

A Comparison of the Accuracy of Two Pulse Oximeter Technologies During Ambulation With a Wheeled Walker: a Pilot Study. Duncan, RP, Aufdenberg CR, Rakers NM, Silver AM. Maryville University of St. Louis. rduncan@maryville.edu

STUDY DESIGN: A concurrent validity study. **OBJECTIVE:** To investigate which pulse oximeter technology and body location will provide the most accurate reading of heart rate while ambulating with a wheeled walker. **BACKGROUND:** Research suggests that motion and body location have a significant influence on the accuracy of heart rate readings from a pulse oximeter. Motion sensitive technology has been integrated into pulse oximetry devices to improve accuracy of readings; however, research has not examined the use of pulse oximeters with ear and finger sensors while ambulating with a wheeled walker. Therefore, this study will provide clinicians with knowledge as to which pulse oximeter technology and which body location provides a more valid reading of heart rate when ambulating with a wheeled walker. We hypothesize the motion sensitive technology on the ear will provide more valid readings. **METHODS AND MEASURES:** Thirty-four able-bodied subjects (mean age \pm SD, 20.68 ± 0.61) were collected from a sample of convenience at Maryville University. Subjects ambulated with a wheeled walker for two trials of 40 feet. Heart rate readings were collected at specified distances at 10, 20, and 30 feet from the ear and finger sensors specific to each pulse oximeter. These readings were compared to the heart rate readings from the ECG. Data collected from the pulse oximeters greater than 10 bpm different from the ECG were defined as false readings. A repeated measures ANOVA was used to determine if there was a significant difference between the heart rates. A post hoc analysis was completed after there was a significant difference noted between heart rates. **RESULTS:** The data showed a significant difference between instruments ($p < .0001$). The post hoc analysis revealed a difference between the ECG and the standard pulse oximeter ($p < .0001$). The results revealed no main effect regarding location of the pulse oximeter ($p = .075$), however, the trend was toward using the ear sensor over the finger sensor. The motion sensitive pulse oximeter on the ear revealed the least amount of false readings (14.7 percent) while the standard pulse oximeter on the ear had the most (32.4 percent). **CONCLUSION:** Accurate readings are needed to provide safe, effective management of patients during activity. The results showed that the motion sensitive technology on the ear performed better than the standard pulse oximeter as it provided fewer false readings. However, clinicians must consider the possibility of instrument error, especially with motion. Although this study showed the motion sensitive device performed best, ultimately, clinicians should not solely rely on pulse oximeter readings during ambulation but should observe patients for signs of a compromised cardiovascular system during ambulation.