Evaluation of Caloric Expenditure Metrics of Garmin Instinct Wearable Technology Devices During Pickleball

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ABSTRACT
While tennis and badminton may present a moderate learning curve for beginners, pickleball, a similar racquet sport that has become increasingly popular in recent years, offers a notably simpler play-style that can be more easily adapted for new players. This sport has emerged during a time when wearable technology devices, such as the Garmin Instinct, have become commonly used to estimate physiological measures among individuals engaging in physical activity. Yet, there is little research that examines the validity and reliability of this technology during pickleball. **PURPOSE**: The purpose of this study was to assess the reliability and validity of caloric expenditure estimates generated by Garmin Instinct devices during pickleball. **METHODS**: Eleven participants (2 females, 8 males, and 1 prefer not to disclose) with an average age of 28.1 ± 9.2 years, average height of 176 ± 8.0 cm, and average mass of 73 ± 13.4 kg consented and were selected for this study through convenience sampling. Participants were equipped with two Garmin Instinct devices on their right wrists. A COSMED K5 wearable metabolic system was secured to their backs and provided the criterion measure. Participants played pickleball for a total of 10 minutes and switched hands after 5 minutes of play. The starting hand was counterbalanced. Total Kcals were measured during each trial. Data were analyzed for validity (Lin's Concordance [CCC] and Mean Absolute Percent Error [MAPE]) and reliability (Coefficient of Variation [CV]). Predetermined thresholds were: MAPE<5%, CCC>0.90, CV<5%. **RESULTS:** The Garmin Instinct did not meet the threshold for either validity test (CCC=0.375, MAPE=31.08%). The Garmin Instinct did not meet the threshold for the reliability test (CV=12.90%).**CONCLUSION:** These results suggest that the Garmin Instinct is not valid nor reliable for measuring caloric expenditure during pickleball. Caloric metrics were statistically different between the two devices and between the devices and the K5. Players cannot be confident that the Garmin Instinct provides an accurate measure of caloric expenditure during pickleball.