Maximal Heart Rate Varies Across Laboratory, Field Testing, and Competition Among Collegiate Female Hockey Athletes.
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In order to prescribe training intensities based on maximal heart rate (MHR), it is important to determine the potential differences in MHR using a variety of different testing conditions. Systematic differences in MHR across testing and competition conditions are poorly defined.

**Purpose:** To determine if MHR varies between laboratory testing, field testing, practice, games and an age-prediction equation in collegiate female hockey athletes.

**Methods:** MHR was measured in 16 NCAA Division 1 female hockey athletes during a progressive, graded maximal treadmill test (MHR\textsubscript{GXT}), on-ice fitness testing (MHR\textsubscript{FIELD}), one season of practices (MHR\textsubscript{TRAIN}) and games (MHR\textsubscript{MATCH}), and estimated by an age prediction equation (208-0.7 x age; MHR\textsubscript{PRED}). Participants were excluded if they failed to obtain 2 out of 3 criteria during MHR\textsubscript{GXT}: 1) RER ≥ 1.1, 2) plateau in VO2 and 3) attainment of ≥ 90\% of MHR\textsubscript{PRED}. MHR measures were compared across different methods by Kruskall-Wallis tests and Pearson correlation coefficients were determined between the different methods.

**Results:** MHR\textsubscript{GXT} (194.5 ± 6.0bpm) was significantly higher than MHR\textsubscript{FIELD} (192.3 ± 4.9bpm, \(p=0.037\)) and lower than MHR\textsubscript{TRAIN} (200.1 ± 8.3bpm, \(p=0.0018\)) and MHR\textsubscript{MATCH} (201.1 ± 11.0bpm, \(p=0.01\)), but not significantly different from MHR\textsubscript{PRED} (193.8 ± 0.9bpm, \(p=0.64\)). Significant correlations were found between MHR\textsubscript{GXT} and MHR\textsubscript{FIELD} (\(r=0.79, p<0.001\)) but not MHR\textsubscript{TRAIN} (\(r=0.41, p=0.11\)) or MHR\textsubscript{MATCH} (\(r=0.10, p=0.70\)). MHR\textsubscript{PRED} was not correlated with any other methods (\(r=0.15\) to 0.22, \(p>0.05\) for all).

**Conclusion:** Among elite female hockey athletes, MHR\textsubscript{GXT} and MHR\textsubscript{FIELD} were significantly lower than practices and games. This suggests that MHR from competition may overestimate the heart rate that is representative of maximal aerobic capacity. Use of this value as a reference to prescribe training volume could result in unintentionally higher training loads with potentially increased risk of overtraining or injury.