The Effect of Tactile Sensory Augmentation on Postural Control in Parkinson’s Disease

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Introduction

Individuals with Parkinson’s Disease (PD) typically have difficulty maintaining vertical posture in standing and have a tendency to lean forward or stoop. Restoring postural orientation may be beneficial in preventing permanent contracture of the spine.

A recent study showed that prolonged standing on a sloped surface produced an aftereffect in which subjects leaned in the direction of the slope when they return to level surface, followed by a slow drift to baseline vertical posture (Kluzik et al. 2005).

A subsequent study found that elderly and PD subjects exhibited a larger lean aftereffect overall compared to healthy young adults (DPT 2012).

Here we incorporated tactile feedback (light fingertip touch) as a form of somatosensory augmentation to standing on a sloped surface to determine its influence on the lean aftereffect. Tactile feedback has been shown to exert a powerful effect in stabilizing postural orientation. Its influence on the lean aftereffect is unclear; it may either reduce or enhance it.

Methods

Subjects
Young Controls: \( n = 20 \) (10 F, 10 M, 25 +/- 2 yrs)
Elderly Controls: \( n = 8 \) (6 F, 2 M, 71 +/- 6 yrs);
MMSE: 29 +/- 1
Parkinson’s Disease: \( n = 6 \) (2 F, 4 M, 72 +/- 6 yrs);
MMSE: 29 +/- 2; UPDRS: 30 +/- 8

Results

Three types of responses were observed:
1. Non-responder (NR) – flat line
2. Responder (R) – initial forward lean, then returns to baseline
3. Touch-responder (TR) – remains in forward lean throughout 180s

Conclusion

The results showed that, tactile feedback increased the lean aftereffect among the healthy young, elderly and PD groups. These findings suggest that somatosensory augmentation may be effective in influencing postural orientation in PD.

It remains to be determined whether sustained benefits might be attained when it is incorporated into a postural training program in PD.

References


This poster is adapted from 1) Carnow C, Darr K, McConway K, Chong R. A case study of rehabilitation following ORIF repair of a calcaneal fracture located at