

Validity and Reliability of the Garmin Instinct in Measuring Heart Rate during Pickleball

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ABSTRACT

Playing a racquet sport called pickleball is increasing in popularity every day in the United States. Garmin is a popular brand that manufactures wearable fitness trackers capable of measuring heart rate (HR). Because HR is a common way to determine exercise intensity, the validity and reliability of wearables to provide accurate HR during pickleball is important. **PURPOSE:** This study aimed to analyze and assess the validity and reliability of HR from the Garmin Instinct vs. Polar H10 (criterion) during pickleball. **METHODS:** Eleven adults (2 female, 8 male, 1 prefer not to disclose; age = 28.1 ± 9.2 years; height = 176.0 ± 8.0 cm; mass = 73.2 ± 13.4 kg) were recruited to participate via convenience sampling. Participants were asked to play alternating intervals of five minutes of pickleball interspersed with five minutes of rest while wearing two Garmin Instinct watches on the same wrist and a Polar H10 chest strap. Outcome measures were average and maximum HR, recorded in beats per minute (bpm). Mean Absolute Percent Error (MAPE) and Lin's Concordance Correlation Coefficient (CCC) were used to assess validity; $MAPE \leq 5\%$ and $CCC \geq 0.90$. Coefficient of Variation (CV) were used to assess reliability; $CV \leq 10\%$ and $ICC \geq 0.70$. **RESULTS:** The Garmin Instinct did not meet the CCC threshold for validity of average or maximum HR but met the thresholds for both reliability tests for average and maximum HR (see Table 1). **CONCLUSION:** These results indicate that, in the present study, the Garmin Instinct was only reliable for measuring average and maximum HR. This is challenging for those who wish to track their HR while playing racquet sports such as pickleball because the Garmin Instinct did not provide accurate average or maximum HR.

Table 1. Average and maximum heart rate measured by the Polar H10 and Garmin Instinct.

Validity	Average			Maximum		
	HR (bpm)	MAPE (%)	CCC	HR (bpm)	MAPE (%)	CCC
Polar H10	134.5(± 19)	-	-	154.5(± 19)	-	-
Garmin Instinct	129.1(± 23)	4.39	0.85	147.3(± 24)	4.45	0.73
Reliability	HR (bpm)	CV (%)	ICC	HR (bpm)	CV (%)	ICC
Garmin Instinct 1	125 (± 26)	6.89	0.89	142 (± 28)	8.42	0.73
Garmin Instinct 2	133 (± 19)			153 (± 19)		