Effects of Vibration Training on Disability Status among Individuals with Multiple Sclerosis

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ABSTRACT

Multiple Sclerosis (MS) is a progressive neurological disease affecting more than 570,000 Americans, and is among the most common causes of neurological disability in young adults. Controlled whole-body vibration (CWBV) training has been recently used to improve functional mobility among older adults and individuals with movement disorders, principally due to its attractive features, such as the safety, portability, and ease to operate, etc. However, it remains undetermined if and to what degree CWBV training can affect the disability level among individuals living with MS. The primary aim of this presented study was to examine the effects of an 8-week vibration training program on reducing the disability level of people with MS. Twenty-two adults diagnosed with MS (mean ± SD age: 52.0 ± 13.7 y/o; body height: 166.0 ± 9.3 cm; body mass: 79.5 ± 24.4 kg; disease duration: 15.5 ± 11.1 y; 15 females) participated in the 8-week vibration training course on a side-alternating vibration platform. They received the training 3 times a week for 8 weeks, leading to 24 training sessions in total. Each training session included 5 cycles of 1-min vibration exposure followed by a 1-min rest. The vibration frequency and amplitude were respectively set at 20 Hz and 3.6 mm. The level of disability was assessed before (or pre-training) and after (post-training) the 8-week training using the MS Functional Composite (MSFC) z-score and the Patient Determined Disability Step (PDDS) score. The higher (or smaller) the MSFC z-score (or PDDS score), the lower the disability level. Paired *t*-tests were used to compare both scores between pre- and post-training assessments in order to determine the possible training-induced changes in the disability level. Our results indicated that participants' MSFC z-score increased significantly following the vibration training (pre-training: 0.00 ± 0.61 vs. post-training: 0.31 ± 0.70; $p < 0.01$). Similarly, the PDDS score reduced significantly from 3.66 ± 1.88 at the pre-training assessment to 3.05 ± 1.99 at the post-training assessment ($p = 0.023$). The results displayed that the 8-week CWBV training course could reduce the disability level in individuals with MS by improving their MSFC and PDDS scores. CWBV training appears to be a promising alterative treatment for reducing the level of disability among people affected by MS, and may have implications for improving the quality of life and delaying the progression of the disease. Furthermore, the 8-week CWBV training program was well accepted by individuals living with MS. However, further studies based on a randomized controlled design are needed to systematically determine the effect of CWBV training on reducing disability level among people with MS. Additionally, the retention effect of CWBV training and the determination of the optimal vibration training dosage for this population warrant more investigation.