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Concurrent validity of the CORE wearable sensor with BodyCap temperature pill to assess core body temperature during an elite women's field hockey heat training camp

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INTRODUCTION:
Wearable temperature sensors offer the potential to overcome several limitations associated with current laboratory- and field-based methods for core temperature assessment. However, their ability to provide accurate data at elevated core temperatures (Tc) has been recently questioned in a laboratory setting. Therefore, this investigation aimed to determine the concurrent validity of a wearable temperature sensor (CORE) compared to a reference telemetric temperature pill (BodyCAP) in an ecologically valid setting during a team sport heat training camp prior to the 2020 Olympic Games.
METHODS:
Female field hockey players (n=19) in the Australian national squad completed 4 sessions in hot conditions where their temperature was monitored via CORE and BodyCAP. Concurrent validity of the wearable CORE device was determined with reference to the ingested BodyCAP pill. Three bands for temperature error were defined as: low (±0.1°C), moderate (±0.3°C), and high (>0.3°C), based on previously established thresholds.
RESULTS:
Lin's Concordance Correlation Coefficients determined there was 'poor' agreement between devices during all sessions. Mean bias demonstrated that CORE underestimated Tc in all sessions (-0.06°C to -0.34°C), with wide mean 95% confidence intervals (±0.35°C to ±0.56°C). Locally estimated scatterplot smoothing regression lines illustrated a non-linearity of error, with greater underestimation of Tc by the CORE device, as Tc increased. The two devices disagreed by more than ±0.1°C for 78-84% of all data samples in each session, and by ±0.3°C for 41-60% of all data samples in each session.
CONCLUSION:
Our findings do not support the use of the CORE device as a valid alternative to telemetric temperature pills for Tc assessment in elite female team sport athletes, particularly during exercise in hot conditions where elevated Tc are expected.

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