Daily activity in minimal footwear increases foot strength

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Introduction

Nearly one-third of older people experience at least one fall a year (Todd & Skelton, 2004) impacting their quality of life. Increasing intrinsic foot muscle strength can influence balance and stability, and reduce fall risk in older people (Spink et al., 2011). Therefore, increasing intrinsic foot muscle strength would be beneficial, and one way could be footwear.

Foot strength can be increased by exercising in minimal footwear for healthy adults (Goldmann, Potthast, & Brüggemann, 2013; Miller, Whitcome, Lieberman, Norton, & Dyer, 2014). However, exercising in minimal footwear can also lead to injury if done excessively (Ridge et al., 2013). Walking in minimal footwear during daily activities has a much lower injury risk and is likely to increase foot strength as well. Yet, the influence of using minimal footwear for daily activities on foot strength for healthy adults is unknown.

Purpose of the study

To investigate the influence daily activity in minimal footwear has on foot strength in healthy adults after a 6-month period.

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Measurements of TFS were recorded using a custom-made dynamometer (knee and ankle angle at 90°, and toes at 25° dorsiflexion; Figure 1), at the beginning and end of the 6-month period.

Intervention participants were given Vivobarefoot Stealth II minimal shoes and were instructed to wear them at least 70% of the time when shod, for at least 6 days per week. Control participants were instructed to wear their most frequently worn regular footwear to the same minimum requirements. Both groups filled out weekly activity logs to monitor progress.

Change in TFS was calculated as the percentage change in post-intervention TFS compared to the baseline. One-way t-tests compared to 0% change were used as the statistical analysis.

Results
Results show no significant change in TFS for the control group (4.6±34.2%, \( p = 0.517 \)) and significant change in TFS for the intervention group (58.7±69.8%, \( p < 0.001 \); Figure 2).

Discussion and conclusion
TFS is significantly increased in the intervention group. This strongly suggests that daily activity in minimal footwear increases intrinsic foot muscle strength for healthy adults. Building up foot strength as a healthy adult will lead to greater foot strength in the later stages of life, likely reducing the fall risk.

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