

JRRD At A Glance Podcast Episode 42

Listen to the JRRD At a Glance Podcast Episode 42: Electric wheelchairs, functional electrical stimulation, telerehabilitation, and more from JRRD Volume 51, Number 9, 2014.

[Johanna Gribble]: This is episode 42 of the JRRD podcast for volume 51, issue 9, produced by the Journal of Rehabilitation Research and Development (JRRD) and the U.S. Department of Veterans Affairs. Hello, I'm Johanna Gribble.

[Ken Frager]: And I'm Ken Frager. You can find more information about the topics we are discussing today, along with detailed Power Point presentations on most of these articles, online at the Table of Contents page for issue 51-9 at www.rehab.research.va.gov.

[Johanna Gribble]: In a guest editorial, researchers at the Rancho Los Amigos National Rehabilitation Center looked at the current rate of overdose death and long-term impairment from opioid use among Veterans and sought to identify better ways to monitor use and reduce harm. Rancho Los Amigos set out to develop a multi-platform approach to not only address the use policies, but also to communicate to their patient population and local community how their approach could benefit everyone involved. Their approach seems to be working, with a measureable decrease in patient use of opioids, but also in some lessons learned that can benefit other facilities struggling with similar issues.

[Ken Frager]: People with spinal cord injury can use electrical stimulation to contract their paralyzed trunk and leg muscles to stand and walk. In their study, "Understanding stand-to-sit maneuver: Implications for motor system neuroprostheses after paralysis," Sarah Chang and colleagues examined forces and acceleration of the stand-to-sit maneuver in nondisabled subjects and in subjects with spinal cord injury using an implanted electrical stimulation system and found that those with spinal cord injury needed much higher arm support forces on a

walker, had higher vertical accelerations at the impact, and had impact forces on the seat that were twice body weight. The findings indicate that an appropriate cushion to prevent injury at the impact is needed until the stand-to-sit maneuver is better controlled.

[Johanna Gribble]: In their study “Role of balance ability and confidence in prosthetic use for mobility of people with lower-limb loss,” Dr. Christopher Kevin Wong and colleagues sought to define the relationship among lower-limb prosthetic use for mobility, balance ability, and confidence for the more than 1,700 individuals who have lost limbs during recent military operations in Afghanistan and Iraq, as well as for the 43,000 people receiving care annually from the Veterans Health Administration for amputation, and suggested a method to identify those who may benefit from additional rehabilitation.

[Ken Frager]: Pressure ulcers are a major concern for wheelchair users, affecting veterans with diagnoses such as spinal cord injury or multiple sclerosis. Pressure mapping has become an important healthcare tool to help prevent pressure ulcers. While this tool has become more available, there is little agreement among researchers about the best methods for data processing. Additionally, healthcare providers frequently struggle with which pressure-mapping system will meet their needs and be cost effective. In their article “Effect of interpolation on parameters extracted from seating interface pressure arrays,” Drs. Winger and Crane aim to help healthcare providers and researchers understand more about how data from these pressure-mapping systems might be a more effective tool in pressure ulcer prevention.

[Johanna Gribble]: In the article “Multidisciplinary approach to converting power chair into motorized prone cart,” Steven Brose and Eisha Wali describe an intervention for people with spinal cord injuries to minimize pressure on areas at risk for pressure ulcers, which can cause problems with quality of life and medical health. The intervention, which centers around

converting a power wheelchair into a motorized prone cart, allows the subject to move around and interact socially without sitting.

[Ken Frager]: In their article “Development of telerehabilitation application with designated consultation categories,” Dr. Tan and colleagues focus on the development of a telerehabilitation application with predefined consultation categories designed to work well in a low-bandwidth environment, for example, in developing countries where computer resources may be scarce. It’s hoped that this application might also begin to resolve current healthcare issues in rural areas, where populations have limited access to proper medical care and resources.

[Johanna Gribble]: Iraq and Afghanistan Veterans with co-occurring mild traumatic brain injury and alcohol use disorder may have higher levels of alcohol craving than Veterans without mild traumatic brain injury or mental health disorder symptoms, according to Dr. Amy Herrold and colleagues. In their article, “Alcohol use and craving among Veterans with mental health disorders and mild traumatic brain injury,” the authors state that this information is important because alcohol craving is known to be associated with relapse to drinking.

[Ken Frager]: A solar-powered electric wheelchair could provide extended travel range compared with a conventional electric wheelchair, according to the designers and authors of the article “Design and development of solar power-assisted manual/electric wheelchair.” The design uses a manual wheelchair as the main frame, incorporating additional solar power and electric propulsion systems as auxiliary components. The chair, which is fitted with a simple clutch mechanism to enable the user to switch between manual and electric driving modes, also is designed on a modular basis to allow for rapid disassembly and collapse for easier transport and storage.

[Johanna Gribble]: Traumatic brain injury, even in a mild form, exerted significant negative effects on bone mass, bone structure, and bone strength, according to the authors of “Reduced bone mass accrual in mouse model of repetitive mild traumatic brain injury.” Dr. Hongrun Yu and colleagues believe these results are instructive to clinicians who devise rehabilitation plans for veterans who have experienced traumatic brain injury, noting that these plans should also include rehabilitation for the skeletal system.

[Ken Frager]: Jacob Segil and colleagues, in their article “Comparative study of state-of-the-art myoelectric controllers for multigrasp prosthetic hands,” hope to create a broader understanding of the benefits and pitfalls of myoelectric control systems and a resource for prosthetists and users when deciding upon a type of myoelectric control system. The article compares three myoelectric control systems requiring the users to produce different muscular activity in order to perform the same function, then compares and discusses the user feedback.

[Johanna Gribble]: Finally, Veterans with spinal cord injury are at a high risk of developing secondary chronic disorders. Functional electrical stimulation, an important tool in the rehabilitation and prevention of these secondary complications, can be used to optimize exercise capacity. In their article “Effect of adjusting pulse durations of functional electrical stimulation cycling on energy expenditure and fatigue after spinal cord injury,” Ashraf Gorgey and colleagues showed how clinicians can adjust pulse duration to increase the exercise energy expenditure and recovery oxygen consumption following exercise.

[Ken Frager]: Today’s discussion focused on articles in JRRD volume 51, issue 9. These articles and many others can be read online at www.rehab.research.va.gov/jrrd. Just a reminder that the *JRRD At a Glance* section is available online in English, Spanish, and Traditional and

Simplified Chinese! You can submit your comments on this podcast or request articles for us to highlight at vhajrrdinfo@va.gov. You also can “Get Social” with JRRD by “following” us on Facebook at JRRDJournal or on Twitter at JRRDEditor.

[Johanna Gribble]: Our thanks to JRRD’s David Bartlinski for his audio engineering, recording, and editing to make this podcast possible. We would also like to thank all of our listeners for your support. We’d love to hear from you. For JRRD, thanks for listening.