JRRD at a Glance

Assistive technologies for self-managed pressure ulcer prevention in spinal cord injury: A scoping review

James Y. Tung, PhD, et al.

This article reviews the risk factors and technological approaches related to self-managed prevention of pressure ulcers in individuals with spinal cord injury. Overall, there is broad consensus that sustaining long-term adherence to prevention regimens is a major concern. The technological approaches reviewed (computer-based education, pressure monitoring, electrical stimulation, and telemedicine) demonstrated low-to-moderate effectiveness in addressing a subset of risk factors. We recommend integrating technologies to address multiple risk factors relevant to sustaining prevention practices in the community. The findings will inform researchers and clinicians in the development and application of technologies to assist in self-managed prevention of pressure ulcers.

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Heart rate and oxygen demand of powered exoskeleton-assisted walking in persons with paraplegia

Pierre Asselin, MS, et al.

Many veterans with a spinal cord injury are unable to ambulate over ground, causing an extreme sedentary condition. Paralysis and loss of upright mobility is associated with secondary medical complications. People with paraplegia who are trained to use an exoskeleton-assisted walking device to ambulate over ground are likely to benefit because the energy cost observed during overground walking was increased from sitting and standing, but not to a level of intensity that would discourage regular use. Daily use of an exoskeleton-assisted walking device could support improvements in cardiovascular and body composition and as such reduce morbidity and mortality.

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Lower-limb amputation and body weight changes in men

Alyson J. Littman, PhD, et al.

Little is known about the relationship between lower-limb amputation (LLA) and subsequent changes in body weight. We evaluated weight changes in 759 males with amputation and 3,790 males without amputation who were matched on age, body mass index, diabetes, and calendar year. Weight gain in the 2 yr after amputation was significantly higher in men with an amputation than without and in men with a higher rather than lower amputation. Generally, percent weight gain peaked at 2 yr and was followed by some weight loss in the third year. These findings indicate that LLA is often followed by clinically important weight gain.

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Ambulatory assessment of shoulder abduction strength curve using a single wearable inertial sensor

Pietro Picerno, PhD, et al.

We studied a new technique for assessing dysfunction in human joints affected by injuries. This technique measures muscle force throughout a joint's range of motion. This is essential for assessing damage and performing interventions that avoid overloading the muscle-tendon structure during rehabilitation. Current assessments measure force-angle curves using cumbersome and expensive dynamometers. Our aim was to assess strength curves

using the latest technology in the movement analysis field: a single, wireless, and wearable inertial sensor that can be used by clinicians as a routine diagnostic tool for assessing the functional recovery of a joint.

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Manual wheelchair satisfaction among long-term users and caregivers: A French study

Claire Marchiori, et al.

In the French context, manual wheelchair users are in general quite satisfied with their wheelchairs but some aspects (weight, comfort, durability, and maneuverability) and technical parameters (weight or propulsion outdoors) should be optimized because they are related to an active lifestyle and participation. It is also important to consider the caregivers when improving technical parameters such as the push handles, brakes, and weight of the wheelchair. Improving these aspects of the manual wheelchair should decrease the risk of musculoskeletal injuries for both manual wheelchair users and the caregivers and also improve satisfaction and promote mobility.

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Assessment of diabetic teleretinal imaging program at the Portland Department of Veterans Affairs Medical Center

Grace L. Tsan, OD, et al.

This is a retrospective study of 200 diabetic patients who had teleretinal imaging performed at Portland Department of Veterans Affairs (VA) Medical Center outpatient clinics. Most (90%) of the available teleretinal imaging studies were of adequate quality for interpretation. At outpatient clinics with both a teleretinal imaging program and an eye clinic, the rate of timely diabetic retinal examinations was higher than at the outpatient clinics with only a teleretinal imaging program or an eye clinic. The Portland VA Medical Center's teleretinal imaging program has successfully increased the screening of patients for diabetic retinopathy, which may lead to early diagnosis and treatment of diabetic retinal diseases.

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Development and initial validation of the Seated Posture Scale

Lelia Barks, PhD, ARNP, et al.

Many Veterans rely on wheelchairs for support of their spines, backs, and arms. This support is used for mobility and also for stable sitting. Support of the wheelchair results in either good or poor posture. Breathing, eating, and speaking are directly related to posture. This study reports development and testing of a new way to judge posture after someone is positioned in a wheelchair. In the future, it may be used in research or long-term care to judge how well residents are sitting. The study suggests that the measurement method is valid and reliable and also may be improved.

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Influence of noncircular chainring on male physiological parameters in hand cycling

Sebastian Zeller, MSc Sport Science, et al.

Hand cycling is a sport for individuals with lower-limb disabilities. A road-racing hand cycle is designed as a three-wheeled vehicle with the front wheel being chain-driven using the upper limbs. In the context of racing and daily living, hand cycling has been shown to be more efficient than handrim wheelchair propulsion. The purpose of our study was to examine the influence of a noncircular chainring (NCC) compared with a conventional circular chainring on hand cycling performance. Focusing on physiological parameters, a performance optimization using an NCC in hand cycling could not be proven.

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Evaluation of motion platform embedded with force plate-instrumented treadmill

Emily H. Sinitski, BSc, et al.

The Computer Aided Rehabilitation Environment (CAREN) virtual environment allows a person to safely walk on level and changing terrain within a three-dimensional computer-generated world. Veterans can benefit from the CAREN system during rehabilitation and from related research. These systems can measure how a person moves and the forces that cause these movements, providing useful information for physical rehabilitation. This article investigates CAREN-Extended system performance and introduces a set of tests for this emerging field that can be used by researchers and healthcare providers. Rehabilitation virtual reality equipment can vary between sites, so these tests can be completed to understand specific system performance at individual sites.

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Identifying contextual influences of community reintegration among injured servicemembers

Brent L. Hawkins, PhD, LRT/CTRS, et al.

Many servicemembers with physical and psychological injuries experience difficulty with reintegrating into their homes and communities after military service. Factors such as age, severity of injury, and social and physical environments likely influence the transition to community life. This study identified the personal and environmental factors that significantly influenced a sample of community-dwelling servicemembers. Results indicated that general self-efficacy, many social and physical environmental barriers, and perception of disability significantly influence community reintegration. The results of this study will help rehabilitation programs better prepare injured servicemembers for their transition.

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