

## Quality of Life in Patients Undergoing Arthrocentesis for Temporomandibular Joint Internal Derangement - A Retrospective Study

Research Article

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### Abstract

Temporomandibular joint (TMJ) dysfunction is a therapeutic challenge to doctors in day-to-day life due to the complex nature of the joint and the underlying mechanism of pain. The aim of this retrospective study was to evaluate the quality of life in patients undergoing arthrocentesis for TMJ disorders in Saveetha Dental College. This hospital-based retrospective study was conducted at Saveetha Dental College, Department of Oral and Maxillofacial Surgery, Chennai, Tamil Nadu, from July 2019 to March 2020. All consecutive case records of patients who underwent arthrocentesis for TMJ internal derangement were included in the study. Patients' data was retrieved from the hospital digital data registry which included demographic details of the patients, etiological factors, diagnosis of the disorder, pre and postoperative mouth opening, visual analogue scale (VAS) scores for pain, and type of viscosupplementation used for the arthrocentesis. Statistical analysis was performed using the SPSS software (version 19.0; SPSS, Chicago, IL, USA) and results obtained. Probabilities of  $P < 0.05$  were considered statistically significant. Our study included 19 patients who underwent TMJ arthrocentesis consisting of 9 males and 10 females. Ringer's lactate with hyaluronidase was predominantly used for TMJ arthrocentesis among males and females. Disc displacement without reduction is the most common type of TMD in both males and females. Our study showed no statistically significant relationship between the types of visco supplementation received and the mouth opening or pain scores. ( $p > 0.05$ ). A statistically significant association was present between frequency of TMJ arthrocentesis ( $p < 0.05$ ) and need for surgical intervention and a success rate of 94.7% was observed in patients undergoing Arthrocentesis. Our study reinforces the benefits of arthrocentesis in TMJ disorders by relieving pain principally and improving mouth opening and function of the joint. A long-term follow-up and repeated arthrocentesis increase the success rate drastically and almost eliminates the need of surgery in most cases. The type of viscosupplementation although did not have an influence on the outcomes of the procedure, it nevertheless establishes a need to conduct randomised controlled trials with larger sample size in this aspect.

**Keywords:** Arthrocentesis; Hyaluronidase; Internal Derangement; PRP; Temporomandibular Joint.

### Introduction

Temporomandibular joint (TMJ) disorder is an overarching term associated with varied conditions affecting muscles of mastication and face along with the joint itself [1, 2]. It is the second most commonest musculoskeletal problem after chronic low back pain. [3, 4]. It is thus recognised as the most common orofacial condition [5-8]. Treatment methods involve education and counselling,

splint therapy, exercise therapy, pharmacotherapy and manipulation of the mandible. If all these modes fail, surgical options are considered [9, 10].

Arthrocentesis bridges the gap between the non-surgical and surgical treatment modalities [11]. It was introduced by Nitzan et al in 1991 which involved irrigation of the upper joint compartment with therapeutic substance, releasing adhesions, and flushing out

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inflammatory substrates thereby, improving the overall function and relieving pain [12-16]. The aim of this retrospective study was to evaluate the quality of life in patients undergoing arthrocentesis for TMJ disorders visiting Saveetha Dental College and hospital.

## Materials And Methods

### Study design and study setting

We conducted a hospital-based retrospective study at Saveetha Dental College, Department of Oral and Maxillofacial Surgery, Chennai, Tamil Nadu, from July 2019 to March 2020. The study was initiated after approval from the institutional review board. (SDC/SIHEC/2020/DIASDATA/0619-0320).

### Patient Population

A total of 19 patients who underwent arthrocentesis at our centre from July 2019 to March 2020 were enrolled in this retrospective study. Patients with incomplete or missing data, and patients with previous history of TMJ surgery or orthognathic surgery were excluded from the study.

### Data Collection

Data on name, age, sex, etiological factors, diagnosis of the disorder, pre and postoperative mouth opening were recorded along with the visual analogue scale (VAS) scores for pain, type of viscosupplementation used for the arthrocentesis.

All of them underwent double cannula method of arthrocentesis under local anesthesia with 2% lignocaine. The procedure involved the insertion of two 48-gauge needles into the upper joint space with one entering the anterior end point and the other entering the posterior end point gaining reference from the Holmlund-Hellsing line marked prior to the insertion. Complete joint lavage was carried out by flushing 50-100cc of Ringer's lactate solution into the upper joint space. Viscosupplementation was enhanced by injecting 0.5-1mL of hyaluronidase solution or platelet rich plasma of the patient. All patients were prescribed analgesics and muscle relaxants invariably along with physiotherapy exercises and were reviewed after 2 weeks.

## Statistical Analysis

Statistical analysis was performed using the SPSS software (version 20). Descriptive statistics was done. Categorical variables were expressed as frequency and percentage; Continuous variables were expressed as mean ± SD. t-tests and analysis of variance (ANOVA) was used to assess the differences in measures among the groups. Pearson's Chi square test was used to test the association between categorical variables. Probabilities of P < 0.05 were considered statistically significant.

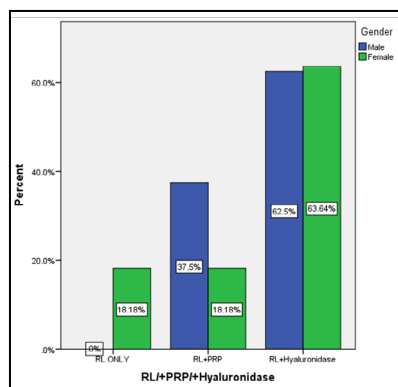
## Results And Discussion

This study included 19 patients who underwent TMJ arthrocentesis consisting of 9 males and 10 females between the age group of 22-55 years. The mean age was 31.05+/-10.24 years. Female predilection was seen with a female to male ratio of 4:3. The gender wise distribution of patients who underwent TMJ arthrocentesis with three types of materials is depicted in Figure 1. In one group only Ringer's lactate solution was used for arthrocentesis. In the second group ringer's lactate with platelet rich plasma was used. In the third group ringer's lactate with hyaluronidase solution was used. Ringer's lactate with hyaluronidase was predominantly used for TMJ arthrocentesis among males and females.

The Patient's chief complaints were pain and limited mouth opening. Clicking sound was heard in 8 patients. The etiological factors observed were habits of clenching in 6 patients, emotional stress in 7 patients, history of previous trauma to the joint in 4 patients and no relevant history in the remaining 2 patients [17]. Disc displacement without reduction (DDw/oR) was observed in 17 patients followed by disc displacement with reduction (DDwR) in 1 patient and Disc degeneration in 1 patient. Disc displacement without reduction is the most common type of TMD in both males and females. [Figure 2]

The chief complaint was pain in 94.7% of the patients preoperatively with a preoperative VAS score ranging from 4-9 with a mean of 5.95+/-1.26 and the postoperative VAS score ranged from 2-5 with a mean of 2.75+/-0.85. Most patients (n=18) showed lesser signs of dysfunction during their follow up except for 1 patient who had to undergo high condylectomy and discopexy. The pre-

**Figure 1. Bar chart depicting the gender wise distribution of patients undergoing TMJ arthrocentesis. X-axis represents the three different groups based on the viscosupplementation used for TMJ arthrocentesis and the Y-axis represents the number of male and female patients who underwent arthrocentesis. Female predilection was seen with a female to male ratio of 4:3. Ringer's lactate with hyaluronidase was predominantly used for TMJ arthrocentesis among males and females.**



operative mouth opening ranged from 18-48mm with a mean of 31.34+/-7.46mm while the postoperative maximum mouth opening ranged between 22-48mm with a mean of 37.0+/-7.76mm showing improvement clinically. The one-way analysis of variance (ANOVA) showed no statistically significant relationship between the types of viscosupplementation received and the mouth opening or pain scores. (p>0.05).

The present study showed a clinically significant increase in mouth opening from 13-45mm which are similar to the findings reported by Nitzan et al.[9, 18-22] Hence, it is noteworthy that the patients perceived pain relief, decreased or nil clicking and improved mouth opening and function following arthrocentesis although the analysis showed that the results were statistically not significant.

The overall success rate from our study is 94.7% for arthrocentesis with only one patient having to undergo High condylectomy and discopexy for improved function. On evaluating the association between frequency of TMJ arthrocentesis and need for surgical intervention, the results were statistically significant. Pearson's Chi square test (p<0.05). Thus, a statistically significant association was present between frequency of TMJ arthrocentesis and need for surgical intervention. A success rate of 94.7% was observed in patients undergoing arthrocentesis and there was no need for surgical intervention except in one patient [Figure 3]. This is possibly the highest success rate recorded so far where previous studies stand at 83.2% by Al Bealsy et al (n=9), 75% by Danny Ben et al (n=7). (22,23) Also the success rates have been reported to

increase upto 95% with follow up for a period of 3 years. (18) In our study repeated arthrocentesis could also be responsible for higher success rates and has been reported to be more beneficial in treatment of disc displacement without reduction [19].

Many authors believed that age has an effect on the success rate of arthrocentesis but, Haitham et al has reported that there is no significant relationship and results obtained in this study is in agreement with the study [20]. The current study shows strong female predilection with incidence in 57.9% of the population against 42.1% males. The possible reason could be due to the presence of estrogen receptors identified in female human TMJ's which are absent in male human TMJ's inhibiting cartilage synthesis. These receptors play a role in inhibiting the cartilage synthesis. [21, 24].

In our study, the viscosupplementation was chosen at random nevertheless it had no influence on the outcome of the treatment. Studies reported by Onur Yilmaz et al showed that hyaluronic acid injection into the joint space after arthrocentesis results in better outcome than arthrocentesis alone [25]. In our study the use of PRP with arthrocentesis also showed no significant results which is in alignment with the findings of Marey Chatles et al [26] Treatment success is higher in patients with acute pain and short duration of pain history [27-30]. Although our study did not aim to find the duration of the presenting illness, a correlation was found between duration of illness and success of the treatment based on the records. Management of TMJ disorders requires multidisciplinary skills and a right diagnosis is always necessary

Figure 2. Bar chart depicting gender wise distribution of patients with TMD disorders. X-axis represents the types of TMD and the Y-axis represents the percentage of male and female patients with TMD disorders. Disc displacement without reduction is the most common type of TMD in both males and females.

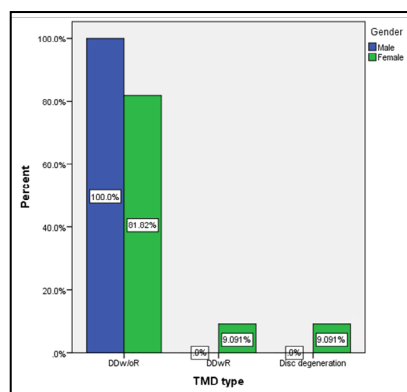
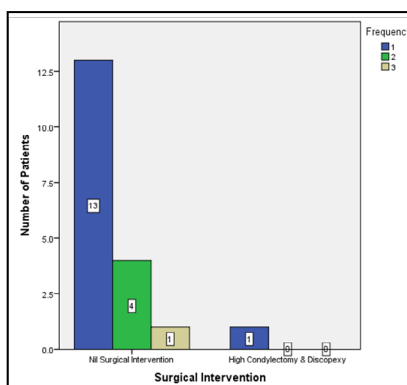


Figure 3. Bar chart X depicting the association between frequency of TMJ arthrocentesis and surgical intervention. X axis denotes surgical intervention done and nil surgical intervention and Y axis denotes the number of patients treated for TMD with arthrocentesis. Frequency indicates the number of times arthrocentesis was performed. Chi square test was done and the results were statistically significant with a p value of 0.016. (p<0.05) Thus, a statistically significant association was observed between frequency of TMJ arthrocentesis and surgical intervention in this study. It is noteworthy that a success rate of 94.7% was observed in patients undergoing Arthrocentesis and only one patient underwent surgery where high condylectomy and discopexy was done.



to offer treatment solutions [31]. The TMJ problems account for 10% of all TMD and initial management is by giving adequate rest, analgesics, muscle relaxants, mouth opening exercises and bite splints [32]. The principal function of arthrocentesis is to release adhesions, wash out inflammatory mediators and thus directly impact the treatment [33]. The key success lies in distention of the joint space, where it can disrupt intra articular adhesions between disc and the joint space, flushing away products of inflammation [34].

## Conclusion

Our study reinforces the benefits of arthrocentesis in TMJ disorders by relieving pain principally and improving mouth opening and function of the joint. Disc displacement without reduction was the most common type of TMD in the population. A long-term follow-up and repeated arthrocentesis increase the success rate drastically and almost eliminates the need of surgery in most cases. Only one patient underwent High condylectomy and discopexy resulting in an overall success rate of 94.7%. The type of viscosupplementation although did not have an influence on the outcomes of the procedure, it nevertheless establishes a need to conduct randomized controlled trials with larger sample size in this aspect.

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