Instruments that assess functioning in individuals with temporomandibular disorders and the International Classification of Functioning: systematic review

Instrumentos que avaliam a funcionalidade em indivíduos com disfunção temporomandibular e a Classificação Internacional de Funcionalidade: revisão sistemática

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ABSTRACT

BACKGROUND AND OBJECTIVES: The objective of this review was to study the tools used to measure functioning in individuals with temporomandibular disorders and verify its consistency with the model of the International Classification of Functioning (ICF), Disability and Health.

CONTENTS: Systematic review performed in the databases Pubmed, PEDro, Scielo, Bireme, Web of Science, Cochrane, CINAHL, SPORTDiscus and Scopus. Published clinical trials from 2001 to 2019, in Portuguese, English and Spanish were included, with one of the outcomes being the evaluation of functioning of people with temporomandibular disorders. For the evaluation of the quality of the articles, the GRADE Checklist was used. The questionnaires were analyzed, and their questions coded according to the domains of the ICF. 425 articles were found and, after screening, 7 of them were included in this research. In these, 4 different instruments used to evaluate the functioning of people with temporomandibular disorders were found: Research Diagnostic Criteria for Temporomandibular Disorders, Mandibular Function Impairment Questionnaire, Pain Disability Index and the 11-point functional impairment scale. The frequency of ICF's domains was: body functions (39.8%), body structure (22.8%), activity (17.7%), health condition (8.86%), personal factors (6.8%), participation (2.88), environmental factors (1.03%).

CONCLUSION: The studies related to functioning in the temporomandibular disorder population is still scarce. Moreover, the instruments used fail to address the domains of the ICF in a homogeneous way, and some do not address the whole conceptual model, with an emphasis on gathering information about body functions and structures.

Keywords: International Classification of Functioning, Disability and Health, Temporomandibular joint, Temporomandibular joint dysfunction syndrome.

RESUMO

JUSTIFICATIVA E OBJETIVOS: O objetivo desta revisão foi estudar as ferramentas utilizadas para mensuração da funcionalidade em indivíduos com disfunção temporomandibular e verificar sua consistência com o modelo da Classificação Internacional de Funcionalidade (CIF), Incapacidade e Saúde.

CONTEÚDO: Revisão sistemática realizada nas bases de dados Pubmed, PEDro, Scielo, Bireme, *Web of Science*, Cochrane, CINAHL, *SPORTDiscus* e Scopus. Foram incluídos ensaios clínicos publicados de 2001 a 2019, nos idiomas português, inglês e espanhol, tendo como um dos desfechos a avaliação da funcionalidade de pessoas com disfunção temporomandibular. Para a avaliação da qualidade dos artigos foi utilizado o *Checklist* GRADE. Os questionários foram analisados e suas questões codificadas de acordo com os domínios da CIF. Foram encontrados 425 artigos, 7 deles foram incluídos nesta pesquisa. Apresentavam 4 diferentes instrumentos para avaliação da funcionalidade de pessoas com disfunção temporomandibular: *Research Diagnostic Criteria for Temporomandibular Disorders*, *Mandibular Function Impairment Questionnaire*, *Pain Disability Index e* Escala de comprometimento funcional de 11 pontos. A frequência dos domínios da CIF foi: função (39,8%), estrutura do corpo (22,8%), atividade (17,7%), condição de saúde (8,86%), fatores pessoais (6,8%), participação (2,88), fatores ambientais (1,03%).

CONCLUSÃO: A literatura é limitada sobre estudos sobre a funcionalidade na população com disfunção temporomandibular. Além disso, os instrumentos utilizados não conseguem abordar os domínios da CIF de uma forma satisfatória, com ênfase na coleta de informações a respeito de funções e estruturas do corpo.

Descritores: Articulação temporomandibular, Classificação internacional de funcionalidade, Incapacidade e saúde, Síndrome da disfunção da articulação temporomandibular.

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INTRODUCTION

Orofacial disorders impact health and quality of life (QL), and the temporomandibular disorder (TMD) is considered the main cause for orofacial pain[1,2]. TMD encompasses different functional and structural conditions which affect the temporomandibular joint (TMJ), the masticatory muscles and associated structures[3]. The prevalence in the population varies from 60 to 70%[4]. The etiology of TMD is multifactorial and may be related to dental, medical, traumatic, psychosocial or genetic conditions[5,6]. The main signs and symptoms are limitations in mandibular movement, cracklings and clicks, muscle pain in the head and cervical region[7]. TMD patients present physical and functional limitations, as well as psychological discomfort, leading to losses in functioning[7,8]. Functioning is considered an important index for measuring the population's health, since evaluating information on deaths and morbidity is not enough to understand the population's health condition[9,10]. The International Classification of Functioning, Disability and Health (ICF) is an instrument proposed by the World Health Organization (WHO) as an element of standardization/unification of concepts, bringing the explanatory proposal of a biopsychosocial model of functioning[11], providing a structure that describes health and its related states[12,13]. The ICF presents functioning as a result of the positive interaction of its domains, which include health condition, the body functions and structures, activity, participation, personal and environmental factors, being disability the antagonist. Functioning is the dynamic combination of health condition and contextual factors[13].

The study of functioning associated to TMD allows for a better understanding of the patients profile, favoring the planning of patient-focused interventions in detriment of protocol interventions, centered on processes. The study of publications on this subject can offer more knowledge on the issue and, at the same time, make available a critical evaluation of the most cited instruments in the literature, contributing to the process of selecting the most appropriate instrument for clinical practice or research. This review's objective was to study the tools used to measure functioning in individuals with TMD and verify their consistency with the ICF model.

CONTENTS

Systematic review performed in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA)[14] which sought to answer the following questions: "What are the instruments used to evaluate the functioning of people with TMD?" and "Are the utilized instruments in accordance with the ICF's concepts"?

Search strategy

The searches were carried out independently by two researchers in the Pubmed, PEDro, Scielo, Bireme, Web of Science, Cochrane, CINAHL, SPORTDiscus and Scopus databases. The descriptors used were combined by boolean operators as follows: (Disability OR Functional Performance OR Functioning OR Impairment) AND (Temporomandibular Joint Disorder OR Temporomandibular Joint Disorder Syndrome) in Portuguese, English and Spanish. The revision protocol was registered on the PROSPERO platform under number CRD42020138859.

Selection of studies

Duplicate works were excluded. The titles and abstracts were analyzed independently by two researchers, with the help of a third one in case of disagreement. After this screening, the texts were read in their entirety for confirmation.

Eligibility criteria

The clinical trials included were published from 2001, the year of the ICF's publication, until September 2019, and studied patients diagnosed with TMD using the Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD). The studies also presented the evaluation of functioning of these patients, over 17 years of age, both sexes. Review studies, observational studies, case reports, pilot studies, case series, and studies that evaluated TMD in conjunction with other diseases were excluded (Figure 1).

Data extraction and analysis

The data on authors, year of publication, sample composition, objective and scale of functioning were extracted. The studies' quality of evidence was assessed by GRADE (Grading of Recommendations Assessment, Development and Evaluation), developed for providing a universal, transparent, and sensitive system for assessing the quality of evidence and strength of recommendations[15]. The methodological quality of the studies was assessed using the PEDro scale, which is very reliable. The scale consists of 11 items, the first of which, the eligibility criteria, is not included in the sum of the scores, therefore, the total ranges from zero to 10[16].

The next process consisted in coding the significant contents of the instruments, according to the ICF's domains. The codification was performed with the extraction of the concepts from all the questions and answers of all instruments. After that, they were classified according to the ICF's domains, following already established rules[17]. The results were compared, and the disagreements resolved by the third researcher. After the classifications were defined, the concepts were summed up and then divided by the domains. Next, the percentage of concepts by domains in each of the questionnaires was made.

The initial search resulted in 425 articles. Of those, 7 were selected according to the criteria (Figure 1).

For the evaluation of functioning in people with TMD, 1 scale and 3 questionnaires were found: RDC/TMD, Mandibular Function Impairment Questionnaire (MFIQ), Pain Disability Index (PDI) and the 11-point functional impairment scale. Only the RDC/TMD was repeated. Of the studies that used this questionnaire, two made use only of the Axis II (Table 1). The instruments were codified according to the ICF's domains (Table 2). The frequency of domains is described in figure 2.

Regarding the quality of evidence according to the GRADE system, the articles varied from high, moderate and low. As for the methodological quality, the total mean score of the articles by the PEDro scale was 5.28, varying between high and low quality.

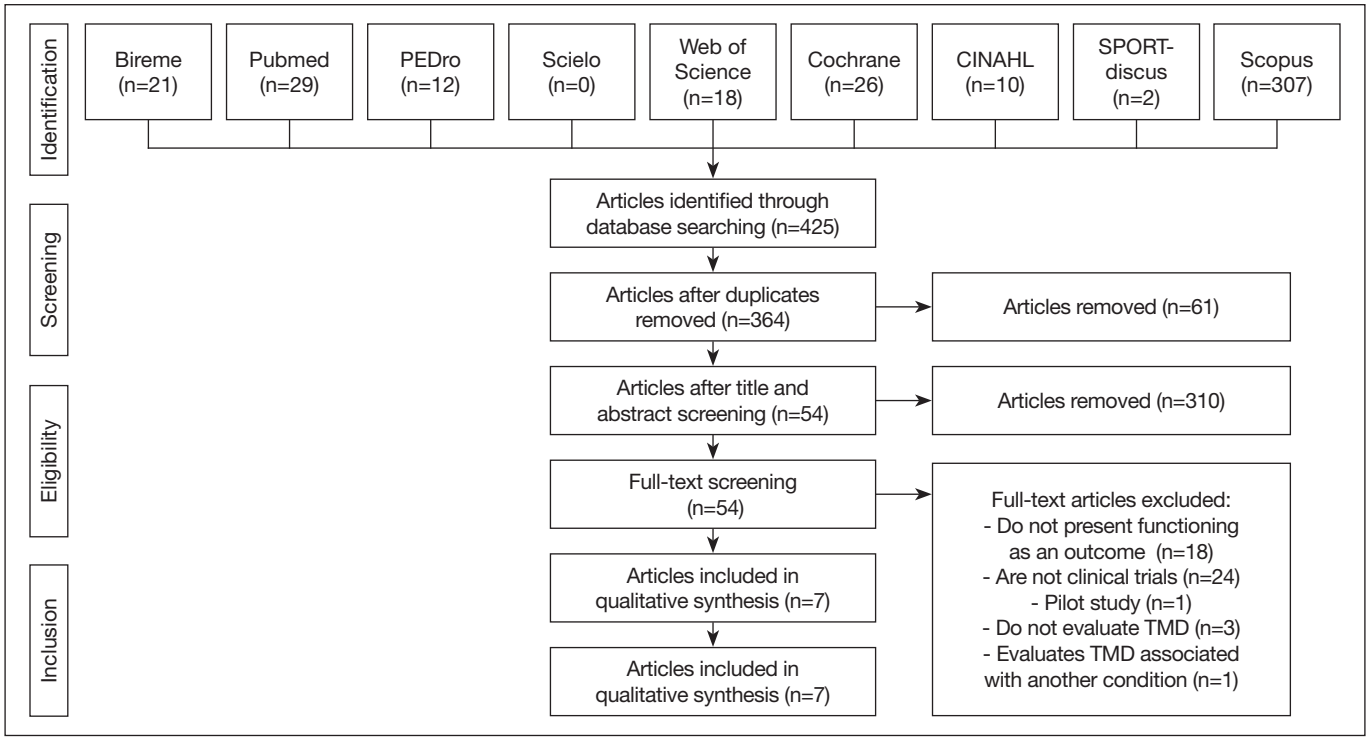

Figure 1. Article selection's flowchart

Table 1. General distribution of articles

Authors	n	Objectives	Instruments	Methodological quality (PEDro scale)	Quality of evidence (GRADE)
Tatli et al.[2]	120	Compare the effectiveness of treatment methods for unilateral displacement of the TMJ disk without reduction.	RDC/TMD- Axis II	7	Moderate
Calixtre et al.[22]	61	Determine whether the upper cervical mobilization and training of craniocervical flexors decrease orofacial pain, increase mandibular function and pain thresholds through the pressure of masticatory muscles, decrease the impact of headache in women with TMD when compared with no intervention.	MFIQ	8	High
Shedden Mora et al.[18]	58	Evaluate the effectiveness of biofeedback-based cognitive-behavioral treatment versus dental treatment with occlusal plate.	PDI RDC/TMD	7	Moderate
Rodrigues et al.[23]	40	Evaluate the effects of low power laser application in auriculotherapy points on the physical and emotional aspects of individuals with TMD compared to the occlusal plate.	RDC/TMD	5	High
Vuckovic et al.[24]	23	Evaluate the feasibility and effectiveness of shamanic healing for individuals with TMD.	11-point functional impairment scale RDC/TMD	2	Low
Vuckovic et al.[25]	23	Evaluate the feasibility and safety of shamanic healing for individuals with TMD.	RDC/TMD - Axis II	2	Low
Wolfart et al.[26]	34	Evaluate the effect of two shortened dental arch treatment options on oral health related QL and RDC/TMD.	RDC/TMD	6	Low

MD = temporomandibular disorder; RDC/TMD= Research Diagnostic Criteria for Temporomandibular Disorders; MFIQ= Mandibular Functional Impairment Questionnaire; PDI= Pain Disability Index; GRADE = Grading of Recommendations Assessment, Development and Evaluation; PEDro scale = Physiotherapy Evidence Database; QL = Quality of life

Table 2. Frequency distribution of the ICF's domains contained in each instrument

Authors	Instruments	ICF's domains	n (%)
Shedden Mora et al.[18] Rodrigues et al.[23] Wolfart S et al.[26] Vuckovic et al.[24]	RDC/TMD	Health condition Function Body structure Activity Participation Personal factors Environmental factors Total	32(11.42) 111(39.65) 76(27.14) 33(11.79) 3(1.08) 21(7.50) 4(1.42) 280(100.00)
Tatli et al.[2] Vuckovic et al.[25]	RDC/TMD– AXIS II	Health condition Function Body structure Activity Participation Personal factors Total	10(8.62) 58(50.00) 26(22.41) 11(9.49) 2(1.73) 9(7.75) 116(100.00)
Calixtre et al.[22]	MFIQ	Health condition Function Body structure Activity Total	1(4.55) 10(45.45) 1(4.55) 10(45.45) 22(100.00)
Shedden Mora et al.[18]	PDI	Function Body structure Activity Participation Personal factors Environmental factors Total	13(20.31) 8(12.50) 30(46.88) 9(14.06) 3(4.68) 1(1.57) 64(100.00)
Vuckovic et al.[24]	11-point functional impairment scale	Function Activity Total	1(33.33) 2(66.67) 3(100.00)

ICF = International Classification of Functioning, Disability and Health; RDC/TMD = Research Diagnostic Criteria for Temporomandibular Disorders; MFIQ= Mandibular Functional Impairment Questionnaire; PDI= Pain Disability Index

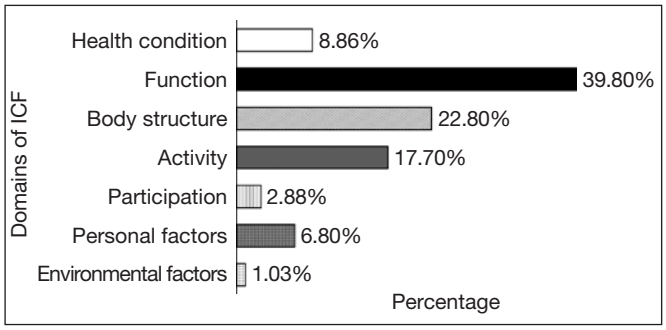

Figure 2. Frequency of ICF's domains in all instruments selected for evaluation of functioning in individuals with temporomandibular disorder

Only two studies were indexed in the PEDro database, and the methodological quality of the others was evaluated by the reviewers (Table 1).

DISCUSSION

There are not many articles about functioning in the TMD population, although the initial searches identified 425 articles, only 7 had functioning as a measure of outcome in clinical trials. This information highlights that the concept of functioning advocated by the WHO is not yet adequately incorporated in the interventional research of the field.

The RDC/TMD was used to evaluate functioning in 6 studies. Being the gold standard for TMD classification, this predominance was expected. It's one of the few tools available in the literature that allows the diagnostic evaluation of the disorder and related psychosocial conditions. RDC/TMD features a biaxial approach, allowing the reliable measurement of physical findings in Axis I and evaluation of psychosocial status in Axis II. In the end, the TMD diagnosis is based on clinical criteria, as well as classification according to the groups: muscular disorders (Group 1), disk displacement disorders (Group 2), arthralgia, osteoarthritis, and osteoarthrosis (Group 3)[3]. The degree of chronic pain and its impact on functioning can also be evaluated[18].

When comparing the concepts present in the instrument with the ICF, the 7 domains were present, however, the questions are more focused in body functions and structures. The participation and environmental factors are little explored. When only the Axis II is used, environmental factors are not addressed. This would be the instrument that is closest to the WHO's recommended way of measuring functioning.

MFIQ made it possible to classify individuals into categories of functional limitation related to TMD: low, moderate and severe. The instrument presents 17 questions regarding daily activities with 5 possible answers, ranging from ''no difficulty" to ''very much difficulty". MFIQ is described as having the advantage of measuring functional limitation related to TMD, unlike other indexes that specifically evaluate the severity of clinical signs and symptoms, being seen as an appropriate tool to verify gains in functional terms after therapeutic interventions[18]. However, when comparing this index with the ICF, it's noticeable that it approaches basically function and activities, thus, not being able to completely develop the outcome and produce data related to the biopsychosocial model.

The PDI is an instrument composed of a self-assessment questionnaire that measures the level of pain-related disability in 7 areas of daily life, assigning values from 0 to 10. This index also presents the 7 domains of the ICF, but in irregular distribution, contemplating mainly activity and function.

The 11-point functional impairment scale was also used, which is a direct question about how individuals rate their functioning on a scale of 0-10. When coded, it was found that it only contemplates the domains of function and activity, being another instrument that also failed to contemplate the whole scope proposed by the ICF and, consequently, does not evaluate functioning in its entirety.

It was verified that the instruments are focused on the body function and structure and activity domains, reinforcing the biomedical model. The change towards the biopsychosocial model emphasizes the dynamic and the bidirectional relations between health condition and personal and environmental factors[13]. As for the psychometric properties of the instruments, the Portuguese version of the RDC/TMD Axis II questionnaire was considered consistent (α Cronbach= 0.72), reproducible (Kappa values between

0.73-0.91; p<0.01) and valid (p<0.01)[19]. MFIQ presents good internal consistency, however, the authors suggest further studies on different samples of patients with TMD[20]. PDI has satisfactory values of validity and reliability in the sample of patients with pain, not being specifically analyzed in individuals with TMD[21].

The selected studies presented as main limitations the presence of risk of bias, such as not blinding the patients in relation to the treatment, as well as risk of inaccurate results, due to the small sample number. In that sense, there must be stimulus for performing and publishing studies with greater methodological consistency, so that these flaws can be overcome.

As for limitations of the present study, the reduced quantity of articles must be noted. This fact shows that, even though TMD has a significant impact on functioning, there are still not enough studies on this disorder. Another limitation was the fact that the study did not approach more deeply the psychometric properties of the instruments since that was not the goal of the review.

Therefore, the recommendation is that, when choosing the instrument to be applied, its psychometric properties, such as stability, internal consistency, equivalence, and validity should be taken into consideration. The importance of the study is in the continuous growth in using functioning as an index for evaluating the health condition of the population, and instruments that measure this outcome more coherently with the concepts of ICF are needed.

CONCLUSION

Literature on the subject is limited. Four instruments that evaluate the functioning in the determined population were found: RDC/TMD, MFIQ, PDI and the 11-point functional impairment scale. The instruments showed consistency with the ICF's model. The RDC/TMD presented the best results, being the most recommended and the 11-point functional impairment scale the least recommended. However, these instruments cannot address the domains satisfactorily and some do not address all components of the conceptual model, the emphasis being on body structures and functions.

AUTHORS' CONTRIBUTIONS

Luana Maria Ramos Mendes
Data Collection, Methodology, Writing - Original preparation, Writing - Review and Editing

Marina Carvalho Arruda Barreto
Data Collection, Project Management, Methodology, Writing - Original preparation, Writing - Review and Editing

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Statistical analysis, Project Management, Research, Methodology, Writing - Original preparation, Writing - Review and Editing, Supervision

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