Effects of wheelchair Tai-Chi training on sitting balance of individuals with spinal cord injury

L. Thongsumrit 1, A. Nana 1, W. Limroongreungrat 1, W. Laksanakorn 2

1 College of Sports Science and Technology, Mahidol University, Thailand
2 Golden Jubilee Medical Center, Mahidol University, Thailand

Introduction: After spinal cord injury (SCI), many people are confined to wheelchairs. Sitting balance is of importance for these individuals in order to perform several functional daily activities. Wheelchair tai chi (WTC) is an exercise which is primarily focused on shifting center of mass during seated position. Therefore, it may help to improve sitting balance in individuals with SCI. Purpose: The purpose of this study is to examine the effect 8-week WTC training on both static and dynamic sitting balance of individuals with SCI.

Methods: Thirty individuals with level of SCI below T1 were randomly assigned to either the WTC group (mean age 27.6 SD 3.8, meanwt 55.6 SD 8.4 kg, meanht 167.6 SD 10.0 cm) or Control group (CON)(meanage 27.2 SD 4.9, meanwt 58.3 SD 13.1 kg, meanht 166.4 SD 13.8 cm). The WTC received the training for 8 weeks. Center of pressures (COP) excursion and velocities in both antero-posterior (AP) and mediolateral (ML) directions were assessed to determine static and dynamic balance during a baseline (pre-test) and

Results: Peak and average forces were significantly greater during pre- compared to immediately post-LW session (P<0.05) and average force was significantly greater during pre- compared to immediately post-HL session (P<0.05). No significant differences in peak and average forces were found between pre- and 6 hours following LW and HL session (>0.05), between pre-, immediately- and 6 hours following HW (P>0.05) and between LW, HL and HW for immediately- and 6 hours following training (P>0.05).

Discussion and conclusion: A significant reduction in MFGC immediately following LW session indicates that a systemic effect was induced, exemplifying greater muscular fatigue compared to post-HW session. Similarly, a significant reduction in MFGC following HL session was found despite comparable MFGC between pre- and immediately post-HW session. These discrepancies in results may be because upper-body exercises were performed after leg-press causing a 30-minute window between the leg-press and the MFGC assessment for HW session. Subsequently, such findings indicate that physical activity may be performed immediately following high intensity- and 6 hours following high volume low intensity resistance training sessions constructed specifically for the current study with minimal risks of injuries.


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