TITLE

Physical demands of elite male and female 3×3 international basketball matches.

Abstract

This study aimed to: 1) characterize the physical demands of 3×3 basketball games during live playing time and ball possession, and 2) assess the differences in physical demands between male and female players. Following an observational design, video footage from 27 games of the FIBA 3×3 World Cup 2019 were analyzed from 104 international 3×3 basketball players (n=52 male and n=52 female players) resulting in a total of 216 (104 male and 112 female) individual game samples. Manual frame-by-frame time-motion analyses determined the relative frequency ($n \cdot min^{-1}$) and duration (%) for several physical demands at different intensities ~~variables~~, according to sex, during the live playing time and in ball possession phases. Linear mixed models for repeated measures and effect size (ES) analyses revealed *small* non-significant differences in the intermittent profile of 3×3 basketball games according to sex (total movements per minute, male = 39.3 (38.6 to 40.1); female = 40.2 (39.5 to 41.0), estimated marginal means with 95% confidence intervals). Female competitions had significantly greater number of low-intensity activities (LIA, *small* ES) and high-intensity activities (HIA, *small* ES) performed per minute over longer games (*small* ES), while male players had more recovery activities (*small* ES). During ball possession, male players spent a larger amount of time performing LIA (*small* ES) than female players, who displayed both the greatest number of HIA and the highest percentage of playing time performed at high intensity (*small* ES). Overall, these findings suggest that basketball coaches should design sex-specific training sessions based on the specific match demands.

Keywords: 3-on-3 basketball; Time-motion analysis; Activity demands; External load; Gender; Sex differences; Ball possession; Team sport.

INTRODUCTION

To further promote participation in basketball all over the world, 3×3 basketball was developed by the International Basketball Federation (FIBA), as an adaptation of traditional 5×5. The 3×3 games are played on a 15-m width × 11-m length court with only one hoop and encompasses 10 minutes of live playing time with a 12-s shot clock (8). Successful free-throws and shots scored within the arc are awarded 1 point, while shots scored behind the arc are awarded 2 points. If a team reaches 21 points within the 10 minutes, it is deemed the winner, while if the game score is tied at the end of the allotted 10 minutes of live playing time, the first team to score two points in the overtime period is declared the winner (8). Teams are composed of three players actively participating in the competition and one bench player that can be replaced without limitations during stoppage time (i.e., time-outs, fouls, rule violations and free throws phases - but not when a shot is scored as live playing time is not stopped) (8). This physically demanding team sport has been recently included in the 2020 Olympics.

In the last few years, the popularity of 3×3 basketball has exponentially increased, but applied research examining this novel team sport is still limited. Understanding the competition demands of 3×3 games is an essential first step in developing specific, individualized and team-based training sessions (22). Accordingly, an increasing number of studies have investigated the technical-tactical aspects of 3×3 games (2-4, 11-13), but knowledge about the internal and external load imposed by 3×3 basketball games is still unclear. Overall, adult players perform high-intensity exercises during 3×3 competitions, achieving an average heart rate of ~165 bpm (13, 15, 16) with no difference between sexes (13). In support of this, hard perceived exertion (i.e., ~5.5-6.0 au; modified Borg CR10 scale) has been reported during 3×3 basketball games, where male players had higher perceived efforts than female players (*P*=0.04, *small* effect size [ES]) (13).

Regarding the external load, only two studies have analyzed the physical demands of the game using inertial movement sensors and positioning system during international tournaments (i.e., 2016 World 3×3 Championship; 2016 European 3×3 Championship and Under 18 2016 World 3×3 Championship) (15, 16). These studies reported that male and female players covered >850 m and experienced absolute PlayerLoads™ ranging from 116 ± 29 to 133 ± 28 AU and relative PlayerLoads™ ranging from 6.3 ± 1.4 to 6.8 ± 1.5 AU·min^{-1} during the games. In addition, while reporting similar inertial characteristics among male and female 3×3 international competitions, Montgomery and Maloney (16) observed a greater volume of high-speed accelerations during changes of directions and a greater number of jumps (i.e., low band jumps [< 20 cm] and high band jumps [> 40 cm]) among male players. However, a more thorough analysis of activity movements exhibited by the players is still required. Although inertial movement sensors are a practical tool to monitor external load (9), they are limited in delivering information about stationary activity that may be characterized by high efforts (e.g., screenings, holding position against opponents), thus possibly leading to an incomplete quantification of the external load sustained by the players (20). Hence, time-motion analysis (TMA) is a valid (9, 21) and reliable (5-7, 14) alternative to provide complementary and qualitative information about physical activities performed during basketball competitions (5, 7, 17). . Furthermore, TMA provides detailed insights about each player's physical demands when in possession of the ball. Team success partially depends on the activities performed by the player in-ball possession (e.g. controlling possession, scoring) (3), but no studies have described the intensity levels and what specific types of activities are selected by the players during ball possession during 3×3 basketball competitions. This information is necessary for developing specific training strategies.

Considering the lack of information available on this topic, a more comprehensive and direct investigation about physical game demands according to sex in 3×3 basketball is needed. Obtaining this knowledge is of interest for sport scientists, strength and conditioning coaches and practitioners to fully understand the match performance profile and to design appropriate training sessions based on sex differences. Therefore, the aim of this study was to: 1) characterize the physical demands of 3×3 basketball competitions during playing time and ball possession and 2) assess the differences in physical demands between male and female players.

METHODS

Experimental Approach to the Problem

An observational study design was used to assess the physical demands experienced during games in male and female players competing at the FIBA 3×3 World Cup 2019. This competition featured 20 male and 20 female teams, that were divided into 4 groups – each composed by 5 teams - seeded automatically based on the 3×3 FIBA ranking. After group games were played, the top two teams for each group were qualified for the quarter-finals and then knock-out games were performed all the way to the final. The games followed the FIBA 3×3 basketball rules ~~(hiips://fiba3x3.com/docs/fiba-3x3-basketball-rules-full-version.pdf)~~ (8). Video footage for each game was publicly accessible online via the tournament website (hiips://www.fiba.basketball/3x3WC/2019) or Youtube (hiips://www.youtube.com/c/FIBA3x3/playlists). A total of 27 official games out of the 96 games disputed during the 2019 FIBA 3×3 World Cup were included in the final analyses. Specifically, all of the games involving two teams not qualifying for the finals phase were excluded (n = 24 games) to reflect a similar distribution of games between competition phases for analyses. Then, games with more than 3% of total playing time not available for technical reasons (e.g., video interruption, commercial break, actions replay) were also excluded (n = 45 games). Specifically, 16 games during the group phase (male games , n = 8; female games, n = 8) out of 80 total games during the group phase and 11 games during the finals phase (male games, n = 5 [final for first and second place, n = 1; semi-final, n = 1 and quarter-finals, n = 3]; female games, n = 6 [final for first and second place, n = 1; final for third and fourth place, n = 1; semi-finals, n = 2 and quarter-finals, n = 2]) out of 16 total games during the finals phase were analyzed, thus resulting in a total of 216 (male games, n = 104 [group phase, n = 40; finals phase, n = 64] and female games, n = 112 [group phase, n = 48; finals phase, n = 64]) individual game observations analyzed.

Subjects

Data were collected from a total of 104 international 3×3 basketball players (52 male and 52 female players) belonging to 26 national teams (13 male teams and 13 female teams), with each team comprised of four players. The study was approved by the Independent Institutional Review Board of MAPEI Sport Research Centre in accordance with the Helsinki Declaration (2013).

Procedures

Manual frame-by-frame software (SICS VideoMatch Basket, version 5.0.5) was used to determine player physical demands during live playing time and ball possession. As previously described (5-7), each player's physical demands were classified into 8 singular activity categories as follows: (i) stand/walk: activity of no greater intensity than walking without any distinction between standing still and walking or between different intensities of walking; (ii) jog: movement (forwards or backwards) at an intensity greater than walking but without urgency; (iii) run: forwards or backwards movement at an intensity greater than jogging and a moderate degree of urgency but which did not approach an intense level of movement; (iv) sprint: forward or backwards movement at a high intensity, characterized by effort and purpose at or close to maximum; (v) low-: (vi) moderate-: (vii) high- specific movements (SM): movements differing from ordinary walking or running performed respectively at low intensity without urgency, at medium intensity with a moderate degree of urgency and at high- intensity with urgency and (viii) jump: the time from the initiation of the jumping action to the completion of landing. SMs mainly included the stance position, shuffling, rolling, reversing, screening, and cross-over running activities (1). Singular activities were then grouped according to their relative intensity into recovery (REC, i.e., standing/walking), low-intensity activities (LIA, i.e., jogging and low-SM), medium-intensity activities (MIA, i.e., running and moderate-SM) and high-intensity activities (HIA, i.e., sprinting, high-SM and jumping) (5-7). The frequency of occurrence and the duration of each activity were determined during live playing time (i.e., when the game clock was running) and when players were in possession of the ball. Activity frequencies were calculated as the total number of events (n) performed and normalised according to live playing time and ball possession time ($n \cdot min^{-1}$) for each player to account for the varying exposures and substitution times across players. Activity durations were determined as a percentage (%) of the live playing time and ball possession time for each player to account for the varying exposures and substitution times across players. The analysis was carried out by a single experienced video analyst. Intra-tester reliability was determined by having the observer analyse the relative frequency ($n \cdot min^{-1}$) and duration (s) of activities during an entire official 3×3 game for all players (n=8) on two separate occasions. The resulting values for the intraclass correlation coefficient (ICC) and the coefficient of variation (CV) were deemed acceptable (log transform variable, ICC [95% confidence interval, CI] – CV [95% CI]): standing/walking – REC, frequency: 0.97 (0.87-0.99) – 5.6% (3.7-11.7) and duration: 1.00 (0.98-1.00) – 3.2% (2.1-6.6); jog, frequency: 0.99 (0.97-1.00) – 4.7% (3.1-9.5) and duration: 0.99 (0.97-1.00) – 5.5% (3.6-11.6); run, frequency: 0.99 (0.97-1.00) – 5.0% (3.3-10.5) and duration: 0.98 (0.91-1.00) – 10.2% (6.7-21.9); sprint, frequency: 0.99 (0.97-1.00) – 5.1% (3.4-10.8) and duration: 0.98 (0.94-1.00) – 8.4% (5.5-17.9); low-SM, frequency: 0.96 (0.83-0.99) – 4.1% (2.7-8.6) and duration: 0.98 (0.92-1.00) – 3.5% (2.3-7.2); moderate-SM, frequency: 0.98 (0.89-0.99) – 4.4% (2.9-9.2) and duration: 0.91 (0.61-0.98) – 10.0% (6.5-21.5); high-SM, frequency: 0.97 (0.84-0.99) – 6.6% (4.3-13.9) and duration: 0.98 (0.91-1.00) – 5.1% (3.4-10.7); jump, frequency: 1.00 (1.00-1.00) – 0.0% (0.0-0.0) and duration: 0.99 (0.96-1.00) – 5.1% (3.3-10.6); LIA, frequency: 0.98 (0.90-0.99) – 3.9% (2.6-8.1) and duration: 0.99 (0.94-1.00) – 3.5% (2.3-7.3); MIA, frequency: 0.99 (0.94-1.00) – 4.0% (2.6-8.3) and duration: 0.95 (0.76-0.99) – 8.7% (5.7-18.5); HIA, frequency: 0.99 (0.96-1.00) – 2.9% (1.9-6.0) and duration: 1.00 (0.92-1.00) – 2.0% (1.3-4.2).

Statistical analysis

The TMA descriptive results are reported as estimated marginal means with 95% CI. Linear mixed models were constructed to examine differences in TMA data during live playing time and ball possession phases according to sex, accounting for individual repeated measures. In all linear mixed models, sex was used as fixed effect and player as random effect with a random intercept and fixed slope. All assumptions were met and the normality of the residuals was assessed using the Kolmogorov-Smirnov test.. Moreover, the magnitude of differences between male and female players was calculated using ES with 95%

confidence intervals and interpreted as <0.2 = *trivial*, 0.20–0.59 = *small*, 0.60–1.19 = *moderate*, 1.2–1.99 = *large*, and ≥2.0 = *very large* (10). An alpha level of P <0.05 was set *a priori* for statistical significance. All data were analyzed using Jamovi software (version 2.0.0.0, 2021).

RESULTS

Female players competed for a greater amount of time during 3×3 games (live playing time: male, 388 (95%CI: 370 to 405) s; female, 412 (95%CI: 395 to 429) s) than male players (P = 0.042, estimate (95%CI) = -24.7 (-48.2 to -1.2), ES (95%CI) = 0.33 (0.06-0.60), *small*).

Descriptive data and statistical analyses for physical demand variables during live playing time according to sex are presented in Table 1 (grouped activities) and Figure 1 (singular activities). During live playing time, female players performed a greater number of LIA (P = 0.026, ES = 0.42 (0.15 to 0.69), *small*) and HIA (P = 0.034, ES = 0.32 (0.05 to 0.59), *small*) per minute, while male players carried out more REC per minute (P = 0.027, ES = -0.36 (-0.63 to -0.09), *small*). No differences were observed in MIA and total activities performed per minute (all P > 0.05). In addition, the distribution of time spent at the various grouped activities (i.e. REC, LIA, MIA and HIA) during the 3×3 competitions was similar between male and female players. With regards to the specific singular activities, male players performed a lower number of low-SM per minute (P < 0.001, ES = 0.73 (0.44-1.01), *moderate* - Figure 1 – panel A). Furthermore, female players spent more time sprinting (P = 0.029, ES = 0.34 (0.07 to 0.61), *small*), while male players spent more time jumping (P = 0.009, ES = -0.47 (-0.75 to -0.20), *small*) during the playing time than the relative counterparts (Figure 1 – panel B).

Insert Table 1 around here

Insert Figure 1 around here

Male and female players spent 11.8% (10.9% to 12.7%) and 11.9% (11.0% to 12.8%) of playing time in ball possession, respectively. No significant differences in the proportion of playing time in ball possession were found according to sex (*P* = 0.894, estimate = -0.09 (-1.36 to 1.18), ES = 0.01 (-0.25 to 0.28), *trivial*).

Descriptive data and statistical analyses for physical demand variables while in ball possession for male and female players are presented in Table 2 (grouped activities) and Figure 2 (singular activities). During ball possession, female players carried out a greater number of HIA per minute than male players (*P* = 0.034, ES = 0.33 (0.06 to 0.60), *small*). No differences were observed in the frequency of occurrence of REC, LIA, MIA, and all activities according to sex when the players were in possession of the ball (all *P* > 0.05). Male players spent more time performing LIA during ball possession (*P* = 0.040, ES = -0.32 (-0.59 to -0.05), *small*), while female players achieved a greater amount of time performing HIA in ball possession than their counterpart (*P* = 0.012, ES = 0.42 (0.15 to 0.69), *small*). With regards to the specific singular activities, sprinting while in ball possession was performed with a greater frequency of occurrence per minute (*P* = 0.028, ES = 0.37 (0.10 to 0.64), *small*) and with longer percentage durations (*P* = 0.015, ES = 0.38 (0.11 to 0.65), *small*) by female players than male players (Figure 2 – panel A and B, respectively).

Insert Table 2 around here

Insert Figure 2 around here

DISCUSSION

The present study provides novel insights ~~and normative data~~ regarding the physical demands of 3×3 basketball games during international competition (i.e., FIBA 3×3 World Cup 2019), highlighting between-sex differences. Additionally, this is the first study describing activities performed when in ball possession in 3×3 basketball. Overall, the intermittent profile of 3×3 games was not influenced by sex. However female competitions were characterized by a greater number of LIA and HIA performed per minute over longer games, while male players were involved in more recovery activities. During ball possession, male players spend a larger amount of time performing LIA than female players, who showed both greater number of HIA and higher percentage of playing time performed at high intensity. Furthermore, specific singular activities ~~grouped as HIA~~ (i.e. sprints and jumps) were partially affected by sex, with live playing time being characterized by a greater amount of time performing sprints by female players and jumps by male players. During the ball possession, female players completed more sprints per minute and spent a larger amount of time sprinting compared to male players.

A thorough understanding of the physical demands performed according to sex during competitions is fundamental to develop more appropriate training sessions and to highlight the most relevant physical determinants for a successful competition. In line with previous findings (4), female competitions appear to be characterized by a longer playing time than male competitions (female ~7 min vs. male ~6 min). This is a likely consequence of a better scoring ability of male players, which would promote more successful shots during offensive possessions and finishing games (i.e., reaching 21 points) more quickly (3, 4). The present results suggest that the intermittent profile of 3×3 basketball competitions is not affected by sex, as male and female players performed on average 39.3 and 40.2 singular activities per minute, respectively (changes in activity types every ~1.5s). However, we found female players performing more LIA and HIA per minute than male players, who on the contrary carried our more REC. Although the ES of the observed differences were *small*, this information indicates a different distribution of the selected grouped activities during 3×3 basketball competitions according to sex. This may be due to the different technical-tactical strategies adopted by male and female teams during the play or the different sex-related physical characteristics. Male players are characterized by a better scoring efficiency and are more prone in shooting outside of the arc than female players. As such, these abilities may permit them to shoot with more confidence over the court without leading them to play more 1-on-1 situations and thus exhibiting less activities at higher intensity (3, 4). With respect to percentage duration of grouped activities (i.e., REC, LIA, MIA and HIA), no differences were observed between male and female players. However, when analyzing singular activities ~~grouped as HIA~~, we found female players spending more time sprinting and male players spending more time jumping. As these results represent preliminary data about the intermittent profile of 3×3 basketball, it is not possible to compare them with existing literature on the topic. However, it should be noted that 3×3 players carry out approximately double the total activities performed per minute during 5×5 basketball games (~40 vs. ~25 activities per minute) (5, 7). This is explained by the greater number of LIA (~15 vs. ~11 activities per minute), MIA (~8 vs. ~3-4 activities per minute) and HIA (~12 vs. ~4 activities per minute) performed per minute during 3×3 competitions than 5×5 format (5, 7). In addition, the portions of time performing various grouped activities seem to be affected by the basketball format, with 3×3 competitions requiring a greater proportion of time at HIA (i.e., ~24% vs. ~11%) and a lower percentage of playing time recovering (i.e., ~15% vs.

~35%) (5, 7). Therefore, the limited playing area (i.e., half court that the typical 5×5 court), the ~~longger~~ shorter distances to transit from offensive-defensive situations and the reduced number of players of the 3×3 format require players to be actively involved on more occasions than the typical 5×5 basketball. Considering that most of the players that compete in international 3×3 basketball games also compete in 5×5 basketball championships, the coaching staff should consider developing training sessions according to the specific physical demands of the selected basketball format to guarantee an adequate training stimulus.

A thorough understanding of the physical demands performed when players are in ball possession is fundamental for developing specific individual and team-based drills during basketball training (5, 19). Overall, 3×3 players spend ~12% of playing time in possession of the ball, irrespectively of their sex, and perform ~8 singular activities per minute in ball possession. Sex comparisons showed female players performing a greater number of HIA per minute and a higher proportion of time in possession of the ball at HIA than male player (*small* ES), likely because of the more frequent sprints (n/min) and higher proportion of time sprinting in ball possession (*small* ES). This information highlights different strategies adopted during 3×3 basketball competitions, as female players are more involved in dribbling activities while sprinting, which are probably carried out during 1-on-1 situations. Altogether, these results show a partially different evolution of the gameplay according to sex, with female teams being involved in more high-intensity dynamic possessions than male teams, which likely perform more pre-planned positional offensive situations (4). Considering that this is the first study to describe the physical demands performed when in possession of the ball during 3×3 basketball games, comparison of findings with previous studies is not possible. Future studies should investigate the physical demands carried out during ball possession in 3×3 basketball competitions across various player samples (e.g. youth and amateur players) and examining the time course of specific actions (e.g. isolations and ball screens) to further expand the evidence based on this topic.

There are some limitations that must be acknowledged. Issues may arise from the qualitative definition of player activity classifications using TMA. Furthermore, the qualitative definition of movements does not take into consideration the absolute intensities achieved (e.g., maximum speed) by the players, but only their relative intensity and urgency to be performed. A further limitation of this study is that physical demands were determined as average values across the entire 3×3 competitions, and sexual differences in physical demands representing the most demanding passages of the play (worst-case scenario) were not explored (23). No data were available about differences in the physical characteristics of male and female 3×3 basketball players, thus studies on this topic are warranted to better interpret the study outcome and to identify the key factors besides the physical demands analyzed in the present study.

PRACTICAL APPLICATIONS

This study provides ~~normative~~ preliminary descriptive values regarding the physical demands of 3×3 gameplay during an international competition, which can be used by coaches and practitioners in developing appropriate sex-specific training sessions to optimize chances for team success (18). The similarities in the activity profile of male and female 3×3 competitions are likely associated with the relatively short duration of the games and the availability of substitutions without limitations. These factors probably allow the players to perform at high-intensity without the occurrence of severe fatigue, thus the observed differences are likely a consequence of the technical-tactical demands and structure of game play according to sex. However, when designing training sessions and long-term training plans, practitioners should consider the existing differences in the competition physical demands according to sex, with female players being involved in longer games and performing more HIA per playing time and per plays in ball possession. As such, female teams should be involved in longer plays with specific tasks to carry out more HIA. The ability to sustain high-intensity efforts, appear to be a relevant determinant for 3×3 basketball games for both male and female players, as more than the 20% of playing time is performed at high-intensity. This proportion is considerably increased when the players are in possession of the ball, as more than the 40% of time in possession of the ball is developed performing HIA. As such, drills in possession of the ball should specifically focus on developing high-intensity SM that end up in 1-on-1 situations (both low-post and facing the basket) or perform scoring tasks from various court positions. A greater focus should be imposed on performing sprints with ball possession mostly for female players rather than male players, who on the contrary should enhance their jumping ability – useful for catching rebounds, blocking, and shooting – during the playing time. However, focusing on the development of the observed physical demands' weaknesses according to sex (e.g., improve jumping ability among female players) may also be a pertinent strategy that could contribute to enhance the 3×3 basketball performance. However, this speculation should be confirmed in future studies.

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FIGURE LEGEND

Figure 1. Frequency of occurrence (n/min - panel A) and duration in percentage of the playing time (% - panel B) of singular activities (i.e., stand/walk, jog, low-specific movements~~ [low SM]~~, run, moderate-specific movements~~ [moderate SM]~~, sprint, high-specific movements~~ [high SM]~~ and jumps) performed by male and female players during the FIBA 3x3 World Cup 2019. * Significant ($P < 0.05$) difference between the conditions. Dashed line in the middle represents the median; dashed lines at the top and at the bottom represent the 75th percentile and the 25th percentile, respectively. Abbreviations: SM, specific movements; REC, recovery; LIA, low-intensity activities; MIA, medium-intensity activities; HIA, High-intensity activities.

Figure 2. Frequency of occurrence (n/min - panel A) and duration in percentage of the playing time (% - panel B) while in possession of the ball of singular activities (i.e., stand/walk, jog, low-specific movements~~ [low SM]~~, run, moderate-specific movements ~~[moderate SM]~~, sprint, high-specific movements~~ [high SM]~~ and jumps) performed by male and female players during the FIBA 3x3 World Cup 2019. * Significant ($P < 0.05$) difference between the conditions. Dashed line in the middle represents the median; dashed lines at the top and at the bottom represent the 75th percentile and the 25th percentile, respectively. Abbreviations: SM, specific movements; REC, recovery; LIA, low-intensity activities; MIA, medium-intensity activities; HIA, High-intensity activities.

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Table 1

Table 1. Grouped game activities during live playing time of the FIBA 3×3 World Cup 2019 according to sex.

Dependent variables	Fixed effect	EMMean (95% CI)	P value	Estimate (95% CI)	ES (95% CI)	Interprepation
			Frequency of occurrence (n/min)			
REC	Male	5.7 (5.2; 6.1)	**0.027**	0.64 (0.07; 1.21)	-0.36 (-0.63; -0.09)	*Small*
	Female	5.0 (4.6; 5.4)				
LIA	Male	14.6 (14.2; 15.0)	**0.026**	-0.58 (-1.09; -0.08)	0.42 (0.15; 0.69)	*Small*
	Female	15.2 (14.8; 15.5)				
MIA	Male	8.0 (7.6; 8.4)	0.506	-0.17 (-0.66; 0.33)	0.07 (-0.20; 0.34)	*Trivial*
	Female	8.2 (7.8; 8.5)				
HIA	Male	11.1 (10.6; 11.7)	**0.034**	-0.79 (-1.51; -0.07)	0.32 (0.05; 0.59)	*Small*
	Female	11.9 (11.4; 12.4)				
Total	Male	39.3 (38.6; 40.1)	0.100	-0.87 (-1.90; 0.16)	0.28 (0.01; 0.55)	*Small*
	Female	40.2 (39.5; 41.0)				
			Total time (%)			
REC	Male	16.2 (14.5; 17.8)	0.060	2.14 (-0.07; 4.34)	-0.33 (-0.60; -0.06)	*Small*
	Female	14.1 (12.4; 15.7)				
LIA	Male	43.6 (42.3; 45.0)	0.290	-0.97 (-2.77; 0.82)	0.20 (-0.07; 0.47)	*Small*
	Female	44.6 (43.3; 45.9)				
MIA	Male	16.9 (16.1; 17.6)	0.912	0.06 (-0.97; 1.09)	-0.03 (-0.29; 0.24)	*Trivial*
	Female	16.8 (16.1; 17.6)				
HIA	Male	23.3 (22.1; 24.4)	0.080	-1.36 (-2.88; 0.15)	0.26 (-0.01; 0.53)	*Small*
	Female	24.6 (23.5; 25.7)				

Abbreviations: EMMean, estimated marginal mean; CI, confidence intervals; ES, effect size (values above zero: greater for female); REC, recovery; LIA, low-intensity activities; MIA, medium-intensity activities; HIA, High-intensity activities. *Notes*: Bolded *P* value indicates statistically significant difference (P <0.05).

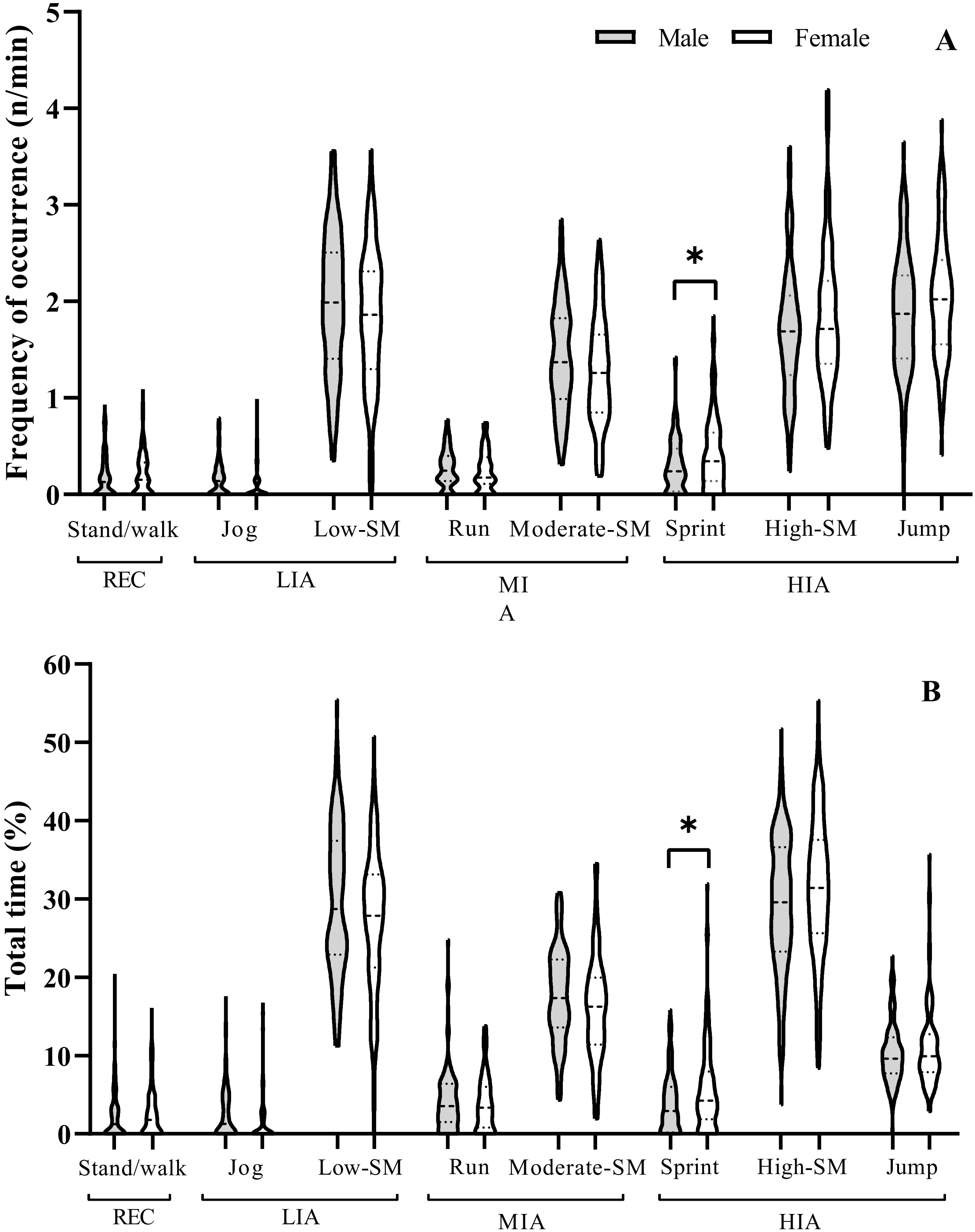
Table 2

Table 2. Grouped game activities during the ball possession phases of the FIBA 3×3 World Cup 2019 according to sex.

Dependent variables	Fixed effect	EMMean (95% CI)	P value	Estimate (95% CI)	ES (95% CI)	Interprepation
Frequency of occurrence (n/min)						
REC	Male	0.2 (0.1; 0.2)	0.512	-0.02 (-0.09; 0.05)	0.13 (-0.13; 0.40)	*Trivial*
	Female	0.2 (0.2; 0.3)				
LIA	Male	2.1 (1.9; 2.3)	0.252	0.15 (-0.11; 0.40)	-0.23 (-0.50; 0.04)	*Small*
	Female	2.0 (1.8; 2.2)				
MIA	Male	1.7 (1.5; 1.8)	0.302	0.11 (-0.10; 0.33)	-0.25 (-0.52; 0.02)	*Small*
	Female	1.5 (1.4; 1.7)				
HIA	Male	3.8 (3.5; 4.1)	**0.034**	-0.46 (-0.88; -0.04)	0.33 (0.06; 0.60)	*Small*
	Female	4.3 (4.0; 4.6)				
Total	Male	7.8 (7.3; 8.3)	0.504	-0.23 (-0.91; 0.45)	0.06 (-0.21; 0.32)	*Trivial*
	Female	8.0 (7.5; 8.5)				
Total time (%)						
REC	Male	2.5 (1.8; 3.3)	0.614	-0.27 (-1.32; 0.78)	0.09 (-0.18; 0.36)	*Trivial*
	Female	2.8 (2.1; 3.6)				
LIA	Male	32.3 (30.0; 34.6)	**0.040**	3.28 (0.18; 6.37)	-0.32 (-0.59; -0.05)	*Small*
	Female	29.0 (26.8; 31.2)				
MIA	Male	21.9 (20.2; 23.5)	0.097	1.92 (-0.33; 4.17)	-0.26 (-0.53; 0.01)	*Small*
	Female	20.0 (18.4; 21.5)				
HIA	Male	43.4 (40.6; 46.1)	**0.012**	-4.83 (-8.55; -1.11)	0.42 (0.15; 0.69)	*Small*
	Female	48.2 (45.5; 50.9)				

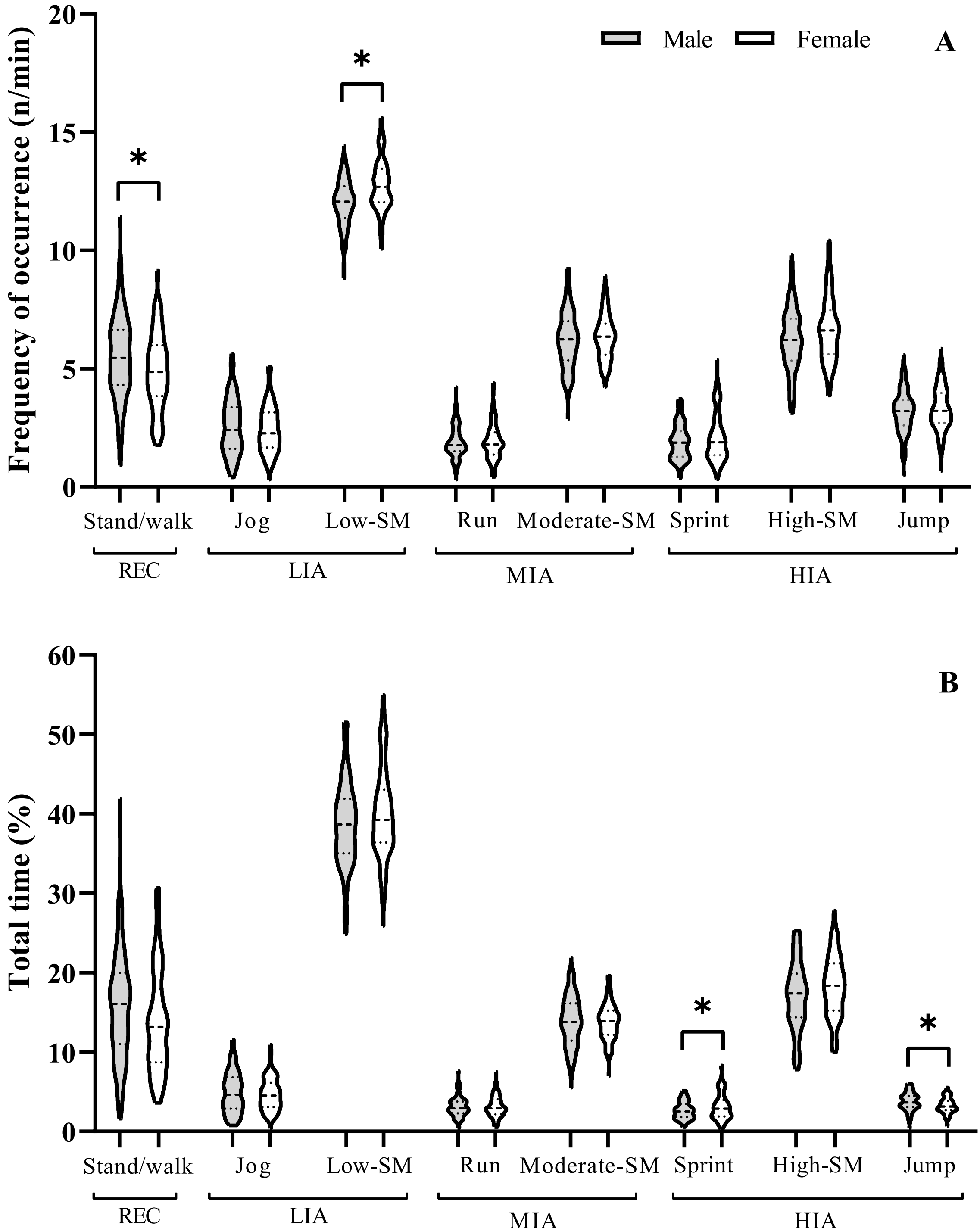
Abbreviations: EMMean, estimated marginal mean; CI, confidence intervals; ES, effect size (values above zero: greater for female); REC, recovery; LIA, low-intensity activities; MIA, medium-intensity activities; HIA, High-intensity activities. *Notes*: Bolded *P* value indicates statistically significant difference (P <0.05).

Figure 2



Male
Female
A
Frequency of occurrence (n/min)
0
1
2
3
4
5
*
Stand/walk
Jog
Low-SM
Run
Moderate-SM
Sprint
High-SM
Jump
REC
LIA
MI
A
HIA
B
Total time (%)
0
10
20
30
40
50
60
*
Stand/walk
Jog
Low-SM
Run
Moderate-SM
Sprint
High-SM
Jump
REC
LIA
MIA
HIA

Figure 1



Frequency of occurrence (n/min)
20
15
10
5
0
Male
Female
A
*
*
Stand/walk
Jog
Low-SM
Run
Moderate-SM
Sprint
High-SM
Jump
REC
LIA
MIA
HIA
Total time (%)
60
50
40
30
20
10
0
B
*
*
Stand/walk
Jog
Low-SM
Run
Moderate-SM
Sprint
High-SM
Jump
REC
LIA
MIA
HIA