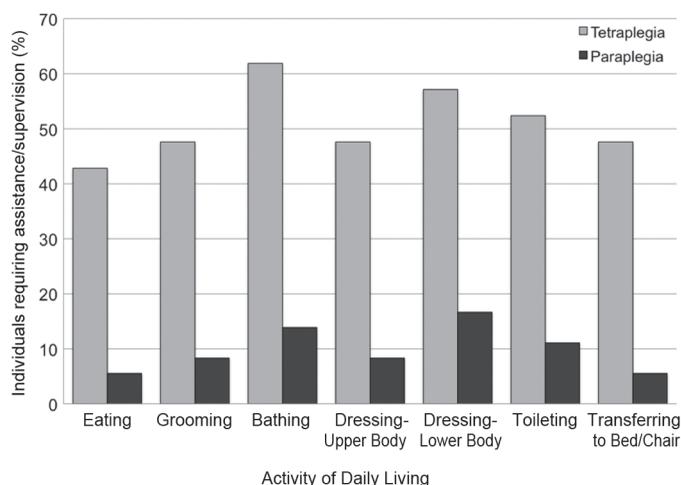


## Functional priorities, assistive technology, and brain-computer interfaces after spinal cord injury

Jennifer L. Collinger, PhD, et al.



It is important to involve consumers in the design process as new assistive technologies are developed, with the goal of improving function for individuals with disabilities. Veterans with spinal cord injury reported that restoration of bladder and bowel control, walking, and arm and hand function were important for improving quality of life. Many were unfamiliar with some currently available assistive technologies. The majority of study participants were interested in using a brain-computer interface (BCI), which uses brain signals to control assistive devices. In particular, they wanted to control a BCI to stimulate their own muscles to improve the mentioned functions.

## Effect of traumatic brain injury among U.S. servicemembers with amputation

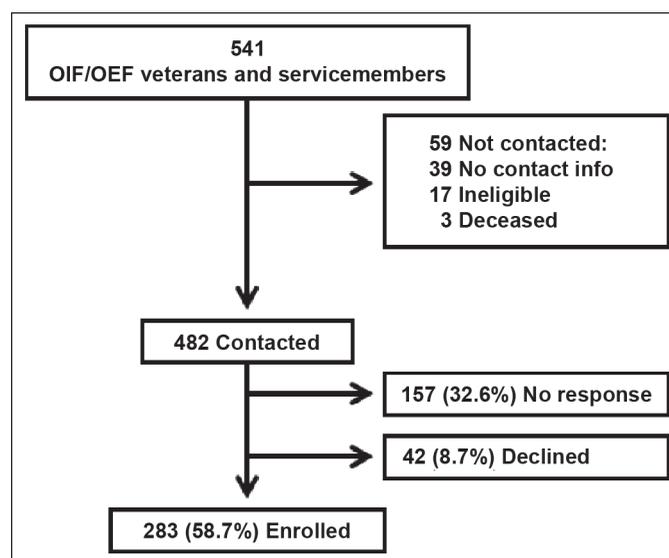
Mitchell J. Rauh, PhD, PT, MPH, et al.

Combat weaponry that causes injuries resulting in limb loss may also be associated with traumatic brain injury (TBI), which may impair cognitive and functional abilities. U.S. servicemembers who had a combat-related major limb amputation while deployed in Iraq

or Afghanistan between 2001 and 2006 were followed for 2 years postamputation. Of the 546 servicemembers with amputation, 23.3 percent had a TBI diagnosis. Those with TBI had a higher average number of medical and rehabilitative outpatient and inpatient visits. We recommend that providers treating those with limb loss assess for TBI because these individuals required increased medical and rehabilitative care use.

## Major traumatic limb loss among women veterans and servicemembers

Jodie G. Katon, PhD; Gayle E. Reiber, PhD



One of the top priorities of the Department of Veterans Affairs is the provision of care for Operation Iraqi Freedom/Operation Enduring Freedom veterans. Women veterans are the fastest growing group of new VA healthcare users, and little is known regarding the health and healthcare needs of women veterans with traumatic limb loss. This study examined the presence of physical and mental health conditions among women Operation Iraqi Freedom/Operation Enduring Freedom veterans and servicemembers who experienced major limb loss (amputation). Compared with men, women reported more migraine headaches, but reported similar frequency of all other physical and mental health conditions.

### Effects of structured vocational services in ex-offender veterans with mental illness: 6-month follow-up

James P. LePage, PhD, et al.

Finding employment with a felony is difficult. Past studies have shown that manualized programs can lead to rapid employment. However, no studies have evaluated longer follow-up periods or the effect of programs on overall amount of employment. This study followed 111 veterans in three different vocational service models. Two of the models used a specialized vocational manual. All veterans had at least one felony and a mental health or substance dependence diagnosis. The findings showed that using the manual in a group led by vocational staff led to higher employment rates, quicker employment, and more employment overall.

### Alterations in body composition and spasticity following subtetanic neuromuscular electrical stimulation training in spinal cord injury

Amanda Carty, BSc, MSc, PhD, et al.

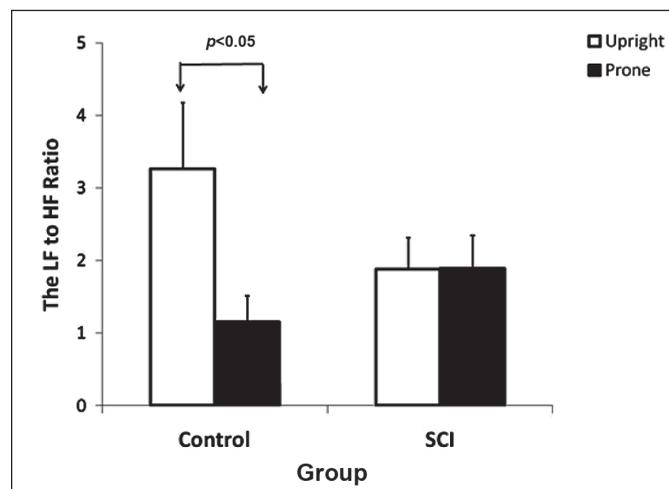


This study explored the effects of training with a new method of delivering electrical muscle stimulation. Fourteen volunteers with spinal cord injury took part. Participants trained 5 days a week for 8 weeks. Before and after testing, participants underwent dual energy X-ray absorptiometry to measure the amount of lean muscle and fat tissue in the legs. Spasticity testing was

also performed. Following training, participants had increased volume of muscle tissue and less local body fat in the legs. Spasticity was lower on testing and on verbal reports but not on analysis of visual analog scales.

### Comparison of changes in heart rate variability and sacral skin perfusion in response to postural changes in people with spinal cord injury

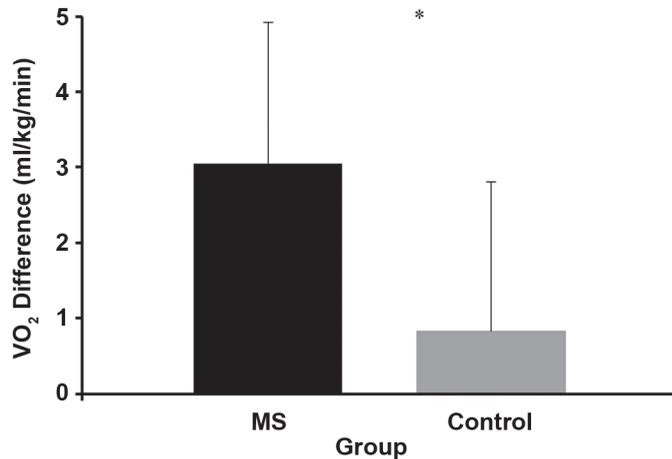
Yih-Kuen Jan, PT, PhD, et al.



The current clinical practice has established guidelines for assessing influences of severity of autonomic injury on the control of heart and blood pressure following spinal cord injury (SCI). However, the influences of SCI-induced autonomic impairment on microvascular dysfunction have not yet been established. Heart rate variability (HRV) has shown a potential for quantifying residual sympathovagal regulations over the cardiovascular system following SCI and may be used to assess the effect of autonomic injury on skin microvascular dysfunction. Our results showed nondisabled people had a significant change in the sympathovagal balance in response to postural changes, while people with SCI did not, and lower sympathovagal balance was associated with higher skin perfusion. Our findings support the use of HRV to assess the influences of sympathovagal balance on microvascular dysfunction following SCI.

### Bilateral differences in lower-limb performance in individuals with multiple sclerosis

Rebecca D. Larson, PhD, et al.



This study showed that there can be differences in how each leg functions in people with mild multiple sclerosis (MS). Leg differences in this population have been recognized, but there is limited information on how they affect function. Our participants with MS showed few physical signs of leg differences (limping), but during exercise, the differences could be observed. This study strongly suggests that limb selection is important for future studies on exercise and function in people with MS and new research designs should address the issue of potential leg differences.

### Laser light visual cueing for freezing of gait in Parkinson disease: A pilot study with male participants

Lisette Bunting-Perry, PhD, RN, et al.

Freezing of gait is a debilitating feature of Parkinson disease. We studied whether a laser beam attached to a rolling walker and projected onto the floor would reduce freezing episodes. The participants with Parkinson disease performed a timed walking task twice: once with the laser beam and once without the laser beam. For each trial, we recorded the time and number of steps taken to complete the task and the number of freezing episodes. As a group, the participants did not perform the tasks better with the laser beam than they did without it.

### Perceived exercise benefits and barriers among power wheelchair soccer players

J. P. Barfield, DA; Laurie A. Malone, PhD

Wheelchair sport provides a valuable and meaningful exercise and rehabilitation setting for veterans with physical disabilities. Power wheelchair soccer is an increasingly popular wheelchair sport, and it provides a meaningful exercise opportunity for veterans who rely on power wheelchairs. Persons with amputations, multiple sclerosis, spinal cord injury, and traumatic brain injury can all participate in this sport. The current study describes factors that either influence or discourage exercise participation among participants. Program directors can use this information to encourage exercise behavior among veterans with severe disabling conditions who need therapeutic exercise.

### Safety, usability, and independence for wheelchair-seated drivers and front-row passengers of private vehicles: A qualitative research study

Linda van Roosmalen, PhD, et al.

A survey and observational study was conducted on issues related to occupant restraint (seat belt) system usage and wheelchair securement device usage among wheelchair-seated drivers and front-row passengers in private vehicles. Usability and accessibility issues related to seatbelt and wheelchair securement technology were revealed, suggesting that wheelchair-seated occupants travel with a higher risk of serious injury in vehicle crashes than that of front-row occupants seated in original equipment manufacturer (OEM) vehicle seats and using OEM seatbelts. Study results indicate the need for passive occupant restraint devices and improved torso support for wheelchair-seated drivers to maintain a posture that allows for effective vehicle control.

### **Acute mountain sickness in athletes with neurological impairments**

Deepan C. Kamaraj, MD, et al.

Acute mountain sickness may be caused by abnormal regulation of brain and spinal fluid volume in response to low oxygen at high altitudes. Very little research has studied acute mountain sickness in people with neurological impairments. We studied the symptoms of 168 subjects with various disabilities (including traumatic brain injury, spinal cord injury, and multiple sclerosis) and subjects with no impairments at the National Veterans Winter Sports Clinic in Snowmass, Colorado, from 2007 to 2009. We found higher than expected acute mountain sickness overall (43%) and much higher Lake Louise Scores among the subjects with disabilities. Fatigue and weakness were the most common symptoms. More research is needed to find medications that can prevent and treat acute mountain sickness, particularly in individuals with disability.

### **Postdischarge quality of care: Do age disparities exist among Department of Veterans Affairs ischemic stroke patients?**

Neale R. Chumbler, PhD, et al.

This study examined whether postdischarge quality indicators differed depending on the age of veterans receiving care for a stroke at Department of Veterans Affairs medical centers. After taking patient, clinical, and facility characteristics into consideration, we found three age differences involving measurement and goal achievement for (1) blood pressure, (2) serum international normalized ratio for patients given warfarin, and (3) cholesterol levels. These findings should encourage the Veterans Health Administration to stay aware of possible age disparities in stroke care.