

Title	不安定姿勢とすくみ足に着目したパーキンソン病患者の症状識別に関する研究
Author(s)	Buated, Wannipat
Citation	
Issue Date	2017-06
Type	Thesis or Dissertation
Text version	ETD
URL	http://hdl.handle.net/10119/14747
Rights	
Description	Supervisor: 藤波 務, 知識科学研究科, 博士

ABSTRACT

Parkinson's disease (PD) is a neuro-degenerative disorder caused by the loss of neurotransmitter called "dopamine" in substantia nigra (SN), basal ganglia (BG). Most of PD patients manifest gait and balance disturbances in advanced stages which causes problems of falling. Postural instability (PI) is one of the factors leading to falls. Falls do not only cause the problems of fracture, but also the problems of disabilities and hospitalization. It also leads to the long-term caring and increases cost of treatments. The quality of life (QoL) of the patients may be reduced with such a problem. The burdens are also drawn to the family members, caregivers and societies. PD patients experience the problems of sensory, motor and cognitive deficits. Reasons that can bring about the problem of falls are the impairments of the systems. The problems of impaired sensation, reduced postural stability, decreased arm swing, and impaired cognition can be associated together as regards the neural circuits of the BG. Currently, falls still often occur in the patients with freezing of gait (FOG) and balance disturbances, which present the symptoms, when the disease turns to advanced stages. Poor balance problems and falls can be detected when the patients fell down on the floor or reported fall history to their clinicians or physical therapists (PTs). Recent balance assessments/tools have hardly explained relationships among sensory, motor, and cognitive aspects. It is difficult to understand the 3 systems' impairments involving PI and FOG. It would be splendid to be able to acknowledge the scale of PI and understand the interaction of the systems in terms of center of pressure (CoP) in order to evaluate balance and provide to the patients with appropriate treatments for the ultimate goal of improving postural control, preventing falls and improving QoL.

This dissertation focused on the presence of the influences of sensory, motor and cognitive deficits toward postural control in PD by raising the main research question (MRQ); What is Parkinson's disease (PD) patients' postural control?, and the 2 subsidiary research questions; SRQ 1: What is balance measurement for evaluating balance dysfunction in Parkinson's disease (PD)? SRQ 2: How to evaluate the progression of Parkinson's disease (PD)? This dissertation illustrated 4 sub-studies with the purposes as follows;

Study I: To investigate the effects of visual input (VI) as clinical predictors of postural instability (PI) in Parkinson's disease (PD)

Study II: To evaluate the arm swing patterns as clinical predictors of postural instability (PI) in Parkinson's disease (PD).

Study III: To determine the arm swing patterns with auditory cues as clinical predictors of postural instability (PI) in Parkinson's disease (PD).

Study IV: To study the impact of cognitive loading as clinical predictors of postural instability (PI) in Parkinson's disease (PD).

Method: 60 patients with PD were recruited to participate in this study under the informed consent approved by the ethical committee board, Faculty of Medicine, Thammasat University, Thailand. General demographic data and clinical scores were recorded. The subjects were instructed to perform in eye, arm swing and cognitive loading sessions of the balance assessment measured by Nintendo Wii balance board (NWBB) in standing position by physical therapist (PT) researcher. *Study I:* stand naturally with eyes open and eyes closed in the total of 90 s. *Study II:* swing arms alternate and synchronous followed by the instructed program in the total of 170 s. *Study III:* swing arms alternate and synchronous followed by the instructed program with auditory cues in the total of 170 s. *Study IV:* read a material and count dates backward followed by the instructed program in the total of 170 s.

Conclusions: Parkinson's disease (PD) patients' postural control is disturbed by the deteriorations of sensory, motor and cognitive aspects. Specific balance measurements for evaluating balance dysfunction in PD were proposed in study I – IV. *Study I:* visual input can be clinical predictors of PI in PD. *Study II:* arm swing patterns; alternation and synchronization can be applied as clinical predictors of PI and FOG in PD. *Study III:* auditory cues effects on the arm swing patterns toward center of pressures. *Study IV:* cognitive loading effects on standing balance and postural stability in PD patients. It is prominent in PD patients with FOG. The progression of PD can be evaluated by the integration of postural control data in sensory, motor and cognitive parts. Degree of postural instability (DPI) was discovered to determine PI in patients with PD.

Keywords: Progressive predictors, Parkinson's disease, Postural instability, Freezing of gait, Balance dysfunction