Concurrent Validity of Lower Limb Domains of the Continuous Scale Physical Functional Performance-10 (CS-PFP10) Assessment in Transfemoral Amputees

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INTRODUCTION

Validated outcome measures for persons with lower limb amputation are limited. Measures that can cross diagnostic groups are even more rare due to poor sensitivity and other psychometric properties in specific diagnostic groups. With \( \approx 350,000 \) Americans with transfemoral amputation (TFA) and nearly 2M in the US presently, the limited ability to measure function in a valid manner is problematic. The continuous scale physical functional performance test (CS-PFP-10) has shown promise in persons with TFA. This is a test, validated in other diagnostic groups including frail elderly, wheelchair users, stroke victims, cardiac compromise and others. The test assesses physical function in 5 domains as well as functional independence. This study sought to determine the concurrent validity of the portions of the CS-PFP-10 that did not involve the upper extremities in comparison to measures of comparable function that have established face validity in this population.

METHOD

The study was approved by the USF IRB. An observational design was used. Unilateral TFAs (\( \geq 3 \)) were recruited. Subjects were 18-85y and free of medical comorbidities. TFAs' preferred prostheses were evaluated for proper fit, alignment and function and to assure no problems within the last 90 days in order to participate.

CS-PFP10 was administered via standardized procedure (i.e. certified test site, script dialogue, trained rater; all reported elsewhere). CS-PFP10 scores 10 ADLs in time, distance, and mass. Raw data reflects physiologic functional domains. Testing requires \( \geq 30 \) min. Raw data (time, distance, mass) are converted to summary scores with a validated algorithm in licensed software. Scaled from 0-100, summary scores include CS-PFP total score (CS-PFP TOT) and 5 physiologic domain scores: upper body strength (UBS) & flexibility (UBF), balance & coordination (BAL), lower body strength (LBS) & endurance (END).

Data were entered into a database and examined for normality. Pearson product moment correlation values (r square) were calculated for each test pair (i.e. respective PFP total or domain score with a measure of concurrent validity). We considered correlations of 0 to \( \pm 0.49 \) as weak, \( \pm 0.50 \) to 0.79 as moderate, and \( \pm 0.80 \) to 1.00 as strong. Statistical significance was also assessed with a critical alpha of 0.05 to determine statistical significance for test pairs.

RESULTS

10 TFAs (age: 41.3±15.5; BMI: 25.2±4.3 kg/m\(^2\)) completed the study. Six lost their leg to trauma, 3 to malignancy and one to vascular disease.

All 5 selected measures which included the AMP, a 75m self-selected walking speed test, an instrumented balance test (the Biodex SD Limits of Stability Test [LOS]) and a timed stair descent test moderately correlated with their respective matched PFP score. For example, Lower Body Strength (LBS) moderately correlated (r square=0.63) with stair descent time as a surrogate measure of strength. Further, all of the matched test values were statistically significant at \( p \leq 0.01 \).

Table: Concurrent Validity Test Pairs.

<table>
<thead>
<tr>
<th>PFP Domain</th>
<th>Comparative Test</th>
<th>r square</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total PFP</td>
<td>AMP</td>
<td>0.64</td>
</tr>
<tr>
<td>Total PFP</td>
<td>75m SSWS</td>
<td>0.73</td>
</tr>
<tr>
<td>PFP BAL</td>
<td>Biodex SD LOS</td>
<td>0.58</td>
</tr>
<tr>
<td>PFP END</td>
<td>75m SSWS</td>
<td>0.66</td>
</tr>
<tr>
<td>PFP LBS</td>
<td>DN Stair Time</td>
<td>0.63</td>
</tr>
</tbody>
</table>

All correlations statistically significant (\( p \leq 0.01 \)) between tests.

DISCUSSION & CONCLUSION

It was surprising that the 75m SSWS test correlated more strongly than the AMP did with total physical functional performance however both were moderately correlated. The 75m SSWS test had a comparable relationship with the Endurance domain of function. Downstairs walking and the instrumented posturography tests were both reasonable surrogate measures for lower body strength and balance respectively. These preliminary results are promising and suggest that further psychometric testing is warranted in this population. The results also suggest that preliminary uses of the CS-PFP-10 test in persons with TFA that detected differences were likely valid comparisons. The greatest concern with these results centers upon the small sample which was predominantly of traumatic etiology in a sample of middle aged community ambulators. Further study is indicated prior to generalizing results to other subsets of persons with TFA.

REFERENCES & ACKNOWLEDGEMENTS

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