

# Magnetic resonance imaging of temporomandibular joint dysfunction-correlation with clinical symptoms, age, and gender

Urška Lamot, MD,<sup>a</sup> Primož Strojjan, MD, PhD,<sup>b</sup> and Katarina Šurlan Popovič, MD, PhD<sup>a</sup>  
University Medical Center Ljubljana, Ljubljana, Slovenia and Institute of Oncology Ljubljana, Ljubljana, Slovenia

**Objective.** To determine whether the morphological (magnetic resonance imaging) MRI manifestations correlate with the signs and symptoms of temporomandibular joint (TMJ) dysfunction according to gender and age of the patients.

**Study design.** One hundred and forty-four subjects with TMJ dysfunction underwent a MRI of both TMJ to establish the presence of disk displacement, osteoarthritis, and effusion. Chi-square test and logistic regression analysis were performed. For the comparison of mean values between samples, we used *T*-test.

**Results.** A significant relationship between symptoms and morphological manifestations was found. In the group without reduction there were significant increases in the risk of experiencing symptoms ( $P = .002$ ). Significant correlation between age and osteoarthritis ( $P = .001$ ) and age and effusion ( $P = .022$ ) was found. There was no correlation between gender and morphological manifestations.

**Conclusion.** MRI morphological manifestations of the TMJ correlate with the presence of symptoms, therefore MRI has a crucial role in the diagnosis of TMJ dysfunction. (*Oral Surg Oral Med Oral Pathol Oral Radiol* 2013;116:258-263)

Temporomandibular joint (TMJ) dysfunction is a common condition that affects up to 39% of the population and is associated with a wide range of clinical signs and symptoms, such as pain, clicking, crepitus, restriction of motion, deviated jaw, headaches, vertigo, and tinnitus.<sup>1-8</sup> Magnetic resonance imaging (MRI) is the primary imaging technique in the diagnosis of (TMJ) dysfunction, because it provides superior information of all joint structures in a non-invasive way.<sup>1,2,5,9</sup>

TMJ dysfunction is known to be of multifactorial origin, with internal derangement, osteoarthritis, and effusion diagnosed by MRI being cited as major influences in the dental literature.<sup>1,3-5,8-10</sup> It is important to detect early MRI signs of TMJ dysfunction because in the advanced and irreversible phase, characterized by osteoarthritic changes,<sup>1,9,11</sup> only surgical treatment is available, which is typically inefficient.<sup>3</sup>

The prevalence of disk displacement in symptomatic individuals is much higher than in the normal population. Disk displacement has been found in 77%-94% of patients with symptoms of TMJ dysfunction referred for MRI and in 20%-34% of the asymptomatic population.<sup>1,3,9,12,13</sup> These findings have led investigators to question whether an anteriorly displaced disk is the precursor of clinical symptoms of a TMJ disorder or merely an anatomic variant.<sup>9</sup>

Hansson, Kircos, and Haley failed to correlate TMJ pain with MRI diagnoses of TMJ internal derangement, osteoarthritis, and effusion, whereas Bertram and Emshoff found a significant correlation between them.<sup>3,7,10,14,15</sup> None of these studies included multivariate analysis to determine the influence of the gender and age of the study group on the occurrence of internal derangement, osteoarthritis, effusion, and clinical symptoms. TMJ disorder is approximately 3 times more common in women than in men,<sup>1,2,16</sup> leading to the scientifically unconfirmed opinion that disk displacement, osteoarthritis, and effusion are more common in women.<sup>7</sup> Moreover, Aiken, Guarda-Nardini, Isberg, and Choi reported that the occurrence rate of TMJ disk displacement is highest in the 2nd-5th decades of life.<sup>1,7,17,18</sup> The weakness of Choi's study is that they considered medial and lateral disk displacements, which are less common categories of abnormal disk displacement in the population. Manfredini confirmed that osteoarthritis is more common in older people.<sup>19</sup> Joint effusion is supposedly more common in younger people but, to our knowledge, no clinical studies support this view.<sup>2</sup>

The aims of our study were to determine which of the morphological manifestations detected by MRI correlate with the signs and symptoms of TMJ dysfunction

## Statement of Clinical Relevance

We found that MRI morphological manifestations of TMJ dysfunction are associated with the presence of symptoms and confirmed the importance of clinical examination and MRI in the diagnosis of TMJ dysfunction and in the selection of the appropriate therapy.

The abstract has been submitted and accepted as an oral presentation at the European Congress of Radiology 2013 in Vienna.

<sup>a</sup>Institute of Radiology, University Medical Center Ljubljana.

<sup>b</sup>Division of Radiation Oncology, Institute of Oncology Ljubljana.

Received for publication Feb 3, 2013; returned for revision Apr 11, 2013; accepted for publication Apr 22, 2013.

© 2013 Elsevier Inc. All rights reserved.

2212-4403/\$ - see front matter

<http://dx.doi.org/10.1016/j.oooo.2013.04.019>

and to assess the impact of gender and age on the occurrence of these manifestations.

## MATERIALS AND METHODS

### Subjects

The study group consisted of 144 subjects (109 females and 35 males; mean age 39.4 years, range 12-81 years) who were assigned a clinical diagnosis of uni or bilateral TMJ dysfunction. All subjects underwent an MRI investigation of both TMJs between March 2004 and September 2010. A criterion for entering the study was a clinical diagnosis of TMJ dysfunction of at least one joint. Clinicians (1 of 3 maxillofacial surgeons from the Maxillofacial Surgery Department in Ljubljana) looked for various signs and symptoms (pain, noises/clicking, limited opening, etc.) in order to submit patients with a clinical diagnosis of TMJ dysfunction to our clinical institute, where we performed the MRI. Radiologists were not blinded to the clinical diagnosis. Patients who are diagnosed myalgia, collagen vascular disease, malignoma, rheumatoid arthritis, congenital anomalies of TMJ and those with a history of TMJ trauma were excluded.

### MRI

The MRI examinations were performed on a 1.5-T imaging system (GE Signa, Milwaukee, USA and Philips Achieva Nova, Netherlands) with the use of dual surface coils. The following protocol was applied:

- T1 spin echo (SE) sequence in the sagittal plane (twenty 3 mm thick slices, repetition time 450 ms, echo time 15 ms),
- Proton density spin echo (PDE SE) sequence in the sagittal plane (twenty 2.5 mm thick slices, repetition time 1500 ms, echo time 30 ms),
- T2 3-dimensional fast field echo (FFE) sequence in the sagittal plane (20 slices, repetition time 40 ms, echo time 18 ms),
- PD turbo spin echo (TSE) sequence in the coronal plane, all in the closed-mouth position (twenty 2.8 mm thick slices, repetition time 1500 ms, echo time 30 ms),
- PD TSE sequence in the sagittal plane in the open-mouth position (twenty 2.5 mm thick slices, repetition time 1500 ms, echo time 30 ms).

The data were collected on a  $256 \times 256$ - $352 \times 352$  dots/cm matrix. Each set of images was read by 2 experienced head and neck radiologists. Sagittal and coronal MR images in the closed-mouth position were obtained to establish the presence of different degrees of disk displacement, osteoarthritis, and effusion. Sagittal images in the open-mouth position were used to determine the presence of disk displacement with or without reduction.

Joints with internal derangement consisting of anterior displacement of the disk were divided into groups according to the location of the posterior band of the disk in relation to the condyle. Normal disk position was defined as the posterior band of the disk being at the superior position (i.e., 12 o'clock or max.  $10^\circ$  off) relative to the condyle. In the case of anterior disk displacement, the degree of displacement was determined (mild  $30^\circ$ - $60^\circ$ , moderate  $60^\circ$ - $90^\circ$ , significant  $90^\circ$ - $120^\circ$ ). The functional aspects of disk displacement were assessed according to disk displacement:

- Disk displacement with reduction: the disk is anteriorly displaced in the closed-mouth position but reverts to a normal position during opening;
- Disk displacement without reduction: the disk lies anterior to the condyle during all mandibular movements, and the normal condyle-disk relationship is not reestablished.

T2-weighted sequences were used for the detection of joint effusion (manifesting as areas of hyperintensity). The presence of any high signal on T2-weighted sequences in places typical of effusion (small to moderate amount in anterior and posterior recess or large amount in the whole superior joint or the inferior joint space) was considered to indicate the presence of joint effusion. The severity or amount of effusion was not taken into account. Chronic osteoarthritis changes were identified with T1- and T2-weighted MR images. We defined a MRI diagnosis of osteoarthritis by the presence of one or more of the following: deformities of the articular surfaces associated with flattening, subchondral sclerosis, surface irregularities, erosion, and osteophyte formation.

In our protocol, we recorded: gender and age, presence or absence of symptoms (pain, clicking, crepitus, restriction of motion, headache) of TMJ dysfunction, degree of disk displacement (mild, moderate, significant) with or without reduction, presence or absence of osteoarthritis and effusion for each of the 2 TMJs.

Since we found that almost all mild and moderate disk displacements were present with a reduction of the disk at mouth opening and that all significant disk displacements were present without a reduction of the disk at mouth opening, we decided to divide the patients into 3 groups: no disk displacement; anterior disk displacement with reduction; and anterior disk displacement without reduction.

### Statistical analysis

The results were analyzed using SPSS software (Release 20.0, SPSS Inc., Chicago, IL, USA). The  $\chi^2$  test or Fisher's exact test were performed to analyze the relationship between the descriptive variables (clinical symptoms and MRI-confirmed morphological changes) and logistic regression for estimating the effect of

Download English Version:

<https://daneshyari.com/en/article/6056799>

Download Persian Version:

<https://daneshyari.com/article/6056799>

[Daneshyari.com](https://daneshyari.com)