

## **Analysis of biomechanical effectiveness of valgus-inducing knee brace for osteoarthritis of knee**

Thomas Schmalz, PhD, et al.



Using orthoses, or knee braces, to manage knee pain from osteoarthritis is cost-effective and tolerated by many patients. This noninvasive treatment is generally recommended in the early and middle stages of osteoarthritis or when other treatments (such as surgery or medication) do not apply. This study objectively measures the direct biomechanical effect of knee braces on 16 individuals who have worn them long-term. The significant pain reduction that these individuals experienced seems to have been the result of the forces that the brace applied to the leg.

## **Cost differences in VHA acute and subacute rehabilitation units: Implications for VHA resource planning**

W. Bruce Vogel, PhD, et al.

In the Veterans Health Administration (VHA), rehabilitation settings range from outpatient clinics to hospital-based inpatient care. Many patients who have a stroke require some rehabilitation care, and the differences in the costs of care across different settings can be substantial. This study compared the costs of care in acute versus subacute rehabilitation beds service units (ARBUs vs SRBUs) within the VHA. After we controlled for factors that influence costs, we found that the hospital-based ARBUs had lower index-stay costs than nonhospital SRBUs and that these lower costs appear to be achieved through shorter

lengths of stay. Moreover, the lower costs observed in ARBUs in this study combined with the higher rates of guideline compliance and improved outcomes in ARBUs found in previous studies suggest that stroke rehabilitation in an ARBU may be more cost-effective than stroke rehabilitation in an SRBU.

## **Evaluation of aluminum ultralight rigid wheelchairs versus other ultralight wheelchairs using ANSI/RESNA standards**

Hsin-yi Liu, MS, et al.

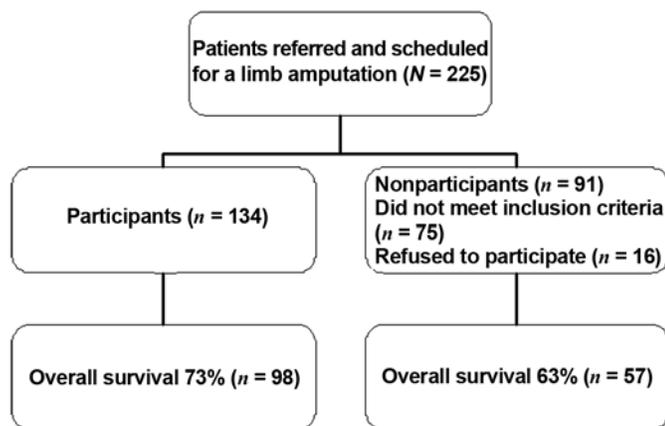


Premature wheelchair failure could injure users and require them to pay for replacements. This study evaluated aluminum ultralight rigid wheelchairs (AURWs) using ANSI/RESNA wheelchair standards, compared the test results among three ultralight wheelchair groups (AURWs, titanium ultralight rigid wheelchairs [TURWs], and aluminum ultralight folding wheelchairs), and investigated the effect of frame material on durability. We tested 12 AURWs with similar frame designs and dimensions as TURWs and hypothesized that the AURWs would be more durable. We found no significant differences between the AURWs and TURWs except in their overall length. Through comparing the failure modes, frames, and components, we propose that tire pressure, tube wall thickness, and tube manufacturing are the factors affecting wheelchair durability. Although the performance of a wheelchair in a natural environment may vary from the

test results because of different wheelchair settings and usage conditions, results of standards tests provide a baseline for comparison. Proper interpretation of the results contributes more detailed and objective information to consumers, clinicians, engineers, and manufacturers.

### Survival of participating and nonparticipating limb amputees in prospective study: Consequences for research

Joline C. Bosmans, PhD, et al.



During a 4-year prospective multicenter study on phantom pain, phantom sensations, and residual-limb pain after an amputation, surgeons referred 225 patients to our study. The two groups of patients emerged, i.e., those who participated by filling in questionnaires over time (134 participants) and those who were followed over time through records (91 nonparticipants). We analyzed the different survival rates of participants and nonparticipants. The main reason for amputation was peripheral vascular disease. Of the patients referred, 69% survived in the 4-year period after amputation. However, we found little difference between the overall number of participants (73%) who survived compared with number of nonparticipants (63%).

### Feasibility study of home telerehabilitation for physically inactive veterans

Nancy D. Harada, PhD, et al.



The aim of this study was to develop and determine the feasibility of implementing a home exercise monitoring system administered through the Health Buddy

(HB) text messaging device for physically inactive older veterans. We developed the text messaging intervention based on feedback from patients and clinicians through focus groups. We evaluated feasibility by administering the text messaging intervention to inpatients and outpatients  $\geq 60$  years old to determine safety, intervention adherence, and exercise adherence. We gave participants a choice between exercise monitoring by text messaging or telephone. The results showed that home exercise monitoring by text messaging and telephone is safe. Both intervention adherence and exercise adherence are better for participants using the HB than the telephone. The results demonstrate the feasibility of using text messaging to monitor home exercise adherence in physically inactive older adults.

### Novel method for measurement of fatigue in multiple sclerosis: Real-Time Digital Fatigue Score

Edward Kim, MD, et al.



Assessing fatigue, a major cause of disability in individuals with multiple sclerosis (MS), is difficult because of differing definitions of fatigue, confounding factors such as loss of motivation or sleepiness, and inherent subjectivity between individuals. We developed the Real-Time Digital Fatigue Score (RDFS) to more easily

measure and digitally record the daily experience of fatigue in real-time at regular time intervals. Over 3 weeks, four times a day, 49 subjects with MS recorded RDFSs on a wrist-worn device. We found that RDFSs significantly correlated with other outcome measures, captured real-time

daily and circadian variations in fatigue, and provided multiple measurements of fatigue that provided statistical advantages over other outcome measures. We hope that this novel method of assessing real-time fatigue will prove to be a valuable outcome measure in clinical trials of drugs and other interventions for treating fatigue in individuals with MS.

### Use of pedometer and Internet-mediated walking program in patients with chronic obstructive pulmonary disease

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

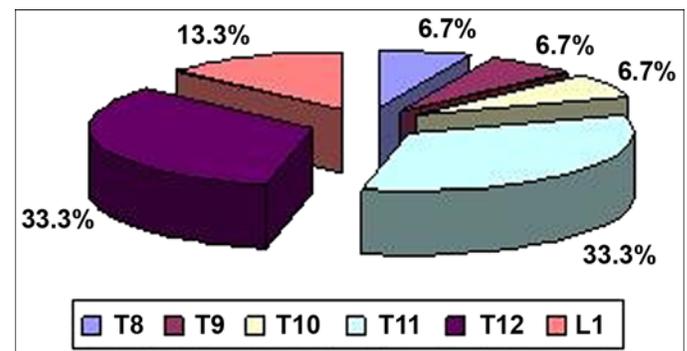


Step counts are related to health outcomes in persons with chronic obstructive pulmonary disease (COPD). We established the accuracy of the Omron HJ-720ITC pedometer (Omron Healthcare, Inc; Bannockburn, Illinois) used with an online walking program in 51 persons with COPD. We examined changes in step count in 24

persons with COPD who used the walking program for 16 weeks as part of a trial that studied people with type 2 diabetes mellitus (DM) or coronary artery disease (CAD) or who were overweight (body mass index [BMI]  $\geq 25$ ). The 24 participants with COPD walked an average of 3,429 steps per day. Sixteen participants completed the 16-week program and daily step counts increased on average by 988 steps. In this preliminary study, an online walking program using the Omron and targeting individuals with DM, CAD, or BMI  $\geq 25$  significantly increases step counts in participants with concomitant COPD.

### Postural control and fear of falling in persons with low-level paraplegia

Ligie T. John, BPT, et al.



Falls are prevalent reasons for spinal cord injury, which can affect rehabilitation potential. We conducted this study to quantify the fear of falling (measured by the Modified Falls Efficacy Scale) in ambulatory persons with paraplegia in correlation with their postural control (measured by a force platform). The main finding of this study was that self-perception of confidence might not represent the actual postural stability in persons with paraplegia. This finding will be useful for patients and professionals in the area of spinal cord injury rehabilitation.

