

Cross-Cultural Adaptation and Validation of the Lower Extremity Measure Into German

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Abstract

Introduction: The Lower Extremity Measure (LEM) was developed to provide a specific instrument to detect changes in physical function in patients with hip fracture. Of 29 questions, 3 have a valid “not applicable” answer option. The goal of this study was to validate the LEM in German and to determine the added value to the physical functioning (pf) subscale of the Short Form 36 (SF-36). **Materials and Methods:** The LEM was translated according to published guidelines and administered to patients with hip fracture (31 A1-A3 and 31 B1-B3) shortly after surgery (baseline), at 3 months (3M), and for reliability testing at 3 months plus 1 week (3M+). The reproducibility, internal consistency, floor and ceiling effects, construct validity, and responsiveness of the German LEM were assessed. **Results:** A total of 106 patients completed the LEM and SF-36 (mean age 75.5; 67% women) at baseline (mean of 4.9 days after operation), and 88 completed both questionnaires at both the 3M and 3M+ assessments. At each assessment time point, between 6% and 23% of the patients answered 7 questions as “not applicable.” Reproducibility and internal consistency were high (intraclass correlation coefficient = 0.93; Cronbach’s α = .96). No floor effect (0%) and a minor ceiling effect (7.87%) were found for the total LEM score. The strongest correlation was found between the LEM and the SF-36 subscale pf (Spearman ρ = .93). Responsiveness was similar for the SF-36 pf subscale and the LEM when using effect size (SF-36 pf 0.71 vs LEM 0.72) and better for the LEM when using standardized response mean (SF-36 pf 0.65 vs LEM 0.76). **Discussion:** The German LEM is a reliable, valid, and responsive measure for the self-assessment of patients after hip fracture surgery. As a number of questions are not applicable to elderly patients, the added value of this lengthy questionnaire in these often frail, sometimes cognitively impaired patients is still open for debate.

Keywords

fragility fractures, geriatric trauma, hip fracture, patient-reported outcome, validation

Introduction

Evaluation of hip fracture surgery has traditionally focused on clinical or surgeon-defined measures, such as the Harris Hip Score or the Charnley score.^{1,2} Although there are a number of patient-reported outcome measures (PROMs) and generic quality-of-life instruments validated for hip osteoarthritis and other hip-related disorders,³⁻⁶ there are no validated functional PROMs specific to hip fractures.⁷ The Lower Extremity Functional Scale, a self-reported questionnaire that has been validated in the context of traumatic injuries of the lower extremities in general, has not been specifically designed for hip fractures and includes questions regarding vigorous activities, such as running and hopping, which are typically not applicable to elderly patients.^{8,9} The Musculoskeletal Function Assessment (MFA) or its short version, the SMFA, has been used in patients with a wide spectrum of musculoskeletal problems including fractures but is also not hip fracture specific.¹⁰ The Lower Extremity Measure (LEM) is a PROM that was developed based on the Toronto Extremity Salvage Score.¹¹

Emphasis was put on designing a short, simple questionnaire considering the advanced age of most patients with hip fracture. The LEM, which is available in French and in English, was shown to be a reliable, valid, and responsive tool to evaluate function in patients with a hip fracture.¹² As no such validated tool is available in German, the goal of the present study was to validate the LEM in German to quantify its psychometric properties and thereby to determine the added value to

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