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REVIEW ARTICLE

The Effect of Reduced Somatosensation on Standing Balance: A Systematic Review

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Abstract

The objective of this review is to identify and review publications describing the impact of reduced somatosensation on balance. Based on knowledge of the association between specific somatosensory loss and deterioration of balance, conclusions can be made about role of somatosensation in standing balance.

A systematic literature review is presented in which publications from the years 1993 through 2007 were searched in Medline and Embase. Medical Subject Headings (MESH) terms and free text words (related to balance, somatosensory loss, and lower limb) were used to perform the searches. Fifteen articles were selected for detailed review based on predetermined inclusion criteria, and three of the included articles described the effect of experimentally reduced somatosensation on balance in healthy subjects. Ten of the articles described balance in diabetic neuropathy (DN). The last two included articles described balance in Charcot-Marie-Tooth (CMT) disease type 1A (CMT1A) or type 2 (CMT2).

The literature indicates that the tactile sensation is reduced in DN, CMT1A, and CMT2 and when the plantar surface of the feet was hypothermically anesthetized. Joint motion sensation seems to be impaired in patients with DN, and passive joint position sensation appears to be reduced in healthy subjects with anesthesia of ankle and foot from prolonged ischemia. This reduced somatosensation seems to have a negative effect on balance in patients with DN and CMT2; however, this appeared not to be the case in patients with CMT1A and in healthy subjects.

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Abbreviations: (CMT) Charcot-Marie-Tooth disease, (CMT1A) Charcot-Marie-Tooth disease type 1A, (CMT2) Charcot-Marie-Tooth disease type 2, (CoM) center of motion, (CoP) center of pressure, (DN) diabetic neuropathy, (MESH) Medical Subject Headings, (NDS) neurological disability score, (PNSD) peripheral nervous system disorders, (VPT) vibration perception threshold

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