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ORIGINAL ARTICLE

The accuracy of dynamic Magnetic Resonance Imaging in evaluation of internal derangement of the temporomandibular joint; comparison with arthroscopic findings

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KEYWORDS

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Abstract *Purpose:* To determine the correlation between dynamic Magnetic Resonance Imaging (MRI) and arthroscopy findings in internal derangement of the temporo-mandibular joint (TMJ). *Material and methods:* This study was conducted on 25 patients (of 28 TMJs), 18 females and 7 males their age ranging from 20 to 42 years (mean 31 years). All patients were submitted to MRI examination of the TMJ. All of these patients underwent arthroscopy for diagnosis and treatment and results were compared with dynamic MRI findings.

Results: Concerning disc position, MR examination revealed 24 TMJs out of 28 (85.7%) with anteriorly displaced discs, while 4 TMJs (15.3%) showed normal disc position. When type of displacement was considered, MRI revealed 8 TMJs (28.7%) with anterior disc displacement with reduction (ADDWR), while 16 TMJs (57.1%) with anterior disc displacement without reduction (ADDWOR). While arthroscopy revealed 6 TMJs out of 28 (21.4%) with ADDWR, 14 TMJs (50%) showed ADDWOR and 8 TMJs (28.6%) with normal disc position.

MRI assessment of disc mobility revealed 12 out of 28 TMJs (42.8%) with limited asynchronous

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movements, while 3 TMJs (10.7%) with stuck disc, and 13 TMJs (46.4%) with normal mobility. While arthroscopy revealed 11 out of 28 TMJs (39.2%) with limited disc mobility, 1 TMJs (3.5%) with stuck disc, and 16 TMJs (57.1%) with normal mobility.

The results of this study showed no significant statistical difference between arthroscopy and MRI in diagnosing disc position and disc mobility.

Conclusions: Both arthroscopy and dynamic MRI are statistically correlated with each other in detecting TMJ internal derangement. Nevertheless, reviewing the results highlighted the advantages of MRI augmented by dynamic protocol over arthroscopy in diagnosing disc position and mobility and hence, we recommend using MRI as a first line diagnostic modality when internal derangement is suspected.

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1. Introduction

Internal derangement (ID) of the temporo-mandibular joint (TMJ) refers to the abnormal relationship or position of the disc to the mandibular condyle and articular eminence (1). It is considered one of the major causes of pain and dysfunction of the TMJ (2). ID by definition is a disruption within the internal aspects of the TMJ, in which there is a displacement of the disc from its normal functional relationship with the mandibular condyle and the articular portion of the temporal bone (3). The American Association of Oral and Maxillofacial Surgeons (AAOMS) defined ID as alterations in the normal dynamic motion of the intra-capsular elements leading to joint dysfunction.

Nowadays there are various methods used for its diagnosis. However, Magnetic Resonance Imaging (MRI) and arthroscopy represent the most effective and reliable modalities among the contemporary techniques. Moreover, they are characterized by being generally safe when compared to old techniques (4,5). Nevertheless, there is not enough data to correlate the findings of both. Therefore it should be of interest to investigate prospectively, how well dynamic MRI findings correlate with intra-articular pathology as seen by arthroscopy.

The aim of this study is to evaluate the correlation between dynamic MRI and arthroscopy findings in internal derangement of the temporo-mandibular joint.

2. Patients and methods

The current prospective study was conducted on 25 patients (of 28 TMJs), 18 females and 7 males their age ranging from 20 to 42 years (mean 31 years). IRB approval was obtained and patients' consent as well. Patients were selected from referred population to the TMJ clinic in the department of Oral and Maxillofacial surgery at the dental hospital at teaching institute, which is a primary referral center for TMD for both conservative and surgical treatments. Patients were examined bilaterally, 3 patients had bilateral TMD and 22 had unilateral TMD, 15 for right TMD and 7 for left TMD. Informed consents were obtained from all patients after explaining the purposes of MRI and arthroscopy.

2.1. Patients selection

Patients were selected on the basis of clinical diagnosis of ID of the TMJ using RDC/TMD system. RDC/TMD offers a standardized system for the clinical diagnostic process (6,7).

Patients involved in this study were classified in the following groups:

1. Axis I group II.a: A condition of disc displacement with reduction
2. Axis I group II.b: A condition of disc displacement without reduction and with limited opening
3. Axis I group II.c: A condition of disc displacement without reduction and without limited opening
4. Axis II: Classification of graded chronic pain, grades I and II.

2.1.1. Inclusion criteria

Patients included in either of the above groups, unresponsive signs and symptoms to splint and conservative non surgical therapy for at least 4–6 months, successful clear dynamic MR image, successful diagnostic arthroscopy procedures and techniques, and age ranged from 15 to 50 years.

2.1.2. Exclusion criteria

Patients with previous TMJ surgery, systemic inflammatory joint disease, facial growth disturbances, direct trauma, or fracture of facial bones, cardiac pacemakers or cerebral aneurysm clips, were excluded from the study. Pregnant and lactating females were also excluded from the study.

2.1.3. Standardization and blinding technique

The study was carried out in a single blind fashion to eliminate bias, every patient underwent dynamic MRI examination. Dynamic MRI examination was performed by the same protocol for all patients to assure technique standardization. All MR images were evaluated by the same experienced radiologist (8 years experience) who was blinded to results of clinical diagnosis. The MRI and arthroscopic examination were conducted within not more than two weeks interval, and the patients received no treatment during this period to avoid any changes in the joint status. The arthroscopic procedures were done by the same surgeon and assistant using standard technique (8). Both of them were blinded to clinical and MRI results. Arthroscopic findings were recorded on DVDs and were recorded as a written report immediately after the procedure, the results of MRI and arthroscopy were compared.

2.1.4. MRI examination

MRI examination were conducted on a MR machine, Intera 1.0 Tesla superconductive unit, Philips medical systems, Netherlands), using bilateral TMJ surface coil.

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