

INTRODUCTION

The ability to maintain one's center of gravity (COG) within the base of support (BOS) is defined as postural stability and crucial when performing activities of daily living (ADLs) that require leaning or weight-shifts¹. The limits of stability (LOS) test assess spatial and temporal measures of postural control which includes intentional movements of leaning and weight-shifts in various directions, maximizing excursions without losing balance and falling. The fear of falling, limits ADLs due to constraints in LOS. Compression socks are used in both clinical and athletic populations to increase postural stability, by aiding in somatosensory-proprioceptive feedback². The purpose of the study was to assess the impact of two types of compression socks [sub-clinical (SC): <20mmHg and clinical (CL): 20-40mmHg] compared against barefoot (BF) on LOS.

METHODS

Twenty male and female young adults [age: 21.5 ± 2 years; height: 169.6 ± 9.2cm; weight: 72.1 ± 16.5kg] completed the LOS test on a BTrackS™ balance platform that involved standing and leaning/performing weight shifts in four directions [front left (FL), back left (BL), back right (BR), and front right (FR)], in BF, SC, and CL, in a counter-balanced order. The center of pressure (COP) area (cm²) was used as an outcome measure of LOS, with greater area indicating better LOS and postural control. A 3 (BF, SC, CL) × 4 (EO, EC, EOF, ECF) repeated measures ANOVA was used to assess COP area at an alpha level of 0.05 using JASP open-source statistical program.



Left: Participant performing the LOS test on the BTrackS balance platform. Right: COP representation of participant during the LOS test in the four directions.

METHODS

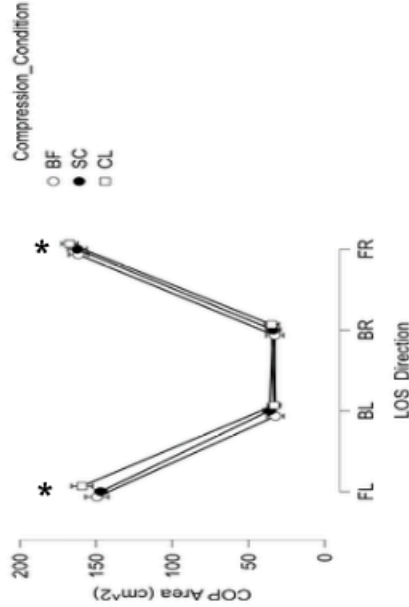


Figure 1. Center of Pressure (COP) area (cm²) during the limits of study (LOS) test in four directions; Front Left (FL), Back Left (BL), Back Right (BR), and Front Right (FR) in three compression conditions: Barefoot (BF), Sub-Clinical Compression Sock (SC) and Clinical Compression Sock (CL). * represent significant differences and bars represent standard errors.

RESULTS

Results revealed significant differences between LOS directions (p < 0.001), with FL and FR demonstrating significantly greater COP area compared to BL and BR (p < 0.001). However, no significant differences were evident between compression socks among LOS directions (p > 0.05). When all LOS directions were combined, although not statistically significant, both SC and CL, demonstrated greater COP area compared to BF.

DISCUSSION

Limits of stability test has been successfully used to identify fall risk in fall prone individuals and aid to differentiate fallers from non-fallers³. Findings from the current study add to the body of literature on LOS and postural control. The anterior (forward) directions of FL and FR demonstrated significantly greater COP area, supporting the inverted pendulum model for postural control. However, the lack of significant differences in compression sock type in each individual direction of the LOS test, suggest that compression socks do not impact the LOS in postural control. However, when all directions of LOS were combined, although not statistically significant, greater COP area in LOS was evident in SC and CL, compared to BF, suggesting that even though SC and CL did not significantly change LOS, benefits of improving LOS exist with both SC and CL compression socks.

CONCLUSION

While several therapeutic benefits have been reported with compression socks, the current findings suggest that in a healthy young population, they do not significantly contribute to an increase in LOS in postural control. LOS in the anterior directions (FL and FR) are greater in comparison to posterior LOS (BL and BR), further supporting previous literature. Finally, some benefits of both SC and CL compression sock may exist in postural control during LOS, given the differences in COP area when all directions of the LOS test were combined. Future research should investigate different neurological and musculoskeletal clinical populations.

REFERENCES

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