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## SHORT COMMUNICATION

### **An exploration of goal scoring strategies in an elite beach soccer tournament**

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## **Abstract**

Despite the increasing popularity of beach soccer, few studies have examined goal scoring strategies during match-play. The aims of this study were to examine the different types of goals scored during an international tournament and determine what type of goals were associated with team performance. Twelve national teams were analysed across 52 matches in all phases of the European Beach Soccer League (2018) tournament. Observational data collection was conducted through video analysis of all 422 goals scored throughout the tournament. Chi square analyses revealed a significance difference in the type of goals scored  $\chi^2(72) = 102, p = 0.01$ . Further, the amount of goals scored from a set-play were significantly higher than all other goal scoring strategies ( $p = 0.001$ ). The amount of goals scored from goalkeeper-line defence were significantly lower than all other goal scoring strategies ( $p = 0.001$ ). The percentage of goalkeeper-line goals was significantly related to total tournament points [ $F_{(2, 10)} = 7.242, p = 0.023, R^2 = 0.42$ ]. These data indicate that teams employing the goalkeeper-line strategy, where the goalkeeper plays outfield to serve as a numerical advantage, was associated with increases in scoring opportunities and team performance.

## **Introduction**

The popularity of beach soccer has grown substantially since the first official tournament held in Los Angeles by the Beach Soccer World Wide (BSWW) in 1992 (McGowan, Ellison, & Lastella, 2019). Despite this increasing popularity, a limited number of applied studies have examined beach soccer, with existing data restricted to the physiological demands of players (Castellano & Casamichana, 2010; Scarfone, Tessitore, Minganti, Capranica, & Ammendolia, 2015) and goal scoring strategies observed during matches (Leite, 2016; Musa et al., 2019). For example, Leite (2016) revealed that most goals were scored in the final (third) period of play and that the first goal of the game increased a team's winning probability to 60% (Leite, 2016). Likewise, Musa et al. (2019) examined the impact of tactical performance indicators such as shots from the back, middle and front third of the field as well as complete and incomplete saves associated with winning and losing teams. However, there were no analyses conducted on the importance of the goalkeeper in relation to goal scoring in previous work (Musa et al., 2019). Given beach soccer is one of the world's fastest growing sports (Musa et al. 2019), it is important to provide insight into goal scoring strategies for coaches and performance analysts to enable optimal tactical preparation leading into tournaments.

Beach soccer is differentiated from regular 11 v 11 soccer in that there are four outfield players and a goalkeeper, unlimited player substitutions to facilitate sustained high movement intensities, and a smaller field of play (35-37 m long and 26-28 m wide) of at least 40-cm deep sand. Matches are divided into three periods of 12 minutes with 3-minute rest intervals between periods, interrupted only via refereeing interventions (e.g., penalties or goals), or calling for medical assistance (Musa et al., 2019). The smaller field and subsequent closer proximity of players to the goal enables a higher frequency of shots on goal and scoring.

The Asian Football Confederation (AFC) technical report of the Beach Soccer Championship in Malaysia (2017) indicated 199 goals were scored in 23 matches (8.6 goals per match). This

figure was significantly higher than the average 2.6 goals scored per game during the FIFA 2018 World Cup in Russia (Statista, 2019). The AFC report demonstrates 39% of goals at the Beach Soccer Championship were scored through open or what is referred to as combination play and 15% of goals were scored by the goalkeeper via a direct shot. While the report offers general statistics on goal frequency and the way goals were scored, no in-depth analysis of the tactical aspects related to the positional offense, transition, set-play goals or employment of the goalkeeper during offensive play is provided. Given the differences between disciplines, existing findings regarding tactical aspects for goal scoring evident for regular soccer cannot be simply translated to beach soccer (Ali, Katis, Patsika, & Kellis, 2015; Tenga, Holme, Ronglan, & Bahr, 2010), indicating further research is needed on this topic specifically in beach soccer.

Novel data examining the tactical aspects specifically related to positional offense, transitions moments, set-plays and using the goalkeeper during offensive play will provide insights to the most effective strategies to win games. For example, if findings indicate that using the goalkeeper as part of the build-up phase associates with a greater number of goals or success for the team in possession, coaching staff could utilize this information in designing team tactical approaches that enhance performance. To date, a limited number of studies have empirically examined the different types of goals scored during in beach soccer and if different types of positional offence results in greater success. Therefore, the aims of this study were (1) to examine the different types of goals scored during an international tournament and (2) to determine what type of goals were associated with higher tournament points.

## **Methods**

### *Participants*

Twelve international teams (Azerbaijan, Belarus, France, Germany, Italy, Poland, Portugal, Russia, Spain, Switzerland, Turkey and Ukraine) were analysed across 52 matches in all phases

of the European Beach Soccer League (2018), including 12 matches from the group stage and 4 matches from the play-offs phase.

### *Video Analysis*

Data collection was conducted via video analysis of all the 422 goals scored throughout the competition, where footage was downloaded via the official website of BSWW ([www.beachsoccer.com](http://www.beachsoccer.com)). Video footage used multiple camera angles with the fixed panned widescreen angle used for data analysis. Two professional coaches with an average coaching experience of 10 years validated the tactical aspects classified using Windows Media Player (version 12, Microsoft, Washington, U.S.). The interrater reliability between the raters was 1.0.

The tactical aspects were examined by analyzing how goals were scored, operationalized into the following five categories: positional attack, counterattack, set-play, goalkeeper-line and goalkeeper-line defence, defined as:

- a) *Positional attack*: where the team in possession is confronted with an organized defence usually a 4 v 4 confrontation in the final third of the pitch (Junior & Cavalcanti, 2013).
- b) *Counterattack*: where the defending team gains possession of the ball and quickly executes a quick transition to score a goal.
- c) *Set-play*: scoring from penalty kicks, corners-kicks, throw-ins, kick-off and fouls. In the specific case of beach soccer, every foul creates a possibility of shooting at the opponent's goal. The team that received the foul will be given the possibility to perform the direct shot because during the foul the players will not be able to form a wall. The player who received the foul must take the free-kick unless they are injured, in which case a substitute takes the free-kick (Pedroza, 2012).
- d) *Goalkeeper-line*: where the goalkeeper steps over his boundary line to serve as a numerical advantage over the opponent. In practice, 5 v 4 is played on the line, since 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 to score the goal (Ganef, Reis, de Almeida, & Navarro, 2009).

- e) *Goalkeeper-line defence*: 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.

### *Statistics Analysis*

The observed data were recorded in a spreadsheet (Microsoft Excel, version 16.0; Microsoft) prepared specifically for the collection of this work. Statistical Package for Social Sciences (Version 25.0 IBM, USA) was used for inferential statistics. To assess the first research aim, Chi square ( $\chi^2$ ) analyses were conducted to examine the differences in the frequency of goal types (set-play, positional attack, counter-attack, goalkeeper-line, and goalkeeper-line defence goals). To further examine the first research aim, a one-way between groups Analysis of Variance (ANOVA) was conducted upon the number of set-play, positional attack, counter-attack, goalkeeper-line, and goalkeeper-line defence goals scored across the tournament. Tukey's Honestly Significant Difference (HSD) post hoc tests were used to determine where significant differences between goal types existed. Effect sizes were calculated as Cohens' *d* with 95% confidence intervals, with the effect magnitude interpreted as: *trivial*, <0.20; *small*, 0.2-0.59; *moderate*, 0.60-1.19; *large*, 1.20-1.99; and *very large*, >2.0 (Hopkins, Marshall, Batterham, & Hanin, 2009). Regarding the second research aim, a backwards stepwise multiple linear regression was conducted to determine the strongest predictor of total tournament points based on the percentage of successful goals from each of the goal scoring strategies. The dependant variable for regression analysis was total tournament points (e.g., 3 points = win, 1 point = draw) and the independent variables included were the percentage of different types of goals.

## Results

With regard to the first research aim, results to Chi Square analyses revealed a significant difference in the type of goals scored  $\chi^2(72) = 102, p = 0.01$ . Further examination of the first research aim conducted via the one-way between groups ANOVA demonstrated a significant difference in the type of goals scored ( $p = 0.001$ ) throughout the tournament (Table 1). The amount of goals scored from a set-play were significantly higher than counterattack goals ( $p = 0.032$ ), goalkeeper-line goals ( $p = 0.001$ ), and goalkeeper-line defence goals ( $p = 0.001$ ). No differences were observed between set-play and positional attack goals ( $p = 0.125$ ). In contrast, goals scored from goalkeeper-line defence were significantly lower than all other goal scoring strategies ( $p = 0.001$ ).

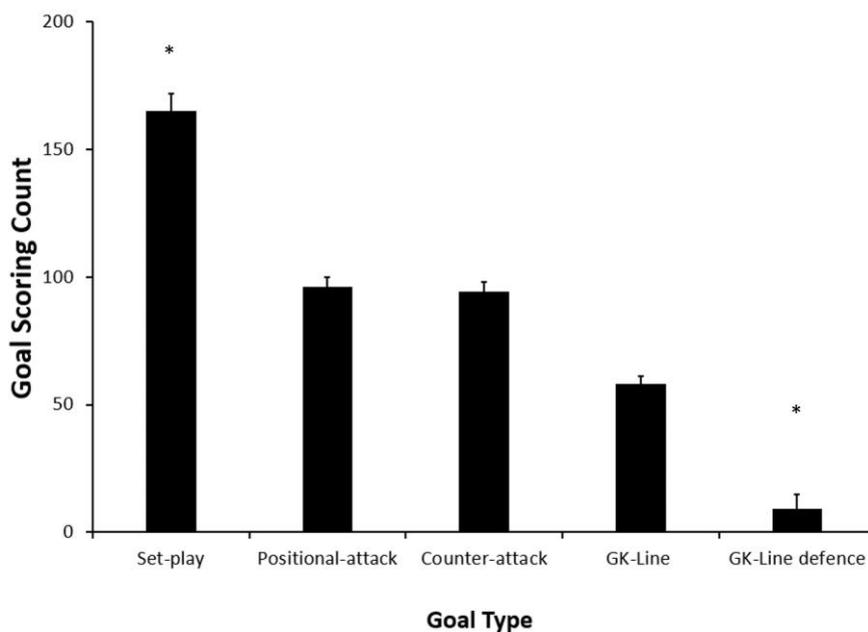


Figure 1. Total goal scoring count categorized by type of goal during the European Beach Soccer League (2018). Note: \* Significantly different from all other goal scoring strategies.

**Table 1.** Effect sizes with 95% confidence limits for pairwise comparisons between type of goals scored throughout the tournament.

	<b>Set-Play</b>	<b>Counter Attack</b>	<b>Positional Attack</b>	<b>Goalkeeper-line</b>	<b>Goalkeeper-line Defence</b>
Set-Play	-	1.0 (0.1-1.8) <i>p</i> =0.032	1.0 (0.1-1.8) <i>p</i> =0.125	1.6 (0.7-2.5) <i>p</i> =0.001	2.6 (1.4-3.6) <i>p</i> =0.001
Counter Attack	1.0 (0.1-1.8) <i>p</i> =0.032	-	-0.1 (-0.8-0.8) <i>p</i> =1.000	0.8 (-0.6-1.6) <i>p</i> =0.164	2.3 (1.2-3.3) <i>p</i> =0.001
Positional Attack	1.0 (0.1-1.8) <i>p</i> =0.125	-0.1 (-0.8-0.8) <i>p</i> =1.000	-	0.9 (0.0-1.7) <i>p</i> =0.034	2.5 (1.4-3.5) <i>p</i> =0.001
GK-Line	1.6 (0.7-2.5) <i>p</i> =0.001	0.8 (-0.1-1.6) <i>p</i> =0.164	0.9 (0.0-1.7) <i>p</i> =0.034	-	1.7 (0.7-2.6) <i>p</i> =0.001
GK-Line Defence	2.6 (1.4-3.6) <i>p</i> =0.001	2.3 (1.2-3.3) <i>p</i> =0.001	2.5 (1.4-3.5) <i>p</i> =0.001	1.7 (0.7-2.6) <i>p</i> =0.001	-

Note: Effects are interpreted as *trivial*, <0.20; *small*, 0.2-0.59; *moderate*, 0.60-1.19; *large*, 1.20-1.99; and *very large*, >2.0.

In terms of the second research aim, normality testing indicated that required data assumptions for the multiple regression were intact (Kolmorov-Smirnov,  $p = 0.20$ ). The regression model determined that the percentage of goalkeeper-line goals was significantly related to total tournament points [ $F_{(2, 10)} = 7.242$ ,  $p = 0.023$ ,  $R^2 = 0.42$ ], yielding a regression equation to predict team tournament goals as:  $0.532 \times \text{percent goalkeeper-line goals} + 1.680$ . All other goal scoring strategies were non-significant.

## Discussion

Despite the rapid global growth of beach soccer, few investigations have examined the tactical aspects related to goal scoring strategy and winning in the sport (Musa et al., 2019). To date, only the study of Musa et al. (2019) has examined performance predictors for winning and losing matches in beach soccer, where shots in the front third, passes in the front third and chances created were identified as key predictors for winning matches. However, Musa et al. (2019) provided no data regarding the tactical strategy of using the goalkeeper as a numerical advantage (e.g. 5 v 4) nor the percentage of goals scored via set-plays. Therefore, the aims of this study were to examine the different types of goals scored during the regular tournament phase and determine what type of goals result in higher tournament points.

The main findings of this study were that: (1) there was marked differences between type of goals scored during the tournament such that the number of goals scored from a set-play were

considerably higher than any other goal scoring strategy; (2) the number of goals scored when the goalkeeper in possession loses the ball was significantly lower than any other scoring method; and (3) teams who scored using the goalkeeper-line goals explained 42% of tournament points.

The percentage of goals scored from a set-play (39%) was higher than any other goal scoring strategy. This percentage for set-plays are slightly higher compared to previous data in regular 11 v 11 soccer, where studies show the percentage of goals scored from set-plays range between 27-36% (Ali et al., 2015; Armatas, Yiannakos, Papadopoulou, & Skoufas, 2009). Plausible explanations this higher percentage of goals scored from set-plays in beach soccer include the size of the field (~35-37 m) which potentially enables a higher frequency of shots from a set-play. A second potential explanation is that beach soccer match rules are designed to increase the number of shots on goal, for example a free kick is awarded when a player impedes an opposition player attempting a bicycle kick. A third explanation pertains to free kicks; when a free kick is awarded, teams are not allowed to set-up a wall or block a direct shot at goal. The increased likelihood of free kicks awarded with no wall and players capable of shooting from any area of the field typically results in a higher frequency of direct shots on goal.

### Practical Implications

Taking into consideration the amount of goals scored from set-plays, it is important for professional beach soccer players to practice isolated free-kick taking from various parts of the field. This finding further highlights the importance for coaching staff to allocate time throughout the training schedule for specific set-play practice.

In this study, teams employing the goalkeeper-line strategy, where the goalkeeper plays outfield to serve as a numerical advantage (e.g., 5 v 4) resulted in higher tournament points. In support of the numerical advantage, only 2% of all goals conceded were a result of goalkeepers

losing possession using the goalkeeper-line strategy. The practical implications of this finding are that beach soccer coaching staff may utilize the goalkeeper-line strategy with greater confidence as very few goals are conceded with the goalkeeper losing possession and likewise, there is a greater chance of the team progressing to later stages of the tournament. These data inform coaching staff to consider the goalkeepers' technical ability when making team selections to optimize the goal scoring potential of the team during matches.

**Disclosure statement**

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**Disclosure statement**

No potential conflict of interest was reported by the authors.

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