

The correlation of research diagnostic criteria for temporomandibular disorders and magnetic resonance imaging: a study of diagnostic accuracy

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Objective. The aim of this study was to evaluate the performance of research diagnostic criteria for temporomandibular disorders (RDC/TMD) as a diagnostic test for temporomandibular joint problems using magnetic resonance imaging (MRI) as the gold standard.

Study Design. Sixty-seven women were assessed with RDC/TMD (2 examiners) and underwent MRI examination (3.0 T). Images were evaluated by 2 independent radiologists blinded to the clinical diagnoses. Results were analyzed by the Catmaker system.

Results. Of the 67 patients, 44 were diagnosed with temporomandibular disorders (TMD) according to RDC/TMD, but 21 (32%) of the diagnoses were not confirmed by MRI. The RDC/TMD sensitivity was 83.0%, specificity was 53.0%, and the positive likelihood ratio was 1.77, whereas the negative likelihood ratio was 0.32 ($P = 0.16$).

Conclusions. Our data suggest that RDC/TMD is a good research tool, but the high rate of false-positive results limits its use in clinical practice. (Oral Surg Oral Med Oral Pathol Oral Radiol 2013;115:277-284)

Temporomandibular disorders (TMDs) encompass joint or muscular disorders related to the temporomandibular joint (TMJ). Because the nature of TMDs is multifactorial, a diagnosis is complex and represents a challenge.¹⁻³

Examination of a TMD patient is accomplished through clinical procedures (muscle palpation, auscultation of articulatory noises, and analysis of mandibular

function) and TMJ imaging. In 1992,¹ the need for standardization and reproducibility of procedures gave rise to the research diagnostic criteria for temporomandibular disorders (RDC/TMD), a clinical diagnostic tool for the main TMDs. These criteria are organized into 3 groups as follows: muscular disorders (group I), disk displacements (group II), and a third group that includes arthralgia (group IIIa), osteoarthritis (group IIIb), and osteoarthrosis (group IIIc). The classification system is based on the signs and symptoms of TMD and aims for a better understanding of TMD's etiologic mechanisms.⁴⁻⁷

A correct diagnosis is essential for successful treatment. Therefore, studies of diagnostic accuracy are important, provided that a carefully considered methodology is adopted to enable the identification of biases and ascertain the clinical applicability of results. The Standards for Reporting of Diagnostic Accuracy initia-

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Statement of Clinical Relevance

The research diagnostic criteria for temporomandibular disorders (RDC/TMD) is the most used clinical tool for diagnosing temporomandibular disorders. However, some studies have investigated this method's performance and expressed concerns for its use in clinical practice. Therefore, we decided to evaluate RDC/TMD in comparison with MRI findings.

tive comprises items that are indispensable for conducting studies and, like the CONSORT initiative for randomized trials, provides authors with a checklist that helps them carry out their research work and ensure its quality.⁸

From the inception of RDC/TMD, studies have associated the assessments made with this set of criteria with the characteristics found in imaging exams.^{2,4,7,9-10} In fact, several studies are being conducted that seek to evaluate the diagnostic agreement between clinical exams and TMJ imaging, particularly magnetic resonance imaging (MRI), because it is used extensively for this purpose.^{4,7,9,11-21}

Technological advances in MRI have produced equipment—such as that used in this study (3.0 T)—with a broader field and sharper images suitable for use in clinical practice. Diagnoses have thus become more accurate.²²⁻²⁴ Furthermore, because MRI allows a view of the temporomandibular anatomy, it is the best method for analyzing temporomandibular articular disk position and degenerative alterations, so much so that in some studies it is used as the gold standard for this purpose.^{9,13,22}

Aware of the importance of correctly diagnosing TMD-related articular problems, the authors aimed to compare the results of the RDC/TMD clinical evaluation with the MRI (3.0 T) findings in the diagnosis of TMJ internal derangement to investigate the accuracy of RDC/TMD.

MATERIAL AND METHODS

Patients

This prospective study was approved by the Ethics Committee for the Analysis of Research Projects (CAPPesq 0175/08) and a statement of voluntary and informed consent was signed by all participants.

A total of 1291 women were examined at the Out-patient Climacteric Unit, Gynecology Department, Clinics Hospital, University of São Paulo, from April 2008 to March 2010. Recruitment was based on typical TMD-related complaints, such as pain in the joints or in the mastication muscles, articular noises, or functional limitations. The patients who met these inclusion criteria were further evaluated by 2 examiners (APMG and MKM), who applied RDC/TMD¹ according to instructions. Patients were partially or totally edentulous or had full dentition. Asymptomatic patients were also included. Exclusion criteria were (1) symptoms related to diseases in other parts of the stomatognathic system (toothache, neuralgia, migraine, intracranial neoplasm), (2) pain from systemic diseases (rheumatoid arthritis, fibromyalgia), (3) a history of psychiatric disorders and inability to answer a questionnaire, and (4) comorbid conditions. Patients who reported having

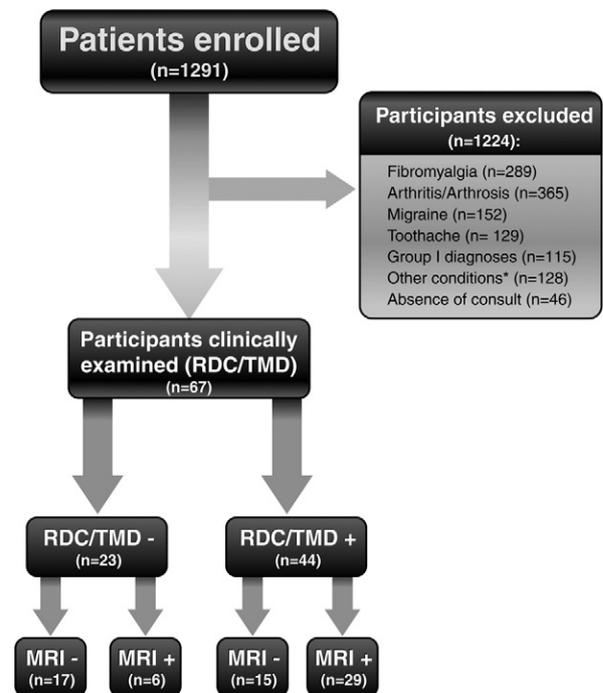


Fig. 1. Flow chart for participants, according to Standards for Reporting of Diagnostic Accuracy⁸ (*neuralgia, intracranial neoplasm, odontological implants, aneurysm clip, heart pacemaker, claustrophobia, refusal to carry out magnetic resonance imaging).

claustrophobia or possessing ferromagnetic objects in the body or who had only group I disorders (i.e., muscular disorders) were also excluded. Of the remaining patients, 67 were selected (23 who tested negative on the RDC/TMD [i.e., they had no clinically diagnosable conditions] and 44 who tested positive on the RDC/TMD [i.e., they were diagnosed with articular disorders]) and underwent MRI scanning (Figure 1).

The features clinically characterizing the articular diagnostic groups according to RDC/TMD were as follows:

Group IIa (disk displacement with reduction): reciprocal clicking (upon opening the mandible, a click is heard at a point at least 5 mm greater than its interincisal distance upon closing and is eliminated upon protrusive opening); TMJs with clicking upon vertical motion (either opening or closing) and clicking during lateral excursion or protrusion.

Group IIb (disk displacement without reduction and limited mouth opening): a history of significant limitation of opening; maximum unassisted opening ≤ 35 mm; passive stretch increases opening by ≤ 4 mm over maximum unassisted opening; contralateral excursion < 7 mm or uncorrected deviation to the ipsilateral side upon opening; absence of joint sounds or presence of joint sounds not meeting the criteria for group IIa.

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