

Reliability and validity of the Turkish version of the Foot Function Index in patients with foot disorders

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Background/aim: The Foot Function Index (FFI) is a valid, reliable, and widely used self-reported questionnaire for the foot. The purpose of this study was to provide evidence for the validity and reliability of the Turkish version of the FFI (FFI-TR) among patients with foot disorders such as plantar fasciitis, hallux valgus, pes planus, and hammertoe deformities.

Materials and methods: One hundred and fifty-nine patients with foot disorders were enrolled. The psychometric properties of the previously translated and adapted FFI-TR were assessed. The internal consistency and test-retest reliability were evaluated. Construct validity was examined for correlations with the Short Form-36 (SF-36) questionnaire.

Results: Cronbach's alpha ranged between 0.821 and 0.938. Reproducibility was satisfactory, with intraclass correlation coefficient values between 0.960 and 0.985. Weak correlations were found between FFI-TR and some SF-36 subscales for validity ($|\rho| < 0.30$). There was a ceiling effect for the activity limitation subscale. There were no floor effects for any items or application times. Good accuracy was determined for all scores.

Conclusion: FFI-TR is a reliable and valid scale. This tool can be used in routine practice and clinical research for evaluating foot disorders and foot-related functional impairments.

Key words: Foot health status, Foot Function Index, outcome measurements, reliability, validity

1. Introduction

There is a high incidence of foot and ankle disorders in society (1,2). The estimated prevalence of plantar fasciitis (PlaF) is about 10% (3), prevalence of hallux valgus (HV) is 30% in females and 13% in males (4), and prevalence of pes planus (PP) ranges between 15% and 20% (5). Foot disorders and their related symptoms may lead to functional limitations. Self-reported outcome instruments can provide valuable information about patients' impairments and functional limitations. Several instruments have been adopted for foot and ankle disorders in clinical evaluation and outcome measurements of treatment and research, with variable evidence to support their use. Of these instruments, the American Orthopedic Foot-Ankle Society Score, Foot Health Status Questionnaire, and Foot Function Index (FFI) are often recommended for use in the literature (6-14).

The FFI is one of the most frequently used questionnaires. It consists of 3 subscales with a total of 23 items evaluating foot pathology, pain, disability, and activity limitations (2,15,16). The FFI was initially

developed as a specific questionnaire to evaluate pain and functional ability in patients with rheumatoid arthritis (Appendix 1) (15).

The FFI and FFI-R (revised) (16) have been widely used in many studies for more than 20 years. These instruments have been applied to more than 4700 participants worldwide, with 20 different foot and ankle disorders. The validity and reliability of the FFI in terms of different pathologies have been investigated in various languages, and the results are mostly satisfactory (2,6,7,10,13,15,16). The first translation of the FFI was into Dutch. The internal consistency, construct validity, and reliability were evaluated in 206 patients with forefoot pain (13). It has been translated and adapted into various languages, including Taiwan Chinese (7), German (10), Turkish (17), Brazilian Portuguese (14), French (6), Italian (8,11), and Spanish (12). The FFI has been reported to be compatible with the SF-36 in assessing foot and ankle problems and to be useful for assessing patients' quality of life (18). Yalman et al. translated and adapted the FFI into Turkish in a study of 20 patients with PlaF in 2014 (Appendix 2) (17).

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The aim of our study was to assess the psychometric properties of the Turkish version of the FFI in patients with PlaF disorder, HV, PP, and hammertoe (HT) deformities.

2. Materials and methods

This study was carried out at Başkent University and Ankara Yıldırım Beyazıt University in Turkey. The protocol was approved by the Başkent University Ethical Committee (No. KA12/204). Participants were asked to sign informed consent forms. One hundred and fifty-nine native Turkish-speaking patients with foot disorders were enrolled. Foot disorders included PlaF disorder and HV, PP, and HT deformities.

Inclusion criteria were presence of foot and ankle disorder including PP, HV, PlaF, or HT, and the ability to read and write in Turkish. Patients using antiinflammatory drugs in the previous week and/or receiving orthosis for foot/ankle problems, receiving physical therapy in the preceding month, having a history of knee or hip injury, having psychological, mental, cognitive, or vascular problems, having neurological problems such as brain injury or systemic diseases such as rheumatoid arthritis, or having a history of foot and ankle surgery were excluded.

The demographic questionnaire elicited sociodemographic data such as age, sex, height, weight, occupation, dominant side, and type of deformation (Table 1).

The FFI is a self-administered questionnaire consisting of 3 subscales: pain (9 items), disability (9 items), and activity limitation (5 items), containing 23 items for assessing patients with foot diseases (15). The pain subscale (PS) evaluates the level of foot pain in various situations. The disability subscale (DS) investigates difficulty in performing various activities due to foot problems. The activity limitation subscale (ALS) shows activity limitations due to foot problems.

Higher scores on the FFI indicate weak foot health, more intense pain, or greater limitation. The lowest and highest scores indicate no limitation and maximal limitation, respectively.

Patients scored each item from 0, the lowest score, to 10, the highest. If a specific status or activity did not apply, patients were asked to mark that question 'N/A' (not applicable). If they considered that some items did not describe their particular situation, they left those blank. These items were excluded from the calculation of the final index score. There is no consensus in the literature concerning calculation of final patient FFI scores. Agel (9) obtained subscale scores by calculating mean values of all items in a subscale, but reported no total score. Wu (7) made no reference to score calculations. Martinelli (8) calculated the pain and disability scores by dividing the sum of subscale items by the maximum possible score, and

then multiplied this by 100. Pod (12) rounded the scores up or down following multiplication by 100. Total score calculations for the FFI-TR were obtained by adding all items and converting the total scores to a scale of 100. For subscales, additional scores were determined by calculating the mean scores of items in the corresponding subscale.

SF-36 was divided into 8 subscales: Physical Functioning (PF), Role-Physical (RP), General Health (GH), Vitality (VT), Bodily Pain (BP), Social Functioning (SF), Role-Emotional (RE), and Mental Health (MH). The SF-36 item scores were then aggregated into 2 main scores: the Physical Component Scale (PCS) (sum of the PF, RP, GH, and BP scores) and the Mental Component Scale (MCS) (sum of the VT, SF, RE, and MH scores). The higher the score (range between 0 and 100), the better the perceived health level. These scores were used to examine the criterion validity of the FFI (8,10,14).

Permission to investigate the psychometric properties of the Turkish version of the FFI questionnaire was received from Elly Budiman-Mak, MD, MPH, MS (15).

The assessment participation period lasted 8 days, during which participants were evaluated 3 times. All participants were asked to complete the SF-36 and FFI-TR on day 1, and the FFI-TR again on days 3 and 8 (final). The participants received no treatment during the questionnaire application procedure.

2.1. Statistical analyses

All statistical analyses and calculations were performed using the Statistic Package for the Social Sciences software (IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY, USA). Distributions of continuous variables were evaluated using the Shapiro–Wilk test.

The instrument measurement properties included internal consistency, test–retest reliability, construct validity, acceptability, accuracy, ceiling and floor effects, and discriminant and convergent validity.

Reliability was evaluated with internal test–retest and consistency. Internal consistency and the correlation among items of the FFI-TR and the total score for each subscale were measured using Cronbach's alpha. A Cronbach alpha value from 0.70 to 0.95 is considered to be sufficient (19). Test–retest reliability was evaluated using the intraclass correlation coefficient (ICC). Values of 0.4 or greater were considered sufficient (20).

Internal consistency: "Cronbach alpha" (≥ 0.70), "Corrected item–total correlation" (≥ 0.30), and "Cronbach alpha if item deleted" (≥ 0.30) values were calculated for the total FFI-TR and the subscales thereof.

Reproducibility: the ICC (two-way mixed effects of ICC for absolute agreement) and its 95% confidence interval were analyzed for the 3 applications, and for the first and third applications.

Construct validity was examined using factor analysis with principal component extraction and varimax rotation. Factor loadings, Bartlett's test result, and the Kaiser–Meyer–Olkin measure of sampling adequacy were calculated.

For discriminant and convergent validity, correlations between FFI-TR scores and SF-36 scores were evaluated using Spearman correlation analysis.

Range, mean, and standard deviation, median, floor and ceiling thresholds (maximum taken as 15% for both), skewness, and kurtosis measures were calculated.

Accuracy was evaluated using standard error of measurement (SEM) and smallest detectable difference (SDD). ICC was used to calculate SEM.

FFI-TR and SF-36 scores were compared across deformation types using the Kruskal–Wallis test, and pairwise comparisons were performed using the Mann–Whitney U test with Bonferroni correction.

3. Results

Demographic features are given in Table 1. The sample size was adequate (KMO measure: 0.895) and the items were suitable (Bartlett's test of sphericity: $P < 0.001$) for factor analysis. During factor analysis, 4 factors with eigenvalues greater than 1 were extracted, explaining 73.13% of the total variance (Table 2).

Table 1. Demographic features.

	Mean \pm SD N	Median (min–max) %
Age (years)	33.16 \pm 11.61	30.0 (17.0–70.0)
Sex (M/F)	72/87	45.3/54.7
Height (cm)	170.84 \pm 7.93	170.0 (150.0–187.0)
BMI (kg/m ²)	23.59 \pm 3.09	23.50 (16.91–34.49)
Occupation		
Clerical	36	22.6
Manual	30	18.9
Self-employed	26	16.4
Retired	9	5.6
Student	31	19.5
Not working	27	17.0
Dominant side		
Left	27	17.0
Right	132	83.0
Deformation and disorder type		
Pes planus	73	45.9
Hallux valgus	49	30.8
Plantar fasciitis	24	15.1
Hammertoe	13	8.2

Table 2. Factor loadings with 4 factors.

Subscale	Item	Factors			
		1	2	3	4
Pain	I1	0.199	0.125	0.707	-0.163
	I2	0.502	0.531	0.208	0.205
	I3	0.067	0.300	0.784	0.173
	I4	0.431	0.532	0.406	0.198
	I5	-0.002	0.173	0.854	0.074
	I6	0.501	0.189	0.525	0.140
	I7	0.103	0.181	-0.021	0.937
	I8	0.114	0.167	-0.015	0.942
	I9	0.248	-0.116	0.655	-0.124
Disability	I10	0.362	0.693	0.290	0.172
	I11	0.496	0.247	0.695	0.034
	I12	0.803	0.210	0.241	0.056
	I13	0.900	0.143	0.163	0.120
	I14	0.865	0.280	0.201	0.141
	I15	0.854	0.219	0.215	-0.009
	I16	0.434	0.626	0.243	0.089
	I17	0.577	0.596	0.238	0.192
	I18	0.299	-0.012	0.788	-0.037
Activity limitation	I19	0.205	0.845	0.107	0.045
	I20	0.160	0.818	0.029	0.290
	I21	0.621	0.541	0.209	-0.014
	I22	0.086	0.665	-0.102	0.484
	I23	0.074	0.468	0.028	0.557

Factor analysis was performed again with the restriction of 3 factors. This resulted in 67.62% of the total variances being captured. The new factor loadings are shown in Table 3. Five pain, 3 disability, and 1 activity limitation subscale items were loaded as different factors.

Mean PS, DS, and ALS scores were 25.50 \pm 12.88, 24.43 \pm 17.34, and 10.38 \pm 12.92, respectively. The distributions of total and subscale FFI-TR scores are given in Table 4. Skewness and kurtosis were too high, and there was a ceiling effect for ALS.

Cronbach's alpha ranged between 0.821 and 0.938 for the total and subscales of the

FFI-TR. The FFI-TR demonstrated a perfect internal consistency with Cronbach's alpha values (Table 5).

Good accuracy was determined for all FFI-TR scores, since all SEMs were less than

$\frac{1}{2} \times$ SD. The smallest detectable differences (SDD) were 3.44, 7.74, 5.89, and 5.31 over 100 for total score and subscales, respectively (Table 5).

Table 3. Factor loadings with 3 factors.

Subscale	Item	Factors		
		1	2	3
Pain	I1	0.249	-0.081	0.711
	I2	0.616	0.434	0.221
	I3	0.137	0.299	0.793
	I4	0.551	0.433	0.420
	I5	0.044	0.150	0.860
	I6	0.509	0.159	0.523
	I7	0.023	0.816	-0.027
	I8	0.028	0.809	-0.022
	I9	0.209	-0.210	0.646
Disability	I10	0.545	0.527	0.313
	I11	0.538	0.113	0.697
	I12	0.810	0.080	0.236
	I13	0.869	0.077	0.153
	I14	0.879	0.183	0.197
	I15	0.870	0.031	0.211
	I16	0.601	0.414	0.263
	I17	0.709	0.456	0.252
	I18	0.278	-0.086	0.782
Activity limitation	I19	0.468	0.550	0.142
	I20	0.381	0.725	0.060
	I21	0.761	0.260	0.223
	I22	0.234	0.786	-0.080
	I23	0.146	0.714	0.041

ICC values were similar for all evaluations (T1, T2, T3) and 2 evaluations (T1-T3). The ICCs of 3 applications were between 0.960 and 0.985, while the ICCs of the first and third applications were between 0.953 and 0.985 for the total and subscales of the FFI-TR (Table 5).

There were no missing data for any FFI-TR item. There were also no floor effects for any items or application times (Table 6). However, the ceiling effect was present except for items 1, 6, 9, 11, and 18.

Corrected item-total correlations were greater than 0.30 for the total scale, while correlation coefficients for items 7 and 8 were less than 0.30 for the pain subscale (Table 6).

Criterion validity was tested by computing Spearman rho coefficients among the FFI-TR subscales and the SF-36 summary scores. Negative correlations were determined between the FFI-TR pain subscale and almost all SF-36 scores (rho between -0.172 and -0.418). There were no correlations between the FFI-TR disability subscale and the SF-36 dimensions of general health, mental health, and mental component scores. Generally, significant correlations were very weak ($|\text{rho}| < 0.30$) (Table 7).

Median total FFI-TR scores were 42.0 for patients with PP, 34.0 for those with HV, 52.5 for those with PlaF, and 58.0 for those with HT (Table 8). The scores were lower for patients with HV than for those with PP and PlaF ($P < 0.05$). Kruskal-Wallis analysis revealed statistical significance for the pain subscale, but no significant results were observed in pairwise comparisons. Disability scores were lower for patients with HV than for the other patients ($P < 0.05$), while activity limitation scores were lower for

Table 4. Descriptive statistics of total and subscale scores.

	Mean \pm SD	Median	Min-Max	Skewness	Kurtosis	Floor effect	Ceiling effect
Total score							
Sum of items	45.11 \pm 27.09	42.00	2.00-133.00	0.822	0.967	0.0%	0.0%
(Sum of items / Max score) \times 100	21.79 \pm 13.09	20.29	0.97-64.25				
Pain							
Sum of items	20.65 \pm 10.43	20.00	2.00-56.00	0.453	0.653	0.0%	0.0%
Mean of items	2.29 \pm 1.16	2.22	0.11-6.22				
(Sum of items / Max score) \times 100	25.50 \pm 12.88	24.69	1.23-69.14				
Disability							
Sum of items	19.79 \pm 14.04	17.00	0.00-66.00	0.751	0.200	0.0%	4.4%
Mean of items	2.20 \pm 1.56	1.89	0.00-7.33				
(Sum of items / Max score) \times 100	24.43 \pm 17.34	20.99	0.00-81.48				
Activity limitation							
Sum of items	4.67 \pm 5.82	3.00	0.00-26.00	1.777	3.165	0.0%	30.8%
Mean of items	0.93 \pm 1.16	0.60	0.00-5.20				
(Sum of items / Max score) \times 100	10.38 \pm 12.92	6.67	0.00-57.78				

Table 5. Reliability, reproducibility, and accuracy of total and subscale scores.

	Cronbach's α	ICC _{T1-T2-T3} 95% CI	ICC _{T1-T3} 95% CI	SD	SEM	SDD
Total score	0.938	0.985 (0.981–0.989)	0.982 (0.976–0.987)	13.09	1.24	3.44
Pain	0.821	0.960 (0.949–0.970)	0.953 (0.936–0.965)	12.88	2.79	7.74
Disability	0.927	0.985 (0.980–0.988)	0.985 (0.980–0.989)	17.34	2.12	5.89
Activity limitation	0.840	0.982 (0.977–0.986)	0.978 (0.970–0.984)	12.92	1.92	5.31

T1: First day, T2: Third day, T3: Last day.

Table 6. Items' reliability and floor and ceiling effects.

Item	Total scale		Subscale		Floor	Ceiling	Floor	Ceiling	Floor	Ceiling
	Corrected item-total correlation	Cronbach's α if item deleted	Corrected item-total correlation	Cronbach's α if item deleted	effect-T1	effect-T1	effect-T2	effect-T2	effect-T3	effect-T3
I1	0.479	0.939	0.556	0.805	5.0%	9.4%	5.7%	10.1%	5.0%	9.4%
I2	0.709	0.934	0.560	0.799	0.0%	36.5%	0.0%	35.2%	0.0%	37.1%
I3	0.614	0.936	0.703	0.781	0.0%	23.3%	0.0%	22.0%	0.0%	22.6%
I4	0.777	0.933	0.697	0.782	0.0%	26.4%	0.0%	31.4%	0.0%	28.3%
I5	0.514	0.937	0.618	0.791	0.0%	15.1%	0.0%	17.0%	0.0%	15.1%
I6	0.687	0.935	0.662	0.787	0.0%	11.3%	0.0%	17.6%	0.0%	15.7%
I7	0.316	0.939	0.261	0.827	0.0%	84.9%	0.0%	84.9%	0.0%	84.3%
I8	0.315	0.939	0.252	0.828	0.0%	84.3%	0.0%	83.6%	0.0%	84.9%
I9	0.374	0.940	0.397	0.820	1.3%	1.9%	1.3%	3.8%	1.3%	2.5%
I10	0.746	0.934	0.655	0.923	0.0%	40.9%	0.0%	40.9%	0.0%	39.0%
I11	0.798	0.933	0.757	0.917	0.0%	12.6%	0.0%	11.9%	0.0%	12.6%
I12	0.719	0.934	0.779	0.915	0.0%	19.5%	0.0%	14.5%	0.0%	17.0%
I13	0.713	0.934	0.798	0.914	0.0%	32.7%	0.0%	32.1%	0.0%	32.7%
I14	0.798	0.933	0.872	0.909	0.0%	37.1%	0.0%	34.6%	0.0%	36.5%
I15	0.725	0.934	0.827	0.912	0.6%	28.3%	0.6%	30.2%	0.6%	28.9%
I16	0.710	0.934	0.671	0.922	0.0%	49.7%	0.0%	46.5%	0.0%	45.3%
I17	0.811	0.933	0.791	0.915	0.0%	43.4%	0.0%	40.3%	0.0%	39.6%
I18	0.550	0.937	0.507	0.935	0.6%	12.6%	0.6%	11.9%	0.6%	11.3%
I19	0.596	0.936	0.777	0.768	0.6%	54.1%	0.6%	54.7%	0.0%	53.5%
I20	0.573	0.937	0.835	0.766	0.0%	63.5%	0.0%	59.7%	0.0%	58.5%
I21	0.751	0.934	0.549	0.846	0.0%	34.6%	0.0%	32.1%	0.0%	30.2%
I22	0.413	0.938	0.653	0.808	0.0%	80.5%	0.0%	79.9%	0.0%	79.9%
I23	0.390	0.938	0.521	0.839	0.0%	87.4%	0.0%	84.9%	0.0%	86.2%

Table 7. Correlations (Spearman rho coefficient) between FFI-TR scores and SF-36 scores.

SF-36	Pain	Disability	Activity limitation	Total score
PF	-0.228 ²	-0.274 ³	-0.091	-0.258 ³
PR	-0.251 ³	-0.251 ³	-0.177 ¹	-0.266 ³
Pain	-0.418 ³	-0.303 ³	-0.283 ³	-0.368 ³
GH	-0.248 ²	-0.116	-0.088	-0.171 ¹
Vitality	-0.172 ¹	-0.166 ¹	-0.059	-0.179 ¹
SF	-0.286 ³	-0.158 ¹	-0.200 ¹	-0.209 ²
ER	-0.138	-0.169 ¹	-0.216 ²	-0.190 ¹
MH	-0.067	-0.149	-0.146	-0.141
PCS	-0.333 ³	-0.246 ²	-0.131	-0.278 ³
MCS	-0.082	-0.109	-0.201 ¹	-0.127

¹ P < 0.05; ² P < 0.01; ³ P ≤ 0.001.

Table 8. Comparisons of total and subscale FFI-TR scores and SF-36 PCS and MCS.

	Pes planus	Hallux valgus	Plantar fasciitis	Hammertoe	χ^2	P
Total score						
Mean ± SD	47.45 ± 27.52	34.45 ± 25.45	55.63 ± 23.01	52.77 ± 27.04	16.996	0 < 0.001
Median (min-max)	42.0 ¹ (2.0-125.0)	34.0 ^{1,2} (34.0-133.0)	52.5 ² (18.0-110.0)	58.0 (18.0-118.0)		
Pain						
Mean ± SD	21.66 ± 10.86	17.16 ± 10.67	23.63 ± 8.07	22.69 ± 8.23	9.143	0.027
Median (min-max)	21.0 (2.0-56.0)	17.0 (1.0-51.0)	21.5 (9.0-39.0)	22.0 (10.0-34.0)		
Disability						
Mean ± SD	20.89 ± 14.12	14.49 ± 13.16	24.00 ± 12.00	25.77 ± 15.36	15.805	0.001
Median (min-max)	18.0 ¹ (0.0-57.0)	11.0 ^{1,2,3} (0.0-66.0)	20.0 ² (2.0-50.0)	30.0 ³ (4.0-60.0)		
Activity limitation						
Mean ± SD	4.90 ± 5.83	2.80 ± 4.45	8.00 ± 6.68	4.31 ± 6.30	14.976	0.002
Median (min-max)	3.0 (0.0-24.0)	1.0 ¹ (0.0-26.0)	6.5 ¹ (0.0-24.0)	4.0 (0.0-24.0)		
PCS						
Mean ± SD	49.48 ± 7.28	48.02 ± 10.06	46.06 ± 10.66	45.95 ± 7.90	2.734	0.434
Median (min-max)	50.6 (29.7-63.3)	50.6 (19.2-62.7)	48.3 (24.5-59.7)	46.1 (32.6-60.1)		
MCS						
Mean ± SD	45.48 ± 8.66	47.61 ± 6.67	43.31 ± 9.08	45.41 ± 9.73	4.001	0.261
Median (min-max)	46.9 (20.5-61.6)	49.0 (34.5-59.0)	41.8 (30.6-60.5)	47.7 (29.9-60.6)		

^{1,2,3} P < 0.05

the patients with HV than those with PlaF only. There were no significant differences in terms of SF-36 PCS and MCS between deformation types.

4. Discussion

We tested the reliability and validity of the Turkish version of the FFI in patients with foot and ankle disorders including PlaF, HV, PP, and HT deformity.

Yaliman et al. translated and adapted FFI into Turkish for 20 patients with PlaF (17). That study involved only patients with PlaF, and not those with other foot and ankle problems. Our study investigated the reliability and validity of this Turkish version with a greater range of deformities and a larger number of patients.

Agel (9) confirmed the validity and the reliability of the FFI with patients with foot disorders. Wu (7) determined an

ICC of 0.82 of patients with PlaF and foot/ankle fractures. Naal (10) reported an ICC of 0.98 for the German version of FFI. ICC has not been calculated for adaptation of the FFI to Spanish. Martinelli (8) determined ICCs of 0.94 for PS and 0.91 for DS. Venditto (11) reported an ICC in the range of 0.90–0.92, while Pourtier-Piotte (6) reported a range of 0.71–0.95. In our study, the ICC values of the 3 applications were between 0.960 and 0.985, and the ICC values of the first and third applications were between 0.953 and 0.985 for the FFI-TR total and subscales. The ICC exhibited satisfactory test–retest reliability and supported the literature. We obtained significant and high ICC values.

Pourtier-Piotte (6) determined that the FFI-F items loaded on 4 factors explained 85% of the total variances. We also extracted 4 factors, explaining 73% of the total variances.

The FFI adaptation to Taiwan Chinese (7) determined moderate correlations between FFI scores and the PCS-MCS of SF-36. There were also strong correlations between the FFI Spanish version (12) and the other scales. Martinelli (8) found strong correlation between the Italian version of the FFI and SF-36, while there were weak correlations between FFI scores and the MCS of SF-36. There were moderate to high correlations between the

German version of the FFI (10) and the SF-36 physical components, while the correlations between this version and MCS of SF-36 were weak. We found weak correlations between the FFI-TR and some SF-36 subscales. There were no significant correlations between the total score/PS/DS and MCS of SF-36.

Wu (7) reported that patients with PlaF registered higher PS scores and lower ALS scores. We observed that patients with HV achieved lower ALS scores compared to those with PlaF and lower DS scores.

Analysis demonstrated that the FFI-TR was conceptually in the same class as the original scale (15), and with other cross-cultural adaptations that have been made for Taiwan Chinese (7), French (6), German (10), and Italian versions (8,11).

The results from the reliability and criterion validity testing were largely comparable with previous studies performed using the original English version (15,18,21–23), supporting the view that the adapted Turkish version is clinically applicable to foot and ankle disorders.

In conclusion, the FFI-TR exhibited acceptable psychometric properties in patients affected by foot and ankle disorders and deformities, such as HV, PlaF, HT, and PP. The FFI-TR has good psychometric properties and is easily applied in a clinical setting.

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Appendix 1.

FOOT FUNCTION INDEX

Date: _____

First name: _____ Surname: _____

This questionnaire has been designed to give your therapist information as to how your foot pain has affected your ability to manage in everyday life. Please answer every question. For each of the following questions, we would like you to score each question on a scale from 0 (no pain or difficulty) to 10 (worst pain imaginable or so difficult it required help) that best describes your foot over the past week.

Pain Subscale: How severe is your foot pain:

1. Foot pain at its worst?
No pain 0 1 2 3 4 5 6 7 8 9 10 Worst pain imaginable
2. Foot pain at its worst?
No pain 0 1 2 3 4 5 6 7 8 9 10 Worst pain imaginable
3. Foot pain at its worst?
No pain 0 1 2 3 4 5 6 7 8 9 10 Worst pain imaginable
4. Foot pain at its worst?
No pain 0 1 2 3 4 5 6 7 8 9 10 Worst pain imaginable
5. Foot pain at its worst?
No pain 0 1 2 3 4 5 6 7 8 9 10 Worst pain imaginable
6. Foot pain at its worst?
No pain 0 1 2 3 4 5 6 7 8 9 10 Worst pain imaginable
7. Foot pain at its worst?
No pain 0 1 2 3 4 5 6 7 8 9 10 Worst pain imaginable
8. Foot pain at its worst?
No pain 0 1 2 3 4 5 6 7 8 9 10 Worst pain imaginable
9. Foot pain at its worst?
No pain 0 1 2 3 4 5 6 7 8 9 10 Worst pain imaginable

Score of Pain Subscale: ____/90 points ' 100 = ____%

Disability Subscale: How much difficulty did you have:

10. Difficulty walking in house?
No Difficulty 0 1 2 3 4 5 6 7 8 9 10 So difficult unable
11. Difficulty walking in house?
No Difficulty 0 1 2 3 4 5 6 7 8 9 10 So difficult unable
12. Difficulty walking in house?
No Difficulty 0 1 2 3 4 5 6 7 8 9 10 So difficult unable
13. Difficulty walking in house?
No Difficulty 0 1 2 3 4 5 6 7 8 9 10 So difficult unable
14. Difficulty walking in house?
No Difficulty 0 1 2 3 4 5 6 7 8 9 10 So difficult unable
15. Difficulty walking in house?
No Difficulty 0 1 2 3 4 5 6 7 8 9 10 So difficult unable
16. Difficulty walking in house?
No Difficulty 0 1 2 3 4 5 6 7 8 9 10 So difficult unable
17. Difficulty walking in house?
No Difficulty 0 1 2 3 4 5 6 7 8 9 10 So difficult unable
18. Difficulty walking in house?
No Difficulty 0 1 2 3 4 5 6 7 8 9 10 So difficult unable

Score of Disability Subscale: ____/90 points ' 100 = ____%

Activity Limitation Subscale: How much of the time do you:

18. Stay inside all day because of feet?
None of the time 0 1 2 3 4 5 6 7 8 9 10 All of the time
18. Stay inside all day because of feet?
None of the time 0 1 2 3 4 5 6 7 8 9 10 All of the time
18. Stay inside all day because of feet?
None of the time 0 1 2 3 4 5 6 7 8 9 10 All of the time
18. Stay inside all day because of feet?
None of the time 0 1 2 3 4 5 6 7 8 9 10 All of the time
18. Stay inside all day because of feet?
None of the time 0 1 2 3 4 5 6 7 8 9 10 All of the time

Score of Activity Limitation Subscale: ____/50 points ' 100 = ____%

Total Score: ____/230 points ' 100 = ____%

Appendix 2.

AYAK FONKSİYON İNDEKSİ

Tarih: _____

Ad: _____ Soyad: _____

Bu sorgu formu ayak ağrınızın günlük yaşamda yapabileceğinizi nasıl etkilediğine dair doktorunuza bilgi vermek için oluşturulmuştur. Aşağıdaki soruları (Geçen hafta boyunca ayağınızı en iyi tarif edecek şekilde) cevaplamanızı ve her bir soruya skala üzerinde 0 (ağrı veya zorluk yok) ile 10 (hissedilebilecek en şiddetli ağrı veya yapılamayacak kadar zor) arasında puan vermenizi istiyoruz. Lütfen her soruyu okuyunuz, seçtiğiniz numarayı tablo üzerinde X ile işaretleyiniz. Sağ ve sol ayak şikayetleriniz farklı ise takip eden kutulara 0 ile 10 arasında bir puan veriniz.

Ağrı Alt Skalası: Ayak ağrınız ne kadar şiddetli?

1. Ayak ağrınız en fazla olduğunda ne kadar şiddetli?

Ağrı yok 0 1 2 3 4 5 6 7 8 9 10 SAĞ SOL Olabilecek en şiddetli ağrı

2. Sabahları ayak ağrınız ne kadar şiddetli?

Ağrı yok 0 1 2 3 4 5 6 7 8 9 10 SAĞ SOL Olabilecek en şiddetli ağrı

3. Yalın ayak yürürken ağrınız ne kadar şiddetli?

Ağrı yok 0 1 2 3 4 5 6 7 8 9 10 SAĞ SOL Olabilecek en şiddetli ağrı

4. Yalın ayak ayakta dururken ağrınız ne kadar şiddetli?

Ağrı yok 0 1 2 3 4 5 6 7 8 9 10 SAĞ SOL Olabilecek en şiddetli ağrı

5. Ayakkabı ile yürürken ağrınız ne kadar şiddetli?

Ağrı yok 0 1 2 3 4 5 6 7 8 9 10 SAĞ SOL Olabilecek en şiddetli ağrı

6. Ayakkabı ile ayakta dururken ağrınız ne kadar şiddetli?

Ağrı yok 0 1 2 3 4 5 6 7 8 9 10 SAĞ SOL Olabilecek en şiddetli ağrı

7. Tabanlıkla yürürken ağrınız ne kadar şiddetli? (Tabanlık kullanmıyorsanız boş bırakınız)

Ağrı yok 0 1 2 3 4 5 6 7 8 9 10 SAĞ SOL Olabilecek en şiddetli ağrı

8. Tabanlıkla ayakta dururken ağrınız ne kadar şiddetli? (Tabanlık kullanmıyorsanız boş bırakınız)?

Ağrı yok 0 1 2 3 4 5 6 7 8 9 10 SAĞ SOL Olabilecek en şiddetli ağrı

9. Akşam saatlerinde ağrınız ne kadar şiddetli?

Ağrı yok 0 1 2 3 4 5 6 7 8 9 10 SAĞ SOL Olabilecek en şiddetli ağrı

Ağrı Alt Skalası Skoru: ____/90 puan ´ 100 = ____%

Yetersizlik Alt Skalası: Ne kadar zorluk çekiyorsunuz?

10. Ev içinde yürürken ne kadar zorluk çekiyorsunuz?

Zorluk yok 0 1 2 3 4 5 6 7 8 9 10 SAĞ SOL Yapılamayacak kadar zor

11. Dışarıda düzgün olmayan yüzeylerde yürürken ne kadar zorluk çekiyorsunuz?

Zorluk yok 0 1 2 3 4 5 6 7 8 9 10 SAĞ SOL Yapılamayacak kadar zor

12. 300 metre yol yürüdüğünüzde ne kadar zorluk çekiyorsunuz?

Zorluk yok 0 1 2 3 4 5 6 7 8 9 10 SAĞ SOL Yapılamayacak kadar zor

13. Merdiven çıkarken ne kadar zorluk çekiyorsunuz?

Zorluk yok 0 1 2 3 4 5 6 7 8 9 10 SAĞ SOL Yapılamayacak kadar zor

14. Merdiven inerken ne kadar zorluk çekiyorsunuz?

Zorluk yok 0 1 2 3 4 5 6 7 8 9 10 SAĞ SOL Yapılamayacak kadar zor

15. Ayak parmaklarınızın ucunda dururken ne kadar zorluk çekiyorsunuz?

Zorluk yok 0 1 2 3 4 5 6 7 8 9 10 SAĞ SOL Yapılamayacak kadar zor

16. Sandalyeden kalkarken ne kadar zorluk çekiyorsunuz?

Zorluk yok 0 1 2 3 4 5 6 7 8 9 10 SAĞ SOL Yapılamayacak kadar zor

17. Kaldırımdan çıkarken ne kadar zorluk çekiyorsunuz?

Zorluk yok 0 1 2 3 4 5 6 7 8 9 10 SAĞ SOL Yapılamayacak kadar zor

18. Hızlı yürürken ne kadar zorluk çekiyorsunuz?

Zorluk yok 0 1 2 3 4 5 6 7 8 9 10 SAĞ SOL Yapılamayacak kadar zor

Yetersizlik Alt Skalası Skoru: ____/90 puan ' 100 = ____%

Aktivite Kısıtlılığı Alt Skalası: Zamanınızın ne kadarını harcadınız?

19. Ayak sorunlarınız nedeniyle zamanınızın ne kadarında tüm gün boyunca evde oturmak zorunda kalıyorsunuz?

Hiçbir zaman 0 1 2 3 4 5 6 7 8 9 10 SAĞ SOL Her zaman

20. Ayak sorunlarınız nedeniyle zamanınızın ne kadarında yatarak istirahat etmek zorunda kalıyorsunuz?

Hiçbir zaman 0 1 2 3 4 5 6 7 8 9 10 SAĞ SOL Her zaman

21. Ayak sorunlarınız nedeniyle günlük yaşam aktiviteleriniz kısıtlanıyor mu?

Hiçbir zaman 0 1 2 3 4 5 6 7 8 9 10 SAĞ SOL Her zaman

22. Zamanınızın ne kadarında iç mekanlarda yürüme yardımcısı (Baston, yürüteç, koltuk değneği) kullanıyorsunuz?

Hiçbir zaman 0 1 2 3 4 5 6 7 8 9 10 SAĞ SOL Her zaman

23. Zamanınızın ne kadarında dış mekanlarda yürüme yardımcısı (Baston, yürüteç, koltuk değneği) kullanıyorsunuz?

Hiçbir zaman 0 1 2 3 4 5 6 7 8 9 10 SAĞ SOL Her zaman

Aktivite Kısıtlılığı Alt Skalası Skoru: ____/50 puan ' 100 = ____%

Toplam Skor: ____/230 puan ' 100 = ____%