

Gea García, G.M. y Molina Martín, J.J. (2015) Relación entre el nivel de juego y la ejecución del saque en voley playa femenino / Relationship Between Sport Level Competition and Serving Skill in Female Beach Volleyball. Revista Internacional de Medicina y Ciencias de la Actividad Física y el Deporte vol. 15 (59) pp. 433-448.  
[Http://cdeporte.rediris.es/revista/revista59/artrelacion603.htm](http://cdeporte.rediris.es/revista/revista59/artrelacion603.htm)  
DOI: <http://dx.doi.org/10.15366/rimcafd2015.59.003>

## ORIGINAL

### RELATIONSHIP BETWEEN SPORT LEVEL COMPETITION AND SERVING SKILL IN FEMALE BEACH VOLLEYBALL

### RELACIÓN ENTRE EL NIVEL DE JUEGO Y LA EJECUCIÓN DEL SAQUE EN VOLEY PLAYA FEMENINO

Gea García, G.M.<sup>1</sup> & Molina Martín, J.J.<sup>2</sup>

1 Associate Professor of the Faculty of Sciences of Physical Education and Sport. Catholic University San Antonio of Murcia- UCAM. (Spain). [gmgea@ucam.edu](mailto:gmgea@ucam.edu)

2 Associate Professor of the Faculty of Sciences of Physical Education and Sport. European University of Madrid- UEM. (España). [jose.molina@uem.es](mailto:jose.molina@uem.es)

**Spanish-English translators:** Carmen Escribano Artés [kartman\\_02@hotmail.com](mailto:kartman_02@hotmail.com)

**Código UNESCO / UNESCO code:** 5899 Otras Especialidades Pedagógicas (Educación Física y Deporte) / Other pedagogical specialties (Physical Education and Sport).

**Clasificación Consejo de Europa / Council of Europe classification:** 4. Educación Física y Deporte Comparado / Comparative Physical Education and Sport.

**Recibido** 30 de mayo de 2012 **Received** May 30, 2012

**Aceptado** 27 de mayo de 2013 **Accepted** May 27, 2013

#### ABSTRACT

The main objective of this study was to analyze the serve employed by female Beach Volleyball players, to determine whether there are differences according to game level. 1100 serving actions were studied. The analyzed serve variables were: type, depth, laterality, trajectory, serving area, and serving skill. A reliability study was carried out in order to determine the degree of agreement intra and inter observer, reaching an agreement between the observers > .80. The results obtained by the correlation analysis showed a difference in the pattern of the service employed after crossing the studied criterion variables. Pearson's Chi-square test showed a significance ( $p < .05$ ). The serve pattern identified for international competitive level couples showed a greater difficulty on the execution and precision of the service, becoming the first element of

attack; while for the national competitive level ones, the technical difficulty in execution and precision was lower.

**KEY WORDS:** Female beach volleyball; Competitive level; Serve; Technical Skills.

## RESUMEN

El objetivo principal de este estudio fue analizar el saque empleado por las jugadoras de vóley playa femenino, para determinar si existen diferencias en función del nivel de juego. Se analizaron 1.100 acciones de saque. Las variables del saque estudiadas fueron: tipo, profundidad de golpeo, lateralidad, trayectoria, destino, y técnica de golpeo. Se realizó un estudio de confiabilidad, para determinar el grado de concordancia inter e intraobservadores, llegando a alcanzar una concordancia entre los observadores  $>0,80$ . Los resultados del análisis correlacional mostraron una diferencia en el patrón de saque utilizado tras el cruce de variables criterio estudiadas, mostrando el test de Chi-cuadrado de Pearson significación en el cruce ( $p < 0,05$ ). El patrón de saque identificado para parejas con nivel internacional, mostró una mayor dificultad en ejecución y precisión, convirtiéndolo en el primer elemento de ataque; mientras que para las de nivel nacional la dificultad técnica en ejecución y precisión fue menor.

**PALABRAS CLAVE:** voley playa femenino; nivel de juego; saque; destreza técnica.

## INTRODUCTION

Beach volleyball is an opposition cooperation sport confronting two teams of two players, characterized by high levels of physical, technical and tactical demand (Häyrinen & Tampouratzis, 2012). It consists of six basic technical actions which are service, service reception, setting, attack, block and defense. According to Zhang (2000), not all actions have the same effect on the game. The service, known as strategic complex 0 (K0) is considered a primary skill for the beach game (Buscá, Moras, Peñas & Rodriguez, 2011; Gea & Molina, 2013). Many are the authors pointing this out as the only skill depending exclusively on the player's expertise (Buscá et al. 2011; Depira & Brenzikofer, 2004; Gil, Moreno, Moreno & Del Villar, 2011). This not only makes of it one of the technical movements with more execution possibilities, but lets interfere with the opponent when performed with mastery, becoming decisive to gain advantage over the other team in the scoreboard (Berruto, 2001; Callejón, 2006; Dávila & García, 2012; Kiraly, 2000; Monge, 2007; Palao, Santos, & Ureña, 2004; Quiroga, García- Manso, Rodriguez- Ruiz, Sarmiento, Saa, & Moreno, 2010; Sturm, 2002; Ureña, Calvo & Lozano, 2002).

Part of the consulted literature suggests that through the changes in the scoring system, the introduction of the 'rally point', fewer risks are assumed at the start

of the game, well against the alleged empowerment sought by this change in regulation (Mai & Mesquita, 2006).

In this vein, the studies developed by Giatsis, Papadopoulou, Dimitrov & Likesas (2003), Giatis & Papadopoulou (2003), and Grgantov, Katic & Marelić (2005) show that by reducing the field's dimensions the differences of performance between the technical and tactical elements decrease between the winning and losing teams as a result of the reduction of space to be covered by the players, which eases the defensive actions. These same studies suggest that there is an increase of serving errors, as a direct consequence of the said reduction of the court's dimensions.

Putting this together with obtaining a low percentage of serving direct points (Gea & Molina, 2013), it becomes relevant considering serve as the decisive skill of attack but, from a tactical point of view based on a greater control of this action and not only as an element of aggressiveness and power when executed (Berruto, 2001; Callejón, 2006; Grgantov et al., 2005; Schlender & Franco, 2002). Both streams of execution have a common goal which is to complicate the reception, significantly decreasing the offensive options of the opponent, thus promoting and facilitating the self defense tasks and a more effective transition and counter-attack of the team in possession of the serve (Buscá et al., 2011; Depra & Brenzikfer, 2004; Gil et al., 2011; Ureña et al., 2002; Palao et al., 2004).

Recent changes in the rules like the new 'rally point' scoring system, and allowing the ball touching the net to continue the game (Dávila & García, 2012; Grgantov et al., 2005), are responsible for the radical evolution of the ball's put-in-play philosophy, from a technical and tactical point of view. As a result of this, serve is considered an element of attack and not only the put in play of the ball to start the game (Giatsis et al., 2003; Grgantov et al., 2005, Koch & Tilp, 2009).

As the only self-regulated action in beach volleyball, dependent just on the player's expertise (Buscá et al., 2011; Depra & Brenzikofer, 2004; Gil et al., 2011), and in view of the above considerations, several are the researches that have studied and backed the importance of this skill to achieve victory in the game, defining it as a technical- tactical offensive action to obtain direct points (Mai & Mesquita, 2006; Dávila & García, 2012), establishing differences in the type of serve and risks assumed by the players involved (Berruto, 2001; Callejón, 2006; Depra & Brenzikfer, 2004; Gea & Molina, 2013; Grgantov et al., 2005; Koch & Tilp, 2009; Schlender & Franco, 2002).

Therefore, the aim of this study was to analyze whether there were differences, when the ball is put in play through serving in female Beach Volleyball, depending on the players' competitive level.

## MATERIAL AND METHOD

### Sample

For this study we analyzed a total of 1,100 serving actions in 15 games of the Spanish Beach Volleyball Championship tournament, involving national teams of different competitive levels. The sample differentiated the players between national and international level of competition. The sample consisted of 19 pairs, divided by the competitive level of play (CLP) in 13 national level couples (NLC) and 6 international ones (ILC).

### Variables

The variables considered, describing the developed technical actions or the strategic complex K0 and accounted for during this study were:

- **Serve technique** (STC), defined as the serve action according to the trajectory described by the ball during its way run after hitting, differentiating between power serve (PWS), soft serve (SFS) and float serve (FLS).
- **Approach depth in serve** (ADS), defined by the distance between the service line at the end of the court, and the place chosen by the player to carry out contact with the ball, differentiating accordingly: short (DS), medium (DM) and long (DL) depth of the serve.
- **Approach laterality in serve** (ALS), limited by the area from where the ball will be served with respect to the transverse plane, dividing the court crosswise into three zones: Left (LL), center (LC) and right (LD).
- **Trajectory of the serve** (TYS), defined as the direction described by the ball on the air, as a result of the union between the origin and destination points. The flight of the ball can be: parallel long (PRL), parallel medium (PRM), parallel short (PRS), long cross court (CCL), medium cross court (CCM), and short cross court (CCS).
- **Serve's destination area in depth** (SAD), defined as the area where the opponent receiver intercepts the ball flight after the serve, having as a reference the distance of the net where this interception or loss of the ball is produced. The differentiated areas are: deep serve (DD), serve to the center of the court (DC), and short serve, near the net (DS).
- **Serve's destination area in laterality** (SAL), defined as the area where the ball falls or is intercepted by the opponent receiver, taking into account the area

where it is performed with respect to the transverse plane, dividing the court into three zones: Left (LL), center (LC), and right (LD).

## Methods

The matches were recorded with a fixed video camera. It was placed at a distance of 3 meters above the court, and 17 meters behind the baseline in imaginary extension with the longitudinal axis of the court and recording angle of 45°, following the protocol established by Koch and Tilp (2009).

The Audiovisual material employed for observational analysis and data recording consisted on a Panasonic Mini DV (PV-GS 14), a Sony TV, model DRC KE-P42M1, and a video Philips Progressive Scan DVD / VCR, model DVP3350V, very useful for stopping and slowing down the images increasing accuracy in observation and recording.

So to ensure an unbiased observation protocol, observers were dully formed and trained in advance as per the phases of training suggested by Anguera, Blanco & Losada (2001) and Anguera & Blanco (2003), modifying them according to the adaptations provided by Molina (2007). The phases were the following:

- a) Selection of the group of observers and written distribution of the system of categories and the registration sheet.
  - Creation of two groups of work.
  - Explanation of categories.
- b) Display of examples from competitive situations, and recordings from other Spanish Championship tournaments.
  - Joint and guided registry of half set by consensus agreement.
  - Determining the strategy to follow with the most conflictive categories.
  - Review of the examples.
- c) Individual registry.
  - Each observer visualises and registers a set from the sample.
  - Visualisation and registry of that set by the single observer.

- Checking of the agreement reached between the data obtained by the single observer, and those obtained by each one of the observers of the observers group.
- d) Selection of the two observers with the highest level of agreement.
- e) Joint registry of the two selected observers.
- Joint and guided registry of half set by consensus agreement.
  - Determining the strategy to follow with the most conflictive categories.
  - Later verification of the agreement reached by consensus agreement.
- f) Final registry of four sets for the final reliability test.
- g) Verification of the level of concordance between the selected observers and the single observer.

To show the validity and reliability of the measure employed, we took into account the concordance index and the inter- and intra-observer Kappa values. The results of inter-observer agreement reached values over 0.85 for all analyzed serving dimensions, whereas the intra-observer agreement reached values above 0.95 for all analyzed serving dimensions (López de Ulibarri & Pita, 1999; Anguera, Blanco & Losada, 2001).

For the Kappa index, the values obtained in the research showed a coefficient above 0.85 for inter-observers. While, for the intra-observer level, the values reached by the Kappa index were over 0.92 for all analyzed serving dimensions.

The obtained data were analyzed using the software tool SPSS for Windows version 19.0. A descriptive and correlation analysis was performed through contingency tables, using the values obtained for the adjusted residuals, considering the value of  $\pm 1.96$  the trigger for considering that there is a pattern of significant association between the two variables. We must bear in mind that the residuals highlight the existing differences between the observed and the expected frequencies, becoming especially useful for interpreting the association patterns found for each one of the contingency tables (Álvarez, 2001).

## RESULTS

The correlation analysis is showed below, based on the contingency tables, the values of Chi-Square and Cramer's V, in order to know the possible relationships existing between the different variables considered in the study,

depending on the level of play exhibited by the players. The significance level was the universally accepted of  $p < .05$ .

- Competitive level of the couple (CLP) depending on the trajectory of the serve (TYS)

Considering the frequency distribution, as shown in Figure 1, the NLC used the PRM serve with 19.1%, while for the serve in CCL the value is 15.7%, indicating a positive relationship of dependence between both variables for the PRM, and negative for the CCL. While, for the ILC the dependence is the opposite, being the percentage for the serve CCL of 28.6% and 9.2% for PRM.

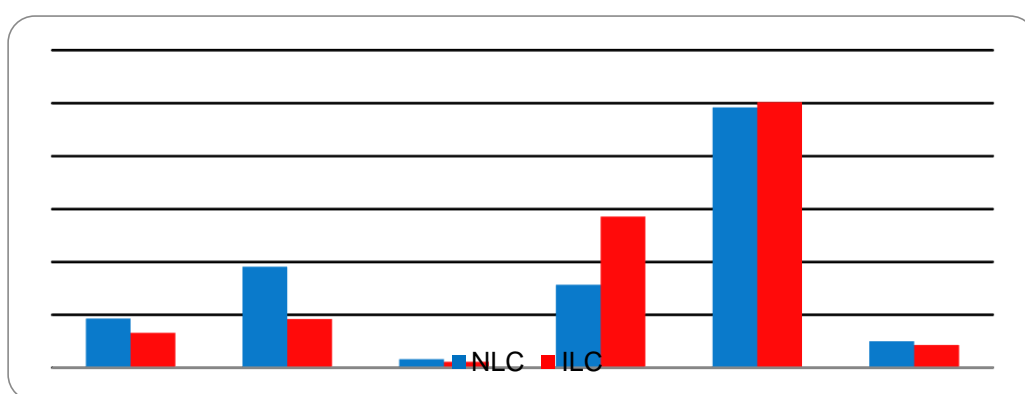


Figure 1. Percentage of the Serve's Trajectory depending on the competitive level

In the correlation analysis, Table 1 allows to verify the association between variable TYS and the CLP ( $X^2=37,780$ ; Cramer's  $V= 0,161$ ;  $P<0,001$ ). The cells contributing positively to this association are of NLC couples, PRM serve, while for ILC couples, is CCL serve. The CCL and PRM serves, contribute in a negative way to this association, for NLC and ILC couples respectively.

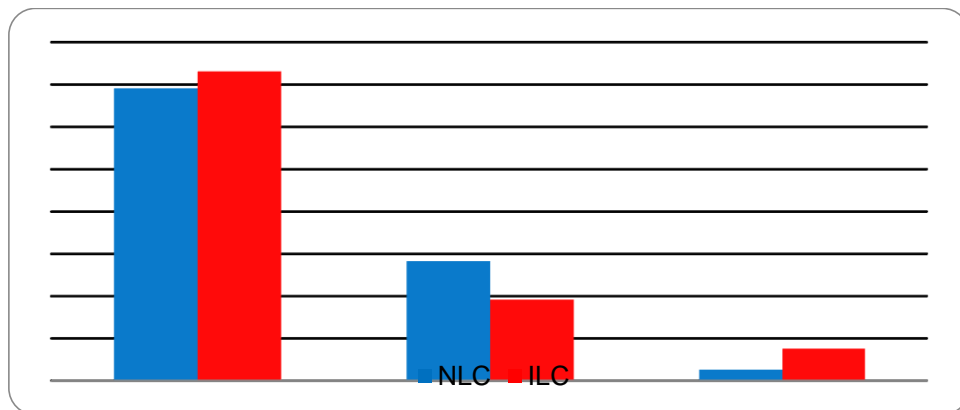
Table 1. Contingency table of the serve's trajectory (TYS) depending on the competitive level of the couples (CLP)

		Trajectory of the serve						Total	
		PRL	PRM	PRS	CCL	CCM	CCS		
CLP	NLC	Count	41	84	7	69	216	22	439
		% CLP	9.3%	19.1%	1.6%	15.7%	49.2%	5.0%	100%
		Adjusted residual	1.6	4.5*	.6	-4.8*	-.3	.5	
ILC		Count	35	49	6	152	267	23	532
		% CLP	6.6%	9.2%	1.1%	28.6%	50.2%	4.3%	100%
		Adjusted residual	-1.6	-4.5*	-.6	4.8*	.3	-.5	
Total		Count	76	133	13	221	483	45	971
		% CLP	7.8%	13.7%	1.3%	22.8%	49.7%	4.6%	100%



- Competitive level of the couple (CLP) depending on the approach depth in serve (ADS)

Figure 2 shows how for NLC, DM serves with 28.3% showed a positive dependence between the variables, while DL serves with 2.6% showed a negative association. The observed trend for the ILC was reverse, with 19.2% for DM serves, and 7.6% for DL ones.



**Figure 2.** Serve percentage according to the approach depth in serve depending on the competitive level of the couple

As shown in Table 2, the statistical analysis allows to verify the association between the variable depth of the serve (ADS) with the competitive level of the couple (CLP) ( $X^2=18.649$ ; Cramer's  $V=0.131$ ;  $P<0.001$ ). The cells contributing positively to this association are of NLC, DM serve, while for ILC, is DL serve. The DL and DM serves, contribute in a negative way to this association, for NLC and ILC respectively.

**Table 2.** Contingency table approach depth in the serve (ADS) according to the level of play of the couples

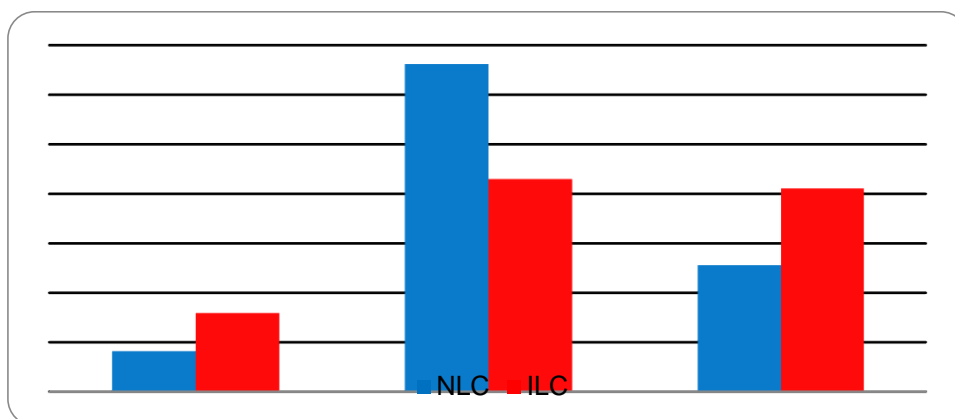
			Approach depth in serve			Total
			DS	DM	DL	
CLP	NLC	Count	317	130	12	459
		% CLP	69.1%	28.3%	2.6%	100%
		Adjusted residuals	-1.4	3.4*	-3.5*	
ILC	ILC	Count	403	106	42	551
		% CLP	73.1%	19.2%	7.6%	100%
		Adjusted residuals	1.4	-3.4*	3.5*	
Total		Count	720	236	54	1010
		% CLP	71.3%	23.4%	5.3%	100%

- Competitive level of the couple (CLP) depending on the approach laterality in the serve (LGS)

As it can be seen in Figure 3, serves can differ depending on LGS, according to the CLP. For NLC couples LC was the most used serve with 66.2%, while LL



and SDRC serves obtained a negative association with 8.2% and 25.6% respectively. Although in the case of ILC, where the most employed serve was LC with 43%, the association is negative. A positive association was found for LL (15.9%) and SDRC (41.1%) serves.



**Figure 3.** Serve's percentage according to the approach laterality in serve depending on the competitive level

As shown in Table 3, the statistical analysis allows to verify the association between the variable approach laterality in the serve (ALS) with the level of play of the couple (CLP) ( $X^2=54.945$ ; Cramer's  $V=0.198$ ;  $P<0.001$ ). The cells contributing positively to this association are of NLC, DM serve, while for ILC, were LL and SDRC serves. The LL, LD and LC serves, contribute in a negative way to this association, for NLC and ILC respectively.

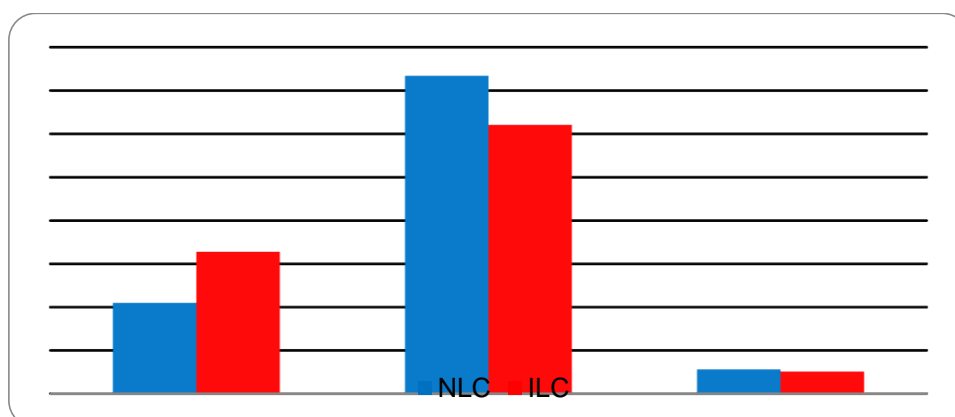
**Table 3.** Contingency table approach laterality in the serve (ALS) according to the competitive level of the couples (CLP)

		Approach Laterality			Total	
		LL	LC	LD		
CLP	NLC	Count	38	305	118	461
		% CLP	8.2%	66.2%	25.6%	100%
		Adjusted residuals	-3.7*	7.4*	-5.2*	
	ILC	Count	89	241	230	560
		% CLP	15.9%	43.0%	41.1%	100%
		Adjusted residuals	3.7*	-7.4*	5.2*	
Total	Count	127	546	348	1021	
	% CLP	12.4%	53.5%	34.1%	100%	

- Competitive level of the couple (CLP) depending on the serve's destination area in depth (SAD)

In Figure 4, it can be observed the association occurred between the CLP and the SAD serve, in such way that for the DD a percentage of 21% was obtained

for NLC, while for ILC ones the percentage was 32.8%. For NLC the percentage of DC serves was 73.4%, while for ILC was 62.1%.



**Figure 4.** Percentage of the serve's destination area in depth depending on the competitive level of the couple.

As shown in Table 4, the statistical analysis allows to verify the association between the grouping of the serve's destination area in depth with the level of play of the couple (CLP) ( $X^2=15.970$ ; Cramer's  $V=0.124$ ;  $P<0.001$ ). The cells contributing positively to this association are, of NLC DC serve, while for ILC, was the DD serve. DD and DC serves, contribute in a negative way to this association, for NLC and ILC respectively.

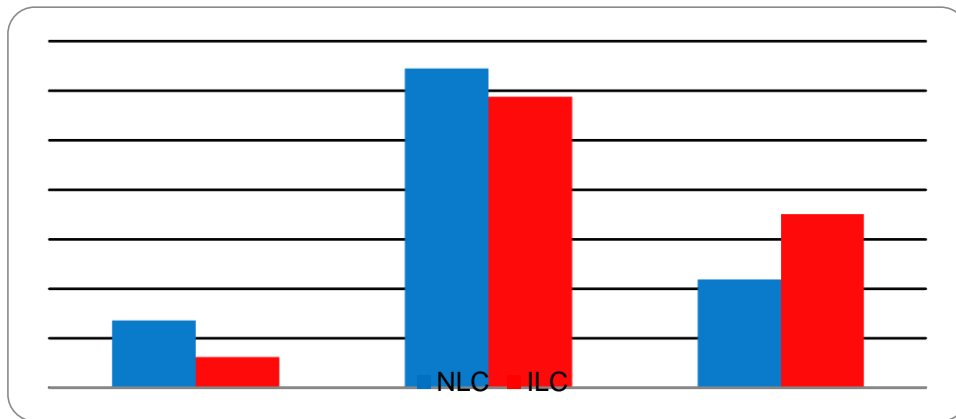
**Table 4.** Contingency board serve's destination area in depth (SAD) according to the level of the couples (CLP)

			Grouping of the serve's destination area in depth			Total
			DD	DC	DS	
CLP	NLC	Count	86	301	23	410
		% CLP	21.0%	73.4%	5.6%	100%
		Adjusted residuals	-4.0*	3.6*	.3	
CLP	ILC	Count	166	314	26	506
		% Level of the couple	32.8%	62.1%	5.1%	100%
		Adjusted residuals	4.0*	-3.6*	-.3	
Total		Count	252	615	49	916
		Expected frequency	252.0	615.0	49.0	916.0
		% Level of the couple	27.5%	67.1%	5.3%	100%

- Competitive level of the couple (CLP) according to the serve's destination area in laterality (SAL)

Regarding the SAL serve's grouping, Figure 5 shows the existing association with respect to the CLP. For NLC couples the LL with 13.6% was the least used, followed by the LD with 21.9%. However, it was observed that for ILC couples the LL serve with 6.2% was the least used, being the association found

negative, followed by the LD serve with 35.1%, but with a positive association between the variables studied.



**Figure 5.** Percentage of the serve according to the destination area in laterality depending on the competitive level of the couples.

As shown in Table 5, the statistical analysis allows to verify the association between the grouping of the serve's destination area in laterality with the level of play of the couple (CLP) ( $X^2=27.209$ ; Cramer's  $V=0.121$ ;  $P<0.001$ ). The cells contributing positively to this association are, for NLC, LL serve, while for ILC, was the LD serve. LD and LL serves, contribute in a negative way to this association, for NLC and ILC respectively.

**Table 5.** Distribution of the serve's destination area in laterality (SAL) according to the competition level of the couples (CLP)

		Grouping of the serve's destination area in laterality			Total	
		LL	LC	LD		
CLP	NLC	Count	54	256	87	397
		% CLP	13.6%	64.5%	21.9%	100%
		Adjusted residuals	3.8*	1.7	-4.3*	
CLP	ILC	Count	31	295	176	502
		% CLP	6.2%	58.8%	35.1%	100%
		Adjusted residuals	-3.8*	-1.7	4.3*	
Total		Count	85	551	263	899
		% CLP	9.5%	61.3%	29.3%	100%

## DISCUSSION

The main objective of this research was to analyze if there were differences in the put in play of the ball, through the study of the serve's characteristics based on the players' competitive level. To do this, we studied the relationship between the variables serve's trajectory, depth and laterality in serving, as well as the destination of the serve in laterality and depth.

Two different serve patterns were found depending on the couples' competitive level.

If we analyze the obtained results, the trend observed for the put in play of the ball by the ILC couples corroborates the statements found in the consulted literature, evolving until being regarded as primary skill of attack, from its technical and tactical consideration for the starting of the game (Berruto, 2001; Schlender & Franco, 2002; Callejón, 2006).

Serving, for ILC couples showed a left or right side pattern, and a long depth of the hit in origin, with CCL trajectory, and a destination away from the center of the field, and near the field's limits in both, laterality and depth. Koch and Tilp (2009), registered a different trend in the pattern of the observed trajectory for the put in play of the ball, highlighting a preference for parallel trajectories with 55% over the cross-court ones (45%), differing from the 16.9% found in this research for the overall of the serves with parallel trajectory. Häyrinen and Tampouratzis (2012) observed similar findings to those reported in this study. These authors found a similar behavior for left and right side serves, being the percentage for long cross-court serves the most employed among any other types with percentages of ie. 9%, and 42% for jump serve, or 35% and 32% for jump float serves. However, these findings do not make a differentiation in their considerations between the players' level of competition.

Current literature shows a trend to make long distance float serves in beach volleyball, generating trajectories that are difficult to guess by the receiver, hindering the receiver's action and drastically reducing the possibility of errors on the serve. Buscá et al. (2011) found a 32.5% for float serves, 32% for jump float serves, and 35.5% for the power jump serve. In the same vein, Gea and Molina (2013), could observe similar percentages, with small variations, depending on the teams' position in the ranking. So that for power serves 34.7% was registered for the teams ranked in the top positions, 37.7% for those at the bottom of the ranking. The float serve percentage was 30.6% for the first classified and 41% for those in the last positions. Given these data, this type of serve raises the pressure on the opponent receptors. Research by Giatsis (2003), and Giatsis et al. (2003) showed an improvement in the quality of the actions performed after the reduction of the field's dimensions. Another advantage of this pattern is the description of a ball trajectory away from the areas near the net, forcing the receiver to cover a wider space in order to attack the ball afterwards, causing him more physical fatigue, as actions are repeated (Sandorfi, 1999; Callejón, 2006; Depra & Brenziolofer, 2004; Nygaard, 2006).

The serving pattern is considered to have a higher technical difficulty by the precision and control it requires, for the ball must describe a longer trajectory, requiring more power in the hit, raising the error percentage if not performed with a certain degree of expertise. We could think that for these couples, it is more important the success percentage rather than the error chances. Serve is considered from the beginning, as a way of scoring, or alternatively, as a means to interfere the opponent's reception (Buscá et al., 2011).

Serving actions for NLC couples showed a serving pattern with a laterality centered in its origin with PRM trajectory, directing their serves to central areas of the court. These findings advocate for a serve that guarantees a higher percentage of success in its action and execution, ending this serve in the center of the field, disregarding this way the possibility of error when trying to adjust to the side and bottom lines in a forced error of the player (Sandorfi, 1999; Prawerman, 2003; Callejón, 2006; Palao et al., 2004; Depra & Brenzikfer, 2004; Nygaard, 2006).

For NLC couples, the serving action in origin and end has a clear aim, safety in execution performing a less aggressive serve that may guarantee their continuity in the game. The trajectory described by the ball backs up this circumstance, being the PRM serve the most significant. Giatsis (2003), and Giatsis et al. (2003), showed with their research a higher quality of the action performed after the reduction of the court dimensions. This type of serve is, according to some of the obtained parameters and its percentages, a way of putting the ball in play. It allows NLC couples to develop their play without losing the serve possession from the beginning. Gea and Molina (2013), observed how for the lowest ranked teams the error percentage in serve was 49.6%.

This pattern of play shows clear differences with the former. It also presents a lower technical difficulty in its implementation by the precision and control it requires. The trend observed is the use of the serve with enough guarantees of success. We could think by the results, that these players sacrifice performance and effectiveness on the serve in favor of security.

However, these NLC players reached a high frequency in serves directed to the left side of the playing area. This data may be a mere reflection of the trend used for serving in court, where it is common to see a serve directed to zone 1 when the setter is in that area of the court. The explanation for this trend is due to the coexistence of in-court competitions during the winter season, with beach competitions during the summer season, sharing their non-exclusive dedication as players of either modality.

## **CONCLUSIONS**

There exists a different play pattern/model depending on the competitive level of the teams in female beach volleyball. This pattern/model varies for the different categories analyzed so that:

- NLC teams showed a group trend for serving, with a centered laterality and medium depth. The serve's trajectory was medium parallel, aimed to the opponent's court central zones in laterality and depth.
- ILC showed a group trend for left and right side serves in the playing court being the long depth hit the most employed one. The serve's trajectory was long cross-court, addressed to those areas of the opponents' court

identified with a right laterality, and in depth, all serves near the court's boundary lines.

From these data, it would be interesting that the technical team took into account the following aspects in the training of the serve, in such way that:

- Integrate the technical gesture of the hit on the serve with the different position variations of the player, ie. with the sending motor space, providing a greater richness of execution.
- Training serves with a higher variability, where the use of different types of serve, performance techniques and flight trajectories avoid the central areas of the playing court, causing a change of position and movement of the opponent, which means an advantage, if you can identify the different sending areas.

## REFERENCES

- Álvarez, C. (2001). Curso de SPSSWIN. Servicio informático de Somosaguas. Universidad Complutense de Madrid.
- Anguera, M.T., Blanco, A. & Losada, J.L. (2001). Diseños observacionales, cuestión clave en el proceso de la metodología observacional. *Metodología de las Ciencias del Comportamiento*, 3 (2): 135- 160.
- Anguera, M.T., y Blanco, A. (2003). Registro y codificación en el comportamiento deportivo. En A. Hernández Mendo (Coord.), *Psicología del deportes* (vol.2). Metodología (p. 6-34). Buenos Aires, Argentina.
- Berruto, M (2001). Rally Point: La fase del saque. *Revista Pallavolo*, Boletín, 2043.
- Callejón D. (2006). Estudio y análisis del saque en el voleibol masculino de alto rendimiento. RICYDE. *Revista Internacional de Ciencias del Deporte*, 5 (2), 12-28. <http://dx.doi.org/10.5232/ricyde2006.00502>
- Dávila, C., & García, A. (2012). Acciones finales del voleibol en categorías de formación masculina: importancia del saque en los partidos igualados. RICYDE. *Revista Internacional de Ciencias del Deporte*, 28 (8), 151- 160. <http://dx.doi.org/10.5232/ricyde2012.02804>
- Depira P, & Brenziolofer, R. (2004). Comparacao de atletas do voleibol através da análise cinemática e dinâmica de trajetórias de bolas de saque. *Revista da Educacao Física*, 15 (1), 7-15.
- Gea, G.M. & Molina, J.J. (2013). El saque como acción determinante de la clasificación en vóley playa femenino. *CCD. Revista Cultura\_Ciencia\_Deporte*, 22 (8) : 49- 58.
- Giatsis, G. (2003). The effect of changing the rules on score fluctuation and match duration in the FIVB women's beach volleyball. *Internacional Journal of Performance Análisis in Sport*, 3 (1): 57- 64.
- Giatsis, G., & Papadopoulo, S. (2003). Effects of reduction in dimensions of the court on timing characteristics for men's beach volleyball matches. *International Journal of Volleyball Research*, 6 (1), 6-9.

- Giatsis, G., Papadopoulou, S., Dimitrov, P. & Likesas, G. (2003). Comparason of beach volleyball team performance parameters after a reduction in the court's dimensions. *International Journal of Volleyball Research*, 6 (1): 2-5.
- Gil, A., Moreno Arroyo, M.P., Moreno, A., García, L., & Del Villar, F. (2011). Estudio del saque en jóvenes jugadores/as de voleibol, considerando la eficacia y función en el juego. *Retos, Nuevas tendencias en Educación Física, Deporte y Recreación*, 19, 19- 24.
- Grgantov, Z., Katic, R., Marelic, N. (2005). Effects of new rules on the correlation between situation parameters and performance in beach volleyball. *Coll. Antropol.* 29, (2) : 717-722.
- Guidetti, G. (2001). El torneo de Montreux. Últimas tendencias del voleibol femenino. *Revista Pallavolo*, boletín N° 2047.
- Häyrynen, M. & Tampouratzis, K. (2012). *Technical and tactical game analysis of elite female beach volleyball*. Jyväskylä, KIHU: Research Institute for Olympic Sports.
- Kiraly, K. (2000). *Beach Volleyball*. Barcelona: Paidotribo.
- Koch, C & Tilp, M (2009). Beach volleyball techniques and tactics: a comparación of male and female playing characteristics. *Kinesiology*, 41 (1): 52- 59.
- López de Ullibarri, I. & Pita, S. (1999). Medidas de concordancia: El índice Kappa. *Cad Aten Primaria*, 6: 169- 171.
- Maia, N. & Mesquita, I. (2006). Caracterizacion of the serve in the female volleyball in high competitive outcome. Worl Congress of performance analysis of sport VII. Szombathely: International Society of Performance Analysis of Sport.
- Molina, J. J. (2007). Metodología científica aplicada a la observación del saque en voleibol masculino de alto rendimiento. Sevilla, Wanceulen.
- Monge, M. A. (2007). *Construcción de un sistema observacional para el análisis de la acción de juego en voleibol*. A Coruña, Universidad de A Coruña, Servicio de Publicaciones.
- Nygaard, J. (2006). Three tips for passing the hard line serve. *Volleyball Magazine*, 5: 48- 49.
- Palao, J. M.; Santos, J. A. & Ureña, A. (2004). Efecto del tipo y eficacia sobre el bloqueo y el rendimiento del equipo en defensa. *Revista Digital Rendimiento Deportivo*, 8.
- Praweman, A. (2003). Le service au beach- volley. *Volleyball Magazine*, 469 (7/8): 38- 39.
- Quiroga, M.E., García-Manso, J.M., Rodríguez-Ruiz, D., Sarmiento, S., De Saa, Y., & Perla, M. (2010). Relation between in game role and service characteristics in elite women's volleyball. *Journal of Strenght and Conditioning Research*, 24 (9):2316- 2321. <http://dx.doi.org/10.1519/JSC.0b013e3181e3812e>
- Sandorfi, C.C. (1999). Strategig serving. *Volleyball Magazine*, 9:58- 59.
- Sturm, F. (2002). Component of sucessfull offensive. *Coach and Athletic Director*, 12: 12- 16.
- Ureña, A., Calvo, R. M. & Lozano, C. (2002). Estudio de la recepción del saque en el voleibol masculino español de élite tras la incorporación del jugador



libero. *Revista Internacional de Medicina y Ciencias de la Actividad Física y del Deporte*, 4: 3.

Zhang, R. (2000). How to profit by the new rules. *The Coach*, 1, 9-11.

**Referencias totales/ Total references:** 29 (100%).

**Referencias propias de la revista/ Journal's own references:** 1 (3,45%).