STUDY ON THE DEVELOPMENT OF THE VERTICAL JUMP IN VOLLEYBALL AT THE JUNIORS LEVEL

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Abstract. The aim of this paper was to study the ways of developing vertical jumping specific to the game of volleyball in juniors 3, by monitoring the training process focused on physical training. We applied three tests specific to vertical jumping in volleyball: vertical jump from the spot, vertical jump on block and triple jump. Based on the results obtained, we established two general physical training programs: one indoor and one outdoor, with the aim of achieving significant progress in both the maximum jumping value and the consistency of the jumping height throughout the volleyball game. As a result of the post-tests, in the vertical jump from the standing position, we observed an increase in the overall arithmetic mean by 2.41 cm. In the vertical jump from the block, the progress was 1.58 cm, and in the triple jump there was a significant increase with an arithmetic mean of 8.91 cm. Analysing the results of the three tests (standing vertical jump, vertical jump on block and triple jump), a significant increase can be observed, which shows that this type of training is effective and beneficial.
Keywords: vertical jump, juniors, physical training, training.

Introduction

Volleyball is a team sport played by six players who, through individual and collective actions, win points and keep or regain serve. The players are separated by a net, and after each phase of play, they change positions in a specific and strict clockwise rotation according to the rules. (Bompa,1999). This rotation system contributes to the development of players skills who are well-prepared for both offense and defense. (Komi & Bosco, 1978)

The essential aspects of a volleyball game refer to the concrete situations that teams and players constantly face during an official match, with the goal of winning the game, i.e. winning sets. Winning a set involves winning points through actions that typically start with serving to win the point, or taking the serve to regain the serve and thus the point. (Verkhoshansky, 2011). Volleyball action ends with either winning or losing a point, which ultimately results in either winning or losing the game. This distinguishing characteristic of volleyball influences all player executions and interventions. The specific peculiarity of the sport determines the key aspects that need to be addressed and achieved in the execution of each play action. (McGown & Kessel, 2001)

Vertical jumping is crucial in the context of attacking shots. The ability to jump upwards allows athletes to hit the ball over the net with powerful and precise attacks. These shots are more difficult for the opposing team to anticipate and block, providing strategic and tactical opportunities in the game of volleyball. (Komi & Bosco, 1978). A well-developed vertical jump is essential in the context of blocking. It is crucial for players to jump quickly and be high to intercept their opponents' attacking shots. This skill contributes significantly to team self-defence and preventing points in benefit of the opponent. (McGown & Kessel, 2001), (Bahrke & Mester, 2009).

In the receiving phase, a vertical jump facilitates efficient taking of strong opponents. The ability of players to jump high and quickly allows them to control the ball more effectively, which helps them to organize more effective attacks for their teams. (Sheppard &Newton, 2012)

Vertical jump training is fundamental for developing player agility and explosiveness. These qualities are important not only for jumping but also for all other aspects of the game, including quick movements and changes in direction. (Sheppard & Newton, 2012). Vertical jumping drills improve the overall fitness of players. They help strengthen the leg and trunk muscles, thereby increasing endurance and the ability to perform at a high level during matches. These exercises are crucial for maintaining optimal physical fitness and sustaining consistent court performance. (Komi & Bosco, 1978)

A high and powerful jump can also psychologically impact opponents. Players able to

dominate in the air can intimidate opponents, influencing their morale and creating additional pressure on them. (Bompa & Buzzichelli, 2018). This ability not only boosts team confidence, but can also disrupt opponents' concentration and performance during the match. (Markovic & Mikulic, 2010)

Improving the vertical jump of junior volleyball players is essential for the progression of their skills in the sport. At this stage of development, it is crucial to pay attention to the development of precise techniques and to work hard to increase the power and height of the jump. These aspects are fundamental to helping subjects become better players and contribute more effectively to their team's success on the court (Markovic & Mikulic, 2010).

According to Côté and Fraser-Thomas (2007), there are some important strategies and aspects to consider when developing vertical jumping in volleyball for juniors 3:

1. Correct jumping technique: It is crucial for juniors to learn and execute vertical jumps correctly. This includes proper foot positioning, correct arm movements, and controlled breathing to maximize jump height.
2. Exercises for power and explosiveness: Specific exercises that develop the power and explosiveness needed for high jumps. Examples include plyometric jumps, dumbbell drills, and other exercises that focus on the legs and torso muscles.
3. Flexibility and mobility: Improving flexibility and mobility improves the efficiency and safety of jumping. Include stretching and mobilization exercises in your training routine to maintain joint and muscle flexibility.
4. Core and balance training: Correct stability and good balance are essential for a controlled and powerful jump. Introduce exercises that target the core muscles (abs, back and pelvis) to increase stability and control during jumps.
5. Regular repetitions and feedback: This affords juniors frequent opportunities to practice vertical jump in various game contexts. Constant feedback from coaches is crucial for correcting and improving their techniques.
6. Motivation and confidence: Encourage juniors to develop confidence in their abilities. A strong jump can have a positive impact on the entire team, contributing to team morale and match success.

By focusing on these aspects and implementing a well-structured training program tailored to their needs, coaches can make a significant contribution to the development of vertical jumping in junior 3's volleyball and improve junior high school volleyball performance. (Côté & Fraser-Thomas, 2007).

Method

Hypothesis

1. If the cues of vertical jumping are defined at a higher level, then materialization in attack and block executions can fit into the requirements of a volleyball game at the performance level.
2. If, in the training program, the activities for the development of vertical jumping are well chosen and programed, significant progress in the jumping values can be achieved, both in terms of the maximum value and in terms of the consistency of the jumping height throughout the game.

Methodology

Participation and procedure

Purpose of the study

The aim of this work was to study the ways to develop the vertical jump specific to the game of volleyball, at the level of juniors 3, through the specific training process of physical preparation development during the period 2022-2023.

Participants

12 volleyball female, aged between 12-15 years competing at the juniors level agreed to participate at this study. The informed content was sign by their tutors.

Procedure

Starting from February 2022 until May 2023, 3 specific tests of vertical jump in volleyball were applied: vertical jump from the spot; vertical jump from the block; triple jump; following which we established 2 general physical training programs, one in the gym and one outdoors, with the aim of recording significant progress in the values of the jump, both in terms of maximum value and in terms of the constancy of the height of the jump throughout the volleyball game.

For the standing vertical jump test, we used the OPTOJUMP device. For the vertical jump during blocking, we utilized the VERTEC, and for the triple jump, we used a measuring tape.

Results

The table below (table 1) shows the results obtained in the control test of the vertical jump from the spot, where it can be seen that the junior 3 athletes of the CSM Constanta team recorded a standard deviation of 4.738 in the initial test and 5.211 in the final test. In February, in the initial test, the athletes had an average of 30.92 cm, and in the final test in May, the average value was 33.33 cm.

Table 1. Initial and final test results of the vertical jump control test

VERTICAL JUMP FROM A STANDING POSITION

		TI	TF
N1	Valid	12	12
	Missing	0	0
Mean		30,92	33,33
Std. Deviation		4,738	5,211
Minimum		24	26
Maximum		40	43
p			.001

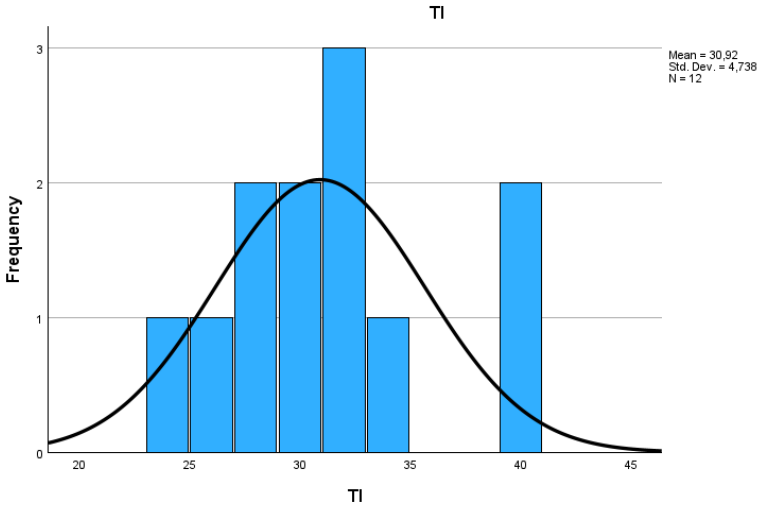

Figure 1. Initial testing: a vertical jump from the standing position.

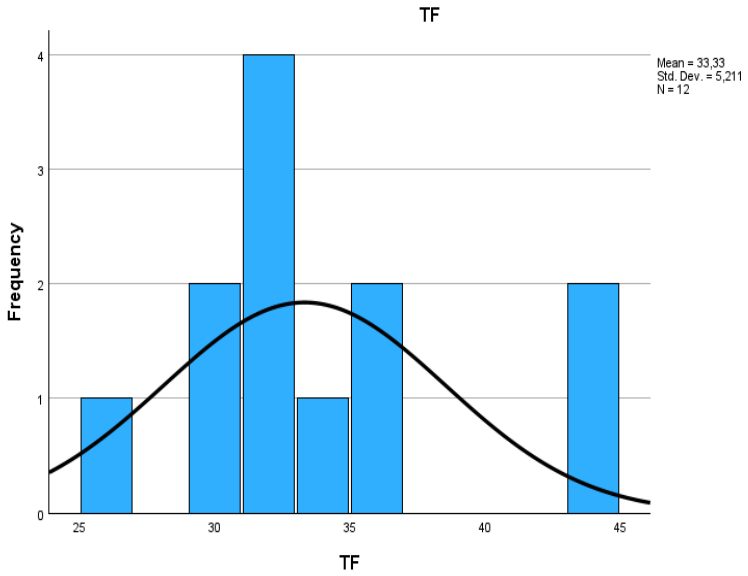

Figure 2. - Final test: vertical jump from the standing position.

According to Figures 1 and 2, the initial testing for the vertical jump from a standing position shows an average of 30.92 cm, while the final testing shows an average of 33.33 cm.
In the standing vertical jump, the overall arithmetic mean increased by 2.41 cm.

Table 2. Initial and final test results of vertical jump to block control

VERTICAL JUMPING TO THE BLOCK

		TI	TF
N2	Valid	12	12
	Missing	0	0
Mean		30,58	32,17
Std. Deviation		4,870	5,006
Minimum		22	24
Maximum		37	39
p			.001

According to the data presented in the table 2, the results of the test for the vertical jump in the block demonstrated significant progress for juniors team ($p<0.05$). In the initial test in February, the athletes obtained an average of 30.58 cm and a standard deviation of 4.870. In the May final test, the average was 32.17 cm, indicating a progress of 1.59 cm. These results highlight the improved sports performance following specific training during the period.

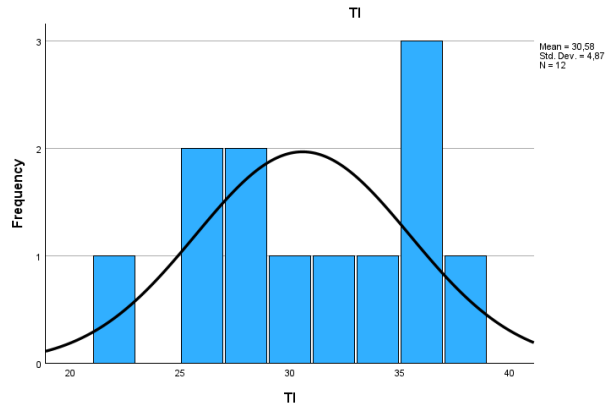

Figure 3. - Initial testing: vertical jump to block

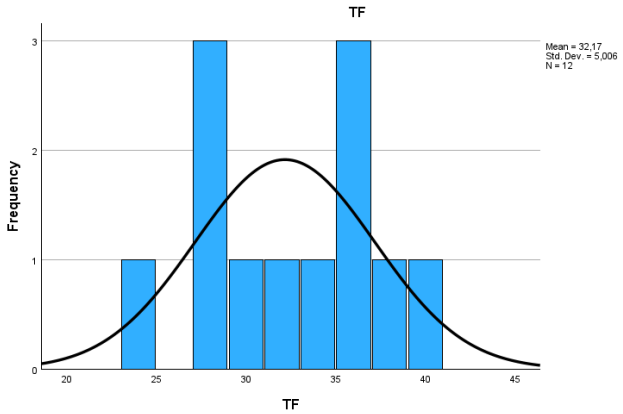

Figure 4. - Final test: vertical jump to the block

According to Figures 3 and 4, the initial testing for the vertical jump in blocking showed an average of 30.58 cm, while the final testing indicated an average of 32.17 cm. A 1.59-cm progress was noted in the vertical block vault.

Table 3. Initial and final test results of the triple salt control test

TRIPLE JUMPS

		TI	TF
N3	Valid	12	12
	Missing	0	0
Mean		319,92	328,83
Std. Deviation		52,978	53,662
Minimum		215	218
Maximum		400	409
p			0.000

The attached table 3 shows the results obtained in the triple jump test, where the juniors team recorded a progress of 8.91cm at the final test. In February, the average height was 319.92 cm, and in the final event in May, the average was 328.83 cm.

Discussion

In volleyball, vertical jumping plays an essential role in effective attacks. It allows players to reach greater heights, thus facilitating the execution of powerful and precise shots that are difficult for opposing teams to defend. The height achieved by jumping provides a strategic advantage, allowing players to hit the ball over the opponent's block. (Kirk et al., 2006; Thibodeanu & Patton, 2019).

Blocking is one of the most important defensive elements in volleyball, and an effective vertical jump is crucial for successful block blocking. The ability to jump high and intercept a ball above the net can neutralize attacks from opponents, which significantly contributes to team defense. An effective block not only prevents opposing points but can also return the ball to a favourable position for one's own team. (Bailey, 2006)

In the service phase, a powerful bounce transforms a simple serve into an offensive weapon. Players who can jump high and execute strong serves put pressure on the opposing team from the start of scoring. In reception, players with a well-developed vertical jump can more efficiently retrieve balls, making it easier to organize quick and efficient attack. (Zatsiorsky & Kraemer, 2006). Training to improve vertical jumping includes plyometric exercises, strength training, and specific jumping techniques. (Fleck & Kraemer, 2014)

Plyometric exercises, such as knee-to-chest or box jumps, help develop the explosive power required for high jumps. Strength training, which focuses on strengthening the leg and trunk muscles, is essential for sustaining repetitive jumps (Platonov, 2009). High and powerful jumps not only have a physical but also psychological impact on athletic performance. Players who dominate the air can intimidate their opponents, creating a mental advantage for their team. Also, successful jumps and effective blocks contribute to players' morale and self-confidence, motivating them to maintain and improve their performances. (Smith, 2009; Gabbett & Jenkins, 2012).

Conclusions

Following the research conducted and the analysis of the reports on the three control tests (vertical jump from the spot, vertical jump from the block and triple jump), we observed a significant improvement. These results demonstrate the effectiveness of the training.

During the entire training period, but particularly during the final phase, we observed considerable positive changes in the indicators of physical and technical preparation.

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