

Concurrent Validity of Heart Rate Measures Using a Wrist Worn Activity Tracker During Treadmill Walking

Anas A. Shargawi,*¹ Khaled A. Hafez¹

Faculty: Heidi A. VanRavenhorst-Bell,^{2,3} Ryan Z. Amick^{2,3}

¹*Department of Industrial and Manufacturing Engineering, College of Engineering*

²*Department of Biomedical Engineering, College of Engineering*

³*Department of Human Performance Studies, College of Education*

Introduction: Wearable technology devices are becoming increasingly popular. Many of these devices offer features allowing users to monitor health related biometric information. One biometric variable commonly measured is heart rate (HR). However, different types of wearable devices may use different technologies to measure HR. Therefore, it is important for end-users to be informed and understand if these devices report accurate information.

Purpose: The purpose of this study was to determine the concurrent validity of HR measures using the IP65 activity monitor compared to a validated HR monitor.

Method: Eighteen subjects (25.2±3.8 years) volunteered to participate in this study. After collecting subject anthropometric data (height, weight), each subject was fitted with a validated HR monitor (Polar T31) and the IP65 activity monitor. Subjects then completed a 5-minute warm-up on the treadmill, walking at a self-selected pace. For the testing protocol, subjects were instructed to walk on the treadmill at a self-selected moderate pace for 5-minutes. HR data from both devices were sampled at 12Hz during the final 3-minutes of the protocol.

Results: Mean HR recorded from the IP65 activity monitor and Polar T31 was 97.6±11.92 and 105.3±9.16, respectively. Pearson correlation coefficient indicates that there was no statistically significant correlation between the IP65 activity monitor and the validated Polar T31 HR Monitor ($p = 0.279$), $r = -0.05$.

Conclusion: The IP65 activity tracker does not demonstrate concurrent validity when compared to a validated HR monitor. Such findings warrant continued investigation of each biometric variable provided by the IP65 and other wearable devices.