

The Effects of Combined Fitness Training Towards Amelioration of Motor-Condition

Abilities of Handball

Key words: fitness training, transformational process, motor-condition abilities, handball, quantitative changes

Ključne riječi: transformacioni procesi, rukomet, kvantitativne promjene

Abstract

The aim of this work was confirmation of quantitative changes of motor-condition abilities of students under the influence of programmed work lasting for 60 hours. The research was done at the sample of 32 students of 1 year of study at the University of Tuzla. Weekly program applied in this research contained usage of fitness program, precisely weight lifting, two times a week and work in sports hall that included pliometric regime, once a week. Variables for the motor-condition abilities are chosen to cover four latent dimensions: managing ball, speed of moving with the ball, speed of moving without the ball and power of throwing out the ball (total 9 variables). For the confirmation of global quantitative differences, in two time points, the canonic discriminative analysis was used. After the analysis of the founded results, we can make conclusion that realized program positively affected firstly advancement of results in situational tests of managing ball, secondly moving without the ball and finally power of throwing the ball from jump.

Sažetak:

Efekte programiranog rada na poboljšanje situaciono-motoričkih sposobnosti u rukometu

Cilj ovog rada je bio utvrđivanje kvantitativnih promjena situaciono motoričkih sposobnosti studenata pod uticajem programiranog rada u trajanju od 60 sati. Istraživanje je sprovedeno na uzorku od 32 studenata 1 godine Univerziteta u Tuzli. Program primjenjen u ovom istraživanju trajao je 60 sati. Sedmični rad se sastojao od upotrebe fitnessa to jest rada sa tegovima, dva puta sedmično te rada u dvorani, koji je uključivao pliometrijski režim rada, jedan put sedmično. Varijable za procjenu situaciono motoričkih sposobnosti odabrane su da pokriju četiri latentne dimenzije i to: baratanje loptom, brzina kretanja s loptom, brzina kretanja bez lopte i snaga izbačaja lopte (ukupno 9 varijabli). Za utvrđivanje globalnih kvantitativnih promjena, u dvije vremenske tačke, korištena je kanonička diskriminativna analiza. Nakon analize dobijenih rezultata, može se konstatirati da je sprovedeni program u trajanju od 60 sati je pozitivno utjecao u prvom redu na poboljšanje rezultata u situacionim testovima baratanja s loptom, kretanje bez lopte i snagu izbačaja lopte iz skoka.

Introduction

Recently handball becomes more and more dynamic and more interesting for the spectators. Fast changing of rhythm, frequent transitions, attractive shoots, shifts of different tactical variants and many other things that attract audience more and more to the handball court are the manifestation of better physical preparation of handball players. Motor-condition abilities, practically that what audience can see as technical elements, handing, moving in defense are additions to the basic motor abilities and they depend on their capacity. We can say that they are directly responsible for achieving quality results (Mujezinović, 2008) Programmed transformational processes, without which nowadays no one sport cannot exist, have to have optimally positive influence to the development and improvement of motor abilities (basic and specific ones) that are relevant for the success of any sport. After the transitional fazes when most of the athletes train the strength a little, it is scientifically and methodically to start program of strength for the reason of adapting to the new program (Malacko & Rađo, 2004).. Main goal of this faze is to activate and prepare most of the muscles, ligaments, tendons and joints for further long and hard fazes of training (Bompa, 2004). Gym workout and engagement of muscles that are the most active in performance of moving structures of the handball game are the most important segments of conditional preparation of handball. Training process in handball can be advanced with choice of the proper load and training exercises, which should be individually adapted to every individual athlete.

There are not enough scientific research effects of the training process and proves of efficiency of every separate training methods meaning different kind of programs for conditional preparation of handball, especially in Bosnia and Herzegovina. That was exactly the reason for the realization of this research that included programming of conditional training, with aim of advancement of motor-condition abilities. As there were about the students not active in some sport's activities, program was adapted to them and then divided in more fazes. The first faze was the one in which gym workout and techniques of weight lifting was introduced to the examined students. In further fazes they were following linear load that was defined by 1 RM (repetitium maximum), precisely based on how much examined in one maximal muscle strain can achieve external resistance. After two weeks of introduction followed work on development of strength repetition and strength endurance. That is followed by gradual increase of intensity until sub maximal and maximal when the accent was on a development of strength. Subject of research are students. Problem of this research are differences between motor-condition abilities appeared between two time points under the influence of combined fitness program. The aim of the work was to confirm global quantity changes of motor-condition abilities appeared under the influences of realized fitness program.

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Methods

Sample of the examined

The research is done with male students of Faculty sports and physical education, 19-21 years old, whom the subject *Fitness* was chosen one. Examined were not participate in any other additional organized sport activities. Included were only the students that realized program provided for this research (N=32).

Sample of variables

For the estimation of motor-condition abilities 9 variables were used:

1. Ability of handling the ball

SPR2LO – playing with two balls,
SBHZ1R – ability to throwing and catching the ball bounced from the wall with one hand

SBHL2R – throwing and catching the ball from the wall, jump and shoot with two hands

2. Moving speed with ball

SBVLS20 – speed of leading the ball in slalom 20m

SSBL20 – start speed with ball on 20m

3. Moving speed without ball

SKOTBBL – moving in defense triangle without the ball

SBIDP – Aside and deep mobility

4. Strength of throwing the ball

SSBLDS – strength during horizontal jump throw of the handball ball

SSBLM – strength of throwing team handball from the position

Data processing methods

For the confirmation of quantitative differences in tested motor-condition abilities of the students after the combined fitness program canonic discriminative analysis was applied.

Results and Discussion

Equality of the matrix covariance of the population we tested with Box method. By the received results from the Table 1 we can see that differences in matrix covariance are not statistically important (sig. .911) and supposition about equality of matrix covariance necessary for the Fisher's approach of linear discrimination in our case is valid.

Table 1.

Box test Results

Box's M		38.045
F	Approx.	.730
	df1	45
	df2	1,61E+07
	Sig.	.911

Statistical importance of discriminative function we tested with Bartlett's Chi-square test (Table 3). As it is evident we received one discriminative function that statistically discriminates a lot (sig. = .000) the results received by motor-condition tests in handball at the initial and final measuring. The value of canonic correlation (Table 2) that actually represents Pearson's correlation between scores of discriminative functions and appurtenance to the group is extremely high (0.737). That shows that based on 9 motor-condition applied tests they can be clearly differentiated initially from final measurement.

Table 2.

Eigenvalues

Function	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
1	1.189 ^a	100.0	100.0	.737

Table 3.

Wilks' Lambda

Test of Function(s)	Wilks' Lambda	Chi-square	df	Sig.
1	.457	51.323	9	.000

The results of the Table 4 show the positions of centroid group at the function of 9 variables of motor-condition tests in handball. Positive side is represented by the results of final measurement, and negative side from initial measurement.

Table 4.

Functions at Group Centroids

GROUP	Function
	1
1 (initial measurement)	-1.075
2 (final measurement)	1.075

Positive side, precisely final measurements are best defined by variables SBHZ1R, SBHL2R, SKOTBL, SBIDP, while negative side, precisely initial measurements are best defined by variables SSBL20, SBVLS20 (Table 5).

Table 5.

Matrix of the structure

GROUP	Variables	Function 1
FINAL MEASUREMENT	SBHZ1R	.743
	SBHL2R	.508
	SKOTBL	.436
	SBIDP	.393
	SSBLM	.241
INITIAL MEASUREMENT	SSBL20	-.222
	SBVLS20	-.159
	SPR2LO	-.011

Received results shows that the biggest contribution to the differentiation from the initial to the final measurement have variables SBHZ1 and SBHL2R – those that test abilities of throwing and catching the balls bounced from the wall, with one or two hands. Values of the correlations with discriminative function of these variables are .743 and .508. It could be said that realized program mostly influence transformation, precisely advancement of the results using these tests. This is also result of raising the level of hands' strength, under the influence of applied program. It is

imposed the fact that for the raising of good results in specific tests of handling the ball it is necessary the wide range of movement, agility and explosive strength of arms, shoulder part and legs. (Vuleta et al., 2006.) If we know the structure of mentioned tests for the estimation of abilities of throwing and catching the balls bounced from the wall with one or two hands in which examined student has to rebound the ball as much as possible in certain time frame, than it is not hard to connect realized program with increase of the tested abilities level. However the program with weight lifting, and specially it's preparatory part, than part of development of muscle endurance that followed, contributed for sure to the results of these tests. The structure of the exercise itself with weight like pressure of the weight from horizontal and angled bench is very similar to movement that structure of the test needs. Precisely engagement of the muscle groups is same in both concerning very small genetic conditioning of muscle endurance, the transformation of this ability of the examined students were expectable.

Also, significant correlation with function, variables SKOTBLI – test moving in defense, triangle formation without ball, SBIDP – side and deep moving and SSBLM – strength of throwing team handball from the position contributed to the discrimination of the results for two tests. Improvement of the results in mentioned tests we can give to the rising of the level of maximal strength of the examined students. It can be directly connected to the last three weeks of workout with weight lifting. At that time after the enlargement of the muscle mass of the examined students it was about raising of their maximal strength, through smaller number of repetition in serial with sub maximal and maximal load. Applying transformational pliometric training, intention was to “transform” maximal strength and realize it in frame of improvement of moving speed and agility, explosive strength of arms and shoulder part.

Even the variables that represent negative side SSBL20 – start speed with ball on 20m and SBVLS20 – speed of leading the ball in slalom for 20m, meaning better results on initial measurement, no chance we can say that they represent even better result from first test because there are the tests that have better results if less number. So we can conclude that these variables contributed differing of initial from final measurement, final test being better. Simply said examined students realized better results after the realization of the program. With application of T-test for dependent samples there were noticed statistically important changes on 7 to 9 variables in the space of motor-condition abilities. At the variables SPR2LO – playing with two balls and SBVLS20 – speed of leading the ball in slalom 20m we didn't notice statistically important changes. It can be assumed that test of playing with two balls is too complicate and hard test, and this fact can be added to the lower level of technical knowledge of examined students. Pliometric transformational training realized in gym hall previously mentioned as raising the level of explosive strength of legs, which contributed to the augmentation of moving speed and acceleration abilities of examined students.

Conclusion

Based on discriminative analysis in the frame of motor-condition abilities it was received one discriminative function that statistically differ a lot (sig. 000) results received by testing of motor-condition tests in handball on initial and final measurement. The results show that there are global quantity differences in results of tested abilities after the realization of program. Firstly, realized

programmed work lasting for 60 hour positively influenced improvement of results in condition tests of handling the ball, moving without the ball and strength of throwing the ball. Secondly it is probably the result of raising the level of strength of upper extremities and raising the level of maximal strength of examined students. It was realized through pliometric transformational training in form of positive transformation of explosive strength and speed accelerating ability of examined students. Combination of these two trainings in the gym with weight and pliometrically produced important effects concerning researched frame of motor-condition of handball players. In available literature there is the smallest amount of research and proves that considers problems of this research and treated population. Realized fitness program, lasting for 60 hours provoked statistically important changes in motor-condition abilities of the examined group of students. It can be said that this experimental program could be used not only as a streamline to the creation of future curricula concerning subject handball, but can also serve as a kind of work in handball clubs. Having in mind that just a little if any the fitness program doesn't realizes, we think that work in gym and generally raising the level of motor readiness, the quality of realization of handball techniques and game tactics improve.

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