Raymond Chong, J Nov Physiother 2018, Volume 8
DOI: 10.4172/2165-7025-C4-031

Raymond Chong
Augusta University, USA

Postural adaptation to somatosensory conditioning

The ability to flexibly adapt one's postural orientation and equilibrium is important for sports and activities of daily living. One method of studying postural adaptation is to perturb the sensorimotor set of subjects and observe how they reset their posture. Here in a series of experiments, we applied somatosensory conditioning by having subjects stand blindfolded on a toes-up inclined surface for several minutes (inclined phase). When healthy adult subjects were returned to a level surface (post-inclined phase), a range of postural adaptation was observed. On one extreme, subjects showed a large aftereffect of the prior inclined stance by leaning their body forward. Other subjects did not display the aftereffect. Instead, they remained standing upright. Individuals with Parkinson's disease also showed a normal range postural adaptation. Those with a cerebellar disorder adapted normally but all presented with high postural sway variability during the post-incline phase. Finally, individuals with a vestibular disorder all showed the aftereffect (i.e., all were responders) whereas among subjects with a somatosensory deficit (neuropathy in the legs and feet), all except one remained standing upright (i.e., all except one were non-responders). High postural sway variability was also observed in the subjects. These results increase our understanding of how postural control is reset following somatosensory conditioning in healthy and impaired populations. It appears that being a responder or non-responder is largely a function of whether the somatosensory or vestibular system pre-dominates the natural sensory integrative mechanism of each individual. In subjects with a vestibular deficit, postural control is deferred to the somatosensory system as evidenced by the forward body lean during the post-inclined phase. On the other hand, the absence of the lean aftereffect in subjects with a somatosensory deficit indicates the natural preference to align posture to gravity via vestibular inputs. Rehabilitation should be focused on increasing patient awareness of the environmental factors that increase their risk of falls secondary to vestibular or somatosensory deficits. Therapists can incorporate interventions to improve the integration or dominance of the underperforming sensory system, provide strategies for ambulating across uneven or shifting terrain, or modifying their surroundings.

Biography

Raymond Chong is the Chair of the Department of Interdisciplinary Health Sciences as well as the Director of the Applied Health Sciences PhD program. He has completed his PhD in 1997 from the University of Oregon. He is the lead author in over 60% of his papers. He is a regular Reviewer for the US Veteran Affairs Research Department and also serves on the Editorial Board of several journals including Gait & Posture.

rchong@augusta.edu

Notes: