

## CHANGES IN SOME MOTOR-FUNCTIONAL ABILITIES IN FOOTBALL PLAYERS OF YOUNGER AGE GROUPS AFTER A THREE-MONTH KINESIOLOGICAL TREATMENT

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### Abstract

Statistically significant differences in several motor and functional abilities between initial and final measurements were determined on the specimen of 47 footballers aged 15 and 16. The measurement was carried out during three-month pre-season training. Transformational process contents included practice for pace expansion (sprint), agility, explosive strength and stamina. T-test results showed that the difference between two measurements was evident in all applied tests except explosive strength test (test for horizontal jump intensity) after only three months. Vertical jump intensity was rather emphasized than horizontal one. The main reason was that vertical jump intensity is more common and often in football and also during the training process. These results can serve as a guideline for youth coaches especially during training session correction. According to this they should increase and encourage practice for horizontal jump intensity. Globally, these kinds of data, referring to significant differences measured during pre-season training, were expected due to high training intensity based on basic motor and functional abilities development.

**Key words:** footballers, motor, transformational process, differences

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### Introduction

According to structural complexity in sports classification, football belongs to complex sport activities as well as to the group of team sport games such as basketball, handball waterpolo... This involves various technical performances in terms of mutual cooperation of all team members within planned tactical framework. The regular duration of a match is 2\*45 minutes with a fifteen-minute break in half-time which requires maximum physical strain. To be able to perform his football assignments, a football player must possess the required level of endurance (aerobic and anaerobic), power (maximum power, explosive power, speed power) and speed (reaction speed, start speed, maximum speed) (Weineck, 2000; according to Mihačić et al., 2003). According to the criterion of domination of energy processes, football belongs to the group of aerobic-anaerobic sports. Being as complex sport as it is, it is impossible to determine the exact proportion of anaerobic and aerobic energy share. This depends on several factors such as a player's position, technical-tactical training level and physical potentials of an individual. By analysing movement structures of players during a game, we came to a conclusion that all important game components develop in the zone of maximum and submaximum muscle and, at the same time, in the zone of energy intensity which is covered by anaerobic and mixed energy mechanisms (ATP, CP, anaerobic

glycolysis, anaerobic-aerobic glycolysis), while aerobic energy mechanisms dominate during periods of decreased performance intensity or during a break ( anaerobic-aerobic glycolysis, aerobic glycolysis, aerobic disintegration of fat). These facts are very important in the implementation of this experimental procedure as well as in choosing variables which have been tested by different tests.

### Aim

The aim of this article is to determine the differences in some motor-functional abilities in young football players after a three-month kinesiological treatment. The obtained results will help correct and update the syllabus as well as change the kinesiological treatment depending on the obtained results.

### Methods

This research was conducted on 47 younger football players of FC *Hajduk*, Split, aged 15 and 16. The respondents underwent the testing voluntarily with the approval of their coach and the manager of the junior team. All the players were healthy on the day they were tested and had previously participated in the training syllabus of the football school on regular basis. Before testing they all underwent a medical examination where no morphological, pathological or other damages of locomotor system were discovered, so they were prepared for physical strains.

All the players were explained the procedure and the protocol of testing and they were given a possibility to freely leave if they did not wish to continue with it. To assess basic motor abilities we chose speed tests and explosive power tests in addition to one aerobic endurance test for the purpose of their relevance for success in this sport, proved by some previous researches (e.g. Hadžić, 2007). The sample of variables includes the following tests: standing start in 30 and 60-metre sprints and block starts in 30-metre sprints to assess explosive power of sprint, running on 10-metre distances with the change of movement course, 1500-metre runs to assess functional abilities, sargent test for explosive power of vertical jump ability and the long jump from a spot for explosive power of horizontal jump ability. The preparation period between two testing lasted for 10 weeks. The initial testing was done on 29 January, 2007, at the beginning of the second week of the preparation period, and final testing was done on 3 April, 2007, after two championship matches.

There were 52 training days during a 3-month cycle. The preparation of functional and motor abilities took 38 hours, while the technical-tactical preparations took 32 hours. There were six matches, two out of which had a competing character. Other forms of preparations (psychological, theoretical, motivational preparation) took additional 6 hours. The content of given syllabus within training units are available at the authors and they mostly involve operators with effect on the development of functional abilities and motor abilities such as sprint and vertical jump ability. The other part of the syllabus abounds in exercises characteristic for football and in tactical preparation of the players. The data obtained by initial and final testing of young football players were processed by basic elementary statistical procedures to determine central and dispersive variable parameters. To determine statistical significance of transformation changes in two time points, we applied t-test for dependent samples. The results were processed by *Statistica* ver. 7.1.

Table 1 – Periodization of the 3-month cycle and the training curriculum

TRAINING PERIOD											TOTAL
MONTHS	1		2				3				3
WEEKS	1	2	3	4	5	6	7	8	9	10	10
DURATION OF MIC	22/01 – 28/01	29/01 – 04/02	05/02 – 11/02	12/02 – 18/02	19/02 – 25/02	26/02 – 04/03	05/03 – 11/03	12/03 – 18/03	19/03 – 25/03	26/03 – 01/04	22/01/2007-01/04/2007
DYNAMICS MON	X	X	XX	XX	X	X					
OF TRAINING AND TUE	X	X	X	X	X	X	X	X	X	X	
COMPETITION WED		X	XX	XX	X	X	X	X	X	X	
IN MIC THU	X	X	X	X	X	X	X	X	X	X	
FRI	X	X	XX	XX	X	X	X	X	X	X	
SAT			X	X		X		X			
SUN									X	X	
NO. OF DAYS	14		28				28				70
TRAINING DAYS	9		23				19				52
MATCHES	0		3				3				6
TRAINING HOURS	12		32				26				70
WITHOUT TRAINING	5		5				9				19
TESTING DAYS	29/01/2007						03/04/2007				
HOURS OF FUN/MOT PREPARATION	8		18				12				38
HOURS OF TECH/TACT PREPARATION	4		14				14				32

## Results

Table 2 displays results of descriptive parameters conducted on tests results for motor-functional abilities in young football players. Observing arithmetic means, it is evident almost every variable of values in final measuring is better than in the initial one, except for the SDM variable.

By further inspection of the table, we can see there are statistically significant differences between two points of measuring in most of the variables except in let30m and sdm variables. Let30m test is close to the borderline value, and observing the arithmetic mean, it can be noticed that values in the final measuring are somewhat higher than in the initial one.

Table 2 – Basic statistical parameters and t-test for dependent samples  
(AM – arithmetic mean of the variable, SD – standard deviation, MIN, MAX – minimum and maximum value,  $a_3$  – coefficient of asymmetry distribution of results,  $a_4$  – coefficient of curve distribution of results,  $f$  – value of t-test,  $p$  – level of relevance)

VAR	AM	SD	MIN	MAX	$a_3$	$a_4$	t	p
30m_I	4,62	0,21	4,19	5,11	0,20	-0,31	2,64	<b>0,011</b>
30m_F	4,57	0,19	4,25	5,02	0,43	-0,46		
60m_I	8,48	0,45	7,61	9,55	0,28	-0,37	3,19	<b>0,003</b>
60m_F	8,34	0,40	7,63	9,33	0,31	-0,41		
let30m_I	3,85	0,24	3,41	4,44	0,35	-0,40	1,85	0,071
let30m_F	3,81	0,26	3,36	4,47	0,42	-0,39		
5x10m_I	11,47	0,39	10,80	12,34	0,23	-0,51	2,13	<b>0,038</b>
5x10m_F	11,38	0,39	10,77	12,30	0,22	-0,62		
1500m_I	5,21	0,20	4,58	6,02	0,91	7,15	2,97	<b>0,005</b>
1500m_F	5,11	0,23	4,52	5,44	-1,13	1,16		
sargent_I	44,45	5,15	30,00	58,00	-0,37	0,79	-3,59	<b>0,001</b>
sargent_F	46,43	5,10	34,00	60,00	0,16	0,82		
SDM_I	228,19	14,50	194,00	264,00	-0,20	-0,04	0,51	0,610
SDM_F	227,45	13,32	196,00	268,00	0,09	0,95		

## Discussion and conclusion

The long jump from a spot test does not reveal any statistically significant difference, and further on, this difference in favour of final measuring cannot be observed even in central values, but is, on the contrary, in favour of initial measuring. The reason for this may be found in the syllabus which had too little operators influencing the development of explosive power of horizontal jump ability; therefore this ability was not significantly affected during preparation period. It should be stressed the treatment was based on the development of functional abilities, agility and explosiveness, but of sprint and vertical take-off. Football game abounds in vertical jumps relevant to score goals or to kick out the ball unlike long jumps which are more characteristic for games involving technical elements with this particular take-off, such as handball. In the end we can draw a conclusion that researches of this kind are very useful since they provide trainers with a more clear insight in the situation on the field.

The authors' opinion is that further testing of football players of all ages and qualities are necessary, not only in basic motor and functional abilities, but in other anthropological characteristics as well. In this way we obtain information which helps us not only make and correct the curriculum and syllabus of the training process, but also the possibility of choosing from the youngest age groups those football players whose anthropological characteristics can answer modern demands of game in top football.

In practice, this research can help the trainers of a certain group of respondents to correct the curriculum and syllabus in a way to focus on motor abilities of explosive power of horizontal jump ability, primarily due to previous researches which revealed this ability, among other, is rather essential in the entire anthropological framework of a quality football player.

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## PROMJENE MOTORIČKO- FUNKCIONALNIH SPOSOBNOSTI NOGOMETAŠA MLAĐIH UZRASNIH SKUPINA NAKON TROMJESEČNOG KINEZIOLOŠKOG TRETMANA

### **Sažetak**

*Na uzorku od 47 nogometaša starosne dobi 15 i 16 godina utvrđene su statistički značajne razlike u nekim motoričko-funkcionalnim sposobnostima između inicijalnog i finalnog mjerenja. Mjerenje se vršilo u pripremnom razdoblju u razmaku od tri mjeseca, a sadržaji transformacijskog procesa obilovali su vježbama za razvoj brzine tipa sprinta, agilnosti, eksplozivne snage i izdržljivosti. Temeljem rezultata dobivenih t-testom utvrdilo se da je razlika između dva mjerenja vidljiva već nakon tri mjeseca i to u većini primjenjenih testova izuzev testa za eksplozivnu snagu tipa horizontalne skočnosti. Iako je skočnost bitna u nogometu ipak je naglasak stavljen na vertikalnu a ne horizontalnu skočnost, jer su takvi skokovi češći i uobičajeniji u nogometu pa se i u trenažnom procesu i na samim utakmicama ta sposobnost više razvija. Iz tog razloga ovi rezultati mogu biti smjernica trenerima mladih nogometaša pri korekciji trenažnog sadržaja u ovom razdoblju u smislu da povećaju vježbe i sadržaje koji potiču razvoj eksplozivne snage tipa horizontalne skočnosti. Globalno promatrajući ovakvi podaci o izraženim razlikama u dvije vremenske točke a izmjereni nakon pripremnog razdoblja su očekivani jer je intenzitet rada u tom periodu jako visok i baziran upravo na razvoju bazičnih motoričkih i funkcionalnih sposobnosti.*

**Ključne riječi:** *nogometaši, motorika, transformacijski proces, razlike*

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