INDIVIDUAL MONITORING OF DIVISON 1 FEMALE BASKETBALL PLAYERS IN THE COUNTERMOVEMENT REBOUND JUMP ACROSS THE 2023-24 SEASON: USING THE MODEL STATISTIC AND COEFFICIENT OF VARIATION APPROACH

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BACKGROUND

Athlete-monitoring systems measure neuromuscular fatigue over a competitive season to provide insight into the physical demands of practice, competition, travel, and in-season training.

The countermovement jump (CMJ) is a common test to measure neuromuscular status. Recent studies report a viable alternative, the countermovement rebound jump (CMRJ), as a substitute for the CMJ and drop jump tests. CMRJ is attractive to practitioners because it is time efficient, and controlling for drop height in the drop jump test can be challenging. However, there is no research on monitoring CMRJ when assessing neuromuscular fatigue across a season.

PURPOSE This study aimed to monitor weekly lower body neuromuscular fatigue using the CMRJ test in a sample of Division I female basketball players during the 2023–2024 season.

METHODS

Thirteen Division I female basketball players were tested from November to February. Thirteen CMRJ metrics were analyzed for each testing session, and players were tested twice weekly before physical activity (age: 20.8 ± 1.8 yrs., body mass: 72.5 ± 8.1 kg, height: 174.3 ± 8.7 cm). On each testing day, players performed three sets of two jumps for a total of six jumps on a portable force plate platform (Hawkin Dynamics, Westbrook, ME). Baseline testing was conducted at the end of the preseason across two days. A single-subject repeated measures design, using the combined model statistic and coefficient of variation (CV) approach, was used to detect significant decrement (*fatigue*) between the testing days and baseline measures.

The CMRJ is reliable for assessing neuromuscular fatigue throughout a competitive basketball season. Individual analysis provides greater insight into player fatigue compared to team averages.

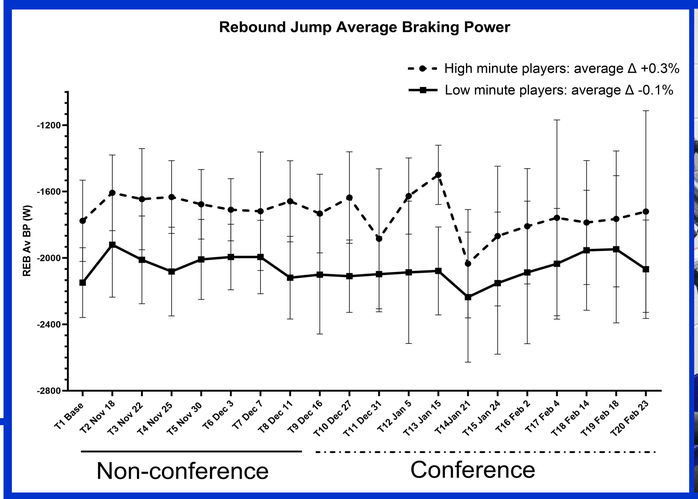
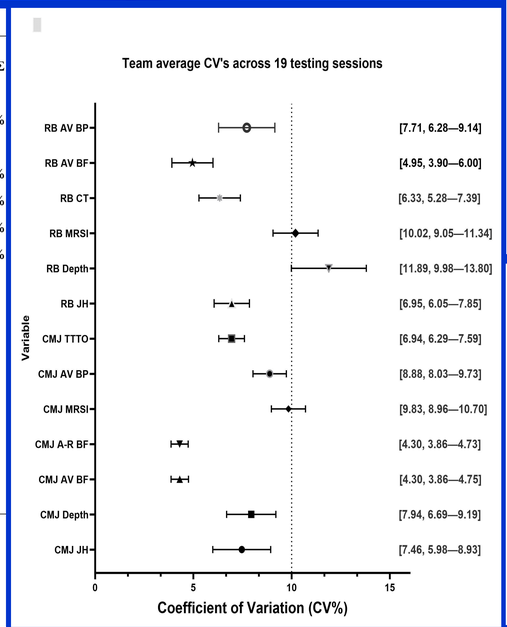


TABLE 4: Total number of fatigues reported across all CMRJ metrics for each player (ordered by min. played from greatest to least).

Variable	P1-G¥	P2-G¥	P3-G¥	P4-FC¥	P5-G	P6-G	P7-G	P8-G	P9-F	P10-F	P11-G	P12-G	P13-G	Tot Ftg Var	% of total Σ
Min played	582	565	547	528	323	297	253	235	146	140	79	78	0		
CMJ JH (m)	10	5	15	0	16	4	1	14	3	6	9	14	4	101	12.3%
CMJ Depth (m)	7	0	8	3	0	2	5	0	0	0	2	1	0	28	3.4%
CMJ Av BF (N)	13	0	18	10	2	8	3	16	5	1	0	8	2	86	10.5%
CMJ A-R BF (%)	13	0	18	11	2	7	3	16	4	0	0	5	7	86	10.5%
CMJ MRSI (m/s)	10	1	17	4	14	5	1	17	3	0	1	10	0	83	10.1%
CMJ Av BP (W)	6	6	17	8	3	6	4	15	8	6	1	15	6	101	12.3%
CMJ TTTO (s)	2	0	12	6	1	1	2	4	0	0	0	1	0	29	3.5%
RB JH (m)	0	4	13	1	13	0	0	12	7	2	2	18	9	81	9.9%
RB Depth (m)	0	0	5	0	0	1	8	1	1	0	0	1	1	18	2.2%
RB MRSI (m/s)	0	0	18	4	2	0	1	14	0	0	0	5	8	52	6.3%
RB CT (s)	1	0	13	7	1	2	11	5	0	0	0	2	2	44	5.4%
RB Av BF (N)	0	2	17	2	2	3	4	13	0	0	0	2	4	49	6.0%
RB Av BP (W)	0	3	16	2	4	2	2	16	0	3	0	6	7	61	7.4%
Tot Ftg Plyr	62	21	187	58	60	41	45	143	31	18	15	88	50	**Σ = 819**	
% of total Σ	7.6%	2.6%	22.8%	7.1%	7.3%	5.0%	5.5%	17.5%	3.8%	2.2%	1.8%	10.7%	6.1%		

Note. P = player number; ¥ = regular starter; Min = minutes; G = guard; F = forward; C = center; Tot Ftg Var = total fatigues by variable; Tot Ftg Plyr = total fatigues by player; CMRJ = countermovement rebound jump; CMJ = countermovement jump; JH = jump height; CMJ Av BF = countermovement jump average braking force; CMJ A-R BF = countermovement jump average relative braking force; MRSI = modified reactive strength index; CMJ Av BP = countermovement jump average braking power; TTTO = time to takeoff; RB = rebound; CT = contact time; RB Av BF = rebound average braking force; RB Av BP = rebound average braking power. m = meters; N = newtons; s = seconds; ms = milliseconds; W = watts.



RESULTS

Fatigue was assessed on 19 occasions throughout the competitive season. A total of 819 fatigues were recorded for all players across each of the CMRJ metrics (Table 4). The metrics that indicated the highest percentages of fatigue were CMJ jump height (JH) (12.3%) and CMJ average braking power (12.3%). Regarding the second jump, rebound JH reported the highest percentage of fatigue (9.9%). On average, each player contributed 7.7 ± 6.2% to total fatigue, with Players 3 and 8 contributing much higher percentages, 22.8% and 17.5%, respectively.

CONCLUSIONS

When using the combined model statistic and CV approach to detect fatigue, CMJ JH, CMJ braking power, and rebound JH were the most sensitive metrics to fatigue throughout the season in Division I female basketball players. Although most players contributed a small percentage to overall fatigue, a select few contributed to a much higher percentage than the entire team. These findings justify the importance of inspecting the data by individual players instead of reporting overall team averages. Coaches who monitor fatigue using CMRJ can use the data to become more informed as to which metrics to monitor when assessing athlete readiness.

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