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EFFECTS OF TRAINING WORK MODEL ON THE DEVELOPMENT OF SPORTS PLAYERS' FUNCTIONAL ABILITIES

Summary

This research has been carried out in order to establish the effects of the training model for the development of functional abilities of sports players. Six tests for the functional abilities assessment were applied on the sample of 30 young sports players. By use of the multivariate analysis the statistical significance was established (P — level 0.014) in the final, in comparison to the initial measurement.

Key words: sports players, functional abilities, variance analysis.

I. INTRODUCTION

A big number of researchers (**Verhošanskiv 1981, Matvejev 1987, Najšteter 1997, Pržulj 2007**) points out to the fact that by use of certain models of training work, a significant influence can be exerted upon the change of the anthropological characteristics, under the condition that methodical shape of exercises is maximally adapted to the individual abilities of sports players.

Such a process of exercising, according to some researchers (**De Vries 1976, Malacko i Radosav 1985, Matvejev i Ulaga 2000**), needs to be based on the scientific facts along with the use of methods that comply with the level of sports players' fitness.

The main problem of this article is to investigate whether, by use of programmed tools for functional abilities development, certain statistically significant differences between the functional abilities in the final measurement in comparison to the initial one. The aim of this research is to establish the effects of the training work model on the development of functional abilities among sports players.

2. METHODS

In order to follow the effects of a training model on the development of functional abilities among sports players, as the experimental programme in the research, the method of pedagogical experiment was used. Statistical method was used for the analysis of the obtained data. Descriptive method and method of logical concluding was used for the description and explanation of the obtained results.

The research was carried out on the sample of 30 examinees, of a male sex, 11, 12 and 13 years old and all of them are enrolled into the training work of different sports clubs

of East Sarajevo. The sample of measuring instruments comprised of the test of functional abilities: vital capacity of lungs (FVPUL), Margery test for the assessment of anaerobic capacity (FMARG), Harvard step-test for the assessment of a puls frequency after training (F02LM), systolic pressure (FTASI) and diastolic pressure (FTADI).

2.1 Experimental procedures for the development of functional abilities

Experimental programmes for functional abilities development exercises was carried out in East Sarajevo. It lasted for a month and it comprised for classes of exercising per a week. The structure of each class of training work comprised of introductory, main and final part of the class. Initial measurement (at the beginning of the treatment) and final measurement (at the end of the treatment) of the same measuring instruments for the assessment of functional abilities were carried out.

The use of physical exercising tools was directed towards the improvement of glycolytic abilities (the exposure to effort lasted from 20-30 seconds to 1,5-2 minutes) and anaerobic abilities (it was mostly repeated effort that lasted about 7-8 minutes).

In order to improve *anaerobic alactate mechanism*, the regime of work comprised exercises that enabled the development of sprint speed endurance, i.e. the development of ability to repeat short distances in the form of interval work. The effort was of almost of maximal intensity (about 95%) and of short span (4-10 seconds), which corresponded to the distances from 20 to 80 meters. Breaks between series lasted from 20 seconds to 2 minutes. The training was usually carried out in 3-5 series with 4-6 repetitions of elements in each series along with the use of relaxing intervals of 3-5 minutes¹ in each series in order to make up for creatin phosphate.

In order to develop *glycolytic anaerobic mechanism* exercises that lasted 20-40 seconds and longer were used, at distances of 200-600 meters.² The exercises were carried out with the highest intensity from the beginning until the end (for example, running back and forth, exercises of running techniques of 2 or 3 sports players), while the puls rate was above 180 beats/min, which indicates that the training was carried out in anaerobic phase. The number of repeating was about 4 times, the number of series 2-4, and relaxing time between the series was 10-15 minutes for exercises of small intensity.

For the development of *aerobic and non-aerobic abilities* that are important for special endurance of sports players, the method of repeating effort³ was mainly used. The exercises were mostly technical and tactical (of a situational character) and they lasted from 5-8 minutes, and were repeated 4-6 times with the break of a small intensity of 3-5 minutes between repeating. The puls rate ranged from 150-180 beats/min.

For the development of *aerobic abilities*, the repeating exercises that took about 7-8 min. and longer were carried out, the single exercises took up to 30 minutes were used. The intensity of exercising was high, the puls rate went up to 180 beats/min and more, and therefore it would cause the lack of oxygen.⁴

¹ Such a training model is suggested by many researchers (Anohin 1970, De Vries 1976, Hofman, 1980, Heimar i saradnici 1997, Malacko 2002, Željaskov 2003) since it causes the high use of creatin-phosphate in muscle cells. Namely, it fully activates the creatin-phosphate mechanism that creates the energy that is needed for resynthesis of atp on muscle cells (alcatel regime).

² According to Željaskovu 2003, such work that is done in intervals fully engages glycolytic mechanism of resynthesis (updates) ATP and it produces a big amounts of lactates in muscles, that are being eliminated from muscles and blood during breaks.

³ The trainings that combine aerobic and anaerobic exercises (according Matvejevu 2000) makes up 95% of the overall training work in the training period.

⁴ After the previous work (according to Markovu and Ozolinu 1992) new training effort needs to exerted when

The data that were obtained through the initial and final measurement among sports players were at first analysed by use of the main statistical descriptive parameters (Mean, MIN, MAX, RANGE, SD), and then by use of Kolmogorov-Smirnov test the regularity of a distribution of each variable was tested. The transformation of functional abilities in the course of the experiment was established through the analysis of variance on the multi-variant and univariant level.

3. RESULTS OF INVESTIGATION

Testing the regularity of distribution of the results of functional tests by use of Kolmogorov-Smirnov test shows that further data analysis is possible.⁵

Table 1. Multivariant variance analysis between initial and final measuring of functional abilities of sports players

WILK'S LAMBDA TEST	0.612
RAO-va F-approximation	0.736
Q	0.014*

The obtained results of the significance of level differences of all the arithmetic middles of the tests of functional abilities between the initial (IN) and final (FI) measuring at the multivariant level (Table 1) shows that there is a statistically significant difference, since WILK'S LAMBDA is 0.612, which prilikom Raove F-approximation of 0.736 gives the significance of the result of $Q=0.014$.

These results points out to the fact that statistically significant differences were obtained in the final in comparison to the initial measuring, in the course of the experimental period.

Tabela 2. Univariate analysis of the variance between the initial and final measuring functional abilities of sports players

TESTS	Measuring	N	Mean	F-relationship	P-level
FVKPL	IN	30	3782.00	6.64	0.013*
	FI	30	4129.00		
FMARG	IN	30	3.72	8.20	0.032*
	FI	30	3.18		
F02LM	IN	30	148.00	5.90	0.024*
	FI	30	132.00		
FTASI	IN	30	112.13	6.20	0.070
	FI	30	110.56		
FTADI	IN	30	72.16	12.46	0.096

The results of the research as shown on Table 2, were established on the basis of the univariant analysis of the variance, by comparing the results of the arithmetic middle tests of *the puls rate gets down to 120-140 beats per a minute, i.e.45-90 sec, depending on how long the intensitylasts.*

⁵ Basic statistical parameters of Kolmogorov-Smirnovs, for limited space will not be displayed.

the functional abilities in the final and initial measuring. The results of coefficient F-relation and its significance P- Level at the level $P < 0.05$ shows that at the end of the experimental period statistically significant increase of functional abilities took place in relation of vitality capacity of lungs (FVKPL 0.013), Margery test (FMARG 0.032) and puls rate after exerting training effort (F02LM 0.024).

Statistical significant increase of the level of functional abilities tests is probably the result of the influence of the efficient methods, tool, models of work, as well as the genetic characteristics of sports players.

4. CONCLUSION

Six tests that investigate the functional abilities were applied on the sample consisting of 30 young sports players, 11-13 years old, from the sports clubs of East Sarajevo. The aim of the research was to establish the effects of training work model on the development of functional abilities of the examinees. The use of multivariant analysis showed statistically significant increase, in the final measurement in comparison to the initial measurement, of the vital capacity, of the Margery test to the assessment of the anaerobic capacity (FMARG) and of the maximal oxygen use faster the training effort (F02LM). Other functional tests did not show statistically significant difference in the final measurement.

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