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# Association between effect of reception and game procedures in high-level Brazilian volleyball: The case of the women's "Superliga" champion team

## *Análise da associação do efeito da recepção com os procedimentos de jogo no voleibol de alto nível brasileiro: O caso da equipe campeã da Superliga Feminina*

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**Abstract** – The present study aimed to analyze the association between effect of reception and game procedures practiced by the women's "superliga" champion team in the side-out, as well as the behavior of the opposing central blocker, according to the performance level of the opposing team. The sample was composed of the observation of 21 games of the 2015-2016 Women's "Superliga" champion team. Data were analyzed using the Chi-square test, SPSS software version 20.0 for Windows and significance of p≤0.05. The results showed that there was an association between performance level of the opposing team with the effect of reception ($\chi^2$=12.96 and ϕ =0,14, p=0,01), as well the effect of reception with the central blocker disposal (χ2=13.70 and ϕ =0.14, p=0.01), with the attack tempo ($\chi^2$=353.27 and ϕ =0.72, p<0.001), with the attack site ($\chi^2$=91.05 and ϕ =0.36, p<0.001) and the attack effect ($\chi^2$=30.11 and ϕ =0.21, p<0.001) according to the performance level of the opposing team. Together, the results showed that there were differences in the game procedures according to the opposing team classification, contributing to a better understanding of the game played in high-level women's volleyball.

**Key words**: Analysis of situation; Efficacy; Volleyball.

**Resumo** – *O presente estudo objetivou analisar a associação entre o efeito da recepção e os procedimentos de jogo praticados pela equipe campeã da superliga feminina no side-out, bem como o comportamento do bloqueador central adversário, segundo o nível de desempenho da equipe adversária. A amostra constituiu-se pela observação de 21 jogos da equipe campeã da Superliga Feminina 2015-2016. Para análise dos dados utilizou-se o teste de Qui-Quadrado, software SPSS versão 20.0 para Windows e significância de p≤0,05. Os resultados mostraram que houve associação do nível de desempenho da equipe que sacou com o efeito da recepção ($\chi^2$=12,96 e ϕ =0,14, p=0,01), bem como do efeito da recepção com à disposição do bloqueador central (χ2=13,70 e ϕ =0,14, p=0,01), com o tempo de ataque ($\chi^2$=353,27 e ϕ =0,72, p<0,001), com o local do ataque ($\chi^2$=91,05 e ϕ =0,36, p<0,001) e com o efeito do ataque ($\chi^2$=30,11 e ϕ =0,21, p<0,001), segundo o nível de desempenho do adversário. Em conjunto, os resultados mostraram que houve diferença nos procedimentos de jogo conforme a classificação da equipe adversária, contribuindo para melhor compreensão do jogo praticado no voleibol feminino de alto nível.*

**Palavras-chave**: *Análise da situação; Eficácia; Voleibol.*

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# INTRODUCTION

The analysis of game in volleyball, although not recent[1], is still an incipient field of research. Analyses about the type of game practiced focus on men's volleyball[2,3], lacking studies about women's volleyball. In this context, studies have shown that in men's volleyball, the attack is the most researched fundamental, especially its association with the other game procedures[4,5]. Thus, it was observed that the attack point in the side out, that is, attack after reception, is related to the victory in the set and in the game[6]. Thus, high-quality receptions are considered predictive factors of the attack effectiveness, by allowing its organized construction[4].

The comparison of the game with respect to sex shows differences in game procedures[7]. Thus, in women's volleyball, there is a predominance of less potent serves, placed attacks and slower attack tempos when compared to men's volleyball[7-9]. However, in both sexes, there is the claim of receptions that allow the organized attack with all attack options, since it predicts the victory in the set [9]. In this way, reception differentiates the performance level of teams[10], fact observed in the change of the rule that allowed the introduction of a player specialized in reception and defense: the líbero[11].

Although most studies on volleyball focus on the analysis of game procedures in a general way[12-13], there is recognition of the importance of reception in the construction of offensive plays. However, it is still unclear in literature whether reception is affected by the competitive level of the opposing team, as well as what are the possible repercussions in the chaining of actions in women's volleyball games. Thus, the present study aimed to analyze, according to the performance level of the opposing team, the association between effect of reception and the game procedures practiced by the Women's "Superliga" champion team in the side-out, as well as the behavior of the opposing central blocker.

# METHODOLOGICAL PROCEDURES

## Sample

The sample was composed of the observation of 21 games of the 2015-2016 Women's "Superliga" champion team, of the total of 27 disputed games, totaling 691 serving actions of the opponents that culminated in reception, setting and attack actions. In the analyzed games, there were no mistaken receptions, that is, servings allowed the offensive organization and none resulted in a direct point for the serving team.

## Variables

Performance level of teams: Teams were divided according to the classification at the end of the championship. Thus, teams that finished the competition between 2$^{nd}$ and 4$^{th}$ positions were considered of high quality (HIGH), teams that finished the competition between the 5$^{th}$ and 8$^{th}$ positions were considered of moderate quality (MOD) and teams that finished the competition

between the 9th and 12th positions were considered of low quality (LOW).

Disposition of the central blocker: the instrument proposed by Afonso and Mesquita[14] was used to classify disposition in: centralized blocker (the blocker waits for the definition of the setting to read it and react the action) or blockage anticipation (the blocker anticipates the setting and initiates its displacement before the distribution occurs).

Place of attack: the instrument proposed by Costa et al.[5] was used. Thus, the attack sites were position 1, position 2, position 3, position 4 and position 6.

Effect of Reception: to evaluate the quality of reception, the instrument proposed by Maia and Mesquita[15] was adapted, in order to classify the fundamental in:

- Reception of excellent quality (A): reception that allowed the organized attack with all the attackers available for attack.
- Reception of moderate quality (B): Reception that allowed the organized attack, although not all the attackers were available for attack; more specifically, reduced the chances of rapid attacks.
- Low quality reception (C): reception that did not allow the organized attack, evidencing the location of the attack distribution.
- Attack tempo: According to Afonso et al.[16], the attack tempo was categorized as:
- 1st attack tempo: the attacker jumped during or immediately after the setting, and a step may occur after the setting;
- 2nd attack tempo: the attacker performed two or three steps after the setting;
- 3rd attack tempo: the attacker waited for the ball to reach the peak of the upward trajectory, and only then started the attack.

Type of attack: to analyze the type of attack, an adaptation of the instrument proposed by Costa et al.[6] was used, classifying it as:

- Powerful Attack in the Parallel (APP): attack performed in descending path, parallel to the side line with maximum power.
- Powerful Attack in the Diagonal (APD): Attack performed on downward trajectory, diagonally to the side line with maximum power.
- Placed Attack: the ball is contacted at the bottom.
- Attack effect: the instrument proposed by Marcelino, Mesquita and Sampaio [17] was used, classifying the attack effect as:
- Error: The attacker failed in the attack, striking the ball in the net, out or performing some infraction to the regulation.
- Block: Attacker failed in attack due to opponent block, resulting in opponent's point.
- Continuity: the attack action did not result in a terminal action and allowed game continuity.
- Point: the attack resulted in a direct point as the ball touched the opponent's field or was deflected by blocking off the court.

### Data collection procedure

All games were recorded from the top perspective, i.e., about 7-9 meters behind the court bottom line and the camera was positioned approximately three meters above ground level for better viewing of video scenes. A Sony camera with 1080p HD resolution and frequency of 60 Hz was used. Images were analyzed by two evaluators, physical education teachers, and volleyball experts with minimum of 5 years of experience in this specific function. For the reliability calculation, 20% of actions were re-analyzed, exceeding the reference value of 10%[18]. The Cohen Kappa values for inter and intra-observer reliability, respectively, were: effect of reception = 0.96 and 0.94; attack tempo = 0.92 and 0.90; type of attack = 0.98 and 0.94; attack effect = 1.00 and 1.00. In this way, the reliability values are above the reference value of 0.7519.

### Statistical Procedures

For the analysis of the association among study variables, the chi-square test with the Monte Carlo correction we used whenever less than 20% of cells had value lower than 5. The residual adjustments were calculated with the objective of identifying which cells presented statistical significance in explaining the relationship between two variables. In the treatment of data, the significance level was set at 5% ($p \leq 0.05$) and the power of the effect was calculated using *Phi* ($\phi$). SPSS (Statistical Package for the Social Sciences) software version 20.0 for Windows was used.

## RESULTS

The results showed that there was an association between effect of reception and game procedures, except when the type of attack performed was analyzed ($\chi 2 = 14.89$ and $\phi = 0.15$, $p = 0.14$). The descriptive analysis of the effect of reception in relation to the classification of the team that served (table 1) revealed that most receptions of the "superliga" champion team were A, regardless of quality of the opposing team. The inferential results showed that there was a significant association ($\chi 2 = 12.96$ and $\phi = 0.14$, $p = 0.01$) when the serving team was of high quality, and there was a positive association of servings performed by high quality teams with receptions B and negative association of receptions B with receptions A.

Regarding the effect of reception in relation to the disposition of the opposing team's central blocker (table 2), the evidence indicates that most blocks were centralized, regardless of quality of the opposing team. The inferential results showed that there was a significant association ($\chi 2 = 13.70$ and $\phi = 0.14$, $p = 0.01$) with moderate quality teams. Thus, there was a positive association of anticipated block with receptions A and the centralized block after receptions B and C. On the other hand, a negative association of centralized block was observed after receptions A and anticipated block after receptions B and C.

**Table 1.** Association between the effect of reception and the classification of the team that served

| Level of the team that served | | Effect of Reception | | | Total |
|---|---|---|---|---|---|
| | | Reception A | Reception B | Reception C | |
| HIGH | Occurred | 62 | 36 | 16 | 114 |
| | Expected | 74.2 | 23.1 | 16.7 | 114 |
| | % Total | 9.0% | 5.2% | 2.3% | 16.5% |
| | Adjusted Residues | -2.6* | 3.3* | -0.2 | |
| MOD | Occurred | 248 | 70 | 49 | 367 |
| | Expected | 239 | 74.4 | 53.6 | 367 |
| | % Total | 35.9% | 10.1% | 7.1% | 53.1% |
| | Adjusted Residues | 1.4 | -0.8 | -1.0 | |
| LOW | Occurred | 140 | 34 | 36 | 210 |
| | Expected | 136.8 | 42.5 | 30.7 | 210 |
| | % Total | 20.3% | 4.9% | 5.2% | 30.4% |
| | Adjusted Residues | 0.6 | -1.8 | 1.2 | |
| Total | Occurred | 450 | 140 | 101 | 691 |
| | % Total | 65.1% | 20.3% | 14.6% | 100.0% |

* difference for p <0.05

**Table 2.** Association between effect of reception and the disposition of the central blocker

| Effect of Recepticion | | | Central blocker | | Total |
|---|---|---|---|---|---|
| | | | Centralized | Anticipated | |
| HIGH | Reception A | Occurred | 43 | 19 | 62 |
| | | Expected | 45.7 | 16.3 | 62 |
| | | % Total | 37.70% | 16.70% | 54.40% |
| | | Adjusted Residues | -1.1 | 1.1 | |
| | Reception B | Occurred | 27 | 9 | 36 |
| | | Expected | 26.5 | 9.5 | 36 |
| | | % Total | 23.70% | 7.90% | 31.60% |
| | | Adjusted Residues | 0.2 | -0.2 | |
| | Reception C | Occurred | 14 | 2 | 16 |
| | | Expected | 11.8 | 4.2 | 16 |
| | | % Total | 12.30% | 1.80% | 14.00% |
| | | Adjusted Residues | 1.4 | -1.4 | |
| MOD | Reception A | Occurred | 137 | 111 | 248 |
| | | Expected | 154.1 | 93.9 | 248 |
| | | % Total | 37.30% | 30.20% | 67.60% |
| | | Adjusted Residues | -3.9* | 3.9* | |
| | Reception B | Occurred | 51 | 19 | 70 |
| | | Expected | 43.5 | 26.5 | 70 |
| | | % Total | 13.90% | 5.20% | 19.10% |
| | | Adjusted Residues | 2.1* | -2.1* | |
| | Reception C | Occurred | 40 | 9 | 49 |
| | | Expected | 30.4 | 18.6 | 49 |
| | | % Total | 10.90% | 2.50% | 13.40% |
| | | Adjusted Residues | 3.0* | -3.0* | |

Continue...

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| Effect of Recepticion | | | Central blocker | | Total |
|---|---|---|---|---|---|
| | | | Centralized | Anticipated | |
| LOW | Reception A | Occurred | 84 | 56 | 140 |
| | | Expected | 84.7 | 55.3 | 140 |
| | | % Total | 40.00% | 26.70% | 66.70% |
| | | Adjusted Residues | -0.2 | 0.2 | |
| | Reception B | Occurred | 21 | 13 | 34 |
| | | Expected | 20.6 | 13.4 | 34 |
| | | % Total | 10.00% | 6.20% | 16.20% |
| | | Adjusted Residues | 0.2 | -0.2 | |
| | Reception C | Occurred | 22 | 14 | 36 |
| | | Expected | 21.8 | 14.2 | 36 |
| | | % Total | 10.50% | 6.70% | 17.10% |
| | | Adjusted Residues | 0.1 | -0.1 | |
| Total | | Occurred | 439 | 252 | 691 |
| | | % Total | 63.50% | 36.50% | 100.00% |

* difference for p <0.05

As for the effect of reception in relation to the attack tempo (table 3), the analysis indicated that the 2nd attack tempo was the most recurrent, regardless of quality of the opposing team. However, after reception C, the "superliga" champion team, when playing against moderate and low quality opponents, resorted to the 3rd attack tempo more often. The inferential results showed that there was a significant association ($\chi 2 = 353.27$ and $\phi = 0.72$, $p < 0.001$) according to the quality of the opponent. Thus, the "superliga" champion team, when playing against high quality teams, showed a positive association of receptions C with the 3rd attack tempo and negative association of receptions A and B with the 3rd attack tempo, as well as receptions C with the 2nd attack tempo. When playing against teams of moderate quality, a positive association of receptions A with the 1st attack tempo and receptions B with the 2nd attack tempo was observed. On the other hand, there was a negative association of receptions B and C with the 1st attack tempo, the receptions C with the 2nd attack tempo and receptions A with the 3rd attack tempo. When playing against low-quality teams, a positive association of receptions A with the 1st attack tempo, receptions B with the 2nd attack tempo and receptions C with the 3rd attack tempo was observed. On the other hand, negative association of receptions C with the 1st and 2nd attack tempo and receptions A with the 3rd attack tempo was observed.

Regarding the effect of reception with the place of attack (table 4), data have shown that attacks by positions 4 were the most recurrent, regardless of quality of the opponent. However, when playing against high- and low-quality teams, after receptions A, the "superliga" champion team resorted to the 3rd position attack more frequently and after receptions B and C, there was more request of positions 2 and 4 in attacks. The inferential results showed that there was a significant association ($\chi 2 = 91.05$ and $\phi = 0.36$, $p < 0.001$) according to the quality of the opponent. Thus, the "superliga" champion team, when

playing against high-quality teams, showed a positive association of receptions A with position 3 and receptions C with position 4, as well as negative association of receptions C with position 3 and receptions A with position 4. When playing against moderate-quality teams, positive association of receptions B with position 2, receptions A with position 3 and of receptions C with position 4 was observed. On the other hand, negative association of receptions C with position 2, receptions B and C with position 3 and receptions A with position 4 was observed. When playing against low-quality teams, there was a positive association of receptions A with position 3 and receptions C with position 4. On the other hand, there was a negative association of receptions B and C with position 3 and receptions A with position 4.

**Table 3.** Association between the effect of reception and attack tempo

| Effect of Reception | | | Attack Tempo | | | Total |
|---|---|---|---|---|---|---|
| | | | 1st tempo | 2nd tempo | 3rd tempo | |
| HIGH | Reception A | Occurred | 13 | 47 | 2 | 62 |
| | | Expected | 10.3 | 46.2 | 5.4 | 62 |
| | | % Total | 11.40% | 41.20% | 1.80% | 54.40% |
| | | Adjusted Residues | 1.3 | 0.3 | -2.3* | |
| | Reception B | Occurred | 6 | 30 | 0 | 36 |
| | | Expected | 6 | 26.8 | 3.2 | 36 |
| | | % Total | 5.30% | 26.30% | 0.00% | 31.60% |
| | | Adjusted Residues | 0 | 1.5 | -2.2* | |
| | Reception C | Occurred | 0 | 8 | 8 | 16 |
| | | Expected | 2.7 | 11.9 | 1.4 | 16 |
| | | % Total | 0.00% | 7.00% | 7.00% | 14.00% |
| | | Adjusted Residues | -1.9 | -2.4* | 6.3* | |
| MOD | Reception A | Occurred | 55 | 191 | 2 | 248 |
| | | Expected | 39.9 | 186.5 | 21.6 | 248 |
| | | % Total | 15.00% | 52.00% | 0.50% | 67.60% |
| | | Adjusted Residues | 4.6* | 1.2 | -7.8* | |
| | Reception B | Occurred | 4 | 66 | 0 | 70 |
| | | Expected | 11.3 | 52.6 | 6.1 | 70 |
| | | % Total | 1.10% | 18.00% | 0.00% | 19.10% |
| | | Adjusted Residues | -2.6* | 4.1* | -2.9* | |
| | Reception C | Occurred | 0 | 19 | 30 | 49 |
| | | Expected | 7.9 | 36.9 | 4.3 | 49 |
| | | % Total | 0.00% | 5.20% | 8.20% | 13.40% |
| | | Adjusted Residues | -3.3* | -6.3* | 14.0* | |
| LOW | Reception A | Occurred | 39 | 100 | 1 | 140 |
| | | Expected | 28.7 | 94.7 | 16.7 | 140 |
| | | % Total | 18.60% | 47.60% | 0.50% | 66.70% |
| | | Adjusted Residues | 3.7* | 1.7 | -7.1* | |
| | Reception B | Occurred | 4 | 28 | 2 | 34 |
| | | Expected | 7 | 23 | 4 | 34 |
| | | % Total | 1.90% | 13.30% | 1.00% | 16.20% |
| | | Adjusted Residues | -1.4 | 2.0* | -1.2 | |
| | Reception C | Occurred | 0 | 14 | 22 | 36 |
| | | Expected | 7.4 | 24.3 | 4.3 | 36 |
| | | % Total | 0.00% | 6.70% | 10.50% | 17.10% |
| | | Adjusted Residues | -3.3* | -4.0* | 10.0* | |
| Total | | Occurred | 121 | 503 | 67 | 691 |
| | | % Total | 17.50% | 72.80% | 9.70% | 100.00% |

* difference for p <0.05

**Table 4.** Association between effect of reception and place of attack

| Effect of reception | | | Place of Attack | | | | | Total |
|---|---|---|---|---|---|---|---|---|
| | | | P.1 | P.2 | P.3 | P.4 | P.6 | |
| HIGH | Reception A | Occurred | 4 | 15 | 22 | 18 | 2 | 61 |
| | | Expected | 2.2 | 14.6 | 16.7 | 23.8 | 3.8 | 61 |
| | | % Total | 3.50% | 13.30% | 19.50% | 15.90% | 1.80% | 54.00% |
| | | Adjusted Residues | 1.9 | 0.2 | 2.2* | -2.2* | -1.4 | |
| | Reception B | Occurred | 0 | 9 | 9 | 15 | 3 | 36 |
| | | Expected | 1.3 | 8.6 | 9.9 | 14 | 2.2 | 36 |
| | | % Total | 0.00% | 8.00% | 8.00% | 13.30% | 2.70% | 31.90% |
| | | Adjusted Residues | -1.4 | 0.2 | -0.4 | 0.4 | 0.6 | |
| | Reception C | Occurred | 0 | 3 | 0 | 11 | 2 | 16 |
| | | Expected | 0.6 | 3.8 | 4.4 | 6.2 | 1 | 16 |
| | | % Total | 0.00% | 2.70% | 0.00% | 9.70% | 1.80% | 14.20% |
| | | Adjusted Residues | -0.8 | -0.5 | -2.7* | 2.6* | 1.1 | |
| MOD | Reception A | Occurred | 7 | 72 | 71 | 77 | 21 | 248 |
| | | Expected | 7.4 | 75.7 | 50.7 | 95.3 | 18.9 | 248 |
| | | % Total | 1.90% | 19.60% | 19.30% | 21.00% | 5.70% | 67.60% |
| | | Adjusted Residues | -0.3 | -0.9 | 5.6* | -4.2* | 0.9 | |
| | Reception B | Occurred | 1 | 31 | 4 | 32 | 2 | 70 |
| | | Expected | 2.1 | 21.4 | 14.3 | 26.9 | 5.3 | 70 |
| | | % Total | 0.30% | 8.40% | 1.10% | 8.70% | 0.50% | 19.10% |
| | | Adjusted Residues | -0.9 | 2.8* | -3.4* | 1.4 | -1.7 | |
| | Reception C | Occurred | 3 | 9 | 0 | 32 | 5 | 49 |
| | | Expected | 1.5 | 15 | 10 | 18.8 | 3.7 | 49 |
| | | % Total | 0.80% | 2.50% | 0.00% | 8.70% | 1.40% | 13.40% |
| | | Adjusted Residues | 1.4 | -2.0* | -3.8* | 4.2* | 0.7 | |
| LOW | Reception A | Occurred | 5 | 37 | 53 | 40 | 5 | 140 |
| | | Expected | 4 | 41.3 | 37.3 | 51.3 | 6 | 140 |
| | | % Total | 2.40% | 17.60% | 25.20% | 19.00% | 2.40% | 66.70% |
| | | Adjusted Residues | 0.9 | -1.4 | 5.2* | -3.4* | -0.7 | |
| | Reception B | Occurred | 0 | 16 | 3 | 12 | 3 | 34 |
| | | Expected | 1 | 10 | 9.1 | 12.5 | 1.5 | 34 |
| | | % Total | 0.00% | 7.60% | 1.40% | 5.70% | 1.40% | 16.20% |
| | | Adjusted Residues | -1.1 | 2.4* | -2.6* | -0.2 | 1.4 | |
| | Reception C | Occurred | 1 | 9 | 0 | 25 | 1 | 36 |
| | | Expected | 1 | 10.6 | 9.6 | 13.2 | 1.5 | 36 |
| | | % Total | 0.50% | 4.30% | 0.00% | 11.90% | 0.50% | 17.10% |
| | | Adjusted Residues | 0 | -0.7 | -4.0* | 4.5* | -0.5 | |
| Total | | Occurred | 21 | 201 | 162 | 262 | 44 | 691 |
| | | % Total | 3.00% | 29.10% | 23.50% | 38.00% | 6.40% | 100.00% |

* difference for p <0.05

The descriptive analysis of the effect of reception in relation to the attack effect (table 5) indicated that the most recurrent effect, in general, of attack was the point and that after receptions C, the most recurrent attack effect was the game continuity, regardless of quality of the opposing team. The inferential results showed that there was a significant association ($\chi 2$

= 30.11 and ϕ = 0.21, p <0.001) according to the quality of the opponent. Thus, the "superliga" champion team, when playing against high-quality teams, showed positive association of Reception C with the attack error. When playing against moderate-quality teams, positive association of reception B with the attack error, reception C with game continuity and reception A with the attack point was observed. On the other hand, negative association of reception A with the attack error and reception C with the attack point was observed. When playing against low-quality teams, positive association of reception C with game continuity and reception A with the attack point was observed. On the other hand, negative association between reception C and the attack point was observed.

**Table 5.** Association between effect of reception and attack effect

| Effect of reception | | | Attack effect | | | | Total |
|---|---|---|---|---|---|---|---|
| | | | Error | Block | Continuity | Point | |
| HIGH | Reception A | Occurred | 5 | 4 | 17 | 36 | 62 |
| | | Expected | 6 | 4.9 | 19.6 | 31.5 | 62 |
| | | % Total | 4.40% | 3.50% | 14.90% | 31.60% | 54.40% |
| | | Adjusted Residues | -0.6 | -0.6 | -1 | 1.7 | |
| | Reception B | Occurred | 2 | 4 | 13 | 17 | 36 |
| | | Expected | 3.5 | 2.8 | 11.4 | 18.3 | 36 |
| | | % Total | 1.80% | 3.50% | 11.40% | 14.90% | 31.60% |
| | | Adjusted Residues | -1 | 0.9 | 0.7 | -0.5 | |
| | Reception C | Occurred | 4 | 1 | 6 | 5 | 16 |
| | | Expected | 1.5 | 1.3 | 5.1 | 8.1 | 16 |
| | | % Total | 3.50% | 0.90% | 5.30% | 4.40% | 14.00% |
| | | Adjusted Residues | 2.2* | -0.3 | 0.5 | -1.7 | |
| MOD | Reception A | Occurred | 6 | 22 | 90 | 130 | 248 |
| | | Expected | 12.2 | 20.9 | 95.3 | 119.6 | 248 |
| | | % Total | 1.60% | 6.00% | 24.50% | 35.40% | 67.60% |
| | | Adjusted Residues | -3.2* | 0.4 | -1.2 | 2.3* | |
| | Reception B | Occurred | 7 | 5 | 24 | 34 | 70 |
| | | Expected | 3.4 | 5.9 | 26.9 | 33.8 | 70 |
| | | % Total | 1.90% | 1.40% | 6.50% | 9.30% | 19.10% |
| | | Adjusted Residues | 2.2* | -0.4 | -0.8 | 0.1 | |
| | Reception C | Occurred | 5 | 4 | 27 | 13 | 49 |
| | | Expected | 2.4 | 4.1 | 18.8 | 23.6 | 49 |
| | | % Total | 1.40% | 1.10% | 7.40% | 3.50% | 13.40% |
| | | Adjusted Residues | 1.8 | -0.1 | 2.6* | -3.3* | |
| LOW | Reception A | Occurred | 8 | 12 | 50 | 69 | 139 |
| | | Expected | 10.6 | 12.6 | 54.5 | 61.2 | 139 |
| | | % Total | 3.80% | 5.70% | 23.90% | 33.00% | 66.50% |
| | | Adjusted Residues | -1.5 | -0.3 | -1.4 | 2.3* | |
| | Reception B | Occurred | 4 | 4 | 12 | 14 | 34 |
| | | Expected | 2.6 | 3.1 | 13.3 | 15 | 34 |
| | | % Total | 1.90% | 1.90% | 5.70% | 6.70% | 16.30% |
| | | Adjusted Residues | 1 | 0.6 | -0.5 | -0.4 | |
| | Reception C | Occurred | 4 | 3 | 20 | 9 | 36 |
| | | Expected | 2.8 | 3.3 | 14.1 | 15.8 | 36 |
| | | % Total | 1.90% | 1.40% | 9.60% | 4.30% | 17.20% |
| | | Adjusted Residues | 0.9 | -0.2 | 2.2* | -2.5* | |
| Total | | Occurred | 45 | 59 | 259 | 327 | 691 |
| | | % Total | 6.50% | 8.60% | 37.50% | 47.40% | 100.00% |

* difference for p <0.05

## DISCUSSION

The aim of the present study was to analyze the association between effect of reception and procedures of game played by the "superliga" women's champion team, as well as the behavior of the opponent central blocker, according to the level of performance of the opposing team. The results showed that most receptions performed by the "superliga" champion team were A and that there was a positive association between effect of reception B and high-quality teams, as well as their negative association with reception A. These findings agree with studies in the area, although these have analyzed men's volleyball[2,5]. In this context, it was observed that high-quality teams, when playing against each other, perform more powerful and effective servings[17,20], since low effectiveness in this fundamental allows the organized attack of the opposing team[13,21] and, consequently, the winning of the point[2,5].

The analysis between the effect of reception and the disposition of the central blocker showed that most blocks were centralized and that, when playing against moderate quality teams, there was a positive association of receptions B and C with centralized block, as well as of reception A with block anticipation. The descriptive results corroborate the study by Afonso and Mesquita[14], since they observed that the strategy of not anticipating was more recurrent in women's volleyball teams. However, studies on this theme emphasize that the specificity of the action must be considered so that anticipations culminate in positive results[14,22-23]. Thus, the results showed that there was no association of the central blocker disposition strategy in games with high-quality teams, demonstrating that the block strategy was probably taken in a timely manner to the specificities of different game contexts. On the other hand, when playing against teams of moderate or low-quality, there was an association of the block strategy in relation to the quality of reception of the "superliga" champion team. In this context, it is possible to suggest that moderate and low-quality teams need to anticipate block in optimal distribution situations (reception A) or wait to react to the setting when reception was B due to disparities in tactical-technical performance, as observed in other studies[17,20].

The analysis between the effect of reception and the attack tempo showed that the 2$^{nd}$ tempo was the most used and that after reception C, the "superliga" champion team, when playing against moderate and low-quality opponents, resorted to the 3$^{rd}$ attack tempo more often. In addition, it was observed that there was a negative association between receptions A and B and the 3$^{rd}$ attack tempo when playing against high-quality teams. On the other hand, when the opponent was of intermediate or low-quality, positive association between reception A and the 1$^{st}$ attack tempo and of reception B with the 2$^{nd}$ attack tempo was observed. In addition, there was a negative association between reception C with the 1$^{st}$ and 2$^{nd}$ attack tempo when playing against teams of low and intermediate-quality, and, regardless of quality of the opponent, there was a positive association between reception C and the 3$^{rd}$ attack tempo. Descriptive results corroborate studies in the area, since these indicate greater use of the 2$^{nd}$ attack tempo during games,

as well as greater recurrence of the slower attack tempo after low-quality receptions (reception C)[8,9]. However, the results partially corroborate studies in this area, since they indicate association of high-quality receptions with the 1st attack tempo, as well as the association of low-quality receptions with the 3rd attack tempo[2,8,9,16]. However, we did not find in literature studies that analyzed this association in relation to the quality of the opponent. In this context, it was noticed that in confrontations with high-quality teams, there was no relation between quality of reception and the fastest attack, evidencing that playing fast is a prerequisite at this level of performance. On the other hand, games against lower-quality teams allowed to risk more and made possible the accomplishment of fast game even in situations limited by the quality of reception.

The analysis of the effect of the reception with the location of the attack showed, in general, that in the attack by position 4 was the most recurrent. In addition, it was observed that there was a positive association between position 3 and reception A and between position 4 and reception C when the "superliga" champion team played against high-quality opponents. The same tendency was observed when the opponent was of intermediate or low quality. However, positive association with attack by position 2 and negative with attack by position 3 was observed when reception B occurred. These results corroborate tendencies of the area, which point to the greater use of attacks by position 4[5] and that advocate need to attack by position 3 under ideal distribution conditions[5] in order to obtain the attack point [24]. In addition, the use of attacks by extremities after low-quality receptions is perceived, due to the restrictions imposed on the distribution[2,25]. Thus, it is well known that the quality of reception influences the choice of the place of attack, since receptions of excellent quality like reception A, make possible the accomplishment of the game with speed, and the use of the central attackers and, consequently, the attack point[5,6,9].

The analysis between the effect of reception and attack effect showed that the most recurrent attack effect was the point, although, after receptions C, the most recurrent attack effect was the game continuity. In addition, it was observed that there was a positive association of reception C with the attack error when playing against high- quality opponents, from reception B with attack error, reception C with game continuity and reception A with the attack point, when playing against moderate-quality teams, of reception C with the game continuity and reception A with the attack point, when playing against low-quality teams. On the other hand, negative association was observed of reception A with the attack error and reception C with the attack point when playing against moderate-quality opponents; of reception C with the attack point when playing against low-quality teams. These results are partially in agreement with studies about the game analysis[5,26,27] which observed the point as the most recurrent attack effect, as well as the association of the effect of reception with the attack effect, identifying that the finalization conditions depend on the quality of reception. However, the surveys did not analyze the association according to the level of performance of the opponent. In this context, the

present research showed that, possibly, in games against high-quality teams, it was necessary to risk the attacks after reception C, fact that culminated in many attack errors. On the other hand, games against moderate and low-quality teams allowed the sustentation game, that is, it was decided to keep the ball in game by means of a controlled attack that allowed game continuity. However, the analysis of game procedures occurred only in the side-out context, and the influence of the game location (home or away from home) was not considered, and the influence of the setter position during the offensive construction was not analyzed, being study limitations and suggesting caution in the generalization of findings.

## CONCLUSION

Based on the analysis carried out, the present study allows us concluding that the quality of reception of the 205-2016 "superliga" champion team is high, since reception A was the most recurrent, although there was a reduction of this effect in games against high-quality teams; the analysis of the block strategy of the opposing team showed that the teams used the central blocker centralization, although moderate-quality teams opted to anticipate the block in situations where reception A occurred and wait to react to the setting after reception B and C; the game speed from attack tempo showed that the 2nd attack tempo was the most recurrent and that when playing against high-quality teams, the reduction of the quality of reception required slower attacks as well as games against moderate and low-quality teams have allowed the game to be played faster after high-quality receptions; in general analysis, was position 4. However, after high-quality reception, it was preferred to use attack by position 3, suggesting a close relationship between quality of reception, attack tempo, and place of attack, since in position 3 the central attacker requires faster attack (1$^{st}$ time), which is dependent on the quality of reception; the attack point was the most recurrent, although it was observed that after receptions C, the most recurrent attack effect was the game continuity. In addition, it was observed that in confrontation with high-quality teams, receptions C can lead to more frequent attack errors. On the other hand, it was observed that when playing against moderate and low-quality teams, the reduction in the quality of reception led to game continuity.

Taken together, the results found contributed to a better understanding of the game procedures practiced in women's volleyball. However, it is necessary to investigate other game variables and procedures, such as quality of defense and game procedures at different moments of the game, in order to consolidate knowledge about high-level women's volleyball.

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