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Validation of the Single Assessment Numeric Evaluation (SANE) Score as an Outcome Measure as Compared to the revised Foot Function Index (rFFI)

Nicholas Bellas, BS, Carl Cirino, MD, Mark Cote, PT, DPT, MSCTR, Vinayak Sathe, MD, Lauren Geaney, MD

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Introduction/Purpose: Patient reported outcome measures serve as an invaluable tool in both the clinical and research setting to monitor a patient's condition and efficacy of treatments over time. We aim to validate the Single Assessment Numeric Evaluation (SANE) score for disorders of the lower extremity using the revised Foot Function Index (rFFI) as a reference. The rFFI is a validated 34-question survey tool utilized in the evaluation of patients with foot and ankle related pathology [1-4], while the SANE score consists of a patient's single numerical rating of the status of their extremity [5]. Given its ease of use and prior validation with shoulder pathology, the SANE score has potential as a practical and effective outcome measure in foot and ankle pathology.

Methods: Patient age, sex, visit diagnosis by ICD-10 code, SANE score, and FFI score were collected retrospectively from 218 initial patient encounters between January 2015 through July 2017. Patients were included if they were 18 years and older presenting for outpatient evaluation to the University of Connecticut Foot and Ankle Orthopedic Department. Patients were excluded if they had incomplete SANE or rFFI data. The rFFI is a 34-question survey with subscales including pain (7 questions), stiffness (7 questions), activity limitation (3 questions), difficulty (11 questions), and social issues (6 questions). Results of the two scores were compared using the Pearson or Spearman correlation coefficients with correlation defined as excellent (>0.7), excellent-good (0.61-0.7), good (0.4-0.6), or poor (0.2-0.39) [6]. Diagnoses were categorized into 9 subgroups that were analyzed including: forefoot, plantar fasciitis, arthritis, deformity, fracture, tendinitis, OCD, soft tissue trauma and "other".

Results: The SANE score had good correlation with the overall rFFI score ($r=0.51$, $p<0.001$). When comparing the SANE score to the rFFI subscores, there was good correlation with pain ($r=0.42$, $p<0.001$), good correlation with stiffness ($r=0.44$, $p<0.001$), poor correlation with activity ($r=0.36$, $p<0.001$), good correlation with difficulty ($r=0.52$, $p<0.001$), and poor correlation with social issues ($r=0.39$, $p<0.001$). Sub-analysis showed an excellent to good correlation between SANE and rFFI score for forefoot pathology ($r=0.67$, $p<0.001$), "other" pathologies ($r=0.65$, $p<0.001$), and plantar fasciitis ($r=0.63$, $p<0.016$), good correlation for arthritis ($r=0.49$, $p<0.038$), deformity ($r=0.60$, $p<0.010$), fracture ($r=0.50$, $p<0.004$), and tendinitis ($r=0.47$, $p<0.017$), and no significant correlation for OCD of the talus ($r=0.56$, $p<0.145$) and soft tissue trauma ($r=0.19$, $p<0.319$).

Conclusion: The SANE score demonstrates good correlation with the rFFI overall. However, its correlation varies depending on the subscore of the rFFI and the presenting pathology of the patient. The SANE score correlates best with the rFFI pain, stiffness, and difficulty subscore, and poorly with activity and social issues. In addition, the SANE score correlates best with forefoot pathologies, plantar fasciitis, and "other" pathologies but does not correlate with patients presenting for OCD of the talus or soft tissue trauma.

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Figure 1 - Correlation Coefficients and Classification Between the rFFI and SANE Score Used in Assessment of Foot and Ankle Pathology

	Pearson Correlation Coefficient	p value	Classification
Overall	0.51	<0.001	Good
Difficulty	0.52	<0.001	Good
Stiffness	0.44	<0.001	Good
Pain	0.42	<0.001	Good
Social Issue	0.39	<0.001	Poor
Activity	0.36	<0.001	Poor
Forefoot	0.67	<0.001	Excellent-good
Other	0.65	0.001	Excellent-good
Plantar fasciitis	0.63	0.016	Excellent-good
Deformity	0.60	0.010	Good
Fracture	0.50	0.004	Good
Arthritis	0.49	0.038	Good
Tendinitis	0.47	0.017	Good
OCD of talus	0.56	0.145	No significance
Soft tissue trauma	0.19	0.319	No significance

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