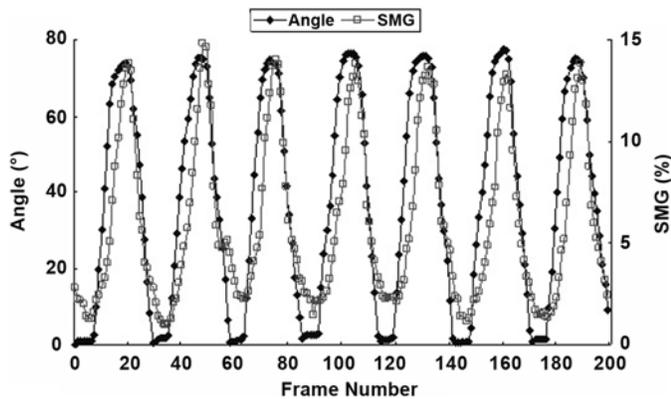


## Feasibility of controlling prosthetic hand using sonomyography signal in real time: Preliminary study

Jun Shi, PhD, et al.

In this study, the thickness deformation of the forearm extensor muscle was taken from ultrasound images during wrist extension-flexion; we call this process sonomyography (SMG). SMG provides an alternative signal source for prosthetic control with proprioception. The fast block-matching algorithm was used to track the thickness deformation and then the opening and closing of the prosthetic fingers were controlled according to the thickness deformation SMG in real time. We expect that SMG could be used together with electromyography to provide more accurate prosthetic control. Our work will contribute to human rehabilitation engineering for persons with upper-limb loss.

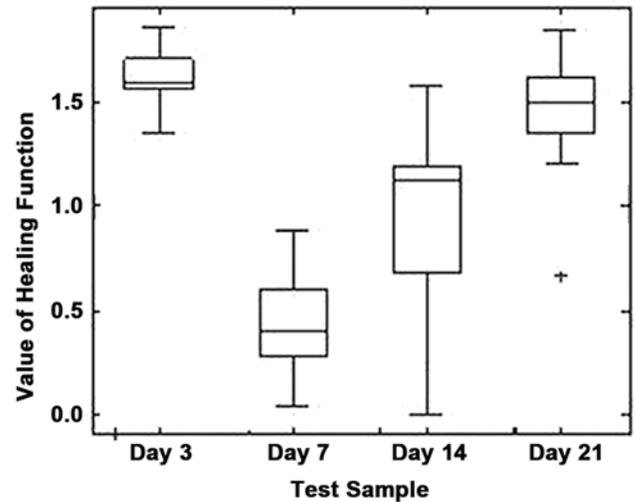


## Quantitative assessment of pressure sore generation and healing through numerical analysis of high-frequency ultrasound images

Sahar Moghimi, MS, et al.

Prolonged unrelieved pressure can lead to the development of necrotic tissue and pressure sore formation. A non-invasive and quantitative assessment tool, which is able to monitor deeper tissue layers, is very useful for monitoring the generation and healing of pressure sores. We developed

an assessment tool based on high-frequency (20 MHz) ultrasound B-mode scans. We artificially induced pressure sores in guinea pigs and monitored them for 21 days. We defined a healing function by extracting relevant parameters from the obtained images. It was demonstrated that the output of this function is capable of monitoring the healing/nonhealing behavior of the tissue under study.



## Competitive employment for consumers who are legally blind: A 10-year retrospective study

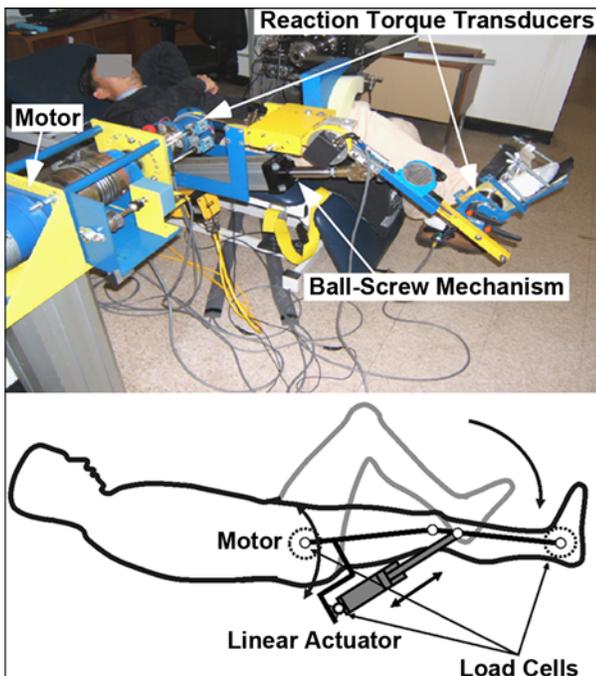
Edward Bell, PhD, CRC, NOMC

This study analyzes the employment outcomes for individuals with legal blindness who have exited the adult rehabilitation system. The fact has been long discussed that individuals who are blind or who have very limited vision have difficulty becoming employed, maintaining employment, and earning a living wage. This study examines employment statistics from fiscal year 1997 to 2007. These statistics are relevant to veterans who are exiting military service and seeking employment in mainstream employment. This study shows important trends and likely prospects for earning potential of individuals who are legally blind.

### Reflex responses to combined hip and knee motion in human chronic spinal cord injury

Ming Wu, PhD; Brian D. Schmit, PhD

This study characterized the relative role of the hip and knee proprioceptors in triggering extensor spasms in people with spinal cord injury (SCI). Although extensor spasms are common in people with SCI, including veterans, the precise triggers for multijoint extensor spasms are not well understood. Results from this study emphasize the role of knee and hip proprioceptors, especially the biarticular sartorius muscle afferents, in initiating extensor spasms in SCI. This knowledge may help identify rehabilitation strategies for producing functional movements in people with SCI.

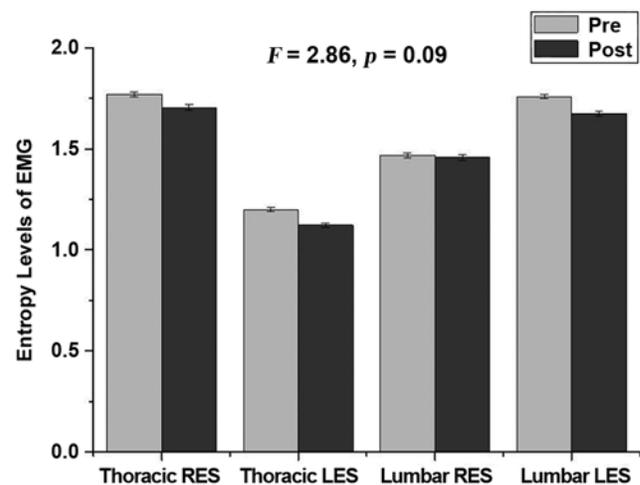


### Spectral and entropy changes for back muscle fatigability following spinal stabilization exercises

Tae-Ro Lee, PhD, et al.

We investigated tools for evaluating back muscle fatigability in participants with chronic low back pain (LBP) after spinal stabilization exercises (SSE). We compared

electromyography (EMG) signals of the thoracic and lumbar erector spinae muscles between the entropy of the EMG signals and the power spectrum analysis. The results indicated that the participants' pain levels decreased significantly after 4 weeks of SSE. The entropy of the EMG signals also decreased and demonstrated significant interaction with pain level. The slope of the median frequency based on power spectrum analysis also decreased but did not demonstrate any interaction with pain level. Therefore, the entropy of the EMG signals might be a useful tool for measuring LBP and should be further investigated with regard to pain level following intervention.



### Wheelchair tiedown and occupant restraint loading associated with an adult manual transit wheelchair in rear impact

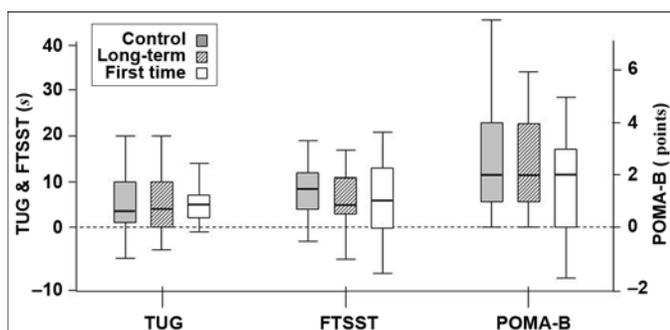
Zdravko Salipur, MEng; Gina Bertocci, PhD, PE

It is important to provide wheelchair users with appropriate protection during transportation. So far, most research has focused on developing wheelchairs and securement systems that increase safety in case of a frontal crash. Rear-impact crashes may cause different wheelchair and securement system failures than frontal impact crashes. It is therefore important to evaluate how wheelchairs and securement systems that are crashworthy in frontal impact will perform in rear-impact collisions. This study looked at tiedown and occupant restraints loading during a simulated rear-impact crash.

### Rollator use and functional outcome of geriatric rehabilitation

Lutz Vogt, PhD, et al.

Ambulation assistive devices are increasingly used and prescribed to enhance stability, facilitate independence, or increase safety and security. At the same time, it is assumed that the regular use of such devices could lessen mobility-related activities of daily living function. The present study shows that device users, regardless of their walking aid experience, demonstrated nearly comparable mobility, strength, and balance improvements during inpatient rehabilitation. The findings, to some extent, also legitimize the prescription of assistive devices to improve confidence and restore or maintain motor ability at the highest possible level.



### Construct validity of RT3 accelerometer: A comparison of level-ground and treadmill walking at self-selected speeds

Paul Hendrick, MPhty, et al.

Being physically active plays a key role in staying healthy and is an effective way of dealing with many medical conditions. Walking is an important activity and forms the main exercise of a large percentage of the population. The results of this study will help health professionals measure how active patients are in their daily lives. Health professionals can use an activity monitor to measure how much patients walk, and with a simple treadmill test, can set patient goals and develop a program to target any problems.

