Effects of Calculation Tasks on Static and Dynamic Balance in Patients with Traumatic Brain Injury

YASU Michihito
Graduate School of Science for Human Services, Ritsumeikan University
Keywords: Traumatic brain injury, calculation task, balance

This study investigated the ability of balance in patients with traumatic brain injury when conducting dual tasks by examining the effects of a calculation task on static and dynamic balance.

A case study was conducted to examine the correlations between the results of statistic and dynamic balance assessments, life episode assessments, and cognitive function tests. The participants consisted of healthy adults and (N=33) patients with traumatic brain injury (N=24). Static balance was assessed by measuring the degree of sway, and dynamic balance was assessed by counting the number of steps taken when standing. As a dual cognitive task, an addition task using only two one-digit numbers was conducted while assessing both static and dynamic balance. The results indicated a main effect for all the sway parameters between the healthy and patient groups, as well as a main effect for the tasks under the single-task and dual-task conditions. Furthermore, the type of sway was different between the healthy and patient groups in both the single-task and dual-task conditions. The above results indicate that the calculation tasks had a similar effect on static and dynamic balance in both groups. Furthermore, it suggested that patients with traumatic brain injury have difficulties in movement, which is not observed in healthy adults, even if adults with such injury are independent in their daily life and are undergoing rehabilitation regarding social activities at a high level, such as returning to work or school. The results of the case study suggested that it would be necessary to establish support methods for the “invisible” disturbance of motor functions, after sufficiently considering the effects of cognitive functions. Furthermore, it is suggested that dual tasks can be utilized for rehabilitation in daily life, by providing suitable training to develop balance ability and the traits of cognitive functions.