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ORIGINAL RESEARCH

Analysis of the accuracy and reliability of the Short-Form Fonseca Anamnestic Index (SFAI) in the diagnosis of myogenous temporomandibular disorder in women

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KEYWORDS
Q2 Temporomandibular joint disorders;
Sensitivity and specificity;
Diagnosis;
Accuracy studies;
Reliability

Abstract
Background: The Fonseca Anamnestic Index (FAI) is a questionnaire used to classify individuals with temporomandibular disorders (TMD). Previous studies have shown that the FAI provides a multidimensional measurement of the TMD construct and that the main dimension presents a good fit to the model according to the item response theory.
Objective: To evaluate the between-day reliability, accuracy, and best cut-off score of the Short-Form Fonseca Anamnestic Index (SFAI) for the diagnosis of myogenous TMD.
Methods: The sample consisted of 123 women (57 with myogenous TMD and 66 asymptomatic), evaluated by the Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD). The participants answered the SFAI on two occasions with a seven-day interval between tests. For the analysis of between-day reliability, the intraclass correlation coefficient ($ICC_{3,1}$), the standard error of measurement (SEM) and the minimum detectable change (MDC) were used. The Receiver Operating Characteristic (ROC) curve was used to determine the diagnostic accuracy and the best cut-off point.
Results: The SFAI demonstrated excellent reliability (ICC $\geq$ 0.95) for all items and for the total SFAI score (ICC = 0.98; SEM = 3.28; MDC = 9.09). The level of accuracy of the SFAI for the diagnosis of myogenous TMD was high (area under the curve of 0.97), with a better cut-off score of 17.5 points.

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Conclusion: The FAI should be used in its short form to classify the absence of myogenous TMD (scores between 0 and 15 points) or presence of myogenous TMD (scores between 20 and 50 points) in women.

Introduction

Temporomandibular disorders (TMD) involves a series of clinical alterations involving the masticatory muscles, the temporomandibular joints (TMJ), and their associated structures.[1] The most common signs and symptoms of TMD are pain in the TMJ, pre-auricular region, cervical spine, face, and/or head, fatigue of cervical muscles, craniofacial muscles, and/or masticatory muscles, TMJ mobility limitation, jaw deviation, and unusual joint sounds.[2]

Epidemiological studies have found that TMD-related symptoms occur predominantly in young women between the ages of 20 and 40 years.[3,4] TMD presents with a multifactorial etiology that can be classified as predisposing factors when they increase the risk of developing dysfunction, beginner factors when they provoke the onset of the condition, or perpetuating factors when they interfere in the cure or favor the progression of TMD.[5] In addition, because it is a multifactorial dysfunction, the diagnosis of TMD becomes complex and very controversial and therefore it is recommended that it be conducted by a multidisciplinary team composed of several allied-health professionals.[6]

Thus, to obtain the diagnosis of TMD, instruments such as the *Research Diagnostic Criteria for Temporomandibular Disorders* (RDC/TMD) and the Fonseca Anamnestic Index (FAI)[7,8] have been developed. The RDC/TMD has demonstrated a high level of accuracy and reliability in the diagnosis of myogenous TMD and has become widespread in its use as a validated and standardized diagnostic tool for TMD dysfunction.[9] However, this instrument is difficult to apply because of the long protocol, the need for face-to-face evaluation,[10] and the need for evaluator training and experience.[11] It is important to emphasize that the RDC/TMD has been updated to the Diagnostic Criteria for Temporomandibular Disorders (DC/TMD),[12] with the purpose of improving the description of the procedures and diagnosis for clinical practice and research. However, the new version has not yet been clinimetrically tested for the Brazilian population.

The FAI is a patient-reported outcome in which a volunteer answered questions on the questionnaire. This index is a simple, easy, and low-cost tool that displayed the signs and symptoms of TMD and classified the condition according to its severity.[13]

In previous studies, some authors have already established information on the accuracy and reliability of the FAI, among them Berni et al.,[8] who demonstrated its high accuracy for the diagnosis of individuals with or without myogenous TMD, and Campos et al.,[10] who reported good to excellent reproducibility for some items of the FAI. However, the analyses of these surveys were performed using all of the items of the FAI, ruling out the possibility of its multidimensionality.

Rodrigues-Bigaton et al.[14] recently demonstrated the multidimensionality of the FAI and established that its main dimension was composed of items 1, 2, 3, 6, and 7. Therefore, the present study proposed to evaluate the reliability and accuracy of the Short-Form Fonseca Anamnestic Index (SFAI), taking into account the importance of establishing an ideal cut-off score for the diagnosis of individuals with myogenous TMD, for the possible use of a short version of the index, and considering that there have been no reports on the accuracy and best cut-off score of this dimension. It is also important to calculate the diagnostic accuracy of the SFAI instrument to ensure that researchers and/or clinicians can use it with confidence. Thus, this study hypothesized that the SFAI would present adequate reproducibility, sensitivity, and specificity in the diagnosis of myogenous TMD.

Methods

Study design

This study was a cross-sectional observational study analyzing the accuracy and diagnostic reliability of the SFAI. The study was approved by the Research Ethics Committee of Universidade Metodista de Piracicaba (UNIMEP), Piracicaba, SP, Brazil (protocol number 15/11). All subjects were informed about the evaluation procedures and signed an informed consent. It is important to note that this study followed the recommendations of the STAndards for the Reporting of Diagnostic accuracy studies (STARD),[15] the Guidelines for Reporting Reliability and Agreement Studies (GRRAS)[16] and the COnsensus-based Standards for the selection of health Measurement INstruments (COSMIN).[17]

Sample

Between 2006 and 2016, a total of 123 women were recruited from the city of Piracicaba, SP, Brazil. The invitation was made through verbal invitation, posters, and dissemination via websites. After recruitment and screening of the eligibility criteria, the subjects were allocated to the myogenous TMD Group ($n = 57$) and assymptomatic group ($n = 66$) according to the RDC/TMD.

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