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STUDY OF THE INTERDEPENDENCE BETWEEN PHYSICAL, SENSORY, MOTOR AND FUNCTIONAL PARAMETERS AT 15-16 YERS OLD PERFORMANCE VOLLEYBALL PLAYERS

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Abstract:
We started from the premise that volleyball performance influences the functional, sensory, motor and functional parameters of 15-16-year-old students, at the same time directly proportionally influencing the physical parameters The purpose of this study was to confirm the hypothesis from which we started, studying the results obtained by two groups that had different mains of training. The period between initial and final testing was 11 months. The difference between the two types of training was the introduction in the training of the experimental group of the video analysis, respectively of the resulting methods. The methods used in the research are: the study of the specialized literature, the experimental method, the video analysis method and the graphical and tabular method. The premise we started from is true, we can conclude by saying that performance volleyball affects at the same time the physical and the sensory, motor and functional parameters of 15-16 year old volleyball players, there being, in this context, a relationship of direct proportionality

Introduction

After Bompa T.O. [2, p. 33] "The effort capacity of each individual depends on the following factors: biological and chronological age, especially in children and juniors, whose bodies have not yet reached maturity. Their preparation compared to that of adult athletes should be much more extensive, multilateral and moderate"

Demeter A. (1974), Ifrim M. (1986), Duşamin S. A., Şigalevski V. (1988), cited by Păcuraru A. Volei [10] consider that in this age category "The cord is voluminous, compared to the thorax: the mechanisms regulation of the circulation are frequently disturbed (sympathetic predominance), and they are exaggerated with effort. Functional heart murmurs, arrhythmias and hypertensive crises are common. The heart rate registers at the beginning of the period 90-100 pulsations per minute and decreases at the age of 15-16 years to 75-80 pulsations per minute in orthostatism

and to 65-75 pulsations per minute in clinostatism. Blood pressure can be from 115/72 mm Hg to 120/75 mm Hg due to multiple changes in a relatively short time".

The quantity and quality of oxygen brought to the pulmonary alveoli by red blood cells represents the fuel of the muscles, thus Szogy A., Ifrim M., Merkudova R.A., Hruscev S.V., Helibin V.N., cited by Dorgan V. [5], following tests on boys, obtained values oxygen-pulse averages (14.0 ml at 14 years), (16.0 at 15 years) and (17.0 at 16 years). From the respiratory point of view, the respiratory frequency reaches values between 15-18 breaths per minute and the chest perimeter registers values between 85±5cm and 90cm Dorgan V. [5]. During this growth spurt, the lungs increase in volume and weight. Between 12 and 16 years, the lung volume increases by 50%, along with it, the diameter of the pulmonary alveoli also increases. The respiratory movement registers an increase up to approximately 400-450 ml. F.R. it decreases reaching somewhere around 18/minute at 15 years old, the minute respiratory volume increases reaching 6.3 l min. at 15-16 years old.

Another point shared by us is that of the specialists [1, 3, 4] who consider that the maximum volume of oxygen, respectively oxygen consumption, are determining factors in performance.

Material method

Hypothesis - we started from the premise that performance in sports, in volleyball, leads to a change at the same time in physical and the sensory, motor and functional parameters of 15-16 year old volleyball players.

Physiologically, all systems and devices are in full expansion, thus a series of morpho-functional changes take place, the most important of which are the sexual ones. In addition to the above, specialists in the field [5, 8] believe that this period is characterized by the growth of the bones in length, the development of the muscular system, the development of the larynx in boys. In addition to hereditary factors, environmental factors (food, geoclimatic, urbanization) play an important role.

The sensory, motor and functional parameters that we took into account in this study are: heart rate, the psycho-motor coordination test and the Matorin test.

The physical parameters are: speed run - 20 meters and endurance running - 800

The research was carried out between August and June on 15 sportsmen from LPS Piatra-Neamţ who formed the control 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, and the experiment group had a different trening based on video analyses.

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

Results:

Interdependent with performance are functional and sensorimotor parameters. The existence of the relationship of direct proportionality between the two is indubitable, without it the notion of high performance cannot exist. [7, 11].

Effort capacity and the way the body reacts under stress conditions are defining elements of achieving performance [8, 9].

Following initial and final testing, we have obtained a number of results that have been analyzed and statistically compared

Table 1. Centralizer of functional and sensory, motor and physical parameters obtained by both groups at the initial and final testing (n=15)

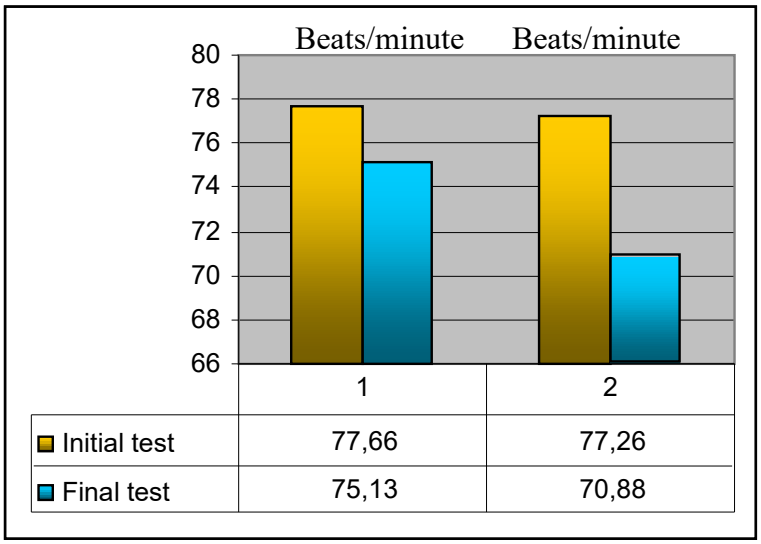
No		Groups and statisti	Statistical indicators			
			I.T. $\overline{X} \pm m$	F.T. $\overline{X} \pm m$	t	P
1	Heart rate beats/minute	M	77,66±1,52	75,13±1,49	1,78	< 0,05
		E	77,26±1,50	70,88±0,44	4,59	< 0,001
		t	0,19	2,05	—	—
		P	> 0,05	< 0,05	—	—
2	Psychomotor coordination test cm	M	9,88±0,16	9,66±0,15	1,47	< 0,05
		E	9,68±0,18	9,23±0,14	3,00	< 0,01
		t	0,83	2,13	—	—
		P	> 0,05	< 0,05	—	—
3	Matorin test degrees	M	351,53±2,41	355,00±2,40	0,67	> 0,05
		E	352,66±2,38	362,05±2,33	4,21	< 0,001
		t	0,33	2,11	—	—
		P	> 0,05	< 0,05	—	—
	Speed run 20m	M	3,51±0,05	3,46±0,04	1,25	> 0,05
		E	3,52±0,06	3,33±0,05	3,80	> 0,05
		t	0,20	2,17	—	—
		P	> 0,05	< 0,05	—	—
		M	166,46±2,77	164,31±2,65	0,84	> 0,05

	Endurance running 800m	E	166,26±2,72	156,54±2,58	3,87	< 0,01
		t	0,05	2,10	—	—
		P	> 0,05	< 0,05	—	—

Notă: E – Grupa experiment, M – Grupa martor f = 28; t = 2,048 2,763 3,674
n= 15; P - 0,05; 0,01; 0,001. r = 0,553 f = 14; t = 2,145 2,977 4,140

Discussions

During the testing of the functional index - Heart rate, during the initial testing, the value obtained by the control group is 77.66 beats/minute, with an average error of ±m=0.1.52. and at the final test the arithmetic average obtained is 75.13 beats/minute, with an average error of ±m=1.49. In the same test, the experimental group obtained an arithmetic mean of 77.26 beats/minute in the initial test, with an average error of ±m=1.50, and in the final test obtained an arithmetic mean of 70.88 beats/minute, with an average error of ±m=0.44.



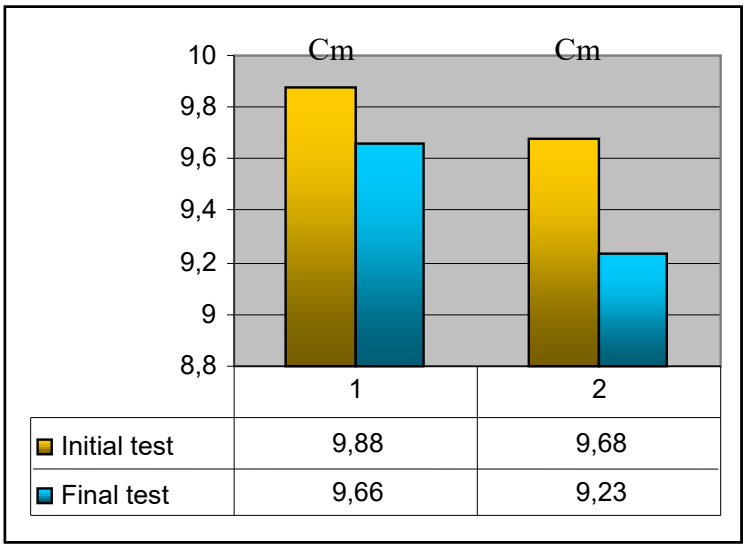
1 - Control Group 2 - Experiment Group
Fig. 1 The dynamics of the average values obtained in the functional test Heart rate (n=15)

Analyzing the differences between the tests of the control group, we notice that the calculated "t" is 1.78, lower than the tabular "t", which proves that the

differences are relatively significant between the tests (P<0.05). Regarding the tests of the experimental group, we note that the calculated "t" is 3.50, higher than the tabular "t", which shows that the differences between the tests are significant in favor of the experimental group (P<0.01).

Statistically interpreting the differences between the final tests of the two groups, we notice that the calculated "t" is 2.05, more higher than tabular "t", which proves that the differences between the two groups are significant, the experimental group obtaining better results, even if the control group also obtained good results (P<0.05).

Processing the data provided by the sensorimotor test - Psychomotor coordination test, we notice that the average value of the control group, at the initial testing is 9.88cm, with an average error of ±m=0.16 and at the final testing, it is 9.66cm, with an average error ±m=0.15. Regarding the experimental group, in the initial testing, it obtains an arithmetic mean of 9.68cm, with an average error of ±m=0.18, and in the final testing, it obtains 9.23cm, with an average error of ±m=0.14. Interpreting the differences between the tests of the control group, we notice that the calculated "t" is 1.37, higher than the tabular "t", which proves that



1 - Control Group 2 - Experiment Group

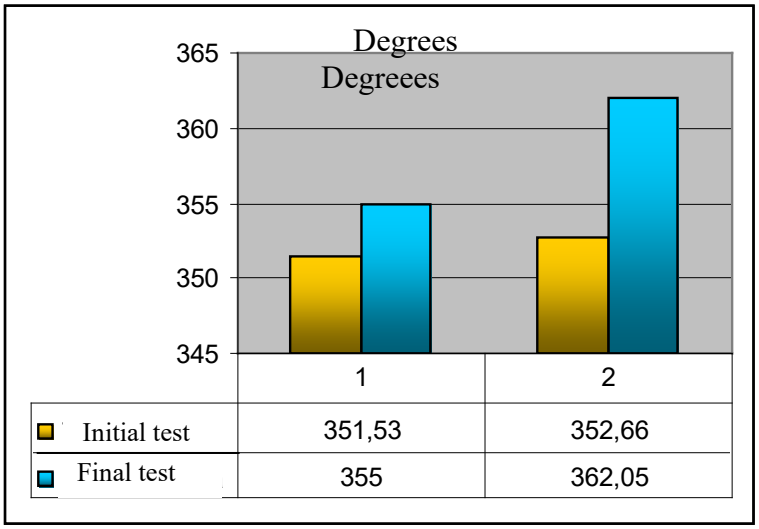
Fig. 2 The dynamics of the average values obtained in the sensorimotor test Psychomotor coordination test (n=15)

the differences between the tests are significant (P<0.05). Regarding the tests of the experimental group, we note that the calculated "t" is 3.00, higher than the tabular

"t", which proves an increase, and the differences between the tests are significant (P<0.01). Statistically analyzing the differences between the final tests of the two groups, we notice that the calculated "t" is 2.13, higher than the tabular "t",a fact that proves that the differences between the two groups are significant, the experimental group having superior results, despite the good results obtained by the control group at the final test (P<0.05).

Processing the data provided by the sensorimotor test - Matorin, we notice that the average value of the control group, at the initial testing is 351.53 degrees, with an average error of ±m=2.41 and at the final testing, it is 355.00 degrees, with a average error ±m=2.40. Regarding the experimental group, in the initial testing, it obtains an arithmetic mean of 352.66 degrees, with an average error of ±m=2.38, and in the final testing, it obtains 362.05 degrees, with an average error of ±m=2, 33. Interpreting the differences between the tests of the control group, we notice that the calculated "t" is 0.67, lower than the tabular "t", which proves that the differences between the tests are insignificant (P<0.05).

Regarding the tests of the experimental group, we note that the calculated "t" is 4.21, higher than the tabular "t", which proves a qualitative increase, and the differences between the tests are significant (P<0.001). Analyzing from a statistical point of view the differences between the final tests of the two groups, we notice that the calculated "t" is 2.11, higher than the tabular "t", which proves that the differences between the two groups are significant (P<0, 05).

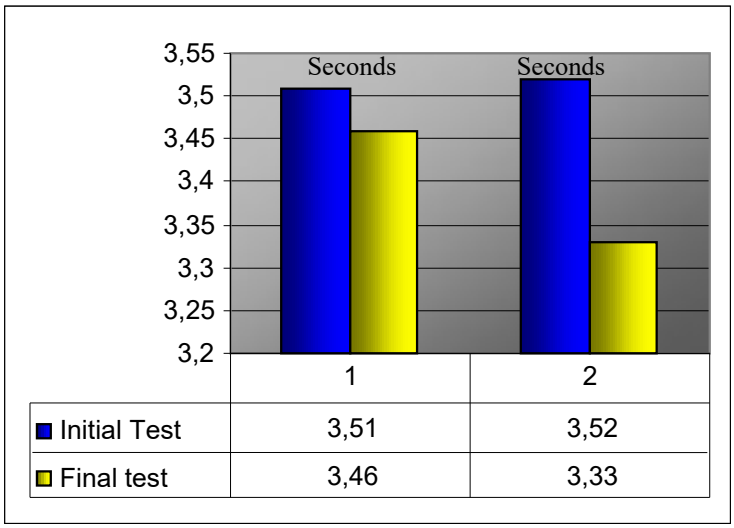


1 - Control Group 2 - Experiment Group

Fig. 3 The dynamics of the average values obtained in the sensorimotor test

Matorin (n=15)

In the physical testing - Speed running (20 m), at the initial testing, the

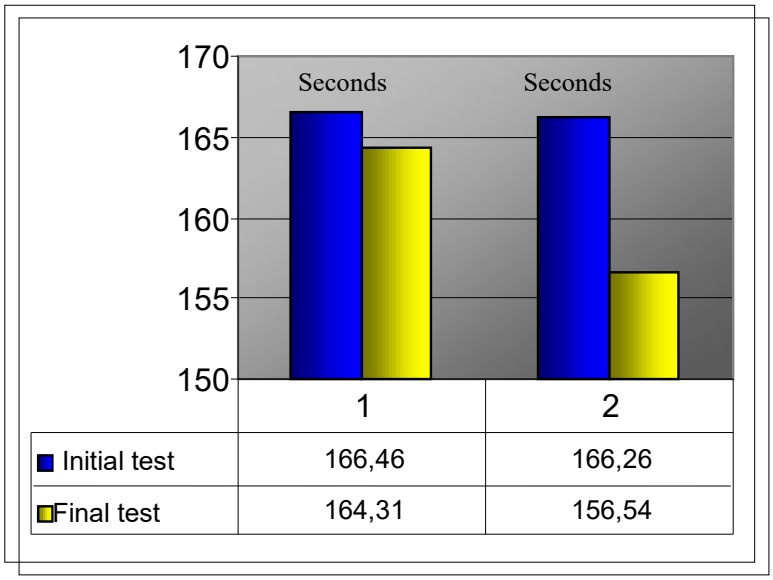


1 - Control Group 2 - Experiment Group

Fig. 4 The dynamics of the average values obtained in the physical test Speed run 20m (n=15)

value obtained by the control group is 3.51 seconds, with an average error of ±m=0.05. and at the final test the arithmetic mean obtained is 3.46 seconds, with an average error of ±m=0.04. The experimental group obtains at the initial test an arithmetic mean of 3.52 seconds, with an average error of ±m=0.06, and at the final test obtains an arithmetic mean of 3.33 seconds, with an average error of ±m=0 ,05. Analyzing the differences between the tests of the control group, we notice that the calculated "t" is 1.25, lower than the tabular "t", which proves that the differences are insignificant between the tests (P>0.05). Regarding the tests of the experiment group, we note that the calculated "t" is 3.80, higher than the tabular "t", which shows that the differences between the tests are significant in favor of the experiment group P<0.01. Statistically interpreting the differences between the final tests of the two groups, we notice that the calculated "t" is 2.17, higher than the tabular "t", P<0.05, which proves that the differences between the two groups are significant, the experimental group obtaining better results.

Processing the data provided by the test - Endurance running (800m), we notice that the average value of the control group, at the initial testing, is 166.46



1 - Control Group 2 - Experiment Group
Fig. 5 The dynamics of the average values obtained in the physical test endurance running - 800 meters (n=15)

seconds, with an average error of ±m=2.77, and at the final testing, it is 164.31 seconds, with an average error of ±m=2.65. Regarding the experimental group, during the initial testing, it obtains an arithmetic mean of 166.26 seconds, with aaverage error ±m=2.72, and in the final testing it obtains 156.54 seconds, with an average error ±m=2.58. Interpreting the differences between the tests of the control group, we notice that the calculated "t" is 0.84, lower than the tabular "t", which proves that the differences between the tests are insignificant (P>0.05). Regarding the tests of the experimental group, we note that the calculated "t" is 3.87, higher than the tabular "t", which proves a qualitative increase, and the differences between the tests are significant (P<0.01). Analyzing from a statistical point of view the differences between the final tests of the two groups, we notice that the calculated "t" is 2.10, higher than the tabular "t", which proves that the differences between the two groups are not significant, although the experimental group had superior results (P<0.05).

Conclusions

In the game of volleyball, psycho-motor coordination has an essential role in the performance of game tasks. Over time, following repeated training, automaticity

appears, it makes possible the appearance of the element of surprise (a strategic pass in a free zone) that ends with winning the point. The development of the psycho-motor plan, makes this element of surprise to be executed by the athlete naturally, with great ease.

The results obtained in the scientific approach showed that there is a direct proportionality between the physical, sensory, motor and functional parameters.

The superior results obtained by the experimental group highlight the increased ability of the athletes to better orient themselves in the spatial-temporal plane. They are capable of game phases with increased complexity, which can make the difference in a critical game situation

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