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[AAR](#) > Vol.1 No.3, November 2012



Evaluating the effects of open/closed eyes and age-related differences on center of foot pressure sway during stepping at a set tempo

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ABSTRACT

This study aimed to examine the effects of open/ closed eyes and age difference on Center of Foot Pressure (COP) sway during stepping. The subjects were 87 healthy males aged 10 - 80 years. COP was measured 20 times when subjects stepped on two force plates (left and right) at a rate of 60 steps/min. The evaluation parameters selected were: total trace length, velocity, circumference, rectangular area, left-right width, and front-back width. The former four of these parameters were found to be significantly lower with eyes open than eyes closed in 80-year-old subjects, while the last parameter was significantly lower with eyes open in 10-year-old subjects. In 70- and 80-year-old subjects with eyes open, circumference was greater than that in 10- and 40 - 60-year-old subjects; their rectangular area was greater than that in 50- and 60-year-old subjects; and, their front-back width was greater than that in 10- and 30 - 60-year-old subjects. With eyes closed, circumference, rectangular area, left-right width, and front-back width in 80-year- old subjects, were greater than those in 10 - 70- year-old subjects. The front-back width during stepping with eyes closed was greater in 70- and 80-year-old subjects than in 30 - 50-year-old subjects. The Romberg quotient for all COP sway parameters revealed no significant age-related differences. From our findings, a difference in body sway was observed in 80-year-old subjects (with eyes open/closed) when compared with the other age groups. In addition, the extent of sway varied little among <60-year-old subjects. However, COP sway was greater with eyes open in 70- and 80-year-old subjects compared with <60- year-old subjects, and greater with eyes closed in 80-year-old subjects compared with <70- year-old subjects. In conclusion, >80 year-old- subjects have greater body sway during stepping, particularly with eyes closed.

KEYWORDS

Elderly; Dynamic Balance; Tempo; Stepping; Center of Foot Pressure (COP)

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