JRRD At A Glance Podcast Episode 35

Listen to the JRRD At a Glance Podcast Episode 35: Oculomotor rehabilitation, body-powered prostheses, gait, and more from JRRD Volume 51, Number 2, 2014.

[Johanna Gribble]: This is episode 35 of the JRRD podcast for volume 51, issue 2, 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 51-2 at www.rehab.research.va.gov.

[Johanna Gribble]: In a guest editorial, David Morris and Edward Taub describe the evolution of the Constratint Induced Movement Therapy Training Program at the University of Alabama-Birmingham, detailing the instructional elements provided in the program, posttraining experiences of selected program participants, and future plans for the training program to further enhance the translation of CI therapy into other clinical and research settings. The program provides an example of how research findings can be translated into a practical clinical program and then disseminated for use by clinicians and researchers.

[Ken Frager]: Diffiiculty with eye focusing is common in people with mild traumatic brain injury. Its presence can adversely affect near work activities and general activities of daily living, because words and objects would be "blurry." In their article "Effect of oculomotor rehabilitation on accommodative responsivity in mild traumatic brain injury," the authors describe the results of 3 hours of eye focusing training. The research shows that following the training, nearly all aspects of accommodation improved significantly, along with reduced symptoms and improved

visual attention. These findings demonstrate considerable residual neural/visual system plasticity in the adult brain following a mild traumatic brain injury.

[Johanna Gribble]: How do walking, standing, and resting influence transtibial amputee residual-limb fluid volume? In their study, Joan Sanders and her colleagues measured the effects of resting, standing, and walking on residual-limb fluid volume in participants with transtibial amputation to determine whether the nature of activity is important when considering carrying out volume accommodation strategies. Their findings show that standing caused fluid volume losses, while walking and resting caused fluid volume gains in some subjects and fluid volume losses in other subjects.

[Ken Frager]: People with stroke and chronic gait disability participated in a 3-week, three sessions per week robotics training program using their affected ankle to play video games. Half of the participants were given encouragement, performance feedback, and the opportunity to win money during each session. The other half trained equally on the ankle robot but received none of the immediate reinforcements presented to the first group. In their article “Increased reward in ankle robotics training enhances motor control and cortical efficiency in stroke,” Ronald Goodman and his team describe how the high-reward group learned faster and improved certain aspects of their walking, while the high-reward group also had more efficient brain networking during ankle movements.

[Johanna Gribble]: In the article “Sensor-based hip control with hybrid neuroprosthesis for walking in paraplegia,” Curtis To and colleagues examine the feasibility of a sensor-based hybrid neuroprosthesis combining body bracing with automated joints to regulate movements

with functional electrical stimulation of an individual's own muscles in providing the ability to walk. Getting in and out of places remains a problem for veterans and others with paraplegia, and this type of a device could provide people with spinal cord injury options to access places not readily reachable by wheelchair, while at the same time preventing or reversing degradation of bones, joints, heart, lungs, and skin due to immobility resulting from paralysis.

[Ken Frager]: Muscle vibrations are known to induce a strong perception of joint movement in the absence of actual movement. They can also trigger low-intensity muscle contractions. Thus, it would be possible, with the appropriate pattern of vibration, to trigger a perception of gait movements and small amplitude stepping-in-place movements. In their article "Complex muscle vibration patterns to induce gait-like lower-limb movements," Cyril Duclos and colleagues discuss the possibility of delivering such complex vibration patterns to leg muscles and measuring the induced leg movements. According to the authors, this complex vibration pattern could activate the central nervous system in a gait-like manner for rehabilitation of persons with difficulty walking because of neurological deficits.

[Johanna Gribble]: The majority of people with an upper-limb amputation use body-powered prostheses rather than myoelectric prostheses. Body-powered prehensors may be controlled by either voluntarily opening or closing the device. Kelsey Berning and others, in their article "Comparison of body-powered voluntary opening and voluntary closing prehensor for activities of daily life," discuss the differences between the two options, finding that voluntary closing devices are faster across tasks and preferred for some tasks, whereas voluntary opening devices are preferred for others. These results will help clinicians prescribe the most appropriate device for veterans and others, allow occupational therapists to recommend when users should

switch between devices for specific tasks, and provide parameters that enable engineers to design devices that can switch between modes.

[Ken Frager]: In their article “Performance-based assessment of falls risk in older veterans with executive dysfunction,” Dr. Barbara Fischer and colleagues examined whether three versions of the Timed Up and Go test detected whether older veterans or other potential “fallers” with cognitive impairment would be at greater risk for future falls. Researchers found that use of the Timed Up and Go tasks may prevent future falls and identify individuals who could benefit from physical therapy and other fall-prevention strategies.

[Johanna Gribble]: In their article “Evaluation of two cane instruments in older adults with knee osteoarthritis,” Nancy Harada and her colleagues describe the psychometric properties of the Cane Cognitive Mediator Scale and Psychosocial Impact of Assistive Devices Scale in adults with osteoarthritis and determine whether these instruments are effective screening tools to identify patients who are likely to use a cane under specific circumstances.

[Ken Frager]: The military veteran population is aging, resulting in a surge of older patients using Veterans Health Administration services. These older veterans also account for a rising number of posttraumatic stress disorder cases treated in the VHA. Multiple illnesses at the same time are common among older veterans, with effects seen across lifestyle behaviors, functional ability, and quality of life. In their article “PTSD is negatively associated with physical

performance and physical function in older overweight military Veterans," Katherine Hall and colleagues examine the relationship between PTSD and physical function and its tremendous potential for improving integrated healthcare and optimally directing rehabilitation services.

[Johanna Gribble]: Persons with amyotrophic lateral sclerosis, or Lou Gehrig Disease, can experience weakness and fatigue of the neck muscles that hold the head up. In some cases, the muscles cannot hold the head up and the chin drops onto the person's chest, which can interfere with eating, communication, comfort, and/or breathing. In their article "Elastic head support for persons with amyotrophic lateral sclerosis," Dr. Andrew Hansen and others describe a simple device constructed for persons with ALS to assist with holding the head up during daily activities, including walking.

[Ken Frager]: Individuals with Parkinson and other neurodegenerative diseases often succumb to complications of dysphagia and resulting pulmonary sequelae. Therefore, long-term dysphagia management is a top priority throughout the progression of the disease. Expiratory muscle strength training has been found to provide specific, clinically meaningful gains to swallowing and cough function. In their prelimiiary study "Detraining outcomes with expiratory muscle strength training in Parkinson disease," Michelle Troche and her colleagues highlight the need for the development of maintenance programs to sustain function following intensive periods of training.

[Johanna Gribble]: In their article "New methods for evaluating physical and thermal comfort properties of orthotic materials used in insoles for patients with diabetes," Wai Ting Lo and colleagues describe new approaches in the evaluation of shearing and thermal comfort

properties of orthotic insoles for patients with diabetes. Additionally, they describe a novel performance index that combines various material test results proposed to quantify the overall performance of the insole materials. The authors hope practitioners can use the performance index to better understand the properties and performance of various insole materials, enabling them to prescribe suitable orthotic insoles for patients with diabetic foot.

[Ken Frager]: Finally, Dr. Morimoto and others suggest that hearing devices using cartilage conduction can contribute to rehabilitation of people with acquired fibrotic aural atresia. In their study "Sound transmission by cartilage conduction in ear with fibrotic aural atresia," the authors show that cartilage conduction thresholds were lower than bone conduction thresholds in the low to middle frequency range for patients with fibrotic aural atresia in which fibrotic tissue was connected to the ossicles. The authors believe these findings may also have other useful audiological applications.

[Johanna Gribble]: Today's discussion focused on articles in JRRD volume 51, issue 2. 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.

[Ken Frager]: 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. Don't forget to "Get Social"

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