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Comparison Between Compression Socks and Normal Socks on Comfort Level and Sports Performance Among Sport Practitioners

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I. Introduction

The use of compression socks has become popular among sports enthusiasts and athletes because of the assumption that they may improve athletic performance and comfort during physical exercise. These garments apply graduated pressure to the lower legs, which may theoretically enhance blood circulation, reduce muscle vibration, and support proprioception. However, scientific evidence supporting these claims remains inconclusive and inconsistent. This uncertainty is further complicated by the fact that most published research has been conducted in temperate regions. Less is known about the use of compression socks in tropical environments such as Malaysia, where ambient temperature and humidity may influence both comfort and performance outcomes.

II. Methods

A randomised crossover experimental design was employed, allowing each participant to serve as their own control and thereby minimizing inter-individual variability. Nineteen physically active university students (n=19) aged between 21 and 25 years were recruited for the study. All participants met the inclusion criteria of running at least three times per week and being free from cardiovascular disease symptoms, as confirmed by the Physical Activity Readiness Questionnaire (PAR-Q).

The six-week experimental procedure was systematically structured into distinct phases. Following recruitment and baseline testing, participants underwent two intervention phases: wearing Decathlon KIPRUN 900 compression socks (providing 20-25 mmHg graduated compression) and wearing Decathlon RUN900 Mid normal running socks. A one-week washout period was implemented between phases to eliminate potential carry-over effects. During each phase, participants completed the Multistage Fitness Test (Bleep Test) three times per week to assess aerobic performance, followed immediately by a comfort level questionnaire adapted from previous studies, which measured thermal comfort, tactile comfort, and fit comfort using a Likert scale.

Data were analysed using Jamovi statistical software. Descriptive statistics summarised demographic characteristics and performance outcomes, while paired sample t-tests were employed to determine significant differences between sock conditions for both performance and comfort variables.

III. Results and Discussion

A total of 19 physically active university students aged between 21 and 25 years participated in this randomised crossover study. All participants completed both experimental conditions: wearing compression socks and wearing normal socks during the Multistage Fitness Test (Bleep Test). Descriptive statistics were computed for both performance and comfort level outcomes under each condition.

Table I
Descriptive Statistics for Beep Test Performance

Variable	*M*	SD	n
Normal Socks	5.3	0.922	19
Compression Socks	5.99	0.909	

The descriptive statistics indicated that participants recorded a higher mean Bleep Test score when wearing compression socks (M = 5.99, SD = 0.909) than when wearing normal socks (M = 5.30, SD = 0.922). Conversely, comfort ratings were slightly higher for normal socks (M = 3.69, SD = 0.477) than for compression socks (M = 3.54, SD = 0.545), suggesting that normal socks were perceived as slightly more comfortable during exercise.

A paired-samples t-test was conducted to determine whether the observed difference in Bleep Test performance between sock conditions was statistically significant. The results showed that compression socks produced higher performance scores, but the difference was not statistically significant, t (18) = -1.92, p =.071. The normality test for the difference scores was non-significant (W = 0.934, p =.201), indicating that the assumption of normality was not violated and that a parametric test was appropriate. A second paired-samples t-test was conducted to compare self-reported comfort levels between the two sock conditions. The analysis showed no statistically significant difference in comfort ratings, t (18) = 1.44, p =.167, indicating that perceived comfort did not differ significantly

between compression and normal socks. Normality was again met (Shapiro–Wilk $W = 0.965$, $p = .662$). Notably, compression socks showed greater variability in comfort scores ($SD = 0.545$) and a lower minimum rating, suggesting that although average ratings were comparable, some participants experienced greater discomfort when wearing compression socks.

This study compared compression socks and normal socks in terms of comfort level and sports performance among university sport practitioners in Malaysia's tropical climate. The findings showed no statistically significant differences between the two sock types for either dependent variable. The performance results are consistent with the inconclusive evidence in the literature. Although participants achieved a higher mean Bleep Test score when wearing compression socks ($M = 5.99$) than when wearing normal socks ($M = 5.30$), the difference was not statistically significant ($p = .071$). This near-significant result may indicate a possible performance effect of compression socks, which might be detected with a larger sample. This interpretation is partly consistent with past study who reported improved running performance when wearing compression socks.

The comfort findings provide important tropical-specific insight. The absence of a significant difference between sock types ($p = .167$), together with the slightly lower mean comfort rating for compression socks, suggests that compression sportswear in a tropical climate may create a warmer and more humid microclimate, contributing to thermal discomfort. The comfort ratings for compression socks were also more variable ($SD = 0.545$) than those for normal socks ($SD = 0.477$), indicating individual differences in response to compression. These findings may be interpreted using the climate mediation perspective suggested by [4] In Malaysia's thermal environment, the thermal penalty of compression garments may offset any potential biomechanical or circulatory benefit, which may explain why the performance effect was not statistically significant and why comfort ratings favoured normal socks.

Several limitations should be considered. The sample size of 19 participants was statistically acceptable but relatively small, which may have limited the ability to detect small effect sizes. Although the Bleep Test is a validated field test, it may not fully represent sport-specific performance outcomes. In addition, the subjective measurement of comfort may introduce response bias.

IV. Conclusions

Overall, this study found no statistically significant difference in comfort or performance between compression socks and normal socks among university athletes. Although compression socks produced slightly higher performance scores, the difference was not statistically significant. Comfort levels also did not differ significantly between sock types, and no relationship was observed between performance and comfort. These findings suggest that compression and normal socks do not substantially influence comfort or performance among active young adults in Malaysia's tropical environment. Therefore, the choice between compression and normal socks may be based on personal preference rather than expected improvements in comfort or performance.

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