

## **INFLUENCE OF THE ANTROPOMETRIC MEASURES OF THE ATHLETES THAT ARE PRACTICING THE VOLLEYBALL GAME ON TECHNICAL PROCEDURE SPIKE**

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**Keywords: volleyball, anthropometric sizes, technical spike, pedagogical research.**

**Summary:** In this scientific paper we highlighted the numerical importance of anthropometric parameters in the efficiency of the technical spike process. A series of anthropometric parameters were tested, and then we split and tested the yield obtained from the technical attack process. After final testing there was a direct proportional increase in the results obtained, so statistically the research was a success,  $P < 0.05, 0.01$ .

### **Introduction:**

Undoubtedly, performance in sports are constantly changing and upgrading everyday, due to factors that interact with each other in order to maximize the team's potential, players, and last but not least, volleyball in general.

The muscular system and the osteo-articular system are the main mill stones that perform the body's activity, whether static or dynamic.

The specialist in the field [3, p. 40] points out that "Kinematic couples and chains, formed by movable articulated levers, have as muscular organs striated muscles, which for each degree of freedom of the couple form a functional muscular group (in the elbow joint, which has two degrees of freedom, there are two muscle groups: flexors and extensors); in the joints with more degrees of freedom we will have several functional groups: the flexors, the extensors, the abductors, the adductors, the medial rotators and the lateral rotators - the coxofemoral joint. "

In the view of the volleyball specialist [5, p.7], the spike is the technical element that learns and improves after a long period of time from the beginning of the training, it is related to the specific physical qualities and the peculiarities of the game. It is at the same time the most complex element in the education and training process. "

With a high degree of difficulty, this technical process requires a correct execution throughout it. For this reason, arm flexion and extension are two biomechanical essential movements for a correct execution to print the ball with a proper trajectory. The opinion of the specialist [6 p.65] "For the correct execution of this movement, it takes a nervous coordination, which will lead to physical and proper adjustment of all movements. In this movement the upper limbs act as fully extended levers, mobilizing not only in the scapular-humeral joints."

The anthropometric dimensions give us clear facts about athletes, the primary selection, largely based on these data.

In the author's view [5] in the functional and biomechanical anatomy of the locomotor apparatus, it states that "the detent" records the maximum development at 14-16 years and can be defined as "the expression of maximum power in minimum time"

This stage is a very important, one which needs to be given increased attention, representing a "period of fragility". [2 p. 15]

At this age, the athlete's physique undergoes a number of important changes noted and highlighted by the specialists in the field. [1, 4, 7]

### **Hypothesis**

We have assumed that anthropometric dimensions and spike efficiency are in a direct proportionality and causality relationship, and that improved anthropometric indices result in an improvement in the effectiveness of the technical spike process.

### **Work tasks:**

Following this work we want:

- Let us point out that between the anthropometric dimensions and the technical process spike there are links of direct proportionality;
- Let us find ways to maximize the results obtained in the final tests;
- Theoretical and experimental argumentation of the effectiveness of the proposed means;

### **Material-method**

The research was carried out between August 2013 and June 2014 on 15 sportsmen from LPS Piatra-Neamț who formed the witness group and 15 athletes from CSS "Nicu-Gane" Fălticeni, who formed the experiment group. Athletes of the control group trained according to a standard schedule, aiming to increase the team's performance and the group's athletes adopted an individualized training based on video and biomechanical analysis.

The test scores were:

1. Height with arms extended upwards - the athlete stands with his arms stretched up in front of the tallometer, measured at the level of the fingertips in centimeters.

2. Span is the distance between the fingertips of both hands, the arms are stretched to the side, parallel to the ground, the distance is measured with a metric band or a roulette.

3. Length of the palm - is done with metric tape, from the tip of the longest finger to the fist joint.

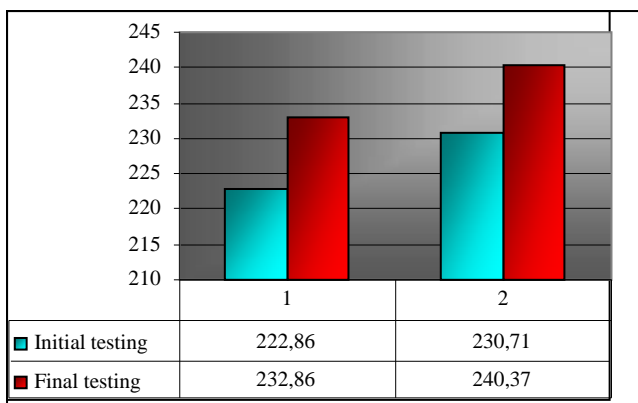
4. Length of the arm is the distance between the two epiphyses of the humerus. In order to get this index, the athlete is in orthostage, the length is measured with a roulette.

5. Spike in the direction of the impulse, from the ball thrown by the coach, the mistakes being recorded in a work sheet, the athlete executing the attack ten times.

**The methods** used in the research are: the study of the specialized literature, the experimental method, the video and biomechanical analysis method and the graphical and tabular method.

**Research results:**

Following initial and final testing, we have obtained a number of results that have been analyzed and statistically compared. (Fig. 1)



1 – Witness Gr. 2 – Experiment Gr.

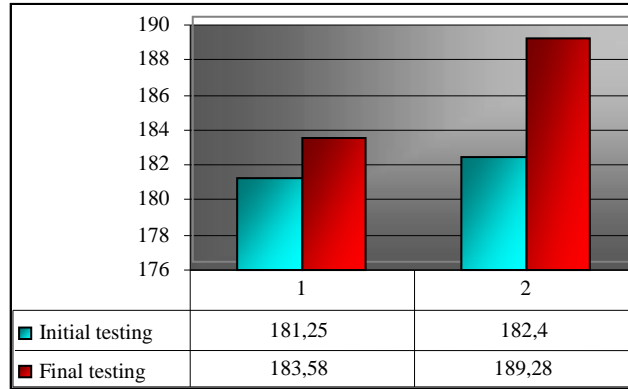
Fig. 1 Dynamics of the mean values obtained in the - Height with extended arms

Interpreting statistically the difference between the final tests of the two groups in the testing of the Index - **Height with the extended arms**, we note that the "t" calculated is 2.12, higher than the "t" table,  $P < 0.05$ , proves that the differences between the two groups are significant, with the experiment group getting better results.

Working out the data provided by the **“Span”** test and statistically analyzing the differences between the final tests of the two groups, we note that the calculated "t" is 2.05, higher than the "t" table,  $P < 0.05$ ,

1 – Witness Gr. 2 – Experiment Gr.

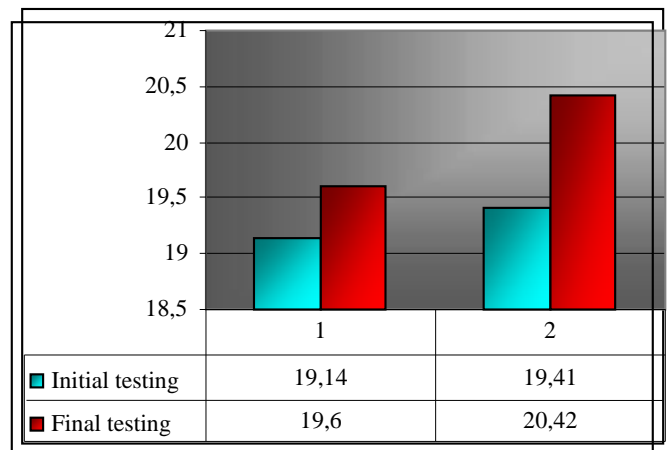
Fig. 2 Dynamics of the mean values obtained in the - Height with extended arms



which proves that the differences between the two groups are significant, the experiment group having higher net results. (Fig. 2)

In the test of the index - **The length of the palm**, interpreting statistically the differences between the final tests of the two groups, we can see that the "t" calculated is 2.10, larger than the "t" table,  $P < 0.05$ , proves that the differences between the two groups are significant, with the experiment group getting better results. (Fig. 3)

If we analyze statistically and mathematically the results obtained in **The humerus length** test, the differences between the final tests of the two groups, we note that the "t" calculated is 2.13, larger than the "t" table,  $P < 0.05$ , which proves that the differences between the two groups are significant. (Fig. 4)



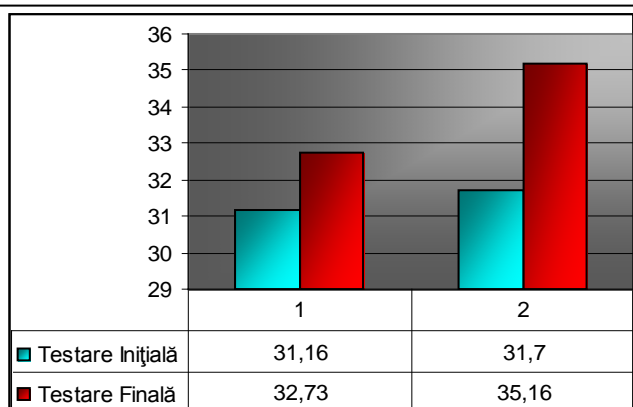


Table 1 summarizes the results obtained by the two groups in

1 – Witness Gr.  
2 – Experiment Gr.  
Fig. 46 Dynamics of the mean values obtained in the - Humerus length

the initial and final tests, respectively the statistical analysis of them.

Table 1. Centralization of indices obtained by both groups at initial and final testing

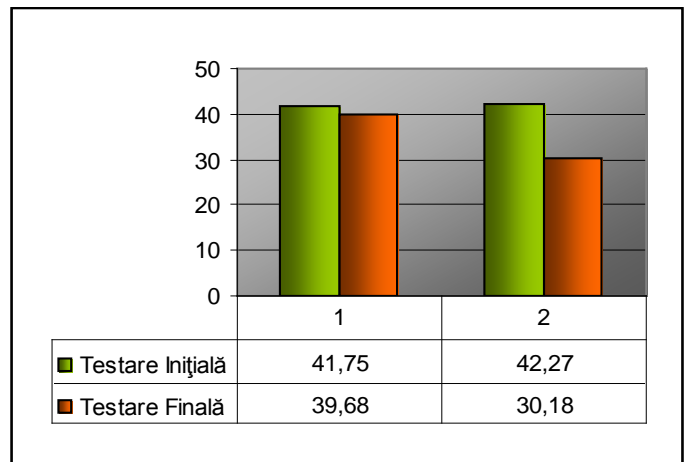
o	Test	The groups and statistic	Statistical indicators			
			Initial $\bar{X} \pm m$	Final $\bar{X} \pm m$	t	P
	Height with arms extended arms	M	229,86±2,64	232,86±2,59	1,21	> 0,05
		E	230,71±2,60	240,37±2,41	4,07	< 0,01
		t	0,23	2,12	—	—
		P	> 0,05	< 0,05	—	—
	Span	M	181,25±2,09	183,58±2,03	1,20	> 0,05
		E	182,40±2,10	189,28±1,91	3,62	< 0,05
		t	0,39	2,05	—	—
		P	> 0,05	< 0,05	—	—
	Palm length	M	19,14±0,33	19,60±0,30	1,53	> 0,05
		E	19,41±0,32	20,42±0,25	3,61	< 0,01
		t	0,59	2,10	—	—
		P	> 0,05	< 0,05	—	—
	Length of the humerus	M	31,16±0,88	32,73±0,86	1,91	> 0,05
		E	31,70±0,87	35,16±0,75	4,49	< 0,01
		t	0,43	2,13	—	—
		P	> 0,05	< 0,05	—	—
	Spike in the direction of the impulse	M	41,75±3,23	39,68±3,19	0,68	> 0,05
		E	42,27±3,20	30,18±3,15	4,03	< 0,01
		t	0,11	2,12	—	—
		P	> 0,05	< 0,05	—	—

Legend: E – Experimental group, M - Control group  
n= 15; P - 0,05; 0,01; 0,001. r = 0,553

f = 28; t = 2,048 2,763 3,674  
f = 14; t = 2,145 2,977 4,140

In the volleyball game, **The spike** is defining in winning points.

After analyzing this procedure together with the expert group, I came to the conclusion that most execution errors are encountered in the "contact with the ball" phase, some athletes hitting the ball with their forearms or fingertips and "the work of the other segments and the completion of the procedure / accuracy", the attack being either in the tab or out. Analyzing statistically the differences between the final tests of the two groups, we note that the calculated "t" is 2.12, higher than the table "t",  $P < 0.05$ , which proves that the experiment group gets better values, decreasing the number of mistakes. (Fig. 5)



1 – Witness Gr. 2 – Experiment Gr.  
Fig. 5 Dynamics of the mean values obtained in the - Spike in the direction of the impulse

### Conclusions:

The dynamics of the values obtained by the two groups varies between initial and final testing, although the values obtained are close.

In all five tests, the values obtained by the experimental group are better, the significance threshold being reached mainly by the experiment group.

The direct proportionality between anthropometric tests and the technical spike procedure exists, which shows that there is a relationship of

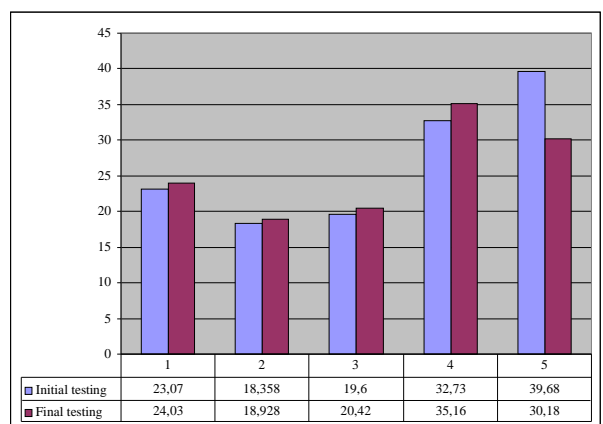


Fig. 6 Centralizer of final testing of the two groups

subordination and causality between the two.

The premise from which it has turned out to be true, so we recommend that in the training, coaches also focus on improving anthropometric values. (Fig. 6)

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**INFLUENȚA MĂRIMILOR ANTROPOMETRICE ALE  
SPORTIVILOR ASUPRA PROCEDEULUI TEHNIC ATAC, ÎN  
JOCUL DE VOLEI**

**Cuvinte cheie:** volei, mărimi antropometrice, procedeul tehnic atac, cercetare pedagogică;

**Rezumat:** În această lucrare științifică am evidențiat importanța numerică a parametrilor antropometrici în eficientizarea procedeului tehnic atac. Au fost testați o serie de parametrii antropometrici, apoi am defalcat și testat randamentul obținut la procedeul tehnic atac. În urma testării finale s-a observat o creștere direct proporțională a rezultatelor obținute, astfel, din punct de vedere statistic cercetarea a fost o reușită,  $P < 0,05, 0.01$ .