

Rehabilitation for Postural Deformities in Parkinson's Disease: An Update and Novel Findings

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Abstract

Rehabilitation is one of important treatments for postural deformities in patients with Parkinson's disease. Various possible mechanisms have been suggested. Among these, soft tissue changes such as reduced flexibility and muscle weakness and proprioceptive disintegration that likely induce impaired vertical perception seem to be partially improved by rehabilitation. For soft tissue changes, stretching, strengthening and functional exercise are adopted. For proprioceptive disintegration, postural reeducation exercises are adopted to promote proper postural realignment in each plane. This short review provides an update on the rehabilitation for patients with Parkinson's disease with anterior bending posture and lateral bending posture, and introduces novel rehabilitation interventions and assessment methods for postural deformities.

Keywords: Parkinson's disease; Postural deformities; Rehabilitation; Soft tissue change; Postural reeducation; Galvanic vestibular stimulation; Kinect

Postural deformities are disabling complications in patients with Parkinson's disease (PD). Severe postural deformities in PD patients include camptocormia (severe (minimum 45 degrees) anterior bending posture, but relieved in the spine), pisa syndrome (severe (minimum 10 degrees) lateral bending posture, but almost alleviated in the spine), scoliosis (lateral bending not relieved passive movement), and antecollis (severe (minimum 45 degrees) anterior neck flexion) [1].

Rehabilitation is one of important treatments for postural deformities in PD patients. However, there has been very small number of reports on effectiveness of rehabilitation for mild to moderate anterior and/or lateral bending posture, pisa syndrome and camptocormia and no reports on that for scoliosis and antecollis, as far as we know. In this short review, we briefly summarize postural rehabilitation in PD patients with lateral bending posture (including pisa syndrome) and those with anterior bending posture (including camptocormia) and provide information about the possibility of novel

Proprioceptive disintegration could affect impaired vertical perception in PD patients with postural deformities, especially lateral trunk flexion. Lateral trunk flexion increased when PD patients with lateral trunk flexion closed their eyes [19]. This phenomenon supports the notion concerning the relationship between the proprioceptive disintegration and lateral trunk flexion in PD patients. Prolonged body tilt to one side induces a bias in the perception of body verticality, even in the healthy subjects [20]. Because PD patients with lateral trunk flexion that develops in the chronic fashion is tilted to one side for a long time, the perception of body verticality is assumed to be biased additionally.

Postural reeducation could improve trunk posture both in the frontal and sagittal planes to some extent [21]. Postural reeducation exercise aims to promote proper postural realignment in sagittal and frontal plane. Combination of postural reeducation exercise with intervention for proprioceptive discrimination exercise at the patients' back might additionally enhance their awareness of trunk position and promote adjustment. If PD patients could hardly correct postural abnormalities, physiotherapist might adopt compensatory devices such as truncal orthosis [22], high frame walker and backpack for camptocormia [23] and crutches for pisa syndrome. It is also important for physiotherapists to know these compensatory devices.

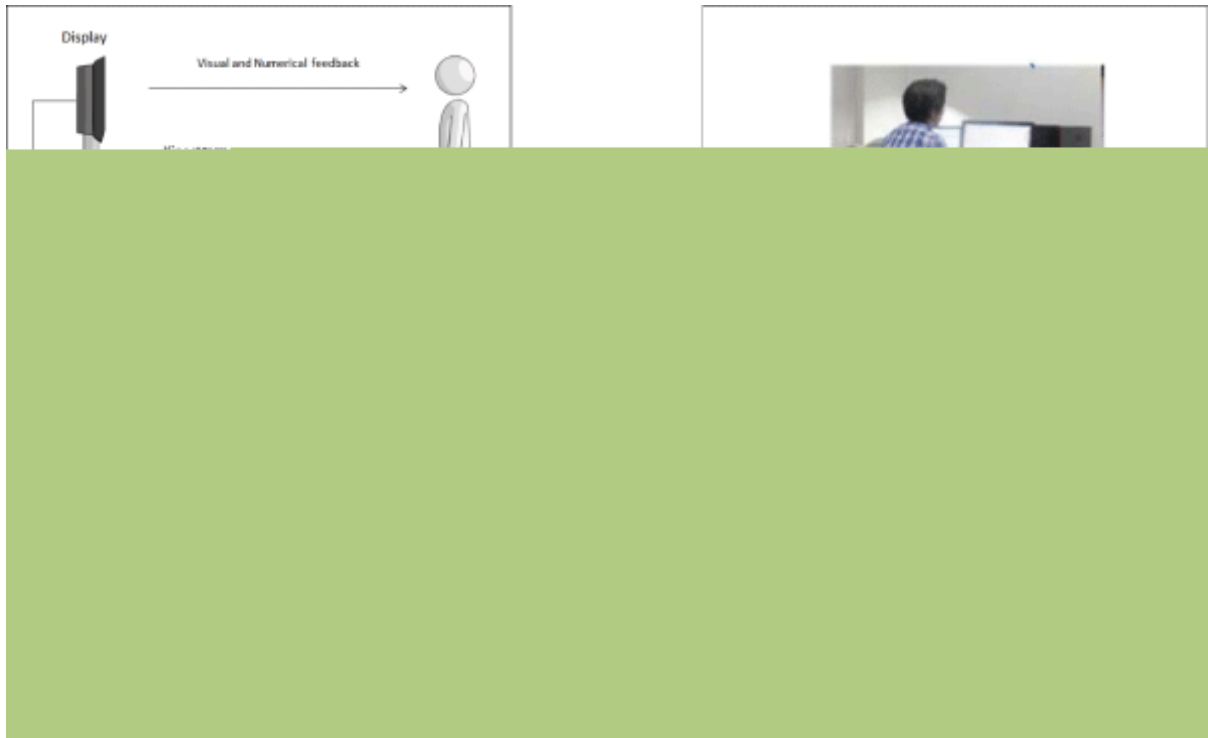


Figure 1: Schema of intercommunicate with persons in medical institution or laboratory and in-home patient who use Kinect-based system

