

TRANSLATION, CULTURAL ADAPTATION AND VALIDATION OF FOOT AND ANKLE OUTCOME SCORE (FAOS) QUESTIONNAIRE INTO PORTUGUESE

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ABSTRACT

Objective: (1) to translate and validate the original version of the Foot and Ankle Outcome Score (FAOS) questionnaire from English into Portuguese in patients with diagnosis of lateral ligament injuries with ankle sprain history, (2) to provide cultural adaptation for Brazilian patients (3) to correlate it with the quality of life SF_36 questionnaire. **Method:** The method of translation and validation followed the criteria described by Guillemin et al. Fifty patients with ankle sprain were included. Results and

Conclusion: FAOS questionnaire showed good reproducibility for patients with ankle sprain and good reliability for all intra- and inter-interviewer sub-scales ($p < 0.05$). The translation and cultural adaptation of FAOS questionnaire had its properties of assessment, reliability and validity measured, showing that this questionnaire is suitable for use in Brazilian patients with lateral ligament ankle injuries.

Keywords: Pain measurement. Ankle. Ankle injuries. Questionnaires.

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INTRODUCTION

Injuries of the lateral ligament complex of the ankle constitute 1/4 of all sports-related injuries, with basketball, soccer and volleyball being the sports with the highest prevalence of injuries.¹ Injuries severity can be graded from I to III.² Level I means a mild ligament stretching without instability, while level II is a partial rupture with a mild joint instability, and level III involves total rupture of ligaments with joint instability. Clanton and Schon³ suggested another classification, encompassing the highest number of events found in practice while correlating the applicable therapies to the various functional types of patients:

- stable ankle: level I – negative for clinical tests of anterior drawer and talus lateral bending - symptomatic treatment

- unstable ankle: levels II and III - positive for clinical tests of anterior drawer and/ or talus lateral bending.

Group 1 – non-athletes or elderly patients - functional treatment

Group 2 – athletes: A) Negative stress X-ray - functional treatment, B) Positive stress X-ray (drawer and/ or talus bending) - surgical treatment, C) Subtalar instability.

Targeting to assess the effectiveness of the different treatment approaches for ankle and foot conditions, the use of questionnaires assessing pain, function and daily life activities are important for determining the parameters favoring an objective and reproducible analysis of treatment results, enabling the comparison of data.

Outlining the challenges for measuring the results, there is no conclusive understanding around what patients regard as important for a final result of treatment.

Whereas the need to provide a validated assessment tool in Portuguese for ankle sprains, the purposes of this study were the following: (1) translate and validate the original English version of the functional assessment for ankle and foot, the *Foot and Ankle Outcome Score* (FAOS) into Portuguese for patients with history of inverted ankle sprain, (2) culturally adapt it for Brazilian population, and to (3) correlate it with the quality of life questionnaire SF-36.⁵

MATERIALS AND METHODS

FAOS (Chart 1) is a questionnaire developed for assessing the opinion of patients concerning conditions associated to ankle and foot. It has been used for patients with lateral instability of the ankle, calcaneus tendonitis and plantar fasciitis. FAOS consists of five sub-scales: pain, other symptoms, activities of daily life, sports and recreational activities, and ankle- and foot-related quality of life. The last week is taken into account when the questionnaire is applied. The standard alternatives are provided, and, for each question, a score ranging from 0 to 4 is assigned. A normal scoring is calculated for each sub-scale (with 100 indicating absence of symptoms and 0 indicating extreme symptoms). FAOS can be self-applicable for patients between 20 and 60 years old. Reliability was confirmed in patients with lateral instability of the ankle⁶ The contents on FAOS are based on the *Knee Injury and Osteoarthritis Outcome Score* (KOOS).⁷

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Chart 1 – Final Portuguese version of the FAOS questionnaire

FAOS (Foot and Ankle Outcome Score) QUESTIONNAIRE for assessment of ankle and foot function and symptoms	
PAIN	
P1. How often do you experience foot/ankle pain?	Never, Monthly, Weekly, Daily, Always
What amount of foot/ankle pain have you experienced the last week during the following activities?	
P2. Twisting/pivoting on your foot/ankle	None, Mild, Moderate, Severe, Extreme
P3. Straightening foot/ankle fully	None, Mild, Moderate, Severe, Extreme
P4. Bending foot/ankle fully	None, Mild, Moderate, Severe, Extreme
P5. Walking on flat surface	None, Mild, Moderate, Severe, Extreme
P6. Going up or down stairs	None, Mild, Moderate, Severe, Extreme
P7. At night while in bed	None, Mild, Moderate, Severe, Extreme
P8. Sitting or lying	None, Mild, Moderate, Severe, Extreme
P9. Standing upright	None, Mild, Moderate, Severe, Extreme
OTHER SYMPTOMS	
S1. How severe is your foot/ankle stiffness after first wakening in the morning?	None, Mild, Moderate, Severe, Extreme
S2. How severe is your foot/ankle stiffness after sitting, lying or resting later in the day?	None, Mild, Moderate, Severe, Extreme
S3. Do you have swelling in your foot/ankle?	Never, Rarely, Sometimes, Often, Always
S4. Do you feel grinding, hear clicking or any other type of noise when your foot/ankle moves?	Never, Rarely, Sometimes, Often, Always
S5. Does your foot/ankle catch or hang up when moving?	Never, Rarely, Sometimes, Often, Always
S6. Can you straighten your foot/ankle fully?	Always, Often, Sometimes, Rarely, Never
S7. Can you bend your foot/ankle fully?	Always, Often, Sometimes, Rarely, Never
ACTIVITIES OF DAILY LIFE - please indicate the degree of difficulty you have experienced in the last week due to your foot/ankle.:	
A1. Descending stairs	None, Mild, Moderate, Severe, Extreme
A2. Ascending stairs	None, Mild, Moderate, Severe, Extreme
A3. Rising from sitting	None, Mild, Moderate, Severe, Extreme
A4. Standing	None, Mild, Moderate, Severe, Extreme
A5. Bending to floor/pick up an object	None, Mild, Moderate, Severe, Extreme
A6. Walking on flat surface	None, Mild, Moderate, Severe, Extreme
A7. Getting in/out of car	None, Mild, Moderate, Severe, Extreme
A8. Going shopping	None, Mild, Moderate, Severe, Extreme
A9. Putting on socks/stockings	None, Mild, Moderate, Severe, Extreme
A10. Rising from bed	None, Mild, Moderate, Severe, Extreme
A11. Taking off socks/stockings	None, Mild, Moderate, Severe, Extreme
A12. Lying in bed (turning over, maintaining foot/ankle position)	None, Mild, Moderate, Severe, Extreme
A13. Getting in/out of bath	None, Mild, Moderate, Severe, Extreme
A14. Sitting	None, Mild, Moderate, Severe, Extreme
A15. Getting on/off toilet	None, Mild, Moderate, Severe, Extreme
A16. Heavy domestic duties (moving heavy boxes, scrubbing floors, etc)	None, Mild, Moderate, Severe, Extreme
A17. Light domestic duties (cooking, dusting, etc)	None, Mild, Moderate, Severe, Extreme
FUNCTIONAL SPORTS AND RECREATIONAL ACTIVITIES	
please indicate the degree of difficulty you have experienced in the last week due to your foot/ankle:	
Sp1. Squatting	None, Mild, Moderate, Severe, Extreme
Sp2. Running	None, Mild, Moderate, Severe, Extreme
Sp3. Jumping	None, Mild, Moderate, Severe, Extreme
Sp4. Twisting/pivoting on your injured foot/ankle	None, Mild, Moderate, Severe, Extreme
Sp5. Kneeling	None, Mild, Moderate, Severe, Extreme
FOOT- AND ANKLE-RELATED QUALITY OF LIFE	
Q1. How often are you aware of your foot/ankle problem?	Never, Monthly, Weekly, Daily, Always
Q2. Have you modified your life style to avoid potentially damaging activities to your foot/ankle?	Not at all, Mildly Moderately, Severely, Totally
Q3. How much are you troubled with lack of confidence in your foot/ankle?	Not at all, Mildly Moderately, Severely, Totally
Q4. In general, how much difficulty do you have with your foot/ankle?	None, Mild, Moderate, Severe, Extreme

FIRST TRANSLATION

The translation and validation method employed followed the criteria described by Guillemin et al.⁸ The items of the version of the FAOS questionnaire were first translated into Portuguese by two independent Brazilian English teachers who were aware of the objective of the research. Both translations were compared and discussed by the translators and by the members of the committee (2 physical therapists and 1 orthopaedic doctor specialized in ankle and foot conditions), and, in case of disagreement, changes were provided in order to obtain a single version, keeping the key characteristics of the original questionnaire.

Back Translation

In the stage of *back translation*, the Portuguese version was translated back into English by two American teachers, who did not participate on the first stage. Subsequently, both existing versions were compared to the original tool in English, and the inconsistencies were assessed and documented by a group composed by one orthopaedic doctor, specialized in foot and ankle conditions, two physical therapists specialized on orthopaedic physical therapy, and one of the English teachers. The sentences in Portuguese were re-written until a consensus was reached, leading to the second Portuguese version.

Assessment of Translation

The FAOS questionnaire for assessing ankle and foot symptoms, version number 2 in Portuguese, was then randomly applied to ten patients in a private orthopaedics and rehabilitation clinic, intending to assess the level of understanding regarding the questions and alternatives of the questionnaire. Once the patient was informed about the purpose of the research and signed a consent term, the questionnaire was applied. To each answered question, the patients gave their opinions about how difficult it was to understand the question and the alternatives. Those opinions were recorded and, if exceeding a limit of 10% of the interviewed patients, the questions would be reviewed for their meanings and, if required, re-written. For 100% of the patients, the opinion was favorable for all questions/alternatives, thus this phase was completed and the evaluation of the measurement properties of the questionnaire was initiated.

SAMPLE

Fifty individuals with medical diagnosis of ankle sprain were included. In addition to clinical examination, all patients were submitted to X-ray imaging of the ankle. The inclusion criteria were the following: ability to read and write, age between 20 and 60 years, either practicing sports or not, with clinical diagnosis of ankle lateral ligament injury by inverted sprain, without associated fractures and with normal cognition to understand the questionnaire. (Table 1). All patients signed the consent term.

Table 1 – socio-cultural and clinical characteristics of the 50 patients included in the process of translation and validation of the FAOS questionnaire into Portuguese

Socio-cultural and clinical characteristics		Absolute Values	
Gender	Male (%)	28	(56)
	Female (%)	22	(44)
Age (years)			
	Mean (SD)	31.54	(12.38)
	Minimum-Maximum	(20 - 60)	
Ethnicity			
	Caucasian (%)	43	(86)
	Non-Caucasian (%)	7	(14)
Education			
	High school - incomplete (%)	13	(26)
	High school - completed (%)	27	(54)
	College degree (%)	10	(20)
Injury time (months)			
	Mean (DP)	16.14	(38.17)
	Minimum-Maximum	(2 - 240)	

PROCEDURE

The definitive Portuguese version of the FAOS and SF-36 questionnaire was applied on 50 patients by interviewer 1, and, after 20 minutes, FAOS was applied by interviewer 2. After 7-15 days, the interviewer 1 applied the FAOS again. Meanwhile, no changes could be made to the medication.

STATISTICAL ANALYSIS

The Pearson and Spearman's linear correlation coefficient was employed to assess the correlation between the FAOS questionnaire and the SF-36 questionnaire for quality of life for pain, other symptoms, ADLs, sports and ankle- and foot-related quality of

life. The intra-class correlation coefficient was employed for assessing intra- and inter-investigator reproducibility. For all tests, a significance level of 5% ($\alpha=0.05$) was used, with tests with $p<0.05$ being regarded as statistically significant.

The intra-class correlation coefficient (*Cronbach's alpha coefficient*) measures the internal consistency or the reproducibility of a test. It corresponds to the variability quotient between patients for total variability (between patients and systematic error). It ranges from 0 to 1, measuring the ability of a tool to differentiate patients, with the values being distributed as follows: 0 - 0.3, poor consistency; 0.4 - 0.7, moderate consistency, and; 0.8 - 1, strong consistency.

RESULTS

The mean, median and standard deviation values for the scores on the sub-scales pain, other symptoms, ADLs, sports and ankle- and foot-related quality of life on FAOS questionnaire and each domain of the SF-36 quality of life questionnaire are shown on Table 2. The mean time for applying the FAOS questionnaire was 10 min.

Table 2 – Mean, median and standard deviation values for FAOS and SF-36

Tools	Mean	Median	Standard Deviation
FAOS (Pain)	83.4200	90.5	20.17
FAOS (Other Symptoms)	82.6800	89.0	18.0
FAOS (ADLs)	90.6600	99.0	19.38
FAOS (Sports)	71.6000	85.0	29.28
FAOS (Quality of Life)	61.6400	63.0	28.65
SF-36			
Functional ability	86.1	95	21.14
Physical aspects	62.5	75	41.72
Pain	64.78	62	23.56
Overall health status	84.16	87	15.7
Vitality	71.9	75	16.25
Social aspects	83.24	88	18.25
Emotional aspects	77.28	100	36.61
Mental Health	75.36	76	18.78

Intra- and Inter-investigator reproducibility for the 5 sub-scales of FAOS questionnaire

On Table 3, we can find intra-and inter-investigator intra-class correlation coefficients for each sub-scale of the FAOS questionnaire: pain, other symptoms, ADLs, sports and quality of life. The FAOS questionnaire showed a strong degree of reproducibility for all intra- and inter-investigator domains ($p<0.05$).

Table 3 – Intra-class coefficients and corresponding p values for the 5 sub-scales of FAOS questionnaire

Sub-scale	Intra-investigator	Inter-investigator
Pain	0.9*	0.8*
Other symptoms	1.0*	0.9*
ADLs	1.0*	1.0*
Sports	1.0*	0.9*
Quality of Life	1.0*	0.9*

* significant correlation for 0.05

Correlations between FAOS questionnaire and the SF-36 questionnaire

The correlation of the FAOS questionnaire with the SF-36 questionnaire of quality of life is shown on Table 4. The correlation of the

Table 4 – Spearman's correlation coefficient for FAOS questionnaire (5 sub-scales) and the different domains of the SF-36 questionnaire

FAOS Domains	Functional ability	Physical aspects	Pain	Overall health status	Vitality	Social aspects	Emotional aspects	Mental health	Comp. health status
PAIN	0.6(**)	0.4(*)	0.4(**)	0.4(**)	0.2	0.3	0.1	0.1	0.3
OTHER SYMPTOMS	0.3	0.07	0.3(*)	0.2	0.2	0.2	-.042	0.03	-0.026
ADLs	0.7(**)	0.6(**)	0.5(**)	0.6(**)	0.2	0.3	0.05	0.1	0.06
SPORTS	0.7(**)	0.4(**)	0.5(**)	0.5(**)	0.2	0.2	0.04	0.2	0.2
Ankle- and foot-related quality of life	0.5(**)	0.5(**)	0.5(**)	0.4(**)	0.2	0.1	0.1	0.0	0.3(*)

** significant correlation for 0.01; * significant correlation for 0.05

pain sub-scale of the FAOS had a moderately significant correlation with SF-36 domains: Pain, Overall Health Status, Physical Aspects and Functional Ability. The 'other symptoms' sub-scale had a poor significant correlation for pain. The ADLs sub-scale had a moderate significant correlation with functional ability, physical aspects, pain and overall health status. The 'ankle- and foot-related quality of life' sub-scale had a moderate significant correlation with the domains: functional ability, physical aspects, pain, overall health status, and compared health status.

DISCUSSION

Traumas to the lateral ligament complex of the ankle are commonly found in medical services. It is estimated that one ankle sprain occurs among each 10,000 individuals everyday.⁹ Appropriate treatments evaluated in an effectively and comparable manner can reduce medical and social costs and favor an earlier return to sports and professional activities. The purpose of this study was to translate and validate the FAOS questionnaire specifically designed for ankle function and symptoms into Portuguese and correlate it to the SF-36 quality of life questionnaire.

Function questionnaires can be used both as an assessment tool and as a treatment guidance for several orthopaedic conditions.¹⁰ We didn't find in literature any specific assessment questionnaire for patients with ankle sprains validated into Portuguese. According to Guillemain et al.⁸, a foreign-language function questionnaire must be validated when the intention is to apply it to a population with different culture and language than the country where the tool was created. FAOS questionnaire was validated on 213 patients submitted to anatomical surgical reconstruction of lateral ankle ligaments with a postoperative time of approximately 12 years (3 - 12 years) and was shown to be useful for assessing symptoms associated to ankle ligaments reconstruction.⁶

In our study, the FAOS questionnaire has been shown to be highly reproducible both inter- and intra-investigator. This enables health-care professionals to objectively assess a patient's health status in the beginning, during, and at the end of the rehabilitation period.

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Furthermore, we can check the results of applying different rehabilitation protocols or different kinds of surgeries.

SooHoo et al¹¹ checked the correlation of AOFAS scales to SF-36. A poor to moderate correlation was found for patients with hindfoot conditions. In our study, we found that FAOS sub-scales for pain, ADLs, sports and quality of life had a moderately significant correlation with some of the SF-36 domains.

Eechaute et al.¹² made a systematic review aiming to check the clinimetric quality of assessment tools in patients with chronic ankle instability. Four assessment tools were included: the *Ankle Joint Functional Assessment Tool (AJFAT)*, the *Functional Ankle Outcome Score (FAOS)*, the *Foot and Ankle Disability Index (FADI)* and the *Functional Ankle Ability Measure (FAAM)*. FAOS and FAAM fulfilled the inclusion criteria for content and construction validity. The content validity subjectively evaluates if the components of a tool determine or represent the domain or dimension it intends to measure and the constructive validity: the results of the tool under validation process must be compared to a previously established golden standard, or, when absent, to compare the tool with clinical parameters usually employed for what it intends to measure.¹³ Evidence-based medicine shows us that the use of clinical endpoints is critical for objectively finding the most effective treatment approach. We believe that the translation and validation of the FAOS questionnaire in Brazil will facilitate and encourage further scientific studies on patients diagnosed with lateral ligament injury secondary to ankle sprains.

CONCLUSION

By means of the translation and cultural adaptation of the FAOS questionnaire into Portuguese, we found that, due to its good reproducibility and validity, this tool was shown to be appropriate for measuring function and symptoms in Brazilian patients with ankle lateral ligament injuries.

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