THE EFFECT OF COMPRESSION GARMENTS ON WEARERS USING BIOSENSORS

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Abstract

Introduction: Wearable sensors, especially biosensors, are playing an important role in healthcare, security, environmental monitoring domains and fitness [6]. Many researchers have demonstrated the benefit of compression garments in sports performance [1, 5]. However, there is insufficient evidence to support the reasons for this improved performance [4]. This paper aims to determine the effects of whole body compression garments (whole body-CGs) on cardiovascular function of human subjects using biosensors. Methods: Eight non-athletes (age: 25.1±3.8 years, height: 165.9±8.3 cm; weight: 61.4±13.7 kg), including five men and three women, volunteered for three random sessions. Undersize-compression garments (undersize-CGs), correct size compression garments (correct size-CGs) and a control garment (non-CGs) respectively were used in these sessions. A running test was conducted starting at 6-km.h⁻¹ and increasing by 1-km.h⁻¹ per two minutes on a treadmill. ECG signals were monitored using Lead II-position during the test. Subjects paused for 90 seconds after each designated speed for data collection. Each session was performed on a separate day. The trial has been approved by the University of Technology Sydney Human Ethics Committee. ECG signals were analyzed to determine the statistically significant difference using t-test in Matlab (p<0.05). Results: Compared to the non-CGs case, the correct size-CGs demonstrated a statistically significantly lower heart rate (HR) when reaching the speed of 7 km.h⁻¹ and above until 11 km.h⁻¹ (p<0.05). Compared with non-CG, in the group using undersize-CGs, there was significantly longer QTc at 10-km.h⁻¹ and 11-km.h⁻¹ (p<0.05). Conclusion: This study indicated that whole body-CGs had affected the cardiovascular function of non-athletes. As undersize-CGs may cause adverse effects due to longer QTc [3], correct size-CGs have a positive effect relating to lower HR [2]. Correct size compression garments should be recommended as a practical tool for improving performance in sports.

References


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