

EFFECT OF SMALL-SIDED GAMES RULE CHANGES ON TIME SPENT IN DIFFERENT INTENSITY ZONES, FREQUENCY OF TECHNICAL ACTIONS AND DISTANCE COVERED DURING SOCCER TRAINING

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Abstract

Purpose: The efficacy of SSGs has been difficult to assess as researchers have used a wide-ranging number of players, pitch dimensions and game rules, making comparisons complicated. Therefore, this study compared four SSG rules [one (SSG1T), two (SSG2T), three (SSG3T), and unlimited touches (SSGFT)] on time spent in different heart-rate (HR) intensity zones, frequency of technical actions and distance covered involving the starting 11 players and the reserve goalkeeper of a national soccer league team. **Methods:** The participants (age: 24.3±4.0 yr; height: 171.2±5.9 cm; weight: 61.9±7.4 kg) were measured for previously mentioned dependent variables during each SSG format. **Results:** Analysis found no significant difference among the four SSGs formats [$F(3, 27) = 2.897, p = .053$] for time spent in the low-intensity zone, but significant differences were observed for time spent in moderate [$F(3, 27) = 13.642, p = .001$] and high [$F(3, 27) = 13.431, p = .001$] intensity zones. Significantly more time was spent in the high intensity zone [$F(3, 27) = 13.431, p = .001$] when players performed SSG2T and SSGFT when compared SSG1T ($p = .002$ and $p = .009$) respectively. SSG1T induced most unsuccessful passing [$F(3,27) = 500.498, p = .001$] but no differences was observed among SSG2T, SSG3T and SSGFT. SSG2T, SSG3T and SSG3T obtained significantly more shots on goal shots on goal [$F(3,27) = 25.398, p = .001$], with SSGFT achieving higher numbers than the other three formats. There were no significant differences in goals scored ($p = .537$) and distance covered ($p = 0.574$) for all SSG formats. **Conclusion:** The main findings of this study revealed that all four SSG formats stimulated moderate to high heart rate intensities that could induce positive aerobic and anaerobic adaptations depending on frequency of technical actions and players' skill level. Therefore, coaches could select specific SSG formats to help players achieved intended

intensity and technical objectives programmed for different phases of periodized training.

Keywords: Games training, rule changes, intensity, soccer skills, fitness

Introduction

The normally long competitive phase in soccer makes it difficult for soccer players to train and retain fitness during competition, as technical or skill training also need to be given priority. During the competition phase, most teams train daily and play 1-2 matches a week (FIFA, 2013). Observations from other research indicate that many teams also play 2-3 matches in five days with 1-3 days of recovery before playing the next match (Lago-Penas, Rey, Lago-Ballesteros, Casais, & Dominguez, 2011; Odetoynho, Wooster & Lane, 2009). Soccer players have been estimated to cover approximately 8 -14 km and execute in excess of 1000 short-bout (4-6 s) actions within a match (Koklu, Sert, Alemdaroglu & Arslan, 2015). These short-bout actions include technical and tactical actions, combined with movements to reposition the ball. These physical exertions require soccer players to have high levels of physical fitness in order to perform technique and tactic correctly and precisely even when tired. The short recovery period between matches also impose high physiological demands on players they need to be efficient in many fitness variables including aerobic and anaerobic power, muscular strength, speed and power, flexibility, coordination, and agility (Reilly, 2003). The tight competition schedule practised in many competitive leagues allow players only a short recovery period between matches and this may induce fatigue, reduce coordination and performance, thereby increasing risk of injury (Ekstrand, Walden & Hagglund, 2004).

Consequently, one of the biggest challenges for coaches and players is to effectively develop and maintain both the fitness and skill elements throughout the competition phase. The way soccer is played currently entails running, dribbling, jumping, shooting at goal, tackling and shadowing opponents at different speeds and intensities, which requires player to stress both the aerobic and anaerobic energy systems (Koklu et al., 2015). Traditionally, coaches have used running drills without the ball to develop soccer players' aerobic and anaerobic endurance (Little & Williams, 2006). However, it is now thought that technical skills, decision-making ability, and both energy systems can be developed in the same training session by using small-sided games (SSGs), which can contribute to developing the level of physical exertion required by soccer matches, and at the same time ensure more efficient use of limited training time (Dellal, Chamari, Pintus, Girard, Cotte, & Keller, 2008). SSGs have been used to simultaneously train fitness, techniques and tactics because utilization of smaller pitch sizes and the fewer number of players allow more contact time with the ball and deal with tactical situations more specifically and frequently (Katis & Kellis, 2009). Additionally, when SSGs were utilized for physical conditioning, it was capable of eliciting heart rate responses approximating 80 to more than 90% of maximum heart rate (Brandes, Heitmann & Muller, 2012; Impellizzeri & Marcora, 2009). In a recent review, SSGs seem capable of

helping coaches help players meet technical, tactical and conditioning objectives if training conditions are being manipulated carefully (Clemente & Sarmiento, 2020).

In spite of support for SSGs as an efficient training method, its effectiveness relies on a number of variables such as the number of players, pitch dimensions, duration of play, rules (number of touches/plays), presence or absence of goalkeeper and size of goals, goal scoring methods, specific rules allowed/disallowed (e.g. off-side, defending methods), continuous or intermittent work (work-to-rest conditions), whether coach encouragement was offered, age, fatigue level, and also technical, tactical and physical standings (Clemente & Sarmiento, 2020). The control of each of these variables separately or in combination would influence the training load (volume and intensity), and hence influence the training effect felt by the players. Previous research found SSG effective for inducing changes in both aerobic (Impellizzeri & Marcora, 2009) and anaerobic (Castagna, Francini, Povoas, & D'Ottavio, 2017) energy systems. Manipulation of distances run at high intensity during SSG training emphasizes anaerobic speed-endurance adaptations similar to what has been observed in matches (Fransson et al., 2018). The number of players utilized during SSG training, the size of the pitch and the combination of both these factors (playing area/number of players) has been referred to as “players’ density” (Castagna et al., 2017), with lower densities producing higher physical and physiological stresses on players (Castagna, D’Ottavio, Cappelli, & Povoas, 2019). Unfortunately, the efficacy of SSGs has been difficult to assess as researchers have used a wide-ranging number of players, pitch dimensions, and game rules during SSGs making comparisons tenuous.

Regardless of the ambiguity of the previously mentioned variables, published literature has indicated that the 5 vs. 5 format is frequently used during SSG research (Dellal, Owen, Wong, Krustup, Exsel & Mallo, 2012; Hill-Haas, Rowsell, Dawson & Coutts, 2009a), and as the appropriate players’ density is still ambiguous (Castagna et al., 2019), most previous researchers allocate areas approximating 150-200m² per player (Sanchez-Sanchez, Hernández, Casamichana, Martínez-Salazar, Ramirez-Campillo, & Sampaio., 2017; Owen, Wong, Paul & Dellal, 2014; Dellal et al., 2012) making a pitch size of 40 x 50m popular among researchers (Barbero-Alvarez, D’ottavio, Vera, & Castagna. 2009; Kelly & Drust, 2009). However, establishing ranges for other SSG training variables have not been consistent, and additional investigation is needed. Among them, the influence of different number of touches on physiological demands and technical actions during SSG training still need illumination. Commonly used rules during SSG research are one-touch (SSG1T), two touches (SSG2T), three touches (SSG3T) and unlimited or free touches (SSGFT) although SSG3T seems has been suggested to the most used rule (Lacome, Simpson, Cholley, Lambert, & Buchheit, 2018).

Physiological demands that still need investigation include heart rate (HR) changes during different SSG formats could help coaches and trainers identify rules that emphasize different energy systems, making training objectives more specific and focused. This would involve the comparison of the amount of time spent in different HR intensity zones as various rules are utilized. Linking HR with SSG rules is important as the number of touches would affect intensity (Abrantes, Nunes, MaCas, Leite, & Sampaio, 2012; Dellal et al., 2012; Hill-Haas, Coutts, Dawson & Rowsell, 2010).

Although previous studies have examined HR changes and the amount of time spent in different intensity zones (Abrantes et al., 2012; Hill-Haas et al., 2009a), the number of intensity zones investigated and the heart-rate percentages utilized for each intensity zone were organized inconsistently, making comparisons pointless. Comparing more current studies, three HR zones with maximal HR (HRmax) less than 60% indicative of low intensity, 60-79% representing moderate intensity, and HR more than 80% considered high intensity seems suitable for categorizing training intensity (Nagy, Holienska & Babic, 2020). From the technical perspective, more information is needed regarding the influence of rule changes on the frequency of technical actions, and the distance covered during SSG training. To further confound these issues, no previous research has utilized the starting players from an elite state team, playing 5 vs. 5 in two teams, with two defenders, two midfielders, one striker and one goalkeeper for each team. Therefore, the objective of this study was to examine the effect of SSG rule changes on time spent in three HR intensity zones (low, medium and high), frequency of technical actions (passing, shots on goal, crossing, interceptions, and goals scored) and distance covered during soccer training involving the starting 11 players of a state team, with an additional goalkeeper.

Material and Methods

Participants

The experimental group (n=12) comprised of the starting 11 players and the first reserve goalkeeper of a state team participating in the Malaysian Super League. Most of the participants (age: 24.3±4.0 yr; height: 171.2±5.9 cm; weight: 61.9±7.4 kg) were from a previous season's winning team. The participants were assigned into two teams, each having one goalkeeper, two defenders, two midfielders and one striker. Both teams were similar in physical fitness and skill according to assessments (Yo-Yo test and skill assessment ranking) by an experienced and qualified coach (A-License, Football Association Malaysia), who has been coaching the same players for 3 years. The same team combination applying a 2-2-1 formation was used for all SSG formats. All participants were free from injuries, and gave written informed consent after they were briefed regarding the procedures and risks of participating in the study.

Procedure & Instrumentation

1) Overall Procedure

Four weeks were used to complete the experimental protocols. A 2-week pre-season training period was implemented to obtain the players' maximum HR and served as familiarization for the four SSG formats utilized in the study. During the familiarization sessions, the players played SSGs with different rule changes (SSG1T, SSG2T, SSG3T, and SSGFT). Using randomization to determine the presentation of the protocols, participants performed experimental sessions with SSG2T and SSG3T in week three, and underwent SSG1T and SSGFT in week 4. All four rule changes have been regularly applied by the coach as part of normal training prior to the experiment.

2) Small-Sided Games

SSGs were carried with at least 48 hour separating each familiarization or experimental session over four weeks during the pre-season phase. The SSGs were performed outdoors on a 50m x 40m natural grass pitch with two regulation size goals. A standardized 20-minute warm-up incorporating low-intensity running, striding, stretching and control/passing drills (Almeida, Ferreira, & Volossovitch, 2012; Da Silva et al., 2011) were performed by all participants prior to every SSG session. All four SSG formats were performed continuously for 24 min as previous research (Hill-Haas, Coutts, Rowsell, & Dawson, 2008; Hill-Haas, Dawson, Coutts & Rowsell, 2009b) found blood lactate concentration and maximal HR responses that induced better training adaptations. All SSGs were conducted at the same time of day to limit the potential effects of circadian variation on physiological variables (Drust, Waterhouse, Atkinson, Edwards & Reilly, 2005) and coach encouragement was provided (Koklu, Ersoz, Alemdaroglu, Asci, & Ozkan, 2012; Hill-Haas, Dawson, Impellizzeri & Coutts, 2011). All official rules of soccer were implemented apart from the offside rule, and refereeing was performed by an assistant coach. When the ball was kicked out of play, a replacement soccer ball was put into play.

3) Heart Rate Monitoring

Heart rate was recorded at 5-s intervals during each SSG via short-range radio telemetry (Polar Team 2 System, Polar Electro Oy, Kempele, Finland) as in previous research (Sanchez-Sanchez et al., 2017; Hill-Haas et al., 2009a, 2009b). The heart rate monitors were worn to determine how much time each player spent in three HR zones (HRmax < 60% = low intensity; HRmax 60-79% = moderate intensity; HRmax > than 80% = high intensity) during 24min of each SSG. The reliability of HRmax has been previously reported with typical error (TE) % being less than 5% (Hill-Haas et al., 2008).

4) Technical Actions

All SSGs were visually recorded using a digital video camcorder (Sony DCR-SR42E Digital Camera Recorder, Japan) to evaluate the frequency of technical actions of the players. The video camera was positioned on a tripod 40m from the side of the pitch at the level of the half way line and at an elevation of 1m (Abrantes et al., 2012; Kelly & Drust, 2009). Two trained assessors (inter- and intra-rater Cohen $K > .80$) tallied and classified correct and successful technical actions such as passing, shots on goal, crossing, interceptions and goals scored. Data of each player were recorded on a computer-based worksheet and notational analyses were performed. Criteria for analysis was based on merged definitions from literature (Santos, Coutinho, Gonçalves, Abade, Pasquarelli & Sampaio, 2020; Bennett, Novak, Pluss, Stevens, Coutts & Fransen, 2018; FIFA, 2013): passes made by permissible parts of the body were deemed successful if the ball reaches a teammate, and unsuccessful when they were not received because the action was inferior; shots on goal are scoring attempts that would have gone into the net if they were not stopped by a defender or goalkeeper; crossing is when an airborne ball is sent from the side of the pitch to the front of the goal and is considered successful when a teammate is able to subsequently contact the ball; interceptions are considered successful when a player interferes or diverts the trajectory of a ball to an intended target/area; goals are shots that went pass the goal line into a goal via the scorer's permissible body parts.

5) Distance Covered

Players' movement distance during SSGs were measured using portable global positioning system (GPS) units (SPI 10, GPSports, Canberra, Australia) sampling at 10 Hz min⁻¹. The same GPS units were worn on the wrist by six players (two defenders, two midfielders and two strikers) during all SSGs. This was to reduce variability and possible differences among GPS units. The reliability of the GPS device for measuring team sport-specific movement characteristics has previously been reported (Coutts & Duffield, 2010).

Statistical Analysis

Descriptive statistics (mean ± standard deviation) were used to describe biodata of the participants and all dependent variables. The two goalkeepers were not analysed for any dependent variables. The Kolmogorov-Smirnov test was employed to verify if data was normally distributed while the Levene's test was applied to assess the homogeneity of variance. A one-way repeated measures analysis of variance (ANOVA) was then performed on each dependent variable (training intensity zones, frequency of technical actions and distance covered) among the four SSG formats. When significant differences were detected, Tukey's post hoc pair-wise comparisons were applied to examine the differences. Differences among the formats for all dependent variables were also compared in percentage. The level of statistical significance was set at $p \leq 0.05$. Analyses were performed using IBM SPSS Statistics for Windows (Version 22.0).

Results

Participants' characteristics

The participants were the 11 starting players and the first reserve goal keeper of a top performing state team participating in the Malaysian Super League. These players have been training and playing together at least three years. Table 1 is a summary of the participants' age, height, and body mass. However, as stated earlier, the two goalkeepers were not analysed for the dependent variables.

Table 1: Physical characteristics of the participants (mean + SD).

Subject (N = 12)	Values
	Mean ± SD
Age (yr)	24.3 ± 4.0
Height (cm)	171.2 ± 5.9
Body Mass (kg)	61.9 ± 7.4

Time spent in different intensity zones

The analysis of time spent in each intensity zone during SSG1T, SSG2T, SSG3T and SSGFT is illustrated in Table 2. Repeated measures indicated no significant difference among the four SSGs formats [$F(3, 27) = 2.897, p = .053$] for time spent in the low-

intensity zone. However, significant differences were observed among the different formats for time spent in moderate [$F(3, 27) = 13.642, p = .001$] and high [$F(3, 27) = 13.431, p = .001$] intensity zones. Post hoc tests (Tukey's HSD) revealed that players spent significantly more time performing moderate-intensity activities during SSG1T compared to SSG2T ($p = .009$) and SSGFT ($p = .002$), but was not significantly different from SSG3T. Significant differences among the four playing formats for time spent in the high intensity zone were also found [$F(3, 27) = 13.431, p = .001$]. Post hoc comparisons indicated that significantly more time was spent in the high intensity zone when players performed SSG2T and SSGFT when compared SSG1T ($p = .002$ and $p = .009$) respectively. The difference between SSG3T and SSG1T approached significance but there were no differences among SSG2T, SSG3T and SSGFT for time spent in the high intensity zone (Table 2). The percentages of time spent in each intensity zone is also presented in Table 2.

Table 2: Time spent in each intensity zone by each SSG rules (mean + SD)

Intensity zones	SSGFT	SSG1T	SSG2T	SSG3T	<i>p</i>
	Mean ± SD (% of 24min)	Mean ± SD (% of 24min)	Mean ± SD (% of 24min)	Mean ± SD (% of 24min)	
Low (min)	0.10 ± 0.08 (0.42%)	0.12 ± 0.07 (0.50%)	0.08 ± 0.06 (0.33%)	0.14 ± 0.05 (0.58%)	.053
Moderate (min)	5.92 ± 3.94 (24.67%)	16.67 ± 8.13 (69.46%)	3.15 ± 3.08 (12.98%)	10.49 ± 8.45 (43.71%)	.001*
High (min)	17.98 ± 3.98 (74.92%)	7.21 ± 8.16 (30.04%)	20.77 ± 3.03 (86.54%)	13.37 ± 8.67 (55.72%)	.001*

* denotes statistical significance

Analysis of Frequency of Technical Actions

Table 3 is a summary of the frequency of all technical actions analysed during the four SSG formats. Technical actions included passing, shots on goal, crossing, interceptions and goals scored, with passing also analyzed as successful, unsuccessful, and for total number of passes. Analysis on successful passing obtained significant difference [$F(3,27) = 500.498, p = .001$] between SSG1T with all other playing formats, with SSG1T scoring lowest. Post hoc analysis found no differences in successful passing among SSG2T, SSG3T and SSGFT. Additionally, SSG1T stimulated the most number of passes but also generated the highest number of unsuccessful passes ($p = .001$) with no differences among the other three formats.

For shots on goal, SSG2T, SSG3T and SSGFT obtained significantly higher attempts compared to SSG1T [$F(3,27) = 25.398, p = .001$], with SSGFT getting significantly higher frequencies than the other three formats. SSG2T and SSG3T obtained significantly higher attempts than SSG1T but no difference was observed between the two formats. Analysis did not reveal a similar pattern for successful shots as no significant differences were obtained among the four SSGs formats for frequency of goals scored [$F(3,27) = 0.740, p = .537$].

For crossing performance, SSG1T and SSGFT generated much higher frequencies than SSG2T and SSG3T [$F(3,27) = 7.691, p = .001$] without significant differences between these two formats. Repeated measures ANOVA indicated that there was a significant difference in frequency of performing interceptions among the four SSGs formats [$F(3,27) = 9.762, p = .001$]. SSG1T and SSG3T obtained the highest frequencies for interceptions but were not significantly different from each other while being significantly different from SSG2T and SSGFT.

Table 3: Frequency of technical actions during SSG1T, SSG2T, SSG3T and SSGFT.

Technical actions	SSGFT	SSG1T	SSG2T	SSG3T	<i>p</i>
Successful passing	225 (85.6%)	302 (81.2%)	272 (87.7%)	246 (89.1%)	.001*
Unsuccessful passing	38 (14.4%)	70 (18.8%)	38 (12.3%)	30 (11.0%)	.001*
Total passes	263 (100%)	372 (100%)	310 (100%)	276 (100%)	.001*
Shots on goal	39	23	31	28	.001*
Crossing	11	10	2	4	.001*
Interceptions	34	50	25	48	.001*
Goals scored	13	11	14	13	.537

* denotes statistical significance

Analysis of Distance Covered

The repeated measures result for SSG1T, SSG2T, SSG3T and SSGFT in Table 4 indicated no significant difference between the four SSGs rule changes [$F(3,27) = 0.686, p = .574$] for distance covered.

Table 4: Total distance covered during SSG1T, SSG2T, SSG3T and SSGFT.

	SSGFT (mean ± SD)	SSG1T (mean ± SD)	SSG2T (mean ± SD)	SSG3T (mean ± SD)	<i>p</i>
Distance covered (m)	2573 ± 215.9	2575 ± 163.1	2695 ± 127.4	2656 ± 155.4	.574

Discussion

The primary aim of this study was to examine soccer players' variability in physiological factors such as time-spent in different heart rate zones, frequency of technical actions and distance covered during 5 vs. 5 SSGs with different rule change formats (SSG1T, SSG2T, SSG3T and SSGFT). The main finding was that the four formats affected time-spent in three heart rate zones (low, moderate and high-intensity), frequency of technical actions (passing, shots on goal, crossing, interceptions, and goals scored) and distance covered differently within a sample that could be considered highly skilled. The confounding effect of poor skill can then be minimized.

The SSG formats in this study required soccer players to use different number of touches during play. The results suggest that all four experimental formats resulted in very little time spent in low intensity HR zones, but SSG2T and SSGFT promoted greater amount of time-spent in high-intensity zones, while SSG1T and SSG3T seems more suitable

when moderate intensity training is planned. This corroborates with previous findings that indicated changes in SSG rules appear to influence intensity and physiological demands in soccer players (Hill-Haas et al., 2009a, 2010; Dellal et al., 2012). The four formats resulted in training HR at high (SSG2T and SSGFT) and moderate (SSG1T and SSG3T) intensities for approximately 55-86% of SSG training time, reinforcing that these SSGs elicited a range of intensities (65–90% of HRmax) recommended for improving and maintaining aerobic and anaerobic capacity and power (Abrantes et al., 2012; Owen, Wong, McKenna & Dellal, 2011). The current results would suggest the use of SSG1T and SSG3T to emphasize aerobic capacity training, while SSG2T and SSGFT be used to stress the anaerobic system.

However, it needs to be highlighted that SSG1T resulted in the highest number of unsuccessful passes as the players seemed to make mistakes when they have to make quick decisions when receiving the ball on how and where to make the pass which also resulted in the occurrence of more interceptions compared to the other formats. More unsuccessful passes and interceptions seem to increase stoppage time, thereby decreasing the HR intensity (Katis & Kellis, 2009). SSGs that allow more touches result in players making fewer mistakes as they have more opportunities to receive and control the ball, and immediately making short and quick passes in addition to creating space and supporting team mates accentuates attacking movements, possibly resulting in higher heart rates, mechanical loads and training intensities (Lacome et al., 2018). Another reason related to SSG1T resulting in more interceptions could be due to a lack of or late support from team-mates as passes are made, giving opposing players the opportunity to pressure and make interceptions (Casamichana & Castellano, 2010). It seems possible that players with good ball control and skillful in giving support may be able to increase training intensity and the ball would be in play most of SSG training time (Clemente & Sarmiento, 2020).

Findings related to the number of shots on goal found that frequency was highest during SSGFT possibly because players had more time with the ball allowing them to control and redirect the ball, and dribble towards better positioning before making shots at goal with more accuracy. This seems the most likely reason for explaining the higher number of goal scored during SSGFT (Katis & Kellis, 2009). In contrast, SSG1T had the lowest frequency for shots on goal possibly because the players have to make a shot immediately after they received a ball regardless whether they were in a good position or not. As shots on goal is frequently related to crossing, SSGFT also showed the highest frequency for this technique, and similarly to shots on goal, players had more ball control touches to control and redirect the ball before making a cross. However, in spite of SSGFT creating the most shots on goal, SSG2T achieved the most number of goals but there was little difference with SSG3T and SSGFT. This also reinforces that more touches resulted in more ball control prior to goal shooting, promoting opportunities to place the ball into better goal scoring positions reinforcing again, the need for high levels of skills to achieve SSG training objectives (Clemente & Sarmiento, 2020).

Although there was no significant difference among the formats for total distance covered during SSG training, longer distances were covered during SSG2T followed by SSG3T, SSG1T and SSGFT respectively. The non-significant results could be because

all four SSG formats were played on a same sized pitch. Previous research has indicated that distances travelled by players during SSG is dependent upon the size of the pitch (Fleay, Joyce, Banyard, & Woods, 2018), therefore similarly sized pitches would likely observe similar distances regardless of SSG formats when the size of the pitch is the same. Additionally, the SSG duration (24 minutes) used in this study may not be sufficient to induce differences in distance covered as compared to the 90-min match duration (Hill-Haas et al., 2010).

Conclusions

The main findings of this study revealed that when utilizing starting players from a high-level national league team to compare SSG formats that allowed one, two, three and unlimited touches for a duration of 24 min on a 40 x 50m pitch stimulated moderate to high heart rate intensities that has been recommended for inducing positive aerobic and anaerobic adaptations. Specifically, it seemed that higher frequency of technical actions stimulated the anaerobic energy system while lower rates emphasized the aerobic energy system. However, these results may be linked to the number of touches allowed and the skill level of the players. More touches allowed better control of the ball better before passing or shooting, but if players are more skilful, they can control the ball with fewer touches. The results also reaffirmed that if pitch size remained the same, distances travelled by players utilizing a variety of SSG formats will probably be similar. Finally, as football training needs to focus on physiological, technical and tactical development to help players cope with match demands throughout a season, coaches could use these results to select specific SSG formats to help players achieved intended intensity and technical objectives programmed for different phases of periodized training. Subsequent research could replicate this study on elite level female players to observe similarities and differences.

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