

Development and reliability testing of the Comprehensive High-Level Activity Mobility Predictor (CHAMP) in male servicemembers with traumatic lower-limb loss

Robert S. Gailey, PhD, PT, et al.

We developed a new outcome measure called the Comprehensive High-Level Activity Mobility Predictor (CHAMP) that assists clinicians at U.S. Department of Defense medical treatment facilities and Department of Veterans Affairs medical centers to determine the capabilities of servicemembers (SMs) with traumatic lower-limb loss (LLL) in the performance of high-level mobility. The goal of the outcome measure is to assist the clinician to determine current function, measure change in function over time during rehabilitation, and help predict when the SM with LLL can return to high-level activity such as sport. We found that the CHAMP is a safe and reliable outcome measure of high-level mobility for SMs with traumatic LLL.

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Construct validity of Comprehensive High-Level Activity Mobility Predictor (CHAMP) for male servicemembers with traumatic lower-limb loss

Robert S. Gailey, PhD, PT, et al.

We developed a new outcome measure called the Comprehensive High-Level Activity Mobility Predictor (CHAMP) that assists military clinicians in determining the capabilities of servicemembers with traumatic lower-limb loss to perform high-level mobility. One of the primary steps in developing the CHAMP was to confirm that it actually measures what it is intended to measure. We found that the CHAMP was a valid measure of high-level mobility in servicemembers with amputation. We also determined that the CHAMP has the ability to discrimi-

nate between different levels of lower-limb loss in young, male servicemembers.

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Comparison of 6-minute walk test performance between male Active Duty soldiers and servicemembers with and without traumatic lower-limb loss

Alison A. Linberg, DPT, ATC, et al.

We established reference data for a commonly used functional outcome measure, the 6-minute walk test, for servicemembers with and without lower-limb loss. These data will help clinicians and military and nonmilitary individuals with lower-limb loss track progression of rehabilitation and set realistic function and mobility goals for rehabilitation.

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Comparison between microprocessor-controlled ankle/foot and conventional prosthetic feet during stair negotiation in people with unilateral transtibial amputation

Vibhor Agrawal, PhD, et al.

We compared prosthetic feet with different ranges of motion at the ankle during stair negotiation to determine work symmetry between the intact and prosthetic limbs. All participants received standardized functional training specific for each foot. We found that the microprocessor-controlled prosthetic foot, with active dorsiflexion, resulted in greater work symmetry than conventional prosthetic feet during stair ascent. While descending stairs, subjects employed a similar movement strategy with all feet. Prosthetic users who encounter stairs frequently may benefit from a microprocessor-controlled foot.

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Comparison of three agility tests with male servicemembers: Edgren Side Step Test, T-Test, and Illinois Agility Test

Michele A. Raya, PhD, PT, SCS, ATC, et al.

We established the reliability and validity of three similar yet distinct tests that assess agility performance, called the Edgren Side Step Test, T-Test, and Illinois Agility Test, in young, fit Active Duty servicemembers (SMs). We found these tests to be reliable in that two clinicians can administer each of these tests to the same SM and be confident that they are scoring the performance in the same way. It was found that all three tests assess different aspects of agility, and together have the potential to be used as a comprehensive assessment of high-level mobility for sport and tactical activities.

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Amputee Mobility Predictor-Bilateral: A performance-based measure of mobility for people with bilateral lower-limb loss

Michele A. Raya, PhD, PT, SCS, ATC, et al.

We identified a lack of performance-based instruments designed for use with people with bilateral lower-limb amputation. To address this deficiency, we modified the Amputee Mobility Predictor (AMP) to more accurately reflect the functional capabilities of people with bilateral lower-limb amputation. The modified version is called the AMP-Bilateral (AMP-B). We found that the AMP-B and the AMP have a strong relationship with the 6-minute walk test in the higher functioning servicemembers with bilateral lower-limb loss. The AMP-B can assist clinicians at the Department of Defense medical treatment facilities and Department of Veterans Affairs medical centers determine the capabilities of servicemembers and veterans with traumatic bilateral lower-limb loss in the performance of mobility-related tasks.

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Factors related to high-level mobility in male servicemembers with traumatic lower-limb loss

Ignacio A. Gaunard, PhD, MSPT, et al.

Currently, many servicemembers (SMs) who experience traumatic lower-limb loss seek to return to high-level mobility activities such as sport. Yet, it has been reported that less than a quarter of them actually return to high-level activity. The purpose of this study was to examine the possible relationship between different factors that can be affected by rehabilitation, other factors associated with lower-limb loss, and high-level mobility, as measured by a new outcome measure called the Comprehensive High-Level Activity Mobility Predictor in SMs with traumatic lower-limb loss. We found that rehabilitation-related factors such as lower-limb strength and balance and other factors such as the number of knee joints, waist circumference measurement, and prosthetic foot type were related to high-level mobility. These results could help guide rehabilitation programs and clinical interventions to help maximize the potential of our SMs with traumatic lower-limb loss return to high-level mobility activities.

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Effects of 660 nm low-level laser therapy on muscle healing process after cryolesion

Natalia C. Rodrigues, PhD, et al.

Skeletal muscle injuries are often seen in rehabilitation centers. Although muscle tissue can regenerate after injury, this usually happens slowly and results in muscle weakening, pain, and reinjury. Treatments are needed that will speed up this process and, in doing so, decrease rehabilitation time and return the patient to previous functioning as quickly and thoroughly as possible. Low-level laser therapy (LLLT) is a promising treatment for skeletal muscle recovery, and its effectiveness has been demonstrated over the years. We found that LLLT at two levels positively

affected rats' injured skeletal muscle, speeding up the muscle-regeneration process.

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OtoID: New extended frequency, portable audiometer for ototoxicity monitoring

Marilyn F. Dille, PhD, et al.

A new portable hearing testing device, the OtoID, was designed to monitor hearing while a Veteran is undergoing treatment for cancer. Since many Veterans enter treatment with hearing loss, minimizing any additional treatment-related hearing loss is very important. The OtoID device allows a Veteran to test himself using an automated testing mode or be tested by an audiologist using a manual testing mode. We tested 50 subjects in a sound booth and on a hospital ward for 3 days and found that the OtoID provided equivalent results regardless of the test environment, subject age, or hearing ability.

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Influence of prior activity on residual limb volume and shape measured using plaster casting: Results from individuals with transtibial limb loss

Joan E. Sanders, PhD, et al.

The purpose of this research was to determine whether prior activity affected the shape of a plaster cast taken of a residual limb. Plaster casts were taken twice a day on subjects with transtibial amputation using standard clinical casting procedures. Results showed that prior activity influenced residual-limb cast shape. Patients with amputation and practitioners should be mindful of the patient's activities before casting for a new prosthetic socket.

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Evaluation of scooters using ANSI/RESNA standards

Ana E. Souza, PhD, PT, et al.

Scooters are popular mobility devices. To date, only one study has looked at how stable the scooters are according to standard tests. Our study looked at 12 three-wheeled scooters, and most of them had different results on each standard test. Smaller scooters were more unstable and tended to fall to the side easily during sharp turns. Half the scooters did not survive the time equivalent to 5 years of use as required by the standards. Our results indicate that those commercially available scooters may not meet the standard requirements and suggest revision of framework requirements, such as using a test dummy according to the device weight capacity and adding tests to evaluate the scooter's tiller to ensure that these devices are safe and durable.

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Prolonged electrical stimulation-induced gluteal and hamstring muscle activation and sitting pressure in spinal cord injury: Effect of duty cycle

Christof A. J. Smit, MD, et al.

Pressure ulcers (PUs) are the most prevalent secondary complications in individuals with spinal cord injury (SCI). An active way to prevent PUs might be muscle activation using electrical stimulation (ES), which has been found to improve both interface pressure distribution and intrinsic risk factors. ES applied to the gluteal and hamstring muscles in a custom-made garment with built-in electrodes gives significant pressure relief of the ischial tuberosities even after 3 h of activation in individuals with SCI. Participants scored the usability of the ES shorts as satisfactory, and all stated they would wear them daily should they help prevent PUs.

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