

Evaluating Role of Arthrocentesis in Management of Internal Derangement of TMJ

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ABSTRACT

Background: Concerning the management of TMJ the complex anatomy of TMJ plays a vital role since it has its components that attached the most versatile part of human body. It has its several components performing and aiding in multitude of functions(1). Each instance of TMD is different and complex, thus diagnosis involves a thorough examination of the individual patient's history and symptoms as well as a range of methods.

Objective: The objective of this study was to evaluate the role of arthrocentesis in management of internal derangement of TMJ

Methodology: In order to access the relevant research articles a systemic research was conducted via three data bases including PubMed, Google Scholar and web of science.

INTRODUCTION

Concerning the management of TMJ the complex anatomy of TMJ plays a vital role since it has its components that attached the most versatile part of human body. It has its several components performing and aiding in multitude of functions(1). Each instance of TMD is different and complex, thus diagnosis involves a thorough examination of the individual patient's history and symptoms as well as a range of methods. Similarly, the treatment must be tailored to the unique features of each patient's illness. Restoring joint function while also being able to adapt to the TMJ's biochemically dynamic and mechanically demanding environment is an increasingly important goal for TMJ therapy. Among these methods, tissue engineering stands out as particularly intriguing because of its capacity to generate repair and replacement tissue and because it can be included and modified for use in the TMJ. Up to a quarter of the population suffers from a condition of the temporomandibular joint (TMD), however its origins and the variables that contribute to its development remain unknown. Because of this, there aren't a lot of therapy options, and the ones that do don't address the long-term concerns of the patients, who are typically rather young. The temporomandibular disorders (TMD) are a group of degenerative musculoskeletal conditions that alter not only how the body looks but also how it works. About 70% of people with TMD have a misaligned disc in their TMJ. That's what doctors call "internal derangement," and it's not good. Although its cause is obscure, there is evidence that suggests a connection between internal disarray and osteoarthritic change.

Some estimates put the percentage of people who suffer TMD symptoms at 25%, yet only a fraction of those who do really seek treatment. For instance, research done in the 1980s showed that between 16 and 59 percent of the population experienced TMD symptoms. However, only 3-7% of those who experienced TMD-related discomfort and impairment sought therapy. The ratio of women to men who experience TMD symptoms is also much higher, ranging from 2 to 8. Most people with symptoms are between the ages of 20 and 50, making this an unusual age range for an illness thought to worsen with age.

Surgical intervention isn't always necessary for treating TMD; alternative methods exist. It is preferable to try a different treatment if the first one doesn't work, but if it doesn't help either, surgery may be a last resort. Surgeries in this area, however, come with a high risk of complications. The history of TMJ arthrocentesis shows that it has developed into a successful treatment for TMDs. Most commonly, arthrocentesis is performed on patients who have not improved despite undergoing less invasive treatments.

The approach has been used in a large number of peer-reviewed clinical trials. This paper's goal is to make an attempt at

reviewing the existing literature concerning the shortcomings of this approach. In addition, it offers a synopsis of the current understanding of TMJ arthrocentesis, focusing on the technical issues and variables that influence the treatment's outcomes. We'll think about the red flags that could raise an alarm and any potential fallout from those indicators. By draining the joint area of inflammatory cells, an arthrocentesis can alleviate pain. Mandibular mobility is enhanced as a result of the reduction of mechanical obstruction brought on by anterior disc displacement, the elimination of negative pressure inside the joint, and the recovery of disc and fossa space.

Search strategy: In order to access the relevant research articles a systemic research was conducted via three data bases including PubMed, Google Scholar and web of science. The research was narrow down by sorting the year ranging from 2010 till 2021 and selection of article to critique was ensured to be Randomized clinical/control trials, case reports, and case series. Total of 7 relevant studies were selected to suffices the research objective. The key words that were used for research are arthrocentesis, TMJ disc derangement, arthrocentesis and management of TMJ derangement, internal disc derangement, and disc displacement. TMJ functional anatomy: The squamous or glenoid fossa of the temporal bone forms the cranial surface of the TMJ. Part of the temporal bone, this is where the condyle of the jaw attaches. The term "posterior articular ridge" is used to describe the area of the fossa that lies behind the joint. The postglenoid process refers to the bony prominence that lies behind the posterior articular ridge. The postglenoid process region helps build the external acoustic meatus by making up some of the upper wall.

As a bony outcropping, the articular eminence can be seen at the zygomatic bone's posterior edge. The temporal bone's glenoid fossa protrudes forward to create this prominence. To reach the articular eminence, the preglenoid plane gently slopes. The articular eminence sits in front of the cranial base and the pit. You'll find it not far from where the zygomatic process all started. Bony prominence around the zygomatic process's base, also known as the articular tubercle.

The glenoid fossa appears narrower in the middle and on the sides when viewed from the front and the rear. The glenoid fossa's inferior articular surface forms the top part of the mandible. The glenoid fossa is the site of this surface. It is made up of the mandibular condyle, which typically ranges in size from 8-10 mm in the anteroposterior direction and 15-20 mm in the transverse direction.

The articular disc is an oval with biconcave edges; it covers the condyle and sits below the glenoid fossa. As a counterpoint, the cartilaginous disc is broader at the ends and narrower in the middle. The stresses exerted on the TMJ are

regulated by a network of ligaments, which also serve as a major transmitter of proprioceptive afferents to the brain.

When a person speaks, the discomandibular space rotates due to the translational discotemporal space coming into play. Turning comes first, followed by shifting positions. The condyle can rotate and then slide forward on the same condylar structure, or it can rotate forward on the opposing condyle, and then slide forward on it, to make lateral movements. Sometimes one condyle will travel in the opposite direction of the other condyle. When the jaw moves forward from its normal position, the condition is known as anterior slippage.

TMJ disorder classification

Classification of Temporomandibular Disorders

Articular disorders (intra-articular)

- Congenital or developmental disorders
- Condylar hyperplasia
- First and second branchial arch disorders
- Idiopathic condylar resorption

Degenerative joint disorders

Inflammatory: capsulitis, synovitis, polyarthritides (rheumatoid arthritis, psoriatic arthritis, ankylosing spondylitis, Reiter syndrome, gout)

Noninflammatory: osteoarthritis

Disk derangement disorders

- Displacement with reduction
- Displacement without reduction (closed lock)
- Perforation
- Infection
- Neoplasia

Temporomandibular hypermobility

- Dislocation
- Joint laxity
- Subluxation

Temporomandibular hypomobility

Ankylosis: true ankylosis (bony or fibrous) or pseudoankylosis
 Postradiation fibrosis
 Trismus

Trauma

- Contusion
- Fracture
- Intracapsular hemorrhage

Masticatory muscle disorders (extra-articular)

- Local myalgia
- Myofascial pain disorder
- Myofibrotic contracture
- Myositis
- Myospasm
- Neoplasia

Information from: De Leeuw R, Klasser GD; American Academy of Orofacial Pain. Orofacial Pain: Guidelines for Assessment, Diagnosis, and Management. 5th ed. Chicago, Ill.: Quintessence Publ.; 2013.

Schiffman E, Ohrbach R, Truelove E, et al. Diagnostic criteria for temporomandibular disorders (DC/TMD) for clinical and research applications: recommendations of the International RDC/TMD Consortium Network and Orofacial Pain Special Interest Group. J Oral Facial Pain Headache. 2014;28(1):6–27.

Internal Derangement of TMJ: About 70% of people who suffer from TMD have what is called "internal derangement," which is a problem with or misalignment of the TMJ disc. There is no way to predict the course of this condition, but it appears to be caused by osteoarthritis (OA) or osteoarthrosis (depending on whether the joint is inflamed or not). Even if the course of the sickness is unknown, it is possible that this is the case.

Achievable Management Options: Depending on the severity of the degeneration, different treatments are available for each of Wilkes' phases of internal TMJ degeneration. To help people whose ID is just starting to worsen, there are non-invasive and minimally invasive treatments available. Patients in the chronic phase of the

disease might choose between a total or less invasive reconstruction. People with late-stage ID are the only ones who can benefit from total joint replacements, which are the only therapy option. Unfortunately, many patients need additional or follow-up surgical procedures, suggesting that this approach of treatment is unlikely to be useful in the long run.

Arthrocentesis as an emerging treatment modality internal derangement of TMJ: There are as many TMD treatment options as there are patients. When treating TMDs, conservative treatment should be attempted first; however, in severe cases, surgery is frequently the only option. [10,11] TMD surgery is only recommended when the appropriate combination of symptoms, clinical features, and radiographic indicators are present. [10] Numerous conditions, including the following: [11,12]

A surgical procedure is required to restore and heal injured or non-salvageable tissue.

Grafts can be used to replace missing tissues in the event of a chronically misplaced disc, collapsed articular cartilage, or osteophytes obstructing the joint's smooth and painless operation. When a joint becomes inflamed as a result of a serious illness.

Dolwick and Dimitroulis[11] distinguished two types of surgical indications: relative and absolute [Table 1]. The majority of patients who require TMJ surgery have refractory joint disease that has not improved with nonsurgical treatment[4] or are experiencing TMJ-related discomfort and dysfunction. As a result, the following are some specific reasons for TMJ surgery: [11]

Table 1: Indications for surgery by Dolwick and Dimitroulis

Absolute indication
Ankylosis of TMJ (e.g., fibrous or osseous joint fusion)
Neoplasia (e.g., osteochondroma of the condyle)
Dislocation of TMJ either recurrent or chronic
Developmental disorders affecting the TMJ
Relative indication
Internal derangement of TMJ
Osteoarthrosis
Trauma to the TMJ

TMJ=Temporomandibular joints

When there are significant mechanical difficulties, including severe clicking and crackling, arthrocentesis or arthroscopy of the TMJ is not beneficial. The question of whether or not surgical treatment of TMJ-related pain and dysfunction is warranted is still up for debate. There are risks and complications associated with TMJ surgery, and the procedure is not a guarantee of success. TMJ arthrocentesis is done to help people who are having trouble. People generally agree that this is the best way to get someone to stop talking.

Rationale of Arthrocentesis: Joint tissues can undergo structural changes in response to variations in articular stress, such as cartilage degradation and changes in the bone that sits beneath the cartilage. TMDs are linked to both of these alterations. Enzymes' capacity to degrade the matrix during inflammation is almost certainly due to cytokines and other inflammatory mediators. To put it another way, disease is the outcome of the physical and biological breakdown of tissues governed by matrix degradation. Due to the presence of inflammatory debris, proteoglycans, and collagen in synovial fluid. [14] Cytokines can either stimulate or suppress inflammation, depending on their context. Many different types exist, and the ratio between them determines how quickly damage and inflammation occur. Consider IL-1, IL-6, IL-8, and TNF as examples of pro-inflammatory cytokines; IL-4, TIMP-1, TIMP-2, and transforming growth factor (TGF)-1 and -2 are examples of anti-inflammatory cytokines. These cytokines are representative of their class. [15] Inflammation triggers the production of IL-1 and IL-6 by monocytes and macrophages. Although chondrocytes and fibroblasts can secrete TIMP, IL-6 also plays a role in the process. Synovial cells and mononuclear cells that have migrated into the vessel wall produce it. It is found in synovial tissue and synovial fluid. Synovial tissue is home to cells called synoviocytes. IL-6 The clicking in your jaw, as

well as the other TMJ symptoms, may be caused by one of these conditions. [15,17,18]

Arthrocentesis is a surgery used to treat joint pain by removing inflammatory cells that are to blame for the discomfort.

Procedure of TMJ Arthrocentesis (The Technical Considerations): The term "arthrocentesis" has evolved over the years. The technique was pioneered by Murakami et al. [24], who used water and pressure applied to the upper joint cavity to move the jaw. Joint lavage was then improved by inserting two needles into the upper chamber of the joint. In order to do an arthroscopy, this method mimics McCain et al's methods by determining the optimal needle insertion site on the skin (posterolateral approach to the upper joint space).

There are a few things to consider before undergoing surgery.

Local anaesthetic, intravenous conscious sedation, or general anesthesia may be used during a TMJ arthrocentesis, depending on the patient's preference and the surgeon's preference. Some considerations prior to beginning the process are as follows: [29]

Draping and cleaning the surgical field with povidone iodine or a related material is critical, especially in the preauricular and ear regions. A cotton pledget seals the external auditory canal, preventing blood and fluid from entering. Following an auriculotemporal block, injections into the joint penetration sites are delivered.

Two-needle techniques: There are two techniques to treat TMJ arthrocentesis. Separate aspiration and injection needles are employed. [30] As a guide for the two-needle procedure, the Holmlund–Hellsing line (canthotragal line) is used (see Figure 1). You can determine the location of your ipsilateral eye from your tragus by drawing a straight line on your skin.

Two needles should be inserted along this line. The initial, more posterior position will be ten millimetres inferior to the canthotragal line and two millimetres from the tragus. In other words, this is the location of the glenoid fossa's posterior limit. At the second point, the articular eminence will be approximately 20 millimetres anterior to the tragus and 10 millimetres inferior to the canthotragal line.



Figure 1

The glenoid fossa is a small depression in the shoulder blade. The thickness could be ranging from half a millimeter to one and a half millimeter. [25,35] The dura and the temporal lobe are two important anatomical components that sit beneath the glenoid fossa. Degenerative arthritis and previous infections are two potential sources of pain felt in the ankles and hips. Drilling holes into the building is therefore a distinct possibility. When placing the needle into the joint, the surgeon must exercise the utmost care. After excavating around 25 mm, you will reach the upper joint space. [27]. It is standard procedure to have the patient open their

lips and turn it to the side of their face on which the procedure is being performed in order to facilitate arthrocentesis. Nagori et al. [36] found that a custom mouth support is necessary for arthrocentesis procedures.

After the rear of the articular eminence has been touched with the needle, another needle is placed into the area just above the joint at a depth of 20 to 25 millimeters while the patient's mouth is left open. To do this, the patient's lips must be separated so that the needle can enter the patient's body from above and forward. Subsequently, the irrigating fluid (also called Ringer's lactate solution or physiological saline) is injected into the superior joint region with the first needle. The Hartmann solution is the name given to this fluid. [29] The greatest volume of a liquid that can be stored in this jar is 5 ml. In order to view the solution and regulate the flow of the joint lavage solution, a second needle is inserted into the swollen area before the first.



Figure 2

According to Laskin[38], he used a 3-4 millimeter anterior placement while placing the anterior needle into the posterior recess of the upper joint compartment before inserting the second needle anterior to the first. If the first needle is inserted first, the irrigating fluid may have a more difficult time exiting the second needle due to the tighter upper joint chamber. There has been no alteration to the original back-facing needle insertion hole. A second needle was inserted perpendicular to the first and 3 mm behind it to confirm that the first needle was indeed touching bone. As a result, when the second needle is put laterally into a higher joint compartment, it is hypothesised that the solution will flow more freely. Due to the fact that multiple needle injections have been demonstrated to reduce treatment outcomes for both doctors and patients, this novel practise may be appropriate to implement as the standard of care.

Patients may suffer discomfort when two needles are placed into the joint cavity during the initial lavage. After a typical two-needle arthrocentesis, participants' perceptions of tolerance increased over time following a five-week round of hyaluronic acid injections. Catabolytes and adhesions are removed and eliminated during subsequent arthrocentesis treatments, facilitating needle insertion and enhancing posttreatment quality. [40] In a recent investigation, a single needle was effectively employed to inject and evacuate irrigation fluid [41]

The Single Needle Technique: Because the pressure generated by an open mouth injection of saline into the superior joint compartment was sufficient to dislodge adhesions and drain fluid, the single-needle approach was chosen for TMJ lavage. The joint cavity is enlarged and adhesions are removed using a single needle to inject fluid under pressure into the joint[31]. This allows the condyle to move freely in and out of the joint. [42,43] Up to ten repetitions of the injecting and releasing operation are required, equating to around 40 cc. Joints with extensive degeneration or scar tissue are suitable candidates for the single-needle technique. As a result [31], single-needle arthrocentesis has a

number of advantages over two-needle arthrocentesis. These advantages include the following: [31]

As a result, the procedure is less time consuming and obtrusive.

- When a second needle is utilised in a two-needle surgery, the first needle's access into the joint cavity may be compromised, which is why the single-needle technique is preferable.
- Because the anaesthetic supply is limited, the single-needle method significantly minimises postoperative pain and discomfort. This may help to decrease the likelihood of facial nerve paraesthesia following surgery.
- By placing a second needle into the glenoid fossa, a popular place for the second needle, it is possible to damage the facial nerve. The use of a single needle technique significantly minimises the likelihood of such errors.
- With a single needle technique, the therapy is done more quickly.
- Because hyaluronic acid cannot flow out of the joint compartment via the second injection site, a single-needle method may result in 100% retention of the injected hyaluronic acid.

However, this method has a number of disadvantages. [29] Due to the irrigating solution's small total circulation volume, algogenic chemicals found in upper TMJ synovial fluid that cause pain and fibrocartilaginous alterations cannot be eliminated with this approach.

Even if the patient puts a hand over his or her mouth or pulls down on the syringe's plunger, only a little fraction of the fluid will be returned. Localized swelling and pain can occur in the face before and after surgery if fluid escapes from the upper compartment onto the face. Lots of studies on the effectiveness of both single- and double-needle arthrocentesis have been conducted over the past few decades. Sindel and associates[44] compared the effectiveness of single- and double-needle arthrocentesis. The study concluded that if the double-needle method isn't an option, the single-needle method may be superior. Studying TMJ arthrocentesis, Entürk et al. [45] discovered that both the single-puncture and double-puncture techniques were equally effective. Entürk et al.[46] established that the SPA method is a viable long-term treatment option.



Figure 3

Modifications in Arthrocentesis: Arthrocentesis has seen numerous technical developments over the years, making the treatment more convenient and minimally invasive.

A single cannula contained two needles: Alkan and Bas[47] were able to give proper irrigation and lavage of the joint using the same cannula at the requisite pressure as a result of this method. Due to the absence of a second puncture to insert the additional needle, it is significantly safer than traditional arthrocentesis. When there are significant degenerative changes in the joint space, osteophytes and limited joint space make implanting this instrument more problematic.

Single cannula used by Shepard: Rehman and Hall[48] report that a Shepard cannula was used to connect two needles. However, the mechanism that connects the two needles appears to be somewhat large, which may cause nerve injury. Additionally, the study discovered that the single-needle approach was more effective at treating disc displacement without affecting the TMJ.

For arthrocentesis, high-pressure irrigation and automated irrigation used: This second needle was linked to a surgical and dental implant motor that drove an irrigation pump. According to Alkan and Kilic[50], high-pressure irrigation was set to begin automatically. The technique of arthrocentesis originally described by Nitzan et al.[19] was modified in this way. In less than two minutes, they irrigated the upper joint region with 300 mL of a salt solution. They said that after making this change, the hydraulic pressure was maximized. In the event of a clog in the output needle, the surgeon must immediately halt irrigation.

Needles concentrated in a single packet: It was determined that the least stressful and most cost-effective way for TMJ lavage was to use a concentric-needle cannula system. [51]

Irrigating Solutions for Arthrocentesis: According to current thought, the volume of fluid utilised for joint lavage during arthrocentesis is large. Irrigation solutions of varying volumes and pressures were used. [21,52] According to research, the volume of fluid utilised for TMJ arthrocentesis varies between 50 and 500 mL. [53] Zardeneta et al. state that 100 mL of total perfusate is sufficient for therapeutic joint lavage. [54]. According to Kaneyama et al., the optimal volume of perfusate lavage for arthrocentesis is between 300 and 400 mL. [21].

A popular approach is to inject Ringer's lactate or physiological saline into the superior joint space.

Ringer's lactate is regarded to be more tolerable by tissues than other irrigants due to its similarity to human serum. [56,57]

[31,58] On the other hand, individuals with severe adhesions were freed using 40 kPa arthrocentesis rather than low-pressure arthrocentesis (6.7 kPa). They concluded that individuals with closed locks and adhesions may benefit from irrigation at a pressure high enough to dissolve adhesions and enhance joint space.

According to Guarda-Nardini et al.[33], when adhesions or a lack of adhesiveness exist, one needle should be blocked while the patient performs opening and laterality movements. Multiple manipulations may be used to remove adhesions and restore a mouth opening pattern with a minimum of 35 millimetres laterality and 4 millimetres protrusion. Dolwick reached a similar conclusion. Giacomo de Riu et al. discovered that arthrocentesis with saline and sodium hyaluronate injections considerably reduced discomfort in all 30 patients with TMJ issues in their prospective clinical research. However, to avoid complications, the syringe pressure should be maintained throughout the treatment.

Post Arthrocentesis: Prednisolone or sodium hyaluronate injections into the joint region following lavage have been indicated to minimise intracapsular inflammation (IC1). [60] Intra-articular corticosteroids' anti-inflammatory actions can help alleviate joint soreness, edoema, and dysfunction. [61,62]

According to Kunjur and colleagues, arthrocentesis significantly reduced patients' pain levels, and 269 of the 298 patients who underwent the procedure expressed satisfaction with the outcome. [64] Furst et al.[65] discovered that bupivacaine alone was superior to morphine or morphine combined with bupivacaine in another research.

Indications: Approximately 91% of patients who underwent arthrocentesis for anterior disc displacement did not lose weight as a result of the surgery. In people with internal TMJ issues, arthrocentesis has been proven to alleviate long-term discomfort and dysfunction [21,66,67].

[68,69] It's recommended by Frost et al. [70] for acute and chronic TMJ closure lock in internal derangement. In a similar study, Thomas et al.[71] discovered that arthrocentesis was a good therapy for acute TMJ closure lock.

• Arthrocentesis with mouth-opening restrictions may be utilized when disc adhesions surround the fosa and/or the upper portion of the articular tubercle. When the centre of a healthy disc disengages from its socket, increasing negative pressure in the fossa-disc gap arises, the disc is said to be in an open lock. Negative pressure on the disc is relieved, allowing it to travel more freely. A method known as arthrocentesis is used to do this. Intra-articular pressure variations are necessary for nutrition and medication perfusion, therefore restoring them is advantageous for joint rehabilitation. In individuals with disc adhesions, mouth opening and deviation both improved dramatically. [73]

• Degenerative osteoarthritis can be treated by arthrocentesis. [29,73,74]. Early morning stiffness, significant joint discomfort, restricted mouth opening, and swelling in the affected area are all indications of TMJ osteoarthritis.

• Increased intra-articular pressure, joint overloading, and subchondral bone sclerosis,[18] decreased blood supply induced by pain, and a lack of clearance of inflammation substrates normally eliminated during normal joint mobility create these symptoms. [27] Arthrocentesis is a procedure that drains inflammatory synovial fluid and isolates the components of a joint, reducing pain and stress while also enhancing mouth opening. [75,76]

• When patients open and close their mouths, they may hear painful joint noises. [29] Loud or intermittent joint noises, such as clicking, can be caused by disc displacement. During arthrocentesis, the disc-condyle complex is moved in lockstep to reduce clicking, stretching the upper joint compartment. [75]

Contraindications: The arthrocentesis operation is extremely contraindicated in certain circumstances. The technique can have absolute or relative contraindications. [37]

Complications: Arthrocentesis as a surgical procedure has been linked to a slew of negative outcomes and side effects. The extent of these problems is determined by the state of the TMJ and surrounding tissues, as well as the surgical technique used (i.e., the single-needle or two-needle approaches). These problems have been documented in the literature between 2% and 10% of the time. [37] It was found that arthrocentesis-related problems were only temporary in the study conducted retrospectively by Vaira et al[77].

• (0.7–0.6%) of the population Abrasions of the facial nervous system [78,79,80]

• Many needle attempts are the most common problem following an unsuccessful first attempt to insert a needle into an area around the joint. In these instances, a single needle procedure appears to be the best option. [48,81]

• There is a lack of the fifth nerve (0.1 percent to 2.4 percent) [78]

• Injuries to the otoliths can occur (0.5 percent to 8.6 percent) [78,79]

• Due to lavage fluid (Ringer's solution) leakage[30,37], extra-articular edoema

o percent of needles in the joint are broken.

• Joint inflammation of this severity[37] is considered acute.

• This condition can cause symptoms such as swelling and redness around the preauricular region as well as pain and difficulty opening the mouth fully.

• An allergy's signs and symptoms

• Some patients have an adverse reaction to the anaesthetics or drugs used during the arthrocentesis [31,78,79,80,82,83,84,85,86,87,88]

• Having suffered from severe dizziness and nausea without any hearing loss

• In addition, there are the following issues to be addressed:

• A bleed in the preauricular region

• Haemorrhage outside of the brain

• After injuring the superficial temporal artery, an aneurysm was formed

• Development of arteriovenous fistulas and subsequent joint haemorrhage.

Success Rate and the Prognosis: Numerous studies have demonstrated that arthrocentesis can restore normal mouth opening while also alleviating discomfort and functional constraints. According to Brennan and Ilankovan[63], arthrocentesis is a minimally invasive surgical method used to treat persons who are experiencing pain that does not respond to non-surgical treatment. Arthrocentesis was effective in 87.1 percent of cases, while conservative therapy was beneficial in 55.9 percent of cases. As a result, the success rate of arthrocentesis surgery is inconsistent [Table 2]. [53,68,91,92,93,94,95]

The prognosis of arthrocentesis is assumed to be influenced by the patient's age, the duration of symptoms, and oral habits. [95] According to Nitzan et al.[93] and Guarda et al.[94], individuals over the age of 40 frequently require more time to recuperate following arthrocentesis. Hyaluronic acid arthrocentesis, according to Nardini et al.[96], is less successful in patients younger than 45 years of age. Bruxism, one of the most common causes of TMJ, is suspected to be a factor. According to Kim et al.[95], oral behaviours such as clenching and bruxism impair arthrocentesis performance. According to Alpaslan et al.[69], those who do not have bruxism may have better results with arthrocentesis.

Table 2: Success rate of the arthrocentesis procedure mentioned in the literature

Author	Success rate (%)
Murakami et al.[91]	70
Hosaka et al.[92]	78.9
Nitzan et al.[93]	91-95
Murakami et al.[94]	83.8
Carvajal and Laskin[68]	88
Al-Belasy and Dolwick[53]	83.2
Kim et al.[95]	83.4

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