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Trunk, Head, and Step Characteristics During Normal and Narrow-Based Walking Under Deteriorated Sensory Conditions

Nandini Deshpande & Fang Zhang

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ABSTRACT

The ability to maintain stability in the frontal plane (medialateral direction) while walking is commonly included as a component of motor performance assessment. Postural control in the frontal plane may deteriorate faster and earlier with increasing age, compared to that in the sagittal plane (anteroposterior direction). Fifteen young (20–30 years old) and 15 older (>65 years old) healthy participants were recruited to investigate age-related differences in postural control during the normal and narrow-based walking when performed under suboptimal vestibular and lower limb somatosensory conditions achieved by galvanic stimulation and compliant surfaces, respectively. Gait speed decreased in the narrow-based walking condition, with larger decrease in the elderly (by 6%). In the elderly head roll increased with perturbed

vestibular information in impaired somatosensory condition (by 40.70%). In both age groups trunk roll increased under impaired somatosensation in the narrow-based walking condition (by 43.62%) but not in normal walking condition. Older participants adopted a more cautious strategy characterized by lower walking speed when walking on a narrow base and exhibited deteriorated integrative ability of the CNS for head control. Accurate lower limb somatosensation may play a critical role in narrow-based walking.

Keywords:

gait | head control | trunk control | step characteristics | sensory integration

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