

## Acute mountain sickness in disability and adaptive sports: Preliminary data

Brad E. Dicianno, MD, et al.

Symptoms of acute mountain sickness (AMS) may be due to abnormal regulation of the volume of brain and spinal fluid. No relevant research exists on individuals with traumatic brain injury (TBI) or spinal cord injury (SCI). We studied symptoms of 64 subjects with TBI, SCI, multiple sclerosis, or no impairments at the 2007 National Veterans Winter Sports Clinic in Snowmass, Colorado. We found a higher than expected occurrence of AMS overall (51.6%) but no differences among groups in occurrence or severity. Fatigue and weakness were the most common symptoms. More research is needed on medications to prevent and treat AMS.

## Effects of assistance dogs on persons with mobility or hearing impairments: A pilot study

Diana H. Rintala, PhD, et al.

Service dogs help persons with mobility impairments by retrieving items and performing other tasks. Hearing dogs alert persons with hearing impairments to environmental sounds. Study participants waiting for dogs completed an initial questionnaire packet. The Experimental group completed another packet 6 months after receiving a dog. The Control group (which had not yet received a dog) completed a second packet 6 months after the initial data collection. On average, dog recipients were very satisfied with their assistance dogs. The dog recipients depended less on other persons. Service dog recipients reduced their hours of paid assistance. Assistance dogs made a major positive impact on the lives of recipients.

## Distributed cognitive aid with scheduling and interactive task guidance

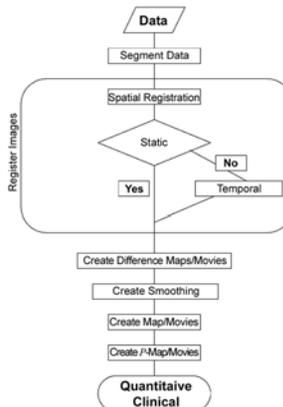
Edmund F. LoPresti, PhD, et al.



A system has been designed to help people with memory and organizational impairments perform daily living, vocational, or recreational tasks with greater independence. Veterans are susceptible to cognitive disabilities caused by brain injury or other conditions. This system provides scheduling assistance and task guidance on any device with an Internet connection and Web browser. A prototype has been developed that focuses on task guidance. In preliminary testing of the system, including simulated trials and monitored use of the prototype in a clinical setting, participants with brain injuries were able to respond to cues provided by the system and complete prescribed tasks.

## New technique for real-time interface pressure analysis: Getting more out of large image data sets

Kath Bogie, DPhil, et al.

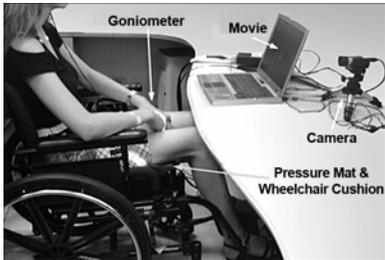


Interface pressure mapping is often used in seating clinics to determine the effects of different cushions. Currently, therapists and clinicians cannot easily compare repeated assessments. Longitudinal analysis and self-registration (LASR) is a new technique, developed by our team, to get rapid three-dimensional analysis of pressure maps. LASR was tested on measurements from neuromuscular electrical stimulation experiments. LASR showed that seating pressure distributions improve over time with electrical stimulation of paralyzed buttock muscles in people with spinal cord injury. These changes may reduce the risk of pressure ulcer development. Using LASR in seating

clinics will help clinicians decide which cushion is best for the user.

### **Toward real-time detection of deep tissue injury risk in wheelchair users using Hertz contact theory**

Limor Agam, MSc; Amit Gefen, PhD



Individuals with paraplegia or tetraplegia are susceptible to pressure ulcers on their buttocks that are caused by prolonged mechanical compression of the tissues of the buttocks

between the sitting surface and the skeleton. This article describes a newly developed device for monitoring these internal tissue loads during daily life and studies conducted in sitting subjects with paraplegia and control subjects on the application of the device to pressure ulcer prevention. When fully validated, the device can be used as an alarm system to inform a wheelchair user or the attending staff that a risk has been detected for developing a deep pressure ulcer before tissue damage actually occurs.

### **Validation of use of wireless monitors to measure levels of mobility during hospitalization**

Cynthia J. Brown, MD, MSPH, et al.

We validated the use of small accelerometers (wireless monitors) to measure mobility during hospitalization. Hospitalized medical patients older than 65 years who were not confused and could walk in the 2 weeks before admission were enrolled. Wireless monitors attached to the thigh and ankle of the 47 male patients recorded their average mobility status (lying, sitting, or standing/walking) every 20 seconds. Trained observers used preprogrammed personal digital assistants to also record the patients' mobility status. The wireless monitors had excellent agreement with the observations. The monitors were valid, easy to wear, noninvasive, and capable of measuring mobility continuously over 24 hours. This study is the first to examine the validity of a measure that can assess the mobility that patients achieve during a hospital stay and can be used in future mobility studies.

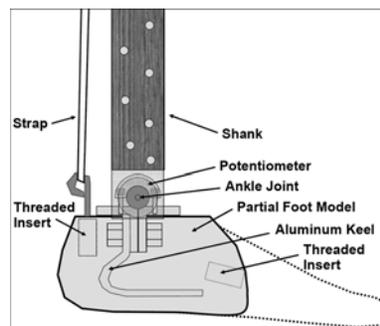
### **Evaluation of psychometric properties of Walking Impairment Questionnaire in overweight patients with osteoarthritis of knee**

Eileen Collins, PhD, RN, et al.

This study examined the psychometric (measurement) properties of the Walking Impairment Questionnaire (WIQ) in patients with osteoarthritis (OA) of the knee. A total of 105 patients completed the WIQ. Internal consistency of the WIQ was supported. Scores were consistent when patients were tested 14 days apart. The relationships were moderate between the WIQ subscales and other established measures such as the 6-minute walk distance, stair climb and descend, and the Western Ontario and McMaster Universities OA Index. After evaluating the psychometric properties of the WIQ, we concluded that it is a valid and reliable instrument to use in patients with OA of the knee.

### **Influence of marker models on ankle kinematics in persons with partial foot amputation: An investigation using a mechanical model**

Michael Dillon, PhD, BPO(Hons), et al.

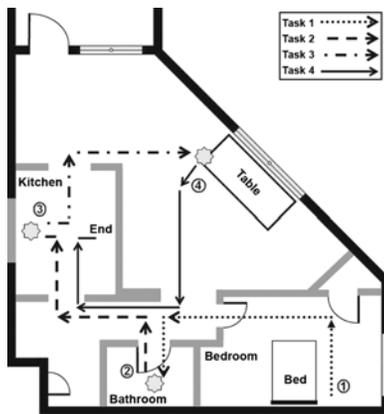


Previous investigations using marker-based gait analysis to describe how persons with partial foot amputation walk suggest that the amount of dorsiflexion (movement that bends the foot upward) is more exaggerated when walking

with shoes or a prosthesis than when walking barefoot. This exaggeration may be caused by the amputated foot moving inside the shoe and/or the prosthetic forefoot deforming, events that are not easily measured with conventional marker sets. We used a mechanical model of an amputated foot to describe an alternative marker set and compare its accuracy with a conventional marker set and a potentiometer. Results showed that the conventional marker set was acceptable for measuring ankle motion in metatarsophalangeal and transmetatarsal amputations, but the accuracy of these measures was improved with use of the alternative marker set for Lisfranc amputations.

### Ambulation monitoring of transtibial amputation subjects with patient activity monitor versus pedometer

Nancy L. Dudek, MD, MEd, et al.



Accurate devices to measure activity levels in patients with a lower-limb amputation can benefit patient care and research. In this study, we found that both the Yamax Digi-Walker SW-700 and the Össur patient activity monitor accurately measure step count during continuous walking in patients

with a below-knee amputation. However, these devices were not accurate for measuring step count during short distance walking in a small indoor environment such as an apartment. Therefore, these devices can presently only be recommended for use during relatively continuous walking.

### Electroacupuncture may help motor recovery in chronic stroke survivors: A pilot study

Wen Liu, PhD, et al.

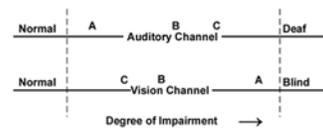


This study aimed to determine whether acupuncture treatment may help improve motor function in stroke survivors. A total of 10 chronic stroke patients with moderate to severe wrist muscle spasticity participated in this study. They went through a combined treatment of electroacupuncture and muscle strength

training and a strength training program only. After the combined treatment, the muscle spasticity level, active wrist range of motion, and motor functional score of the arm/hand changed significantly. This result was not found for the strength training alone. Electroacupuncture may help motor recovery in chronic stroke survivors.

### Prevalence and characteristics of dual sensory impairment (hearing and vision) in a veteran population

Sherri L. Smith, PhD, et al.



We determined the prevalence of dual sensory impairment (DSI)—concurrent hearing and visual impairments—in a veteran

population. A chart review obtained the veterans' auditory and visual data. The prevalence of DSI ranged from 0% for veterans younger than 65 to more than 20% for veterans 85 and older. Individuals with DSI have more difficulties than individuals with single sensory impairments and therefore require specialized approaches to the treatment of various health conditions. The number of veterans with DSI will increase in the next several years.

### Accuracy of uniaxial accelerometer in chronic obstructive pulmonary disease

Marilyn L. Moy, MD, MSc, et al.



Wearable sensors have been developed and used in nondisabled adults, but little is known about their accuracy in patients with chronic disease. We used the ActiHealth accelerometer, which measures step counts, in subjects with chronic obstructive pulmonary disease (COPD).

The ActiHealth accelerometer has acceptable intra- and interdevice coefficients of variation. It is highly accurate in nondisabled subjects; however, the accuracy declines in subjects with COPD. Usual walking speed is the most important predictor of accuracy in COPD. Prior to using the ActiHealth accelerometer, researchers and clinicians should assess walking speed and accuracy in each subject with COPD.

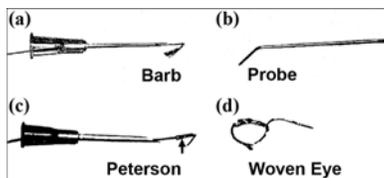
### Reliability and validity of World Health Organization Quality of Life-100 in homeless substance-dependent veteran population

Elizabeth Garcia-Rea, PhD; James P. LePage, PhD

The number of homeless veterans is increasing. Accurate assessment of quality of life is important in working with homeless veterans because of the number of problems encountered. However, reliability and validity of quality-of-life instruments have not been assessed in this population. We evaluated the U.S. version of the World Health Organization Quality of Life-100 (WHOQOL-100) in a homeless veteran population. Results found adequate reliability and validity for all WHOQOL-100 domain scores and most facet scores, while test-retest stability varied for the facet scores. The study supports the use of the WHOQOL-100 in a homeless veteran population.

### Effective methods of pelvic plexus nerve and bladder stimulation in anesthetized animal model

Larissa Bresler, MD, et al.



Urinary retention is a serious urological problem associated with spinal cord injury (SCI) and some pelvic disorders. Effective meth-

ods of electrical stimulation of the pelvic plexus nerves near the bladder wall were investigated to manage this difficult problem. Results in an anesthetized animal model showed that a barb electrode could be implanted with a

needle close to the bladder nerves. The best electrode configurations were on both sides of the bladder and bipolar (two electrodes close together). Stimulating parameters that induced strong bladder contractions without unwanted skeletal muscle activation were shown. Further investigations of direct bladder stimulation methods are warranted, especially since barb electrodes can be tested and implanted with minimally invasive techniques. These investigations may lead to improved methods of bladder emptying following SCI.

### A 24-hour feasibility study of intraurethral valved catheter for bladder management in males with spinal cord injury

Bradley G. Orris, MD, et al.



Improvements are needed in bladder management methods following spinal cord injury. This study evaluated the feasibility of a new type of internal urethral catheter that only spans the part of the urethra that makes bladder emptying difficult and that contains a magnetically actuated valve to allow for emptying the bladder. With the current design of the product, meeting the objectives is not feasible based on the results. However, this feasibility study provided important information that will help guide design improvements for intended applications, including an adequate draining rate with the external magnet placed on the perineum and reliable implantation and extraction, as well as facilitate independent patient use.