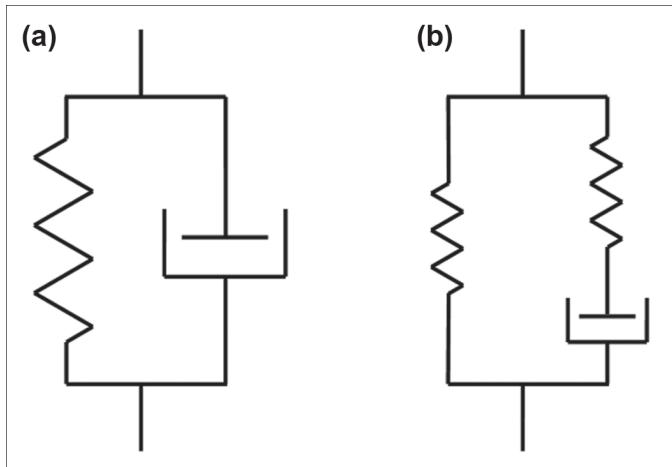


**Stance phase mechanical characterization of transtibial prostheses distal to the socket: A review**

Matthew J. Major, PhD, et al.



Achieving the required functionality of a below-knee prosthesis during the weight-bearing phase of walking (e.g., shock absorption, close to normal roll-over characteristics, and smooth transition into swing) depends on the mechanical properties of the prosthesis that directly influence the performance of the amputee. We define these properties as those characterized independent of the amputee and that reflect the overall behavior of the prosthesis, not its detailed design. Based on a review of previous work on prosthesis mechanical characterization, we conclude that a comprehensive and standardized method is required to properly represent the desired prosthesis properties for effective and efficient component design and prescription.

**Assessment of transfemoral amputees using C-Leg and Power Knee for ascending and descending inclines and steps**

Erik J. Wolf, PhD, et al.

The addition of active power to a prosthetic knee unit may improve function and reduce the potential for

overuse injuries in persons with transfemoral amputation. The goal of this article was to compare ramp and stair descent and ascent for servicemembers with unilateral transfemoral amputation using the C-Leg and the Power Knee. Results showed significant differences between the knee units specifically in the amount of extra power required from the sound limb during stair climbing while using the C-Leg. Results also showed greater walking speed during ramp descent and significantly less stance time on the nondisabled limb. In conclusion, there were significant differences between the two knee units during ramp and stair ascent and descent. With improvement, the addition of power to a prosthetic knee may reduce the impact on the nondisabled limb of persons with unilateral transfemoral amputation; however, it appears that the technology may not yet be advanced enough to provide benefit over other microprocessor knees.

**Perception of socket alignment perturbations in amputees with transtibial prostheses**

David A. Boone, PhD, et al.

Orientation of a socket relative to a foot is called alignment, and its fine adjustment plays an important role in successful prosthetic function. Since people with amputation are required to communicate sensations to prosthetists about the function of their prostheses to achieve good alignment, we studied whether those with below-knee prostheses could feel alignment changes and communicate them effectively. The results of this study suggest that subjects with below-knee prostheses were sensitive to certain types of alignment changes but not to others. Therefore, a tool that can help communicate alignment changes may assist prosthetists in adjusting prosthetic alignment.

**Relationship between hand function and grip force control in women with hand osteoarthritis**

Paula Martins Nunes, PT, et al.

Hand osteoarthritis (OA), a common joint disorder affecting about 70 percent of people aged 65 years and older, usually results in decreased strength and function of the hand and deficits in motor control. This study investigated the relationships between the parameters of grip force control during an object lifting task and the outcomes of functional and clinical tests commonly used in the assessment of hand function in individuals with hand OA. The results of this study showed that there were strong correlations between the outcomes of hand functional tests and parameters of grip force control in patients with hand OA. For instance, the Moberg Pickup Test was strongly correlated with the magnitude of grip force and the time spent lifting the object. This information will help to improve clinical and functional diagnostic tests for the individuals with hand OA and, therefore, provide new data for development of more focused physical therapy interventions.

**Insomnia treatment acceptability and preferences of male Iraq and Afghanistan combat Veterans and their healthcare providers**

Dana R. Epstein, PhD, RN, et al.

Insomnia is a common problem among combat Veterans who have suffered traumatic events and injuries. Effective treatments exist, but we do not know Veterans' preferences for the type of treatment and how and where to receive it. We asked 18 Operations Iraqi Freedom and Enduring Freedom Veterans and 19 healthcare providers to give us their views about insomnia treatment. The Veterans and providers found relaxation treatment most acceptable and preferred. Veterans also preferred medication, but not as a long-term treatment. The information provided will help to modify current insomnia treatments to meet the preferences and unique needs of returning Veterans.

**Psychometric study of the Neurobehavioral Symptom Inventory**

Paul R. King, PhD, et al.

The Neurobehavioral Symptom Inventory is the measure used to evaluate veterans' reports of post-concussive symptoms in the Department of Veterans Affairs' comprehensive traumatic brain injury (TBI) Evaluation. In this study, we collected data from 500 veterans of Operations Enduring Freedom and Iraqi Freedom; 219 of these veterans had experienced at least one TBI. We found that, even many years after injury, emotional disturbances, especially symptoms consistent with probable posttraumatic stress disorder, depression, and generalized anxiety, seemed to increase ratings of common postconcussive symptoms in both the control group and the group of veterans with a TBI history.

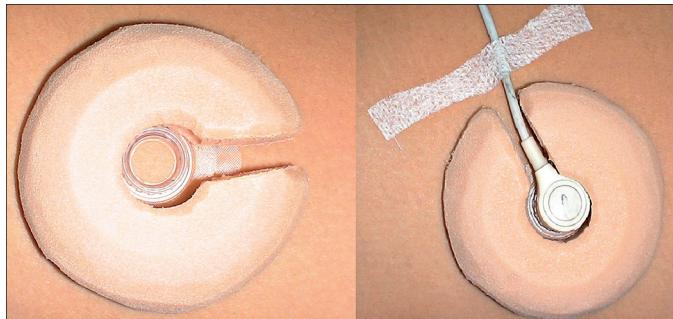
**Center of mass acceleration feedback control of functional neuromuscular stimulation for standing in presence of internal postural perturbations**

Raviraj Nataraj, et al.

Functional neuromuscular stimulation (FNS) is a clinically proven method for helping people with spinal cord injury (SCI) stand again. To keep their balance, people with SCI mostly rely on upper-body effort on an assistive device. We investigated the development of a sensor-based control system that provided assistive balance capabilities while the participant performed reaching movements similar to those during activities of daily living. The control system included an FNS implant, wearable control unit, and only two small body-mounted sensors. With the control system active, the participant could perform reaching movements with 27% less upper-body effort.

## **Physical activity and transcutaneous oxygen pressure in men with spinal cord injury**

Beatriz Crespo-Ruiz, MSc, et al.



Spinal cord injury (SCI) involves a number of changes at the metabolic and physiological levels. Several studies have shown that pressure at the interface between the user and the seating surface is the main factor involved in the emergence of pressure ulcers (PUs). This pressure leads to less or even no peripheral arterial blood circulation. Physical activity improves the quality of life and physiological responses of people in SCI. Therefore, regular physical activity could improve the physiological parameters involved in readapting blood flow overall and in the ischial area (lower buttocks), specifically, which is at higher risk for PUs.

## **Immunoendocrine responses of male spinal cord injured athletes to 1-hour self-paced exercise: Pilot study**

Judith E. Allgrove, PhD, et al.

Individuals with spinal cord injury (SCI) tend to suffer from recurrent infections of the respiratory tract, urinary tract, and skin. Intense exercise in nondisabled individuals can have a detrimental effect on immune function, while moderate exercise may enhance immunity. The current study demonstrates that 1 h self-paced upper-body exercise in individuals with SCI enhanced some aspects of the immune system, while others remained unchanged. This suggests that exercise may confer some resistance to infection, in addition to the other well-known health benefits. These preliminary findings provide further support for the role of exercise in promoting health in this special population.

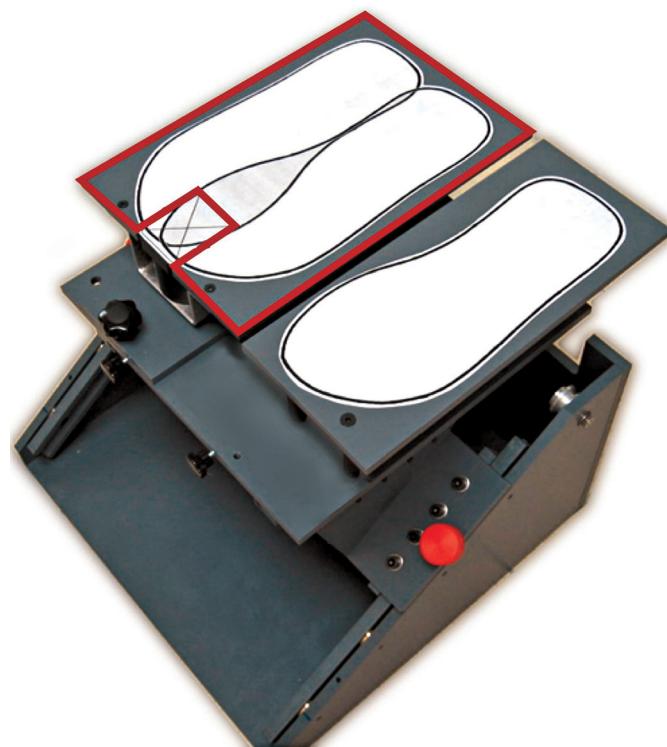
## **Investigation of wheelchair instability during transport in large accessible transit vehicles**

Zdravko Salipur, MEng, et al.

It is important to provide wheelchair users with appropriate protection during transportation. Recent research suggests that wheelchair passengers may not be properly protected while traveling on fixed-route intracity buses, in part because of the disuse and misuse of securement systems. This article examines possible instabilities wheelchair passengers encounter while on intracity buses.

## **An ergonomic modular foot platform for isometric force/torque measurement in poststroke functional assessment: A pilot study**

Stefano Mazzoleni, PhD, et al.

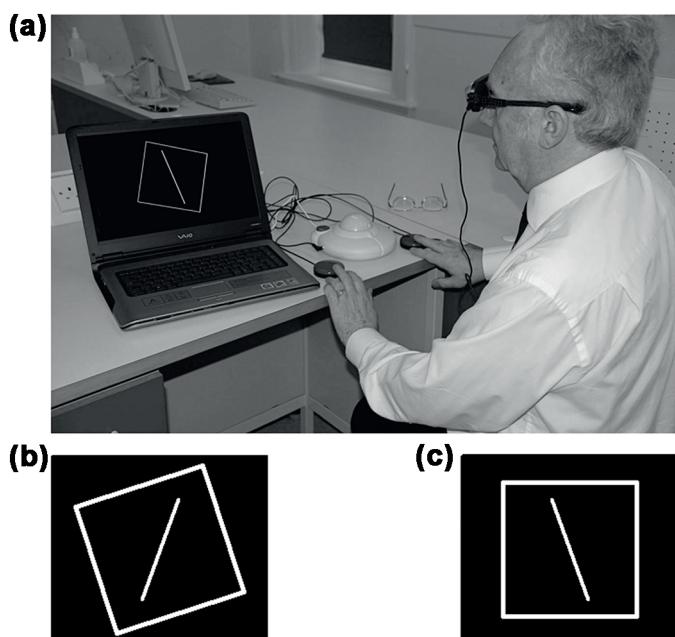


This article presents a platform for force/torque measurements on the foot of human subjects. The device, which can be used to perform accurate quantitative measurements during the initiation of a predefined set

of activities of daily living tasks, is aimed at performing functional assessment tests in poststroke patients undergoing a rehabilitation treatment. The measurements of ground reaction forces can be performed in the early stages of rehabilitation and can provide information on the motor recovery of each poststroke patient. Such information can help clinical staff choose the most appropriate rehabilitation treatment.

### **Subjective visual vertical perception and sense of smell in Parkinson disease**

Ahmed Khattab, PhD, et al.



Impaired sense of smell is present in most patients with Parkinson disease (PD) at an early stage. This article aims to explore the relationship between smell and perception of vertical in PD. Smell was tested by scratch cards with different odors. Subjective visual vertical was assessed by a computerized rod and frame (CRAF) test (similar to a computer game). Nondisabled controls were more likely to correctly identify odors than were patients with PD. There were minor differences between the two groups in their visual perception, but patients with PD and a lower cognitive score took more time to complete the subjective visual vertical test. More research is needed in using the CRAF test in rehabilitation.