Mechanistic Model of Multisensory Postural Control
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The long-term goal of this research is to understand how the nervous system fuses information from multiple sensory systems for the control of upright stance. The ability to select and reweight alternative orientation references adaptively is considered a critical factor for postural control in patient and elderly populations. Despite the importance of multisensory reweighting, little is known about how it is achieved. We have developed a new experimental paradigm that simultaneously manipulates two sensory inputs (vision and touch) to probe the properties of multisensory integration. In parallel, we have developed a unique two-step modeling approach using time series techniques and mechanistic models to determine which characteristics of postural sway can: i) be attributed to estimation or control; and ii) distinguish different mechanisms of estimation used for multisensory reweighing. Here we focus on modeling the process of multisensory reweighting in changing sensory environments. The goal is to develop a mechanistic model that will explicitly link underlying physiological subsystems to postural control. Future work will address patient populations with similar techniques to determine the basis of their balance deficits.

Publications

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