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Foot muscle morphology is related to center of pressure sway and control mechanisms during single-leg standing

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Conflict of Interest Statement

The authors declare that there are no known conflicts of interest related to this project that could have influenced this manuscript.

Highlights:

- 1. Larger abductor hallucis is related to smaller COP sway.
- 2. Abductor hallucis affects open-loop and closed-loop control mechanisms.
- 3. Larger peroneus muscles are related to larger COP sway.
- 4. Training intrinsic foot muscles may benefit balance.

Abstract:

Maintaining balance is vitally important in everyday life. Investigating the effects of individual foot muscle morphology on balance may provide insights into neuromuscular balance control mechanisms. This study aimed to examine the correlation between the morphology of foot muscles and balance performance during single-leg standing. Twenty-eight recreational runners were recruited in this study. An ultrasound device was used to measure the thickness and cross-sectional area of three intrinsic foot muscles (abductor hallucis, flexor digitorum brevis and quadratus plantae) and peroneus muscles. Participants were required to perform 30 seconds of single-leg standing for three trials on a force plate, which was used to record the center of pressure (COP). The standard deviation of the amplitude and ellipse area of the COP were calculated. In addition, stabilogram diffusion analysis (SDA) was

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