

Effect of oculomotor rehabilitation on accommodative responsivity in mild traumatic brain injury

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Impairment of human ocular accommodation, or eye focusing, is common in those with mild traumatic brain injury (mTBI). Its presence can adversely affect near work activities and general activities of daily living because words and objects would be “blurry.” Following 3 h of eye focusing training, nearly all aspects of accommodation improved significantly, along with reduced symptoms and improved visual attention. There was no effect of the placebo training. These findings demonstrate considerable residual neural/visual system plasticity in the adult brain with mTBI.

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Influence of physical capacities of males with transtibial amputation on gait adjustments on sloped surfaces

Karine Langlois, MSc, et al.

Gait is a challenging activity for people with transtibial amputation who must cope with the loss of ankle muscles. Particularly, slope walking, a daily situation, must be addressed during rehabilitation. The role of the individual muscular capacity and functional ability was investigated through a quantified analysis of gait of seven transtibial patients. Walking strategies are clearly related to the muscular impairment, suggesting hip and knee extensors strengthening as a priority. The six-minute walk test, a good predictor of uphill walking ability, can be proposed as a functional score usable in clinical routine for rehabilitation evaluation of people with transtibial amputation.

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How do walking, standing, and resting influence transtibial amputee residual limb fluid volume?

Joan E. Sanders, PhD, et al.

In this study, the effects of resting, standing, and walking on residual limb fluid volume were measured. Results from 24 participants with transtibial amputation showed that standing caused fluid volume losses, while walking and resting caused fluid volume gains in some subjects and fluid volume losses in other subjects. The nature of activity is important when considering carrying out volume accommodation strategies.

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Increased reward in ankle robotics training enhances motor control and cortical efficiency in stroke

Ronald N. Goodman, PhD, et al.

People with stroke and chronic gait disability participated in a 3 wk, 3 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. The high reward group learned faster and improved certain aspects of their walking. Electrical brain activity was also recorded before and after training and showed that after training, the high reward group had more efficient brain networking during ankle movements.

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Sensor-based hip control with hybrid neuroprosthesis for walking in paraplegia

Curtis S. To, PhD, et al.

Getting in and out of places remains a problem for veterans with paraplegia despite advances in medicine and the passage of the Americans with Disabilities Act. This study examines 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. This should 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.
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Complex muscle vibration patterns to induce gait-like lower-limb movements: Proof of concept

Cyril Duclos, PhD, et al.

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. This study tested the possibility of delivering such complex vibration patterns to leg muscles and measuring the induced leg movements. 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.
<http://dx.doi.org/10.1682/JRRD.2013.04.0079>

Comparison of body-powered voluntary opening and voluntary closing prehensor for activities of daily life

Kelsey Berning, et al.

The majority of veterans 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. This study examined differences in performance between the two categories. The study found 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, allow occupational therapists to recommend when veterans should switch between devices for specific tasks, and provide parameters that enable engineers to design devices that can switch between modes.
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Performance-based assessment of falls risk in older veterans with executive dysfunction

Barbara L. Fischer, PsyD, et al.

Falls are a serious danger to older veterans and may lead to injury, loss of independence, and death. Among cognitively impaired veterans, it is difficult to determine risk for future falls; walking tasks such as the Timed Up and Go test may be helpful. We examined whether three versions of the test detected potential fallers with cognitive impairment. Results showed the tasks were associated with cognitive functioning and successfully differentiated between infrequent and recurrent fallers. Use of the Timed Up and Go tasks may prevent future falls and identify individuals who could benefit from physical therapy and other falls-prevention strategies.
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Evaluation of two cane instruments in older adults with knee osteoarthritis

Nancy Harada, PT, PhD, et al.

The study described the psychometric properties of the Cane Cognitive Mediator Scale (CCMS) and Psychosocial Impact of Assistive Devices Scale (PIADS) in adults with osteoarthritis (OA) and determined the feasibility of using these instruments as screening tools to identify patients who are likely to use a cane. The findings indicate acceptable test-retest reliability for the CCMS Attitudes and Subjective Norms subscales. Internal consistency reliability was good for the CCMS and PIADS. The CCMS Subjective Norms subscale demonstrated acceptable predictive validity across all subjects, while the PIADS Adaptability subscale demonstrated acceptable predictive validity for adults 45 to 64 years old.

<http://dx.doi.org/10.1682/JRRD.2013.06.0140>

PTSD is negatively associated with physical performance and physical function in older overweight military Veterans

Katherine S. Hall, PhD, et al.

The military Veteran population is aging, resulting in a surge of older patients (65 and older) using Veterans Health Administration (VHA) services. These older Veterans also account for a rising number of posttraumatic stress disorder (PTSD) 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. The added burden of comorbid psychological conditions such as PTSD on physical performance outcomes in older Veterans has received little attention to date. Examining the relationship between PTSD and physical function has tremendous potential for improving integrated health care and optimally directing rehabilitation services.

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Elastic head support for persons with amyotrophic lateral sclerosis

Andrew Hansen, PhD, et al.

Persons with amyotrophic lateral sclerosis (ALS) 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. This article describes a simple device constructed for persons with ALS to assist with holding the head up during daily activities, including walking. The article also describes a 2-week trial of this device by a group of male veterans with ALS.

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Detraining outcomes with expiratory muscle strength training in Parkinson disease

Michelle S. Troche, PhD, et al.

Information related to detraining following dysphagia rehabilitation is highly relevant in populations with neurodegenerative disease where dysphagia and aspiration are often considered inevitable. Individuals with Parkinson disease 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. This preliminary study highlights the need for the development of maintenance programs to sustain function following intensive periods of training.

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New methods for evaluating physical and thermal comfort properties of orthotic materials used in insoles for patients with diabetes

Wai Ting Lo, et al.

This article describes new approaches in the evaluation of shearing and thermal comfort properties of orthotic insoles for patients with diabetes. In addition, a novel performance index that combines various material test results is proposed to quantify the overall performance of the insole materials. Practitioners can use the performance index to better understand the properties and performance of various insole materials, thus prescribing suitable orthotic insoles for patients with diabetic foot.

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Sound transmission by cartilage conduction in ear with fibrotic aural atresia

Chihiro Morimoto, MD, et al.

A clear sound can be heard when a vibration signal is delivered to the aural cartilage from a transducer. This form of transmission is referred to as cartilage conduction (CC). This study showed that CC 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. Acquired fibrotic aural atresia is not uncommon in the adult population. The results suggest that hearing devices using CC can contribute to rehabilitation of these patients, as well as having other useful audiological applications.

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