Analysis of the variables that predict serve efficacy in young volleyball players

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Abstract

The main objective of this research study was to analyse, in volleyball, the prediction level of different serve variables on its efficacy. The sample comprised of 2038 serve actions, corresponding to 36 female teams participating in the Spanish Championship female in 2010 in the Under-14 and Under-16 categories. The independent variables were: serve zone, serve type, striking technique, in-game role of the server, reception zone, receiver player and serve direction. The dependent variable was serve efficacy. The multinomial logistic regression applied showed that all the variables considered in the study, except for serve direction and striking technique, predicted the efficacy of serve. The probability of increasing serve efficacy was achieved through: executing standing serves, serving to the space between players and serve reception by players other than the libero. These results can guide coaches in volleyball player training processes, with respect to the serve action.

Key words: Notational analysis, volleyball, performance, multinomial logistic regression.

1. Introduction

Volleyball is a sport where attack prevails over defence (Moreno et al., 2007). Different modifications have been made to the rules of the game, in an attempt to offset this imbalance, but always favouring defence: increase of the serve zone (1998) and the incorporation of a new player, the libero (1998). The inclusion of the libero has led to greater effectiveness both in reception (Joao et al., 2006; Callejón and Hernández, 2009) and in defence (Mesquita et al., 2007), although imbalance between attack and defence still exists.

Due to this imbalance between attack and defence, one of the game actions that teams consider to be very important is the serve (Moreno, et al., 2007), as an improvement in its effectiveness may avoid or limit the construction of the opponent’s attack, and therefore, favour defence. Thus, the serve has gone from being an action used to start
the game, to being an attack weapon that is able to score a direct point [ace] (Quiroga et al., 2010).

The serve, just like attacking and blocking, has a purpose-determined nature and may be decisive in a team’s performance (Drikos et al., 2009; Patsiaouras et al., 2009). The benefit of the serve is not just that a point is immediately scored, but rather, the serve has an influence on the later development of the game. Thus, it has been observed that the execution of a good serve (power serve or with a tactical intention), affects the reception performance (Quiroga et al., 2010; Quiroga et al., 2012) and the attacking options of the opposite team, reducing first tempo attacks and increasing second tempo attacks (Katsikadelli, 1996; Papadimitriou et al., 2004). This influence of the serve on the attack options causes an increase in blocking performance, significantly increasing triple block (Palao et al., 2004), which would facilitate the defence.

Due to the importance of the serve in the development of the game, many different research studies have been developed to determine the typical characteristics of the serve and how this affects the opposite team, both at a high level and in formative stages. To this end, the typical variables of the serve action have been analysed, such as the serve zone (Quiroga et al., 2010; Travlos, 2010), the serve type (Marcelino et al., 2011; Costa et al., 2012), the serve direction (Gil et al., 2011b; Marcelino et al., 2011), the in-game role of the server (Afonso et al., 2012) and even some more kinematic type variables such as the serve speed (Coleman et al., 1993; Quiroga et al., 2012) or situational variables, such as the set number (Campos et al., 2014) and moment in the set when the serve is executed (Marcelino et al., 2012).

Another of the variables most frequently analysed in connection with the serve, are the variables related to reception such as the receiver player (Quiroga et al., 2012), the reception zone (Lidor et al., 2007; Afonso et al., 2010) and the receiving technique (Afonso et al., 2012).

The majority of the research studies conducted on the serve are descriptive studies, which analyse the frequency of occurrence of each serve type, or whose aim is to discover the existing association between different serve variables. These studies have been carried out both at high level (Papadimitriou et al., 2004; Moreno et al., 2007; Quiroga et al., 2010), and in formative stages (Gil et al., 2011a; Costa et al., 2012; Dávila-Romero et al., 2012).

Descriptive statistics help us characterise the game actions, but recently and so as to discover which factors determine performance in the different game actions, the multinomial logistic regression analysis has started to be used, thus permitting an estimation of the predictive range of the variables. The application of this statistical test in the analysis of sporting performance gives rise to greater comprehension of the fundamental dynamics of the sport (Nevill et al., 2002). However, this test has largely been applied, until now, in high-level research studies (Marcelino et al., 2011; Afonso et al., 2012; Costa et al., 2012).

Due to the reduced number of studies conducted on formative stages and to the implications that these studies may have, we believe it advisable to conduct studies that
provide relevant information regarding the serve action for the training process of players in formative stages, taking technical and tactical factors into account.

Thus, the main objective of our research study was to analyse the prediction level of different serve variables (serve zone, serve type, striking technique, in-game role of the server, reception zone, receiver player and serve direction), on the serve efficacy, in formative stage volleyball.

The hypotheses of this study are:
- The variables: serve zone, serve type, striking technique, in-game role of the server, reception zone, receiver player and serve direction, will act as predictors for the serve efficacy.
- Standing serves will increase the serve efficacy compared with jumping serves.
- Serves made to the space between players will increase the serve efficacy, compared with serves made to the mid field zone.
- Serves made to a player other than the libero will increase the serve efficacy, compared with serves made to the libero.

2. Methods

2.1. Sample
The study sample was comprised of 2038 serve actions, corresponding to the observation of 36 teams participating in the Spanish Championship female in the Under-14 and Under-16 categories. The number of teams and serve actions observed per category were distributed as follows: Under-14 female (18 teams/1029 serve actions) and Under-16 female (18 teams/1009 serve actions). To guarantee data homogeneity, the serves analysed correspond to the observation of one match played by each team to be studied. The results of the observed matches where three sets to two and three sets to one, these results assure similar level of play in both matches. Furthermore, due to the championship been played in neutral field for both teams, it was not necessary to take into account whether the teams were playing at home or away.

The protocol was fully approved by the Research Ethics Committee of the University of Extremadura (Spain). All players and their parents or guardians were fully informed about the study, and they signed a consent form.

2.2. Variables
The following independent variables were considered in our study: (a) serve zone, defined as the zone from where the serve is carried out, covering a 9-metre wide space located behind the baseline of the court and as an extension to the sidelines of the court, differentiating three zones of origin (zone 1, zone 6, zone 5); (b) striking technique, defined as the type of serve technique used by the player, considering the flight trajectory of the ball after striking (power or float); (c) serve type, defined as the type of serve used by the player, considering the location of the player at the time of contact
with the ball (standing or jump); (d) reception zone (figure 1), defined as the zone where the serve is received (lane 1, lane 6, lane 5 and space between players); (e) in-game role of the server, defined as the in-game role of the player serving (setter, receiver-attacker, middle attacker, opposite); (f) receiver player defined as the in-game role of the player who the serve is aimed at for reception (forward-attacker, libero and other players); (g) serve direction, defined as the direction determined by the serve depending of the serve zone and reception zone (parallel, mid cross-court and long cross-court).

Figure 1. Zone where the serve is received

The dependent variable considered in our study was; serve efficacy, defined as the performance or effect obtained with the serve. In order to assess the effectiveness, the FIVB statistics system was used, adapted from Coleman (1975), grouping together some values that were differentiated in this system. Three levels were established: (I) permits attacking, “Serve that permits the construction of an attack, with all the attack options or with limited options”; (II) does not permit attacking, "Serve that makes it impossible to construct the attack, which is the equivalent to serving a free ball"; (3) Point, “Serve that directly scores a point”.

The aforementioned variables were measured via the systematic observation of the serve.

2.3. Procedures
Initially, and to guarantee the validity of the instrument, a group of four researchers – experts in analysing volleyball performance – developed a first version of the instrument, in agreement with the theoretical framework and based on existing bibliography. Later, this instrument was used by a group of 10 volleyball coaches, thus enabling the creation of a final version of the instrument that would guarantee its validity for the study (Okoli and Pawlowski, 2004).

The data were later collected on video. The matches were recorded using a SONY HDR-XR155 digital camera (M2TS format). This camera was located at one of the ends of the court, guaranteeing a height of 5 m above floor level and a distance of 7 metres behind the baseline, to obtain an optimal line of sight.
For the reliability of the observation, after collecting the video footage and previously to the coding process, one observer with experience in this function were trained to observe and encode game actions, carried out a training process, using, in the different training sessions, samples with different characteristics, and exceeding 10% of the total sample (203 serves), indicated by Tabachnick and Fidell (2007). The intra-observer Cohen’s Kappa values reached, in the observation of all the variables, were higher than .81 (in table 1), in the sixth training session, which was the minimum value considered to be almost perfect agreement (Landis and Koch, 1977). To guarantee the time reliability of the measurement, the same coding was developed on two occasions, with a time difference of 10 days, obtaining Cohen’s Kappa values of over .81.

**Table 1. Intra-observer reliability**

<table>
<thead>
<tr>
<th>Intra-observer</th>
<th>Intra-observer (with a space interval of 10 days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serve zone</td>
<td>0.92</td>
</tr>
<tr>
<td>Striking technique</td>
<td>0.88</td>
</tr>
<tr>
<td>Serve type</td>
<td>0.92</td>
</tr>
<tr>
<td>reception zone</td>
<td>0.92</td>
</tr>
<tr>
<td>In-game role of the server</td>
<td>1.00</td>
</tr>
<tr>
<td>Receiver player</td>
<td>1.00</td>
</tr>
<tr>
<td>Serve direction</td>
<td>0.92</td>
</tr>
</tbody>
</table>

**2.4. Statistical Analysis**

Previously, the absence of multicollinearity was verified through the level of tolerance and the inflation factor (VIF). The tolerance values of the model are greater than 50%, so there are no collinearity problems, as the values are a long way from 0. The inflation factor values of the model are less than 5, which implies an absence of collinearity, as the acceptable value of VIF is 5 or less than 5 (Kleinbaum et al., 1988).

A multinomial logistic regression analysis was performed to obtain the estimated occurrence probabilities of the dependent variable based on the values of the independent variables. The level of significance was established as $p < .05$.

The association of each independent variable with the dependent variable (crude odds ratio) was verified to determine which variables presented statistical significance and thus enter them into an adjusted model (adjusted odds ratio). This step provides information about which independent variables contribute to predicting the dependent variable. According to Field (2009), the interpretation of the odds ratio (OR) values indicate that if they are greater than 1 as the predictor increases, the odds of the outcome occurring also increase. On the other hand, a value less than 1 indicates that as the predictor increases, the odds of the outcome occurring decrease.
3. Results.

It was initially verified (in table 2), through an inferential analysis using Chi-cuadrado ($x^2$), that all the variables, except for the striking technique, had a significant association ($p<.05$) with efficacy.

**Table 2.** Association of independent variables with the dependent variable.

<table>
<thead>
<tr>
<th>Variable</th>
<th>$X^2$</th>
<th>$P$</th>
<th>V de Cramer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serve zone</td>
<td>17.316</td>
<td>.002</td>
<td>.047</td>
</tr>
<tr>
<td>Striking technique</td>
<td>5.812</td>
<td>.055</td>
<td>.039</td>
</tr>
<tr>
<td>Serve type</td>
<td>11.158</td>
<td>.004</td>
<td>.054</td>
</tr>
<tr>
<td>reception zone</td>
<td>151.223</td>
<td>.000</td>
<td>.140</td>
</tr>
<tr>
<td>In-game role of the server</td>
<td>16.328</td>
<td>.012</td>
<td>.046</td>
</tr>
<tr>
<td>Receiver player</td>
<td>90.589</td>
<td>.000</td>
<td>.109</td>
</tr>
<tr>
<td>Serve direction</td>
<td>57.250</td>
<td>.000</td>
<td>.086</td>
</tr>
</tbody>
</table>

In table 3, we present the results over the complete multinomial logistics regression model.
Table 3. Adjusted model for serve effectiveness.

<table>
<thead>
<tr>
<th>Serve variables</th>
<th>Permits attacking(^a)</th>
<th>Does not permit attacking(^a)</th>
<th>OR Crude</th>
<th>OR Adjusted</th>
<th>P</th>
<th>Point (^c)</th>
<th>OR Crude</th>
<th>OR Adjusted</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Serve zone</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zone 1</td>
<td>58.7%</td>
<td>22.8%</td>
<td>0.879</td>
<td>0.909</td>
<td>.460</td>
<td>18.5%</td>
<td>0.802</td>
<td>0.811</td>
<td>.123</td>
</tr>
<tr>
<td>Zone 5</td>
<td>48.9%</td>
<td>29.2%</td>
<td>1.352</td>
<td>1.531</td>
<td>.016</td>
<td>21.9%</td>
<td>1.140</td>
<td>1.218</td>
<td>.299</td>
</tr>
<tr>
<td>Zone 6 (^b)</td>
<td>54.5%</td>
<td>24.1%</td>
<td></td>
<td></td>
<td></td>
<td>21.4%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Serve type</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standing</td>
<td>54.1%</td>
<td>25.6%</td>
<td>1.566</td>
<td>1.623</td>
<td>.002</td>
<td>20.2%</td>
<td>1.064</td>
<td>0.992</td>
<td>.960</td>
</tr>
<tr>
<td>Jump (^b)</td>
<td>50.5%</td>
<td>18.3%</td>
<td></td>
<td></td>
<td></td>
<td>21.2%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Reception zone</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lane 1</td>
<td>58.1%</td>
<td>23.5%</td>
<td>0.910</td>
<td>0.858</td>
<td>.400</td>
<td>18.3%</td>
<td>1.116</td>
<td>1.134</td>
<td>.524</td>
</tr>
<tr>
<td>Space between players</td>
<td>34.5%</td>
<td>25.3%</td>
<td>1.644</td>
<td>1.138</td>
<td>.634</td>
<td>40.2%</td>
<td>4.125</td>
<td>3.247</td>
<td>.000</td>
</tr>
<tr>
<td>Lane 5</td>
<td>56.4%</td>
<td>22.0%</td>
<td>0.878</td>
<td>0.871</td>
<td>.374</td>
<td>21.5%</td>
<td>1.352</td>
<td>1.439</td>
<td>.028</td>
</tr>
<tr>
<td>Lane 6 (^b)</td>
<td>57.9%</td>
<td>25.8%</td>
<td></td>
<td></td>
<td></td>
<td>16.3%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### In-game role of the server

<table>
<thead>
<tr>
<th>Role</th>
<th>Percentage</th>
<th>95% CI</th>
<th>p-value</th>
<th>Control Rate</th>
<th>95% CI</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setter</td>
<td>52.5%</td>
<td>1.383</td>
<td>.015</td>
<td>20.5%</td>
<td>1.211</td>
<td>.015</td>
</tr>
<tr>
<td>Attacker receiver</td>
<td>52.9%</td>
<td>1.352</td>
<td>.010</td>
<td>20.5%</td>
<td>1.201</td>
<td>.139</td>
</tr>
<tr>
<td>Opposite</td>
<td>59.1%</td>
<td>0.808</td>
<td>.488</td>
<td>23.1%</td>
<td>1.213</td>
<td>.141</td>
</tr>
<tr>
<td>Middle attacker b</td>
<td>59.0%</td>
<td>0.808</td>
<td>.488</td>
<td>23.1%</td>
<td>1.213</td>
<td>.141</td>
</tr>
</tbody>
</table>

### Receiver player

<table>
<thead>
<tr>
<th>Role</th>
<th>Percentage</th>
<th>95% CI</th>
<th>p-value</th>
<th>Control Rate</th>
<th>95% CI</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forward attacker</td>
<td>57.5%</td>
<td>1.631</td>
<td>.028</td>
<td>20.7%</td>
<td>2.271</td>
<td>.013</td>
</tr>
<tr>
<td>Others players</td>
<td>50.0%</td>
<td>2.359</td>
<td>.000</td>
<td>22.5%</td>
<td>2.836</td>
<td>.000</td>
</tr>
<tr>
<td>Libero b</td>
<td>71.9%</td>
<td>2.359</td>
<td>.000</td>
<td>22.5%</td>
<td>2.836</td>
<td>.000</td>
</tr>
</tbody>
</table>

### Serve direction

<table>
<thead>
<tr>
<th>Direction</th>
<th>Percentage</th>
<th>95% CI</th>
<th>p-value</th>
<th>Control Rate</th>
<th>95% CI</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long Cross court</td>
<td>44.2%</td>
<td>1.414</td>
<td>.040</td>
<td>29.6%</td>
<td>2.025</td>
<td>.194</td>
</tr>
<tr>
<td>Mid Cross court</td>
<td>58.4%</td>
<td>0.973</td>
<td>.563</td>
<td>17.8%</td>
<td>0.923</td>
<td>.997</td>
</tr>
<tr>
<td>Parallel b</td>
<td>57.2%</td>
<td>1.414</td>
<td>.040</td>
<td>29.6%</td>
<td>2.025</td>
<td>.194</td>
</tr>
</tbody>
</table>

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**Note:**
- "a" Category of reference for the dependent variable.
- "b" Category of reference of the independent variables.
- "c" Numbers in brackets refer to the 95% confidence interval.
All the variables presented (serve zone, serve type, in-game role of the server, reception zone, receiver player), except for the serve direction, show significant association, and therefore predict the serve efficacy in the adjusted model (Table 3).

Executing the serve from zone 1 instead of from zone 6, increases the frequency (OR=1.53) of the serve not permitting the construction of a subsequent attack on the opposite team (does not permit attacking/permits attacking ratio).

Executing the standing serve instead of the jump serve, increases the frequency (OR=1.63) of the serve not permitting the construction of the subsequent attack on the opposite team (does not permit attacking/permits attacking ratio).

Aiming the serve at the seam or to lane 5 instead of to lane 6, increases the frequency (OR=3.24 and OR=1.43, respectively) of obtaining an ace with the serve (point/permits attacking ratio).

If the serve is executed by the setter and the attacker receiver, instead of being executed by the middle attacker, this increases the frequency (OR=1.45 and OR=1.43, respectively) of the serve not permitting the construction of the subsequent attack on the opposite team (does not permit attacking/permits attacking ratio).

If the serve is received by the forward attacker or by another receiver, instead of by the libero, this increases the frequency (OR=1.58 and 2.35, respectively) of the serve not permitting the construction of an attack (does not permit attacking/permits attacking ratio). Furthermore, the serve received by the forward attacker or by another receiver, instead of by the libero, increases the frequency (OR=1.79 and OR=2.62, respectively) of obtaining an ace with the serve (point/permits attacking ratio).

4. Discussion

The main objective of this research study was to analyse the prediction level of different serve variables in volleyball, on its efficacy, in formative stages.

The first hypothesis indicated that the variables: serve zone, serve type, striking technique, in-game role of the server, reception zone, receiver player and serve direction will act as predictors of the serve efficacy. The results of our study do not confirm this hypothesis, as the variables, striking technique and serve direction do not predict its efficacy.

Furthermore, the variables considered in our study have been used in previous research studies, showing a significant association with the serve efficacy, both at formative stages (García-Tormo et al., 2006; Gil et al., 2011b), and in high level volleyball (Afonso et al., 2012; Quiroga et al., 2012). At a high level volleyball, predictive studies indicate that the serve type, receiver player and reception zone variables act as predictors of the serve efficacy (Afonso et al., 2012), whilst in our study in formative stages, there is a greater number of predictive variables of the serve efficacy. These results clearly show that, in formative stages, there is a greater number of variables that
affect the serve efficacy than at high level volleyball. It is thus advisable to work with different variables (serve zone, serve type, striking technique, in-game role of the server, reception zone, receiver player) to improve the performance of this technical-tactical action. Whilst, at a high level volleyball, the variables that affect the serve efficacy are more particularize (Quiroga et al., 2012), favouring much more specific training.

The second hypothesis indicated that standing serves will increase the serve efficacy with respect to jump serves. The results of our study confirm this hypothesis, as it is the standing serve, instead of the jump serve that increases the likelihood of the opposite team not being able to construct the attack.

In line with our results, García-Tormo et al. (2006) and Gil et al. (2011a) found a significant association between the variables, serve type and efficacy, indicating that the least missed serve is the floater standing type. It is also the serve type that fosters play continuity and is commonly used in formative stages. It is also more frequent in female than in male categories.

However, research studies performed at high level volleyball differ from our results, as they showed that the jump serve is the most effective serve type (Asterios et al., 2009; Palao et al., 2009; Costa et al., 2012).

Along this line, in high level female volleyball, the most commonly used type of serve is the jump serve (Costa et al., 2012), highlighting that the greater percentage of aces is served with the power jump serve and with the tennis floater serve, the first of these being the fastest serve and the one with the largest number of errors in execution with respect to other serve modalities (Quiroga et al., 2012).

This shows differences between the serve type used in elite women’s volleyball, the jump serve, and the serve used in formative stages in female category, that is, the standing serve (Vescovi and Dunning, 1999). These differences may be due to the fact that, in formative stages, the technical mastery of the jump serve is limited due to the anthropometric characteristics (Stamm, 1999) and physical-physiological characteristics (Côté et al., 2003) of female players. These aspects may, in formative stages, slow down the jump serve and make it less aggressive, not obtaining the same efficacy as at a high level volleyball.

The third hypothesis indicated that serves made to the space between players, will increase the serve efficacy, compared with those made to the mid field area. The results of our study confirm the hypothesis, as if the serve is made to the seam, instead of serving to zone 6, there is a greater likelihood of serving an ace.

In disagreement with our results, Gil et al. (2011a) did not find any significant association in formative stages between the variables, reception zone and serve efficacy. This fact can be justified by a low serve control technical-tactical level of the players from this sample, which might prevent them from aiming the serve at specific zones or even evaluating the importance of serving to certain reception zones.
At high level volleyball, and in line with our results, one of the most important aspects in serve efficacy is the zone that the serve is aimed to (Quiroga et al., 2012). Research studies in this area indicate that a serve aimed at the zones near to the sidelines and baseline (Moreno et al., 2007), increase the likelihood of the reception not going to an acceptable zone for the setting (Afonso et al., 2012). Furthermore, the serve must be aimed at the setter’s penetration zone (Lidor et al., 2007), at the player who is in zone 4 (Afonso et al., 2010) and, as indicated by the results of our study, at the space between players (López-Martínez and Palao, 2009). So, in formative stages, it is necessary to work on the precision of this technical-tactical action to increase its efficacy (Lidor et al., 2007).

The fourth hypothesis indicated that the serves sent to a player other than the libero, will increase the serve efficacy, compared with serves sent to the libero. The results of our study confirm this hypothesis, as if the forward attacker or another player, instead of the libero receives, there are more frequent of not being able to construct the attack or even of serving an ace.

In formative stages, coinciding with our results, Gil et al. (2011b) indicated that the libero player, together with the forward attackers, are the players with the lowest reception percentages. This shows that, from formative stages, the serving player clearly intends to prevent the libero from receiving.

In line with our results, at high level volleyball, it has been observed that the contribution of the libero to the serve reception favours the construction of the attack, increasing the offensive capacity of the receiving team (Callejon and Hernández, 2009). Thus, one of the most important aspects to optimise serve efficacy is to aim it at the player with least reception efficacy (Quiroga et al., 2012) or the non-specialist reception players (Maia and Mesquita, 2006) and avoid the libero player. The libero is a player that has a significant and positive association with the perfect reception (Joao et al., 2006) and successful defence (Mesquita et al., 2007). Furthermore, Afonso et al. (2012), in a predictive type study, similar to our own, but carried out at high level volleyball, indicate that if the reception is made by a player other than the libero, there is a greater likelihood of that reception being aimed at a non-acceptable setting zone. All of this goes to show the influence of the libero in the defence and reception actions of the team, both at high level volleyball and in formative stages. Therefore, we suggest placing emphasis on working on the precision of the serve in formative stages in order to able to aim it at players with less reception efficacy.

Our study highlights the importance of using statistical procedures that permit considering the dynamics of the game in team sport, as is the case of the multinomial logistic regression analysis (Nevil et al., 2002). These analyses must be contextualised and interpreted at specific game levels, as the factor that determines success may differ between formative stages and high level volleyball. Our results suggest that in team sport and at formative stages, the different variables that influence the game should be taken into account during the training process, this will provide the training with greater variability and quality (Werner and Rink, 1989; Williams and Hodges, 2005). More specifically, the variables to be taken into account when training the serve and reception
in volleyball are the service zone, the serve type, the in-game role of the server, the reception zone and the receiver player.

This work suggests the need to know the development moment and the specific skills of the player during the training process. In formative stages, if players do not have the skills to carry out complex game actions, they will not obtain efficacy in these actions (French et al., 1996; Rink et al., 1996). Additionally, in formative stages, it is essential to work on precision in the different game actions (Lidor et al., 2007).

5. Conclusions

In conclusion, our study advises female category coaches in formative stages that the jump serve in these stages should only be used when players can develop these serves at a certain aggressiveness for their use foster efficacy and not error.

Additionally, it is suggested to train the serve accuracy, in order to send the ball to the space between players and to avoid the reception by the libero, because these are the main factors that determine the serve efficacy in formative stages.

This study contributes to knowledge not only factors that determine serve efficacy in formative stages competition, but also how to conduct training processes at those ages.

6. Acknowledgements

This work has been developed through the project funded by the Ministry of Science and Innovation entitled "MASVb System of competitive assessment and technical guidance for the Spanish Superliga Volleyball" (DEP2011-27503).

7. References

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