



Service Priorities and Programmes
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A case series on robot-assisted gait training in improving gait parameters in Parkinson's Disease patients with deep brain stimulation

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Introduction

Patients with Parkinson's Disease (PD) develop progressive gait disturbances with disease advancement. Hypokinetic rigid gait pattern with reduction of gait velocity and step amplitude limits the patients' walking capacity. Robot-assisted gait training (RAGT) is suggested as an effective adjunct physiotherapy intervention for PD patients. At the Queen Elizabeth Hospital (QEH), Deep Brain Stimulation (DBS) is a surgical treatment option for controlling the debilitating symptoms of PD. However, there is limited evidence to demonstrate the effectiveness of RAGT in PD patients with DBS.

Objectives

To investigate the effectiveness of RAGT on selected gait parameters in PD patients with DBS.

Methodology

Four PD patients who had DBS and attended medical follow-up at the Specialist Out-patient Department of QEH were recruited. All patients received 30 minutes of RAGT, 2 sessions per week for 12 weeks in addition to conventional physiotherapy treatments. Primary outcome measures were gait parameters that included the gait velocity, stride length and cadence; and the data were analyzed using an instrumented gait assessment system. Secondary outcome measures were functional mobility and self-perceived balance confidence measurements which were evaluated by using the Timed Up and Go Test (TUG) and the Chinese translated Activities-specific Balance Confidence (ABC-C) Scale respectively. All tests were performed at baseline and after intervention.

Result

Upon completion of the program, all 4 patients demonstrated improvement in selected gait parameters. The mean gait velocity and stride length increased from 50.6 to 86.4 cm/sec (70.8%) and from 78.8 to 122.2 cm (55.1%) respectively. The mean cadence reduced from 118.5 to 76.6 steps/min (-35.4%). The mean TUG diminished from 36.7 to 35.8 sec (-2.5%) whereas the mean ABC-C scale improved from 38.0 to 43.1% (13.4%). RAGT combined with conventional physiotherapy interventions appears to improve selected gait parameters in PD patients with DBS. The functional mobility and the self-perceived balance confidence also improved upon completion of the program. The results may help to set up a framework for future studies that could consolidate the evidence of utilizing RAGT as an effective adjunct in managing PD patients with DBS.