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Serindere G
Assistant Professor, Mustafa
Kemal University, Faculty of
Dentistry, Department of
Dentomaxillofacial Radiology,
Hatay, Turkey

Serindere M
MD, Antakya State Hospital,
Department of Radiology,
Hatay, Turkey

The effect of arthrocentesis in temporomandibular joint internal derangement with magnetic resonance imaging

Serindere G and Serindere M

Abstract

Temporomandibular joint (TMJ) disc derangement is a malpositioning of the articular disc related to the condyle and eminence. Arthrocentesis is a minimally invasive technique for the patients who complain about TMJ internal derangement. The aim of this case report is to know efficiency of TMJ arthrocentesis in patients with internal derangement and control the situation of TMJ using Magnetic resonance imaging (MRI) after arthrocentesis. This case report presents MRI images of internal derangement of 24 year old woman with acute open mouth limitation after TMJ arthrocentesis.

Keywords: Temporomandibular joint, internal derangement, disc displacement, arthrocentesis

Introduction

Temporomandibular disorders (TMD) involve many pathological situations of temporomandibular joint (TMJ) and relevant to musculoskeletal structures^[1].

Pathologic situations are often misdiagnosed for this reason they are mistreated in clinical practice and make difficult patients' lives. TMD can be subdivided into two groups as Intra- articular and extra- articular disorders. The most frequently observed intra- articular derangements are disc displacement (DD) with reduction, DD without reduction and degenerative joint disease^[2,3].

When the disc becomes displaced and the DD without reduction exists, condylar sliding is restricted therefore mouth opening is limited. Symptoms of DD without reduction includes limited mouth opening that occurs step by step with a noise namely clicking. Pain happens during mouth opening and forced movement of the pathologic joint, because of overloading and stretching of the nonadaptive retrodiscal tissue that has high innervation^[4].

In general, temporomandibular joint disorders are gradually treated. Conservative precautions should be primarily experienced instead of any surgical operations. There are some non invasive precautions such as soft diet, jaw exercises, the usage of non steroidal anti-inflammatory drugs and bite raising appliances^[5].

There are several invasive therapeutic procedures in TMJ disorders such as arthrocentesis, arthroscopic lysis and lavage and arthrotomy^[6].

"Arthrocentesis" is surgical treatment in patients who don't benefit from conservative treatment. This procedure is based on the fluid aspiration with a needle in joint cavity and injection of a therapeutic object. The reason of this treatment was based on two methods as pumping manipulation way, arthroscopic lysis and lavage. The superior joint space irrigation will be concluded the existence of the hydraulic pressure, which will release the displaced disc and therefore provide normal maximal mouth opening^[7].

MRI is the gold standard modality to diagnose intra- articular changes of TMJ^[8]. So that, in this study, MRI was chosen to determine complaint of the patient.

This case report gives important results about arthrocentesis as a minimally invasive procedure to relax acute symptoms of the patients.

Case Report

A 24 year old female was referred to Department of Dentomaxillofacial Radiology in Mustafa Kemal University with main complaint of pain during mouth opening.

Correspondence

Serindere G
Assistant Professor, Mustafa
Kemal University, Faculty of
Dentistry, Department of
Dentomaxillofacial Radiology,
Hatay, Turkey

Her past medical history was insignificant. Arthrocentesis of left TMJ had been performed about 4 years ago in Department of Maxillofacial Surgery. She said that any trauma or infection history did not exist. Clinical examination revealed crepitation in left TMJ and bilaterally clicking. Patient had limited and painful movements of the jaw. Bruxism was questioned and existence of this was learned. Muscle examination was performed and there was no pain in mastication muscles. In dental and radiographic examination, the caries of upper right 1st premolar, upper left central, upper right 1st molar and 3rd molar, lower left 1st and 2nd molar was determined however there was nonadaptive restoration in upper right 1st molar and upper left 2nd premolar. There was root- canal treatment failing in lower right 3rd molar. Additionally, lower left third molar was partially erupted in mesioangular position. Lower right and left 1st premolar was

congenitally missing (Figure 1).

Even though arthrocentesis was performed, according to clinical examination, bilateral DD was thought as clinical diagnosis. MRI study was performed for detailed evaluation with this protocol; sagittal proton density (PD) and T2-weighted images with open and close mouth, coronal T1-weighted images. Shape of bilateral mandibular condyles and joint space were normal. Joint effusion did not exist bilaterally. Left disc has lost normal configuration and slight T2-weighted hyperintensity was seen in the left disc. Bilateral DD were seen on MR images with close mouth position. Reduction was seen in the right TMJ disc, however left disc had not reduction (Figure 2,3). The clinical diagnosis was confirmed by MRI.

The patient was referred to Department of Maxillofacial Surgery to relieve the acute symptoms.



Fig 1: Panoramic radiograph showing the caries of upper right 1st premolar, upper left central, upper right 1st molar and 3rd molar, lower left 1st and 2nd molar. Lower right and left 1st premolar was congenitally missing.

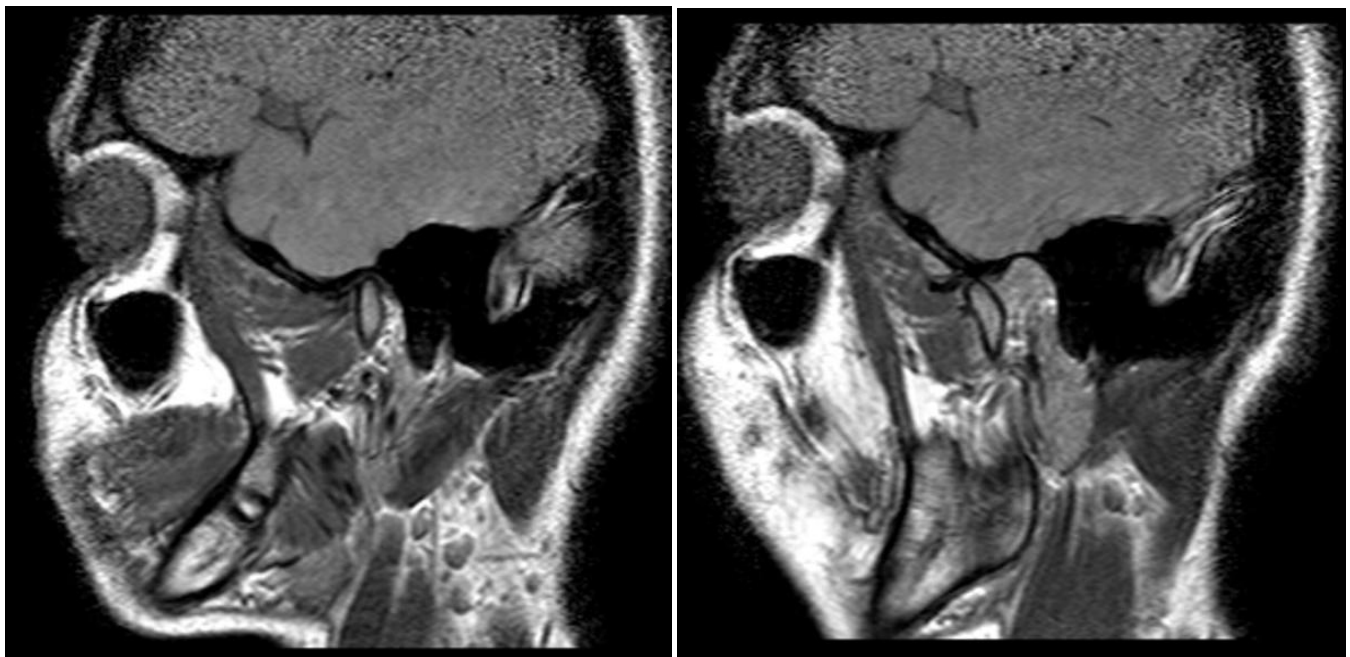


Fig 2: A. Left sagittal oblique PD-weighted MRI obtained in the closed-mouth position shows an anteriorly displaced disc that has lost its typical biconcavity and hypointensity.

B. Left sagittal oblique PD-weighted MRI obtained in the open-mouth position shows an anteriorly displaced disc (non-reduction).

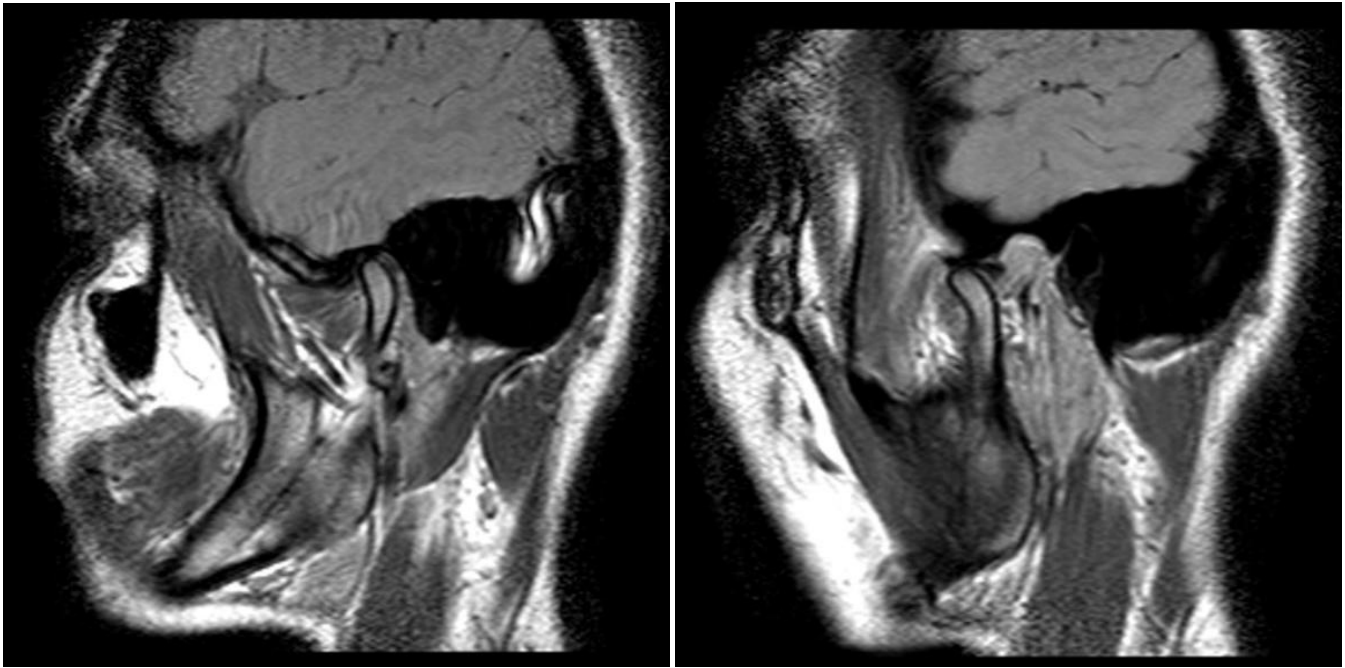


Fig 3: A. Right sagittal oblique PD-weighted MRI obtained in the closed-mouth position shows an anteriorly displaced disc that has normal signal intensity.

B. Right sagittal oblique PD-weighted MRI obtained in the open-mouth position shows an anteriorly displaced disc with reduction.

Discussion

Treatment of TMJ pain dysfunction is difficult in oral and maxillofacial department. Although TMJ pain and dysfunction may be arisen from various etiologic reasons such as bruxism, malocclusion, trauma, DD and degenerative joint diseases, symptoms are frequently similar^[9].

If TMJ hasn't any pathological condition, the disc is situated over the condylar head with the posterior band located in the 12 o'clock position as superior to the condyle and the intermediate zone located in the 1 o'clock position as superior-anterior to the condyle. During the mouth opening, the disc and condyle move forwardly. Besides, the condyle rotates forward, the disc slightly rotates in a posterior way over the condyle^[10, 11]. In patients who has internal derangement of TMJ, changes occur in normal joint movement, as mentioned. Internal derangement can be identified as any interference with straight joint movement because of the changed joint morphology. A disc derangement is identified as articular disc malposition relation to the condyle and eminence. Disc derangement can be divided into with reduction or without reduction of the displaced disc. In patients who has disc derangement with reduction, the articular disc maintains its normal position when the mouth opens, while in patients with disc derangement without reduction, the articular disc doesn't locate in normal position on mouth opening and this situation results in restricted mouth opening in acute cases^[10].

Arthrocentesis of the TMJ is frequently identified as a lavage of TMJ and is conventionally concluded without viewing the joint^[12, 13]. The principal task of arthrocentesis is to release adhesions, to wash out with inflammatory mediators and besides, to affect directly with medical treatments^[14].

Frost and Kendell reported that arthrocentesis can be considered as a treatment choice between non-surgical treatment and arthroscopic surgery^[15]. Goudot *et al.* studied comparatively about formation of pain and function after arthroscopy and arthrocentesis of the TMJ and reported that both arthroscopy and lavage are beneficial methods for function progress and decrease of pain. Arthroscopy had

better results for functional treatment however results of arthrocentesis and arthroscopy were similar in pain control^[16].

In the studies, it has been reported up to 91% effective rate belonging to arthrocentesis to treat patients with anterior disc displacement without reduction^[6, 17, 18]. Despite this high percentage, in our patient, the pain and anterior disc displacement relapsed after arthrocentesis. About failure in TMJ arthrocentesis, various conditions must be noticed. To determine the indication of case is important, because arthrocentesis can be inefficient in the patients who has bony changes, fibroankylosis and perforation of the disc^[19, 20].

Failure to directly demonstrate intra-articular pathology, the deficient possibility of pathological tissue biopsy are some disadvantages of arthrocentesis. Additionally, when more mature adhesions exist, treatment is performed more difficult^[4]. Sweeping and other nonoperative arthroscopic procedures with arthroscopic lysis and lavage, are not possible with arthrocentesis by oneself. Temporary facial paresis because of the local anaesthetic or swelling of the adjacent tissues derived from perfusion of solution can happen during arthrocentesis^[5].

MRI is the gold standard to diagnose intracapsular disorders. The MRI images provide diagnosing the morphologic characteristics of the disc and describing its location relation to the condyle in both mouth opening and closing. Findings of TMJ dysfunction that can be seen in MRI images contain thickening, perforations of retrodiscal layers, or joint effusion. So MRI is useful for evaluating degenerative signs and enables early certain diagnosis of varied TMJ diseases^[21]. In our study, MRI images were evaluated and obtained the certain diagnosis.

Arthrocentesis is a minimally invasive procedure of TMJ and clinicians can give priority to arthrocentesis before planning more invasive surgical operation for internal derangement of TMJ. In this study, the failure of arthrocentesis was evaluated in the patient who complained TMJ pain and dysfunction.

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