Defensive Interactions in Soccer Small-Sided Games: an Integrated Approach Between the Fundamental Tactical Principles and the Social Network Analysis

Interações Defensivas em Pequenos Jogos no Futebol: uma Abordagem Integrada dos Princípios Táticos Fundamentais e da Social Network Analysis

Gibson Moreira Praça[1]
Raphael Brito e Sousa[1]
Sarah da Glória Teles Bredt[1]
Filipe Manuel Clemente[2]
Israel Teoldo[3]
Henrique de Oliveira Castro[4]
Gustavo De Conti Teixeira Costa[5]
Pedro Emílio Drumond Moreira[1]

Abstract – This study aimed to 1) present a new analysis of the interactions between the tactical principles of defensive coverage and delay using the Social Network Analysis (SNA); 2) compare the defensive cooperation patterns presented by players of different categories during a 3vs.3 soccer small-sided games SSG; 3) compare the level of defensive prominence presented by defenders, midfielders, and forwards in 3vs.3 SSG within and between different categories. Twenty-eight soccer athletes from U-13 (n=14) and U-14 (n=14) categories of a sports club performed 3vs.3 SSG for the analysis of the defensive tactical principles. Defensive interactions were considered successful defensive coverage and a delay actions performed within the same time interval. Macro (density and clustering coefficient) and micro (degree centrality, degree prestige and page rank) analyses were used as SNA measures. Results indicated no significant differences between categories for the macro and micro analyses. Only in the U-14 category, midfielders presented higher prominence levels than the other playing positions (p=0.004). We concluded that U-13 and U-14 athletes are not different regarding defensive cooperation patterns. A higher positional tactical knowledge obtained through deliberate practice is essential to induce different defensive interactions between playing positions, as shown by significant differences only in the U-14 category.

Key words: Physical education and training; Soccer; Task performance and analysis.

Resumo – Este estudo objetivou 1) apresentar uma nova análise das interações entre os princípios cobertura defensiva e contenção utilizando a Social Network Analysis (SNA); 2) comparar os padrões de cooperação defensiva apresentados por jogadores de diferentes categorias durante pequenos jogos (SSG) 3vs.3; 3) comparar o nível de proeminência entre defensores, meio-campistas e atacantes entre duas categorias e dentro de uma mesma categoria. Vinte e oito atletas das categorias sub-13 (n=14) e sub-14 (n=14) de um clube participaram em pequenos jogos 3vs.3 para a análise dos princípios táticos defensivos. As interações defensivas foram consideradas quando ocorreu uma cobertura defensiva e uma contenção em um mesmo intervalo de tempo. As análises macro (density e clustering coefficient) e micro (degree centrality, degree prestige e page rank) foram utilizadas como medidas da SNA. Os resultados indicaram ausência de diferenças entre categorias para ambas as análises macro e micro. Meio campistas apresentaram maiores níveis de proeminência apenas na categoria sub-14 (p=0,004). Nós concluímos que atletas sub-13 e sub-14 não apresentam diferenças significativas entre si para os padrões de cooperação defensiva. Um maior conhecimento tático posicional obtido por meio da prática deliberada é crucial para o desenvolvimento de interações defensivas diferentes entre as posições, como mostrado pelas diferenças entre posições apenas na categoria sub-14.

Palavras-chave: Educação Física e treinamento; Futebol; Análise de desempenho de tarefas.

1 Universidade Federal de Minas Gerais. Escola de Educação Física, Fisioterapia e Terapia Ocupacional. Belo Horizonte, MG. Brasil.

2 Instituto Politécnico de Viana do Castelo. Escola Superior de Desporto e Lazer. Instituto de Telecomunicações. Complexo Desportivo e Lazer Comendador Rui Solheiro. Melgaço. Portugal.

3 Universidade Federal de Viçosa. Departamento de Educação Física. Núcleo de Pesquisa e Estudos em Futebol. Viçosa, MG. Brasil.

4 Centro Universitário Estácio de Brasília. Brasília, DF. Brasil.

5 Universidade Federal de Goiás. Faculdade de Educação Física e Dança. Goiás, GO. Brasil.

INTRODUCTION

The analysis of players' behavior in soccer small-sided games (SSG) allows coaches to better prescribe training contents[1]. For example, previous studies have shown that changes in the number of players per team modifies the frequency of the fundamental tactical principles[2]. Moreover, the teams' composition criteria influences tactical performance[3] and the presence of floaters changes players prominence levels and cooperation patterns, as shown by the *Social Network Analysis* (SNA)[1]. These data support the understanding that different SSG represent different pedagogical requirements during the training process of tactical skills. In soccer official matches, a few studies have used the SNA as a means of coding players' interaction patterns of cooperation and opposition[4–6]. Macro and micro interaction patterns (i.e., interaction patterns related to the whole team or between individual players, respectively) may be analyzed through the passes performed between players and allow the understanding of interactions during the offensive phase. Moreover, players' actions are supported by some tactical principles, defined as a group of game rules that allow players to quickly reach tactical solutions for the game problem-situations[7]. Although these principles represent individual actions, they lead to a common plan among players, who adopt preferential behaviors[7]. Before the unpredictable nature of the game[8], the tactical principles lead players to act as a unit, both in the collective and individual aspects, making their behavior partially predictable to reach a common tactical goal. In this sense, when players successfully perform the tactical principles they establish cooperation patterns, what may be measured using the SNA. Therefore, the SNA may be used to understand the relationship between specific tactical principles. For example, considering that the defensive coverage and delay actions may be complementary defensive principles[7], the SNA may be used to improve the understanding on how players interact to each other by applying these principles during the game adding further information on the frequency-based analysis presented so far in the literature.

Although the SNA have been applied to obtain data on players' offensive behavior, no studies have investigated the cooperation patterns during the defensive phase, which is important to fully understand the game dynamics in a soccer match. In regard to the defensive fundamental tactical principles, the defensive coverage is characterized by a defensive support to the player who performs the delay action[9], which is in turn the direct opposition to the player with ball possession[9]. The defensive coverage is based on the understanding that the game center must be protected. Performance indicators for this principle are reflected by players' ability to reduce the number of passing possibilities of the opponent with the ball and positioning for a second delay in case the first defender is overcome[10]. Thus, there is a direct interaction between the player who performs the defensive coverage and the player who performs the delay. This relationship between players who perform the defensive coverage and delay principles

may be investigated using the SNA. Nevertheless, the use of this integrated approach has not been discussed in the literature.

Furthermore, previous studies showed different tactical behaviors in soccer SSG played by athletes of different ages[11,12]. These differences resulted from the deliberate practice and represent the evolution of the understanding of the soccer game logic. Therefore, it could be expected that more experienced athletes would present a higher tactical performance[12], as well as higher levels of defensive interactions between players in SSG. Moreover, Praça et al.[1] showed that players from different positions present different levels of prominence during the offensive phase of a 3vs.3 SSG. Yet, another study found that midfielders perform more defensive coverage actions in soccer SSG[13]. These results allow us to hypothesize that midfielders would present a higher defensive prominence during SSG, although this issue has not been investigated.

Considering the abovementioned issues, this study aimed to 1) present a new analysis of the interactions between players who perform the tactical principles of defensive coverage and delay using the SNA; 2) compare the collective (macro) defensive cooperation patterns presented by players of different categories during a 3vs.3 soccer SSG; 3) compare the individual (micro) defensive prominence levels presented by defenders, midfielders, and forwards in a 3vs.3 SSG within different categories.

METHODOLOGICAL PROCEDURES

Participants
Twenty-eight male soccer athletes from the U-13 (13.1±0.6 years) and U-14 (14.3±0.7 years) categories participated in this study. There were two goalkeepers (not assessed in this study), four defenders, four midfielders, and four forwards in each category, as defined by the head coach. Athletes and their legal guardians signed an informed consent about all the research procedures before participation. This study was approved by the local ethics committee (Federal University of Minas Gerais, project number 64639417.0.0000.5149).

Procedures
Praça et al.[3] showed that the team composition criterion based on players' tactical skills increases tactical performance during soccer SSG. Therefore, on the first day, we assessed players' tactical performance using the System of Tactical Assessment in Soccer (FUTSAT)[9], which consists of a 4-minute 3vs.3 game. Players of the same position (e.g., four defenders, four midfielders, four forwards) within each category were divided in 2 teams to perform the test. Two players of the same position, who were part of participants' squad but did not have their data included in the analysis (these players participated in all ethical procedures), completed the a 3vs.3 game performed in the FUT-SAT. These players were randomly assigned to any of the two teams, so that three FUT-SAT tests were performed for

each category, one within each playing position. The test was filmed so that two examiners assessed the percentage of successful tactical actions performed by each player. The percentage of successful tactical actions was used to create a rank from first (e.g., player who presented the best tactical performance in the FUT-SAT test) to fourth (e.g., player who presented the worst tactical performance in the FUT-SAT test) within each playing position (excluding the players that took part only in the FUT-SAT test). This rank was used to form balanced teams according to players' positions and tactical performance within each category, as described in Table 1.

Table 1. Teams composition within each category.

|	Team A	Team B	Team C	Team D
Defender	d^1	d^2	d^3	d^4
Midfielder	m^2	m^1	m^4	m^3
Forward	f^1	f^2	f^3	f^4

Note. d – defender; m – midfielder; f – forward; numbers 1-4 – position in the rank of tactical performance within each playing position.

One week after the first session – used just for the team composition -, the two teams composed of players with the highest tactical performance (e.g., A and B) and the two teams composed of players with the lowest tactical performance (e.g., C and D) within each category played against each other two 3vs.3 SSG. Each SSG was played as four 4-minute bouts with 4-minute of passive recovery in-between. The field dimensions were 36x27 meters, with goals sized 6x2 meters. All soccer rules were adopted – including offside – except for throw-ins, which had to be performed with the feet. Extra balls were placed around the field to quickly restart the game in case the ball went out of play. All the SSG were filmed with a digital camera (JVC® HD Everio GZ-HD520) for further analyses.

Instruments

The frequencies of the individual defensive tactical principles in each SSG bout were analyzed by two observers using the macro category of the FUTSAT observation system[9]. This analysis was carried out within the software Soccer Analyser®, which allows the insertion a virtual grid on the video with the game center and ball line.

The new analysis proposed in this article aimed to present the possible relationship between the defensive coverage and delay principles using the SNA adjacencies matrix of the interactions between players. For this analysis, we considered an interaction between players when there were both a successful defensive coverage and a delay within the same time interval. The interaction direction was "from" the defensive coverage "to" delay, as shown in Figure 1. The adjacencies matrix was analyzed using the software "*Social Network Visualizer*" (SocNetV 1.9 © 2005-2015 by Dimitris V. Kalamaras).
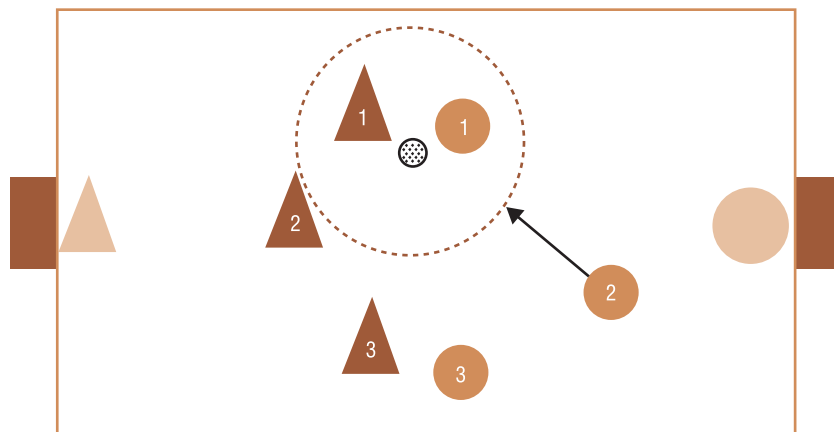
Figure 1. Example of a defensive interaction.
Note. Circles and triangles represent players from opposing teams in the 3vs.3 small sided game. Grey circle and grey triangle are the goalkeepers of each team. Black rectangles represent the goals. Large dotted line circle indicates the game center. A defensive interaction is performed from player 3 (circle) to player 1 (circle). The defensive coverage (i.e., support to player 1 in the game center) performed by player 3 is an interaction with player 1.

General Network Properties

The general network properties of the SNA indicate the macro level of analysis, which are the interactions between players from a collective perspective (e.g., considering the whole team). The macro analysis includes the density and clustering coefficient, as described below.

- Density: is the ratio between the observed links (total links) and the maximum number of links (all possible links) (six in a three-a-side small-sided game). Values range from 0 (no density, lack of cooperation) to 1 (maximal cooperation)[14];
- Clustering Coefficient: expresses how close the teammates are, indicating the level of interconnectivity between close teammates. Values range from 0 (no density, lack of cooperation) to 1 (maximal cooperation)[14].

Centrality Measures

The centrality measures are related to the level of prominence of a player in the game and indicates how effectively each player participated in the defensive process.

- Degree Centrality: indicates the number of connections performed by a player. For this study, indicates the proportion of successful defensive coverage performed by each player. Values range from 0 (lack of activity) and 1 (maximum exclusive centrality within the network).
- Degree Prestige: indicates the total number of connections received by a player. For this study indicates the proportion of successful defensive coverage received by each player. Values range from 0 (lack of activity) and 1 (maximum exclusive prestige within the network).
- Page Rank: indicates a player defensive popularity or the probability of

a player to be activated. Values range from 0 (lack of probability) and 1 (maximum exclusive popularity within the network).

Data analyses

Data were first checked for normality (Shapiro-Wilk test) and homocedasticity of variances (Levene test). For the macro interaction analyses, the density data met all the parametric assumptions and, therefore, the independent t test were used for comparisons between categories. In this case, Cohen d effect size was calculated and classified as trivial (d<0,2), small (0,2<d<0,6), moderate (0,6<d<1,2), large (1,2<d<2,0), very large (2,0<d<4,0), or almost perfect (4,0<d)[15]. The clustering coefficient variable presented significant deviations from normality. Thus, the comparison between categories were performed using the Mann-Whitney test. In this case, effect sizer r were calculated and classified as small (r<0,10), medium (0,10<r<0,30), or large (r>0,30)[16].

For the micro interaction analyses, the within-category comparison between playing positions was performed using a one-way ANOVA. In this case, the partial eta squared effect size (η^2_p) was calculated and classified as no effect (η^2_p<0,04), minimum effect (0,04< η^2_p<0,25), moderate effect (0,25< η^2_p<0,64), and large effect (η^2_p<0,64)[17]. In all cases, statistical significance was set at 5%.

Within and between-observer reliability for the two observers were verified through the Kappa of Cohen coefficient[18], based on the reanalysis of 12,5% of data (two SSG bouts), after 21 days from the first analysis. Within and between-observer reliability showed Kappa values above 0,94 (95%CI 0,93-0,95) and above 0,89 (95%CI 0,86-0,91), respectively, for all variables, and were classified as "perfect"[19].

RESULTS

Considering the macro interaction analysis, there were no significant differences (small to medium effect size) for density and clustering coefficient between categories, as shown in Table 2.

Table 2. Comparisons of the mean (standard deviation) values for Density and Clustering Coefficient between U-13 and U-14 categories.

	Density	Clustering Coefficient
U-13	0,58 (0,03)	0,04 (0,08)
U-14	0,66 (0,23)	0,08 (0,09)
p-value	0,636	0,686
Effect Size	d = 0,487	r = 0,241

Note. d: Cohen effect size; r: non-parametric effect size

Table 3 presents the within-category comparisons between playing positions for the prominence levels (e.g., micro analysis). Significantly higher values for Degree Prestige were found for midfielders in the U-14 category (p=0,004; large effect size) compared to the other positions, as

well as a moderate effect size for the comparison between different positions within each category for degree centrality. No significant differences between playing positions were found for the U-13 category.

Table 3. Comparisons of the mean (standard deviation) values for Degree Centrality, Degree Prestige, and Page Rank between playing positions within the U-13 and U-14 categories.

Sub-13		
Degree Centrality	Degree Prestige	Page Rank
Defenders[1] 0,34 (0,12)	0,41 (0,37)	0,35 (0,15)
Midfielders[2] 0,21 (0,18)	0,45 (0,37)	0,40 (0,14)
Forwards[3] 0,44 (0,21)	0,12 (0,18)	0,23 (0,15)
p-value 0,228	0,343	0,312
Effect size 0,280*	0,211	0,228

Sub-14		
Degree Centrality	Degree Prestige	Page Rank
Defenders[1] 0,22 (0,18)	0,28 (0,09)	0,34 (0,12)
Midfielders[2] 0,29 (0,20)	0,55 (0,09)	0,37 (0,07)
Forwards[3] 0,47 (0,16)	0,16 (0,15)	0,27 (0,10)
p-value 0,186	0,004[&]	0,423
Effect size 0,312*	0,715**	0,174
Paired comparisons	$2>^{1,3}$	

Note. & significant differences within category; * moderate effect size; ** large effect size.

DISCUSSION

This study had three objectives. First, we aimed to present a new analysis of the defensive interactions in soccer SSG. We suggest that the analysis of the interactions between players who perform specific tactical principles using the SNA improves the understanding of the defensive cooperation patterns, complementing the offensive phase analysis performed in previous studies on different soccer SSG[1] and adding information to the isolated frequency-based analysis of the fundamental tactical principles. In addition, we aimed to compare the collective defensive cooperation patterns between categories and the prominence levels between players of different positions within two formative categories. A higher positional specialization during the defensive phase in the older category corroborated our hypothesis, despite no differences between categories for collective defensive patterns.

For the macro analysis (e.g., collective cooperation patterns – density and clustering coefficient), U-13 and U-14 categories did not show significant differences. This result suggests that one year of deliberate practice could not change players distribution on the field and their interactions with teammates. This result corroborates other studies that did not show differences on players' tactical behavior regarding defensive principles of defensive coverage and delay after a period of 20 training sessions in U-14 players[23]. Another study also showed no differences in the frequency of the

abovementioned principles between U-13 and U-15 players[11]. These results suggest that a longer time (e.g., two years or more) of deliberate practice may be necessary to promote significant differences in players' collective defensive patterns in youth athletes. Future studies should address this issue in order to better understand how players develop team defensive skills.

On the other hand, the micro interaction analyses according to playing positions within categories showed a higher prominence of midfielders in the U-14 category. These results are in line with the results of previous studies on the formal game[24] and SSG[1], in which midfielders presented a more active role for constructing offensive actions, taking the ball from the defensive to the offensive field[24]. Midfielders are also important for organizing the defensive actions during the defensive transition because they are usually closer to the game center and, therefore, can properly direct opponents to lower risk areas and create numerical superiority in the game center. Nevertheless, the prominence levels showed no differences in the U-13 players of different playing positions. Previous studies suggested that the development of expertise in a sport leads to the increase in the frequency of position-specific behaviors, associated to the increase in players' participation in deliberate practice[20]. Therefore, considering that U-13 players are in a more initial phase of the training process compared with U-14 players (one more year of deliberate practice), we may consider that the positional learning process is less developed among them. Studies with older samples are required to better understand the role of deliberate practice on the development of positional specificities in young players. Additionally, previous studies suggested that the 3vs.3 SSG present more general tactical demands compared to the formal game (e.g., 11vs.11), which decreases the number of position-specific actions[21,22]. It could be expected that the differences between playing positions (e.g., defenders, midfielders, forwards) would be more noticeable in SSG that are more similar to the formal game, such as 5vs.5 and 7vs.7. Therefore, the general characteristics of the 3vs.3 and the initial phase of positional training may justify the lack of differences between categories. Future studies should investigate athletes of different categories to better understand these results.

The use of both Social Network Analysis[25,26] and the fundamental tactical principles[7,27] analyses improves the understanding of the defensive cooperation patterns in soccer. Although this study was conducted in only one club and only on the 3vs.3 SSG, this new methodological and conceptual analysis seems interesting to improve the understanding of the soccer game. Future studies may use both analyses (SNA and fundamental tactical principles) to better prescribe the technical-tactical contents in game-based approaches during training and understand the tactical relationships that emerge from the game.

CONCLUSION

We concluded that U-13 and U-14 soccer athletes present similar col-

lective patterns of defensive cooperation and that positional specificities characterized by defensive prominence levels are more noticeable in older players. These results suggest that one year of deliberate practice may be sufficient to develop individual position-specific behaviors although more time may be necessary to change collective defensive cooperation patterns in young soccer athletes.

COMPLIANCE WITH ETHICAL STANDARDS

Conflict of interest statement
The authors have no conflict of interests to declare.

Author Contributions
Conceived and designed the experiments: GMP, FMC, IT, RBS, HOC, GTCC and PEDM. Performed the experiments: GMP, RBS, SGTB, and PEDM. Analyzed the data: GMP, SGTB, FMC and IT. Contributed reagents/materials/analysis tools: GMP, SGTB, HOC, GTCC, FMC and IT. Wrote the paper: GMP, RBS, SGTB, FMC, IT, HOC, GTCC, PEDM.

REFERENCES

1. Praça GM, Clemente FM, de Andrade AGP, Morales JCP, Greco PJ. Network analysis in small-sided and conditioned soccer games: The influence of additional players and playing position. Kinesiology 2017;49(2):185-92.
2. Silva B, Garganta J, Santos R, Teoldo I. Comparing Tactical Behaviour of Soccer Players in 3 vs. 3 and 6 vs. 6 Small-Sided Games. J Hum Kinet 2014;41:191–202.
3. Praça GM, Morales JCP, Moreira PED, Peixoto GHC, Bredt ST, Chagas MH, et al. Tactical behavior in soccer small-sided games: influence of team composition criteria. Rev Bras Cineantropom Desempenho Hum 2017;19(3):354–63.
4. Cotta C, Mora AM, Merelo JJ, Merelo-Molina C. A network analysis of the 2010 FIFA world cup champion team play. J Syst Sci Complex 2013;26(1):21–42.
5. Gama J, Passos P, Davids K, Relvas H, Ribeiro J, Vaz V, et al. Network analysis and intra-team activity in attacking phases of professional football. Int J Perform Anal Sport 2014;14(3):692–708.
6. Clemente FM, Martins FM, Kalamaras D, Wong del P, Mendes RS. General network analysis of national soccer teams in FIFA World Cup 2014. Int J Perform Anal Sport 2015;15:80–96.
7. Teoldo I, Garganta JM, Greco PJ, Mesquita I. Princípios táticos do jogo de futebol: conceitos e aplicação. Motriz: J Phys Ed 2009;15(3):657-68.
8. Garganta J. Trends of tactical performance analysis in team sports: bridging the gap between research, training and competition. Rev Port Ciênc Desporto 2009;9(1):81–9.
9. Teoldo I, Garganta JM, Greco PJ, Mesquita I, Maia J. System of tactical assessment in Soccer (FUT-SAT): Development and preliminary validation. Motri 2011;7(1):69–83.
10. Teoldo I, Garganta J, Greco PJ, Mesquita I. Avaliação do desempenho tático no futebol: concepção e desenvolvimento da grelha de observação do teste "gr3-3gr." Rev Min Educ Fís 2009;17(2):36–64.

11. Borges PH, Guilherme J, Rechenchosky L, da Costa LCA, Rinadi W. Fundamental Tactical Principles of Soccer: a Comparison of Different Age Groups. J Hum Kinet 2017;58(1):207–14.

12. Américo HB, Cardoso F, Machado G, Andrade MOC, Resende ER, Teoldo I. Análise do comportamento tático dos jogadores de futebol de categoria de base. J Phys Educ 2016;27(1):e2710.

13. Praça GM, Pérez-Morales JC, Greco PJ. Influência do estatuto posicional no comportamento tático durante jogos reduzidos no futebol: um estudo de caso em atletas sub-17 de elite. Rev Port Ciênci Desporto 2016;16(S2A):194–206.

14. Clemente FM, Martins FM, Mendes RS. Social network analysis applied to team sports analysis. London, UK: Springer; 2016.

15. Cohen J. Statistical Power Analysis for the Behavioral Sciences. 2nd ed. Hillsdale, NJ: Lawrence Erlbaum Associates Publishers; 1988.

16. Field A. Discovering Statistics Using SPSS. 3rd ed. London: Sage; 2009. 822 p.

17. Ferguson CJ. An effect size primer: A guide for clinicians and researchers. Prof Psychol Res Pr 2009;40(5):532–38.

18. Robinson G, O'Donoghue PG. A weighted kappa statistic for reliability testing in performance analysis of sport. Int J Perform Anal Sport 2007;7(11):12–9.

19. Landis JR, Koch GC. The measurement of observer agreement for categorical data. Biometrics 1977;33(1):159-74.

20. Kannekens R, Elferink-Gemser MT, Visscher C. Positioning and deciding: key factors for talent development in soccer. Scand J Med Sci Sports 2011;21(6):846–52.

21. Praça GM, Folgado H, de Andrade AGP, Greco PJ. Influence of additional players on collective tactical behavior in small-sided soccer games. Rev Bras Cineantropom Desempenho Hum 2016;18(1):62-71.

22. Silva MV, Sousa RB, Praça GM, Morales JCP, Chagas MH, Greco PJ. Are there differences in the technical actions performed by players from different playing position during small-sided games? Rev Bras Cineantropom Desempenho Hum 2018;20(3):300–8.

23. Souza CRBC, Muller ES, Costa IT, Graça ABS. Quais comportamentos táticos de jogadores de futebol da categoria sub-14 podem melhorar após 20 sessões de treino? Rev Bras Ciênc Esporte;36(1):71-86.

24. Peixoto D, Praça GM, Bredt ST, Clemente FM. Comparison of network processes between successful and unsuccessful offensive sequences in elite soccer. Hum Mov 2017;18(5):48–54.

25. Lusher D, Robins G, Kremer P. The application of social network analysis to team sports. Meas Phys Educ Exerc Sci 2010;14(4):211–24.

26. Duch J, Waitzman JS, Amaral LA. Quantifying the performance of individual players in a team activity. PLoS One 2010;5(6):e10937.

27. Clemente FM, Martins FML, Mendes RS, Figueiredo AJ. A systemic overview of football game: the principles behind the game. J Hum Sport Exerc 2014;9(2):656–67.

CORRESPONDING AUTHOR

Gibson Moreira Praça
Universidade Federal de Minas Gerais
Escola de Educação Física
Fisioterapia e Terapia Ocupacional,
Campus Pampulha.
Av. Antônio Carlos 6627 - CEP: 31270-901
Belo Horizonte, Minas Gerais, Brasil
E-mail: gibson_moreira@yahoo.com.br