

Difference in Heart Rate Readings Between Wrist- and Chest-Worn Heart Rate Monitors

VANIA Y. GONZALEZ, ZACKARIA MUNOZ, & JOHN D. SMITH

Health and Human Performance Laboratory; Department of Counseling Health and Kinesiology; Texas A&M University-San Antonio; San Antonio, TX

Category: Undergraduate

Advisor / Mentor: Smith, John (jsmith@tamusa.edu)

ABSTRACT

Wrist-worn heart rate measurement on fitness trackers, activity watches, and smartwatches are relatively new and accuracy verification of these monitors is needed. Polar chest strap monitors, which have been validated for accuracy (Gillinov et al., 2017; Pasadyn et al., 2019), were used as the criterion to establish the validity of the wrist-worn device. **PURPOSE:** The purpose of this study was to determine the difference between a Garmin wrist-worn heart rate monitor and a Polar chest-worn heart rate monitor. **METHODS:** The session included measurement of age, height, body weight, and four 5-minute exercise sessions, one each while walking on a treadmill, jogging on a treadmill, on a stationary bike, and on a stationary arm ergometer. Data was analyzed with IBM SPSS v27 (Chicago IL). Repeated Measures ANOVA were used to determine significant differences between sessions for each condition. Alpha was set to .05 for all tests. **RESULTS:** Average heart rates on the stationary bike were significantly lower on the right (105 ± 23 b/min) and left (106 ± 26 b/min) wrist compared to the chest (127 ± 23 b/min), $F_{(2, 25)} = 15.4, p = .001$. There were no significant difference in wrist and chest average heart rates between walking, jogging, and the arm ergometer. There was a significant difference when measuring maximal heart rate during walking, $F_{(2, 14)} = 6.63, p = .009$, with left wrist (139 ± 7 b/min) significantly lower than chest (128 ± 17 b/min). No significant differences in wrist and chest maximal heart rates during jogging, stationary bike, and arm ergometer were evident. **CONCLUSION:** The significant difference between wrist-worn heart rate monitors while doing exercise may be activity dependent. It seems wrist-worn watches, when checking the heart rate, were fairly reliable depending on the exercise. Wrist-worn heart rate monitors should be improved in the future to have a more accurate reading of heart rates on individuals.