

ISSN 1986-6089

SPORTLOGIA

Naučno-stručni časopis o antropološkim aspektima sporta, fizičkog vaspitanja i rekreacije
Scientific-Expert Journal of Anthropological Aspects of Sports, Physical Education and Recreation

2/2013

Vol. 9, Issue 2, December 2013



Publisher:

Fakultet fizičkog vaspitanja i sporta,
Univerzitet u Banjoj Luci
Faculty of Physical Education and
Sports, University of Banja Luka

Editor-in-chief

Slobodan Simović, *University of Banja Luka,*
BIH

Editors

Milan Čoh, *University of Ljubljana, SLO*
José Antonio Rodríguez, *University of Los
Andes, VEN*

Editorial Board

Žarko Bilić, *University of Mostar, BIH*
Božo Bokan, *University of Belgrade, SRB*
Peter Bonov, *National Sports Academy, BUL*
Stojan Burnik, *University of Ljubljana, SLO*
Daniela Daševa, *National Sports Academy,
BUL*
Predrag Dragosavljević, *University of Banja
Luka, BIH*
José Fernandes Filho, *University of Estácio
de Sá/LAFIEX, BRA*
Zenfira Gasanova Matvejeva, *Russian State
University of Physical Education, Sport, Youth
and Tourism, RUS*
Muriz Hadžikadunić, *University of Sarajevo,
BIH*
Walter Ho, *University of Macau, CHN*
Martin Holzweg, *Stellenbosch University, ZAF*
Slobodan Jarić, *University of Delaware, USA*
Igor Jukić, *University of Zagreb, CRO*
Edita Kastratović, *University of Belgrade,
SRB*
Vladimir Koprivica, *University of Belgrade,
SRB*
Zdenka Krivokuća, *University of Banja Luka,
BIH*
Bojan Matković, *University of Zagreb, CRO*
Mihajlo Mijanović, *University of Banja Luka,
BIH*
Zoran Milošević, *University of Novi Sad,
SRB*
Toshiko Sugino, *Kogakuin University, JPN*
Petar Pavlović, *University of Banja Luka,
BIH*
Dragan Popović, *University of Priština, SRB*
Milorad Prnjatović, *University of Haifa, ISR*
Enric M. Sebastiani, *University of Ramon
Lull, ESP*
José Antonio Pérez Turpin, *University of
Alicante, ESP*
Claudie Scheuer, *University of Luxembourg,
LUX*
Simo Vuković, *University of Banja Luka, BIH*
Nenad Živanović, *University of Niš, SRB*
Milan Žvan, *University of Ljubljana, SLO*

Section Editors and Members

Sport

Nicolae Ochiană, *University of Bacău, ROU,*
editor
Luis Carrasco, *University of Seville, ESP*
Almir Atiković, *University of Tuzla, BIH*
Francisco Pradas de la Fuente, *University of
Zaragoza, ESP*
Veroljub Stanković, *University of Leposavić,
SRB*

Physical Education

Ken Hardman, *University of Worcester, GBR,*
editor
Branislav Antala, *University of Bratislava,
SVK*
Manuel Vizuete Carrizosa, *University of
Extremadura, ESP*
Marjeta Kovač, *University of Ljubljana, SLO*

Recreation

Dušan Mitić, *University of Belgrade, SRB,*
editor
Dana Badau, *University of Tirgu - Mures,
ROM*
Goran Nikovski, *University of Skopje, FJRM*

Bio-medicine

Dragan Radovanović, *University of Niš, SRB*
Violeta Dopsaj, *University of Belgrade, SRB*
Dušan Hamar, *Comenius University, SVK*
Vladimir Jakovljević, *University of Kragujevac,
SRB*
Nenad Ponorac, *University of Banja Luka,
BIH*

Theory, History and Philosophy of Sport Editor

Nenad Suzić, *University of Banja Luka, BIH,*
editor
Jelena Ilić, *University of Belgrade, SRB*
Milan Mihajović, *University of Megatrend,
SRB*
Heris Sheikhalizadeh, *University of Azad,
IRN*

Assistant Editors

Adriana Lukić, *University of Banja Luka,
BIH*
Kristina Pantelić, *University of Banja Luka,
BIH*

Language Editors

Dalibor Kesić, *Banja Luka, BIH (English)*
Tatjana Marić, *Banja Luka, BIH (Serbian)*
Milan Vinčić, *Banja Luka, BIH (English)*

Library Consultants

Duško Šljivić, *Banja Luka, BIH (DOI
deposits)*

Secretary Board

Vanja Kosić, *Banja Luka, BIH*

Web site

Jovana Danilović, *Banja Luka, BIH*
Saša Šljivić, *Banja Luka, BIH*

Printed by

Grafid, *Banja Luka, Bosnia and Herzegovina*

Copies

500

Editorial Office

Fakultet fizičkog vaspitanja i sporta / Fac-
ulty of Physical Education and Sports
Univerzitet u Banja Luci / University Banja
Luka
Bulevar Vojvode Petra Bojovića 1A
78000 Banja Luka
Bosnia and Herzegovina
Phone/Fax: 00387 (0)51 31 22 80
E-mail: ffvis@blic.net
Web site: <http://sportlogia.com> (full text
available free of charge)

Abstract or Indexed-in:

Academic Search Premier, CAB Abstracts,
DOAJ, EBSCO SPORTDiskus with Fulltext,
EBSCOhost Research Databases, Fulltext
Sources Online, Cab Global Health, Google
Scholar, Index Copernicus, INASP - Interna-
tional Network for the Availability of Scien-

tific Publication, Open Access Map, Open
J-gate, Science Gate, WorldCat.

Catalogued in:

Bentley University, Biblioteca Victoria de
Sá - Biblioteca Universitaria, Brown University
Library, Butler University Libraries, Califor-
nia Polytechnic State University - Robert E.
Kennedy Library, Central Michigan Univer-
sity, Central Taiwan University of Science
Technology Library, Cha Yung University of
Technology Library, COBISS.ba, COBISS.
si, Deets Library Southwestern College,
De-Yeh University Library, Electronic
Journals Library - Regensburg, Feng Chia
University, Geneva foundation for medi-
cal education and research, German Sport
University Cologne, Georgetown University,
GrandValley State University, Henderson™
State University, Hörskolan I Borås Bibli-
otek & Lärande esurers, Journal Finder
(Everest University Tampa Library, Brescia
University Library), Kaohsiung Medical
University Library E-Journals System, Kun
Shan University, Langara - The College of
Higher Learning, Lund University, Macao
Polytechnic Institute Library, Mercyhurst
College Hammermill Library, MONASH
University Library, National Library of Swe-
den, Nationa Yunlin University of Science
and Technology, NHS Scotland Knowledge
Network, NIU, New York University Librar-
ies, Northern Illinois University, Open Ac-
cess Journal Search Engine (OAJSE), Proach,
San José State University, Staatsbibliothek zu
Berlin, StatCounter, Technical TU Clausthal,
Universidad del País Vasco, University Berlin,
Université de Neuchâtel, Univeriste de Lyon,
Universiteit Utrecht, Univesitet I Tromsø
Universitetbiblioteket, University Library
Hamburg, University of Applied Sciences
and Arts Hannover, University of Hong
Kong, University of Indianapolis, University
of New Hampshire, University of Saskatch-
ewan, University of Teesside, University of
Utah, University of Washington, University
of The West of England - Bristol, Univerza
v Ljubljani, Univerzitet Bibliothek Stuuugart,
Univerzitet Wrocławski, USNO James Mel-
ville Gilliss Library, Virginia Commonwealth
University, Vrije Universiteit Amsterdam,
Vrije Universiteit Brussel, York University,
Washington State University, Winthrop
University, Wissenschaftszentrum Berlin für
socialforschung, Wittenberg University

SportLogia journal (print ISSN 1986-
6089, e-ISSN 1986-6119, CD-ROM
ISSN 1986-6097) is published two times
in one volumen per year (every June
and December) by Faculty of Physi-
cal Education and Sports, University
of Banja Luka, Bulevar Vojvode Petra
Bojovića 1A, 78000 Banja Luka, Bosnia
and Herzegovina. Subscriptions are
available on a calendar year basis for 25
euros, one issue 15 euros + post-office
delivery costs. Printed in Bosnia and
Herzegovina.
All articles are stored and registered
in regional and national Co-operative
Online Bibliographic System & Service
Cobiss.net with full analytical processing
of journal.
According to Ministry of science and
technology in Government of Republic
of Srpska SportLogia Journal is the best
scientific journal in our country.
SportLogia Journal won the first prize in
the Festival of science under the patron-
age of Ministry of science and technol-
ogy in 2011.

Articles

- 101 Separating the relevant from the irrelevant: The SRI learning model
Nenad Sužić, Vera Jelić, and Ankica Milivojac
- 118 Management of activities in the opening of sporting events through the techniques of network planning
Sretenka Dugalić
- 139 Influence of psychological characteristics on the efficiency of the performance of the defence against attacks by the hand
Darko Paspalj
- 154 Relations between morphological variables and normal and pathological conative characteristics of handball players
Veroljub Stanković, Julijan Malacko, Ivana Bojić, and Jelena Ilić
- 172 Contribution of Cedomir Milic to education of sokol staff in Herzegovina
Kristina Pantelić Babić and Petar Pavlović
- 186 Level of sprint and jump abilities and intermittent endurance of elite young soccer players at different positions
Pavol Pivovarniček, Martin Pupiš, Zuzana Tonhauserová, and Martina Tokárová
- 201 Training effects on general and specific motor skills on female volleyball players 13-14 years old
Goran Nešić, Dejan Ilić, Nikola Majstorović, Vladimir Grbić, and Nedžad Osmankač
- 217 Analysis and differences the basic motor and situational motor abilities between female handball players in the BiH first federale league and the First league of the Republic Srpska
Srdan Pavlović, Munir Talović, Elvir Kazazović, and Rasim Lakota
- 225 Use of an authorial training technology during technical and tactical training of women epee fencers
Zoryana Semeryak, Yuriy Briskin, Maryan Pityn, and Oleksandr Vaulin
- 235 Guidelines for authors
- 239 Bibliography of articles

Članci

- 101 Odvajanje bitno od nebitnog: OBN model učenja
Nenad Sužić, Vera Jelić i Ankica Milivojac
- 118 Upravljanje aktivnostima u fazi do otvaranja sportskog događaja tehnikom mrežnog planiranja
Sretenka Dugalić
- 139 Uticaj psiholoških karakteristika na efikasnost izvođenja odbrane od napada rukom
Darko Paspalj
- 154 Relacije morfoloških varijabli normalnih i patoloških konativnih karakteristika rukometaša
Veroljub Stanković, Julijan Malacko, Ivana Bojić i Jelena Ilić
- 172 Doprinos Čedomira Milića školovanju sokolskog kadra u Hercegovini
Kristina Pantelić Babić i Petar Pavlović
- 186 Nivo sprinterskih sposobnosti, eksplozivne snage i specijalne izdržljivosti vrhunskih mladih fudbalera na različitim pozicijama
Pavol Pivovarniček, Martin Pupiš, Zuzana Tonhauserová i Martina Tokárová
- 201 Uticaj treninga na opšte i specifične motoričke sposobnosti odbojkašica uzrasta 13-14 godina
Goran Nešić, Dejan Ilić, Nikola Majstorović, Vladimir Grbić i Nedžad Osmankač
- 217 Analiza i razlike u bazično-motoričkim i situaciono-motoričkim sposobnostima rukometašica Prve federalne lige i Prve lige Republike Srpske
Srdan Pavlović, Munir Talović, Elvir Kazazović i Rasim Lakota
- 225 Korišćenje trening tehnologije autora u tehničko-taktičkoj obuci mačevalki u disciplini sportski mač
Zoryana Semeryak, Yuriy Briskin, Maryan Pityn i Oleksandr Vaulin
- 235 Uputstvo autorima
- 239 Bibliografija članaka

ODVAJANJE BITNOG OD NEBITNOG: OBN MODEL UČENJA

SEPARATING THE RELEVANT FROM THE IRRELEVANT: THE SRI LEARNING MODEL

Nenad Suzić¹, Vera Jelić², and Ankica Milivojac³

¹Filozofski fakultet, Univerzitet u Banjoj Luci, Bosna i Hercegovina

Faculty of Philosophy, University of Banja Luka, Bosnia and Herzegovina

²Osnovna škola „Petar Kočić“ Šibovska, Prnjavor, Bosna i Hercegovina

Elementary school “Petar Kočić” Šibovska, Prnjavor, Bosnia and Herzegovina

³Diplomirani pedagog, nezaposlena, Boasna i Hercegovina

Pedagogue, unemployed, Bosnia and Herzegovina

EDITORIAL ARTICLE
ORIGINAL SCIENTIFIC PAPER

UVODNIČKI ČLANAK
ORIGINALAN NUČNI ČLANAK

doi: 10.5550/sgia.130902.en.001S

UDK: 378.014.3:371.147

doi: 10.5550/sgia.130902.se.001S

SUMMARY

The present study shows an experimental application of the SRI model of studying in teaching. We are talking about separating the relevant from the irrelevant, i.e. the SRI model which was applied in a group rotation experiment. Namely, the first group, which included the second, the third and the fourth class, applied the mentioned model for twelve lessons, and three parallel classes represented group K, which applied traditional teaching models. After the twelve lessons the effects of the SRI model in group E and traditional teaching in group K were measured. Then, the students from group K applied the SRI model for twelve lessons, and group E applied traditional teaching models. Again, with the completion of both, measurements were conducted once again. The measurement included students' motivation, the way they evaluated the material and how many important facts they memorized from the material. The results show that the application of the SRI model gives better effects when it comes to motivation, evaluation of the material and memorizing facts.

Key Words: material evaluation,
memorizing facts, motivation,
studying, students' activity.

INTRODUCTION

Phrase separating the relevant from the irrelevant requires a selective approach, which implies that the

SAŽETAK

U ovom istraživanju prikazana je eksperimentalna primjena OBN modela učenja u nastavi. Radi se o odvajanju bitnog od nebitnog, OBN modelu koji je primijenjen u eksperimentu sa rotacijom grupa. Naime, prvo su tri odjeljenja drugog, trećeg i četvrtog razreda vježbala primjenu OBN modela na 12 časova, a tri paralelna odjeljenja predstavljala su K-grupu i radila po tradicionalnom nastavnom modelu. Nakon 12 časova mjereni su efekti primjene OBN modela u E-grupi i tradiciionalne nastave u K-grupi. Potom su učenici K-grupe radili 12 časova uz primjenu OBN modela, a E-grupa je radila po tracionalom nastavnom modelu. Nakon toga izvršena su ponovna mjerenja. Mjerena je motivisanost učenika, zatim kako oni vrednuju gradivo i koliko su zapamtili najbitnije činjenice iz gradiva koje rade. Pokazalo se da OBN model daje bolje efekte u motivaciji, vrednovanju gradiva te u pamćenju činjenica.

Ključne riječi: aktivnost učenika,
motivacija, pamćenje činjenica,
učenje, vrjednovanje gradiva.

UVOD

Sintagma odvajanje bitnog od nebitnog obuhvata selektivnu pažnju, pri čemu selektivna pažnja podra-

individual is focused on limited aspects of what is being observed (Myers, 1989), selective memory, related to the expectations of the individual during the process of memorizing (Bugg & McDaniel, 2012; Gilovich, Griffin, & Kahneman, 2002), and selective metacognition, which implies the individual's ability to choose information which he will cognitively abstract (Ibid). If we want to analyze all the aspects of separating the relevant from the irrelevant in one theoretical framework then we have to turn to the theory of selective learning (Bandura, 1969, 1977; Restle, 1957). Separating the relevant from the irrelevant is an individual, but a social act as well. Albert Bandura calls this social aspect selective activation, and this means that the individual selectively directs his activity towards social setting. This thesis Bandura elaborates in the theory of selective learning (1969).

At times of learning civilization, at times of fast information production, it is not possible to retain memory reproductive concept of school teaching and education typical for the 19th and the 20th centuries. In order not to learn everything that is in the curriculum and syllabus and textbooks, the student needs to learn how to separate the relevant from the irrelevant. In order to achieve this, we need to train students to ask questions and give answers (Bugg & McDaniel, 2012), to read selectively and actively (McNamara, 2004), to understand the things they are learning (Noordman, Vomk, & Kempff, 1992), to evaluate their own activity (Rogers, 1969). All this can only be accomplished with the teacher's ability to engage or interactively include students into the process.

People read at four levels: (1) by recognizing graphemes, graphic signs for phonemes, (2) distinguishing concepts, i.e. words or groups of phonemes separated from other words, then (3) understanding sentences which represent graphical signs for thoughts and (4) understanding ideas which are graphically presented in passages, i.e. in several sentences centered around the main sentence, like bees around the queen. Schools train students to read at the third level, and the fourth level is a precondition for efficient and fast reading (Fry, 1996) and is something which is unattainable in schools today. How to understand ideas and separate the relevant? First, view the text vertically. Second, recognize the key facts. Third, ask the key question for each idea. Fourth, circle the key information or thoughts (Ibid, p. 61). This simple method can be applied in the existing curriculums and syllabuses and textbooks. It is precisely this that we researched in the three school subjects of lower-class teaching.

According to researches, if the student asks questions on his own about the topic being learned and

zumijeva da se u svakom trenutku osoba fokusira na ograničene aspekte onog što opservira (Myers, 1989), selektivnu memoriju, koja se vezuje za očekivanja osobe koja pamti (Bugg i McDaniel, 2012; Gilovich, Griffin i Kahneman, 2002), te na selektivnu meta-kogniciju, koje podrazumijeva sposobnost osobe da odabere informacije koje će kognitivno izdvojiti (Ibid). Ako ove aspekte odvajanja bitnog od nebitnog želimo opservirati u jednoj teoriji, tada se nužno orijentišemo na teoriju selektivnog učenja (Bandura, 1969, 1977; Restle, 1957). Odvajanje bitnog od nebitnog jeste individualni, ali je i socijalni čin. Albert Bandura taj socijalni aspekt naziva selektivnom aktivacijom, a to podrazumijeva da osoba svoju aktivnost selektivno usmjereva u skladu sa socijalnim okruženjem. Ovu tezu Bandura razvija u okviru teorije socijalnog učenja (1969).

U vremenu učeće civilizacije u kome živimo, u vremenu nevjerovatno brze produkcije novih informacija, nije moguće zadržati memorativno reproduktivni koncept školskog poučavanja i nastave koji je bio karakterističan za XIX i XX vijek. Da ne bi učio sve što propisuju nastavni planovi i programi i sve što je dato u udžbenicima, učenik treba biti ospodobljen da odvaja bitno od nebitnog. Da bismo ovo ostvarili, nužno je osposobljavati učenike da sami postavljaju pitanja i na njih odgovaraju (Bugg i McDaniel, 2012), da čitaju selektivno i aktivno (McNamara, 2004), da razumiju ono što uče (Dunolsky i Lpko, 2007; Noordman, Vomk i Kempff, 1992), da vrednuju vlastitu aktivnost (Rogers, 1969). Sve ovo nemoguće je ostvariti bez osposobljavanja nastavnika da angažuju ili interaktivno uključe učenike u ovoj proces.

Ljudi čitaju na četiri nivoa: (1) prepoznaju grafeme, garfičke znakove za foneme, (2) razlikuju pojmove, odnosno riječi ili skupine grafema odvojene od drugih riječi, zatim (3) razumiju rečenice koje predstavljaju grafičke znakove za misli i (4) shvataju ideje koje su grafički predstavljene u pasusima, tj. u više rečenica okupljenih oko jedne vodeće kao pčele oko matice. Škole osposobljavaju učenike da čitaju na trećem nivou, a četvrti nivo čitanja je uslov efikasnog i brzog čitanja (Fry, 1996) i uporno izmiče školama današnjice. Kako čitati ideje i izdvojiti bitno. Prvo, vertikalno pregledati tekst. Drugo, uočiti važne činjenice. Treće, postaviti ključno pitanje za svaku ideju. Četvrto, zaokružiti ključne informacije ili misli (Ibid, str. 61). Ovaj jednostavni model nije teško primijeniti u postojećim nastavnim planovima i programima uz upotrebu aktuelnih udžbenika. Upravo to smo u našem istraživanju testirali na gradivu tri nastavna predmeta u razrednoj nastavi.

answers them or if we form groups which will answer these questions, this will significantly improve meta-cognitive understanding and memorizing the material (Griffin, Wiley, & Thiede, 2008; Thiede, Anderson, & Therriault, 2003; Thiede, Griffin, Wiley, & Anderson, 2010). If the teacher applies methods which will direct the students to separate the relevant from the irrelevant, to ask and answer questions on their own, this will lead to accurate metaobservation of what is being learned (Bugg & McDaniel, 2012). This research shows that groups which asked and answered questions on their own were more successful at memorizing what was being learned (Ibid, p. 927).

Researches (TIMMS, PISA) also show that economically most prosperous countries are not necessarily best at classical school proficiency tests (Zhao, 2009). The reason for this is that in the traditional teaching practice students have to learn a lot of the material in the curriculum and syllabus which is contained in textbooks. It is necessary to train students how to value the material, to identify what is important and not to learn everything. Researches also show that emotions and moral judgment about the material significantly influence students' motivation (Ugazio, Lamm, & Singer, 2012). While testing the preconceptions of students about whether their actions will have a negative or neutral outcome, the results show that preconceptions affect motivation but are unreliable (Young, Camprodon, Hauser, Pascual-Leone, & Saxe, 2010). It is precisely this dimension of evaluating the material that this research is concerned with. Namely, we conducted an experiment in order to find out if students who think that the material they are learning is important are better at learning and memorizing than students who have an indifferent attitude towards the same material.

Students who take notes and learn from them, in general learn more (Kiewra et al., 1991), and when they note down the key and the most important ideas, learning improves and is raised to the next level (Huffman & Spires, 1994). This efficiency is more emphasized if students analyze and value the things marked as relevant, if they evaluate ideas (Mayer, 2002; Rinehart & Thomas, 1993). Our experimental research comprises all three levels of separating the relevant from the irrelevant. Specifically, we measured their curiosity, imagination, challenge, affirmation and knowledge change if they learn based on the SRI model in relation to the traditional way of learning.

When students themselves ask and answer questions in a group interaction they memorize information better than the groups which read the text again or just repeat the information (Bugg & McDaniel, 2012). In our SRI experiment we applied a group

Ako učenik sam postavlja pitanja o materiji koju uči i ako sam na njih odgovara ili ako formiramo grupe koje će odgovoriti na ta pitanja, to značajno poboljšava metakognitivno razmišljanje i pamćenje gradiva, pokazala su istraživanja (Griffin, Wiley i Thiede, 2008; Thiede, Anderson i Therriault, 2003; Thiede, Griffin, Wiley i Anderson, 2010). Ako nastavnik primjenjuje metode koje će učenike voditi ka tome da izdvajaju bitno od nebitnog, da sami postavljaju pitanja i iznalaze odgovore, to rezultira tačnošću meta-opservacije onoga što se uči (Bugg i McDaniel, 2012). Ovo istraživanje pokazalo je da su grupe koje su same postavljale pitanja i na njih odgovarale bolje zapamtile ono što se uči (Ibid, str. 927).

Istraživanja su pokazala (TIMSS, PISA) da ekonomski najuspješnije zemlje svijeta nisu ujedno i najbolje na klasičnim testovima školskog postignuća (Zhao, 2009). Razlog tome je što se u tradicionalnoj nastavnoj praksi učenicima nudi da usvoje što više sadržaja propisanih nastavnim planovima i programima koje posreduju udžbenici. Potrebno je osposobiti učenike da vrednuju gradivo, da uoče ono što je značajno, a ne da uče sve odreda. Istraživanje je pokazalo da emocije i moralno suđenje o gradivu znatno predodređuju motivaciju učenika (Ugazio, Lamm i Singer, 2012). Prilikom testiranja predubjeđenja učenika o tome da li će njihova akcija imati negativan ili neutralan ishod, pokazalo se da ova predviđanja djeluju na motivaciju ali da su nepouzdana (Young, Camprodon, Hauser, Pascual-Leone i Saxe, 2010). Upravo tu dimenziju vrednovanja gradiva zahvatili smo ovim istraživanjem. Naime, eksperimentalno smo testirali da li učenici koji smatraju da je gradivo važno i značajno bolje uče i pamte u odnosu na učenike koji gradivu pristupaju nediferencirano.

Učenici koji vode zabilješke i po njima uče, u pravilu nauče više (Kiewra i saradnici, 1991), a kada bilježe glavne ili najvažnije ideje, učenje se poboljšava i podiže na viši nivo (Huffman i Spires, 1994). Ova efikasnost se dalje pospješuje ako učenici analiziraju i vrdnuju ono što su odvojili kao bitno, ako evaluiraju ideje (Mayer, 2002; Rinehart i Thomas, 1993). Sva tri ova nova odvajanja bitnog od nebitnog zahvatili smo našim eksperimentalnim istraživanjem. Konkretno, mjerili smo da li se njihova znatiželja, imaginacija, izazov, afirmacija i znanje mijenjaju u situaciji dok uče po modelu OBN u odnosu na tradicionalan način rada.

Kada učenici postavljaju pitanja i na njih odgovaraju u grupnoj interakciji, bolje pamte informacije nego grupe koje ponovo čitaju tekst ili samo ponavljaju informacije (Bugg i McDaniel, 2012). U našem OBN eksperimentu primijenili smo grupnu interak-

interaction which meant that the students asked key questions and answered them as a group. We immediately noted noticeable effects, but after a several workshops the results were clearly visible. For meta-comprehension of the material a certain amount of time must pass in the application of separating the relevant from the irrelevant (Son & Metcalfe, 2000). It is completely understandable that students need time to master the SRI model. It is for this reason that we tested the influence of time on curiosity, imagination, challenge, affirmation and the knowledge of students.

In order to improve efficient memorizing of the material, it is necessary to secure active participation of students in teaching. Some researches show that the techniques teachers employ to secure active participation of their students in conceptual mapping and self-explanation of the material significantly improves meta-comprehension of the material (Thiede et al., 2003; Thiede et al., 2010). Traditional teaching in its predominantly teaching and didactical paradigm renders the student a receptive passive listener which needs only to memorize and repeat what the teacher and textbooks say. This didactical approach rendered the student a passive listener, and rarely enabled an active participation in teaching. Active participation of the student in our research was conducted by applying group work, presentations and evaluation of students.

The starting hypothesis of the research is that the SRI learning model gives better results in regard to evaluating the material, memorizing facts, and motivational components such as curiosity, imagination, challenge, affirmation and competence in relation to the traditional way of teaching.

METHODS

Sample

The sample included 85 students from the elementary school "Petar Kočić" in Šibovsko, a village near Prnjavor, a town near Banja Luka (BiH). There were 45 girls and 40 boys ($\chi^2 = 29$, is not statistically important), which means that the sample was gender uniform. Mean age was from 7 to 10 years old.

Design and procedure

The research was conducted experimentally with the rotation of E and K groups. The experimental SRI program was tested on three school subjects, Math (fourth class), L1 (third class) and Nature and Society (second class). In the three E group classes

ciju pri čemu su učenici grupno izvodili ključna pitanja a potom dogovarali odgovore na ta pitanja. Na samom startu nismo mogli uočiti zapaženije efekte, ali nakon nekoliko radionica, pomoci su bili vrlo uočljivi. Za meta razumijevanje (metacomprehension) gradiva potrebno je da prođe vrijeme (Son i Metcalfe, 2000) u primjeni odvajanja bitnog od nebitnog. Sasvim razumljivo je da za ovladavanje modelom OBN učenicima treba određeno vrijeme. Upravo zato testirali smo dejstvo vremena na znatiželju, imaginaciju, izazov, afirmaciju i znanje učenika.

Da bismo pospjeli efikasno memorisanje gradiva, nužno je da u nastavi obezbijedimo aktivnu participaciju svakog učenika. Nalazi istraživanja pokazuju da tehnike kojima nastavnici obezbjeđuju aktivno učešće učenika u konceptualnom mapiranju (concept mapping) i samoobjašnjavanju (self-explanation) gradiva značajno poboljšavaju meta-razumijevanje (metacomprehension) gradiva (Thiede i saradnici 2003; Thiede i saradnici 2010). Tradicionalna nastava u svojoj predominantno predavačkoj i didaktičiziranoj paradigmi učeniku ostvalja uglavnom receptivnu ulogu pasivnog slušaoca koji treba da zapamti i ponovi ono što kaže nastavnik i što donose udžbenici. Ovaj didaktičizam učeniku je u pravilu ostvaljao ulogu pasivnog slušaoca, a vrlo rijetko omogućavao aktivnu participaciju u nastavi. Aktivnu participaciju učenika u našem istraživanju obezbijedili smo interaktivnim grupnim radom, grupnim prezentacijama i grupnom evaluacijom učenika.

Osnovna hipoteza od koje polazimo u ovom istraživanju glasi da OBN (odvajanje bitnog od nebitnog) model učenja daje bolje rezultate u pogledu vrednovanja gradiva, zapamćenosti činjenica, te u motivacionim komponentama kao što su znatiželja, imaginacija, izazov, afirmacija i kompetencija u odnosu na tradicionalni način rada u nastavi.

METODE

Uzorak

Uzorakom je obuhvaćeno 85 učenika Osnovne škole „Petar Kočić“ iz Šibovske, sela pored Prnjavora, grada u regiji Banja Luka (BiH). Ženskih je bilo 45, a muških 40 ($\chi^2 = 0,29$, nije statistički značajno), što znači da je uzorak ujednačen po polu. Dob učenika je bila od 7 do 10 godina.

Dizajn i procedura

Istraživanje je provedeno u eksperimentalnom dizajnu uz rotaciju E i K-grupa. Eksperimentalni program OBN testiran je na tri predmeta, na matematici (IV razred), maternjem jeziku (III razred) i

the teaching process was performed based on the SRI model, and in the parallel three K group classes the teaching process was realized based on the traditional concepts. Then the experimental SRI program was tested in group K making them an experimental group, and group E was subjected to the traditional teaching. With E and K group rotation we excluded any possibility of the effect of the SRI program being associated to individual characteristics of students of one or the other group, we eliminated subjective influence of the teachers since the same teachers participated in the E and K teaching design.

At the beginning of the research the students had to fill in two instruments: SMMSC test (Suzić, 2008) and TM profile (Jelić, 2013). During the implementation of the SRI program the students were instructed how to read the paragraphs and based on each paragraph ask one question and write a key thesis. Based on these theses the students prepared presentations with the help of textbooks and the teacher, after which the presentations were evaluated by the other groups. After the presentations the teacher and the students analyzed the key questions and the key information learned in the material. After the realization of the SRI experimental program proficiency tests were conducted from three subjects in all six classes. The same tests were used in both E and K groups. In the proficiency test the students were asked to fill in the SMMSC tests again and TM profile. The experimental SRI program was thus conducted in K groups, while E groups were control groups. After this the students did proficiency tests and the SMMSC test and the TM profile. Repeated testing helped us to measure the influence of time as a variable important for the experimental program. All the students and the teachers participated in the experiment voluntarily, and after the experiment many asked if the program was going to be continuously applied or if they could it carry it out without the examiners. We regarded these questions as support and, of course, we approved the application of the SRI model in the teaching process.

The SRI program is designed so it gradually by steps trains students to ask questions or write a shorter thesis, sometimes even a single word for every paragraph in the book, for every idea presented by the teacher. After each student has written a question, small groups are formed so the first group can prepare a presentation which can answer the first few questions, the second group can answer the following questions and so on. The presentation is followed by evaluation of the quality of presentation, and together with the teacher evaluation of the key facts and in-

poznavanju prirode i društva (II razred). U tri odjeljenja koja su činila E-grupe prvo je realizovana nastava po eksperimentalnom OBN modelu, a u paralelna tri odjeljenja koja su činila K-grupe, isti nastavni sadržaji realizovani su u tradicionalnom nastavnom dizajnu. Zatim je eksperimentalni OBN program testiran u tri odjeljenja K-grupa čime su sada ova odjeljenja postala eksperimentalna, a u prethodnim E-grupama sada se radilo tradicionalno. Ovom rotacijom E i K grupa isključili smo mogućnost da se učinak OBN programa pripíše individualnim svojstvima učenika jedne ili druge grupe, eliminisali smo subjektivni uticaj nastavnika jer su isti nastavnici realizovali i E i K dizajn nastave.

Učenici su na početku istraživanja popunjavali dva instrumenta: MUPBS test (SMMSC test; Suzić, 2008) i NS profil (Jelić, 2013). Tokom provođenja OBN programa učenicima je objašnjeno kako treba da čitaju pasuse te da na osnovu svakog pasusa postave jedno pitanje ili ispišu jednu ključnu tezu. Na osnovu ovih teza grupe su pripremale prezentacije uz pomoć udžbenika i nastavnika, a nakon svake prezentacije slijedilo je vrednovanje od strane ostalih grupa. Nakon svih prezentacija nastavnik je sa učenicima analizirao šta su ključna pitanja i koje su ključne informacije u gradivu koje se uči. Nakon realizacije OBN eksperimentalnog programa, u svih šest odjeljenja provedeni su testovi znanja iz tri predmeta. Isti testovi su korišteni za E i K grupe. Uz test znanja učenici su ponovo popunjavali MUPBS test i NS profil. Sada je eksperimentalni OBN program proveden u K grupama a E grupe postale su kontrolne. Nakon ovoga učenici su ponovo rješavali nove testove znanja i popunili MUPBS test i NS profil. Ovim smo u ponovljenim mjerenjima obezbijedili da ustanovimo djelovanje vremena kao varijable značajne za djelovanje eksperimentalnog programa. Svi učenici i nastavnici dobrovoljno su sudjelovali u ovom eksperimentu, a nakon eksperimenta mnogi su pitali da li ćemo nastaviti sa ovim načinom rada i da li to mogu nastaviti bez nas istraživača. Ta pitanja smo doživjeli kao podršku i, naravno, odobrili primjenu OBN modela učenja u daljem nastavnom radu.

OBN program je koncipiran tako da postepeno, u koracima osposobljava učenike da za svaki pasus u udžbeniku, za svaku ideju koju iznosi nastavnika ili koju oni mogu zapaziti, postave pitanje ili ispišu što kraću tezu, ponekad samo jednu riječ. Nakon što svaki učenik ispiše ključna pitanja, formiraju se male grupe tako da prva grupa pripremi prezentaciju kojom će odgovoriti na nekoliko prvih pitanja, druga grupa odgovara na naredna pitanja i tako redom. Poslije prezentacije slijedi ocjena kvaliteta prezentacije, a zajedno sa nastavnikom procjena koja pitanja su najvažnija i koje informacije bi trebalo znati. Na ovaj

formation. Thus the students are gradually prepared to separate the relevant from the irrelevant.

Instruments

We will describe the instruments in detail so it is clearer how the effects of the experimental SRI program were measured.

SMMSC test: Students' Motivation to Memorize Senseless Contents (Suzić, 2008) has 25 items divided into five subtests: curiosity, imagination, challenge, affirmation and competence. The data on inner consistency are compatible with former calibration (2008) where Cronbach's alpha was $\alpha=.73$, and in this research is $\alpha=.84$, which is a respectable level of consistency. The logics for the application of this instrument is the fact that it represents an excellent general indicator of motivation, and we needed an instrument which is neutral in measuring motivation regardless of the school subject, i.e. the content of learning. This instrument implied that the examiner read statements, and the examinees circled one of the four numbers on the scale from 1 = completely false for me to 4 = entirely true for me. For example, one statement said: I love mysteries – related to imagination, and the other said: I love complicated situations and complex tasks – related to challenge.

TM profile: The Importance of the Teaching Material (Jelić, 2013) is an instrument designed for this research, it contains 11 situations where students have to choose one of the three forced-choice answers related to the material: important, interesting and non-selective. For example, the situation is following: While the teacher is presenting a new material, you 1) want to memorize everything, but cannot achieve it (non-selective), b) want to memorize what is interesting (interesting) and c) are trying to memorize the most important (important). After 11 such choices this instrument represents an excellent selection for three value orientations. The same results can be found in Kendall tau rank correlation coefficients which perfectly depict orthogonality between variables (Bryman & Cramer, 2001, p. 179). The correlation between important and interesting is $r=-.10$, between interesting and selective non-selective is $r=-.23$, and between non-selective and important is $r=-.79$. These coefficients undoubtedly confirm that there is orthogonality between three value orientations measured by the TM profile.

Proficiency tests are calibrated with Cronbach's alpha coefficient for inner consistency. There are total of six tests. The first test is IT-L1: L1 initial test ($\alpha=.79$), the second is FT-L1: final L1 test ($\alpha=.79$), the third is IT-N: initial Nature test ($\alpha=.67$), the fourth

način učenici su se postepeno osposobljavali da odvoje bitno od nebitnog.

Instrumenti

Instrumente ćemo ovdje detaljnije opisati kako bi bilo jasnije na koji način su mjereni efekti eksperimentalnog OBN programa.

MUPBS test: Motivacija u pamćenju besmislenih sadržaja (SMMSC test: Students' Motivation to Memorize Senseless Contents; Suzić, 2008) ima 25 ajtema raspoređenih u pet subtestova: znatiželja, imaginacija, izazov, afirmacija i kompetencija. Podaci o unutrašnjoj konzistentnosti saglasni su sa prethodnim baždarenjem (2008) u kome je Kronbahov alfa iznosio $\alpha=0,73$, a u ovom istraživanju $\alpha=0,84$, što je svakako respektabilan nivo konzistencije. Logika za primjenu ovog instrumenta je da on predstavlja odličan opšti indikator motivisanosti, a trebao nam je instrument koji neutralno mjeri motivaciju bez obzira na nastavni predmet, odnosno sadržaj učenja. Ovaj instrument primijenjen je tako što je testator čitao tvrdnje, a ispitanici su zaokruživali jednu od četiri brojke na skali od 1 = vrlo se razlikuje od mene do 4 = mnogo važi za mene. Na primjer, jedna tvrdnja glasi: Volim misterije – ovo se odnosi na imaginaciju, a druga Volim komplikovane situacije i složene zadatke – a odnosi se na izazov.

NS profil: Pridavanje značaja nastavnom gradivu (Jelić, 2013) je instrument rađen za ovo istraživanje, ima 11 situacija na koje učenici odgovaraju prinudnim izborom, pri čemu moraju da odaberu jednu od tri opcije koje se odnose na gradivo: važno, zanimljivo i neselektivno. Na primjer, situacija je odslikana tvrdnjom: Dok nastavnik izlaže novo gradivo, ti: a) hoćeš da zapamtiš sve, ali ne uspijevaš (neselektivno), b) pamtiš samo ono što ti je zanimljivo (zanimljivo) i c) trudiš se da zapamtiš najvažnije (važno). Nakon 11 ovakvih opredjeljenja ovaj instrument odlično razvrstava tri vrijednosne orijentacije. To su pokazali i Kendalovi tau koeficijenti koji najbolje odslikavaju ortogonalnost među varijablama (Bryman i Cramer, 2001, str. 179). Korelacija između važno i zanimljivo iznosi $r=-0,10$, između zanimljivo i neselektivno je $r=-0,23$, a između neselektivno i važno je $r=-0,79$. Ovi koeficijenti nedvosmisleno potvrđuju da postoji ortogonalnost između tri vrijednosne orijentacije koje mjeri NS profil.

Testovi znanja baždareni su Kronbahovim alfa koeficijentom za unutrašnju konzistentnost. Radi se o šest testova. Prvi test je IT-MJ: Inicijalni test maternjeg jezika ($\alpha=0,79$), drugi je FT-MJ: Finalni test maternjeg jezika ($\alpha=0,79$), treći test je IT-PP: Inicijalni test poznavanja prirode ($\alpha=0,67$), četvrti je FT-PP: Finalni test poznavanja prirode ($\alpha=0,68$), peti je IT-

is FT-N: final Nature test ($\alpha=.68$), the fifth is IT-M: initial Math test ($\alpha=.75$) and the sixth is FT-M: final Math test ($\alpha=.77$). These are short tests which contain only important information from the textbooks. All coefficients are high enough in order for us to validly judge the level of adoption of the key information. The validity of comparison lies in the fact that both E and K groups used the same tests.

Conceptual questions

The first question concerned how the students would react to the idea that the SRI implies working independently. At first, there was a slight hesitation and distance, but by the third lesson they “swallowed the bite” and it was easy to see that they enjoyed this approach. When we measured the effects of facts adoption we expected this to be less efficient than in the traditional approach which the students were accustomed to, but it turned out that the SRI model was more efficient here. In terms of emotions we did not measure the SRI effects, but the instrument SM-MS test significantly indicated student’s emotionality (“I am happy...”, “I love when...” and alike), so we judged about emotions indirectly, but it would have been better if we had tested them directly. This is also one of the weaknesses of this research, so we suggest that researchers take this fact into account in further experiments, especially since there are excellent instruments for measuring emotions and students’ emotionality.

The second conceptual question is how to direct traditional teaching from reproductive memory conception to learning how to learn, to the development of managerial and interactional competencies. We are convinced that the SRI model contributes to this, especially since it is compatible with traditional teaching methods and patterns.

In this research we anticipated that the SRI learning model would contribute to better memorizing of the material, that it would strengthen motivational components of learning and motivate students to strengthen their memory capabilities even when it comes to senseless contents.

RESULTS

The starting hypothesis is that students will efficiently memorize the material because the experimental SRI program trains them to separate the relevant from the irrelevant. This coincides with the research where students by asking and answering questions had better memory effects (Bugg & McDaniel, 2012). The results shown in Table 1 in our research undoubtedly confirm the fact.

-MM: Inicijalni test matematike ($\alpha=0,75$) i šesti FT-MM; Finalni test matematike ($\alpha=0,77$). Radi se o kratkim testovima u kojima su zahvaćene samo najbitnije informacije obrađene udžbenicima. Svi koeficijenti su dovoljno visoki da možemo validno suditi o nivou usvojenosti ključnih informacija. Opravdanost poređenja je i u činjenici da su i u E i K grupi primjenjivani isti testovi.

Konceptualna pitanja

Prvo pitanje bilo je kako će učenici reagovati na to da po OBN modelu moraju raditi samostalno. U početku je bilo evidentno blago oklijevanje i distanciranje, ali već na trećem času oni su „zagrizli“ i bilo je lako prepoznati njihovo uživanje u ovom načinu rada. Kada smo mjerili efekte u usvojenosti činjenica očekivali smo da ovo bude manje efikasno nego u tradicionalnom načinu rada na koji su učenici navikli, ali pokazalo se da OBN model i na ovom planu daje bolje efekte. Na planu emocija nismo posebno mjerili efekte OBN modela, ali instrument MUPBS test znatno indicira emocionalnost učenika („sretan sam“ „volim kad“ i slično), tako da smo o emocijama samo posredno sudili, ali bilo bi bolje da smo ih direktno testirali. To je, ujedno, jedna od slabosti ovog istraživanja, pa predlažemo da u ponovljenoj formi potencijalno zainteresovani istraživači mjere i ovu varijablu, posebno stoga što već postoje odlični instrumenti za mjerenje emocija i emocionalnosti učenika.

Drugo konceptualno pitanje je kako tradicionalnu nastavu sa reproduktivno memorativne koncepcije pomjeriti ka učenju učenja, ka razvijanju menadžerskih i interakcionih kompetencija. Sigurni smo da OBN model ovome doprinosi, posebno stoga što je kompatibilan sa tradicionalnim nastavnim metodama i obrascima.

U našem istraživanju pretpostavili smo da će OBN model učenja rezultirati poboljšanjem pamćenja gradiva, da će pojačati motivacione komponente učenja i motivisati učenike da ujačaju svoje memorativne sposobnosti čak i na besmislenim sadržajima.

REZULTATI

Osnovna teza od koje smo pošli u ovom istraživanju glasi da će učenici efikasno pamtit i gradivo jer ih primjena eksperimentalnog OBN programa omogućava da odvajaju bitno od nebitnog. Ovo je u skladu sa nalazima istraživanja u kome su učenici izvođenjem pitanja i odgovaranjem na njih ostvarili bolje efekte pamćenja (Bugg i McDaniel, 2012). Rezultati našeg istraživanja prikazani u Tabeli 1 to nedvosmisleno potvrđuju.

TABLE 1*The efficiency of memorizing the material with E and K group rotation.***TABELA 1***Efikasnost pamćenja gradiva uz obrtanje uloga E i K grupa.*

Students/Groups	Experimental SRI model			Traditional teaching		<i>t</i>	<i>p</i>
	<i>N</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
	Class: 2a, 3a i 4a	45	79.70	15.78	67.33		
Class: 2b, 3b, 4b	40	76.52	16.41	73.57	15.68	1.05	.302
All classes: 2a, 2b, 3a, 3b, 4a, 4b	85	78.21	16.06	70.26	16.63	4.73	.000

Legend/Legenda: Students/Groups - Učenci/Grupe; Experimental SRI model - Eksperimentalni OBN model; Traditional teaching - Tradicionalni nastavni rad; Class - Razred; All classes - Svi razredi; **2a** - Second class, a room (Drugi razred, a odjeljenje); **2b** - Second class, b room (Drugi razred, b odjeljenje); **3a** - Third class, a room (Treći razred, a odjeljenje); **3b** - Third class, b room (Treći razred, b odjeljenje); **4a** - Fourth class, a room (Četvrti razred, a odjeljenje); **4b** - Fourth class, b room (Četvrti razred, b odjeljenje); *N* - Total number of participants (Ukupan broj ispitanika); *M* - Sample mean (Aritmetička sredina); *SD* - Standard deviation (Standardna devijacija); *t* - Student's *t* distribution (Studenova *t* distribucija); *p* - Probability (Vjerovatnoća).

By working in experimental conditions both groups achieved a better percentage of facts adoption (*M* in Table 1) than in the traditional teaching concept, provided that in b-rooms these differences were not statistically significant. This can be explained with the fact that during the application of the SRI model in b-rooms classification period was near so the students were not able to relax and make the most of the experimental program. This raised the questions whether the Grade Point Average in a-rooms was higher than in b-rooms. In order to check this variable, we measured the school grade point average for both a- and b-rooms. It turned out that there was no significant difference ($t=.29$, which is not statistically significant). When we summarized the results from all six classes, it turned out that the SRI contributed to a higher level of facts adoption ($t=4.73$, important at the level .001; Table 1) than in the traditional teaching. This is because the SRI model trained the students to memorize the key information, and traditional teaching models train them to be reproductive and where they have to learn the material, non-selective memorizing. The experimental SRI program directed the students to separate the relevant from the irrelevant, to memorize the chosen, to value the material, which is analogous to other researches (McNamara, 2004; Noordman et al., 1992; Rogers, 1969). The entire program was conducted in social interaction, with coeducation and cooperation of the students,

Kada su radile u eksperimentalnim uslovima obje grupe su postigle bolji postotak usvojenosti činjenica (*M* u Tabeli 1) nego u tradicionalnom nastavnom dizajnu, s tim što u b-odjeljenjima ove razlike nisu statistički značajne. Ovo možemo objasniti činjenicom da se tokom primjene OBN modela u b-odjeljenjima bližio klasifikacioni period tako da djeca nisu mogla opušteno da se prepuste dejstvu eksperimentalnog programa. Ovdje se postavlja pitanje da li je školski uspjeh učenika (GPA: Grade Point Average) u a-odjeljenjima bio viši nego u b-odjeljenjima. Da bismo provjerili dejstvo ove varijable, izmjerili smo prosjek školskih ocjena za a i b-odjeljenja. Ispostavilo se da tu nema značajne razlike ($t=0.29$ što nije statistički značajno). Kada smo sumirali rezultate svih šest odjeljenja, ispostavilo se da eksperimentalni OBN program rezultira višim nivoom usvojenosti činjenica ($t=4.73$, značajno na nivou 0,001; Tabela 1) nego tradicionalna nastava. Ovo možemo objasniti činjenicom da su djeca u OBN modelu osposobljavana da pamte samo ključne informacije, a tradicionalni nastavni modeli ih vode reproduktivno gdje se najčešće posreduje učenje odreda, neselektivno pamćenje. Eksperimentalni OBN program upućivao je učenike da odvoje bitno od nebitnog, da pamte samo odabrano, da vrednuju gradivo, analogno onom što je realizovano u drugim istraživanjima (McNamara, 2004; Noordman, i sardnici, 1992; Rogers, 1969). Kompletan program realizovan je u socijalnoj interakciji, uz koedukaciju i kooperaciju učenika, što je u skladu sa

which is in accordance with Albert Bandura's theory and the theory of social learning (1969).

The second important aspect of our hypothesis in this research is that during the application of the SRI learning model motivational components will be strengthened and that students will learn even when they are memorizing senseless contents. In order to prove this we chose multivariate analysis of covariance (MANCOVA) which is used for testing the influence of time on the motivational components and memorizing senseless contents (Bryman & Cramer, 2001). The results are shown in Table 2.

Mauchly's test of sphericity tells us if the error covariance matrix is proportional to the identity matrix after orthogonal normalization (Ibid). Since χ^2 ,

teorijom Alberta Bandure i teorijom socijalnog učenja (1969).

Drugi važan aspekt naše hipoteze u ovom istraživanju je da će tokom primjene OBN modela učenja doći do jačanja motivacionih komponenata učenja i da će porasti opredijeljenost učenika za učenje čak i kada memorišu besmislene sadržaje. Za dokazivanje ove pretpostavke opredijelili smo se za multivarijantnu analizu kovarijanse (MANKOVA) kojom provjeravamo uticaj vremena na komponente motivacije i pamćenje besmislenih sadržaja (Bryman i Cramer, 2001). Ove nalaze prikazuje Tabela 2.

Mauchly's test of sphericity nas obavještava o tome da li matrica greške kovarijanse ostaje proporcionalna matrici identiteta nakon ortogonalne nor-

TABLE 2

The influence of time on motivational components and the commitment of students to memorize senseless contents (MANCOVA).

TABELA 2

Uticaj vremena na motivacione komponente i opredijeljenost učenika za pamćenje besmislenih sadržaja (MANKOVA).

Variables	Time 1		Time 2		Time 3		<i>W</i>	χ^2	<i>p</i>	<i>F</i>	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>					
Curiosity	2.80	.67	3.08	.78	3.21	.59	.89	10.05	.007	25.80	.000
Imagination	3.11	.62	3.21	.72	3.30	.58	.97	2.96	.251	7.51	.008
Challenge	2.98	.59	3.15	.75	3.11	.51	.78	.000	.000	4.06	.047
Affirmation	2.96	.50	3.28	.69	3.30	.49	.89	.008	.008	28.75	.000
Competency	2.90	.75	3.16	.77	3.25	.64	.72	.000	.000	13.34	.000
SMMSC	2.94	.48	3.12	.66	3.24	.39	.79	.000	.000	31.31	.000

Legend/Legenda: Variables - Varijable; Time - Vrijeme; Curiosity - Radoznalost; Imagination - Mašta; Challenge - Iazov; Affirmation - Potvrđivanje; Competency - Sposobnost; **SMMSC** - Motivation to memorize senseless contents (Motivacija za pamćenje besmislenih sadržaja); *M* - Sample mean (Aritmetička sredina); *SD* - Standard deviation (Standardna devijacija); *W* - Mauchly's test of sphericity (Maučlijev test sfernosti); χ^2 - Chi-square test (HI kvadrat test); *F* - F distribution (F distribucija); *p* - Probability (Vjerovatnoća).

which is present in all motivation subtests except imagination ($\chi^2=2.95$; $p=.251$), was significant, it was necessary to adjust *F* ratio for each of them. After the adjustment we got more *F* ratio, which confirmed that the differences between the first (Time 1), the second (Time 2) and the third (Time 3) measurement were important for every motivational component (Table 2; last column). If we compare arithmetic mean from the first to the third measurement we will see that time had a positive influence on all motivational components. We recorded a permanent increase in curiosity, imagination, affirmation, competen-

malizacije (Ibid). Pošto je χ^2 za sve subtestove motivacije, osim imaginacije ($\chi^2=2,95$; $p=0,251$), značajan, bilo je potrebno prilagoditi *F* ratio za svaki od njih. Nakon te prolagodbe dobili smo još više vrijednosti *F* ratio, što je potvrdilo da su razlike između prvog (Time 1), drugog (Time 2) i trećeg (Time 3) mjerenja značajne za svaku komponentu motivacije (Table 2; last column). Ako poredimo aritmetičke sredine od prvog do trećeg mjerenja, vidjećemo da je vrijeme pozitivno uticalo na sve komponente motivacije. Zabilježili smo permanentan porast radoznalosti, imaginacije, afirmacije, kompetencije i motivacije

ce and students' motivation to remember senseless contents. Only in the last measurement the arithmetic mean for challenge ($M=3.11$) was somewhat lower compared to the second measurement (Time 2; $M=3.15$), but it is still higher compared to the first measurement ($M=2.98$). This proves the values of F ratio, which shows that the motivational components remained consistent even in contrasting conditions.

The changes we have presented in the Table 2 undoubtedly show that during the experimental application of the SRI model key motivational components increased. This increase was not linear only for challenge, but we can say that there was no fall in any motivational component of students during the experimental application of the SRI learning model. If specific learning components have a positive influence we can expect other components to have a positive influence as well (Restle, 1957). In separating the relevant from the irrelevant working memory comes in the forefront, and while evaluating more elements relevant for learning, persons simultaneously choose the key ones (Awh, 2012). Our experimental program focused on training students to separate the relevant from the irrelevant, to decide what is important and what is less important on their own.

In the traditional teaching process the teacher separates the relevant from the irrelevant, decides what the students have to learn, i.e. memorize, monitors their work and efforts and in the end evaluates how much material is memorized, i.e. learned, whether it be knowledge, skills or habits. The students have a little saying in what facts to choose, to value them and to memorize them in the way that suits them best. In the experimental program where students within their groups asked and answered questions on their own, there were significant changes in the increase of attention and activity of the students and a higher level of self-consciousness and understating the material (Bugg & McDaniel, 2012). One of the most important self-generation effects issues is the increase of understanding and metaunderstanding of the material, accompanied by the increase of facts knowledge (King, 1992; Rosenshine, Meister, & Chapman, 1996). The experimental SRI program trained students to think of questions on their own, to answer them within a small group and to present their answers to the other students in the class. This led to the increase of efficient memorizing of the material (Table 1) and enhancing students' motivation (Table 2). It is especially interesting that the students made a progress in memorizing senseless contents (Time 1, $M=2.94$; Time 2, $M=3.12$; Time 3, $M=3.24$; $\chi^2=19.77$; Table 2), which proves how important it is to practice their own memory.

The third aspect of the general hypothesis relates to the material evaluation. It stems from the logics

učenika u pamćenju besmislenih sadržaja. Jedino je u posljednjem mjerenju aritmetička sredina za izazov ($M=3,11$) nešto niža u odnosu na drugo mjerenje (Time 2; $M=3,15$), ali je ipak viša u odnosu na prvo mjerenje ($M=2,98$). Ovo potvrđuju vrijednosti F ratio koji pokazuje da su motivacione komponente ostale konzistentne i u uslovima kontrastiranja.

Promjene koje smo prikazali u Tabeli 2 nedvosmisleno pokazuju da su tokom eksperimentalne primjene OBN modela porasle ključne komponente motivacije. Taj rast nije bio linearan jedino za izazov, ali možemo konstatovati da nije došlo do pada ni u jednoj komponenti motivacije učenika tokom eksperimentalne primjene OBN modela učenja. Ako određene komponente učenja djeluju pozitivno, možemo očekivati da će i većina ostalih komponenata učenja djelovati motivaciono (Restle, 1957). Pri odvajanju bitnog od nebitnog u prvom planu djeluje radna memorija, a kada vrednuju više elemenata značajnih za učenje, osobe simultano biraju one ključne (Awh, 2012). U našem eksperimentalnom programu vježbali smo učenike da odvajaju bitno od nebitnog, da sami odlučuju o tome šta je bitno, a šta manje bitno.

U tradicionalnoj nastavi nastavnik odvaja bitno od nebitnog, određuje šta učenici treba da nauče, odnosno zapamte, prati njihov rad i zalaganje i na kraju vrednuje koliko je zapamćeno odnosno usvojeno gradivo, bilo da se radi o znanjima, vještinama ili navikama. Vrlo malo je ostavljano učenicima da biraju činjenice, da ih vrednuju i pamte na način koji njima odgovara. U eksperimentalnom programu gdje su učenici sami izvodili pitanja i u grupama odgovarali na njih, došlo je do značajnih promjena na povećanju pažnje i aktivnosti učenika, do višeg nivoa samosvijesti i razumijevanja gradiva (Bugg i McDaniel, 2012). Jedan od bitnih efekata samogenerisanja (self-generation) pitanja je porast razumijevanja i metarazumijevanja gradiva, ali uz to imamo i drugi efekat u povećanju zapamćenosti činjenica (King, 1992; Rosenshine, Meister i Chapman, 1996). U eksperimentalnom OBN programu obučavali smo učenike da sami izvode i postavljaju pitanja, da na njih u malim grupama odgovaraju i svoje odgovore pripreme kao prezentaciju za ostale učenike u razredu. Ovo je rezultiralo značajnim porastom efikasnog pamćenja gradiva (Tabela 1) i pospješivanjem motivacije učenika (Tabela 2). Posebno zanimljivo je da su učenici napredovali u pamćenju besmislenih sadržaja (Time 1, $M=2,94$; Time 2, $M=3,12$; Time 3, $M=3,24$; $\chi^2=19,77$; Table 2), što dokazuje da su shvatili kako vrijedi vježbati vlastitu memoriju.

that those who think that the material is something important will be more successful at separating the relevant from the irrelevant, those who value it more or find it more interesting in comparison to those who learn non-selectively. For testing this relation we used the IM-test (The Importance of the Material) which through a forced choice measures three value orientations of students in relation to the material: important, interesting and non-selective. Those who learn non-selectively or all at once do not pay much attention to the fact which material is relevant or interesting.

The results of the experimental application of the SRI model show that students regard what they learn relevant (the first three *t*-values in the Table 3). The results also show that this program has no effect on

Treći aspekt generalne hipoteze odnosi se na vrednovanje gradiva. On proizilazi iz logike da će bolje odvajati bitno od nebitnog oni koji gradivu pridaju značaj, koji ga vrednuju više ili ga smatraju zanimljivim, u odnosu na one koji uče neselektivno. Za testiranje ovog odnosa koristili smo IM-test (The Importance of the Material) koji putem prinudnog izbora mjeri tri vrijednosne orijentacije učenika u odnosu na gradivo: važno, zanimljivo i neselektivno. Oni koji uče neselektivno ili sve odreda, nedovoljno razmišljaju o tome koliko je gradivo važno ili zanimljivo.

Tokom eksperimentalne primjene OBN modela pokazalo se da učenici sve više smatraju da je ono što uče značajno (prve tri *t*-vrijednosti u Tabeli 3). Poka-

TABLE 3

The importance which students give to the material and learning.

TABELA 3

Značaj koji učenici pripisuju gradivu i učenju

Pair of variables	The first paired		The second paired		<i>t</i>	<i>p</i>
	M	SD	M	SD		
Important (I)–Important (M)	2.66	1.18	3.05	1.41	-3.93	.000
Important (M)– Important (F)	3.05	1.48	3.57	1.09	-3.14	.002
Important (I)– Important (F)	2.66	1.18	3.57	1.09	-6.74	.000
Interestingly (I)–Interestingly (M)	.41	.53	.45	.59	-.65	.521
Interestingly (M)–Interestingly (F)	.45	.59	.47	.80	-.28	.778
Interestingly (I)–Interestingly (F)	.41	.53	.47	.80	-.69	.494
Indiscriminate (I)–Indiscriminate (M)	1.93	1.19	1.50	1.42	4.13	.000
Indiscriminate (M)–Indiscriminate (F)	1.50	1.42	.96	.80	3.02	.003
Indiscriminate (I)–Indiscriminate (F)	1.93	1.19	.96	.80	7.00	.000

Note/Bilješka: Minus shows that *t*-value is in favor of the second variables - Minus pokazuje da je *t*-vrijednost je u korist druge varijable

Legend/Legenda: Pair of variables - Par varijabli; The first paired - Prvo uparivanje; The second paired - Drugo uparivanje; Important - Važno; Interestingly - Zanimljivo; Indiscriminate - Nediskriminativno; **I** - Initial measurement - Time 1 (Inicijalno mjerenje); **M** - Measurement at middle experiment - Time 2 (Mjerenje u sredini ekperimenta); **F** - Final measurement - Time 3 (Finalno mjerenje); **M** - Sample mean (Aritmetička sredina); **SD** - Standard deviation (Standardna devijacija); **t** - Student's *t* distribution (Studenova *t* distribucija); **p** - Probability (Vjerovatnoća).

whether the students will regard the material interesting (the next three variables in the Table 3). It is particularly encouraging that the SRI program influences decrease in non-selective learning (the last three variables in Table 3). These data undoubtedly show that the SRI model reduces non-selective learning and has a positive effect on the material evaluation which

zalo se i to da ovaj program ne djeluje na to da li će učenici gradivo smatrati zanimljivim (sljedeće tri varijable u Tabeli 3). Posebno ohrabrujuće djeluje činjenica da OBN program djeluje na smanjenje neselektivnog učenja (posljednje tri varijable u Tabeli 3). Ovi podaci nedvosmisleno pokazuju da OBN model smanjuje neselektivno učenje i pozitivno djeluje na

students learn. If we want the children to learn with will, to decide what to do learn and experience school as an institution which meets their needs, then we have to win over the value world of the child, as Carl Rogers suggests (1969). Our experimental testing of the SRI model shows that it has a positive role in children's evaluation of the material.

Further, we want to know if there are any differences in memorizing facts between the students who consider the material interesting and important in comparison to those students who learn the whole

vrednovanje gradiva koje učenici uče. Ako želimo da djeca uče sa voljom, da odlučuju o tome šta učiti i da školu dožive kao instituciju koja ide u susret njihovim potrebama, tada moramo pridobiti vrijednosni svijet djeteta, kako to predlaže Carl Rogers (1969). U našem eksperimentalnom testiranju OBN modela dobili smo pozitivne pomake u vrednovanju gradiva od strane učenika.

Dalje nas zanima da li postoje razlike u memorisanju činjenica između učenika koji gradivo smatraju značajnim i zanimljivim u odnosu na učenike koji uče

TABLE 4

Memorizing facts, the teaching design and the material evaluation (ANOVA).

TABELA 4

Pamćenje činjenica, dizajn nastave i vrednovanje gradiva (ANOVA).

Design	Orientation	Memorization of facts			$F_{(2)}$	p
		N	M	SD		
SRI experimental model of learning	Important	59	79.59	13.42	4.38	.016
	Interestingly	5	60.87	30.90		
	Indiscriminate	21	72.82	15.83		
	Total	85	76.81	15.94		
Traditional teaching	Important	59	73.25	16.43	1.68	.194
	Interestingly	5	58.33	16.40		
	Indiscriminate	21	72.86	20.73		
	Total	85	72.28	17.72		

Legend/Legenda: Design - Dizajn; SRI experimental model of learning - OBN eksperimentalni model učenja; Traditional teaching - Tradicionalna nastava; Orientation - Orijentacija; Important - Važno; Interestingly - Interesntno; Indiscriminate - Nediskriminativno; Total - Ukupno; Memorization of facts - Pamćenje činjenica; N - Total number of participants (Ukupan broj ispitanika); M - Sample mean (Aritmetička sredina); SD - Standard deviation (Standardna devijacija); F - F distribution (F distribucija); p - Probability (Vjerovatnoća).

material or who learn non-selectively. For this type of relationship testing we applied a variance analysis (ANOVA). The results show that with the application of the SRI model the students who regard the material relevant are better at memorizing facts than the students who learn non-selectively ($F_{(2)}=4.38; p=.016$; Table 4), which is statistically significant at the level .05. Those who regard the material interesting, had the lowest score of memorizing facts ($M=60.87$). This shows that the material which was part of the experiment was not important for the students, but the way of learning – SRI in comparison to the traditional teaching. In the traditional teaching model there was no record of difference in memorizing facts between those who regard the material interesting, appealing, and those who learn non-selectively

sve odreda ili neselektivno. Za testiranje ovog odnosa primijenili smo analizu varijanse (ANOVA). Pokazalo se da uz primjenu OBN modela učenici koji gradivo smatraju važnim bolje pamte činjenice nego učenici koji uče neselektivno ($F_{(2)}=4,38; p=0,016$; Tabela 4), što je statistički značajno na nivou 0,05. Oni koji gradivo smatraju interesantnim, imali su najmanji skor na pamćenju činjenica ($M=60,87$). To pokazuje da gradivo na kome smo proveli eksperiment samo po sebi nije značajno za učenike, ali je za njih značajan način rada – OBN u odnosu na tradicionalnu nastavu. U tradicionalnom nastavnom modelu nije zabilježena razlika u pamćenju činjenica između onih koji gradivo smatraju interesantnim, zanimljivim i onih koji neselektivno uče ($F_{(2)}=1,68; p=0,194$; Ta-

($F_{(2)}=1.68$; $p=.194$; Table 4), which is not statistically important. Students who learn non-selectively rely on their cognition (Greene Sommerville, Nystrom, Darley, & Cohen, 2001). Aside from the fact that we noticed positive emotions on the faces and in the behavior of students, we have no records of their emotions during the realization of the SRI program, hence further research in the field should include the measurement of students' emotions.

DISCUSSION

This research focuses on experimental testing of the SRI learning model. The results show that the training for separating the relevant from the irrelevant (SRI) results in better memorization of facts, increase in motivation and a higher level of positive material evaluation. When students ask question about the material they are learning on their own that leads to a better concentration of attention, a higher level of activity and understanding of the material (Rosenshine et al., 1996). Aside from that, the effects of combining questioning self-generation and answering these questions result in a better memorization of facts and a higher level of metacognition (Bugg & McDaniel, 2012). Our research confirms the fact that questioning self-generation results in better material memorization, but we have also obtained indicators about significant improvements of motivational learning components such as curiosity, imagination, challenge, affirmation and competency. Also, important results on the application of the SRI model in teaching show a higher level of the evaluation of the material being learned.

In order for the SRI model to succeed, we followed the three stages of its implementation: 1) separating relevant, 2) analyzing the contents and 3) evaluating the material being learned (Mayer, 2002; Rinehart & Thomas, 1993). Aside from that, all the activities of the students were viewed in interaction (Bugg & McDaniel, 2012), which undoubtedly had positive effects. All this was followed by the measurement of students' motivation and their evaluation of the material. It turned out that not only were the students better at memorizing the material, but the level of motivation for learning increased as well as the evaluation of the material being learned. The present study shows that self-generation and answering questions result in better accomplishments at memorizing the material test, as the research results show in the study of Julie Bugg and Mark McDaniel (2012). All this leads to the conclusion that the SRI model is very useful as a compensation for some weak points in the traditional teaching.

The limitations of this study include several components: the length of the program, lack of measurement of students' emotions and longitudinal assess-

bela 4), što nije statistički značajno. Učenici koji uče neselektivno, oslanjaju se na svoju kogniciju (Greene Sommerville, Nystorm, Darley i Cohen, 2001). Osim što smo registrovali pozitivne emocije na licima i ponašanju učenika, ovdje nemamo podatke o njihovim emocijama tokom realizacije OBN programa, tako da bi u narednom istraživanju bilo poželjno uključiti mjerenje emocija učenika.

DISKUSIJA

U ovom istraživanju eksperimentalno smo testirali OBN model učenja. Pokazalo se da obuka učenika za odvajanje bitnog od nebitnog (OBN) rezultira boljim pamćenjem činjenica, povećanjem motivacije i višim nivoom pozitivnog vrednovanja gradiva. Kada učenici sami izvode pitanja o materiji koju uče to rezultira boljom koncentracijom pažnje, višim nivoom aktivnosti i razumijevanja gradiva (Rosenshine i saradnici, 1996). Osim toga, efekti kombinovanja question self-generation i odgovaranja na ta pitanja rezultiraju boljom zapamćenošću činjenica i višim nivoom metakognicije (Bugg i McDaniel, 2012). U našem istraživanju potvrdili smo da question self-generation rezultira boljim pamćenjem gradiva, ali dobili smo i pokazatelje o značajnim poboljšanjima motivacionih komponenata učenja kao što su: curiosity, imagination, challenge, affirmation and competency. Isto tako, značajna rezultat primjene OBN modela u nastavi je i viši nivo vrednovanja gradiva koje se uči.

Da bi OBN model učenja uspio, slijedili smo tri faze njegove implementacije: 1) izdvajanje bitnog, 2) analiza sadržaja i 3) evaluacija onoga što se uči (Mayer, 2002; Rinehart i Thomas, 1993). Osim toga, sve aktivnosti učenika posredovali smo putem interakcije (Bugg i McDaniel, 2012) što je dalo nedvosmislene efekte. Sve to pratili smo mjerenjem motivacije učenika i njihovim vrednovanjem gradiva. Pokazalo se da su učenici ne samo bolje pamtili gradivo, nego i da je porasla motivacija za učenje kao i vrednovanje materije koja se obrađuje. In the present study potvrđeno je da self-generation and answering questions rezultira boljim postignućem na testu pamćenja gradiva, kao što su našli u istraživanju Julie Bugg i Mark McDaniel (2012). Sve to nas upućuje na zaključak da je OBN model vrlo koristan kao kompenzacija za neke slabosti tradicionalne nastave.

Ograničenja ove studije odnose se na nekoliko komponenti: trajanje programa, izostanak mjerenja emocija učenika i longitudinalna provjera. Program

sment. The SRI program was carried out in the period of twelve lessons which involved an experimental inclusion of students in this learning technique. It turned out that this was long enough for the students to master this technique, but we do not know if this would lead to saturation due to a long period of application. During the application of the SRI model the students showed positive emotions, but we did not measure them. Further research in the field should include measurement of students' emotions during the process of mastering the SRI learning model. It would be good if the SRI model was tested in a longitudinal research in order to find out if the students would independently and spontaneously apply separating the relevant from the irrelevant model without the teacher's help.

OBN trajao je 12 časova u eksperimentalnom uvodnju učenika u ovu tehniku učenja. Pokazalo se da je to dovoljno da učenici savladaju ovu tehniku, ali ne znamo da li bi u dugotrajnijoj primjeni došlo do zasićenja. Toko primjene OBN modela učenici su pokazivali pozitivne emocije, ali ih nismo mjerili. Za buduće studije predlažemo mjerenje emocija učenika tokom ovladavanja OBN modelom učenja. Dobro bi bilo da smo OBN model testirali u longitudinalnom istraživanju kako bismo saznali da li će učenici samostalno i spontano slijediti vještinu primjene modela odvajanja bitnog od nebitnog i bez nastavnikove pomoći.

REFERENCES

- Awh, E. (2012). A common discrete resource for visual working memory and visual search. Paper presented at 2012 annual meeting near Munich, Germany, in July 2012: Visual search and selective attention (VISSA III). Retrieved from <http://www.mvss.org>.
- Bandura, A. (1969). Social-learning theory of identificatory processes. In D. A. Goslin (Ed.), *Handbook of socialization theory and research* (pp. 213–262). Chicago, IL: Rand McNally.
- Bandura, A. (1977). *Social learning theory*. Englewood Cliffs, NJ: Prentice-Hall.
- Bryman, A., & Cramer, D. (2001). *Quantitative data analysis with SPSS release 10 for Windows: A guide for social scientists*. New York, NY: Routledge.
- Bugg, J. M., & McDaniel, M. A. (2012). Selective benefits of Question self-generation and answering for remembering expository text. *Journal of Educational Psychology, 104*(4), 922–931. doi: 10.1037/a0028661
- Fry, R. W. (1996). *Improve your memory*. 3rd ed. New York, NY: Book-Smart Press.
- Gilovich, T., Griffin, D., & Kahneman, D. (2002). *Heuristics and Biases: The Psychology of Intuitive Judgment*. Cambridge, UK: Cambridge University Press. doi: 10.1017/CBO9780511808098
- Greene, J. D., Sommerville, R. B., Nystrom, L. E., Darley, J. M., & Cohen, J. D. (2001). An fMRI investigation of emotional engagement in moral judgment. *Science, 293*(5537), 2105–2108. doi: 10.1126/science.1062872; PMID:11557895
- Griffin, T. D., Wiley, J., & Thiede, K. W. (2008). Individual differences, rereading, and self-explanation: Concurrent processing and cue validity as constraints on metacomprehension accuracy. *Memory & Cognition, 36*(1), 93–103. doi: 10.3758/MC.36.1.93
- Huffman, L. E., & Spires, H. A. (1994). Effects of explicit instruction in note taking on sixth graders' lecture comprehension and attitudes toward note taking. *Reading Improvement, 11*, 72–76.
- Jelić, V. (2013). *Pamćenje sadržaja s obzirom na značaj koji učenici pridaju gradivu* [Memory contents due to the importance that students attach to school material]. Unpublished master thesis, Filozofski fakultet, University of Banja Luka.
- Kiewra, K., Dubois, N., Christain, D., McShane, A., Meyerhoffer, M., & Roskelley, D. (1991). Note-taking functions and techniques. *Journal of Educational Psychology, 83*(2), 240–245. doi: 10.1037/0022-0663.83.2.240
- King, A. (1992). Facilitating elaborative learning through guided student-generated questioning. *Educational Psychologist, 27*(1), 111–126. doi: 10.1207/s15326985ep2801-8.
- Mayer, R. R. (2002). *The promise of educational psychology*. Vol. 2. Teaching for meaningful learning. Columbus, OH: Merrill/Prentice Hall. doi: 10.1207/S15326985EP3702_5; doi: 10.1037/0022-0663.94.3.486; doi: 10.1207/00461520252828528; doi: 10.1037/0022-0663.94.1.171; doi: 10.1207/S15326985EP3701_3
- McNamara, D. S. (2004). SERT: Self-explanation reading training. *Discourse Processes, 38*(1), 1–30. doi: 10.1207/s15326950dp3801_1
- Myers, D. G. (1989). *Psychology*. New York: Worth Publishers, Inc.
- Noordman, L. G. M., Vonk, W., & Kempff, H. J. (1992). Causal inferences during the reading of expository text. *Journal of Memory and Language, 31*, 573–590. doi: 10.1016/0749-596X(92)90029-W

- Restle, F. (1957). Theory of selective learning with probable reinforcements. *Psychological Review*, 64(3), 182–191. doi: 10.1037/h0042600
- Rinehart, S. D., & Thomas, K. A. (1993). Summarization ability and text recall by novice studiers. *Reading Research and Instruction*, 32(4), 24–32. doi: 10.1080/19388079309558130
- Rogers, C. R. (1969). *Freedom to Learn: A View of What Education Might Become*. Columbus, OH: Charles E. Merrill.
- Rosenshine, B., Meister, C., & Chapman, S. (1996). Teaching students to generate questions: A review of the intervention studies. *Review of Educational Research*, 66(2), 181–221. doi: 10.3102/00346543066002181
- Son, L. K., & Metcalfe, J. (2000). Metacognitive and control strategies in study time allocation. *Journal of Experimental Psychology Learning, Memory, and Cognition*, 26(1), 204–221. doi: 10.1073/0278-7393.26.1.204.
- Suzić, N. (2008). Can we motivate students to memorize senseless contents. In A. Kozłowska, R. Kahn, B. Kožuh, A. Kington, and J. Mažgon (Eds.), *The role of theory and research in educational practice* (pp. 113–133). University of North Dakota.
- Thiede, K. W., Anderson, M. C. M., & Theriault, D. (2003). Accuracy of metacognitive monitoring affects learning of texts. *Journal of Educational Psychology*, 95(1), 66–73. doi: 10.1037/0022-0663.95.1.66
- Thiede, K. W., Griffin, T. D., Wiley, J., & Anderson, M. C. M. (2010). Poor metacomprehension accuracy as a result of inappropriate cue use. *Discourse Processes*, 47, 331–362. doi: 10.1080/01638530902959927.
- Ugazio, G., Lamm, C., & Singer, T. (2012). The role of emotions for moral judgments depends on the type of emotion and moral scenario. *Emotion*, 12(3), 579–590. doi: 10.1037/a0024611
- Young, L., Camprodon, J., Hauser, M., Pascual-Leone, A., & Saxe, R. (2010). Disruption of the right temporo-parietal junction with transcranial magnetic stimulation reduces the role of beliefs in moral judgment. *Proceedings of the National Academy of Science, USA of the USA*, 107, 6753–6758. doi: 10.1073/pnas.0914826107; PMID: 20351278; PMCID: PMC2872442.
- Zhao, Y. (2009). *Catching up or leading the way: American education in the age of globalization*. Alexandria, VA: Association for supervision and curriculum development.

Received: October 3, 2013

Revision received: December 19, 2013

Accepted: December 19, 2013

Primljeno: 3. oktobar 2013

Izmjene primljene: 19. decembar 2013

Odobreno: 19. decembar 2013

Correspondence to:

Nenad Suzić, PhD

Faculty of Philosophy

Bulevar V. Petra Bojovića 1A

78000 Banja Luka

Bosni and Herzegovina

Phone: 00387 65 53 85 00

E-mail: nenad_szc@yahoo.com

Korespondencija:

dr Nenad Suzić

Filozofski fakultet

Bulevar V. Petra Bojovića 1A

78000 Banja Luka

Bosna i Hercegovina

Telefon: 00387 65 53 85 00

E-mail: nenad_szc@yahoo.com

SEPARAZIONE DEL RILEVANTE DALL'IRRILEVANTE: MODELLO DI APPRENDIMENTO - SRI

Nenad Suzić¹, Vera Jelić² e Ankica Milivojac³

¹Facoltà di Lettere, Università di Banja Luka, Bosnia-Erzegovina

²Scuola elementare „Petar Kočić“ di Šibovska, Prnjavor, Bosnia ed Erzegovina

³Pedagogo, disoccupata, Bosni ed Erzegovina

Viviamo in una civiltà di apprendimento in cui la capacità di imparare velocemente e facilmente è la condizione della libertà individuale. Nell'era di un'infinità

di informazioni è impossibile ricordare tutte nuove e importanti cognizioni. Come vediamo, la collisione è evidente: da un lato c'è la necessità di imparare velo-

cemente e facilmente, dall'altro la quantità delle informazioni che aumenta enormemente e diventa impossibile tenerle tutte in memoria e renderle facilmente accessibili. Questa collisione si risolve efficacemente separando il rilevante dall'irrilevante. Di che cosa si tratta? Il sintagma la separazione del rilevante dall'irrilevante comprende l'attenzione selettiva, e l'attenzione selettiva significa che in qualsiasi momento la persona si concentra sugli aspetti limitati di ciò che osserva (Mayers, 1989), la memoria selettiva, legata alle aspettative della persona che memorizza (Bugg & McDaniel, 2012; Gilovich, Griffin & Kahneman, 2002), e la meta-cognizione selettiva, che sottintende la capacità di una persona di scegliere le informazioni che isolerà in modo cognitivo (Gilovich, Griffin, & Kahneman, 2002). Qui ci troviamo nel campo della teoria dell'apprendimento selettivo (Bandura, 1969). Separando il rilevante dall'irrilevante gli studenti memorizzano selettivamente solo ciò che è importante per loro, solo ciò che possono utilizzare per i propri scopi. Oggi è maturata la consapevolezza che la separazione del rilevante dall'irrilevante è la condizione della libertà e del successo di una persona giovane. Si tratta di una competenza o abilità che possiamo sviluppare dai bambini, ma è un lavoro che a questo punto possiamo realizzare meglio attraverso la scuola, e solo in parte attraverso i genitori.

In questo studio gli autori hanno controllato in modo sperimentale come introdurre gli studenti nella separazione del rilevante dall'irrilevante. Gli studenti erano informati come leggere i testi, cioè le idee e non frasi, termini o lettere. Con ogni testo loro facevano le domande e soltanto cercavano le risposte sostanziali a queste domande. In questo modo valutavano l'unità di apprendimento ed evidenziavano ciò che consideravano utile. Proprio questa dimensione della valutazione dell'unità di apprendimento è stata coperta da questo studio. In particolare, gli autori hanno sperimentato se gli studenti che ritenevano l'unità di apprendimento importante e significativa studiavano e imparavano meglio rispetto agli studenti che avevano un approccio non differenziato all'unità di apprendimento. Si è dimostrato che quando lavoravano in condizioni sperimentali entrambi i gruppi hanno raggiunto una percentuale maggiore dell'adozione dei fatti (M nella tabella 1) rispetto all'insegnamento tradizionale. È la prima ipotesi di questo studio.

La seconda ipotesi dello studio è che nell'applicazione del modello di apprendimento SRI, le componenti motivazionali di apprendimento diventeranno più forti e che sarà aumentata la determinazione degli studenti di apprendere anche i contenuti senza senso. Per dimostrare queste ipotesi gli autori hanno optato

per l'analisi multivariata della covarianza (MANCOVA) con la quale hanno verificato l'influenza del tempo sulle componenti della motivazione e della memoria dei contenuti senza senso (Bryman & Cramer, 2001). È stato confermato che le differenze tra la misurazione prima (Time 1), seconda (Time 2) e terza (Time 3) sono significative per ciascuna componente di motivazione. È stato dimostrato chiaramente che le componenti chiave di motivazione erano aumentate durante l'applicazione sperimentale del metodo SRI. Nell'insegnamento tradizionale l'insegnante separa il rilevante dall'irrilevante, determina ciò che gli studenti dovrebbero imparare, cioè ricordare, segue il loro lavoro e il loro impegno e, in fine, valuta quanto dell'unità di apprendimento è stato memorizzato cioè appreso, siano loro le conoscenze, abilità o abitudini. È stato lasciato pochissimo spazio per gli studenti di scegliere i fatti, di valutarli e ricordarli in modo che va bene per loro. In questa prova, gli autori hanno trovato che gli studenti sono fortemente motivati di separare indipendentemente il rilevante dall'irrilevante.

In un programma sperimentale in cui gli studenti da soli facevano le domande e in gruppi rispondevano a loro, ci sono stati i cambiamenti significativi quanto all'aumento dell'attenzione e dell'attività degli studenti, al livello più alto di consapevolezza e di comprensione dell'unità di apprendimento (Bugg & McDaniel, 2012). I risultati simili sono stati ottenuti anche nella ricerca presentata nello studio che questi autori mostrano qui. Per porre le domande relative all'unità di apprendimento, gli studenti devono valutare il materiale su cui lavorano. Questa è la terza ipotesi di questo studio e si riferisce alla valutazione dell'unità di apprendimento. Risulta dalla logica che coloro che attribuiscono l'importanza all'unità di apprendimento, che la apprezzano di più o la ritengono interessante separeranno meglio il rilevante dall'irrilevante rispetto a coloro che imparano in maniera non selettiva. Per verificare questa relazione, gli autori hanno utilizzato l'IM-TEST (The Importance of the Material) che tramite la scelta obbligatoria misura i tre orientamenti di valore degli studenti in relazione all'unità di apprendimento: importante, interessante e non selettivo. Coloro che imparano in modo non selettivo o tutto senza distinzione, non pensano sufficientemente quanto l'unità di apprendimento è importante o interessante. Durante l'applicazione sperimentale del modello SRI, si è dimostrato che gli studenti sempre di più credono che ciò che stanno imparando è importante. Si è anche dimostrato che questo programma non influisce sul fatto se gli studenti ritengono l'unità di apprendimento interessante. Particolarmente incoraggiante è il fatto che il

programma SRI influisce sulla riduzione dell'apprendimento non selettivo.

Per avere il modello SRI di successo, gli autori hanno seguito le tre fasi della sua realizzazione: 1) il selezionamento del rilevante, 2) l'analisi del contenuto e 3) la valutazione di ciò che si sta imparando (Mayer, 2002; Rinehart & Thomas, 1993). Inoltre, tutte le attività degli studenti sono state mediate tramite l'interazione (Bugg & McDaniel, 2012), il che ha dato i risultati inequivocabili. Tutto ciò è stato seguito misurando la motivazione degli studenti e la loro valutazione dell'unità di apprendimento. Si è dimostrato che non solo che gli studenti memorizzavano meglio l'unità di apprendimento ma anche la motiva-

zione per l'apprendimento così come per la valutazione dell'unità di apprendimento trattata è cresciuta. Questo studio ha confermato che l'autogenerazione e il rispondere alle domande si traducono in risultati migliori nelle prove della memorizzazione dell'unità di apprendimento, come hanno trovato nel loro studio Julie Bugg e Mark McDaniel (2012). Tutto ciò ci porta alla conclusione che il modello SRI è molto utile per compensare alcune debolezze dell'insegnamento tradizionale.

Parole chiave: l'attività degli studenti, la motivazione, la memorizzazione dei fatti, l'apprendimento, la valutazione dell'unità di apprendimento.

UPRAVLJANJE AKTIVNOSTIMA U FAZI DO OTVARANJA SPORTSKOG DOGAĐAJA TEHNIKOM MREŽNOG PLANIRANJA

MANAGEMENT OF ACTIVITIES IN THE OPENING OF SPORTING EVENTS THROUGH THE TECHNIQUES OF NETWORK PLANNING

Sretenka Dugalić¹

¹Visoka sportska i zdravstvena škola, Beograd, Srbija
College of Sport and Health, Belgrade, Serbia

ORIGINAL SCIENTIFIC PAPER

doi: 10.5550/sgia.130902.en.002D

doi: 10.5550/sgia.130902.se.002D

ORIGINALAN NUČNI ČLANAK

COBISS.BH-ID:

COBISS.BH-ID:

UDK: 796.062:005

SUMMARY

This paper presents an exemplar of how network planning technique can be applied within sport management. Sporting events involve a very large number of participants (excluding the audience, sponsors and members of the media, the Olympic Games often encounter over 10,500 participants). Because some sporting events last several days, constantly being updated, it is possible to use prior experience. However, considering that sport managers often have the task of preparing and organizing sporting events that take place in a relatively short period of time, the specifications required are primarily limited by time resources.

The aim is therefore to provide assistance to and share experiences with potential users and the organizers of sporting events by emphasizing the importance of network planning techniques to the management of sport, which itself needs to have a greater application within sport management to increase organizational resources, and possibly, contribute to the saving of other resources, particularly money, people and equipment.

The examples of network planning techniques (Critical Path Method - CPM, Program Evolution and Review Technique - PERT) shown in this paper are the result of the author's many years of experience with their practical application and implementation, and aspirations to see, as much as possible, contemporary theoretical achievements find their place within sports management. In this way, the field of management and business are themselves affirmed, creating the basis for further developments within

SAŽETAK

U radu su prikazane tehnike mrežnog planiranja koje doprinose uspješnoj organizaciji sportskih i specijalnih događaja, i kao takve mogu naći svoju širu primjenu u menadžmentu u sportu. Sportski događaji uključuju često veoma velik broj učesnika (osim publike, sponzora i pripadnika medija, na Olimpijskim igrama se npr. susreće preko 10.500 učesnika). Neke sportske manifestacije traju više dana i ponavljaju se, tako da je moguće koristiti iskustva iz prošle prakse (tzv. učenje iz iskustva). Međutim, često sportski menadžeri imaju zadatak da pripremaju i organizuju sportske događaje koji će se održavati jednokratno, u relativno kratkom roku, zbog čega su specifikacije zahtijeva ograničene vremenskim, prostornim, ljudskim i vremenskim resursom.

Cilj je da se potencijalnim organizatorima sportskih događaja pruži pomoć, prenošenjem znanja i vještina, i da se istakne značaj tehnika mrežnog planiranja za menadžment u sportu. Ovo iz razloga da se poveća kompetentnost organizacionog resursa, ali i da se eventualno doprinese uštedi drugih resursa, prije svega novca, ljudi i opreme.

Primjer aplikacije tehnika mrežnog planiranja (Critical Path Method - CPM, Program Evolution and Review Technique - PERT) na sport, prikazane u radu, rezultat su iskustva autora u praktičnoj primjeni i realizaciji rješenja u oblasti upravljanja pomoću projekata jednog događaja, sa težnjom da što je više moguće, pronađu svoje mesto i u okviru sportskog menadžmenta. Na taj način se afirmiše sama oblast menadžmenta i biznisa, i posebno menadžmenta u sportu. Takođe, stvara se podloga za dalji razvoj discipline upravljanja sportskim događajima, i dopri-

the sporting events discipline, whilst contributing to the formation of new ideas, and improving sporting systems and institutions.

Key Words: CPM method, management of sporting events, network planning techniques.

INTRODUCTION

The method of planning theory utilizing critical path (critical path method - CPM) is a project management technique developed in 1950 by Morgan R. Walker, whilst working for DuPont and E. Kelley, Jr., for the Remington Rand (Kelley, 1961; Kelley & Walker, 1959). Since then, the technique has found its application in all areas of the economy and non-economy (Dugalic, 1995), as well as in sports and the management of sport (Appenzeller, 2000), which is understandable when it is known that the resources in this area are very limited, and the requirements for sporting-economic efficiency is exposed to growing expectations and competitive pressures as a result of rapid globalization (Raič, 2006).

This paper presents a model for organizing sporting events using network planning techniques, with the intent of facilitating, on the basis of these experiences, the work of sports organizers and coordinators. With the aid of scientific knowledge and quantitative methods available within management, sports management and the management of sporting competitions, it points to the possibility of more effective and efficient management of human, infrastructural, financial and IT resources, within the context of time constraints (Dugalic, 2005).

Systematic studies focusing on the organization of sports events and competitions have, in addition to foreign theorists (Aaron & Stewart, 1992; Farmer, Mulrooney, & Amon, 1996; Pitts & Stotlar, 1996), been dealt with in our region by many authors: Ljubojević (2001), Pelević (2011), Raič and Maksimović (2000), etc. This enabled a solid theoretical foundation for the management of sporting events, with each idea finding its application within modern sporting practice. On the other hand, it is also rooted in the idea that the constraints, factors and courses of action within the framework of these phenomena, are accurately identified through empirical research in sport, utilizing network planning techniques and other quantitative methods (Bloem & Vermei, 2005; Vasiljević, 2013) The aim is therefore to offer an analysis through the confirmation of underlying assumptions and knowledge of management processes and techniques for organizing events, as well as eventually arrive at a conclusion that is able to interpret results in a way

nosi nastajanju novih ideja, pomoću kojih je moguće unaprijediti sistem i institucije u sportu, putem obrazovnih procesa.

Ključne riječi: CPM metod, menadžment sportskih događaja, tehnike mrežnog planiranja.

UVOD

Metod mrežnog planiranja pomoću kritičnog puta (critical path method - CPM) je tehnika upravljanja pomoću projekta koju su još davne 1950-te godine razvili Morgan R. Walker, radeći za DuPont, i E. Kelley, Jr., za Remington Rand (Kelley, 1961; Kelley i Walker, 1959). Od tada je ova tehnika našla svoju primjenu u svim oblastima privrede i neprivrede (Dugalić, 1995), pa tako i u sportu i menadžmentu u sportu (Appenzeller, 2000). To je razumljivo kada se zna da su resursi u toj oblasti veoma ograničeni, a zahtjevi za sportsko-ekonomskom efikasnošću, uslijed nagle globalizacije, izloženi sve većim očekivanjima i konkurentskom pritisku (Raič, 2006).

U radu je izložen primjer organizovanja sportske manifestacije primjenom tehnike mrežnog planiranja. Cilj je da se na bazi ovih iskustava, olakša posao organizatorima i koordinatorima sportskih događaja, na način da se uz pomoć naučnih spoznaja i kvantitativnih metoda koje stoje na raspolaganju u okviru menadžmenta, menadžmenta u sportu, i menadžmenta sportskih takmičenja, ukaže na mogućnost efektivnijeg i efikasnijeg upravljanja ljudskim, infrastrukturnim, novčanim i informatičkim resursom, u kontekstu vremenskih ograničenja (Dugalić, 2005).

Sistematskim izučavanjem organizovanja sportskih priredbi i takmičenja, pored stranih teoretičara (Aaron i Stewart, 1992; Farmer, Mulrooney i Amon, 1996; Pitts i Stotlar, 1996), na našim prostorima bavili su se do sada brojni autori: Ljubojević (2001), Pelević (2011), Raič i Maksimović (2000), i dr. To je omogućilo jednu solidnu teorijsku bazu menadžmenta sportskih događaja, a svima njima je zajedničko to što su ove ideje našle svoju primjenu u savremenoj sportskoj praksi. Sa druge strane, takođe se pošlo od ideje da se putem empirijskih istraživanja u sportu, primenom tehnika mrežnog planiranja i drugih kvantitativnih metoda, egzaktno odrede ograničenja, faktori i pravci djelovanja u okviru ovih pojava (Bloem i Vermei, 2005; Vasiljević, 2013). Takođe, cilj je da se putem analiza potvrde pretpostavke o značaju menadžment procesa i tehnika za organizovanje događaja, i eventualno dodje do spoznaja koje bi omogućile da se

correspondent to effective sporting practices within the decision-making processes apparent in organizing sporting events, other special events such as jubilees, fairs, exhibitions, celebrations, press conferences (Van Der Wagen & Carlos, 2009), or used for further research and application in the field of project management within sport.

METHODS

On the basis of the existing theoretical knowledge within the field of network planning and the CPM method, constructed and exhibited within the study is a hypothetical model designed by the author on the basis of previous research and their experience within the specialist field of sporting project management. The primary aim is to arrive at an understanding which will, through the assistance of this methodology, enrich sporting practice, as well as affirm the methods of network planning within the management of sport.

The organization of sporting events is, within sporting practice, realized through stages of project preparation, implementation, analysis and an evaluation of the actual sporting and financial results (HBS Press, 2006). In the preparation phase (conceptualization) the inputs (technical and financial support: capital sources), time, human resources, and the structure of revenue and expenses are analyzed, and risks (default event, ie cancellations, punching time, budget, etc.) projected. Concurrently, appropriate targets are set for the date, duration of activities, special deadlines and critical dates. The planning and organization of events includes:

- strategy formulation,
- the feasibility of the study and decision made,
- establishing objectives
- appointing an organizing committee and a coordinator of the committee (single) for various areas (security, security staff, measuring and testing, logistics and etc.)
- budgeting (financial plan),
- organizational structure,
- personnel by sector (volunteers, etc.),
- detailed planning,
- presentation of events including preparation, closing and cleaning, and
- evaluation, feedback and modification of future events (Dugalić, 2007).

The maintenance of sporting events is, as we can see, very complex, and it is thus desirable to accentuate in a systematic way, and using specific methodologies, activities that are crucial for the success of

dobijeni rezultati interpretiraju u svrhu potvrđivanja dobre sportske prakse, u odlučivanju kod organizovanja sportskih manifestacija, drugih, specijalnih događaja kao što su: jubileji, sajmovi, izložbe, proslave, konferencije za štampu (Van Der Wagen i Carlos, 2009), ili koriste za dalja istraživanja i primjenu u oblasti upravljanja pomoću projekata u sportu.

METODE

Na bazi postojećih teorijskih spoznaja iz oblasti mrežnog planiranja i CPM metoda, konstruisan je i izložen u radu jedan hipotetski model kojeg je autor rada dizajnirao na osnovu ranijih istraživanja i iskustava u specijalističkom području upravljanja pomoću projekta u sportu. Osnovni cilj je da se uz pomoć ove metodologije dodje do spoznaja koje će obogatiti sportsku praksu, ali i da se afirmišu metode mrežnog planiranja u menadžmentu u sportu.

Organizovanje sportskih manifestacija se u sportskoj praksi realizuje putem etapa kao što su priprema projekta, realizacija, analiza i ocjena ostvarenih sportskih i finansijskih rezultata (HBS Pres, 2006). U fazi pripreme (konceptualizacije) analiziraju se inputi (tehnička i finansijska podrška: kapital, izvori), vrijeme, ljudski resursi, struktura trškova i prihoda i projektuju rizici (neizvršenja događaja, tj. otkazivanja, probijanja vremena, budžeta i sl.). Paralelno s tim utvrđuju se ciljevima primjereni: datum, vrijeme trajanja aktivnosti, posebni rokovi i kritični datumi. Planiranje i organizovanje događaja uključuje:

- formulisanje strategije,
- studiju izvodljivosti i donošenje odluke,
- utvrđivanje ciljeva,
- imenovanje organizacijskog komiteta i koordinatora komisija (jedinica) za razne oblasti (bezbjednost, redarska služba, mjerenje i testiranje, logistika i sl.),
- budžetiranje (finansijski plan),
- organizacionu strukturu,
- personal po sektorima (volonteri i sl.),
- detaljno planiranje,
- predstavljanje događaja uključujući pripremanje, zatvaranje i pospremanje, i
- vrednovanje, povratne informacije i modifikovanje za neke buduće događaje (Dugalić, 2007).

Održavanje sportskih događaja je kao što se vidi, veoma kompleksno, te se u radu žele na sistematičan način, primjenom posebne metodologije, akcentovati aktivnosti koje su ključne za uspjeh događaja.

events. The expected outcome is in line with the set objectives, so that through the application of quantitative methods of network planning (CPM, PERT) through computer technology, these stages and activities translate into management models that can help sport officials plan events, organize activities and implement coordination during later phases, on a routine basis. In order to popularize, simplify and converge these techniques for use in sport, the paper presents a hand-drawn (manual) display of a CPM model.

This technique of network planning replaced the Gantt chart, as it provides: a comprehensive overview of the entire structure of planning, unambiguously shows the logical representations and interdependence of parts, informs of a critical situation in a timely manner and those parts of greatest burden, factors that adversely affect the completion date of the project, disturbing factors that threaten the progress and completion of the project, objectively comparing individual variants of the plan, so as to obtain a superior solution, relieving planners of their routine work especially within overly complex projects, carried out by computers, etc. (Roel, 2011; Weiss & Gershon, 1989).

RESULTS

Forming project management models in sport is achieved in the following phases:

- the setting of model structures or the specification of activities necessary for the organization of events,
- defining the parameters of models which are predefined through a subjective assessment or estimation of parameters based on data derived from the past through experiences encountered during the organization of similar events (ie learning from practice),
- evaluation models relative to theoretical and empirical data, statistical criteria and tests, as well as the practical possibility of using the model for project management within the field of sporting events.

Activities of planning within project management in sport reflect:

- clearly defined stages within all processes, requiring time and resources (human, infrastructure, money, information in the form of equipment and accessories),
- waiting, or the process of project management that requires only the time consumed, and
- dependence, which does not waste any time or resources, and may be apparent or fictitious.

Očekivani ishod je u skladu sa postavljenim ciljem, da se primjenom kvantitativnih metoda mrežnog planiranja (CPM, PERT) ove etape i aktivnosti, računarskim tehnikama, prevedu u upravljačke modele koji mogu pomoći sportskim funkcionerima da planiraju sportski događaj, organizuju aktivnosti i provode koordinaciju tokom kasnijih faza, na rutinski način. U cilju popularizacije, pojednostavljenja i približavanja ovih tehnika za primjenu u sportu, u radu je izložen ručni (manuelni) prikaz CPM modela.

Ova tehnika mrežnog planiranja zamjenila je gantograme, jer osigurava: razumljiv pregled cijelog objekta planiranja, jednoznačno prikazuje logičke prikaze i međuzavisnost dijelova, preciznije praćenje vremena i rokova događaja, informiše pravovremeno o kritičnom vremenu najopterećenijeg dijela rada, faktora koji negativno utiču na rok završetka projekta, ometajućim faktorima koji ugrožavaju tok i završetak projekta, objektivno poređi pojedine varijante plana, kako bi se dobilo superiornije rješenje, rasterećuje planere rutinskih poslova osobito kod veoma složenih projekata, koje obavlja računar i sl. (Roel, 2011; Weiss i Gershon, 1989).

REZULTATI

Oblikovanje modela upravljanja projektom u sportu se odvija u fazama po sledećem redosledu:

- postavlja se struktura modela ili specifikacija aktivnosti neophodnih za organizovanje događaja;
- određuju se parametri modela koji su predodređeni subjektivnom procjenom ili procjenom parametara na osnovu podataka iz prošlosti, na bazi iskustava tokom organizovanja sličnih manifestacija (tzv. učenje iz prakse);
- ocjena modela (vrednovanje) u odnosu na teorijske i iskustvene činjenice, statističke kriterijume i testove, te praktičnu mogućnost upotrebe modela za upravljanje projektom u oblasti sportskih događaja.

Aktivnosti iz plana upravljanja projektom u sportu odražavaju:

- jasno određenu etapu svih procesa, koji zahtijevaju vrijeme i resurs (ljudski, infrastrukturni, novčani, informatički i u vidu opreme i rekvizita);
- čekanje, ili proces upravljanja projektom koji iziskuje samo utrošak vremena, i
- zavisnost, koja ne troši ni vrijeme ni sredstva, a može biti prividna ili fiktivna.

The basic functions of project management within sport are: planning project tasks, appointing the project team, organizing activities, managing the deadlines of project activities, controlling flow and resources, management during the project, and evaluating the project. Network planning, which is the recommended model for the management of sport, can be thoroughly and accurately analyzed and experiments conducted upon, so as to explain which results lead to concrete ideas for implementing projects. This means that managing the process of implementation is adaptable (can be monitored, controlled, corrected and adapted to the situation), which is highly applicable for sporting events which sometimes last only one day.

Tables 1 and 2, and Figures 1 and 2, as interpreted in the next chapter, present the results of the analysis which contribute to the rationalization of time resources, and with it, the causal scheduling of human, informational and monetary resources, according to the other authors (Đurićin & Lončar, 2012).

DISCUSSION

Project management within sport has not, through the application of network planning techniques, found a wide application within sporting practice. There are many problems, difficulties and considerations that limit the use of these models within sport, primarily, the absence of a software package. In these circumstances, CASE tools or programs, such as Project Manager can be used. Training sport managers to manage projects within sporting practice through accredited courses can encourage their wider application. Citing it as a reason for not accepting the adequacy of the models within practice, some theorists state that they oversimplify reality, that situations within sporting practices change quicker than the models allow, that the data within sport marketing is often weak and inconsistent, and the models have therefore not shown a superiority in decision-making.

In order for the project management model to be more represented in sport, sports organizations need to equip themselves with proper management techniques, and correctly chose a model according to the desired area of activity (Chadwick, 2010). Shown below is a simplified example of a model from sporting practice, applied to the phase prior to a sporting event.

Procedures for the implementation of projects

The implementation of projects within sport us-

Osnovne funkcije upravljanja projektom u sportu su: planiranje projektnih zadataka, imenovanje projektnog tima, organizovanje aktivnosti, pridruženje rokova aktivnosti projekta, kontrola tokova i resursa, upravljanje tokom projekta i ocjena projekta. Model mrežnog planiranja koji se preporučuje kod upravljanja projektima u sportu se može detaljno i tačno analizirati, na njemu se može eksperimentisati, te objasniti do kakvih rezultata dovodi neka konkretna zamisao u realizaciji projekta. To znači da je upravljanje procesom realizacije adaptibilno (može se pratiti, kontrolisati, korigovati i prilagoditi novonastaloj situaciji), što je za sportske događaje koji ponekad traju tek jedan dan, veoma primjenjivo.

Uvidom u Tabele 1 i 2, kao i Slike 1 i 2, interpretirane u narednom poglavlju, mogu se sagledati rezultati analiza koji doprinose racionalizaciji vremenskog resursa, i sa njime uzročno-posledični povezanog rasporeda ljudskog, informatičkog i novčanog resursa, što se može vidjeti i kod drugih autora (Đurićin i Lončar, 2012).

DISKUSIJA

Upravljanje projektima u sportu primjenom tehnika mrežnog planiranja nije našlo širu primjenu u sportskoj praksi. Postoje brojni problemi, poteškoće i razlozi koji ograničavaju primjenu ovih modela u sportu, prije svega neposjedovanje programskih paketa. U tu svrhu mogu da se koriste case alati ili programi, npr. Project Manager. Edukacija sportskih menadžera za upravljanje pomoću projekata u sportu kroz akreditovan kurs može podstaći na njihovu širu primjenu. Neki teoretičari kao razlog za nedovoljno prihvatanje modela u praksi navode da oni suviše pojednostavljaju stvarnost, da se situacije u sportskoj praksi mijenjaju brže od modela, da su podaci u sportskom marketingu često slabi i nekonzistentni, pa time modeli nisu pokazali superiornost u donošenju odluka.

Da bi strategija upravljanja modelom projekta u sportu bila više zastupljena, sportske organizacije treba da se osposobe za odgovarajuće tehnike vođenja, i pravilno izaberu model za željeno područje djelovanja (Chadwick, 2010). Slijedi prikaz pojednostavljenog primjera modela iz sportske prakse, apliciranog na fazu koja prethodi sportskom događaju.

Procedure za realizaciju projekta

Realizacija projekta u sportu primjenom CPM

ing the CPM model has two supporting procedures, such as structure analysis and timing analysis. Activities should begin by analyzing the structure, which consists of: issuing a list of activities and the total time of preparation, and the construction of a network diagram for the sporting event, respectively those parts and controls relative to the rules of the construction. Questions for getting the Gantt model for event management are:

- Which actions must be completed immediately before?
- Which actions must begin immediately after?
- Which actions can be performed independently and in parallel?
- Can the observed activity are further divided into sub-activities?

Data lists of activities necessary for the holding of events are collected systematically, and some discovered during the construction of a network diagram. The rules for constructing a network diagram requires that every activity have its beginning and end expressed throughout the event (must start and finish within the event), as follows:

- The succeeding activity occurs only after the completion of the prior activity.
- Activities that take place simultaneously can occur only after the completion of the previous activity.
- When a subsequent activity begins during the activity preceding it, it is divided into sub-activities of the prior events.
- In the event of an activity which has the same beginning and end, a fictitious or mock activity is introduced with duration of zero.
- Mock activities are used in other scenarios when requirements are incorporated if an event ends and begins with a number of activities that are interdependent.
- Within a series of activities, any number of apparent activities can be included, so long as they do not disrupt the structure of the network diagram, which is highly important when dismantling large diagrams into sub-networks of lesser scale.
- Each activity within the diagram can only be undone once, so in as much as the process of construction reveals the existence of either the loop, double line or closed cycle, they must, in the analysis of discrepancies, be removed.

Now, on the basis of prior and future activities, and initial and final events, all project events are numbered in ascending order, numbering initial (i)

modela ima dva oslonca procedure kao što su analiza strukture i analiza vremena. Aktivnosti se započinju analizom strukture koja se sastoji od: ispostavljanja spiska aktivnosti i vremena ukupnog trajanja priprema, konstrukcije mrežnog dijagrama za sportski događaj, odnosno njegovih dijelova i kontrole u odnosu na pravila konstruisanja. Pitanja za dobijanje gantograma modela za upravljanje događajem su:

- Koje aktivnosti moraju biti završene neposredno prije?
- Koje aktivnosti moraju otpočeti neposredno poslije?
- Koje aktivnosti se mogu nezavisno paralelno odvijati?
- Da li se posmatrana aktivnost može dalje podijeliti na podaktivnosti?

Podaci za spisak aktivnosti neophodnih za odvijanje događaja se prikupljaju sistematski, a neki se otkrivaju za vrijeme same konstrukcije mrežnog dijagrama. Pravila za konstruisanje mrežnog dijagrama su da svaka aktivnost ima svoj početak i kraj iskazan kroz događaj (mora otpočeti i završiti događajem), kako slijedi:

- Naredna aktivnost nastupa tek nakon završetka prethodne aktivnosti.
- Aktivnosti koje se odvijaju paralelno, mogu nastupiti tek nakon završetka prethodne aktivnosti.
- Kada naknadna aktivnost počinje za vrijeme aktivnosti koja joj prethodi, ona se dijeli u podaktivnosti prethodnog događaja.
- Kod pojave aktivnosti sa istim početkom i završetkom, uvodi se fiktivna ili prividna aktivnost sa nultim trajanjem.
- Prividne aktivnosti koriste se u drugim slučajevima kada se ugrade uslovi i ako u jednom događaju završava i otpočinje veći broj aktivnosti koje nisu sve međusobno zavisne.
- U niz aktivnosti se može uključiti proizvoljan broj prividnih aktivnosti, a da se pri tome ne naruše konstrukcije mrežnog dijagrama, što je naročito bitno kod rastavljanja velikih dijagrama u podmreže manjeg obima.
- Svaka aktivnost u dijagramu može se odvijati samo jednom, pa ukoliko se u fazi konstruisanja otkrije postojanje petlji, dvostrukih linija ili zatvorenih ciklusa, oni se tokom analize nelogičnosti moraju otkloniti.

Sada se na osnovi prethodnih i sledećih aktivnosti, i početnih i završnih događaja, numerišu svi događaji projekta po rastućem nizu numerisanja početnih (i) i

and final (j) events, where $i < j$. If this requirement is not fulfilled, the following problems arise:

- difficulties in identifying specific activities and frequent errors in writing the order of numbers,
- the application of computational methods to analyze network diagrams is made more difficult as the possibility of introducing some order to sequential data processing is made more difficult,
- processing on a computer requires increasing numbering network diagrams, and
- it is difficult to detect a closed cycle (loop) which needs to be removed from the network diagram.

For projects with a large number of activities, these problems are difficult to remove, and so adherence to these rules is very important. To create labels, symbols are used: i, j = events or nodes, (i, j) activities in sequential order, t_{ij} = duration of activity in units of time. In the planning and implementation of sporting events, all activities are grouped into tasks through the process of departmentalization, particularly commissions, committees or sectors (for safety, the hospitalization of participants, ceremonial part, logistics, surveillance, sports events, cooperation with the media, medical support, monitorial services...). In this

završnih (j) događaja, pri čemu je $i < j$. Ako ovaj uslov nije ispunjen pojavljuju se sledeći problemi:

- teškoće u identifikovanju pojedinih aktivnosti i česte greške u redoslijedu pisanja brojeva,
- otežana je primjena računskih postupaka kod analize mrežnog dijagrama jer su ograničene mogućnosti uvođenja nekog reda u redoslijedu obrade podataka,
- obrada na računaru zahtijeva rastuće numerisanje mrežnog dijagrama, i
- teško se otkrivaju zatvoreni ciklusi (petlje) koje treba otkloniti iz mrežnog dijagrama.

Kod projekta sa velikim brojem aktivnosti ovi se problemi teško mogu otkloniti, pa je pridržavanje navedenih pravila veoma bitno. Za označavanje se koriste simboli: i, j = događaji ili čvorovi, (i, j) = aktivnosti po redosledu, t_{ij} = trajanje aktivnosti u vremenskim jedinicama. Kod planiranja i realizacije sportskog događaja, sve aktivnosti su procesom deparmentalizacije grupisane u zadatke posebno oformljenih komisija, odbora ili sektora (za bezbjednost, hospitalizaciju učesnika, cermonijalni dio, logistiku, praćenje sportskih događaja, saradnju sa medijima, medicinsku podršku, redarsku službu...). Na taj način

TABLE 1

List of activities within the sports project for the flowchart.

TABELA 1

Lista aktivnosti za dijagram toka sportskog projekta.

	Activities	Duration in days
1.	<i>Defining</i> the mission, goals, and name of the event, market research on similar, previously held events, data collection on the structure of the program, becoming familiar with legislation (laws, regulations of sports associations), activities preceding the opening ceremony, information on potential participants, evaluation of attendance, a list of potential sponsors, fundraising plan. Elaboration of the concept.	30
2.	<i>Conduction of a feasibility</i> study and, if requested, submission to the relevant bodies, including all necessary information (name of the event, organizer, place and date, the goals of the organization, activities, expectations regarding sport results and number of participants, program competition, approximate funds required for the project).	7
3.	<i>Enactment of decisions regarding the organization and start of the sporting event</i> , the candidates, if necessary, submission and elaboration of the action plan of the sporting event, that is complete, necessary documents, notification of the relevant sporting bodies and commissions, obtainment of necessary approvals.	5
4.	<i>Evaluation of attendance</i> : number of participants and visitors, determining the price of the registration fee, the number of participating sponsors and their approximate combined value, determining the range of ticket prices, the expected response of the audience and its total value, number, value and schedule of concessions.	3
5.	<i>Organizing the structure of management</i> : the appointing of a body or committee for coordination (organizational team), determining the level of coordination and the number of working bodies and commissions.	10
6.	<i>Appointment of remaining participants in the organizational structure</i> , managers and executives, a plan of the number of volunteers and monitorial service.	4
7.	<i>Production cost estimate for all categories</i> : place of origin, deadlines and implementers.	7

8.	<i>Revenue forecast and budget planning</i> , in alignment with the cost estimate.	5
9.	<i>Creating licensing programs and media contacts</i> to divide costs, and sell broadcasting rights.	3
10.	<i>Planning of sporting events</i> : leadership plans, management and control activities during sporting events for all sequences required by the law, regulations and good management practices.	3
11.	<i>Enactment of the financial plan</i> (income and expense plan) through direct and indirect income and expenses, by categories, tariffs, price lists and bonuses for the various categories of actors, athletes, audiences, sponsorship pool, media, stall owners... Strategies of differentiation with respect to the scope, time and method of payment.	1
12.	<i>Procurement plan</i> : equipment, apparatus, equipment room, sound system, power supply, informational materials, office supplies, hygiene products, medical supplies, ordering of food and drinks for refreshments and cocktails, promotional material, conceptual design plans and implementation of plaques, medals and certificates etc.	2
13.	<i>A plan to inform</i> participants and the public, as well as paths and placement of information.	5
14.	<i>Study of public attitudes</i> , equipping of facilities with necessary equipment and props at the chosen location, a logistics plan, planning accommodation and transfers if needed.	15
15.	<i>Plan of contact and manner of communication</i> with all registered participants and interested parties (members of the police, sponsors, the media, suppliers, the public, accreditation of participants and journalists).	7
16.	<i>Planned indicators</i> : assessment of the efficacy of the event.	15
17.	<i>Appointment of working bodies and commissions</i> , production of a calendar of activities and detailed timeline for each sequence of activities, flowchart of competitive activities, development of a daily plan for the monitoring of and methods of evaluation for the implemented activities.	3
18.	<i>Execution plan by activity type</i> , number, plan, number and distribution of volunteers by committees, plan concerning the distribution of resources necessary for the implementation of activities, aligned with the cost estimate.	2
19.	<i>Marketing plan</i> , promotions plan, business advertising and other forms of promotion, plan to encourage sales in coordination with sponsors and tenants, an activities plan for promoters of the event and the media, creating print, audio and audio-visual materials, and press releases.	5
20.	<i>The preparation and signing of contracts</i> for all product types, equipment, requisites, supplies (supply) and previously required services, according to the expenses.	14
21.	<i>An action plan for sponsors</i> involved with the project, media activity plan, preferably in the form of a special network plan of promotional activities with a detailed description of elements within the promotional mix (advertising, sales, promotions, and public relations), length of activities by media, within the specified budget, content, the method and means of communication.	5
22.	<i>Graphic, art, visual (mascots, logo, posters, catalogs), audio, audio-visual solutions</i> , content editing, prototyping and final versions of promotional materials.	10
23.	<i>Crosscheck of candidates working on the project</i> , selection and appointment of executives, contracts, their training and involvement in the project.	10
24.	<i>Audit of all plans</i> (during the course of the sporting activity, security, movement of visitors, athletes and VIP, medical plans and courses of action, all dynamics of control of athletes: weight measurement, medical examinations, doping control). Evaluation of activities by the organizational team, decision-making on the manner of coordination during the events, establishing a system of compensation for the executives (nature of rewards and penalties for lateness, tardiness or comments on the work of individual executives, etc.).	14
25.	<i>Development of educational materials</i> , certificates, ID cards, uniforms, decorations and submission of participants.	7
26.	<i>Printed promotional material</i> , audio and audio-visual, magnetic and other media records submitted to sponsors, media houses and publicists according to the media plan in order to broadcast, deliver and realize the potential of attendees from the public and publicity.	14
27.	<i>Engagement of personnel</i> in accordance with the contract and other forms of engagement. Checking the cleaning and maintenance action plan before, during and after the conclusion of the event. Engagement of reporters and managers in ceremonies.	5
28.	<i>Finalization of the project</i> , a confirmed list of participants and media sponsors, supplied promotional material, hired staff, checking: implementation of the contract, supply of equipment, props and expendable supplies, approval of authorized institutions (organization of the inside order, professional sports associations), sending of invitations to guests to attend the opening ceremony of the sporting event.	8

29.	<i>Seminar for volunteers</i> , check: techniques, measuring equipment, sound systems, electric power supply, coordination with external perpetrators (law enforcement, medical staff, journalists, reporters, cameramen, delegates, judges, sponsors, volunteers). Inspection of the arena and a written record of it. Insight into the finished material, medals, plaques, awards, audio recordings of the anthem, the preparation of protocols for the ceremony, announcing: the opening of the event, the winners and the closing the event.	7
30.	<i>Furnishing works scheduled for the ceremony</i> with decor and other necessary resources (flowers, special effects, etc.). Rehearsal of the opening ceremony, the awarding of medals and closing. The organization of cocktails for all the evening before the event to provide sponsors the opportunity to submit their hospitality, encourage media writing in the presence of athletes and those potential visitors who are interested. A registered plan for participants and competition schedules. The opening ceremony proceeded by the official sport, entertaining, and commercial programs.	8

Legend/Legenda: Activities - Oznaka aktivnosti; Duration in days - Trajanje u danima; **1.** - *Definisanje misije*, ciljeva i naziva manifestacije, marketing istraživanja o sličnim, ranije održanim manifestacijama, prikupljanje podataka o strukturi programa, upoznavanje sa regulativom (zakoni, propisi sportskih asocijacija), aktivnostima koje prethode svečanom otvaranju, podaci o potencijalnim učesnicima, procjena posjećenosti, spisak potencijalnih sponzora, plan prikupljanja sredstava. Izrada idejnog koncepta; **2.** - *Izrada studije izvodljivosti* i podnošenje nadležnim tijelima ukoliko se to zahtjeva, sa svim neophodnim podacima (naziv manifestacije, organizator, mjesto i datum održavanja, ciljevi organizovanja, aktivnosti, očekivanja u pogledu sportskih rezultata i broja učesnika, program takmičenja, okvirna finansijska sredstva neophodna za projekat); **3.** - *Donošenje odluke o organizovanju i početku sportske manifestacije*, o kandidaturi ako je to neophodno, podnošenje plana aktivnosti sportske manifestacije i izrada elaborata, tj. kompletne, neophodne dokumentacije, obavještanje nadležnih sportskih tijela i komisija, pribavljanje neophodnih saglasnosti; **4.** - *Procjena posećenosti*: broj učesnika i posjetioca, određivanje visine kotizacije, broj uključenih sponzora i aproksimativna ukupna vrijednost, određivanje raspone cijena ulaznica, očekivani odziv publike i ukupna vrijednost, broj, vrijednost i rapored koncesija; **5.** - *Organizovanje strukture menadžmenta*: imenovanje tijela ili odbora za koordinaciju (organizacioni tim), određivanje nivoa koordinacije i broja radnih tijela i komisija; **6.** - *Imenovanje ostalih učesnika u organizacionoj strukturi*, menadžera i izvršioaca, plan broja volontera i redarske službe; **7.** - *Izrada troškovnika* po svim kategorijama: mjestu nastanka, rokovima i izvršiocima; **8.** - *Prognoza prihoda i planiranje budžeta*, usklađivanje sa troškovnikom; **9.** - *Izrada programa licenciranja, i kontakti sa medijima* u cilju podjele troškova, prodaja prava prenosa; **10.** - *Planiranje realizacije sportskog događaja*: plan vođenja, rukovođenja i kontrolisanja aktivnosti tokom sportske manifestacije, za sve sekvence koje propisuju zakon, pravilnici ili dobra upravljačka praksa; **11.** - *Izrada finansijskog plana* (plana prihoda i rashoda), direktnih i indirektnih prihoda i troškova, po kategorijama, tarife, cjenovnici i bonifikacije za razne kategorije učesnika, sportiste, publiku, sponzorski pul, medije, zakupce štandova... Strategije diferenciranja s obzirom na obim, vrijeme i način plaćanja; **12.** - *Plan nabavki*: opreme, rekvizita, opremanja prostora, ozvučenja, napajanja električnom energijom, informativnim materijalom, kancelarijskim materijalom, sredstvima za higijenu, medicinskim materijalom, porudžbine hrane i pića za osvježanje i koktele, propagandnog materijala, plan idejnog rješenja i realizacije plaketa, medalja i zahvalnica i sl.; **13.** - *Plan informisanja učesnika i javnosti*, putevi i načini plasmana informacija; **14.** - *Istraživanje stavova javnosti*, opremanje objekata na izabranoj lokaciji neophodnom opremom i rekvizitima, plan logistike, planiranje smještajnih kapaciteta i transfera ukoliko za to ima potrebe; **15.** - *Plan kontakta i načina komunikacije* sa svim prijavljenim učesnicima i zainteresiranim stranama (pripadnici organa unutrašnjih poslova, sponzori, mediji, dobavljači, javnost, akreditacije učesnika i novinara); **16.** - *Planski pokazatelj*: procjena efekata manifestacije; **17.** - *Imenovanje radnih tijela i komisija*, izrada kalendara aktivnosti i detaljne vremenske linije po pojedinim sekvencama aktivnosti, dijagram toka aktivnosti takmičarskog dijela, izrada dnevnog plana praćenja i metoda procjene realizacije aktivnosti; **18.** - *Plan izvršenja po vrsti aktivnosti*, broju, plan, broj i raspored volontera po komisijama, plan raspodjele resursa neophodnog za realizaciju aktivnosti, u skladu sa troškovnikom; **19.** - *Plan marketinga*, plan promocije, ekonomske propagande i drugih vidova promocije, plan podsticanja prodaje u koordinaciji sa sponzorima i zakupcima, plan aktivnosti za promotere i medije, izrada štampanih, audio i audio-vizuelnih materijala i saopštenja za javnost; **20.** - *Sastavljanje i potpisivanje ugovora* za sve vrste proizvoda, opreme, rekvizita, potrošnog materijala (snabdjevanje) i prethodno preciziranih i zahtjevanih usluga, prema troškovniku; **21.** - *Plan aktivnosti sponzora* uključenih u projekat, plan medijskih aktivnosti, poželjno u vidu posebnog mrežnog plana promotivnih aktivnosti sa detaljnim opisom elemenata promotivnog miksa (propaganda, podsticanje prodaje, promoteri, odnosi s javnošću), vrijeme trajanja aktivnosti po medijima, uz preciziran budžet, sadržaj, način i sredstvo komunikacije; **22.** - *Grafička, likovna, vizuelna (maskote, logo, plakati, katalozi), audio, audio-vizuelna rješenja*, lektura sadržaja, izrada prototipa i konačne verzije promotivnog materijala; **23.** - *Provjera kandidata za rad na projektu*, selekcija i imenovanje izvršioaca, sklapanje ugovora, njihova obuka i uključivanje u projekat; **24.** - *Provjera svih planova* (toka odvijanja sportskih aktivnosti, bezbjednosti, kretanja posetioca, sportista i VIP, medicinskih planova i načina djelovanja, svih vidova i dinamike kontrole sportista: mjerenje težine, medicinski pregledi, doping kontrola). Ocjena realizovanih aktivnosti od strane organizacionog tima, donošenje odluke o načinu koordinacije tokom održavanje događaja, ustano-

vljavanje sistema kompenzacije za izvršioce (način nagrađivanja i penali za kašnjenje, neažurnost ili primjedbe na rad pojedinih izvršioaca i slično); **25.** - *Izrada edukativnih materijala*, sertifikata, ID kartica, uniformi, dekora i dostavljanje učesnicima; **26.** - *Odštampanje promotivni materijal*, audio i audio-vizuelni, magnetni i dr. medijski zapisi dostavljeni sponzorima, medijskim kućama i javnosti prema medija planu u cilju emitovanja i isporuke u vidna polja potencijalnih posjetioca-publike i javnosti; **27.** - *Angažovanje personala* u skladu sa ugovorom o radu i drugim vidovima radnog angažovanja. Provjera plana aktivnosti čišćenja i održavanja prije, tokom i poslije završetka događaja. Angažovanje izvještača i voditelja kod ceremonijalnog dijela; **28.** - *Finalizacija projekta*, potvrđeni spiskovi učesnika i medijskih pokrovitelja, isporučen propagandni materijal, angažovan personal, provjera: realizacije ugovora, snadbjevanja opremom, rekvizitima i potrošnim materijalom, odobrenja nadležnih ustanova (organa unutrašnjeg reda, sportskih strukovnih asocijacija), slanje pozivnica gostima za učešće na ceremoniji otvaranja sportske manifestacije; **29.** - *Seminar za volontere*, provjera: tehnike, mjernih uređaja, ozvučenja, napajanja električnom energijom, koordinacije sa spoljašnjim izvršiocima (organi reda, medicinske ekipe, novinari, izveštači, kamermani, delegati, sudije, sponzori, volonteri). Inspekcija terena za igru i sastavljanje zapisnika o tome. Uvid u gotov materijal, medalje, plakete, nagrade, audio zapisi himne, sastavljanje protokola za ceremonije proglašenja: otvaranja manifestacije, pobjednika i čin zatvaranja manifestacije; **30.** - *Opremanje dijela predviđenog za ceremonije* dekorom i dr. neophodnim sredstvima (cvijeće, specijalni efekti i sl.). Proba svečanog otvaranja, dodjele medalja i zatvaranja. Organizovanje koktela za sve, veče prije početka manifestacije kako bi se pružila mogućnost sponzorima da ukažu gostoprimstvo, podstaklo pisanje medija u prisustvu sportista i zainteresovali potencijalni posjetioci. Plan registracije učesnika i rasporeda takmičenja. Svečano otvaranje ceremonijalnog karaktera sa pratećim oficijelnim sportskim, zabavnim i komercijalnim programima.

way, the schedule of activities according to the type of job, is displayed within a single timeline, as shown in Table 1.

Analysis of time (start and completion) required for the implementation of activities and projects

On the basis of the activities described in Table 1, one can construct a flow chart of activities, in accordance with the time line (Figure 1).

When the analysis of the structure is complete, the author of the project approaches the analysis of time or the end of one or more activities, or the entire project. The initial event is a condition in which an activity can begin, and the final event - the state of its completion. The initial and final event of the project, which reflect their beginning and end, are special cases, whereby the initial event has no preceding, and the final event, succeeding activities.

The analysis of time (relative to structure) varies according to the chosen model of network planning. When converting it to a mathematical model, differences between this and the PERT model can be observed. Within the CPM model, a deterministic and within PERT, a stochastic model occurs, which introduces uncertainty into the assessment of time for each individual activity. Within our literature, a sporting project which utilizes the PERT model can be found (Dugalić 2007), through which the cost of managing sporting events and implementing changes (shortening or extension) and simultaneously resources (savings or exceeding of the budget) can be monitored. The duration of activities is, within both models, utilized to calculate additional values through the analysis time. The number of the given time de-

se raspored aktivnosti po grupisanim poslovima prikazuje u okviru jedinstvene vremenske linije, kako je to prikazano u Tabeli 1.

Analiza vremena (početaka i završetaka) potrebnog za realizaciju aktivnosti projekata

Na bazi aktivnosti opisanih u tabeli broj 1, može se konstruisati dijagram toka aktivnosti, u skladu sa vremenskom linijom (Slika 1).

Kada se izvrši analiza strukture, autor projekta pristupa analizi vremena ili završetka jedne ili više aktivnosti ili cijelog projekta. Početni događaj je stanje u kojem neka aktivnost može otpočeti, a završni događaj – stanje njenog završetka. Početni i završni događaj projekta koji odražavaju njegov početak i završetak su posebni slučajevi, pri čemu početni događaj nema prethodnih, a završni događaj slijedećih aktivnosti.

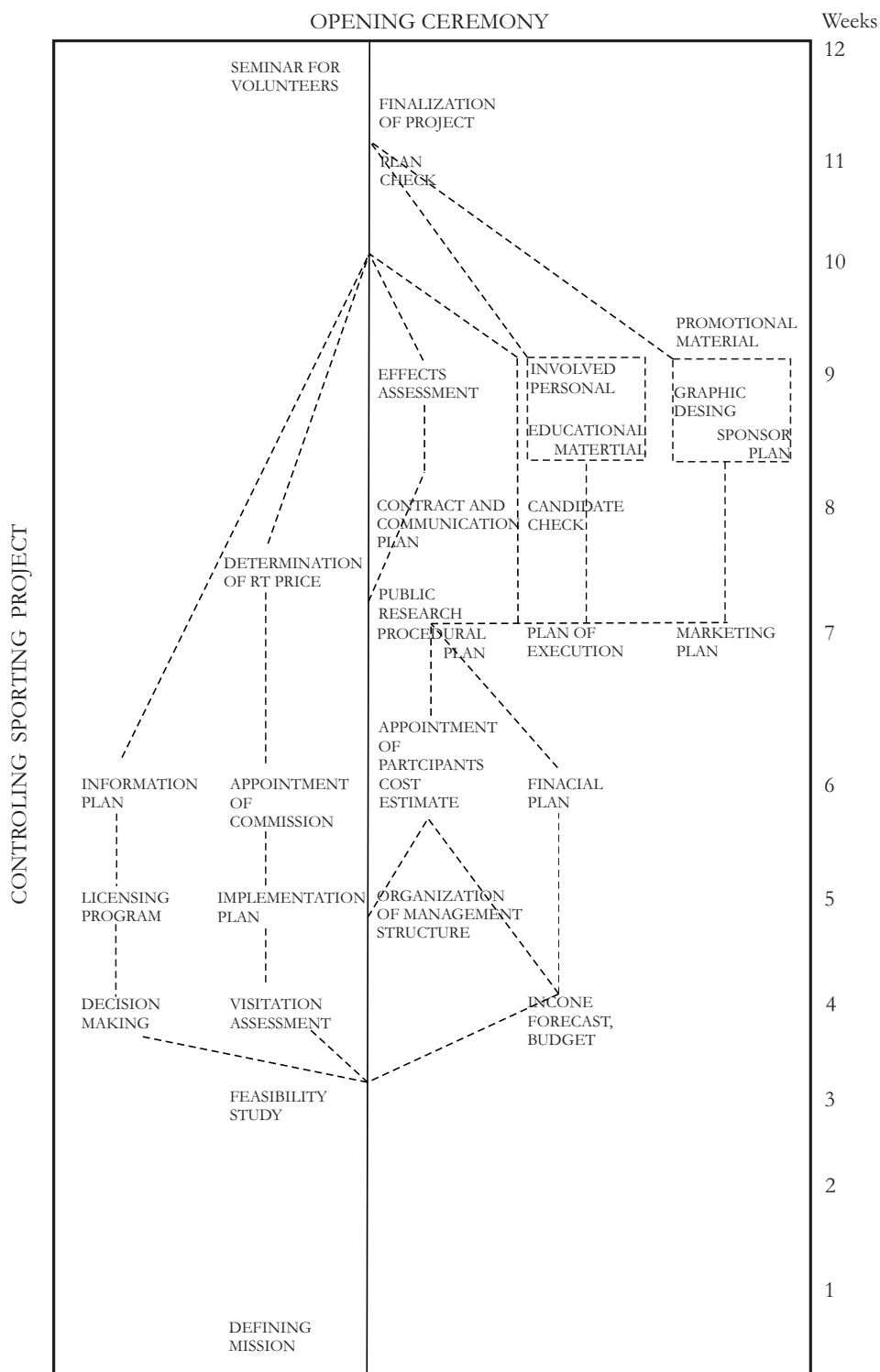
Analiza vremena (u odnosu na strukturu) se razlikuje prema izabranom modelu mrežnog planiranja. Kod transformacije modela u matematički, uočavaju se razlike između ovog i PERT modela. Kod CPM modela se javlja deterministički, a kod PERT – stohastički model, koji uvodi u račun nesigurnost vremenske procjene trajanja pojedinih aktivnosti. U domaćoj literaturi se može naći primjer upravljanja sportskim projektom primjenom PERT modela (Dugalić 2007), pomoću kojeg se mogu pratiti troškovi upravljanja sportskim događajem i provoditi izmjene (skraćenje ili produženje) uz istovremeno pridruženje resursa (uštede ili probijanje budžeta). Vremena trajanja aktivnosti kod oba modela služe za izračunavanje

FIGURE 1

Flowchart of activities within the sports project, sketches the network plan.

SLIKA 1

Dijagram toka aktivnosti sportskog projekta, skica mrežnog plana.



Legend/Legenda: Activities - Opening ceremony - Ceremonija svečanog otvaranja; Controlling sporting project - Upravljanje sportskim projektom; Weeks - Nedelje; Seminar for volunteers - Seminar za volontere; Finalization of project - Finalizacija projekta; Plan check - Provjera plana; Promotional material - Propagandni materijal; Effects assessment - Procjena efekata; Involved personal - Angažovan personal; Graphic design

- Grafička rješenja; Educational material - Edukativni materijal; Sponsor plan - Plan sponsorstva; Contact and communication plan - Plan kontakata i komuniciranja; Candidate check - Provjera kandidata; Contacts - Ugovoranje; Detremintation of RT price - Određivanje MP cijena; Public research - Istraživanje javnosti; Procedural plan - Plan nabavki; Plan of execution - Plan izvršenja; Marketing plan - Marketing plan; Appoitment of participants - Imenovanje učesnika; Information plan - Plan informisanja; Appointment of commission - Imenovabnje komisija; Cost estimate - Troškovnik; Financial plan - Finansijski plan; Licensing program - Program licenciranja; Implementation plan - Plan realizacije; Organization of mamangement structure - Organizacija strukture menadžmenta; Decision making - Donošenje odluka; Visitation assessment - Procjena posjećenosti; Income forcast, budget - Prognoza prihoda, budžet; Feasibility study - Izrada studije izvodljivosti; Deffinig mission - Definisane misije.

termines the choice between a CPM and PERT model, for PERT respects the most probable times (like the difference between optimistic and pessimistic time). The analysis of time within the CPM model (which is shown in this paper) is comprised of: determining the duration of activities, the progressive and retrograde calculation of the time of implementing the project, and finding a critical path as well as time reserves.

The progressive calculation of time is based on the earliest completed event of the project. The following is calculated:

- The earliest start to any activity (t_i^0) which is equivalent to the earliest time at which the event has been achieved, and
- The earliest completed activities (i-j) are recorded as t_{ij} , and equivalent to the earliest time in which the event is achieved, and is obtained by adding the duration of the activity, and then activity with time t_i^0 .

When the earliest completed set of activities which have n as their final event are set (the earliest completion of the project t_n^0), the calculation of the latest beginning and the latest ending of any activity (i-j) is enabled, and these values are entered into the network diagram. This is a retrograde calculation of time, and proceeds from the final event of a project and moves towards the initial event. In doing so, there is value in ensuring that the earliest time in which the project's completed event occurs is the shortest possible time required for its implementation, and the earliest occurrence of the completed event, at the same time of and no later than the occurrence of the event.

The progressive and retrograde computation of time provides values which are utilized to calculate the critical path and time reserves. A critical path is a series of interconnected activities within a sports project which extend between the beginning of and completion of an event as found in network diagrams, and combined, have the longest duration of time. All events which lie on the critical path have equal values of time between the earliest and latest time of occurrence, with the value of reserves respectively being

ostalih vrijednosti u analizi vremena. Broj zadatih vremena opredeljuje izbor između CPM ili PERT modela jer PERT uvažava i najvjerovatnije vrijeme (kao razliku između pesimističkog i optimističkog vremena). Analiza vremena kod CPM modela (koji je prikazan u radu) se sastoji u: određivanju vremena trajanja aktivnosti, progresivnog i retrogradnog izračunavanja vremena realizacije projekta i pronalaženja kritičnog puta kao i vremenskih rezervi.

Progresivno izračunavanje vremena polazi od najranijeg završnog događaja projekta. Računa se:

- Najraniji početak svake aktivnosti (t_i^0) i jednak je najranijem vremenu u kojem je postignut događaj, i
- Najraniji završetak aktivnosti (i-j), označava se kao t_{ij} i jednak je najranijem vremenu u kojem je postignut događaj j, a dobije se zbrajanjem vremena trajanja te aktivnosti s vremenom t_i^0 .

Kada je određen najraniji završetak aktivnosti koje imaju n kao završni događaj (najraniji završetak projekta t_n^0), pristupa se izračunavanju najkasnijih početaka i najkasnijih završetaka bilo koje aktivnosti (i-j), i te se vrijednosti unose u mrežni dijagram. Ovo je retrogradno računanje vremena, a polazi od završnog događaja i kreće se ka početnom događaju. Pri tome vrijedi da je: najranije vrijeme nastupanja završnog događaja projekta ujedno i najkraće vrijeme potrebno za njegovu realizaciju, a najranije vrijeme nastupanja završnog događaja projekta ujedno i najkasnije vrijeme nastupanja tog događaja.

Progresivno i retrogradno računanje vremena daje vrijednosti koje služe za izračunavanje kritičnog puta i vremenskih rezervi. Kritični put su niz aktivnosti u sportskom projektu, međusobno povezanih, koje se protežu između početnog i završnog događaja mrežnog dijagrama, a imaju zbirno najduže vrijeme trajanja. Svi događaji koji leže na kritičnom putu imaju jednako najranije i najkasnije vrijeme nastupanja, odnosno vrijednost vremenskih rezervi nula (0). Ove ak-

TABLE 2*Duration, time reserves and the calculation of critical times.***TABELA 2***Vremensko trajanje, vremenske rezerve i izračunavanje kritičkog puta.*

Events		Duration	Earliest		Latest		Time reserves		
Starting	Closing		Start	Finish	Start	Finish	Total	Available	Independent
1	2	3	4	5	6	7	8	9	
i-j	t _{ij}	t _i ⁰	t _i ⁰	t _i ¹	t _i ¹	s _{ii} ^t	s _{ii} ^s	s _{ii} ⁿ	
1-2	30	0	30	0	30	0	0	0	K
2-8	7	30	37	30	48	11	0	0	
2-3	5	30	35	30	60	25	0	0	
2-4	3	30	33	30	68	35	0	0	
2-5	10'	30	40	30	40	0	0	0	K
5-6	4	40	44	40	44	0	0	0	K
5-7	7	40	47	40	52	5	(-3),0	(-3),0	
8-11	5	37	48	48	53	11	6	(-5),0	
3-9	3	35	38	60	63	25	0	(-25),0	
4-10	3	33	36	68	71	35	0	(-35),0	
7-11	1	47	48	52	53	8	8	(-5),0	
11-12	2	48	50	53	60	10	0	1	
9-13	5	38	43	55	68	25	0	(-17),0	
6-14	15	44	59	44	59	0	0	0	K
14-15	7	59	66	59	74	8	0	0	
16-24	15	59	74	59	74	0	0	0	K
17-24	3	36	74	71	74	35	35	0	
11-18	2	48	50	53	67	17	0	1	
11-19	5	48	53	53	58	5	0	(-5),0	
13-20	14	43	57	60	82	25	0	(-17),0	
21-26	5	53	63	63	68	10	5	(-5),0	
22-26	10	53	63	58	68	5	0	(-5),0	
23-27	10	50	60	67	77	17	0	(-17),0	
12-24	14	50	74	60	74	10	10	0	
18-25	7	50	57	67	77	20	0	(-17),0	
26-28	14	63	82	68	82	5	5	0	
27-28	5	60	82	77	82	17	17	0	
24-28	8	74	82	74	82	0	0	0	K
28-29	7	82	90	82	90	1	0	0	
28-30	8	82	90	82	90	0	0	0	K

Legend/Legenda: Events - Događaj; Starting - Početni; Closing - Završni; Duration - Trajanje; Earliest - Najraniji; Start - Početak; Finish - Završetak; Latest - Najkasniji; Time reserves - Vremenske rezerve; Total - Ukupne; Available - Slobodne; Independent - Nezavisne; **K** - Critical path (Kritični put).

zero (0). These activities, situated on the critical path are, within a network diagram, underlined by double lines, and the completion of these activities are also dependent on the completion of the sporting event's plan.

By completing the table for the network diagram, all the relevant sizes are found. The following data is for calculating the earliest completion of certain activities towards progressive procedures (Dobrenić, 1987):

$$t_j^{(0)} = t_i^{(0)} + t_{ij} \quad (1)$$

If the event has multiple paths, the earliest start to any activity which has j as the starting event, is calculated by:

$$t_j^0 = \max_i \{t_i^0 + t_{ij}\}; \quad t_i^0 = 0 \quad (2)$$

When the project cannot be completed within the planned time, it is necessary to make corrections to the network diagram by shortening the duration of activities through management processes, on the critical paths until the following is achieved:

$$t_n^0 = T_p = t_n^1 \quad (3)$$

where t_n^1 signifies the latest completion of the project.

The latest beginning of all activities i - j is calculated by subtracting the duration of the activity from the latest completion of activities by:

$$t_i^1 = t_j^1 - t_{ij} \quad (4)$$

Where more activities arise from the initial event i , the latest time taken to achieve that event is calculated by:

$$t_i^1 = \min_j \{t_j^1 + t_{ij}\}; \quad t_n^1 = t_n^0 \quad (5)$$

If for some activity (i - j) is $t_j^1 - t_i^0 - t_{ij} = 0$, then this activity is referred to as a critical activity. For those activities in which the duration of activities is greater than the standard duration of the activity, i.e. greater than 0, there emerges a reserve time.

In such a case, the calculation of time reserves is undertaken so as to uncover those sub critical paths which have very low time reserves and can easily become critical. Non-critical activities contain a certain reserve time (total, free, independent) relative to the observed activity and those activities which immediately precede or follow on from the observed activities (Table 2).

$$\begin{array}{ll} t_1^{(0)} = 0, \text{ followed by: } t_2^0 & t_{18}^0 = 48 + 2 = 50 \\ = 0 + 30 = 30 & t_{19}^0 = 48 + 5 = 53 \\ t_4^0 = 30 + 3 = 33 & t_{20}^0 = 43 + 14 = 57 \\ t_3^0 = 30 + 5 = 35 & t_{21}^0 = 53 + 0 = 53 \\ t_5^0 = 30 + 10 = 40 & t_{22}^0 = 53 + 0 = 53 \\ t_8^0 = 30 + 7 = 37 & t_{23}^0 = 50 + 0 = 50 \\ t_6^0 = 40 + 4 = 44 & t_{24}^0 = \max_i 50 + 14 = 64 = 74 \end{array}$$

ktivnosti na kritičnom putu su na mrežnom dijagramu podvučene dvostrukim linijama, a o završetku tih aktivnosti ovisi i završetak plana sportske manifestacije.

Popunjavanjem tabele za mrežni dijagram navode se sve relevantne veličine. Slijede podaci za izračunavanje najranijih završetaka pojedinih aktivnosti progresivnim postupkom prema (Dobrenić, 1987):

$$t_j^{(0)} = t_i^{(0)} + t_{ij} \quad (1)$$

Ukoliko u događaj i ulazi više puteva, najraniji početak bilo koje aktivnosti koja ima j kao početni događaj, računa se prema:

$$t_j^0 = \max_i \{t_i^0 + t_{ij}\}; \quad t_i^0 = 0 \quad (2)$$

Kada se projekat ne može završiti u planiranom roku, potrebno je izvršiti korekcije u mrežnom dijagramu skraćanjem roka trajanja aktivnosti upravljačkim procesom, na kritičnim putevima dok se ne postigne:

$$t_n^0 = T_p = t_n^1 \quad (3)$$

gde t_n^1 označava najkasniji završetak projekta.

Najkasniji početak svih aktivnosti i - j izračunava se oduzimanjem vremena trajanja aktivnosti od najkasnijeg završetka aktivnosti prema:

$$t_i^1 = t_j^1 - t_{ij} \quad (4)$$

Ukoliko iz početnog događaja i izlazi više aktivnosti, najkasnije vrijeme postizanja tog događaja računa se prema:

$$t_i^1 = \min_j \{t_j^1 + t_{ij}\}; \quad t_n^1 = t_n^0 \quad (5)$$

Ukoliko je za neku aktivnost (i - j), $t_j^1 - t_i^0 - t_{ij} = 0$, tada se ta aktivnost naziva kritična aktivnost. Kod aktivnosti kod kojih je vrijeme trajanja aktivnosti veće od normiranog vremena trajanja aktivnosti, tj. veća od 0, postoji izvjesna vremenska rezerva.

Tada se pristupa izračunavanju vremenskih rezervi kako bi se otkrili subkritični putevi koji imaju vrlo malu vremensku rezervu i mogu lako postati kritični. Nekritične aktivnosti raspolažu sa izvjesnom rezervom vremena (ukupnom, slobodnom, nezavisnom) u odnosu na posmatranu aktivnost prema aktivnostima koje joj neposredno prethode ili slijede iza posmatrane aktivnosti (Tabela 2).

$$\begin{array}{ll} t_1^{(0)} = 0, \text{ a slijedi: } t_2^0 & t_{18}^0 = 48 + 2 = 50 \\ = 0 + 30 = 30 & t_{19}^0 = 48 + 5 = 53 \\ t_4^0 = 30 + 3 = 33 & t_{20}^0 = 43 + 14 = 57 \\ t_3^0 = 30 + 5 = 35 & t_{21}^0 = 53 + 0 = 53 \\ t_5^0 = 30 + 10 = 40 & t_{22}^0 = 53 + 0 = 53 \\ t_8^0 = 30 + 7 = 37 & t_{23}^0 = 50 + 0 = 50 \\ t_6^0 = 40 + 4 = 44 & t_{24}^0 = \max_i 50 + 14 = 64 = 74 \end{array}$$

$t_7^0 = 40 + 7 = 47$	$66 + 0 = 66$	$t_7^0 = 40 + 7 = 47$	$66 + 0 = 66$
$t_{11}^0 = 37 + 5 = 42 = 48\max_i$	$59 + 15 = 74$	$t_{11}^0 = 37 + 5 = 42 = 48\max_i$	$59 + 15 = 74$
$47 + 1 = 48$	$t_{25}^0 = 50 + 7 = 57$	$47 + 1 = 48$	$t_{25}^0 = 50 + 7 = 57$
$t_9^0 = 35 + 3 = 38$	$t_{26}^0 = \max_i 53 + 5 = 58 = 63$	$t_9^0 = 35 + 3 = 38$	$t_{26}^0 = \max_i 53 + 5 = 58 = 63$
$t_{10}^0 = 33 + 3 = 36$	$53 + 10 = 63$	$t_{10}^0 = 33 + 3 = 36$	$53 + 10 = 63$
$t_{12}^0 = 48 + 2 = 50$	$t_{27}^0 = \max_i 57 + 0 = 57 = 60$	$t_{12}^0 = 48 + 2 = 50$	$t_{27}^0 = \max_i 57 + 0 = 57 = 60$
$t_{13}^0 = 38 + 5 = 43$	$50 + 10 = 60$	$t_{13}^0 = 38 + 5 = 43$	$50 + 10 = 60$
$t_0^{14} = 44 + 15 = 59$	$60 + 5 = 65$	$t_0^{14} = 44 + 15 = 59$	$60 + 5 = 65$
$t_{15}^0 = \max_i 59 + 7 = 66$	$t_{28}^0 = \max_i 63 + 14 = 77 = 82$	$t_{15}^0 = \max_i 59 + 7 = 66$	$t_{28}^0 = \max_i 63 + 14 = 77 = 82$
$36 + 3 = 39$	$74 + 8 = 82$	$36 + 3 = 39$	$74 + 8 = 82$
$57 + 0 = 57$	$t_{29}^0 = 82 + 7 = 89$	$57 + 0 = 57$	$t_{29}^0 = 82 + 7 = 89$
$t_{16}^0 = 59 + 0 = 59$	$t_{30}^0 = \max_i 89 + 0 = 89 = 90$	$t_{16}^0 = 59 + 0 = 59$	$t_{30}^0 = \max_i 89 + 0 = 89 = 90$
$t_{17}^0 = 36 + 0 = 36$	$82 + 8 = 90$	$t_{17}^0 = 36 + 0 = 36$	$82 + 8 = 90$

Activities on the critical path are placed over events which have the same earliest and latest times: 1, 2, 5, 6, 14, 16, 24, 28 and 30. Within the network diagram, the calculated values are entered into the left position of the corresponding events, and based on the assumption that the earliest completion time of the project is $t_{n1}^0 = t_{30}^0 = 90$ days, and similarly, the latest completion time, i.e. $t_n^1 = t_{30}^1 = 90$ days. This is located within columns 3 and 4 of the Table 2, in which additional formulas are utilized if the event j has more activities.

$t_{22}^1 = 90 - 8 = 82$	$t_9^1 = 59 - 15 = 44$	$t_{22}^1 = 90 - 8 = 82$	$t_9^1 = 59 - 15 = 44$
$t_{21}^1 = 82 - 8 = 74$	$t_8^1 = 60 - 5 = 55$	$t_{21}^1 = 82 - 8 = 74$	$t_8^1 = 60 - 5 = 55$
$t_{20}^1 = 82 - 5 = 77$	$t_7^1 = \min_j 60 - 2 = 58$	$t_{20}^1 = 82 - 5 = 77$	$t_7^1 = \min_j 60 - 2 = 58$
$t_{19}^1 = 82 - 14 = 68$	$67 - 2 = 65 = 53$	$t_{19}^1 = 82 - 14 = 68$	$67 - 2 = 65 = 53$
$t_{18}^1 = 77 - 10 = 67$	$58 - 5 = 53$	$t_{18}^1 = 77 - 10 = 67$	$58 - 5 = 53$
$t_{17}^1 = 74 - 14 = 60$	$t_6^1 = 53 - 1 = 52$	$t_{17}^1 = 74 - 14 = 60$	$t_6^1 = 53 - 1 = 52$
$t_{16}^1 = \min_j 77 - 7 = 67$	$t_5^1 = 71 - 3 = 68$	$t_{16}^1 = \min_j 77 - 7 = 67$	$t_5^1 = 71 - 3 = 68$
$67 - 0$	$t_4^1 = 55 - 3 = 52$	$67 - 0$	$t_4^1 = 55 - 3 = 52$
$t_{15}^1 = 68 - 10 = 58$	$t_3^1 = 53 - 5 = 48$	$t_{15}^1 = 68 - 10 = 58$	$t_3^1 = 53 - 5 = 48$
$t_{14}^1 = 68 - 15 = 63$	$t_2^1 = \min_j 44 - 4 = 40$	$t_{14}^1 = 68 - 15 = 63$	$t_2^1 = \min_j 44 - 4 = 40$
$t_{13}^1 = 60 = 74 - 10$	$52 - 7 = 45$	$t_{13}^1 = 60 = 74 - 10$	$52 - 7 = 45$
$t_{12}^1 = 74 - 3 = 71$	$t_1^1 = \min_j 52 - 5 = 47$	$t_{12}^1 = 74 - 3 = 71$	$t_1^1 = \min_j 52 - 5 = 47$
$t_{11}^1 = 74 - 15 = 59$	$68 - 3 = 65 = 30$	$t_{11}^1 = 74 - 15 = 59$	$68 - 3 = 65 = 30$
$t_{10}^1 = \min_j 74 - 7 = 67 = 59$	$40 - 10 = 30$	$t_{10}^1 = \min_j 74 - 7 = 67 = 59$	$40 - 10 = 30$
$59 - 0$	$48 - 7 = 41$	$59 - 0$	$48 - 7 = 41$
	$t_0^1 = 30 - 30 = 0$		$t_0^1 = 30 - 30 = 0$

Through the retrograde procedure, the latest start to certain activities can now be calculated by $t_j^1 = t_i^1 - t_{ij}$, (6), and these values are entered in the 5th and 6th columns of Table 2:

The calculation of time reserves is undertaken in order to uncover sub critical paths, which have very little time reserves and can easily become critical. The calculated time reserves which have a negative signi-

Aktivnosti na kritičnom putu idu preko događaja koji imaju jednaka najranija i najkasnija vremena: 1, 2, 5, 6, 14, 16, 24, 28 i 30. Izračunate vrijednosti se unose u lijevu poziciju odgovarajućeg događaja u mrežnom dijagramu, a polazi se od pretpostavke da je najranije vrijeme završetka projekta $t_{n1}^0 = t_{30}^0 = 90$ dana, ujedno i najkasnije vrijeme završetka projekta tj. $t_n^1 = t_{30}^1 = 90$ dana. To su 3. i 4. kolona iz Tabele 2, pri čemu se koriste dodatne formule ako u događaj j ulazi više aktivnosti.

Retrogradnim postupkom sada se izračunaju najkasniji počeci pojedinih aktivnosti prema $t_j^1 = t_i^1 - t_{ij}$, (6), i te se vrijednosti unose u 5. i 6. kolonu Tabele 2:

Izračunavanju vremenskih rezervi pristupa se kako bi se otkrili subkritički putevi, koji imaju vrlo malu vremensku rezervu i mogu lako da postanu kritični. Izračunate vremenske rezerve koje imaju negativan

fication of time are exclusively applied to independent time reserves and have a value of 0, as:

$$s_{ij}^n = \max\{0, t_j^0 - t_i^0 - t_{ij}\} \quad (7)$$

Activities which are not on the critical path contain the reserved time relative to those activities which immediately precede or follow behind the observed activity. There exist: total, free and independent reserves of time. Within the table, the value of time reserves is calculated by subtracting the value of individual columns.

The total reserve time (column 7 in Table 2), is given by:

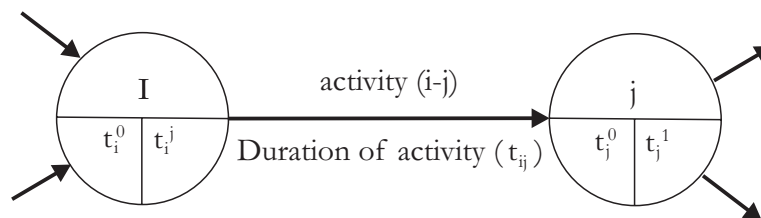
$$s_{ij}^t = t_j^1 - t_i^0 - t_{ij} \quad (8)$$

FIGURE 2

The insertion of time values to events within the network diagram.

SLIKA 2

Unošenje vremenskih vrednosti u događaje mrežnog dijagrama.



for each activity, e.g. 2-8 amounts to 11 days and represents the difference between the maximum time both allowed and made available to perform the activities, and the time of its duration. This means that the duration of these activities can be moved 11 days from the earliest start, so long as the project's completion date is not compromised. If this time reserve is loaded in full, the earliest and latest completion coincide, and from this position, a new critical path may emerge as the following activities' time reserves are likewise exhausted.

Free time reserves emerge in situations where in the event of j, two or more activities are entered, and which play an important role in shortening or reshaping the network diagram. This is calculated by:

$$s_{ij}^s = t_j^0 - t_i^0 - t_{ij} \quad (9)$$

For activities 17-24, it amounts to 35 days, meaning that the duration of that activity may be extended or moved by this amount, whilst still maintaining the earliest starts for the following activities.

Independent reserve times exist within activities 11-12 and 11-18 for periods of 1, meaning that the duration of these activities may be extended by this amount, the duration of which corresponds to moving the deadline of the earliest commencement of the activity. Within the network diagram, this shift

vremenski predznak, odnose se isključivo na nezavisnu vremensku rezervu i imaju vrednost 0 jer važi:

$$s_{ij}^n = \max\{0, t_j^0 - t_i^0 - t_{ij}\} \quad (7)$$

Aktivnosti koje nisu na kritičnom putu, raspoložu s rezervom vremena u relaciji prema aktivnostima koje neposredno prethode ili slijede iza posmatrane aktivnosti. Postoje: ukupna, slobodna i nezavisna vremenska rezerva. Vrijednost vremenskih rezervi se u tabeli računa oduzimanjem vrijednosti pojedinih kolona.

Ukupna vremenska rezerva (kolona 7 u Tabeli 2), računa se prema:

$$s_{ij}^t = t_j^1 - t_i^0 - t_{ij} \quad (8)$$

za svaku aktivnost, npr. za 2-8 iznosi 11 dana i predstavlja razliku između maksimalno dozvoljenog vremena koje stoji na raspolaganju za izvođenje aktivnosti i vremena njenog trajanja. To znači da se vrijeme trajanja ove aktivnosti može pomaknuti za 11 dana od njenog najranijeg početka, a da pri tome rok završetka projekta ne bude ugrožen. Ako se ova vremenska rezerva optereti u cjelosti, poklapaju se najraniji i najkasniji završetak pa od ovog mjesta može nastati novi kritički put, jer su sve vremenske rezerve sledećih aktivnosti takođe iscrpljene.

Slobodna vremenska rezerva nastaje u slučaju kada u događaj j ulaze dvije ili više aktivnosti, a igra važnu ulogu kod skraćivanja ili preoblikovanja mrežnog dijagrama. Računa se prema:

$$s_{ij}^s = t_j^0 - t_i^0 - t_{ij} \quad (9)$$

Kod aktivnosti 17-24 ona iznosi čak 35 dana, a to znači da se za toliko može produžiti ili pomaknuti trajanje ove aktivnosti, a da se i dalje zadrže najraniji počeci kod narednih aktivnosti.

Nezavisna vremenska rezerva postoji kod aktivnosti 11-12 i 11-18 u trajanju od 1 dana i znači da se za toliko može produžiti vrijeme trajanja te aktivnosti, odnosno pomaknuti rok najranijeg početka aktivnosti. Ovo pomjeranje neće uticati na vremenske relacije drugih aktivnosti u mrežnom dijagramu ako

will not affect the time relations of other activities if the shift is carried out within a day.

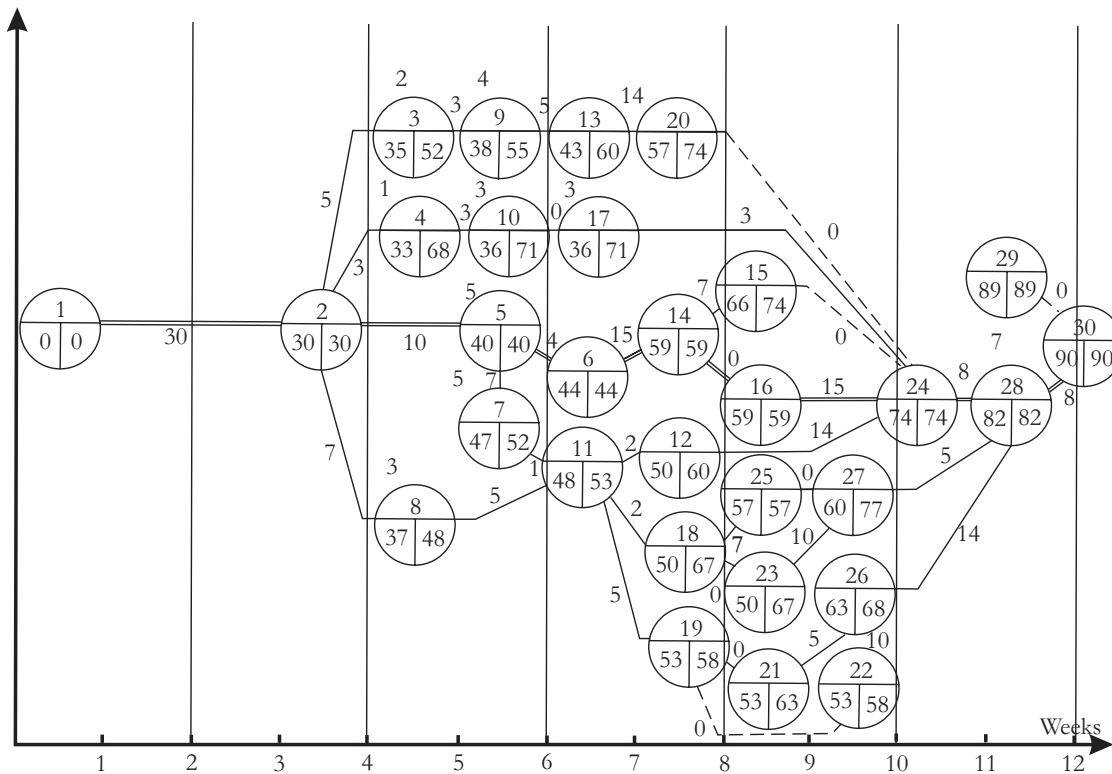
The probationary time reserve in not, in this example, calculated (it refers to the events of the network, as opposed to other time reserves which are related to activities). If carried out, the calculation is conducted through the formula:

FIGURE 3

The network plan of the management of sporting projects.

SLIKA 3

Mrežni plan upravljanja projektima u sportu.



Legend/Legenda: **Solid line (Puna linija)** - Course of ordinary activities (Tok redovnih aktivnosti); **Dotted line (Isprekidana linija)** - Relationship between the activities that have zero or negative independent reserve (Veza između aktivnosti koje imaju nultu ili negativnu nezavisnu rezervu); **Double line (Dupla linija)** - Trajectory of activities lying on the critical path (Putanja aktivnosti koje leže na kritičnom putu).

$$s_j^u = t_j^1 - t_j^0 \quad (10)$$

It defines the criticality of events and serves as a measure of the sub criticality of events.

The position of time values within network diagrams are displayed as follows in Figure 2.

The appearance of the final network plan within sport project management is shown in Figure 3.

CONCLUSION

If implemented to sport, the network planning

se izvrši pomak od samo jednog dana.

Uslovna vremenska rezerva u ovom primjeru nije izračunavana (odnosi se na događaje mreže za razliku od ostalih vremenskih rezervi koje se odnose na aktivnosti). Ukoliko se vrši, obračun radi se po formuli:

$$s_j^u = t_j^1 - t_j^0 \quad (10)$$

Ona definiše kritičnost događaja i služi kao mjera subkritičnosti događaja.

Pozicija vremenskih vrednosti u mrežnom dijagramu su prikazane kao na Slici 2.

Izgled konačnog mrežnog plana upravljanja projektom u sportu prikazan je u Slici 3.

ZAKLJUČAK

Model mrežnog planiranja u sportu, ukoliko se

model could significantly contribute to the resolution of organizational problems specific to planning complex sporting and special events. When one intends to compete for the championship, it is imperative that they go through certain procedures with a number of requirements relative to the rules set by sporting associations, and the purpose of expense and management requirements, so that candidacy within sporting events may be realized in a manner through which the organizer is able to achieve positive economic and other effects.

This paper presents some quantitative theory (the models of network planning) by presenting a practical explanation of the models through a practice-based example which seeks to affirm their use in sport. The paper likewise aims to encourage and motivate the development of software through which the use of these models within sport is augmented, and therefore demands from management teams who organize these sporting projects, that its techniques and methods are promoted in accordance with the needs and anticipated levels of technological and informational developments.

REFERENCES

- Aaron, S., & Stewart B. (1992). *Sports management*. Melbourne, AU: Allen & Unwin Pty Ltd. PMCid: PMC1737143
- Appenzeller, H. L. (2000). *Successful sport management*. 2nd ed. Durham, NC: Carolina Academic Press.
- Bloem, M., & Vermei, A. (2005). The olympic road to performance improvement. *Performance Improvement*, 44(6), 7–13. doi: 10.1002/pfi.4140440604
- Chadwick, J. S. (2010). *Sportski menadžment* [The business of sport management]. Zagreb, HR: Mate.
- Dobrenić, S. (1987). *Operativno istraživanje* [Operational research]. Varaždin, HR: Fakultet organizacije i informatike.
- Dugalić, S. (1995). Lansiranje novog proizvodnog asortimana [The launch of the new product assortment]. *Plasman i tržište*, 2, 21–31.
- Dugalić, S. (2005). *Finansijski i marketinški aspekti strategija u sportu* [Financial and marketing aspects of the strategy in sport]. Belgrade, RS: Viša škola za sportske trenere.
- Dugalić, S. (2007). *Menadžment sportskih objekata* [Management of sports facilities]. Belgrade, RS: Visoka škola za sport.
- Đuričin, D., & Lončar, D. (2012). *Menadžment pomoću projekata* [Management by projects]. Belgrade, RS: Centar za izdavačku delatnost Ekonomskog fakulteta u Beogradu.
- Farmer J. P., Mulrooney L. A., & Amon R. Jr. (1996). *Sport facility planning and management*. Morgantown, WV: Fitness Information Technology, Inc.
- Harvard Business School Press. (2006). *Menadžment projekta* [Project management]. Belgrade, RS: Data status.
- Kelley, J. (1961). Critical path planning and scheduling: Mathematical basis. *Operations Research*, 9(3), 1091–1105. doi: 10.1287/opre.9.3.296
- Kelley, J., & Morgan, W. (1959). Critical-Path Planning and Scheduling. *Proceedings of Eastern Joint Computer Conference* (pp. 160–173). Boston, MA, December 1959.
- Ljubojević, Č. (2001). *Menadžment i marketing u sportu* [Management and marketing in sport]. Belgrade, RS: Želnid,
- Pelević B. (2011). *Menadžment sportskih takmičenja* [Management of sports events]. Belgrade, RS: Visoka sportska i zdravstvena škola.
- Pitts B. G., & Stotlar, D. (1996). *Fundamentals of sport marketing*. Morgantown, WV: Fitness Information Technology, Inc.
- Raić, A. (2006). Sportski menadžment kao profesija i kao nauka [Sports management as a profession and as a science]. In Đ. Nićin (Ed.), 2nd International conference "Management in sport" (pp. 17–24). Belgrade, RS: Fakultet za menadžment u sportu Univerziteta "Braća Karić".

- Raič, A., & Maksimović, N. (2000). *Sportski menadžment* [Sports management]. Novi Sad, RS: Fakultet fizičke kulture.
- Roel, G. (2011). *Project management*. Groningen, NL: Noordhoff Uitgevers B.V
- Van Der Wagen, L., & Carlos, B. R. (2009). *Upravljanje događanjima* [Event management]. Beograd, RS: Mate d.o.o.
- Vasiljević, D. (2013). Material requirements planning in manufacturing of sport industry equipment. In D. Životić and V. Šiljak (Eds.), *Proceedings of 8th International conference "Management in sport"* (pp. 324–330). Belgrade, RS: Fakultet za menadžment u sportu Alfa univerziteta.
- Weiss, H. J., & Gershon, M. E. (1989). *Production and operations management*. Boston, MA: Allyn and Bacon

Received: April 19, 2013

Revision received: September 29, 2013

Accepted: October 17, 2013

Primljeno: 19. aprila 2013. godine

Izmjene primljene: 29. septembra 2013. godine

Odobreno: 17. oktobra 2013. godine

Correspondence to:

Sretenka Dugalić, PhD

Visoka sportska i zdravstvena škola

Toše Jovanovića 11

11000 Belgarde

Serbia

Phone: 00381 11 23 80 537

E-mail: sretenkadugalic@yahoo.com

Korespondencija:

Dr Sretenka Dugalić

Visoka sportska i zdravstvena škola

Toše Jovanovića 11

11000 Beograd

Srbija

Telefon: 00381 11 23 80 537

E-mail: sretenkadugalic@yahoo.com

MANAGEMENT-AKTIVITÄTEN MIT DER NETZPLANTECHNIK IN DER PHASE BIS ZU DER ÖFFNUNG DES SPORTEREIGNISSES

Sretenka Dugalić¹

¹College of Sport und Gesundheit, Belgrad, Serbien

Die Methode der Netzplanung mit Hilfe des kritischen Weges wurde von Morgan R. Walker, und E. Kelley, Jr, im Jahr 1950 entwickelt. Seitdem wird sie versucht auf die Verwaltung des Sports, wo die Ressourcen sehr begrenzt sind, und die Anforderungen für Sport und Wirtschaft, zu hohen Erwartungen ausgesetzt sind, anzuwenden.

Wachsendes Interesse an der Anwendung der CPM in der Verwaltung des Sports, ist eine Folge der Entwicklung des spezialistischen Projektmanagements im Sport. Diese Arbeit stellt ein Beispiel der Planung einer Sportveranstaltung mit dieser Methode, mit dem Ziel, dass diese Erfahrungen die Arbeit der Organisatoren und Koordinatoren erleichtern, und mit Hilfe von wissenschaftlichen Erkenntnissen und quantitativen Methoden die zur Verfügung stehen, auf die Möglichkeit der effektiveren und effizienteren Verwaltung der menschlichen, infrastrukturellen, Geld und IT-Ressourcen im Zusammenhang mit Zeitdruck aufzuweisen.

Systematische Untersuchungen der Organisation von Sportveranstaltungen wurden bis jetzt von vielen Autoren behandelt. Dies hat eine solide theoretische Basis im Management von Sportveranstaltungen geschaffen, und sie alle haben eines Gemeinsam, dass diese Ideen in der modernen Sportpraxis angewendet werden können. Auf der anderen Seite, wurde von der Idee angefangen, dass durch empirische Forschung im Sport, mit den Techniken der Netzplanung und anderen quantitativen Methoden, Zwänge, Faktoren und Vorgehensweisen im Rahmen dieser Phänomene genau zu identifizieren. Das Ziel ist, dass durch die Analyse die Annahme der Bedeutung der Management-Prozesse und Techniken für die Organisation der Veranstaltung bestätigt werden, und zu der Erkenntnis kommen, dass man die Ergebnisse interpretiert, um die gute sportliche Praxis in der Entscheidung bei der Organisation von Sport und ähnlichen Veranstaltungen (Jubiläen, Messen, Ausstellungen, Presse-

konferenzen), oder für die weitere Forschung auf dem Gebiet des Projektmanagements im Sport.

Methoden

In der Studie wurden moderne Verfahren und Methoden, auf dem akademischen Bereich Management im Sport, angewendet: Abzug, Analyse und Synthese, Vergleich, Illustrationen, quantitative Methoden, etc. Die Arbeit stellt den theoretischen Ansatz, mit dem eine Methodik für die Erstellung von Projekt-Management-Strategien im Sport gelten.

Auf der Grundlage der vorhandenen theoretischen Kenntnisse im Bereich der Netzplanung und CPM-Techniken und der bisherigen empirischen Studien und Erfahrungen in dem spezialisierten Bereich des Projektmanagements im Sport wurde in dieser Arbeit ein theoretischer Mode konstruiert.

Das Ziel ist, mit Hilfe dieser Methode Kenntnis zu erlangen, die die sportliche Praxis verbessern wird, die Methoden der Netzplanung im Sport zu fördern, wo immer es möglich ist oder die Notwendigkeit entsteht.

Beispiel Entität

Eine Sportveranstaltung wird durch Stufen wie Projektvorbereitung, Durchführung, Analyse und Auswertung der eigentlichen sportlichen und finanziellen Ergebnisse realisiert. In der Vorbereitungsphase analysiert man die Eingänge (technische und finanzielle Unterstützung (Kapital Quellen), Zeit, Personal, die Struktur der Einnahmen und Ausgaben und man projiziert Risiken (Nichtbefolgung des Ereignisses, dh Stornierungen, Überschreitung der Zeit und des Budgets...). Parallel damit, angemessen mit einem Ziel werden Datum, Dauer der Aktivitäten, spezielle Fristen und kritische Daten gesetzt. Mit dem Ziel der Popularisierung, Vereinfachung und Konvergenz dieser Techniken für den Einsatz im Sport, wurde in der Arbeit als Probe eine manuelle hypothetische Anzeige der Critical Path Method gezeigt.

Variablen

Die Planung und Organisation von Veranstaltungen beinhaltet: 1/ Formulierung einer Strategie, 2/ Machbarkeitsstudie und Entscheidung, 3/ Zielsetzung, 4/ Benennung des Organisationskomitees und des Koordinators des Komitees für verschiedene Bereiche (Sicherheit, Sicherheitspersonal, Mess- und Prüftechnik, Logistik, etc.), 5/ Budgetierung (Finanzplan), 6/ Organisationsstruktur, 7/ Personal nach Sektoren (Freiwillige, etc.), 8/ Feinplanung, 9/ Präsentation von Veranstaltungen einschließlich der Vorbereitung, Schließung und Reinigung, und Auswertung, Feedback

und Modifizierung bestimmter zukünftiger Ereignisse (Dugalić, 2007). Diese Aktivitäten werden mit Variablen vorgestellt: Analyse von Zeit und Struktur und Rechnung der Zeitreserven.

Prüfverfahren

Aufgrund der vielen Anforderungen und Beschränkungen, war es notwendig in einer systematischen Weise, mit speziellen Methoden Aktivitäten zu betonen, die entscheidend für den Erfolg der Veranstaltung sind. Die Anwendung von quantitativen Methoden der Netzplanung (CPM, PERT) dieser Phasen und Aktivitäten, werden sie durch Computer Techniken in Steuerungsmodelle übersetzt, mit denen man folgendes macht: Die Planung der Sportveranstaltung, die Organisation der Aktivitäten und Durchführung der Koordinierung in den letzten Stadien, auf einer routinemäßigen Weise. Das Testverfahren beinhaltet Segmente und Aktivitäten, die erforderlich sind, um eine Sportveranstaltung zu planen, damit man zu den frühesten und spätesten Anfängen und Enden aller Aktivitäten kommt, vor allem diejenigen, die auf dem kritischen Weg liegen, und die endgültige Fertigstellung des Projekts sind.

Statistische Analyse

Die Daten aus der statistischen Analysen wurden durch die Einträge in dem Flussdiagramm der Aktivitäten des Sportprojekts verwendet. Es passiert, dass man im Laufe der Datenverarbeitung wie die Analyse der Struktur und Analyse der Zeit mehrere Daten für das gleiche Phänomen bekommt, wobei bei der progressiven Rechnung der Zeit Maximalwerte und in retrograde – Minimalwerte genommen werden. Die statistische Analyse zeigt den kritischen Weg in einem Netzwerkdiagramm der über die Ereignisse geht, die die frühesten und spätesten Zeiten haben, wie in der Tabelle Nr. 2 und Figur Nr. 3 gezeigt wird.

Ergebnisse

Das Verfahren für die Durchführung des Projekts von einem Sport aus dem Beispiel hat dazu geführt, dass man die Ergebnisse und die Vorteile der CPM-Methode leichter begreift: einen umfassenden Überblick über die gesamte Planung des Objektes, eindeutig gezeigte logische Sicht auf die Interdependenz der Teile, eine präzise Zeiterfassung und Fristen von Veranstaltungen, aktuelle Informationen über die kritische Zeit der größten Belastung der Arbeit, die Faktoren, die negativ auf die Fertigstellung des Projekts wirken, ein objektiver Vergleich der Varianten des Plans, um eine bessere Lösung zu bekommen,

die Erleichterung des Planers bei Routinarbeiten, besonders bei sehr komplexen Projekten, die der Computer durchführt, usw. Abbildung Nr. 3 bietet einen vollständigen Überblick über alle notwendigen Daten, die das Resultat der Analyse der Struktur und der Zeit, sowie der berechneten Zeitreserven sind. Aber um diese präzisen Ergebnisse zu erreichen, war es notwendig, aus der Sicht aller Aktivitäten anzufangen (Tabelle Nr. 1), und Bild Nr. 1 zeigt ein Flussdiagramm dieser Aktivitäten.

Diskussion

Der Netzplan eines Sportprojekts in dieser Arbeit, der auf der Grundlage der vorliegenden Forschung in der modernen Sportpraxis aufgebaut ist, zeigt, dass die Anwendung von CPM im Sport es möglich macht die Ziele zu realisieren, wessen Ausführung begrenzte Ressource verlangt: Zeit, Personal und Geld. Niemand kann die Bedeutung der CPM-Methode für jedes Unternehmen aberkennen, wessen Gründer M. R. Walker und Kelley, J. E bei der Entwicklung effizienter Institutionen wie zum Beispiel DuPont und Remington Rand beigetragen haben. In dieser Arbeit wurde eine bewährte Methode der Anwendung von Netzwerkplanung in der Verwaltung des Sports gezeigt: die Zeit des Projektes ist maximal gekürzt, die Möglichkeit Fristen zu überschreiten sowie andere Risiken wurden auf ein Minimum reduziert, und man hat konkrete zeitliche Daten erhalten, innerhalb

denen einige Aktivitäten durchgeführt werden müssen (12 Wochen), was die Kontrolle der Realisation des Projektes erleichtert und eine zeitliche Reaktion des Koordinators des Sportereignisses ermöglicht.

Der Schlussteil

Die Projektleitung im Sport durch die Anwendung von Techniken der Netzplanung hatte keinen großen Einsatz in der Sportpraxis. Daher wird die Durchführung von Sportveranstaltungen in unserer Region so charakterisiert: Überschreiten der Termine und des Budgets, was eine schlechte Empfehlung, bei den internationalen Sportverbänden für die Kandidatur neuer Sportveranstaltungen ist. Wenn solche Gründe, wie teure Programmpakete für die Verwaltung des Ereignisses genannt werden, wegen des Geldmangels, zeigen die Ergebnisse dieser Studie, dass die manuelle Anzeige des CPM-Modelles bei kleinen und mittelgroßen Veranstaltungen helfen kann. Die Bildung der Projektmanager im Sport kann die Anerkennung der CPM-Methode und ihre Anwendung fördern. Aus dem Grund, weil die Strategie der Verwaltung des Modelles des Projekts im Sport zeigt, dass Sportorganisationen Ressource haben die in der Lage sind diese Techniken durchzuführen, und ein Modell auf dem gewünschten Bereich der Aktivität auszuwählen.

Schlüsselbegriffe: Netzplantechnik, CPM-Methode, das Management von Sportveranstaltungen.

UTICAJ PSIHOLOŠKIH KARAKTERISTIKA NA EFIKASNOST IZVOĐENJA ODBRANE OD NAPADA RUKOM

INFLUENCE OF PSYCHOLOGICAL CHARACTERISTICS ON THE EFFICIENCY OF THE PERFORMANCE OF THE DEFENCE AGAINST ATTACKS BY THE HAND

Darko Paspalj¹

¹Visoka škola unutrašnjih poslova, Banja Luka, Bosna i Hercegovina
Internal Affairs College, Banja Luka, Bosnia and Herzegovina

ORIGINAL SCIENTIFIC PAPER

ORIGINALAN NUČNI ČLANAK

doi: 10.5550/sgia.130902.en.003P

UDK: 796.8:159.9.016.41

doi: 10.5550/sgia.130902.se.003P

SUMMARY

Based on the fact that psychological characteristics play a significant role in the training of special physical education, both for programming of selection diagnostics and programming methods and means to overcome specific curriculum, a study conducted aimed to determine the effect of cognitive and conative characteristics of students of the Internal Affairs College on the quality of the performance of the defense against attacks by the hand to the head from the special physical education program. The study was conducted on 70 students of both sexes of the third year of the internal Affairs College in Banja Luka, aged between 21 and 23 years. Regression analysis showed a significant effect of joint variables for assessing cognitive and conative characteristics on the performance of the defense against attacks by the hand to the head where the single statistically significant effect in explaining criterion has been achieved by: test of visual specializing (S1) designed for simultaneous assessment of education of spatial relations, test of anxiety (alpha) was used to estimate the efficiency of the defense regulation and control system and test of social disintegratedness (ETA) that was used to estimate the efficiency of the integration of regulatory functions, based on which we can assume that these variables are predictive for the successful execution of the defense against attacks by the hand to the head from the special physical education program and should be taken into consideration in the planning and realization of the process in solving situational-motor problems in familiar and unfamiliar conditions.

SAŽETAK

Polazeći od činjenice da psihološke karakteristike imaju značajnu ulogu u obuci iz Specijalnog fizičkog obrazovanja, kako za programiranje selekcionarne dijagnostike tako i za programiranje metoda i sredstava u savladavanju specifičnog nastavnog plana i programa, obavljeno je istraživanje koje je imalo za cilj utvrđivanje uticaja kognitivnih sposobnosti i konativnih karakteristika studenata Visoke škole unutrašnjih poslova na kvalitet izvođenja odbrane od napada rukom u glavu iz programa Specijalnog fizičkog obrazovanja. Istraživanje je provedeno na 70 studenata oba pola treće godine Visoke škole unutrašnjih poslova iz Banje Luke, uzrasta od 21 do 23 godine. Regresiona analiza je pokazala značajan uticaj udruženih varijabli za procjenu kognitivnih sposobnosti i konativnih karakteristika na efikasnost izvođenja odbrane od napada rukom u glavu pri čemu su pojedinačan statistički značajan uticaj u objašnjenju kriterijumske varijable ostvarili: test vizuelne specijalizacije (S1) namijenjen za procjenu simultane edukacije specijalnih relacija, test anksioznosti (ALFA) korišćen za procjenu efikasnosti sistema za regulaciju i kontrolu reakcija odbrane i test socijalne neintegrisanosti (ETA) korišćen za procjenu efikasnosti sistema za integraciju regulativnih funkcija, na osnovu čega možemo pretpostaviti da su navedene varijable prediktivne za uspješno izvođenje odbrane od napada rukom iz programa specijalnog fizičkog obrazovanja i da ih treba uzeti u obzir kod planiranja i realizacije nastavnog procesa prilikom rješavanja situaciono-motoričkih problema u poznatim i nepoznatim uslovima.

Key Words: attack by hand, defense, psychological characteristics.

Ključne riječi: napad rukom, odbrana, psihološke karakteristike.

INTRODUCTION

Bearing in mind the fact that man as a system occupies a central place in achieving the objectives of the Special physical education, in order to meaningfully could influence its development is necessary to know its structure, its way of functioning and adaptive characteristics. Special Physical Education (hereafter SPE), as one of the narrow professional subjects of the Internal Affairs College, has the task to, using a variety of activities, form a proper system of response and to enable the students to perform well in addition to other activities that require the use of force in resolving problem situations with different levels of complexity. Already because of the fact that the performance of professional duties and obligations implies the use of firearms, it is necessary that the students of the Internal Affairs College master specific skills that will enable them to more effectively carry out their activities. The current model of education in the SPE, which is conducted at the Internal Affairs College in Banja Luka phase involves learning specific and very complex motor structures and their application in a variety of determinants and functions of the goal. Learning takes place through elementary, vocational and situational training, each phase has its own goals and tasks to be accomplished through certain processes through which they learn new motor skills, develop the right motor programs and develop adaptive characteristics. Because police officers are often the target of physical attack by one or more persons, special attention is paid to training the successful execution of the defense and the establishment of full control over the attackers. Given the fact that defense programming is a complex cognitive activity that involves observing and understanding spatio-temporal relations as a whole, identifying and recognizing your opponent's actions, comparing the recognized motor program with a program that needs to be realized, the selection of appropriate software, select and add appropriate values for the selected program and giving orders to implement, while impact of these activities in real work situations can be summarized in a binary variable success - failure with the aim of control or destruction of the opponent, it is assumed that cognitive abilities and conative characteristics play an important role in its implementation. Cognitive abilities have influence on the formation of programs that operate control mechanisms for programming and reprogramming of motor algorithms responsible for timely, accurate and rapid means of force appli-

UVOD

Imajući u vidu činjenicu da čovjek kao sistem zauzima centralno mjesto u ostvarivanju ciljeva Specijalnog fizičkog obrazovanja, da bi se smisleno moglo uticati na njegov razvoj potrebno je da se zna njegova struktura, način funkcionisanja i njegove adaptivne karakteristike. Specijalno fizičko obrazovanje (u daljem tekstu SFO), kao jedan od uže stručnih predmeta Visoke škole unutrašnjih poslova, ima zadatak da, koristeći različite aktivnosti, oformi adekvatan sistem reagovanja i da osposobi studente za kvalitetno obavljanje poslova koji pored ostalih aktivnosti zahtijevaju i upotrebu sile pri rješavanju problemskih situacija različitog nivoa složenosti. Već zbog same činjenice da obavljanje profesionalnih dužnosti i obaveza podrazumijeva i upotrebu vatrenog oružja, potrebno je da studenti Visoke škole unutrašnjih poslova ovladaju specifičnim znanjima i vještinama koje bi im omogućile da što efikasnije obavljaju svoju djelatnost. Aktuelni model edukacije u SFO, koji se provodi na Visokoj školi unutrašnjih poslova u Banjoj Luci podrazumijeva fazno učenje specifičnih i veoma složenih motoričkih struktura i njihovu primjenu u različitim determinantama i funkcijama cilja. Učenje se odvija kroz osnovnu, usmjerenu i situacionu obuku, pri čemu svaka od faza ima svoje ciljeve i zadatke, koji se ostvaruju kroz određene procese u kojima se uče nove motoričke strukture, prave motorički programi i razvijaju adaptivne karakteristike. Pošto su policijski službenici veoma često meta fizičkog napada od strane jednog ili više lica, posebna pažnja u obuci se poklanja uspješnom izvođenju odbrana i uspostavljanju potpune kontrole nad napadačima. S obzirom na činjenicu da programiranje odbrane predstavlja veoma kompleksnu misaonu aktivnost koja podrazumijeva sagledavanje i shvatanje prostorno-vremenskih odnosa kao cjeline, uočavanje i prepoznavanje protivnikove akcije, upoređivanje prepoznatog motoričkog programa sa programom koji treba da se realizuje, izbor odgovarajućeg programa, odabiranje i dodavanje odgovarajućih vrijednosti za odabrani program i davanje naredbe za realizaciju, pri čemu rezultat primjene ovih aktivnosti u konkretnim radnim situacijama može da se sažme na binarnu varijablu uspjeh – neuspjeh sa ciljem kontrole ili destrukcije protivnika, pretpostavlja se da kognitivne sposobnosti i konativne karakteristike imaju značajnu ulogu u njenoj realizaciji. Kognitivne sposobnosti imaju uticaja na formiranje programa po kojima funkcionišu regulacioni mehanizmi za programiranje

cation (techniques to bring, defend against unarmed and armed attackers, the use of firearms and other means of force), whereby the effective functioning of the particular process can be estimated by timely and appropriate decision-making on the activities in conditions where the means of force can be applied (it comes to the close cooperation of the highest levels of the central nervous system, responsible for receiving and processing information and making decisions on actions). Considering that the means of force are applied in terms of attack rejection, overcoming resistance or escape, put very high demands in front of a police officer: to estimate the fraction of a second all the circumstances, make the right decision and to apply adequate means of force, aware of the consequences that the use of the means of force may result on the person but also the consequences that would follow the service and specific duty of the police officer if he refrained from applying adequate means of force. Tactics in use of force resources require a trained, qualified and physically ready professional who clearly knows the rules and has the ability to quickly recognize the specific situation, make a proper evaluation and effectively use means of force in the permitted way. In order for the decision making to be qualitative, we need recognize the need for making decisions and be aware that there are time limits for it, which is determined by the problem situation and the intention of gaining an advantage over a rival. Before making a decision on the action it is necessary to analyze the information caused by people that prevent individual performances (age, sex, number of people, their skills), spatial and time factors, then their knowledge and skills and the fulfillment of legal conditions for the application of individual means of force, and based on their efficiency criteria to make a decision on taking appropriate action. For this reason it is necessary to train the students of the Internal Affairs College for the use of physical force (as an appropriate and adequate mean of the force), in order for this application to be lawful, proper, impartial, effective and restrictive, and that with the least harmful effects provide services and tasks within the police jurisdiction. According to Milošević, Mudrić, Jovanović, Amanović, & Dopsaj (2005), cognitive skills are important for the effective application of techniques from the program of SPE in combat, because police officers need to recognize the actions of the opponents, to distinguish the important from the less important elements of movement for certain situations, predict motion changes and to solve various problems in which the spatial relationships are portrayed visually. Also, they have to qualitative and quick establish interrelations between elements of the current situation and to

i reprogramiranje motoričkih algoritama odgovornih za pravovremenu, preciznu i brzu primjenu sredstava sile (tehlike za privođenje, odbrane od nenaoružanog i naoružanog napadača, upotreba vatrenog oružja i drugih sredstava sile), pri čemu se efikasnost funkcionisanja pojedinih procesora može procijeniti pravovremenim i adekvatnim donošenjem odluka o djelovanju u uslovima kada mogu da se primijene sredstva sile (dolazi do uske saradnje najviših nivoa centralnog nervnog sistema, odgovornih za prijem i preradu informacija i donošenje odluka o akcijama). S obzirom na to da se sredstva sile primjenjuju u uslovima odbijanja napada, savladavanja otpora ili bjekstva, pred policijskog službenika se postavljaju vrlo visoki zahtjevi: da u djeliću sekunde procijeni sve okolnosti, donese ispravnu odluku i primjeni adekvatno sredstvo sile, svjestan posljedica koje po lice može prouzrokovati upotreba sredstva sile ali i posljedica koje bi proizašle po službu i konkretnu dužnost policajca ako bi se uzdržao od primjene adekvatnog sredstva sile. Taktika upotrebe sredstava sile zahtijeva obučenog, osposobljenog i fizički spremnog profesionalca koji nedvosmisleno poznaje propise i posjeduje sposobnost da brzo prepozna konkretnu situaciju, izvrši pravilnu procjenu i efikasno primijeni zakonsko sredstvo na dozvoljen način. Da bi odlučivanje bilo kvalitetno, treba prepoznati potrebu za donošenjem odluke i biti svjestan vremenskog limita koji postoji pri odlučivanju, a koji je determinisan problemskom situacijom i namjerom sticanja prednosti nad suparnikom. Prije donošenja odluke o djelovanju potrebno je izvršiti analizu informacija koje uzrokuju lica koja sprečavaju pojedina izvršenja (uzrast, pol, broj ljudi, njihove sposobnosti), prostorni i vremenski faktori, zatim vlastita znanja i sposobnosti i zakonsko ispunjenje uslova za primjenu pojedinog sredstva sile, te na osnovu stečenih kriterijuma efikasnosti donijeti odluku o preduzimanju adekvatnih akcija. Iz tog razloga potrebno je osposobiti studente Visoke škole unutrašnjih poslova za primjenu fizičke snage (kao odgovarajućeg i adekvatnog sredstva sile), kako bi ta primjena bila zakonita, pravilna, nepristrasna, efikasna i restriktivna, te da se sa što manje štetnih posljedica obezbijedi obavljanje poslova i zadataka iz nadležnosti policije. Prema Milošević, Mudrić, Jovanović, Amanović i Dopsaj (2005), kognitivne sposobnosti su bitne za efikasnost primjene tehnika iz SFO u borbi, jer policijski službenici treba da prepoznaju akcije protivnika, naprave razliku važnih od manje važnih elemenata kretanja za pojedine situacije, predviđaju promjene kretanja, te da rješavaju različite probleme u kojima se prostorni odnosi predočavaju vizuelnim putem. Takođe, moraju kvalitetno i brzo da utvrđuju međusobne veze elemenata aktuelne si-

properly and quickly select the tactic of treatment whereby a high working level of processes responsible for the analysis, programming and data storage, provides a high level of efficiency using various techniques of defense and attack. Given the fact that in the training, there are no existing programs for dealing with situational conditions, cognitive processes are current in the analysis of a case problem and the formation of motor responses, and conative characteristics whether acting directly or complement each other, form a synergy or make certain disorders in the task performance, causing such behaviours that promote or prevent certain processes in order to establish control over the movement effects. Knowledge of the hierarchical structure of psychological attributes and characteristics allows the teacher to understand and predicting the behaviour of students in problem-solving situations with different levels of complexity. Starting from the assumption that psychological characteristics have a certain role in the training of special physical education, and that in the previous period through a series of studies was confirmed that parts of the personality (cognitive and conative domain) do not operate as separate, isolated units, but are linked together and act in mutual conjunction (Momirović & Horga, 1990; Stojiljković, 1995; Vučinić, Popović, & Momirović, 1992), a study conducted that aimed to determine whether, and to what extent the observed psychological characteristics of students of the Internal Affairs College in Banja Luka have an impact on the efficiency of the defense against attacks by the hand to the head. The results of this type of research would be of theoretical and practical value for the teaching of special physical education because they can provide the possibility to choose new teaching methods and resources, introducing in the program structure of subject matter specific problem situations with which police officers most commonly encountered in the field, and whose criterion for resolution is harmonized with the behaviour of persons against whom they need to apply certain means of force.

METHODS

Sample of subjects

The study was conducted on 70 students (44 male and 26 female subjects) of the fifth semester of the College of Internal Affairs in Banja Luka, of the 2007/2008 academic year. The sample included students aged between 21 and 23 years.

Sample of variables

The Sample of variables in this study is divided into predictor variables and the variables of the cri-

tuacije i da pravilno i brzo odaberu taktiku postupanja, pri čemu visok radni nivo procesora odgovornih za analizu, programiranje i memorisanje podataka, omogućava i visok nivo efikasnosti primjene različitih tehnika odbrana i napada. S obzirom na činjenicu da u sklopu obuke ne postoje gotovi programi za postupanje u situacionim uslovima, kognitivni procesi su aktuelni u analizi postavljenog problema i formiranju motoričkog odgovora, dok konativne karakteristike bez obzira da li djeluju posredno ili se uzajamno dopunjuju, čine jednu sinergiju ili pak čine određene smetnje kod izvršavanja poslova, izazivajući takva ponašanja koja pospješuju ili onemogućavaju određene procese radi uspostavljanja kontrole nad efektima kretanja. Poznavanje hijerarhijske strukture psiholoških osobina i karakteristika omogućuje nastavniku razumijevanje i predviđanje ponašanja studenta kod rješavanja problemskih situacija različitog nivoa složenosti. Polazeći od pretpostavke da psihološke karakteristike imaju određenu ulogu u obuci Specijalnog fizičkog obrazovanja, a da je u dosadašnjem periodu kroz niz istraživanja potvrđeno da dijelovi ličnosti (kognitivni i konativni domen) ne funkcionišu kao zasebne, izdvojene cjeline, već da su povezane i da djeluju u uzajamnoj sprezi (Momirović i Horga, 1990; Stojiljković, 1995; Vučinić, Popović i Momirović, 1992), obavljeno je istraživanje koje je imalo za cilj da se utvrdi da li, i u kojoj mjeri posmatrane psihološke karakteristike studenata Visoke škole unutrašnjih poslova iz Banja Luke imaju uticaj na efikasnost odbrane od napada rukom u glavu. Rezultati ove vrste istraživanja bili bi od teorijske i praktične vrijednosti za nastavu specijalnog fizičkog obrazovanja jer bi mogli dati mogućnost izbora novih nastavnih oblika i sredstava, uvođenjem u programske strukture nastavnih sadržaja određenih problemskih situacija, sa kojima se policijski službenici najčešće susreću na terenu, a čiji kriterijum za rješavanje bi bio usklađen sa oblicima ponašanja lica prema kojima treba primjeniti određeno sredstvo sile.

METODE

Uzorak ispitanika

Istraživanje je sprovedeno na 70 studenata (44 ispitanika muškog i 26 ispitanika ženskog pola) petog semestra Visoke škole unutrašnjih poslova iz Banje Luke, školske 2007/2008. godine. Uzorkom su bili obuhvaćeni studenti starosnog uzrasta između 21 i 23 godine.

Uzorak varijabli

Uzorak varijabli u ovom istraživanju podijeljen je na varijable prediktorskog i varijable kriterijumskog

terion system. Pattern of predictor variables consisted of a set of nine variables for assessing the psychological characteristics of subjects, and 3 variables for the assessment of cognitive abilities and 6 variables for the assessment of cognitive characteristics. Their name, the subject and the measurement reliability of the coefficients are given in Table 1.

sistema. Uzorak prediktorskih varijabli sačinjavao je set od 9 varijabli za procjenu psiholoških karakteristika ispitanika, i to: 3 varijable za procjenu kognitivnih sposobnosti i 6 varijabli za procjenu konativnih karakteristika. Njihov naziv, predmet mjerenja i koeficijenti pouzdanosti dati su u Tabeli 1.

TABLE 1

Title, case measurement and reliability of predictor variables.

TABELA 1

Naziv, predmet mjerenja i pouzdanost prediktorskih varijabli.

Title	Case measurement	Reliability
IT1	The efficiency of perceptual processors	.91
AL4	The efficiency of serial processors	.94
S1	The efficiency of parallel processors	.92
EPSILON	Activity regulation	.90
HI	Regulation of organic functions	.89
ALFA	Regulation of defense reactions	.92
SIGMA	Regulation of attack reactions	.90
DELTA	Coordination of regulatory functions	.91
ETA	Integration of regulatory functions	.91

Legend/Legenda: Title - Naziv; Case measurement - Predmet mjerenja; Reliability - Pouzdanost; The efficiency of perceptual processors - Efikasnost perceptivnog procesora; The efficiency of serial processors - Efikasnost serijskog procesora; The efficiency of parallel processors - Efikasnost paralelnog procesora; Activity regulation - Regulacija aktiviteta; Regulation of organic functions - Regulacija organskih funkcija; Regulation of defense reactions - Regulacija reakcija odbrane; Regulation of attack reactions - Regulacija reakcija napada; Coordination of regulatory functions - Koordinacija regulativnih funkcija; Integration of regulatory functions - Integracija regulativnih funkcija.

The table shows that all the variables for assessing psychological characteristics have the necessary metrical characteristics (Momirović, Wolf, & Džamonja, 1992). The examination of the psychological characteristics of samples was performed in groups (from 18 to 25 subjects) in specific areas that met the standard requirements for group psychological testing. Psychologist-examiner is fully complied with the procedures related to the implementation of testing (explained research objectives and provide general motivational and instructions), whereby he led a protocol on testing in which he amounted all the information and events that could affect the regularity tests. Through the insight into these protocols it can be concluded that all the group tests conducted under regular circumstances and that all subjects were motivated for the examination. The criterion variable was represented by the score of quality assessment of the performance of the defense against

Iz tabele je vidljivo da sve varijable za procjenu psiholoških karakteristika posjeduju potrebne metrijske karakteristike (Momirović, Wolf i Džamonja, 1992). Ispitivanje psiholoških karakteristika uzorka, izvršeno je grupno (od 18 do 25 ispitanika) u posebnim prostorijama koje su ispunjavale standardne uslove grupnog psihološkog testiranja. Psiholog-ispitivač je u potpunosti ispoštovao proceduru vezanu za provođenje testiranja (objašnjenje cilja istraživanja i davanja opšteg i motivacionog uputstva za rad), pri čemu je vodio protokol o ispitivanju u kom je iznosio sve podatke i događaje koji su mogli da utiču na regularnost ispitivanja. Uvidom u ove protokole može se konstatovati da su sva grupna ispitivanja sprovedena pod regularnim okolnostima i da su svi ispitanici bili motivisani za ispitivanje. Kriterijumsku varijablu predstavljala je ocjena procjene kvaliteta izvođenja odbrane od napada rukom pravo naprijed

attacks by the hand to the head with a step forward with the same named leg, and has already been formed by performing the average score by five experts who teach the SPE in the a scale of 5.00 to 10.00. The criterion of evaluation was as follows:

Grade 10 (ten) - uniform and coordinated performance in the optimal rhythm of techniques that satisfy the principles for solving the specific problem situation, the basic principles of biomechanics and provide a safe and complete control of the attacker.

Grade 9 (nine) - excellent performance of techniques, with one of the components being a little disturbed, but the performance is still very safe.

Grade 8 (eight) - good performance of technique, the appearance of small errors, where the basic structure of the elements is not disrupted, and performance is still safe.

Grade 7 (seven) - pretty good performance of technique element, there is a slightly higher number of errors, the basic principles are not significantly disturbed and there is some uncertainty in the performance of his defense.

Grade 6 (six) - the basic structure of the technique is partially disturbed, lack of complete control over the attacker and unsafe design.

Grade 5 (five) - poor performance, larger defects, the structure of movement is substantially impaired, extreme uncertainty.

Statistical analysis of data

Data analysis was performed using the software package SPSS 17.0, with descriptive statistical parameters calculated for each variable while for the determination of the impact of the system of predictor variables on the criterion variable we used regression analysis.

RESULTS

Table 2 shows the descriptive value of the variables in the area of cognitive skills and cognitive performance. It turned out that the majority of the distribution of the results fairly well grouped and that there are no significant deviations from the mean results. Results of the Kolmogorov-Smirnov test showed that most of the variables have a symmetrical distribution. The exceptions are the variables of conversion test (HI) and test of psychotizismus (DELTA), in which the distribution deviates significantly from the Gaussian curve. The highest range of scores and the maximum deviation from the mean value of results was recorded in variables: test anxiety (alpha), test of aggression (Sigma) and test intro-extroversion (EPSILON). It can be seen that the greater asymmetry Skewness to the right compa-

u glavu uz iskorak istoimenom nogom, a formirana je izvođenjem prosječne ocjene od strane pet eksperata koji predaju SFO u skali od 5,00 do 10,00. Kriterijum ocjenjivanja je bio sljedeći:

Ocjena 10 (deset) – jednolično i usklađeno izvođenje u optimalnom ritmu tehnika koje zadovoljavaju principe za rješenje konkretne problemske situacije, osnovne biomehaničke principe i omogućavaju bezbjednu i potpunu kontrolu nad napadačem.

Ocjena 9 (devet) – odlično izvođenje tehnika, pri čemu je jedna od komponenti nešto narušena, ali je izvedba još uvijek veoma sigurna.

Ocjena 8 (osam) – dobro izvođenje tehnika, pojava manjih grešaka, pri čemu osnovna struktura elemenata nije narušena, a izvedba je još uvijek sigurna.

Ocjena 7 (sedam) – dosta dobro izvođenje elemenata tehnike, postoji nešto veći broj grešaka, osnovni principi nisu znatno narušeni i postoji određena nesigurnost u izvođenju odbrane.

Ocjena 6 (šest) – osnovna struktura tehnika djelomično poremećena, nedostatak potpune kontrole nad napadačem i nesigurna izvedba.

Ocjena 5 (pet) – loša izvedba, veći nedostaci, struktura kretanja bitno narušena, izrazita nesigurnost.

Statistička obrada podataka

Obrada podataka izvršena je primjenom programskog paketa SPSS 17.0, pri čemu su deskriptivni statistički parametri izračunati za svaku varijablu, dok je za utvrđivanje uticaja sistema prediktorskih varijabli na kriterijumsku varijablu korišćena regresiona analiza.

REZULTATI

U Tabeli 2 prikazane su deskriptivne vrijednosti za varijable iz prostora kognitivnog sposobnosti i konativnih karakteristika. Pokazalo se da je većina distribucija rezultata prilično dobro grupisana i da nema značajnijih odstupanja od srednjih vrijednosti rezultata. Rezultati Kolmogorov-Smirnov testa pokazali su da većina varijabli ima simetričnu distribuciju. Izuzetak su varijable test konverzivnosti (HI) i test psihotizma (DELTA), kod kojih distribucija značajno odstupa od Gaussove krive. Najveći raspon rezultata i najveće odstupanje od srednje vrijednosti rezultata zabilježeno je kod varijabli: test anksioznosti (ALFA), test agresivnosti (SIGMA) i test intro-ekstrovertnosti (EPSILON). Može se uočiti da Skewness veću asimetriju udesno u odnosu na normalnu ra-

red to normal distribution shows in variable: test of conversion (HI) test and psychotizismus (DELTA), while other variables recorded small and medium asymmetry in the accordance with the prefix. Assessments of the degree of curvature Kurtosis it was observed that higher values of kurtosis also show variables: test of conversion (HI) test and psychotizismus (DELTA), while other variables do not deviate from the normal distribution.

spodjelu pokazuje kod varijabli: test konverzivnosti (HI) i test psihotizizma (DELTA), dok je kod ostalih varijabli zabilježena mala ili srednja asimetrija u skladu sa predznakom. Procjenom stepena zakrivljenosti Kurtosis uočeno je da veće vrijednosti spljoštenosti takođe pokazuju varijable: test konverzivnosti (HI) i test psihotizizma (DELTA), dok ostale varijable ne odstupaju od normalne raspodjele.

TABLE 2

Descriptive indicators of psychological characteristics of subjects.

TABELA 2

Deskriptivni pokazatelji psiholoških karakteristika ispitanika.

Variables	N	Min	Max	M	SD	Skew.	Kurt.	KS	p
IT1	70	15	31	20.97	3.467	.560	-.315	1.169	.130
AL4	70	18	40	32.63	5.525	-.573	-.560	1.061	.210
S1	70	14	30	23.33	4.429	-.316	-.973	.982	.290
EPSILON	70	78	150	115.74	15.014	-.180	.019	.551	.922
HI	70	30	75	39.33	8.810	1.501	2.931	1.458	.029
ALFA	70	30	106	60.47	18.981	.378	-.653	.846	.471
SIGMA	70	34	109	77.26	15.048	-.191	-.131	.665	.769
DELTA	70	30	70	39.89	9.048	1.504	1.806	1.880	.002
ETA	70	30	82	47.21	12.225	.708	-.044	.895	.400

Legend/Legenda: **IT1** - The efficiency of perceptual processors (Efikasnost perceptivnog procesora); **AL4** - The efficiency of serial processors (Efikasnost serijalnog procesora); **S1** - The efficiency of parallel processors (Efikasnost paralelnog procesora); **EPSILON** - Activity regulation (Regulacija aktiviteta); **HI** - Regulation of organic functions (Regulacija organskih funkcija); **ALFA** - Regulation of defense reactions (Regulacija reakcija odbrane); **SIGMA** - Regulation of attack reactions (Regulacija reakcija napada); **DELTA** - Coordination of regulatory functions (Koordinacija regulativnih funkcija); **ETA** - Integration of regulatory functions (Integracija regulativnih funkcija); **N** - Total number of participants (Ukupan broj ispitanika); **Min** - Minimum (Minimum); **Max** - Maximum (Makimum); **M** - Sample mean (Aritmetička sredina); **SD** - Standard deviation (Standardna devijacija); **Skew.** - Skewnis; **Kurt.** - Kurtosis; **K-P** - Konglo-Smirnov test; **p** - Probability (Vjerovatnoća).

Table 3 shows the relationship between the dependent variable of the defense against attacks by the hand to the head (DAHTH) and the associated independent variables for assessing cognitive and conative characteristics. The coefficient of multiple correlation ($R=.516$) indicates a significant approval of the dependent variable with the independent variables. The coefficient of determination ($R^2=.266$) indicates that 26.6% of the total variability of the depending variable can be explained by the independent variables associated with the assessment of cognitive and conative characteristics, while the remaining 73.4% of the variability is influenced by other (unexplained)

U Tabeli 3 prikazane su relacije između zavisne varijable odbrana od napada rukom u glavu (ONRG) i udruženih nezavisnih varijabli za procjenu kognitivnih sposobnosti i konativnih karakteristika. Koeficijent multiple korelacije ($R=0,516$) ukazuje na značajnu saglasnost zavisne varijable sa nezavisnim varijablama. Koeficijent determinacije ($R^2=0,266$) pokazuje da se 26,6% ukupnog varijabiliteta zavisno promjenjive može objasniti uticajem udruženih nezavisnih varijabli za procjenu kognitivnih sposobnosti i konativnih karakteristika, dok je preostalih 73,4% varijabiliteta pod uticajem nekih drugih (neobjašnjenih) faktora.

factors. Based on the value of F -test (2.414) and the achieved level of significance ($p=0.021$) it can be concluded that on the basis of psychological characteristics may be possible in some degree to predict the efficiency of execution of the defense against attacks by the hand to the head.

Na osnovu vrijednosti F -testa (2,414) i ostvarenog nivoa značajnosti ($p=0.021$) zaključuje se da se na osnovu psiholoških karakteristika može u izvjesnom stepenu predvidjeti efikasnost izvođenja odbrane od napada rukom pravo naprijed u glavu.

TABLE 3

Regression analysis of associated predictors and the defense against attacks by the hand to the head.

TABELA 3

Regresiona analiza udruženih prediktora i odbrane od napada rukom.

R	R ²	SD	F	p
.516	.266	.93272	2.414	.021

Legend/Legenda: **R** - Coefficient of multiple correlation (Koeficijent multiple korelacije); **R²** - Coefficient of determination (Koeficijent determinacije); **SD** - Standard deviation (Standardna devijacija); **F** - F-test; **p** - Probability (Vjerovatnoća).

Table 4 shows the values of beta coefficients, which provide information on the partial impact of independent variables on the criterion variable. A statistically significant effect was achieved with variables: visual test of specializing (S1) designed for the assessment of simultaneous education of spatial relations in which the process of establishing and restructuring independent from the quantity previously acquired information, test anxiety (alpha) that was used to estimate the efficiency of the system for the regulation and control of defense reactions and test social disintegratedness (ETA) that was used to estimate the efficiency of the integration of regulatory functions, whose function is to integrate conative regulatory process under the aspect of the structure of social fields.

U Tabeli 4 prikazane su vrijednosti Beta koeficijenta koji daju informacije o parcijalnom uticaju nezavisnih varijabli na kriterijumsku varijablu. Statistički značajan uticaj ostvarile su varijable: test vizuelne specijalizacije (S1) namijenjen za procjenu simultane edukacije spacijalnih relacija kod kojih su procesi utvrđivanja i restrukturiranja nezavisni od prethodno stečene količine informacija, test anksioznosti (ALFA) korišćen za procjenu efikasnosti sistema za regulaciju i kontrolu reakcija odbrane i test socijalne neintegrisanosti (ETA) korišćen za procjenu efikasnosti sistema za integraciju regulativnih funkcija, čija je funkcija da integriše konativne regulativne procese pod vidom stukture socijalnog polja.

DISCUSSION

The structure of applied anthropological characteristics in this study is entirely consistent with the purposes of identification and development of skills, attributes and students' knowledge which are important for the methodological design of teaching process especially in the application acquired knowledge in the observed motoric problems. The results of this study showed a significant effect of associated variables for assessing cognitive and conative characteristics on the performance of the defense against attacks by the hand to the head, whereby a single statistically significant effect in explaining the criterion has been achieved: visual test of specializing (S1) designed for simultaneous assessment of education of spatial relations, test of anxiety (alpha) that was used to

DISKUSIJA

Struktura primijenjenih antropoloških obilježja u ovom istraživanju u potpunosti je u skladu sa potrebom identifikacije i razvoja sposobnosti, osobina i znanja studenata koja su značajna za metodičko oblikovanje nastavnog procesa posebno u segmentu primjene naučenog kod posmatranog motoričkog problema. Rezultati ovog istraživanja pokazali su značajan uticaj udruženih varijabli za procjenu kognitivnih sposobnosti i konativnih karakteristika na efikasnost izvođenja odbrane od napada rukom u glavu, pri čemu su pojedinačan statistički značajan uticaj u objašnjenju kriterijumske varijable ostvarili: test vizuelne specijalizacije (S1) namijenjen za procjenu simultane edukacije spacijalnih relacija, test anksioznosti (ALFA) korišćen za procjenu efikasnosti sistema za regulaciju

TABLE 4*Regression and associated predictors of the defense against attacks by hand.***TABELA 4***Regresiona i odbrane udruženih prediktora odbrane od napada rukom.*

Model	B	SE	β	<i>t</i>	<i>p</i>
(Constant)	6.188	1.614			
IT1	.004	.035	.014	.110	.913
AL4	-.010	.022	-.056	-.460	.647
S1	.064	.029	.281	2.231	.029
EPSILON	-.006	.009	-.092	-.700	.487
HI	-.015	.023	-.133	-.654	.515
ALFA	.034	.010	.635	3.374	.001
SIGMA	.014	.009	.203	1.541	.128
DELTA	.017	.020	.149	.820	.415
ETA	-.055	.022	-.663	-2.506	.015

Legend/Legenda: **IT1** - The efficiency of perceptual processors (Efikasnost perceptivnog procesora); **AL4** - The efficiency of serial processors (Efikasnost serijskog procesora); **S1** - The efficiency of parallel processors (Efikasnost paralelnog procesora); **EPSILON** - Activity regulation (Regulacija aktiviteta); **HI** - Regulation of organic functions (Regulacija organskih funkcija); **ALFA** - Regulation of defense reactions (Regulacija reakcija odbrane); **SIGMA** - Regulation of attack reactions (Regulacija reakcija napada); **DELTA** - Coordination of regulatory functions (Koordinacija regulativnih funkcija); **ETA** - Integration of regulatory functions (Integracija regulativnih funkcija); **B** - Beta coefficient (Beta koeficijent); **SD** - Standard deviation (Standardna devijacija); **t** - Student's t distribution (Studenova t distribucija); **p** - Probability (Vjerovatnoća).

estimate the efficiency of the system for the regulation and control of defense reactions and test social disinterestedness (ETA) that was used to estimate the efficiency of the integration of regulatory functions, based on which we can assume that these variables are predictive for the successful execution of the defense against attacks by the hand to the head from special physical education program and should therefore be taken into consideration in the planning and realization of the processes in solving situational-motor problems in familiar and unfamiliar conditions. Explanation of the obtained results should be primarily looked for in a well-developed abilities to search the visual field and locate objects in it, low intensity mechanism for the regulation and control of defense reactions which requires good control of anxiety, probably because the subjects in the course of training of the given motor problem knew in advance in what way will their partner perform the motor movement and have in that way gained the confidence and trust of each other, whereby in the implementation of techniques of attack and defense, there was no fear of injury because of the subjects' guarded

i kontrolu reakcija odbrane i test socijalne neintegrisanosti (ETA) korišćen za procjenu efikasnosti sistema za integraciju regulativnih funkcija, na osnovu čega možemo pretpostaviti da su navedene varijable prediktivne za uspješno izvođenje odbrane od napada rukom iz programa Specijalnog fizičkog obrazovanja i da ih samim tim treba uzeti u obzir kod planiranja i realizacije nastavnog procesa prilikom rješavanja situaciono-motoričkih problema u poznatim i nepoznatim uslovima. Objašnjenje dobijenih rezultata treba prije svega potražiti u dobro razvijenoj sposobnosti pretrage vizuelnog polja i lociranja objekata u njemu, niskom intenzitetu mehanizma za regulaciju i kontrolu reakcija odbrane što uslovljava dobru regulaciju anksioznosti, vjerovatno zato što su ispitanici u toku uvježbavanja datog motoričkog problema unaprijed znali na koji način će partner izvršiti motoričku kretnju pa su na taj način stekli samopouzdanje i međusobno povjerenje, pri čemu kod realizacije tehnika napada i odbrana nije postojala bojazan od povrijeđivanja jer su ispitanici „čuvali“ jedni druge. Treba ukazati da je kod izvođenja udarca

»each other. It should be pointed that in the execution of punches to the head a significant deviation from the real attack was noticed and that the subjects while solving problem situations were very confident because they have handled the situation in familiar terms, during which they have applied adopted solutions, whereby they prefer »safer« techniques that carry less risk in their implementation, which made the implementation of motor programs during execution techniques of defense and counter-attack easier. Considering the fact that it is a punch in the head, cognitive involvement in the execution of the defense could be explained by the fact that in such situations a man reflexively (we could say, without consciousness, if that's possible) protects, and it is not to expect a significant cognitive process before and during the performance of defense techniques, but it would rather be talked about the ability to control emotions (that is, above all, the fear and excitement). Furthermore, the reason for these results can be found in the structure of the performance of the punches. The punch is characterized by terminal movement that has a beginning and an end and which is performed by an initial impulse of force, as an initial ballistic phase, followed by a phase reaction based on the current speed and position. The first part of the movement is performed by controlling the initial impulse whereby its subsequent sequence considering to high speed performance cannot be corrected. The support of this claim comes from the fact that the hand hit are genetically encoded natural movements and therefore do not require significant cognitive charge, such as defense, which in our case is characterized more by reflex than a learned movement, which is completely understandable given the relatively small number of lessons and repetition. To have a complete picture about the relationship between psychological characteristics and efficiency of the performance of the defense against attacks by the hand to the head is necessary to consider a study on the featured characteristics which are conducted on a similar sample subjects. Mudrić and Jovanović (2001) on a sample of 102 students of the fifth semester of the Police College in Zemun conducted a research of cognitive and conative characteristics with had the aim of forming a model of the psychological characteristics of students of the Police College. The obtained results speak about psychological profile of students who expressed a high factor of crystallized intelligence, conscientiousness, dependability, responsibility, emotional stability, perseverance, self-confidence and serenity. If we compare the results above mentioned research with the results of our study, it is obvious that the obtained results very similar. The explanation can be found in the fact that both subjec-

rukom u glavu primjećeno znatno odstupanje od realnog napada te da su ispitanici prilikom rješavanja problemske situacije bili veoma sigurni jer su situaciju rješavali u poznatim uslovima, kojom prilikom su primjenjivali već usvojena rješenja, pri čemu su preferirali »sigurnije« tehnike koje nose manji rizik prilikom njihove realizacije, što je olakšalo realizaciju motoričkih programa pri izvođenju tehnika odbrana i kontranapada. S obzirom na to da je u pitanju udarac rukom u glavu, kognitivno učešće kod izvođenja odbrane moglo bi se objasniti i činjenicom da se u takvim situacijama čovjek refleksno (mogli bismo reći, bez učešća svijesti, ako je to uopšte moguće) zaštićuje, pa nije ni za očekivati neki značajan kognitivni proces prije i u toku izvođenju tehnike odbrane, već bi se prije moglo govoriti o sposobnosti kontrole emocija (misli se, prije svega, na strah i uzbuđenje). Dalje, razlog ovakvim rezultatima je moguće potražiti i u strukturi izvođenja samog udarca rukom. Naime, udarac rukom karakteriše terminalni pokret koji ima svoj početak i kraj a koji se izvodi inicijalnim impulsom sile, kao jedna inicijalna balistička faza, koju prati faza reakcije bazirana na trenutnoj brzini i položaju. Prvi dio pokreta se vrši putem kontrole inicijalnog impulsa pri čemu njegove kasnije sekvence s obzirom na veliku brzinu izvođenja nije moguće korigovati. U prilog ovoj tvrdnji ide i činjenica da su udarci rukom genetski kodirani prirodni pokreti pa samim tim ne zahtijevaju značajan kognitivni naboj, poput odbrane koju u našem slučaju karakteriše više refleksna nego naučena kretnja, što je potpuno razumljivo s obzirom na relativno mali broj nastavnih časova i ponavljanja.

Da bismo imali potpuniju sliku o odnosu psiholoških karakteristika i efikasnosti izvođenja odbrane od napada rukom u glavu potrebno je sagledati istraživanja navedenih karakteristika koja su sprovedena na sličnom uzorku ispitanika. Mudrić i Jovanović (2001) su na uzorku od 102 studenta petog semestra Više škole unutrašnjih poslova iz Zemuna izvršili istraživanje kognitivnih sposobnosti i konativnih karakteristika sa ciljem formiranja modela psiholoških karakteristika studenata Više škole unutrašnjih poslova. Dobijeni rezultati govore o psihološkom profilu studenata kod kojih je izražen visok faktor kristalizovane inteligencije, savjesnosti, pouzdanosti, odgovornosti, emocionalne stabilnosti, upornosti, samouvjerenosti i spokojnosti. Ukoliko se uporede dobijeni rezultati pomenutog istraživanja sa rezultatima našeg istraživanja, vidljivo je da su dobijeni veoma slični rezultati. Objašnjenje se može potražiti u činjenici da su i jedni i drugi ispitanici prilikom konkursa za prijem na školovanje bili podvrgnuti gotovo istim ili sličnim

ts in the competition for admission to school were subjected to nearly the same or similar tests for the assessment of psychological characteristics, as well as that during the education they studied identical teaching contents, which are implemented in the same or similar conditions. Kasum and Bačanac (2007) investigated the association between individual psychological characteristics of elite wrestlers and their main scoring techniques, during which they found that the choice of the dominant techniques in wrestling was associated with a specific psychological characteristics of wrestlers. It was found that the wrestlers that are characterized by a higher level of sport competition anxiety choose and use scoring techniques which bear higher risk and uncertainty lead to lower his score. This is in agreement with the results of research conducted by Popović (1990) which established that the performance of dedicated techniques in judo, have a great participation of conative characteristics that are defined by anxiety and obsessive tendencies. However, the results of this research when it comes to the level of anxiety, differ from the results of these studies, which is understandable given the fact that our subjects defense is performed in known conditions, while the wrestlers and judoists were doing sports fight in order to achieve competitive results, and expected much fear in terms of achieving competitive success. So, if we take into consider the fact that the subject of this study were students of the Internal Affairs College, who are in the process of learning the defense from an attack by hand an activity performed several times in familiar terms, it is reasonable to assume that they have gained trust and confidence to for the performance of the defense, and is understandable that they did not show fear of injury or the loss of points, as a possible cause of anxiety behavior.

Blazevic and Malacko (2007) conducted a research to determine the effects of cognitive abilities on individual specific motor skills by top boxers. By applying a regression analysis of they obtained results under which the test AL - 4 had a statistically significant impact on all criterion variables, and test IT - 1 had an impact on the execution speed of the combined blows on the bag, performances of hops with both legs for 10 seconds, performance of left and right uppercuts and performing a series of 100 combined shots at the coaches hand. When comparing their results with the results of this study it will be seen that they are very different. Namely, the authors have investigated the combination of successive techniques by default form, while in this study, subjects had to simultaneously process the incoming information and is quite understandable that a significant role in the defense against attacks by the hand to the head has

testovima za procjenu psiholoških karakteristika, kao i da su u toku školovanja izučavali identične nastavne sadržaje koji se realizuju u istim ili sličnim uslovima. Kasum i Bačanac (2007) su istraživali povezanost pojedinih psiholoških karakteristika vrhunskih rvača i njihovih glavnih poentirajućih tehnika, kojom prilikom su ustanovili da je izbor dominantne tehnike u rvanju povezan sa određenim psihološkim svojstvima rvača. Utvrđeno je da rvači koje karakteriše viši nivo sportske takmičarske anksioznosti biraju i koriste poentirajuće tehnike koje u sebi nose veći rizik i donose manju rezultatsku neizvjesnost. Ovo je u skladu sa rezultatima istraživanja koje je proveo Popović (1990) u kome je utvrdio da za izvođenje požrtvovnih tehnika u judou, veliko učešće imaju konativne karakteristike koje su definisane anksioznim tendencijama i opsesivnošću. Međutim, rezultati ovog istraživanja, kada je u pitanju nivo anksioznosti, se razlikuju od rezultata navedenih istraživanja, što je i razumljivo s obzirom na to da su naši ispitanici odbrane izvodili u poznatim uslovima, dok su rvači i džudisti radili sportske borbe u cilju ostvarenja takmičarskih rezultata, pa je kod njih i očekivano znatno strahovanje u smislu postizanja takmičarskog uspjeha. Dakle, imali se u vidu činjenica da su predmet ovog istraživanja bili studenti Visoke škole unutrašnjih poslova, koji su u procesu učenja odbrane od napada rukom aktivnost izvodili više puta u poznatim uslovima, realno je pretpostaviti da su stekli međusobno povjerenje i sigurnost kod izvođenja odbrane, pa je i razumljivo da se nije pojavio strah od povrede ili gubitka poena, kao mogući uzrok anksioznog ponašanja.

Blažević i Malacko (2007) su proveli istraživanje s ciljem utvrđivanja uticaja sistema kognitivnih sposobnosti na pojedinačne specifične motoričke sposobnosti kod vrhunskih boksera. Primjenom regresione analize dobili su rezultate prema kojima je test AL - 4 imao statistički značajan uticaj na sve kriterijumske varijable, dok je test IT - 1 imao uticaja na brzinu izvođenja kombinovanih udaraca na vreći, izvođenje sunožnih poskoka za 10 sekundi, izvođenje lijevog i desnog aperkata i izvođenje serije od 100 kombinovanih udaraca na ruku trenera. Kada se uporede njihovi rezultati sa rezultatima ovog istraživanja vidjeće se da se oni bitno razlikuju. Naime, navedeni autori su istraživali kombinaciju sukcesivnih tehnika po zadanom obrascu, pri čemu su ispitanici sami procjenjivali efekat svakog izvedenog pokreta, dok su u ovom istraživanju ispitanici morali da pristizujuće informacije istovremeno obrađuju pa je i razumljivo da značajnu ulogu u odbrani od udarca rukom u glavu ima sposobnost procjene simultane edukcije spacijalnih relacija kod kojih su procesi utvrđivanja i

the capability of simultaneous assessment of education of spatial relations in which the process of establishing and restructuring independent of the amount of previously acquired information. From the aforementioned reasons it is obvious that the psychological characteristics with other features and capabilities are a very important determinant which can decide on the ultimate success in the integrated education students of the Internal Affairs College in solving situational-motor problems of different levels of complexity in the known and unknown conditions.

CONCLUSION

Bearing in mind that besides the techniques, tactics and physical training, psychological regulatory mechanisms are very important for the ultimate success, based on the fact that different individuals vary in their characteristics, there is a need for the special physical education to be a function of individual capabilities and characteristics of students. For this reason, research was conducted on the students of the third year of the Internal Affairs College in Banja Luka, which was aimed to determine whether and to what extent the observed psychological characteristics of students of the Internal Affairs College in Banja Luka have an impact on the efficiency of the defense against attacks by the hand to the head. The obtained results of the regression analyzes revealed also that psychological characteristics have a statistically significant impact on the efficiency of the performance of the defense against attacks by the hand to the head, where it is possible to conclude that the subjects who had developed a better ability to search the visual field and locating objects in it and good control of anxiety were more effective in the performance of the defense against attacks by the hand to the head. Thus, the results of this research would from the aspect of methodology training provide a choice of new teaching methods and resources, introducing to the program structure of subject matter SPE, certain problem situations that would address the harmonization of possible solutions to the psychological characteristics and capabilities of each individual.

REFERENCES

Blažević, S., & Malacko, J. (2007). Evaluacija doprinosa kognitivnog statusa boksača uspjehu u izvođenju specifičnih motoričkih struktura [Evaluation of the contribution of cognitive boxer success in the execution of specific motor structure]. *Acta Kinesiologica*, 1(2), 12–17.

restrukturiranja nezavisni od prethodno stečene količine informacija. Iz svega navedenog vidljivo je da su psihološke karakteristike uz ostale karakteristike i sposobnosti veoma važna determinanta koja može da odlučuje o konačnom uspjehu u integralnom obrazovanju studenata Visoke škole unutrašnjih poslova pri rješavanju situaciono -motoričkih problema različitog nivoa složenosti u poznatim i nepoznatim uslovima.

ZAKLJUČAK

Imajući u vidu da su pored tehnike, taktike i fizičke pripreme, psihološki regulatorni mehanizmi veoma bitni za konačan uspjeh, a na osnovu činjenice da se različiti pojedinci međusobno razlikuju po svojim obilježjima, nameće se potreba da nastava specijalnog fizičkog obrazovanja treba da bude u funkciji individualnih sposobnosti i osobina studenata. Iz tog razloga je provedeno istraživanje na studentima treće godine Visoke škole unutrašnjih poslova u Banjoj Luci, koje je imalo za cilj da se utvrdi da li i u kojoj mjeri posmatrane psihološke karakteristike studenata Visoke škole unutrašnjih poslova iz Banja Luke imaju uticaj na efikasnost odbrane od napada rukom u glavu. Na osnovu dobijenih rezultata regresionom analizom utvrđeno je da psihološke karakteristike imaju statistički značajan uticaj na efikasnost izvođenja odbrane od napada rukom u glavu, pri čemu je moguće zaključiti da ispitanici koji su imali bolje razvijenu sposobnost pretrage vizuelnog polja i lociranja objekata u njemu i dobru regulaciju anksioznosti su bili efikasniji u izvođenju odbrana od napada rukom u glavu. Dakle, rezultati ovog istraživanja bi sa aspekta metododike obučavanja mogli dati mogućnost izbora novih nastavnih oblika i sredstava, uvođenjem u programske strukture nastavnih sadržaja SFO, određenih problemskih situacija koje bi se rješavale usklađivanjem mogućih rješenja sa psihološkim karakteristikama i sposobnostima svakog pojedinca. S obzirom na to da su istraživanja ove problematike veoma rijetka u ovom prostoru, moguće je da ovo istraživanje podstakne i druga slična istraživanja koja bi mogla doprinijeti efikasnosti u obučavanju ali i u selekciji kandidata.

Kasum, G., & Bačanac, Lj. (2007). Povezanost pojedinih psiholoških karakteristika vrhunskih rvača i njihovih glavnih poentirajućih tehnika [Connection between some psychological characteristics of elite wrestlers and their main scoring techniques]. *Fizička kultura*, 61(1–2), 1–12.

Milošević, M., Mudrić, R., Jovanović, S., Amanović, Đ., & Dopsaj, M. (2005). *Konstituisanje sistema za*

- upravljanje trenutnim i kumulativnim edukativnim i trenaznim efektima (upravljanje u SFO)*
[Constituting system for managing current and cumulative educational and physical training effects (management SFO)]. Beograd, RS: Monografija iz istraživačkog projekta.
- Momirović, K., & Horga, S. (1990). Povezanost rezultata u testovima intelektualnih sposobnosti i osobina ličnosti [Correlation of results of tests of intellectual abilities and personality factors]. *Primijenjena psihologija*, 11(1), 31–36.
- Momirović, K., Wolf, B., & Džamonja, Z. (1992). *Kibernetička baterija konativnih testova* [Cybernetic battery of cognitive tests]. Beograd, RS: Savez društva psihologa Srbije, Centar za primijenjenu psihologiju.
- Mudrić, R., & Jovanović, S. (2001). Model psiholoških karakteristika studenata VŠUP [Model psychological characteristics of students of College of Interior]. *Treći zbornik radova nastavnika Više škole unutrašnjih poslova* (pp. 63–80). Beograd, RS: Viša škola unutrašnjih poslova.
- Popović, D. (1990). Struktura kognitivnih sposobnosti judista [The structure of cognitive abilities of judokes]. *Scientific Congress, Valorisation of Program's Effects in Physical Culture*. Novi Sad, RS: Fakultet fizičke kulture.
- Stoiljković, S. (1995). Odnosi između inteligencije i ličnosti [Relationship between intelligence and personality]. *Psihologija*, 1-2, 29–43.
- Vučinić, B., Popović, B. V., & Momirović, K. (1992). Prilog poznavanju odnosa između intelektualnih sposobnosti i osobina ličnosti [Contribution to the knowledge of the relationship between intellectual abilities and personality factors]. *Zbornik instituta za kriminološka i sociološka istraživanja*, 21(1-2), 178–200.
- Wolf, B., Momirović, K., & Džamonja, Z. (1992). *Baterija testova inteligencije* [Battery of intelligence tests]. Beograd, RS: Savez društva psihologa Srbije, Centar za primijenjenu psihologiju.

Received: October 10, 2013

Revision received: December 2, 2013

Accepted: December 23, 2013

Primljeno: 10. septembar 2013. godine

Izmjene primljene: 2. decembar 2013. godine

Odobreno: 23. decembar 2013. godine

Correspondence to:

Darko Paspalj, PhD

Visoka škola Unutrašnjih poslova

Buluvera V. Živojina Mišića 10A

78000 Banja Luka

Bosnia and Herzegovina

Phone: 00387 66 24 03 57

E-mail: dpaspalj@yahoo.com

Korespondencija:

Dr Darko Paspalj

Buluvera V. Živojina Mišića 10A

78000 Banja Luka

Bosnia and Herzegovina

Telefon: 00387 66 24 03 57

E-mail: dpaspalj@yahoo.com

EINFLUSS DER PSYCHOLOGISCHEN MERKMALE AUF DIEEFFEKTIVITÄT DER VERTEIDIGUNG GEGEN HANDANGRIFFE

Drako Paspalj¹

¹Polizeihoehschule, Banja Luka, Bosnien und Herzegowina

Die Methode der Netzplanung mit Hilfe des kritischen Weges wurde von Morgan R. Walker, und E. Kelley, Jr, im Jahr 1950 entwickelt. Seitdem wird sie versucht auf die Verwaltung des Sports, wo die Ressourcen sehr begrenzt sind, und die Anforderungen für Sport und Wirtschaft, zu hohen Erwartungen ausgesetzt sind, anzuwenden.

Wachsendes Interesse an der Anwendung der CPM in der Verwaltung des Sports, ist eine Folge der Entwicklung des spezialistischen Projektmanagements im Sport. Diese Arbeit stellt ein Beispiel der Planung einer Sportveranstaltung mit dieser Methode, mit dem Ziel, dass diese Erfahrungen die Arbeit der Organisatoren und Koordinatoren erleichtern, und mit Hilfe von wissenschaftlichen Erkenntnissen und

quantitativen Methoden die zur Verfügung stehen, auf die Möglichkeit der effektiveren und effizienteren Verwaltung der menschlichen, infrastrukturellen, Geld und IT-Ressourcen im Zusammenhang mit Zeitdruck aufzuweisen.

Systematische Untersuchungen der Organisation von Sportveranstaltungen wurden bis jetzt von vielen Autoren behandelt. Dies hat eine solide theoretische Basis im Management von Sportveranstaltungen geschaffen, und sie alle haben eines Gemeinsam, dass diese Ideen in der modernen Sportpraxis angewendet werden können. Auf der anderen Seite, wurde von der Idee angefangen, dass durch empirische Forschung im Sport, mit den Techniken der Netzplanung und anderen quantitativen Methoden, Zwänge, Faktoren und Vorgehensweisen im Rahmen dieser Phänomene genau zu identifizieren. Das Ziel ist, dass durch die Analyse die Annahme der Bedeutung der Management-Prozesse und Techniken für die Organisation der Veranstaltung bestätigt werden, und zu der Erkenntnis kommen, dass man die Ergebnisse interpretiert, um die gute sportliche Praxis in der Entscheidung bei der Organisation von Sport und ähnlichen Veranstaltungen (Jubiläen, Messen, Ausstellungen, Pressekonferenzen), oder für die weitere Forschung auf dem Gebiet des Projektmanagements im Sport.

Methoden

In der Studie wurden moderne Verfahren und Methoden, auf dem akademischen Bereich Management im Sport, angewendet: Abzug, Analyse und Synthese, Vergleich, Illustrationen, quantitative Methoden, etc. Die Arbeit stellt den theoretischen Ansatz, mit dem eine Methodik für die Erstellung von Projekt-Management-Strategien im Sport gelten.

Auf der Grundlage der vorhandenen theoretischen Kenntnisse im Bereich der Netzplanung und CPM-Techniken und der bisherigen empirischen Studien und Erfahrungen in dem spezialisierten Bereich des Projektmanagements im Sport wurde in dieser Arbeit ein theoretischer Mode konstruiert.

Das Ziel ist, mit Hilfe dieser Methode Kenntnis zu erlangen, die die sportliche Praxis verbessern wird, die Methoden der Netzplanung im Sport zu fördern, wo immer es möglich ist oder die Notwendigkeit entsteht.

Beispiel Entität

Eine Sportveranstaltung wird durch Stufen wie Projektvorbereitung, Durchführung, Analyse und Auswertung der eigentlichen sportlichen und finanziellen Ergebnisse realisiert. In der Vorbereitungsphase analysiert man die Eingänge (technische und finan-

zielle Unterstützung (Kapital Quellen), Zeit, Personal, die Struktur der Einnahmen und Ausgaben und man projiziert Risiken (Nichtbefolgung des Ereignisses, dh Stornierungen, Überschreitung der Zeit und des Budgets...). Parallel damit, angemessen mit einem Ziel werden Datum, Dauer der Aktivitäten, spezielle Fristen und kritische Daten gesetzt. Mit dem Ziel der Popularisierung, Vereinfachung und Konvergenz dieser Techniken für den Einsatz im Sport, wurde in der Arbeit als Probe eine manuelle hypothetische Anzeige der Critical Path Method gezeigt.

Variablen

Die Planung und Organisation von Veranstaltungen beinhaltet: 1/ Formulierung einer Strategie, 2/ Machbarkeitsstudie und Entscheidung, 3/ Zielsetzung, 4/ Benennung des Organisationskomitees und des Koordinators des Komitees für verschiedene Bereiche (Sicherheit, Sicherheitspersonal, Mess- und Prüftechnik, Logistik, etc.), 5/ Budgetierung (Finanzplan), 6/ Organisationsstruktur, 7/ Personal nach Sektoren (Freiwillige, etc.), 8/ Feinplanung, 9/ Präsentation von Veranstaltungen einschließlich der Vorbereitung, Schließung und Reinigung, und Auswertung, Feedback und Modifizierung bestimmter zukünftiger Ereignisse (Dugalić, 2007). Diese Aktivitäten werden mit Variablen vorgestellt: Analyse von Zeit und Struktur und Rechnung der Zeitreserven.

Prüfverfahren

Aufgrund der vielen Anforderungen und Beschränkungen, war es notwendig in einer systematischen Weise, mit speziellen Methoden Aktivitäten zu betonen, die entscheidend für den Erfolg der Veranstaltung sind. Die Anwendung von quantitativen Methoden der Netzplanung (CPM, PERT) dieser Phasen und Aktivitäten, werden sie durch Computer Techniken in Steuerungsmodelle übersetzt, mit denen man folgendes macht: Die Planung der Sportveranstaltung, die Organisation der Aktivitäten und Durchführung der Koordinierung in den letzten Stadien, auf einer routinemäßigen Weise. Das Testverfahren beinhaltet Segmente und Aktivitäten, die erforderlich sind, um eine Sportveranstaltung zu planen, damit man zu den frühesten und spätesten Anfängen und Enden aller Aktivitäten kommt, vor allem diejenigen, die auf dem kritischen Weg liegen, und die endgültige Fertigstellung des Projekts sind.

Statistische Analyse

Die Daten aus der statistischen Analysen wurden durch die Einträge in dem Flussdiagramm der Aktivitäten des Sportprojekts verwendet. Es passiert, dass

man im Laufe der Datenverarbeitung wie die Analyse der Struktur und Analyse der Zeit mehrere Daten für das gleiche Phänomen bekommt, wobei bei der progressiven Rechnung der Zeit Maximalwerte und in retrograde – Minimalwerte genommen werden. Die statistische Analyse zeigt den kritischen Weg in einem Netzwerkdiagramm der über die Ereignisse geht, die die frühesten und spätesten Zeiten haben, wie in der Tabelle Nr. 2 und Figur Nr. 3 gezeigt wird.

Ergebnisse

Das Verfahren für die Durchführung des Projekts von einem Sport aus dem Beispiel hat dazu geführt, dass man die Ergebnisse und die Vorteile der CPM-Methode leichter begreift: einen umfassenden Überblick über die gesamte Planung des Objektes, eindeutig gezeigte logische Sicht auf die Interdependenz der Teile, eine präzise Zeiterfassung und Fristen von Veranstaltungen, aktuelle Informationen über die kritische Zeit der größten Belastung der Arbeit, die Faktoren, die negativ auf die Fertigstellung des Projekts wirken, ein objektiver Vergleich der Varianten des Plans, um eine bessere Lösung zu bekommen, die Erleichterung des Planers bei Routinearbeiten, besonders bei sehr komplexen Projekten, die der Computer durchführt, usw. Abbildung Nr. 3 bietet einen vollständigen Überblick über alle notwendigen Daten, die das Resultat der Analyse der Struktur und der Zeit, sowie der berechneten Zeitreserven sind. Aber um diese präzisen Ergebnisse zu erreichen, war es notwendig, aus der Sicht aller Aktivitäten anzufangen (Tabelle Nr. 1), und Bild Nr. 1 zeigt ein Flussdiagramm dieser Aktivitäten.

Diskussion

Der Netzplan eines Sportprojekts in dieser Arbeit, der auf der Grundlage der vorliegenden Forschung in der modernen Sportpraxis aufgebaut ist, zeigt, dass die Anwendung von CPM im Sport es möglich macht die Ziele zu realisieren, wessen Ausführung begrenzte Ressource verlangt: Zeit, Personal und Geld.

Niemand kann die Bedeutung der CPM-Methode für jedes Unternehmen aberkennen, wessen Gründer M. R. Walker und Kelley, J. E bei der Entwicklung effizienter Institutionen wie zum Beispiel DuPont und Remington Rand beigetragen haben. In dieser Arbeit wurde eine bewährte Methode der Anwendung von Netzwerkplanung in der Verwaltung des Sports gezeigt: die Zeit des Projektes ist maximal gekürzt, die Möglichkeit Fristen zu überschreiten sowie andere Risiken wurden auf ein Minimum reduziert, und man hat konkrete zeitliche Daten erhalten, innerhalb denen einige Aktivitäten durchgeführt werden müssen (12 Wochen), was die Kontrolle der Realisation des Projektes erleichtert und eine zeitliche Reaktion des Koordinators des Sportereignisses ermöglicht.

Der Schlussteil

Die Projektleitung im Sport durch die Anwendung von Techniken der Netzplanung hatte keinen großen Einsatz in der Sportpraxis. Daher wird die Durchführung von Sportveranstaltungen in unserer Region so charakterisiert: Überschreiten der Termine und des Budgets, was eine schlechte Empfehlung, bei den internationalen Sportverbänden für die Kandidatur neuer Sportveranstaltungen ist. Wenn solche Gründe, wie teure Programmpakete für die Verwaltung des Ereignisses genannt werden, wegen des Geldmangels, zeigen die Ergebnisse dieser Studie, dass die manuelle Anzeige des CPM-Modelles bei kleinen und mittelgroßen Veranstaltungen helfen kann. Die Bildung der Projektmanager im Sport kann die Anerkennung der CPM-Methode und ihre Anwendung fördern. Aus dem Grund, weil die Strategie der Verwaltung des Modelles des Projekts im Sport zeigt, dass Sportorganisationen Ressource haben die in der Lage sind diese Techniken durchzuführen, und ein Modell auf dem gewünschten Bereich der Aktivität auszuwählen.

Schlüsselbegriffe: Verteidigung, Handangriff, psychologische Merkmale.

RELACIJE MORFOLOŠKIH VARIJABLI I NORMALNIH I PATOLOŠKIH KONATIVNIH KARAKTERISTIKA RUKOMETAŠA

RELATIONS BETWEEN MORPHOLOGICAL VARIABLES AND NORMAL AND PATHOLOGICAL CONATIVE CHARACTERISTICS OF HANDBALL PLAYERS

Veroljub Stanković¹, Julijan Malacko², Ivana Bojić³, and Jelena Ilić⁴

¹Fakultet za sport i fizičko vaspitanje, Univerzitet u Prištini, Srbija
Faculty of Sport and Physical Education, University of Priština, Serbia

²Fakultet sporta i fizičkog vaspitanja, Univerzitet u Novom Sadu, Srbija
Faculty of Sport and Physical Education, University of Novi Sad, Serbia

³Fakultet sporta i fizičkog vaspitanja, Univerzitet u Nišu, Srbija
Faculty of Sport and Physical Education, University of Niš, Serbia

⁴Zavod za sport i medicinu sporta Republike Srbije, Beograd, Srbija
Institute for Sport and Sports Medicine of the Republic of Serbia, Belgrade, Serbia

ORIGINAL SCIENTIFIC PAPER

ORIGINALAN NUČNI ČLANAK

doi: 10.5550/sgia.130902.en.004S

UDK: 796.322.012.1

doi: 10.5550/sgia.130902.se.004S

SUMMARY

The aim of the research was to study the relations between morphological, normal and pathological conative characteristics of handball players of the Premiere Handball League of Serbia. The study was based on a system of 51 variables (23 anthropometric, 16 normal conative and 12 pathological conative variables). The data were collected on a suitable sample ($N=71$) and processed using a canonical correlation analysis. The results indicate that there is a canonical correlation between the systems of anthropometric variables and the system of normal conative characteristics ($R_c=.80$; $p<.00$), and that there were two statistically significant correlations between the system of normal and pathological conative characteristics ($R_c=.69$; $p<.00$ i $R_c=.62$; $p<.02$). The handball players of the ectomesomorph type are characterized at the one end with longitudinal measures and on the other with transversal dimensionality, the volume of the femoral region if they have increased values of conative variables, are extrovert and non-anxious. Among the handball players who are polite and considerate of each other there is an increase in the scores for depression as well as those which indicate a more pronounced vivacity and impulsiveness and expressiveness. Handball players who more frequently manifest dominant, competitive or even aggressive behavior are more anxious, while those who are more moral and adhere more to the rules are more prone to hypersensitivity. The ones who are undaunted and

SAŽETAK

Cilj istraživanja je ispitivanje relacija morfoloških, normalnih i patoloških konativnih karakteristika rukometaša Prve rukometne lige Srbije. U istraživanju je primijenjen sistem od 51 varijable (23 antropometrijske, 16 normalnih konativnih i 12 patoloških konativnih varijabli). Podaci su prikupljeni na prigodnom uzorku ($N=71$) i obrađeni pomoću kanoničke korelacione analize. Rezultati pokazuju da između sistema antropometrijskih varijabli i sistema normalnih konativnih karakteristika postoji kanonička korelacija ($R_c=0,80$; $p<0,00$), a između sistema normalnih i patoloških konativnih karakteristika dobijene su dvije statistički značajne korelacije ($R_c=0,69$; $p<0,00$ i $R_c=0,62$; $p<0,02$). Rukometaši ektomezomorfog tipa se karakterišu na jednom polu longitudinalnim mjerama a na drugom transversalnom dimenzionalnošću obimom femoralne regije ako imaju povećane vrijednosti u konativnim varijablama, ekstraverti su i neanksiozni. Kod rukometaša koji su ljubazni i pažljivi prema drugima postoji porast skorova na depresivnosti kao i kod onih koji pokazuju izraženiju živahnost i impulsivnost i ekspresivnost. Rukometaši koji češće manifestuju dominantno, takmičarsko, asertivno ili čak agresivno ponašanje su anksiozniji, dok su oni koji su moralniji i više poštuju pravila su skloniji hipersenzitivnosti. Oni koji su

have an adventurous spirit score higher for obsession. Tense, energetic and impatient handball players often develop gastrointestinal conversion, hypochondria and phobias.

Key Words: conative relations, morphology, handball, Serbia.

INTRODUCTION

Handball is a very demanding contact team sport which in its structure contains elementary movements such as running, jumping, sprint, arm swings, hits, blocks, pushing along with interactive contact with the opponent during the game (Vrbik, Čizmek, & Grujić, 2011). Handball success depends on a great number of external and internal factors. According to some authors (Gabrijelić, 1977; Ilić, 1993; Pokrajac, 1983), in the equation of the specification of sports results, as many as 13 factors have to be taken into consideration 13 (morphological, motor, functional, conative, cognitive, motivational, sociological, health etc.).

Even though the morphological characteristics of the anthropological status of a man usually include the processes of growth and ontogenetic development, it is based on the interaction between all the anthropological morphological characteristics and to a significant extent is determined by endogenously and exogenously conditioned factors. There is a significant body of research which deals with the morphological characteristics of handball players (Popović-Ilić, Stanković, Vitošević, & Ilić, 2010; Srhoj, Marinović, & Rogulj, 2002; Šentija, Matković, Vuleta, Tomljanović, & Džaj, 1997; Šibila & Pori, 2009; Vrbik et al., 2011), as well as the relations between their anthropometric and psychological characteristics. Within them, the identification of latent variables in the morphological space was carried out with the help of factor analysis, along with the increased use of taxonomy (cluster) algorithms, with the primary aim of determining the morphological structure of the human body, then the relations between these characteristics and other anthropological features, abilities and characteristics, as well as how much they contribute to success in sport (Malacko & Popović, 2001; Popović & Simonović, 2008; Stanković, 2000; Stanković & Malacko, 2008; Stanković, Malacko, & Doder, 2011; Stanković & Popović, 2011; Szirovicza, Momirović, Hošek, & Gredelj, 1980).

Some of the morphological characteristics of athletes are strongly bound to success in sport (Stanković, 2001). It has been determined that in sports games, tall athletes, the ones with a greater arm and leg length have a certain advantage when compared to short athletes, or those with short extremities. Furthermore, athletes with greater amounts of fatty

neustrašiviji i avanturističkog duha imaju više skorove na opsesivnosti. Napeti, energični i nestrpljivi rukometaši češće razvijaju gastrointestinalnu konverziju, hipohondriju i fobičnost.

Ključne riječi: konativne relacije, morfologija, rukomet, Srbija.

UVOD

Rukomet je zahtijevan kontaktni, ekipni sport koji u svojoj strukturi sadrži elementarne pokrete kao što su trčanje, skakanje, sprint, zamahivanje, udaranje, blokiranje i guranje uz interaktivni kontakt sa protivnikom tokom igre (Vrbik, Čizmek i Grujić, 2011). Uspjeh u rukometu zavisi od velikog broja spoljašnjih i unutrašnjih faktora. Prema nekim autorima (Gabrijelić, 1977; Ilić, 1993; Pokrajac, 1983), u jednačini specifikacije sportskog rezultata učestvuje čak 13 faktora (morfološki, motorički, funkcionalni, konativni, kognitivni, motivacioni, sociološki, zdravstveni i dr.).

Iako se pod morfološkim karakteristikama antropološkog statusa čovjeka najčešće podrazumijevaju procesi rasta i ontogenetskog razvoja on za svoju osnovu ima interakciju svih antropoloških morfoloških karakteristika i u znatnoj mjeri je određen endogeno i egzogeno uslovljenim činiocima. Postoji veliki broj istraživanja koja su se bavila morfološkim karakteristikama rukometaša (Popović-Ilić, Stanković, Vitošević i Ilić, 2010; Srhoj, Marinović i Rogulj, 2002; Šentija, Matković, Vuleta, Tomljanović i Džaj, 1997; Šibila i Pori, 2009; Vrbik i saradnici, 2011), kao i relacijama njihovih antropometrijskih i psiholoških karakteristika. U njima je identifikacija latentnih varijabli u morfološkom prostoru vršena najčešće pomoću faktorske analize, a sve su više bile prisutne i metode taksonomskih (cluster) algoritama, sa ciljem da se najprije utvrdi morfološka struktura ljudskog organizma, a zatim i relacije ovih karakteristika sa drugim antropološkim osobinama, sposobnostima i karakteristikama, kao i koliko one doprinose uspjehu u sportskom stvaralaštvu (Malacko i Popović, 2001; Popović i Simonović, 2008; Stanković, 2000; Stanković i Malacko, 2008; Stanković, Malacko i Doder, 2011; Stanković i Popović, 2011; Szirovicza, Momirović, Hošek i Gredelj, 1980).

Neke morfološke karakteristike sportista imaju visok stepen povezanosti s uspjehom u sportu (Stanković, 2001). Utvrđeno je da u sportskim igrama, visoki sportisti, dužih ruku i nogu imaju određenu prednost pred nižim sportistima, odnosno onima s

tissue are inferior in comparison to the ones with the same weight but unburdened by the unwanted fatty tissue. A great number of studies which deal with the transformations of morphological characteristics (Popović-Ilić et al., 2010; Srhoj et al., 2002; Šentija et al., 1997; Šibila et al., 2009; Vrbik et al., 2011) indicate their complexity considering that they are under the influence of both genetic factors as well as online factors, where we need to point out that the influence of genetic factors is not the same for all the latent morphological dimensions. The analysis of latent dimensions of morphological variables led to solutions which could taxonomically be interpreted, primarily those responsible for the growth of bones in terms of length, that is longitudinal dimensionality of the skeleton which is responsible for body mass, and circular dimensionality, subcutaneous fatty tissue and transversal dimensionality of the skeleton. It has been determined that in the case of handball players, it is possible to speak of ecto-mesomorphia. The bicristal range or second horizontal axis of the body is more responsible for a harmonious and biomechanically more functional morphological development than the first horizontal axis of the body.

In the study carried out by Stanković et al. (2009), it was determined that unlike basketball and soccer players, handball players have increased values for soft tissue, defined through the amount of muscle mass and subcutaneous fatty tissue. Regarding that, the relevant literature indicates that muscle volume has a direct influence on the ability to develop muscle strength, and thus define the possibilities of greater or lesser effective movement, overcoming resistance or obstacles. Even though subcutaneous fatty tissue in motor manifestations of athletes represents a ballast mass, it is very important not to disregard the need for the optimum amount of fatty tissue, considering the fact that it contains fatty acids which are necessary not only for the proper realization of a variety of chemical processes in the human body, but also for the structure of certain tissues and for energy production.

Conative characteristics are responsible for the modalities of human behavior and are determined as the latent structures on which the modalities of human behavior depend in relation to oneself, other people and society in general, as well as the characteristic modalities of emotional reactions and determine manner, form and stability, but not the intensity of the reaction (Pajević, 2003). Considering the fact that there are normal and pathological modalities of behavior, conative characteristics can be divided into normal and pathological. Normal conative characteristics, or factors, are usually mutually independent and normally distributed in the population. They integrate the ego and enable dynamic and effective communication with the environment. Different authors have often obtained very different results in

kratkim ekstremitetima. Zatim, da su sportisti s velikom količinom masnog tkiva inferiorni u odnosu na one s istom težinom, ali bez ovog nepotrebnog balasta. Veliki broj istraživanja koje se bave transformacijama morfoloških karakteristika (Popović-Ilić i saradnici, 2010; Srhoj i saradnici, 2002; Šentija i saradnici, 1997; Šibila i saradnici, 2009; Vrbik i saradnici, 2011), ukazuje na njihovu veliku složenost s obzirom da su one pod uticajem kako genetskih faktora tako i faktora okoline, pri čemu treba istaći da uticaj genetskih faktora nije isti za sve latentne morfološke dimenzije. Analizom latentnih dimenzija morfoloških varijabli dobijena su rješenja koja su se mogla taksonomski interpretirati i to ona odgovorna za rast kostiju u dužinu, odnosno longitudinalnu dimenzionalnost skeleta, odgovorna za masu tijela i cirkularnu dimenzionalnost skeleta, potkožno masno tkivo i transversalnu dimenzionalnost skeleta. Utvrđeno je da je kod rukometaša moguće govoriti o ektomezomorfiji. Bikristalni raspon ili druga horizontalna osovina tijela odgovornija je za harmoničan i biomehanički funkcionalniji morfološki razvoj od prve horizontalne osovine tijela.

U istraživanju koje su sproveli Stanković i saradnici (2009), utvrđeno je da za razliku od košarkaša i fudbalera, rukometaši imaju povećane vrijednosti u mekim tkivima, definisanim količinom mišićne mase i potkožnog masnog tkiva. U vezi s tim, u stručnoj i naučnoj literaturi je poznato da volumen mišića ima direktnog uticaja na sposobnost razvijanja snage u mišićima, te samim tim definiše i mogućnost većeg ili manje efikasnog kretanja, savladavanja otpora ili prepreka. Iako potkožno masno tkivo u motoričkim manifestacijama sportista predstavlja balastnu masu, veoma je važno ne zanemariti potrebu za optimalnom količinom masnog tkiva, s obzirom da ono sadrži masne kiseline koje su nužne u ljudskom organizmu za odvijanje najrazličitijih hemijskih procesa, ali i za izgradnju pojedinih tkiva i proizvodnju energije.

Konativne karakteristike su odgovorne za modalitete ljudskog ponašanja i određuju se kao latentne strukture od kojih zavise modaliteti reagovanja u odnosu na sebe, druge ljude i društvo u cjelini, kao i karakteristični modaliteti emocionalnog reagovanja i određuju način, oblik i stabilnost, ali ne i intenzitet reagovanja (Pajević, 2003). Kako postoje normalni i patološki modaliteti ponašanja, tako se i konativne karakteristike mogu podijeliti na normalne i patološke. Normalne konativne karakteristike, odnosno faktori, su najčešće međusobno nezavisne i normalno distribuirane u populaciji. One integrišu ego i omogućavaju

terms of the structure of normal conative characteristics and thus, various theories of personality were also formed. The theoretical framework of this paper is Cattell's trait theory, which is based on the existence of 16 factors. Namely, Cattell (1978) thinks that personality is what tells us what a person will do when he finds himself in a certain situation. Human behavior is the product of a situation in which a man finds himself and the characteristics of his personality. Cattell sees personality as a complex and differentiated group of features with the motivation which to a great extent depends on the subgroup of dynamic features which refer to the activities of an individual when focusing on achieving a goal.

It is known that conative characteristics are connected to the decrease or increase in adaptive powers, while pathological ones cause disturbances in the integration of the personality, where the balance between the process of excitation and relaxation is interrupted, including the relative influence of disposition on most individual characteristics or groups of these characteristics of the personality. This includes the fact that they are primarily genetically conditioned (Popović & Simonović, 2008; Powell & Royce, 1981). They diminish the adaptation abilities of individuals and their distribution in the population is not normal considering that most people score low values on these factors (Pajević, 2003).

However, we should add that conative regulatory mechanisms, which have the task to neutralize the consequences of various disturbances (that is, to produce adaptable behavior or emotional stability), can themselves become a disturbance the moment when they cross a certain threshold of regulation. The joint characteristic of both kinds of conative dimensions (both normal and pathological) is that they determine the forms of behavior and reaction, which they use to affect the adaptational and active effectiveness.

At the very beginning of the 20th century, Sheldon & Kretschmer tried to establish a typology of the personality on the basis of body constitution. Kretschmer (1925/1970) claimed that individuals with a pyknic body type are prone to manic-depressive psychosis, while the asthenic type is characterized by a schizoid personality with a tendency of developing schizophrenia. Sheldon (Sheldon & Stevens, 1942) claimed that with the help of a series of measuring data on body composition we can obtain a certain image on the manifestation of these factors. The morphogenotype, as a hypothetical biological makeup, which can be found in the basis of external, visible body type (phenotype) also plays an important role not only in determining physical development but also shaping behavior. The somatotype represents a compromise between the morphogenotype and phenotype. The study of the connection between the somatotype and temperament types determined that

dinamičku i efikasnu komunikaciju sa sredinom. Različiti autori dobijali su često veoma različite rezultate u pogledu strukture normalnih konativnih karakteristika pa su se shodno tome, formirale i različite teorije ličnosti. Kao teorijski okvir u ovom radu je korišćena Katelova teorija ličnosti koja podrazumeva da postoji 16 faktora. Naime, Katel (1978) smatra da je ličnost ono što nam pokazuje šta će osoba učiniti kada se nađe u određenoj situaciji. Ponašanje čovjeka je proizvod situacije u kojoj se nalazi i karakteristika njegove ličnosti. On vidi ličnost kao složen i diferenciran sklop crta sa motivacijom koja uveliko zavisi od podskupa dinamičkih crta, koje se odnose na stupanje pojedinca u akciju usmjerenu ka ostvarenju nekog cilja.

Za konativne karakteristike je poznato da su one povezane sa smanjenjem ili povećanjem adaptivne moći, a one patološke izazivaju poremećaje u integraciji ličnosti, čime se vrši narušavanje ravnoteže između procesa razdraženja i kočenja, kao i da postoji relativan uticaj dispozicije na većinu pojedinačnih karakteristika ili grupa tih karakteristika ličnosti kao i da su one pretežno genetski uslovljene (Popović & Simonović, 2008; Powell & Royce, 1981). One umanjuju adaptacione sposobnosti pojedinca i njihova distribucija u populaciji nije normalna budući da većina ljudi na ovim faktorima ima niske vrijednosti (Pajević, 2003).

Ali, treba dodati i to da konativni regulatorni mehanizmi koji imaju zadatak da neutrališu posledice različitih smetnji (odnosno, da proizvedu adaptibilno ponašanje ili emocionalnu stabilnost), mogu i sami postati smetnja onoga trenutka kada pređu određeni prag regulacije. Zajednička karakteristika obe vrste konativnih dimenzija (normalnih i patoloških) je da određuju oblike ponašanja i reagovanja, čime djeluju na adaptacionu i akcionu efikasnost.

Još početkom XX vijeka, Šeldon i Krečmer su pokušali da uspostave tipologiju ličnosti na osnovu tjelesne konstitucije. Krečmer (1925/1970) je tvrdio da su osobe sa pikničkom građom sklone manično – depresivnoj psihozi dok astenični tip odlikuje šizoidna ličnost sa tendencijom ka razvijanju šizofrenije. Šeldon (Sheldon & Stevens, 1942) tvrdi da se pomoću niza mjernih podataka o tjelesnoj građi može dobiti izvjesna slika i o ispoljavanju tih činilaca. Morfogentip, kao hipotetički biološki sklop, koji leži u osnovi spoljne, opažljive telesne građe (fenotipa) ima i važnu ulogu ne samo u određivanju fizičkog razvoja nego i u obličavanju ponašanja. Somatotip predstavlja kompromis između morfogenotipa i fenotipa. Ispitivanjem

in the case of endomorphs, we find features which characterize the viscerotome type of temperament, including a proclivity for comfort, sociability, gluttony and the desire for love and affection. They are relaxed, slow to react, balanced in their nature, tolerant and cooperative. Mesomorphs are characterized by features such as love of physical activity and a tendency for risk which is characteristic of the somatotype. This type of temperament is also characterized by aggression, insensitivity for the feelings of others, a mature look, loud behavior, courage and claustrophobia, while its basic values include action, power and imposition. Ectomorphs are characterized by hypersensitivity in comparison to the stimuli which originate from the surroundings, are introvert and find pleasure in reflection, a longing to withdraw into themselves and their solitude, which are the characteristics of the cerebrotone type of temperament, including control, stiffness, secrecy, shyness, a young spirit, fear of people, as they are happiest in small and isolated spaces. The individual reacts quickly, sleeps poorly and tries to avoid attracting attention to oneself (Hol & Lindzi, 1983).

Herdis, Deabler, Hartl, & Willis (1973) in their study carried out on 300 war veterans attempted to determine whether there was a connection between Sheldon's somatotypes and Cattell's personality factors. Their results indicated that endomorphic and ectomorphic somatotypes did not have a significant correlation with Cattell's personality factors. In addition to factor L, which has a positive correlation with the mesomorphic type, this type has also indicated negative statistically significant correlations (although of a very low intensity) with the factors of high/low ergic tension Q4 (calm – high strung), crystallized intelligence B and the factor of ego strength C which represents emotional (in)stability. The mesomorphic ("sports") type of veteran was characterized by a greater level of suspicion, jealousy and calm, a lower level of crystallized intelligence and lower emotional stability.

The aim of this research was to evaluate whether there were any statistically significant relations between the system of morphological characteristics, normal conative characteristics and pathological conative characteristics as well as to precisely determine which anthropological characteristics successful handball players, who were able to secure a position in the Premiere League, possess.

METHODS

Sample of participants

The sample was suitable and consisted of 71 handball players of the Premiere National Handball League

povezanosti somatotipa i tipova temperamenta, ustanovio je da su kod endomorfa prisutne osobine koje odlikuju viscerotoni tip temperamenta a to su sklonost ka udobnosti, druželjubivost, pohlepnost za hranom te potreba za ljubavlju i nježnošću. Opušteni su, sporo reaguju, uravnotežene su naravi, tolerantni i saradljivi. Mezomorfe odlikuju osobine poput ljubavi ka bavljenju fizičkim aktivnostima i sklonost riziku koje su karakteristične za somatotoni tip. Ovaj tip temperamenta odlikuju još i agresivnost, neosjetljivost za osjećanja drugih, zreo izgled, bučno ponašanje, hrabrost i klaustrofobičnost a osnovne vrijednosti su mu akcija, moć i nametanje. Ektomorfe odlikuje hipersenzitivnost u odnosu na stimulse koji potiču iz spoljašnje sredine, okrenuti su sebi i nalaze zadovoljstvo u razmišljanju, težnja ka povlačenju u sebe i samoći, što su karakteristike cerebrotonog tipa temperamenta kao i uzdržanost, ukočenost, tajnovitost, stidljivost, mladolikost, strah od ljudi a najsretniji su u malim i izolovanim prostorima. Osoba reaguje brzo, ima loš san i pokušava da izbegne privlačenje pažnje na sebe (Hol i Lindzi, 1983).

Herdis, Deabler, Hartl i Willis (1973) su u istraživanju sprovedenom na 300 ratnih veterana pokušali da ustanove da li postoji povezanost između Šeldonovih somatotipova i Katelovih faktora ličnosti. Dobili su da endomorfni i ektomorfni somatotipovi nisu značajno korelirali sa Katelovim faktorima ličnosti. Osim faktora L, koji je pozitivno korelirao sa mezomorfim tipom, ovaj tip je zabilježio i negativne, statistički značajne korelacije (iako veoma niskog intenziteta) i sa faktorima visoke/niske ergičke tenzije Q4 (smirenost - razdražljivost), kristalizovane inteligencije B i faktorom snage ega C koji predstavlja emocionalnu (ne)stabilnost. Mezomorfni ("sportski") tip veterana je odlikovala veća sumnjičavost, ljubomora i smirenost, niži nivo kristalizovane inteligencije i manja emocionalna stabilnost.

Cilj ovog istraživanja je bio ispitati da li postoje statistički značajne relacije između sistema morfoloških karakteristika, normalnih konativnih karakteristika i patoloških konativnih karakteristika, kako bi se preciznije utvrdilo koje sve antropološke karakteristike odlikuju uspješne rukometaše, koji su izborili svoje mjesto u Prvoj ligi.

METODE

Uzorak ispitanika

Uzorak je bio prigodan i činio ga je 71 rukometaš Prve savezne rukometne lige.

Measuring instruments

In order to evaluate the morphological characteristics, the following variables were used:

Longitudinal dimensionality of the skeleton

- Body height (VIS),
- Leg length (DNO),
- Hand length (DSA),
- Foot length (DST),
- Arm length (DRU),
- Biacromial range (BIA),

Transversal dimensionality of the skeleton

- Bicristal range (BIK),
- Hand width (SSA),
- Wrist diameter (DIR),
- Elbow diameter (DIL),
- Knee diameter (DIK),
- Foot width (SST),

Circular dimensionality and body mass

- Body mass (MAS),
- Upper arm volume (ONA),
- Lower arm volume (OPO),
- Upper leg volume (ONT),
- Lower leg volume (OPT),
- Average thorax volume (OGK),

Subcutaneous fatty tissue:

- Upper arm skinfold (KNA),
- Back skinfold (KLE),
- Armpit skinfold (KPA),
- Abdominal skinfold (KTR),
- Lower leg skinfold (KPT).

In order to evaluate the normal conative characteristics, the 16PF battery was used (Cattell, Eber, & Tatsuoka, 1970) with first-order factors:

- Outgoing – reserved (A),
- High intelligence – low intelligence (B),
- Higher ego strength – lower ego strength (C),
- Dominance – submissiveness (E),
- Surgency – desurgency (F),
- Stronger superego – weaker superego (G),
- Bold (parmia) – shy (threctia) (H),
- Tender-minded (premsia) – tough-minded (I),
- Protension (L),
- Autia (imaginative) – practical (M),
- Shrewdness – artlessness (N),
- Apprehensive (O),
- Radicalism – conservatism (Q1),
- Self-sufficiency – group dependence (Q2),
- High self-concept – low self-concept (Q3),
- Tense – relaxed (Q4).

Instrumenti

Za procjenu morfoloških karakteristika korištene su sljedeće varijable:

Longitudinalna dimenzionalnost skeleta

- Visina tijela (VIS),
- Dužina noge (DNO),
- Dužina šake (DSA),
- Dužina stopala (DST),
- Dužina ruke (DRU),
- Biakromialni raspon (BIA).

Transverzalna dimenzionalnost skeleta

- Bikristalni raspon (BIK),
- Širina šake (SSA),
- Dijametar ručnog zgloba (DIR),
- Dijametar lakta (DIL),
- Dijametar koljena (DIK),
- Širina stopala (SST).

Cirkularna dimenzionalnost i masa tijela

- Masa tijela (MAS),
- Obim nadlaktice (ONA),
- Obim podlaktice (OPO),
- Obim natkoljenice (ONT),
- Obim potkoljenice (OPT),
- Srednji obim grudnog koša (OGK).

Potkožno masno tkivo

- Kožni nabor nadlaktice (KNA),
- Kožni nabor leđa (KLE),
- Kožni nabor pazuha (KPA),
- Kožni nabor trbuha (KTR),
- Kožni nabor potkoljenice (KPT).

Za procjenu normalnih konativnih karakteristika korišćena je baterija 16PF (Cattell, Eber i Tatsuoka, 1970) sa faktorima prvog reda:

- Afektotimija - sajzotimija (A),
- Viša inteligencija - niža inteligencija (B),
- Snažan ego -slab ego (C),
- Dominacija - samopotčinjavanje (E),
- Surgencija - desurgencija (F),
- Snažan super ego - slab super ego (G),
- Neustrašivost (parmija) -strašljivost (H),
- Meka narav (premsija) -oštra narav (I),
- Protensija (L),
- Autija (uobrazilja) - praktičnost (M),
- Oštromnost (fitmija) - prostodušnost (N),
- Psihostenija (O),
- Tradicionalizam -liberalizam (Q1),
- Individualizam - grupna zavisnost (Q2),
- Dobra samokontrola- self konflikt (Q3),
- Visoka ergička tenzija - niska ergička tenzija (Q4).

Pathological conative characteristics were operationalized through the score for selected scales on a test of pathological conative characteristics (Momi- rović, 1971), C.I.-N4 - the efficiency of the regulatory system and control of organic functions (HI):

- Cardiovascular conversion (K10),
- Gastrointestinal conversion (G11),
- Inhibitory conversion (I7),
- Hypochondria (H13), the effectiveness of the regulatory system and the control of defensive reactions (ALPHA),
- Anxiety (A1),
- Obsession (O3),
- Hypersensitivity (S5),
- Phobias (F2), the efficiency of the regulatory system and the control of attack reactions (SIGMA),
- Impulsiveness (N14),
- Aggression (T15) and the effectiveness of the system for the coordination of regulatory functions (DELTA),
- Paranoia (P18),
- Depression (D6).

Methods of data processing

When calculating the relations between the systems of variables of morphological characteristics, normal and pathological conative characteristics, a canonical correlation analysis was used.

RESULTS

The results of the descriptive statistics for all of the variables are shown in Table 1.

After using a matrix analysis of the cross-correlations between the system of anthropometric variables and the system of normal conative variables (Table 2) we can note that there were statistically significant correlations between the pairs of variables between the moderate number of analyzed variables of the left and right set. The personality factors which did not indicate any statistically significant correlation with the set of anthropometric variables include: higher ego strength – weaker ego strength (C), stronger superego – weaker superego (G), tender-minded (premsija) – tough-minded (I), while the variables from the set of anthropometric variables which did not indicate any statistically significant correlations with the personality factors of the first order included leg length (DNO), the bicristal range (BIK), foot width (SST), upper arm volume (ONA), average thorax volume (OGK), back skinfolds (KNL), lower leg skinfolds (KPT).

Patološke konativne karakteristike su operaciona- lizovane preko skora na odabranim skalama na testu patoloških konativnih karakteristika (Momi- rović, 1971), C.I.-N4 - efikasnost sistema za regulaciju i kontrolu organskih funkcija (HI):

- Kardiovaskularna konverzija (K10),
- Gastrointestinalna konverzija (G11),
- Inhibitorna konverzija (I7),
- Hipohondrija (H13), efikasnost sistema za regulaciju i kontrolu reakcija odbrane (ALPHA),
- Anksioznost (A1),
- Opsesivnost (O3),
- Hipersenzitivnost (S5),
- Fobičnost (F2), efikasnost sistema za regulaciju i kontrolu reakcije napada (SIGMA),
- Impulsivnost (N14),
- Agresivnost (T15) i efikasnost sistema za koordinaciju regulativnih funkcija (DELTA),
- Paranoidnost (P18),
- Depresivnost (D6).

Metode obrade podataka

Prilikom izračunavanja relacija između sistema varijabli morfoloških karakteristika, normalnih i patoloških konativnih karakteristika bila je korišćena kanonička korelaciona analiza.

REZULTATI

Rezultati deskriptivne statistike za sve varijable su date u Tabeli 1.

Analizom matrice kroskorelacija između sistema antropometrijskih varijabli i sistema normalnih konativnih varijabli (Tabela 2) uočavaju se statistički značajne korelacije parova varijabli između umjerenog broja analiziranih varijabli lijevog i desnog seta. Faktori ličnosti koji nisu zabilježili nijednu statistički značajnu korelaciju sa setom antropometrijskih varijabli su: snažan ego -slab ego (C), snažan super ego - slab super ego (G) i meka narav (premsija) -oštra narav (I), dok su varijable iz seta antropometrijskih varijabli, koje nisu zabilježile nijednu statistički značajnu korelaciju sa faktorima ličnosti prvog reda bile dužina noge (DNO), bikristalni raspon (BIK), širina stopala (SST), obim nadlaktice (ONA), srednji obim grudnog koša (OGK), kožni nabor leđa (KNL), kožni nabor potkolenice (KPT).

TABLE 1*Basic statistical parameters.***TABELA 1***Bazični statistički parametri.*

Var.	Anthropometric variables						Pathological conative variables			Personality factors (raw scores)		
	M	Min	Max	SD	Skew.	Kurt	Var.	M	SD	Var.	M	SD
VIS	1815.18	1626	1960	62.632	-.269	.321	K10	2.60	1.625	A	12.67	8.724
DNO	1032.00	940	1180	47.547	.250	.295	G11	.84	1.327	B	7.15	2.162
DSA	196.09	170	235	11.015	.564	1.323	I7	1.31	1.293	C	16.16	3.492
DST	279.67	260	310	12.664	.817	.560	H13	.23	.818	E	15.43	4.298
DRU	782.47	690	880	49.924	-.211	-.220	A1	.21	.674	F	15.33	3.422
BIA	414.31	312	540	30.129	.385	4.664	O3	.29	.900	G	9.77	1.987
BIK	299.16	245	390	25.861	.731	2.183	S5	.40	.903	H	15.62	3.969
SSA	85.67	75	100	5.442	.092	-.362	F2	1.19	1.489	I	6.57	3.059
DIR	58.54	53	68	3.022	.219	.152	N14	.59	.887	L	10.38	2.963
DIL	74.78	62	88	6.581	.225	-.500	T15	.54	.841	M	10.26	2.699
DIK	92.38	76	105	5.909	.177	-.399	P18	1.45	1.528	N	10.70	2.647
SST	92.22	69	110	7.878	-.407	.608	D6	1.14	.682	O	10.21	3.193
MAS	788.52	550	1080	110.893	.426	-.286				Q1	9.19	2.974
ONA	283.38	230	370	25.285	.745	.940				Q2	10.11	2.733
OPO	269.15	220	320	21.027	.275	-.050				Q3	12.64	2.844
ONT	561.83	480	680	45.428	.653	-.066				Q4	9.95	3.852
OPT	392.25	320	600	48.820	2.097	6.215						
OGK	956.62	840	1110	69.548	.249	-.717						
KNN	94.01	36	198	36.395	.940	.687						
KNL	104.93	66	214	33.835	1.695	2.805						
KNP	75.46	46	162	23.521	1.474	2.679						
KNT	116.57	50	432	62.879	2.547	9.261						
KPT	102.88	35	256	48.759	.821	.517						

Legend/Legenda: Anthropometric variables - Antropometrijske varijable; Pathological conative variables - Patološke konativne varijable; Personality factors (raw scores) - Faktori ličnosti (sirovi skorovi), **Var.** - Variables; **Min** - Minimum (Minimum); **Max** - Maximum (Makimum); **M** - Sample mean (Aritmetička sredina); **SD** - Standard deviation (Standardna devijacija); **Skew.** - Skewnis; **Kurt.** - Kurtosis.

Later, a canonical correlational analysis was used to study the connection between the multivariate system of anthropometric variables and system of normal conative variables. It was determined that there is a statistically significant connection between these two factors ($R_c=0.89$, $p<.00$).

From the data contained in the matrix of the canonical structure of anthropometric and normal conative variables (Table 3), we can note a statistically significant correlation between anthropometric variables and the first canonical factor. The first iso-

Dalje je kanoničkom korelacionom analizom ispitivana povezanost između multivarijantnog sistema antropometrijskih varijabli i sistema normalnih konativnih varijabli i dobijeno je da postoji statistički značajna povezanost između ovih faktora ($R_c=0.89$, $p<.00$).

Iz rezultata sadržanih u matrici kanoničke strukture antropometrijskih i normalnih konativnih varijabli (Tabela 3) uočava se statistički značajna korelacija između antropometrijskih varijabli i prvog kanoničkog faktora. Izolovani prvi kanonički faktor je definisan

lated canonical factor was defined by relatively high values of statistically significant canonical correlation coefficients. Considering the fact that the structure of the first isolated canonical factor consists of the variables of foot length (DST), arm length (DRU), hand width (SSA), wrist diameter (DIR), knee diameter (DIK) and lower leg volume (OPT), it represents a combination of the ectomesomorphic sports type. The same table shows the matrix of the structure of canonical factors of normal conative variables which indicate that there is a very high correlation between the applied variables and the canonical factors. Considering that the isolated canonical factor represents seven conative variables: affectia - sizia (A), high intelligence - low intelligence (B), bold (parmia) - shy (H), tender-minded (premsia) – tough-minded (I),

relativno visokim vrijednostima statistički značajnih kanoničkih koeficijenata korelacije. S obzirom da strukturu prvog izolovanog kanoničkog faktora sačinjavaju varijable dužina stopala (DST), dužina ruke (DRU), širina šake (SSA), dijametar ručnog zgloba (DIR), dijametar koljena (DIK) i obim potkoljenice (OPT) on predstavlja kombinaciju ekto-mezomorfnog sportskog tipa. U istoj tabeli prikazana je i matrica strukture kanoničkih faktora normalnih konativnih varijabli koja pokazuje da postoje veoma visoke korelacije između primijenjenih varijabli i kanoničkog faktora. S obzirom da izolovani kanonički faktor prezentuje sedam konativnih varijabli: afektotimija - sajzotimija (A), viša inteligencija - niža inteligencija (B), neustrašivost (parmija) - strašljivost (H), meka narav (premsija) - oštra narav (I), proten-

TABLE 2

The cross-correlations between anthropometric and normal conative variables.

TABELA 2

Kroskorelacije antropometrijskih i normalnih konativnih varijabli.

	A	B	C	E	F	G	H	I	L	M	N	O	Q1	Q2	Q3	Q4
VIS	.05	-.12	-.09	-.04	-.31	-.12	.05	.04	.03	.10	-.08	.02	-.08	-.19	-.10	-.02
DNO	.17	-.08	-.18	-.05	.23	-.03	.09	.12	.11	.02	-.08	.06	-.03	-.21	-.22	.00
DSA	.09	-.02	-.11	-.09	-.10	-.13	-.01	.07	.02	.24	-.31	-.02	-.10	-.22	-.23	-.02
DST	.20	.13	.05	-.01	-.07	-.08	.28	.22	.28	.09	-.07	.12	-.06	-.00	-.11	.16
DRU	.26	.04	-.02	-.14	-.01	.00	.23	.21	.14	.05	-.18	.02	-.12	.06	-.01	-.06
BIA	.18	.01	-.10	-.30	-.16	.07	-.15	-.04	-.08	.05	-.12	.06	-.07	-.23	-.07	-.10
BIK	.04	.00	-.00	-.05	-.02	-.05	.12	-.05	-.02	-.03	-.03	-.05	-.05	-.00	.03	-.00
SSA	-.23	-.19	.17	-.09	-.05	-.14	.10	.06	-.02	.12	-.32	.04	.11	-.24	-.27	-.15
DIR	-.06	-.27	.09	-.11	.00	-.05	-.04	.02	-.02	.30	-.08	-.03	.01	-.14	.22	-.37
DIL	-.02	-.08	.02	-.23	-.16	.00	-.11	.05	-.15	.06	-.32	.07	.09	-.01	-.08	-.17
DIK	-.36	-.41	-.09	.18	-.00	.02	-.09	.14	.14	.04	.07	.10	.36	.01	-.01	.04
SST	.08	-.04	.05	.13	.13	-.06	.00	-.12	.21	.00	.12	-.08	-.03	-.00	.10	.08
MAS	-.09	-.13	-.04	-.02	-.03	-.10	.15	.13	.10	.25	-.01	-.08	.04	-.20	.00	-.02
ONA	-.10	-.08	-.05	-.04	.03	-.00	.10	-.04	.17	.09	-.01	-.09	.09	-.14	-.09	.00
OPO	-.12	-.16	.00	.02	-.05	.04	.07	.09	-.05	.25	.04	-.04	.09	-.14	-.01	-.17
ONT	-.09	-.14	.02	.01	.10	-.10	.19	-.02	.11	.24	-.00	-.13	.11	-.16	-.03	-.02
OPT	-.09	-.37	.01	.09	.21	.05	.15	-.03	-.00	.02	.37	.11	.06	-.04	.00	.00
OGK	-.08	-.19	-.07	-.11	-.04	-.12	.09	.04	.13	.15	.01	-.01	.11	-.17	.01	-.07
KNN	-.02	.00	.00	.16	.24	.07	.18	-.01	.19	.11	.09	-.20	.35	.02	-.06	.10
KNL	-.06	.00	-.05	.10	.09	-.00	.07	.01	.05	.21	.11	-.19	.22	.13	-.08	.10
KNP	-.13	-.10	-.08	.13	.29	.04	.12	.08	.01	.07	.22	-.12	.37	.07	.01	-.00
KNT	-.01	.19	.00	-.09	.22	-.02	.06	-.06	.04	.12	.03	-.28	.08	-.01	.10	.02
KPT	-.15	-.05	.03	.04	.15	-.00	.20	-.03	.10	.05	-.03	-.21	.12	-.00	.01	.10
		R_c	R_c^2	χ^2	p											
		.89	.80	440.70	.00											

TABLE 3*The canonical structure of anthropometric and normal conative variables.***TABELA 3***Kanonička struktura antropometrijskih i normalnih konativnih varijabli.*

	Fc-1		Fc-1
Anthropometric variables		Normal conative factors	
VIS	-.07	A	-.34
DNO	-.16	B	-.42
DSA	.05	C	.11
DST	-.57	E	-.21
DRU	-.37	F	.02
BIA	.01	G	-.02
BIK	-.08	H	-.36
SSA	.34	I	-.32
DIR	.30	L	-.45
DIL	.14	M	.00
DIK	.30	N	-.18
SST	.01	O	-.05
MAS	-.00	Q1	.09
ONA	.03	Q2	-.26
OPO	.14	Q3	-.00
ONT	.08	Q4	-.40
OPT	.28		
OGK	.00		
KNN	-.04		
KNL	-.05		
KNP	.11		
KNT	-.11		
KPT	-.01		

Legend/Legenda: Anthropometric variables - Antropometrijske varijable; Normal conative factors - Normalni konativni faktori.

protension (L), self-sufficiency - group adherence (Q2), tense - relaxed (Q4), it is clear that we are dealing with a single complex factor.

Based on the analysis of the cross-correlation matrix between the system of normal and system of pathological conative characteristics (Table 4) we can also note statistically significant correlations between pairs of variables of one and the other anthropological space. Statistically significant correlations between normal and pathological conative characteristics were determined for the following variables: affectia - sizia (A) and depression (D6); dominance - submissiveness (E) and cardiovascular conversion (K10), gastrointestinal conversion (G11), inhibitory conversion (I7), anxiety (A1); surgency - desurgency

sija (L), individualizam - grupna zavisnost (Q2), visoka ergička tenzija - niska ergička tenzija (Q4) očigledno se radi o jednom složenom faktoru.

Iz analize matrice kroskorelacija između sistema normalnih i sistema patoloških konativnih karakteristika (Tabela 4) uočavaju se takođe statistički značajne korelacije parova varijabli jednog i drugog antropološkog prostora. Statistički značajne korelacije normalnih i patoloških konativnih karakteristika imaju slijedeće varijable: afektotimija - sajzotimija (A) i depresivnost (D6); dominacija -samopotčinjavanje (E) sa kardiovaskularna konverzija (K10), gastrointestinalna konverzija (G11), inhibitorna konverzija (I7), anksioznost (A1); surgencija -desurgencija (F) i depresivnost (D6); snažan superego-slab superego (G) sa hipersenzitivnost

(F) and depression (D6); stronger superego - weaker superego (G) and hypersensitivity (S5); bold - shy (H) and obsession (O3); protension (L) and cardiovascular conversion (K10); shrewdness - artlessness (N) and inhibitory conversion (I7), anxiety (A1), phobia (F2) and impulsivity (N14); apprehensive (O) and aggression (T15); radicalism - conservatism (Q1) and hypochondria (H13), obsession (O3), paranoia (P18); self-sufficiency – group-adherence (Q2) and obsession (O3); high self-concept – low self-concept (Q3) and gastrointestinal conversion (G11), inhibitory conversion (I7), impulsiveness (N14); tense - relaxed (Q4) and gastrointestinal conversion (G11), hypochondria (H13) and phobias (F2).

By solving the characteristic equations of the cross-correlation matrix, as the roots of these equation, two canonical factors were isolated. While studying the relations between the systems of normal conative variables and systems of pathological conative variables relatively high canonical correlations were determined for both isolated canonical factors ($R_c=.83$ and $R_c=.79$), and are statistically significant

(S5); neustrašivost-strašivost (H) sa opsesivnost (O3); protensia (L) sa kardiovaskularna konverzija (K10); oštromnost - prostodušnost (N) sa inhibitorna konverzija (I7), anksioznost (A1), fobičnost (F2) i impulsivnost (N14); psihostenija (O) sa agresivnost (T15); tradicionalizam - liberalizam (Q1) sa hipohondrija (H13), opsesivnost (O3), paranoidnost (P18); individualizam - grupna zavisnost (Q2) sa opsesivnost (O3); dobra samokontrola - self konflikt (Q3) sa gastrointestinalna konverzija (G11), inhibitorna konverzija (I7), impulsivnost (N14); visoka ergička tenzija - niska ergička tenzija (Q4) sa gastrointestinalna konverzija (G11), hipohondrija (H13) i fobičnost (F2).

Rješavanjem karakterističnih jednačina kroskorelacione matrice izolovani su, kao korijeni tih jednačina, dva kanonička faktora. Prilikom ispitivanja relacija između sistema normalnih konativnih varijabli i sistema patoloških konativnih varijabli dobijene su relativno visoke kanoničke korelacije za oba izolovana kanonička faktora ($R_c=0,83$ i $R_c=0,79$), i statistički su značajne na nivou $p<0,00$. Kvadrati kanoničke korelacije (R_c^2), koji objašnjavaju zajedničku vari-

TABLE 4

The cross-correlations between normal and pathological conative variables.

TABELA 4

Kroskorelacije normalnih i patoloških konativnih varijabli.

	K10	G11	I7	H13	A1	O3	S5	F2	N14	T15	P18	D6
A	.07	-.08	-.18	.01	-.03	-.05	-.12	-.09	.05	-.12	-.06	-.23
B	.06	.04	.12	.07	-.09	.14	-.08	-.02	-.04	.12	.19	.03
C	.19	.15	.20	.18	.06	.22	-.06	.07	.07	.20	.22	.08
E	.23	.26	.27	.12	.35	-.04	.14	.16	.03	-.03	.03	.30
F	-.10	.09	.19	-.06	-.03	.22	.05	-.10	.10	.17	-.04	.23
G	.02	.10	.10	.01	.10	.03	.23	.01	.04	.12	.04	.07
H	.12	.13	.20	.00	.19	.24	-.06	-.01	-.00	.10	.02	.04
I	.13	-.03	-.08	-.20	.18	.00	.01	-.10	.14	-.15	-.03	.11
L	.26	.10	.14	.12	.20	-.16	.02	.18	-.08	-.03	-.10	-.04
M	.08	.05	-.04	-.04	.05	.20	.02	-.00	.07	.02	.04	.08
N	.08	.19	.25	.16	.24	.08	.13	.23	.25	-.03	.04	.14
O	-.01	.09	-.04	-.05	.01	-.10	.07	-.08	-.13	-.25	-.01	.02
Q1	-.11	-.14	-.07	-.24	.13	-.29	-.05	-.11	-.20	-.20	-.30	-.05
Q2	-.11	-.07	-.05	-.01	.14	-.30	.05	.07	.14	-.08	-.16	-.00
Q3	-.05	.28	.24	.19	.16	.06	-.04	.18	.23	.15	.08	.07
Q4	.06	.31	.14	.39	.10	-.11	.17	.29	.15	.01	.03	-.02
		R_c	R_c^2	χ^2	p							
		.83	.69	262.94	.00							
		.79	.62	197.24	.04							

at the $p < .00$ level. The squares of the canonical correlation (R_c^2), which explain the common variance of the variables of the two groups of the overall variability of the analyzed systems of variables have a value of $R_c^2 = .69$, and $R_c^2 = .62$

On the basis of the obtained results contained within the matrix of the canonical structure of normal and pathological conative variables, we can note statistically significant correlations between the applied variables of the first and second canonical factor. The first canonical factor in the space of normal conative variables was defined with the variables of high intelligence - low intelligence (B), higher

jansu varijabli iz dva skupa od ukupnog varijabiliteta analiziranih sistema varijabli iznose $R_c^2 = 0,69$, i $R_c^2 = 0,62$

Na osnovu dobijenih rezultata sadržanih u matrici kanoničke strukture normalnih i patoloških konativnih varijabli uočavaju se statistički značajne korelacije između primijenjenih varijabli kod prvog i drugog kanoničkog faktora. Prvi kanonički faktor u prostoru normalnih konativnih varijabli definisan je varijablama viša inteligencija - niža inteligencija (B), snažan ego - slab ego (C), neustrašivost (parmija) - strašljivost (H), meka narav (premsija) - oštra narav

TABLE 5

The canonical structure of normal and pathological conative variables.

TABELA 5

Kanonička struktura normalnih i patoloških konativnih varijabli.

	Normal conative factors		Patological conative factor		
	Fc-1	Fc-2		Fc-1	Fc-2
A	-.14	.04	K10	.37	-.07
B	.28	-.19	G11	.40	.32
C	.37	-.09	I7	.49	.17
E	.22	.08	H13	.41	.57
F	.00	-.10	A1	.19	.21
G	-.03	-.01	O3	.16	-.32
H	.35	-.17	S5	-.05	.16
I	-.35	-.20	F2	.30	.55
L	.31	.22	N14	-.24	.42
M	-.01	-.20	T15	.20	.15
N	.04	.30	P18	.30	-.05
O	-.00	-.13	D6	-.01	-.22
Q1	-.13	.03			
Q2	-.39	.42			
Q3	.17	.32			
Q4	.17	.56			

Legend/Legenda: Normal conative factor - Normalni konativni faktor; Patological conative factor - Patološki konativni faktor.

ego - lower ego (C), bold (parmia) - shy (H), tender-minded (premsia) – tough-minded (I), protension (L) so that it could be defined as the canonical factor which characterizes handball players in relation to intelligence, ego, boldness, tough-mindedness and protension. Since the second canonical factor is defined by variables of self-sufficiency – group adherence (Q2), high self-concept – low self-concept (Q3), tense - relaxed (Q4) and shrewdness - artlessness (N), it can be interpreted as a factor of introspection and

(I), protensija (L) tako da se on može definisati kao kanonički faktor koji karakteriše rukometaše u odnosu na inteligenciju, ego, neustrašivost, oštru narav i protensiu. Pošto drugi kanonički faktor definišu varijable individualizam - grupna zavisnost (Q2), dobra samokontrola - self konflikt (Q3), visoka ergička tenzija - niska ergička tenzija (Q4) i oštroomnost - prostodušnost (N) on se može interpretirati kao faktor introspekcije i oštroomnosti - prostodušnosti.

shrewdness – artlessness. The first canonical factor in the space of pathological conative variables is defined by the variables of cardiovascular conversion (K10), gastrointestinal conversion (G11), inhibitory conversion (I7) and paranoia (P18), and can be defined as a canonical factor of the effectiveness of the system for the regulation and control of organ function and regulatory function. Since other canonical factors are defined by the variables of obsession (O3), phobia (F2), impulsiveness (N14) and depression (D6), it can be interpreted as a canonical factor of the regulation of reactions such as defense and attack.

Between the systems of anthropometric variables and the system of pathological conative characteristics, no significant relations were determined.

DISCUSSION

Based on the results contained in the matrix of the canonical structure of anthropometric and normal conative variables (Table 3), we can note a statistically significant correlation between the anthropometric variables and the first canonical factor. The relations between the first canonical factor from the system of anthropometric variables, interpreted as the bipolar canonical factor of the ectomesomorphic morphological type and the first canonical factor from the system of normal conative factors, interpreted as the canonical factor of extrovertness – introvertness and anxiety indicates that handball players of the ectomesomorphic type are characterized at one end by longitudinal measures and on the other by transversal dimensionality of the volume of the femoral region with an increase in the value of the conative variables of extrovertness and decreased anxiety.

The first order factors, C – ego strength, G – superego strength I – tender-tough minded were not significantly related to any of the measured morphological variables. This is a fact which is not completely in accordance with the results, which in this research focusing on the differences in terms of the personality features of athletes and non-athletes, were obtained by Havelka and Lazarević (1981). Namely, they determined that athletes and non-athletes differ significantly in terms of the crystallized intelligence, B, ego strength C, superego strength G, emotional sensitivity I, imaginativeness M and self-sufficiency Q2. Thus, athletes in relation to non-athletes had a greater crystallized intelligence, were emotionally more stable, had a stronger super ego, harsher temper and were more emotionally sensitive, more practical, non-self-sufficient and more cooperative. It would seem that handball players, in relation to other athletes are specific in the fact that they are emotionally more stable, with a lower tolerance to frustration and a far lower level of self-control (whi-

Prvi kanonički faktor u prostoru patoloških konativnih varijabli definisan je varijablama kardiovaskularna konverzija (K10), gastrointestinalna konverzija (G11), inhibitorna konverzija (I7) i paranoidnost (P18) i on se može definisati kao kanonički faktor efikasnosti sistema za regulaciju i kontrolu organskih funkcija i regulativnih funkcija. Pošto drugi kanonički faktor definišu varijable opsesivnost (O3), fobičnost (F2), impulsivnost (N14) i depresivnost (D6) on se može interpretirati kao kanonički faktor regulatora reakcija odbrane i napada.

Između sistema antropometrijskih varijabli i sistema patoloških konativnih karakteristika nisu dobijene značajne relacije.

DISKUSIJA

Iz rezultata sadržanih u matrici kanoničke strukture antropometrijskih i normalnih konativnih varijabli (Tabela 3) uočava se statistički značajna korelacija između antropometrijskih varijabli i prvog kanoničkog faktora. Relacije između prvog kanoničkog faktora iz sistema antropometrijskih varijabli, interpretiranog kao bipolarni kanonički faktor ektomezomorfog morfološkog tipa i prvog kanoničkog faktora iz sistema normalnih konativnih faktora, interpretiranog kao kanonički faktor ekstravertnost - introvertnost i anksioznost, pokazuje, da se rukometaši ektomezomorfog tipa karakterišu na jednom polu longitudinalnim merama a na drugom transverzalnom dimenzionalnošću obimom femoralne regije uz povećanje vrednosti u konativnim varijablama ekstravertnost i sniženu anksioznost.

Faktori prvog reda, C – snaga ega, G – snaga super ega i I - blaga – oštra narav nisu bili značajno povezani ni sa jednom mjerenom morfološkom varijablom. To je nalaz koji nije sasvim u skladu sa rezultatima koje su u svom istraživanju koje se bavilo razlikama u pogledu crta ličnosti sportista i nesportista dobili Havelka i Lazarević (1981). Naime, oni su dobili da se sportisti i nesportisti značajno razlikuju u pogledu faktora kristalizovane inteligencije B, snage ega C, snage super ega G, emocionalne osjetljivosti I, imaginativnosti M i samodovoljnosti Q2. Dakle, sportisti su u odnosu na nesportiste imali veću kristalizovanu inteligenciju, bili emocionalno stabilniji, snažnijeg super ega, oštrije naravi i manje emocionalno osjetljivi, praktičniji, nesamostalniji i saradljiviji. Čini se da su rukometaši, u odnosu na druge sportiste specifični po tome što su manje emocionalno stabilni, sa nižom tolerancijom na frustracije i daleko

ch is also confirmed by the correlation obtained in this study on the relations between a stronger superego – weaker superego (G) and hypersensitivity (S5), and are thus less conscientious, more realistic in their evaluations, and less self-reliant in solving problems (as seen in the terms of Sten scores).

On the basis of the results obtained and contained within the matrix of the canonical structure of normal and pathological conative variables, we can note statistically significant correlations between the measured variables in the case of the first and second canonical factor. The first canonical factor in the space of normal conative variables can be defined as the canonical factor which characterizes handball players in relation to intelligence, ego, boldness, tough mindedness and protension. The second one can be interpreted as a factor of introspection and tender-mindedness – tough-mindedness.

The first canonical factor in the space of pathological conative variables can be defined as a canonical factor of effectiveness of the system for the regulation and control of organ function and regulatory function, while the second canonical factor can be interpreted as a canonical factor of the regulator of the reactions of defense and attack.

The structure of the correlations indicate that among the handball players with more pronounced warm types of behavior, who are more polite, considerate of others, there was an increase in the scores for depression, as with those who indicated more pronounced liveliness and impulsiveness and expressiveness. Handball players who usually manifest dominant, competitive, assertive or even aggressive behavior face a greater danger of developing one of the conversions (cardiovascular, gastrointestinal or inhibitory) and are more prone to anxiety. Those who are more moral individuals and who have more respect for the rules are more prone to hypersensitivity, and those who are fearless and adventurous score higher for obsession. Those who are suspicious and skeptical indicate a higher inclination towards cardiovascular conversion. The more agile, inquisitive, and discrete participants indicated a greater tendency for inhibitory conversion, anxiety, phobia and impulsive reactions. Those who were more worried, more insecure, often blaming themselves for everything were less prone to aggression. Those who were more open to change, more liberal, more analytical and critical handball players scored lower values for hypochondria, obsession and paranoia. The participants who were more self-satisfied and more self-confident were more prone to obsession, and those with a tendency for perfection, compulsion and self-discipline, who showed a tendency towards more dominant behavior with a lot of self-pity were at a higher risk of gastrointestinal and inhibitory conversion and were more impulsive. Tense, energetic, impatient handball players

manjom samokontrolom (što potvrđuje i korelacija dobijena u ovom istraživanju na relaciji snažan superego-slab superego (G) sa hipersenzitivnost (S5), te manje savesni, realistični u svojim procjenama i nesamostaljniji u procesu rješavanja problema (posmatrano u terminima Sten skorova).

Na osnovu dobijenih rezultata sadržanih u matrici kanoničke strukture normalnih i patoloških konativnih varijabli uočavaju se statistički značajne korelacije između mjerenih varijabli kod prvog i drugog kanoničkog faktora. Prvi kanonički faktor u prostoru normalnih konativnih varijabli se može definisati kao kanonički faktor koji karakteriše rukometaše u odnosu na inteligenciju, ego, neustrašivost, oštru narav i protensiu. Dok se drugi može interpretirati kao faktor introspekcije i oštroumnosti - prostodušnosti.

Prvi kanonički faktor u prostoru patoloških konativnih varijabli se može definisati kao kanonički faktor efikasnosti sistema za regulaciju i kontrolu organskih funkcija i regulatornih funkcija, dok se drugi kanonički faktor može interpretirati kao kanonički faktor regulatora reakcija odbrane i napada.

Strukture korelacija pokazuju da kod rukometaša kod kojih je izraženije toplo ponašanje, koji su ljubazniji, pažljiviji prema drugima postoji porast skorova na depresivnosti kao i kod onih koji pokazuju izraženiju živahnost i impulsivnost i ekspresivnost. Rukometaši koji češće manifestuju dominantno, takmičarsko, asertivno ili čak agresivno ponašanje u većoj su opasnosti da razviju neku od konverzija (kardiovaskularnu, gastrointestinalnu ili inhibitornu) i skloniji su anksioznosti. Oni koji su moralističniji i više poštuju pravila su skloniji hipersenzitivnosti a oni koji su neustrašiviji i avanturistički nastrojeniji imaju više skorove na opsesivnosti. Oni koji su sumnjičavi i skeptičniji pokazuju veću sklonost ka kardiovaskularnim konverzijama. Vispreniji, pronicljiviji i diskretniji ispitanici pokazuju veću sklonost ka inhibitornim konverzijama, anksioznosti, fobičnosti i impulsivnom reagovanju. Oni koji su zabrinutiji, nesigurniji, često okrivljuju sebe za sve su manje skloni agresivnosti. Otvoreniji za promjene, liberalniji, analitičniji i kritičniji rukometaši imaju manje skorove na hipohondriji, opsesivnosti i paranoidnosti. Ispitanici koji su samodovoljniji i samopouzdaniji skloniji su opsesivnosti, a oni skloni perfekcionizmu, kompulsivnosti i samodisciplini, koji pokazuju tendenciju ka nadmoćnom ponašanju uz dosta samosažaljenja su pod većim rizikom za gastrointestinalnu i inhibitornu konverziju i impulsivniji su. Napeti, energični, nestrpljivi rukometaši češće razvijaju gastroingestinalnu konverziju, hipohondriju i

more frequently develop gastrointestinal conversion, hypochondria and phobias.

In their study, Hošek & Momirović (1992) dealt with the relationship between the morphological characteristics and pathological conative factors on a sample of 836 men, aged 19 – 21, all clinically healthy. Even though these authors indicate that the hypotheses on the connection between morphological characteristics do not a priori need to be rejected, the results obtained in our study indicate that none of the morphological characteristics did not correlate significantly with pathological conative factors. Even Hošek & Momirović (1992) determined that there was only one statistically significant correlation between the set which measured only seven morphological characteristics (height, weight, biacromial range, average thorax volume, extended upper arm volume, lower leg volume and upper arm skinfold) and the factors included in the test. This difference, even though statistically significant, was very low and the authors themselves considered that these results could be ascribed to the tendency that men with a strong physique have a weaker regulatory function for the reaction of attack, that is, that viewed in the terms of the factors, are more prone aggression and impulsive reactions in situations where they feel threatened and frustrated. Their assumption was not proven justified in our research, primarily because the study included as many as 23 morphological characteristics, at a very high level of selection, considering the fact that the sample consisted of Premiere League handball players. The game of handball at this level requires extremely strong and physically fit players, and thus they need to be in possession of above average anthropomorphological features in relation to the general population.

CONCLUSION

Effectiveness in performing any kind of human activity is not independent of the features which regulate the modalities of human behavior, handball included. Namely, it is known that certain features of conative space limit effectiveness in various activities, directly, and in others indirectly (for example, due to the contaminating effect on some other anthropological features, abilities or characteristics). One cannot exclude the possibility that in some activities the same conative features represent a restrictor, in other a stimulator of effectiveness, especially in situations when the success of a certain activity is at stake. In relation to that, the rule that there are no two participants who could manifest identical structure of any, including conative, features is true, irrespective of their ultimate number. For that reason, knowledge of the complex nature of certain activities, to which the

fobičnost.

Proučavanjem odnosa morfoloških karakteristika i patoloških konativnih faktora na uzorku od 836 muškaraca, uzrasta 19 – 21 godine, pripadnika klinički zdrave populacije su se u svom istraživanju bavili Hošek i Momirović (1992). Iako ovi autori kažu da se hipoteze o povezanosti morfoloških karakteristika ne moraju a priori odbaciti, rezultati dobijeni u našem istraživanju pokazuju da nijedna od morfoloških karakteristika nije značajno korelirala sa patološkim konativnim faktorima. Čak su i Hošek i Momirović (1992) dobili da postoji samo jedna statistički značajna korelacija između seta koji je merio svega sedam morfoloških karakteristika (visina, težina, biakromijalni raspon, srednji obim grudí, obim opružene nadlaktice, obim potkoljenice i kožni nabor nadlaktice) i faktora obuhvaćenih testom. Ta razlika, iako statistički značajna, bila je veoma niska i sami autori smatraju da se ovakvi rezultati mogu pripisati tendenciji da muškarci snažne tjelesne građe imaju slabiju regulaciju funkcije reakcije napada, odnosno, da su posmatrano u terminima faktora, skloniji agresivnom i impulsivnom reagovanju u situacijama ugroženosti i frustracije. Njihova pretpostavka se u našem istraživanju nije pokazala kao opravdana, tim prije što je istraživanjem bilo obuhvaćeno čak 23 morfološke karakteristike i to na visoko selekcionisanom uzorku, budući da je riječ o rukometašima koji nastupaju u Prvoj ligi i da rukomet kao takav zahtijeva igrače izrazito snažne i naglašene tjelesne konstitucije, pa samim tim i natprosječnih antropomorfoloških odlika u odnosu na opštu populaciju.

ZAKLJUČAK

Efikasnost u obavljanju bilo koje ljudske aktivnosti nije nezavisna od osobina koje regulišu modalitete čovjekovog ponašanja, pa samim tim i u rukometu. Naime, poznato je da neke osobine iz konativnog prostora ograničavaju efikasnost u različitim aktivnostima direktno, a u nekim drugim indirektno (nap., zbog kontaminirajućeg djelovanja na neke druge antropološke osobine, sposobnosti ili karakteristike). Nije isključena ni mogućnost da u nekim aktivnostima iste konativne osobine predstavljaju restriktor, a u nekim stimulator efikasnosti, posebno u situacijama kada učestvuju u uspjehu određene aktivnosti. U vezi s tim, vrijedi i pravilo da ne postoje dva subjekta kod kojih bi bila potpuno istovjetna struktura bilo kojih, pa i konativnih osobina, bez obzira na njihov konačni broj. Iz tih razloga je

field of conative characteristics belongs, is an important assumption for the operationalization of the aim of any activity, including handball. The results obtained in this study speak of the fact that handball players of the ectomesomorphic type are characterized at the one end, by longitudinal measures and at the other the dimensionality and volume of the femoral region if they are extrovert and non-anxious. In the case of handball players of this rank of competition, who show pronounced signs of warm behavior, who are more polite, considerate of others, there is an increase in the scores for depression, as in the case of those who indicate pronounced liveliness and impulsiveness and expressiveness. Handball players who frequently manifest dominant, competitive, assertive or even aggressive behavior are more prone to anxiety. Those who have higher morals and more respect for the rules are more prone to hypersensitivity, and those who are fearless and adventurous score higher values on the score for obsession. Tense, energetic, impatient handball players more frequently develop gastrointestinal conversion, hypochondria and phobia.

poznavanje kompleksiteta neke aktivnosti, u koji spada i prostor konativnih karakteristika, važna pretpostavka operacionalizacije cilja svake aktivnosti, pa shodno tome i rukometa. Dobijeni rezultati u ovom radu govore da se rukometaši ektomezomorfne tipa karakterišu na jednom polu - longitudinalnim merama a na drugom transverzalnomo dimenzionalnošću i obimom femoralne regije ako su ekstravertni i neanksiozni. Kod rukometaša ovog ranga takmičenja, kod kojih je izraženije toplo ponašanje, koji su ljubazniji, pažljiviji prema drugima postoji porast skorova na depresivnosti kao i kod onih koji pokazuju izraženiju živahnost i impulsivnost i ekspresivnost. Rukometaši koji češće manifestuju dominantno, takmičarsko, asertivno ili čak agresivno ponašanje su skloniji anksioznosti. Oni koji su moralističniji i više poštuju pravila su skloniji hipersenzitivnosti, a oni koji su neustrašiviji i avanturistički nastrojeni imaju više skorove na opsesivnosti. Napeti, energični, nestrpljivi rukometaši češće razvijaju gastroingestinalnu konverziju, hipohondriju i fobičnost.

REFERENCES

- Cattell, R. B., Eber, H. W., & Tatsuoka, M. (1970). *Handbook for the Sixteen Personality Factor Questionnaire*. Champaign, ILL: Institute for Personality and Ability Testing.
- Gabrijević, M. (1977). *Manifestne i latentne dimenzije vrhunskih sportista nekih momčadskih sportskih igra u motoričkom, kognitivnom i konativnom prostoru* [Manifest and latent dimensions of elite athletes some TEAM sport plays in motor, cognitive and cognitive space]. Unpublished doctoral dissertation, University of Zagreb, Fakultet za fizičku kulturu.
- Havelka, N., & Lazarević, Lj. (1981). *Sport i ličnost* [Sport and personality]. Belgrade, RS: Sportska knjiga.
- Herdis, L., Deabler, E., Hartl, M., & Willis, C. A. (1973). Physique and personality: somatotype and the 16 PF. *Perceptual and Motor Skills*, 36, 927–933. doi: 10.2466/pms.1973.36.3.927
- Hol, S. K., & Lindzi, G. (1983). *Teorije ličnosti* [Theories of personality]. Beograd, RS: Nolit.
- Hošek, A., & Momirović, K. (1992). Prilog poznavanju odnosa između morfoloških karakteristika i osobina ličnosti [Contribution to the knowledge of the relationship between morphological characteristics and personality traits]. *Psihologija*, 3–4, 36–42.
- Ilić, S. (1993). *Relacije bazično-motoričkih i situaciono-motoričkih sposobnosti u rukometu* [Relationships basic-motor and situational-motor skills in handball]. Unpublished master's thesis, University of Belgrade, Fakultet fizičke kulture.
- Katell, R. B. (1978). *Naučna analiza ličnosti* [Scientific analysis of personality]. Beograd, RS: BIGZ.
- Kretschmer, E. (1970). *Physique and character*. New York, NY: Cooper Square.
- Malacko, J., & Popović, D. (2001). *Metodologija kineziološko antropoloških istraživanja* [Methodology of Kinesiology and anthropological research]. Leposavić, RS: Fakultet za fizičku kulturu.
- Momirović, K. (1971). *Struktura i mjerenje patoloških konativnih faktora* [Structure and measurement of cognitive pathological factors]. Zagreb, HR: Republički zavod za zapošljavanje.
- Pajević, D. (2003). *Psihologija sporta i rekreacije* [Psychology of sport and recreation]. Laktaši, BA: Grafomark.
- Pokrajac, B. (1983). *Telesni i motorički status rukometaša u odnosu na takmičarski nivo i komparativna analiza sa sportistima drugih sportskih igara* [Physical and motor status of handball in relation to the competitive level and comparative analysis with athletes of other sports games]. Unpublished doctoral dissertation, University of Belgrade, Fakultet fizičkog vaspitanja.
- Popović, D., & Simonović, M. (2008). *Psihologija i psihologija sporta* [Psychology and psychology of sport]. Leposavić, RS: Fakultet za sport i fizičko vaspitanje.

- Popović-Ilić T., Stanković V., Vitošević B., & Ilić S. (2010). Struktura morfoloških dimenzija vrhunskih sportista [Structure of the morphological dimensions of elite athletes]. *Praxis medica*, 38(3-4), 63–70.
- Powell, A., & Royce, J.R. (1981). An overview of a multifactor - system theory of personality and social differences: The factor and system models and the hierarchical factor structure of individuality. *Journal of Personality and Social Psychology*, 41(4), 818–829. doi: 10.1037/0022-3514.41.4.818
- Sheldon, W. H., & Stevens, S. S. (1942). *The varieties of temperament: a psychology of constitutional differences*. New York, NY: Harper.
- Srhoj, V., Marinović, M., & Rogulj, N. (2002). Position specific morphological characteristics of top-level male handball players. *Collegium antropologicum*, 26(1), 219–227. PMID: 12137302
- Stanković, V. (2000). *Testiranje i primena programa za utvrđivanje strukture i razlika u međusobno povezanim prostorima kod rukometaša u toku jednogodišnjeg trenaznog procesa* [Testing and implementation of programs for the determination of structure and the difference in the interrelated areas of the handball players during a one-year training process]. Unpublished doctoral dissertation, University of Priština, Fakultet za fizičku kulturu.
- Stanković, V. (2001). *Osnove primenjene kineziologije* [Basic of applied kinesiology]. Leosavić, RS: Fakultet za fizičku kulturu.
- Stanković, V., & Malacko, J. (2008). Relations between systems of motor, cognitive and conative variables of top-class handball players. *Kinesiology Slovenica*, 3(14), 33–44.
- Stanković, V., Malacko, J., & Doder, D. (2009). The differences in morphological characteristics among top handball, basketball and football players. *Acta Kinesiologica*, 3(2), 90–94.
- Stanković, V., Malacko, J., & Doder, D. (2011). Comparative analysis of factor structures of latent variables of pathological conative characteristics in case of handball players belonging to different competition ranks. *Acta Kinesiologica*, 5(2), 58–62.
- Stanković V., & Popović M. (2011). Identifikacija morfoloških karakteristika povezanih sa horizontalnim osovina rukometaša i fudbalera [Identification of morphological characteristics associated with the horizontal axis and handball players]. *Praxis medica*, 39(1-2), 55–58.
- Szirovicza, L., Momirović, K., Hošek, A., & Gredelj, M. (1980). Latentne morfološke dimenzije određene na temelju faktorskog i taksonomskog modela u standardiziranom image prostoru [Latent morphological dimensions determined on the basis of factor and taxonomic models in a standardized image space]. *Kineziologija*, 10, 15–20.
- Šentija, D., Matković B., Vuleta D., Tomljanović M., & Džaj, I. (1997). Funkcionalne sposobnosti vrhunskih rukometaša i rukometašica [Functional abilities of top handball players]. In D. Milanović D and S. Heimer S. (Eds.), *Dijagnostika trenirnosti sportaša* (pp. 36–39). Zagreb, HR: Fakultet za fizičku kulturu.
- Šibila, M., & Pori, P. (2009). Position-related differences in selected morphological body characteristics of top-level handball players. *Collegium antropologicum*, 33(4), 1079–1086. PMID: 20102051
- Vrbik, I., Čizmek, A., & Gruić I. (2011). Morfološke karakteristike između igračkih pozicija kod vrhunskih rukometaša [Morphological characteristics between playing positions in elite handball players]. *Hrvatski sportskomedicinski vjesnik*. 26(2), 94–99.

Received: October 7, 2013

Revision received: December 12, 2013

Accepted: December 21, 2013

Primljeno: 7. oktobra 2013. godine

Izmjene primljene: 12. decembra 2013. godine

Odobreno: 21. decembra 2013. godine

Correspondence to:

Veroljub Stanković, PhD
Fakultet za sport i fizičko vaspitanje
Univerzitet u Prištini
Dositeja Obradovića bb
38218 Leosavić
Serbia
Phone: 00381 64 890 46 00
E-mail: veroljub.stankovic@pr.ac.rs

Korespondencija:

Dr Veroljub Stanković
Fakultet za sport i fizičko vaspitanje
Univerzitet u Prištini
Dositeja Obradovića bb
38218 Leosavić
Srbija
Telefon: 00381 64 890 46 00
E-mail: veroljub.stankovic@pr.ac.rs

ВЗАИМООТНОШЕНИЯ MORFOЛОГИЧЕСКИХ ПЕРЕМЕННЫХ И НОРМАЛЬНЫХ И ПАТОЛОГИЧЕСКИХ КОНАТИВНЫХ ХАРАКТЕРИСТИКАХ У ГАНДБОЛИСТОВ

Веролоуб Станкович¹, Юлиан Малацко², Ивана Боич³, и Елена Илич⁴

¹Факультет физического воспитания и спорта, Приштинский университет, Сербия

²Факультет физического воспитания и спорта, Нови-Садский университет, Сербия

³Факультет физического воспитания и спорта, Нишский университет, Сербия

⁴Учреждение в области спортивной медицины и спорта Республики Сербии, Белград, Сербия

Гандбол - требовательный спорт, который содержит в своей структуре основных движения с интерактивным контактом с соперником во время игры и в котором достижение успеха зависит от большого ряда внешних и внутренних факторов. Волевые характеристики определяются как скрытые структуры, от которых зависят характерные режимы ответов, по которым действуют на приспособляемую и действующую эффективность личности.

Целью исследования являлось изучение статистически значимой взаимосвязи между системой морфологических характеристик нормальных и патологических мотивационных характеристиках, чтобы утвердить характеристики успешных гандболистов. Применительно к системе 23 антропометрических, 16 нормальных и 12 патологических когнитивных переменных. Исполнителям соответствующего образца стало 71 гандболистов первой лиги. Чтобы определить соотношение между системой переменных, были использованы методы канонического корреляционного анализа.

Результаты показывают, что между системами антропометрических переменных и нормальных конативных характеристик существует каноническая корреляция ($R_c=0,80$; $p<0,00$), а между системами нормальных и патологических конативных характеристик были получены два статистически значимых корреляций ($R_c=0,69$; $p<0,00$ и $R_c=0,62$; $p<0,02$). Гандболисты экто-мезоморфного типа характеризуются на одной поле лонгитудинальными мерами, а на второй поле поперечной размерности. Гандболисты которые чаще ведут себя доминантно, соревновательно, асертивно и даже агрессивно, оказываются тревожными, пока у тех, которые ведут себя морально и соблюдают правила игры, большая склонность к гиперчувствительности. Отважные гандболисты, авантюристы, оказались более обсессивным, а у напряженных, энергичных и нетерпеливых чаще всего являются гастроинтестинальная конверсия, ипохондрия и фобичность.

Ключевые слова: конативные отношения, морфология, гандбол, Сербия.

DOPRINOS ČEDOMIRA MILIĆA ŠKOLOVANJU SOKOLSKOG KADRA U HERCEGOVINI

CONTRIBUTION OF CEDOMIR MILIC TO EDUCATION OF SOKOL STAFF IN HERZEGOVINA

Kristina Pantelić Babić¹ and Petar Pavlović¹

¹Fakultet fizičkog vaspitanja i sporta, Univerzitet Banja Luka, Bosna i Hercegovina
Faculty of Physical Education and Sport, University of Banja Luka,
Bosnia and Herzegovina

REVIEW PAPER

PREGLEDNI ČLANAK

doi: 10.5550/sgia.130902.en.005B

UDK: 929:796.011.3 Milić Č.

doi: 10.5550/sgia.130902.se.005B

SUMMARY

Cedomir Milic, from father Jovan Milic and mother Soka Milic (maiden Govedarica), was born on March 23rd 1886 in Mostar, and killed on November 22nd 1941 near Niksic. Since the founding of first Serbian gymnastic society "Obilic" in Mostar in 1904 (since 1910 known as "Serbian Sokol"), Milic was involved in its work and dedicated his whole life to sokol and national work. Through sokol and fraternity societies he fought for spiritual and physical strengthening of his people. He was deeply respected, not only by sokols and brothers (members of the fraternity), but also by the intellectuals of that time. Among his numerous sokol activities, he also gave great contribution to education and specialization of sokol staff on the territory of Herzegovina during Austro-Hungarian occupation, and also in Sokolism in the time of Kingdom of Serbs, Croats and Slovenians (since 1929 Kingdom of Yugoslavia). The goal is to highlight and research the role of Cedomir Milic in education and specialization of sokol staff. Numerous sources from the time of Milic's life and work, as also sources originated after that, were reviewed and analyzed.

Key Words: candidates, courses, district; school, sokols.

INTRODUCTION

Sokol movement started in Czech Republic in 1862, when a group of young Czechs led by Miroslav

SAŽETAK

Čedomir Milić je, od oca Jovana Milića i majke Soke Milić (devojačko Govedarica), rođen 23. marta 1886. godine u Mostaru, a ubijen je 22. novembra 1941. godine u blizini Nikšića. Od osnivanja prvog srpskog gimnastičkog društva "Obilić" u Mostaru 1904. godine (od 1910. godine "Srpski Soko"), Milić se uključuje u njegov rad i ceo svoj život je posvetio sokolskom i nacionalnom radu. Kroz sokolska i pobratimska društva borio se za duhovno i telesno jačanje svog naroda. Bio je poštovan ne samo od strane sokola i pobratima, već i od umnih ljudi tog vremena. Pored ostalih brojnih aktivnosti, koje je obavljao uspešno u sokolstvu, on je dao i veliki doprinos u školovanju i usavršavanju sokolskog kadra na području Hercegovine, kako u srpskom sokolstvu u vreme austrougarske okupacije, tako i u sokolstvu u vreme Kraljevine Srba, Hrvata i Slovenaca (od 1929. godine Kraljevina Jugoslavija). Cilj rada je da se osvetli i istraži uloga Čedomira Milića u školovanju i usavršavanju sokolskog kadra. Pregledani su i proanalizirani izvori koji su nastajali u vreme kada je Milić Živeo i stvarao, kao i izvori koji su nastajali kasnije.

Ključne riječi: polaznici, sokoli, tečajevi, škola, župa.

UVOD

Sokolski pokret nastao je u Češkoj 1862. godine, kada je grupa Čeha na čelu sa Miroslavom Tiršom

Tyrsh founded first Prague gymnastic society, with the idea of physical and spiritual strengthening of Czech people in fighting against the occupier. Professor Emanuel Toner, inspired by Serbian heroic poetry where hawk (sokol) symbolises courage, heroism, chivalrous, justice, etc, came to idea to name the newfound society "Sokol", wishing to pass all those characteristics to their members. Soon after sokol movement spread to all countries inhabited with Slavic people (Илић & Мијатовић, 2006).

Second half of the 19th century brought significant changes for the people of Balkan Peninsula. By surrender of Turkish army and decision of Berlin congress in 1878, the government over Bosnia and Herzegovina was given to Austro-Hungarian monarchy (Екмечић, 2010). In that period any form of political organizing was strictly forbidden and all other activities were carefully monitored. Very hard time started for Serbian people, and therefore they were forced to find other ways for physical and spiritual fight against the occupier.

Therefore Serbian intellectuals and other citizens started forming different sport, cultural and other institutions, and started publishing different magazines and newspapers with the goal of strengthening and rising of spirit and national awareness of people. In that way starts also development of Sokolism on the territory of Bosnia and Herzegovina.

The idea of Sokolism on the territory of Bosnia and Herzegovina appeared in 1893 when a group of Serbs in Foca tried to found first Serbian sokol society, but the Austro-Hungarian authorities did not allow it. After few years, in 1899, they allow founding of first anti-alcohol and sober society "Pobratimstvo" (Fraternity). In Mostar in 1904 first Serbian gymnastic society "Obilić" was formed, and after it societies in other places of Herzegovina and Bosnia, so in 1914 there was a total of 58 societies. From 1909 and fist initiatives for forming Serbian Sokol Union of Bosnia-Herzegovina, the united name "Serbian Sokol" was adopted for all Serbian gymnastic societies on the territory of Herzegovina and Bosnia, which was officially approved by National government (Zemaljska vlada) in 1910 (Павловић, 1999).

During Skadar crisis on May 2nd 1913, the actual chief of Bosnia and Herzegovina, Oskar Poćorek, introduced so-called "special actions" that announced closing of Union and all Serbian Sokol Societies and Fraternities. With the contribution of representatives of closed societies on October 1st 1913 National government allowed them to continue their work. On the Union assembly on March 2nd 1914 in Sarajevo, they elected the seniority, which was mostly the same as before "special actions". The new positions were

formirala prvo Gimnastičko društvo praško, sa idejom tjelesnog i duhovnog jačanja češkog naroda u borbi protiv okupatora. Profesor Emanuel Toner, koji je bio inspirisan srpskim junačkim pjesmama, u kojima ptica soko simboliše hrabrost, junaštvo, viteštvo, pravdoljublje i slično, došao je na ideju da se novoformirano društvo nazove "Sokol" sa željom da i njihovi članovi imaju navedene osobine. Sokolski pokret se ubrzo proširio na sve zemlje u kojima je živio slavenski narod (Илић и Мијатовић, 2006).

Druga polovina 19. vijeka sa sobom je donijela značajne promjene za narode Balkanskog poluostrva. Predajom turske vojske i odlukom Berlinskog kongresa od 1878. godine upravu nad Bosnom i Hercegovinom dobija tadašnja Austrougarska monarhija (Екмечић, 2010). U tom periodu svaki oblik političkog organizovanja bio je strogo zabranjen, a sve ostale aktivnosti bile su pažljivo praćene. Nastao je veoma težak period za srpski narod koji je bio primoran da traži druge načine za tjelesnu i duhovnu borbu protiv okupatora.

Tada su srpski intelektualci i ostali građani pribjegavali formiranju raznih sportskih, kulturnih i drugih ustanova, kao i pokretanju raznih časopisa i novina u cilju jačanja i odgajanja duha i nacionalne svijesti naroda. Na taj način počinje i razvoj sokolstva na prostorima Bosne i Hercegovine.

Na prostorima Bosne i Hercegovine ideja sokolstva javila se već 1893. godine, kada je grupa Srba u Foči pokušala da osnuje prvo srpsko sokolsko društvo, ali im austrougarske vlasti to nisu dozvolile. Tek poslije nekoliko godina, 1899. godine, odobreno je osnivanje prvog antialkoholičarskog i trezvenjačkog društva "Pobratimstvo". U Mostaru je 1904. godine formirano prvo Srpsko gimnastičko društvo "Obilić", a nakon njega i društva u ostalim mjestima Hercegovine i Bosne, tako da ih je do 1914. godine bilo ukupno 58. Od 1909. godine, i prvih inicijativa za formiranje Srpske sokolske župe bosansko-hercegovačke, usvojen je i jedinstven naziv "Srpski soko" za sva srpska gimnastička društva na prostoru Hercegovine i Bosne, koji je i zvanično odobren 1910. godine od strane Zemaljske vlade (Павловић, 1999).

Uslijed skadarske krize, 2. maja 1913. godine, tadašnji poglavar Bosne i Hercegovine Oskar Poćorek uveo je takozvane "iznimne mjere" kojima je proglašeno raspuštanje župe i svih srpskih sokolskih društava i pobratimstava. Zalaganjem predstavnika raspuštenih društava 1. oktobra 1913. godine Zemaljska vlada je dozvolila nastavak njihovog rada. Na skupštini župe, 2. marta 1914. godine u Sarajevu, birano je starješinstvo, koje je većinski ostalo u istom sastavu kao i prije

Head of the county: for Mostar county was elected Cedomir Milic.

After assassination of Franz Ferdinand in Sarajevo on national holiday Vidovdan in 1914, the Union was closed again and "[...] started searches in Serbian sokol societies and arresting of sokol workers" (Ibid, p. 131). In that time over eighty Serbian sokols were arrested and prosecuted in Banja Luka in 1916.

By closing of Union's and societies' work after the assassination, the first period of Serbian Sokolism in Bosnia and Herzegovina, period of the Austro-Hungarian occupation, was finished.

After WW1 started the period of Yugoslavian Sokolism, when "Serbian Sokol" embraced the Yugoslavian idea and in 1922 in Ljubljana joined the Sokol Union of Kingdom of Serbs, Croats and Slovenians (SUKSCS). After WW2 the renovation of Sokol was not allowed, and Society for physical exercise "Partizan" took over all its properties.

The subject of this paper is Sokolism in Herzegovina, and the goal is to research the role of Cedomir Milic in education and specialisation of sokol staff.

METHODS

Historical method was used in this paper. Sources from the time of Cedomir Milic's life and work, as also sources originated after that, were reviewed and analyzed.

RESULTS AND DISCUSSION

Cedomir Milic

Cedomir Milic was born on March 23rd 1886 in Mostar from father Jovan and Mother Soka Milic (maiden Govedarica).

According to Milic's son Jovan and Milic's biographer and close associate Vasilije Paranos, Cedomir Milic "[...] after his primary school, was a candidate of Serbian cultural society 'Prosveta', formed in 1902, where he finished high school" (J. Milić, personal communications, August 20, 2012; Паранос, 1982, p. 1). After school, he started to do sawing craft (making of national suits). He had a sawing shop "Cedo Milic" which existed until the beginning of WW2. Even though Milic stooped with sawing and started to be a merchant, he hired one friend with sawing knowledge and even helped him in hard times, and all in the purpose of saving that craft.

When he was a young man, Mostar was a centre of cultural life of Herzegovina, which was not surprising knowing that Mostar was a place of great

"iznimnih mjera". Novina su bili nadzornici okruga: za mostarski okrug izabran je Čedomir Milić.

Nakon sarajevskog atentata na Franca Ferdinanda na Vidovdan 1914. godine, župa je ponovo raspuštena i "[...] počeli su pretresi u srpskim sokolskim društvima i hapšenja sokolskih radnika" (Ibid, str. 131). Tada je uhapšeno preko osamdeset srpskih sokola, kojima je 1916. godine suđeno u Banjoj Luci.

Obustavom rada župe i društava nakon atentata završen je prvi period srpskog sokolstva u Bosni i Hercegovini, period u vrijeme austrougarske okupacije.

Po završetku Prvog svjetskog rata počeo je period jugoslovenskog sokolstva, kada je "Srpski soko" prihvatio jugoslovensku ideju i 1922. godine u Ljubljani stupio u Sokolski savez Kraljevine Srba, Hrvata i Slovenaca (SSKSHS). Poslije Drugog svjetskog rata nije bilo dozvoljeno obnavljanje sokola, a njegovu imovinu preuzelo je Društvo za tjelesno vježbanje "Partizan".

Predmet rada je sokolstvo u Hercegovini, a cilj je da se istraži uloga Čedomira Milića u školovanju i usavršavanju sokolskog kadra.

METODE

U radu je korišten istorijski metod. Pregledani su i proanalizirani izvori koji su nastajali u vrijeme kada je živio i stvarao Čedomir Milić, kao i izvori koji su nastajali posle toga.

REZULTATI I DISKUSIJA

Čedomir Milić

Čedomir Milić, od oca Jovana Milića i majke Soke Milić (djevojačko Govedarica), rođen je 23. marta 1886. godine u Mostaru.

Prema riječima Milićevog sina Jovana, kao i Milićevog biografa i bliskog saradnika Vasilija Paranosa, Čedomir Milić, "[...] poslije osnovne škole, bio je pitomac Srpskog kulturnog društva 'Prosveta', koja je osnovana 1902. g. gde je svršio srednju školu" (J. Milić, personalna komunikacija, 20. avgust, 2012; Паранос, 1982, str. 1). Nakon završene škole, počeo je da se bavi terzijskim zanatom (izrađivanjem narodnih nošnji). Imao je terzijsku radnju "Čedo Milić" koja je postojala sve do početka Drugog svjetskog rata. Iako se Milić prestao baviti tim pozivom i prešao na trgovinu, u radnji je zaposlio prijatelja terzijske struke kome je u teškim vremenima pomagao, a sve u cilju održanja tog zanata.

Kada je bio mladić, Mostar je bio centar kulturnog života Hercegovine, što nije iznenađujuće kada znamo da je Mostar mjesto srpskih velikana kao što su Aleksa

Serbian people as Aleksa Santic, Jovan Ducic, brothers Svetozar and Vladimir Corovic, who left eternal mark to our people with their words, poems and other work. With becoming more mature Cedomir Milic showed more interest for cultural, political, spiritual, economic and agriculture development, he loved to read about it, what gave him the knowledge to be on the same level as highly educated people he always loved to talk with. As Paranos claims, he was especially inspired and thrilled with Aleksa Santic.

Šantić, Jovan Dučić, te braća Svetozar i Vladimir Čorović, koji su svojim riječima, pjesmama i drugim djelima ostavili vječni i duboki trag u našem narodu. Kako je postajao zreliji, Čedomir Milić se više zanimao za kulturni, politički, vjerski, ekonomski i privredni razvoj, volio je o tome da čita, što mu je obezbjedilo da nimalo ne zaostaje za visokoobrazovanim ljudima sa kojima je uvijek volio da razgovara. Kako tvrdi Paranos, posebno ga je inspirisao i oduševljavao Aleksa Šantić.

FIGURE 1

Cedomir Milić (Source: Photograph of Cedomir Milić).

SLIKA 1

Čedomir Milić (Izvor: Photograph of Cedomir Milić).



On November 10th 1913 he married Ljubica Kadijević, with whom he had six children: sons Jovan and Djordje, and daughters Dragica, Mirjana, Smilja and Biljana.

Young and full of will for helping the national development, on Prosvjeta's initiative for starting Serbian Sokolism, Milić embraced that idea and started working on physical, spiritual and moral rebirth of Serbian people. He nurtured special love towards Herzegovinian village and its people. According to his son Jovan, he always unselfishly helped others, but did not like to emphasize that. Jovan Milić remembers how his father gave a lot to poor people and other who needed help, but he never wanted to brag with that. He remembered how during one religious feast of some poor hosts, when they exit the room to get food and drink, Cedomir Milić left some money under something, so they can find it later. He helped Herzegovinian villagers by procuring and giving them seeds for sowing. He was teaching villagers how to sow, he brought fruit for sick, etc. During his life several drinking fountains in Herzegovina were built, what improved life, work and breeding in that territory. Today there still stands one drinking fountain with his name in Nevesinje (J. Milić, personal communications, August 20, 2012).

He specially advocated for bond between village and town, saying that "[...] the only way for national unity and a general revival is possible through the Sokol work in village" (Милић, 1935a, p. 14), and that "Village should spiritualize the town, and town should economically recover the village" (Ibid, p. 15).

We already mentioned that Cedomir Milić was inspired and fascinated by Aleksa Santić, but himself did not lag for such a great man. He was a man of the people, very tall, with sokol attitude, the one who always knew how to say something nice about village and its inhabitants, and the one who gave them all its energy. In one of many speeches inspired by Herzegovinian village and Sokolism, among other things, he said:

Organizing villages through Sokolism is like the cultivation and preservation of the roots of a large oak tree that will be able to resist all winds and weather disasters. Because wind, lightning or an axe can break and cut down branches and even the whole tree, but healthy and developed root rejuvenates all wounds from wind, thunder or an ax, and gives new life to young shoots of ruptured oak (Ibid, p. 16).

He directed all his strength into fight for physical, national and spiritual enlightenment of people. By

Godine 1913, 10. novembra, oženio se Ljubicom Kadijević, sa kojom je imao šestoro dece: sinove Jovana i Đorđa, i kćeri Dragicu, Mirjanu, Smilju i Biljanu.

Mlad i pun volje da pomogne nacionalnom razvoju na inicijativu "Prosvjete" za pokretanjem srpskog sokolstva, Milić se objeručke prihvatio posla na tjelesnom, duhovnom i moralnom preporodu srpskog naroda. Posebnu ljubav gajio je prema hercegovačkom selu i ljudima koji tamo žive. Prema riječima njegovog sina Jovana, uvek je nesebično pomagao drugima, ali nije volio to da ističe. Jovan Milić se sjeća kako je njegov otac puno davao sirotinji i ostalima kojima je pomoć bila potrebna, ali da nikada nije volio da se to ističe. Prisetio se kako je na jednoj slavi, kod nekih siromašnih domaćina, kada su izašli iz sobe da donesu jelo i piće, Čedomir Milić stavio novac ispod nečega kako bi ga posle domaćini pronašli. Pomagao je hercegovačkim seljacima nabavljajući i dajući im sjeme za sjetvu. Seljake je učio kako da sade, bolesnicima je nosio voće i slično. U toku njegovog života podignuto je i ozidano nekoliko česama po Hercegovini, što je u mnogome pomoglo život, rad i uzgoj na tom prostoru. Danas u Nevesinju još uvek postoji česma sa njegovim imenom (J. Milić, personalna komunikacija, 20. avgust, 2012).

Posebno se zalagao za stvaranje veze između sela i grada govoreći da "[...] je jedini put narodnom jedinstvu i opštem preporodu moguć sokolskim radom kroz selo" (Милић, 1935a, str. 14), i da "Selo treba da varoš oduhotvori, a varoš selo da privredno preporodi" (Ibid, str. 15).

Već smo naveli da je Čedomira Milića veoma inspirisao i oduševljavao Aleksa Šantić, ali ni sam Milić svojom rečitošću nije zaostajao za jednim takvim velikanom. Bio je narodni čovjek, veoma visok, sokolskog držanja, koji je uvijek znao reći nešto lijepo o selu i narodu koji tamo živi, a u koji je ulagao svu svoju energiju. U jednom od mnogih govora inspirisanih hercegovačkim selom i sokolstvom, između ostalog, rekao je:

Organizovanje sela preko sokolstva sličilo bi njegovanju i čuvanju korijena velikog hrasta koji će moći da odoli svim burama i nepogodama vremenskim. Jer, i hrastu bura, munja ili sjekira može da lomi i sječe grane, pa čak i stablo, ali korijen zdrav i razvijen podmlađuje sve rane od bure, groma ili sjekire, i daje novi život mladim izdancima hrasta slomljenoga (Ibid, str. 16).

Svoje snage je usmjerio u borbu za tjelesnim, nacionalnim i duhovnim prosvjećenjem naroda. Svojim

his national work he fought for its preservation and strengthening, because, as same as occupying authorities, he knew where our strength lies. About aforementioned he said:

Austro-Hungarian authorities knew well where the strength of our people lies and where from comes the danger for its politics. [...] Behead the village, and alienate the intelligence (town), that was the main goal of their well designed politics (Ibid, p. 10).

Through his work he tried to help people as much as he can, but also at the same time, every day he learned from the people. He considered home as the greatest sacred thing because "[...] Home builds spiritual strength of family members more perfect than any university programs..." (Ibid, p. 20), and the host as the greatest authority. According to him the host "[...] by tradition and national custom is the highest sanctity in the family" (Ibid).

He devoted his whole life to national work. Through Sokol and Fraternity societies he fought for spiritual and physical growth of nation. He was highly respected, not only by all Sokols and brothers, but also from the famous people of that time, like: Bishop Nikolaj Velimirovic, Bishop Petar Zimonic and King Aleksandar Karadjordjevic. In 1935, together with his son Jovan, he went for a devotional pilgrimage in Bari, to the grave of Holy Father Nikolai (Стојковић, 1935).

Besides working in Sokolism, Cultural-educational society "Prosvjeta" and Fraternity, he also worked for "National Defence" as a trustee for Herzegovina. He was in contact with other trustees as Spiro Soldo, Vaso Medan and Mirko Tomovic, who was "[...] one of the most agile trustees. He was equally standing out both in report and organizational work through Sokolism and fraternity, and the second one together with Cedo Milic from Mostar" (БЕАТОВИЋ & МИЛАНОВИЋ, 1989, p. 137). Because of the aforementioned he was not a minion of the occupying authorities, and therefore was persecuted and convicted.

During the First World War ensued a difficult time for the whole world and in our country especially for those who did not follow the occupying regime. Among them there were also Serbian Sokols. After assassination in Sarajevo in 1914, difficult time started for all Serbian sokol and other societies. Sokols were arrested, societies shut down, and their assets deprived and most frequently destroyed. During the famous Traitorous process in Banja Luka in 1916, under the accusation for working on secession of Herzegovina and Bosnia from Austro-Hungarian Monarchy and affiliation to Kingdom of Serbia, more than 80 sokols

nacionalnim radom borio se za njegovo očuvanje i jačanje, jer je, kao i okupatorska vlast, znao u čemu leži naša snaga. O tome je rekao:

Austro-ugarske vlasti dobro su znale gdje se nalazi snaga našeg naroda i otkuda dolazi opasnost njenoj politici. [...] Selo obezglaviti, a inteligenciju odroditi, to je bio osnovni cilj njene dobro smišljene politike (Ibid, str. 10).

Kroz svoj rad pomagao je narodu koliko je bilo u njegovoj moći, ali je, isto tako, svakim danom od naroda učio. Dom je smatrao najvećom svetinjom "[...] Duhovnu snagu članova porodice dom izrađuje savršenije od svih sveučilišnih katedra..." (Ibid, str. 20), a domaćina najvećim autoritetom. Prema njegovim rečima domaćin "[...] je po tradiciji i rasnom običaju najveća svetost u porodici" (Ibid).

Čitav svoj život posvetio je nacionalnom radu. Kroz sokolska i pobratimska društva borio se za duhovno i tjelesno jačanje naroda. Bio je veoma poštovan ne samo od strane svih sokola i pobratima, već i od znamenitih ljudi tog vremena: vladike Nikolaja Velimirovića, vladike Petra Zimonjića, te kralja Aleksandra Karađorđevića. Godine 1935, sa sinom Jovanom išao je na poklonstveno hodočašće u Bari na grob Svetog oca Nikolaja (Стојковић, 1935).

Pored rada u sokolstvu, Kulturno-prosvjetnom društvu "Prosvjeta" i pobratimstvu, radio je i za "Narodnu odbranu" kao njen povjerenik za Hercegovinu. Bio je u kontaktu sa ostalim povjerenicima kao što su Špiro Soldo, Vaso Medan i Mirko Tomović, koji je spadao "[...] među najagilnije povjerenike. On se jednako isticao i u izvještajnom i u organizatornom radu preko sokolstva i pobratimstva, ovo potonje zajedno s Čedom Milićem iz Mostara" (БЕАТОВИЋ И МИЛАНОВИЋ, 1989, str. 137). Upravo zbog prethodno navedenog nije bio miljenik okupatorskih vlasti, pa je od njih proganjan i osuđivan.

U periodu Prvog svjetskog rata nastaje teško vrijeme za cio svijet, a na našim prostorima posebno za one koji nisu odgovarali okupatorskom režimu. Među njima nalazili su se i srpski sokoli. Nakon sarajevskog atentata 1914. godine, počelo je teško vrijeme za sva srpska sokolska i ostala srpska društva. Sokoli su hapšeni, društva zatvarana, a imovina oduzimana i najčešće uništavana. Na čuvenom veleizdajničkom procesu u Banjoj Luci 1916. godine, pod optužbom da su radili na otcjepljenju Hercegovine i Bosne od Austrougarske i njenom pripajanju Kraljevini Srbiji, uhapšeno je više od 80 sokola, a među njima i Čedomir Milić. Godine 1916, 22. aprila, Milić je osuđen na smrt. Nakon toga, odlukom Vrhovnog suda, njegova smrtna kazna pretvorena je u 20 godina teške tamnice.

were arrested, among them also Cedomir Milić. On April 22nd 1916, Milić was sentenced to death penalty. After that, by the decision of Supreme Court, his sentence was changed to 20 years of heavy prison. Together with other sentenced sokols, Cedomir Milić was sent to hard labour in Zenica, where he stayed until "[...] moment of national liberation" (Бесаровић, 1930, p. 205). He managed to avoid death sentence which did not avert him from his intensive sokol work.

After WW1 sokol societies revived their work and continued their mission of physical, intellectual and spiritual rebirth on nation. Their number grew constantly, sokol unions were formed and they directed their work towards village. Sokol Union Mostar was also formed, and its head from the very beginning was Cedomir Milić. Mostar union was one of the most active unions, and by that most successful in all aspects of social work, revival and making of better life. Her influence on cultural life of Herzegovina was priceless. Sokols participated in numerous ceremonies, slets (gatherings), public classes and other events were Milić's presence was infallible.

In the period between two world wars a lot was done regarding sokol societies and Serbian, later Yugoslav Sokolism. It rapidly spreads among people, especially the one living in the village. It was well accepted, and with common strengths they intensively worked on edification of village and its rapprochement to town. Different papers and magazines about Sokolism started, as also the ones directed towards life in the village. One of those was Milić's magazine *Book for sokol village*.

However, that huge love towards people and restless work in hard and difficult years, did not suit nor Austro-Hungarian authorities or supporters of the occupying forces at the beginning of WW II. According to words of son Jovan Milić, his father

[...] was not involved in politics, and they presented him like quite a politician... [...] He was a great patriot. He helped wherever he could, and did not make any difference whether somebody is a Catholic, or a Muslim... He did not make any difference; the important was that somebody is a good man, wants' to work, to do good[...] (J. Milić, personal communications, August 20, 2012).

Milić continued with sokol work regardless to difficulties from the occupier. In 1916 he managed to escape death after Banja Luka process, but it was not the only time. His life was again threatened in 1940 when he managed to survive the attack occurred in Imotski. Shortly after that, because of his own and security of his family, he was forced to retire in Montenegro, in Piva monastery, where he spent the last days of life. According to Jovan Milić, after Cedomir Milić went to Montenegro, his family was arrested and

Zajedno sa ostalim osuđenim sokolima, Čedomir Milić je poslan na robiju u Zenicu, gdje je ostao do "[...]časa narodnog oslobođenja" (Бесаровић, 1930, str. 205). Uspio je da izbjegne smrtnu kaznu, koja ga nije spriječila da intenzivno nastavi sa svojim sokolskim radom.

Nakon Prvog svjetskog rata, sokolska društva obnavljaju i nastavljaju svoju misiju tjelesnog, umnog i duhovnog preporoda naroda. Broj društava je neprekidno rastao, formirane su sokolske župe koje svoj rad usmjeravaju na selo. Formirana je i Sokolska župa Mostar, čiji je starešina od osnivanja bio Čedomir Milić, i koja je bila jedna od najaktivnijih, a samim tim i najuspješnijih župa u svim aspektima njenog društvenog rada, preporoda i ostvarivanja boljeg života. Njen uticaj na kulturni život Hercegovine bio je neprocjenjiv. Sokoli su učestvovali na brojnim svečanostima, sletovima, javnim časovima i drugim dešavanjima, na kojima je Milić bio neizostavan.

U periodu između dva svjetska rata mnogo je učinjeno po pitanju sokolskih društava i srpskog, a kasnije i jugoslovenskog sokolstva. Ono se veoma brzo širi među narodom, posebno seoskim. Biva jako dobro prihvaćeno, i zajedničkim snagama intenzivno se radilo na prosvjećivanju sela i na njegovom zbližavanju sa gradom. Pokrenuti su razni listovi i časopisi koji su se bavili sokolstvom, ali i oni koji su bili usmjereni ka selu i njegovom životu. Jedan od njih bio je i Milićev časopis *Knjiga za sokolsko selo*.

Međutim, ta ogromna ljubav prema cijelom narodu i neumoran rad u teškim i mučnim godinama, nije odgovarao ni austrougarskim vlastima ni pristalicama okupatorskih sila početkom Drugog svjetskog rata. Prema riječima sina Jovana Milića, njegov otac

[...] se nije bavio politikom, a ispaao je političar ne znam kakav... [...] Bio je samo veliki rodoljub. Pomagao je kome je god mogao da pomogne, i nije pravio razliku da li je neko katolik, da li je neko musliman,... on nije pravio razliku, nek` je samo čovek i nek` hoće da uradi, hoće da učini[...] (J. Milić, personalna komunikacija, 20. august, 2012).

Milić je nastavio sa sokolskim radom bez obzira na otežavanje od strane okupatora. Godine 1916, uspio je da izbjegne smrt nakon banjolučkog veleizdajničkog procesa, ali to nije bio jedini put. Život mu je ponovo bio ugrožen 1940. godine, kada je uspio da preživi napad koji se dogodio u Imotskom. Nakon toga, situacija je postala opasna po njega i njegovu porodicu. To je Milića natjeralo da se, radi svoje sigurnosti, povuče u Crnu Goru, u manastir Pivu, gdje je proveo posljednje dane života. Prema riječima Jovana Milića, nakon što je Čedomir Milić otišao u Crnu

closed up in school “Queen Mary”, which was a prison at a time. After that, with escort up to Visegrad, they managed to go to Belgrade, where they continued to live in a small apartment (Ibid). His wife Ljubica, together with five children, stayed there until the end of her life.

According to previous research, better said writings of authors who dealt with his death, partisans found Čedomir Milic in Montenegro and on November 22nd 1941 in Duga of Niksic (place Podstoge) they threw him into pit. Not until 1942 his body was found, drawn out of the pit and buried near the church in the village Zavrh near Niksic (Скоко, 2000). By memories of Jovan Milic, the family knew about his death from some newspapers. In reviewed documents we were not able to find that article.

However, that was not the end of Milic's family agony, which continued even years after his death. The Town Board of Mostar declared Milic a criminal, posthumously. and the authorities confiscated all his property.

Milic's work on education and specialization of sokol staff

Period until 1918

As there was a lack of professional staff for working in sokol societies, one of the main activities of Sokol Union of Bosnia-Herzegovina from the very beginning was education of sokol staff. Čedomir Milic and his Herzegovinian sokols were always one of the main actors of sokol courses and other forms of education.

In August 1911 there was a gymnastic course for leaders of small sokol units (troops) in Prague, where also attended Herzegovinian sokols Dusan Savic from Ljubinja and Lazo Piceta from Gacko. According to writings of "Serbian Sokol" no. 1-12, from October 15(25) 1911, they successfully passed the gymnastic course exams (Павловић, 1998).

Besides courses in other sokol countries, the county always tried to organize as many domestic educational activities as possible. One of those, which we will use as our example on how the courses looked like, was also teacher's course in Sarajevo.

The leader of Serbian Sokol Union of Bosnia-Herzegovina, Stevan Žakula, through Serbian word on May 30th 1912 addressed letter about abovementioned course, where he gave all necessary information about time and place of the course, as also the general conditions for interested candidates. Every municipality paid the travel expenses for their teachers, and in Sarajevo they had food and accommodation,

Goru, njegovu porodicu su uhapsili i zatvorili u školu „Kraljica Marija“, koja je u to vrijeme bila zatvor. Nakon toga, sa pratnjom do Višegrada, uspjeli su da se prebace do Beograda, gde su nastavili da žive u malom stanu (Ibid). Tu je supruga Ljubica, sa petoro djece, ostala do kraja svog života.

Prema dosadašnjim istraživanjima, odnosno napisima autora koji su se bavili njegovom smrću, Čedomira Milića su u Crnoj Gori pronašli partizani, koji su ga 22. novembra 1941. godine u Dugi nikšičkoj (mjesto Podstoge) ubili i bacili u jamu. Tek 1942. godine njegovo tijelo je pronađeno, izvučeno iz jame i sahranjeno kod crkve u selu Zavrhu u blizini Nikšića (Скоко, 2000). Po sjećanju Jovana Milića, porodica je za očevu smrt saznala putem novina (J. Milić, personalna komunikacija 20. avgust, 2012). U pregledanim dokumentima nismo uspjeli pronaći taj novinski članak.

Međutim, ni tu nisu završile patnje porodice Milić, koje su uslijedile i godinama nakon očeve smrti. Gradski odbor Mostara, posthumno, proglasio je Čedomira Milića zločincem. Tadašnje vlasti su od njegove porodice oduzele svu imovinu.

Milićev rad na školovanju i usavršavanju sokolskog kadra

Period do 1918. godine

Kako je bilo vrlo malo stručnog kadra za rad u sokolskim društvima, jedna od aktivnosti kojoj je poklanjana velika pažnja Srpske sokolske župe bosanskohercegovačke od samog početka bilo je obrazovanje sokolskog kadra. Čedomir Milić i njegovi hercegovački sokoli uvek su bili jedni od glavnih učesnika sokolskih kurseva i svih ostalih vidova usavršavanja.

U avgustu 1911. godine, u Pragu je održan gimnastički tečaj za četovođe, na kome su bili i hercegovački sokoli Dušan Savić iz Ljubinja i Lazo Pičeta iz Gacka. Prema pisanju "Srpskog sokola" u broju 1-12, od 15(25) oktobra 1911. godine, uspešno su položili ispite iz gimnastičkog tečaja (Павловић, 1998).

Pored pohađanja kurseva u drugim zemljama u kojima je postojalo sokolstvo, župa se uvijek trudila da organizuje što više domaćih obrazovnih aktivnosti. Jedna od tih, koja će nam između ostalog poslužiti kao primjer kako su ti kursevi izgledali, bio je i sokolski učiteljski kurs u Sarajevu.

Vođa Srpske sokolske župe bosanskohercegovačke Stevan Žakula, putem Srpske riječi 30. maja 1912. godine uputio je dopis o održavanju pomenutog kursa, gdje je dao sve potrebne podatke o vremenu i mjestu održavanja, kao i o uslovima koji se pružaju zainteresovanim polaznicima. Svaka opština je svome učitelju plaćala

as also expenses of planned trips ("СОКОЛСКИ УЧИТЕЉСКИ КУРС", 1912a).

The beginning of course was planned for 2(15) July, and lasted for one month, until 2(15) August 1912. ("СОКОЛСКИ УЧИТЕЉСКИ КУРС", 1912b) After end of the course all candidates were awarded with identifications about attending the mentioned course. Until May 30th there were eight applied candidates.

As the date of the course approached, certain problems regarding application of candidates appeared, as also about support of the very course. Stevan Zakula expressed his discontent about negligence of Serbian teachers for applying for the course, but at the same time about the negligence of Serbian Teacher Society which, although kindly asked to give their respective opinion about this matter, kept silent.

Even greater Zakula's disappointment caused suggestion to share the money that Great Council¹ gave for the purpose of organizing the course among applied candidates, so they can take care for themselves about the accommodation and meal (because in somebody's opinion, there is no need for Sokol Union to think about that). Zakula welcomes and states the names of four applied teachers, but clearly admits defeat of his hope that at the very beginning the interest will be much greater. Nevertheless, Great Council saves the case and applies 15 more teachers, but the debate about whether the money will be shared or managed by Union, still stays unsolved, which leaves Zakula quite disappointed.

Besides all dissatisfaction, he advised all those who are not ready for serious and hard work, to stay at their homes. "Because, to say the truth, in my eyes I cannot see nor sokol or man among those who fear from chivalrous trouble. During the course the getting up will be at 5 a.m. and exercise until 7 a.m., lectures will last from 8 a.m. to 12 a.m. and from 3 p.m. to 6 p.m., and the evening exercise from 8 p.m. to 10 p.m. Who thinks he cannot manage that, he better not come" (Жакула, 1912, str. 2). He finished his appeal with words: "I am Sokol, and Sokolism has taught me to speak openly, face to face" (Ibid).

Milić also participated and gave significant contribution to organization of sokol staff education.

Period from 1918 to 1941

After WW1 sokol societies continue their work. Sokol convocation of Serbs, Croats and Slovenians was held on June 28th and 29th 1919 in Novi Sad. Second gala session of Sokol convocation of Serbs,

¹Great steering and educational council had headquarters in Sarajevo, and it presented supreme steering, supervisory and judicial power in autonomous church-national government for all four metropolises in Bosnia and Herzegovina. (Grujić, n.d., ¶ 7) Special attention of the Council was dedicated to national education. (Mikić, n.d., ¶ 7)

putni trošak do Sarajeva i nazad, a u samom Sarajevu imali su obezbjeđenu hranu i smještaj, kao i troškove planiranih izleta ("СОКОЛСКИ УЧИТЕЉСКИ КУРС", 1912a).

Početak kursa bio je planiran za 2/15. jul i trajao je mjesec dana, do 2/15. avgusta 1912. godine ("СОКОЛСКИ УЧИТЕЉСКИ КУРС", 1912b). Po završetku, svim uspješnim polaznicima dodjeljene su isprave kao zvanične legitimacije o pohađanju pomenutog kursa. Do 30. maja bilo je ukupno osam prijavljenih učitelja.

Kako se datum kursa približavao, tako su se javljali problemi oko prijave kandidata, kao i same podrške održavanju kursa. Stevan Žakula izrazio je svoje nezadovoljstvo zbog nemarnosti srpskih učitelja za prijavljivanje na kurs, ali, isto tako, i nemarnosti samog Srpskog učiteljskog udruženja koje, iako je zamoljeno da da svoje mišljenje o tome, ostalo ćutke u pozadini.

Još veće razočarenje kod Žakule izazvao je prijedlog da se novac koji je Veliki savjet¹ dao u svrhu organizovanja kursa razdijeli među prijavljene učitelje da bi se oni sami pobrinuli za stan i hranu (jer po nečijem mišljenju, nema potrebe da o tome brine sokolska župa). Žakula pohvaljuje i navodi imena četvorice prijavljenih učitelja, ali jasno priznaje poraz njegove nade da će u samom startu interes biti mnogo veći. Ipak, Veliki savjet spasava situaciju, i prijavljuje se još 15 učitelja, ali spor o tome da li će novac biti podijeljen lično njima ili će njime upravljati župa, i dalje je ostao neriješen, zbog čega je Žakula bio jako razočaran.

Pored svog nezadovoljstva, upozoravao je sve one koji nisu spremni na ozbiljan i naporan rad da slobodno ostanu kod svoje kuće. "Jer, da rečem istinu, u mojim očima nije ni soko ni čovjek, ko se boji viteške nevolje. U kursu će se svaki dan ustajati u 5 sati izjutra i vježbati do 7 sati, predavanje će trajati od 8 do 12 i od 3 do 6, a uveče će se vježbati od 8 do 10 sati. Ko misli da to neće moći izdržati, neka ne dolazi u kurs" (Жакула, 1912, str. 2). Svoje obraćanje je završio rečima: "Ja sam soko, a sokolstvo me je naučilo da govorim otvoreno oči u oči. Zdravo!" (Ibid).

Milić je, takođe, učestvovao u organizaciji školovanja sokolskog kadra i tome dao značajan doprinos.

Period od 1918. do 1941. godine

Poslije prvog svjetskog rata sokolska društva nastavljaju svoj rad. Sokolski sabor Srba, Hrvata i Slovenaca održan je 28. i 29. juna 1919. godine u Novom Sadu. Druga svečana sjednica sokolskog

¹Veliki upravni i prosvjetni savjet imao je sedište u Sarajevu, i predstavljao je vrhovnu upravnu, nadzornu i sudsku vlast u autonomnoj crkveno-narodnoj upravi za sve četiri mitropolije u Bosni i Hercegovini (Grujić, n.d., ¶ 7). Naročitu pažnju Savjet je poklanjao narodnoj prosvjeti (Mikić, n.d., ¶ 7).

Croats and Slovenians was held on June 30th 1919 in hotel "Liberty" in Novi Sad. Total of 607 Sokol delegates, from which 25 from Herzegovina, attended the session. As a member of Technical Board and Fraternity Board the session also attended Čedomir Milić. Among other things, they discussed about forming and organization of Sokol Unions. The suggestion was to form 33 separate Unions, and among them also Mostar Union (Herzegovina with Dubrovnik and Korcula districts, and part of Montenegro up to Duga pass – Banjani and Rudine) ("Organizacija župa sa teritorijalnim razgraničenjem", 1919).

Sokol Union (region), with headquarters in Mostar, formed from societies from Herzegovina, border parts of Dalmatia and Montenegro, called its First assembly in November 1919, and constitutional assembly was held on March 28th 1920 ("Sokolska župa Mostar", 1930). Union (region) started the work with 22 societies, and soon societies from Avtovac and Janjine joined the Union. The number of societies grew constantly, so in 1933 Union had 29 societies and 120 sokol troops (smaller, village sokol societies). The Union directed its work in several directions, and especially to work at village, because it felt that the village will be Union's mainstay. At the session of steering committee of Union on June 9th 1925 they unanimously decided to name the Union "Aleksa Santić".

From the very founding of Mostar Union in 1919, Čedomir Milić was the head and main engine for all activities. He gave immeasurable contribution to Union's development, first of all through unselfish love and huge will for physical and spiritual rising of people, but also with practical work: visits to societies, lectures, correspondence, different kind of help, etc. The organization of Union was like this: the Union was on top of Sokol societies, and Sokol societies were on top, took care of and gathered smaller sokol units, village sokol troops.

As in the time of Austro-Hungarian occupation, Milić still worked on empowering and education of staff for work in sokol troops and societies. From foundation of Union, until 1929 he made some memorable results in that field. He organized more than fifty different courses in that period: five courses for sokol leaders, two courses for leaders of sokol troops, five union (region) courses, two courses for preparing of leaders for gathering in Belgrade and thirty courses of sokol societies (Blato, Vela Luka, Dubrovnik, Djenović, Imotski, Korcula, Kotor, Ljubuski, Metković, Mostar, Nevesinje, Nikšić, Opuzen, Podgorica, Stolac, Cetinje and Čapljina) held from 1924 to 1929 ("Sokolska župa Mostar", 1930).

sabora Srba, Hrvata i Slovenaca, održana je 30. juna 1919. godine u Hotelu "Sloboda" u Novom Sadu. Sjednici je prisustvovalo 607 sokolskih delegata, od kojih je 25 delegata sokola bilo iz Hercegovine. Kao član Tehničkog odbora i Pobratimskog odbora sjednici je prisustvovao i Čedomir Milić. Pored ostalog, raspravljalo se o formiranju i organizaciji sokolskih župa. Predloženo je da se osnuju 33 župe. Župa mostarska (Hercegovina sa dubrovačkim i korčulanskim kotarom, te dijelom Crne Gore do klanca Duge - Banjani i Rudine) ("Organizacija župa sa teritorijalnim razgraničenjem", 1919).

Sokolska župa Mostar, sa sjedištem u Mostaru, formirana od društava iz Hercegovine, pograničnih dijelova Dalmacije i Crne Gore, sazvala je svoju Prvu skupštinu u novembru 1919. godine, a konstitutivnu skupštinu su održali 28. marta 1920. godine ("Sokolska župa Mostar", 1930). Župa je svoj rad počela sa 22 društva, a ubrzo su joj se priključili i društva iz Avtovca i Janjine. Broj društava se iz godine u godinu neprestano povećavao, tako da je u 1933. godini u župi bilo 29 društava i 120 sokolskih četa. Župa je svoj rad usmjeravala u više pravaca, a posebno u rad na selu, jer je osjećala da ono mora biti njen glavni oslonac. Na sjednici upravnog odbora župe, 9. juna 1925. godine, jednoglasno je odlučeno da se župi dodijeli naziv "Aleksa Šantić".

Od samog osnivanja župe mostarske godine 1919, Čedomir Milić bio je njen starješina i glavni nosilac i pokretač svih njenih aktivnosti. Dao je neizmjeran doprinos njenom razvoju, prije svega putem nesebične ljubavi i ogromne volje za tjelesnim i duhovnim uzdizanjem naroda, ali i svojim praktičnim radom: obilaženjem društava, predavanjima, dopisivanjem, pomaganjem i slično. Organizacija župe bila je takva da je ona pod sobom imala sokolska društva, a društva su brinula za rad i u sebi okupljala seoske sokolske čete.

Kao i u vrijeme austrougarske okupacije, Milić je i dalje radio na osposobljavanju i školovanju kadra za rad u sokolskim četama i društvima. Od osnivanja župe do 1929. godine, on je postigao zapažene rezultate na tom polju. U tom periodu organizovao je više od pedeset raznih tečajeva: pet tečajeva za sokolske prednjake, dva tečaja za vođe sokolskih četa na selu, pet župskih tečajeva, dva tečaja za spremanje prednjaka za slet u Beogradu i trideset društvenih tečajeva sokolskih društava (Blato, Vela Luka, Dubrovnik, Đenović, Imotski, Korčula, Kotor, Ljubuški, Metković, Mostar, Nevesinje, Nikšić, Opuzen, Podgorica, Stolac, Cetinje i Čapljina) održanih od 1924. do 1929. godine ("Sokolska župa Mostar", 1930).

Sokol Union "A. Santić", among other things, worked on preparation of sokol experts through Union courses. One of those, fourth, was held on February 26th and 27th 1927 in Mostar. One of the lecturers was Cedomir Milic. The test attended ten male and four female sokols.

After that there was a party with different significant spiritual, military and national personalities, among whom also Cedomir Milic. He addressed to all present about sokol views on life, and the speech "[...]" was very good and rich with words of world moralists and preachers" (Ćurić, 1927, p. 3).

The candidates received the certificates of attendance, after what they started dancing and celebrating. In special room Cedomir Milic said goodbye to candidates with touching speech, and with some Sokols who joined them. In the name of the course organizers Kosta Ligutić expressed gratitude to lecturers, and especially Cedomir Milic, for their effort and the fact that they have always been there for all candidates. After that the singing and dancing continued.

Milic worked intensively on founding of sokol schools for preparing village youth for work in sokol troops. By working with youngsters and developing in them "[...] faith in God, love towards fatherland and old family moral laws, he repelled destructive and demolishing forces that youth is always inclined to" (Грђић, 2002, p. 205).

The schools started to work in 1929. According to Dusan Bajić, those schools had "[...] a character of preparing village youth for sokol troop leaders and general work in villages" (Bajić, 1934, p. 133). The host and leader of those schools was Cedomir Milic "[...] who by constant presence among candidates followed the work of all teachers and put together all subjects according to needs or life of village nowadays" (Ibid).

The teacher's section in Union was formed in 1933, when it started to work.

When we talk about courses in Mostar, in 1933 there were two Union courses for leaders of Sokol troops. They both lasted 54 days with total of 509 lectures (Dokić, 1934).

The great attention was dedicated to preparing and education of leaders. According to already mentioned report of Турањанинова and Чолић (1934), in 1933 there were a total of nine leaders courses:

- Three-day course in Mostar for programme of union matches and preparations for regional gathering in Ljubljana.
- Three-day course for county chiefs, Mostar.
- Seven-day course of light athletics and games, led by Union leaders in Mostar.
- Union leader course in Vela Luka.

Sokolska župa "A. Šantić" je, pored ostalog, radila i na stvaranju sokolskih stručnjaka putem župskih tečajeva. Jedan od njih, četvrti po redu, održan je 26. i 27. februara 1927. godine u Mostaru. Jedan od predavača na kursu je bio i Čedomir Milić. Ispitu je pristupilo deset sokola i četiri sokolice.

Po završetku organizovana je zabava (sjelo) kojem su prisustvovali ugledne duhovne, vojne i civilne ličnosti, među kojima se nalazio i Čedomir Milić. On je prisutnima govorio o sokolskim pogledima na život, a sam govor je "[...] bio veoma dobar i iskićen frazama svetskih moralista i pripovednika" (Ćurić, 1927, str. 3).

Polaznicima su uručena uvjerenja o kursu, nakon čega se prešlo na igru i veselje. U posebnoj prostoriji se Čedomir Milić dirljivim govorom oprostio od tečajaca, a tome su se pridružili još neki sokolski članovi. Ispred organizatora tečaja Kosta Ligutić se zahvalio svim predavačima, a posebno Čedomiru Miliću, na njihovom trudu i tome što su uvijek bili tu za sve polaznike kursa. Nakon toga nastavilo se sa pjesmom i veseljem.

Milić je intenzivno radio na osnivanju sokolskih škola za spremanje seoske omladine za rad u sokolskim četama. Radeći sa mladima i razvijajući u njima "[...] veru u Boga, ljubav prema otadžbini i starim porodičnim moralnim zakonima, on je najbolje suzbijao destruktivne i rušilačke snage kojima je omladina uvek sklona" (Грђић, 2002, str. 205).

Škole su sa radom počele tokom 1929. godine. Prema riječima Dušana Bajića, te škole su imale: „[...] karakter spremanja seoske omladine za vođe četa i opšti rad u selu“ (Bajić, 1934, str. 133). Domaćin i rukovodilac tih škola je bio Čedomir Milić, „[...] koji je stalnim boravkom među tečajcima pratio rad svih nastavnika i dovodio sve predmete u cjelinu prema potrebama ili životu seoske današnjice“ (Ibid).

Učiteljski odsijek u Župi osnovan je 1933. godine, kada je i počeo sa radom.

Kada su u pitanju tečajevi u Mostaru, u 1933. održana su dva župska tečaja za vođe sokolskih četa. Oba su trajala ukupno 54 dana sa 509 održanih predavanja (Dokić, 1934).

Spremanju i vaspitanju prednjaštva je takođe posvećivana velika pažnja. Prema već spomenutom izveštaju Турањанинова i Чолић (1934) u 1933. godini održano je ukupno devet prednjačkih tečajeva:

- Trodnevni tečaj u Mostaru za upoznavanje programa rada za savezne utakmice i pripreme za pokrajinski slet koji će se održati u Ljubljani.
- Trodnevni tečaj za okružne načelnike, Mostar.
- Sedmodnevni tečaj lake atletike i igara, vođen od župnog načelnštva u Mostaru.

- Seven-day course for male and female leaders of youth and kids, first time held in Union.
- Fourth union course for leaders of sokol troops, Mostar.
- Fifth union course for leaders of sokol troops.
- Fourth federal course for sokol solders, Belgrade.
- Fifth federal course for sokol solders, Belgrade.

In these courses, among others, also participated members of Union management, including Milic.

On fourth and fifth November 1933 there were union leader's courses, organized for the first time in Mostar Union and in this range.

Among already stated, there were also leaders courses of societies: Vrgorac, Gacko, Dubrovnik, Imotski, Janjina, Ljubinje, Mostar and Trpanj, as also troops practical courses, whose main goal was to introduce leaders of sokol troops with programme for 1933. Those courses were held in sokol troops who haven't held it in 1932, and those were: Dubrovnik, Konjic, Ljubuski and Trebinje.

In 1934 there were seven planned courses, with total duration of 106 days, and those were:

- Seven-day course for male and female chiefs of societies,
- Seven-day course for light athletics and games,
- Seven-day course for swimming, rowing and water games,
- Ten-day course for leaders of youngsters and kids,
- Thirty-day union course for preparing of union leaders,
- Fifteen-day course for skiing,
- Thirty-day course for sokol troops leaders (Ibid).

All planned courses were held in 1934.

Based on the aforementioned, we can ascertain that Čedomir Milic, among other numerous successful activities in Sokolism, gave great contribution to education and specialization of sokol staff on the territory of Herzegovina, as during Serbian Sokolism in the time of Austro-Hungarian occupation, also during Sokolism in the time of Kingdom of Serbs, Croats and Slovenians (from 1929 Kingdom of Yugoslavia).

REFERENCES

- Bajić, D. (1934). *Izvjestaj odbora za rad u selu* [Report of the Committee to work in the countryside]. Mostar, BA: Sokolska župa Mostar.
- Батовић, Ђ. и Милановић, Д. (1989). *Велеиздајнички процеси Србима у Аустро-Угарској* [High-treason processes Serbs in the Austro-

- Župski prednjački tečaj u Veloj Luci.
- Sedmodnevni tečaj za vodnike i vodnice naraštaja i djece, koji je prvi put održan u župi.
- Četvrti župski tečaj za vođe sokolskih četa, Mostar.
- Peti župski tečaj za vođe sokolskih četa.
- Četvrti savezni tečaj za vojnike sokole, Beograd.
- Peti savezni tečaj za vojnike sokole, Beograd.

Na tečajevima su, pored ostalih, učestvovali i članovi starenstva župe, među kojima je bio i Milić.

Četvrtog i petog novembra 1933. godine održani su župski prednjački ispiti, koji su prvi put organizovani u ovom obimu i u župi mostarskoj.

Pored već navedenih, organizovani su i društveni prednjački tečajevi društava: Vrgorac, Gacko, Dubrovnik, Imotski, Janjina, Ljubinje, Mostar i Trpanj, kao i četni praktični tečajevi, čiji je cilj bio upućivanje vođa sokolskih četa u rad predviđen programom za 1933. godinu. Ti tečajevi održani su u četama društava koja to nisu uradila 1932. godine, a to su: Dubrovnik, Konjic, Ljubuški i Trebinje.

U 1934. planirano je da se održi sedam tečajeva sa ukupnim trajanjem od 106 dana, a to su:

- Sedmodnevni tečaj za načelnike i načelnice društava,
- Sedmodnevni tečaj za laku atletiku i igre,
- Sedmodnevni tečaj za plivanje, veslanje i igre na vodi,
- Desetodnevni tečaj za vodnike naraštaja i djece,
- Tridesetodnevni župski tečaj za spremanje župskih prednjaka,
- Petnaestodnevni tečaj za skijanje,
- Tridesetodnevni tečaj za vodnike četa. (Ibid)

Planirani tečajevi su tokom 1934. godine i održani.

Na osnovu naprijed iznjetog možemo konstatovati da je Čedomir Milić, pored ostalih brojnih aktivnosti koje je uspješno obavljao u sokolstvu, dao i veliki doprinos u školovanju i usavršavanju sokolskog kadra na području Hercegovine, kako u srpskom sokolstvu u vrijeme austrougarske okupacije, tako i u sokolstvu u vrijeme Kraljevine Srba, Hrvata i Slovenaca (od 1929. Kraljevina Jugoslavija).

Hungarian Empire]. Beograd, RS: Književne novine.

- Бесаровић, В. (1930). *Соколи у Бањалучком процесу* [Sokoli in Banja Luka process]. Beograd, RS: Savez sokola Kraljevine Jugoslavije.
- Čurić, H. (1927). Iz sokolske župe "Aleksa Šantić" [From Sokol parish "Aleksa Šantić"]. *Омладина*, 3(3), 3.

- Dokić, M. (1934). *Izveštaj predsjednika Župskog prosvjetnog odbora o prosvjetnom radu u godini 1933* [Report of the President of the Zupa Educational Board of the educational work in 1933]. Mostar, BA: Sokolska župa Mostar.
- Екмечић, М. (2010). *Дуго кретање између клања и орања – Историја Срба у новом веку (1492-1992)* [Long movement between slaughter and plowing - History of Serbs in the new century (1492-1992)]. Beograd, RS: Evro - Đunti.
- Грђић, Р. (2002). *Успомене* [Memories]. Valjevo - Beograd, RS: Glas Crkve - Sabornost.
- Grujić, M. R. (n.d.). *Pravoslavna srpska crkva* [Serbian Orthodox Church]. Retrived from http://www.svetosavlje.org/biblioteka/Istorija/PSC/Lat_PSC78.htm
- Илић, С., & Мијатовић, С. (2006). *Историја физичке културе* [History of Physical Education]. 3rd ed. Beograd, RS: “D.T.A. TRADE”.
- Mikić, G. (n.d.). *Pregled istorije brišćanske crkve* [View the history of the Christian church]. Retrived from http://www.svetosavlje.org/biblioteka/Istorija/IstorijaSPC/Lat_Istorija50.htm
- Миличић, Ч. (1935а). *Наше мисли пред улазак у село* [Our thoughts before entering the village]. Beograd, RS: Savez sokola Kraljevine Jugoslavije..
- Milić, J. (2012, avgust 20). Interview given to K. Pantelic. [recorded on tape]. Audio tape owned by Kritine Pantelić.
- Organizacija župa sa teritorijalnim razgraničenjem. (1919). *Sokolски гласник*, 1(8, 9 and 10), 311–313.
- Паранос, В. (1982). *Успомене на Чеду Милића српског националног и соколског радника* [Memories to Cedo Milic Serbian national and Sokol workers]. New York, NY: independent edition by author.
- Павловић, Д. П. (1998). *Физичка култура српског народа у Босни и Херцеговини до 1918. године* [Physical Education of the Serbian people in Bosnia and Herzegovina until 1918. the]. Istočno Sarajevo, BA: Fakultet fizičke kulture.
- Павловић, П. (1999). *Српски соко* [Serbian Soko]. Istočno Sarajevo, BA: Viteška organizacija Srpski soko.
- [Photograph of Cedomir Milic]. (ca. 1918–1925). Personal archive by Jovan Milić, Dragice Končar 14, Belgrade, RS.
- СОКОЛСКИ УЧИТЕЉСКИ КУРС [Sokolski teaching course]. (1912а). *Српска ријеч*, 8(81), 2.
- СОКОЛСКИ УЧИТЕЉСКИ КУРС [Sokolski teaching course]. (1912б). *Српска ријеч*, 8(83), 1.
- Sokolska župa Mostar. (1930). *Sveslavensko sokolstvo* [Whole Slavic Sokolstvo]. Beograd, RS: Savez sokola Kraljevine Jugoslavije.
- Скоко, С. (2000). *Крваво коло херцеговачко 1941-1942* [Bloody round of Herzegovina 1941-1942]. Beograd, RS: SPKD Prosvjeta.
- Стојковић, Ј. (1935). *Утисци са поклоничког пута у Бари и Рим* [Impressions from the road in Bari and Rome]. Novi Sad, RS: D. Čamprag i drug.
- Турањанинова, Б., & Чолић, П. (1934). *Извјештај начелништва соколске жупе Мостар за 1933. годину* [Report Command parish Mostar for 1933]. Mostar, BA: Sokolska župa Mostar.
- Жакула, С. (2/15 јун 1912). Одговор на закључак скупштине Срп. Учит. Удружења [Reply to this conclusion Serbian Assembly of the Teacher Association]. *Српска ријеч*, 8(88), 2.

Received: November 3, 2013

Revision received: December 11, 2013

Accepted: December 11, 2013

Correspondence to:

Kristina Pantelić Babić, MSc
Fakultet fizičkog vaspitanja i sporta
Bulevar V. Petra Bojovića 1A
78000 Banja Luka
Bosnia & Herzegovina
Phone: 00387 65 59 76 85
E-mail: kri.pan@hotmail.com

Primljeno: 3. novembra 2013. godine

Izmjene primljene: 11. decembra 2013. godine

Odobreno: 11. decembra 2013. godine

Korespondencija:

Mr Kristina Pantelić Babić
Fakultet fizičkog vaspitanja i sporta
Bulevar V. Petra Bojovića 1A
78000 Banja Luka
Bosna i Hercegovina
Telefon: 00387 65 59 76 85
E-mail: kri.pan@hotmail.com

IL CONTRIBUTO DI ČEDOMIR MILIĆ ALL'ISTRUZIONE DEL PERSONALE DELLA SOCIETÀ SOKOL IN ERZEGOVINA

Kristina Pantelić Babić¹ e Petar Pavlović¹

¹Facoltà di Formazione Fisica e dello Sport, Università di Banja Luka, Bosnia-Erzegovina

Čedomir Milić, di padre Jovan e di madre Soka Milić (cognome da nubile Govedarica), nato il 23 Marzo 1886 a Mostar, è stato ucciso il 22 Novembre 1941 vicino a Nikšić. Quando era un giovane uomo, Mostar era il centro della vita culturale di Erzegovina, e diventando più maturo, si interessava di più per lo sviluppo culturale, politico, religioso, economico e commerciale. Dalla fondazione della prima organizzazione serba di ginnastica »Obilić« a Mostar nel 1904 (dal 1910 il nome è »Srpski Sokol«), Milić fu coinvolto nel lavoro dell'organizzazione e la sua vita è stata dedicata alle attività di Sokol e al lavoro nazionale. In particolare, si impegnava per la creazione di collegamenti tra città e campagna, e attraverso l'associazione Sokol e le associazioni aggemellate combatteva per il rafforzamento spirituale e fisico della sua gente. Era rispettato, non solo dagli aderenti del Sokol e delle associazioni aggemellate, ma anche dagli intellettuali del tempo. Nel 1919 è fondata la Parrocchia di Sokol a Mostar, formata dalle associazioni di Erzegovina, e dalle associazioni dei territori confinari di Dalmazia e Montenegro, e sin da quest'istituzione Čedomir Milić era il capo e l'iniziatore di tutte le attività. La parrocchia ha iniziato le sue attività con 22 associazioni, e già nel 1933 c'erano 29 associazioni e 120 truppe di Sokol. Oltre a molte altre attività,

eseguite con successo in associazione, Milić ha dato un grande contributo per l'istruzione e la formazione del personale presso Sokol (Falconieri; i giovani membri) in Erzegovina, sia in movimento serbo in periodo dell'occupazione austro-ungarica, sia in movimento nel Regno dei Serbi, Croati e Sloveni (dal 1929 Regno di Jugoslavia). Milić stava lavorando intensamente sulla creazione di scuole di Sokol per preparare gioventù rurale a lavorare nelle truppe dei membri, per l'organizzare corsi presso Sokol e dell'altre attività, per la preparazione e l'educazione di progressisti. Nel 1933 è stato fondato un dipartimento per l'educazione degli insegnanti in Parrocchia. Milić è stato coinvolto come l'organizzatore e il docente in più di cinquanta diversi corsi di formazione, scuole e altre attività didattiche. Lo scopo di questo lavoro è quello di evidenziare e di esplorare il ruolo di Čedomir Milić nell'istruzione e nella formazione del personale della società Sokol. Sono state rivelate e analizzate le fonti create in un momento in cui Milić ha vissuto e lavorato, così come le fonti che sono state create nel periodo doppio.

Parole chiave: membri (cosidetti sokoli), corsi, corsista, scuole, parrocchia.

NIVO SPRIINTERSKIH SPOSOBNOSTI, EKSPLOZIVNE SNAGE I SPECIJALNE IZDRŽLJIVOSTI VRHUNSKIH MLADIH FUDBALERA NA RAZLIČITIM POZICIJAMA

LEVEL OF SPRINT AND JUMP ABILITIES AND INTERMITTENT ENDURANCE OF ELITE YOUNG SOCCER PLAYERS AT DIFFERENT POSITIONS

Pavol Pivovarniček¹, Martin Pupiš¹, Zuzana Tonhauserová¹, and Martina Tokárová¹

¹Katedra za fizičko vaspitanje i sport, Fakultet humanističkih nauka, Matej Bel Univerzitet, Republika Slovačka
Department of Physical Education and Sports, Faculty of Humanities, Matej Bel University, Slovak Republic

REVIEW PAPER

PREGLEDNI ČLANAK

doi: 10.5550/sgia.130902.en.006P

UDK: 796.332.012.116-053.6

doi: 10.5550/sgia.130902.se.006P

SUMMARY

The aim of the study was to analyse a level of sprint abilities, jump abilities and intermittent endurance of playing groups divided according to playing positions (goalkeepers, defenders, midfielders, forwards) from Slovak national under-21 soccer team ($N=18$, goalkeepers $n=2$, defenders $n=4$, midfielders $n=7$, forwards $n=5$) in time of qualification for the UEFA European Under-21 Football Championship 2011. The level of sprint abilities was diagnosed with the device Fitro Light Gates (FiTRONIC, Bratislava, The Slovak Republic). The criterion for the level assessment was the time obtained in the distance of 10 m with the exactness of 0.01 s. The level of jump abilities was diagnosed with the device FiTRO Jumper (FiTRONIC, Bratislava, The Slovak Republic). The criterion for the level assessment was the jump height in centimeter (cm) with the exactness of 0.1 cm. Intermittent endurance was diagnosed with Yo-Yo Intermittent recovery test, level 2. The criterion for the evaluation was total overcame distance in the test in metres (m). Differences in the level of sprint abilities, jump abilities and intermittent endurance were recognised and defined with the special subject analysis. The level of sprint abilities of the whole group was presented with the average performance with the value 2.21 ± 0.08 s, the level of jump abilities with the average performance with the value 39.0 ± 4.2

SAŽETAK

Cilj studije bio je da se analizira nivo sprinterske sposobnosti, eksplozivnih sposobnosti donjih ekstremiteta i specifične izdržljivost igrača u zavisnosti od pozicije u timu (golmani, odbrambeni igrači, vezni igrači, napadači) slovačkog fudbalskog nacionalnog tima ispod 21 godine ($N=18$, golmana $n=2$, odbrambenih igrača $n=4$, veznih igrača $n=7$, napadača $n=5$) tokom kvalifikacija za UEFA Evropskog prvenstva ispod 21 godinu 2011. Nivo sprinterskih sposobnosti dijagnostikovana je uređajem Fitro Light Gates (FiTRONIC, Bratislava, Slovačka Republika). Kriterijum za procenu nivoa bilo je vrijeme dobijen na distanci od 10 m sa tačnošću 0,01 s. Nivo eksplozivne sposobnosti donjih ekstremiteta dijagnostikovana je uređajem FiTRO Jumper (FiTRONIC, Bratislava, Slovačka Republika). Kriterijum za procjenu nivoa eksplozivnosti bila je visina skoka u centimetrima (cm) sa tačnošću 0,1 cm. Izdržljivost je dijagnostikovana sa Yo-Yo intervalnim testom oporavka, nivo 2. Kriterijum za procjenu bio je ukupno pređena distanca u testu u metrima (m). Razlike u nivoima sprinterske sposobnosti, eksplozivnih sposobnosti i izdržljivosti su prepoznate i definisane kao posebni predmet analize. Nivo sprinterskih sposobnosti cijele grupe predstavlja prosječna sposobnost sa vrijednošću $2,21 \pm 0,08$ s, nivo eksplozivnih sposobnosti sa

cm and the level of intermittent endurance with the average value 1283 ± 294 m, what means $\text{VO}_2\text{max. kg}^{-1} = 62.7 \pm 4.0 \text{ ml.kg}^{-1}\text{min}^{-1}$. We have not found out with special subject analysis any significant differences in monitored parameters between groups divided according to playing positions. The significantly lower level was observed only in the level of sprint abilities and intermittent endurance of goalkeepers.

Key Words: elite young soccer players, intermittent endurance, jump abilities, sprint abilities.

INTRODUCTION

The present professional soccer is characterised mainly by dynamics and constant increase in playing speed. We can agree with Nemeč, Štefaňák, and Sylvestrovič (2005) that explosive power, speed-power movement abilities and intermittent endurance are limiting movement abilities in soccer. The condition according to Bunc (1999) presents 30-40% of playing performance. We agree with the statement of Orendurff et al. (2010), Psotta, Bunc, Netscher, Mahrová, and Nováková (2006), Reilly (1997), who say that soccer is intermittent movement activity which contains very short, usually 1 to 5 seconds continuing intervals of endurance with high to maximum intensity, which alternate with intervals of endurance with lower intensity or inaction continuing from 5 to 10 seconds. Little and Williams (2005) include the running acceleration, maximal running speed and agility, which exist usually in the match, into movement activities at high intensity. Bangsbo, Iain, and Krusturp (2007), Bangsbo, Mohr, and Krusturp (2006), state by players of the highest level 150 to 250 short intensive activities in a match. Hipp (2007) declares that in the soccer match we can observe by player around 100 to 150 sprints with different length. According to findings of Psotta et al. (2006) is 50-65% of all realized sprints shorter than 5 m, 75-85% of all sprints is no longer than 10 m and the average length of sprints is 9 m in a single soccer game. Grasgruber and Cacek (2008) state the length of sprints is ca. 15 m and usually no more than 30 m, every ca. 90 s, it means 0.8 to 1 km for the whole match. Jovanović, Sporiš, Omrcen, and Fiorentini (2011) declare that number of metres run at high intensity is criteria for division of players in elite or lower performance level. Andrzejewski, Chmura, Pluta, Strzelczyk, and Kasprzak (2012) found out by professional players from European leagues that 90% of all sprints in matches are till 5 seconds. According to researchers professi-

prosjječnom vrijednošću visine vertikalnog skoka od $39,0 \pm 4,2$ cm i nivo specifične izdržljivosti sa prosječnom vrijednošću od 1283 ± 294 m, što znači $\text{VO}_2\text{max.kg}^{-1} = 62,7 \pm 4,0 \text{ ml.kg}^{-1}\text{min}^{-1}$. Posebnim predmetom analize nismo utvrdili bilo kakve značajne razlike u posmatranim parametrima između grupa podjeljenih prema poziciji u timu. Značajno niži nivo zabilježen je samo u nivou sprinterskih sposobnosti i specifične izdržljivosti kod golmana.

Ključne riječi: ponavljajuća izdržljivost, skakačke sposobnosti, sprinterske sposobnosti, vrhunski mladi fudbaleri.

UVOD

Moderni profesionalni fudbal se uglavnom odlikuje dinamikom i stalnim povećanjem brzine igre. Možemo se složiti sa Nemeč, Štefanak i Silvestrom (2005) da eksplozivna snaga, sposobnost brzinske snage pokreta i specifična izdržljivost ograničavaju kretnu sposobnost u fudbalu. Kondicija prema Buncu (1999) predstavlja 30-40% igračkih sposobnosti. Takođe se slažemo se sa izjavom Orendurff i saradnika (2010), Psotta, Bunc, Netscher, Mahrová i Nováková (2006), Reilly (1997), koji kažu da je fudbal ponavljajuća aktivnost pokreta koja sadrži veoma kratke, obično 1 do 5 sekundi kontinuirane intervale izdržljivosti sa visokim do maksimalnim intenzitetom, koje smjenjuju intervali izdržljivosti sa nižim intenzitetom ili neaktivnosti u kontinuitetu od 5 do 10 sekundi. Little i Williams (2005) u kretne aktivnosti visokog intenziteta koje preovladavaju u utakmici uključuju trkačko ubrzanje, maksimalnu brzinu trčanja i agilnost. Bangsbo, Iain i Krusturp (2007), Bangsbo, Mohr i Krusturp (2006) utvrdili su kod vrhunskih igrača 150 do 250 kratkih intenzivnih aktivnosti u utakmici. Prema istraživanjima Psotta i saradnika (2006) 50-60% svih realizovanih sprinteva je kraće od 5 m, 75-85% svih sprinteva nije duže od 10 m a prosječna dužina sprinta u jednoj fudbalskoj utakmici je 9 m. Grasgruber i Cacek (2008) došli su do zaključka da je prosječna dužina sprinta 15 m i obično ne veća od 30 m, sve ukupno 90 s, što znači 0,8 do 1 km za svaku utakmicu. Jovanović, Sporiš, Omrcen i Fiorentini (2011) ističu da je obim trčanja u visokom intenzitetu kriterijum za podjelu igrača na vrhunske i igrače sa nižim nivoom sposobnosti. Andrzejewski, Chmura, Pluta, Strzelczyk i Kasprzak (2012) došli su do saznanja da su profesionalni igrači u evropskim ligama od svih sprinteva u 90% slučajeva u sprintu

onal players achieve significantly higher speed in first 10m of sprints in comparison with players of lower leagues (Grasgruber & Cacek, 2008; Psotta et al., 2006). Besides Mohr, Krusturup, and Bangsbo (2003) found out by elite players about 28 to 58% bigger distance ($p < .05$) in runs at high intensity ($> 19 \text{ kmh}^{-1}$) and sprints compared to players of lower level (run at high intensity = $2.43 \pm .14$ vs. $1.90 \pm .12$ km, sprint = $.65 \pm .06$ vs. $.41 \pm .03$ km). Haugen, Tønnessen, and Seiler (2012) discovered that Norwegian national soccer players and players of the Norwegian TopLeague achieved higher performance from the point of view of the acceleration and running speed ($p < .05$) than players of 2nd division (difference 1.0-1.4%), 3rd – 5th division (difference 3.0-3.8%), junior national team (difference 1.7-2.2%) and junior players (difference 2.8-3.7%). Considering that this research lasted more years (1995-2010, $n=939$, age = 22.1 ± 4.3 years), the authors had the possibility to determine that players in years 2006-2010 were faster about 1-2% in 20 m run and had achieved rather maximal speed in comparison with players in years 1995-1999 and 2000-2005.

According to Psotta et al. (2006) the active concept of offensive and defensive phase of the game in playing systems is applied more in present soccer. This concept is characterised by involvement of more players in both phases of the game. It means fast switches of groups of players in transition phases from defence to offense and vice versa, movement activity on the large area of the field, which is evident in spatial intersection of players from particular groups and horizontal and vertical circulations of players in offensive phase. Bangsbo has already found out in the year 1994 that midfielders make the biggest distance in the match; however the distance in runs at high intensity did not vary by players at different playing positions (Bangsbo, 1994). Rebelo et al. (2012) discovered by elite U19 soccer players that the level of intermittent endurance was significantly higher in comparison with players of the same category from the lower league. Krusturup et al. (2006) and Rostgaard, Iaia, Simonsen, and Bangsbo (2008) found out significantly higher ($p < .05$) level of intermittent endurance in Yo-Yo test by elite international soccer players compared to elite soccer players from lower league too.

Mentioned studies show the fact that stimulations for development of sprint abilities, jump abilities and intermittent endurance in the training process of soccer players are very necessary. We know that the level of sprint and jump abilities is genetically determined and it depends on neuromuscular coordination and representation of fast muscle fibres but it is necessary to focus on stimulation too.

do 5 s. Prema istraživačima profesionalni igrači postižu značajno veću brzinu u prvih 10 metara sprinta u poređenju sa igračima nižih liga (Grasgruber i Cacek, 2008; Psotta i saradnici, 2006). Pored toga Mohr, Krusturup i Bangsbo (2003) pokazali su da je kod vrhunskih igrača 28 do 58% veća distanca ($p < .05$) trčanja visokim intenzitetom ($> 19 \text{ kmh}^{-1}$) i sprintom u poređenju sa igračima nižih nivoa igranja (trčanje visokim intenzitetom = 2.43 ± 0.14 prema 1.90 ± 0.12 km, sprint = 0.65 ± 0.06 prema 0.41 ± 0.03 km). Haugen, Tønnessen i Seiler (2012) otkrili su da norveški nacionalni fudbaleri i igrači norveške TopLeague postižu bolje rezultate sa stanovišta ubrzanja i brzine trčanja ($p < .05$) od igrača druge lige (razlika 1,0-1,4 %), treće do pete lige (razlika 3,0-3,8 %), juniorske nacionalne reprezentacije (razlika 1,7-2,2 %) i juniora (razlika 2,8-3,7 %). Obzirom da je ovo istraživanje trajalo više godina (1995-2010, $n=939$, starost = $22,1 \pm 4,3$ godine), autori su imali mogućnost da utvrde da su igrači u godinama 2006-2010 bili brži oko 1-2% na distanci 20 m i razvijali maksimalnu brzinu u poređenju sa igračima u godinama 1995-1999 i 2000-2005.

Prema Psotta i saradnici (2006) aktivni koncept napadačke i odbrambene faze igre u sistemu igranja primjenjuje se više u savremenom fudbalu. Ovaj koncept se odlikuje uključivanjem više igrača u obe faze igre. To znači brzo uključivanje grupa igrača u tranzicionu fazu iz odbrane u napad i obratno, kretnu aktivnost na većem prostoru terena, što se ogleda u prostornom kretanju igrača iz različitih grupa i u horizontalnoj i vertikalnoj cirkulaciji u fazi napada. Bangsbo je još 1994. godine utvrdio da vezni igrači pretiče najveće distance u utakmici; ali ipak distance koje trče visokim intenzitetom ne razlikuju se od igrača na drugim pozicijama u timu (Bangsbo, 1994). Rebelo i saradnici (2012) su pronašli da je nivo izdržljivosti značajno veći kod vrhunskih igrača U19 u odnosu na igrače istog uzrasta iz nižih liga. Krusturup i saradnici (2006) i Rostgaard, Iaia, Simonsen i Bangsbo (2008) takođe su dokazali značajno viši ($p < .05$) nivo izdržljivosti u Yo-Yo testu vrhunskih fudbalera internacionalca u poređenju sa igračima nižih liga.

Navedena istraživanja ukazuju na činjenicu da je veoma potrebno podsticati razvoj sprinterskih i eksplozivnih sposobnosti i specifične izdržljivosti u procesu fudbalskog treninga. Znamo da je nivo sprinterskih i eksplozivnih sposobnosti genetički uslovljen i da zavisi od neuro-mišićne koordinacije i broja brzih mišićnih vlakana ali je takođe potrebno usredsrediti se i na stimulaciju.

METHODS

The observational group consisted of Slovak national under-21 soccer players ($N=18$, goalkeepers $n=2$, defenders $n=4$, midfielders $n=7$, forwards $n=5$). The players belonged to the team which had fought for qualification in the UEFA European Under-21 Football Championship 2011 in Denmark in the 7th qualification group together with U21 national teams from Croatia, Serbia, Norway and Cyprus.

We made this research on October 8th, 2009 in the morning, when we as well as Jančoková (2000) can speak about first daily peak of performance. Diagnostics of the level of sprint abilities, jump abilities and intermittent endurance took place in Národnétréningové centrum (NTC) in Senec before qualification match with the national team of Cyprus for European Under-21 Football Championship on October 14th, 2009 in Achna.

Before diagnostics soccer players went through general warm-up (10 minutes) and speed warm-up (10 minutes).

Sprint abilities were measured with the device FiTRO Light Gates (FiTRONIC, Bratislava, The Slovak Republic) in 10 m run from the middle-standing start at the soccer field with natural grass. Examined soccer player posed a starting position on a start line at the beginning of measurement and started to run with the audio signal „Hop“ which was at the same time a tripper of measuring in the computer device. Within one measurement the soccer players took two trials. We have chosen a better trial to the evaluation.

Jump abilities were measured with the device FiTRO Jumper (FiTRONIC, Bratislava, The Slovak Republic) consisted of a contact switch mat placed on the floor and connected by means of an USB interface to the computer. Jump abilities were diagnosed with vertical jump from a squat with a counter-movement and use of swinging arms (Weineck, 2007). Examined players posed on the device position of a squat with arms raising forward and gently bent, they made a movement with arms towards rising upward, swished with them and at the same time they made three maximum jumps. Jumping players should make the shortest and strongest take-off, without bending of knees and with relaxed knees. We have chosen the best jump from three jumps for the evaluation.

We have used Yo-Yo Intermittent recovery test, level 2 for diagnostics of intermittent endurance (intermittent Yo-Yo test with short recovery – level 2, Krusturp et al., 2006). Examined players ran sections of 40 m (2 x 20 m). They recovered with relaxed jogging in limited area of 5 m behind the starting line, only certain period of time, after every section. The running speed and rest intervals were controlled

METODE

Posmatrana grupa sastojala se od 21 fudbalera slovačkog nacionalnog tima ispod 21 godine ($N=18$, golmana $n=2$, odbrambenih igrača $n=4$, veznih $n=7$, našadača $n=5$). Igrači su pripadali timu koji se borio u kvalifikacijama za UEFA Evropsko fudbalsko prvenstvo 2011 ispod 21 godine u Danskoj u sedmoj kvalifikacionoj grupi sa U21 nacionalnim timovima Hrvatske, Srbije, Norveške i Kipra.

Istraživanje smo napravili 8. oktobra 2009. godine u jutarnjim časovima kada se, kao i kod Jančoková (2000), može govoriti o prvom dnevnom vrhuncu sposobnosti. Dijagnoza nivoa sprinterskih i eksplozivnih sposobnosti i specifične izdržljivosti izvršena je u Národnétréningové centrum (NTC) u Senjecu prije kvalifikacionog meča protiv nacionalnog tima Kipra za Evropsko fudbalsko prvenstvo ispod 21, 14. oktobra 2009. godine u Ahnasu.

Prije dijagnostike fudbaleri su prošli kroz opšte zagrijavanje (10 minuta) i brzinsko zagrijavanje (10 minuta).

Sprinterske sposobnosti su mjerene uređajem FiTRO Light Gates (FiTRONIC, Bratislava, Slovačka Republika) trčanjem na 10 m iz polustojećeg stava na fudbalskom terenu sa prirodnom travom. Ispitivani fudbaler postavljao se na startnu poziciju na početku mjerenja i započinjao je sa trčanjem na audio signal „hop“ kada je istovremeno startovalo i mjerenje u aparaturi mjerenja. Za procjenu je izabran najbolji pokušaj. Eksplozivne sposobnosti mjerene su uređajem FiTRO Jumper (FiTRONIC, Bratislava, Slovačka Republika) koja se sastojala od kontakta sa prekidačem u prostirci na podu koja je pomoću USB interfejsa povezana sa računarom. Eksplozivna sposobnost dijagnostikovana je visinom vertikalnog skoka sa suprotnim pokretom korištenja zamaha rukama (Weineck, 2007). Ispitivani igrači su stajali na uređaju u polučučnju sa rukama koje su se kretale naprijed i blago savijene, potom su pravili pokret sa rukama koje su se dizale nagore sa zamahom i istovremeno su izvođena tri skoka. Skokove su igrači trebali napraviti u što kraćem vremenu i što snažnijim odrazom, bez savijanja u koljenima i opuštenih koljena. Za procjenu je uziman najbolji od tri skoka.

Za dijagnostiku specifične izdržljivosti koristili smo Yo-Yo intervalni test oporavka, drugi nivo (intervalni Yo-Yo test sa kratkim oporavkom - nivo 2, Krusturp i saradnici, 2006). Ispitanici su trčali distancu od 40 m (2 x 20 m). Oni su se oporavljali relaksiranim trčkanjem u ograničenom prostoru od 5 m iza startne linije tačno određeno vrijeme nakon svakog ponavljanja. Brzina trčanja i vrijeme oporavka

by audible signals recorded on original CD. The test was finished when examined soccer player did not fulfil time limit for 40 m long section two times consecutively. The result of the test was total exceeded distance given in metres.

In presented study we have used basic statistical descriptive characteristics of performance values: arithmetic average (M), standard deviation (SD), maximum of measured values (Max) and minimum of measured values (Min).

Significance of differences in the level of sprint abilities, jump abilities and intermittent endurance was determined with special subject analysis. The criterion of significance was the value of 1 SD. When it came to difference by evaluation of the group of players according to playing positions minimum about one value of SD including the value of SD compared to average performance and the level of the whole group, so we considered it as subject significant difference.

The criterion of the level evaluation of sprint abilities was achieved time in 10 m distance. In the study we have evaluated the level of sprint abilities in time with exactness of .01 s.

The criterion of the level evaluation of jump abilities was the jump height in cm with exactness of 0.1 cm. The device FITRO Jumper uses for calculation of the jump height relation $h = (g \times Tf^2) / 8$. The producer FITRONIC s.r.o. guarantees exactness and reliability of the device. There were made certified synchronic measurements with reflexion mat of the company KISTLER.

The criterion of evaluation of intermittent endurance was total exceeded distance in the test in metres and calculated to $VO_2maxkg^{-1}v \text{ mlkg}^{-1}min^{-1}$ with formula $VO_2maxkg^{-1} = \text{distance in metres} \times 0.0136 + 45.3$, according to study of Bangsbo, Iaia, and Krusturp (2008).

RESULTS

The average level of sprint abilities of the whole group was 2.21 ± 0.08 s (Table 1). Regarding special subject analysis we have discovered significantly lower level only in the group of goalkeepers in comparison with the average performance of the whole group. We have not observed significant differences of other groups divided according to playing positions compared to the average level of the whole group.

The average level of jump abilities of the whole group was 39.0 ± 4.2 cm. Regarding special subject analysis we have not discovered significant differences in the average level of the whole group in comparison with the average level of jump abilities of other groups divided according to playing positions (Table 2).

bili su pod kontrolom zvučnih signala snimljenih na originalnom CD-u. Test je prekidan kada ispitivani fudbaler nije ispunio vrijeme predviđeno za dionicu od 40 m dva puta za redom. Rezultat testa bio je ukupna pretrčana distanca data u metrima

U istraživanju smo koristili osnovne deskriptivne statističke metode izmjerenih sposobnosti: aritmetičku sredinu (M), standardnu devijaciju (SD), maksimalnu izmjerenu vrijednost (Max) i minimalno izmjerenu vrijednost (Min).

Značajnost razlike u sprinterskim i eksplozivnim sposobnostima i specifičnoj izdržljivosti određena je posebnim predmetom analize. Kriterij značajnosti bio je jedna SD. Kada je došlo do razlike u procjeni grupe igrača prema poziciji u timu u minimum oko jedne vrijednosti SD uključujući vrijednosti SD u odnosu na prosjek sposobnosti i nivoa cijele grupe, tada je to smatrano kao predmet značajne razlike.

Kriterij procjene nivoa sprinterskih sposobnosti bilo je postignuto vrijeme na 10 m. U istraživanju smo procjenjivali nivo sprinterskih sposobnosti sa vremenom tačnosti od 0,01 s.

Kriterij procjene nivoa eksplozivnih sposobnosti bila je visina skoka u cm sa tačnošću od 0,1 cm. Uređaj FITRO Jumper koristi formulu $h = (g \times Tf^2) / 8$ za izračunavanje visine skoka. Proizvođač FITRONIC s.r.o. garantuje tačnost i pouzdanost uređaja. Napravljena su sertifikovana mjerenja na refleksionoj prostirci u kompaniji KISTLER.

Kriterij procjene specifične izdržljivosti bila je ukupno pretrčana distanca u metrima i izračunat $VO_2maxkg^{-1}v \text{ mlkg}^{-1}min^{-1}$ uz pomoć formule $VO_2maxkg^{-1} = \text{distanca u metrima} \times 0,0136 + 45,3$ u skladu sa istraživanjem Bangsbo, Iaia i Krusturp (2008).

REZULTATI

Prosječan nivo sprinterskih sposobnosti za čitavu grupu iznosio je $2,21 \pm 0,08$ s (Tabela 1). Kada je u pitanju predmet posebne analize otkrili smo značajno niži nivo samo u grupi golmana u odnosu na prosječne sposobnosti čitave grupe. Nisu se mogle zapažiti značajnije razlike ostalih grupa formiranih prema poziciji u timu u poređenju sa prosječnim nivoom cijele grupe.

Prosječan nivo eksplozivnih sposobnosti cijele grupe mjeren visinom skoka iznosio je $39,0 \pm 4,2$ cm. Kada je u pitanju predmet posebne analize nismo otkrili značajne razlike u prosječnom nivou cijele grupe u poređenju sa prosječnim nivoom eksplozivnih sposobnosti ostalih grupa podijeljenih prema poziciji u timu (Tabela 2).

TABLE 1*The level of sprint abilities of players.***TABELA 1***Nivo sprinterskih sposobnosti igrača.*

Players	Average time 10 m run (s)	Rank
Goalkeepers	2.31±.06 s	5
Defenders	2.25±.05 s	4
Midfields	2.18±.10 s	1
Forwards	2.20±.06 s	2
Whole group	2.21±.08 s	3

Legend/Legenda: Players - Igrači; Average time 10 m run (s) - Prosječno vrijeme trčanja na 10 m (s); Rank - Rang; Goalkeepers - Golmani; Defenders - Odbrambeni igrači; Midfields - Vezni igrači; Forwards - Napadači; Whole group - Čitava grupa.

TABLE 2*The level of jump abilities of players.***TABELA 2***Nivo skakačkih sposobnosti igrača.*

Players	Vertical jump with counter- movement of arms (cm)	Rank
Goalkeepers	39.2±4.0 cm	3
Defenders	39.6±5.4 cm	2
Midfields	38.0±3.8 cm	5
Forwards	39.9±4.8 cm	1
Whole group	39.0±4.2 cm	4

Legend/Legenda: Players - Igrači; Vertical jump with countermovement of arms (cm) - Vertikalni skok sa suprotnim kretanjem ruku (cm); Rank - Rang; Goalkeepers - Golmani; Defenders - Odbrambeni igrači; Midfields - Vezni igrači; Forwards - Napadači; Whole group - Čitava grupa.

The average level of intermittent endurance of the whole group was 1283 ± 294 m ran in the test, what means the value $VO_{2max} kg^{-1} = 62.7 \pm 4.0$ ml. $kg^{-1} min^{-1}$ (Table 3). Regarding special subject analysis we have determined significantly lower level only in the group of goalkeepers in comparison with the average performance of the whole group. We have not observed significant differences of other groups divided according to playing positions compared to the average level of the whole group.

DISCUSSION

We agree with statements of Reilly, Bangsbo, and Franks (2000) that soccer players do not have to dispose with extraordinary performance in any field

Prosječan nivo specifične izdržljivosti cijele grupe bio je pretrčanih 1283 ± 294 m u testu, što znači vrijednost $VO_{2max} kg^{-1} = 62,7 \pm 4,0$ ml. $kg^{-1} min^{-1}$ (Tabela 3). Kada je u pitanju predmet posebne analize utvrdili smo značajno niži nivo samo u grupi golmana u odnosu na prosječne performanse cijele grupe. Nismo primjetili značajne razlike kod drugih grupa podjeljenih prema poziciji u timu u odnosu na prosječni nivo cijele grupe.

DISKUSIJA

Slažemo sa mišljenjem Reilly, Bangsbo i Franaka (2000) da fudbaleri ne moraju da imaju izuzetno dobre motoričke sposobnosti, ali moraju da imaju

TABLE 3*The level of intermittent endurance of players .***TABELA 3***Nivo ponovljene izdržljivosti igrača.*

Players	Number of ran metres in the test	Value VO ₂ maxkg ⁻¹	Rank
Goalkeepers	900±85 m	57.5±1.1 ml.kg ⁻¹ min ⁻¹	5
Defenders	1345±126 m	63.5±2.7 ml.kg ⁻¹ min ⁻¹	1
Midfields	1343±352 m	63.5±4.8 ml.kg ⁻¹ min ⁻¹	2
Forwards	1304±288 m	63.0±3.9 ml.kg ⁻¹ min ⁻¹	3
Whole group	1283±294 m	62.7±4.0 ml.kg ⁻¹ min ⁻¹	4

Legend/Legenda: Players - Igrači; Number of ran metres in the test - Broj pretrčanih metara u testu; Value VO₂maxkg⁻¹ - Vrijednost VO₂maxkg⁻¹; Rank - Rang; Goalkeepers - Golmani; Defenders - Odbrambeni igrači; Midfields - Vezni igrači; Forwards - Napadači; Whole group - Čitava grupa.

of physical performance but they have to have appropriate high level in all fields. The authors Bunc and Psotta (2001) mention that physiological presuppositions and norms represent necessary conditions for success at the professional level.

Sprint abilities, jump abilities and intermittent endurance in soccer belong to limiting movement presuppositions in achievement of top playing performance at the world level. On the one side considering comparison of the level of sprint abilities of individual playing positions, midfielders have achieved the best time (2.18±.10 s) surprisingly. Sporiš, Jukić, Ostojić, and Milanović (2009) had observed Croatian elite soccer players (N=270) in seasons 2005/2006 and 2006/2007 and discovered that forwards had achieved the highest performance considering sprint abilities in 5, 10 and 20 m. On the other side it is necessary to point out that we have not discovered significant differences in performance levels of players in the field compared to the whole group by comparing all groups divided according to playing positions. Mentioned time of our midfielders was better only about 3.2% compared to defenders and about .9% compared to forwards. We have found out significantly lower level of sprint abilities only in the group of goalkeepers (2.31±.06 s) compared to the whole group. It is important to notice that if we had defined the determination of subject significance with other criterion as was the value of one decisive divergence, so the results would be interpreted differently. Taşkin (2008) came to similar results when he did not discover significant differences ($p>.05$) among groups of players divided according to playing positions belonging to professional soccer teams (N=243). The matter of his research was running speed in 30 m.

odgovarajući visok nivo u svim sposobnostima. Autori Bunc i Psotta (2001) napominju da fiziološke predispozicije i norme predstavljaju neophodne predušlove za uspjeh na profesionalnom nivou.

Sprinterske i eksplozivne sposobnosti i specifična izdržljivost u fudbalu pripadaju sposobnostima koje ograničavaju kretne pretpostavke u ostvarivanju vrhunskih performansi na svjetskom nivou pripadaju pretpostavkama koje ograničavaju kretanje u dostizanju vrhunskih igračkih vještina na svjetskom nivou. Iznenadujuće je da su, s jedne strane, u odnosu na individualnu poziciju u timu, vezni igrači u sprinterskim sposobnostima postigli najbolje vrijeme (2,18±0,10 s). Sporiš, Jukić, Ostojić i Milanović (2009) su posmatrali hrvatske vrhunske fudbalere (N=270) u sezonama 2005/06 i 2006/07 i otkrili da su napadači iskazivali najbolje sposobnosti u sprintu na 5, 10 i 20 m. S druge strane, potrebno je istaći da nismo otkrili značajnije razlike u nivoima sposobnosti igrača na terenu u odnosu na cijelu grupu upoređujući sve grupe podijeljene prema poziciji u timu. Pomenuto vrijeme naših veznih igrača bilo je bolji samo oko 3,2 % u odnosu na odbrambene igrače i oko 0,9 % u odnosu na napadače. Pronašli smo samo značajno niži nivo sprinterskih sposobnosti u grupi golmana (2,31±0,06 s) u odnosu na cijelu grupu. Važno je primjetiti da ako definišemo utvrđivanja predmeta značajnosti sa drugim kriterijumom, kao što je vrijednost presudnog odstupanja, rezultati će biti drugačije tumačeni. Taşkin (2008) je došao do sličnih rezultata koji nisu pokazali značajne razlike ($p>0,05$) među grupama igrača podijeljenih prema poziciji na kojoj igraju a nastupaju u profesionalnim fudbalskim klubovima (N=243). Predmet njegovog istraživanja

Similarly Rampinini et al. (2007) did not determine significant differences ($p > .05$) among groups of defenders, midfielders, forwards and goalkeepers at professional and non-professional level ($N=78$, age = 21.0 ± 4.9) considering running speed in 30 m too.

Malý et al. (2011) discovered that Czech national U16 soccer players ($N=23$) achieved the level of sprint abilities in time $1.87 \pm .10$ s in 10 m run on the surface with artificial grass. Cometti, Maffiuletti, Pousson, Chatard, and Maffulli (2001) found out that French first league players ($N=29$) achieved the average level of sprint abilities in time $1.80 \pm .06$ s in 10 m run on the surface with natural grass. Dauty, Bryand, and Potirion-Josse (2002) discovered that first league players ($N=20$, age = 23.5 ± 3.7 years) from French team FC Nantes reached the average performance in 10m run with the value $1.82 \pm .08$ s on the surface with natural grass too. Strudwick, Reilly, and Doran (2002) determined that players from English team in Premier League ($N=19$, age = 22.0 ± 2.0 years) achieved the average performance in time $1.75 \pm .08$ s. Wisløff, Castagna, Helegerud, Jones, and Hoff (2004) discovered that players from Norwegian elite team Rosenborg FC Trondheim ($N=17$, age = 25.8 ± 2.9 years) achieved the level of sprint abilities with the value $1.82 \pm .30$ s. Measurement was made in indoor shoes on the wooden floor. In our study we have discovered the level of sprint abilities in 10 m with time $2.18 \pm .10$ s. Determined time is influenced by the fact that players from our group started on audible signal. On the one side the final performance in our test was influenced by reaction speed because it exists in game demands. On the other side it is necessary to mention that majority of stimuli in the game have a visual character. It is necessary to say that the level of running speed is influenced by running technique too.

Considering jump abilities we have not determined significant differences in individual groups divided according to playing positions in comparison with the whole group. We have found out that forwards achieved the highest level (39.9 ± 4.8 cm). Sporiš et al. (2009) in correspondence with results from our study discovered that forwards had achieved the highest level of jump abilities from all players in the field. Generally in the study of Ibid the highest level of jump abilities was discovered by goalkeepers. In our study the level of jump abilities of forwards was higher about .8% compared to defenders, about 1.6% compared to goalkeepers and about 4.8% compared to midfielders. In other studies Lago-Peñas, Lago-Ballesteros, and Rey (2011) found out that young soccer players ($N=321$, age = 15.63 ± 1.82 years) achieved the best performances in vertical jumps in the groups of goalkeepers and central defenders.

je bilo trčanje u sprintu na 30 m. Takođe slično Rampinini i saradnici (2007) nisu utvrdili značajne razlike ($p > 0,05$) između grupa odbrambenih igrača, veznih igrača, napadača i golmana u profesionalnom i amaterskom fudbalu ($N=78$, godine = $21,0 \pm 4,9$) u brzini trčanja na 30 m.

Malý i saradnici (2011) došli su do zaključka da igrači češkog nacionalnog tima U16 ($N=23$) dostigli nivo sprinterskih sposobnosti sa vremenom $1,87 \pm 0,10$ s na terenu sa vještačkom travom. Cometti, Maffiuletti, Pousson, Chatard i Maffulli (2001) ustanovili su da igrači francuske prve lige ($N=29$) imaju ostvaren nivo sprinterskih sposobnosti u trčanju na 10 m u vremenu $1,80 \pm 0,06$ s na podlozi sa vještačkom travom. Dauty, Bryand i Potirion-Josse (2002) otkrili su da igrači prve lige ($N=20$, uzrast = $23,5 \pm 3,7$ godina) iz francuskog tima FK Nant takođe postigli prosječnu sposobnost u trčanju na 10 m od $1,82 \pm 0,08$ s na podlozi sa vještačkom travom. Strudwick, Reilly i Doran (2002) utvrdili su da igrači iz engleskih timova Premijer lige ($N=19$, uzrast = $22,0 \pm 2,0$ godina) dostižu prosječnu sposobnost u vremenu $1,75 \pm 0,08$ s. Wisløff, Castagna, Helegerud, Jones i Hoff (2004) pokazali su da norveški igrači iz vrhunskog tima FK Rosenborg iz Trondhajma ($N=17$, uzrast = $25,8 \pm 2,9$ godina) dostižu nivo sprinterskih sposobnosti sa vrijednošću $1,82 \pm 0,30$ s. Mjerenje je izvedeno sa dvoranskim patikama na parket podlozi. U našem istraživanju otkrili smo nivo sprinterskih sposobnosti na utčanju na 10 m u vremenu $2,18 \pm 0,10$ s. Na postignuto vrijeme uticala je činjenica da su igrači, u našem istraživanju, startovali na zvučni signal. S jedne strane, na finalni rezultat u našem testu uticala je brzina reakcije jer ona postoji i u uslovima igre. S druge strane, važno je napomenuti da većina stimulusa u igri ima vizuelni karakter. Takođe, potrebno je naglasiti da je nivo brzine trčanja pod uticajem tehnike trčanja.

U odnosu na eksplozivne sposobnosti nismo utvrdili značajnije razlike pojedinačnih grupa podjeljenih prema poziciji u timu u poređenju sa cjelokupnom grupom. Spoznali smo da su napadači dostigli najviši nivo ($39,9 \pm 4,8$ cm). Istraživanje Sporiš i saradnici (2009) je u korespondenciji sa našim istraživanjem koje je otkrilo da su napadači postigli najviši nivo eksplozivnih sposobnosti u odnosu na sve ostale igrače na terenu. Generalno Ibid istraživanje je ustanovilo najviši nivo eksplozivnih sposobnosti kod golmana. U našem istraživanju eksplozivna sposobnost napadača bila je veća oko 0,8 % u odnosu na odbrambene igrače, oko 1,6 % u odnosu na golmane i oko 4,8 % u odnosu na vezne igrače. U drugom istraživanju Lago-Peñas, Lago-Ballesteros i Rey

Boone, Vaeyens, Steyaert, Vanden Bossche, and Bourgois (2012) discovered that adult players ($N=289$) from six teams of Belgian Pro League achieved the average performance (squat jump = 40.7 ± 4.6 cm and countermovement jump = 43.1 ± 4.9 cm). Considering division of players into groups according to playing positions goalkeepers and central defenders achieved the highest performance compared to the group of all defenders, midfielders and forwards in correspondence with results of the study of Lago-Peñas et al. (2011). Forwards reached higher performance than midfielders and defenders, what is in correspondence with results of our study. Haugen et al. (2012) found out that Norwegian players including senior and junior national soccer players ($N=939$, age = 22.1 ± 4.3 years) in years 1995-2010 had reached significantly lower performance ($p < .05$) in vertical jumps in the group of midfielders compared to other groups divided according to playing positions. Gil, Ruiz, Irazusta, Gil, and Irazusta (2007) state the highest performance of forwards in all observed parameters of endurance, speed, agility and jump abilities. The authors mention that they did not examine elite young soccer players ($N=241$, age = 17.31 ± 2.64 years). Wisløff, Helgerud, and Hoff (1998) discovered that players from elite Norwegian League had achieved significantly higher level of jump abilities in the group of defenders and forwards in comparison with the group of midfielders. Mujika, Santisteban, Impellizzeri, and Castagna (2009) did not determine differences ($p > .05$) between the height of vertical jumps of elite senior soccer players and elite young soccer players. Gissis et al. (2006) compared performance of young soccer players ($N=54$) divided into group of young national team of Greece, high-performance young soccer players and recreational soccer players. Considering vertical jumps there were observed differences ($p < .05$) among national soccer team and other groups. There were not observed differences in evaluation of vertical jumps between high-performance and recreational young soccer players. Kalapotharakos et al. (2006) compared three teams ($N=19$, age = 26 ± 4 years, $N=15$, age = 24 ± 4 years, $N=20$, age = 23 ± 3 years) of Greek Super League from the point of view of several anthropometric and condition parameters. They found out that tolerance of lactate, isokinetic power of the knee extensors and performance in vertical jumps showed higher values ($p < .05$) of the team which belonged to three best teams of Super league compared to values of observed teams which were in the middle and among last teams of the league. Wong and Wong (2009) found out that Asian young players ($N=16$, age = $16.2 \pm .6$ years) achieved lower performance in vertical jumps in comparison with European and African players. In

(2011) našli su da su mladi fudbaleri ($N=321$, uzrast = $15,63 \pm 1,82$ godina) ostvarili najbolje sposobnosti u vertikalnim skokovima u grupama golmana i centralnih odbrambenih igrača. Boone, Vaeyens, Steyaert, Vanden Bossche i Bourgois (2012) ustanovili su da su odrasli igrači ($N=289$) u šest timova belgijske Pro League postigli prosječnu sposobnost (skok iz čučnja = $40,7 \pm 4,6$ cm i skok sa suprotnim kretanjem ruku = $43,1 \pm 4,9$ cm). Obzirom na podjelu igrača u grupe prema pozicijama u timu golmani i centralni odbrambeni igrači ostvarili su najbolje rezultate u odnosu na grupu svih odbrambenih igrača, veznih igrača i napadača što je u skladu sa rezultatima istraživanja Lago-Peñas et al. (2011). Haugen i saradnici (2012) ustanovili su da norveški igrači uključujući seniorski i juniorski nacionalni tim ($N=939$, uzrast = $22,1 \pm 4,3$ godine) u godini 1995-2010 su postizali značajno manji učinak ($p < 0,05$) u vertikalnim skokovima u grupi veznih igrača u poređenju sa drugim grupama podijeljenih prema pozicijama u timu. Gil, Ruiz, Irazusta, Gil i Irazusta (2007) navode da napadači posjeduju najviše sposobnosti u svim posmatranim parametrima izdržljivosti, brzine, agilnosti i skoka. Autori napominju da nisu ispitivali vrhunske mlade fudbalere ($N=241$, uzrast = $17,31 \pm 2,64$ godine). Wisløff, Helgerud i Hoff (1998) ustanovili su da su igrači iz vrhunske norveške lige imali značajno viši nivo eksplozivnih sposobnosti u grupi odbrambenih igrača i napadača u odnosu na grupu veznih igrača. Mujika, Santisteban, Impellizzeri i Castagna (2009) nisu utvrdili razliku ($p > 0,05$) u visini vertikalnog skoka između vrhunskih fudbalera seniora i vrhunskih mladih fudbalera. Gissis i saradnici (2006) poredili su sposobnosti mladih fudbalera ($N=54$) podijeljenih u grupe: fudbaleri mlade reprezentacije Grčke, kvalitetni mladi fudbaleri i fudbaleri rekreativci. U odnosu na vertikalan skočnost ustanovljena je razlika ($p < 0,05$) između nacionalne fudbalske selekcije i ostalih grupa. Razlika između kvalitetnih mladih fudbalera i fudbalera rekreativaca nije ustanovljena. Kalapotharakos i saradnici (2006) upoređivali su tri ekipe ($N=19$, uzrast = 26 ± 4 godine, $N=15$, uzrast = 24 ± 4 godine, $N=20$, uzrast = 23 ± 3 godine) grčke Super lige uzimajući u obzir nekoliko antropometrijskih parametara i stanja. Oni su došli do zaključka da je tolerancija na laktate, izokinetička moć ekstenzora koljena i vertikalna skočnost pokazala veće vrijednosti ($p < 0,05$) kod tima koji je spadao u tri vodeće ekipe Super lige u poređenju sa vrijednostima posmatranih timova koji su bili u grupi među posljednje plasiranim timovima. Wong i Wong (2009) spoznali su da azijski mladi igrači ($N=16$, uzrast = $16,2 \pm 0,6$ godina) su ostvarili manji učinak u vertikalnim skokovima u poređenju sa evropskim i

other studies Arnason et al. (2004) discovered that jump height of elite Icelandic soccer players was SJ = 37.8 cm and CMJ = 39.4 cm. Casajús (2001) discovered that the jump height of Spanish elite team ($N=15$) was SJ = 39 cm and CMJ with use of arms = 47.8 cm.

Regarding game demands, high level of jump abilities presents an advantage in personal air duels but in running and total speed performance of a soccer player too, what provethe researches of Wisløff et al. (2004), who accomplished significant correlation of sprint in 10 and 30 m and vertical jumps of elite international soccer players ($N=17$, age = 25.8 ± 2.9 years).

Intermittent endurance was diagnosed with Yo-Yo Intermittent recovery test, level 2. Bradley et al. (2011) state the correlation ($p < .05$) between results in this test and ran distance at high intensities ($R = .58$) and total ran distance ($R = .74$). By interpretation of determined level of intermittent endurance of young soccer players from our group is necessary to regard the statements from the study of Bangsbo, Iaia, and Krusturup (2008) that performance in Yo-Yo intermittent recovery tests grows with the age of young sportsmen. On the one side regarding comparison of the level of intermittent endurance of individual playing positions defenders have achieved the highest performance (1345 ± 126 m). On the other side it is necessary to say that we have not determined significant differences at comparison of the groups divided according playing positions compared to players in the field and the whole group. Mentioned level of intermittent endurance of our defenders was higher only about .2% and forwards about 3.1% in comparison with midfielders. We have discovered significantly lower level of sprint abilities of goalkeepers with the value 900 ± 85 m in Yo-Yo test compared to the level of the whole group.

In our study all groups of players had adequate value in comparison with recommendations of Weineck (2007). He specifies the average value 1059 m for professional players at international level. Bangsbo, Iaia, & Krusturup (2008) specify the value 1260 m for the highest level of players, what responds to average levels of players at all positions with exception of goalkeepers. According to findings of Bunc (1999), the results of the whole group are satisfactory. He states $VO_2 \max$ kg^{-1} of players at world level above the value $60 \text{ ml} \cdot \text{kg}^{-1} \cdot \text{min}^{-1}$, whereby the average value of our group was $62.7 \pm 4.0 \text{ ml} \cdot \text{kg}^{-1} \cdot \text{min}^{-1}$ including goalkeepers.

It is also necessary to mention the limits of carried research. The matter of study was sprint abilities running speed in 10 m and non specific test of jump abilities. Performance in direct sprint and vertical jump in conditions isolated from real game are

afričkim igračima. U drugoj studiji Arnason i saradnici (2004) otkrili su da visina skoka vrhunskih islandskih fudbalera iznosi SJ = 37,8 cm and CMJ = 39,4 cm. Casajús (2001) je istraživanjem utvrdio da visina skoka španskih vrhunskih timova ($N=15$) je iznosila SJ = 39 cm, a CMJ uz korišćenje ruku = 47,8 cm.

Kada su u pitanju zahtjevi igre, visok nivo eksplozivnih sposobnosti predstavlja prednost u individualnim duelima u vazduhu ali, takođe, i u trčanju što je potvrdilo i istraživanje Wisløff i saradnika (2004), a koje je ustanovilo značajne korelacije između sprinta na 10 i 30 m i vertikalnih skokova vrhunskih fudbalera međunarodne klase ($N=17$, uzrast = $25,8 \pm 2,9$ godina).

Specifična izdržljivost dijagnosticirana sa Yo-Yo intervalnim testom oporavka, nivo 2. Bradley i saradnici (2011) naveli su korelaciju ($p < 0,05$) između rezultata ovog testa i pretrčane distance u visokom intenzitetu ($R = 0,58$) i ukupno pretrčane distance ($R = .74$). Za tumačenje utvrđenog nivoa ponavljajuće izdržljivosti mladih fudbalera iz naše grupe neophodno je vidjeti rezultate istraživanja Bangsbo, Iaia i Krusturup (2008) da sposobnosti u Yo-Yo intervalnom testu oporavka rastu sa godinama mladih sportista. Na jednoj strani kada se upoređuju nivoi specifične izdržljivosti, na pojedinim pozicijama u timu, odbrambeni igrači postigli su najbolje rezultate (1345 ± 126 m). S druge strane, neophodno je reći da nismo utvrdili značajne razlike prilikom poređenje grupa podeljenih prema poziciji u timu u odnosu na igrače na terenu i cijelu grupu. Pomenuti nivo specifične izdržljivosti naših odbrambenih igrača bila je veća samo oko 0,2 % u odnosu na napadače i oko 3,1 % u odnosu na vezne igrače. Otkrili smo značajno niži nivo sposobnosti golmana sa vrijednošću od 900 ± 85 m u Yo-Yo testu u poređenju sa nivoom čitave grupe. U našem istraživanju sve grupe igrača imale su adekvatnu vrijednost u poređenju sa preporukama Weinecka (2007). On navodi da je prosječna vrijednost 1059 m za profesionalne igrače na međunarodnom nivou. Bangsbo, Iaia i Krusturup (2008) odredili su vrijednost 1260 m za najviši nivo igrača, što se odnosi na prosječan nivo kod igrača na svim pozicijama sa izuzetkom golmana. Prema istraživanjima Bunc (1999) rezultati su zadovoljavajući za čitavu grupu. On navodi $VO_2 \max$ kg^{-1} igrača svjetske klase u vrijednosti $60 \text{ ml} \cdot \text{kg}^{-1} \cdot \text{min}^{-1}$ pri čemu prosječna vrijednost naše grupe je $62.7 \pm 4.0 \text{ ml} \cdot \text{kg}^{-1} \cdot \text{min}^{-1}$ uključujući i gomane.

Takođe je potrebno naglasiti i ograničenja sprovedenog istraživanja. Predmet istraživanja je sprinterske sposobnosti trčanjem na 10 m i nespecifičan test eksplozivnih sposobnosti. Sposobnosti direktnog sprinta i vertikalni skok u uslovima izolovanim iz

only certain preconditions because playing performance of a soccer player is influenced by variability of specific game conditions and actual game demands. The specific movement ability becomes evident with changes of frequency, changes in length of step and also changes in running direction because the player is forced to regulate constantly his direct movement on the ground of perception of external conditions. It is cooperation with teammates for example, perception of opponents and realising of running sprint with a ball. As well as by realizing of shooting the player is forced to adjust the sprint technique before shooting. All these reasons can be necessary for creating of specific field tests in the future which will be valid for sprint and jump abilities and will compare with the tests we present in this study. The unrepeated testing is certain limitation too and it is joined with limitation in reliability. The unrepeated measurement can be influenced by external conditions but also by actual internal disposals of examined individual. However we had to adapt to time limiting and organizing possibilities of the schedule of a national U21 soccer team.

In spite of mentioned limits the study can be an inspiration for condition and athletic coaches of football teams in order to reveal and eliminate weak aspects of their young players, especially in condition trainings in preparatory seasons and individual trainings according to actual results of diagnostics during entire annual training cycle. Given data can serve as the certain norm or standard of elite young soccer players from the point of view of the level of examined movement abilities. The results of study can be a valuable material for scientists, but for coaches, experts and persons interested in soccer too.

CONCLUSION

The average level of sprint abilities of the players of Slovak national under-21 soccer team was 2.21 ± 0.08 s. The special subject analysis has showed that there were not significant differences by comparison of the level of sprint abilities in the groups of players in the field. The highest level of sprint abilities was discovered in the group of midfielders with the value 2.18 ± 0.10 s, then in the group of forwards with the value 2.20 ± 0.06 s, and defenders with the value 2.25 ± 0.05 s. The group of goalkeepers has achieved significantly lower level of sprint abilities with the value 2.31 ± 0.06 s.

The average level of jump abilities of players of the whole group was indicated with the value 39.0 ± 4.2 cm. We have not found out any differences among groups of players divided according to playing positions considering the special subject analysis. The highest level of jump abilities was discovered in the

stvarne igre su samo određeni preduslovi, jer vještine u igri fudbalera su pod uticajem promjenljivih specifičnih uslova i stvarnih zahtjeva igre. Specifične kretne sposobnosti dolaze do izražaja sa promjenom frekvencije, promjenom dužine koraka i takođe promjene u pravcu trčanja pošto je igrač prinuđen da neprestano prilagođava svoje kretanje na terenu na osnovu percepcije spoljnih uslova. To je i saradnja sa saigračima, na primjer, percepcija protivnika i realizacija u sprintu sa loptom. Kao i kod šutiranja, igrač je primoran da prilagodi tehniku sprinta prije šuta. Svi ovi razlozi mogu se uzeti u obzir pri kreiranju specifičnih terenskih testova u budućnosti koji će biti validni za sprinterske i eksplozivne sposobnosti i moći će se uporediti sa testovima koji su predstavljani u ovom istraživanju. Neponovljeno testiranje je takođe određeno ograničenje a time se postavlja i pitanje pouzdanosti. Neponovljeno mjerenje može da bude pod uticajem spoljnih uslova ali takođe i nedostupnost ispitivane osobe. Međutim, mi smo se morali prilagoditi ograničenom vremenu i mogućnosti organizovanja testiranja u rasporedu nacionalnog U21 fudbaskog tima.

Uprkos navedenim ograničenjima istraživanje može da bude inspiracija za kondicione i sportske trenere fudbalskih timova da bi se otkrile i otklonile slabosti njihovim mladim igrača, posebno pri kondicionom treningu u pripremnom periodu i individualnom treningu u skaldu sa rezultatima dijagnostike tokom cjelokupnog godišnjeg ciklusa treninga. Iznijeti podaci mogu da posluže kao određena norma ili standard za vrhunske mlade fudbalere sa stanovišta nivoa ispitivanih kretnih sposobnosti. Rezultati istraživanja mogu biti vrijedan materijal za naučnike, ali i za trenere, stručnjake i, takođe, i osobe koje interesuje fudbal

ZAKLJUČAK

Prosječan nivo sprinterskih sposobnosti igrača slovačke nacionalne fudbalske reprezentacije spod 21 godine bio je $2,21 \pm 0,08$ s. Posebna analiza predmeta pokazala je da ne postoji značajna razlika upoređujući nivo sprinterskih sposobnosti u grupama igrača na terenu. Najviši nivo sprinterskih sposobnosti otkriven je kod grupe veznih igrača sa vrijednošću $2,18 \pm 0,10$ s, onda grupa napadača sa vrijednošću $2,20 \pm 0,06$ s i odbrambeni igrači sa vrijednošću $2,25 \pm 0,05$ s. Grupa golmana postigla je značajno niži nivo sprinterskih sposobnosti sa vrijednošću $2,31 \pm 0,06$ s.

Prosječan nivo eksplozivnih sposobnosti igrača čitave grupe ukazuje na vrijednost vertikalnog skoka od $39,0 \pm 4,2$ cm. Nismo pronašli nikakve razlike između grupa podjeljenih prema poziciji u timu s ob-

group of forwards with the value 39.9 ± 4.8 cm, then in the group of defenders with the value 39.6 ± 5.4 cm, goalkeepers with the value 39.2 ± 4.0 cm, and midfielders 38.0 ± 3.8 cm.

The average level of intermittent endurance of players of the whole group was indicated with the value 1283 ± 294 m, what means the value $\text{VO}_2\text{maxkg}^{-1} = 62.7 \pm 4.0 \text{ mlkg}^{-1}\text{min}^{-1}$. There were not determined significant differences in comparison of the level of intermittent endurance in the groups of players in the field from the point of view of special subject analysis. The highest level of intermittent endurance was noticed at defenders with the value 1345 ± 126 m ran in Yo-Yo test, what means $\text{VO}_2\text{maxkg}^{-1} = 63.5 \pm 2.7 \text{ mlkg}^{-1}\text{min}^{-1}$, then at midfielders 1343 ± 352 m, what is $\text{VO}_2\text{maxkg}^{-1} = 63.5 \pm 4.8 \text{ mlkg}^{-1}\text{min}^{-1}$. Then followed the group of forwards with the value $\text{VO}_2\text{maxkg}^{-1} = 63.0 \pm 3.9 \text{ mlkg}^{-1}\text{min}^{-1}$. The significantly lower level of intermittent endurance was discovered only in the group of goalkeepers with the value 900 ± 85 m, what is $\text{VO}_2\text{maxkg}^{-1} = 57.5 \pm 1.1 \text{ mlkg}^{-1}\text{min}^{-1}$.

zirom na poseban predmet analize. Najviši nivo eksplozivnih sposobnosti otkriven je u grupi napadača sa vrijednošću skoka $39,9 \pm 4,8$ cm, potom grupa odbrambenih igrača sa vrijednošću $39,6 \pm 5,4$ cm, golmani sa vrijednošću $39,2 \pm 4,0$ cm i vezni igrači $38,0 \pm 3,8$ cm.

Prosječan nivo specifične izdržljivosti igrača čitave grupe iskazana je vrijednošću 1283 ± 294 m što znači da je vrijednost $\text{VO}_2\text{maxkg}^{-1} = 62.7 \pm 4.0 \text{ mlkg}^{-1}\text{min}^{-1}$. Nije ustanovljena značajna razlika u poređenju nivoa specifične izdržljivosti među grupama igrača na terenu sa stanovišta posebnog predmeta analize. Najviši nivo specifične izdržljivosti je ustanovljen kod odbrambenih igrača sa vrijednošću 1345 ± 126 m trčanja u Yo-Yo testu, što znači $\text{VO}_2\text{maxkg}^{-1} = 63.5 \pm 2.7 \text{ mlkg}^{-1}\text{min}^{-1}$, onda kod veznih igrača 1343 ± 352 m, što iznosi $\text{VO}_2\text{maxkg}^{-1} = 63.5 \pm 4.8 \text{ mlkg}^{-1}\text{min}^{-1}$. Onda slijedi grupa napadača sa vrijednošću $\text{VO}_2\text{maxkg}^{-1} = 63.0 \pm 3.9 \text{ mlkg}^{-1}\text{min}^{-1}$. Značajno niži nivo ponavljajuće izdržljivosti ustanovljen je smo kod grupe golmana sa vrijednošću 900 ± 85 m, što iznosi $\text{VO}_2\text{maxkg}^{-1} = 57.5 \pm 1.1 \text{ mlkg}^{-1}\text{min}^{-1}$.

REFERENCES

- Andrzejewski, M., Chmura, J., Pluta, B., Strzelczyk, R., & Kasprzak, A. (in press). *Analysis od sprinting activities of professional soccer players*. Journal of Strength and Conditioning research.
- Arnason, A. Siquardsson, S. B., Gudmundsson, A., Holme, I., Engebretsen, L., & Bahr, R. (2004). Physical Fitness, Injuries, and Team Performance in Soccer. *Medicine and Science in Sports and Exercise*, 36(2), 278–285. doi:10.1249/01.MSS.0000113478.92945.CA; PMID: 14767251
- Bangsbo, J. (1994). The physiology of soccer--with special reference to intense intermittent exercise. *Acta physiologica Scandinavica*, Supplementum, 619, 1–155.
- Bangsbo, J., Iaia, F. M., & Krstrup, P. (2007). Metabolic response and fatigue in soccer. *International journal of sports physiology and performance*, 2(2), 111–127.
- Bangsbo, J., Iaia, F. M., & Krstrup, P. (2008). The Yo-Yo intermittent recovery test : a useful tool for evaluation of physical performance in intermittent sports. *Sports medicine*, 38(1), 37–51. doi: 10.2165/00007256-200838010-00004; PMID: 18081366
- Bangsbo, J., Mohr, M., & Krstrup, P. (2006). Physical and metabolic demands of training and match-play in the elite football player. *Journal of sport sciences*, 24(7), 665–674. doi: 10.1080/02640410500482529; PMID: 16766496
- Boone, J., Vaeyens, R., Steyaert, A., Vanden Bossche, L., & Bourgois, J. (2012). Physical fitness of elite Belgian soccerplayers by player position. *Journal of Strength and Conditioning research*, 26, 2051–2057. doi: 10.1519/JSC.0b013e318239f84f; PMID: 21986697
- Bunc, V. (1999). Role kondice v přípravě hráče fotbalu [Fitness role in practice of football players]. *Fotbal a trénink*, 5, 20–21.
- Bunc, V., & Psotta, R. (2001). Physiological profile of very young soccer players. *The Journal of Sports Medicine and Physical Fitness*, 41(3), 337–341. PMID: 11533564
- Casajús, J. A. (2001). Seasonal variation in fitness variables in professional soccer players. *Journal of Sports Medicine and Physical Fitness*, 41(4), 463–469. PMID: 11687765
- Cometti, G., Maffiuletti, N. A., Pousson, M., Chatard, J.-C., & Maffulli, N. (2001). Isokinetic strength and anaerobic power of elite, subelite and amateur French soccer players. *International Journal of Sports Medicine*, 22, 45–51. doi: 10.1055/s-2001-11331; PMID: 11258641
- Dauty, M., Bryand, F., & Potiron-Josse. M. (2002). Relation entre la force isocinétique, le saut et le sprint chez le footballeur de haut niveau. *Science and Sports*, 17(3), 122–127. doi: 10.1016/S0765-1597(02)00137-5

- Gil, S., Ruiz, F., Irazusta, A., Gil, J., & Irazusta, J. (2007). Selection of young soccer players in terms of anthropometric and physiological factors. *Journal of sports medicine and physical fitness*, 47, 25–32. PMID: 17369794
- Gissis, I., Papadopoulos, C., Kalapothrakos, V. I., Sotiropoulos, A., Komsis, G., & Manolopoulos, E. (2006). Strength and speed characteristics of elite, subelite, and recreational young soccer players. *Research in Sports Medicine*, 14, 205–214. doi: 10.1080/15438620600854769; PMID: 16967772
- Grasgruber, P., & Cacek, J. (2008). *Sportovnígeny* [Sports Genes]. Brno, CZ: FSS MU.
- Haugen, T. A., Tønnessen, E., & Seiler, S. (in press). *Anaerobic Performance Testing of Professional Soccer Players 1995-2010*. International journal of sports physiology and performance.
- Hipp, M. (2007). *Futbal: Rozvojový brány pohybových schopností, diagnostika a strečing v družstve vrcholového futbalu* [Football: Development of selected motor skills, diagnosis and stretching of team of senior football]. Bratislava, SK: SPN.
- Janačková, I. (2000). *Biorytmy v športe (S úvodom do chronobiológie)* [Biorhythms in sport (With an introduction to chronobiology)]. Banská Bystrica, SK: FHV UMB.
- Jovanović, M., Sporiš, G., Omrcen, D., & Fiorentini, F. (2011). Effects of speed, agility, quickness training method on power performance in elite soccer players. *Journal of Strength and Conditioning Research*, 25, 1285–1292. doi: 10.1519/JSC.0b013e3181d67c65; PMID: 21522073
- Kalapotharakos, V. I., Strimpakos, N., Vithoulka, I., Karvounidis, C., Diamantopoulos, K., & Kapreli, E. (2006). Physiological characteristics of elite professional soccer teams of different ranking. *The Journal of sports medicine and physical fitness*, 46, 515–519. PMID: 17119514
- Krustrup, P., Mohr, M., Nybo, L., Jensen, J. M., Nielsen, J. J., & Bangsbo, J. (2006). The Yo-Yo IR2 test: physiological response, reliability, and application to elite soccer. *Medicine and science in sport and exercise*, 38, 1666–1673. doi: 10.1249/01.mss.0000227538.20799.08; PMID: 16960529
- Lago-Penas, C., Lago-Ballesteros, J., & Rey, E. (2011). Differences in performance indicators between winning and losing teams in the UEFA champions league. *Journal of Human Kinetics*, 27, 137–148. doi: 10.2478/v10078-011-0011-3
- Little, T., & Williams, A. G. (2006). Effects of differential stretching protocols during warm-ups on high-speed motor capacities in professional soccer players. *Journal of Strength and Conditioning Research*, 20, 203–207. doi: 10.1519/00124278-200602000-00033; doi: 10.1519/R-16944.1; PMID: 16503682
- Malý, T., Zahálka, F., Malá, L., Buzek, M., Hrásky, P., & Gtyc, T. (2011). Vzťahy kinetickéj silydolných končatín k rýchlostný mindi kátorom bežeckej rýchlosti mladých futbalistov [The relationship of the kinetic force of the lower extremities to which the velocity Mindi an athletic young footballers speed]. *Česká kinantropologie*, 15(3), 157–164.
- Mohr, M., Krustrup, P., & Bangsbo, J. (2003). Match performance of high-standard soccer players with special reference to development of fatigue. *Journal of sport sciences*, 21(7), 519–528. doi: 10.1080/0264041031000071182; PMID: 12848386
- Mujika, I., Santisteban, J., Impellizzeri, F. M., & Castagna, C. (2009). Fitness determinants of success in men's and women's football. *Journal of Sports Sciences*, 27, 107–114. doi: 10.1080/02640410802428071; PMID: 19058090
- Nemec, M., Štefaňák, P., & Sylvestr, M. (2005). *Tréner futbalu* [Football coach]. Banská Bystrica, SK: SsFZ TMK.
- Orendurff, M. S., Walker, J. D., Jovanović, M., Tulchin, K. L., Levy, M., & Hoffmann, D. K. (2010). Intensity and duration of intermittent exercise and recovery during a soccer match. *J Strength Cond Res.*, 24, 2683–2692. doi: 10.1519/JSC.0b013e3181bac463; PMID: 20145552
- Psotta, R., Bunc, V., Netscher, J., Mahrová, A., & Nováková, H. (2006). *Fotbal-kondičnítrénink* [Football fitness training]. Praha, CZ: Grada.
- Rampinini E, Bishop D, Marcora SM, Ferrari Bravo D, Sassi R, Impellizzeri, FM. (2007). Validity of simple field tests as indicators of match-related physical performance in top-level professional soccer players. *Int J Sports Med.*, 28(3), 228–235. PMID: 17024621
- Rebelo, A., Brito, J., Maia, J., Coelho-e-Silva, M. J., Figueiredo, A. J., Bangsbo, J. ... Seabra, A. (in press). Anthropometric Characteristics, Physical Fitness and Technical Performance of Under-19 Soccer Players by Competitive Level and Field Position. *International journal of sports medicine*.
- Reilly, T. (1997). Energetics of high-intensity exercise (soccer) with particular reference to fatigue. *J Sports Sci.*, 15(3), 257–263. doi: 10.1080/026404197367263; PMID: 9232551

- Reilly, T., Bangsbo, J., & Franks, A. (2000). Anthropometric and physiological predispositions for elite soccer. *Journal of sports sciences*, 18(9), 669–683. doi: 10.1080/02640410050120050; PMID: 11043893
- Rostgaard, T., Iaia, F. M., Simonsen, D. S., & Bangsbo, J. (2008). A test to evaluate the physical impact on technical performance in soccer. *Journal of Strength and Conditioning research*, 22(1), 283–292. doi: 10.1519/JSC.0b013e31815f302a; PMID: 18296988
- Sporis, G., Jukic, I., Ostojic, S. M., & Milanovic, D. (2009). Fitness profiling in soccer: physical and physiological characteristics of elite players. *Journal of Strength and Conditioning Research*, 23(7), 1947–1953. doi: 10.1519/JSC.0b013e3181b3e141; PMID: 19704378
- Strudwick, A., Reilly, T., & Doran, D. (2002). Anthropometric and fitness profiles of elite players in two football codes. *Journal of Sports Medicine and Physical Fitness*, 42(2), 239–242.
- Taskin, H. (2008) Evaluating sprinting ability, density of acceleration, and speed dribbling ability of professional soccer players with respect to their positions. *The Journal of Strength and Conditioning Research*, 22(5), 1481–1486. doi: 10.1519/JSC.0b013e3181fd90; PMID: 18714240
- Weineck, J. (2007). *Optimales Training: leistungsphysiologische Trainingslehre unter besonderer Berücksichtigung des Kinder- und Jugendtrainings* [Optimal training: Exercise physiology, training theory with special emphasis on children and youth training]. Balingen, DE: Spitta Verlag GmbH & Co. KG.
- Wisløff, U., Castanga, C., Helgerud, J., Jones, R., & Hoff, J. (2004). Strong correlation of maximal squat strength with sprint performance and vertical jump height in elite soccer players. *British Journal of Sports Medicine*, 38, 285–288. doi: 10.1136/bjsm.2002.002071; PMCID: PMC1724821
- Wisløff, U., Helgerud, J., & Hoff, J. (1998). Strength and endurance of elite soccer players. *Medicine and science in sports and exercise*, 30(3), 462–467. doi: 10.1097/00005768-199803000-00019
- Wong, D. P., & Wong, S. H. S. (2009). Physiological profile of Asian elite youth soccer players. *Journal of Strength and Conditioning research*, 23, 1383–1390. doi: 10.1519/JSC.0b013e3181a4f074; PMID: 19620928

Received: September 19, 2013
Revision received: December 9, 2013
Accepted: December 22, 2013

Primljeno: 19. septembra 2013. godine
Izmjene primljene: 9. decembra 2013. godine
Odobreno: 22. decembra 2013. godine

Correspondence to:
Pavol Pivovarniček, PhD
Faculty of Humanities
MatejBel University
Tajovského 40
974 01 BanskáBystrica
Slovakia
Phone: 00421 48 44 67 530
E-mail: pavol.pivovarnicek@umb.sk

Korespondencija:
Dr Pavol Pivovarniček
Faculty of Humanities
MatejBel University
Tajovského 40
974 01 BanskáBystrica
Slovakia
Telefon: 00421 48 44 67 530
E-mail: pavol.pivovarnicek@umb.sk

ÚROVEŇ RÝCHLOSTI, EXPLOZÍVNEJ SILY A VYTRVALOSTI ELITNÝCH MLADÝCH FUTBALISTOV PODĽA HRÁČSKYCH POZÍCIÍ

Pavol Pivovarniček¹, Martin Pupiš¹, Zuzana Tonhauserová¹ a Martina Tokárová¹

¹Katedra telesnej výchovy a športu, Fakulta humanitných vied, Univerzita Mateja Bela, Slovenská republika

Cieľom štúdie bolo analyzovať úroveň akceleračnej rýchlosti, explozívnej sily dolných končatín a špeciálnej vytrvalosti hráčskych skupín podľa hráčskych

pozícií (brankári, obrancovia, stredoví hráči, útočníci) u hráčov futbalovej reprezentácie Slovenskej republiky kategórie U21 v období kvalifikácie na Majstrovstvá Európy U21 2011 vo futbale.

Výskumný súbor tvorili hráči ($N=18$, brankári $n=2$, obrancovia $n=4$, stredoví hráči $n=7$, útočníci $n=5$) družstva bojujúceho o postup na Majstrovstvá Európy vo futbale 2011 (U21) v Dánsku v 7. kvalifikačnej skupine spolu s U21 reprezentáciami Chorvátska, Srbska, Nórska a Cypru. Výskum sme realizovali 8. 10. 2009 v dopoludňajších hodinách. Diagnostika úrovne akceleračnej rýchlosti, explozívnej sily dolných končatín a špeciálnej vytrvalosti sa uskutočnila v komplexe Národného tréningového centra (NTC) v Senci pred kvalifikačným zápasom na ME s reprezentáciou Cypru U21 dňa 14. 10. 2009 v cyperskom Achnase. Futbalisti absolvovali pred diagnostikou všeobecné rozcvičenie (10 minút) a rýchlostné rozcvičenie (10 minút).

Akceleračnú rýchlosť sme diagnostikovali zariadením FiTRO Light Gates (FiTRONIC, Bratislava, Slovenská republika) behom na 10 m z polovysokého štartu na zvukový signál na futbalovom ihrisku s prírodnou trávou. V rámci jedného merania futbalisti absolvovali dva pokusy. Do hodnotenia sme brali lepší z pokusov. Na diagnostiku explozívnej sily dolných končatín sme použili zariadenie FiTRO Jumper (FiTRONIC, Bratislava, Slovenská republika) pozostávajúce z kontaktnej platne umiestnenej na podlahe interfejsom pripojenej na počítač. Explozívnu silu dolných končatín sme diagnostikovali vertikálnym výskokom z drepu s protipohybom a použitím švihovej práce paží (Weineck, 2007). Do hodnotenia sme brali najlepší z troch výskokov. Na diagnostiku špeciálnej vytrvalosti sme použili Yo-Yo Intermitent recovery test, level 2 (Prerušovaný Yo-Yo test s krátkym zotavením – stupeň 2).

Významnosť rozdielov úrovne akceleračnej rýchlosti, explozívnej sily dolných končatín a špeciálnej vytrvalosti sme zistovali expertíznou vecnou analýzou, ktorej kritériom významnosti bola hodnota 1 smerodajnej odchýlky (SD). Ak pri vyhodnocovaní rozdielov došlo u skupiny hráčov podľa hráčskych pozícií k rozdielu minimálne o hodnotu SD vrátane hodnoty SD v porovnaní s priemernou výkonnosťou a úrovňou súboru, tak rozdiel sme považovali za vecne významný. Kritériom hodnotenia úrovne akceleračnej rýchlosti bol dosiahnutý čas na vzdialenosť 10 m. V štúdiu vyhodnocujeme úroveň akceleračnej rýchlosti v čase s presnosťou 0,01 s. Kritériom hodnotenia

úrovne explozívnej sily dolných končatín bola výška výskoku v cm s presnosťou 0,1 cm. Kritériom hodnotenia špeciálnej vytrvalosti bola celková prekonaná vzdialenosť v teste uvádzaná v metroch (m) a prepočítaná na $VO_2\max.kg^{-1}v ml.kg^{-1}.min^{-1}$.

Priemerná úroveň akceleračnej rýchlosti hráčov súboru slovenskej futbalovej reprezentácie U21 bola $2,21\pm 0,08$ s. Expertízna vecná analýza ukázala, že pri porovnaní úrovne akceleračnej rýchlosti skupín hráčov v poli sa nevyskytli významné rozdiely. Najvyššia úroveň akceleračnej rýchlosti bola zaznamenaná u stredových hráčov s hodnotou $2,18\pm 0,10$ s, potom u útočníkov s hodnotou $2,20\pm 0,06$ s a obrancov $2,25\pm 0,05$ s. Významne nižšiu úroveň akceleračnej rýchlosti sme zaznamenali u len u skupiny brankárov s hodnotou $2,31\pm 0,06$ s.

Priemerná úroveň explozívnej sily dolných končatín hráčov súboru bola indikovaná hodnotou $39,0\pm 4,2$ cm. Expertízna vecná analýza neukázala rozdiely medzi skupinami hráčov podľa hráčskych pozícií. Najvyššia úroveň explozívnej sily dolných končatín bola zaznamenaná u útočníkov s hodnotou $39,9\pm 4,8$ cm, potom u obrancov s hodnotou $39,6\pm 5,4$ cm, u brankárov $39,2\pm 4,0$ cm a stredových hráčov $38,0\pm 3,8$ cm.

Priemerná úroveň špeciálnej vytrvalosti hráčov súboru bola indikovaná hodnotou 1283 ± 294 m, čo predstavuje v prepočte $VO_2\max.kg^{-1} = 62,7\pm 4,0$ $ml.kg^{-1}.min^{-1}$. Expertízna vecná analýza ukázala, že pri porovnaní úrovne špeciálnej vytrvalosti skupín hráčov v poli sa nevyskytli významné rozdiely. Najvyššia úroveň špeciálnej vytrvalosti bola zaznamenaná u obrancov s hodnotou 1345 ± 126 m nabehaných v Yo-Yo teste, čo v prepočte znamená $VO_2\max.kg^{-1} = 63,5\pm 2,7$ $ml.kg^{-1}.min^{-1}$. Ďalej nasledovali stredoví hráči s výkonnosťou 1343 ± 352 m, čo znamená $VO_2\max.kg^{-1} = 63,5\pm 4,8$ $ml.kg^{-1}.min^{-1}$. Potom nasledovala skupina útočníkov s hodnotou $VO_2\max.kg^{-1} = 63,0\pm 3,9$ $ml.kg^{-1}.min^{-1}$. Významne nižšiu úroveň špeciálnej vytrvalosti sme zaznamenali u len u skupiny brankárov s hodnotou 900 ± 85 m, čo znamená $VO_2\max.kg^{-1} = 57,5\pm 1,1$ $ml.kg^{-1}.min^{-1}$.

Kľúčové slová: bežecký čas, diagnostika, expertízna vecná analýza, výška výskoku, Yo-Yo test.

UTICAJ TRENINGA NA OPŠTE I SPECIFIČNE MOTORIČKE SPOSOBNOSTI ODBOJKAŠICA UZRASTA 13-14 GODINA

TRAINING EFFECTS ON GENERAL AND SPECIFIC MOTOR SKILLS ON FEMALE VOLLEYBALL PLAYERS 13-14 YEARS OLD

Goran Nešić¹, Dejan Ilić¹, Nikola Majstorović¹, Vladimir Grbić¹, and Nedžad Osmankač²

¹Fakultet sporta i fizičkog vaspitanja Univerzitet u Beogradu, Srbija
Faculty of Sports and Physical Education, University of Belgrade, Serbia

²Fakultet za sport i turizam, Univerzitet Educons, Srbija
Faculty of Sports and Tourism, Educons University, Serbia

SHORT SCIENTIFIC PAPER

KRATKI NAUČNI ČLANAK

doi: 10.5550/sgia.130902.en.007N

UDK: 796.325.012.1-055.2

doi: 10.5550/sgia.130902.se.007N

SUMMARY

The physical growth and development of motor skills, are important components that can be programmed to act physical exercise and training. The aim of this study is to present the impact of volleyball training at changing the general and specific motor abilities at female volleyball players 13-14 years old.

The sample represented 40 subjects, students at volleyball school "DIF" from Belgrade. In this study, the sample of variables is divided into two sub-samples (variable assessment of general motor skills and variables to assess specific skills in volleyball). On the first day, they made measurements of height and weight (in the gym) and conducted tests: long jump seats (SUD), easy to block (DUB), running at 20 m (TRC), and the second day were conducted in the remaining three tests (Russell Lang-test - fingers (RLTP), Russell Lang-test - "hammer" (RLTC) and service (RLTS)). Repeat testing (re-test) was carried out in three months.

Regarding the experimental factor that is active during the three months, it is important to mention that the trainings are held 4 times a week.

The results (applied comparative statistics and t-test for small dependent samples), indicating that there was a positive difference in all variables, three months after the programmed work, and particularly demonstrated statistical significance of the variable long jump places (SUD) and in all three specific abilities

SAŽETAK

Fizički razvoj i usavršavanje motoričkih sposobnosti, značajne su komponente na koje se može djelovati programiranim fizičkim vježbanjem, odnosno treningom.

Cilj ove studije je prikaz i analiza uticaja odbojkaškog treninga na promjene nekih opštih i specifičnih motoričkih sposobnosti odbojkašica uzrasta 13-14 godina.

Uzorak ispitanika je predstavljalo 40 ispitanica, polaznica škole odbojke "DIF" iz Beograda. U ovom istraživanju uzorak varijabli je podeljen u dva sub-uzorka (varijable za procjenu opštih motoričkih sposobnosti i varijable za procjenu specifičnih sposobnosti u odbojci). Prvog dana, izvršena su merenja tjelesne visine i telesne mase (u trim kabinetu) i sprovedeni testovi: skok u dalj iz mesta (SUD), dohvat u bloku (DUB), trčanje na 20 m (TRC), a drugog dana sprovedena su preostala tri testa (Rasel-Langov test – prsti (RLTP), Rasel-Langov test – „čekić“ (RLTC) i servis (RLTS)). Ponovljeno testiranje (re-test) je obavljen kroz tri meseca.

Kada se radi o eksperimentalnom faktoru koji je djelovao tokom tri meseca, važno je napomenuti da su se treninzi održavali 4 puta nedeljno.

Dobijeni rezultati (primjenjena je komparativna statistika, odnosno t-test za male zavisne uzorke), ukazuju da je došlo do pozitivnog pomaka u svim varijablama, nakon tri meseca programiranog rada, a posebno je pokazana statistička značajnost varijable skok u dalj iz mesta (SUD) i kod sve tri specifične

(RLTP, RLTC and RLTS).

The positive changes in the expression of general and specific abilities of volleyball players aged 13-14 years can be achieved only by well-programmed training sessions, conducted by trained specialists.

Key Words: female volleyball players, motor skills, training effects.

INTRODUCTION

Volleyball is very attractive, interesting, complex and dynamic sport, with a constant quick transfer of action from one half of the court to the other, in which the teams attempt to achieve victory by scoring a greater number of points, achieved by successful spikes and 'scheming' on the part of the opposing team. Physical development and improvement of motor skills are significant components that can be influenced through programmed physical practice (Bompa, 2005). Technical-tactical demands in large number of sport disciplines include frequent direction changes in frontal, and sagittal planes, as well as different types of jumps, and among them jumps characteristic for certain sport discipline (Nešić, 2008). These features demand adequate preparedness, and high technical, and tactical ability, as well as basic, and specific physical ability, considering the large number of jumping techniques, in dependence of sport discipline specificity (Zatsiorsky & Kraemer, 2006). Modern volleyball shows an increasingly expressed connection with science, opening new paths and views on volleyball practice (Ivanović, Dopsaj, Nešić, & Stanković, 2010). Given the fact that basic volleyball elements include whole series of motorical actions in order for them to be performed right, at the same time efficient, it is understandable, and completely justified to expect that training exercise conducted for the improvement of those elements will benefit the motorical skills as well (Nešić, Sikimić, Ilić, & Stojanović, 2011). Modern volleyball play demands the players to have a high level of general motor skills, as well as specific skills for volleyball play and certain player positions (Martinović et al., 2011). The players need to be prepared to perform each technical-tactical element perfectly. Maximum attention needs to be devoted to the phase of learning, adoption or perfect performance of these elements, so that they are performed in a proper, fast, strong, precise manner. Having in mind the gradual and methodical progress in training process, it is necessary to find the adequate "shortest route" from volleyball beginner to volleyball player who possesses the whole set of volleyball skills and knowledge which he can use (Jurko, Nešić, & Stojanović,

sposobnosti (RLTP, RLTC i RLTS).

Pozitivne promjene u ispoljavanju opštih i specifičnih sposobnosti odbojkašica uzrasta 13-14 godina mogu se ostvariti isključivo kvalitetno programiranim treninzima, koje sprovode obrazovani stručnjaci.

Ključne riječi: motorne vještine, odbojkašice, efekti treninga.

UVOD

Odbojka je vrlo atraktivna, interesantna, kompleksna i dinamična sportska grana, sa brzim transferom akcija sa jedne strane terena, na drugi, u kojoj timovi nastoje da dođu do pobjede postignuvši veći broj poena, putem uspješnog napada ili nadmudrivanjem protivnika. Fizički razvoj i usavršavanje motoričkih sposobnosti, značajne su komponente na koje se može djelovati programiranim fizičkim vežbanjem, odnosno treningom (Bompa, 2005). Tehničko-taktički zahtjevi u velikom broju sportskih disciplina uključuju česte promjene pravca u frontalnoj i sagitalnoj ravni, različite vrste skokova, među njima i skokove karakteristične za određenu sportsku granu (Nešić, 2008). Ove karakteristike zahtjevaju adekvatnu pripremljenost i visoke performanse u odnosu na sportsku tehniku, taktiku i bazičnu i specifičnu fizičku pripremu, s obzirom da postoji veliki broj skakačkih tehnika u zavisnosti od specifičnosti sportske grane (Zatsiorsky i Kraemer, 2006). Savremena odbojka pokazuje sve više i značajnije vezivanje za nauku, koja otvara nove puteve i nova gledanja na trening odbojkaša (Ivanović, Dopsaj, Nešić i Stanković, 2010). Obzirom da osnovni odbojkaški elementi uključuju i čitav niz motoričkih radnji kako bi njihovo izvođenje bilo pravilno, ujedno i efikasno, razumljivo je i potpuno opravdano očekivati da će trenažni rad na poboljšanju tih elemenata uticati i na razvoj motoričkih sposobnosti (Nešić, Sikimić, Ilić i Stojanović, 2011). Savremena odbojkaška igra zahteva od svih igrača visok nivo opštih motoričkih sposobnosti, kao i specifičnih – karakterističnih za odbojkašku igru i za određene igračke pozicije (Martinović i saradnici, 2011). Igrači moraju biti pripremljeni da perfektno izvedu svaki tehničko-taktički element. Fazi učenja, usvajanja ili perfektnog izvođenja ovih elemenata, mora se posvetiti maksimalna pažnja, kako bi se oni mogli izvesti pravilno, brzo, snažno, precizno. Poštujući postupnost i metodičnost u procesu obuke, neophodno je pronaći adekvatan „najkraći put“ od odbojkaša početnika do odbojkaša koji posjeduje čitav niz odbojkaških znanja i umjenja kojima može efikasno

2013). Therefore, the phases of teaching the main elements of volleyball technique in junior competition categories (as well as volleyball schools), will never cease to be a primary imperative – an essential part in the process of “creating” a high-quality volleyball player (Nešić, 2005)!

The goal of this study is an overview and impact analysis of volleyball practice to the changes in some general and specific motor skills of female volleyball players aged 13-14, that is, whether a three-month volleyball technique practice would influence the alterations in observed variables.

METHODS

The research sample involved 40 examinees, attendants of volleyball school “DIF” from Belgrade. For the purpose of this research, the sample has been divided into two sub-samples (to monitor the variables for evaluation of general motor skills and variables for evaluation of specific skills in volleyball). The first day involved measuring of height and weight, upon which the following tests were performed: standing long jump, block reach, 20 m running, and the second day involved the three remaining tests: Rassel-Lange test – overhand pass, Rassel-Lange test – underhand pass and Rassel-Lange test – serve.

The initial and final testing were performed through a battery of tests conducted on the attendants of volleyball school “DIF”, in the span of three months – by implementing the pre-test / post-test method. The results achieved through testing of general and specific motor skills were then further analyzed.

As for experimental treatment that lasted for three months, it is important to note that practice was held 4 times a week.

Testing procedure and the description of tests performed

On 1st and 2nd March 2013, from 10:00 to 13:00, the testing of motor skills of volleyball school “DIF” – Belgrade attendants was conducted (in the hall of the Faculty of Sports and Physical Education in Belgrade). The testing was performed through a battery of tests, with a 2-minute break between two obligatory attempts (better result being taken into account as final). The first day involved measuring of height and body weight and the tests in the following categories: standing long jump, block reach, 20 m running. The second day included the remaining three tests: Rassel-Lange test – overhand pass, Rassel-Lange test – underhand pass and Rassel-Lange test – serve.

da manipuliše (Jurko, Nešić, i Stojanović, 2013). Zato, faze obučavanja osnovnih elemenata odbojkaške tehnike, u mlađim takmičarskim kategorijama (kao i u školama odbojke), nikada neće prestati da budu primaran imperativ – neizostavan dio procesa „stvaranja“ kvalitetnog odbojkaša (Nešić, 2005)!

Cilj ove studije je prikaz i analiza uticaja odbojkaškog treninga na promene nekih opštih i specifičnih motoričkih sposobnosti odbojkašica uzrasta 13-14 godina, odnosno da li će tromesečni odbojkaški trening tehnike uticati na promjene posmatranih varijabli.

METODE

Uzorak ispitanika je predstavljalo 40 ispitanica, polaznica škole odbojke “DIF” iz Beograda. U ovom istraživanju uzorak varijabli je podeljen u dva subuzorka (varijable za procjenu opštih motoričkih sposobnosti i varijable za procenu specifičnih sposobnosti u odbojci). Prvog dana, izvršena su mjerenja tjelesne visine i tjelesne mase i sprovedeni testovi: skok u dalj iz mjesta, dohvat u bloku, trčanje na 20 m, a drugog dana sprovedena su preostala tri testa: Rassel-Langeov test – „odigravanje prstima”, Rassel-Langeov test – „odigravanje čekićem“ i Rassel-Langeov test – servis.

Inicijalno i finalno testiranje je sprovedeno baterijom testova na polaznicama škole odbojke “DIF”, u razmaku od tri mjeseca – primjenom metode pre-test – post-test. Analizirani su rezultati dobijeni testiranjem određenih opštih i specifičnih motoričkih sposobnosti.

Kada se radi o eksperimentalnom faktoru koji je delovao tokom tri mjeseca, važno je napomenuti da su se treninzi održavali 4 puta nedeljno.

Procedura testiranja i opis primjenjenih testova

Dana 1. i 2. marta 2013. godine, u periodu od 10:00 do 13:00 časova, izvršeno je testiranje motoričkih sposobnosti polaznica škole odbojke „DIF” – Beograd (u sali Fakulteta sporta i fizičkog vaspitanja u Beogradu). Testiranje je izvršeno pomoću baterije testova, sa pauzom između dva obavezna pokušaja u trajanju od 2 minuta (od kojih se bolji rezultat uzima kao konačan). Prvog dana, izvršena su mjerenja tjelesne visine i tjelesne mase i sprovedeni testovi: skok u dalj iz mesta, dohvat u bloku, trčanje na 20 m; a drugog dana sprovedena su preostala tri testa: Rassel-Langeov test – “odigravanje prstima”, Rassel-Langeov test – odigravanje “čekićem” i Rassel-Langeov test – servis.

On 1st and 2nd June 2013, from 10:00 to 13:00, in the hall of Faculty of Sports and Physical Education in Belgrade, the above mentioned tests were conducted again, in order to determine whether, and to what extent, there was a change in general and specific skills after three months of practice.

Before the testing, the examinees were measured height and body weight. This was followed by aerobic exercise and shaping exercise of moderate intensity, lasting 10 minutes. The testing was performed through a battery of tests:

Day 1

- Standing long jump;
- Block reach;
- 20 m running.

Day 2:

- Rassel-Lange test – overhand pass the wall;
- Rassel-Lange test – underhand pass the wall;
- Rassel-Lange test – serve (the number of successful serves).

For measuring anthropometric characteristics, the following instruments were used:

- Martin anthropometer
- a scale allowing measurement precision of 0.5 kg and allowing the option of regulating the pointer to zero position.

After measuring the height and body weight, the first day involved a battery of tests:

Standing long jump

Instruments: Flat, non-slippery surface with marked take-off point, the take-off area being at the same level as the landing area.

Task: Examinee jumps with both feet from behind the take-off line and lands as far as possible. The landing needs to be with both feet. The examinees are entitled to two attempts. An improperly performed jump is repeated.

Evaluation: The point of measuring is the point of heel contact with the surface closest to the take-off line. The measurement value is 1 cm. The longest jump measured in cm is recorded.

Notes: The jump is performed with both legs taking off simultaneously. The examinees are allowed to raise on their toes before the take-off (Ivanić, 1988).

Block reach

Instruments: Volleyball net, height indicator.

Task: The starting position is standing, with feet spread shoulder width apart, arms in the block position. Examinee jumps with both feet taking off simultaneously, imitating hand block of a ball. The

Takođe, 1. i 2. juna iste godine, u periodu od 10:00 do 13:00, u sali Fakulteta sporta i fizičkog vaspitanja u Beogradu, ponovo su sprovedeni već pomenuti testovi, kako bi se utvrdilo da li je došlo, i u kojoj meri, do promene nivoa opštih i specifičnih sposobnosti, nakon tri meseca treniranja.

Pre testiranja, ispitanicima su izmerene telesna masa i telesna visina. Nakon toga je usledilo izvođenje aerobnih vežbi i vežbi oblikovanja umerenog intenziteta – u cilju zagrevanja u trajanju od 10 minuta. Ispitivanje je izvršeno baterijom testova:

Prvi dan

- Skok u dalj iz mesta;
- Dohvat u bloku;
- Trčanje na 20 m.

Drugi dan

- Rassel-Lange-ov test – odigravanje lopte “prstima” od zid;
- Rassel-Lange-ov test – odigravanje lopte “čekićem” od zid;
- Rassel-Lange-ov test – servis (broj ubačenih servisa).

Za merenja antropometrijskih karakteristika, korišćeni su sledeći instrumenti:

- antropometar po Martinu i
- vaga koja omogućuje tačnost merenja od 0,5 kg i kod koje postoji mogućnost regulisanja kazaljke na nulti položaj.

Nakon što su izmerene telesna visina i telesna masa, prvog dana sprovedena je i baterija testova:

Skok u dalj iz mesta

Instrumenti: Ravna, ali ne klizava površina sa obeleženim skakalištem, na kome je odskočište na istom nivou kao i doskočište.

Zadatak: Ispitanica se sunožno odrazi sa kraja odrazne linije i doskoči što može dalje. Obavezan je sunožni doskok. Izvode se dva skoka. Nepravilno izveden skok se ponavlja.

Ocenjivanje: Kao tačka merenja uzima se tačka dodira pete sa površinom koja je najbliža liniji odskoka. Tačnost merenja je 1 cm. U obzir se uzima najduži skok izmeren u cm.

Napomene: Skok se izvodi iz sunožnog položaja. Dozvoljeno je podizanje na prste pre odraza (Ivanić, 1988).

Dohvat u bloku

Instrumenti: Odbojkaška mreža, visinometar.

Zadatak: Stav raskoračni u širini ramena, ruke u poziciji za blok, ispitanica vrši maksimalni sunožni

landing needs to be with both feet simultaneously as well. The examinees are entitled to two attempts.

Evaluation: The measured indicator is the height of reach. The measurement value is 1 cm. The highest jump measured in cm is recorded.

Notes: The jump is performed with both legs simultaneously. The examinees are allowed to raise on their toes before the take-off.

20 m running

Instruments: Whistle, stopwatch, two stands for marking the finish line.

Task: Examinee takes a standing start position behind the start line. The signal is only “set” and the whistle sound. Examinee runs towards the finish line. Two examinees run simultaneously. They have two attempts, and the better result is recorded.

Evaluation: The time from the sound of whistle to the point when the examinee crosses the vertical plane of the finish line with her chest. The time is measured in seconds.

Notes: The starter stands alongside the start line, and the time keeper is 5-7 m along side the finish line. The examinees should be instructed to run across the finish line in full speed.

On the second day, the remaining three tests are conducted:

Rassel-Lange volleyball test – overhand pass the wall

Instruments: Ball, whistle, stopwatch.

Task: Examinee is standing at a distance of 1 m from the wall. A line is drawn at the height of 2.28m. At a signal, she throws the ball against the wall and then sets the ball over the indicated line, with no breaks. The objective is to set the ball as many times as possible within the interval of 30 seconds. In case an examinee loses control over the ball, she returns to the initial position. The marked line in front of the wall may not be crossed. She has the right to two attempts, better result is recorded.

Evaluation: The number of set balls is evaluated.

Notes: The time keeper stands next to the examinees all the time and encourages her to perform as many overhand pass as possible.

Rassel-Lange volleyball test – underhand pass the wall

Instruments: Ball, whistle, stopwatch.

Task: Examinee is standing at a distance of 1 m from the wall. A line is drawn at the height of 2.28m. At a signal, she throws the ball against the wall, and then digs it over the indicated line with no breaks. The objective is to dig the ball as many times as possible within the interval of 30 seconds. In case an

skok, imitirajući rukama blokiranje lopte. Obavezan je sunožni doskok. Izvode se dva skoka.

Ocenjivanje: Meri se visina dohvata. Tačnost merenja je 1 cm. U obzir se uzima najviši skok izmeren u cm.

Napomene: Skok se izvodi iz sunožnog položaja. Dozvoljeno je podizanje na prste pre odraza.

Trčanje na 20 m.

Instrumenti: Pištaljka, štoperica, dva staka za obeležavanje cilja.

Zadatak: Ispitanica stoji u položaju visokog starta iza startne linije. Komanda je samo “pozor!” i zvuk pištaljke. Ispitanica trči prema liniji cilja. Trče istovremeno dve ispitanice. Izvode se dva pokušaja, a računa se bolji.

Ocenjivanje: Meri se vreme od zvuka pištaljke do trenutka kada ispitanica grudima pređe vertikalnu ravan koja se nalazi na liniji cilja. Merenje je u sekundama.

Napomene: Starter stoji u produžetku linije starta, a merilac 5 – 7 m u produžetku linije cilja. Ispitanicu treba upozoriti da trči punom brzinom kroz cilj.

Drugog dana, sprovode se preostala tri testa:

Rassel-Lange-ov volleyball test – odigravanje lopte “prstima” od zida

Instrumenti: Lopta, pištaljka, štoperica.

Zadatak: Ispitanica stoji na udaljenosti 1m od zida. Na visini od 2,28m je povučena linija. Na dati znak baci loptu na zid, a zatim je prstima odbija preko obeležene linije bez zastoja. Zadatak je da se lopta odigra što veći broj puta u vremenskom intervalu od 30 sekundi. Ako ispitanica izgubi kontrolu nad loptom, ponovo se vraća u početni položaj. Obeležena linija ispred zida ne sme se prelaziti. Ima pravo na dva pokušaja, bolji se boduje.

Ocenjivanje: Ocenjuje se broj izvedenih odigravanja.

Napomene: Merilac stoji sve vreme pored ispitanika i podstiče da izvede što veći broj odbijanja lopte od zida.

Rassel-Lange-ov volleyball test – odigravanje lopte “čekićem” od zida

Instrumenti: Lopta, pištaljka, štoperica.

Zadatak: Ispitanica stane na 1m od zida. Na visini od 2,28m je povučena linija. Na dati znak baci loptu na zid, a zatim je čekićem odbija preko obeležene linije bez zastoja. Zadatak je da se lopta odigra što veći broj puta u vremenskom intervalu od 30 sekundi.

examinee loses control over the ball, she returns to the initial position. The marked line in front of the wall may not be crossed. She has the right to two attempts, better result is recorded.

Evaluation: The number of dug balls is evaluated.

Notes: The timekeeper stands next to the examinee all the time and encourages her to perform as many underhand pass as possible.

Rassel-Lange volleyball test – serve (Figure 1)

Instruments: Ball, volleyball net, whistle.

Task: The test is conducted at a volleyball court. The examinees serve from one half, and the other half is marked in fields. Each examinee has the right to ten serves and tries to achieve a maximum sum of points, that is, as many successful serves as possible. She has the right to two attempts, and better result is recorded.

Evaluation: The number of successful serves is evaluated.

Notes: Overhand serve is used.

FIGURE 1

Rassel-Lange volleyball test – serve.

SLIKA 1

Rassel-Langeov volleyball test – servis.

5	5	5
4	3	4
2	1	2

Ako ispitanica izgubi kontrolu nad loptom, ponovo se vraća na početni položaj. Obeležena linija ispred zida ne sme se prelaziti. Ima pravo na dva pokušaja, bolji se boduje.

Ocenjivanje: Ocenjuje se broj izvedenih odbijanja.

Napomene: Merilac stoji sve vreme pored ispitanika i podstiče da izvede što veći broj odbijanja lopte od zid.

Rassel-Lange-ov volleyball test – servis (Slika1)

Instrumenti: Lopta, odbojkaška mreža, pištaljka.

Zadatak: Test se sprovodi na odbojkaškom igralištu. Sa jedne polovine se servira, a druga je obeležena. Svaka ispitanica ima pravo na deset servisa i pokušava da postigne što više poena, tj. što više ubačenih servisa. Ima pravo na dva pokušaja, a bolji rezultat se boduje.

Ocenjivanje: Računa se broj ubačenih servisa.

Napomene: Servira se gornji servis.

Experimental treatment

As for experimental treatment conducted during three months, it is important to note that the practice was held 4 times a week and they lasted for 90 minutes (Nešić, 2005). The practice was held on Wednesdays, Fridays, Saturdays and Sundays. As for the practice itself, it is important to stress that it mostly involved improvement of the adopted technique elements – through a wide range of exercises, and continued teaching of new elements of volleyball play. The practice largely focused on proper performance of volleyball technique elements, with correc-

Eksperimentalni tretman

Kada se radi o eksperimentalnom tretmanu, koji je delovao tokom tri meseca, važno je napomenuti da su se treninzi održavali 4 puta nedeljno i da su trajali 1h i 30min (Nešić, 2005). Treninzi su se održavali sredom, petkom, subotom i nedeljom. Kada su u pitanju sami treninzi, važno je napomenuti da je na njima uglavnom bilo aktuelno usavršavanje usvojenih tehničkih elemenata – kroz široki spektar različitih vežbi, kao i nastavak obučavanja novih elemenata odbojkaške igre. Na treninzima se dosta pažnje obraćalo

TABLE 1*The program of training of volleyball school "DIF" - Belgrade.***TABELA 1***Program treniniga škole odbojke „DIF“ – Beograd.*

	<ul style="list-style-type: none"> • Acrobatics, overhand pass, underhand pass. • Basic volleyball positions, overhand pass back, underhand pass back. • Running school, Underhand serve technique. • Rhythm and dance, The technique of standing float. • Acrobatics, overhand pass with movement, underhand pass with movement. • Basic volleyball positions, overhand and underhand pass overside. • Ball toss school, Combination of overhand and underhand pass. 	<u>Initial measurement:</u> <ul style="list-style-type: none"> • anthropometric characteristics • motor abilities
March	<ul style="list-style-type: none"> • Rhythm and dance, 6vs6 gameplay (introduction to game-rules, and 6:0 formation). • Acrobatics, Overhand pass forwards, underhand pass forwards. • Basic volleyball technics poses, overhand backwards pass technique, underhand backwards pass. • Running school, Under-serve technique. • Rhythm and dance, Standing float serve technique. • Acrobatics, Overhand pass technique with movement, Underhand pass technique with movement. • Basic volleyball technics poses, Overhand and underhand passing sideways. • Ball toss school, Overhand-underhand passing combinations. • Rhythm and dance, 6vs6 gameplay (introduction to game-rules, and 6:0 formation). 	
April	<ul style="list-style-type: none"> • Rhythm and dance, Spiking technique – coach holds the ball (zone 4, 3, 2). • Volleyball poses and positions, Standing float serve technique. • Running school, Repeting and underwriting all of the taught technique elements. • Rhythm and dance, Player positioning for 6:0 formation. • Acrobatics, Standing float serve technique. • Basic volleyball technics poses, Under-serve and underhand reception technique. • Ball toss school, 6vs6 gameplay (introduction to game-rules, and 6:0 formation). • Rhythm and dance, Spiking technique – coach throws the ball (zone 4, 3, 2). • Acrobatics, Spiking technique – coach holds the ball (zone 4, 3, 2). • Volleyball poses and positions, Standing float serve technique. • Running school, Repeting and underwriting all of the taught technique elements. • Rhythm and dance, Player positioning for 6:0 gameplay formation. • Acrobatics, Standing float serve technique. • Basic volleyball technics poses, Under-serve and underhand reception technique. • Ball toss school, 6vs6 gameplay (introduction to game-rules, and 6:0 formation). • Rhythm and dance, Spiking technique – coach throws the ball (zone 4, 3, 2). 	
May	<ul style="list-style-type: none"> • Acrobatics, 6vs6 gameplay (standing float and underhand serve, underhand reception, seting and attacking with overhand pass technique). • Volleyball poses and positions, Spiking technique – coach throws the ball (zone 4, 3, 2). • Running school, Individual blocking technique, sideways step. • Rhythm and dance, Underserve and standing float underhand reception. • Acrobatics, Individual blocking technique, sideways overstep. • Basic volleyball technics poses, Underserve and standing float overhand reception. • Ball toss school, 6vs6 gameplay (standing float and underhand serve, underhand reception, overhand seting and spiking). • Rhythm and dance, Spiking technique – coach throws the ball (zone 4, 3, 2) • Acrobatics, Underhand defence technique. • Basic volleyball technics poses, Individual blocking technique, sideways step and overstep. • Running school, 6vs6 gameplay (standing float and underhand serve, underhand reception, overhand seting and spiking). • Rhythm and dance, Standing float serve with aim (parallel, diagonal). • Acrobatics, Spiking with aim (parallel, diagonal). • Volleyball poses and positions, 6vs6 gameplay (standing float serve, underhand reception, overhand seting and spiking). • Ball toss school, Two-player block technique. 	

	<ul style="list-style-type: none"> • Rhythm and dance, 6vs6 gameplay (standing float serve, underhand reception, overhand seting and spiking).
	<p><u>Final measurement:</u></p>
Jun	<ul style="list-style-type: none"> • anthropometric characteristics • motor abilities
<p>cm, the average body weight 49.63 kg, and the avera- 161,15 cm, prosečna telesna masa 49,63 kg, dok je</p>	
	<ul style="list-style-type: none"> • Akrobatika, Tehnika odigravanja prstima naprijed, Tehnika odigravanja čekićem naprijed. • Osnovni odbojkaški stavovi, Tehnika odigravanja prstima nazad, Tehnika odigravanja čekićem nazad. • Škola trčanja, Tehnika donjeg servisa. • Ples, Tehnika gornjeg servisa. • Akrobatika, Tehnika odigravanja prstima iz kretanja, Tehnike odigravanja čekićem iz kretanja. • Osnovni odbojkaški stavovi, Odigravanje prstima i čekićem u stranu. • Škola bacanja loptice, Kombinacija prsti – čekić. • Ples, *Igra 6:6 (upoznavanje sa pravilima igre i sistemom 6:0). • Akrobatika, Tehnika odigravanja prstima napred, Tehnika odigravanja čekićem naprijed. • Osnovni odbojkaški stavovi, Tehnika odigravanja prstima nazad, Tehnika odigravanja čekićem nazad. • Škola trčanja, Tehnika donjeg servisa. • Ples, Tehnika gornjeg servisa. • Akrobatika, Tehnika odigravanja prstima iz kretanja, Tehnike odigravanja čekićem iz kretanja. • Osnovni odbojkaški stavovi, Odigravanje prstima i čekićem u stranu. • Škola bacanja loptice, Kombinacija prsti – čekić. • Ples, *Igra 6:6 (upoznavanje sa pravilima igre i sistemom 6:0).
Mart	<p><u>Incijalno mjerenje:</u></p> <ul style="list-style-type: none"> • antropometrijske karakteristike • motorne sposobnosti
	<ul style="list-style-type: none"> • Akrobatika, Tehnika smečiranja - trener pridržava loptu (zona 4, 3, 2). • Stavovi i položaji, Tehnika gornjeg servisa. • Škola trčanja, Ponavljanje i utvrđivanje svih naučenih elementa tehnike. • Ples, Razmeštanje igrača na terenu sistem igre 6:0. • Akrobatika, Tehnika gornjeg servisa. • Osnovni odbojkaški stavovi, Prijem donjeg servisa čekićem. • Škola bacanja loptice, *Igra 6:6 (upoznavanje sa pravilima igre i sistemom 6:0). • Ples, Smečiranje sa podbacivanjem od strane trenera (zona 4, 3, 2). • Akrobatika, Tehnika smečiranja - trener pridržava loptu (zona 4, 3, 2). • Stavovi i položaji, Tehnika gornjeg servisa. • Škola trčanja, Ponavljanje i utvrđivanje svih naučenih elementa tehnike. • Ples, Razmeštanje igrača na terenu sistem igre 6:0. • Akrobatika, Tehnika gornjeg servisa. • Osnovni odbojkaški stavovi, Prijem donjeg servisa čekićem. • Škola bacanja loptice, *Igra 6:6 (upoznavanje sa pravilima igre i sistemom 6:0). • Ples, Smečiranje sa podbacivanjem od strane trenera (zona 4, 3, 2).
April	
	<ul style="list-style-type: none"> • Akrobatika, *Igra 6:6 (donji i gornji servis, prijem čekićem, dizanje lopte i napad prstima). • Stavovi i položaji, Smečiranje sa podbacivanjem od strane trenera (zona 4). • Škola trčanja, Tehnika individualnog bloka - dokorak. • Ples, Prijem donjeg i gornjeg servisa čekićem. • Akrobatika, Tehnika individualnog bloka - prekorak. • Osnovni odbojkaški stavovi, Prijem donjeg i gornjeg servisa prstima. • Škola bacanja loptice, *Igra 6:6 (donji i gornji servis, prijem čekićem, dizanje lopte i napad smečiranjem). • Ples, Smečiranje sa podbacivanjem lopte od strane trenera iz zone 4, 3, 2. • Akrobatika, Odbrana čekićem. • Osnovni odbojkaški stavovi, Tehnika individualnog bloka – dokorak i prekorak. • Škola trčanja, *Igra 6:6 (gornji servis, prijem čekićem, dizanje lopte i napad smečiranjem). • Ples, Gornji servis sa zadatkom (paralela i dijagonala). • Akrobatika, Smečiranje sa zadatkom (paralela i dijagonala). • Stavovi i položaji, *Igra 6:6 (gornji servis, prijem čekićem, dizanje lopte i napad smečiranjem). • Škola bacanja loptice, Tehnika dvojnog bloka – kretanje. • Ples, *Igra 6:6 (gornji servis, prijem čekićem, dizanje lopte i napad smečiranjem).
May	

Finalno mjerenje:

- Jun
- antropometrijske karakteristike
 - motorne sposobnosti

tion of errors if necessary. In terms of targeted and specific (situational) exercises, they were slightly less represented than those mentioned above – not meaning that this very important part of practice for competition age was treated to a significantly less extent. Volleyball school “DIF” orientation is that children should not be introduced in specialization too early (Kenny & Gregory, 2006).

Data processing

The data obtained through research will be analyzed through processes of descriptive and comparative statistics. The data were analyzed using SPSS19.0 program.

In the area of comparative statistics, the research applied the T-test for small dependent samples – for evaluating the significance between average results acquired at the initial and final test for almost each variable (all variables from anthropometric area and all variables from morphological area).

RESULTS

Table 2 shows the main descriptive indicators of the tested girls, with data on age and basic morphological characteristics. Based on the results, it can be seen that the average height of examinees was 161.15

na pravilno izvođenje odbojkaških elemenata tehnike, uz eventualnu korekciju grešaka. Kada su u pitanju usmerene i specifične (situacione) vežbe, one su, u odnosu na gore navedene, imale malo manju zastupljenost – ali to ne znači da je ovaj važan deo treninga takmičarskog uzrasta bio znatno manje tretiran. Orijehtacija škole odbojke “DIF” je da decu ne bi trebalo uvoditi rano u specijalizaciju (Kenny i Gregory, 2006).

Obrada podataka

Podaci dobijeni tokom istraživanja, obrađeni su postupcima deskriptivne i komparativne statistike. Podaci su obrađeni pomoću programa SPSS 19.0.

Iz prostora komparativne statistike, korišćen je T-test za male zavisne uzorke – prilikom testiranja značajnosti između prosečnih rezultata dobijenih na inicijalnom i finalnom merenju za svaku varijablu (sve varijable iz antropomotoričkog prostora, kao i sve varijable iz morfološkog prostora).

REZULTATI

Na Tabeli 2 su prikazani osnovni deskriptivni pokazatelji testiranih devojčica sa podacima o uzrastu i osnovnim morfološkim karakteristikama. Na osnovu rezultata se može videti, da je prosečna visina ispitanica

TABLE 2

The results of initial testing of main descriptive indicators of the tested examinees, with data on age and basic morphological characteristics.

TABELA 2

Rezultati inicijalnog merenja osnovnih deskriptivnih pokazatelja testiranih ispitanica, sa podacima o uzrastu i osnovnim morfološkim karakteristikama.

	<i>N</i>	<i>Min</i>	<i>Max</i>	<i>M</i>	<i>SD</i>	<i>cV%</i>
A	40	13.00	14.00	13.500	.513	3.80
BH	40	144.00	175.00	161.150	8.833	5.48
BM	40	33.00	65.00	49.625	8.547	17.22
BMI	40	15.07	24.14	19.040	2.292	12.04

Legend/Legenda: **A** - Age (Uzrast); **BH** - Body High (Visina tijela); **BM** - Body Mass (Težina tijela); **BMI** - Body Mass Index; **N** - Total number of participants (Ukupan broj ispitanika); **Min** - Minimum (Minimum); **Max** - Maximum (Makimum); **M** - Sample mean (Aritmetička sredina); **SD** - Standard deviation (Standardna devijacija); **cV%** - % of coefficient of variation (% koeficijent varijacije).

ge BMI value 19.02 kg/cm².

Table 3. shows the main descriptive characteristics of explosiveness, speed and preciseness. It also shows the maximum and minimum values of test results, standard deviation results, coefficient of variation and average values.

TABLE 3

The results of initial testing examinees– the data onevaluated motor skills.

TABELA 3

Rezultati inicijalnog testiranja ispitanica – podaci o procenjenim motoričkim varijablama.

	<i>N</i>	<i>Min</i>	<i>Max</i>	<i>M</i>	<i>SD</i>	<i>cV%</i>
SLJ	40	160.00	190.00	176.750	8.472	4.79
BR	40	210.00	240.00	226.250	7.412	3.27
20R	40	4.00	5.00	4.530	.289	6.37
RLOP	40	22.00	30.00	27.050	2.724	10.07
RLUP	40	19.00	28.00	23.750	3.059	12.88
RLS	40	7.00	10.00	8.250	.967	11.72

Legend/Legenda: **SLJ** - Standing long jump (Skok u dalj iz mesta); **BR** - Block reach (Dohvat u bloku); **20R** - 20 m running (Trčanje na 20 m); **RLOP** - Rassel-Lange test – overhand pass the wall (Rassel-Langeov test odigravanja lopte “prstima” od zid); **RLUP** - Rassel-Lange test – underhand pass the wall (Rassel-Langeov test odigravanja lopte “čekićem” od zid); **RLUP** - Rassel-Lange test serve - the number of successful serves (Rassel-Langeov test servisa - broj ubačenih servisa); **N** - Total number of participants (Ukupan broj ispitanika); **Min** - Minimum (Minimum); **Max** - Maximum (Maksimum); **M** - Sample mean (Aritmetička sredina); **SD** - Standard deviation (Standardna devijacija); **cV%** - % of coefficient of variation (% koeficijent varijacije).

Table 4 shows the results of main descriptive indicators of tested examinees, with the data on age and basic morphological characteristics. Based on the results after three months, it can be noted that there were no significant alterations in terms of height, body weight and BMI. Certainly, this fact is not determined by experiment, but it is the effect of growth factors.

Table 5 shows the main descriptive characteristics of explosiveness, speed and preciseness. It also shows the maximum and minimum values of test results, standard deviation results and average values.

DISCUSSION

Based on obtained results, it can be noted that, no significant alterations were seen in height, body weight and BMI (even though there was a minor increase of average value of body height and a decrease of average value of body weight and BMI). However, improvements (at varied degrees) were noted regarding

prosečna vrednost BMI 19,04 kg/cm².

Na Tabeli 3 su prikazani i osnovni deskriptivni pokazatelji eksplozivnosti, brzine i preciznosti. Takođe su prikazane i najveće vrijednosti rezultata testova, minimalne vrijednosti, vrednosti standardne devijacije, koeficijenta varijacije, kao i prosečne vrednosti.

Na Tabeli 4. su prikazani rezultati osnovnih deskriptivnih pokazatelja testiranih ispitanica, sa podacima o uzrastu i osnovnim morfološkim karakteristikama. Na osnovu dobijenih rezultata mjerenja može se utvrditi da nije došlo do značajnijih pomaka u smislu tjelesne visine, tjelesne mase i BMI. Naravno, ova činjenica nije uslovljena eksperimentom, već je to efekat faktora rasta.

Na Tabeli 5. su prikazani i osnovni deskriptivni pokazatelji eksplozivnosti, brzine i preciznosti. Takođe su prikazane i najveće vrijednosti rezultata testova, minimalne vrijednosti, vrijednosti standardne devijacije, kao i prosečne vrijednosti.

DISKUSIJA

Na osnovu dobijenih rezultata može se zaključiti da kod tjelesne visine, tjelesne mase i BMI-a, nije došlo do značajnih promjena (mada je evidentno minimalno povećanje prosječne vrednosti telesne visine, kao i smanjenje prosječne vrijednosti telesne mase i BMI-a). Međutim, kod opštih i specifičnih motoričkih sposobnosti

TABLE 4

The results of main descriptive indicators of tested examinees, with data on age and basic morphological characteristics.

TABELA 4

Rezultati osnovnih deskriptivnih pokazatelja finalnog merenja testiranih ispitanica, sa podacima o uzrastu i osnovnim morfološkim karakteristikama.

	<i>N</i>	<i>Min</i>	<i>Max</i>	<i>M</i>	<i>SD</i>	<i>cV%</i>
A1	40	13.00	14.00	13.500	.513	3.79
BH1	40	145.00	176.00	161.950	8.982	5.54
BM1	40	33.00	64.00	48.800	8.340	17.09
BMI1	40	14.86	23.57	18.527	2.219	11.97

Legend/Legenda: **A** - Age (Uzrast); **BH** - Body High (Visina tijela); **BM** - Body Mass (Težina tijela); **BMI** - Body Mass Index; **N** - Total number of participants (Ukupan broj ispitanika); **Min** - Minimum (Minimum); **Max** - Maximum (Makimum); **M** - Sample mean (Aritmetička sredina); **SD** - Standard deviation (Standardna devijacija); **cV%** - % of coefficient of variation (% koeficijent varijacije).

TABLE 5

The results of final testing – data on evaluated motoric variables.

TABELA 5

Rezultati finalnog testiranja ispitanica – podaci o procenjenim motoričkim varijablama.

	<i>N</i>	<i>Min</i>	<i>Max</i>	<i>M</i>	<i>SD</i>	<i>cV%</i>
SLJ1	40	170.00	200.00	184.750	8.347	4.52
BR1	40	210.00	245.00	229.750	8.347	3.63
20R1	40	4.00	4.90	4.450	.265	5.49
RLOP1	40	25.00	33.00	28.600	1.903	6.65
RLUP1	40	22.00	30.00	26.350	2.159	8.19
RLS1	40	7.00	10.00	8.850	.813	9.18

Legend/Legenda: **SLJ** - Standing long jump (Skok u dalj iz mesta); **BR** - Block reach (Dohvat u bloku); **20R** - 20 m running (Trčanje na 20 m); **RLOP** - Rassel-Lange test – overhand pass the wall (Rassel-Langeov test odigravanja lopte “prstima” od zid); **RLUP** - Rassel-Lange test – underhand pass the wall (Rassel-Langeov test odigravanja lopte “čekićem” od zid); **RLUP** - Rassel-Lange test serve - the number of successful serves (Rassel-Langeov test servisa - broj ubačenih servisa); **N** - Total number of participants (Ukupan broj ispitanika); **Min** - Minimum (Minimum); **Max** - Maximum (Makimum); **M** - Sample mean (Aritmetička sredina); **SD** - Standard deviation (Standardna devijacija); **cV%** - % of coefficient of variation (% koeficijent varijacije).

general and specific motor skills after 3 months of volleyball practice.

As for general motor skills, the least improvement was noted at the “20m running” test. This comes as logical, because speed is a motor skill that is very difficult to improve, particularly at the age 13-14 – when the natural growth of speed skills is being finalized (Cole, Bellizzi, Flegal, & Dietz, 2000). Stati-

je uočljivo poboljšanje (u različitom stepenu) nakon 3 meseca odbojkaškog treninga.

Kada je u pitanju opšta motorika, najslabije poboljšanje je utvrđeno kod testa „trčanje na 20m“. Ovo je i logično, jer je brzina motorička sposobnost koja se veoma teško može poboljšati, pogotovo u uzrastu od 13-14 godina – kada se prirodni prirast brzine privodi kraju (Cole, Bellizzi, Flegal i Dietz,

TABLE 6

The results of statistical difference (statistical significance) of tested examinees – comparison of initial and final testing and evaluation of morphological and motoric characteristics and skills (t-test for small dependent samples).

TABELA 6

Rezultati statističke razlike (statistička značajnost) testiranih ispitanica u odnosu na inicijalno i finalno merenje i procenjivanje morfoloških i motoričkih karakteristika i sposobnosti (t-test za male zavisne uzorke).

	<i>t</i>	<i>df</i>	<i>p</i>
Pair 1	.498	39	.620
Pair 2	.190	39	.850
Pair 3	1.050	39	.300
Pair 4	-13.597	39	.000
Pair 5	-1.398	39	.170
Pair 6	.589	39	.560
Pair 7	-2.121	39	.040
Pair 8	-9.313	39	.000
Pair 9	-2.130	39	.040

Legend/Legenda: **Pair 1** - Body height - Body height 1 (Visina tijela - Visina tijela 1);

Pair 2 - Body mass - Body mass 1 (Masa tijela – Masa tijela 1); **Pair 3** - BMI - BMI 1;

Pair 4 - Standig long jump - Standig long jump 1 (Skok u dalj iz mjesta - Skok u dalj iz mjesta 1); **Pair 5** - Block reach - Block reach 1 (Dohvat u bloku - Dohvat u bloku 1);

Pair 6 - 20 m running - 20 m running 1 (Trčanje na 20 m - Trčanje na 20 m 1);

Pair 7 - Rassel-Lange test, overhand pass the wall - Rassel-Lange test, overhand pass the wall 1 (Rassel-Langeov test odigravanja lopte “prstima” od zid - Rassel-Langeov test odigravanja lopte “prstima” od zid 1); **Pair 8** - Rassel-Lange test, underhand pass the wall - Rassel-Lange test, underhand pass the wall 1 (Rassel-Langeov test odigravanja lopte “čekićem” od zid - Rassel-Langeov test odigravanja lopte “čekićem” od zid 1); **Pair 9** - Rassel-Lange test serve, the number of successful serves - Rassel-Lange test serve, the number of successful serves 1 (Rassel-Langeov test servisa, broj ubačenih servisa - Rassel-Langeov test servisa, broj ubačenih servisa 1); **t** - Student's distribution (Studentova distribucija); **df** - Degrees of freedom (Stepeni slobode); **p** - Probability (Vjerovatnoća).

stically, significant improvement was seen at the test “standing long jump”. In terms of “block reach” test, it was also determined that post-tests showed improved results – but the improvements were less significant (which can be explained with the fact that the methodology of teaching volleyball technique does not involve many exercises insisting on maximum engagement of vertical component of speed power and leg extensor explosiveness – meaning that the practice does not include many vertical jumps – standing or running.

On the other hand, for specific motor skills, one may note that the post-test brought improved results – at a more significant degree than with general motor skills. That is, the 3-month volleyball practice influenced the changes in observed variables, and statistical significance was determined in regards to

2000). Statistički značajno poboljšanje rezultata je utvrđeno kod testa „skok u dalj iz mesta“. Kada je u pitanju test „dohvat u bloku“, takođe je utvrđeno poboljšanje rezultata u post-testu – ali je poboljšanje manje izraženo (što može da se objasni time što, u metodici obučavanja odbojkaške tehnike, nema mnogo vježbi koje insistiraju na maksimalnom angažovanju vertikalne komponente brzinske snage i eksplozivnosti opružaća nogu – što bi značilo da nema mnogo vertikalnih odskoka – što iz mesta, što iz kretanja.

S druge strane, kada se radi o specifičnim motoričkim sposobnostima, može se uočiti da je, u post-testu, došlo do poboljšanja rezultata – i to u značajnijim okvirima nego kod rezultata opštih motoričkih sposobnosti, odnosno tromesečni odbojkaški trening tehnike je uticao na promjene posmatranih varijabli, a statistička značajnost je utvrđena kod testova

specific motor skills tests, as well as the standing long jump test.

The results show that the applied model of volleyball practice dominantly influenced the specific motor skills, in comparison to general motor skills. The obtained results testify in favor of the applied model of volleyball practice to the educational component, as opposed to the development component from the aspect of physical skills, which is consistent with the current theory of training methodology. The changes observed in the presentation of specific motor skills are the result of training program within the three months of practice performed on examinees. Namely, the practice program focused exclusively on the technique, that is, the specific motor skills, and therefore had to provide the above given results (Nešić, 2002). On the other hand, as for general motor skills tested, the long jump was the only indicator that involved a significant difference – which can be interpreted as the product of movement and locomotion in the course of specific motor skills practice (Janković & Marelić, 1995). The movement and locomotion manifested hereby are in a horizontal plane, that is, they require sudden shifts of running direction and course (running forward-backward, sideways...). This is in line with the expression of agility, and certainly contributed to the development of leg extensor explosiveness – in terms of horizontal component, which is important for the result on standing long jump test in this case (Dopsaj, 1994; Milišić, 2003).

The results showed that, after three months of applied volleyball practice, there were certain improvements in the general and specific anthropomotoric skills tested. Certainly, one should take into account that it was not possible to form a control group, so for that reason, there is a possibility of certain error in the obtained result. In terms of height and body weight, there were no statistically significant changes during this period, therefore it can be considered that this error is negligible (meaning that the effect of maturation, as a measure of internal validity of statistical inference, was not significant).

CONCLUSION

This study involved a pre-test / post-test experimental research design, but without a control group. Based on the obtained results, it can be noted that both of the defined research hypotheses were confirmed. The results showed that, after three months of volleyball practice, there was certain improvement in the general and specific motor skills tested. Additionally, the results also showed that the impact of applied model of volleyball practice was more dominant in terms of specific motor skills, compared to

specifičnih motoričkih sposobnosti, kao i kod testa skok u dalj iz mesta.

Rezultati pokazuju da je primjenjeni model odbojkaškog treninga dominantno uticao na specifičnu motoriku, u odnosu na opštu. Dobijeni rezultati govore u prilog uticaja primjenjenog modela odbojkaškog treninga na edukativnu komponentu, nasuprot razvojne sa aspekta fizičkih sposobnosti, što se poklapa sa postojećom teorijom metodike obučavanja. Promjene do kojih je došlo u ispoljavanju specifične motorike su rezultat programa trenažnog procesa u tri mjeseca treninga, koji je sproveden na ispitanicima. Naime, program treninga je bio posvećen samo tehnici, odnosno specifičnoj motorici, te je stoga moralo da dođe do pomenutih razlika (Nešić, 2002). S druge strane, od testiranih opštih motoričkih sposobnosti, jedino je kod skoka u dalj došlo do značajnije razlike – što se može komentarisati kao produkt kretanja i lokomocija prilikom treniranja specifičnih motoričkih sposobnosti (Janković & Marelić, 1995). Kretanja i lokomocije koje se manifestuju tom prilikom su u horizontalnoj ravni, odnosno prisutne su nagle promjene pravca i smjera kretanja (istrčavanja naprijed – nazad, u stranu...), što odgovara ispoljavanju agilnosti, a što svakako doprinosi razvoju eksplozivnosti opružaća nogu – kada je u pitanju horizontalna komponenta, što je važno za rezultat u skoku u dalj iz mesta, u ovom slučaju (Dopsaj, 1994; Milišić, 2003).

Rezultati su pokazali da je, poslije tri mjeseca primjene odbojkaškog treninga, došlo do određenog poboljšanja opštih i specifičnih antropomotoričkih sposobnosti koje su testirane. Naravno, treba uzeti u obzir da nije postojala mogućnost formiranja kontrolne grupe, te iz tog razloga postoji mogućnost određene greške u dobijenim rezultatima. U pogledu tjelesne visine i tjelesne mase, nije došlo do statistički značajnih promjena u ovom periodu, te se može reći da je ta greška zanemarljiva (što znači da efekat maturacije, kao mjera unutrašnje valjanosti statističkog zaključivanja, nije značajno izražen).

ZAKLJUČAK

U ovom istraživanju, bio je aktuelan pre-test – post-test eksperimentalni nacrt istraživanja, ali bez kontrolne grupe. Rezultati su pokazali da je, posle tri meseca primene odbojkaškog treninga, došlo do određenog poboljšanja opštih i specifičnih motoričkih sposobnosti koje su testirane. Takođe, rezultati su pokazali da je primenjeni model odbojkaškog treninga dominantno uticao na specifičnu motoriku, u odnosu na opštu. Predselekcija i selekcija imaju svoj puni smisao jedino kada se ne oslanjaju samo na procjenu

the general. Pre-selection and selection make their full purpose only when they rely not only on the assessment of current characteristics and skills, but when they are observed and evaluated as part of estimation of development that should occur as a result of sports training process (Stojanović, Kostić, & Nešić, 2005, 2010).

Testing of motor skills is only an auxiliary information, which certainly cannot provide insight on the overall condition of trained skills, as practice is a much more complex skill development process – not only of physical skills, but their maximum application in specific competition circumstances (Zatsiorsky & Kraemer, 1995).

ACKNOWLEDGEMENTS

The study was developed within the project “The effects of applied physical activity on the locomotion, metabolism, psycho-social and educational status of the population of the Republic of Serbia” classified under No. III47015, as part of sub-project “The effects of applied physical activity on the locomotion, metabolism, psycho-social and educational status of athletes population of the Republic of Serbia” financed by the Ministry of Education, Science and Technological Development of the Republic of Serbia – The cycle of scientific projects 2011-2014.

REFERENCES

- Bompa, T. (2005). Cjelokupan trening za mlade pobjednike [Total training for young champions]. Zagreb, HR: Gopal.
- Cole, T., Bellizzi, M., Flegal, K., & Dietz, W. (2000). Establishing a standard definition for child overweight and obesity worldwide: international survey. *MBJ*, 320(7244), 1240–1243.
- Dopsaj, M. (1994). *Metode podizanja i održavanja sportske forme kod vrhunskih sportista u sportskim igrama* [Methods of raising and maintaining the sports form in elite athletes in sports games]. Belgrade, RS: Jugoslovenski zavod za fizičku kulturu i medicinu sporta.
- Ivanić, S. (1988). *Kriterijumi za procenu fizičkog razvoja i fizičkih sposobnosti dece i omladine uzrasta od 7 – 19 godina (normativi)* [Criteria for evaluation of physical development and physical abilities of children and adolescents aged 7 - 19 years (norms)]. Belgrade, RS: Gradska samoupravna interesna zajednica fizičke kulture Beograda.
- Ivanović, J., Dopsaj, M., Nešić, G., & Stanković, R. (2010). Polni dimorfizam kod različitih indikatora za procenu izometrijske eksplozivne sile opružača nogu [Sexual dimorphism in

aktuelnih osobina i sposobnosti, već se posmatraju i vrednuju u sklopu sa prognoziranjem prirasta, koji treba da donese proces sportske obuke (Stojanović, Kostić i Nešić, 2005, 2010).

Testiranje motoričkih sposobnosti je samo pomoćna informacija, koja nikako ne daje uvid o cjelokupnom stanju treniranosti, jer je trening mnogo kompleksniji proces usavršavanja – ne samo fizičke sposobnosti, već i njenog maksimalnog ispoljavanja u konkretnim uslovima takmičenja (Zatsiorsky i Kraemer, 1995).

ZAHVALNOST

Rad je dio Projekta „Efekti primenjene fizičke aktivnosti na lokomotorni, metabolički, psiho-socijalni i vaspitni status populacije Republike Srbije” pod brojem III47015, a kao dio potprojekta “Efekti primenjene fizičke aktivnosti na lokomotorni, metabolički, psiho-socijalni i vaspitni status populacije sportista Republike Srbije” koji se finansira od strane Ministarstva prosvete, nauke i tehnoloskog razvoja Republike Srbije – Ciklus naučnih projekata 2011-2014.

- various indicators for assessing explosive isometric knee extensor force]. *Fizička kultura*, 64(1), 46–61.
- Janković, V., & Marelić, N. (1995). *Odbojka* [Volleyball]. Zagreb, HR: Fakultet fizičke kulture.
- Jurko, D., Nešić, G., & Stojanović, T. (2013). Does precompetitive anxiety affect perceived competitive efficacy of volleyball players? *Facta Universitatis Series: Physical Education and Sport*, 11(1), 57–64.
- Kenny, B., & Gregory, S. (2006). *Volleyball – steps to success*. Champaign, IL: Human Kinetics.
- Martinović, J., Dopsaj, V., Kotur-Stevuljević, J., Dopsaj, M., Vujović, A., Stefanović, A., & Nešić G. (2011). Oxidative stress biomarker monitoring in elite women volleyball athletes during a 6-week training period. *J Strength Cond Res*, 25(5), 1360–1367. doi: 10.1519/JSC.0b013e3181d85a7f; PMID: 21157395
- Milišić, B. (2003). *Upravljanje treningom* [Management of training]. Belgrade, RS: Autor.
- Nešić, G. (2002). *Osnovi antropomotorike* [Fundamentals of anthropomotorics]. Belgrade, RS: Sportska akademija.

- Nešić, G. (2005). Model rada odbojkaške škole [Operating model of volleyball school]. *Sportska medicina*, 5(3), 136–145.
- Nešić, G. (2008). Struktura takmičarske aktivnosti odbojkašica [Structure of competitive activity in female volleyball players]. In L. Radisavljević and L. Moskovljević (Eds.), *Godišnjak No 14* (pp. 89–111). Belgrade, RS: Fakultet sporta i fizičkog vaspitanja.
- Nešić, G., Sikimić, M., Ilić, V., & Stojanović, T. (2011). Play structure of top female volleyball players: explorative factorial approach. *Br J Sports Med*, 45, 541. doi: 10.1136/bjism.2011.084558.24
- Stojanović, T., Kostić, R., & Nešić, G. (2005). *Odbojka* [Volleyball]. Banja Luka, BA: Fakultet fizičkog vaspitanja i sporta.
- Stojanović, T., Kostić, R., & Nešić, G. (2010). *Odbojka – tehnika i taktika* [Volleyball - technique and tactics]. Banja Luka, BA: Fakultet fizičkog vaspitanja i sporta.
- Zatsiorsky, B. M., & Kraemer, W. J. (1995). *Science and practice of strength training*. Champaign, IL: Human kinetics. PMID: 7595983

Received: November 1, 2013

Revision received: December 5, 2013

Accepted: December 13, 2013

Primljeno: 1. novembar, 2013

Izmjene primljene: 5. decembra, 2013

Prihvaćeno: 13 decembar, 2013

Correspondence to:

Goran Nešić, PhD

Fakultet sporta i fizičkog vaspitanja

Blagoja Parovića 156

11030 Belgrade

Serbia

Phone: 00381 64 11 36 305

E-mail: goran.nesic@fsfv.bg.ac.rs

Korespondencija:

Dr Goran Nešić

Fakultet sporta i fizičkog vaspitanja

Blagoja Parovića 156

11030 Beograd

Srbija

Telefon: 0038164 11 36 305

E-mail: goran.nesic@fsfv.bg.ac.rs

TRAININGSEFFEKTE ZU ALLGEMEINEN UND SPEZIFISCHEN MOTORFÄHIGKEITEN DER VOLLEYBALLSPIELERINNEN IM ALTER VON 13-14 JAHREN

Goran Nešić¹, Dejan Ilić¹, Nikola Majstorović¹, Vladimir Grbić¹ und Nedžad Osmankač²¹

¹Fakultät für Sport und Leibeserziehung, Universität in Belgrad, Serbien

²Fakultät für Sport und Tourismus, EduconsUniversität, Serbien

Volleyball ist ein sehr attraktiver, interessanter, komplexer und dynamischer Sportzweig, mit einer schnellen Übertragung von Aktien von einer Seite des Feldes zur anderen, in dem die beiden Mannschaften versuchen, den Sieg mit einer größeren Anzahl von Punkten zu erreichen, durch einen erfolgreichen Angriff oder Übertölpelung des Gegners. (Nešić, 2011).

Physikalische Entwicklung und Verbesserung der motorischen Fähigkeiten sind wichtige Komponenten, auf die man durch die programmierten körperlichen Übungen, bzw. das Training wirken kann (Bompa, 2005). Der gegenwärtige Volleyball zeigt immer mehr und immer wichtiger Bindung mit der Wissenschaft, die neue Wege und neue Ansichten auf das

Training der Volleyballspieler öffnet (Ivanović u.a. 2010). Da die Grundelemente des Volleyballs auch eine Reihe von Motorikfähigkeiten einschließen, so dass ihre Ausführung richtig und gleichzeitig effizient ist, ist auch selbstverständlich und berechtigt zu erwarten, dass die Trainingsarbeit auf Verbesserung dieser Elemente auch auf die Entwicklung der motorischen Fähigkeiten Einfluss einbringt. (Nešić u.a., 2011). Das zeitgenössische Volleyballspiel verlangt von allen Spielern ein hohes Niveau der allgemeinen motorischen aber auch spezifischen, und für Volleyballspiel und bestimmte Spielerpositionen typischen Fähigkeiten (Martinović u.a., 2011).

Das Ziel dieser Studie sind Übersicht und Analyse der Auswirkungen eines Volleyballtrainings auf die

Änderungen von einigen allgemeinen und spezifischen motorischen Fähigkeiten bei Volleyballspielerinnen im Alter von 13 bis 14 Jahren, beziehungsweise das Ziel ist festzustellen, ob ein dreimonatiges Training der Volleyballtechnik die Veränderungen von beobachteten Variablen beeinflussen wird.

Im Experiment nahmen 40 Volleyballspielerinnen aus der Volleyballschule »DIF« in Belgrad teil. In dieser Studie wird eine Probe von Variablen in zwei Subproben (Variablen zur Bewertung der allgemeinen Motorik und Variablen zur Bewertung der spezifischen Fähigkeiten im Volleyball) unterteilt. Am ersten Tag sind die Messungen von Körpergröße und Körpergewicht gemacht und die folgenden Tests durchgeführt: Standweitsprung, Erreichbarkeit im Block, 20 m – Laufen und am zweiten Tag sind die verbleibenden drei Tests durchgeführt: Russell-Lange-Test - »Überhandzuspiel Pass«, Russell-Lange-Test - »Unterhandzuspiel« und der Russell-Lange-Test - Service.

Die Anfangs- und Abschlusstesten waren mittels einer Reihe von Tests über die Volleyballschülerinnen aus der Volleyballschule „DIF“ durchgeführt, in einer Zeitspanne von drei Monaten – durch die Anwendung der „Vortest-“ und „Nachtstestmethode“

Wenn es sich um experimentelles Verfahren handelt, das drei Monate im Lauf war, ist es wichtig zu betonen, dass die Trainings vier Mal wöchentlich je 90 Minuten stattfanden. Die Trainings sind mittwochs, freitags, samstags und sonntags stattgefunden. Es ist wichtig zu erwähnen, wenn es um die Trainings geht, dass die Verbesserung der gewonnenen technischen Elementen relevant war, und zwar durch den großen Umfang von verschiedenen Übungen, als auch in Fortsetzung des Erwerbens von neuen Elementen des Volleyballspiels.

Aufgrund der erhaltenen Ergebnissen kann geschlossen werden, dass eine spürbare Verbesserung in allgemeinen und spezifischen motorischen Fähigkeiten nach 3 Monaten der Volleyballtrainings zu sehen ist. Wenn es um die allgemeine Motorik geht, wurde die geringste Verbesserung im Test »20m Laufen« festgestellt. Das ist auch logisch, weil die Geschwindigkeit eine motorische Fähigkeit ist, die sehr schwer zu verbessern ist, vor allem in der Altersgruppe von 13-14 Jahren - wenn die natürliche Wachstumsrate der Geschwindigkeit fast zu Ende ist (Cole i dr., 2000). Eine statistisch signifikante Verbesserung der Ergebnisse wurde für den Test »Standweitsprung« festgestellt. Im Bezug auf den Test „Erreichbarkeit im Block“ wurde auch eine Verbesserung von Ergebnissen im Nachtstest festgestellt – jedoch ist diese Verbesserung weniger ausgedrückt (diese Tatsache ist leicht zu er-

klären, weil die Methodik der Volleyballschulung nicht viele Übungen umfaßt, die auf ein maximales Engagement der vertikalen Komponente der Geschwindigkeitskraft und Exlpositivität vom Erstrecker des Beins bestehen – d.h. es gibt nicht viele vertikale Absprünge, weder aus Stand, noch aus Bewegung (Kostić, Stojanović i Nešić, 2010).

Auf der anderen Seite, wenn es sich um die spezifischen motorischen Fähigkeiten handelt, ist zu bemerken, dass es im Nachtstest eine Verbesserung der Ergebnisse gibt - und zwar in einem wichtigeren Umfang als bei Ergebnissen von allgemeinen motorischen Fähigkeiten, bzw. ein dreimonatiges Training der Volleyballstechniken die Veränderungen von beobachteten Variablen beeinflusst hat und eine statistische Signifikanz in allen Tests von spezifischen motorischen Fähigkeiten gefunden war. Die erhaltenen Ergebnisse sprechen für den Einfluss des angewandten Modells des Volleyballtrainings auf die Bildungskomponente, im Gegensatz zur Entwicklungskomponente unter Aspekt von der körperlichen Fähigkeit, was im Einklang mit der bestehenden Methodiktheorie des Erwerbens von Motorikfähigkeit ist.

Es ist wichtig darafu hinzuweisen, dass es für diese Studie keine Möglichkeit gab, eine Kontrollgruppe zu bilden. Aus diesem Grunde ist es nicht auszuschließen, dass die eventuellen möglichen Fehler in erworbenen Ergebnissen aufgetreten sind. Im Bezug auf die Körpergröße und –gewicht ist in diesem Zeitraum zu keinen statistisch relevanten Änderungen gekommen, so dass man sagen kann, dass dieser Fehler geringfügig ist (das heißt, der Effekt der Reifung als Maß der internen Gültigkeit der statistischen Schlußfolgerung, nicht bedeutend ausgeprägt ist).

Anmerkung

Die Studie wurde im Rahmen des Projektes »Die Auswirkungen der Anwendung von körperlichen Aktivitäten auf Bewegung, Stoffwechsel, psycho-sozialen- und Bildungsstand der Bevölkerung der Republik Serbien« entwickelt, unter No. III47015 klassifiziert, als Teil des Subprojektes »Die Auswirkungen der Anwendung von körperlichen Aktivitäten auf Bewegung, Stoffwechsel, psycho-sozialen- und Bildungsstand der Sportler der Republik Serbien« finanziert vom Ministerium für Ausbildung, Wissenschaft und technologische Entwicklung der Republik Serbien – der Zyklus von wissenschaftlichen Projekten 2011 – 2014.

Stichworte: Trainingseffekte, motorische Fähigkeiten, Volleyballspielerinnen.

ANALIZA I RAZLIKE U BAZIČNO-MOTORIČKIM I SITUACIONO-MOTORIČKIM SPOSOBNOSTIMA RUKOMETAIŠICA PRVE FEDERALNE LIGE I PRVE LIGE REPUBLIKE SRPSKE

ANALYSIS AND DIFFERENCES IN THE BASIC MOTOR AND SITUATIONAL MOTOR ABILITIES BETWEEN FEMALE HANDBALL PLAYERS IN THE BIH FIRST FEDERAL LEAGUE AND THE FIRST LEAGUE OF THE REPUBLIKA SRPSKA

Srđan Pavlović¹, Munir Talović¹, Elvir Kazazović¹, and Rasim Lakota¹

¹Fakultet sporta i tjelesnog odgoja, Univerzitet u Sarajevu, Bosna i Hercegovina
Faculty of Sport and Physical Education, University of Sarajevo, Bosnia and Herzegovina

SHORT SCIENTIFIC PAPER

KRATKI NAUČNI ČLANAK

doi: 10.5550/sgia.130902.en.008P

UDK: 796.322.012.1-055.2

doi: 10.5550/sgia.130902.se.008P

SUMMARY

The aim of this study was to confirm the difference in basic motor and situational motor abilities of female handball players. Studies were conducted on 77 adult female handball players playing in the BiH First Federal League and the First League of the Republika Srpska. For basic-motor abilities, 18 variables were used which covered factors for estimating segmental speed, flexibility, coordination, power, repetitive power, and balance. Situational motor capabilities were tested using five hypothetical latent factors which are responsible for situational efficiency in handball: speed of ball handling, precision, throwing strength, speed without the ball, and ball handling.

Discriminative analysis of quantitative differences showed that statistically significant differences exist between the capabilities of players from the BiH First Federal League and the First League of the Republika Srpska. Our results can aid in better understanding, tracking, analyzing and perfecting conditioning and tactical preparation for female handball players at various levels of competition, all in the aim of achieving better quality of competition for senior handball players in BiH.

Key Words: basic motor and situational motor abilities, differences, handball.

SAŽETAK

Osnovni cilj ovog istraživanja bio je utvrditi razlike u bazično-motoričkim i situaciono-motoričkim sposobnostima rukometašica. Istraživanje je urađeno na 77 rukometašica, seniorskog uzrasta iz Prve federalne lige BiH i Prve lige Republike Srpske. U prostoru bazično-motoričke sposobnosti korišteno je 18 varijabli koje su obuhvatale faktore za procjenu segmentarne brzine, fleksibilnosti, koordinacije, eksplozivne snage, repetitivne snage i ravnoteže. Situaciono-motorički prostor je posmatran i obuhvata pet hipotetskih latentnih faktora koji su odgovorni za situacionu efikasnost u rukometu: brzina baratanja sa loptom, preciznost, snaga izbačaja lopte, brzina kretanja bez lopte, baratanje loptom.

U analiza kvantitativnih razlika na multivarijantnom nivou, diskriminativnom analizom, između Prve federalne lige BiH i Prve lige Republike Srpske u situaciono-motoričkim i bazično-motoričkim sposobnostima dobili smo da se nivoi takmičenja razlikuju odnosno da postoji statistička značajnost između tretiranih nivoa takmičenja. Dobijeni rezultati mogu doprinijeti boljem razumijevanju praćenja, analiziranja te boljem usavršavanju kondicijske i tehničko-taktičke pripreme rukometašica na različitim nivoima takmičenja, a sve u cilju postizanja većeg kvaliteta takmičenja seniorskih rukometašica u Bosni i Hercegovini.

Ključne riječi: bazična motorika i situaciona motorika, razlike, rukomet.

INTRODUCTION

Modern handball is exceptionally quick and explosive and is made up of varying physically intense movements which require high level motor skills, both basic and specific (Czerwinski, 1995; Đug, 2005).

Basic motor abilities form the basis for further development of specific motor abilities which are directly responsible for achieving quality results (Brčić, Viskić Štalec, & Jaklinović Fressl, 1997; Demir, 2000). The existence of five latent situational motor dimensions in handball has been confirmed by various authors and they are as follows: accuracy, ball handling, speed of movement with the ball, speed of movement without ball and throwing strength.

Kules and Simenc (1983) researched the impact of basic motor abilities on the success of players in handball, and they found that explosive strength (both horizontal and vertical leaping ability and the type of throw), accuracy, speed of movement (with and without the ball) and coordination define the quality of the player.

Handball is increasingly dominated by action and reaction speed, strength, and aggressiveness, as well as the versatility of the player as reflected by how many different positions he/she can play (Delija, Šimenc, & Vuleta, 1995; Rogulj, 2000; Srhoj, Rogulj, Padovan, & Katić, 2001; Vuleta, Milanović, & Sertić, 2003).

Players are required to improve their ability to perform elements of technique with maximum intensity and develop their agility and explosive-reactive movement both in offense and defense.

Due to the number of powerful shots, attacks on goal, taxing duels between players, and leaps in defence and offense, players consume large amounts of energy during the game. As such, a handball game demands much energy (Mujezinović, 2008; Vuleta, Milanović, & Sertić, 1999).

The aim of this study is to determine the differences and magnitude of differences at different levels of competition based on basic motor and situational motor indicators.

METHODS

Sample of entities

Studies were conducted on 77 physically fit, adult female handball players. All were players from the BiH First Federal League and the First League of the Republika Srpska, who were registered with the BiH

UVOD

Današnji moderni rukomet igra je izuzetno brzih, eksplozivnih i višestruko složenih pokreta, razvoja akcija, situacionih rješavanja problema, a koje sve zajedno obilježava nivo intenziteta aktivnosti što zahtijeva od igrača visok nivo sposobnosti, kako bazičnih tako specifičnih (Czerwinski, 1995; Đug, 2005).

Utjecaj bazičnih motoričkih sposobnosti čini osnovu za daljnju nadogradnju specifičnih motoričkih sposobnosti koje su direktno odgovorne za postizanje kvalitetnih rezultata (Brčić, Viskić Štalec i Jaklinović Fressl, 1997; Demir, 2000). Postojanje pet latentnih situacijsko-motoričkih dimenzija u rukometu potvrđeno je od strane brojnih autora a to su: preciznost, baratanje loptom, brzina kretanja igrača s loptom, brzina kretanja igrača bez lopte i snaga izbačaja lopte.

Još su Kuleš i Šimenc (1983) istraživali utjecaj bazičnih motoričkih sposobnosti na uspjeh u rukometu i utvrdili da eksplozivna snaga (horizontalne i vertikalne skočnosti te tipa bacanja), preciznost, brzina kretanja igrača sa i bez lopte te koordinacija definišu efikasnost rukometaša. U rukometu sve više dominiraju akcijska i reakcijska brzina, snaga, agresivnost, kao i univerzalnost igrača sa stanovišta pozicije u igri (Delija, Šimenc i Vuleta, 1995; Rogulj, 2000; Srhoj, Rogulj, Padovan i Katić, 2001; Vuleta, Milanović i Sertić, 2003).

Od igrača se zahtijeva poboljšanje sposobnosti izvođenja elemenata tehnike maksimalnim intenzitetom, razvoj agilnosti i eksplozivno-reaktivnog načina kretanja kako u napadačkim tako i u odbrambenim akcijama.

Uzimajući u obzir snažne udarce loptom napadača na gol, veliki broj snažnih duela igrača odbrane i napada po kojima je rukomet poznat, veliki broj skokova u odbrani i napadu, maksimalno brze kretanje igrača u kontranapadu i ostale faktore, pouzdano se može reći da je potrošnja energije na utakmici veoma visoka. To znači da je u rukometnoj igri u velikoj mjeri eksploatisana i energetska komponenta (Mujezinović, 2008; Vuleta, Milanović i Sertić, 1999).

Cilj ovog istraživanja je da na osnovu istraživanih prostora bazično-motoričkih i situaciono-motoričkih sposobnosti, utvrdimo razlike i nivo razlika rukometašica na različitim nivoima takmičenja.

METODE

Uzorak entiteta

Istraživanje je sprovedeno na uzorku od 77 rukometašica, seniorskog uzrasta, klinički zdravih. Sve ispitanice su rukometašice Prve federalne lige BIH i Prve lige Republike Srpske, registrovane u Rukometnom Savezu Bosne i Hercegovine. Definisane

Handball Federation. Definition of motor model in this study was done in accordance with Kurelic et al (1975).

Simple of variables

To measure basic motor abilities, we used 18 variables. To measure situational motor capabilities we used five variables.

Variables for determining basic motor capabilities:

- Hand tapping – MSBTAP,
- Leg tapping – MSBTAN,
- Bend, body twist, touch – MSBPZD,
- Flex movement with a stick – MFLISK,
- Full extensions on a benches – MFDPK,
- Splits – MFSPA,
- Standing on one leg crosswise on a bench with eyes closed – MRRAV,
- Standing on a turned bench – MRSOK,
- Balancing on a narrow beam – MRSUK,
- Back extensions – MRSIST,
- 30 second sit ups – MRSD30,
- Push-ups – MRSSK,
- Coordination with pole – MKKOP,
- Slalom with three medicine balls – MKS3M,
- 20 steps with pole – MK2IP,
- Long jump from stationary position – MESDM,
- Throwing a medicine ball from a lying position – MFEBML,
- Vertical leap – MESVS.

Variables for determining situational motor capabilities:

- Ball handling in a slalom – SMVLS,
- Shooting at a target – SMGLC,
- Shooting at a distance from a walk – SMSLD,
- Running in a triangle in a basic defensive position – SMTTOS,
- Shooting against a wall for 20 seconds – SMSZ20.

Statistical analysis

Differences between the BiH First Federal League and the First League of the Republika Srpska players, for each applied variable, were confirmed by a discriminative analysis.

RESULTS AND DISCUSSION

We analyzed discriminate differences between basic-motor and situational-motor abilities of handball players from First federal league of BH and First League of the Republika Srpska.

In Table 1 was tested covariance matrix of similarity between two sub-samples (Rađo & Wolf, 2002) between respondents from First federal league and

motoričkog modela u ovom istraživanju izvršeno je na osnovu modela strukture motoričkih sposobnosti koje su definisali Kurelić i saradnici (1975).

Uzorak varijabli

U prostoru bazično-motoričkih sposobnosti korišteno je 18 varijabli. U prostoru situaciono-motoričkih sposobnosti obuhvaćeno je pet varijabli.

Varijable za procjenu bazično- motoričkih sposobnosti:

- Taping rukom - MSBTAP,
- Taping nogom - MSBTAN,
- Pretklon- zasuk- dodir - MSBPZD,
- Iskret sa palicom - MFLISK,
- Duboki pretklon na klupici - MFDPK,
- Špagat - MFSPA,
- Stajanje na jednoj nozi sa zatvorenim očima - MRRAV,
- Stajanje na obrnutoj klupici - MRSOK,
- Stajanje uzduž klupice za ravnotežu - MRSUK,
- Ispravljanje trupa - MRSIST,
- Dizanje trupa za 30 sekundi - MRSD30,
- Sklekovi - MRSSK,
- Koordinacija sa palicom - MKKOP,
- Slalom sa tri medicinke - MKS3M,
- 20 iskoraka sa palicom - MK2IP,
- Skok u dalj iz mjesta - MESDM,
- Bacanje medicinke (ležeći) na leđima - MFEBML,
- Vertikalni skok, sargent - MESVS.

Varijable za procjenu situaciono- motoričkih sposobnosti:

- Vođenje lopte u slalom - SMVLS,
- Gađanje loptom u cilj - SMGLC,
- Šutiranje loptom na daljinu iz koraka - SMŠLD,
- Trčanje u trouglu osnovnim odbrambenim stavom - SMTTOS,
- Šutiranje od zid 20 sekundi - SMSZ20.

Statistička analiza

Razlike između rukometašica Prve federalne lige BiH i Prve lige Republike Srpske, za svaku primijenjenu varijablu su utvrđene diskriminativnom analizom.

REZULTATI I DISKUSIJA

Analizirane su diskriminativne razlike između bazično-motoričkih i situaciono-motoričkih sposobnosti rukometašica Prve federalne lige BiH i Prve lige Republike Srpske.

U Tabeli 1 testirana je sličnost matrica kovarijansi između dva subuzorka (Rađo i Wolf, 2002) tj između ispitanica Prve federalne lige i Prve lige RS-a. Može

First League of the Republika Srpska. We can notice that difference of covariance matrix statistically significant ($p=.001$) and allows access to the further procedure of discriminant analysis.

se uočiti da je razlika matrica kovarijansi statistički značajna ($p=0,001$) te dozvoljava pristup daljoj proceduri diskriminativne analize.

TABLE 1

Box test results.

TABELA 1

Boxov test.

Box's M	530.977
F	Approx. 1.286
	<i>df</i> 1 276.000
	<i>df</i> 2 16520.816
	<i>p</i> .001

Legend/Legenda: *df* - Degrees of freedom (Stepeni slobode); *p* - Probability (Vjerovatnoća).

Analyzing the Table 2 we can see that in this area there was a quantitative difference in the patients, which was expected. We see that there is a formation of an important discriminant function of height .856, which shows us where the correlation data set on which we done a discriminant analysis with discriminant function.

Analizirajući Tabelu 2 možemo vidjeti da je i u ovom prostoru došlo do kvantitativnih razlika kod ispitanica, što je i bilo očekivano. Vidimo da je došlo do formiranja jedne značajne diskriminativne funkcije visine 0,856 koja nam dokazuje u kojoj je korelaciji skup podataka na osnovu kojih smo vršili diskriminativnu analizu sa diskriminativnim funkcijama.

TABLE 2

The significance results of a discriminant analysis

TABELA 2

Značajnost rezultata diskriminativne funkcije.

Eigenvalue	% of variance	Cumulative %	R	λ	χ^2	<i>df</i>	<i>p</i>
2.753	100.0	100.0	.856	.266	83.976	23	.000

Legend/Legenda: Eigenvalue - Svojstvena vrijednost; % of Variance - % varijanse; Cumulative % - Kumulativni %; *R* - Canonical correlation (Kanonička korelacija); λ - Wilks' Lambda; χ^2 - Chi-square (Hi kvadrat); *df* - Degrees of freedom (Stepeni slobode); *p* - Probability (Vjerovatnoća).

Based on the results of the structure of discriminant functions in Table 3, it can be seen that the highest correlations with the discriminant function, with a variable that maximizes the value of the results of different basic-motor and situational-motor abilities of the two sub-samples have the following variables:

- Back extensions who are perishing space repetitive strength. A significant contribution to the repetitive force for the front part of the body can be explained by the fact that the strength of the muscle groups except for the body in the

Na osnovu rezultata strukture diskriminativne funkcije u Tabeli 3, može se uočiti da najveće korelacije sa diskriminativnom funkcijom, tj. sa varijablom koja maksimalno razlikuje vrijednosti rezultata bazično-motoričkih i situaciono-motoričkih sposobnosti dva subuzorka imaju slijedeće varijable:

- Ispravljanje trupa koji propadaju prostoru repetitivne snage. Značajan doprinos repetitivne snage prednjeg dijela trupa moguće je obrazložiti činjenicom što je snaga ove mišićne skupine osim za pregib trupa kod šutiranja i fintiranja, važna i za stabilizaciju trupa prijeko potrebnu

TABLE 3*Matrix of the structure of discriminant function.***TABELA 3***Matrica strukture diskriminacione funkcije:*

	Function
MRSIST	.346
SMGLC	-.277
MK2IP	-.222
MFDPK	-.185
MKS3M	.180
SMTTOS	-.169
MRSD30	.160
SMVLS	.141
MFLISK	-.140
ŠMLŠD	.129
MKKOP	-.127
MFEBML	.127
MRSUK	-.120
MRSOK	-.118
MRRAV	-.095
MRSSK	.091
MESVS	.067
SMSZ20	.062
MSBTAP	.058
MSBTAN	.044
MSBPZD	.019
MESDM	.014
MFSPA	-.007

Legend/Legenda: **MSBTAP** - Hand tapping (Taping rukom); **MSBTAN** - Leg tapping (Tapping nogom); **MSBPZD** - Bend, body twist, touch (Pretklon- zasuk- dodir); **MFLISK** - Flex movement with a stick (Iskret sa palicom); **MFDPK** - Full extensions on a benches (Duboki pretklon na klupici); **MFSPA** - Splits (Špagat); **MRRAV** - Standing on one leg crosswise on a bench with eyes closed (Stajanje na jednoj nozi sa zatvorenim očima); **MRSOK** - Standing on a turned bench (Stajanje na obrnutoj klupici); **MRSUK** - Balancing on a narrow beam (Stajanje uzduž klupice za ravnotežu); **MRSIST** - Back extensions (Ispravljanje trupa); **MRSD30** - 30 second sit ups (Dizanje trupa za 30 sekundi); **MRSSK** - Push-ups (Sklekovi); **MKKOP** - Coordination with pole (Koordinacija sa palicom); **MKS3M** - Slalom with three medicine balls (Slalom sa tri medicinke); **MK2IP** - 20 steps with pole (20 iskoraka sa palicom); **MESDM** - Long jump from stationary position (Skok u dalj iz mjesta); **MFEBML** - Throwing a medicine ball from a lying position (Bacanje medicinke ležeći na leđima); **MESVS** - Vertical leap (Vertikalni skok, sargent); **SMVLS** - Ball handling in a slalom (Vođenje lopte u slalom); **SMGLC** - Shooting at a target (Gađanje loptom u cilj); **SMSLD** - Shooting at a distance from a walk (Šutiranje loptom na daljinu iz koraka); **SMTTOS** - Running in a triangle in a basic defensive position (Trčanje u trouglu osnovnim odbrambenim stavom); **SMSZ20** - Shooting against a wall for 20 seconds (Šutiranje od zid 20 sekundi).

crease and kicking feinting, is important for stabilizing hull indispensable in solid contact with the opponent, but this muscle group participates in the folding of the upper leg, which indirectly contributes to the efficiency and speed of the players and without the ball.

- Shooting at a target area is accuracy, and precision is like a specific motor ability has a large share of the final result of which is manifested through the ability of matching stationary targets (goals) for the most movement, but also from a static position.
- 20 steps with pole that belongs to the area of coordination, belonging to the area to assess the factors that coordination to a single, highly complex motor dimension, and we can say that this is a form of motor intelligence in athletes thinking about the movement in time and space, the way his performance, speed of execution and speed of learning new motor actions.

Analysis of the results in Table 4 it can be seen that the first group of respondents, handball players from First federal league BiH located in the negative part of the discriminant function which is defined variables that have a negative impact on the discriminant function. Second group of respondents are handball players from First League of the Republika Srpska which are located in the positive part of the discriminant function, which define variables that have a positive impact on the discriminant function

TABLE 4
Group centroids.

TABELA 4
Centroidi grupa.

Group	Function
1	-1.747
2	1.534

CONCLUSION

Results of this study show that female handball players in different levels of competition differ significantly statistically in basic and situational motor abilities.

The existence of these differences between female handball players of different levels of competition is primarily due to the differences in level of competition. BiH First Federal League players have significantly more motivation because they have better help and support from RSBiH, and therefore have seriously defined careers. As is recognized, the psycho-

kod čvrstih kontakata s protivnikom, ali ova mišićna skupina participira i u pregibanju natkoljenice, što posredno doprinosi učinkovitosti i brzini kretanja igrača sa i bez lopte.

- Gađanje loptom u cilj koji pripada prostoru preciznosti, a preciznost kao specifična motorička sposobnost ima velik udio u krajnjem rezultatu što se manifestira kroz sposobnost pogađanja nepokretne mete (gola) najčešće iz kretanja, ali i iz statičke pozicije.
- 20 iskoraka sa palicom koji pripada prostoru koordinacije, koji pripadaju prostoru faktora za procjenu koordinacije koja predstavlja jednu, veoma kompleksnu motoričku dimenziju, i može se reći da je to jedan oblik motoričke inteligencije kod sportista-način razmišljanja o samom pokretu u vremenu i prostoru, način njegove interpretacije, brzine izvođenja i brzine učenja nove motorne akcije.

Analizom rezultata u Tabeli 4 može se uočiti da se prva grupa ispitanika tj. rukometašice Prve federalne lige BiH, nalaze u negativnom dijelu diskriminativne funkcije, čime je definišu varijable koje imaju negativan uticaj na diskriminativnu funkciju. Druga grupa ispitanika čine rukometašice Prve lige Republike Srpske koje se nalaze u pozitivnom dijelu diskriminativne funkcije, čime su definisane varijable koje imaju pozitivan uticaj na diskriminativnu funkciju.

ZAKLJUČAK

Rezultati ovog istraživanja pokazuju da se rukometašice različitog nivoa takmičenja statistički značajno razlikuju u bazično motoričkim i situaciono motoričkim sposobnostima.

Objašnjenje postojanja razlika između rukometašica različitih nivoa takmičenja je prije svega u nivou takmičenja. Prve federalne lige BIH imaju znatno bolju motivaciju jer imaju jasnu pomoć i podršku RSBiH, samim tim i ozbiljno definisanu karijeru. Kao što je poznato psihološki aspekt je veoma važan u sportu. Drugi razlog postojanja razlika se može

logical aspect is very important in sport. The second reason for the existence of these differences can be attributed to the training regime. A third reason for the difference is in the level of mental, physical and technical tactical training. The obtained results can contribute to better understanding, tracking and analyzing and perfecting conditioning and tactical training in various levels of competition, with the aim of improving the quality of competition in Bosnia and Herzegovina.

posmatrati sa aspekta dizajniranih treninga za seniorke. Treći razlog postojanja razlika je u nivou mentalne, kondicijske i tehničko taktičke pripreme seniorki. Dobiveni rezultati mogu doprinijeti boljem razumijevanju praćenja, analiziranja te boljem usavršavanju kondicijske i tehničko-taktičke pripreme rukometašica na različitim nivoima takmičenja, a sve u cilju postizanja većeg kvaliteta takmičenja rukometašica za seniorke u Bosni i Hercegovini.

REFERENCES

- Brčić, B., Viskić Štalec, N., & Jaklinović Fressl, Ž. (1997). Prediktivna vrijednost varijabli za procjenu tehničko-taktičkih elemenata u rukometu [Predictive value of variables for the evaluation of technical-tactical elements in handball]. *Kinesiology*, 1(29), 60–70.
- Czerwinski, J. (1995). The influence of technical abilities of players on the tactical selection in the handball game. *European Handball*, 2, 16–19.
- Delija, K., Šimenc, Z., & Vuleta, D. (1995). Razlike u nekim općim i situacijskim testovima motoričkih sposobnosti rukometaša i onih koji ne igraju rukomet [Differences in some general and situation tests of motor abilities in handball player and those not play handball]. *Kinesiology*, 27(1), 57–61.
- Demir, M. (2000). *Kanonički odnos morfoloških dimenzija i situacijsko-motion sposobnosti s mladim rukometašima* [Canonic relation between morphological dimensions and situational-motion abilities with young handball players]. Unpublished master's thesis, University of Sarajevo, Faculty of Sport and Physical Education.
- Đug, M. (2005). *Efikasnost različitih metoda za poboljšanje sakakačkih sposobnost rukometaša* [Efficiency of different methods for improvement of handball players jumping ability]. Unpublished master's thesis, University of Tuzla, Faculty of physical education and sport.
- Kuleš, B., & Šimenc, Z. (1983). Odnos između različitih motoričkih sposobnosti i efikasnosti u rukometu [Relationship between different motor abilities and efficiency in handball]. *Kinesiology*, 15(2), 153–163.
- Kurelić, N., Momirović, K., Stojanović, M., Šturm, J., Radojević, Đ, & Viskić-Štalec, N. (1975). *Struktura i avluacija morfoloških i motornih dimenzije omladine* [The Structure and evolution of morphological and motor dimensions of youth]. Belgrade, RS: Institutu za naučna istraživanja Fakulteta fizičke kulture.
- Mujezinović, M. (2008). *Uticaj programiranog treninga na specijalne i bazične motoričke sposobnosti u rukometu* [Effects of programmed training on special and basic motor abilities in handball]. Unpublished master's thesis, University of Sarajevo, Faculty of Sport and Physical Education.
- Rađo, I., & Wolf, B. (2002) *Metode kvantifikacije u sportu* [Methods for quantification in sport]. Sarajevo, BA: Faculty of Sport and Physical culture.
- Rogulj, N. (2000). Razlike u rukometnim situacionim indikatorima u odnosu na postignute rezultate takmičarskih ekipa na Svetskom prvenstvu 1999 u Egiptu [Differences in situation-related indicators of the handball game in relation to the achieved competitive results of teams at 1999 World Championship in Egypt]. *Kinesiology*, 32(2), 63–74.
- Srhoj, V., Rogulj, N. Padovan, M., & Katić R. (2001). Influence of the attack end conduction on match result in handball. *Collegium antropologicum*, 25(2), 611–617.
- Vuleta, D., Milanović, D., & Sertić, H. (1999). Latentna struktura prostornih, faznih, pozicijskih i kretnih karakteristika rukometne igre [Latent structure of the spatial, phasic, positional and movement characteristics of the handball game]. *Kinesiology*, 31(1), 37–53.
- Vuleta, D., Milanović, D., & Sertić, H. (2003). Odnosi između varijabli šuta na gol i rezultata na utakmicama muškog Evropskog rukometnog prvenstva 2000 [Relations among variables of shooting for a goal and outcomes of the 2000 Men's European Handball Championship matches]. *Kinesiology*, 35(2), 168–183.

Received: October 21, 2013
Revision received: November 12, 2013
Accepted: December 21, 2013

Primljeno: 21 oktobra, 2013
Izmjene primljene: 12 nivembra, 2013
Odobreno: 21 decembra, 2013

Correspondence to:
Srđan Pavlović, MSc
Faculty of Sport and Physical Education
Patriotske lige 41
71000 Sarajevo
Bosnia and Herzegovina
Phone: 00387 65 64 61 63
E-mail: srdjanpavlovic1984@hotmail.com

Korespodencija:
Mr Srđan Pavlović
Fakultet sporta i tjelesnog odgoja
Patriotske lige 41
71000 Sarajevo
Bosna i Hercegovina
Telefon: 00387 65 64 61 63
E-mail: srdjanpavlovic1984@hotmail.com

DIE ANALYSE UND GRUNDLEGENDE UNTERSCHIEDE IN BASISCH-MOTORISCHEN UND SITUATIV-MOTORISCHEN FÄHIGKEITEN BEI HANDBALLSPIELERIN DER ERSTE BUNDESLIGA UND DER ERSTE LIGA DER REPUBLIK SRPSKA

Srđan Pavlović¹, Munir Talović¹, Elvir Kazazović¹ und Rasim Lakota

¹Fakultät für Sport und Sportwissenschaft, Universität in Sarajevo,
Bosnien und Herzegowina

Das Hauptziel dieser Studie war es, die Unterschiede in den basisch-motorischen und situativ-motorischen Fähigkeiten der Handballspielerin festzustellen. Die Umfrage wurde an 77

Handballspielerinnen im Senior Alter der Ersten Bundesliga Bosnien und Herzegowina und der Erste Liga der Republik Srpska durchgeführt. Im Bereich der basisch-motorischen Fähigkeiten wurden 18 Variablen verwendet, die Faktoren für die Bewertung im segment Geschwindigkeit, Flexibilität, Koordination, Schnellkraft, sich wiederholende Kraft und Gleichgewicht enthalten.

Situativ-motorischer Bereich wurde beobachtet und umfasst fünf hypothetischen latenten Faktoren, die für die situative Effizienz im Handballspiel verantwortlich sind: Speed Ball Handhabung, Genauigkeit, Leistung der Ballauswürfe, Geschwindigkeit der Bewegung ohne Ball, Handspiel. Die Analyse der quantitativen Unterschiede in der multivariaten Ebene, Diskriminanzanalyse, zwischen dem Ersten Bundesliga Bosnien und Herzegowina und der Erste

Liga der Republik Srpska in situativ-motorischen und der basisch-motorischen Fähigkeiten – hat gezeigt, dass sich Ebenen des Wettbewerbs zwei genannten Liga unterscheiden, bzw. es ergibt sich eine statistische Signifikanz zwischen den zwei genannten Ebenen des Wettbewerbs. Der Grund für die bestehende Unterschiede kann man aus dem Aspekt verschiedenen gestalteten Trainingseinheiten für Seniorinnen betrachten. Weitere Unterschiede sind in Niveau der geistigen, körperlichen und technisch-taktischen Vorbereitungen den Seniorinnen. Die Ergebnisse können zu einem besseren Verständnis der Überwachung, Analyse und besseren Fitness-Training als auch technisch-taktische Vorbereitung der Handballspielerinnen auf verschiedenen Ebenen der Wettbewerb beitragen, mit dem Ziel eine höhere Qualität der Handball-Wettbewerbe für Seniorinnen in Bosnien und Herzegowina zu schaffen.

Stichwort: Handball, Unterschiede, basisch-motorisch und situativ-motorisch

KORIŠĆENJE TRENING TEHNOLOGIJE AUTORA U TEHNIČKO-TAKTIČKOJ OBUCI MAČEVALKI U DISCIPLINI SPORTSKI MAČ

USE OF AN AUTHORIAL TRAINING TECHNOLOGY DURING TECHNICAL AND TACTICAL TRAINING OF WOMEN EPEE FENCERS

Zoryana Semeryak¹, Yuriy Briskin¹, Maryan Pityn¹, and Oleksandr Vaulin¹

¹Dražavni univerzitet fizičke kulture, Lavov, Ukrajina
State University of Physical Culture, Lviv, Ukraine

SHORT SCIENTIFIC PAPER

KRATKI NAUČNI ČLANAK

doi: 10.5550/sgia.130902.en.009S

UDK: 796.86.015.1-055.2

doi: 10.5550/sgia.130902.se.009S

SUMMARY

Fencing belongs to group of martial arts with variable conditions of competitive activities, that determines priority in training structure of sportsmen opportunities for effective realization of tactical and technical set of moves. Level of rivalry in fencing competitions in Ukraine on all kinds of weapon, including epee is very low, this must be related to the problem of absence of qualified program of training on previous stages of long-term perfection. It indicates on the problem of accented review of scientific questions of effective training of qualified sportsmen that in future would be able to realize their individual opportunities on national and international levels. Possibility of accented increase of specialized load on sportsmen training should be considered on stage of specialized basic training. As follows, necessity of increasing effective training and results of competitive activity of qualified women epee fencers form a relevant scientific and practical task for technical and tactical improvement of sportsmen on stage of specialized basic training with account of structure and content of competitive activity of modern fencing.

Key Words: fencing, improvement, means, technique, tactic.

INTRODUCTION

Main attention of specialists in fencing is concentrated on questions that are related to the structure and content of competitive activity in different kinds

SAŽETAK

Mačevanje spada u grupu borilačkih sportova u promjenljivim uslovima takmičarske aktivnosti, koje određuju prioritete u strukturi mogućnosti treninga sportista u cilju efikasne realizacije taktičkog i tehničkog skupa kretnji. Nivo rivalstva na takmičenjima u mačevanju u Ukrajini sa svim vrstama oružja, uključujući tu i borbu mačem, je veoma nizak. To je u direktnoj vezi sa problemom manjka kvalitetnih programa obuke na prethodnim nivoima dugoročne pripreme. To ukazuje na problem, koji je istaknut u naučnoj literaturi, efektivne obuke talentovanih sportista koji će u nekoj budućnosti moći da iskažu svoje individualne mogućnosti na nacionalnom i međunarodnom nivou. Mogućnost značajnijeg povećanje specijalizovanog opterećenja u treningu sportista treba uzeti u obzir već u fazi specijalizovane početne obuke. Iz toga proizilazi neophodnost povećanja efektivnog treninga i rezultata takmičarske aktivnosti talentovanih žena mačevalaca u disciplini mač zasnovanih na relevantnim naučnim i praktičnim ciljevima tehničkog i taktičkog usavršavanja sportiskinja u fazi specijalizovane početne obuke u odnosu na strukturu i sadržaj takmičarske aktivnosti modernog mačevanja.

Ključne riječi: mačevanje, sredstva, tehnika, taktika, usavršavanje.

UVOD

Glavna pažnja stručnjaka u mačevanju posvećena je pitanjima koja se odnose na strukturu i sadržaj takmičarske aktivnosti sa različitim vrstama oružja

of weapon (Бакум, 2011; Роцін, 2007; Войтов, 1984), training improvement of different sides of fencers (Шевчук, 2009) and their control (Кабанова, 2007; Тышлер, 2010), that mainly reveal questions of sportsmen training and partly touch theoretical and methodological aspects of fencing training.

Fencing belongs to group of martial arts with variable conditions of competitive activities (Келлер, 1983), that determines priority in training structure of sportsmen opportunities for effective realization of tactical and technical set of moves (Бычков, 2006; Мороз & Бусол, 2006; Семеряк & Смирновський, 2013).

Level of rivalry in fencing competitions in Ukraine on all kinds of weapon, including epee is very low, this must be related to the problem of absence of qualified program of training on previous stages of long-term perfection (Семеряк & Смирновський, 2013; Смирновський, Семеряк, & Бріскін, 2013; Шевчук, 2007).

It indicates on the problem of accented review of scientific questions of effective training of qualified sportsmen that in future would be able to realize their individual opportunities on national and international levels. Possibility of accented increase of specialized load on sportsmen training should be considered on stage of specialized basic training.

As follows, necessity of increasing effective training and results of competitive activity of qualified women epee fencers form a relevant scientific and practical task for technical and tactical improvement of sportsmen on stage of specialized basic training with account of structure and content of competitive activity of modern fencing.

Aim of research is to justify means of technical and tactical training of women epee fencers with use of an authorial training technology.

METHODS

In this paper it used: theoretical analysis and generalization, comparison, abstraction, modeling, and biomechanical analysis.

Totally in process of research was analyzed more than 150 sources of information that are related with use of technical devices in training system of combat sport sportsmen, including fencing.

Comparison was used with the aim to determine existence of another analogical authorial training technologies that have intellectual right on it and compare them.

Abstraction and modeling let us to get away from minor signs of anthropometric models of high qualified fencers. This models were created by us with

(Бакум, 2011; Роцін, 2007; Войтов, 1984), trenajžno unapređenje različitih strana mačevaoca (Шевчук, 2009) i njihova kontrola (Кабанова, 2007; Тышлер, 2010), koja se uglavnom tiču pitanja sportskog treninga i djelomično dotiču teoretske i metodološke aspekte treninga mačevanja.

Mačevanje spada u grupu borilačkih sportova u promjenljivim uslovima takmičarske aktivnosti (Келлер, 1983), koje određuju prioritete u strukturi mogućnosti treninga sportista u cilju efikasne realizacije taktičkog i tehničkog skupa kretnji (Бычков, 2006; Мороз & Бусол, 2006; Семеряк & Смирновський, 2013).

Nivo rivalstva na takmičenjima u mačevanju u Ukrajini sa svim vrstama oružja, uključujući tu i borbu mačem, je veoma nizak. To je u direktnoj vezi sa problemom manjka kvalitetnih programa obuke na prethodnim novoim dugoročne pripreme (Семеряк & Смирновський, 2013; Смирновський, Семеряк, & Бріскін, 2013; Шевчук, 2007).

To ukazuje na problem, koji je istaknut u naučnoj literaturi, efektivne obuke talentovanih sportista koji će u nekoj budućnosti moći da iskažu svoje individualne mogućnosti na nacionalnom i međunarodnom nivou. Mogućnost značajnijeg povećanje specijalizovanog opterećenja u treningu sportista treba uzeti u obzir već u fazi specijalizovane početne obuke.

Iz toga proizilazi neophodnost povećanja efektivnog treninga i rezultata takmičarske aktivnosti talentovanih žena mačevalaca u disciplini mač zasnovanih na relevantnim naučnim i praktičnim ciljevima tehničkog i taktičkog usavršavanja sportistkinja u fazi specijalizovane početne obuke u odnosu na strukturu i sadržaj takmičarske aktivnosti modernog mačevanja.

Cilj istraživanja je da se elaborira način tehničke i taktičke obuke mačevalki u disciplini sportski mač korišćenjem trening tehnologije autora.

METODE

U ovom radu su korišćene: teorijska analiza i generalizacija, komparacija, apstrakcija, modeliranje i biomehanička analiza.

Ukupno u procesu istraživanja analizirano je više od 150 izvora informacija koje su u vezi sa upotrebom tehničkih uređaja u sistemu obuke sportista u borilačkim sportovima uključujući i mačevanje.

Poređenje je korišćen sa ciljem da se utvrdi postojanje ostalih analogijskih autorskih trening tehnologija koja imaju intelektualna prava na njih i da se međusobno uporede.

Apstrakcija i modeliranje su nam omogućili da izbjegnemo manje značajne antropometrijske modele vrhunskih mačevalaca. Ovaj autorski model napravljen

help of biomechanical analysis of competitive activity – 30 fights at level of European Championship and World Championship (60 sportsmen), that had place in main part of the competition.

RESULTS AND DISCUSSION

Theory and methods evolution of training in fencing led to significant changes in structure and content of technical and tactical training of qualified sportsmen in fencing and their realization in competitive activity.

So, Келлер (1983), Тышлер (2010a, 2010b), and other show that such changes in competitive activity like introduction of devices for touch registration, changes of size and requirements to equipment, greatly effect on demands of sportsmen training. Long-term development of world fencing led to significant changes in sportive practice and to regulation of fights, touched some components of specialized moves system of sportsmen.

By statements of specialists (Алексеенко, 1970; Бычков, 2006; Смирновський et al., 2013; Тышлер, 2010; Шевчук, 2007) in fencing is traced a clear orientation on training system that improves technical and tactical actions of sportsmen.

Note that in scientific literature are widely expressed modern trends and accents of technical and tactical training of sportsmen (Алексеенко, 1970; Мороз & Бусол, 2006; Семерьяк & Смирновський, 2013; Смирновський et al., 2013; Тышлер, 2010; Шевчук, 2007). Results of theoretical analysis of modern means and methods that are used for improvement technical skills of fencers allow us to affirm about existence of different approaches in this part of sportsmen training.

Herewith, existing approaches that are expressed in scientific fencing literature for example on such kind of weapon as foil and sabre can't be used in epee fencing. It is related to specific of rules in this kinds of weapon that is shown in: minimal restriction of valid target area, absence of priority, availability of double-touches, and significant difference of weapon weight.

In recent years improvement of technical and tactical training in epee fencing was detailed by Шевчук (2007). Author has proposed an approach with use of computer program. In form of this approach was predicted a development of automated system that analyzed competitive activity of sportsmen.

In epee fencing it is important to improve technical and tactical training system of sportsmen. It can be achieved by using of new effective technical and tactical improvement programs in long-term training.

je uz pomoć biomehaničke analize takmičarske aktivnosti - 30 borbi na nivou Evropskog i Svjetskog prvenstva (60 sportista) koji su se plasirali u glavni dio takmičenja.

REZULTATI I DISKUSIJA

Evolucija teorije i metodike treninga mačevanja dovela je do značajnih promjena u strukturi i sadržaju tehničke i taktičke obuke kvalitetnih mačevalaca i njihove realizacije u takmičarskim aktivnostima.

Tako, Келлер (1983), Тышлер (2010a, 2010b) i ostali pokazuju da takve promjene u takmičarskim aktivnostima, kao što je uvođenje uređaja osjetljivog na dodir, promjene veličine i zahtjeva opreme, imaju veliki uticaj na zahtjeve treninga sportista. Dugoročni razvoj svjetskog mačevanja doveo je do značajnih promjena u sportskoj praksi i na vođenje borbe dotičući i neke dijelove specifičnog sistema pokreta sportista.

Po izjavama stručnjaka (Алексеенко, 1970; Бычков, 2006; Смирновський i saradnici, 2013; Тышлер, 2010; Шевчук, 2007) u mačevanju postoji jasna orijentacija na sistem treninga koji poboljšava tehnička i taktička djelovanja sportista.

Treba imati na umu da su u naučnoj literaturi široko prisutni savremeni trendovi i pristupi tehničkoj i taktičkoj pripremi sportista (Алексеенко, 1970; Мороз & Бусол, 2006; Семерьяк & Смирновський, 2013; Смирновський i saradnici, 2013; Тышлер, 2010; Шевчук, 2007). Rezultati teoretske analize savremenih sredstava i metoda, koji se koriste za usavršavanje tehničkih vještina mačevalaca, omogućuju nam da potvrdimo postojanje različitih pristupa ovom aspektu treninga sportista.

Samim tim, postojeći pristupi koji su izneseni u naučnoj literaturi o mačevanju, na primjer o vrsti oružja kao što su floret i sablja, ne mogu se koristiti u disciplini sportski mač. To se odnosi na specifična pravila u ovim vrstama oružja koje se ogleda u: minimalnom ograničenju važećeg ciljanog područja, odsustvu prioriteta, mogućnosti duplog dodira i značajnoj razlici u težini oružja.

U poslednjih nekoliko godina Шевчук (2007) je detaljno prikazala trening usavršavanja tehnike i taktike mačevanja u disciplini sportski mač. Autor je predložio pristup uz upotrebu računarskog programa. Ovaj pristup predviđa razvoj automatizovanog sistema koji analizira takmičarsku aktivnost sportista.

U sportskoj disciplini mač vrlo je važno poboljšati tehničke i taktičke sistema obuke sportista. To se može postići korišćenjem novih efikasnih tehničkih i taktičkih programa dugoročnog usavršavanja.

U vezi s tim predstavljen je program tehničkog i

For your attention is presented a program of technical and tactical training of women epee fencers with use of means based on use of authorial training technology of technical and tactical training which received a patent in January 2013 (Figure 1).

Device can be used as separate training exercise or in complex of exercises for fencers in different kinds of weapon and in particular on epee.

taktičkog treninga mačevalki u disciplini sportki mač upotrebom sredstava koja se baziraju na korišćenju trenažne tehnologije za tehnički i taktički trening osmišljene od strane autora koja je patentirana u januaru 2013. godine (Slika 1).

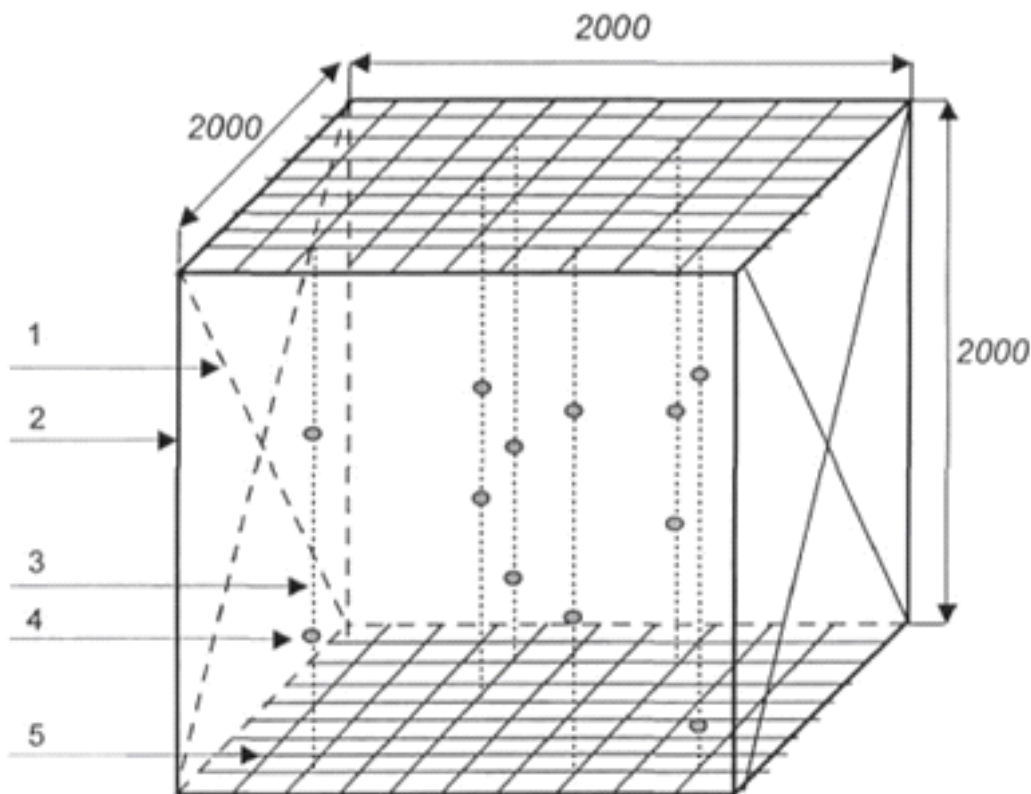
Tranažer se može koristiti zasebno ili u kompleksu vježbi za mačevalaca u različitim vrstama oružja, a posebnu u borbama sa sportskim mačem.

FIGURE 1

Authorial training technology of technical and tactical training of epee fencers (Ukraine Patent No. 76884, 2013).

SLIKA 1

Trening tehnologija autora za tehnički i taktički trening mačevalca u disciplini sportski mač (Ukraine Patent No. 76884, 2013).



Known at present methods of fencing training that provide causing touches in target areas of manequin that is situated in one position, in frontal plane (“Tysler simulator (TTD)”, “Favero Fencing Target” and other). But, this method doesn’t show opportunities in using variable options of competitive activity and anthropometric characteristics of the opponent (height, length and correlation of parts of the body).

In methods basics of technical and tactical training of fencers is set a task to increase quantitatively and qualitatively level of options for performing specialized moves with given algorithm of motor task

Poznato je da sadašnje metode treninga mačevanja dovode do dodira u ciljanim područjima lutke koja se nalazi u jednoj poziciji, frontalnoj ravni (“Tysler simulator - TTD”, “Favero Fencing Target” i drugi). Ali, taj metod ne pokazuje mogućnost korišćenja promenljivih situacija u takmičarskoj aktivnosti i antropometrijskih karakteristika protivnika (visina, dužina i korelacija dijelova tijela).

U metodama osnovne tehničke i taktičke obuke mačevalaca je postavljen zadatak kvantitativnog i kvalitativnog povećanja nivoa za obavljanje specijalizovanih kretnji koje su date algoritmom motornog

(Ukraine Patent No. 76884, 2013).

Introduced improvement method of complex technical and tactical training of fencers has a generalized structure of training means, analogical to already known exercises but they are different because it gives possibility to consider anthropometrical options of opponents in training and determine conditions of competitive activity.

Use of improvement methods for complex technical and tactical training provides disposition of simulator on fencing lane (3D-target) (Figure 1), that directly provides demonstration of objective conditions of performance that is solving a training task where for touch areas are used balloon targets that are located on vertical guides 1, 2, 3, 4, 5, that are installed in one-piece cube simulator, that models same options of competitive activity and anthropometric characteristics of opponents.

Fencer gets an algorithmic task from coach which is done for successively performing touches in different sections of simulator one by one (3D-target), that are located in accordance with anthropometric characteristics and style of simulated opponent.

As follows, introduced method of technical and tactical training of fencers allows considering anthropometric characteristics of opponents and letting training conditions closer to reality of competitive activity and improve the process of training. Our introduced program of technical and tactical means of training solve main tasks of skills improvement of women epee fencers (Figure 2).

Generalized structure of the program and some methods contains training exercises that are divided by difficulty and distance and their combination with use of training forms of competition exercise.

Reviewing the structure by content of methods we noted and divided them by difficulty on those that have 1 action, 2 actions or 3 actions. Analysis of scientific and methodological literature and experience of practice allowed including such valid target areas of opponent body with exercises that have 1 action: hand, forearm, shoulder, head, four sectors of trunk, hip, foot. They can be done from close, medium and long distance. The most popular target areas are sectors of trunk because its valid target area is the biggest.

With analysis of competitive activity of high qualified women epee fencers to exercises with 2 actions we include the most used combinations: hand–forearm, hand – shoulder, hand – hip, hand – trunk, hand – foot, hip – foot, trunk – foot.

In fencing practice also widely used are technical and tactical moves with 3 actions. This happens in case when opponent is at long distance. In our research

zadatka (Ukraine Patent No. 76884, 2013).

Predstavljeni metod poboljšanja složenog tehničkog i taktičkog treninga mačavalaca ima opšta načela sadržaja treninga, analogan sa već postojećim vježbama ali je različit zato što daje mogućnost da se uzmu u obzir antropometrijske karakteristike protivnika u treningu i određene uslove koje diktira takmičarska aktivnost.

Korišćenje metoda za poboljšanje složene tehničke i taktičke obuke pruža stimulator na liniji mačevaoca (3D-meta) (Slika 1), koji direktno pruža demonstraciju stvarnih uslova takmičenja koji rješava zadatke obuke gdje se za područja dodira koriste balon mete koje su locirane na vertikalnim vodičima 1, 2, 3, 4 i 5 koji su postavljeni u simulatoru izrađenom u jednom dijelu, koji je podešen da odgovara takmičarskim aktivnostima i antropometrijskim karakteristikama protivnika.

Mačevalac dobija algoritamske zadatke od trenera koji se izvršavaju sukcesivnim ubodima u različite dijelove simulatora jedan po jedan (3D meta), koje su postavljene u skladu sa antropometrijskim karakteristikama i stilom protivnika koji se oponaša.

Kao što je istaknuto, iznjeti metod tehničke i taktičke obuke mačvalaca omogućava da se u obzir uzmu antropometrijske karakteristike protivnika, da se trening približi realnim uslovima takmičenja i da se poboljša proces treninga. Predstavljeni program tehničkih i taktičkih sredstava treninga rješava glavni zadatak poboljšanja vještina mačevalki u disciplini sportski mač (Slika 2).

Opšta struktura programa i neke metode sadrže vježbe obuke koje su podjeljene po težini i udaljenosti i njihove kombinacije uz korišćenje takmičarske vrste treninga.

Razmatrajući strukturu sadržaja metoda naveli smo ih i podijelili po težini na one koje imaju jednu, dvije ili tri akcije. Analiza naučne i metodološke literature i iskustvo iz prakse omogućuju uključivanje tkavih opravdanih prostora koji se ciljaju na protivnikovom tijelu sa vježbama koje imaju jednu akciju: ruka, podlaktice, ramena, glava, četiri sektora trupa, kuk, stopalo. To se može uraditi sa bliskog i srednjeg odstojanja ili sa distance. Najpopularniji ciljani prostor je sektor trupa zato što je on i najveći ciljani prostor.

U analizi takmičarske aktivnosti vrhunskih mačevalki u disciplini sportski mač vježbe sa dvije akcije uključuju najčešće korišćene kombinacije: ruka - podlaktica, ruka - rame, ruka - kuk, ruka - tijelo, ruka - stopalo, kuk - stopalo, tijelo - stopalo.

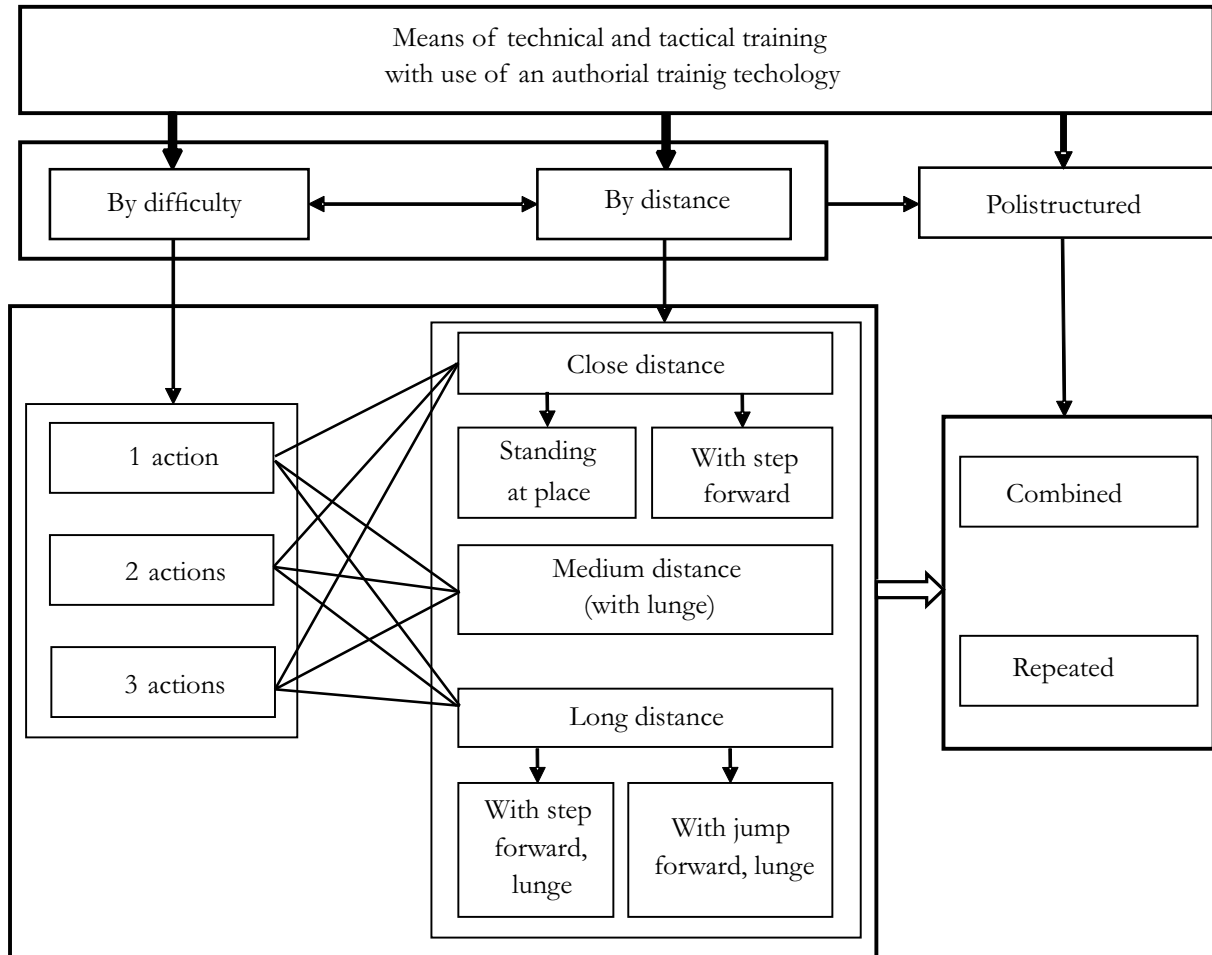
U praksi mačevanja takođe se često koriste i tehnički i taktički potezi sa tri akcije. To se dešava kada je

FIGURE 2

Means of technical and tactical training with use of an authorial training technology.

SLIKA 2

Sredstva tehničke i taktičke obuke uz korišćenje trenažne tehnologije autora..



Legend/Legenda: Means of technical and tactical training with use of an authorial training technology - Sredstva tehničke i taktičke obuke korišćenjem trening tehnologije autora; By difficulty - Po težini; By distance - Po udaljenosti; Action - Akcija; Close distance - Bliska distanca; Standing at place - Stojanje u mjestu; With step forward - Sa iskorakom jednom nogom; Medium distance (with lunge) - Srednja distanca (sa ubodom); Long distance - Velika distanca; With step forward, lunge - Sa iskorakom, ubod; Sa poskokom naprijed, ubod; Polistructured - Polistrukturalne; Combined - Kombinovane; Repeated - Ponavljajuće.

is introduced such options: hand – forearm – trunk, hand – trunk – hip, hand – foot – trunk, trunk – hip – trunk, hand – hip – foot, hand – forearm – shoulder, hip – shoulder – trunk, forearm – shoulder – trunk, forearm – trunk – hip. Mainly combinations with 3 actions are used by sportsmen of high qualification because they require wide set of fencing moves. Considering this appears a necessity of including exercises with use of 3 actions in training process, including improvement of technical and tactical training in epee fencing.

protivnik na velikoj udaljenosti. U našem istraživanju korištene su takve mogućnosti: ruka - podlaktica - trup, ruka - trup - kuk, ruka - stopalo - trup, trup - kuk - trup, ruka - kuk - stopalo, ruka - podlaktica - rame, kuk - rame - trup, podlaktica - rame - trup, polaktica - trup - kuk. Kombinacije sa tri akcije uglavnom koriste vrhunski sportisti jer one zahtijevaju širok set mačevalačkih kretnji. Obzirom na to, pojavljuje se neophodnost uključivanja u proces obuke vježbi uz korišćenje tri akcije uključujući i usavršavanje tehničke i taktičke obuke u mačevanju u disciplini sportski mač.

Other structural units of proposed methods are exercises that are performed from different distances: close, medium and long.

In epee fencing practice is shown that distance from what touches are made has a notable value with the look on its results, possibility of counter-attack moves. Close distance gives opportunities for simple attacks, parry and attacks on opponent's preparation (remise, straight arm). Except main moves medium and long distance allows to include also preparation moves (exploration, disguise, call, game of blades, imaginary attack, maneuvering). To main actions can be included attacks (main attack, repeated attack, attack in answer and attack on preparation), defenses (parry and circle parry), attacks from both fencers (double-attacks, counterattacks).

But technical and tactical moves that are done regardless from distance must predict its effective ending. This gives requirements to include distance feeling in improvement of technical and tactical training of sportsmen.

Important for training process and especially for technical and tactical training of women epee fencers is performance of polistructured moves. This is related with situations in competitive activity. In most situations there is a necessity of combining touches from different distances and in different target areas. And also sportsmen often try to hide their moves by tactic (Figure 3).

So, to totality of means we include group of polistructured exercises. It includes exercises of repeated character and combined exercises. In first case (repeated) exercises are characterized by two or more times performance from one distance. For example close distance – starting position, touch in to trunk, repeated touch in to trunk, or medium distance – touch into trunk with lunge, repeated touch into trunk with lunge. Also as an example of an exercise in this group can be performance from long distance – touch into trunk with step forward and lunge, repeated touch with step forward and lunge.

Combined exercise also includes more movement actions in conditions of solving technical and tactical task. But by its content they include different distance and different target areas. For example: standing at place with a touch into hand, two steps back, touch in foot with lunge or with step forward touch in trunk, three steps back, touch in foot with lunge. Also one of the options is a touch in hip, three steps back, touch with step forward and lunge in to trunk; touch with step forward in hand, two steps back, touch with lunge in shoulder.

Ostali strukturni dijelovi predložene metode su vježbe koje se izvode sa različitim udaljenosti: bliske, srednje i sa velike distance.

U praksi mačevanja u disciplini sportski mač pokazalo se da udaljenost sa koje se vrši ubod ima značajnu povezanost sa rezultatom posebno u kretanjama protivnapada. Blisko odstojanje daje priliku za jednostavan napad, pariranje i napad na protivnikovu pripremu (odustajanje, ispružena ruka). Osim glavnih pokreta srednja i velika distanca dozvoljavaju i pripremne kretnje (ispitivanje, prikrivanje, prozivanje, igra sječivima, zamišljeni napad, manevrisanje). Glavna akcija može da uključuje napade (glavni napad, ponovljeni napad, napad kao odgovor i napad na pripremu), odbranu (pariranje i pariranje u krug) i napad oboje mačevalaca (dupli napad, protivnapad).

Tehničke i taktičke kretnje koje se izvode, bez obzira na udaljenost, moraju uključivati i njen efikasan završetak. Sve to zahtijeva da se osjećaj distance uključi u usavršavanje tehničke i taktičke obuke sportista.

U procesu treninga, posebno kod mačevalki u disciplini sportski mač, važna je vještina polistrukturalnih kretnji. One su u vezi sa situacijama u takmičarskim aktivnostima. U većini situacija postoji neophodnost kombinovanja uboda sa različitim udaljenosti i u različite ciljane prostore. Pored toga sportisti često pokušavaju da prikriju svoje taktičke namjere (Slika 3).

Dakle, na sveukupna sredstva treninga uključena je grupa polistrukturalnih vježbi. To obuhvata vježbe ponavljanja i kombinovane vježbe. U prvom slučaju (ponovljene) vježbe karakteriše dvije ili više vještina sa iste distance. Na primjer, blisko odstojanje - početna pozicija, ubod u trup, ponovljeni ubod u trup, ili srednja distanca - ubod u trup sa bacanjem, ponovljeni ubod u trup sa bacanjem. Takođe, kao primjer vježbe iz ovog seta može biti vještina sa velike distance - ubod u trup sa iskorakom naprijed i bacanjem, ponovljeno ubod u trup iskorakom sa bacanjem.

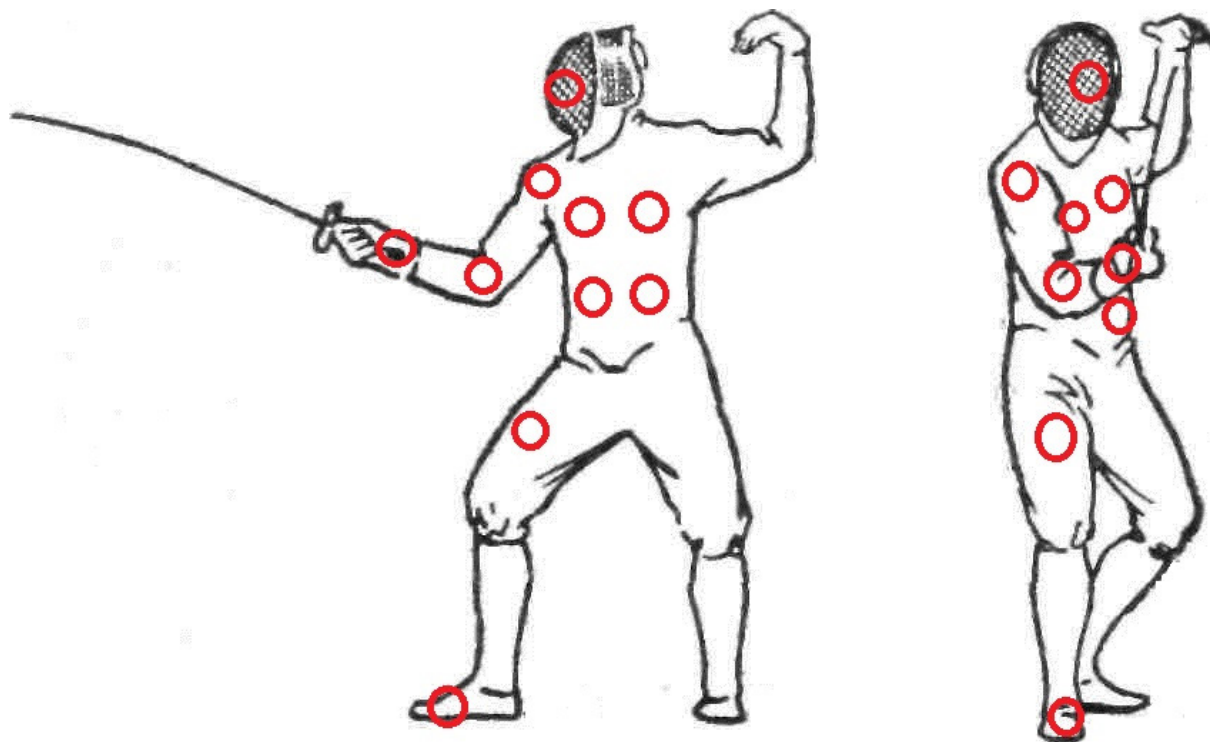
Kombinovane vježbe takođe uključuju više pokreta u akciji u uslovima rješavanja tehničkih i taktičkih ciljeva. Ali po svom sadržaju obuhvataju različite distance i različite ciljane prostore. Na primjer, stajanje u mjestu sa ubodom u ruku, dva koraka nazad, ubod u stopalo sa bacanjem ili sa iskorakom ubod u tijelo, tri koraka nazad, ubod u nogu sa bacanjem. Takođe jedna od mogućnosti je ubod u kuk, tri koraka nazad, ubod u trup sa iskorakom i bacanjem; ubod sa iskorakom naprijed u ruku, dva koraka nazad, ubod u rame sa bacanjem.

FIGURE 3

Main valid target areas on opponent body in epee fencing.

SLIKA 3

Glavni opravdani ciljani prostori na protivnikovom tijelu u mačevanju u disciplini sportski mač.



CONCLUSION

Need of improvement of technical and tactical training of fencers must be solved at all stages of long-term training process of sportsmen by improving such options of training like increasing quantitatively and qualitatively of technical and tactical actions realization, increase of efficiency of specialized moves with given algorithm of movement task, realization of sportsmen skills in competitive activity.

Improvement program of technical and tactical training of women epee fencers with use of an authorial training technology includes system of training means that include means divided by difficulty (one action, two action and three action), by distance (close, medium and long) and polistructured (combined and repeated).

Possibilities of further research predict to justify options of dosage to introduced means of improvement technical and tactical training of women epee fencers with use of an authorial training technology.

ACKNOWLEDGEMENTS

This research is performed according to topic 2.9. "Individualization of training process of qualified

ZAKLJUČAK

Potreba za usavršavanjem tehničke i taktičke obuke mačevalaca mora da se rješava u svim fazama dugoročnog procesa treninga sportista poboljšavanjem onih mogućnosti treninga kao što su povećanje kvantiteta i kvaliteta realizacije tehničkih i taktičkih akcija, povećanje efikasnosti specijalizovanih kretnji na zadani algoritam kretnih zadataka, realizovanje sportske vještine u takmičarskim aktivnostima.

Unapređenje programa tehničke i taktičke obuke mačevalki u disciplini sportski mač sa upotrebom trenazne tehnologije autora obuhvata sistem obuke sredstava koje uključuju sredstva podeljena po težini (jedna akcija, dvije akcije i tri akcije), po udaljenosti (blisko, srednje i distanca) i polistrukturi (kombinovano i ponavljjuće).

Mogućnosti daljeg istraživanja je da obrazloži mogućnosti doziranja izloženih sredstava u usavršavanju tehničke i taktičke obuke mačevalki u disciplini sportski mač korišćenjem trenazne tehnologije autora.

ZAHVALNOST

Ovo istraživanje se sprovodi u skladu sa temom 2.9 "Individualizacija procesa treninga kvalitetnih

combat sport sportsmen” of Consolidates plan of scientific research work in field of physical culture and sport for period 2011-2015.

sportista u borilačkim sportovima” Konsolidovanog plana naučno-istraživačkog rada u oblasti fizičke kulture i sporta od 2011. do 2015. godine.

REFERENCES

- Алексеевко, В. А. (1970). *Исследования двигательных реакций у фехтовальщиков в процессе тренировки и обоснование подбора специальных упражнений для контроля за их совершенствованием* [Research of moving reactions of fencers in training process and justification of selection of special exercises for control on its improvement]. Unpublished doctoral dissertation, GCOLIFK, Moscow.
- Бакум, А. В. (2011). *Современные тенденции технической подготовки фехтовальщиков* [Modern trends of technical training of fencers]. Kharkiv, UA: Pedagogical, psychological and medicobiological problems of ph. cult. and sport.
- Бріскін, Ю., Пітин, М., & Семеряк, З. (2013). *Ukraine Patent No. 76884*. Kiev, UA: Ukraine Patent Office.
- Бычков, Ю. М. (2006). *Тренер в уроке фехтования: монограмма* [Coach in fencing lessons: monogram]. Moscow, RU: Phys. culture.
- Кабанова, И. А. (2007). *Уровни взаимосвязей объемов и результативности атак и контратак с показателями двигательных качеств и длины тела* [Connection levels of extent and effectiveness of attacks and counterattacks depending on movement qualities and body length]. St. Petersburg, RU: Theory and practice of physical culture.
- Келлер, В. С. (1983). *Теоретические основы спортивной тактики* [Theoretical basics of sport tactics]. Moscow, RU: Fencing: collection of articles.
- Мороз, О., & Бусол В. (2006). *Залежність стилю змагальної діяльності фехтувальників-шпажистів від особливостей темпераменту*. [Style dependence of competitive activity of epee fencers depending on characteristics of temperament]. *Young Sport Science of Ukraine: col. of scientific works in ph. cul.*, 274–280.
- Рыжкова, А. Г. (2011). *Тактическая информация о намерениях на применение разновидностей действий в фехтовальном бою* [Tactical information about use of different movements during fencing match]. *Scientific articles*, 173-178.
- Роцін, І. Г. (2008). *Оптимізація техніко-тактичної підготовки фехтувальників-шаблістів на етапі спеціалізованої базової підготовки* [Optimization of technical and tactical training of sabre fencers on level of specialized basic training]. Unpublished doctoral dissertation, University of Lviv.
- Семеряк З. С., & Смирновський, С. Б. (2013). *Техніко-тактична підготовка фехтувальників на шпагах: стан та перспективи досліджень*. [Technical and tactical training of epee fencers: condition and possibilities of research]. *Young Sport Science of Ukraine: col. of scientific works in ph. cul.*, 239–244.
- Смирновський, С., Семеряк, З., & Бріскін Ю. (2013). *Актуальні питання техніко-тактичної підготовки фехтувальників*. [Current questions of technical and tactical training of fencers]. *IV Inter. electronic. scien.-practical conf.* (pp. 35–37). Odessa, UA.
- Шевчук, Е. Н. (2007). *Состояние проблемы технико-тактической подготовки квалифицированных фехтовальщиков*. [Problem status of technical and tactical training of qualified fencers]. *XI Inter. scien.congress “Modern Olympic sport and sport for all”* (pp. 56–59). Minsk, BY.
- Шевчук, Е. Н. (2009). *Компьютерная программа “Анализ и моделирование соревновательной деятельности фехтовальщиков” как средство и метод подготовки к соревнованиям* [Computer program “Analysis and modelation of modern fencing activity” like a mean and method of preparation to competition”]. *Messages of Chernigiv national university*, 311–315.
13. Тышлер Д.А. (2010) *Тышлер Д.А.. Фехтование. Начальное обучение. Техничко-тактичские приоритеты. Методики и упражнения: методическое пособие*. [Fencing. Beginning of training Technical and tactical priorities. Methods and exercises: methodological manual] - Moscow – P. 100–128.
- Войтов, В. Г. (1984). *Методика технико-тактической подготовки на этапе углубленной специализации в фехтовании на саблях* [Methodology of technical and tactical training on level deep specialization in sabre fencing]. Unpublished doctoral dissertation, Moscow.
- Тышлер, Д. А. (2010) *Фехтование. Техничко-тактическая и функциональная тренировка: Метод. пособие* [Fencing. Technical, tactical and functional training: Method. manual]. Moscow.

Received: September 19, 2013
Revision received: November 11, 2013
Accepted: December 18, 2013

Primljeno: 19. septembra 2013. godine
Izmjene primljene: 11. novembra 2013. godine
Odobreno: 18. decembra 2013. godine

Correspondence to:
Maryan Pityn, PhD
Lviv State University of Physical Culture
Department of theoretical and methodological
foundations of sport
Kostyushka str. 11
Lviv, zip code 79000
Ukraine
Phone: 003809 68 79 88 58
E-mail: pityn7@gmail.com

Korespondencija:
Dr Maryan Pityn
Lviv State University of Physical Culture
Department of theoretical and methodological
foundations of sport
Kostyushka str. 11
Lviv, zip code 79000
Ukraina
Telefon: 003809 68 79 88 58
E-mail: pityn7@gmail.com

ТЕХНОЛОГІЯ ВИКОРИСТАННЯ АВТОРСЬКОГО ПРИСТРІЮ У ТЕХНІКО-ТАКТИЧНІЙ ПІДГОТОВЦІ ФЕХТУВАЛЬНИЦЬ-ШПАЖИСТОК

Зоряна Семеряк¹, Юрій Бріскін¹, Марян Пітин¹, і Олександр Ваулін¹

¹Львівський державний університет фізичної культури

Постановка проблеми. Фехтування відноситься до групи одноборств із варіативними умовами змагальної діяльності, що визначає пріоритет у структурі підготовленості спортсменів можливостей до ефективної реалізації арсеналу техніко-тактичної дій. Це формує актуальне науково-практичне завдання урахування структури та змісту змагальної діяльності сучасного фехтування.

Мета дослідження: обґрунтувати засоби техніко-тактичної підготовки фехтувальниць-шпажисток із використанням авторського тренажерного пристрою.

Результати дослідження. У науково-методичній літературі широко висвітлено сучасні тенденції та акценти техніко-тактичної підготовки фехтувальників. Результати теоретичного аналізу сучасних засобів і методів, що використовуються для вдосконалення спортивно-технічної майстерності фехтувальників дозволяють стверджувати про існування різних підходів у цьому розділі системи підготовки фехтувальників.

Актуалізацію техніко-тактичної підготовки спортсменів у фехтуванні на шпагах вбачаємо в обґрунтуванні ефективності нових програм удосконалення техніко-тактичної підготовки фехтувальників на шпагах на різних етапах багаторічної підготовки.

Розроблено авторський пристрій техніко-тактичної підготовки на який отримано патент (січень 2013 року) та на його основі створено програму удосконалення техніко-тактично підготовленості фехтувальниць-шпажисток з використанням. Вона включає систему засобів тренування, що розподілені за складністю (на одну, дві та три дії), за дистанцією (ближня, середня та дальня) та їх поєднанні – комплексні (комбіновані та повторні). Пристрій може використовуватись як окрема тренувальна вправа або у комплексі вправ для спортсменів-фехтувальників у різних видах зброї та зокрема шпазі.

Ключове слово: фехтування, спосіб, поліпшення, техніка, тактика

GUIDELINES FOR AUTHORS

Journal intention

SportLogia journal covers the areas of sports and physical education. It is issued twice a year and publishes original scientific papers, reviewed scientific papers, scientific gathering presentations, short scientific articles and professional articles from the area of sports, physical education, recreation, kinesiology anthropology, training methods, sport biology and exercise, sport medicine, biomechanics, sport history and sport management as well as contributions from other sciences (medicine, sociology, psychology, philosophy, exact sciences and mathematics) applied in sports.

General remarks on papers

All manuscripts are submitted to the journal's editors, who, after reading the manuscripts, decide about the further procedure: (1) the manuscript is immediately sent for review; (2) if there are any objections and suggestions, the manuscript is sent back to the author for corrections; (3) rejection of the manuscript. The editor may decline the manuscript in the following cases: (1) the topic of the manuscript is not relevant; (2) a manuscript with a similar topic has already been published in the journal; (3) the manuscript does not conform to the standards of the journal. If the manuscript is not accepted, a short notice is sent to the author, but the manuscript is not sent back. The process of preliminary evaluation lasts up to 4 weeks.

If the author has corrected the text in accordance with the instructions from the editor, the manuscript is sent for review. In that case, the author will be given a form called *Copyrights Declaration*, which needs to be filled in and sent back to the editor. The signature of the author verifies the authenticity of the text, authorship and acceptance of the review procedure.

All articles must be reviewed. There will be two reviewers from the relevant scientific area for each article, and both reviews will be anonymous. The author's name will be unknown to the reviewers (double blind review). If a reviewer finds the article noncompliant with the criteria of the journal, the editorial will not accept the article. The review process lasts 8 to 12 weeks. If, on the other hand, the reviewers find the article acceptable, it will be put in one of the following categories:

- *Original scientific paper* is a first publication of original research results in a form that the research can be repeated, and the asserted facts verified. It is organized in accordance with the IMRAD

UPUTSTVO AUTORIMA

Namjera časopisa

Časopis SportLogia iz oblasti sporta i fizičkog vaspitanja izdaje se dva puta godišnje i objavljuje izvorne naučne članke, pregledne naučne članke, kratke naučne članke, izlaganje sa naučnog skupa i stručne članke iz područja sporta i sportskih aktivnosti, fizičkog vaspitanja, rekreacije, kineziološke antropologije, trening metoda, biologije sporta i vježbanja, sportske medicine, biomehanike, istorije sporta i menadžmenta u sportu kao i priloge iz drugih nauka (medicine, sociologije, psihologije, filozofije, prirodnih nauka i matematike) primjenjenih na sport.

Opšte odredbe o priložima

Svi rukopisi dostavljaju se uredništvu časopisa koji, nakon što ih pročita, određuje dalji postupak: (1) odmah šalje rukopis na recenziju; (2) ako ima određenih primjedbi i sugestija, rukopis vraća autoru na doradu; (3) odbija rukopis. Urednik može da odbije rukopis u sledećim slučajevima: (1) tema koju obrađuje rukopis nije relevantna; (2) rukopis sa sličnom temom već je objavljen u časopisu; (3) rukopis ne ispunjava standarde časopisa. Ukoliko rukopis nije prihvaćen, autoru se šalje kratko obavještenje, ali rukopis se ne vraća. Proces preliminarne evaluacije traje do 4 sedmice.

Ukoliko je autor usvojio primjedbu urednika i preradio tekst u skladu sa sugestijama, rukopisi se šalju na recenziju. U tom slučaju autoru se šalje formular *Izjava o autorskim pravima*, koju treba ispuniti, potpisati i vratiti uredniku. Svojim potpisom autor potvrđuje izvornost članka, svoje autorstvo i prihvatanje recenzentskog postupka.

Svi članci obavezno podliježu recenziji. Za svaki članak predviđena su dva recenzenta iz relevantne naučne oblasti i oba su anonimna (Imena autora takođe su i za recenzente anonimna (double blind recension). Ukoliko članak, prema mišljenju recenzenta, ne zadovoljava kriterije časopisa, uredništvo članak ne prihvata. Postupak recenzije traje 8 do 12 sedmica. Ukoliko pak recenzenti pozitivno ocjene članak, svrstavaju ga u jednu od kategorija:

- *Izvorni naučni članak* predstavlja prvu objavu originalnih istraživačkih rezultata u takvom obliku da istraživanje može da se ponovi, a utvrđene činjenice da se provjere. Organizovan je po šemi IMRAD za eksperimentalna istraživanja

scheme for experimental research or in a descriptive way for descriptive science areas.

- *Scientific work review* is a review of papers on a specific topic, works of an individual researcher or a group of researchers whose aim is to summarize, analyze, evaluate or synthesize already published information. It brings new syntheses which also include results of author's own research.
- *Short scientific article* is an original scientific article which may skip some elements of IMRAD. It concisely presents results of a completed own research or of an ongoing research.
- *Scientific gathering presentation* is a comprehensive article that has previously been briefed to a scientific gathering, but it has not been published in its comprehensive form in the Paper Collection Book of the gathering.
- *Professional article* is a review of something that is already known, with an emphasis on the usability of the results of the original research and the spread of knowledge. The complexity of the text is adjusted to the needs of the professional and scientific aspects of the journal.

After reviews have been done, the editorial board will analyze them. If needed, the paper is sent back to the author who must comply with the suggestions and objections made by the reviewers. Once they have redone the paper, the authors need to specifically describe, on a *separate sheet of paper*, how they have resolved the reviewer's suggestions.

Only those papers that have been placed in one of the categories and which have *two positive reviews will be published*.

Text style and organization

Scientific articles must adhere to the IMRAD scheme (Introduction, Methods, Results and Discussion).

Title

The title page of the manuscript should contain the following information: (1) a concise, but informative title. Use of abbreviations is not encouraged; (2) the author's names (do not include degrees); the last one is introduced by "&"; (3) the affiliation of the authors, town and state; (4) the name and address of the corresponding author (must include title, degree and position of the corresponding author, phone and fax numbers – zip code for the country and city, and email address).

Summary, large summary and key words

The summary should be brief and Self-explanatory. It should cover a general presentation of the topic (the

ili na deskriptivan način za deskriptivna naučna područja.

- *Pregledni naučni članak* predstavlja pregled najnovijih radova o određenom predmetnom području, radova pojedinog istraživača ili grupe istraživača sa ciljem da se već publikovane informacije sažmu, analiziraju, evaluiraju ili sintetizuju. Donose nove sinteze koje, takođe, uključuju i rezultate sopstvenog istraživanja autora.
- *Kratki naučni članak* predstavlja izvorni naučni članak kod kojih neki elementi šeme IMRAD mogu da budu ispušteni. Ukratko sažima rezultate završenog izvornog istraživačkog rada ili rada koje je još u toku.
- *Izlaganje sa naučnog skupa* predstavlja cjelovit članak koji je prethodno referisan na načnom skupu, ali u obliku cjelovitog članka nije objavljen u zborniku naučnog skupa.
- *Stručni članak* predstavlja prikaz već poznatog, s naglaskom na upotrebljivost rezultata izvornih istraživanja i širenja znanja, a zahtijevnost teksta prilagođena je potrebama stručnosti i naučnosti časopisa.

Nakon primljenih recenzija uredništvo ih analizira. Ukoliko je to potrebno, rad se vraća autoru koji je dužan uvažiti sugestije i primjedbe recenzenata. Kada preradi svoj rad autor-i treba da, na *posebnom listu papira*, konkretno navedete kako su razriješili sugestije vezane za recenziju.

Objavljuju se samo radovi koji su svrstani u jednu od kategorija i koji *imaju dvije pozitivne recenzije*.

Stil i organizacija teksta

Naučni članci se organizuju po šemi IMRAD (Introduction, Methods, Results, i Discussion).

Naslov rada

Naslov rada treba da sadrži sledeće informacije: (1) kratak ali informativan naslov u kome se ne preporučuje korišćenje skraćenica; (2) ime autora bez titule gdje se ispred poslednjeg autora stavlja "i"; (3) institucija u kojoj autor-i radi, grad i država; (4) ime i adresa autora predviđenog za korespondenciju (naučno zvanje, položaj, broj telefona i faksa, poštanski broj grada, državu i e-mail adresu).

Sažetak, veliki sažetak i ključne riječi

Sažetak treba da bude kratak i razumljiv sam po sebi. U sažetku se ne treba pozivati na tekst članka.

purpose and the objective of the paper), results and conclusions. Authors should not use abbreviations. The abstract should include 150-250 words. Authors from abroad write the large summary in their native language (the summary has to be reviewed), and the authors whose native language is BCS write the mentioned summary in one of the official languages of the IOC Assembly (article 27 of Olympic Charter), except English. The translation should be made by relevant person.

Large summary should not exceed 1800 characters (up to three pages of double spaced text), and should include title, keywords and summary text.

Three to six words, which are not part of the title, need to be singled out. The Key words need to reflect the contents of the paper.

Introduction

This part of the paper ought to inform the reader of the issues dealt with in the research and the results of previous analyses. The purpose of the research should also be clearly stated in this part.

Methods

This part should consist of the following subtitles: entity sample, variables, procedures, tastings, statistical analysis.

Units of measurement, symbols and abbreviations must conform to international standards. Measurements of length, height, weight and volume should be given in metric units (meter, kilogram, liter).

Results

The results should be presented as tables, graphs and pictures, possibly processed statistically and be concisely presented in the text.

Tables, graphs and pictures showing the results of individual analyses need to be indicated in the text for easier reader navigation.

Discussion

The authors are expected here to comment on the results and compare them with literature data. The discussion must be professional and correspond to experimental data. Practical implications are welcome.

Conclusion

Contains clearly stated scientific assertions, open issues and recommendations for further research.

Tables, graphs and pictures

Each table and any illustration (black and white only) must be submitted on a separate sheet of paper. Tables should be numbered in the order in which they

Treba da obuhvati opšti prikaz teme (predmet i cilj rada), rezultate i zaključak. Autori ne bi trebali da tom prilikom koriste skraćenice. Sažetak treba da sadrži 150-250 riječi.

Velik sažetak ne smije da pređe 1800 karaktera (do tri stranice u duplom proredu), i treba da sadrži naslov rada, ključne riječi i tekst sažetka. Autori iz inostranstva veliki sažetak pišu na maternjem jeziku (sažetak mora da bude lektorisan), a autori kojima je maternji jezik BHS ovaj sažetak pišu na jednom od jezika Međunarodnog olimpijskog komiteta, naravno osim engleskog, na koje se simultano prevodi na svim Skupštinama MOK-a (član 27 Olimpijske povelje). Prevođenje mora da uradi stručna osoba.

Potrebno je izdvojiti i dati tri do šest ključnih riječi koje se ne nalaze u naslovu. Ključne riječi moraju da odražavaju suštinu sadržaja rada.

Uvod

Ovaj dio rada treba da informiše čitaoca o problemima datog istraživanja i rezultatima prethodnih analiza. Cilj istraživanja takođe treba jasno navesti u ovom dijelu.

Metode

Ovaj dio treba da se sastoji od sledećih podnaslova: uzorak entiteta, varijable, procedure testiranja, statistička analiza.

Mjerne jedinice, simboli i skraćenice moraju da poštuju međunarodne standarde. Mjere dužine, visine, težine i zapremine moraju da budu u metričkim jedinicama (metar, kilogram, litar).

Rezultati

Rezultati bi trebalo da budu predstavljeni kroz, tabelle, grafikone i slike, statistički obrađene i koncizno interpretirane.

Tabele, grafikoni i slike koje pokazuju rezultate pojedinih analiza trebaju da budu naznačene u tekstu kako bi se pažnja čitaoca skrenula na njih.

Diskusija

Od autora se očekuje da iznesu dokaze istraživanja i da ih uporede sa dosada objavljenim istraživanjima u toj oblasti. Diskusija mora da bude stručna i u skladu sa podacima eksperimenta. Poželjno je da diskusija obuhvati i praktične implikacije rada.

Zaključak

Sadrži jasno izrečene naučne tvrdnje, otvorena pitanja i preporuke za daljnja istraživanja.

Tabele, grafikoni i slike

Svaka tabela, grafikon i slika (samo u crno bijeloj tehnici) treba da bude dostavljena na posebnom listu papira. Tabele treba da budu numerisane po redosli-

occur in the text and referred to as, for example, "Table 1". Each table should be accompanied by a short title. Tables should be accompanied with interpretations (legends). It will also be deemed informative if the tables include indications of important correlations and relevant variables. Tables should be submitted separately

Illustrations, graphs and pictures shall be marked as "Figure 1". Photographs are sent in electronic form in a resolution not smaller than 300 dpi and in a .tif (figures) and .eps (graphics) format. Each figure needs to have a short title. In case that the figures are taken over from another paper, the title should not include the original name. In such a case, the source where the picture was taken from should be indicated under the picture.

If tables, graphs and pictures contain special symbols, or are prepared in a special program, they must be submitted in a separate file, with clearly indicated order of their inclusion in the text.

Article technical form

Articles are written and published in Latin alphabet, and, when needed, in other alphabets, in the Serbian language (ijekavica dialect) and the English language. Any deviation from this, needs to be agreed with the editorial board in advance. If author's native language is not Serbian, Croatian or Bosnian their papers will be translated by editorial board. When translating the paper authors are suggested to engage someone whose native language is English.

Texts are to be written in Microsoft Word Windows program, on A4 paper format. Text is to be written in the Times New Roman font, size 12 pt in 1.5 spacing, aligned on both sides, with a 1 tub denting of the first row of a paragraph, with 2.5 cm paper margins. If it is necessary to indicate a word or a sentence in the text, use the italic. Text size should conform to 15 pages. The editorial board may accept a bit longer papers, but it will seldom do so.

Articles and abstracts should be written in the third person, neutrally, adhering to a good style and defined linguistic norms.

Refereneces

The journal uses the Harvard reference system - APA standards for referencing literature.

Sending papers

The manuscripts are received directly through logging on our web page <http://www.sportlogia.com>. In case you need any additional information please be kind to contact us on e-mail address kri.pan@hotmail.com.

jedu kojim se pojavljuju u tekstu i označena kao npr. "Tabela 1". Svaka tabela treba da ima kratak naslov. Potrebno je dodati legende za tabele. Takođe bilo bi informativno ako bi se u tabelama naznačile značajnije korelacije i značajnije varijable. Tabele treba posebno priložiti.

Ilustracije, grafikoni i slike obilježavaju se sa "Slika 1". Fotografije se šalju u elektronskoj formi u rezuliciji najmanje 300 dpi i formatu .tif (slike) i .eps (grafike). Svaka slika treba da ima kratak naslov. U slučaju da su slike preuzete iz nekog drugog rada, u naslovu ne bi trebalo da se nalazi originalni naziv. U takvom slučaju potrebno je da se ispod slike nalazi Izvor odakle je slika preuzeta.

Ukoliko tabele, grafikoni i slike sadrže posebne znakove, te su rađeni u posebnom programu, dostavljaju se na posebnom fajlu, sa tačno navedenim rasporedom po kojem se uključuju u tekst.

Tehničko oblikovanje članka

Članci se pišu i štampaju latiničnim pismom, po potrebi i drugim pismima, na srpskom (ijekavica) i engleskom jeziku. Svako odstupanje od navedenog, treba posebno unaprijed dogovoriti s Uredništvom. Ako se radi o autorima kojima maternji jezik nije srpski, hrvatski ili bošnjački njihove radove na srpski prevodi uredništvo. Autori su dužni da prilikom prevođenja rada na engleski jezik angažuju stručne osobe, najbolje one kojima je maternji jezik engleski.

Tekstovi se pišu u Microsoft Word Windows programu, na papiru A4 formata. Tekst se piše u Times New Roman fontu, veličine 12 pt u proredu 1,5, poravnat sa obje strane, sa uvlačenjem prvog reda pasusa od 1 tab, sa marginama papira 2,5 cm. Ukoliko je u tekstu potrebno posebno označiti neku riječ ili rečenicu, koriste se kosa slova (italik). Obim teksta treba da sadrži do 15 strana. Uredništvo može prihvatiti i malo duže radove ali će to činiti rijetko.

Članke i sažetke treba pisati u trećem licu, neutralno, pridržavajući se dobrog stila i utvrđenih jezičkih normi.

Literatura

Časopis koristi Harvard reference system APA standard kod navođenja literture.

Slanje radova

Radovi se šalju putem direktnog logovanja na web stranici časopisa <http://www.sportlogia.com>. U slučaju da trebate dodatne informacije molimo vas da se obratite na e-mail adresu kri.pan@hotmail.com.

BIBLIOGRAFIJA ČLANAKA (2012) BIBLIOGRAPHY OF ARTICLES

- ARAZI, Hamid
A comparasion of nutritional knowledge and food habits of collegiate and non-collegiate athletes / Hamid Arazi, Rastegar Hosseini. - . - Način dostupa (URL): <http://dx.doi.org/10.550/sgia.120802.en.100A>
U: SportLogija [Štampano izd.]. - ISSN 1986-6089.. - God. 8, br. 2 (2012), str. 100-107.
796.015.132:613
COBISS.BH-ID 3467032 1
- ARAZI, Hamid
Poređenje znanja i navika o ishrani između studenata i nestudenata sportista / Hamid Arazi, Rastegar Hosseini. - . - Način dostupa (URL): <http://dx.doi.org/10.5550/sgia.120802.se.096A>
U: SportLogija [Štampano izd.]. - ISSN 1986-6089.. - God. 8, br. 2 (2012), str.96-102.
796.015.132:613
COBISS.BH-ID 3463192 2
- ZAMBOVA, Denisa
Efficiency shooting program for youth basketball players / Denisa Zambova, Eubor Tománek. - . - Način dostupa (URL): <http://dx.doi.org/10.5550/sgia.120801.en.087Z>
U: SportLogija [Štampano izd.]. - ISSN 1986-6089.. - God. 8, br. 1 (2012), str.87-92.
796.323.2.012.1/.2
COBISS.BH-ID: 2933784 3
- ZAMBOVA, Denisa
Program efikasnog šutiranja za mlade košarkaše/ Denisa Zambova, Eubor Tománek. - . - Način dostupa (URL): <http://dx.doi.org/10.5550/sgia.120801.se.083Z>
U: SportLogija [Štampano izd.]. - ISSN 1986-6089.. - God. 8, br. 1 (2012), str.83-88.
796.323.2.012.1/.2
COBISS.BH-ID: 2931224 4
- KARALIĆ, Tamara
Struktura izolovanih faktora preciznosti kod odbojkaša / Tamara Karalić, Nenad Marelić, Aleksandra Vujmilović. - Način dostupa (URL): <http://dx.doi.org/10.5550/sgia.120801.se.065K>
U: SportLogija [Štampano izd.]. - ISSN 1986-6089.. - God. 8, br. 1 (2012), str. 65-73.
796.325
COBISS.BH-ID: 2932760 5
- KARALIĆ, Tamara
Structure of isolated precision factors of the male volleyball players/ Tamara Karalić, Nenad Marelić, Aleksandra Vujmilović. - Način dostupa (URL): <http://dx.doi.org/10.5550/sgia.120801.en.069K>
U: SportLogija [Štampano izd.]. - ISSN 1986-6089.. - God. 8, br. 1 (2012), str. 69-77.
796.325
COBISS.BH-ID 2936344 6
- KASUM, Goran
Descriptive profile of body structure of top greco-roman style wrestrels defined with method multichannel bioelectric impedance / Goran Kasum, Milivoj Dopsaj. - Način dostupa (URL): <http://dx.doi.org/10.5550/sgia.120802.en.123K>
U: SportLogija [Štampano izd.]. - ISSN 1986-6089.. - God. 8, br. 2 (2012), str. 123-131.
796.819
COBISS.BH-ID 3468056 7
- KASUM, Goran
Deskriptivni profil tjelesne strukture vrhunskih rvača grčko-rimskog stila definisan metodom multikanalne bioelektrične impedance / Goran Kasum, Milivoj Dopsaj. - Način dostupa (URL): <http://dx.doi.org/10.5550/sgia.120802.se.118K>
U: SportLogija [Štampano izd.]. - ISSN 1986-6089.. - God. 8, br. 2 (2012), str. 118-126.
796.819
COBISS.BH-ID 3465496 12
- COBISS.BH-ID 3464216 8
- KOPRIVICA, Vladimir
Block-periodization – a breakthrough or misconception / Vladimir Koprivica. - . - Način dostupa (URL): <http://dx.doi.org/10.5550/sgia.120802.en.093K>
U: SportLogija [Štampano izd.]. - ISSN 1986-6089. - God. 8, br. 2 (2012), str.93-99.
796.011.3
COBISS.BH-ID 3466776 9
- KOPRIVICA, Vladimir
Blok periodizacija : prekretnica ili zabluda u sportskom treningu / Vladimir Koprivica. - . - Način dostupa (URL): <http://dx.doi.org/10.5550/sgia.120802.se.089K>
U: SportLogija [Štampano izd.]. - ISSN 1986-6089. - God. 8, br. 2 (2012), str.89-95.
796.011.3
COBISS.BH-ID 3462936 10
- KOSTOVSKI, Žarko
Validity, reliability and sensitivy of the test stroke with leg mae gery / Žarko Kostovski, Marko Zeljković, Lulzim Ibri, Elena Soklevska, Boško Zaborski. - . - Način dostupa (URL): <http://dx.doi.org/10.5550/sgia.120802.en.157C>
U: SportLogija [Štampano izd.]. - ISSN 1986-6089. - God. 8, br. 2 (2012), str.157-161.
796.853
COBISS.BH-ID 3469336 11
- KOSTOVSKI, Žarko
Valjanost, pouzdanost i osjetljivost testa udarac nogom-MAE GERI / Žarko Kostovski, Marko Zeljković, Lulzim Ibri, Elena Soklevska, Boško Zaborski. - . - Način dostupa (URL): <http://dx.doi.org/10.5550/sgia.120802.se.150K>
U: SportLogija [Štampano izd.]. - ISSN 1986-6089. - God. 8, br. 2 (2012), str.150-154.
796.853
COBISS.BH-ID 3465496 12

- MILANOVIĆ, Zoran
Promjene fizičkog fitnesa muškaraca starijih od 60 godina - pilot studija / Zoran Milanović, Saša Pantelić, Bojan Jorgić. - . - Način dostupa(URL): <http://dx.doi.org/10.5550/sgia.120801.se.039M>
U: SportLogija [Štampano izd.]. - ISSN 1986-6089. - God. 8, br. 1 (2012), str.39-45.
796.012.1-055.1
COBISS.BH-ID: 2933272 13
- MILANOVIĆ, Zoran
Changes in physical fitness of men older than 60 - A pilot study / Zoran Milanović, Saša Pantelić, Bojan Jorgić. - . - Način dostupa(URL): <http://dx.doi.org/10.5550/sgia.120801.en.043M>
U: SportLogija [Štampano izd.]. - ISSN 1986-6089. - God. 8, br. 1 (2012), str.43-49.
796.012.1-055.1
COBISS.BH-ID: 2935064 14
- McGEE, Jane E.
Identitet i učešće učenica muslimanki u nastavi fizičkog vaspitanja u Engleskoj / Jane E. McGee, Ken Hardman. - . Način dostupa (URL): <http://dx.doi.org/10.5550/sgia.120801.se.027M>
U: SportLogija [Štampano izd.]. - ISSN 1986-6089. - God. 8, br. 1 (2012), str. 29-41.
371.212:796/799(410)
COBISS.BH-ID: 2931992 15
- McGEE, Jane E.
Muslim schoolgirls' and participation in school-based physical education in England / Jane E. McGee, Ken Hardman. - . Način dostupa (URL): <http://dx.doi.org/10.5550/sgia.120801.en.029M>
U: SportLogija [Štampano izd.]. - ISSN 1986-6089. - God. 8, br. 1 (2012), str. 29-41.
371.212:796/799(410)
COBISS.BH-ID: 2934552 16
- RAĐEVIĆ, Nenad
Effects of a specific model of training on body composition of judo athletes of younger senior age / Nenad Rađević. - . Način dostupa (URL): <http://dx.doi.org/10.5550/sgia.120801.en.079R>
U: SportLogija [Štampano izd.]. - ISSN 1986-6089. - God. 8, br. 1 (2012), str. 79-85.
796.853.23
- COBISS.BH-ID: 2936856 17
- RAĐEVIĆ, Nenad
Efekti specifičnog modela treninga na tjelesnu kompoziciju džudista mlađeg seniorskog uzrasta / Nenad Rađević. - . Način dostupa (URL): <http://dx.doi.org/10.5550/sgia.120801.se.073R>
U: SportLogija [Štampano izd.]. - ISSN 1986-6089. - God. 8, br. 1 (2012), str. 75-81.
796.853.23
COBISS.BH-ID: 2933016 18
- RUPČIĆ, Tomislav
Razlike u antropološkom profilu košarkaških sudija s obzirom na starosnu dob / Tomislav Rupčić, Bojan Matković, Damir Knjaz, Saša Baščevan, Saša Rodić. - . - Način dostupa (URL): <http://dx.doi.org/10.5550/sgia.110701.se.027R>
U: SportLogija [Štampano izd.]. - ISSN 1986-6089. - God. 7, br. 1 (2011), str.27-34.
796.323.072.4
COBISS.BH-ID: 2098456 19
- RUPČIĆ, Tomislav
Razlike u fiziološkom opterećenju sudija s obzirom na period košarkaške utakmice / Tomislav Rupčić, Branka R. Matković, Damir Knjaz, Antonela Nedić, Siniša Popek. - . - Način dostupa (URL): <http://dx.doi.org/10.5550/sgia.120801.se.047R>
U: SportLogija [Štampano izd.]. - ISSN 1986-6089. - God. 8, br. 1 (2012), str.47-52.
796.323.2.012
COBISS.BH-ID: 2932248 20
- SINDIK, Joško
Latentna struktura parametara situacione efikasnosti kod hrvatskih vrhunskih košarkaša seniora / Joško Sindik, Igor Jukić, Maja Adžija. - . Način dostupa (URL): <http://dx.doi.org/10.5550/sgia.120802.se.127S>
U: SportLogija [Štampano izd.]. - ISSN 1986-6089. - God. 8, br. 2 (2012), str. 127-135.
796.323.2
COBISS.BH-ID 3464472 21
- SINDIK, Joško
Latent structure of situational efficiency parameters at croatian top basketball players / Joško Sindik, Igor Jukić, Maja Adžija. - . Način dostupa (URL): <http://dx.doi.org/10.5550/sgia.120802.en.132S>
U: SportLogija [Štampano izd.]. - ISSN 1986-6089. - God. 8, br. 2 (2012), str. 127-135.
796.323.2
COBISS.BH-ID 3468568 22
- SINDIK, Joško
Correlation between the index and efficiency indicators of success in recreation table tennis / Joško Sindik, Nicolae Ochiana, Miran Kondrič. - . - Način dostupa(URL): <http://dx.doi.org/10.5550/sgia.120801.en.057S>
U: SportLogija [Štampano izd.]. - ISSN 1986-6089. - God. 8, br. 1 (2012), str. 57-67.
796.386.06
COBISS.BH-ID: 2935832 23
- SINDIK, Joško
Povezanost indeksa i varijabli u rezultatske uspješnosti u rekreativnom stnom tenisu / Joško Sindik, Nicolae Ochiana, Miran Kondrič. - . - Način dostupa(URL): <http://dx.doi.org/10.5550/sgia.120801.se.053S>
U: SportLogija [Štampano izd.]. - ISSN 1986-6089. - God. 8, br. 1 (2012), str. 53-63.
796.386.06
COBISS.BH-ID: 2932504 24
- STANKOVIĆ, Marija
Oksidativni stres i fizička aktivnost / Marija Stanković, Dragan Radovanović. - . Način dostupa (URL): <http://dx.doi.org/10.5550/sgia.120801.se.001S>
U: SportLogija [Štampano izd.]. - ISSN 1986-6089. - God. 8, br. 1 (2012), str. 1-10.
616-008.9:Š577.344:546.21
COBISS.BH-ID: 2930968 25
- STANKOVIĆ, Marija
Oxidative stress and physical activity / Marija Stanković, Dragan Radovanović. - . Način dostupa (URL): <http://dx.doi.org/10.5550/sgia.120801.en.001S>
U: SportLogija [Štampano izd.]. - ISSN 1986-6089. - God. 8, br. 1 (2012), str. 1-11.
616-008.9:Š577.344:546.21
COBISS.BH-ID: 2930968 26
- STOJANOVIĆ, Nikola
Differences in the explosive and repetitive strength of twelve-year-old schoolchildren with different morphological characteristics / Nikola Stojanović, Mihajlo Mijanović, Toplica Stojanović, Dragan Perić. - . - . - Način

- dostupa (URL): <http://dx.doi.org/10.5550/sgia.120802.en.142S>
- U: SportLogija [Štampano izd.]. - ISSN 1986-6089. - God. 8, br. 2 (2012), str. 142-150.
- 796.012.11
COBISS.BH-ID 3468824 27
- STOJANOVIĆ, Nikola
Razlike u eksplozivnoj i repetitivnoj snazi dvanaestogodišnjih učenika sa različitim morfološkim pokazateljima / Nikola Stojanović, Mihajlo Mijanović, Toplica Stojanović, Dragan Perić. - Način dostupa (URL): <http://dx.doi.org/10.550/sgia.120802.se.136S>
- U: SportLogija [Štampano izd.]. - ISSN 1986-6089. - God. 8, br. 2 (2012), str.136-143.
- 796.012.11
COBISS.BH-ID 3464728 28
- CLEMENTE, Filipe
Influence of task constrains on attacker trajectories during 1 v 1 cub-phase in soccer practice / Filipe Clemente, Micael Couceiro, Fernando Martins, Gonçalo Dias, & Rui Mendes. - . Način dostupa (URL): <http://dx.doi.org/10.5550/sgia.120801.en.011C>
- U: SportLogija [Štampano izd.]. - ISSN 1986-6089. - God. 8, br. 1 (2012), str. 11-17.
- COBISS.BH-ID: 2934040
UDK: 796.332.093.1 29
- CLEMENTE, Filipe
Uticao zadatka sa ograničenjima na kretanje napadača u segmentu igre 1 na 1 u treningu fudbalera / Filipe Clemente, Micael Couceiro, Fernando Martins, Gonçalo Dias, & Rui Mendes. - . Način dostupa (URL): <http://dx.doi.org/10.5550/sgia.120801.se.011C>
- U: SportLogija [Štampano izd.]. - ISSN 1986-6089. - God. 8, br. 1 (2012), str. 11-17.
- COBISS.BH-ID: 2931480
UDK: 796.332.093.1 30
- FERREIRA, Antonio Gomes
Perceptions of pedagogical practice of physical education teachers in Portugal since 1970s / António Gomes Ferreira, José António Moreira. - . Način dostupa (URL): <http://dx.doi.org/10.5550/sgia.120801.en.021F>
- U: SportLogija [Štampano izd.]. - ISSN 1986-6089. - God. 8, br. 1 (2012), str. 21-28.
- 371.14+371.12:Š796/799
COBISS.BH-ID: 2934296 31
- FERREIRA, Antonio Gomes
Percepција pedagoške prakse nastavnika fizičkog vaspitanja u Portugalu od 1970-ih / António Gomes Ferreira José António Moreira. - . Način dostupa (URL): <http://dx.doi.org/10.5550/sgia.120801.se.019F>
- U: SportLogija [Štampano izd.]. - ISSN 1986-6089. - God. 8, br. 1 (2011), str. 19-26.
- 371.14+371.12:Š796/799
COBISS.BH-ID: 2931736 32
- HAWKEY, Adams
Vibracioni trening cijelog tijela poboljšava snagu mišića kod rekreativno aktivne populacije / Adam Hawkey. . Način dostupa (URL): <http://dx.doi.org/10.5550/sgia.120802.se.111H>
- U: SportLogija [Štampano izd.]. - ISSN 1986-6089. - God. 8, br. 2 (2012), str. 111-117.
- 796.011.3
COBISS.BH-ID 3463704 33
- HAWKEY, Adams
Whole body vibration training improves muscular power in a recreationally active population / Adam Hawkey. Način dostupa (URL): <http://dx.doi.org/10.5550/sgia.120802.en.116H>
- U: SportLogija [Štampano izd.]. - ISSN 1986-6089. - God. 8, br. 2 (2012), str. 116-122.
- 796.011.3
COBISS.BH-ID 3467800 34
- CIGROVSKI, Vjekoslav
Doprinos razvijenosti motoričkih sposobnosti kod savladavanja skijaške tehnike / Vjekoslav Cigrovski, Igor Božić, Nikola Prlenda. . - Način dostupa (URL): <http://dx.doi.org/10.5550/sgia.120802.se.103C>
- U: SportLogija [Štampano izd.]. - ISSN 1986-6089. - God. 8, br. 2 (2012), str. 103-110.
- 796.926:796.012
COBISS.BH-ID 3463448 35
- CIGROVSKI, Vjekoslav
Influence of motor abilities on learning of alpine ski technique / Vjekoslav Cigrovski, Igor Božić, Nikola Prlenda. . - Način dostupa (URL): <http://dx.doi.org/10.5550/sgia.120802.en.108C>
- U: SportLogija [Štampano izd.]. - ISSN 1986-6089. - God. 8, br. 2 (2012), str. 108-110.
- 796.926:796.012
COBISS.BH-ID 3467544 36
- ČOH, Milan
Overtraining syndrome in the running / Milan Čoh. - . - Način dostupa (URL): <http://dx.doi.org/10.5550/sgia.120802.en.151C>
- U: SportLogija [Štampano izd.]. - ISSN 1986-6089. - God. 8, br. 2 (2012), str. 151-156.
- 796.422.12
COBISS.BH-ID 3469080 37
- ČOH, Milan
Sindrom preopterećenja u trčanju / Milan Čoh. - . - Način dostupa (URL): <http://dx.doi.org/10.5550/sgia.120802.se.144C>
- U: SportLogija [Štampano izd.]. - ISSN 1986-6089. - God. 8, br. 2 (2012), str. 151-156.
- 796.422.12
COBISS.BH-ID 3465240 38