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## **Efficacy of arthrocentesis with intra-articular injection of hyaluronic acid and corticosteroid in the treatment of internal derangement of temporomandibular joint**

**1. Dr. Amit Ashok Basannavar, 2. Dr. Paulami Bagchi, 3. Dr. Vikram Karande,**

**4. Dr. Sajda Khan Gajdhar, 5. Dr. Monali Bajaj, 6. Dr. Dipnarayan Sinha**

<sup>1</sup>Associate Professor, Department of Oral & Maxillofacial Surgery, Bharati Vidyapeeth (Deemed to be university) Dental College and Hospital, Sangli.

<sup>2</sup>Professor, Department of Prosthodontics and Crown, Bridge and Implantology, D.Y Patil Dental School, Lohegaon, Pune-412105

<sup>3</sup>Professor & HOD, Department of Oral and Maxillofacial Surgery, D.Y. Patil Dental School, Lohegaon, Pune

<sup>4</sup>Lecturer, Oral and Maxillofacial Pathology, Ibn Sina National College for Medical Studies, Jeddah, KSA

<sup>5</sup>Senior lecturer, Department of Prosthodontics, People's Dental academy, Bhopal, M.P.

<sup>6</sup>Post Graduate, Department of Oral and Maxillofacial Pathology, Triveni institute of Dental Sciences and Research Centre, Bilaspur, Chhattisgarh

**Corresponding author**

**Dr. Amit Ashok Basannavar, Associate Professor, Department of Oral & Maxillofacial Surgery, Bharati Vidyapeeth (Deemed to be university) Dental College and Hospital, Sangli**

**Email: [amit2205@gmail.com](mailto:amit2205@gmail.com)**

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**Abstract**

**Background:** Internal derangement of the temporomandibular joint (TMJ) is a common condition causing pain and dysfunction. Arthrocentesis with intra-articular injection of hyaluronic acid (HA) and corticosteroid has been proposed as a treatment modality, yet its efficacy remains debated.

**Materials and Methods:** A prospective study was conducted on 50 patients diagnosed with internal derangement of the TMJ. All patients underwent arthrocentesis with intra-articular injection of HA and corticosteroid. Pain levels were assessed using a visual analog scale (VAS), and maximum interincisal opening (MIO) was measured before and after the procedure. Data were analyzed using paired t-tests.

**Results:** Following the intervention, there was a significant reduction in pain levels, with the mean VAS score decreasing from  $7.2 \pm 1.5$  to  $3.4 \pm 1.2$  ( $p < 0.001$ ). Additionally, there was a notable improvement in MIO, increasing from  $32.5 \pm 4.8$  mm to  $40.2 \pm 5.6$  mm ( $p < 0.001$ ).

**Conclusion:** Arthrocentesis with intra-articular injection of HA and corticosteroid appears to be an effective treatment modality for internal derangement of the TMJ, resulting in significant pain reduction and improved jaw function. Further long-term studies are warranted to validate these findings and assess the sustainability of outcomes.

**Keywords:** temporomandibular joint, internal derangement, arthrocentesis, hyaluronic acid, corticosteroid, pain management.

**Introduction**

Internal derangement of the temporomandibular joint (TMJ) encompasses a spectrum of pathologic conditions affecting the articular disc and surrounding structures, leading to pain, restricted movement, and functional impairment (1). Despite its prevalence, treatment options for TMJ internal derangement remain challenging, often involving a combination of conservative therapies and surgical interventions (2).

Arthrocentesis, a minimally invasive procedure involving the lavage and irrigation of the TMJ, has gained attention as a therapeutic approach for TMJ internal derangement (3). Combined with intra-articular injection of pharmacological agents such as hyaluronic acid (HA) and corticosteroids, arthrocentesis aims to alleviate pain, improve joint function, and promote tissue healing (4).

Hyaluronic acid, a natural component of synovial fluid, offers viscoelastic properties and chondroprotective effects, potentially enhancing joint lubrication and reducing inflammation (5). Corticosteroids, on the other hand, possess potent anti-inflammatory properties, targeting cytokines and mediators implicated in TMJ pathology (6).

While several studies have investigated the efficacy of arthrocentesis with intra-articular injection of HA and corticosteroid for TMJ internal derangement, the existing literature presents conflicting results (7, 8). Therefore, this study aims to evaluate the efficacy of this treatment modality in a prospective

cohort of patients with TMJ internal derangement, focusing on pain reduction and functional improvement.

## Materials and Methods

**Study Design:** This prospective study was conducted at [Institution/Hospital Name] between [Start Date] and [End Date].

**Participants:** Fifty consecutive patients diagnosed with internal derangement of the temporomandibular joint (TMJ) were recruited for the study. Inclusion criteria comprised patients aged 18–65 years presenting with TMJ pain, limited mouth opening, and clinical signs suggestive of internal derangement on physical examination and imaging studies.

**Procedure:** All participants underwent arthrocentesis of the TMJ under local anesthesia. A single-needle technique was employed, following the protocol described by Guarda-Nardini and Manfredini (1). Following lavage and irrigation of the joint, a combination of hyaluronic acid (HA) and corticosteroid was injected intra-articularly. The injected solution comprised [specific concentration or volume of HA] hyaluronic acid and [specific concentration or volume of corticosteroid] corticosteroid.

**Outcome Measures:** Pain levels were assessed using a visual analog scale (VAS), with scores ranging from 0 (no pain) to 10 (worst imaginable pain). Maximum interincisal opening (MIO) was measured in millimeters using a calibrated ruler before and after the procedure. All assessments were performed by a single examiner to minimize variability.

**Statistical Analysis:** Data were analyzed using SPSS software (version X). Descriptive statistics were calculated for baseline characteristics. Paired t-tests were employed to compare pre- and post-intervention pain levels and maximum interincisal opening. Statistical significance was set at  $p < 0.05$ .

## Results

Table 1 presents the baseline characteristics of the study participants. The mean age of the cohort was 40.6 years, with a predominance of female patients ( $n=35$ , 70%). The most common presenting symptom was TMJ pain ( $n=50$ , 100%), followed by limited mouth opening ( $n=48$ , 96%).

Table 1: Baseline Characteristics of Study Participants

Characteristic	Value
Age (years)	40.6 ± 8.3
Gender (Female/Male)	35/15
TMJ Pain (n, %)	50 (100%)
Limited Mouth Opening (n, %)	48 (96%)

Table 2 summarizes the changes in pain levels and maximum interincisal opening (MIO) following arthrocentesis with intra-articular injection of hyaluronic acid (HA) and corticosteroid. There was a significant reduction in pain levels post-intervention, with the mean visual analog scale (VAS) score decreasing from  $7.2 \pm 1.5$  to  $3.4 \pm 1.2$  ( $p < 0.001$ ). Concurrently, there was a notable improvement in MIO, increasing from  $32.5 \pm 4.8$  mm to  $40.2 \pm 5.6$  mm ( $p < 0.001$ ).

Table 2: Changes in Pain Levels and Maximum Interincisal Opening (MIO)

Parameter	Pre-Intervention	Post-Intervention	p-value
VAS Score	7.2 ± 1.5	3.4 ± 1.2	<0.001
Maximum Interincisal Opening (MIO)	32.5 ± 4.8 mm	40.2 ± 5.6 mm	<0.001

Overall, arthrocentesis with intra-articular injection of HA and corticosteroid demonstrated significant efficacy in reducing pain and improving jaw function in patients with internal derangement of the temporomandibular joint.

## Discussion

Internal derangement of the temporomandibular joint (TMJ) presents a complex array of symptoms and challenges for both patients and clinicians. In this study, we investigated the efficacy of arthrocentesis with intra-articular injection of hyaluronic acid (HA) and corticosteroid in managing TMJ internal derangement, focusing on pain reduction and functional improvement.

The findings of our study demonstrate significant improvements in both pain levels and maximum interincisal opening (MIO) following the intervention. The substantial reduction in pain, as evidenced by the decrease in visual analog scale (VAS) scores, aligns with previous research highlighting the analgesic properties of intra-articular injections of corticosteroids and HA (1). Furthermore, the notable increase in MIO post-intervention reflects the enhancement of TMJ mobility and function, essential for restoring patients' oral health-related quality of life (2).

The observed efficacy of arthrocentesis with HA and corticosteroid in our study corroborates findings from previous investigations. Saravanan et al. reported similar improvements in pain and functional outcomes following arthrocentesis with sodium hyaluronate injection (3). Zhang et al. also demonstrated the superiority of arthrocentesis with additional drugs, including HA and corticosteroids, over arthrocentesis alone in TMJ inflammatory-degenerative disease (4). These findings collectively support the role of adjunctive pharmacological agents in optimizing the outcomes of TMJ arthrocentesis.

Despite the favorable outcomes observed in our study, several limitations warrant consideration. Firstly, the lack of a control group limits the ability to ascertain the specific contributions of arthrocentesis, HA, and corticosteroid to the observed improvements. Additionally, the relatively short-term follow-up duration precludes assessment of the sustainability of treatment effects over time. Future studies incorporating randomized controlled trial designs and long-term follow-up periods are warranted to address these limitations and provide more robust evidence.

## Conclusion

In conclusion, arthrocentesis with intra-articular injection of HA and corticosteroid emerges as a promising therapeutic option for managing internal derangement of the TMJ, offering significant pain reduction and functional improvement. Clinicians should consider integrating this minimally invasive intervention into the comprehensive management of TMJ disorders, while further research endeavors continue to refine treatment algorithms and elucidate long-term outcomes.

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