

ABSTRACT OF THE DOCTORAL THESIS

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TITLE THESIS:

THE PHYSICAL TRAINING PROGRAMS IMPROVEMENT IN JUNIOR VOLLEYBALL PLAYERS THROUGH SPECIFIC GYMNASTICS MEANS

The value leveling trend, in terms of technical and tactical features, observed currently in high performance sport, payable to the generalization of the training methods, expresses the importance of muscle component in an increased size from the baseline, so that it seems to be only the muscle component that can make the difference between players being a consequence of the athlete's physical training. After its concrete orientation, it is a process of educating the motor skills required in sport.

Meanwhile, the physical preparation of the athlete is inextricably linked to the rise in the general level of functional possibilities of the body, in the complex physical development, complete and total. This research represents a new approach to introducing elements Gymnastics in preparing volleyball players.

The work consists of three parts: the first part (Part I) the scientific substantiation of the topic; Part II is represented by a preliminary study on the establishment and pursuit of physical training programs focusing on Gymnastics elements applied to volleyball players; Part III is represented by the personal contributions of the proposed training programs, in which physical training is accomplished through elements of gymnastics.

The purpose of research is to develop the final model preparation for junior volleyball players for their physical training, having as their principal means the specific elements of gymnastics, but also to validate the effectiveness of our approach in the experimental group.

The research premises

Performance sport has a dynamic evolutionary nature caused by intrinsic or extrinsic factors that require a specific orientation in the current volleyball. The Underlying premise for this research started from the idea that, mostly, the Romanian volleyball training system needs improvement and reconsiderations within the conceptual indicators sphere and at the level of practical work, tinted in this research at the echelon of juniors.

Another assumption that is required is that all motor abilities in volleyball present different degrees of determination and development, being necessary to know in order to successfully address the physical training.

Knowing the physical training factor in specific sports training of junior volleyball players is a starting point in the analysis of its components, to identify the current theoretical and methodological concepts.

Poor performance at the level of senior volleyball players in our country may be due to a malfunction in the junior training strategies, probably caused by the lack of concern for the introduction of non-specific means in preparation.

Research Hypotheses

1. The Components of motor abilities can be developed by determining the biomechanical indicators that can lead to the development of structures exercises strict accuracy needed to develop upper limb mobility involved in attack for junior volleyball players.
2. The proposed final model, which is based on specific means of gymnastics can help streamline the process of junior volleyball player's physical training.

Conducting research

The research was conducted from October 2012 to May 2013 and was conducted within CN Titulescu where work programs have been implemented in the premises of the Faculty of Physical Education and Sport in Craiova where there were given some of the testing. Following the development of new work programs that have had Gymnastics and acrobatic elements within their structure, they were placed in the training experiment group (n = 10). The control group (n = 10) followed its training program without using the acrobatic elements or Gymnastics in training, our intervention being irretrievable into their case. The choice, the group and the dosage of means was made taking into account the objectives of training and the evolution of subjects. The time allocated to the programs application was 45 minutes in a session of 90 minutes, every week and was kept constantly during the training conducted.

The Research subjects were tested before and after the work programs. The tests were as follows:

A. Anthropometric and motor tests

1. Height
2. Vertical jump with enthusiasm to achieve a fixed point with one hand (cm)
- 3 Vertical jump with enthusiasm to achieve a fixed point with two hands.
4. Lateral displacement over 4 m
5. Anteroposterior Flexibility
6. Abdominal Strenght
7. Back Strenght
8. Arms Strenght
9. Triple jump 2 on 2 feet- explosive power of the lower body + coordination
10. Forward-back displacement on a distance of 6 mx 3 reps
11. General coordination test (Matorin)

B. Biomechanical Assessment - allows the assessment of upper limb kinematics studied as open kinetic chain, throughout the specific movements within the game of volleyball, as in the preliminary experiment using an image acquisition system Contemplas (CONTEMPLAS GmbH - Germany <http://www.contemplas.com>).

In the final experiment there were established two upper limb angles in two different positions of the arm. The first position was the maximum lift of the arm and the second the imaginary moment targeted when hitting the ball.



The phases studied



The Referencing of measurements made in two phases that can be traced through the Contemplas system, namely:

For angle a having three markers arranged to:

- Marker 1 - lateral humeral epicondyle
- Marker 2 - external angle of the scapula
- Marker 3 - lower angle of the scapula

For angle b, with three markers positioned as follows:

- Marker 1 - acromial process of the scapula (deltoid insertion)
- Marker 2 - median angle of the scapula
- Marker 3 - inferior angle of the scapula

Results

The motor tests have validated our work programs, the research results from the experiment group being significantly better in statistical terms compared to the control group. Applying the test of correlation between the final testing in jump to reach a fixed point with one hand and the touch of a fixed point with two hands, in the experimental group there was a strong correlation for the two tests, with a value of $r = 0.721$ at a significance level $p < 0.05$, with the result that the proposed program positively influenced the group of volleyball players jump experiment.

Applying the T test between the two groups at final testing the record level of $p = 0.001$ ($p < 0.005$), indicating that there are significant differences between the two environments, rejecting the null hypothesis and accepting the research hypothesis, which means that the acrobatic elements positively influenced the movement index (one that sums up most of the tests above), thus streamlining the physical training of the subjects in the experimental group.

Statistical and mathematical analysis of the results achieved under the Contemplas system

Results of angle a, position 1



In initial testing, the angle values (defined side humeral epicondyle, the external angle of the scapula and inferior angle of the scapula) varies in position 1 (lifting arm) between 81.98° and 137.77° , recorded an average of 123.39 ± 18.62 . The range of this angle is part of the data in the literature indicating a positive development, indicating an increase in intervention scapula in the middle phase of the movement of lifting the arm, shoulder stabilization.

In the final test, the increases range of flexibility values in the 1-position of the angle varying between 110° and 140° , with an average of 132.97° . This development is

supported by literature data indicating a major intervention in the range 80-140° scapular therefore we can talk about a good workout muscle in physical training, which is due to trapezium muscle (upper and lower beams) and anterior grand dantele muscle.

Results of angle a, position 2

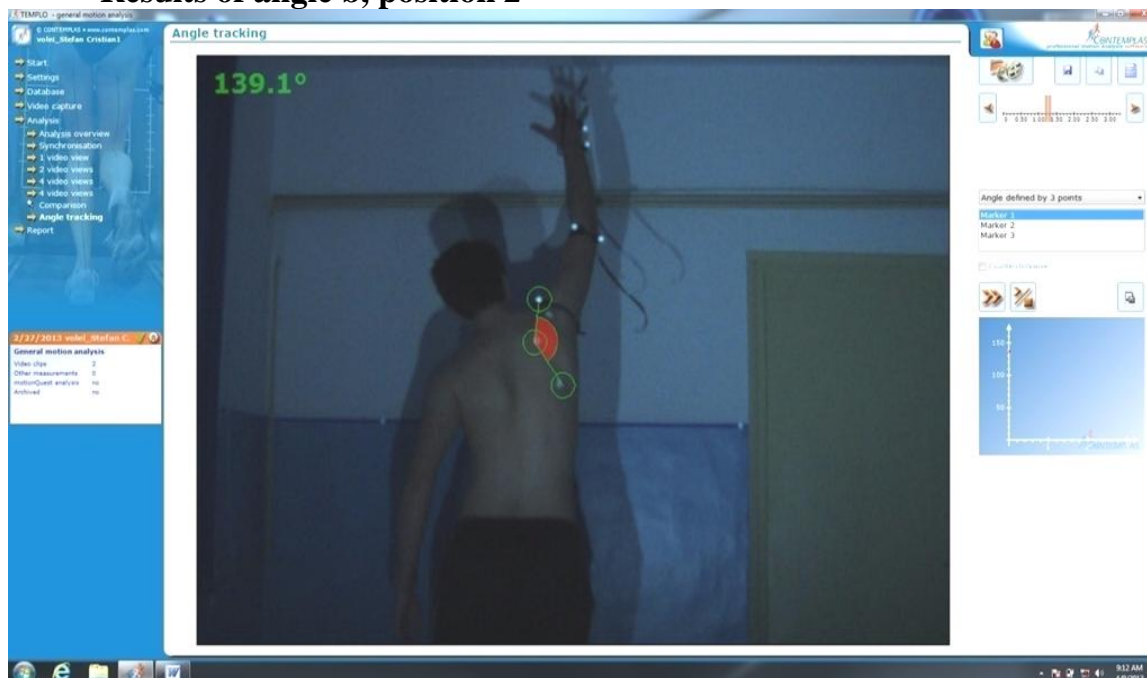
In the second position, the ball striking angles ranging between 115 ° and 169 °, the group average of 145.08 ± 17.04 in the initial test. The final test shows an increase of the average angle with 13 °, the value of 157.16, the variation of the angle between 130 and 180 degrees. This trend indicates a significant increase in athletes only possible due to muscle involvement by enrolling in one of the patterns described by Bagg and Forrest.

By applying the TTestt for both tests was obtained value of t (-4069) degrees of freedom (9) and the bi-directional significance ($p < 0.005$). As is the 0.003 significance level, this difference is significant. Confidence interval ranging between -18.71 and -5.34 and since is not passing through 0, the difference is statistically significant at the 5% significance bidirectional.

Results of angle b, position 1

- Values b located between the acromial angle of the scapula (deltoid insertion), inferior angle of the scapula and the medial angle of the scapula, ranging from initial testing in position 1 between 72.77 and 131.54, with a mean of 116.65 ± 21 group.
- In final testing, angle values are improved, varying between 95 and 145.3 degrees, the average being 127.43.

Results of angle b, position 2



In the second position angle b, find the initial testing angles between 97.16 and 168.77, with an average of 142.36 ± 25.67 .

For angle b we can discuss about scapula movement evolving in an arc, causing displacement angle is determined from superior to inferior on the beach which corresponds to a movement of the clavicle elevation equivalent to the first position are within limits set by other authors, namely 120-150°, for then the final testing this angle to reach an average of 153.44 ± 18.61 , exceeding the set, which is explained by stabilizing the scapula, the middle phase, and positioning it in line the acromioclavicular joint. In fact, the explanation of these developments is owed workout used which had specific structure elements of gymnastics, who acted on previous shoulder muscles (pectoralis, deltoid previous bundles, anterior), which favored the previous tipping of the scapula, raising and stabilizing the thorax corresponding to the middle phase of shoulder elevation, aspect specific and extremely important in volleyball. Evolutions of the values of these angles in the two elected positions are supported by the existence of dynamic equilibrium established between the supraspinatus and deltoid whose action intensifies abduction > 110°.

Conclusions of the experiment

1. The physical training in volleyball performance is the foundation on which all other factors are optimized sports training, of particular importance at all levels of education which can act effectively, aiming at tackling of model features fully performer.
2. By application of the questionnaire proposed in this paper to coaches that operate in the junior volleyball players, highlighted the fact that they place a priority on physical training in practical training that theoretically recognize the importance of using non-specific means as gymnastics and acrobatic elements but which are not used in practice.
3. As a result of the same questionnaire, also notes that there are no coaches to use as a means of evaluating the performance junior volleyball players' specific equipment, such as, for example Contemplas image acquisition system used to determine joint flexibility.
4. The work programs proposed, which included gymnastics and acrobatic elements, such as targeted physical training as components of overall coordination, flexibility, strength in the upper limbs, lower limbs, abdomen and back, proved viable and effective, given their acceptance by the athletes and their progress supported by test data performed.
5. Components of the motor capacities could be developed by determining the biomechanical indicators that led to the improving of structures exercises strict accuracy needed to develop upper limb flexibility involved in the attack hit of the junior volleyball player, first of the research hypothesis being confirmed.
6. Initial tests have revealed that subjects included in the research, the control and experiment group, recorded relatively close watch on all indicators, then, the final tests, the differences between them are significant, highlighting the effectiveness group work programs implemented by experiment, the proposed model contributes to

progress in the physical training, which confirmed the validity of the second research hypotheses .

7. The direct influence of flexibility has not the effect of force level parking, it also recorded higher values, and statistical analysis of data obtained from the tests applied highlighting that specific means of gymnastics can be used successfully in the physical training of junior volleyball players.
8. As a hinge directly involved in the game of volleyball, especially in the phases of attack, the shoulder requires careful study, given the complexity of its movements on the three phases of elevation can allow proper consideration of flexibility at its.
9. The effectiveness of application of the gymnastics means in the physical training of junior volleyball player has been demonstrated by analyzing angular kick attack, the complex evaluation conducted through Contemplas system, which followed the elevation of the shoulder on the three stages of its training program coordination.
10. Exercises proposed priority to the increase the flexibility, promote the shoulder stability followed by attachment of the scapula on the thorax, resulting in a balance between length and tension, resulting in motor control, traction on muscle length tension leading to a maximum direct effect to increase explosive strength.
11. The data provided by Contemplas system underlying the structure of the training program, orient us to the middle phase of the movement of elevation as minimal risk of overloading caused by anatomical structure and operation scapular plane where the joint capsule relaxation allows the increasing of movement amplitude.
12. The phases studied contraction between suprascapular and infraspinatus combination creates a coupling that provides stability to the range 60-150° abduction angle, observing that the maximum differences - the minimum time T1 for selected angles, while at the time T2 this difference decreases, which means an increase in stability.
13. The positive results in physical training that influenced motor capacity, especially coordinative abilities, achievements were corroborated in the performance plan, the experimental group target to qualify in the junior tournament. However, two of the members of the team were selected to the national junior team, receiving the gold medal in the Balkan Junior Championship 2013. Competition for the year 2013-2014, the two athletes are found in male SCMU Craiova team composition, team who plays in A1 division national championship volleyball.

General conclusion

1. Physical training in volleyball performance is a key factor for success in sport, reason for which specialist materials are constantly referring to its importance and the dynamics of game development requires new approaches and theoretical reconsideration.
2. The program of general and specific physical training must be well defined at each stage, with clear objectives and content as it is the basis for efficient sports training that support the approach of other factors; ensures good physical training under technical execution, tactical and training availabilities manifestation mental conditioning establishing relations between it and other components of training.

3. The success at senior volleyball player is determined by previous training, requiring consider the entire system's skill enabling high performance indicators that need to be taken from the first stage of the training.
4. A good technical training is not necessarily the key to success as a technical player does not ensure victory in a match if you do not have good support from physical training.
5. Poor performances in the senior volleyball players in our country may be due to a malfunction in the junior training strategies, probably caused by the lack of concern of the frontal approach to training components, to introduce structures in physical training exercises and nonspecific means of addressing the technical content of some sports, such as gymnastics.
6. Using the biomechanical analysis system can provide evidence of the level achieved by an athlete scientific basing plan preparation and success, it proved to be a valuable support for both the coach and the athlete, as demonstrated in our approach .

In its current form, the thesis contains many essential elements required for a reorientation of physical training methodology volleyball player from the state of beginners and can be made available to coaches interested in optimizing training athletes. Also noting that in our country for the first time when evaluating the shoulder joint mobility is achieved junior volleyball players procurement system through image Contemplas considered a new scientific approach, approach who may be a possible marker for other research aimed at assessing joint flexibility of the volleyball players and other athletes from various other sports branches.