

Sánchez, M.; González-Silva, J.; Fernández-Echeverría, C.; Claver, F. y Moreno, M.P. (2019) Participación e influencia del líbero en recepción y defensa, en voleibol juvenil / Participation and Influence of the Libero in Reception and Defence, in Volleyball U-19. Revista Internacional de Medicina y Ciencias de la Actividad Física y el Deporte vol. 19 (73) pp. 45-62  
[Http://cdeporte.rediris.es/revista/revista73/artcual984.htm](http://cdeporte.rediris.es/revista/revista73/artcual984.htm)  
DOI: <http://doi.org/10.15366/rimcafd2019.73.004>

## ORIGINAL

### PARTICIPATION AND INFLUENCE OF THE LIBERO IN RECEPTION AND DEFENCE, IN U-19 VOLLEYBALL

### PARTICIPACIÓN E INFLUENCIA DEL LÍBERO EN RECEPCIÓN Y DEFENSA, EN VOLEIBOL JUVENIL

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**Acknowledgments:** This study was made possible thanks to the contribution of the Consejería de Economía e Infraestructura of the Junta de Extremadura (Spain) through the European Regional Development fund.



**UNESCO Code:** 5899. Other Educational Specialties (Physical Education and Sport)

**Classification Council of Europe:** Physical Education and sport compared.

**Recibido** 14 de febrero de 2017 **Received** February 14, 2017

**Aceptado** 6 de abril de 2017 **Accepted** April 6, 2017

## ABSTRACT

The aim was to know the participation and influence of the libero in side-out phase and counter-attack, in young athletes. The sample was 6948 game actions, carried out by the players of the 21 teams that participate in the Under-19 Spanish Championship. The variables were: player that intervened in reception/dig, depth and laterality reception/dig zone, reception/dig efficacy, setting zone in reception/dig, set's area in reception/dig, tempo of attack/counterattack and attack/counterattack efficacy. In reception, showed significant association between player that intervened in reception, depth-laterality reception zone and the setting zone. In defense, showed significant association between the player that intervened in dig and the depth-laterality dig zone, dig efficacy, setting zone, set's area and tempo of counterattack. The influence of the participation of the libero, in young athletes, appeared more often in defense than in the reception.

**KEY WORDS:** match analysis, libero player, side-out, counterattack phase.

## RESUMEN

El objetivo fue conocer la participación e influencia líbero en fase de ataque y defensa, en etapas de formación. La muestra fueron 6948 acciones de juego, realizadas por los jugadores de los 21 equipos del Campeonato de España Juvenil masculino. Las variables fueron: función del receptor/defensor, zona de recepción/defensa en profundidad y lateralidad, eficacia de recepción/defensa, zona donde se realiza colocación en recepción/defensa, zona hacia donde se realiza la colocación en recepción/defensa, tiempo de ataque/contraataque y eficacia de ataque/contraataque. En recepción, existió asociación significativa entre función del receptor y zona de recepción en profundidad-lateralidad, y zona donde se realiza la colocación. En defensa, existió asociación significativa entre función del defensor y zona de defensa en profundidad-lateralidad, eficacia de defensa, zona donde se realiza la colocación, zona hacia donde se realiza la colocación y tiempo de contraataque. La influencia del líbero, en estas etapas, se manifiesta más en defensa que en recepción.

**PALABRAS CLAVE:** análisis del juego, líbero, fase de ataque, fase de defensa.

## INTRODUCTION

The cyclical nature of volleyball generates different game complexes (Beal, 1989; Ugrinowitsch et al., 2014), which have specific and different characteristics (Bergeles, Barzouka & Nikolaidou, 2009; Palao, Santos & Ureña, 2004). Among these complexes, we can highlight the complex 1 or KI and complex 2 or KII (Palao et al., 2004).

The KI is known as the attack phase and includes the actions of reception, setting, attack (Marelic, Rešetar & Janković, 2004; Monteiro, Mesquita & Marcelino 2009; Silva, Lacerda & Joao, 2004) and attack coverage (Palao et al., 2004). The main objective of the KI is to receive the serve to optimize the offensive organization and, through the attack (Papadimitriou, Pashali, Sermaki, Mellas & Papas, 2004), obtain the point and the possession of the serve (Monteiro et al., 2009). Since this complex depends only on the action of the opponent serve, the KI is a predictable phase with low contextual interference (Castro, Souza & Mesquita, 2011).

The sequentiality of volleyball causes that the different actions of the KI are related to each other. Thus, the quality of the reception will affect the setting and this, in turn, to the attack (Eom & Schultz, 1992). Therefore, although the reception does not let to obtain the point directly (Mesquita, Manso & Palao, 2007), it is an action of great importance in the construction of the attack (Palao, Santos & Ureña, 2006). If the reception is not adequate, will condition the setting, limiting the attack, and thus facilitating the defensive action of the opposing team (Ureña, Calvo & Lozano, 2002; Palao et al., 2006).

The KII is known as the defense phase, with the main objective to neutralize and counteract the attack of the opposing team, allowing an optimum counterattack construction, the achievement of the point and the continuity in the possession of the serve (Ureña et al. 2002). The actions of this complex are the block, defense, setting, counterattack and counterattack coverage (Palao et al., 2004; Silva et al., 2014). Unlike KI, KII is preceded by the attack. Since the attack is more unstable than the serve, it causes the KII to be a complex with great contextual interference (Castro et al., 2011).

The defense, like the reception, is an intermediate action (Mesquita et al., 2007) whose main objective is to neutralize the attack of the opposing team (Sellinger & Ackerman, 1985). Previous studies showed that teams with good defense were able to win the set, demonstrating that defense efficacy can determine winning or losing the set (Marcelino, Mesquita & Sampaio & Moraes, 2010).

In volleyball, as in other sports, there has been a continuous evolution of the game rules, over the years. Specifically, in 1998 (FIVB, 1997) there were important changes, among them, the expansion of the serve area, the elimination of double touch in the first contact, the introduction of the rally point system and the incorporation of a new player, the libero. The introduction of this

player was aimed to balance the predominance of the attack on the defensive action (Castro et al., 2011), increasing the defensive potential and then, the continuity of the game (Mesquita et al., 2007).

However, beyond this initial intention by what libero was introduced, that player is participating not only in the defense phase, but also in the attack phase, specifically in the reception of the serve. Therefore, the question arises whether its incorporation really favors the defense phase, or contributes to increase the potential of the attack phase. Several investigations have tried to answer this question (Callejón & Hernández, 2009; Rentero, Joao & Moreno, 2015).

Thus, previous studies showed that the libero was influencing reception more than defense (Murphy, 1999; Zimmermann, 1999), increasing the reception efficacy, the pressure of the server player, emerging more second line attacks and increasing the combined defensive game.

In the existing bibliography we find several studies referring to the libero player, most of them developed in high level (Joao & Pires, 2015, Joao, Mesquita, Sampaio & Mountinho, 2006), and few in formation stages (Ureña, León & González, 2013). In addition, these investigations have analyzed the influence of the libero in reception or defense phases, with the results sometimes being non-coincident. Therefore, the aim of the study was to determine the participation and influence of the libero in the side-out and counter-attack phases, in young volleyball players.

## **MÉTODO**

### **MUESTRA**

The study sample consisted of a total of 6948 actions, 3489 were carried out in the attack phase and 3450 in the defense phase. Divided into 1348 receiving actions, 1089 KI setting actions, 1061 attack actions, 1745 defensive actions, 874 KII and 831 counterattack actions. These actions were carried out by the 21 teams participating in the U-19 Spanish Championship celebrated in Cáceres in 2012. The actions observed belong to two matches of each of the participating teams.

### **VARIABLES**

The study variables were:

Function of the receiver/defender, defined as the in game role of the player that receive/defend the serve/attack. The two categories considered were: libero and others players (Joao & Pires, 2015, Joao et al., 2006).

Reception/defense zone in depth, defined as the area where the reception/defense of the serve/attack is performed, considering the distance to

the net from where it is performed. The categories were: short, medium, long (Afonso, Esteves, Araújo, Thomas & Mesquita, 2012, Ureña et al., 2002).

Reception/defense zone in laterality, defined as the area where the reception/defense of the serve/attack is performed, considering the distance to the lateral lines of the field where it is performed. The categories were: line one, line six and line five (Gil, Del Villar, Moreno, García-González & Moreno, 2011).

Reception/defense efficacy, defined as the performance or effect obtained by the reception of the serve or defense of the attack. For the evaluation of the reception efficacy and the defense, the categories of the FIVB system adapted from Coleman (1975) have been used. The categories were: perfect reception/defense, defined as the reception/defense that allows all attack options; good reception/defense, defined as the reception/defense that does not allow all attack options, not allowing fast attack times; bad reception/defense, defined as the reception/defense that does not allow the attack, the ball passes directly to the opposing field; reception/defense error, defined as the reception/defense that involves loss of point.

Setting zone (figure 1), defined as the location of the field from which the setting pass is made. The categories were: excellent area (area of 10 m<sup>2</sup>, 5 meters long by 2 meters wide, located 1 meter from the right lateral line and 3 meters from the left lateral line), acceptable area (area of 6 m<sup>2</sup>, 2 meters long between zone 1 and 3, located 2 meters from the right lateral line and 4 meters from the left lateral line), and area not acceptable (area excluded in the two cases mentioned above), as they considered in their study Castro and Mesquita, (2010).

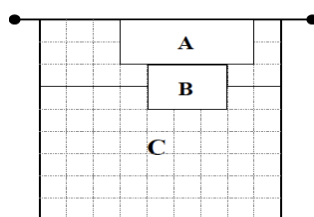


Figure 1. Setting zone (Castro & Mesquita, 2010).

Set's area, defined as the area of the field where the attack/counterattack is performed. The categories were: backcourt zone, zone two, zone three, zone four (Papadimitriou et al., 2004).

Attack/counterattack time, defined as the interaction between the time the setter contacts the ball and the start of the attacker's approach. The categories were: fast times, defined as, when the ball reaches the hands of the setter, the attacker is in the air or in his penultimate career step; slow times, when the ball reaches the setter's hands and the attacker has not started his career steps (Selinger & Ackermann-Blount, 1986).

Attack/counterattack efficacy, defined as the performance obtained with the attack/counterattack. In order to evaluate the efficacy, the FIVB statistical system, adapted from Coleman (1975), have been used: direct attack/counterattack, defined as the attack/counterattack to gain the point; strong attack/counterattack, defined as the attack/counterattack that produces that the opponent counterattack can not be built, the defense directly passing the ball to the opposing field; weak attack/counterattack, defined as attack/counterattack that does not allow a counterattack construction with all options, not allowing fast attacks/counterattacks; bad attack/counter-attack, defined as the attack/counterattack that allows all counter-attack options; attack/counterattack error, defined as the attack/counterattack that involves loss of point.

## **PROCEDURE AND DATA COLLECTION**

For the systematic observation of the game actions, two matches of each team were recorded. The recordings were done with a SONY HDR-XR155 digital camera on M2TS format. The camera was placed behind the game court on a height of 5 meters, obtaining a similar plane in the different recordings.

The observation of the game actions was performed by a single observer with the following characteristics: Graduated in Physical Activity and Sport Sciences, and National Level II Coach. A training process was carried out. Different samples were used in the different training sessions (including matches with different results and teams with different positions in the final classification) and exceeding 10% of the total sample, indicated by Tabachnick and Fidell (2014). Intra-observer Cohen's Kappa values greater than .81, were reached in the observation of all variables. This value is considered an almost perfect agreement (Landis & Koch, 2003). To guarantee the temporary reliability of the measurement, the same observation was developed twice, with a time difference of ten days, obtaining higher of Cohen's Kappa values .81.

## **DATA ANALYSIS**

The statistical program SPSS 19.0 (Chicago, IL) was used as a computer support for the analysis of the collected data. An inferential analysis was performed, which showed the associations between each of the studied variables and the function of the receiver and the defender. This analysis is presented through the contingency tables where the values of Chi-Square and V of Cramer are included. The level of statistical significance considered was  $p < .05$ .

## **RESULTS**

### **Receiver/defender's function - receiving/defending zone in depth**

In reception, the statistical analysis verify the existence of a significant association between the receiver's function and the receiving zone in depth

( $\chi^2=17.492$ ; Cramer's  $V=.114$ ;  $p<.001$ ). The cells that contribute positively to this association are: the libero player with the long reception zone, and the other players with the short and medium reception areas (Table 1).

In defense, the statistical analysis verify the existence of a significant association between the defender's function and the defense zone in depth ( $\chi^2=42.461$ ; Cramer's  $V=.156$ ;  $p<.001$ ). The cells that contribute positively to this association are: the libero player with the middle zone and other of players with the long and short zones (Table 1).

**Table 1.** Contingency table receiver/defender's function – receiving/defending zone in depth

		Receiving/defending zone in depth								
		Reception*				Defense**				
		Short	Medium	Large	Total	Short	Medium	Large	Total	
<b>Receiver/ defender's function</b>	<b>Libero</b>	Count	3	300	72	375	102	231	40	373
		Expected frequency	7.5	316.9	50.6	375.0	123.3	178.1	71.6	373.0
		Ajusted residual	-2.0	-2.8	3.8		-2.6	6.2	-4.7	
	<b>Others</b>	Count	24	839	110	973	475	602	295	1372
		Expected frequency	19.5	822.1	131.4	973.0	453.7	654.9	263.4	1372.0
		Ajusted residual	2.0	2.8	-3.8		2.6	-6.2	4.7	
<b>Total</b>	Count	27	1139	182	1348	577	833	335	1745	
	Expected frequency	27.0	1139.0	182.0	1348.0	577.0	833.0	335.0	1745.0	

\*0 cells (0.0%) have an expected frequency of less than 5. The minimum expected frequency is 7.51.

\*\*0 cells (0.0%) have an expected frequency of less than 5. The minimum expected frequency is 71.61.

### Receiver/defender's function - reception/defense zone in laterality

In reception, the statistical analysis verify the existence of a significant association between the receiver's function and the reception area in laterality ( $\chi^2=95.772$ ; Cramer's  $V=.267$ ;  $p<.001$ ). The cells that contribute positively to this association are: the libero player with line six, and the other players with line five (Table 2).

In defense, the statistical analysis verify the existence of a significant association between the defender's function and the defense zone in laterality ( $\chi^2=223.162$ ; Cramer's  $V=.358$ ;  $p<.001$ ). The cells that contribute positively to this association are: libero player with line five and the other players with line one (Table 2).



**Table 2.** Contingency table receiver/defender's function – receiving/defending zone in laterality

			Receiving/defending zone in laterality							
			Reception*				Defense**			
			Line 1	Line 5	Line 6	Total	Line 1	Line 5	Line 6	Total
<b>Receiver/ defender's function</b>	<b>Libero</b>	Count	89	27	259	375	19	199	155	373
		Expected frequency	77.9	96.8	200.3	375.0	107.5	98.8	166.7	373.0
		Ajusted residual	1.7	-9.7	7.2		-11.4	13.3	-1.4	
	<b>Others</b>	Count	191	321	461	973	484	263	625	1372
		Expected frequency	202.1	251.2	519.7	973.0	395.5	363.2	613.3	1372.0
		Ajusted residual	-1.7	9.7	-7.2		11.4	-13.3	1.4	
<b>Total</b>	Count	280	348	720	1348	503	462	780	1745	
	Expected frequency	280.0	348.0	720.0	1348.0	503.0	462.0	780.0	1745.0	

\*0 cells (0.0%) have an expected frequency of less than 5. The minimum expected frequency is 77.89.

\*\*0 cells (0.0%) have an expected frequency of less than 5. The minimum expected frequency is 98.75.

### Receiver/defender's function - receiving/defending efficacy

In reception, the results showed no significant association between receptor function and reception efficacy ( $\chi^2=4.545$ ; Cramer's  $V=.058$ ;  $p=.208$ ).

In defense, the statistical analysis verify the existence of a significant association between the defender's function and the defense efficacy ( $\chi^2=22.920$ ; Cramer's  $V=.115$ ;  $p<.001$ ). The cells that contribute positively to this association are: the libero player with defense that allow all attack options and other of players with defense that do not allow all attack options (Table 3).

**Table 3.** Contingency table receiver/defender's function – defense efficacy

			Defense efficacy				Total
			Perfect defense	Good defense	Bad defense	Error defense	
<b>Receiver/ defender's function</b>	<b>Libero</b>	Count	108	86	45	134	373
		Expected frequency	77.0	109.9	45.7	140.4	373.0
		Ajusted residual	4.5	-3.1	-.1	-.8	
	<b>Others</b>	Count	252	428	169	523	1372
		Expected frequency	283.0	404.1	168.3	516.6	1372.0
		Ajusted residual	-4.5	3.1	.1	.8	
<b>Total</b>	Count	360	514	214	360	360	
	Expected frequency	360.0	514.0	214.0	360.0	360.0	

\*0 cells (0.0%) have an expected frequency of less than 5. The minimum expected frequency is 45.74.

### Receiver/defender's function – setting zone

In reception, the statistical analysis verify the existence of a significant association between the receiver's function and the setting zone ( $\chi^2=7.264$ ; Cramer's  $V=.082$ ;  $p<.001$ ). The cells that contribute positively to this association are: the libero player with the excellent zone, and other players with the acceptable zone (Table 4).

In defense, the statistical analysis verify the existence of a significant association between the defender's function and the setting zone ( $\chi^2 = 22.278$ ; Cramer's  $V=.160$ ;  $p<.001$ ). The cells that contribute positively to this association

are: the libero player with the excellent zone and the other players with the acceptable zone (Table 4).

**Table 4.** Contingency table receiver/defender's function – setting zone

			Setting zone							
			Reception*				Defense**			
			Excelent zone	Acceptable zone	No acceptable zone	Total	Excelent zone	Acceptable zone	No acceptable zone	Total
<b>Receiver/ defender's function</b>	<b>Libero</b>	Count	216	37	59	312	108	44	42	194
		Expected frequency	198.8	50.1	63.0	312.0	80.1	64.6	49.3	194.0
		Ajusted residual	2.4	-2.4	-.7		4.6	-3.6	-1.4	
	<b>Others</b>	Count	478	138	161	777	253	247	180	680
		Expected frequency	495.2	124.9	157.0	777.0	280.9	226.4	172.7	680.0
		Ajusted residual	-2.4	2.4	.7		-4.6	3.6	1.4	
<b>Total</b>	Count	694	175	220	1089	361	291	222	874	
	Expected frequency	694.0	175.0	220.0	1089.0	361.0	291.0	222.0	874.0	

\*0 cells (0.0%) have an expected frequency of less than 5. The minimum expected frequency is 50.14.

\*\*0 cells (0.0%) have an expected frequency of less than 5. The minimum expected frequency is 49.28.

### Receiver/defender's function – set's area

In reception, our results showed no significant association between the receiver's function and the set's area ( $\chi^2=4.851$ ; Cramer's  $V=.068$ ;  $p=.183$ ).

In defense, the statistical analysis verify the existence of a significant association between the defender's function and the set's area ( $\chi^2=11.081$ ; Cramer's  $V=.115$ ;  $p<.001$ ). The cell that contributes positively to this association is the libero player with zone three (Table 5).

**Table 5.** Contingency table receiver/defender's function – set's area

			Set's area				
			Backcourt zone	Zone 2	Zone 3	Zone 4	Total
<b>Receiver/ defender's function</b>	<b>Libero</b>	Count	34	40	33	74	181
		Expected frequency	41.8	38.1	21.1	79.9	181.0
		Ajusted residual	-1.6	.4	3.1	-1.0	
	<b>Others</b>	Count	158	135	64	293	650
		Expected frequency	150.2	136.9	75.9	287.1	650.0
		Ajusted residual	1.6	-.4	-3.1	1.0	
<b>Total</b>	Count	192	175	97	367	831	
	Expected frequency	192.0	175.0	97.0	367.0	831.0	

\*0 cells (0.0%) have an expected frequency of less than 5. The minimum expected frequency is 21.13.

### Receiver/defender's function - attack/counterattack time

In reception, our results showed no significant association between receptor function and attack time ( $\chi^2=.289$ ; Cramer's  $V=.016$ ,  $p=.591$ ).

In defense, the statistical analysis verify the existence of a significant association between the defender's function and the counterattack time ( $\chi^2=13.127$ ; Cramer's  $V=.126$ ;  $p<.001$ ). The cells that contribute positively to this association are: the libero player with the fast times and the other players with the slow times (Table 6).

**Table 6.** Contingency table receiver/defender's function – counterattack time

		Counterattack time			
		Fast times	Slow times	Total	
Receiver/ defender's function	Libero	Count	33	148	181
		Expected frequency	19.6	161.4	181.0
		Ajusted residual	3.6	-3.6	
	Others	Count	57	593	650
		Expected frequency	70.4	579.6	650.0
		Ajusted residual	-3.6	3.6	
Total	Count	90	741	831	
	Expected frequency	90.0	741.0	831.0	

\*0 cells (0.0%) have an expected frequency of less than 5. The minimum expected frequency is 19.6.

### Receiver/defender's function - attack/counterattack efficacy

In both reception and defense, our results showed no significant association between receiver/defender's function and attack efficacy ( $\chi^2=5.170$ ; Cramer's  $V=.070$ ;  $p=.270$ )/counterattack ( $\chi^2=2.141$ ;  $V$  Cramer=.051,  $p=.710$ ).

## DISCUSSION

Since the introduction of the libero player in volleyball the question above is whether the objective with which was included in the game rules has been achieved. Over the years, various investigations, (most of them developed in high level) has tried to answer this question. However, in formative stages, the studies carried out on this topic are scarce, although the use of libero is frequent. Therefore, the objective of this investigation was to determine the participation and influence of the libero player in both the attack and defense phases in male volleyball, in formative stages.

In reception, related to the participation of the libero and other players, the variables that showed significant association with the receiver's function were the reception zone in depth and the reception zone in laterality.

Specifically, our results showed that, in the association between the receiver's function and the receiving zone in depth, is more frequent than expected by chance that, when the libero receives in the long zone in depth, and when another player receives, the reception is performed in short or medium zone. In addition, in the association between the receptor function and reception zone in laterality, our results showed that it is more frequent than expected by chance

that, when the libero receives it is performed in line six, while when other players receive the reception is performed in line five.

In relation to the reception zone in laterality, Maia and Mesquita (2006) found results in the same line, obtaining that libero player received, frequently, in line six. Regarding to the reception area in depth, we have not found studies that relate the function of the receiver and this area, although some investigations show that the largest number of receptions occur in the central zone of the field (Gil, Moreno, García-González & del Villar, 2010; Joao & Pires, 2015).

The cyclical nature of volleyball (Beal, 1989; Buscá & Febrer, 2012; Ugrinowitch et al., 2014) produces that the game actions are interrelated. This makes the serve efficacy affect the reception performance, and thus the subsequent attack (Papadimitriu, et al., 2004). In training stages, players attack frequently to the central area of the court (Gil et al., 2010), as it is a safer area. As this area is the place with the highest incidence of serves, coaches should consider placing the player with more efficacy, the libero, in this area, justified by the results of our study.

In reception, the variable that showed significant association with the receiver's function was the setting zone. So, it is more frequent than expected by chance, that when the libero receives reaches an excellent zone while, when another player receives, it reaches an acceptable zone

In line with our results, Afonso et al. (2012) obtained, in a high level study, that when the receiver was the libero player, excellent receptions are increased.

In reception, players send the ball towards a specific area, favoring the setting action. By affecting reception to subsequent actions (Marelic et al., 2004), the introduction of a specialized player may favor both the action itself (Joao et al., 2006) and the subsequent action, by a greater number of balls reached to an excellent setting zone, as obtained in our results.

In defense, in relation to the participation of the libero and other players, the variables that showed significant association with the defender's function were the defense zone in depth and the defense zone in laterality.

Specifically, our results showed that in the association between the defender's function and defense zone in depth, it is more frequent than expected by chance, that libero defends in the middle zone, while when the defense is performed by another player, in short or long zone. Regarding to the defense zone in laterality, our results showed a significant association between the defender's function and the defense zone in laterality. So, it is more frequent than expected by chance for the libero to defend in line five, while when the defense is performed by another player, it occurs in line six.

In line with our results, studies such as Rentero et al. (2015), in high level, obtained that the libero player defended frequently in zone five.

Mesquita et al. (2007) showed that the area where most attacks are directed to zone one, five and six (backfield zones) trying to create uncertainty among the defense players. In training stages, the most predominant attack is by zone four (Gouvêa & Lopes, 2008), because it is usually where the best and most regular player of the team is located. Moreover, the easiest and most usual attack is in line to the attack approach steps, frequently sent to zone five of the opposite field (Mesquita et al., 2007). Zone five is where the libero is more frequently placed, as shown in the results of our study.

In defense, in relation to the influence of the libero and other players, the variables that showed significant association with the defender's function were defense efficacy, setting zone, set's area and counterattack time.

In the association between the defender's function and the defense efficacy, our results showed a significant association between both variables. So, it is more frequent than expected by chance that when defending the libero are counterattack options are possible, while when the defense performed by another player, counterattacks in first times are not possible.

In line with our results, Mesquita et al. (2007), obtained that the libero performed excellent defenses, favoring this the next counterattack.

The KII is a game complex where there is a high time deficit in the defense action, produced by the high speed of the attack (Castro et al., 2011). This fact increases the difficulty in performing perfect defenses. Studies such as that of Mesquita et al. (2007) and Palao et al. (2006) showed that the participation of the libero increased the defense efficacy. Therefore, both our results and those of previous studies show that the introduction of a defense specialist (FIVB, 1997) improve the efficacy of this action.

In the association between the defender's function and the set's area, our results showed a significant association between both variables. So, it is more frequent than expected by chance that when defending the libero an excellent zone is reached, while when the defense is made by another player, the ball reaches an acceptable zone.

Sending the defense to an excellent setting zone will allow the setter play all attack options (Afonso, Mesquita, Marcelino & Silva, 2010). The libero increases the efficacy of the defense (Mesquita et al., 2007; Palao et al., 2006), providing situations in which all the attack options are allowed. The sequence of actions in volleyball, makes the setting affected by previous actions (Mesquita & Graça, 2002). Therefore, in situations where the libero is involved, the balls are more likely to reach an excellent setting zone.

In the association between defender's function and the set's area, our results showed a significant association between both variables. Thus, it is more frequent than expected by chance that when defending the libero the ball is sent to zone three.

Mesquita et al. (2007), in a high-level study, did not obtain a significant association between the role of the defender and the area where the setting is sent.

In the bibliography, we find zone four as the zone where most attacks are carried out, in U-19 category (Gouvêa & Lopes, 2008). This may be due to that, as previously said, zone four is the place where the best and most important player of the team usually attacks, in training stages. Moreover, the setting to this zone is the safest and most automated by the settler (Costa, Mesquita, Geco, Ferreira & Moraes, 2010). In addition, because the setters' unadequate technical level, settings to zone three are performed when conditions are optimal (Afonso et al., 2010). So, it is essential to perform perfect defenses, an efficacy frequently obtained by the libero (Mesquita et al., 2007; Palao et al., 2006). Therefore, the intervention of this player increases the number of settings to zone three.

In the association between the variable defender's function and the counterattack time, our results showed a significant association between both variables. Thus, it is more frequent than expected by chance that the libero defense increase the options of counterattack in fast times, while when the defense is made by another player, the options of counterattack in slow times are increased.

Mesquita et al. (2007) obtained, as in the present study, that when the libero defended, the chances of fast times were increased, decreasing when the defense was performed by other players.

The fast times are usually performed in situations where the defense is perfect (Asterios, Kostantinos, Athanasios & Dimitrios, 2009), the setter is located in an excellent zone (Afonso et al., 2010), in jump setting (Marelic et al., 2004) and the central attacker is available to perform the attack (Afonso et al., 2010). Therefore, a specialized player in defense, the Libero, increases the possibility of all these conditions. Therefore, there is a higher frequency of fast time attacks that make difficult the defense of the opposing team.

## **CONCLUSIONS**

In U-19 male category, the participation of the libero is different in the attack and in the defense phases. Thus, in particular, the areas where the libero is significantly more involved, in reception and defense, are: reception in the long zone and line six; defense in the middle zone and line five. Therefore, in the training process it would be advisable to train the libero by separating his

function in the attack and defense complexes, performing exercises as similar as possible to the game situation.

The influence of the libero player is greater in defense phase than in attack phase. Thus, in reception, his intervention increases the settings from the excellent zone. In defense, his intervention produces perfect defenses, settings from excellent zone, to zone three and fast settings. These results show that, at this level, the objective to introduce the libero player as a regulatory change is fulfilled.

Therefore, it would be advisable, in the defense training process, and specifically with the libero player, in U-19 male category, to focus the training situations on optimizing and controlling the quality of his performance, in order to create an appropriate influence on the game.



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