Continuing Professional Development Lecture
Rehabilitation for Freezing of Gait in Parkinson’s Disease: Is There a Role for Motor Imagery?

Abstract
Freezing of gait (FOG) is defined as a brief interruption of walking during which patients with Parkinsonism cannot generate effective forward stepping movements. As such, FOG constitutes a significant and independent predictor of falls. FOG occurs more frequently in the later stages of Parkinson’s disease (PD) but is much more complex than a mere function of disease progression. The physiology of freezing episodes is characterized by highly abnormal spatiotemporal characteristics of the preceding stepping pattern and by oscillatory movements during freezing. Cognitive factors also play a role. We found that loading both the cognitive (dual tasking) and the motor system (turning) increases the odds for the occurrence of FOG.

As rehabilitation relies on the learning ability and thus on the cognitive resources of PD patients, freezers may pose a specific challenge. In addition, motor rehabilitation may enhance fall risk. The evidence on the effects of rehabilitation confirms that freezers benefit from exercise and cueing strategies even during challenging circumstances such as turning and dual tasking. However, patients with freezing were found to be more cue-dependent and impaired for implicit learning under dual task conditions. This calls for fine-tuning of rehabilitation intervention, addressing the appropriate motor and cognitive challenges for this patient group.

Motor imagery (MI) is a well-known training technique among athletes and has recently gained attention as a promising method for neurological patients. We tested whether the motor imagery ability of 14 PD patients in the early and mid-stage of the disease (H&Y 1-3) was intact in comparison to that of 14 age-matched controls. Patients were evaluated “on” medication and had good cognitive abilities. The results showed that MI ability is intact in PD. However, the inter-individual differences between patients also highlight the need for a thorough evaluation of each patient’s imagery ability before considering MI for therapy. In addition, we found that the provision of visual cues improves the vividness and temporal structure of MI in patients with PD. Since cueing can be used to diminish PD patients’ bradykinesia during imagery, we hypothesize that it may also enhance the efficacy of MI strategies to alleviate or prevent freezing. However, whether this is true has not been shown yet. Recent work, however, suggests that action observation of strategies to prevent FOG, is beneficial. Therefore, we conclude that effective rehabilitation of FOG requires strategy-training in which motor imagery may play a role to strengthen motor and cognitive function.

Biography
Alice Nieuwboer is working as a professor at the Faculty of Movement and Rehabilitation Sciences of the Katholieke Universiteit Leuven (Belgium), where she obtained her PhD in 2001. She is teaching both undergraduate and postgraduate physiotherapy students in specialised topics in neurological rehabilitation and evidence-based physiotherapy. Within the faculty she is head of the Neuromotor Research Group. She was principal investigator of the EU-funded RESCUE-project (2002-2005) on cueing in Parkinson’s disease (PD) and has published widely in the field of neurological rehabilitation. Her present research efforts are dedicated to the mechanisms of freezing of gait, cueing and rehabilitation of movement disorders. Since 2007, she is running several research programs involving gait and upper limb repetitive movement analysis, brain imaging of upper limb freezing and motor learning in PD.

Alice’s research interests are focused on the rehabilitation potential, learning ability and neuroplasticity in patients with chronic neurological disease and more specifically in patients with Parkinson’s disease (PD). Her research team investigates how basal ganglia deficits influence driving, walking, turning and upper limb movements (writing). Central in all her work is the question, why freezing episodes occur and how the interplay between cognition and motor function and generic mechanisms of repetitive movement breakdown may lead to freezing. This has led on to studies of motor and cognitive compensatory mechanisms, as a result of targeted exercise, dual tasking training, motor imagery and motor learning in PD patients with and without cognitive impairment.

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Registration fee: $10 / 8 (SPA members)
Venue: Singapore General Hospital
Block 6, Level 1
Postgraduate Medical Institute
**Registration Form**

Continuing Professional Development (CPD) Lecture by Dr Alice Nieuwboer

“Rehabilitation for Freezing of Gait: Is There a Role for Motor Imagery?”
24 January 2013 (Thursday)
6.00 – 7.00 pm

*Please register for the lecture by 18 January 2013.*

**Participant's Details:**

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**Payment for Registration:**

$10 / $8 for SPA members / **Complimentary for participants of Physiotherapy Management of Parkinson’s Disease Workshop**

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