The Validity of the Quick-FAAM in Patients Seeking Treatment for an Acute or Subacute Foot or Ankle Condition

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Context: Documented barriers to implementation of patient-reported outcome instruments (PROs) in practice include administration and scoring time. The Quick Foot and Ankle Ability Measure (Quick-FAAM) was developed to decrease these barriers; however, the clinometric properties in an acute population are unknown.

Purpose: To determine the internal consistency, validity, and floor and ceiling effects of the Quick-FAAM in patients seeking treatment for an acute or subacute ankle or foot health condition. Study Design: Cross-sectional. Setting: Health care facilities. Patients: 50 patients (20.3 ± 2.2 y, 177.9 ± 10.7 cm, 80 ± 19.4 kg) seeking treatment for an acute or subacute ankle or foot condition. Main Outcome Measures: Each patient completed a demographic and health-history questionnaire followed by 5 PROs: the Quick-FAAM, the FAAM-Activities of Daily Living (ADL), FAAM-Sport, the modified Disablement in the Physically Active Scale (mDPA), the Short-Form 12 (SF-12), and the PROMISv1.2 Physical Function (PROMIS-PF). Cronbach alpha was used to determine internal consistency, and Spearman rank correlations were performed to examine the relationship between the Quick-FAAM and all other outcomes.

Results: The Quick-FAAM was very strongly correlated with the FAAM-Total \( (r = .91, r^2 = .83, P < .001) \), FAAM-ADL \( (r = .83, r^2 = .69, P < .001) \), FAAM-Sport \( (r = .89, r^2 = .79, P < .001) \), SF12-Physical Component Score (PCS, \( r = .74, r^2 = .55, P < .001 \)), mDPA-PSC \( (r = –.83, r^2 = .69, P < .001) \), and PROMIS PF \( (r = .85, r^2 = .72, P < .001) \). There was a weak or no relationship with the SF12-Mental Component Score (MCS, \( r = .04, r^2 = .00, P < .001 \)) and the mDPA-MSC \( (r = –.35, r^2 = .12, P < .001) \). A total of 8% (n = 4) of the patients scored a 0, and 2% (n = 1) patients scored a 48.

Conclusion: The Quick-FAAM demonstrated good convergent and divergent validity along with good internal consistency. There was no evidence of a floor or ceiling effect. The Quick-FAAM should be considered for use in practice when determining treatment effectiveness for patients with acute or subacute ankle or foot health conditions. Future research should determine the test–retest reliability and the minimal detectable change of this instrument.

Keywords: patient-centered care, region-specific instrument, patient-reported outcome

Patient-reported outcomes (PROs) are used to assess physical limitations and health-related quality-of-life detriments after injury. One commonly used region-specific measure for patients with ankle or foot health conditions is the Foot and Ankle Ability Measure (FAAM). The FAAM is composed of the activities of daily living (FAAM-ADL) and sport (FAAM-Sport) subscales. The FAAM takes an extended time to administer and score compared with other PROs. Scoring time and administration time are reported barriers to implementing PROs for physical therapists and athletic trainers.

A recently developed reduced-item version of the FAAM, the Quick-FAAM, has been proposed for use in clinical practice to decrease scoring and administration time. The Quick-FAAM was developed and validated using physically active individuals with chronic ankle instability. However, the validity and internal consistency of this instrument in patients seeking treatment for acute or subacute ankle and foot health conditions have yet to be established. Therefore, the purpose of this study was to determine clinometric properties of the Quick-FAAM in physically active adults seeking treatment for an acute or subacute ankle or foot health condition.

Methods

Study Design

A cross-sectional study design was used to determine the relationship between the Quick-FAAM, the FAAM (Total, Sport, and ADL), the Modified Disablement in the Physically Active Scale (mDPA), the Short Form-12 (SF-12), and the PROMIS bank v.1.2-Physical Function computer adaptive test (PROMIS-PF).
Participants

Patients between the ages of 18 and 35 years, physically active before injury (≥90 min/wk of strenuous/moderate or mild exercise) who self-reported as either recreational or intercollegiate athletes and were seeking treatment for 1 acute or subacute ankle or foot health condition were recruited to participate from 4 health care facilities including 3 athletic training facilities who provide health care services to intercollegiate athletes and 1 physical therapy clinic. Demographic information can be found in Table 1, and a summary of all included health conditions can be found in Table 2. The study was approved by all institutional review boards where data were collected. Each patient provided a signed informed consent before participation.

Procedures

After providing consent, the patients electronically completed a demographic questionnaire and the PROs in the following order: Quick-FAAM, FAAM-ADL, FAAM-Sport, mDPA, SF-12, and PROMIS-PF. Data collection took approximately 15 to 30 minutes.

Instrumentation

Quick-FAAM. The Quick-FAAM is a reduced-item, region-specific PRO developed to decrease administration and scoring time.\(^5\) The 29 items from the FAAM-ADL and FAAM-Sport were combined, and items with a \(z\)-skewness of \(\geq 1.96\) or a corrected item-total correlation of \(\leq .30\) were removed, resulting in a 12-item instrument (5 ADL and 7 Sport items).\(^5\) The Quick-FAAM had excellent internal consistency and good convergent and divergent validity when developed. The Quick-FAAM is scored similarly to the FAAM, and the total score is reported as a percentage, with lower scores indicating decreased health-related quality of life.

Foot and Ankle Ability Measure. The FAAM\(^1\) is a region-specific PRO with 2 subscales, ADL and Sport, used to assess function in patients with leg, ankle, or foot health conditions. The FAAM is scored on a 5-point Likert scale where 0 indicates no problem and 4 indicates unable to do, and each scale is scored independently.\(^1\) The final score is often reported as a percentage of the total score, where lower scores indicate decreased function and health-related quality of life. The FAAM is reliable, valid, and responsive in quantifying progress of patients with a wide range of foot and ankle pathologies.\(^1\)

Modified Disablement in the Physically Active Scale. The mDPA has 2 components, physical (Physical Summary Component; mDPA-PSC) and psychosocial (Mental Summary Component; mDPA-MSC).\(^6\) These components are scored separately using a 5-point Likert scale. The mDPA-PSC and mDPA-MSC scores range from zero to 48 and zero to 16, respectively, with higher scores indicating greater disability.\(^6\) The mDPA demonstrated good internal consistency for both components.\(^6\)

Short-Form 12. The SF-12 v2 four-week recall is a reliable, 12-item generic PRO adapted from the SF-36 to increase patient acceptability and comprises physical (SF12-PCS) and mental (SF12-MCS) subscales.\(^7\) The SF-12 is scored off of a norm-based algorithm of 50, where lower scores represent a decrease in health-related quality of life.\(^7\)

Patient-Reported Outcomes Measurement Information System Bank v.1.2-Physical Function. The PROMIS is a series of free, federally funded computer adaptive tests that tailor questions to a patient’s responses on the previous questions. The PROMIS-PF contains 124 items that assess the patient’s ability to complete various levels of physical activities.\(^2\) The instrument uses answers from previous items to select the most appropriate next question from the item bank and continues until the standard error drops below a specific level or the participant has answered 12 questions.\(^2\) Although the PROMIS is not tailored to a specific condition, it is both valid and reliable in an orthopedic population.\(^2,8\) This instrument is also scored on a norm-based algorithm of 50, and lower scores represent decreased health-related quality of life.

Statistical Analysis

Descriptive statistics (mean ± SD) were calculated for all demographic information. The median, interquartile range (IQR), and mean (SD) were calculated for each outcome variable. Cronbach alpha examined the internal consistency of the Quick-FAAM, while floor and ceiling effects were determined as the percentage of patients who reported the lowest score (0/48) or the highest score.
Validity of the Quick-FAAM

If more than 15% of the patients scored a zero or a 48, the instrument would be considered to have a floor or ceiling effect, respectively. Convergent and divergent validity were examined with Spearman rank correlations \( (r) \). Spearman rank correlations were performed as the data collected from the outcome measures are ordinal in nature. Values for \( r \) were interpreted as very strong (.8–1.0), strong (.6–.8), moderate (.4–.6), weak (.2–.4), or no relationship (.0–.2). Alpha was set a priori \( P \leq .05 \). Statistical analyses were performed in IBM SPSS (version 22.0, IBM Corp, Armonk, NY).

Results

Descriptive statistics for all demographic variables are in Table 1. The median (IQR) and mean (SD) for all PROs are in Table 3. The Quick-FAAM demonstrated excellent internal consistency \( (\alpha = .968) \). There was no evidence of a floor effect or ceiling effect as 8% of patients \( (n = 4) \) scored zero and 2% \( (n = 1) \) scored 48.

The Quick-FAAM demonstrated very strong correlations with the FAAM-Sport, FAAM-ADL, FAAM-Total, SF12-PCS, and PROMIS-PF (Table 3), indicating strong convergent validity. A strong correlation was also identified between the Quick-FAAM and mDPA-PSC (Table 3). There was little to no relationship between the Quick-FAAM and SF12-MCS and mDPA-MSC (Table 3), indicating strong divergent validity.

Discussion

The Quick-FAAM was derived from a population of physically active subjects with chronic ankle instability. The purpose of this study was to determine if this instrument could also be applied to patients with acute or subacute ankle and foot conditions. Our study identified strong relationships between the Quick-FAAM, SF12-PCS, mDPA-PSC, PROMIS-PF, FAAM-ADL, FAAM-Sport, and FAAM-Total scores providing, evidence of convergent validity. Our research also found that the Quick-FAAM had excellent internal consistency and was not subject to floor or ceiling effects. The findings of this study suggest that the Quick-FAAM is a useful tool to assess a patient’s health-related quality of life as it relates to physical function when evaluating a variety of acute and subacute foot and ankle health conditions.

Prior research examined the construct validity of the original FAAM by examining its relationship with the SF-36. Those investigations identified a significant correlation between the FAAM-Sport, FAAM-ADL, and SF12-PCS, suggesting that the 2 instruments measure similar constructs. As expected, the results of our investigation revealed a strong correlation between the Quick-FAAM and the SF12-PCS, implying that the tools measure similar concepts. Furthermore, strong to very strong correlations were noted between the Quick-FAAM and all included PROs that measure physical constructs of health-related quality of life, including the mDPA-PSC, PROMIS-PF, FAAM-Sport, FAAM-ADL, and FAAM-Total. These findings suggest that the Quick-FAAM is a valid instrument that should be considered as a replacement for the longer FAAM-ADL and FAAM-Sport, thus reducing administration time.

Our findings are also consistent with previous research that identified good divergent validity with the FAAM-ADL or FAAM-Sport and the SF36-MCS. Our results indicated there was little to no relationship between the Quick-FAAM and the PROs that measure psychological constructs, such as the mDPA-MSC and the SF12-MCS. These data suggest that the Quick-FAAM was developed to measure aspects related to physical function and not the psychological constructs.

<table>
<thead>
<tr>
<th>Outcome measure</th>
<th>Mean</th>
<th>SD</th>
<th>Median</th>
<th>Interquartile range</th>
<th>( r )</th>
<th>( r^2 )</th>
<th>( P )</th>
<th>Interpretation</th>
</tr>
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<tbody>
<tr>
<td>mDPA-PSC</td>
<td>26.5</td>
<td>10.4</td>
<td>25.0</td>
<td>17</td>
<td>-.83</td>
<td>.69</td>
<td>&lt;.001</td>
<td>Very strong</td>
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<td>mDPA-MSC</td>
<td>2.6</td>
<td>3.2</td>
<td>2.0</td>
<td>5</td>
<td>-.35</td>
<td>.12</td>
<td>.020</td>
<td>Weak</td>
</tr>
<tr>
<td>mDPA-Total</td>
<td>29.2</td>
<td>12.0</td>
<td>27.5</td>
<td>20</td>
<td>-.81</td>
<td>.66</td>
<td>&lt;.001</td>
<td>Very strong</td>
</tr>
<tr>
<td>SF-12PCS</td>
<td>44.1</td>
<td>10.4</td>
<td>46.2</td>
<td>15</td>
<td>.74</td>
<td>.55</td>
<td>&lt;.001</td>
<td>Very strong</td>
</tr>
<tr>
<td>SF-12MCS</td>
<td>53.9</td>
<td>11.7</td>
<td>57.2</td>
<td>11</td>
<td>.04</td>
<td>.00</td>
<td>.778</td>
<td>No relationship</td>
</tr>
<tr>
<td>PROMIS-PF</td>
<td>43.1</td>
<td>9.0</td>
<td>45.9</td>
<td>11</td>
<td>.85</td>
<td>.72</td>
<td>&lt;.001</td>
<td>Very strong</td>
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<td>FAAM-ADL</td>
<td>67.4%</td>
<td>28.0%</td>
<td>77.4%</td>
<td>35%</td>
<td>.83</td>
<td>.69</td>
<td>&lt;.001</td>
<td>Very strong</td>
</tr>
<tr>
<td>FAAM-Sport</td>
<td>45.6%</td>
<td>28.7%</td>
<td>57.8%</td>
<td>51%</td>
<td>.89</td>
<td>.79</td>
<td>&lt;.001</td>
<td>Very strong</td>
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<tr>
<td>FAAM-Total</td>
<td>62.4%</td>
<td>26.5%</td>
<td>72%</td>
<td>35%</td>
<td>.91</td>
<td>.83</td>
<td>&lt;.001</td>
<td>Very strong</td>
</tr>
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<td>Quick-FAAM</td>
<td>50.3%</td>
<td>28.1%</td>
<td>54.2%</td>
<td>47%</td>
<td></td>
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Abbreviations: FAAM, Foot Ankle and Ability Measure; mDPA, Modified Disablement in the Physically Active Scale; PSC, physical summary component; MSC, mental summary component; SF-12, Short-Form 12; PROMIS-PF, Patient-Reported Outcomes Measurement Information System v.1.2 Physical Function; ADL, activities of daily living.
of health-related quality of life. Therefore, the Quick-FAAM should be used in combination with other PROs that assess the psychological or mental constructs of health-related quality of life when providing patient care.

While our study presented significant findings, it was not without limitations. First, administration order of the involved PROs was not randomized, which may have influenced the patients’ scores. The time to administer and complete all PROs was approximately 15 to 30 minutes, and this could have resulted in testing fatigue. However, given the strength of the correlations identified between all instruments, it is unknown if testing fatigue was a factor in the results. Second, we did not record the time it took the patients to complete the instruments. Therefore, we are unable to provide an estimate of the time it took to complete the Quick-FAAM when compared with the FAAM.

Conclusion

One of the barriers associated with the administration of PROs in clinical practice for both athletic trainers4 and physical therapists3 is scoring and administration time. Our results indicate that the Quick-FAAM has good convergent and divergent validity, has no ceiling or floor effects, and has good internal consistency in patients seeking treatment for acute or subacute ankle and foot health conditions. These results in combination with previous results5 indicate that the Quick-FAAM is a region-specific instrument that takes minimal time to administer and score, has sound clinometric properties, and could be used when treating patients with a variety of acute and chronic ankle and foot health conditions. Future research should examine the test–retest reliability and minimally clinically important difference of the Quick-FAAM.

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References