

Investigating the Dynamic Plantar Pressure Distribution in Individuals with Multiple Sclerosis

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Abstract : Objectives and Goals: Spasticity is a common symptom characterized with a velocity dependent increase in tonic stretch reflexes (muscle tone) in patient with multiple sclerosis (MS). Hypertonic muscles affect the normal plantigrade contact by disturbing accommodation of foot to the ground while walking. It is important to know the differences between healthy and neurologic foot features for management of spasticity related deformities and/or determination of rehabilitation purposes and contents. This study was planned with the aim of investigating the dynamic plantar pressure distribution in individuals with MS and determining the differences between healthy individuals (HI). Methods: Fifty-five individuals with MS (108 foot with spasticity according to Modified Ashworth Scale) and 20 HI (40 foot) were the participants of the study. The dynamic pedobarograph was utilized for evaluation of dynamic loading parameters. Participants were informed to walk at their self-selected speed for seven times to eliminate learning effect. The parameters were divided into 2 categories including; maximum loading pressure (N/cm²) and time of maximum pressure (ms) were collected from heel medial, heel lateral, mid foot, heads of first, second, third, fourth and fifth metatarsal bones. Results: There were differences between the groups in maximum loading pressure of heel medial ($p < .001$), heel lateral ($p < .001$), midfoot ($p=.041$) and 5th metatarsal areas ($p=.036$). Also, there were differences between the groups the time of maximum pressure of all metatarsal areas, midfoot, heel medial and heel lateral ($p < .001$) in favor of HI. Conclusions: The study provided basic data about foot pressure distribution in individuals with MS. Results of the study primarily showed that spasticity of lower extremity muscle disrupted the posteromedial foot loading. Secondly, according to the study result, spasticity lead to inappropriate timing during load transfer from hind foot to forefoot.

Keywords : multiple sclerosis, plantar pressure distribution, gait, norm values

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