PHYSICAL PROFILE (skill time) AND PERFORMANCE OF SOME CONDITIONING CAPACITIES (skill reach) OF THE MASTER VOLLEYBALL DURING THE SETS

Perfil físico (tiempo de la habilidad) y rendimiento de algunas capacidades condicionales (alcance de la habilidad) del voleibol máster durante los sets)

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Abstract

The objective of the study was to analyze of each set the physical profile (attack ball time, serve ball time and setter time) and some conditioning capacities (block reach, block jump, spike reach and spike jump). The study was composed of 15 matches of the male master volleyball of the category 35 years or more. The data were collected with the camera in a gymnasium. After the data collected, the researcher practiced the physical performance analysis with the Kinovea® software and wrote on a scout. Kruskal Wallis ANOVA did not identify statistical difference during each set of the block reach [H (2) = 5,66, p = 0,05], of the spike reach [H (2) = 3,45, p = 0,17], of the attack ball time [H (2) = 4,08, p = 0,12], of the serve ball time [H (2) = 2,51, p = 0,28] and of the setter time [H (2) = 2,39, p = 0,30]. The new statistic did not identify a statistical difference of the physical performance data (block and spike reach, attack and serve ball time and the setter time). In conclusion, the analysis of the physical performance during each set is important to guide the physical training.
Keywords: volleyball; athletic performance; computer software; sports.

Resumen

El objetivo del estudio fue analizar de cada set el perfil físico (tiempo de la pelota del ataque, tiempo de la pelota del saque y tiempo del colocador) y algunas capacidades condicionales (alcance del bloqueo, salto del bloqueo, alcance del ataque y salto del ataque). El estudio fue compuesto por 15 partidos del voleibol máster masculino de la categoría de 35 años o más. Los datos fueron recogidos con la cámara en el gimnasio. Después de la recolección de datos, el investigador practicó el análisis de rendimiento físico con el software Kinovea® y escribió en un scout. Kruskal Wallis ANOVA no identificó diferencia estadística durante cada set del alcance del bloqueo [H (2) = 5,66, p = 0,05], del alcance del ataque [H (2) = 3,45, p = 0,17], del tiempo de la pelota del ataque [H (2) = 4,08, p = 0,12], del tiempo de la pelota del saque [H (2) = 2,51, p = 0,28] y del tiempo del colocador [H (2) = 2,39, p = 0,30]. La nueva estadística no identificó diferencia estadística del rendimiento físico (alcance del bloqueo y del ataque, del tiempo de la pelota de ataque y del saque y del tiempo del colocador). En conclusión, el análisis del rendimiento físico durante cada set es importante para guiar el entrenamiento físico.
Palabras claves: voleibol; desempeño atlético; software de computador; deportes.

Introduction

The volleyball skills with the objective of practice a point are the most important actions for a volleyball team because these skills cause the victory during the match (Cieminski, 2017; Oliveira, Vaz, Pastore & João, 2018). Then, the most decisive skills in volleyball`s victory are the serve, the attack and the block (Conejero, Claver, Silva, Echeverria & Moreno, 2017).

A high performance of the block and of the attack depends on a block reach and an attack reach with 2,64 to 3 meters (m) or more of height (Marques Junior, 2018). The high block reach is important for the volleyball team because the volleyball player has more opportunity of practice the point and the same occurs with the attack (Marques Junior, 2016; Wnorowski & Cieminski, 2016).

Other important content for a high performance of the volleyball team is the attack speed and the serve speed because these skills with high velocity of the ball has more opportunity of practice a or more points (Denardi, Clavijo, Oliveira, Silva, Travassos & Corrêa, 2017; Valadés, Palao, Aúnsolo & Ureña, 2016). However, the researcher to determine the ball speed during the match needs to use a radar (Valadés & Palao, 2015), but the researcher with less technological resources can use the Kinovea® software to determine the ball time of the service and of the attack (Marques Junior, 2017; Valadés & Palao, 2012).

The setter of the volleyball has the objective of prepare the ball with the set for the attack volleyball player (Fagundes & Ribas, 2017) practice different types of attack, the 1st attack tempo, the 2nd attack tempo and the 3rd attack tempo (Costa, Castro, Freire, Evangelista, Pedrosa, Ugrinowitsch & Praça, 2018; Pinto, Vale & Vicente, 2018). A setter with high performance during the match is important for the offensive system because the attack volleyball player practices the attack with more facilities (Silva, Echeverria, Claver, Conejero & Moreno, 2017). The setter for practice a good preparation of the ball with the set needs of a speed displacement from the backcourt to the frontcourt (Denardi, Clavijo, Oliveira, Travassos, Tani & Corrêa, 2017). Then is important the researcher determines the setter time of each set when the player practices the displacement to prepare the ball for the attack.

Therefore, a study about the master volleyball that determines the physical performance (block reach, spike reach, attack ball time, serve ball time and setter time) of the volleyball team during each set is important for the physical trainer elaborate and prescribe the session (Arruda & Hespanhol, 2008; Marques Junior, 2016b).

What is the physical performance (block reach, spike reach, attack ball time, serve ball time and setter time) of the master volleyball during each set?

The volleyball literature did not have information about these results (Schons, Fischer, Rosa, Berriel & Tartaruga, 2018; Palao, Alcaraz, Hernández, Valadés & Toro, 2018; Padilla, Marques Junior & Lozada, 2018), only the study of Marques Junior (2017) about a team.

The objective of the study was to analyze of each set the physical profile (attack ball time, serve ball time and setter time) and some conditioning capacities (block reach, block jump, spike reach and spike jump).

Method

Participants

The study was composed of 15 matches of the male master volleyball of the category 35 years or more during the Carioca Championship of 2016 (n = 9 matches) and of 2017 (n = 6 matches). The study had 15 matches during the 1st set, 15 matches during the 2nd set and 4 matches during the 3rd sets – a total of 34 sets. The master volleyball team studied were Street Volley, the Canto do Rio, the Castelo Tijuca, the Master Friburgo and the Mirandela because these teams played in the Canto Rio gymnasium, is the best volleyball court of the master volleyball of the Rio de Janeiro, Brazil. The rule of the master volleyball is practiced with two sets of 25 points or two points of difference for the winner. When each team wins one set, the tie-break (3rd set) is practiced with a set of 15 points or two points of difference for the winner.

Procedure

The matches were filmed with a time of duration and these results were the match time. Therefore, the match time is the duration of the volleyball game. Table 1 presented the results.

Table 1. Men`s master volleyball data of the category 35 years or more.

Match	Year	Match Time
1	2016	56 min 13 s
2	2016	51 min 25 s
3	2016	36 min 14 s
4	2016	55 min
5	2016	49 min 36 s
6	2016	40 min 34 s
7	2016	40 min 01 s
8	2016	41 min 36 s
9	2016	42 min 36 s
10	2017	43 min 04 s
11	2017	53 min 28 s
12	2017	44 min 25 s
13	2017	40 min
14	2017	36 min 43 s
15	2017	26 min 13 s

Abbreviation: min – minutes, s – seconds.

The data were collected with the camera Sony® Handycam, model DCR-SX20 on the tripod Mirage® in a gymnasium, at a distance of 2 meters (m) behind of the court and at a height of 2 m because it was the best place to film the master volleyball. The height of the camera was similar to the study of Costa, Maia, Capuzzo, Evangelista, Freire, Nora, Campos and Ugrinowitsch (2016) and the camera was positioned behind the court equal to the study of Costa, Castro, Evangelista, Malheiros, Greco and Ugrinowitsch (2017). All the matches were filmed in the Canto Rio gymnasium, a club in Niterói, Rio de Janeiro, Brazil. The researcher positioned back of the court for filmed the match during the rally and the rest. But when the match was not being played, for example, technical time-out and other, the researcher stopped the camera.

The researcher practiced the physical performance analysis of a master volleyball team that was filmed from the back with the Kinovea® software and with the scout at a distance of 1 m from the Philips 42 LCD television with the Compaq Presario CQ43 notebook. Figure 1 illustrates these explanations.

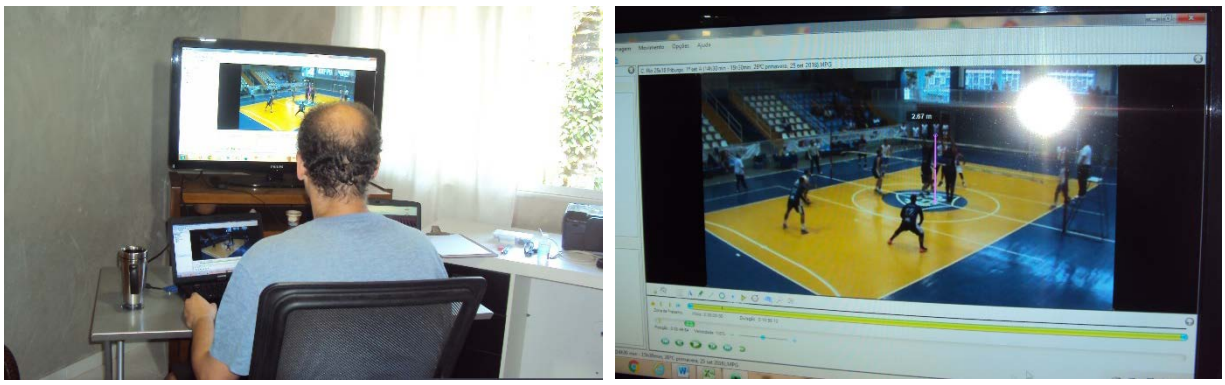

Figure 1. The researcher practiced the physical performance analysis with the Kinovea® software.

The use of the Kinovea® software was with the explanations of Marques Junior (2016b) and the standardized for collect the data of the matches about the physical performance of the skills was with the norms of Marques Junior (2017). The scout used during the study was similar to the of Marques Junior (2016) study. Figure 2 showed the scout with A4 sheet size.

Match: …….. **Analysis time:** ……..

Position	Physical Performance
Middle Blocker	
Outside Hitter/Serve Receiver	
Opposite Hitter	
Setter	

Figure 2. Scout of the study.

The researcher collected the spike jump in centimeters (cm), the spike reach in meters (m) and cm, the block jump in cm, the block reach in m, the time in hundredths of the ball after the attack (attack ball time), the time in seconds of the ball after the serve (serve ball time) and the time in seconds of the setter practices the displacement from the backcourt to the frontcourt for practice the set (setter time). Figure 3 illustrates these explanations.

A B

Figure 3. (A) Block jump of 95 cm and block reach of 3.21 m, (B) time in seconds of the ball after the serve.

The analysis time with the use of the Kinovea® software and with the scout had different durations and table 2 presents these data. The minimum and maximum analysis time of each set was as follows: 50 minutes to 6 hours and 39 minutes the 1st set, 56 minutes to 3 hours and 31 minutes the 2nd set and 31 minutes to 3 hours and 32 minutes the 3rd set.

Table 2. Analysis time of the men`s master volleyball of the category 35 years or more.

Match	Year	Analysis Time
1	2016	1st set: 6 h 39 min, 2nd set: 3 h 31 min, 3rd set: 3 h 32 min
2	2016	1st set: 3 h 10 min, 2nd set: 1 h 31 min, 3rd set: 31 min
3	2016	1st set: 1 h 32 min, 2nd set: 1 h 05 min
4	2016	1st set: 50 min, 2nd set: 56 min
5	2016	1st set: 1 h 41 min, 2nd set: 1 h 35 min, 3rd set: 40 min
6	2016	1st set: 3 h 11 min, 2nd set: 1 h 15 min
7	2016	1st set: 1 h 13 min, 2nd set: 1 h 28 min
8	2016	1st set: 1 h 20 min, 2nd set: 1 h 35 min
9	2016	1st set: 1 h 20 min, 2nd set: 1 h 56 min
10	2017	1st set: 1 h 20 min, 2nd set: 1 h 56 min
11	2017	1st set: 1 h 36 min, 2nd set: 1 h 53 min, 3rd set: 1 h 19 min
12	2017	1st set: 1 h 41 min, 2nd set: 1 h 41 min
13	2017	1st set: 1 h 20 min, 2nd set: 1 h 56 min
14	2017	1st set: 1 h 10 min, 2nd set: 1 h 31 min
15	2017	1st set: 1 h 33 min, 2nd set: 1 h 25 min

Abbreviation: hours – h, min – minutes, s – seconds.

The researcher calculated the percentage (%) of jump fatigue recommended by Edwards (2002). The calculation is as follows: **% of Jump Fatigue = (**mean of the jump of each set **:** maximum jump of each set**) .** 100 = **?%**.
The reliability of the physical performance was similar to the study of Ramos, Coutinho, Silva, Davids and Mesquita (2017). The researcher practiced the data collection in three months of 2016 and of 2017 the matches of each year. After 11 months of the data collection of the physical performance, the researcher practiced new performance analysis of 10% (34 sets is equal 3,4 sets, approximately three sets of each set or three matches with three sets) of the games for checking the reliability of the data.

Data Analysis

The results were expressed as the mean and the standard deviation, the minimum and maximum, the confidence interval of 95%. The effect size (ES) of Hedges and Olkin (1985) was calculated in the Excel®. The classification of the ES was based in Cano-Corres, Sánchez-Álvarez and Fuentes-Arderiu (2012), the classification was as follows: 0,20 or less is very small the effect, 0,21 to 0,49 is small the effect, 0,50 to 0,79 is medium the effect and 0,80 or more is great the effect.
The reliability of the physical performance was treated by the Cohen`s Kappa with a minimum accepted result of 0,75 (Ramos, Coutinho, Mesquita & Silva, 2017).
The Kolmogorov Smirnov test detected data not normal of all the sets of the block reach, of the spike reach, of the attack ball time, of the serve ball time and of the setter time. The histogram illustrates the data not normal, see figure 4, 7 and 9.
Then, the researcher determined the difference between the physical performance of the skills (of the block reach, of the spike reach, of the attack ball time, of the serve ball time and of the setter time) in each set with the Kruskal Wallis ANOVA, with acceptable results with the significance level of $p \leq 0,05$. The Dunn post hoc was used to identify the difference of the physical performance of the skills in each set, with acceptable results with the significance level of $p \leq 0.05$. All these statistical treatments were performed according to the procedures of the GraphPad Prism, version 5.0. The histogram and the bar graph were elaborated according to the procedures of the GraphPad Prism, version 5.0.
After the calculation of the Kruskal Wallis ANOVA, the new statistic of Cumming (2014) was performed for the significance p to be more precise.

Results

The Cohen`s Kappa detected a good agreement of the reliability of the skills (Landis & Koch, 1977). Table 3 presented the result of each set.

Table 3. Result of the reliability.

Skills	1st set	2nd set	3rd set
Block Reach	0,75	0,76	0,75
Block Jump	0,75	0,75	0,75
Spike Reach	0,76	0,75	1
Spike Jump	0,75	0,75	0,77
Attack Ball Time	0,94	0,75	0,75
Serve Ball Time	0,75	0,75	0,76
Setter Time	0,76	0,77	0,75

The data of the block reach and of the spike reach of each set were presented in table 4.

Table 4. Block and spike reach in meters (m) of each set.

Set	Reach	Min and Max	IC 95%	ES and Classification
1st	2,77±0,20 (block)	2,44 and 3,51 (block)	2,75 to 2,78 (block)	1st and 2nd set = 0,03 (very small) 1st and 3rd set = 0,03 (very small)
2nd	2,74±0,20 (block)	2,44 and 3,44 (block)	2,73 to 2,76 (block)	2nd and 3rd set = 0 (null)
3rd	2,74±0,16 (block)	2,44 and 3,11 (block)	2,71 to 2,77 (block)	-
1st	2,82±0,20 (spike)	2,44 and 3,57 (spike)	2,80 to 2,84 (spike)	1st and 2nd set = 0 (null) 1st and 3rd set = 0,05 (very small)
2nd	2,82±0,21 (spike)	2,44 and 3,49 (spike)	2,79 to 2,84 (spike)	2nd and 3rd set = 0,05 (very small)
3rd	2,77±0,18 (spike)	2,44 and 3,17 (spike)	2,73 to 2,81 (spike)	-

Abbreviation: min and max – minimum and maximum, IC 95% – confidence interval of 95%, ES – effect size.

The histogram illustrates the data not normal of the block reach and of the spike reach because the distribution of the data is not equal to normal curve or Gaussian distribution. Therefore, the data not normal the histogram is not equal to the bell (Dancey & Reidy, 2006). Figure 4 illustrates the results.

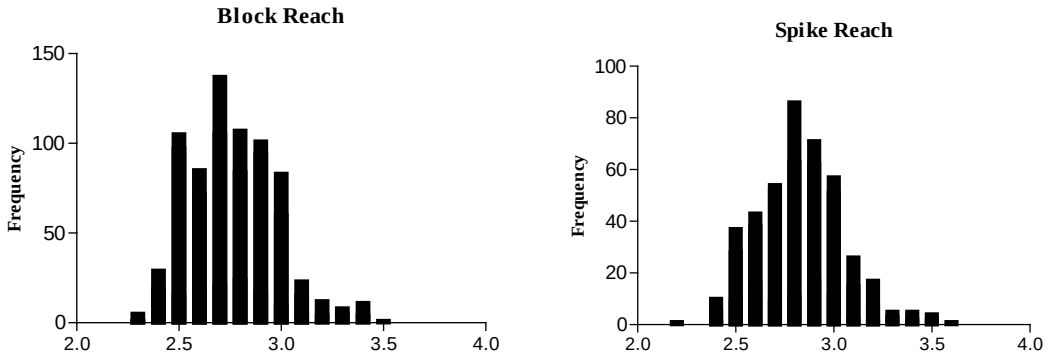

Figure 4. Histogram.

Kruskal Wallis ANOVA did not identify a statistical difference of the block reach [H (2) = 5,66, p = 0,05] and of the spike reach [H (2) = 3,45, p = 0,17] during each set. Figure 5 illustrates the results.

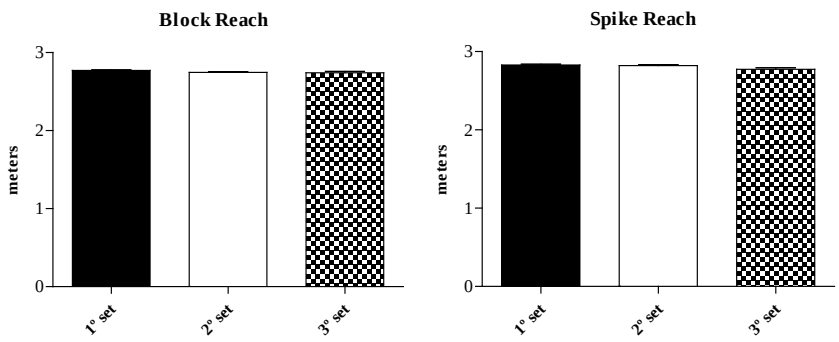

Figure 5. Result of the block reach and of the spike reach of each set.

Table 5 shows the result of the new statistic of Cumming (2014) without statistical difference of the block reach and of the spike reach.

Table 5. Result of the new statistic without statistical difference of the block and spike reach.

Comparison of the Block Reach	Overlap	p	Comparison of the Spike Reach	Overlap	p
1st set x 2nd set	-0,52	0,001*	1st set x 2nd set	2	1
1st set x 3rd set	-3,04	0,001*	1st set x 3rd set	-0,52	0,001*
2nd set x 3rd set	0,01*	1	2nd set x 3rd set	-0,52	0,001*

n = 10 or more: Overlap of 0,50 or less***** and p≤0,05***** (statistical difference)

The researcher calculated the % of jump fatigue of each set of the block and of the spike. Table 6 presented the data of this calculation.

Table 6. Block and spike jump in centimeters (cm) of each set.

Set	Mean	Maximum	Mean	Maximum
1st	62,84 (block)	120 (block)	66,91 (spike)	119 (spike)
2nd	59,38 (block)	109 (block)	63,70 (spike)	125 (spike)
3rd	65,79 (block)	104 (block)	62,16 (spike)	99 (spike)

Figure 6 shows the results of the % of jump fatigue of the block and of the spike during each set.

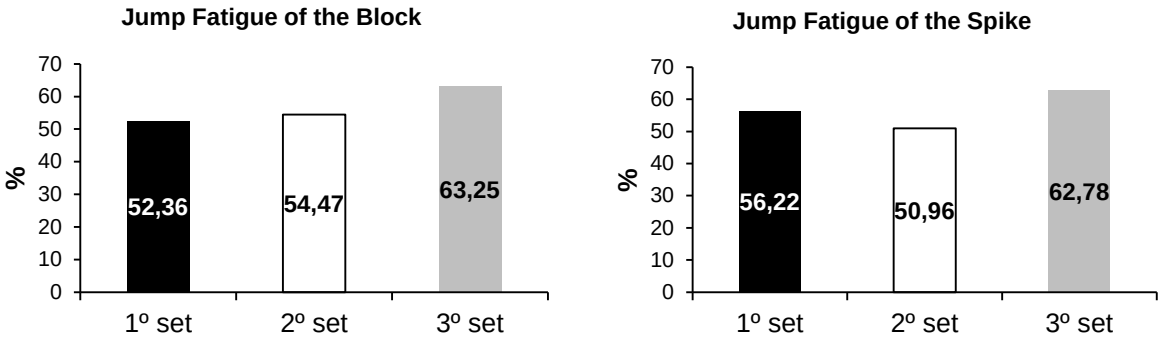

Figure 6. Result of the % of jump fatigue of the block and of the spike during each set.

The data of the time in hundredths of the ball after the attack (attack ball time) and of the time in seconds of the ball after the serve (serve ball time) of each set were presented in table 7.

Table 7. Data of the attack ball time in hundredths and of the serve ball time in seconds of each set.

Set	Ball Time	Min and Max	IC 95%	ES and Classification
1st	62,67±18,64 (attack)	10 and 100 (attack)	60,76 to 64,58 (attack)	1st and 2nd set = 1,27 (great) 1st and 3rd set = 1,37 (great)
2nd	60,92±17,12 (attack)	20 and 99 (attack)	59,14 to 62,69 (attack)	2nd and 3rd set = 0,19 (very small)
3rd	60,49±18,02 (attack)	13 and 99 (attack)	56,37 to 64,61 (attack)	-
1st	1,26±0,28 (serve)	0,50 and 2,50 (serve)	1,23 to 1,30 (serve)	1st and 2nd set = 0 (null) 1st and 3rd set = 0,02 (very small)
2nd	1,26±0,37 (serve)	0,43 and 3,77 (serve)	1,22 to 1,31 (serve)	2nd and 3rd set = 0,02 (very small)
3rd	1,28±0,51 (serve)	0,10 and 3,97 (serve)	1,15 to 1,41 (serve)	-

Abbreviation: min and max – minimum and maximum, IC 95% – confidence interval of 95%, ES – effect size.

The histogram illustrates the data not normal of the attack ball time and of the serve ball time during each set because the distribution of the data is not equal to normal curve or Gaussian distribution. Therefore, the data not normal the histogram is not equal to the bell (Dancey & Reidy, 2006). Figure 7 illustrates the results.

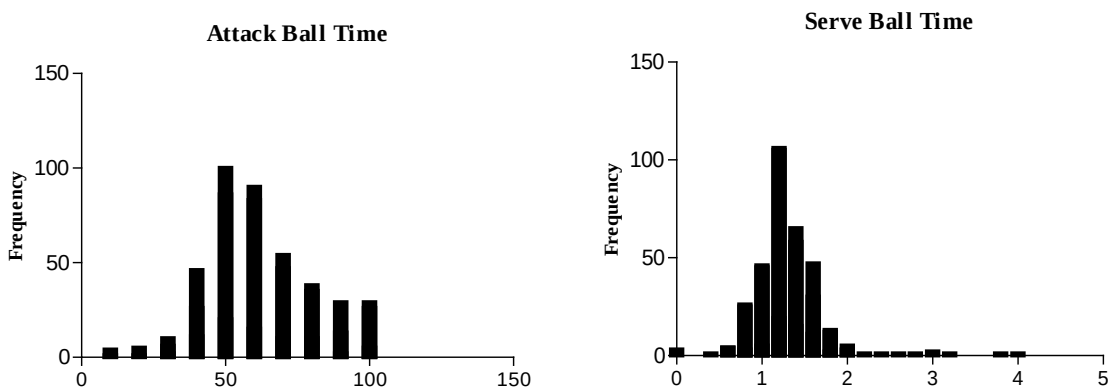

Figure 7. Histogram.

Kruskal Wallis ANOVA did not identify a statistical difference of the attack ball time [H (2) = 4,08, p = 0,12] and of the serve ball time [H (2) = 2,51, p = 0,28] during each set. Figure 8 illustrates the results.

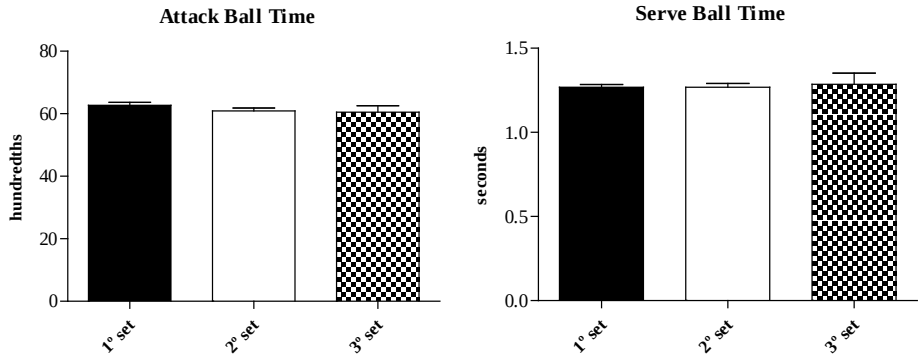

Figure 8. Result of the attack ball time and of the serve ball time of each set.

Table 8 shows the result of the new statistic of Cumming (2014) without statistical difference of the attack ball time and of the serve ball time.

Table 8. Result of the new statistic without statistical difference of the ball time.

Comparison of the Attack Ball Time	Overlap	p	Comparison of the Serve Ball Time	Overlap	p
1st set x 2nd set	-3,04	0,001*	1st set x 2nd set	1,33	1
1st set x 3rd set	-3,47	0,001*	1st set x 3rd set	0,81	0,12
2nd set x 3rd set	0,90	0,12	2nd set x 3rd set	1,15	0,21

n = 10 or more: Overlap of 0,50 or less* and p≤0,05* (statistical difference)

The data of the time in seconds of the setter practices the displacement from the backcourt to the frontcourt for practice the set (setter time) during each set were presented in table 9.

Table 9. Data of the setter time in seconds of each set.

Set	Setter Time	Min and Max	IC 95%	ES and Classification
1st	1,47±0,42	0,01 and 3,63	1,40 to 1,53	1st and 2nd set = 0,01 (very small) 1st and 3rd set = 0,09 (very small)
2nd	1,46±0,38	0,02 and 3,53	1,40 to 1,52	2nd and 3rd set = 0,10 (very small)
3rd	1,56±0,36	0,76 and 2,33	1,41 to 1,71	-

Abbreviation: min and max – minimum and maximum, IC 95% – confidence interval of 95%, ES – effect size.

The histogram illustrates the data not normal of the setter time and Kruskal Wallis ANOVA did not identify a statistical difference of the setter time during each set, H (2) = 2,39, p = 0,30. Figure 9 illustrates the results.

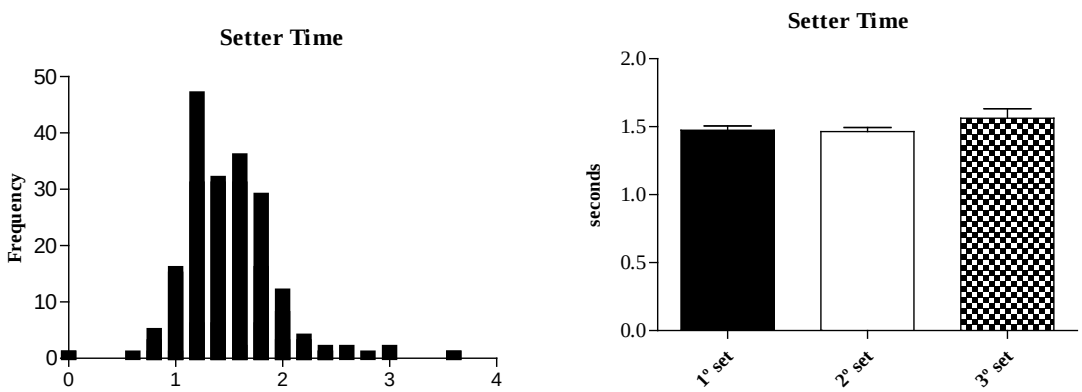

Figure 9. Histogram and result of the setter time of each set.

Table 10 shows the result of the new statistic of Cumming (2014) without statistical difference of the setter time.

Table 10. Result of the new statistic without statistical difference of the setter time.

Comparison of the Setter Time	Overlap	p
1st set x 2nd set	2	1
1st set x 3rd set	0,74	0,21
2nd set x 3rd set	0,74	0,21

n = 10 or more: Overlap of 0,50 or less***** and p≤0,05***** (statistical difference)

Discussion

The block reach of the master volleyball of the category 35 years or more had a better performance of 2,77±0,20 meters (m) during the 1st set than the 2nd (2,74±0,20 m) and the 3rd set (2,74±0,16 m). The block reach of the study had a decrease of 3 centimeters (cm) and mathematically the study detected an exponential increase of the % of jump fatigue of the block during each set (52,36% of the 1st set, 54,47% of the 2nd set and 63,25% of the 3rd set). The sports literature determined a fatigue of the lower limb when the vertical jump decreases the height during the match (Lima, Teixeira, Nakamura, Hayakawa, Assumpção & Menzes, 2015). However, the study did not measure by tests the decline of the vertical jump and the fatigue was not determined. Then, this is a limitation of the research.

The block reach of the study was similar to the block reach of the middle blocker (2,75±0,20 to 2,78±0,20 m) and of the outside hitter/receiver (2,71±0,17 to 2,72±0,17 m) of the master volleyball of the category 35 years or more (Marques Junior, 2018). But the block reach of the professional volleyball is higher because the volleyball player practiced a block reach of 3,27±10,96 m (Przybycien, Sterkowicz & Zak, 2014).

The spike reach of the study had a better performance of 2,82±0,20 m of the 1st set and of 2,82±0,21 m of the 2nd set than the 3rd set (2,77±0,18 m). The spike reach of the study had a decrease of 5 cm and mathematically occurred an increase of the % of jump fatigue of the spike during the 3rd set (62,78%) and the 1st set (56,22%) the result was greater than the 2nd set (50,96%).

In other study about the master volleyball of the category 35 year or more occurred a decline of the spike reach during the sets of four matches (match 1: 2,80±0,20 m of the 1st set and 2,69±0,12 m of the 2nd set, match 2: 2,75±0,18 m of the 1st set and 2,73±0,12 m of the 2nd set, match 3: 2,76±0,10 m of the 1st set and 2,68±0,11 m of the 2nd set and match 4: 2,77±0,17 m of the 1st set and 2,66±0,18 m of the 2nd set) (Marques Junior, 2017). The study about five (n = 5) professional volleyball players of the Poland determined a decrease of the spike reach of the 2nd set (3,08±18,89 m) because the 1st set the players had a greater spike reach (3,29±14,74 m) than the others sets (Wnorowski, Aschenbrenner, Skrobecki and Stech, 2013). The 3rd set (3,15±15,13 m) and the 4th set (3,10±14,31 m) the volleyball players of Poland had a spike reach a little higher than the 2nd set.

The spike reach decreased of the article and of two studies (Marques Junior, 2017; Wnorowski, Aschenbrenner, Skrobecki and Stech, 2013) but the motive the studies did not have an answer. Perhaps, the volleyball team had a fatigue and/or the players practiced more the 1st attack tempo when the spike reach had a smaller height. These questions need to study.

The study with the United States of America of the master volleyball of the category 40 years or more detected a spike reach of 2,95±13,1 m (Gladden & Colacino, 1978). Therefore, the United States players had a spike reach bigger than the study (2,82±0,20 m of the 1st set, 2,82±0,21 m of the 2nd set and 2,77±0,18 m of the 3rd set) and they were of a category with more age. The spike reaches this article the 1st and the 2nd set had a result similar to the 1st attack tempo of the outside hitter/receiver (2,82 to 2,83 m) of the master volleyball team of the category 35 years or more (Marques Junior, 2018). But the spike reaches this article the 3rd set was similar to the 1st attack tempo of the middle blocker of the category 35 years or more. This result deserves study in a next research, perhaps the 1st and the 2nd set the players this article practiced more attack by the left front court and/or by the right frontcourt and the 3rd set the players practiced more attack by the center frontcourt.

However, the master volleyball of the category 35 years or more had a lower spike reach (2,82±0,20 m of the 1st set, 2,82±0,21 m of the 2nd set and 2,77±0,18 m of the 3rd set) than the professional volleyball with 3,43±13 m (Palao, Manzanares & Valadés, 2014). The professional volleyball had a spike reach of 3 m or more and this occurs in all positions of the volleyball (Marques Junior, 2015; Wnorowski & Cieminski, 2016). Volleyball team with greater spike reach are Australia with 3,45 m, the Bulgaria with 3,48 m, the Russia with 3,49 m and the United States of America with 3,51m (Arruda & Hespanhol, 2008; Bellendier, 2003; Peeri, Sharif & Matinhomaee, 2013).

The attack ball time of each set was similar (62,67±18,64 hundredths or hun of the 1st set, 60,92±17,12 hun of the 2nd set and 60,49±18,02 hun of the 3rd set). This result was similar to the study of Marques Junior (2017), the attack ball time of each set had 60 hun or more. But the professional volleyball the attack ball time was shorter than this study, with 36,44±8,33 to 56±22,55 hun of the 1st attack tempo, with 40 to 50,63±22,42 hun of the 2nd attack tempo and with 39,83±8,99 to 51±13,82 hun of the 3rd attack tempo (Marques Junior, 2016). However, the study had a limitation, the Kinovea® software measures ball speed, but the researcher needs to position the camera on the tripod to the side of the volleyball court because this position the software determines the ball speed in meters per second (Marques Junior, 2016b).

The serve ball time of each set was similar (1,26±0,28 seconds or s of the 1st set, 1,26±0,37 s of the 2nd set and 1,28±0,51 s of the 3rd set). The study had serve ball time with a shorter duration than the professional volleyball of 1974 (1,40 to 1,50 s) (Barbanti, 1986). But the professional volleyball of 1990 had a serve ball time with the shorter duration of 1,20 s than the study (Jasiukiewicz, 1990). Perhaps this occurred in 1974 because the service was not very strong, but in 1990 serve was stronger because the players practiced with a frequency the jump power serve.

The setter time the 1st (1,47±0,42 s) and the 2nd set (1,46±0,38 s) had a similar result, but the 3rd set the setter time was longer (1,56±0,36 s). The setter time of another study about the master volleyball had a similar result of 1,40 to 1,48 s when the volleyball team won the match and the setter time was longer when the volleyball team lost the match, with a time of 1,64 to 1,79 s (Marques Junior, 2017). Then, this needs of a researcher.

The study had a limitation because more camcorders are needed to collect the data more accurately. The study had other limitation. Kinovea® software was not validated to measure the physical profile (attack ball time, serve ball time and setter time) and some conditioning capacities (block reach, block jump, spike reach and spike jump). This software was validated during the active cervical range of motion (r = 0,97 and r = 0,95) (Wardany, Sayed & Ali, 2016) and during locomotor activity in mice (r = 0,91 to 0,97) (Hong & Moon, 2018).

Conclusion

The study with the Kinovea® software is important for the physical trainer because he can detect the evaluation and/or decline of the physical preparation of the master volleyball player during each set of the match. Therefore the trainer with the evaluation of the block reach, of the spike reach, of the attack ball time, of the serve ball time and of the setter time can prepare and prescribe the physical training based on game data. In conclusion, the analysis of the physical performance during each set is important to guide the physical training.

Therefore, practical application for the physical preparation is important because of this information orient the trainer. The block reach and the spike reach are two measures important for the strength training because the trainer can determine the effect this training for improve or not the reach (block and spike) during the sets and this is important for the trainer structure strength training with the objective of the block reach and of the spike reach have constant values during the sets. The attack ball time and the serve ball time are two measures of the volleyball with the objective of determining the level of strength of the strike on the ball. Then, the trainer needs of determining during the sets the effect of the strength training on the attack ball time and the serve ball time with the objective of structure or not the bodybuilding and the reactive training. The setter time improves with the strength training and the resistance speed running training but during the sets, the time of the displacement from backcourt to the frontcourt is an important measure for the trainer determines the level of the setter time. Then, the setter time is important for the trainer structure the type of training (strength training and resistance speed running training) with the objective of the volleyball player practices a shorter setter time.

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