joint a joint lavage which flushes out all the inflammatory mediators resulting in cessation of the deleterious effects being caused by the inflammation.<sup>5,8,9</sup> In addition, it breaks the adhesions formed between the disc and articular fossa.<sup>9,10</sup> This can be very useful in cases of patients suffering from anchored disc phenomenon as arthrocentesis results in disc returning to its normal anatomic relationship.<sup>11</sup>

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This eventually helps in improving mouth opening of patients.

Arthrocentesis has proven to be very effective as numerous studies have shown the diagnostic and therapeutic value of arthrocentesis while emphasizing the low incidence of associated complications.<sup>12</sup> Studies have been carried out to determine the effect of arthrocentesis on synovial fluid level of cytokines. Outcome analysis of major studies by Gulen et al<sup>13</sup> and Nitzan et al<sup>14</sup> pertaining to the treatment by arthrocentesis have shown success rates between 70% and 100%.

In patients who fail to respond to conventional measures, arthrocentesis should be attempted for relief of pain before considering any invasive surgical option for the patient. It is a simple technique which is inexpensive and minimally invasive.<sup>29,30</sup> By conducting this study, we will be able to make an assessment of effectiveness of arthrocentesis in relieving TMJ pain in a sample of Pakistani patients referred to a tertiary care hospital in Rawalpindi area.

## METHODOLOGY

Written consent was taken after explaining risk and benefit of therapy to the patient and informed consent was taken from the ethical committee of AFID for inclusion of patients in the study.

This randomized controlled trial was conducted at oral and Maxillofacial Surgery Department, Armed Forces Institute of Dentistry (AFID), Rawalpindi. Both male and female of age 18 years and above with complaint of pain in TMJ as diagnosed by history, clinical examination and radiographic examination were included in the study. Patients presenting with clinical and radiographic signs of advanced degenerative bony changes, patients with co-morbid medical conditions, patients who had a history of surgery for TMJ disorder and infection in and around temporomandibular joint were excluded from the study. The sample size of 104 was calculated by using Epi info (3.4.1) with 68% maximum expected frequency and 63% worst acceptable frequency at 95% confidence interval. Total 104 patients were randomly divided into two groups group A and group B of 52 each through random numbers table.

Orthopantomograph was taken for all the patients to exclude any bony pathology and CT Scans and MRI were taken only if required. After inclusion of subjects in the study, their pain scores were recorded using the visual analog scale (VAS) as follows;

A horizontal line 10 cm long was used with verbal cues in either end, such as "No pain at all" and "Worst pain ever". Patients were instructed to make a vertical line at the point that corresponded with their pain. That mark was measured from the left of the line with a millimeter ruler and a numerical value was assigned using a 0-10 scale.

After recording pre op scores, both the group A and group B patients were treated by conventional conservative measures. All the patients were given the same NSAID, Ibuprofen. In group A arthrocentesis was performed additionally as follows:

After proper preparation of target site, the points of needle insertion was marked by McCain's method of arthroscopy, a line was drawn from the middle of tragus to outer canthus. The posterior entrance point was drawn from middle of tragus to outer canthus. The posterior entrance point was located along canthotragal line, 10 mm from the middle of tragus and 2 mm below the line. The anterior point of entry was placed 10 mm further along the line and 10 mm below it. After giving local anesthesia in the area, lactated ringer's solution was inserted into the superior compartment by 19 gauge needle connected to a syringe.

Patients were followed up for any improvement in pain at 1st, 7th and 14th post op day and their pain scores were measured by VAS. All the scores were entered in the patient's proforma. The pain scores were then categorized into mild, moderate and severe groups as follows;

Mild= 1-3. Moderate= 4-6. Severe= 7-10.

The data was analyzed through SPSS version 10. Descriptive statistics were used to describe the results. Chi square test was applied to compare qualitative variables between both the groups. A p-value < 0.05 was considered significant.

## RESULTS

The data was analysed SPSS version 10. Descriptive statistics were used to analyse the results. Chi square test was applied to compare qualitative variables between both the groups. A p-value < 0.05 was considered as significant. One hundred and four patients were included in the study and randomly divided into two equal groups of 52 each. Majority of the patients were between 41 to 50 years of age i.e.27 (51.9%) in each group (Fig 1). There were 22 (42.3%) males in group A while in group B there were 19 (36.5%) males in group B. Both groups are comparable with respect to gender (p = 0.547) and age (p = 1.000). Duration of pain was constant in 40 (76.9%) patients in group A while it was intermittent in 35 (67.3%) patients in group B with insignificant difference (p = 0.274).

Comparison of pain at different times between both the groups is summarized in Table 1. Independent sample T test was used to compare the means of the two groups, male and female, with p-value of less than or equal to 0.05. There was no statistical difference between the male and female groups. Paired sample T test between the age groups revealed no statistical difference between the age groups revealed no statistical difference between the age groups and pain score.

TABLE 1: COMPARISON OF PAIN AT DIFFERENT TIMES BETWEEN THE TWO GROUPS

Pain score	Group A (n=52)	Group B (n=52)	P-value
<b>Pre-operative</b>			
Moderate pain	5(9.6%)	3(5.8%)	0.715
Severe pain	47(90.4%)	49(94.2%)	
<b>1st post operative day</b>			
Moderate pain	6(11.5%)	5(9.6%)	0.750
Severe pain	46(88.5%)	47(90.4%)	
<b>7th post operative day</b>			
Mild pain	16(30.8%)	6(11.5%)	0.022
Moderate pain	22(42.3%)	21(40.4%)	
Severe pain	14(26.9%)	25(48.1%)	
<b>14th post operative day</b>			
No pain	14(23.1%)	2(3.8%)	0.005
Mild pain	17(32.7%)	11(21.2%)	
Moderate pain	15(25.8%)	24(46.2%)	
Severe pain	8(15.4%)	15(28.8%)	

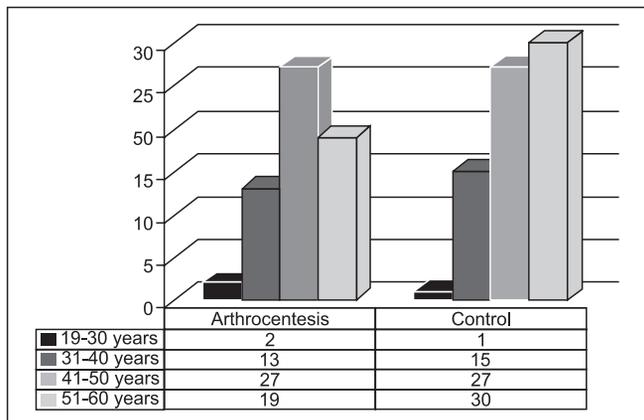


Fig 1: Description of age groups among the two groups

## DISCUSSION

There are many treatment options which are used for management of temporomandibular disorders, ranging from medication, physiotherapy, minimally invasive procedures such as arthrocentesis to invasive surgical procedures such as eminoplasty, discectomy, condylotomy and joint replacement surgery.<sup>6,16</sup> Joint pain may result in impairment of mandibular function; therefore the treatment of temporomandibular disorders is usually aimed at improving mandibular function by reducing pain.<sup>15</sup> In cases where conservative measures fail to provide relief to the patient, arthrocentesis is recognized as a first line surgical intervention as it removes inflammatory mediators from the joint and helps eliminate pain from the TMJ.<sup>14,18,20</sup>

Arthroscopic studies have confirmed the theory that inflammatory processes of synovium, capsule or

the retrodiscal tissue are the underlying cause for the occurrence of TMJ pain.<sup>17</sup> The synovial fluid aspirate analysis showed that these conditions may play a part in the pathogenesis of TMJ related pain and dysfunction.<sup>21</sup> The inflammatory mediators such as bradykinin and interleukins are considered to cause pain sensations in the joint region.<sup>22</sup> Pain can get relieved by flushing away these mediators.<sup>24,25</sup> The therapeutic procedures such as arthrocentesis are considered to correct the dysfunctional state and pain by washing away the inflammatory products, lubricating joint surfaces and promoting healthy synovial fluid production.

In patients where arthrocentesis fails to reduce pain to a desired level, the causes of failure should be assessed. Various factors need to be considered, most important of all factors is the case selection as its clearly evident that arthrocentesis is not going to be effective in patients of TMJ disorders with advanced internal derangement which results in disc perforation, osteophyte formation and cortical erosion of articular surfaces.<sup>14</sup> In some cases where patients are suffering from both myofascial pain dysfunction (MPDS) and joint disorder, arthrocentesis alone is not effective in reducing the pain.<sup>8,19</sup> In such cases MPDS should be treated with other means along with arthrocentesis to control the pain.

In our study arthrocentesis was performed to assess improvement in pain in TMJ by using a commonly applied one dimensional pain measurement method called visual analogue scale (VAS). Many studies on TMJ pain assessment have used VAS to assess the pain intensity in the TMJ region.<sup>14,23</sup> Smolka W et al<sup>23</sup>, Nitzan et al<sup>14</sup>

and various others have used VAS in order to assess the pain level in TMJ before and after arthrocentesis. The success rates of arthrocentesis in TMD patients have been found to be very high in recent studies, ranging from 90 to 100%.<sup>26</sup> In a study conducted by San Roman, the mean VAS was 10 preoperatively which reduced to 2 following the arthrocentesis. Similarly a mean score of 2.15 was found after arthrocentesis was performed in patients who had a mean VAS score of 5.68. In our study the preoperative and post operative follow up evaluation of TMJ pain were accomplished by patient self-assessment using VAS. The mean VAS score was found to be 7.36 preoperatively and 2.83 postoperatively in the arthrocentesis group. In the control group the mean VAS score was 7.34 preoperatively and 4.82 postoperatively. Patients were prescribed NSAIDs to relieve post surgical pain. In our study the use of NSAID was standardized, that is, all patients were prescribed the same drug Ibuprofen in a dose of 400mg three times daily. In this study, arthrocentesis was performed in addition to conventional measures for management of temporomandibular disorders to reduce the pain in TMJ due to various temporomandibular disorders. After lavage of the inflamed synovial fluid, pain is considerably reduced which in turn improves joint function. This improved function of the joint enables its lubrication and nutrition as well as absorption of the medications such as NSAIDs.<sup>14</sup> Following arthrocentesis conservative measures in the form of occlusal splints, physiotherapy and pharmacotherapy should be advised as next step of rehabilitation.<sup>27</sup>

Temporary facial paresis caused by local anesthesia or swelling of the neighbouring tissues caused by perfusion of Ringer's solution may occur during arthrocentesis.<sup>28</sup> In our study no facial paresis was found and three patients suffered mild swelling in the TMJ region following arthrocentesis, which was transient and resolved in one day.

## CONCLUSION & RECOMMENDATIONS

TMJ arthrocentesis is highly efficient in resolving signs and symptoms associated with temporomandibular disorders. TMJ arthrocentesis can be an effective treatment modality when conservative measures alone fail to relieve the TMJ pain. It can also prove to be an efficient adjunct to the conservative measures for treating the patients with temporomandibular disorders.

TMJ arthrocentesis is a blind procedure as surgeon can not directly visualise the joint cavity, so it is recommended that only experienced or trained surgeons should perform this procedure. This study assessed the effect of arthrocentesis on reduction of pain in TMJ. Additional research is needed to assess the effect of arthrocentesis on mandibular function such as jaw opening.

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<b>Dr Mohsin Fazal, Dr Syed Gulzar Ali Bukhari:</b>	Acquisition of data
<b>Dr Mohsin Fazal:</b>	Analysis and interpretation of data
<b>Dr Mohsin Fazal, Dr Owais Khalid Durrani:</b>	Drafting of manuscript
<b>Dr Owais Khalid Durrani, Dr Mohsin Fazal:</b>	Critical revision