ANALYSIS OF ATHLETE LOAD VIA WEARABLE MICROSENSORS ACROSS A WOMEN'S COLLEGIATE BASKETBALL SEASON

Jennifer B. Fields,[1] Margaret T. Jones,[2] Andrew R. Jagim,[3] Jason White[4]

[1]Department of Nutritional Sciences, University of Connecticut, Storrs, CT
[2]Sport, Recreation, and Tourism Management, George Mason University, Fairfax, VA
[3]Sports Medicine Department, Mayo Clinic Health System, La Crosse, WI, USA
[4]School Of Kinesiology, Counseling & Rehabilitative Sciences, Northern Kentucky University, KY, USA

BACKGROUND

- Wearable microsensor technology enables the quantification of practice and competition-based workloads of athletes
- Limited research exists exploring such workloads in women's collegiate basketball

PURPOSE

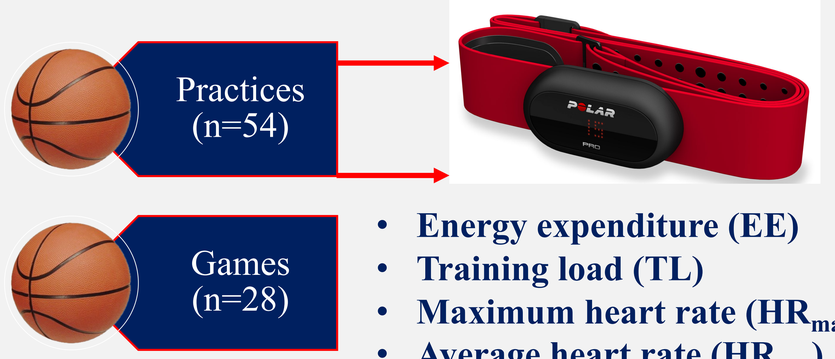
- To investigate workload metrics during practices and games throughout a competitive National Collegiate Athletics Association (NCAA) Division I (D-I) basketball season

METHODS

- NCAA D-I women's basketball athletes (n=15) participated **(Table 1)**.
- High-minute players were classified as those who played ≥15 minutes per game (n=10); others were classified as low-minute players (n=5).
- Separate multivariate analysis of variance (MANOVA) assessed differences in loads between games and practices in high- and low-minute players ($p<0.05$).

Table 1. Descriptive characteristics

Athlete Characteristic (n=15)	Mean ± SD
Age (yrs)	19.0 ± 1.3
Weight (kg)	73.8 ± 6.6
Height (cm)	180.5 ± 6.7



- **Energy expenditure (EE)**
- **Training load (TL)**
- **Maximum heart rate (HR_{max})**
- **Average heart rate (HR_{avg})**

RESULTS

- High-minute players were exposed to higher absolute loads during games ($p<0.01$), likely due to a longer playing duration **(Table 2).**
- Relative intensities (kcal/min and HR_{avg}) were higher in practice for high-minute players ($p<0.001$).
- High-minute players had higher energy expenditures and training loads in practices when compared to low-minute players ($p<0.01$)

Table 2. Load metrics during games and practices in high- and low-minute players

	High Minute (n=10)				Low Minute (n=5)			
	Game (n=189)	Practice (n=420)	P-value	Eta-square	Game (n=163)	Practice (n=381)	P-value	Eta-square
EE (kcal)	1195 ± 295	1124 ± 405	<0.001	0.29	943 ± 381	1013 ± 335	0.03	0.01
EE/min (kcal/min)	8.8 ± 1.6	10.0 ± 2.6	<0.001	0.05	5.2 ± 2.1	9.2 ± 2.5	<0.001	0.36
TL (AU)	249 ± 54	190 ± 71	<0.001	0.14	94 ± 72	161 ± 69	<0.001	0.16
HR_{max} (bpm)	200 ± 13	196 ± 17	0.01	0.01	194 ± 19	198 ± 19	0.03	0.01
HR_{avg} (bpm)	134 ± 9	142 ± 14	<0.001	0.08	113 ± 14	143 ± 16	<0.001	0.45

Partial eta^2 effect sizes were classified as: η2=0.01, small effect; η2=0.06, medium effect; and η2=0.14, large effect.
EE: energy expenditure; TL: training load; HR: heart rate

CONCLUSIONS & PRACTICAL APPLICATION

- An individualized approach to periodization and load management is warranted to improve athlete health, performance, and reduce injury risk throughout a collegiate basketball season for high- and low-minute players.
- It is recommended that high-minute players receive adequate recovery, while low-minute players receive added exposure to game-level intensities to ensure they are maintaining appropriate fitness levels throughout the season for game scenarios.