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Physiological Effects of Standing Work on Edema and Muscle Fatigue: A Field Study Using Compression Socks

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Abstract: The purpose of this research is to evaluate the effects of prolonged standing work on muscle fatigue and vascular outcomes when using two types of compressions socks (15-20mmHg and 20-30mmHG). Jobs where people need to maintain a prolonged standing position during the workday, such as: guards, salespeople, and retail services, are very common. People that work in these positions are prone to develop musculoskeletal disorders (MSDs) such as: back pain (lower and upper back), knee problems, plantar fasciitis, varicose veins, and leg swelling. There is little research, in particular field studies, regarding effective interventions methods to attenuate the effects of prolonged standing on physiological outcomes. For the study, quantitative and qualitative methods will be used to evaluate the effectiveness of compression socks. The qualitative method that will be used is a modified Nordic questionnaire which evaluates the pain that people have in nine different body areas; and the quantitative methods include: electromyography, muscle twitch force through electrical stimulation, and water-plethysmography volumetric change in the lower leg (edema). In addition, standing time will be tracked with inertial measurement unit sensors. To present the potential benefits of the proposed solution in the activity evaluated, the measurements will be taken before and after the use of the compression socks. Finally, it is expected to find which level of compression gives better results enabling the accurate suggestion of using these to reduce prolonged standing effects and potential musculoskeletal and vascular problems.

Keywords: Prolonged standing work, muscle fatigue, compression socks, EMG, leg edema

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