The Comprehensive High Level Activity Mobility Predictor (CHAMP): A Performance-Based Measure of Functional Ability of People with Lower Limb Loss

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INTRODUCTION

People who have sustained traumatic lower limb amputation frequently demonstrate physical capabilities beyond those measured by existing functional outcome measures. A performance-based outcome measure designed to determine both the current level mobility as well as predict the capabilities for high-level activities could be clinically useful for prosthetic selection, planning rehabilitation treatments and assessing when to return the amputee to high level activities. The purpose of this study is to develop an instrument designed to measure high level mobility in military service members with lower limb loss.

METHOD

Subjects:

A convenience sample of 118 military service members with traumatic lower limb amputation completed the study. The mean age was 29.22 ± 5.78 yrs; mean height was 71.5 ± 2.8; and mean weight was 200.1 ± 34.4 lbs.

Methods & Materials:

Data was collected at: Walter Reed Army Medical Center, Washington DC, Brooke Army Medical Center, San Antonio, TX; and Womack Army Medical Center, Fort Bragg, NC. The Single Limb Stance (SLS), Medicine Ball Put (MBP), Edgren Side Step (ESS), T-Test (TT), & Illinois Agility Test (IAT) were administered in a standard sequence as part of the CHAMP. Two additional tests, the Amputee Mobility Predictor (AMP) and Six-minute Walk Test (SMWT) were administered as valid measures of mobility. To determine reliability, participants were administered the CHAMP twice within a 24 to 72 hour period with each participant tested simultaneously by two raters.

RESULTS

A scoring system was developed for the SLS, ESS, TT, and IAT ranging from 0 to 10. Scores were combined to produce a composite score ranging from 0-40 with 40 representing the highest level of performance. A significant difference was found in CHAMP performance between unilateral transtibial, transfemoral, and bilateral lower limb participants. A strong correlation was found between the total CHAMP score and the AMP (r = 0.87, p < 0.0001) and SMWT (r = 0.60, p < 0.0001), respectively. The interrater (r = 1.0, 95% CI = N/A) and test-retest reliability (r =0.97, 95% CI = 0.95-0.98) of the total CHAMP score was excellent.

DISCUSSION

The CHAMP is a clinically friendly measure of high level functional mobility for military service members with lower limb loss. The CHAMP is easily administered in a clinical environment and demonstrates excellent interrater and intrarater reliability. The CHAMP has the capacity to objectively determine the physical capacity of service member with different levels of lower limb loss, discriminates between levels of amputation, and is free of a ceiling effect. The performance strategies of the participants varied within and across levels of amputation suggesting that prosthetic selection and training may have an impact on higher level activities. Because the CHAMP has the ability to measure changes in speed and agility performance it may be a valued clinical instrument in determining and quantifying treatment choices.

CONCLUSION

The CHAMP was developed as a performance-based measurement tool to determine the capabilities of service members with lower limb loss who have the potential to participate in high-level activities. The SMWT and AMP correlated strongly with the CHAMP. The interrater and test retest reliability of the CHAMP was excellent.

REFERENCES


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