The effect of sensory-motor training on hand and upper extremity sensory and motor function in patients with idiopathic Parkinson disease

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ABSTRACT

Introduction: Patients with Parkinson disease (PD) have sensory problems, but there is still no accurate understanding of the effects of sensory-motor interventions on PD.

Purpose of the study: To investigate the effects of sensory-motor training (SMT) on hand and upper extremity sensory and motor function in patients with PD.

Methods: Forty patients with PD were allocated to the SMT group or the control group (CG) (mean ages ± standard deviation: SMT, 61.05 ± 13.9 years; CG, 59.15 ± 11.26 years). The CG received the common rehabilitation therapies, whereas the SMT group received SMT. The SMT included discrimination of temperatures, weights, textures, shapes, and objects and was performed 5 times each week for 2 weeks.

Results: Significantly reducing the error rates in the haptic object recognition test (dominant hand [DH]: F = 15.36, P = .001, and effect size [ES] = 0.28; nondominant hand [NDH]: F = 9.33, P = .004, and ES = 0.21) and the error means in the wrist proprioception sensation test (DH: F = 8.11, P = .005, and ES = 0.19; NDH: F = 13.04, P = .001, and ES = 0.26) and increasing matched objects in the hand active sensation test (DH: F = 12.15, P = .001, and ES = 0.24; NDH: F = 5.03, P = .03, and ES = 0.12) founded in the SMT. Also, the DH (F = 6.65, P = .01, and ES = 0.15), both hands (F = 7.61, P = .009, and ES = 0.17), and assembly (F = 7.02, P = .01, and ES = 0.15) subtests of fine motor performance, as well as DH (F = 10.1, P = .003, and ES = 0.21) and NDH (F = 8.37, P = .006, and ES = 0.18) in upper extremity functional performance, were improved in the SMT.

Discussion: SMT improved hand and upper extremity sensory-motor function in patients with PD.

Conclusion: The SMT group showed improved sensory and motor function. But these results were limited to levels 1 to 3 of the Hoehn and Yahr Scale.

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Introduction

The second most common neurodegenerative disorder after Alzheimer’s disease that is prevalent in approximately 1% of those aged 60 years or older is Parkinson disease (PD). PD is predominantly characterized by motor deficits, which show that processing of sensory signals is altered among patients with PD. Some of these sensory signals are nociception, abnormal processing of kinesthetic information in the basal ganglia, and dopaminergic pathways. Patients with PD showed deficits in the joint position sense (kinesesthesia) that can be partially reversed by deep brain stimulation of the subthalamic nucleus.2,4 Deficits in proprioceptive acuity and impaired performance in motor tasks were found in patients with PD. They also showed sensory integration deficits in visually guided tasks.5 Patients with PD become dependent on caregivers because motor and cognitive disabilities interfere with their ability to perform daily activities.6

There are numerous interventions to improve the problems of patients with PD. Lee et al1 reported that constraint-induced movement therapy improves fine and gross motor performances...