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APT CENTER

Neural Prosthesis Seminar

"Technology in Rehabilitation"

How wearable sensors, robotics, and interactive gaming are going to revolutionize the way we restore motor function in patients with neurological problems

May 14, 2010 • 8:30 AM

Biomedical Research Building • BRB 105

Case Western Reserve University

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Abstract:

Recent advances in sensing technology, robotics, and interactive gaming platforms have provided researchers and clinicians in the field of physical medicine and rehabilitation with new tools. These tools are aimed to improve the management of patients with impairments associated with the inability to perform certain activities of daily living such as walking on level ground, climbing a stairway, reaching for objects with the upper extremities, and manipulating small objects with the hands. Different clinical scenarios require the use of different technologies and the development of different systems and methodologies. In the older adults otherwise healthy, clinicians are interested in tracking activity profiles and detecting the worsening of motor function (e.g. balance control) so that adequate interventions can be set in place when needed. In individuals with severe mobility limitations such as those often associated with a stroke and traumatic brain injury, technology could be used to facilitate the recovery of motor functions. When individuals no longer respond in a clinically significant way to interventions, technology could be used to augment or replace function. This presentation aims at providing examples of clinical applications in which wearable sensors, robotics, and interactive gaming are relied upon in order to provide clinical personnel with ways to facilitate the recovery of motor function in patients with neurological conditions. Issues related to monitoring mobility in older adults and to detecting falls in the home environment will be presented in a clinical context and the technical characteristics of desirable systems for subjects' monitoring will be discussed. Robotic systems designed for implementing exercise routines suitable to restore motor abilities in patients post stroke will be presented. The need for motivating patients using interactive gaming will be discussed together with the need for tracking the quality of the subject's performance. This is a key point to guarantee that patients benefit from the exercise routines prescribed by clinicians. The need for tracking improvements in motor abilities in response to rehabilitation protocols will be emphasized. In conclusion, future scenarios depicting how we anticipate that technology will change physical medicine and rehabilitation in the next decade will be discussed.

For more information, please contact Cathy Naples at (216) 231-3257.

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