28th ECSS Anniversary Congress, Paris/France, 4-7 July 2023

CHANGES IN COUNTERMOVEMENT VERTICAL JUMP PERFORMANCE METRICS DURING A PROFESSIONAL MEN'S BASKETBALL GAME

Cabarkapa, D., Philipp, N., Eserhaut, D., Fry, A.

University of Kansas

INTRODUCTION:
While multifaceted in physical performance parameters influencing success, basketball is a sport that is largely dictated by an athlete's ability to efficiently use their stretch-shortening cycle. One of the non-invasive testing modalities used to quantify this neuromuscular phenomenon, as well as identify fatigue and athletes' readiness status, is the countermovement vertical jump (CVJ) performed on a force plate. Thus, the purpose of this study was to examine how some of the most commonly studied CVJ performance metrics respond to on-court competitive demands.
METHODS:
Eight professional male basketball players ($\bar{x}$±SD; hgt=192.7±10.6 cm, wgt=88.9±12.4 kg; age=27.5±2.5 yrs) volunteered to participate in the present study. After arrival at the gym, all participants completed the standardized warm-up protocol consisting of a set of dynamic stretching exercises and 15 min of partner shooting. Upon completion of the warm-up, the baseline (BS) CVJ performance was assessed. Each participant stepped on a portable force plate system (ForceDecks Max, VALD Performance, Brisbane, Australia) sampling at 1000 Hz, and performed three maximum-effort CVJ without arm swing. The participants were instructed to hold their hands on the hips during the entire movement. Also, to minimize the possible influence of fatigue, each jump trial was separated by a 30 sec rest interval. Then, the participants proceeded with a simulated 5x5 basketball game (i.e., 4x10-minute quarters with Elam Ending). By following the identical testing procedures, each participant performed one CVJ post-first (P1Q) and third quarter (P3Q), and three CVJ post-second (P2Q) and fourth quarter (P4Q). Repeated measures analysis of variance with Bonferroni post-hoc adjustment was used to examine statistically significant changes ($p<0.05$) in the following force plate metrics: vertical jump height (VJH; impulse-momentum calculation), modified reactive strength index (RSI-mod; jump height/contraction time), and peak concentric force (PCF).
RESULTS:
No statistically significant differences were observed in VJH [cm] ($F[4,28]=2.947$, $p=0.110$; BS=16.8±2.6, P1Q=17.0±3.0, P2Q=15.3±3.1, P3Q=15.5±3.4, P4Q=15.4±4.1), RSI-mod [m/s] ($F[4,28]=1.347$, $p=0.291$; BS=0.62±0.13, P1Q=0.66±0.12, P2Q=0.58±0.13, P3Q=0.57±0.19, P4Q=0.58±0.20), and PCF [N] ($F[4,28]=1.381$, $p=0.284$; BS=2408.3±412.7, P1Q=2539.0±372.3, P2Q=2441.8±414.6, P3Q=2449.1±400.4, P4Q=2411.6±335.5) across five testing time points.
CONCLUSION:
The findings of the present study indicate that VJH, RSI-mod, and PCF did not exhibit notable changes during a simulated basketball game. Although further research including the amount of internal and external load that the athletes are exposed to is warranted, we can conclude that the aforementioned force plate metrics were either not sensitive enough to detect fatigue-influenced changes in the neuromuscular performance throughout a game span or that the athletes were already adequately trained to properly respond to on-court competitive demands.

Topic: **Training and Testing**

Presentation **Poster**

European Database of Sport Science (EDSS)

Supported by SporTools GmbH

29105