

# STUDY ON THE WEIGHT OF JUMPING EXERCISES IN THE DEVELOPMENT OF EXPLOSIVE FORCE IN VOLLEYBALL PLAYERS

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**Abstract.** *We highlighted aspects related to the different ways of using jumps to achieve goals aimed at developing explosive force in female volleyball players. We administered a questionnaire to 64 volleyball players registered with different teams in the Romanian championship to determine their opinions regarding the importance of jumping exercises in the development of explosive strength in volleyball players. The data presented in the research results highlight the fact that some types of jumps are used in a greater proportion in the parts of training intended for the development of explosive force, compared with other types of jumps. Referring to the type of strength pursued as a training goal, we found that the weight of the use of jumps is different, with a significant increase in their use in the parts of training aimed at speed strength/explosive strength.*

**Key words:** *Questionnaire, volleyball players, explosive force, sports clubs.*

## 1. Introduction

The game of volleyball made its appearance around 1895, being propelled by Professor William G., Morgan from the College of Massachusetts (USA), based on a very old Italian game, the so-called German “Faustball”. Morgan's name for this game was “mintonette” [14].

Morgan borrowed the tennis net, raised it to 6 feet 6 inches (1.98 cm), on a badminton court. Initially using a tennis

ball hit with the palm of the hand, then the chamber of an old basketball, the game was played by players coming in a row, like in baseball. There were no limits on the number of players and the number of balls touched [15].

After a while, the game acquired a somewhat more defined form, and the demonstration made by two teams, in 1896, was liked, and the game was proposed for broadcasting. The name „volley-ball” was proposed by Halsted A.

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T. (Director of the College), a name derived from “volley” (flight) and “ball” (ball). As for the rules, they were similar to the game of tennis and were very different from today. They were implemented by Ariens A. T., in 1897, and referred to the dimensions of the field, the net, the ball, the number of players, etc. As the game developed, new and new rules appeared. [1]

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It is the YMCA organization, through its affiliates, that is helping to spread this game in Canada, South America, Asia and Europe. If, at the beginning, the number of players was unlimited, it kept changing from 5 to 14 or 9, then reaching 6 [2].

Volleyball is one of the world's most popular sports and because of its enormous popularity many studies have been conducted in an attempt to understand the better program training required to develop total body performance by a volleyball player [10], [3]. Unfortunately, the scientific understanding of this issue remains unclear, with most young participants acquiring muscular performance through individual experience rather than research-based instructions [17], [18]. Indeed, volleyball is a sport that requires strength in upper and lower limbs [4], [13]. The development of muscle strength and specific technical skills are particularly important for young players and especially to female athletes [9], as priority factors to achieve success [12], [7].

The aim of the game is to make the ball fall into the opponent's court, sending it over the net and preventing it from touching the ground of your own court. Each team has three touches to return the ball (in addition to the blocking touch). [6]

The ball is put into play by a service: the service player hits the ball to send it over the net into the opponent's court. The phase of play continues until the ball touches the ground in the field of play, is sent out, or until a team fails to return it correctly.

In the game of volleyball, the team that wins the phase of the game receives a point (point system at each phase of the game). When the receiving team wins the phase, it will win a point and the right to serve, and the players of this team perform a rotation, moving one position clockwise [5].

## **2. Objectives**

Through this research, we aimed to highlight aspects related to the different ways of using jumps, in achieving the goals, aiming at the development of explosive force in volleyball players.

The main objective of the research is to determine the ways in which jumps are included in training aimed at developing strength in general and explosive strength in particular, in volleyball players.

## **3. Material and Methods**

The research was carried out during 8 months. The practical part of the research (the application of the questionnaire to the volleyball players from the 9 teams from different regions and sports clubs and the collection and partial processing of the data) was carried out in two stages

for a better application and conducting the questionnaire.

The instrument of our research (the questionnaire) was presented to the subjects, its role in our research was explained to them, and further instructions and explanations were provided. [11]

Completion of the questionnaire was spontaneous where possible, where the teacher involved in our research answered the questionnaire on the spot. Where it was not possible, it was returned on another day or another week after the questionnaire.

The subjects of the research were represented by 64 performance sportswomen, registered as volleyball players at 9 sports clubs in Romania.

The research tool used was

represented by a questionnaire with 15 items, each item having different answer options, the subjects being asked to opt for at least one answer option or to choose a value from a proposed scale.

#### 4. Results

In order to be able to analyze and interpret the results, we present the data processed through statistical analysis, for the 15 items of our survey based on a questionnaire.

Item no. 1 (*From the exercises below, choose 2 variants that represent the most frequent categories of exercises, which your coach/physical trainer included in the preparation physical from the preparatory period*).

Table 1

*Use of jumps for strength development*

Variants offered for the answer	Number of options expressed	Percentage
Endurance running exercises over different distances or durations	21	16,40%
Short and medium distance running exercises (speed)	10	7,81%
Exercises carried out in the strength room	21	16,40%
Jumping exercises (variants: free, over/on/off different obstacles)	20	15,63%
Coordination exercises (games with or without the ball)	17	13,28%
Workshop exercises (combinations of different exercises with or without objects, intended for general strength or resistance)	28	21,88%
Volleyball game with different themes	11	8,59%
<b>Total</b>	<b>128 (64 subjects × 2)</b>	<b>100%</b>

Item no. 2 (*From the exercises below, choose 2 variants that represent the most frequent categories of exercises, which*

*your coach/physical trainer included in your physical training in the pre-competitive period*).

Table 2

*Weight of the most frequent exercises included in the subjects' physical training, in the pre-competitive period*

Variants offered for the answer	Number of options expressed	Percentage
Endurance running exercises over different distances or durations	14	10,93%
Short and medium distance running exercises (speed)	21	16,40%
Exercises carried out in the strength room	15	11,72%
Jumping exercises (variants: free, over/on/off different obstacles)	22	17,18%
Coordination exercises (games with or without the ball)	19	14,84%
Workshop exercises (combinations of different exercises with or without objects, intended for general strength or resistance)	13	10,16%
Volleyball game with different themes	23	17,97%
Total	<b>128 (64 subjects × 2)</b>	<b>100%</b>

Item no. 3. (Which of the following training sessions for the preparation? - jumps were used more often during the choose 3 options)

Table 3

*Types of jumps used more often in training subject*

Variants offered for the answer	Number of options expressed	Percentage
Standing long jump	14	7,29%
Jumping jumps on two feet in place	24	12,50%
Double jumps with displacement	30	15,62%
Skip step	22	11,46%
Leapt step	23	11,98%
Jump combinations	31	16,14%
Jumping over obstacles	29	15,10%
Jumping on obstacles	19	9,90%
Total	<b>192 (64 subjects × 3)</b>	<b>100%</b>

Item no. 4 (Which of the following jumps were used more often in the preparation training aimed at developing explosive strength (strength in speed regime? - choose 3 variants).

Table 4

*Types of jumps used more often in the development of explosive strength*

Variants offered for the answer	Number of options expressed	Percentage
Standing long jump	2	1,04%
Jumping jumps on two feet in place	30	15,62%
Double jumps with displacement	27	14,06%
Skip step	16	8,33%
Leapt step	24	12,50%
Jump combinations	43	22,40%
Jumping over obstacles	39	20,31%
Jumping on obstacles	11	5,73%
Total	<b>192 (64 subjects × 3)</b>	<b>100%</b>

Item no. 5 (Jumping combinations, as a means for developing motor skills, can be used in different forms of organization. Choose the most frequently used form that coaches or physical trainers have used to develop explosive strength)

Table 5

*The form under which they were used more often jump combinations designed to develop strength*

Variants offered for the answer	Number of options expressed	Percentage
Application path	17	26,56%
Relays	-	0%
Structure of stand-alone combinations	47	73,44%
Total	<b>64</b>	<b>100%</b>

Item no. 6 (To have a greater effect on the development of strength certain jumps in athletics can be performed on soft surfaces (sand, mats). How often were such jumps used in your training lessons aimed at developing the general strength of the lower limbs?)

Table 6

*Use of jumps on soft surfaces in developing the general strength of the lower limbs*

Variants offered for the answer	Number of options expressed	Percentage
very often	20	31,25%
often	27	42,19%
rare	8	12,50%
very rarely	9	14,06%
Total	<b>64</b>	<b>100%</b>

Item no. 7 (To have a greater effect on the development of strength, certain jumps in athletics can be performed on soft surfaces (sand, mats). How often were such jumps used in your training lessons aimed at developing the explosive strength of the lower limbs?)

Table 7

*Using jumps on soft surfaces in the development of EXPLOSIVE strength of the lower limbs*

Variants offered for the answer	Number of options expressed	Percentage
very often	17	26,56%
often	21	32,81%
rare	13	20,31%
very rarely	13	20,31%
Total	<b>64</b>	<b>100%</b>

Item no. 8 (In order to increase the difficulty of the task to be performed and to better develop the explosive force, means from the jumping school can be used with various weights attached (sandbags, small weights in the hands, etc.). Such exercises were included in your trainings?)

Table 8

*Use of jumps with weights attached to the body in training subjects*

Variants offered for the answer	Number of options expressed	Percentage
Yes, very often	10	15,63%
Yes, often	31	48,43%
Yes, rarely	10	15,63%
No	13	20,31%
Total	<b>64</b>	<b>100%</b>

Item no. 9 (When the coach/physical trainer followed the development of general strength, what type of exercises did he include more often in the training? – choose 2 options).

Table 9

*Types of exercises used more often in the development of the general strength of the subjects*

Variants offered for the answer	Number of options expressed	Percentage
Exercises carried out in the strength room, with objects and devices	61	47,66%
Free exercises carried out in the strength room, with the weight of your own body (abdominal, back, squats, standard half-squats or jumps, etc.)	35	27,34%

Variants offered for the answer	Number of options expressed	Percentage
Jumping exercises (different types, with or without additional weights)	32	25,00%
Total	<b>128 (64 subjects × 2)</b>	<b>100%</b>

Item no. 10 (When the coach/physical strength), what type of exercises did he trainer followed the development of include more often in the training? – specific strength (including explosive choose 2 variants).

Table 10  
*Types of exercises used more often in the development of the subjects' explosive strength*

Variants offered for the answer	Number of options expressed	Percentage
Exercises carried out in the strength room, with objects and devices	49	38,28%
Free exercises carried out in the strength room, with the weight of your own body (abdominal, back, squats, standard half-squats or jumps, etc.)	26	20,31%
Jumping exercises (different types, with or without additional weights)	53	41,41%
Total	<b>128 (64 subjects × 2)</b>	<b>100%</b>

Item no. 11 (Among the jumps with splits on two legs exposed, specify two that you used most often in the training aimed at developing explosive force?)

Table 11  
*The weight of the use of jumping from two feet for developing explosive power*

Variants offered for the answer	Number of options expressed	Percentage
Spring break on two feet - performed with rope	11	8,59%
Two-legged spring break - „like a ball” without additional weights attached	21	16,41%
Two-legged spring break - „like a ball” with additional weights attached	31	24,22%
Sequences of bound long jumps („frogs”)	26	20,31%
Jumping over obstacles (over fences)	39	30,47%
Total	<b>128 (64 subjects × 2)</b>	<b>100%</b>

Item no. 12. (Among the exposed jumps, specify two that you used most often in training aimed at developing explosive strength?).

Table 12

*Types of jumps used more often and the percentage weight*

Variants offered for the answer	Number of options expressed	Percentage
Jumps in place with simulation of blocking (lifting arms up)	59	46,09%
Jumping over landmarks marked on the ground (equal distances between landmarks)	24	18,75%
Jump steps with attack simulation	25	19,53%
Jumping over landmarks marked on the ground (unequal distances between landmarks)	20	15,63%
Total	<b>128 (64 subjects × 2)</b>	<b>100%</b>

Item no. 13. (Among the exposed jumps, training aimed at developing explosive specify which one you used most often in strength?).

Table 13

*Share of the use of the skipped step and the skipped step for developing explosive power*

Variants offered for the answer	Number of options expressed	Percentage
step jump over different distances	28	43,75%
skip step over different distances	36	56,25%
Total	<b>64</b>	<b>100%</b>

Item no. 14. (Among the jumps with used most often in training aimed at splits on two feet from the place, developing explosive strength?). presented below, specify which one you

Table 14

*Types of jumps used more often and the percentage weight*

Variants offered for the answer	Number of options expressed	Percentage
Jumps with separations on two feet from the place, to imitate blocking	23	35,94%
Jumps with separations on two feet from the place, reaching a landmark as high as possible	41	64,06%
Total	<b>64</b>	<b>100%</b>

For the last item of our questionnaire *Item no. 15 - On a scale from 1 to 5 (1 less important, 5 very important), specify what would be the role that the different types of jumps would have in the development of explosive force of volleyball players?)*

From the five answer options, we

determined percentage weights for only three, because no subject opted for the values "1" and "2" on the value scale.

The highest percentage was statistically determined for the value "5" on the proposed scale, maximum value, which indicates that for 45.31% of the

investigated subjects, performance the development of explosive force is very volleyball players, the role of jumping in important.

Table 15  
Percentages determined for the opinion expressed by the subjects regarding the role of jumping in the development of explosive strength

Variants offered for the answer	Number of options expressed	Percentage
Value "1" on the scale	-	0%
Value "2" on the scale	-	0%
Value "3" on the scale	11	17,19%
Value "4" on the scale	24	37,50%
Value "5" on the scale	29	45,31%
Total	64	100%

## 5. Conclusions

After analyzing and processing the data for this paper, we reached the following conclusions:

- the data presented in the research results highlight the fact that some types of jumps are used in a greater proportion in the training parts intended for the development of explosive force, compared to other types of jumps.
- referring to the type of strength pursued as a training objective, we found that the weight of the use of jumps is different, with a significant increase in their use in the training parts intended for speed strength / explosive strength;
- almost 50% of the subjects often use jumps with different weights attached to the body in training;

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