

The Validity of Bicep Located Heart Rate Monitors During Running

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ABSTRACT

Running is a popular sport with 621 million people participating worldwide. Heart rate (HR) is a way to determine intensity but many people do not want to wear a HR strap around their chest because it is uncomfortable and can cause chaffing. An alternative location for determining HR could be the biceps but the validity of such devices need to be determined. **PURPOSE:** To determine the validity of the Polar OH 1 and Polar Verity biceps devices during self-paced running. **METHODS:** Wearing Polar OH1, Polar Verity, and Polar H10 (criterion) 5 female and 5 male participants were asked to perform running for 5 minutes up and down a 100 ft hallway. The average HR and maximal HR over the run was recorded in beats per minute (bpm). Validity was determined using mean absolute percent error (MAPE) and Lin's concordance (CCC), with a threshold of less than 10% and greater than 0.70 respectively. The threshold for both was required to be met to be considered valid. **RESULTS:** Average HR returned from the devices was: Polar H10 = 154.6 (16.3) [mean (standard deviation)], Polar OH1 = 152.0 (16.2), and Polar Verity = 151.1 (16.5) bpm. The average HR MAPE for the Polar OH1 and the Polar Verity was 12.2% and 12.6%, respectively, and the CCC for each device was 0.94 and 0.90. Maximal HR returned from the devices was: Polar H10 = 174.2 (18.1), Polar OH1 = 171.8 (18.8), and Polar Verity = 167.2 (35.1) bpm. The maximal HR MAPE for the Polar OH1 and the Polar Verity was 1.3% and 4.2%, respectively. The CCC for each device was 0.93 and 0.43, respectively. **CONCLUSION:** We evaluated whether HR monitors located on the biceps could return accurate measures. Neither device met both thresholds when average HR was considered. Because the Polar OH 1 satisfied both thresholds for maximal HR, we conclude it to be the more accurate device for use during running. These results should be used with caution until further improvements in biceps located devices can be made to return valid measures for both average and maximal heart rate.