

Systematic Review TMJ Disorders

Arthroscopy versus arthrocentesis in the management of internal derangement of the temporomandibular joint: a systematic review and meta-analysis

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Abstract. The aim of this study was to assess whether arthroscopy or arthrocentesis is most effective and feasible in the management of internal derangement of the temporomandibular joint (TMJ), specifically in relation to joint movement and pain. A comprehensive electronic search without date or language restrictions was performed in January 2014. Inclusion criteria were the following: study in humans; randomized or quasi-randomized controlled trials (RCTs), controlled clinical trials (CCTs), and retrospective studies; comparison of arthrocentesis and arthroscopy in the treatment of internal derangement. Six publications were included in the review, two RCTs, two CCTs, and two retrospective studies. Two studies showed a low risk of bias and four studies showed a moderate risk of bias. There were statistically significant differences between arthrocentesis and arthroscopy with regard to maximal inter-incisal opening and pain reduction, but no difference between the two groups for postoperative complications. The results of this meta-analysis on the management of internal derangement of the TMJ revealed arthroscopy to have superior efficacy to arthrocentesis in increasing joint movement and decreasing pain. Both arthroscopy and arthrocentesis have comparable postoperative complication rates. However, the current meta-analysis is incomplete due to the paucity of good quality studies in the high-impact, peer-reviewed literature; therefore, further better-designed

studies are required to address this important question before final conclusions can be drawn as to the true comparative outcomes of TMJ arthrocentesis versus TMJ arthroscopy.

Keywords: internal derangement; TMJ; arthrocentesis; arthroscopy; maximal inter-incisal opening; pain; meta-analysis; complications.

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Temporomandibular joint disorder (TMD) is a term that encompasses a number of overlapping conditions. Approximately 10% of the population are affected, and the disorder appears to occur most often in younger females.¹ One of the most common forms of TMD is internal derangement. It has been reported that 80% of patients with signs and symptoms of TMD have some form of internal derangement of the temporomandibular joint (TMJ).² Internal derangement is an intra-articular condition in which there is a disruption in the normal relationship of the articular disc of the TMJ to the articular eminence and the condyle when the joint is at rest or in function.³ Internal derangement of the TMJ includes conditions like anchored disc phenomenon, disc displacement with reduction, painful click, and closed lock. Patients with internal derangement of the TMJ often complain of pain, joint sounds, and a limitation in mouth opening.

Most patients with internal derangement can be treated successfully with non-surgical therapy.⁴ Non-surgical therapies include pharmacotherapy, TMJ splints, and physical therapy. Patients who do not respond to non-surgical therapy may require more invasive procedures, such as arthrocentesis and arthroscopy. Farrar estimated that up to 25% of the entire population have an internal derangement, which is usually initially treated with non-surgical methods.⁵ More recently, studies utilizing magnetic resonance imaging reported that the articular disc was displaced in 35% of asymptomatic volunteers.^{6,7}

Over the past 15 years, arthroscopic surgery, arthrocentesis, and physical therapy have commonly been used as therapeutic interventions for permanent TMJ disc displacement.⁸ Lavage of the TMJ was first conducted using arthroscopy by Ohnishi.⁹ Subsequently it was determined that visualization of the joint was not necessary to accomplish the treatment objectives; thus, arthrocentesis alone has been used as a modification of TMJ arthroscopic lavage in the treatment of this condition.^{10,11} Arthrocentesis of the TMJ was first described by Nitzan¹⁰ as a relatively easy, minimally invasive, and highly efficient procedure, and it is currently

used widely in the treatment of various internal derangements as well as for diagnostic purposes. The procedure may be performed under local anaesthesia, with or without sedation, and its primary purpose is to clear the joint of inflammatory cells, degradation products of the inflamed synovium, blood, and pain mediators that are believed to be by-products of intra-articular inflammation.¹²

Some studies have suggested that both arthrocentesis and arthroscopic lavage provide a significant reduction in pain and increase the maximal mouth opening on follow-up.^{13–15} Although arthroscopy shows better outcomes in terms of improvements in functional outcome, there is no difference in the degree of pain control with either of the techniques. Therefore, because arthrocentesis is technically easier to perform compared to arthroscopic lavage, arthrocentesis is highly recommended for the relief of pain in patients with painful clicking in the TMJ that does not respond to non-invasive medical management.¹⁶ To the best of the author's knowledge, no meta-analysis has compared arthrocentesis and isolated lysis and lavage arthroscopy in the treatment of internal derangement with regard to maximal inter-incisal opening (MIO), pain, and the incidence of postoperative complications. The aim of this study was to determine whether arthroscopy or arthrocentesis is most effective and feasible in the management of internal derangement of the TMJ, specifically in relation to joint movement and pain.

Materials and methods

Eligibility criteria

This analysis included studies in humans, including randomized or quasi-randomized controlled trials (RCTs), controlled clinical trials (CCTs), and retrospective studies aimed at comparing arthrocentesis and arthroscopy in the treatment of anchored disc phenomenon, closed lock, anterior disk displacement with or without reduction (ADDR/ADDWR), capsulitis, and synovitis. Further, any controlled clinical trial comparing arthroscopy and arthrocentesis in the treatment of internal

derangement with regard to pain and jaw function (MIO, excursive movements, and protrusive movements) was eligible.

The following were excluded: case reports, technical reports, animal studies, *in vitro* studies, review papers, and uncontrolled studies.

Search methods for the identification of studies

This systematic review and meta-analysis was conducted according to the PRISMA-Equity 2012 checklist.¹⁷ A comprehensive electronic search without date or language restrictions was performed in January 2014 using the following electronic databases: PubMed, Cochrane Database of Systematic Reviews, the Cochrane Central Register of Controlled Trials (CENTRAL), EMBASE, MEDLINE, CINAHL, and Electronic Journal Center. The following search terms were used: “TMJ arthrocentesis” AND/OR “TMJ arthroscopy” AND “TMJ internal derangement”, “TMJ intra articular disorders”, “TMJ lavage”, “TMJ lysis”, “TMJ locking”.

A manual search of oral and maxillofacial surgery-related journals was also performed, including the International Journal of Oral and Maxillofacial Surgery, British Journal of Oral and Maxillofacial Surgery, Journal of Oral and Maxillofacial Surgery, Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology and Endodontology, Journal of Cranio-Maxillofacial Surgery, Journal of Craniofacial Surgery, and Journal of Maxillofacial and Oral Surgery.

The reference lists of the identified studies and relevant reviews on the subject were also scanned for possible additional studies. Moreover, online databases providing information on clinical trials in progress were checked (<https://clinicaltrials.gov>; <http://www.centerwatch.com/clinicaltrials>; <http://www.clinicalconnection.com>).

Data collection process

The author carefully assessed the eligibility of all studies retrieved from the databases. In the final analysis the following

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