

## INVESTIGATIONS ON THE FEATURES SPECIFIC TO HIGH PERFORMANCE MASCULINE VOLLEYBALL

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**Abstract:** Romanian masculine volleyball knows presently a decrease in performance. Therefore, the present paper aims at depicting the elite teams of the world volleyball, namely the 4 teams qualified in the final two phases of the Olympic Games held in London. Two types of anthropometric and motor units were analyzed. The results of the analysis were compared to those of the Romanian national team. It results that the Romanian players' waist measurements are approximately similar to those belonging to the players of the top countries, but the results registered to the control trials focused on the explosive force at the level of the lower limbs point out clear value differences; the players of our national team register lower performances to these trials. We may conclude that there is a difference between the physical training performed by our players and that performed by the elite players in volleyball.

**Keywords:** volleyball, physical training, performance

### Introduction

The physical training is one of the most important factors considered in the sports training which determines the optimum manifestation of the other components. As long as the physical training is inferior to the individual abilities, the technical-tactical training can not be sized upon its maximum value, in addition, the psychological training becomes more efficient when the sportsman is satisfied with his/her physical potential.

The achievement of sports performances depends on a series of requirements. The accurate knowledge of these requirements constitutes an important premise in planning and adjusting a training based on scientific matters.

The physical constitution meant for the performance, such as the height, the body mass, the waist-height ratio, may highly influence the performance ability – it may be clearly seen, when considering the differences of physical aspect, in gymnastics, volleyball and basketball. The technical performance may be limited by the physical features, as well as by the physical condition and the performance characteristics. [1] The decreasing performances registered by the Romanian team require special measures applied to improve the specific physical training complied with the technical-tactical training. In order to align to a professional volleyball game, the physical training should be individualized and multiple. [2]

Despite the increased tendency of professionalization of trainers and sportsmen, there are few research data focused on professional volleyball players. Two main reasons

are pointed out. Certain trainers choose to apply traditional methodology including an increased stress on plyometrics or a decreased stress on training workouts with weights while the studies concerned with the training of the elite volleyball teams may be difficult to apply. [3]

The purpose of this research is to point out the main physical features of world top volleyball players in order to set certain reference points or standards which might be applied to our Romanian volleyball players.

The websites of the International Volleyball Federation helped us to identify the main features of the top players in the world volleyball, namely players from RUSSIA, BRAZIL, ITALY, BULGARIA.

Thus, two anthropometric references (waist and weight) and two specific motor references (vertical jump hitting a fixed point with one hand – attack hit and vertical jump hitting a fixed point with both hands – block jump) were analyzed.

For an accurate identification of certain situations in the elite masculine volleyball, considering certain anthropometric and motor features, we have achieved a synthesis of data provided by the website [www.fivb.com](http://www.fivb.com) [4], by extracting the needed information, such as, the waist, the weight, the registered height during the ball hit with one hand from above (the attack hit) and with both hands from above (the block), from the reports of the International Volleyball Federation.

We have chosen to analyze the national teams qualified on the top four places during the Olympics Games held in London in 2012.

Table 1. Waist report teams occupying 1-4 places during Olympics 2012  
coordinator

<i>Teams/positions</i>	<i>Russia</i>	<i>Brazil</i>	<i>Italy</i>	<i>Bulgaria</i>	<i>Waist average according the game positions</i>
<b>LIBERO</b>	188	184	183 185	185	185
<b>COORDINATORS</b>	195	190 191	200 194	202 196	195
<b>ASSISTANTS</b>	205 196 202 197	190 192 194 201	196 195 202	191 200	197
<b>UNIVERSAL PLAYERS</b>	203 218	198 212	202 204	200 206	205
<b>MAIN PLAYERS</b>	203 210 218	203 209	196	204 206 208	206
<b>Average per country</b>	203	197	196	200	

In table 1 we may see that the players' average waist value differs according the position occupied by the players on the court. It is obvious that the libero is the shortest player, while the main players are the tallest. On a second level taking into account the waist value, we consider the universal players followed up by the assistants. The coordinators register a waist average of 195cm, the value varying between 190 and 202cm.

Considering the team values, Russia register the highest waist average value (203cm) including players whose waist value varies between 188 and 218cm. Even if the waist value is a basic element which is considered for the volleyball players' selection, it is not a compulsory feature in achieving performances, the Brazilian team (lower values) is number 1 in the world volleyball elite.

The Russian team – features presentation

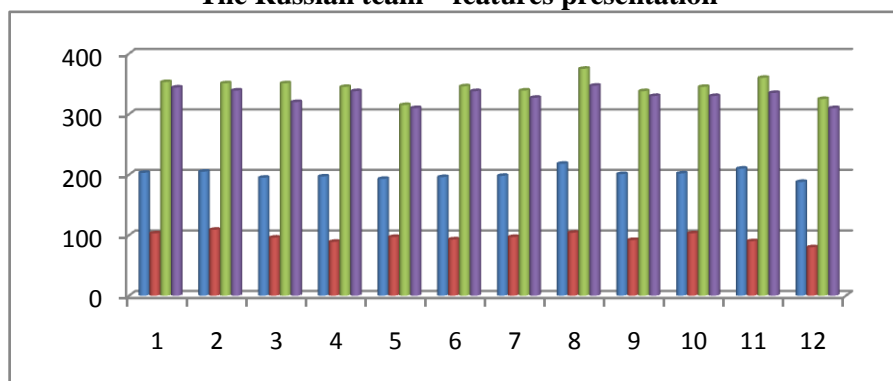


Chart 2.1. Russian team features

Russian team registers an average waist value of 200.5 ( $\pm 8$ cm), the values vary between 188 and 218cm, and includes 6 players whose waist value exceeds 2m. The body mass registers an average value of 96.1

( $\pm 8$ kg), the Russian players' weight varies between 80 and 109kg.

The explosive force at the level of the lower limbs registers an average value of 345.3 ( $\pm 15.5$ cm), the values varying between 325 and 375cm for the

vertical jump by touching a fixed point with one hand performed by the Russian players. Considering the vertical jump by touching a fixed point with both hands (blocking jump), the Russians register an average value of 330.7 ( $\pm 12.1$ cm), the height of the jumps varies between

310 and 347cm.

An analysis of the data considered in table 2.3. points out a high correlation between the Russian players' waist and the explosive force ( $r=0.851$ ) which determines a strong connection between the two variables.

Table 2. Pearson correlation: waist-explosive force – Russian team

Pearson Correlation		
Waist	Pearson Correlation	1
	Sig. (1-tailed)	
	N	12
Attack jump	Pearson Correlation	0.851**
	Sig. (1-tailed)	.000
	N	12
**. Significant correlation p< 0.01		

The Brazilian team – features presentation

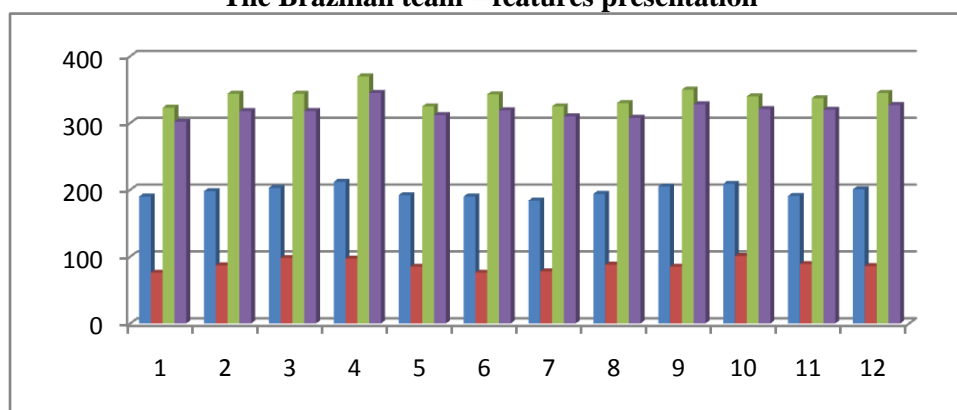


Chart 2.1. Brazilian team features

- The Brazilian team occupies the first place in the national teams hierarchy on world level and registers an average waist value of 197.4 ( $\pm 8.6$ cm), including 5 players whose waist value exceeds 2m. The values of this parameter are placed between 190 and 212 cm.
- The body mass registers an average value of 87.2( $\pm 8.3$ kg), the weight values vary between 76 and 101kg.
- The vertical jump by touching a fixed point with one hand registers an average value of 339.7 ( $\pm 13.2$ cm), the results vary between 325 and 370cm, while for the blocking, the players reach a height of about 319 ( $\pm 11.2$ cm).
- An analysis of the data considered in table 2.5. points out a high correlation between the Brazilian players' waist and the explosive force ( $r=0.795$ ) which determines a strong connection between the

two variables.

#### The Italian team – features presentation

- The Italian team registers an average waist value of 196.3 ( $\pm 7.1$ cm), the waist values vary between 183 and 204cm, and includes 6 players whose waist value exceeds 2m.
- The body mass registers an average value of 88.5( $\pm 8.2$ kg), the weight values vary between 75 and 104kg.
- The explosive force at the level of the lower limbs registers an average value of 343.7 ( $\pm 15.6$ cm), the values varying between 310 and 368cm for the vertical jump by touching a fixed point with one hand performed by the Italian players. Considering the vertical jump by touching a fixed point with both hands (blocking jump), the Italian players register an average value of 324( $\pm 16.5$ cm), the height of the jumps varies

between 310 and 348cm.

- The table 2.7. indicates the correlation between the waist and the explosive force values ( $r=0.754$ ) registered by the Italian players which determines a strong connection between the two variables.

#### **The Bulgarian team – features presentation**

- The Bulgarian team registers an average waist value of  $200.4(\pm 6.5\text{cm})$ , the waist values vary between 190 and 206cm, and includes 8 players whose waist value exceeds 2m.
- The body mass registers an average value of  $92.6(\pm 8.2\text{kg})$ , the weight values vary between 81 and 105kg.
- The vertical jump by touching a fixed point with one hand registers an average value of 347.8

( $\pm 12.7\text{cm}$ ), the results vary between 320 and 370cm, while for the blocking, the Bulgarian players reach a height of about  $332.2 (\pm 12\text{cm})$ .

- As well, the Bulgarian team registers a high correlation (table 2.9) between players' waist and the explosive force ( $r=0.775$ ) which determines a strong connection between the two variables.

The masculine volleyball world ranking on nations, accomplished by the International Volleyball Federation [5] in August 2015, considered the presence to international competitions for the last 3 years. According to this ranking, Romania occupies the 69th position.

Table 3. Romanian team features

No	Height	Weight	Attack jump	Blocking jump
1	196	83	330	318
2	192	83	325	295
3	200	87	335	320
4	204	88	345	335
5	197	85	330	320
6	190	86	300	290
7	192	88	320	310
8	215	90	355	345
9	190	77	330	318
10	191	80	320	290
11	200	88	340	330
12	193	80	328	315
<b>Avera ge</b>	<b>196.67</b>	<b>84.25</b>	<b>329.83</b>	<b>315.50</b>
<b>Stedv</b>	<b>7.33</b>	<b>3.86</b>	<b>13.83</b>	<b>17.23</b>

Romania registers an average waist value of  $196.67 (\pm 7.33\text{cm})$ , the players' height varies between 190 and 215cm. The body mass average is  $84.24 (\pm 3.86\text{kg})$  presenting values between 77 and 90 kg. While performing the vertical jump by touching a fixed point with one hand, the Romanian volleyball players register an explosive force at the level of the lower limbs with an average value of  $329.33 (\pm 13.83\text{cm})$ , the values varying between 300 and 345cm. Taking into account the vertical jump by touching a fixed point with both hands (blocking jump), the players register an average value of  $315 (\pm 17.23\text{cm})$ , the jumping height varying between 290 and 345cm.

Comparing the results of the top teams to those achieved by the Romanian team, we may conclude that, despite the anthropometric parameters whose values are close to those registered by the Italian and Brazilian teams, the

results achieved for the two jumping trials (attack and blocking jump) are inferior to those registered by the other teams. For the attack hit, Romanian team registers an explosive force at the level of the lower limbs which is 16cm lower than that of the Russian team, 10cm lower than that of the Brazilian team, 14cm lower than that of the Italian team and 18cm inferior to that of the Bulgarian team. For the blocking hit, the Romanian team indicates a deficit of 15cm as compared to the Russian team, of 4cm as compared to the Brazilian team, of 9cm as compared to the Italian team and of 17cm as compared to the Bulgarian team. Even if the waist values registered by the Romanian players are almost similar to those of the players performing for the top teams, the results for the two control trials focused on the explosive force at the level of the lower limbs reveal obvious differences, our players'

performances being inferior during these two trials.

The dynamics of the sports performance evolution specific to the volleyball game needs to identify the development tendencies of elements meant to generate, as well as to limit the progress in order to determine their maximization.

These two trials are closely related to the waist values registered by the volleyball players. As the Romanian players register waist values which are almost similar to those registered by other teams, we may conclude that there is an inadequacy in their physical training. This aspect limits the achievement of superior parameters specific to the explosive force at the level of the lower limbs. The improvement of the degree of developing motor skills provides an efficient technical performance whose quality may be limited by an insufficient physical training.

#### References

- [1]. Smith D.J., Roberts D, B. & Watson B., (1992). Physical, physiological and performance differences between Canadian national team and Universiade volleyball players, *Journal of Sports Sciences*, Volume 10, Issue 2, pp. 132-138, doi:10.1080/02640419208729915
- [2]. Niculescu M., Niculescu I., Amzăr L., (2011), Contributions concerning muscle training in professional volleyball, *Journal of Social Sciences*, vol.7, nr.3, pp.343-348
- [3]. Cardoso M., Gonzalez-Badillo J., Kluka D., (2006), In-Season Resistance Training for Professional Male Volleyball Players, *Strength and Conditioning Journal*, 28.6:16-27
- [4] www.fivb.com – accessed on September the 2nd, 2015
- [5] [http://www.fivb.org/en/volleyball/VB\\_Ranking\\_M\\_2015-08.asp](http://www.fivb.org/en/volleyball/VB_Ranking_M_2015-08.asp) - accessed on September the 2nd, 2015