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Translation, cross-cultural adaptation, reliability and validity of the Turkish version of the Olerud-Molander Ankle Score (OMAS)

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ABSTRACT

Objective: The aim of this study was to translate and culturally adapt the Olerud-Molander Ankle Score (OMAS) into Turkish and to assess its reliability and validity.

Methods: The Turkish version of the OMAS (OMAS-Tr) was developed after the translation and back-translation, which included the stages recommended by Beaton. The OMAS-Tr was administered to one hundred patients (49 females, 51 males; average age: 42.3 ± 17.7 ; range 16–81 years) with malleolar fractures. The OMAS-Tr was completed twice by each participant at 7- to 10-days intervals to assess test-retest reliability based on the interrater correlation coefficient, whereas Cronbach's alpha evaluated internal consistency. The external validity was evaluated with correlations between the Turkish version of the Foot and Ankle Ability Measure (FAAM) and the Turkish version of the SF-12 questionnaire. The distribution of floor and ceiling effects was also analyzed.

Results: The internal consistency (Cronbach's $\alpha = 0.84$) and the test-retest reliability (ICC = 0.98) were excellent. The mean interval between the two tests was 8.6 ± 1.4 days. The mean and standard deviation of the first and second assessments of the OMAS-Tr were 74.1 ± 23.7 and 75.7 ± 23.9 , respectively. There was a strong correlation between the OMAS-Tr and the FAAM subscales on activities of daily living and sports ($r = 0.86$, $r = 0.83$; $p < 0.001$, respectively). The OMAS-Tr displayed very good to good correlation with the SF-12 physical component score and the SF-12 mental component score ($r = 0.72$, $r = 0.60$, $p < 0.001$, respectively).

Conclusion: OMAS-Tr was a valid and reliable tool to assess ankle fracture-related problems. Nonetheless, further studies are needed to assess its responsiveness.

Level of evidence: Level III, diagnostic study.

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Ankle fractures are relatively common orthopedic injuries with an incidence of approximately 187/100,000 per year among different ages and genders.^{1,2} The incidence of ankle fractures is highest in young males and middle-to older-aged women.^{3,4} Malleolar fractures are one of the most common injuries in the lower extremity that require operative treatment.⁵ However, malleolar fractures may still be associated with poor clinical outcomes

regarding accompanying occult intra-articular soft tissue or chondral injuries.^{6,7}

Many Patient-Reported Outcomes (PROs), such as the Karlsson score, Foot and Ankle Outcome Score (FAOS), American Orthopedic Foot and Ankle Score (AOFAS), and Foot and Ankle Ability Measure (FAAM) have been developed for the assessment of foot and ankle injuries. While the Karlsson score is generally used for ligament injuries, the FAOS and AOFAS are used for ankle injuries and were developed to evaluate different foot and ankle pathologies.^{7,8} The FAAM is a self-report, region-specific instrument that has displayed the ability to distinguish individuals with different levels of functional performance.^{9,10} Translation, cross-cultural adaptation, reliability and validity of the FAAM into Turkish has been reported.¹¹

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Developed in 1984, the Olerud-Molander Ankle Score (OMAS) is a disease-specific questionnaire specifically designed to evaluate the functions of patients with ankle fractures.^{12–15} The concurrent validity of the OMAS was compared with the Linear Analog Scale and the Ankle Function Score and was found good regarding the floor/ceiling effects.¹⁶ The English version of the OMAS has only been translated into Swedish.¹⁷ The Turkish version of the OMAS would potentially be a PRO measure that would be useful in the clinical management of Turkish-speaking patients with various ankle fractures.

The purpose of this study was to translate and culturally adapt the OMAS into Turkish and evaluate its reliability and validity compared to the FAAM and Short Form-12 (SF-12).

Patients and methods

Translation and cultural adaptation

The guideline suggested by Beaton was preferred for cultural adaptation and translation of the OMAS into Turkish (OMAS-TR).¹⁸ Two native Turkish translators performed the initial translation. The informed translator was a surgeon and the uninformed one was a teacher. The two forward translations were synthesized after being reviewed and discussed by a committee. Two native English translators, who speak Turkish fluently, translated the pre-final Turkish version back to English. After comparing these two translations with the original OMAS, a pre-final version of the OMAS-TR was approved for the purpose of pilot test application (Table 1). The pilot test was applied to 20 patients who were asked to assess the comprehensibility. Questions that caused

Table 1
Olerud Molander Ayakbileği Skoru.

	SKOR
Ağrı	
Yok	25
Engebeli zeminde yürürken	20
Düz zeminde yürürken	10
Ev içinde yürürken	5
Sürekli ve Aşırı	0
Sertlik	
Yok	10
Var	0
Şişlik	
Yok	10
Akşamları	5
Sürekli	0
Merdiven Çıkma	
Sorunsuz	10
Zorlanarak	5
Mümkün Değil	0
Koşma	
Mümkün	5
Mümkün Değil	0
Zıplama	
Mümkün	5
Mümkün Değil	0
Çömelme	
Sorunsuz	5
Mümkün Değil	0
Destekler	
Yok	10
Sarmak, Bandajlamak	5
Baston veya Koltuk Değneği	0
Çalışma, günlük yaşam aktivitesi	
Yaralanma öncesi ile aynı	20
Kısıtlı	15
İş değişikliği	10
İleri düzeyde iş güç kaybı	0
Toplam	100

comprehension problems were noted and patients were asked for suggestions.

Participants

Prior to the study, institutional approval was obtained from the Hacettepe University Ethics Committee (GO 15/495-21). Two hundred fifty-six patients with malleolar fractures, who had undergone surgical or conservative treatments between 2010 and 2014, were recruited from the archives of the Department of Orthopedics and Traumatology at Hacettepe University. The inclusion criteria were; being 16 years of age or older, having malleolar fractures, and having been accepted to participate in both the test and re-test assessments. Patients with tibial pilon fractures, talus fractures, coexisting fractures and serious comorbidities, cognitive impairment, and lack of understanding of the Turkish language were excluded. One hundred patients (49 females, 51 males; average age: 42.3 ± 17.7, range: 16–81 years) who met the inclusion criteria were enrolled in the study. All patients' radiographs were verified by the senior author (E.T.) to depict a malleolar fracture.

Patient-reported outcome measures

OMAS

The OMAS is a disease-specific PRO, which evaluates ankle fractures. The OMAS consists of nine questions with different scorings: pain (25 points), stiffness (10 points), swelling (10 points), stair climbing (10 points), running (5 points), jumping (5 points), squatting (5 points), supports (10 points) and work/activity level (20 points). The score is calculated as the sum of each rated item. Each question was based on an ordinal rating scale with an overall score ranging from 0 (totally impaired function) to 100 (excellent or completely unimpaired function). Values from 0 to 30 were considered poor, 31–60 fair, 61–90 good, and 91–100 excellent.¹²

FAAM

The FAAM is an evaluative self-reported instrument to comprehensively assess the physical function of individuals with musculoskeletal disorders of the feet and ankle.¹⁹ It consists of activities of daily living (ADL) and sports subscales, the first containing 21 and the latter eight items. The ADL and sports subscales have a total score of 84 and 32, respectively.²⁰

SF-12

The SF-12 was developed based on the 36-item Short-Form (SF-36) with the intent of reproducing the SF-36 in a brief and more useful form.²¹ The physical component score (PCS) and the mental component score (MCS) of the SF-12 were derived by the weighted sum of 12 items' scores using the USA standard SF-12 scoring algorithm.²²

Study procedures

Administration of outcome measures

The patients were asked to complete the OMAS-TR, the previously validated Turkish version of the FAAM, and the SF-12. The research assistant distributed the three questionnaires to each patient. Difficulties during the testing regarding comprehensibility and any inconsistencies regarding patients' problems were noted. The patients were requested to complete the second assessment of the OMAS-TR within 7–10 days after their first assessment in order to determine the test-retest reliability.

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