Sports Training

Analysis of goal scoring patterns and match outcome during the Intercontinental Beach Soccer Cup Dubai 2019

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Abstract - Aim: To characterize the goal-scoring patterns and investigate the goal process on match outcome during the Intercontinental Beach Soccer Cup Dubai 2019. **Methods:** A set of 35 goal-scoring patterns were grouped into nine macro-categories: Match-period, Court-zone, Set-play, Open-play, Touching by players before the goal, Offensive method, Goalkeeper-line, Number of passes before the goal, and Ball trajectory. Match outcome in regular time was considered the matches resulting in a loss (n=16), draw (n=8), or win (n=16). The offensive sequences that resulted in the goal were analyzed in all 20 matches during the competition (n=138 goals). **Results:** The most goals were scored in Open-play (69%), during the 2nd and 3rd periods (36% for each), near to goal (Zone 4; 50%), preceded by 1-touch (67%) and 0-pass (29%), using positional attack (46%), without goalkeeper-line (68%), and with high-ball trajectory (51%). In addition, won matches presented a higher number of goals in Zone 4, 1-touch, Counterattack, 4v4 goal-successful, Receiving pass, Sand-touch, and High-ball compared to draw and loss matches ($p<0.001-0.03$; Effect Size [ES]=1.24−2.58, large). **Conclusion:** In summary, winning teams scored their goals mainly in open-play situations and without a goalkeeper-line, using counterattacks to achieve zones near the opponent's goals, and implementing a direct offensive style. In addition, goals scored were usually preceded by 1-touch, both through high-ball and sand-touch ball trajectory. Coaches and practitioners may consider these goal processes to train prescription and deep understanding of the process to goal in elite Beach soccer.

Keywords: match analysis, notational analysis, contextual factors, performance, sports science.

Introduction

Beach soccer substantially increased its number of participants, being considered amongst the world's most rapidly growing sports[1,2]. Previous studies provided important insights into the elements that possibly influence the individual and team performance mainly focused on physiological, injury occurrences[3-6], and tactical-technical aspects[7-10].

A typical beach soccer game is identified with a severe effort coupled with the unexpected transfer of the ball in many directions[2]. For that reason, the process of the goal may come from a variety of possibilities. Rosario et al.[11] showed that during the ~61% of the offensive actions two players were involved and ~54 % of the offensive actions were performed by one pass. In addition, the most goals during the European Beach Soccer League (edition 2018) were scored from a set-play (~39%; e.g., penalty-kicks, free-kicks), using counterattack (~23%), positional attack (~21%), goalkeeper-line (~14%), and goalkeeper-line defense (~3%)[7]. According to match-periods, Leite[9] verified a greater number of goals in the 3rd (~36%) than 2nd (~33%) and 1st (~30%) periods during

eight editions of Beach Soccer Worldwide (editions 2005-2015). However, a deep understanding of the process to goal, considering a representative set of variables, should be better accounted for to inform professional practice.

Furthermore, the intended selection of key performance indicators during the matches is a critical decision during the development of performance analysis in sports[12]. The variables linked to the goal process that discriminated match outcome (i.e., losing, drawing, winning) should provide important insights to coaches and practitioners. Musa et al.[1] demonstrated that shot at the front third court-zone, pass at the front third court-zone, chances created, goals scored during the 1st, 2nd, and 3rd periods, as well as incomplete saves, could potentially influence the chances of winning or losing the matches during Asian elite beach soccer. However, despite the importance of these findings, the cited study did not consider key variables of the beach soccer matches, such as offensive method (i.e., counterattack, positional attack), set-play condition (e.g., free-kicks, long-kicks), goalkeeper-line, ball trajectory, number of passes/touches before the goal. An increase of possible discriminators of match performance may conduct to better information for coaches, thus possibly improving decisions about which drills can be conceived to improve the team and which strategy may employ before and during the matches to increase the opportunities for success. Therefore, to increase the knowledge about the performance in beach soccer, the present study aimed to characterize the goal scoring patterns and investigate the goal process on match outcome during the Intercontinental Beach Soccer Cup Dubai 2019.

Methods

Observational design

This study observed multiple players and teams (i.e., nomothetic) during the group and knockout phases (i.e., intra- and inter-sessional) of the Intercontinental Beach Soccer Cup Dubai 2019[13]. In addition, according to the specific taxonomy of the area, this observational design presented a plurality of unities (i.e., followed-up intra-sessional and inter-sessional, because teams' and players' behaviors were analyzed throughout the match and throughout the group and knockout phase of the competition), as multiple criteria (nine macro-categories; see Table 1) were taken into account[13].

Match sample

The process to goal was analyzed in 20 matches played by eight teams (i.e., Iran, Spain, United Arab Emirates [UAE], Russia, Japan, Egypt, Italy, and Mexico) during the group and knockout phases. All the goal-scoring

Table 1 - Selected goal scoring patterns and operational description in Beach Soccer (adapted from[1,7]).

Goal scoring patterns		Descriptions
Set-play	Corner-kicks	Goals-scored directly or indirectly from the corner of the court
	Throw-ins	Goals-scored directly from the sidelines of the court (with the hands or feet)
	Free-kicks	Goals-scored from free-kicks
	Penalty-kicks	The penalty goals are taken at a distance of nine meters from the opponent's goal
	Ball output	Goals-scored after start/restart, goal-kick, and match interruptions (e.g., time-out)
Open-play	1v1 situation	Goals-scored from individual dispute between 1-attacker and 1-defender.
	Long-kicks	Goals-scored from kicks that originate in Zone 1 or Zone 2 (see Figure 1)
	Rebound	Goals-scored after rebound opponent's goalkeeper or defender
	Bicycle-kicks	Goals-scored from bicycle movement
	Second-post	Goals-scored by players positioned on the second post after receiving a pass
	Receiving pass	Goals-scored by a player receiving a pass
	Goal-against	Goals-scored by players who had ball possession in their own goal
Match-period	1st period	Goals-scored during the first match period
	2nd period	Goals-scored during the second match period
	3rd period	Goals-scored during the third match period
	Extra-time	Goals-scored during the match extra-time
Court-zone	Zone 1	Goals-scored from the goalkeeper's area of the possession team (see Figure 1)
	Zone 2	Goals-scored between the goalkeeper's area and the court middle of the possession team (see Figure 1)
	Zone 3	Goals-scored were between the court middle and goalkeeper's area of the defense team (see Figure 1)

(*continued*)

Table 1 - continued

Goal scoring patterns		Descriptions
	Zone 4	Goals-scored from the goalkeeper's area of the defense team (see Figure 1)
Touches by players before the goal	1-touch	Goal-scored when the player uses 1-touch on the ball
	2-touches	Goal-scored when the player uses 2-touches on the ball
	≥ 3-touches	Goal-scored when the player use ≥3-touches on the ball
Offensive method	Counterattack	Goals-scored when the defending team gains possession of the ball and quickly executes a quick transition
	Positional attack	Goals-scored is when the possession team is confronted with an organized defense usually in 4v4 confrontation in Zone 3 and Zone 4
Goalkeeper-line	5v4 goal-successful	Goals-scored when the team uses the goalkeeper outside the goal area, giving them the possibility to finish the goal or make passes with line players to obtain numerical superiority over the opponent
	4v4 goal-successful	Goals-scored without numerical superiority over the opponent
	5v4 failure-attempt	Occurs when the opposing team uses the goalkeeper-line attack and the defending team recovers the ball and executes the goal quickly in the absence of the goalkeeper
Number of passes before the goal	0-pass	Goal scored without any pass
	1-pass	Goal scored after 1-pass
	2-passes	Goal scored after 2-passes
	3-passes	Goal scored after 3-passes
	≥ 4-passes	Goal scored after ≥ 4-passes
Ball trajectory	Sand-touch	Goals-scored with the ball touching the sand
	High-ball	Goals-scored without the ball touching the sand

patterns of the teams were recorded and analyzed throughout the tournament (i.e., 138 goals, mean ∼7 goals per match). The data collection process was performed using public videotaping analysis (https://www.youtube.com/c/BeachSoccerTV). This study was conducted in compliance with the Declaration of Helsinki and approved by the local university research committee (Federal University of Espírito Santo - CAAE: 30865414.4.0000.5440).

Dependent and independent variables

A set of 35 goal-scoring patterns were analyzed (dependent variables). The indicators were grouped in nine macro-categories organized to respond three main practical questions of the process to goal: "When?" (macro-category: match-period), "Where?" (macro-category: court-zone [Figure 1]), and "How?" (macro-categories: Set-play, Open-play, Touches by players before goal, Offensive method, Goalkeeper-line, Number of passes before goal, Ball trajectory). The macro-categories were defined consulting Beach Soccer coaches (i.e., content validity). Five experts with academic degree and a mean of 10 years (standard deviation = 2 years) of coach practice in youth and/or professional Beach Soccer levels individually analyzed the content of the macro-categories, according to the following aspects: i) the importance and definition of the variables; and ii) the spatial references used in the definition of court-zone category. All the contents that raised questions of a semantic nature were reformulated and presented again to the experts (in person or via email) until a consensus was reached. After unanimous approval, the variables were incorporated to analysis (Table 1). Match outcome (independent variable) in regular time (i.e., 1st, 2nd, 3rd periods) was the result of each team[14], including matches resulting in a loss (n = 16), draw (n = 8) or win (n = 16).

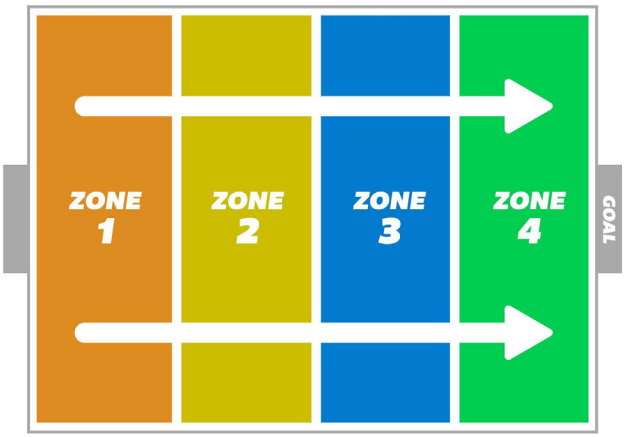

Figure 1 - Court-zone delimitations in Beach Soccer.

Statistical analysis

Data normality was verified using the Shapiro-Wilk test and when necessary non-parametrical tests were

employed. Multivariate normal distribution was confirmed using the software SYSTAT 13. The comparisons of goal statistics according to match outcome (i.e., loss vs. draw vs. won) were performed using the Kruskal-Wallis test. The significance level was set at 5% ($p < 0.05$). In addition, the effect size (ES) was calculated using pairwise comparisons ($ES = z/\sqrt{n}$) and classified as trivial (< 0.1), small (0.1-0.29), moderate (0.3-0.49), and large (≥ 0.5). The statistical software reported the values of "z" and the "n" refers to the sample size[15]. Finally, Kappa correlation coefficients (κ) were calculated for inter-observer and intra-observer reliability. κ values of 0.81-1.0 are generally interpreted as very good, 0.61-0.80 as good, 0.41-0.60 as moderate, 0.21-0.40 as fair, and less than 0.21 as poor[16]. The software SPSS 22.0 for Windows (IBM Statistics, Chicago, IL) was used for statistical analysis. To provide a results section clearly and concisely only were presented. Find the description of the other variables in Supplementary Table 1.

Result

Twenty matches during the Intercontinental Beach Soccer Cup Dubai 2019 resulted in 138 goals (~7 goals per match). Table 2 presents the goal occurrence for each category analyzed. For inter-observer and intra-observer tests, κ values were very good for all the criteria considered. Specifically, 95 goals were scored in Open-play

Table 2 - Frequency of goal occurrence and values of Kappa coefficients for nine macro categories during the Intercontinental Beach Soccer Cup Dubai 2019.

	Frequency of goal occurrence	Kappa coefficients intra-observer	Kappa coefficients inter-observers
1. Set-play	43	0.90	0.89
2. Open-play	95	0.94	0.90
3. Match-period			
1st period	37	0.99	0.98
2nd period	49	1.00	1.00
3rd period	49	0.98	0.99
Extra-time	3	0.99	1.00
4. Court-zone			
Zone 1	7	0.92	0.94
Zone 2	14	0.93	0.90
Zone 3	48	0.90	0.95
Zone 4	69	0.95	0.97
5. Touches before the goal			
1-touch	92	0.99	1.00
2-touches	23	1.00	1.00
≥ 3-touches	23	1.00	1.00
6. Offensive method			
Counterattack	31	0.92	0.90
Positional attack	64	0.91	0.89
7. Goalkeeper-line			
5v4 goal-successful	33	0.94	0.95
4v4 goal-successful	94	0.93	0.90
5v4 failure-attempt	8	0.90	0.92
8. Number of passes before the goal			
0-pass	40	1.00	1.00
1-touch	39	0.99	0.98
2-touches	23	1.00	1.00
3-touches	13	1.00	0.99
≥ 4-touches	23	0.99	0.98
9. Ball trajectory			
Sand-touch	71	1.00	1.00
High-ball	67	1.00	1.00

and 43 in Set-play conditions. According to match-period, 37, 49, 49, and 3 of the goals were scored during the 1st, 2nd, 3rd, and Extra-time periods, respectively. Also, 7 goals were noted in Zone 1, 14 in Zone 2, 48 in Zone 3, and 69 in Zone 4. The analysis of the touches by players before the goal showed 92, 23, and 23 goals preceded by 1-touch, 2-touches, and ≥ 3-touches, respectively. Thirty-one goals were scored using Counterattack and 64 using Positional attack (the other 43 goals resulted in set-play conditions). The variables of the Goalkeeper-line demonstrated 33 goals noted in 5v4 goal-successful; while 94 and 11 were performed in 4v4 goal-successful and 5v4 failure-attempt conditions, respectively. The macro-category of the number of passes before goal showed 40, 39, 23, 13, and 23 goals preceded by 0-pass, 1-pass, 2-passes, 3-passes, ≥ 4-passes, respectively. Seventy-one and 67 goals were scored with the ball trajectory in Sand-touch and High-ball, respectively.

The effects of 35 goal scoring patterns on match outcome (loss vs. draw vs. won) showed significant differences only in nine variables (see Supplementary Table 1). Therefore, we opted to describe the following results of these variables. Won matches presented higher number of goals in Zone 4 ($p = 0.001$; ES = 2.26 [large]), 1-touch ($p = 0.003$; ES = 1.85 [large]), Counterattack ($p = 0.009$; ES = 1.48 [large]), 4v4 goal-successful ($p < 0.001$; ES = 2.58 [large]), Sand-touch ($p = 0.02$; ES = 1.24 [large]), and High-ball ($p = 0.004$; ES = 1.72 [large]) compared to draw and loss matches (Figure 2). In addition, greater number of goals Receiving pass ($p = 0.03$; ES = 1.16 [large]) was observed in won matches than loss and draw (Figure 3). Also, the frequency of goals during the 3rd period was higher in won vs. loss matches ($p = 0.01$; ES = 1.35 [large]) (Figure 2). Draw matches resulted in higher values of goals in Zone 2 compared to loss matches ($p = 0.008$; ES = 1.54 [large]) (Figure 3).

Discussion

The current study is the first to characterize the goal scoring patterns and investigate the goal process on match outcome during the Intercontinental Beach Soccer Cup Dubai 2019. The main results were: i) won matches presented a higher number of goals in Zone 4, 1-touch, Counterattack, 4v4 goal-successful, Receiving pass, Sand-touch, and High-ball compared to draw and loss matches; ii) the frequency of goals during the 3rd period was higher in won vs. loss matches.

Coaches and practitioners have used goalkeeper-line to increase the possibility to finish the goal or make passes with line players to obtain numerical superiority over the opponent. A previous study observed that ∼14% of the goals during the European Beach Soccer League (edition 2018) were scored using a goalkeeper-line and this strategy explained 42% of the tournament points[7]. In this study, 24% of the goals were noted using this condition (i.e., 5v4 goal-successful). However, we observed that winning teams scored more goals using the 4v4 condition (i.e., 4v4 goal-successful) than drawing and losing teams. Therefore, the strategy of using a goalkeeper-line can be performed in specific match moments, to maintain ball possession, advance on the opponents' court, and/or score goals; although coaches and players must consider that most goals occur in the 4v4 condition and this discriminated the match outcome.

The macro-categories Court-zone and Match-period also demonstrated an influence on winning, drawing, and losing teams. During the tournament, sixty-nine goals (50%) were scored in Zone 4 (i.e., opponents' goalkeeper area) and mostly performed by winning than drawing and losing teams. Furthermore, ∼72% of the goals were scored during the 2nd and 3rd periods (∼36% for each); while ∼27% were performed during the 1st period (extra-time presented only ∼1% of the goals). In this study, winning teams scored more goals during the 3rd period than losing teams. A previous study in the Asian elite Beach Soccer demonstrated that shot at the front third (i.e., similar to Zone 4), passes at the front third, chances created, goals scored during the 1st, 2nd, and 3rd periods, as well as incomplete saves, could potentially influence the chances of winning or losing the matches[1]. In addition, Leite[9] verified a greater number of goals in the 3rd (∼36%) than 2nd (∼33%) and 1st (∼30%) periods during eight editions of Beach Soccer Worldwide (editions 2005-2015). This author suggested that the higher incidence of goals in the last match period (excluding extra-time) is associated mainly with the interaction of physical and psychological factors, such as previously demonstrated in soccer matches, although objective measurements of these factors remain to be elucidated. In addition, it is relatively difficult to highlight the factors that seem to affect the higher number of goals scored in the last periods, without considering match status. The need for a team to seek to equalize the score, to take the game to the extra-time, may expose them defensively, leaving spaces for the opposing teams to score their goals through counterattacks, 1-touch, and high-balls.

Traditionally, the greatest number of goals in Beach Soccer were scored in set-play conditions. Lastella, Escobar, and Levell[7] verified that the number of goals scored from a set-play was considerably higher than any other goal-scoring strategy (i.e., counterattack, positional attack, goalkeeper-line, goalkeeper-line defense) during 52 matches of the European Beach Soccer League (edition 2018). However, in our study, most of the goals during the Intercontinental Beach Soccer Cup Dubai (edition 2019) were scored in the Open-play condition (69%). Also, during the Beach Soccer Worldwide (edition 2020), ∼63% of the goals were scored in Open-play actions (∼37% Set-play; unpublished data). During the FIFA Beach Soccer World

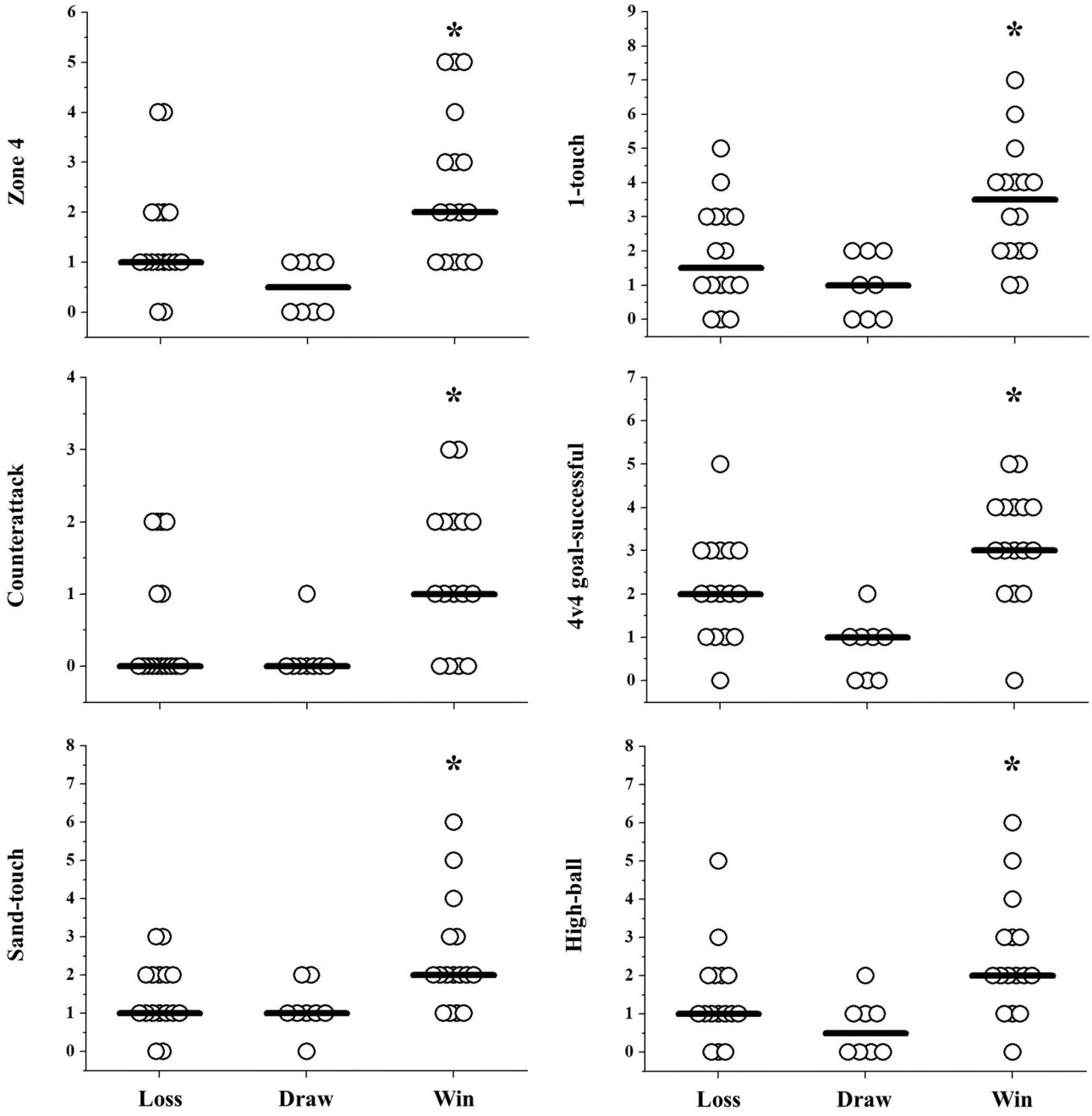

Figure 2 - Frequency of goal scoring patterns that differentiate the winning outcome from loss and draw during the Intercontinental Beach Soccer Cup Dubai 2019. Symbols represent the frequency in each match and the horizontal line represents the median values. *Significant differences ($p < 0.05$) from other outcomes.

Cup Russia 2021, the number of goals scored as a result of set plays was 127 out of the total of 302, or ~42% (unpublished data: please, see FIFA reports - https://www.fifatrainingcentre.com/en/game/tournaments/fifa-beach-soccer-world-cup/set-play-goal-analysis.php). It is evident that the set-play conditions are important for the final match outcome. However, these results may reflect a potential behavioral change in the process of goals during elite Beach Soccer matches. Coaches and practitioners need to devote time and thought to the organization of attacking and defensive open-play actions.

In the macro-categories of Open-play, regarding ball-touches by players before the goal and Offensive methods, we verified that the variable Receiving pass, 1-touch, and counterattack presented greater occurrence in winning vs. drawing and losing teams. A previous study also showed in Beach Soccer players that during the ~61% of the offensive actions two players were involved

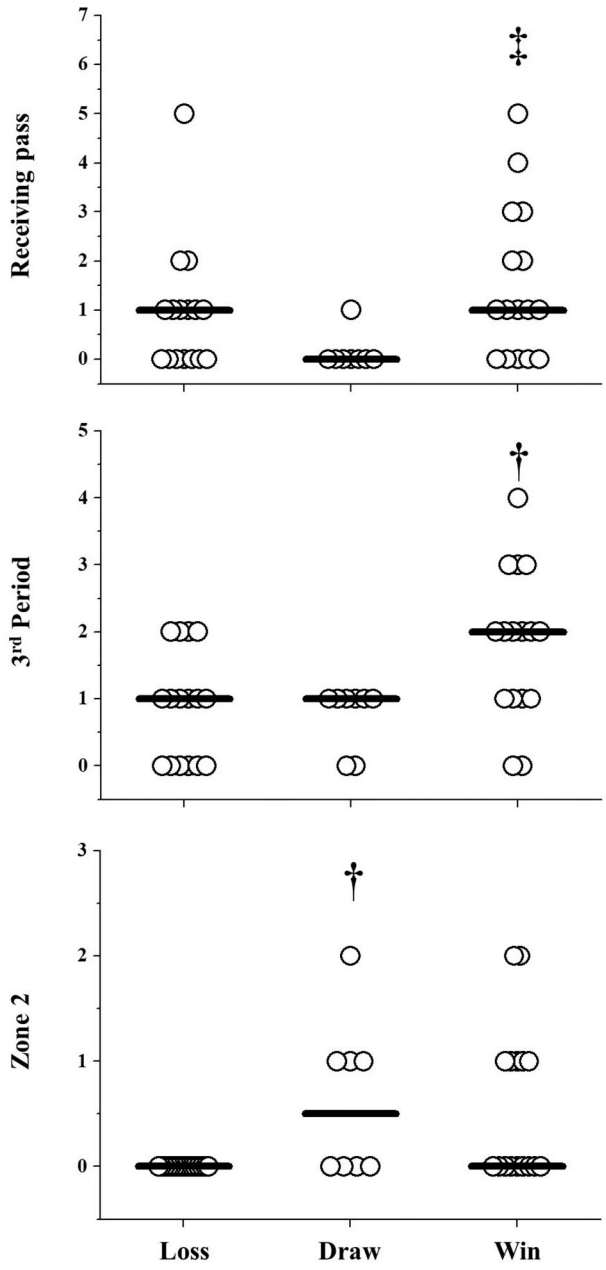

Figure 3 - Frequency of goal scoring patterns during the Intercontinental Beach Soccer Cup Dubai 2019. Symbols represent the frequency in each match and horizontal lines represent the median values. †Significant differences ($p < 0.05$) from loss; ‡Significant differences ($p < 0.05$) from draw.

and ~54% of the offensive actions were performed by one pass[11]. Therefore, coaches and practitioners should consider the importance of the process to goal receiving the pass, by 1-touch, and the counterattack offensive method during the process to goal in training and matches.

The possible influence of the sand court in the ball direction potentially alter the process to goal compared to other team invasion sports (e.g., futsal, soccer). Therefore, we can expect that the kicks touching the sand can result in a higher difficulty level of goalkeeper defense, resulting in a greater frequency of occurrence than high-ball during the process to the goal. However, we verified an equilibrium between the goals scored with the ball touching the sand (51%) or not (49%). Also, the two ball trajectories showed greater values in winning compared to drawing and losing. Therefore, the players' option for the kick-type should consider the interaction between task (e.g., long-kick, penalty-kick), a player (e.g., personal preferences), and environmental constraints (e.g., sand-type).

The most evident limitation of this study was related to the analysis performed only in one tournament (i.e., Intercontinental Beach Soccer Cup Dubai 2019). Further studies may provide these analyses in other editions and/or tournaments to verify the consistency of the results. In addition, other contextual factors (e.g., opponent quality) as modulation variables could provide important insights into match analysis of beach soccer. On the other hand, we consider the strengths of this study the set of variables related to the goal process, including nine representative macro-categories and 35 variables suggested by expert coaches. Moreover, this study analyzed a full-elite competition representing the highest level of the specific sport which is a strength of the present findings.

Conclusions

In summary, winning teams scored their goals mainly in open-play situations and without a goalkeeper-line, using counterattacks to achieve zones near the opponent's goals, and implementing a direct offensive style. Also, goals scored were usually preceded by 1-touch, both through high-ball and sand-touch ball trajectory. Coaches and practitioners may consider these variables for training prescription and a deep understanding of the process to goal in elite Beach soccer.

Acknowledgments

This research was supported partly by the Secretaria Nacional de Futebol e Defesa dos Direitos do Torcedor (Programa Academia & Futebol – Edital n° 1/2020), the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior - Brasil (CAPES – finantial code 001), and the Fundação de Amparo à Pesquisa e Inovação do Espírito Santo (FAPES – Edital n° 07/2022; grant number: 252/2022 P: 2022-1VR80).

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Supplementary material

Supplementary Table 1 - Significant differences only in nine variables.

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Manuscript received on December 9, 2021
Manuscript accepted on April 22, 2022