THE IMPACT OF PHYSICAL EXERCISES IN INCREASING THE EXPLOSIVE POWER ON VOLLEYBALL PLAYERS (AGED 16-18 YEARS)

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Abstract

All types of sports, especially volleyball has high demands in increasing the explosive power, which have an important effect in raising the vertical jump in volleyball and in the general performance of athletes. For this reason volleyball trainers must apply some specific physical exercises in order to increase the explosive power.The aim of this study is to evaluate the impact of physical exercises in raising the explosive power of volleyball player of the Dinamo team aged 16-18 years.

According to the hypothesis if physical exercises that we have chosen, are appropriate to complete the purpose of raising the explosive power, for this reason we have done 3 tests in different period of time (January 2017) and (July 2017) in order to evaluate the improvement in explosive power after applying the selected physical exercises. The number of the subjects that participates in the research study are 20 volleyball players (age 16-18 years old). Three test procedures and assessment are supported by LEONARDO MECHANOGRAPHY which are: Multiple two leg hopping (m2HL)test, Single two leg jump (s2LJ)test (without using arms), Single two leg jump (s2LJ) test (using arms). After first period of measurements (January 2017) volleyball players have conducted some specific physical exercises for six months in order to increase the explosive power. At the end of the physical exercises application, which coincides with the second period of measurements, the subjects have conducted the same tests to see the difference and the effect of the selected exercises. In both periods of measurements, they have performed two times for each test and we took on consideration the best result. The results of this study shows that the selected physical exercises are appropriate to increase the explosive power and the vertical jump of volleyball players. According to this study those selected physical exercises are good example that trainers must consider on.

Key words: explosive power, volleyball, vertical jump, physical exercise, tests ,trainers

Introduction

Nowadays volleyball is more dynamic compared to the volleyball of the 1990s that tended to be more static, therefore today's demands are higher for increasing physical parameters and especially that of strength. For volleyball players, speed and agility are important attributes to act on the volleyball field at the attack or defense action, but if they do not have the power to hit the ball or to achieve a high jump then they will have a negative impact on the preparation as completed athlete. Ray Weisenbarger, UCLA volleyball coach, trainer responsible for strength development considers volleyball as a sport of strength, expediency and speed. This is the way it is played. A strict force program is an important component that makes the difference in the outcome during a match or a championship. His philosophy for force is simple:

"Strength is generated (starts) from the lower limbs and then climbs to the upper limbs of the shoulder, arms, and arms. "During the time you rise to hit the ball it is necessary to have the force in your foot to make the vertical jump as high as you can and also need force at the upper limbs to hunt, block or immerse the ball.

Impact of explosive force on increasing the vertical jump. Vertical jump is an important component for athletes of all types of sport. But we can list some of the sports where vertical jump is very important, such as basketball, football (headshots), tennis (during service shooting), this makes it a key to many athletes. In volleyball vertical jump is important when you hit the ball and during block, service in order to make them faster. Therefore, there is a need to increase explosive power and power in

general. A high level of those two parameters consequently results in increasing the height of vertical jump. The best methods used to increase explosive strength and the height of vertical jump are plyometric method and jump method (1). For these reasons, these methods have been selected to apply to the program physical exercises of this study.

Methods

For the realization of this study, the following methods have been used: researching in literatures, testing method, comparison method, statistical analyses method**.**

The number of subjects participated in this study are 20 athletes (aged 16 to 18 years) of Dinamo team, 12 ofthem are federated by Albanian Volleyball Federation. The platform used for tests is LEONARDO mechanography.Those are the tests that has been conducted:

1. Single two leg jump (s2LJ) test (using arms)
2. Single two leg jump (s2LJ)test (without using arms)
3. Multiple two leg hopping (m2HL)test

The tests are carried out in two different periods, the first measurements are conducted in January 2017 while the second measurements are conducted in July 2017. After collecting the data of each parameter we have found the averages (mean) and we have made comparisons between two different periods.

Protocols of the tests performed

1. Multiple two leg hopping (m2HL) test

Multiple two leg hopping (m2HL)testis used to determine the explosive force on both legs. Subject Orientation

Jump with your feet twice as fast as you can. The first touch on the platform must be with the front of the feet. Touching the platform with the heels cause inaccurate measurement results.

According to the protocol, the subject should not jump as high as it is needed in vertical jump because this may ask for more time, but It is important to jump as fast as you can using the explosive force. The test repeats twice in order to get the best result. The subject should start jumping quickly. After two or three jumps, we should ask him to increase the speed and gradually we ask him to increase the height of the jump. In this way, we can be confident that the subject is actually using explosive force during this test also by verify the measurement window and the values of the force.

2. Single Two Leg Jump (s2LJ) (without using arms)

The single two-leg jump test contains information about the potential level of the subject's explosive force.

Subject Orientation

For this kind of test, the subject must jump as fast as possible, using both feet while hands do not participate in the action but we can place them at the waist.

3.Single two leg jump (s2LJ) test (using arms)

Single two leg jump (s2LJ) test (using arms)is the same as the test presented above, but in this case we have to use arms, and the main parameter being evaluated is the explosive force.

Subject Orientation

The subject should be focused during the test and try to jump as high as possible by swinging the arms back and forward. The touch with the platform after the jump should be soft.

Results

The results from table 1 show mean values for single two leg jump test using arms. The average vertical height is 0.42m, average of force 1.47 KN and average of power 2.99 Kw.

Table 1. Mean.. Single two leg jump (s2LJ) test (using arms) on January 2017.

Average of vertical jump height	**Average of force**	**Average of power**
0.42m	**1.47 KN**	**2.93Kw**

The results from table 2 show mean values for single two leg jump test using arms. The average vertical height is 0.44 m, average of force 1.52 KN and average of power 2.94 Kw.

Table 2 Mean Single two leg jump (s2LJ) (using arms) test (July 2017)

Average of vertical jump height	Average of force	Average of power
0.44m	1.52 KN	2.94Kw

The results from table 3 mean values for single two leg jump test without using arms. The average of jump height is 0.35m, average of force is 1.49 kN and average of power 2.60 kW.

Table 3 Mean Single two leg jump (s2LJ) test (without using arms), January 2017.

Average of vertical jump height	Average of force	Average of power
0.35 m	1.49kN	2.60 kW

The results from table 4 mean values for single two leg jump test without using arms. The average of jump height is 0.37m ,average of force is 1.51 kN and the average of power is 2.60 kW.

Table 4 Mean Single two leg jump (s2LJ) test (without using arms), July 2017.

Average of vertical jump height	Average of force	Average of power
0.37m	1.51 kN	2.60 kW

The results from table 5 mean values multiple two leg hopping test. The average of maximal force is 3.22 Kn, the average of maximal power is 3.77 kw, the average of jump height is 0.36 m and the average number of jumps is 21.4 .

Table 5 Mean .Multiple two leg hopping (m2HL) test (January 2017)

Average of maximal force	Average of maximal power	Average of vertical jump height	Average number of jumps
3.22 Kn	3.77 kw	0.36 m	21.4

The results from table 6 mean values multiple two leg hopping test. The average of maximal force is 3.32 Kn ,the average of maximal power is 3.62 kw , the average of jump height is 0.41m and the average numbers of jumps is 19.

Table 6 Mean.Multiple two leg hopping (m2HL) test (July 2017)

Average of maximal force	Average of maximal power	Average of vertical jump height	Average number of jumps
3.32Kn	3.62 Kw	0.41 m	19

Discussion

Data at the table 1 and 2 are presented those parameters, average height of vertical jump, average force and average power. At table 1 are recorded values of first measurement of the first test while at the table 2 are recorded values of second measurement of the first test. By comparing those two tables we can see improvement at average height of vertical jump (0.02m) ,average force (0.05 kN) and average power (0.01Kw).
Differences between table 3 and 4 shows a progressof two parameters (average force and average height of vertical jump) at the second test. The average force is improved with 0.02 kN while the average height of vertical jump is improved with 0.02 m. The average power has no progress at the second measurement. At the table 5 and 6 are recorded the values of four parameters (average maximal force, average maximal power, average of vertical jump height and average number of jumps).

Average maximal force is improved with 1 kN while the average of vertical jump height is increased with 0.05 m. There is a decrease in average numberof jumps with 2.4 due to the increment of height at vertical jump.

According to this study, the physical exercises selected to increase the explosive power resulted in raising the vertical jump and the parameters of the athletes. From the study results, we have proved that these exercises are appropriate for trainers of this discipline that aimed to increase the explosive power. This is a recommended model to be followed. Testing process is necessary to be carried out before and after the championship. This makes the trainers and volleyball players more aware of their physical capacity and technical problems.

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