COMPARISON OF TACTICAL TENDENCIES BETWEEN 3X3 AND 5X5 BASKETBALL: ANALYSIS OF MEN'S AND WOMEN'S WORLD CUPS

COUTINHO, T., MACEDO, V., LAMAS, L.

UNIVERSITY OF BRASILIA

INTRODUCTION: Basketball 3x3 was introduced by FIBA in 2010 [1]. Literature of tactics in this sport is limited, requiring investigations on differences to 5x5 basketball to support practice. The space creation dynamics (SCDs) - a set of offensive game action classes for creating space to score [2] - have been used to analyze basketball tactics and may support 3x3 and 5x5 comparisons. This study compared 3x3 and 5x5 basketball, women and men, analyzing the frequency and type of game actions, respective court zones used, and efficiency.

METHODS: Matches of women's (35 matches; 2118 ball possessions) and men's (41; 2316) in the 3x3 World Cup – 2023, women's (8; 1226) and men's (8; 1218) in the 5x5 World Cup – 2023 were assessed. A single researcher collected the data (Cohens Kappa result: > .90 for all variables). The following SCDs were notated: pick, screen, ball dribbled, ball not dribbled, hand-off, post-up, dime-in, spot-up, without ball and isolation. The court was divided in the zones: top (TOP), top of key (TPK), key (K), wing (W), short wing (SW), corner (C), short corner (SC), high post (HP), low post (LP). Efficiency was analyzed in points per possession (ppp). Bayesian methods were used to estimate the mean frequency of the SCDs per ball possession of each compared group (3x3W, 3x3M, 5x5W, 5x5M). Posterior distributions of means were computed from the Markov chain Monte Carlo draws. Statistical significance was considered when posterior probability of the mean difference exceeding 0 was > 0.90. Chi-square test was used to analyze differences in the use of court zones and respective SCD types (alpha = 0.05).

RESULTS: Posterior means of SCDs per ball possession were: 3x3W = 1.85, 3x3M = 1.95, 5x5W = 2.56, and 5x5M = 2.47. 5x5 (W and M) had significantly more SCDs per ball possession than 3x3 (M and W) although it represented less than one SCD per possession. TOP, TPK and W, added, presented proportions between 51% - 63% of all zones used by every group to create space. Significant association was found between zones and groups (p< 0.001): 3x3W - TPK (29.7%); 3x3M: SW (16.3%); 5x5W: K (8.2%); 5x5M: TOP (28.3%). Pick, screen and ball dribbled, added, presented proportions of the total SCDs performed between 57% - 70% for all groups. Significant association was found between groups and SCD types performance (p < 0.001), presented with the respective efficiency (ppp): 3x3W: post-up(12.2%, 0.5 ppp); 3x3M: handoff(17.4%, 0.58); 5x5W: screen(28.2%, 0.6); 5x5M: pick(28.2%, 1.1).

CONCLUSION: Basketball 3x3 and 5x5 had different game actions per possession but with minimal practical impact (less than one action). Worth noting, 3x3 possession time (12") is half of 5x5 (24"). Perimeter was mostly emphasized in both sports besides specific tendencies. Groups' preferred SCDs had small ppp rates.

1. Andrianova (2022) 2. Lamas et al. (2011)

INVESTIGATING LOAD FLUCTUATIONS ACROSS QUARTERS IN MALE PROFESSIONAL BASKETBALL PLAYERS: IMPLICATIONS FOR GAME PERFORMANCE AND STRATEGY OPTIMIZATION

ZHANG, S., LI, M., GU, L., WANG, X.

TSINGHUA UNIVERSITY

INTRODUCTION: Tracking the dynamics of game loads across quarters is crucial for coaches; however, a significant limitation in existing research is the lack of integration between dynamic inter-period changes and positional specificity. While some studies consider player positions, they often fail to account for temporal dynamics across game periods. Conversely, research focusing on inter-period variations typically overlooks the distinction between player positions. Therefore, further investigation to bridge this gap is essential. This study aims to examine between- and within-quarter variations in physical loads during basketball games, exploring their interrelationships and considering the influence of contextual factors on the load profiles experienced by backcourt and frontcourt players.

METHODS: A total of 16 professional male basketball players (8 backcourt, 8 frontcourt) from the Chinese National Basketball League were recruited. External load was assessed using Catapult S7 devices, capturing PlayerLoad and Inertial Movement Analysis (IMA) variables. Internal load was measured using the session rating of perceived exertion (sRPE) method. Opponent quality, match outcome, and scoring margin (contextual factors) were incorporated into the analysis. Data were analyzed using linear mixed-effects models and repeated-measures correlation analyses.

RESULTS: Frontcourt players exhibited more pronounced fluctuations in sRPE (F=3.378; p < 0.05) and IMA changes of direction (COD) left (F=4.409; p < 0.01) from the first quarter to the fourth quarter. In contrast, backcourt players demonstrated more stable between-quarter changes but showed larger within-quarter load variations, including higher IMA jump medium in the first three quarters (p < 0.01), and greater IMA accelerations (ACC) (p < 0.05) and decelerations (DEC) (p < 0.01) in the second and fourth quarters compared to frontcourt players. Medium to large (r = 0.41–0.62) correlations were observed between sRPE and PlayerLoad as well as total jumps across quarters for backcourt players. For frontcourt players, sRPE showed medium to large correlations (r = 0.45–0.72) with PlayerLoad, IMA COD, and IMA high jumps across quarters. Backcourt players reported higher sRPE during winning games compared to losing games (ES = 0.34; p < 0.05).

CONCLUSION: The study reveals distinct game load patterns for backcourt and frontcourt basketball players, with frontcourt players experiencing greater physical and perceptual fluctuations across the game, while backcourt players exhibit more consistent between-quarter loads but larger within-quarter variations. The higher sRPE reported by backcourt players during winning games suggests the influence of contextual factors on perceptual measures. These findings un-

derscore the importance of position-specific training strategies that optimally prepare backcourt and frontcourt players for the specific game loads.

KINEMATIC VARIABLES AND MATCH OUTCOMES IN SERIE A: THE IMPACT OF ACCELERATION AND SPRINT DISTANCE

TROIANI, P., LUCADAMO, A., LATERZA, F., SAVOIA, C., BERTOLLO, M., POMPA, D.
UNIVERSITY

INTRODUCTION: The influence of kinematic variables on the outcome of the match has not been extensively investigated, especially in the Italian First Division. Our objective is to fill this gap by analyzing key performance indicators derived from tracking data, focusing on how these metrics relate to different match results (win, draw, loss). This study aims to explore how kinematic, mechanical, and metabolic parameters influence match outcomes in the Italian Serie A during the 2022/2023 and 2023/2024 seasons.

METHODS: We employed a multinomial logit model to evaluate the probability of various match outcomes based on differences in physical metrics between competing teams. The response variable included three categories: win (W), draw (D), and loss (L), with the loss serving as the reference category. Key variables analyzed were Total Distance Covered (Diff_TDC), High-intensity acceleration distance (>3 m/s²; Diff_D_H-acc), sprint distance (> 25 km/h; Diff_D_VHSR), and Metabolic Power High-Intensity (Diff_D_MPHI).

RESULTS: Our findings indicate that Diff_H-acc and Diff_VHSR have a stronger impact on the probability of winning compared to drawing. In both leagues analyzed, these variables are significant when considering the "Win" category. However, for the "Draw" estimates, the p-values are slightly exceeded 0.05, with Diff_D_VHSR showing an even higher value in the 2023/24 season. This suggests that while these two variables have a relatively small influence on the probability of drawing versus losing, they significantly affect the probability of winning versus losing. Specifically, for the 2022/23 season, a 10-meter increase in the difference between the distances covered at high speed by the two teams raises the probability of winning by approximately 12.45%. In the 2023/24 season, the same increase in the explanatory variable leads to a rise of about 17.89%. In contrast, the impact of Diff_D_H-acc on the probability of success is more pronounced. Based on the estimated coefficients, in the first season, a 10-meter increase results in a probability increase of more than 46%. For the 2023/24 season, the probability of winning versus losing rises by approximately 33.6%.

CONCLUSION: From an applied perspective, our results underscore the importance of high-intensity actions, particularly accelerations, in influencing match outcomes. This insight aligns with existing literature emphasizing the tactical value of aggressive pressing and rapid transitions. Coaches and performance analysts can leverage these findings to prioritize training interventions that enhance players explosive capabilities, potentially leading to improved competitive performance. By integrating advanced statistical modeling with applied performance analysis, this study contributes to a deeper understanding of the physical demands in elite soccer and their relationship to tactical success in Serie A.

TRENDS IN HIGH-INTENSITY RUNNING PERFORMANCE: A COMPARATIVE ANALYSIS OF PLAYERS IN THE FIFA WOMENS WORLD CUP

LUO, J., CUI, D., QU, Y.
CHINA INSTITUTE OF SPORTS SCIENCE

INTRODUCTION: High-intensity running (HIR) is a key performance metric in modern football. However, research on HIR in the FIFA Womens World Cup remains limited[1]. This study analyzes 2019-2023 HIR trends using 2023 FIFA Womens World Cup post-match reports and FIFA research. Findings offer scientific insights to support coaches in optimizing training programs.

METHODS: Data were sourced from the 2019 FIFA World Cup Physical Report and 2023 FIFA Post-Match Summary Reports (116 matches).The analysis focused on full-match players HIR metrics across positions: goalkeepers (GK), forwards (FW), midfielders (MF), and defenders (DF), including total distance, high-speed running (Zone 4: 19-23 km/h), sprint running (Zone 5: >23 km/h), and HIR (>19 km/h). Statistical analysis utilized IBM SPSS Statistics 27 for 2023 data (Kruskal-Wallis and Mann-Whitney U tests, $p < 0.05$). For 2019 data, only percentage changes were calculated due to missing variance and sample size information.

RESULTS: GK showed a 10.8% decrease in total distance (2019: 5028m; 2023: 4485m), while Zone 4 running increased by 8.3% (2019: 24m; 2023: 26m). Both Zone 5 (2019:6m; 2023:4m) and HIR (2019:30m; 2023:29m) showed minimal changes.

DF showed a 2.1% decrease in total distance (2019: 9,933m; 2023: 9,725m), while Zone 4 running decreased by 5.9% (2019: 425m; 2023: 400m). Zone 5 distance showed minimal change (2019: 164m; 2023: 161m), and HIR decreased by 4.8% (2019: 589m; 2023: 561m).

MF showed minimal change in total distance (2019: 10,717m; 2023: 10,669m), while Zone 4 running decreased by 11% (2019: 526m; 2023: 468m). Zone 5 distance declined by 24.6% (2019: 183m; 2023: 138m), and HIR decreased by 14.5% (2019: 709m; 2023: 606m).

FW showed a slight increase in total distance (2019: 10,267m; 2023: 10,286m), with Zone 4 running increasing by 2.1% (2019: 530m; 2023: 541m). Zone 5 distance increased by 18.2% (2019: 220m; 2023: 260m), and HIR rose by 6.8% (2019: 750m; 2023: 801m).