

# Comparison of joint pain in patients diagnosed with and without articular disc displacement without reduction based on the Research Diagnostic Criteria for Temporomandibular Disorders

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**Objective.** We compared joint pain (JP) in patients diagnosed with and without articular disc displacement without reduction (ADD) based on the Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD) and identified the characteristics of each JP.

**Study Design.** Fifty-eight patients with restricted mouth opening and pain in temporomandibular joint (TMJ) and with a magnetic resonance imaging diagnosis of ADD were selected. Diagnosis of ADD + JP and nonADD + JP was made with the use of the RDC/TMD.

**Results.** A multiple regression analysis of the data disclosed a positive correlation between range of motion on maximum assisted mouth opening and visual analog scale (VAS) (severity of JP) in the ADD + JP group, and between chronic pain grade (CPG) and VAS in the nonADD + JP group. A significant difference was observed between ADD + JP and nonADD + JP groups in CPG; CPG was higher in the nonADD + JP than in the ADD + JP group.

**Conclusions.** It is suggested that JP related and unrelated to ADD can indicate different types of disease. (Oral Surg Oral Med Oral Pathol Oral Radiol 2013;116:9-15)

It is well known that magnetic resonance imaging (MRI) is effective in the diagnosis of temporomandibular disorders (TMDs).<sup>1,2</sup> If patients with joint pain (JP) and restricted mouth opening are found to have articular disc displacement on MRI examination, a diagnosis of internal derangement accompanied by disc abnormality is usually made. MRI is the only examination in which an articular disc abnormality can be diagnosed noninvasively and objectively. It is effective in providing information about the disc position,<sup>3</sup> the amount of joint effusion,<sup>4,5</sup> and condylar bone marrow abnormality.<sup>6</sup> In contrast, there is a low incidence of a definite diagnosis of disc perforation if it is not accompanied with a severe synovial response and fibrous ankylosis in the MRI findings.<sup>7</sup> Accordingly, MRI examinations for the diagnosis of TMD have both potential and limitations at present. On the other hand, abnormal MRI findings do not always reflect the pathologic state of the TMJ. Some authors have shown overdiagnosis of TMD based on MRI findings.<sup>8,9</sup> One report has suggested that disc displacement is prevalent in the asymptomatic temporomandibular joint (TMJ) in almost 30% of pa-

tients.<sup>10</sup> Furthermore, although studies<sup>11-13</sup> have been made of the relationship between JP and disc disorders, there seems to be little agreement on how disc position and configuration abnormalities contribute to such pain. The Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD) has been established as the standardized diagnostic system for TMD.<sup>14</sup> The RDC/TMD is a diagnostic protocol consisting of a dual axis assessment system, a physical diagnosis (axis I) and a psychologic assessment (axis II). Axis I of the RDC/TMD is performed on the basis of a clinical assessment with diagnostic algorithms for myofascial pain, disc displacement, JP, and osteoarthritis (osteoarthritis). Axis II of the RDC/TMD includes an assessment of psychologic, behavioral, and psychosocial factors and evaluates the psychologic condition and disabilities of TMD patients. However, the RDC/TMD does not involve concurrent examination with MRI. It is considered that the RDC/TMD without MRI examination

## Statement of Clinical Relevance

The assumption that articular disc displacement without reduction (ADD) has ill effects on joint pain (JP) is open to discussion, because JP in patients diagnosed with and without ADD based on the Research Diagnostic Criteria for Temporomandibular Disorders can indicate different types of disease.

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does not significantly impair the accuracy of the clinical diagnosis of TMD. Several reports concerned with the reliability and diagnostic accuracy of the RDC/TMD have compared it with image diagnoses.<sup>10,15-21</sup> Ahmad et al.<sup>15</sup> showed that the agreement rate between diagnoses by RDC/TMD and image diagnoses varies depending on the group classification in the RDC/TMD assessment.

The present study was undertaken to analyze the characteristics of patients with JP and restricted mouth opening and a positive MRI who were not diagnosed with anterior disc displacement without reduction (ADD) in the RDC/TMD compared with patients with JP and diagnosed as ADD based on the RDC/TMD on the basis of the clinical and questionnaire categorical factor and the MRI findings.

**MATERIALS AND METHODS**

Fifty-eight patients, 55 women and 3 men, with a history of restricted mouth opening and JP in 1 TMJ and with an MRI diagnosis of ADD were selected as subjects for this study. Patients with bony changes on the condylar surfaces were excluded to evaluate the characteristics of JP unaffected by degenerative joint disease. The mean age of the patients was 46.2 ± 15.1 years, ranging from 16 to 73 years. The Ethics Committee of Hyogo College of Medicine approved the study.

Each patient had MRI of the TMJ performed with a 1.5-T MRI machine (Magnetom Vision; Siemens, Erlangen, Germany) with the use of 3-mm-thick sagittal slices during centric occlusion and unassisted mouth opening to configure and position the articular discs. The configurations of the discs on the proton density images were divided into 5 types according to Westesson et al.’s<sup>18</sup> classification: biconcave, even thickness, posterior band enlargement, convex, and folded. The amount of joint effusion was assessed on T2-weighted MRI scans and classified as reported by Larheim et al.<sup>3</sup> into 4 grades according to the amount of joint fluid: no or minimal, moderate, marked, and extensive. These assessments were performed in a blind manner by 1 radiologist, who did not know the results of the RDC/TMD assessment, using more than 2 consecutive sections of each MRI scan (256 × 256 dots/in; each image constructed of 300 pixels), all of which clearly showed the disc and the joint effusion.

A program to evaluate the clinical signs, parafunctional behaviors, and psychologic and psychosocial states of the TMD patients using the touch-panel-type PC was developed using Visual Basic (Microsoft Corp., New York, NY, USA) according to the contents of the examinations and questionnaires described in the RDC/TMD publication.

**Table I.** Diagnostic classification of axis I in the Research Diagnostic Criteria for Temporomandibular Disorders clinical examination

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**Group I. Muscular Disorders**  
 Ia. Myofascial Pain  
 Ib. Myofascial Pain with limited opening  
 No Group I dx

**Group II. Disc Displacements**  
 IIa. Disc Displacement with reduction  
 IIb. Disc Displacement without reduction, with limited opening  
 IIc. Disc Displacement without reduction, without limited opening  
 No Group II dx

**Group III. Arthralgia, Arthritis, Arthrosis**  
 IIIa. Arthralgia  
 IIIb. Osteoarthritis of the TMJ  
 IIIc. Osteoarthrosis of the TMJ  
 No Group III dx

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**Table II.** Grade classification in psychologic and psychosocial domains of the Research Diagnostic Criteria for Temporomandibular Disorders assessment

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**Grade of chronic pain (0-4)**  
 Grade 0 No TMD pain  
**-Low Disability-**  
 Grade 1: Low Intensity  
 Grade 2: High Intensity  
**-High Disability-**  
 Grade 3: Moderately Limiting  
 Grade 4: Severely Limiting

**Score of depression and nonspecific physical symptoms (pain items included or excluded) severity (0-4)**  
 Score 0: Not at all  
 Score 1: A little bit  
 Score 2: Moderately  
 Score 3: Quite bit  
 Score 4: Extremely

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Each patient underwent an RDC/TMD clinical examination (Table I). In addition, the initial severity of JP on mouth opening, while chewing, and at rest was recorded with the use of a 100-mm visual analog scale (VAS). Subjects diagnosed as RDC/TMD category IIIa and IIb or IIc, i.e., JP with ADD, were classified into the ADD + JP group. Subjects diagnosed as IIIa without IIb or IIc, i.e., JP not accompanied by ADD, were classified into the nonADD + JP group. Differences in JP in cases diagnosed as ADD + JP and those diagnosed as nonADD + JP based on the RDC/TMD clinical examination were evaluated statistically from the standpoint of clinical signs and MRI findings. Furthermore, we assessed which group, ADD + JP or nonADD + JP, was dependent on the psychologic status (depression and nonspecific physical symptoms [NSPS]) and psychosocial level of function (chronic pain grade) by performing axis II assessment (Table II).

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