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Speaker: Prof. Itzik Melzer

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Title: Properties Balance Control Associated with Unexpected Loss of Balance: Age-related differences

Abstract:

A model is the first step in understanding any natural phenomenon. Reaching an understanding of human movement behavior must, by its very nature, be a long-term study, and a yardstick is required to track our progress. Testing age-related differences in property balance control associated with unexpected balance loss, provides answers to a basic hypothesis driven from my past research. We hypothesized that balance reactions to external unexpected perturbations of posture although thought to be reflexive in nature, will be significantly different between young and old and stroke survivors as well. In the seminar I will explore the age-related difference in balance control during both voluntary and compensatory balance control (i.e., proactive and reactive balance control). In our research we used the mechatronic BaMPer system that was developed and built in Ben-Gurion University in collaboration between the Physical Therapy and Mechanical Engineering Departments—a device with abilities to produce unexpected perturbations of balance during walking and standing.

Bio:

I am the head of Recanti School for community health professions and the director of rehabilitation and movement analysis laboratory at the physical therapy department. The goal of my research is to Investigate the balance recovery function of non-frail and frail older adults with-state-of-the art BaMPer system, a mechatronic system developed at our lab that exposes participants to unexpected loss of balance during standing and walking. The BaMPer (**Ba**lance **M**easure and **Per**turbation system) is an examination system that enable us to explore ability of an older adult to avoid fall when balance is lost unexpectedly during walking and standing. In addition, we investigated the neuronal underpinnings of this modularity using structural imaging approaches, such as voxel based morphometry (VBM) and diffusion tensor imaging (DTI) as well as regions of interest (ROI) based analyses by correlating gray-matter volume with voluntary and compensatory balance-control measures. We are now exploring whether a perturbation training method can improve balance responses during walking after a 4-week perturbation-based balance training (PBBT) in older adults, to investigate whether PBBT can induce brain-volume changes in areas related to balance recovery function.