Attack-Tempo and Attack-Type as predictors of attack point made by opposite players in Volleyball

Rui Marcelino
Bruno César
José Afonso
Isabel Mesquita

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BOOK OF PROCEEDINGS

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Attack-Tempo and Attack-Type as predictors of attack point from opposite players in Volleyball

1. Introduction

The evolution of the volleyball game has been highly marked by a greater importance to offensive actions. Indeed, until the 80s the game was mainly characterized by the defensive actions and, consequently, the continuity of the rallies (Bellendier, 2002). Since the 90s net actions have become more important in the game and the attack has been showing a high correlation with the game victory (Eom & Schutz, 1992; Marcelino & Mesquita, 2006b; Marelic, Zufar, & Omrcen, 1998). The increasing evolution of the team’s competitive output consubstantiates in the increase of the hitters’ specialization; here the opposite stands out, a player with offensive functions, not only in the first line but also in the second line of attack (zone 2 and zone 1, respectively). Mesquita and César (2007) showed that the opposite player in the elite female Volleyball participates in quick offensive actions with the middle attacker, into offensive pattern combinations; moreover, type and tempo of attack showed to be associated with attack efficacy. However, until now the predictive power of the type and tempo of attack on the attack efficacy of the opposite player hasn’t been identified. The purpose of this study was to analyse the influence of attack characteristics, tempo and type, on attack efficacy of the opposite players, in Elite Female Volleyball.

2. Methods

The sample consists of 437 attacks from the opposite player, corresponding to 359 from zone 2 and 78 from zone 1, taken from six games, during the 2004 Olympic Games, in female Volleyball senior teams. The dependent variable was Attack efficacy. We distinguished three levels: Attack-point – action successful and gave point for the team; Attack-continuity – the ball was defended by opponent’s team and still in game; Attack-Error – failed action or action that did not allow the option to continue (point for the opponent). The independent variables were Attack-Tempo and Attack-Type. Regarding Attack-tempo we consider (adapted from (Selinger & Ackermann-Blount, 1986): Tempo 1 (the attacker jumps before or when the set is conducted),
Tempo 2 (the attacker performs the last step when the set is done, or a little earlier), and Tempo 3 (the attacker has not yet started the race approach when the set is done). As for Attack-type it could be performed with combination (more than one hitter interferes in the offensive maneuvers) or without combination (just one hitter participates in the offensive maneuvers). The observation was accomplished on videotaped matches. The reliability of the observations was assured by inter-observer and intra-observers’ agreement, over 18 % of the game actions of the opposite player. Values of Cohen Kappa for agreement of two independent observers ranged from 0.79 to 0.80, considered a good values (Fleiss, 1981). Intra-observer consistency was tested by calculating repeated observations of the same observer, with a 30 day interval. Values of Cohen Kappa ranged from 0.86 to 0.91. Descriptive statistics were used to obtain frequency and percentages of the game actions. Multinomial logistic regression models were used to study the influence of attack characteristics (Tempo and Type) on Attack efficacy. Odds ratios (OR) at their 95% confidence intervals (IC) for each factor were adjusted for all other factors in the model. SPSS 15.0 was used for analyses.

3. Results

Characteristics of attack’s variables are shown in table 1. Forty two percent of attacks give point for the team of the opposite player. Regarding the speed of the attack, the more frequent situation was the Tempo 2 and there was a similar occurrence of attacks with and without combination.

Table 3: Frequencies and percentages of type, tempo and efficacy of attack

<table>
<thead>
<tr>
<th>Attack Variable</th>
<th>Freq. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Efficacy</td>
<td></td>
</tr>
<tr>
<td>Point</td>
<td>181 (42.1)</td>
</tr>
<tr>
<td>Error</td>
<td>58 (13.5)</td>
</tr>
<tr>
<td>Continuity</td>
<td>191 (44.4)</td>
</tr>
<tr>
<td>Tempo</td>
<td></td>
</tr>
<tr>
<td>Tempo 1</td>
<td>62 (14.4)</td>
</tr>
<tr>
<td>Tempo 2</td>
<td>301 (70.0)</td>
</tr>
<tr>
<td>Tempo 3</td>
<td>67 (15.6)</td>
</tr>
<tr>
<td>Type</td>
<td></td>
</tr>
<tr>
<td>With combination</td>
<td>230 (53.5)</td>
</tr>
</tbody>
</table>
Table 2 shows the factors that are associated with Attack-point. After adjustment, the variables that remained associated with Attack-point, in comparison to Attack-error were: Tempo 1*with combination, Tempo 1*without combination, Tempo 2*with combination and Tempo 2*without combination. No difference in Attack-point was detected when analyzing Tempo 3*with combination (OR: 0.54; 95%CI: 0.04-6.77).

**Table 4: Factors associated with attack point**

<table>
<thead>
<tr>
<th>Explanatory variable</th>
<th>Odds Ratio Adjusteda</th>
<th>p-valueb</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>reference category: attack error</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attack point</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tempo 1 * With combination</td>
<td>11.92 (2.30-61.83)</td>
<td>0.003</td>
</tr>
<tr>
<td>Tempo 1 * Without combination</td>
<td>8.13 (1.53-43.21)</td>
<td>0.014</td>
</tr>
<tr>
<td>Tempo 2 * With combination</td>
<td>4.49 (1.79-11.24)</td>
<td>0.001</td>
</tr>
<tr>
<td>Tempo 2 * Without combination</td>
<td>2.65 (1.02-6.90)</td>
<td>0.046</td>
</tr>
<tr>
<td><strong>reference category: attack continuity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attack point</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tempo 1 * With combination</td>
<td>4.37 (1.68-11.37)</td>
<td>0.002</td>
</tr>
<tr>
<td>Tempo 1 * Without combination</td>
<td>4.84 (1.63-14.36)</td>
<td>0.004</td>
</tr>
<tr>
<td>Tempo 2 * With combination</td>
<td>3.04 (1.46-6.33)</td>
<td>0.003</td>
</tr>
</tbody>
</table>

a Odds ratio adjusted for all the variables in the (main effects) model.
b Likelihood ratio test ($\chi^2_{10}$) = 30.12, p=0.001.

The variables that remained associated with the Attack-point, in comparison to Attack-continuity were: Tempo 1*with combination, Tempo 1*without combination, Tempo 2*with combination. No difference in Attack-point was detected when analyzing Tempo 2*without combination (OR: 2.00; 95%CI: 0.92-4.32) and Tempo 3*with combination (OR: 0.32; 95%CI: 0.04-2.87).
4. Discussion

The results show that it is more likely to make point in fast attack situations (tempo 1) with combination. This trend is the same in relation to making error or allowing the continuity of the game. Indeed, the relationship between point - error and point - continuity loses strength as the attack is slower and without combination. These results are particularly important since nowadays the high level game is characterized by an increase in game speed on the sides of the net supported by offensive pattern combinations (Marcelino & Mesquita, 2006a; Marelic et al., 1998). Therefore in the long term it should be a priority to integrate these characteristics, gradually, into the training of young players.

Authors

RUI MARCELINO, ISABEL MESQUITA & BRUNO CÉSAR: Faculty of Sport – University of Porto. Portugal

Literature


