THE IMPACT OF SUB-CLINICAL AND CLINICAL COMPRESSION SOCKS DURING THE MODIFIED CLINICAL TEST OF SENSORY INTEGRATION OF BALANCE

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INTRODUCTION

The sensory information needed to maintain stability, is acquired from visual, vestibular and somatosensory/proprioceptive systems and alterations to these systems can affects one's postural control and increase fall risk[1]. Compression socks are used in both clinical and athletic populations to increase postural stability, by aiding in somatosensory-proprioceptive feedback[2]. 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) during four standing balance testing conditions of the modified clinical test of sensory integration of balance (mCTSIB) [standard eyes open (EO), proprioceptive eyes closed (EC), visual eyes open unstable foam surface (EOF) and vestibular eyes closed unstable foam surface (ECF)].

METHODS

Twenty male and female young adults [age: 21.5 ± 2 years; height: 169.6 ± 9.2cm; weight: 72.1 ± 16.5kg] completed the mCTSIB on a BTrackS™ balance platform, in BF, SC, and CL, in a counter-balanced order. The center of pressure (COP) path length (cm) was used as an outcome measure of postural stability, with greater path lengths indicating worse postural stability. A 3 (BF, SC, CL) x 4 (EO, EC, EOF, ECF) repeated measures ANOVA was used to assess COP path length at an alpha level of 0.05 using JASP open-source statistical program.

Left: Sub-Clinical (<20 mmHg) and Clinical (20-40 mmHg) Compression Socks. Right: Participant tested on the BTrackS balance platform in barefoot condition of the mCTSIB.

RESULTS

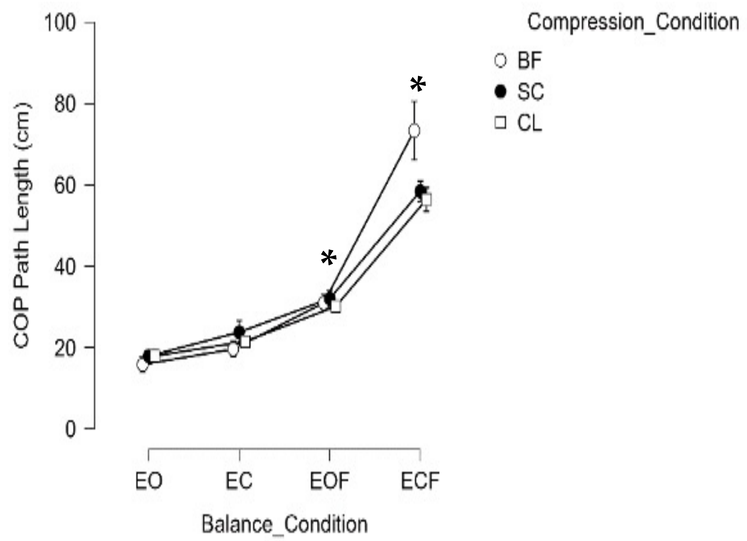

Figure 1: Center of Pressure (COP) path length (cm) during the modified clinical test of sensory integration of balance (mCTSIB) conditions: Eyes Open (EO), Eyes Closed (EC), Eyes Open Foam (EOF) and Eyes Closed Foam (ECF) in three compression conditions: Barefoot (BF), Sub-Clinical Compression Sock (SC) and Clinical Compression Sock (CL). * represent significant differences and bars represent standard errors.

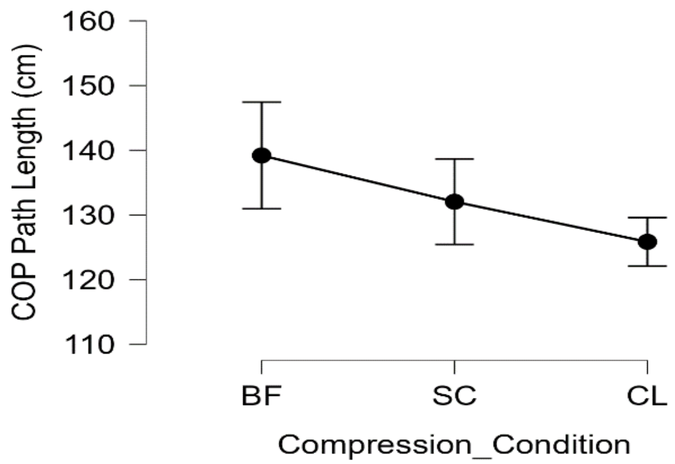

Figure 2: Center of Pressure (COP) composite path length (cm) of all four conditions of the modified clinical test of sensory integration of balance (mCTSIB) conditions: Eyes Open (EO), Eyes Closed (EC), Eyes Open Foam (EOF) and Eyes Closed Foam (ECF) in three compression conditions: Barefoot (BF), Sub-Clinical Compression Sock (SC) and Clinical Compression Sock (CL). Bars represent standard errors.

RESULTS

Results revealed significant differences between mCTSIB conditions ($p < 0.001$) with significantly greater COP path length for ECF compared to EO ($p < 0.001$), EC ($p < 0.001$), and EOF ($p < 0.001$); significantly greater COP path length for EOF compared to EO ($p < 0.001$), and EC ($p = 0.016$). However, no significant differences were evident between compression socks during mCTSIB conditions.

DISCUSSION

Findings from the study supported previous literature that balance testing conditions in which sensory information is missing and/or altered, resulted in decreased postural stability[3]. Regardless of the compression sock type, COP path length was significantly higher in ECF and EOF conditions, suggesting that postural stability is worse when both vision and somatosensory-proprioceptive systems are altered or compromised. While no statistically significant differences were evident between compression socks, when analysed with all mCTSIB conditions combined, SC and CL presented with better postural stability compared to BF, suggesting that among young healthy, trends of better postural stability exist with both SC and CL compression socks. Although there were not remarkable differences in stability between the SC and CL compression socks in a healthy population, there is a likely chance there would be more difference in an unhealthy population. Due to COVID 19, unhealthy participants were not used in order to protect their health status with future research warranted on clinical population.

CONCLUSION

Both SC and CL compression socks show massive improvements in stability compared to being barefoot. The difference between the stability of the SC and CL compression socks was small, but the CL compression socks were slightly more stable. Further studies should incorporate using nonhealthy participants to examine the possibility of greater differences in the stability of the SC and CL compression socks.

REFERENCES

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