AnnalesKinesiologiae

UDK / UDC 796.01:612 | **Annales Kinesiologiae** 7, 2016, 1, pp. 1–92 | **ISSN 2232-2620**

Annales University Press

Koper 2016

ISSN 2232-2620 UDK/UDC 796.01:612 Volume 7, Year 2016, Number 1
ISSN (online ed.) 2335-4240

Publisher / ***Izdajatelj:*** University of Primorska, Science and Research Centre, Annales University Press / Univerza na Primorskem, Znanstveno-raziskovalno središče, Univerzitetna založba Annales

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tel.: +386 5 663-77-00; fax: +386 5 663-77-10
E-mail**:** annales.kinesiologiae@zrs.upr.si
Home page: http://www.zrs.upr.si/revije/single/znanstvena-revija-annales-kinesiologiae-1344

Print / ***Tisk:*** Grafika 3000

Circulation / ***Naklada:*** 250 copies per issue

Financial support / ***Finančna podpora:*** *The publishing of this journal is supported by the Foundation for Financing Sport Organizations in the Republic of Slovenia and Slovenian Research Agency*

Fundacija za šport
www.fundacijazasport.org

SLOVENIAN RESEARCH AGENCY

Izdajo revije sofinancirata Fundacija za šport in Javna agencija za raziskovalno dejavnost Republike Slovenije.

Journal abbriviation: Ann Kinesiol.
Annales Kinesiologiae is an international journal published twice a year.
Annual subscriptions (2 issues in English language) are available for 25 eur, and single issue is available for 15 eur. For students 20% discount applies upon presenting an international valid student ID.
Subscription requests can be send to: annales.kinesiologiae@zrs.upr.si

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EDITORIAL

On numerous occasions, the factors of positive impact of physical / sport activities on health and quality of life have been already studied, tested and proven. The objectives of new and advanced research into these factors are, among other things, the search for new opportunities, shedding light on grey areas, opening any niches ... What is extremely important, is the flexibility of these factors regarding each individual role of man in modern society, the profession, the environment and, especially, gender and age. By studying the differences and mechanisms and by the differentiation of the selected interventions of the adjusted dimensioning and the content of exercise in real time, we can seek higher performance, better management of these factors, and especially, increased efficiency.

The four original scientific contributions published in issue 1, volume 7, of Annales Kinesiologiae, reveal the perspective of examining the young and the old, men and women, in specific situations, and also in sports where the aim is, unfortunately, not always directed only at the quality of an individual and their performance, but also at the competition and the results, here and now.

The articles in this volume demonstrate the importance of longitudinal studies which are necessary in order to monitor the development of an individual from his or her earliest childhood to old age on one hand, and the development of society as a whole on the other. It is becoming increasingly evident that the development of society does not necessarily mean a quality development of an individual. These are topics covered in the article on the pre-school children's achievements on ABC movement tests trends and the article on the correlation between the time of contraction of the biceps femoris skeletal muscle and the maximum running speed both in children and adults.

More methodological is the article on the issue of the role of small-sided games in the modern soccer training. The methodology of small-sided games is not the focal point of the article, however, it does reach into the area of system theories as theories on achieving the most accomplished integrity of reflection and behaviour.

Safety in sport and recreation and planning of activities are of special importance, as discussed in the article of safety elements in paragliding. Only a safe sport is a healthy, quality and entertaining activity. These days, active sports tourism is increasingly gaining in economic importance and so much more can still be done in the area of prevention.

As usual, the section Reviews and Reports in this journal continues with a series of reports from two conferences, which usually summarize various aspects of the aforementioned factors. The journal rounds up with a brief review of the proceedings, published in 2016 by Nova Science. Titled Effects of Physical Activity on the Anthropological Status of Children, Youth and Adults, it associates with the same red thread of the topics mentioned at the beginning of this Editorial.

Prof. Rado Pišot, Ph.D.
Editor-in-Chief and Managing Editor

UVODNIK

Dejavniki pozitivnega vpliva gibalne/športne aktivnosti na zdravje in kakovost življenja so bili neštetokrat preučevani, preverjeni in dokazani. Vedno nove in naprednejše raziskave teh dejavnikov si za cilje med drugim postavljajo iskanje novih možnosti, osvetljevanje sivih con, odpiranje niš ... Gotovo je izredno pomembna njihova prilagodljivost posamezni vlogi človeka v sodobni družbi, poklicu, okolju predvsem pa spolu in starosti. S preučevanjem razlik in mehanizmov ter diferenciacijo izbranih intervencij, prilagojenega dimenzioniranja in vsebine vadbe v realnem času, lahko iščemo večji učinek, lažje upravljanje omenjenih dejavnikov, predvsem pa njihov boljši izkoristek.

V štirih izvirnih znanstvenih prispevkih, objavljenih v prvem zvezku 7. letnika revije Annales Kinesiologiae, nam avtorji odstirajo pogled na preučevanje mlajših in starejših, moškega in ženskega spola, v specifičnih situacijah in nenazadnje v športih, kjer cilj, žal, ni vedno usmerjen le v kakovost posameznika in njegovega učinka, temveč pogosto predvsem v tekmovalni rezultat tukaj in zdaj.

V tokratnih prispevkih se ponovno izkazuje pomen longitudinalnih študij, ki so nujne za spremljanje razvoja posameznika od njegovega najzgodnejšega otroštva do pozne starosti na eni strani ter razvoja družbe kot celote na drugi. Vse bolj očitno namreč postaja, da razvoj družbe ne pomeni nujno kakovostnega razvoja posameznika znotraj nje. To so tematike, o katerih govorita prispevek o dosežkih predšolskih otrok na testih ABC gibanja ter prispevek o korelaciji med časom krčenja skeletne mišice biceps femoris in maksimalno hitrostjo teka pri otrocih in odraslih.

Na bolj metodološko področje posega prispevek o vprašanju vloge igralnih oblik pri sodobni vadbi nogometa. Ne posveča se toliko sami metodologiji igralnih oblik, ampak poseže na področje sistemskih teorij kot teorij o doseganju čim večje celovitosti razmisleka in ravnanja.

Posebnega pomena pa je gotovo varnost v športu in rekreaciji ter s tem povezano načrtovanje aktivnosti, o čemer govori prispevek Elementi varnosti v jadralnem padalstvu. Le varno je lahko zdravo, kakovostno in nenazadnje razvedrilno. V časih, ko aktivni športni turizem vse bolj pridobiva na gospodarskem pomenu, odkrivamo, da je mogoče še marsikaj postoriti na področju preventive.

Kot običajno tudi tokratno številko v rubriki Ocene in poročila nadaljujemo s poročili iz dveh konferenc, ki praviloma povzemajo različne vidike obravnave omenjenih dejavnikov. Revijo pa zaključuje kratka ocena zbornika, ki je v letu 2016 izšla pri založbi Nova Science, in nas z naslovom Učinki telesne aktivnosti na antropološki status otrok, mladine in odraslih ponovno vrne na začetek tega uvodnika.

prof. dr. Rado Pišot,
glavni in odgovorni urednik

original scientific article
received: 2015-07-06

UDC: 796.012-053.4

PRESCHOOL CHILDREN'S RESULTS IN MOVEMENT ABC TESTS: DIFFERENCES BETWEEN GIRLS AND BOYS IN MOVEMENT DEFICIT

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ABSTRACT

The aim of our study was to assess the children's motor skills on a sample of preschool children between the age of 4 and 5 ($x = 4.44$, $SO = 0.46$), using a checklist questionnaire and movement assessment battery for children. We wanted to know whether the examined sample shows any deficits in movement or any physical difficulties, as well as what are the differences in gender. The study included 100 children from three kindergartens on the Slovenian coastal region. We used the percentile norms for common evaluation of movement problems. The total score below 15 percentile which indicates movement problems, was determined in 27 % of children, of which 66.7% in girls and 33.3% in boys. Statistically significant gender difference was found in the skipping rope test ($p = 0.005$), where boys performed better ($\bar{x} = 0.21$) than girls ($\bar{x} = 1.08$). The findings show a high incidence of movement difficulties in preschool children, as a quarter of children do not reach the expected level of motor development, thus, this indicates the suspected occurrence of developmental coordination disorder. Further research is needed in the field of movement ABC tests application and in the incidence of movement deficites on a representative sample. It ia also advisable to identify the factors that are associated with movement deviations in preschool children. In encouraging a child's motor developement a greater attention should be given to girls in particular. The results of the movement ABC tests needs to be considered from the perspective of the child's holistic development and their motivation to perform.

Keywords*: preschool children, motor development, clumsy child, developmental coordination disorder, movement ABC – movement assessment battery for children.*

DOSEŽKI PREDŠOLSKIH OTROK NA TESTIH ABC GIBANJA: RAZLIKE MED DEKLICAMI IN DEČKI V PRIMANJKLJAJIH NA GIBALNEM PODROČJU

IZVLEČEK

Namen naše raziskave je bil s pomočjo vprašalnika in baterije testnih nalog ABC oceniti otrokovo gibanje na vzorcu predšolskih otrok v starosti med 4. in 5. letom (=4,44, SO=0,46). Zanimalo nas je, ali se na proučevanem vzorcu pojavljajo primanjkljaji na gibalnem področju oziroma gibalne težave ter kakšne so na tem področju razlike med spoloma. V raziskavi je sodelovalo 100 otrok iz treh obalnih vrtcev. Uporabili smo percentilne norme za skupno oceno gibalnih težav. Skupna ocena pod 15 percentili, ki nakazuje prisotnost gibalnih težav, se je pokazala pri 27 % otrok, od tega pri 66,7 % deklicah in 33,3 % dečkih. Statistično značilna razlika med spoloma se je pokazala v testu preskakovanje vrvi (p=0,005), v katerem so se bolje izkazali dečki (=0,21) kot deklice (=1,08). Ugotovitve raziskave kažejo visoko pojavnost gibalnih težav pri predšolskih otrocih, saj jih četrtina ne dosega pričakovane stopnje gibalnega razvoja in kaže na sum pojava razvojne motnje koordinacije. Potrebne so nadaljnje raziskave na področju uporabe baterije testov ABC in pojavnosti primanjkljajev na gibalnem področju na reprezentativnem vzorcu ter ugotavljanje dejavnikov, ki so povezani s pojavom gibalnih odstopanj pri predšolskem otroku. Pri spodbujanju otrokovega gibalnega razvoja je potrebno večji poudarek posvetiti zlasti deklicam. Rezultate na testih ABC gibanja je potrebno obravnavati iz perspektive otrokovega celostnega razvoja in motivacije za izvedbo.

***Ključne besede**: predšolski otrok, gibalni razvoj, neroden otrok, razvojna motnja koordinacije, ABC gibanja – baterija za oceno otrokovega gibanja*

THEORETICAL GROUNDS

Preschool period is the period of fundamental motor development. The child's body is most receptive for environmental influences in early childhood, moreover, this affects the development of the child's personality as well. In this period of the child's development, the individual areas, such as movement, physical, cognitive, emotional and social development, are closely linked. Therefore, it is important not to miss the most suitable period, when the child's development is the most sensitive for the various effects that can be achieved with physical / sports activities (Pišot & Planinšec, 2005). The development of motor skills and abilities is connected to the chronological age, but not dependent on it, so it does not take place in all children equally fast (Videmšek &

Pišot, 2007). Gallahue and Ozmun (2006) point out that motor development continues through different periods, which are called development stages, in which certain types of conduct can be detected, which apply to the majority of children at each stage of development. Due to individual differences, individual stages of development may occur in different age groups, although the order of their occurrence is generally the same (Videmšek & Pišot, 2007). As every child has his or her own biological clock (Gallahue & Ozmun, 2006), it is possible to notice among the children of the same age that some children are more adept than others, but some children stand out as being more clumsy than the others. The most common reason to this is a delayed motor development, which can be recognized also from the child's late development of the ability to sit and / or to walk (Kalar, Videmšek, & Karpljuk, 2005).

Delayed development of motor skills and abilities of a child represents a developmental coordination disorder, or the so-called clumsiness. Clumsiness in motor skills may give the impression that the child is also lagging behind in his or her intellectual development. However, it has been proven that clumsy children are without any localized brain damage and are intellectually on the level of their physically more developed peers (Kalar et al., 2005). Gubbay (1975, in Hamilton, 2002), called this clumsiness "a clumsy child syndrome", which used to be considered a description of a child of adequate intelligence, who had no diagnosed medical or neurological problems. The term described the child's difficulties in movement, without a recognized medical or neurological condition. Difficulties were encountered in the child's daily operations and, in particular, in socialization. In recent years, the term "a clumsy child syndrome" has been replaced with the term "developmental coordination disorder" (hereinafter DCD) or "dyspraxia".

Hamilton (2002) points out that the clumsiness is not that insignificant a problem as it may seem, so it is advisable to consistently monitor a child and the possibility of the occurrence of any movement problems. Any evolving physical discrepancy in a child needs to be professionally addressed, as clumsiness may be the potential indicator of DCD. DCD indicators vary depending on the age and the stage of development. Younger children may also show signs of clumsiness and developmental delays and do not reach the milestones in motor development in basic motor activities such as walking, crawling, sitting, tying shoes, opening and closing buttons or zippers (Gubbay, 1975, in Hamilton, 2002; Kirby & Drew 2003; Terčon, 2013). Children have difficulties planning their own movement, describing it or changing it (Clark, Getchell, Smiley-Oyen, & Whitall, 2005; Filipčič, 2006). DCD causes problems with movement, coordination, organization and processing of sensory information and low self-esteem, which can also lead to a variety of learning and socialization problems (Losse et al., 1991; Kremžar & Petelin, 2001; Terčon, 2013). In the preschool age, children suffering from DCD (Clark et al., 2005; Filipčič, 2006; Kirby & Peters, 2007; Harris, Mickelson, & Zwicker, 2015) often have difficulty with orientation in space. Problems and slower development are also reflected in crawling and creeping, seating, activities in standing position, walking, climbing stairs (upstairs and downstairs), running, jumping, catching and throwing the ball. They are noted for being slower at dressing and feeding, their

drawing is less developed in comparison with their peers and they have more difficulties in establishing social contacts. However, Losse et al. (1991) note that there are individual differences among children regarding how they can cope with the continuous difficulties for a long period.

Developmentally conditioned clumsiness typically occurs in the earliest years of life and can continue well into adulthood (Kremžar & Petelin, 2001). Problems can occur in adult with continuing effect on their lives. Physically impaired adults refuse to perform physically demanding tasks, which excludes them from the important activities of daily life (Cousins & Smyth, 2003).

Early detection of children with DCD in the earliest years of life is therefore crucial for offering professional support to both children and their parents before the child starts attending school (Jongmans, 2005, in the Van Waelvelde, Peersman, Lenoir, Smits Engelsmand, & Henderson, 2008). According to some estimates (Kirby, 2005; Harris et al., 2015), the DCD occurs in one of twelve individuals (5% - 6%) in the population, and is three times more common in boys than in girls. The dysfunction is often disguised as children do not have visible physical signs and, they have great difficulty in motor activities at home and at school. Children with such problems are perceived as clumsy, sometimes even as lazy.

AIM OF THE STUDY, OBJECTIVES AND HYPOTHESES

The aim of the research was to assess the children's motor skills on a sample of preschool children, aged between 4 and 5, with the help of a checklist questionnaire and movement ABC tests.

The objectives of the research:

- To identify the presence of impairments in motor skills or deficits in movement when testing a group of preschool children;
- To identify differences in performance on movement ABC tests between girls and boys,
- To identify statistically significant correlations between the movement ABC tests.

In this study, we surveyed the following hypotheses:

- H1: There are significant differences between girls and boys in the results of the movement ABC tests:
- H1.1: We assume that boys perform better in the tests of gross motor skills.
- H1.2: We assume that girls perform better in the tests of fine motor skills.
- H2: There is a statistically significant relationship between all movement ABC tests:
- H2.1: There is a statistically significant relationship between movement ABC tests that assess hand skills and the tests that assess statistical-dynamic balance.

– H2.2: There is a statistically significant relationship between movement ABC tests that assess ball skills and the tests that evaluate the static-dynamic balance.
– H2.3: There is a statistically significant relationship between movement ABC tests that assess hand skills and the tests that assess ball skills.

WORK METHODS

Sample

Three kindergartens from the coastal slovenian region were invited to participate in the survey, 570 children all together. The prior consent to participate in the survey was given by 107 children, of which 52 boys and 55 girls. In fact, 100 children from 10 departments from the selected kindergartens participated in the survey, of which 47 (47%) boys and 53 (53%) girls. The realization of the sample was 17.54%. Our sample was represented by the children in these kindergartens, the average age of 4.44 ± 0.46.

Tools

Data were collected with movement ABC tests (Henderson & Sugden, 1992). We chose single test tasks for all children, namely, eight test tasks for the first age group of 4 to 6 year olds, which include hand skills tasks (inserting coins, stringing blocks, following cycling track) ball skills (catching a bag of beans, rolling a ball into a goal) and the skills of the static and dynamic balance (balancing on one foot, skipping the rope, tiptoeing).

Movement ABC tests were designed to identify and describe the less efficient movement of children of the ages between four and twelve. Movement ABC tests (Henderson & Sugden, 1992) are considered to be commonly used in children for the detection of deficits in the development of coordination.

Test Results, their Conversions and Interpretation

In each individual movement ABC test, the child could have a different number of attempts to perform the required physical task successfully and, thus, reach the score of 0, which means very good. In hand skills tasks two attempts were allowed and in ball skills ten attempts. In the task of balancing on one leg, two attempts were allowed for each leg, and in the tasks of dynamic balance (skipping the rope and tiptoeing), two attempts were allowed. (Henderson & Sugden, 1992).

In each task, the number of seconds needed for the child to successfully complete the task was noted down. If the child did not carry the task out, the test performer marked whether it was an unsuccessful attempt, an inappropriate task that the child

could not perform due to their physical characteristics, or whether the child refused to participate.

The first score of each test, expressed in seconds, was converted to the rating on a scale from 0 to 5. In converting the results, we used the table by Henderson and Sugden (1992), attached the summary sheet, where we looked for the value of a child's result in relation to the his or her age group. The converted result was then entered into the box titled "Total task results" (Figure 1). If the child received an assessment rate higher than 0, namely, any other assessment (i.e. from 1 to 5), and the instructions for each test allow so, the task was repeated until the child reached his or her highest result. If the child still has not reached the rate 0, we considered the best result which we converted into the corresponding rating from 1 to 5, according to the table of Henderson and Sugden (1992). A higher score indicates higher difficulties. If the child did not carry out a task in any of the attempts, he or she got the score 5. In the case of functions test, where the activity of both hands or feet was assessed, we got the overall result by adding up all the results for each arm or leg and then halving the sum.

Motor impairment of children on the movement ABC tests was interpreted by using the percentile norm where higher results means lower motor skills and efficiency (Henderson & Sugden, 1992). The percentile refers to the placement of the child in the rank of the standardization sample according to the identified motor efficacy in the overall population of children of a certain age. In interpreting the percentiles, according to Henderson and Sugden (1992), we used the norms in three intervals: 1) the results under the fifth percentile, pointing to a sign of undoubted movement difficulties; 2) the results between the 5th and 15th percentiles, pointing to borderline level of difficulty; 3) the results above the 15th percentile, pointing to appropriate motor skills of the child. A suspicion of DCD was identified in children whose results were below the 15th percentile (Henderson & Sugden, 1992).

Data Collection Method

Testing has been subject to prior written consent of the parents and the management of the kindergarten and was conducted on the premises of the three kindergartens on the Slovenian coastal area that were included in the study. The tests were performed in April and May 2010, following a previously confirmed schedule. In performing all tests, we took care of equivalent test conditions (in the morning, in ventilated area with adequate light, the same test material, the same evaluators). On the day of the testing, the children were healthy and wore appropriate sports clothing (short-sleeved T-shirts and shorts). In one testing, normally in the morning, from 3 to 4 children were tested. The testing was conducted in two stages, at each stage two children were jointly tested by two test performers. Children had met their test performers in January 2010, when they were tested for elementary movement patterns. The child, who was waiting for testing, could draw or play with soft toys while waiting. The playground area was on the other side of the waiting room, so that the tested children were not distracted by the

children waiting for the test and playing. The test performers also had different roles and assignments. One was directly with the child, demonstrating and explaining the tests. Other test performer was recording, photographing and writing down important notes during the completion of each test. The testing time for one child was 20-25 minutes.

Data Analysis Methods

The collected data were initially analyzed using descriptive statistics (frequency, percentage, average value, median, mode, minimum and maximum values, standard deviation). Gender differences in the results of the movement ABC tests in children were analyzed using nonparametric Mann Whitney U test. The correlations between the measured tests were determined by Spearman's correlation (Newell, Aitchison, & Grant, 2014). in order to achieve statistical significance, the differences by gender were considered, as well as the correlations between the tests at the level $p \leq 0.05$. All data analyzes were performed in the SPSS statistical program, version 20.0.

RESULTS

The results show the distribution of children according to the percentile rank following the movement ABC tests results that indicate the presence of interference in the motor skills or deficits in movement in the studied group of preschool children. Below we present the results of the studied sample of children on movement ABC tests, with respect to the performance resulting on a scale of 0 to 5 (0-best score, 5-worst result), which was used to determine the presence of statistically significant differences between the achievements of boys and girls and statistically significant correlations between individual movement ABC tests.

Table 1: Percentage of children according to the percentile rank in movement ABC tests results.

		GIRLS n (% rank, % gender)	BOYS n (% rank, % gender)	AGE ($\bar{x}$)
≤ 5: sign of undoubted motor difficulties (n=4)	n	3	1	4.32
	% rank	5.7	2.1	
	% gender	75.0	25.0	
5 – 15: borderline level of difficulties (n=23)	n	15	8	4.45
	% rank	28.3	17.0	
	% gender	65.2	34.8	
≥ 15: no difficulties (n=73)	n	35	38	4.45
	% rank	66.0	80.9	
	% gender	47.9	52.1	
Total (n=100)	n	53	47	/
	% rank	100.0	100.0	
	% gender	53	47	

Note: n=number of children, %=percentage of children regarding the percentile rank and gender, =average value.

Table 1 shows that the results ranking below 15th percentile, which draws attention to the suspicion of deficit in motor skills development, showed in 27% of the studied preschool children, the average age of 4.4, of which 66.7% in girls and 33.3% in boys (Table 1). The assessment results of undoubted movement problems were found in four of the children included in the study, namely, in three girls and one boy. Three-quarters of the tested children (75 %) reached the percentile rank above 15, which indicates proper physical functioning. The average age of children from the 5th percentile rank upwards and does not change ($\bar{x}$ = 4.45), but is somewhat lower in children who were ranked in the interval below the 5th percentile rank ($\bar{x}$ = 4.32).

Table 2: Children's results in individual movement ABC tests.

	Minimum	Maximum	$\bar{x}$	SD
Inserting coins	0.0	4.0	0.99	1.027
Stringing blocks	0.0	5.0	1.41	1.634
Following a cycling track	0.0	0.0	0.00	0.000
Catching a bag	0.0	3.0	0.16	0.564
Rolling a ball into a goal	0.0	5.0	0.59	1.181
Balancing on one leg	0.0	4.5	1.06	1.278
Skipping the rope	0.0	5.0	0.67	1.602
Tiptoeing	0.0	5.0	2.48	1.956

Note: =average value, SD=standard deviation.

Table 2 shows that the tested 4 to 5-year old preschoolers performed best in the task of following the cycling track, which was carried out without any observed errors. Second most successfully performed tests were catching a bag ($\bar{x} = 0.16$), rolling a ball into a goal ($\bar{x} = 0.59$) and skipping the rope ($\bar{x} = 0.67$). Less successful they were in performing tiptoeing test ($\bar{x} = 2.48$).

Standard deviations point to considerable differences between the tested children in the results of movement ABC tests, ranging from 1 to 2 points. Deviations are the largest in the results of the test of tiptoeing (SD = 1.96). The exceptions were the tests of following a cycling track (SD = 0.00) and catching a bag (SD = 0.56), which both show the the homogeneity in motor development of the tested children, which is required in the conduct of such tests.

Table 3: Differences between boys and girls in the results of individual movement ABC tests.

	Gender	$\bar{x}$	SD	Mann Whitney U test (p)
Inserting coins	Boy	0.93	1.073	0.405
	Girl	1.05	0.992	
Stringing blocks	Boy	1.57	1.791	0.407
	Girl	1.26	1.483	
Catching a bag	Boy	0.15	0.510	0.656
	Girl	0.17	0.612	
Rolling a ball into a goal	Boy	0.57	1.281	0.524
	Girl	0.60	1.098	
Balancing on one leg	Boy	1.21	1.322	0.237
	Girl	0.93	1.234	
Skipping the rope	Boy	0.21	1.020	**0.002**
	Girl	1.08	1.900	
Tiptoeing	Boy	2.49	1.988	0.977
	Girl	2.47	1.947	

Note: =average value, SD=standard deviation, t=coefficient of the t-test for independent samples, p=level of statistical significance.

Mann Whitney U test showed a statistically significant difference in the test of skipping rope ($p = 0.002$), in which boys proved to be better ($\bar{x} = 0.21$) than girls ($\bar{x} = 1.08$) (Table 3). Girls (SD = 1.90) in this test were more non-uniform as compared with boys (SD = 1.02). In other tests, statistically significant differences between the genders did not occur.

The first hypothesis, which anticipated that there are statistically significant differences between girls and boys in the results of the movement ABC tests measurement, where boys achieve better results in the tests of gross motor skills (H1.1 hypothesis) and girls in tests of fine motor skills (H1. 2 hypothesis) can be confirmed in H1.1 and rejected in H1.2. Boys showed statistically significant, better results in the tests of gross motor skills, whereas girls did not show significantly better results in any of the measured motor skills tests.

Correlation between individual movement ABC tests shows statistically significant correlations between the tests of inserting coins and stringing blocks ($p < 0.001$), between the tests of stringing blocks and skipping the rope ($p < 0.001$) and between the test of balancing on one leg and walking on tiptoe ($p = 0.023$), catching a bag ($p = 0.053$) and

skipping the rope (p = 0.055) (Table 4). The correlations between the test of stringing the blocks and inserting coins (rho = 0.428) and skipping the rope (rho = 0.345) have a medium intensity, the rest of the statistically significant correlations have a low intensity. All statistically significant correlations are positive regarding the integration direction, which means that the scores on the correated tests rise or fall in the same direction.

Table 4: Spearman's correlation in movement ABC tests.

		Inserting coins	**Stringing blocks**	**Catching a bag**	**Rolling a ball into a goal**	**Balancing on one leg**	**Jumping the rope**	**Tip-toeing**
Inserting coins*	rho (p)	1						
Stringing blocks*	rho (p)	**0.428 (<0.001)**	1					
Catching a bag**	rho (p)	0.116 (0.252)	0.053 (0.601)	1				
Rolling a ball into a goal **	rho (p)	-0.050 (0.620)	-0.010 (0.924)	-0.028 (0.781)	1			
Balancing on one leg***	rho (p)	0.064 (0.527)	0.095 (0.348)	**0.194 (0.053)**	0.042 (0.679)	1		
Jumping the rope***	rho (p)	0.181 (0.072)	**0.345 (<0.001)**	0.141 (0.163)	0.084 (0.403)	**0.193 (0.055)**	1	
Tiptoe-ing***	rho (p)	0.101 (0.319)	-0.051 (0.611)	0.056 (0.579)	0.112 (0.265)	**0.227 (0.023)**	0.185 (0.065)	1

Note: rho = Spearman's correlation coefficient , p=level of statistical significance, *=hand skill tests, **=ball skill tests, *** = static-dynamic balance tests.

The second hypothesis, in which we anticipated that there are statistically significant correlations between the movement ABC tests that assess hand skills and the tests that assess a statistical-dynamic balance (H2.1 hypothesis), between the tests that assess ball skills and the tests that assess statistical and dynamic balance (H2.2 hypothesis), and the tests that assess hand skills and the tests that assess ball skills (H2.3 hypothesis), can be confirmed in H2.1 and H2.2 and rejected in H2 .3. The results of Spearman's correlation showed statistically significant correlations between the movement ABC tests, assessing hand skills (putting cubes on a string task), and the tests that assess a statistical-dynamic balance (skipping the rope task), and the tests that assess ball skills (catching a bag task) and tests that assess the statistical-dynamic balance (balancing on one leg task), but did not show any statistically significant correlations between the tests that assess ball skills and the tests that assess hand skills.

DISCUSSION

Our study, which was conducted with movement ABC tests on the sample of 4- and 5-year-old preschool children on the Slovenian coast, showed that three quarters of the tested children have adequate motor skills without any problems occurring. An overall rating below 15 percentile rank, which indicates the presence of deficits in movement or difficulties in motor development, however, was shown in a quarter of the tested children. A high risk degree with the results under the 5 percentile rank was shown in 4% of the tested children, in which case it is possible to conclude that motor difficulties are already present. The results of the present research regarding the proportion of children with motor difficulties is slightly lower compared to the Australian study, which showed that 6% of the children included in the tests were placed in the group with a high degree of DCR risk (Pridham, Hillier, & Estermann, 2011 in Terčon, 2013). The deviations of the related research findings from ours could be attributed to the non-randomized sample of preschool children who participated in our study.

Henderson and Sugden (1992) point out that it is, nevertheless, necessary to be cautious when finalizing the findings of the child's status on the basis of the movement ABC tests achievements. Lower achievements can be expressed as "physical problems", "motor difficulties", "a deficit in movement", "delay in motor skills development" or "developmental coordination disorder". In any case, on the basis of the movement ABC tests achievements it is not possible to establish any medical diagnoses. Before we in any way connect the movement ABC tests results with physical or motor deficit, a precise diagnostic medical treatment needs to be applied. Due to misdiagnosis or labeling a child can suffer irreparable damage, that is why the researcher is supposed to know well the characteristics of the child's age group in order to avoid technical errors and thereby the negative effects on the child's development. Diagnostic assessment of DCD in children is recommended only after the child is five years old (Blank, Smits-Engelsman, Polatajko, & Wilson, 2012), before that we can talk only about the higher risk for DCD occurrence (Pridham, Hillier, & Esterman, 2011; in Terčon, 2013).

The preschool children included in the study were more successful in the following movement ABC tests: following a cycling track, catching a bag, rolling a ball into the goal and skipping ropes, however, they were less successful in tiptoeing. Explaining the results obtained should be based on the theoretical knowledge of the characteristics of the child's motor development, which is characterized by a a sequence of development from mastering coarse to fine motor skills. In the period between four and five years of age, children become increasingly adept in dressing and buttoning visible buttons (Papalia, Olds, & Feldman, 2001; Vander Zanden, 1993; in Marjanovič Umek, Zupančič, Kavčič, & Fekonja, 2009). The latter was also shown with a correlation analysis in our study, which showed statistically significant correlations between the tests of fine motorics or hand skills, such as inserting coins and putting play cubes on a string and gross motor skills tests, such as catching a bag and balancing on one leg.

The correlation analysis also showed statistically significant connections between the tests of static-dynamic equilibrium (skipping ropes, balancing on one leg) and the

tests that require hand skills (stringing blocks) and ball skills (catching a bag). When catching, a child must assess the speed or the force of the approaching object. Power control is also an important factor, or the effort that is put in the task, which is also characteristic of the motor exercises in static-dynamic balance. The way in which a child throws and catches things varies systematically with the child's age. Targeting and catching require fairly accurate skills of mastering space. With the former, the movement plan needs to contain the correct targeting of the ball, while at the latter, the child needs to find the appropriate body and hands postures (Henderson & Sugden, 1992).

Static and dynamic balance are the most common tasks in the neurological development test instruments (in clinical practice and in research). In compliance with the definition of balance, which is the ability of quick formation of compensatory movements, necessary for returning the body in a balanced position when it is destroyed, the functions of the dynamic balance require the movement of the body from one point to another and various means for monitoring the movement (Antolović, 2014). Pišot and Videmšek (2004) emphasize that the child's coordination of movement and balance are crucial in the realization of motor tasks. In particular, balance is the filter that allows or prevents (hinders) the realization of most motor tasks. Similar to our study, in the study performed by Van Waelvelde et al. (2008), 4-year-old Flemish children showed few errors in the task of following the cycling track. In contrast to the tested children in our study, Flemish children were significantly less successful in the task of rolling a ball into the goal and they also needed more attempts in the task of jumping over the rope. The children included in our study reached similar good results as the Chinese children aged 4 to 6, in the tests of dynamic balance (e.g. the task of following a cycling track and skipping the rope) and similar to the American preschoolers in the tasks of accepting / catching items (e.g. the task of catching a bag, rolling a ball into the goal) (Chow, Henderson, & Barnett, 2001). Clarification of the movement ABC test results in preschool children could be also found in looking into the socio-demographic differences among children. The Engel-Yeger, Rosenblum and Josman (2010) survey results, which included 249 Israeli children, have shown that the performance of motor tasks in preschool children are affected by age, gender, the level of the mother's education, and socio-economic status of the family. Pridham, Hillier and Esterman (2011; in Terčon, 2013) performed a research in 4-year-old Australian children which showed as much as 3.6 times greater incidence of high risk of DCD in boys. Other authors (Kadesjö & Gillberg, 1998; Pridham, Hillier, & Esterman, 2011 in Terčon, 2013) also indicate an increased incidence of DCD in boys. In contrast to the survey mentioned, our study showed that the boys reached statistically significantly better results in the skipping rope task, even more, a greater deficit in motor skills was shown in girls. Malina (2004) stresses that when considering the differences between the genders as regards the movement competences, it is necessary to take into account the opportunities for acquiring and consolidating certain motor skills, the adequacy of approaches and the instructions given. Many stereotypical attitudes to girls make it impossible for them to be as physically adept as boys in certain activities such as jumping, running and ball games (Malina, 2004; Venetsanou & Kambas, 2010). In completing and generalis-

ing the results obtained, it is necessary to take into account also certain limitations of our study, such as a deliberately selected sample of children from three kindergartens on the Slovenian coastal region, the age of the children in the study (4-5 year olds) and the sample size. The findings therefore predominantly apply to the studied sample of children and should be re-tested on a representative sample of Slovenian preschool children for any further or broader generalizations. The study looked at differences in motor development with regard to the gender of the children. According to the obtained findings and the findings of other studies, in future it would be necessary to examine the correlations with other socio-demographic and behavioral factors that the analysis of our study did not include.

Nevertheless, we need to consider that in younger children, the test results depend primarily on how the children are motivated and prepared to perform the tasks. Supposedly, though, different test performers had a different impact on motivation and preparation of children, which may be reflected in the findings showing differences between the genders. Any testing of preschool children is undoubtedly an extremely demanding task, as it is to be adapted to the characteristics of the early developmental period (Pišot & Planinšec, 2005; Videmšek & Pišot, 2007; Zajec, Videmšek, Karpljuk, & Štihec, 2009). Henderson and Sugden (1992) similarly consider that the assessment of preschool children can be very difficult and brings a lot of unpredictability. Therefore, working methods, approach and attitude in working with children play a key role (Pišot & Planinšec, 2005).

CONCLUSION

Our study showed that a quarter of children aged 4 to 5 years, does not reach the expected level of motor skills and suspected occurrence of developmental coordination disorder (DCD) is thus indicated. Girls under-perform compared to boys in the skipping rope test.

Further research is needed in the field of movement ABC tests application and in the incidence of movement deficites on a representative sample. The factors that are associated with the occurrence of DCD in a preschool child also need to be further identified. In promoting the child's motor development, a greater emphasis ought to be given to girls in particular.

It is recommended to be cautious in establishing the findings regarding the child's status on the basis of the test achievements in order to avoid technical errors and negative effects on the child's development.

Acknowledgements

The study is based on empirical quantitative methods. Data from the study were collected within the J5-2397 national key project titled "Analysis of Elementary Body Movement Patterns and Adaptation of Skeletal-Muscular System to Certain Modern Lifestyle Factors in Children between the Age of 4 and 7", which was held from 1 May 2009 to 30 April 2011. The project was financed by the Public Agency for Research of the Republic of Slovenia (ARRS) and was authorized by the Commission for Medical Ethics of the Republic of Slovenia (no. 153/07/09). The project was implemented by the Institute for Kinesiology Research (IKARUS), which operates within the University of Primorska, Science and Research Centre (UP SRC). The principal and accountable project leader was prof. Rado Pišot, Ph.D.

We would like to thank all the associates at the Institute for Kinesiology Research – ICARUS, UP SRC, who contributed to the study and enabled it being carried out smoothly and completed successfully. Our thanks go also to Public Agency for Research of the Republic of Slovenia which supported the research financially and to the participating institutions Valdoltra Orthopaedic Hospital, the University Rehabilitation Institute Soča and the Medical Faculty of the University of Trieste.

We appreciate the help of the management and the members of staff in kindergartens in Koper, Semedela and Škofije who helped in the organization and execution of the survey. Last but not least, we are grateful to all the children and their parents for their cooperation, which was key for the success of the study.

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original scientific article
received: 2016-04-18

UDC: 612.741:796.012.13

LOWER CORRELATION BETWEEN BICEPS FEMORIS CONTRACTION TIME AND MAXIMAL RUNNING SPEED IN CHILDREN THAN IN ADULTS: A LONGITUDINAL STUDY IN 9- TO 14-YEAR OLD CHILDREN*

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ABSTRACT

Biceps femoris is a major propulsor muscle in sprinting and its contraction time negatively correlates to the running speeds of adults. Our aim was to compare age- and gender-related correlations between vastus lateralis and biceps femoris contraction times and running speeds during a longitudinal study of 9- to 14-year old children. On a yearly basis, we conducted vastus lateralis and biceps femoris tensiomyographic measurements of muscle contraction time and maximal running speeds measured during 7-metre sprints with flying starts using photocells in 107 children (of which 53 boys). Vastus lateralis contraction time was not correlated with the running speed. However, biceps femoris contraction time was negatively correlated with the running speed only in boys after the age of 12.9 years (Pearson r ranges from -0.391 to -0.426; p <

* The paper has been previously published in the hijacked journal Wulfenia (Vol. 22(1): pp. 233–252, January 2015). The editor has been notified and he fully agrees with the publication in Annales Kinesiologiae. The paper has been modified, double-blind peer reviewed and only then accepted for publication.

0.002). It was concluded that biceps femoris contraction time is far less correlated with running speed than in adult athletes (Pearson r = -0.60); however, the correlation is gender- and age-specific. It seems that the knee flexor and hip extensor, biceps femoris, is not as yet the major determinant of running speed in 9- to 14-year old children at that age.

Keywords: *skeletal muscle,* biceps femoris*,* vastus lateralis*, tensiomyography, pediatrics.*

KORELACIJA MED ČASOM KRČENJA MIŠICE BICEPS FEMORIS IN HITROSTJO ŠPRINTA JE PRI OTROCIH NIŽJA KOT PRI ODRASLIH: LONGITUDINALNA ŠTUDIJA 9- DO 14-LETNIH OTROK

IZVLEČEK

Skeletna mišica biceps femoris je pomembna za propulzijo v fazi odriva med tekom in vemo, da je njen čas krčenja negativno povezan z maksimalno hitrostjo teka pri odraslih moških. Zato smo si za cilj zastavili, da preverimo povezavo med časom krčenja mišic vastus lateralis in biceps femoris pri otrocih, glede na spol in starost. V longitudinalni 5-letni študiji smo spremljali 107 otrok (53 dečkov) s periodično letnimi meritvami telesnih značilnosti, maksimalne hitrosti teka in kontraktilnih lastnosti omenjenih mišic z uporabo Tenziomiografije. Otroci so bili na začetku stari 9 let in na koncu 14 let. Ugotovili smo, da čas krčenja mišice vastus lateralis ni povezan z maksimalno hitrostjo teka. Medtem, ko je bil čas krčenja mišice biceps femoris negativno povezan z maksimalno hitrostjo teka, a le pri dečkih po 12.9 letu starosti (Pearsonov r med -0.391 in -0.426; p < 0.002). Zaključimo lahko, da je čas krčenja mišice biceps femoris bistveno manj povezan z maksimalno hitrostjo teka pri otrocih, kot pri odraslih (Pearsonov r = -0.60). Sklepamo lahko, da mišica biceps femoris pri tej starosti otrok še ni poglaviten dejavnik maksimalne hitrosti teka.

Ključne besede: *skeletna mišica,* biceps femoris*,* vastus lateralis*, tenziomiografija, pediatrija*

INTRODUCTION

Nowadays, we are faced with fast lifestyle as a society, which influences individuals' health, social, cultural, and physical statuses. Children are one of the more vulnerable groups within a society. Therefore, we should pay special attention to their development. Childhood is a very sensitive period and is, in general, characterized by various dynamic changes in physiological and psychological development, as well as the establishment of healthy or unhealthy behaviour (Faigenbaum & Myer, 2012). As a result of global health trends, there is a growing interest in children's physical exercise; and, thus, consequently in their body growth and development.

Tensiomyography (TMG) is a non-invasive tool for the assessment of skeletal muscle contractile properties (Valenčič & Knez, 1997) which are related to muscle composition (Dahmane, Valenčič, Knez, & Eržen, 2001; Šimunič et al., 2011). Rodríguez Ruiz, et al. (2011) performed a study amongst 84 males who were divided into four age groups; teenagers, undergraduate students, adults and the elderly, and discovered a decline in Vm (tensiomyographicaly determined normalized muscle twitch response velocity, contraction time / amplitude of radial displacement) in the vastus lateralis in relation to age. In contrast, Vm values in biceps femoris (BF) did not change between age groups; although, the value was slightly reduced in the older age group. Furthermore, the researchers noted that changes in muscle composition are associated with the physical activity levels of individuals and, therefore, the changes in muscle response may not only depend on age but also on the amounts and types of physical activity (Rodríguez Ruiz et al. 2011).

There is great interest in muscle composition; however, it is more than evident that the invasiveness of the approach used in this research field is the main drawback for obtaining data on muscle composition as a representative sample. Further, the more common muscle to be observed by its composition is the vastus lateralis. Additionally, there is also a huge interest in other muscles that are even more important in childhood for children's health, posture, and motor development. However, sample sizes are rather small and longitudinal studies are very rare. Valenčič and Knez (1997) proposed a non-invasive and selective TMG where several TMG contractile parameters were defined (Valenčič & Knez, 1997), and where contraction time was later correlated to a proportion of slow-twitch muscle fibers within skeletal muscle (Dahmane et al., 2001; Dahmane, Djordjević, Šimunič, & Valenčič, 2005; Šimunič et al. 2011). The TMG contractile parameters were found to be highly reliable (ICC $r > 0.85$; Šimunič, 2012).

Oliver, Lloyd, and Rumpf (2013) claimed that sprinting speed is one of the distinguishing indicators of successful motor performance in children and is developed throughout childhood and adolescence, as children grow and mature. Indeed, a failure to master sprinting may be an enormous barrier preventing children from gaining more complex physical activity skills. These authors also suggest that speed during this period is developed in a nonlinear manner due to the large maturational influence associated with increases in limb lengths, increased muscle mass, and changes in intrinsic muscle-tendon properties. Additionally, gender differences in speed development become

apparent at the onset of puberty, with girls making limited gains in speed throughout adolescence, contrary to boys for whom large gains in speed could be observed. These authors also noted paucity of research studies on speed and muscle development for the above pediatric population (Oliver et al., 2013).

Therefore, we aimed at analysing the correlation between vastus lateralis and biceps femoris contraction time with maximal running speed and, furthermore, at establishing how contraction times of both abovementioned muscles are related to standard anthropometric measures (body height and mass, ROHR index) at different ages and sexes.

METHODS

Participants

Recruitment of participants started in September 2001 in three different Slovenian regions: Ljubljana region, Maribor region, and the Primorska region. Primary schools in these regions were randomly selected. Therefore, the participants come from five different Slovenian towns (Table 1), two of which are major cities covering central and northeast Slovenia, and three small towns covering the coastal region. In this way, we ensured that the sample covered the whole of Slovenia.

Table 1. Selection of regions, primary schools and towns included in the 5-year longitudinal study.

City	Primary School	Town
Ljubljana region	Tone Čufar	Ljubljana
	Valentin Vodnik	Ljubljana
	Dr. Vito Kraigher	Ljubljana
Maribor region	Prežihov Voranc	Maribor
	Slava Klavora	Maribor
	Tone Čufar	Maribor
Primorska region	Anton Ukmar	Koper
	Vojka Šmuc	Izola
	Ciril Kosmač	Piran

Researchers organized short workshops for the school head teachers, physical education teachers, the children, and their parents, with the aim of presenting the purpose and the aims of the research study, the research design, to present the measurement protocols and tools, and to invite potential participants. Throughout the workshop execution, the researchers were available for answering any questions which might occur during the session in order to clarify any dilemmas regarding the study.

In regard to the recruitment process, 300 children in total were selected (100 children from each region), of which 265 children participated in the baseline study (138 boys, 127 girls). In the first follow-up study, 263 children (125 boys, 138 girls) participated, in the second follow-up study 252 children (127 boys, 125 girls), in the third follow-up study 179 children (98 boys, 81 girls), in the fourth follow-up study 175 children (98 boys, 77 girls), and in the last the fifth follow-up study, there were 176 children (96 boys, 80 girls). To summarize, 107 children (53 boys, 54 girls) (initial measurement average age 9.1 ± 0.5 years) who had completed all six longitudinal measurements were selected for the analysis. At the baseline, the study participants attended the third grade of primary school and at the last follow-up study they attended the eighth grade.

The selection process was performed by researchers with the support of teachers in a manner which prevented any possible bias (i.e. gender, geographical distribution, anthropometrical characteristics). However, children eligible to participate in this study had to be in good health. None of the children had had any history of neuromuscular disorders or muscle diseases. During the recruitment process and before carrying out any research study at the baseline or follow-ups, the participants and their parents were informed that any participation in the study was strictly on voluntary basis. Additionally, they were informed that the participants could withdraw from the study at any time and for any reason, and that the collected data would only be used for the research purposes. Therefore, the parents of the children gave their written consent for them to participate in the study. Moreover, all procedures conformed to the 1964 Declaration of Helsinki and were approved by the National Medical Ethics Committee of the Republic of Slovenia.

The organizational settings of the conducted longitudinal study were the same within all three regions.

Procedures

The 5-year-long research was conducted once per school year from 2001 till 2006, and it included single-point quantitative research studies and the following measurements of:

- anthropometrical characteristics;
- contractile properties of skeletal muscles; and
- running speed.

Measurements of Anthropometrical Characteristics

Participants' body masses and heights were measured by using standard tools. The body mass was measured to an accuracy of 0.1 kilograms, while the height was measured to an accuracy of 0.5 centimetres. All participants were barefoot and wearing their sportswear during the measurements. On the basis of the measured variables, each body mass index (ROHR's index) was calculated. ROHR's anthropometric index is a statistical data, which combines a participant's height and mass into a metrical form. Actually, both ROHR's as well as the body mass index (BMI), serve the purpose of classifying individuals into categories of underweight, normal, and obese. BMI measurement projects a two-dimensional square state by measuring the mass per square unit of surface area, while ROHR's index assumes that the body is a three-dimensional cube and, therefore, measures the mass per cubic unit of volume. ROHR's index takes into account both the width and circumference, unlike BMI which projects that the breadth and scope of an individual is proportional to his / her height. ROHR's index was, therefore, chosen as a better indicator of the children's and adolescents' nutritional statuses (Foster, Voors, Webber, Frerichs, & Berenson, 1977; Kokol et al., 1992; Omura, Zinno, Harada, & Inoue, 1993; Freedman & Perry, 2000). The measurements of anthropometrical characteristics were performed on three sport science students.

Measurements of Contractile Properties of Skeletal Muscles

The contractile properties of their skeletal muscles were measured using the TMG method. TMG detects radial displacement of the skeletal muscle belly during maximal isometric twitch contraction (Valenčič, 1990), and has been developed in the Laboratory for Skeletal Muscles and Biomedical Imaging (LBM) at the Faculty of Electrical Engineering, University of Ljubljana, Slovenia. Measurements were performed on two muscles vastus lateralis and biceps femoris of leg-dominant sites. Measurements on the vastus lateralis were performed in supine positions at knee angles set at 30° knee flexion, where 0° represents the extended joint. Measurements on the biceps femoris were performed in prone positions at a knee angles set at 5° knee flexion. A measured muscle was in a relaxed predefined position and muscle contraction was evoked by brief electrical stimulus. To this end, we used a pair of self-adhesive stimulation electrodes (AxelGaard, Pals) within this study with a diameter of 50 millimetres. The muscle was measured in a bipolar way in that we installed the negative electrode (cathode) 5 cm distal, and the positive electrode (anode) 5 cm proximal to the measurement point. The measuring point was selected at a place where the belly muscle was the largest and additionally ensured that the selected place was between the two electrodes. In doing so, we used the experimental measurements, palpation and re-installing the electrodes and sensors if needed. Due to the fact that each muscle has its own specific anatomic structure, we had to make adjustments according to the locations of the measuring equipment. The sensor was set perpendicular to the skin overlying the muscle belly: in vastus lateralis at 30 % of the femur length above the patella on the lateral side; in biceps femoris at the midpoint of the line between the fibula head and the ischial

tuberosity. In order to elicit twitch contraction, we used a single one-millisecond pulse applied through the cathode and the anode. The stimulation current at the start was just above the contraction threshold and then it was gradually increased until the response amplitude did not increase any further. Two maximal twitch responses were recorded and saved.

The maximal displacement amplitude and the contraction times were calculated from each twitch response, as proposed by Valenčič (1990) and Valenčič and Knez (1997). Maximal displacement amplitude (Dm, in millimeters) was defined as the peak amplitude on the displacement-time curve of the TMG twitch response. The contraction time (Tc, in milliseconds) was the time from 10 % to 90 % of Dm being reached. The average value of these parameters, extracted from two twitch responses, was used for further analysis. TMG measurements were performed by an expert from the field of electrical engineering and computer science, four physical education teachers, and five undergraduate sport sciences students. The measurements were supervised by a medical doctor.

Measurement of the Running Speed

Prior to testing the maximal running speed, all the children were appropriately warmed up, which lasted approximately 20 minutes. The warm-up process was composed of running (5 minutes), stretching (5 minutes), and warm-up running practices (10 minutes). The children's warming-up process was always conducted by the same person and by using the same procedure. Each participant had the opportunity of two experimental sprints. Maximal running speed was measured at a distance of 7 meters from a flying start. During the measurement process, the participants performed preliminary runs, then followed the first photocell checkpoint, and after 7 meters the second photocell checkpoint.

We divided up the running distance of 7 meters to include a sprint time from which we calculated the sprint speed. Each participant repeated the sprint twice and the better result was used in the further analysis. Maximum running speed was measured by using a wireless Brower measurement system (Brower Timing Systems Ltd., USA).

Design and Measures

Detailed description of all study procedures and design are presented in Figure 1. We performed six repeated measurements of the children's progress from the third to the eighth grade of their primary schools. Every measurement was performed using the same procedure. A week before the study, each school was notified to follow a specific protocol prior to the measurement, namely, that all major physical or sport activities were discouraged two days before the measurement. All the recruited participants were invited to participate at each study / measurement. A detailed description of the recruitment and data collection is presented in Figure 1.

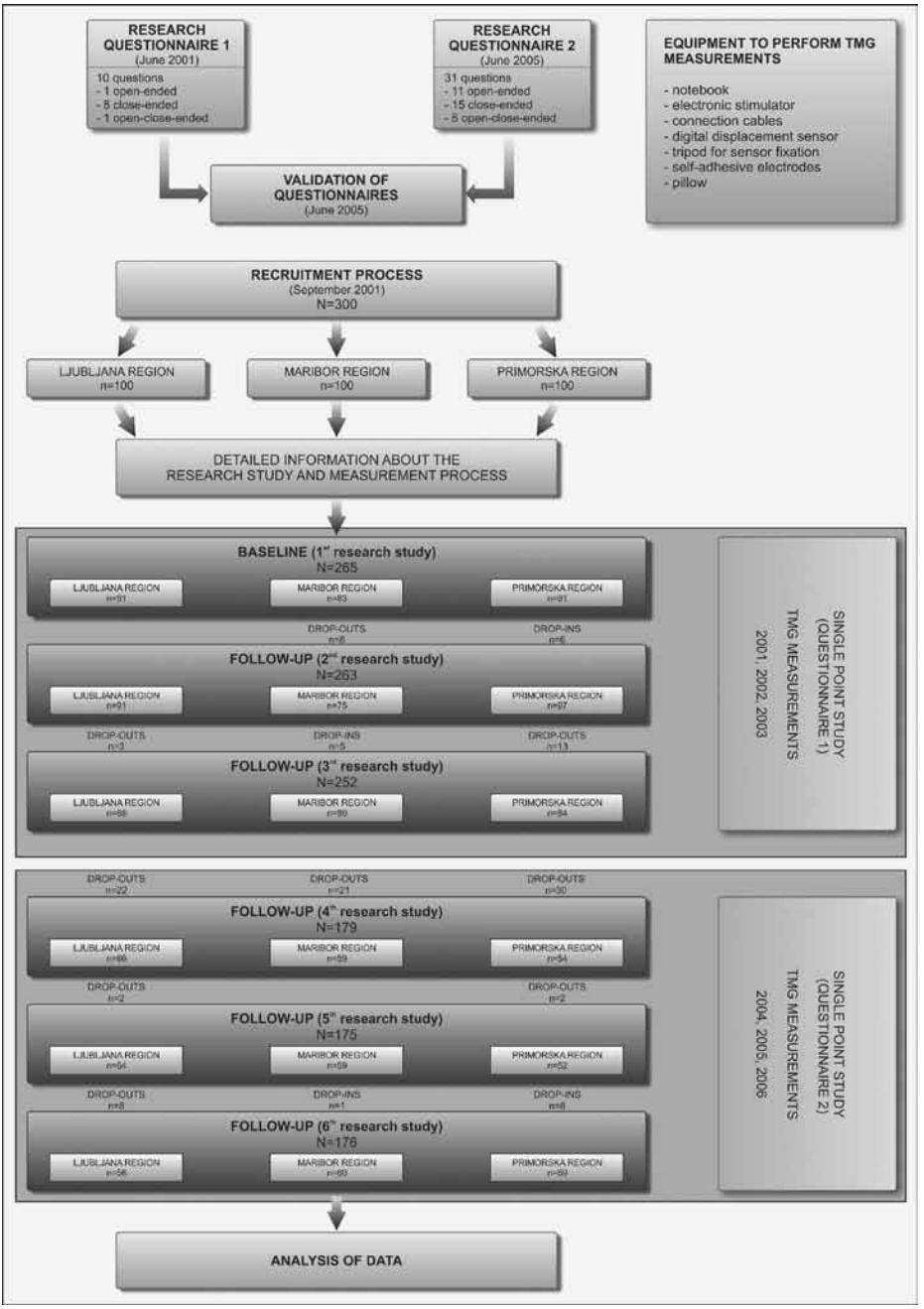


Figure 1. Flowchart of recruitment and data collection procedure

Data Analysis

All data are expressed as means ± standard deviations. For all variables, the hypothesis of a normal distribution was tested and confirmed using visual inspection supported by D'Agostino's normality procedure and Kolmogorov-Smirnov test. Morphologic growth was analyzed by 2-way RM ANOVA, with age as a repeated measure and gender as a fixed group. For correlating vastus lateralis and biceps femoris Tc with running speed, a Pearson correlation coefficient was calculated. Statistical significance was accepted at $p<0.05$ level.

RESULTS

Background of the Participants

In all six-measurement points in total, 107 participants being included; their average age, body height and body mass is shown in Table 2.

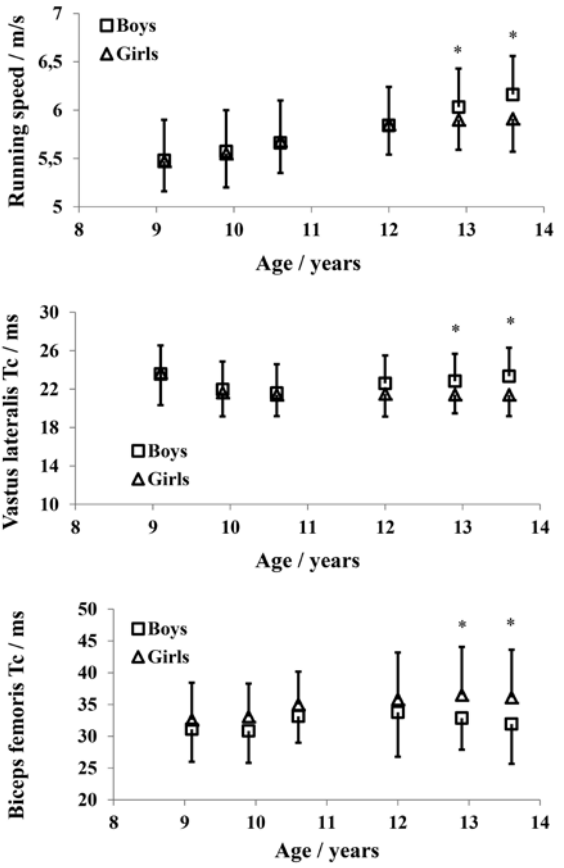
Table 2. Longitudinal descriptive anthropometrical data of 53 boys and 54 girls at different age.

Age / years	Body height / cm		P	Body mass / kg		P	ROHR's index / kg / m3		P
	Boys	Girls		Boys	Girls		Boys	Girls	
9.1±0.5	139.6±6.5	139.5±7.2	0.905	34.9±7.2	32.7±6.8	0.110	12.7±1.78	12.0±1.66	0.025
9.9±0.5	143.4±6.9	143.5±7.5	0.962	37.8±8.2	36.1±7.5	0.257	12.7±1.96	12.1±1.70	0.097
10.6±0.5	147.6±7.2	148.4±7.6	0.602	39.5±8.8	37.4±7.8	0.188	12.2±1.88	11.3±1.54	0.015
12.0±0.5	156.5±7.9	158.4±7.5	0.215	48.5±10.8	45.8±9.0	0.160	12.5±1.92	11.4±1.59	0.002
12.9±0.5	162.6±8.1	162.4±6.9	0.883	53.5±11.6	50.7±9.3	0.166	12.4±2.12	11.8±1.68	0.109
13.6±0.5	167.2±8.0	164.5±6.5	0.058	56.8±11.7	54.3±8.7	0.016	12.1±1.96	11.6±1.49	0.162

Child anthropometrical growth could be classified as normal, following general trends. There was a significant age effect on body height ($p<0.001$), body mass ($p<0.001$) and ROHR's index ($p<0.001$) with a significant age × gender interaction effect on body height ($p<0.001$), body mass ($p=0.028$), and ROHR's index ($p=0.026$).

Vastus lateralis and biceps femoris Tc and running speed correlation analysis

In Figure 2, a descriptive data for vastus lateralis and biceps femoris Tc is presented, as well as for maximal running speed for both muscles and genders. In Tables 3 and 4, a correlation analysis is presented for both muscles and genders. We found sex-related differences only after the age of 12.9 years in all three presented variables. Furthermore, a longitudinal trend reveals that there was no significant correlation between running speed and vastus lateralis Tc; however, significant negative correlation for biceps femoris Tc and running speed could be confirmed in boys after the age of 12.9 years (Figure 3).



** p<0.05 between sexes*

Figure 2: Longitudinal descriptive analysis for vastus lateralis and biceps femoris contraction time (Tc) and maximal running speed.

Table 3. Pearson correlation between vastus lateralis contraction time and running speed.

	Boys		Girls	
Age / years	**Pearson r**	**p**	**Pearson r**	**P**
9.1 ± 0.5	-0.048	0.367	-0.033	0.408
9.9 ± 0.5	-0.062	0.331	-0.053	0.352
10.6 ± 0.5	-0.118	0.201	-0.070	0.309
12.0 ± 0.5	-0.167	0.115	0.037	0.396
12.9 ± 0.5	-0.170	0.112	0.351	0.399
13.6 ± 0.5	-0.172	0.109	0.043	0.380

Table 4. Pearson correlation between biceps femoris contraction time and running speed.

	Boys		Girls	
Age / years	**Pearson r**	**p**	**Pearson r**	**P**
9.1 ± 0.5	0.118	0.200	0.130	0.175
9.9 ± 0.5	-0.021	0.441	-0.020	0.390
10.6 ± 0.5	-0.195	0.081	0.085	0.270
12.0 ± 0.5	-0.177	0.097	0.128	0.178
12.9 ± 0.5	-0.426	0.001	0.117	0.200
13.6 ± 0.5	-0.391	0.002	0.125	0.182

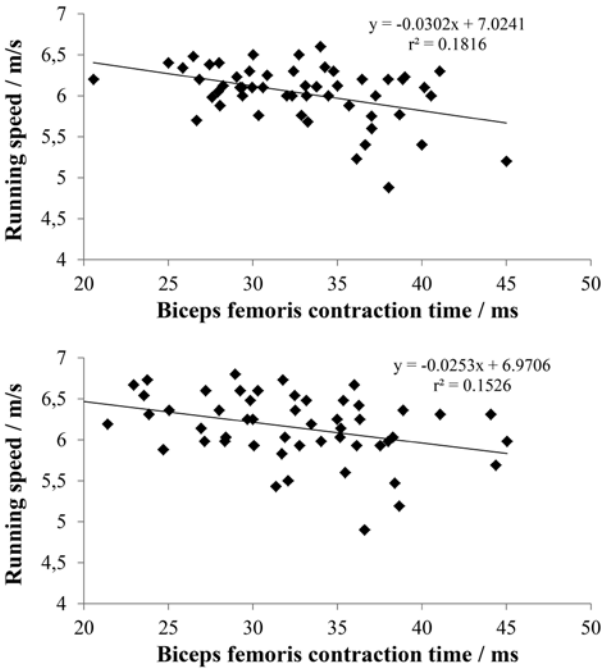


Figure 3: Pearson correlation for biceps femoris contraction time (Tc) and maximal running speed at age 12.9 (left) and 13.6 (right) years.

Correlation between body mass, height, ROHR index, and Tc of vastus lateralis and biceps femoris

While the TMG measurement tool or running speed measurement equipment are not readily available to parents, average school sports teachers or sport club trainers, we decided to analyse how simple anthropometrical measures like mass, height and ROHR's index are correlated to Tc of vastus lateralis and biceps femoris muscles to enable them to have some indicators for predicting the muscle developments and sport talents of young adolescents. Table 5 presents the correlations between body mass, height, and the ROHR index and the Tc of biceps femoris and vastus lateralis muscles for all six measurement points (baseline and 5 follow-up studies). It is evident, that the correlations between the contraction times of the vastus lateralis muscle and the anthropometrical measurements is more frequent than for the BL muscle. To be precise, at least one anthropometrical measurement correlated with the contraction time of the vastus lateralis muscle for the 4th till 6th measurement points. On the contrary, the biceps femoris muscles contraction times are more correlated with anthropometrical measures

at the baseline and the first and the second follow-up compared to the third, the fourth and the fifth follow-up studies.

Table 5. Significant correlations between body mass, height, ROHR index, and contraction time of biceps femoris (BF) and vastus lateralis (VL) muscles.

Average age / years		9.1 ± 0.5	9.9 ± 0.5	10.6 ± 0.5	12.0 ± 0.5	12.9 ± 0.5	13.6 ± 0.5
	Anthropometrical measurements						
9.1 ± 0.5	Body mass	-BF			+VL	+VL	+VL
	Body height				+VL	+VL	+VL
	ROHR index	-BF					-BF
9.9 ± 0.5	Body mass				+VL	+VL	+VL
	Body height				+VL	+VL	+VL
	ROHR index	-BF	-BF				-BF
10.6 ± 0.5	Body mass				+VL	+VL	+VL
	Body height			+VL	+VL	+VL	+VL
	ROHR index	-BF			-BF		-BF
12.0 ± 0.5	Body mass				+VL	+VL	+VL
	Body height				+VL	+VL	+VL
	ROHR index	-BF					-BF
12.9 ± 0.5	Body mass	-BF	-BF		+VL		-BF, +VL
	Body height		+VL		+VL	+VL	+VL
	ROHR index	-BF			-BF		
13.6 ± 0.5	Body mass	-BF	+VL		+VL	+VL	-BF, +VL
	Body height		+VL	+VL	+VL	+VL	+VL
	ROHR index	-BF			-BF		-BF

Interestingly, the ROHR's index is obviously a better predictor of contraction times for biceps femoris muscles compared to mass and height, indeed, it only correlates with biceps femoris muscles and not in any instance to vastus lateralis muscles. On the other hand, the height is a better predictor for the vastus lateralis muscle contraction time than the mass.

DISCUSSION

Our longitudinal study contributed with an insight into children's skeletal muscle development, focusing on skeletal muscle composition. Using a non-invasive TMG, we assessed muscle composition related to the contractile parameter (Tc) in two skeletal muscles. Although there were initially 263 children included in the study, representative subsamples of 107 children (42 %) were present in all six measurements. TMG assessment requires electrical stimulus to evoke muscle contraction and some of the children found this as being less appropriate for them and so they were not forced to cooperate during the measurement. This was also the main reason for not performing the TMG assessment. Other reasons were illness or injury, absence from school, changing schools, etc. Skeletal muscle composition is very difficult, if not even ethically impossible, to measure in healthy children. Therefore, using a non-invasive approach we presented age- and gender-related longitudinal trends in Tc in the two skeletal muscles.

There are numerous data about vastus lateralis composition in adults but only few in children (Bell, MacDougal, Billeter, & Howald, 1980) and in adolescents (Glenmark, Hedberg, & Jansson, 1992). Johnson, Polgar, Weightman, and Appleton (1973) reported 37.8 % and 46.9 % at muscle surface and deep site, respectively. In a longitudinal study, Glenmark et al. (1992) found different developments of fibre type composition with increased age from 16 to 27 in women and men: the type I percentage tended to increase in the women from 51 % to 55 % and decrease significantly in the men from 55 % to 48 %. Fibre cross-sectional areas remained unchanged in both genders. They suggested gender-related fibre type 1 adapted during increased age. In children, Bell et al. (1980) found 58.8 % type1 fibers and concluded that the distribution patterns and ultra-structures of skeletal muscles in six-year-old children was not different from normal adult tissues. However, this study showed no correlation between vastus lateralis contraction time and running speed in both sexes at any age, which is rather logical since the fact that vastus lateralis muscle is not the most important muscle for maximal running speed (Praprotnik, Valenčič, Čoh, & Šimunič, 2002). However, from this study we also found positive proportional correlations between the contraction time of the vastus lateralis muscle and anthropometrical measurements (i.e. body mass, body height) in children older than 12.0 ± 0.5 years; meaning that heavier and taller participants have shorter contraction times for the vastus lateralis muscle.

Vastus lateralis muscle

In the lateral muscle of the knee extensors on the dominant side, we found that the contraction time changes with age, in boys faster than in girls. In boys, according to the third grade results (at the baseline) we found significantly lower contraction times in the fourth and the fifth grades, while in girls we measured significantly lower contraction times in the sixth and the seventh grades. A short contraction time means that the muscle is faster in younger boys than in girls. Differences between correlations according to sex showed significant deviations; meaning that the girls in the seventh and eighth grade had shorter contraction times, due to the fact that their outer knee extensor muscles on the dominant side were faster during this period of time.

Vastus lateralis muscle is an anti-gravitational muscle and as such receives a lot of mechanical stimuli for its adaptation − hypertrophy. Shorter contraction times in the fourth and the fifth grades were witnesses to increasing in physiological cross-section of the rapid muscle fibres, which may be the answer to the intense movement triggered by muscles in the legs. However, the subsequent extension of Tc does not confirm the long age-range. One of the possible causes for an extension of the period Tc in the 6th grade can be with age and physical habits associated with an increase of the pennation angle of the muscle fibres and, thus, less effective transfer of forces to the tendons or bone. In the more pennant muscles, the forces are transferred slower to the attachment of the bone. We assume also that the cause of the extension of Tc in the period from the 6th to 8th grades could be a less active lifestyle at this age. Differences in girls during this period of age could be explained by developmental delay, which is also identified in the speed of sprint.

Biceps femoris muscle

Analysis of the biceps femoris muscles on the dominant side of the body showed that the times of contractions varied with the ages of the children. However, post hoc analysis did not show significant variations in the boys belonging to the third grade. The girls belonging to the third grade did have significant longer contraction times in the fifth, sixth, seventh and eighth grades. Analysis by sex showed significant deviations, namely that the girls had longer contraction times in the seventh and eighth grades, which means that girls compared with boys have slower biceps femoris during the second half of elementary school.

Biceps femoris is not an anti-gravitational muscle and, therefore, there has little everyday mechanical stimuli. This alone can explain the longer Tc versus vastus lateralis muscle. It is interesting that the Tc observed in girls extends through this period, while in boys only to the sixth grade and then it decreases again. This finding coincides with the kind of changes in muscle biceps femoris, which can be confirmed by the characteristics of the life-style, since boys use their legs more from a certain age, while the girls use their hands more. The biceps femoris muscle is used mainly

during various high-speed runs, changing directions, jumps, the trends of which are more typical of boys.

The relation between the contractile properties of the vastus lateralis and biceps femoris skeletal muscles and the maximum running speed

In order to see the connection between the contractile properties of the skeletal muscle and the maximal running speed, we first present the development of the maximal running speeds and the contraction times of the vastus lateralis and the biceps femoris, by age:

- maximal running speed of the boys over the whole measurement period grew, while for the girls it only grew up to the seventh grade;
- the contraction times of the vastus lateralis first declined to the fourth grade and later went upwards, significantly more in boys than in girls;
- the contraction times of the biceps femoral increased over the whole measurement period.

Analysis of the results showed that there was a significant negative correlation between the maximal running speeds and the contraction times of the biceps femoris in boys. This relationship was characterized only from the sixth to the eighth grade and amounted to between -0.21 and -0.29. Regression analysis of the variance showed that the correlation was relatively low, as it was represented by only 8.4 % of the explained variance. As for the girls, the correlation was not determined during any of the measurement period. There was also no evidence found of any correlation between the maximal running speeds and the contraction times of the vastus lateralis, neither in boys nor in girls.

A negative correlation was found confirming that there was a significant correlation between the biceps femoris and the maximum running speed. It is known that the period between the ages 6 to 11 years, or the early school period, as we like to call it, is the most suitable period for the development of children's motor potentials and the learning of movement patterns. The child learns new movement techniques very quickly and without much effort (Shaffer & Kipp, 2009; Koffka, 2002). When children develop coordination, they also change their ways of running. It seems that boys run technically more correctly and they do include a biceps femoris during the running process. The correlation though was only -0.29 but this was the result of poor technique just at the start of a proper running process. In the study (Praprotnik et al., 2002), the correlation between the femoral biceps muscle and the maximum speeds of the adult athletes was studied, specifically male sprinters. They found a correlation of -0.60. A greater coherence was the result of optimal running using a proper technique and by taking advantage of the biceps femoris muscle. In the girls, we did not detect correlations, which can be attributed to their later motor development. Dolenec and Pistotnik (2001) found that in most tests of coordination boys perform better than girls. At the age of 8 or 9, the only statistically significant differences between sexes occur in their capacities to

carry out rhythmic structures, namely, in the benefit of girls, meaning that during this period the girls are not using the biceps femoris as much as boys. It is also true that to date there is no known correlation with adult female sprinting events.

Gender differences in the contraction times of vastus lateralis and biceps femoris skeletal muscles and the maximal running speeds

After identifying the impact of regular sporting activity on the maximal running speed and to the biceps femoris, we checked if the contraction time of the skeletal muscle and maximal running speed differed between the sexes. We found that:

- contraction times of the skeletal muscle were significantly different between the sexes. Throughout the period of the measurements, the following were discovered: vastus lateralis contraction time is shorter in girls, while contraction time of the biceps femoris is shorter in boys;
- maximum running speed differs between sexes where boys reach a higher maximum speed of running than girls. Significant differences were not confirmed only at the age of 10 to 12 year olds.

The vastus lateralis muscle has shorter contraction time in girls during the period of the seventh and eighth grade. In reviewing the periods in which the muscles in girls are faster than in boys, the question appears as to the impact of growth and maturing of the nervous system. It is known that the myelination of the nervous system is crucial for the responsiveness of the muscles, significant differences in the speed of muscle coincides with the so-called blast growth in the middle and late childhood and adolescence (Tomazo-Ravnik, 2004). The period of late childhood, which is from the age of 7 to 10 for girls and from the age of 7 to 12 for boys, is characterized by rapid linear growth of the limbs. The following growth surge occurs during adolescence, beginning with pre-puberty and lasts for about two years, from 11 to 13 years of age in girls and from 12 to 14 years of age in boys. At this stage, a rapid increase occurs in some of the dimensions of the body. Faster growing and maturing of girls could have an impact on their faster muscle responses.

Boys had higher maximal running speed, significantly in the seventh and eighth grade. The exception was in the fifth and sixth grades, where girls were faster but it was not significant.

The previous study (Praprotnik et al., 2002) that was also confirmed by our findings, reported that the biceps femoris muscle was correlated to the maximal running speed ($r = -0.60$). Furthermore, they reported also significant correlation for gastrocnemius lateralis Tc with a maximal running speed ($r = -0,39$) and even bigger correlation was found between half relaxation time of biceps femoris with a maximal running speed ($r = -0.66$). It seems that time-based contractile parameters assessed using TMG are negatively related to maximal running speed. The study of Praprotnik et al. (2002) was conducted on twenty-seven Slovenian adult sprinters and confirmed the primary

importance of the biceps femoris muscle when implementing the propulsive phase of sprint running.

In the analysis of the results, several questions were raised, why the biceps femoris muscle contraction time appears equal for both sexes, and why boys experience higher maximum running speeds than the girls. The answer could be sought in the differences in the muscle masses of children. It is well known that the key biomechanical parameter that affects the speed of running is muscle power, which is the product of force and speed. Using the contraction times of muscles, we measured the rate of shortening, however, this did not cover the muscle mass which affects the maximum force. Šimunič, Volmut, and Pišot (2010) presented that overall muscle mass in boys is higher than in girls by 13 % to 17 % between the ages of 8 to 13. This may explain the higher running speed of boys, although the contraction times of the biceps femoris are the same.

It is known that the biceps femoris can be trained to a greater extent, because it contains the largest number of fibers of type IIc or satellite-based fibers which can be, depending on the functional requirements of the body, transformed into fibers of type I or II.

Djordjević, et al. (2000) measured biceps femoris contraction time in two groups: in non-athletes and sprinters. The difference in the biceps femoris contraction time between both groups was 35.5 %, which confirms the correlation between muscle contractile property and maximum running speed. Differences between athletes and non-athletes were also found by Šimunič, Pišot, and Rittweger (2009), who measured the contractile properties of biceps femoris and vastus lateralis in master athletes and comparable controls. These findings suggest that regular exercise affects muscle properties and were also confirmed by our results.

Undoubtedly, the maximum running speed is affected by the development of the child and, consequently, in the correct technique of running the maximum running speed is also affected by the proper integration of the biceps femoris muscles during the process of running. Among other determinants of the maximal running speed (body dimensions, muscle power, stiffness, etc.) described by Åstrand et al. (2003), Schepens et al. (1998) found also significant increase in step frequency after the age of 12 years, where strengthening of the muscles has a decisive impact on the run, however, differs by gender. In a number of conducted studies, a difference was found in the choice of discipline. Men are more often involved in team sports, while girls prefer to engage in individual sports disciplines (Pears Dawes, Vest, & Simpkins, 2013). When choosing a discipline, it is also important considering their popularity. Boys are often involved in football, basketball, and athletics, while the girls engage in gymnastics, swimming, and athletics (Volmut, Pišot, & Šimunič, 2013). A possible answer would be different muscle compositions by gender but research to date does not support such a hypothesis. Significant differences in the percentage of fibre types between the sexes do not exist (Drinkwater, 1984; Staron et al., 2000). Although women have a smaller cross-section of muscle fibres than men (Always, Grumbt, Gonyea, & Stray-Gundersen, 1989), a possible explanation of shorter contraction time in women can also be in a smaller weight of the body in which the muscles work.

Study Limitations

The limitations of the study are in the selection of the research environment, namely, only three of twelve Slovenian regions were selected for performing this study. Although instructions and test sprinting trials were clearly stated, we did not check for achievement of maximal sprinting speed using redundant photocells setup.

CONCLUSION

The research focuses on studying children's motor development, specifically the biomechanical properties of skeletal muscles in relation to the physical development and growth (anthropometrical characteristics). After the age of 12.9, girls have shorter Tc in vastus lateralis but boys have shorter Tc in biceps femoris. Furthermore, shorter Tc in biceps femoris was found to correlate with higher running speed; however, the correlation was much lower than in adults. Non-invasive and selective assessment of muscle's contractile parameters in two skeletal muscles contributed to some important understanding of children's skeletal muscle development.

Acknowledgement

This study was funded by the Slovenian Research Agency through two three-year projects and performed by the Institute for Kinesiology Research, Science and Research Centre, University of Primorska in cooperation with Dr. Adolf Drolc Healthcare Center Maribor. The authors would like to thank the research group of the TMG-BMC Company and the research group of the Department of Muscle Biomechanics at the Faculty of Electrical Engineering, University of Ljubljana. Finally, we are thankful to school head teachers, their physical education teachers, all the participants in the study, and the parents for their willingness to participate in a study of such magnitude.

Funding

The presented longitudinal research study was a part of two national projects financed by the Ministry of Education, Science and Sport of the Republic of Slovenia: the applicative project with the title "The role of the biomechanical skeletal muscle properties in children's motor development" and the basic project with the title "Monitoring the biomechanical properties of skeletal muscles in childhood and adolescence" performed by the Institute for Kinesiology Research, Science and Research Centre, University of Primorska in cooperation with Dr. Adolf Drolc Healthcare Centre Maribor.

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original scientific article
received: 2016-08-18

UDC: 796.015.1.332:001.8

THE ROLE OF SMALL-SIDED GAMES IN MODERN SOCCER AND THE ISSUE OF THEIR HOLISM

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ABSTRACT

In the modern soccer, small-sided games (SSG) present a significant proportion of the whole training process. SSG are introduced regularly and with different emphases, depending on the players' basic technical skills and on the training objectives, but also according to different (sports) cultural contexts. SSG immersed into the wider soccer area at different speeds and with different emphases, often with rather modified designs. Due to their extraordinary adaptability and efficiency, SSG as a working method have undergone a great expansion. Their design and (possible) versatility are explained in this paper from a somewhat unusual perspective of the systemic theories as the theories of achieving the greatest possible holism of our reflections and actions. In the foreground of this paper there is the question of SSG integrity (as the prevailing practical methods of work in modern football practice), through the analysis of the conditions required in order to classify the use and further development of SSG in practice as an innovation, taking into account the laws of requisite holism and innovation.

Keywords: *soccer, small-sided games, requisite holism, innovation, innovative working.*

VLOGA IGRALNIH OBLIK V SODOBNEM NOGOMETU IN VPRAŠANJE NJIHOVE CELOVITOSTI

IZVLEČEK

Igralne oblike (IO) tvorijo v sodobnem nogometu precejšen delež celotnega procesa vadbe. Vanj se IO vnašajo redno in z različnimi poudarki, glede na osnovno tehnično znanje igralcev in na cilje treninga, vendar tudi glede na različne (športno)kulturne kontekste. Igralne oblike so se z različno hitrostjo in z različnimi poudarki vsidrale v širši nogometni prostor, pogostokrat tudi s precej spremenjeno zasnovo. Zaradi izjemne prilagodljivosti in učinkovitosti so igralne oblike, kot metoda dela, doživele velik razmah. Njihova zasnova in (možna) vsestranskost bo v tem prispevku pojasnjena z nekoliko bolj neobičajnega vidika, to je z vidika sistemskih teorij kot teorij o doseganju čim večje celovitosti razmisleka in ravnanja. V prispevku je v ospredju vprašanje celovitosti igralnih oblik (kot prevladujoče praktične metode dela v sodobni nogometni praksi), preko analize pogojev, ki so potrebni zato, da uvrščamo uporabo in nadaljnji razvoj igralnih oblik v praksi kot inovacijo, ob upoštevanju zakonov o potrebni in zadostni celovitosti ter inovativnosti.

Ključne besede: *nogomet, igralne oblike, potrebna in zadostna celovitost, inovativnost, inovativno poslovanje.*

INTRODUCTION

SSG as a special segment of the practical methods of work and methods of the game (Elsner, 1997) are an extremely widespread and efficient method of work in modern football. This methodical approach appears regularly in all football-developed countries in the world. Although with different emphases and repeatedly revised baselines and at different time sequences, they were successfully anchored almost anywhere. In Europe, the beginnings of SSG occur in the late sixties and early seventies in Germany where this approach was apparently established thanks to Horst Wein (http://www.ydsocceracademy.com/index.php/articles/35- history-of-the-small-sided games).

A brief description of the developmental path of SSG in Europe

The beginnings of SSG, for instance, appeared slightly later in Italy, only in the late 1980s. Of great importance at that time was the article of the Frenchman Christian Bourrel, who, in cooperation with the Italian federal coach Maurizio Seno (1989), wrote *Allenare i dilettanti* (Amateur footballers training) and defined the general theo-

retical and methodological bases. The visible effects of the then-prevailing pedagogical thinking are notable, in particular the famous French pedagogue Bernard Aucouturier. "Active pedagogy", as a basis of teachning the sports elements, therefore entered the Italian soccer space, that mostly still did not know this approach at the time (Costantini, personal communication, 08 May 2015; Seno, personal communication, 05 May 2015). The Italian version of SSG was literaly called the thematic game, games on the (selected) theme (It. Giochi / partitelle a tema).

In Slovenia, in fact, in the former Yugoslavia, they got to know the SSG as a result of the academic exchanges that were maintained by some of the professors from the Faculty of Sport, University of Ljubljana, in particular with the major European football/soccer centers in Germany. The Slovenian pioneers in the field were Branko Elsner, Ph.D., and then Zdenko Verdenik, Ph.D. Their simultaneous engagement in the academia of the former College of Physical Education (later the Faculty of Sport), University of Ljubljana, and in the circles of the former Football Association of Yugoslavia facilitated the transition of this new methodical basis into the learning process of the Soccer courses at the College and into the content of compulsory licensing of soccer coaches at the Football Association of Yugoslavia.

At the same time, the "new" approach to training covered all republican soccer centers in Yugoslavia, where it immersed very specificly. The Belgrade soccer profession, for example, probably accepted the professional challenge without the necessary systematization and contextualization; so, the already established school of teaching the soccer elements without this innovation ultimately prevailed there. The reason for this was mainly in the fact that, at the time, the "Balkan soccer school" was a widely acknowledged superpower in world soccer area; the Yugoslav coaches were greatly appreciated in the world; the Yugoslav national team did not lag behind the best ones in its results. Therefore, they felt that changes in the training process are not needed. SSG were in this area implemented only because of personal beliefs of individual coaches (especially Ivica Osim and Tomislav Ivić), and not as a specific feature of the local soccer school, which, in the design of the game, was still based on teaching the techniques and situational methods.

The Slovenian "path" to the enforcement of SSG was based on a more consistent and coherent development of SSG's initial methodological and substantive assumptions within the Soccer study course at the mentioned College. Transfer of the acquired knowledge and experience in the field of SSG in the program of teaching contents for the licensing of trainers was natural; that was also one of the reasons for the creation of the substantively and methodologically regulated basis to confirm the Slovenian route to the licensing of trainers that was approved by UEFA (in the first years after the independence of Slovenia) as an independent school for the education of coaches. It is worth mentioning that the method of the game was studied; in addition to the aforementioned Elsner and Verdenik, SSG's actual benefit/performance was somewhat later also studied by Pišot (1994). The then-magazine Trener, in which the two authors actually introduced the whole concept of work, also made a big contribution to raising the awareness and promoting the knowledge about SSG.

The FC Barcelona takes great credit for the overall implementation of SSG (also in terms of promotion) in the modern soccer. The incipients of SSG in Spain (Catalonia) are said to have been established already by Laureano Ruiz (Balague, 2013), who, as the first person in charge of Barcelona`s youth groups in the early 1970s, introduced the most elementary forms of "tora" (the version we know in Slovenia as "pepček") in the training process in Spanish soccer; he argues that he has not yet known such exercises. Barcelona's modern SSG undoubtedly present a step forward to an even greater "coming closer" of the SSG to the universal demands of the game. The so-called "positional playing" appeared in consolidating the legality of the game of this team, this time even at the level of the team tactics, which currently presents the highest level of complexity of the traditional SSG.

Multilateral purpose of SSG

SSG are means of socialization of soccer in society that needs orderly and cultural soccer player's personality; the socialization in the game is achieved indeed only through the most appropriate collective/team-effect, with discipline in the game, liability and psychological balance of the players (Verdenik, 1983, 2003). SSG that have actually replaced the so-called "ancillary games" ensure "(...) *the joy, relaxation, emotional experience; motivation is greater, individuality is sufficiently emphasized, the diversity of solving the game situations is abundant and the like*" (Elsner, 1997). It is also important to take into account the consequences of the potential dominance of that working method. Elsner (1997) notes, for example, that there may be "(...) *excessive individuality, automation of faulty execution of technical elements and indirectly an improper development of specific footbal/soccer motor elements, improper design of mutual communication and structural situations and the like*."

Because of clear freedom in the design (creating, structuring) that is allowed by SSG in the pursuit of the objectives, in the period from 1980 to 1990 in Italy, the application of SSG prevailed more for the development of motor abilities than for the development of technical/tactical skills of the players. *Games on the theme,* therefore became, in the modified form, the games "under pressure" (It. "giochi a pressione"). Their main objective was to develop particular energy components (endurance and strength). The application of SSG in this direction marked a whole decade of Italian soccer reality, while in principle, the situational method of work dominated as the basic method of work in the designing of the game (Costantini, Personal communication, 08 May 2015).

The use of SSG with the purpose of development of motor skills was specially exposed by several researchers across Europe and the world. They published the first prominent surveys (Bangsbo, 1998), which substantiate the use of SSG for the development of motor abilities as functional abilities of soccer players. It should be mentioned that the authors agree that a properly adjusted SSG has a very large fitness potential (Aguiar, Botelho, Lago, Macas, & Sampaio, 2012; Athanasios & Eleftherios, 2009;

Bangsbo & Lindquist, 1992; D'Ottavio, Colli, Bosco, & Tranquilli, 1997; Rampinini et al., 2007).

The aim of this paper is, inter alia, to explain the dilemma of the approach to SSG depending on a too narrow or as wide as possible (holistic?) definition, given the constant presence of dualism, which stems from practice: on the one hand, the prevailing reductionist theories and conservative and analytical approach to the training process and, consequently, also to the use of SSG, on the other hand, a more systemic approach (Cano, 2012, 2015). At the same time, the purpose of contribution to the analysis of the conditions that are necessary for the adoption of any new potential novelties in the working practices of innovation, which include, in particular, the law of the requisite holism and innovativeness.

METHOD

When examining the characteristics of SSG and their developmental path, the historical method and a case study was used. The findings of the qualitative approach to research have been complemented by views of two football experts with extensive experience in coaching from Italy (M. Seno and M. Costantini) and renowned Italian researcher in the field of conditioning (R. Colli).

When examining the conditions for the adoption of SSG as an innovation in football practice, the method of dialectical systems theory was used, which includes the law of requisite (i.e. appropriate) holism and the law of hierarchy of sequence and interdependence (Mulej, 1979; Mulej et al., 2013). In the treatment of the chosen theme, the law of entropy was incorporated (Mulej, 1979; Mulej et al., 2013). Using USOMID (Methodology for creative collaboration of many for innovative work) as applied methods for innovation in the work, we have studied the possibilities of success, which depend on the guidelines for appropriate comprehensive definition of objectives and guidelines for appropriate overall achievement (Mulej, 1979; Mulej et al., 2013).

DISCUSSION

The coach's experience and competence, the consideration of the local dynamics (including the social ones) and the general requirements permit the construction of more specific SSG, which are, according to the organization, selected topics and emphases specific to a given environment and (sport) context. The pronounced flexibility of SSG allows the manipulation of basic exercise parameters (number of players, size of the field, tasks in the game, the auxiliary players, etc.); therefore, it indirectly requires the coach's creativity, which can be indicated by the introduction of new, different organizational and substantive legalities, but also completely different ways of integration of these factors with the purpose of achieving the biggest effect possible.

The first condition: the requisite holism of SSG

The noted findings show that even in SSG one-sidedness is possible, but in reality − in order to utilize the most of their potential – the biggest possible holism is necessary. Holism as a word is easy to use, but difficult to precisely define. Different authors have different definitions (detailed in Mulej et al., 2013), either explicitly or implicitly. Literally speaking, it contains everything: *all the components and all their relationships (links, relations) and caused synergistic properties* that characterize this phenomenon. But: what is − all? Experience has shown that people − due to natural causes − cannot and do not want to think and act with such a width to cover *absolutely everything*, as required by the concept and demanded by Bertalanffy (1979), when he created his "General systems theory" "against over-specialization", i.e. against the common and dangerous one-sidedness of specialists. It turns out that, in fact, *everyone feels entitled to define what counts as a whole, according to their own criteria.* This also happens in soccer practice.

The mathematically generalized basis for the definition of a whole, with which the first authors of the systems theory have helped themselves (and achieved the overall impact), said that the whole (= a system, network) is *everything that is composed of a set of components and a set of connections, relationships between them*. In a strict soccer sense, this would mean that the whole covers all players with their abilities (also their opponents), the relationships between them (both in the defense and attack), results, strategy and chosen tactics, playing conditions, the spectators, coaches, other collaborators etc. It is generally a valid **isomorphism** (= similarity), which serves us well enough as long as the *substantive* aspect is less important than the *mathematical* basis for the description of the phenomenon on a general level. When we are interested in **substantive aspect**, we notice that the same reality, the same phenomenon can be described with many different *systems*, i.e. as a variety of wholes, because we look from various angles and, therefore, we observe and consider essential the different parts (!) of the actual characteristics of the phenomenon.

According to the chosen problem (the importance and role of SSG in soccer training), we can easily figure out already from everyday practices that the direction of using SSG can be very different in the forefront. It can be the methodical aspect (learning/teaching the soccer elements), economic aspects (certain game tasks performed by all the lower energy input, rationality), aspects of productivity (the actual usefulness of the selected SSG), organizational, aesthetic aspect, etc. Last but not least, we must also put the question of *the relationship and interaction between these aspects* and their integration into *emergent synergies*, for example, in working or in a match as the new system. In soccer, this means to take into account the interactions e.g. of a selected organization of SSG to actually teach the game element, i.e. the actual usefulness of the selected SSG, and vice versa, for example, the impact of the learning/teaching process on the selection of the organization, etc. Due to the interaction with the selected aspects, the game design appears quite specific (*emergent synergies*) and typicall for it at a given training process.

So, if the so-called wholes can be so numerous and so different in their actual contents, when is the dealing holistic, attaing wholeness, systemicity and when it is one-sided? And also: if Bertalanffy`s idea has not taken root into the practice of modern humanity, which one has, while the specialization is necessary and dangerous at the same time?

Conferences about systems theory show that in fact no **definition of holism** was accepted as a completely general. Specialization is too important and powerful, making the vast majority to not restrict the use of system concepts, holism etc. **within** their individual disciplines. They are not willing to give *priority to holism*; and push (their own!) specialization aside. However, the experience shows that *specialization, even if necessary, is not enough*, because it causes too many oversights until it poorly cooperates with others. Therefore, the will and the ability to work interdisciplinarily are necessary and one must take this as a starting point: "whoever disagrees with me, is useful, because it helps me to strengthen the holism; we share our differences, by linking them we create synergies, therefore I listen, but think about it, not only obey nor reject in advance, in order to hear more of the meaningful ideas." (See e.g. Mulej et al., 2013).

The consequence of the dilemma between specialization (focus on a selected aspect, e.g. SSG only for the development of special endurance) and holism (focus on several aspects at the same time and in sinergy, e.g. some technical/tactical elements of the game and special endurance) is therefore a dilemma, because of which we choose whether we will have **a complex or a simple approach**.

A complex approach requires a lot of work to gain a fairly holistic insight and action. The approach is difficult, but the outcome are the results, that are probably holistic enough, so that at the end there will be no unpleasant surprise waiting for us as side-effects. In short: *a complex and complicated work leads away from oversights and therefore to simple (more manageable) consequences*.

Another option is to choose a **simple approach** that requires little work, but gives no real holistic insight and action. It is pleasant, causing less burden, but the results can easily happen to be not requisitely holistic: unpleasant surprises are 'secondary' effects. In short: over-simplified work leads to oversights and, therefore, to complicated consequences.

But a complete (=total) holism is not feasible, and certainly not in the work and thinking of people as individuals without (interdisciplinary) cooperation; at the same time this causes an excessive burden. Apparently, at the first this requires a decision of *what level of holism is requisite, i.e.* ***sufficient and necessary at the same time*** and, therefore, good enough or adequate ('just right') for the present case.

Therefore, it is about an intermediate path between the two extremes. With *total* (= full, comprising everything) *holism* we would try to cover absolutely everything with every aspect and connection between them, and to connect all into the total system, without any selection and elimination.

The outcome would eliminate any focus on anything and would not allow any response to the question which insights and actions are essential, or resulting *fictitious* (= one-sided, limited to a specific selected aspect) *holism*; it would be too narrow, too

selective, otherwise well focused, but giving a way for information and knowledge only about a fragement of reality. This is enough and important for the individual stages of work or individual specialists in an interdisciplinary group of participants, but not to manage the entire life reality!

The intermediate path between the two extremes must be sufficiently close to reality, both in terms of the needs and of the options/possibilities. Such a choice of holism was named *requisite holism* (Mulej & Kajzer, 1998). Successful people live more in accordance with it - **the law of requisite holism,** than the others do (of course, probably silently, unconsciously, naturally - simply under the influence of specialization and life circumstances).

The decision on the level of *requisite* holism is thus in hands of a human: what to consider and what to omit. Therefore, it also requires human **responsibility** and complete **clarity** of definition, *which system* (network, not a mental picture) of *aspects/viewpoints* one chooses in a given case. It is a dilemma, whether we choose a complex treatment and achieve simple consequences, because nothing substantial is omitted, or select a simple treatment and achieve complex consequences, because something essential is omitted and therefore we experience some possible side-effects in addition to anticipated ones, too.

Holism includes reflection, decision or action that at the same time includes four concepts that are exposed below (Figure 1) and the phenomenon is considered as a system, i.e. a network, covering all at the same time and intertwined, interdependent and with interactions.

Therefore, we do consider, that the *specialization* is inevitable, and *holism* too. Indeed, to specialists (e.g. the coach, fitness coach, physiotherapist, etc.) systematicity (2 in figure 1) is closer than sistemicity (1 in figure 1). Cooperation between mutually different specialists who deal with the same subject from different perspectives and are therefore interdependent, (3 in figure 1) provides, that on the basis of relations interactions result that allow sistemicity (1 in figure 1). If in this case they succeed to propperly take into consideration the law of requisite holism to get to know the essence, not to get lost in irrelevant details and do not even reduce the whole to over-simplified image, they also reach the realism (4 in figure 1). Therefore, it is about the question, how capable are the members of the expert team to be holistic in their thinking, decision-making and functioning, especially in the design stage of the training process, but also in its practical implementation, so that the plan would not remain a dead letter. Therefore, the term "neighboring knowledge" is getting more important than "space", where the communication between the members of the expert team is implemented. Here the opinion of the renowned Italian training researcher is signifficant (Colli, personal communication, 20 May 2015), who believes that e.g. the fitness coach is needed, but even more necessary is that the head coach is able to grasp the meaning and purpose of the exercise, suggested by the fitness coach, and transfer it into more "soccer-type frames" or vice versa.

Figure 1: Definition of holism in the Dialectical Systems Theory.The cases from fotball/ soccer practice are selected purely indicatively. SSG=small sided games.

(1) The whole (sistemicity)	In thinking at the same time we capture the synergy of all the elements that make up the game (match) in its widest sense: e.g. the number of players, the game tasks, individual, group and team tactics, the result, conditions etc. Legality of the game is reflected correctly in the time, spacel and energy. The individual elements are not the central theme.	- SSG involve simultaneously e.g. developing all possible essential technical/tactical elements at the level of team tactics in the phase of attack and defense, and fulfill the respective energy requirements.
(2) Parts (systematicity)	Each part of the game is treated separately (match, the training process ...): e.g. defensive line, midfield, attack , individual tecnical/tactical behavior of the player, physical fitness, individual tactical choices, etc. as separate topics.	- SSG cover, for example, essential tecnical/tactical elements of group tactics in both phases of the game (e.g. defensive line with or without ball possession).
(3) Relationships (correlation, dialecticness, interdependence)	We are dealing with connections that are formed between the individual parts of the whole; e.g. relations between the goalkeeper and the defensive line, the relationship between the defense and the midfield, relationships that are developed according to the opponent, in both phases of the game in the interaction between them.	- SSG has at the forefront for example the aspect of cooperation between players (individual, group and team tactics).
(4) realism (reality proximity, materialism)	We consider how the selected content is actually realized in practice and whether the SSG in its appearent shape is sufficiently similar to reality from the technical/tactical and energetical point of view.	- SSG consistently illustrate the legality of the game in the temporal-spatial and energetical sense.

It is therefore essential to move from a **one-profession** (e.g. only the aspect of the coach is dominating) to **inter-professional** creative cooperation (e.g. the coach and fitness coach), whenever it appears that the individual profession probably does not provide the *requisite holism* and the wider definition of holism is needed; therefore, a trans-disciplinary approach becomes one of the values, because it is preparing them for the starting point: "*My specialization does matter, but not as the only one. It makes me needed by the others, and I need them. We are therefore interdependent, not independent, nor unidirectionally /one-way dependent*." (Mulej & Kajzer, 1998).

Figure 2: A summary of the basic characteristics of systemic thinking. Cases are selected purely indicatively.

Systemic / holistic way of thinking	**Non-systemic / unilateral thinking**
Interdependence/s, the relationship/s, opennes, dialectical system of aspects	Independence, dependence , closed-in behavior, individual aspect.
- The thinking covers all the essential aspects of the soccer game at the same time (e.g . technical/tactical aspect, aspect of physical preparation, importance of the result, economics, aesthetics, etc .).	- Analysis of the performance of a player is limited e.g. only to the aspect of his physical fitness.
The complexity (and also complication)	Simplicity, the complication, the parts alone
- The game includes many technical/tactical elements that form a meaningful and coherent complex of technical/tactical knowledge	- From the complex of technical/tactical knowledge we expose only some specific knowledge (e.g. Individual can properly recieve the ball)
Attractors , influential forces (à relations)	Isolation, no influential forces (à no relations)
- Between the different parts of the team (e.g. defence and midfield) there are relationships that contribute to the teams' functioning like coherency, coordination and maintaining the balance of the game.	- The relationship between e.g. defence and midfield are not considered, we do not perceive them; parts of the team are considered separately; e.g. goalie coach is the only one for them.
Emergence , emerging (à synergy)	No processes that create new properties
- Mentioned relationships between the parts of the team create new features of the game. New opportunities are offered for their development in a more efficient and creative game. Many coaches observe some “solutions” of the players and trying to fit them into the concept of the game.	- Because they do not perceive or do not take into account the relationships, there are no ways to new features, e.g. team did not kick in.
Synergy, system, a hierarchy of systems	*No new features based on relationships*
- Team is well-coordinated, functioning as a whole, without misunderstandings.	No cooperation of players in the game instead of individualism.
Whole and holism, the interdisciplinary approach	*Only parts and characteristics of components, single-professionalism*
- Team is well-coordinated, functions as a whole without misunderstandings, the players are in fitness, technical and tactical training , which also takes health into account, etc., the specificities of the opponent and conditions in the next match, etc.	In consideration we cover only one aspect that is prevailing (e.g. aspect of physical fitness) and on the match we look only from this perspective. We interpret problems exclusively from this aspect.

Network, interactions (of professions , ..)	*No interactions (of professions , ..)*
- Team is well-coordinated, it functions as a whole, without misunderstandings, because the coaches/trainers interact with each other and with doctors and others; they also listen to the players, not only themselves, etc.	Trainer's analysis of the game does not take into account (or does not detect) other aspects (e.g. the aspect of physical fitness, psychological aspect, ambitions, etc. are excluded from the analysis).

The final thought on the question of which approach to the search for holism is correct, is: this is crucially dependent from the *subjective positions/starting points*, that means, from the human personality – values, emotions, talents, knowledge and skills, from the bases of thinking, decision-making, functioning and behavior. On the way from the *coach of individual shot* to *strategy coach of the team*, the individual must therefore increasingly phase out the focus on (only) many details. It must be the characteristic of a narrowly specialized trainer/coach who is interested only in individual segment of the topic. Threfore, high on the scale of complexity, the coaches' look at the work must be wider, work less detailed and more cohesive, width of the requisite holism larger and less deepened in details and currently important features, more into the long-term essence. Input and output information are less detailed, more global, less tactical and operational, more strategic, political, visionary. Selection of dialectical system of aspects (DSA) has to be adapted to reality and tasks.

It depends on DSA which *style of thinking* is used by who. Consideration of the reality, not only of ideas and dreams (what often occurs in novice trainers/coaches), is an essential base of the coach`s work. Therefore, the formal education process of trainers/coaches has an important role to draw attention to these facts. Separate treatment of the segments of trainer's expertise (competence areas) namely exists due to requests for simplification and in a single phase of qualification.

Figure 3: The difference between (1) apparent, (2) requisite and (3) total holism.

←----------		----------→
One-sidedness with limitation to a single chosen aspect - the mental image	Dialectical system (= network), which combines all of essential and only essential aspects in a mental and/or emotional picture of this phenomenon, which corresponds to the law of requisite holism and therefore sufficiently reduces reductionism, so that it allows enough realistic hearing.	Total holism with the network of completely all aspects - mental images
SSG with a focus on a single aspect chosen. Example: SSG focusing exclusively on the development of special endurance	SSG, which include neither one individual selected aspect, except for the individual exercise phase, nor all of them at the same time, but on the basis of requisitely holistic analysis; it covers what we consider the most essential aspects and their interactions; it could also differ for every exercising individual separetly according to his/her advantages and weaknesses as an individual and as a team member.	SSG which simultaneously cover technical/tactical aspects of the game (at the level of the individual, group and team) and enable concurrent development (maintenance) of all aspects of the game in synergy.

The second condition: innovativeness, not only routine, nor only creativity.

Previously it has been shown that some specially organized forms of SSG in some cases and at any given moment have become innovations (e.g. "positional games" of Barcelona), but not in others, because there they did not give new benefits to users. "The position game" therefore presents an upgrade of traditional SSG since in a more complex form of playing the team aspect of the tactic, which presents a special, in practice useful (!) feature. In general, we can say that especially at the lower levels of competition, in principle the old established routine is prevailing, although it is of course necessary to consider the legality of the planning of exercise process, the general requirements of the period of training, etc. Certain SSG are therefore deliberately "impoverished" in order to pursue a single, priority, specific goal (e.g. SSG with an emphasis on aerobic endurance components are often the content in the preparatory period) in a given stage. It raises the question about trainer's creativity, which shows the will and the ability to create something new; by definition it is different from innovation, which also contains the will and ability to change a created novelty in the new benefit, achieved in practice of the users of novelties. What is shown in Figures 4 and 5, has prevailed considerably more in the innovative environment, than in environments, over-addicted to routines.

The new idea, which was for example the idea of SSG succeeded, where the conditions for the formation of innovation from the 'Figure 4' were fulfilled. In soccer clubs mentioned in the introductory part, the ability and willingness to innovate is likely significantly higher than in others; probably the similar assessment applies to their social environment (the Netherlands is better known for their support of innovation than Serbia, e.g.). But, this capacity is the biggest in clubs, able to give additional content to SSG (e.g. some time ago "the pace games" in Germany, SSG at the level of team tactics in Barcelona etc.); thus, they carried out most consistently the invention-innovation--diffusion process, summarized in the Figure 5. At the same time, more than others, they fulfilled the conditions for innovative business.[1]

[1] General characterization of the features of innovative business covers several aspects and assumptions, and no longer refers only to the manufacturing part of the organization, but to all activities and all parts of life in all organizations, including the football clubs. The definition includes the knowledge about the costs, mistakes and failures (in principle are unnecessary), and that any product, process or organization sooner or later becomes obsolete. Survival, and therefore good (or bad) business concerns everyone, and so we should purposely search for possible innovations everywhere (within ourselves and elsewhere) and continuously. The definition also covers the attitude about work (let us work as smart, not like crazy) and the attainment of requisite holism with the practice and ethics of interdependence (e.g. by use of ISO 26000, the international counselling standard on social responsibility). Because of the constant pressure from competitors, the innovationing must cover everything and constantly, and the quality of competitive ability must be systemic, which includes proper price for customers, quality, flexibility, uniqueness, care for the natural environment and social responsibility, all interrelated. This is a condition for (business) excellence. Therefore, from the assesment that the present product/process/service is perfect, the order necessarily follows: "Let's innovate it immediately, because it is perfect under the existing criteria, which may be changed at any moment by the customers and competitors and, therefore, they may withdraw their money away from us." (cf.: Mulej et al., 2013).

Figure 4: The equation of the conditions for the emergence of innovation = in practice of the users of beneficial novelties. Legend: X = factor relationship; all the conditions are necessary for success.

Invention - suggestion	A new idea on SSG, new organization, a new process of learning or designing the game, new methods in the development of motor skills, etc.
X	
Enterprise and entrepreneurship	How present is the entreprise/entrepreneurial approach in the way of thinking and functioning in the club management? How much risks are the coaches and players willing to take? How do they overcome their fear and exaggerated respect for the opponent? How do they overcome their conceit, which is stifling their imagination? How bravely and wisely at the same time the trainers compose and enforce their long-term views on the development of the team and the effort for its achievement?
X	
Management	How do coaches compose short-term programs and enforce them into learning-training process (trainings, matches)?
X	
Holism	How and how much do coaches attain sufficient holismfor the players to come to practice with pleasure and work extremely hard and ambitiously, because there is no boredom, workload and demands are placed slightly above capacity, which consequently rise?
X	
Coleagues	How much is the experts team receptive to learning, the development and introduction of novelties into practice? How much are they willing and able to take into account each other due to mutual differences, making them complementarity?
X	
Culture	Sports culture is associated with the characteristics of the society. Question: would a soccer environment where the skipping of midfield with long passing "traditionaly" dominates, allow the development of SSG that are based on ball posession (e.g. position games) and on a continuous form of attack at all?
X	
Suppliers	Are the members of the professional staff (sports leader, the leader of the youth groups, coaches, fitness trainers, physiotherapists, ..., caretakers of the soccer field and equipment) receptive to implementation of innovations in the working practice? From whom do they learn?
X	

Customers	Spectators, sponsors, donors, parents of young players, their schools, clubs in higher leagues, to which the players of adequate quality could be sold to help maintaining the favorable conditions for the growth of new ones. And the like.
X	
Competitors	More successful clubs are generally more receptive to innovations that bring benefits at all levels of functioning (vision, organizational level, content selection, procedures of trainers selection) ... Competitors are also all the other contents of leisure time and all other ambitions and habits of the players and professional staff outside their own competition process.
X	
Natural environment	How healthy is the playing surface maintained (environment, changing rooms, immediate surroundings) so that the participants do not inhale anything dangerous for health, in terms of the location of the playing field, on traffic and climate, seasons, etc.
X	
Broader social conditions	The city conditions, opportunities to get support from citizens, schools, other organizations and the local management to the team/club, 'viole' and similar fan clubs and their harmful behavior (Večer, 19 Dec. 2015, reported that the penalty that was prescribed by the NZS in 2015, due to the behavior of only “viole” amounts over 33,000 euros.)
X	
Random influences happiness	Effect of referee’s mistakes, poor game conditions, injuries, shots in the post, etc.

Figure 5: Likely providers (e.g. the Faculty and Institute of Sport) and customers (e.g. soccer clubs) by the footsteps of perfection of innovations, simultaneously probable users.

The degree of perfection of (possible) novelty	Likely offerers (in general)	Likely offerers (in soccer)	Likely customers (in general)	Likely customers (in soccer)
The new idea (any)	anyone	e.g. the authors of the idea of SSG	who senses promising ideas	e.g. who appreciates the idea of a new SSG
The invention (= a promising new idea)	anyone who suspects that the new idea is promising	e.g. authors who suspect that the idea of a new SSG is promising	no one unless it becomes a suggestion, because it disappears into oblivion and it is not in the offer	e.g. club that is willing to support the idea of a new SSG because it is considering it promissing
Suggestion (= recorded promising new idea)	inventors and (research) organizations without a lot of will and knowledge for the technical development, production, marketing and trading of the invention	e.g. authors who know just how to record and show the idea of a new SSG to the others	entrepreneurs, prepared to take high risk and low compensation to the owner – inventor or the organization of the invention	e.g. club that gets enough convinced by the record of the idea on a new SSG, so it begins to explore and develop the potential innovation
Potential innovation (= usable but not yet beneficially used novelty)	inventors and research and developmental organizations with the knowledge and will for technical development, less so for production, marketing and trading of the invention, researched till the potential innovation	e.g. authors who are able and want to develop the idea of a new SSG till the practical usefulness, but not to trade it or practicaly use it otherwise	entrepreneurs ready for production and marketing, but less so for technical- technological and other exploratory and developmental risks	e.g. club which supports the development of the idea of a new SSG till practical use, but is not using it yet in practice or marketing

Innovation (= proven useful novelty; this is decided by customers, not the owners)	development and manufacturing organizations with a desire of rental benefits and indirect spread of its market (rarely individual inventors)	e.g. research organization or club that developed the idea of a new SSG, it is using it with new benefit and/or trades it	entrepreneurs and managers less willing to take production and market risk than to take the risk of obsolescence and dependence	e.g. club which has used the idea of a new SSG for itself with benefit
Former innovation - now beneficial routine	practitioners who use the established novelty in everyday practice and are the role models	e.g. club which uses the established idea of a new SSG and is a role model	practitioners who imitate the established novelty	e.g. club which imitates the established idea of a new SSG
Former innovation - now abandoned	authors of substitutional new ideas	e.g. authors of a new SSG that promises more than the existing one	supporters of alternative new ideas	e.g. clubs who support the ideas of a new SSG, that promises more than the existing one

Figure 6: Invention-innovation-diffusion process (IIDP).

Stage of IIDP	The main inputs	The usual outcomes	The usual creators of the outcomes	The usual economic status
Generating ideas, especially inventions	Creative thought, time and resources for research	Promising brainchild from a piece of research, hidden information/knowledge	Imaginative, professional people and groups - researchers, professional and/or amateurs	Labor costs and research funds, no revenue/profit from the market
Creating suggestions from inventions	Written etc. expression of invention	Recorded promising brainchild/idea	The authors of the inventions and consultants for the recording process	The costs of preparing the record, no revenue/ profit
A potential diffusion of suggestions	Offer on the market of inventions/ suggestions within and/or outside organizations	Partial sale, partial ommision, partial transition to one's own development of the suggestion	Owners of the suggestions (authors and/or other) with co-workers	Offer costs, revenue/ profit from sold suggestions
Creating potential innovations from suggestions	Creative thought, time and resources for development of the suggestion into a potential innovation	Utilizing new product/ method/ procedure/ management style/ potential market/ organization/business object	Imaginative, professional people and groups - developers, professional and/or amateur	The cost of labor and resources for developing, no revenue/profit
A potential diffusion of potential innovation	Offer on the market of potential innovations within and/or outside the organization	Partial sale, partial ommision, partial transition to one's own use of the potential innovation	Owners of the potential innovations (authors and/or others) and their (marketing) co-workers	Offer costs, revenue/ profit from sold potential innovations

Creating innovations from potential innovations	Creative thoughts, time and resources for the development of potential innovation into the innovation, including all operations	Benefically applied new market/product/ method/procedure/ management style/ potential market/ organization - in users' organizations	Imaginative, professional people and groups - developers of novelties and market for them, professionals and/or amateurs, including all operations	Offer costs, revenue/ profit from sold innovation (inside and/or outside the organization)
Any potential diffusion of innovations	Offer on the market of innovations within and/or outside the organization, in particular to the extra customers/clients (after the first ones)	In wider circles usefully applied new market/ product/method/ procedure/ management style/ potential market/ organization	Owners of the innovation (authors and/or others) and their marketing co-workers	Offer costs, revenue/ profit from additionaly sold innovations (inside and/or outside the organization)

Where the innovative business is practiced – also in the soccer clubs, because the top-quality soccer is a big, expensive and profitable business process, not just a sport − usually a process summarized in Figure 6 takes place. Under their influence, the novelties also spread to other clubs. Thus, the entire sports discipline is progressing in which such a process is happening. Of course, this does not take place automatically, because the human brain is designed for routine and people are − completely naturally − resisting to innovations, particularly the intrusive ones. In order to accept the novelties, they have to be either coauthors of the innovation or have great trust in their authors. But both should be capable of requisite holism of their conduct, not only of thinking, but of the entire practice.

Limitations and suggestions

The analysis included only the football realities of the countries in which the authors of the article have multiannual work experience. Reliably, with the analysis of other football realities (e.g. Northern European, South American, North American, Central Asian, etc.) we would get a more detailed description of the developmental path of SSG and their versatile use, but that was not the core purpose of the article, while considering SSG only in terms of the learning potential and usefulness offered by this practical work methods in terms of holism.

An important factor is also the contribution of foreign coaches, who, by entering the various elements and sporting habits and vision, contributed to the development of the profession in each country. This aspect is very difficult to assess at the systemic level, despite the known examples of historically successful connections like e.g. between the Dutch and Spanish/Catalan football and the like.

In terms of increasing the learning potential of SSG, we find, that each federation should already on the systemic level take care of a greater emphasis on pedagogical and particularly on narrower didactical competences of football coaches, and particularly on the harmonization of standards of knowledge (UEFA 2015), especially for coaches on youth level and of encouraging a more creative approach. Despite the efforts at the institutional level (UEFA 2015), the quality of education in the individual members of UEFA remains very different (Sedej, 2016).

A particularly important factor is also the way of transmission of knowledge in courses for licensing. Higher quality methods of transmission of knowledge are going more towards practical knowledge, project and problem learning and the need to create relevant learning situations during education and the concomitant need for contextualization of the acquired knowledge (Pavlin, 2012; Vannini & Mantovani, 2007; Zecca, 2014). In general, one should avoid increasing the accumulation of isolated information and promote a holistic, systemic approach, sample thinking, with greater emphasis on the processes and connections and less on data and state (Marentič Požarnik, 1995). Precisely this aspect is, at the licensing procedures, very different from federation to federation (Sedej, 2016). Also, the above-mentioned creation of relevant learning situ-

ations (hosting traineeship, internships, etc.), as a necessary precondition for the quality of qualification of coaches (UEFA 2015), presents a significant problem for individual coaches, since the visit of elite sports centers and the exchange of detailed information on the characteristics of the training process in fact, is difficult to achieve.

CONCLUSION

SSG are very common methods in the process of soccer training and are used for very different purposes. Despite the irrefutable prevalence and effectiveness of this approach, there are still very large reserves for their upgrade in the direction to even greater holism. In this sense, the coach`s methodical/didactical ability is shown as a very important competence, which should be further developed within the process of education of coaches, which is unfortunately not unified in European area. Greater emphasis should therefore take place not only on creativity but also on the actual will to innovate the existing football practices.

In this paper, we have tried to present the possible developmental guidelines, in particular, for overcoming of the typical dualism that prevails in the modern soccer world, i.e. fight between highly specialized/analytical and the routine-addicted approach and those broader, more holistic approaches. This aspect is also directly connected with the (sports) cultural stereotypes, which are typical for every football reality and are its most important component at the same time.

In the foreground there is e the question of the approach to SSG, which would avoid one-sidedness and routine in favor of increasingly interdisciplinary and holistic approach. One should encourage the introduction of the new ideas (innovations) beside the need for increasingly innovative operations of the soccer clubs. With the use of USOMID method, the conditions for the admission of SSG were analysed in football practice as a real innovation at work.

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Colli Roberto, personal communication, May 20th 2015

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original scientific article
received: 2015-08-07

UDC: 797.553:338.48(497.4Posočje)

ELEMENTS OF SAFETY IN PARAGLIDING

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ABSTRACT

Paragliding is an opportunity for tourism development, depending on what position the sport has place in the local community, the restrictions for paragliders and the safety components of the region. The paper explores the phenomenon of paragliding and safety elements in the Upper Soča region, one of ten best paragliding sites in the world (Placestoseeinyourlifetime, 2015). The purpose of the research is to analyse the safety elements, the development and the risk of paragliding.

The goals of the research are to propose solutions in order to improve the safety conditions for paragliding and to make suggestions on the further development of paragliding within the framework of tourism in the Upper Soča destination. According to the interviewees, paragliding is becoming safer from year to year. This is also supported with the ever-growing numbers of pilots, and on the other hand, the number of accidents that do not follow the same trend. The identified causes for the accidents are human errors or weather conditions. The statistical data confirmed the paragliding in the Upper Soča region, with its unique geographical location, has a positive impact on local tourism and its development. The results of the study are useful for paragliders, local tourism stakeholders, researchers of sport tourism, as well to municipalities in the Upper Soča region.

Keywords: *paragliding, safety, tourism, the Upper Soča Valley.*

ELEMENTI VARNOSTI V JADRALNEM PADALSTVU

IZVLEČEK

Jadralno padalstvo je lahko, odvisno od odnosa lokalne skupnosti do tega športa, omejitev, ki so jim jadralni padalci podvrženi in varnostnih elementov na destinaciji, kjer se izvaja jadralno padalstvo, priložnost za razvoj športnega turizma. Članek raziskuje pojav jadralnega padalstva in z njim povezanih varnostnih vprašanj na območju Zgornjega Posočja, ki ga poznavalci uvrščajo med 10 najboljših območij za letenje z jadralnimi padali na svetu (Placestoseeinyourlifetime, 2015). Namen raziskave je analizirati varnostne elemente, razvoj varnosti in tveganja v jadralnem padalstvu.

Temeljna cilja raziskave sta priprava predlogov za izboljšanje varnostnih elementov jadralnega padalstva in priprava predlogov za razvoj turističnega jadralnega padalstva v Zgornjem Posočju. Jadralno padalstvo je po oceni intervjuvancev iz leta v leto varnejši šport, kar posledično povečuje število pilotov, turističnih letov, vendar pa tudi število nesreč. Najpogostejši vzroki nesreč so človeške napake ali vremenske razmere. Podatki kažejo, da je Zgornje Posočje s svojo edinstveno geografsko lego in klimatskimi pogoji, idealna ter konkurenčna destinacija za razvoj turističnega jadralnega padalstva, ki ima neposreden vpliv na razvoj lokalnega turizma. Ugotovljeno je bilo, da je potrebno načrtovati vzpostavitev infotočk za jadralne padalce, kjer bo mogoče pridobiti ustrezne informacije za načrtovanje poletov. Rezultati raziskave so koristni za jadralne padalce in njihova društva, za vse lokalne turistične subjekte (lokalna turistična organizacija, gostinci in ponudniki prenočišč, turistične agencije, itd.), raziskovalce športnega turizma, kot tudi za občine Zgornjega Posočja.

Ključne besede: *jadralno padalstvo, varnost, turizem, Zgornje Posočje*

INTRODUCTION

Among cultural, spa and business tourism, sport tourism is one of the fastest growing segments of tourism. Throughout the last few years, sports, especially adventure sports, are becoming more and more interesting. For the active tourist, sport has become an integral part of life also when on holiday (Slak Valek, Shaw, & Bednarik, 2014). Some find in it relaxation, entertainment, socializing, and for some it has become the meaning of life. On the other hand, there are also some who make a living out of it, and others that have upgraded it into pure competition.

A safety audit to analyse and define safety risks should become a part of the process of developing a sport tourism product. The level of possibility of a safety risk occurrence and the level of consequences should be recognized, defined and managed

afterwards. Overall safety of a sport tourist product and the possibility of assuring personal safety are the two factors which influence the tourist‘s decision of using the services again. Event-specific risks and security strategies differ not only in their main causes, forms, and effects but also in their symbolism and indirect consequences (Perić, Vitezić, & Mekinc, 2016).

Paragliding is very popular and opens up a whole new world of wonderful experiences for the people who practice it. It can range from simple rides from the top of a hill, or a trek to the top of a mountain from which one can glide down the valley. For the daring that seek something more, paragliding also offers aerobatic manoeuvres, cross-country flights and official competitions. Its appeal to all thrill-seekers throughout the world lies in its ease of use and the affordable price and it is now promoted in almost all countries around the globe. Among the most popular ones is the Upper Soča Valley. It offers excellent conditions for the implementation of this sport, where paragliders can see natural and historical places from the air (Gradišek, 2008). So it is of no surprise that paragliding has a significant impact on the development of tourism in this region. In this paper, we discuss paragliding through the perspective of safety. It is explored from its early beginnings, and into what has evolved, and where the risks are. We also review the related laws that regulate the sport, what kind of impact on tourism it brings, and present the opportunities and improvements. As stated before, the Upper Soča Valley is, with its natural resources and weather conditions, very interesting for paragliders. We have to emphasize that although the season takes place only in warmer months of the year, and although a large proportion of the region lies in the Triglav national park, it is popular with tourists. The area is, therefore, protected with the following laws and regulations: The Law on the Triglav National Park (TNP), The Law on Air Navigation (ZZraP) and the regulations in the field of paragliding. The development of sports tourism in the municipalities of Tolmin, Kobarid and Bovec are still restricted due to the poor transportation links to central Slovenia and to the north, the underdeveloped public transport and the tourist signs.

A milestone for Slovenian paragliding was set in 1984 when Dare Svetina flew from Dobrča hill (Kačičnik, 1995). Only three years later, in 1987, Svetina organized the first Slovenian championship in paragliding. In same year, 1987, Sandi Marinčič, Vlasta Kunaver and Igor Krevelj flew from Triglav, the highest Slovenian mountain. The next year there were more than 120 pilots and paragliding became officially recognized (Glušič, 2003). Now, 26 years further on, we have 1,326 registered paragliders (Humphrey, 2014). Kaniamos (2008) says that paragliding is flying where the pilot hangs below the wing, on lines in a custom-made seat. The basic equipment consists of a glider, a parachute, a seat, a spare reserve parachute and a helmet. Accessories vary from a variometer, navigational instruments, a radio station, gloves, appropriate footwear and clothing. A radio station is also defined in the third paragraph of Article 21 of the hang gliding and paragliding regulation, but it is only mandatory when training a novice pilot (Decree on Hang Gliding and Paragliding, 1999).

In the municipalities of Kobarid and Tolmin they sell permits that are obligatory for foreign pilots. They are used as the right for take-off and landing in this valley. Slove-

nians are not required to buy them as being the members of the paragliding associations automatically makes them the members of the Slovenian Free Flight Association. The alliance also offers benefits such as insurance for the liability for damages against a third party, subscription to the Ikarus journal which is designed for paragliders and hang gliders. Through the alliance, all the necessary procedures of registering the take-offs and landing sites are managed (Slovenian Free Flight Association, 2015).

In the region, we have three paragliding associations, which maintain the take-off and landing sites. The Posočje Free Flight Association was founded in 1981 as the first hang gliders were already flying from the Kobala hill in 1975. The first paraglider took off from the same hill in the year 1985. The take-off and landing points are marked with information boards and other information. As mentioned before, one needs a permit that is sold for a day (€4.00), three days (€11), ten days (€20) or a season (€35), covering takeoff and landing (Adrenalin Gornje Posočje, 2014).

Table 1: Number of permits sold / foreign arrivals, 2008-2012.

	no. of permits sold	foreign arrivals	permits sold / arrivals (%)
2008	7,181	27,088	26.5
2009	6,289	25,622	24.5
2010	6,219	24,770	25.1
2011	7,748	30,446	25.4
2012	8,454	31,887	26.5

Source: adapted from the Adrenalin Gornje Posočje and Statistical office RS, 2015.

According to table 1, through the number of sold permits and number of arrivals we can estimate a percentage of foreign paragliders who visit the area. We need to eliminate domestic arrivals from the analysis, as well as the ones from the municipalities of Bovec since the permits are not sold there, the vast majority of paragliders stationed in Tolmin and Kobarid, and competitors. From 2008 to 2012, the proportion of paragliders ranged around stable 25.6% (Adrenalin Gornje Posočje, 2014).

The regulation of hang gliding and paragliding states "the take-off and landing points have to meet the safety criteria" (Decree on Hang Gliding and Paragliding, 1999). Further it is provided that "records of organized take-off and landing places are kept by the administration". Organized flying from the official spots will be permitted upon registration. For registration, the following is required: a consent by the land owner, an expert opinion by the Management Board of Slovenian Nature Conservation body which states that the take-off point, the landing site and the flight area are not in conflict with environmental restrictions. Also, if the new take-off or landing area needs construction work or change of land use, then the municipality needs to give its

opinion. If the proposed new flying or landing area is in the zone of a sport airfield, the airport management also needs to give their approval.

The safety of paragliding is always the foremost criteria. An experienced pilot is able to assess to what extent an environment is safe or unsafe to fly – regarding his or her skills, experience, or equipment. The beginners should fly under the supervision of their instructor, who will complement their lack of experience. It should be noted that almost all accidents occur due to human error and not due to the nature of the sport. There are also test pilots who are constantly exploring the limits of the equipment in order to test the security restrictions. But there are also pilots who do not respect even the most basic safety principles (Kaniamos, 2008).

Decree on Hang Gliding and Paragliding (1999) defines the conditions for the construction, operation and maintenance of hang-gliders and paragliders, and the conditions associated with the determination of their ability to fly. Moreover, the owner or operator of a paraglider is required (every two years) to carry out a technical examination of the materials used and the construction, which must be conducted by an authorized person or the manufacturer. In accordance with the above mentioned decree, accidents will be investigated by a permanent commission appointed by the administration and carried out in accordance with the standards of the investigation of aircraft accidents, serious incidents and incidents relating to aircraft.

The Slovenia Free Flight Association (2014) has also determined a statutory height of flight in the Upper Soča Valley stating it is permissible to fly 2,895 meters above sea level. In 2014, the Ministry of Infrastructure of the Republic of Slovenia adopted the Regulation on Compulsory Registration of Paragliders and Kites. The regulation has raised a lot of questions. The Regulation provides compulsory registration of all the flying equipment in a special register. By the provisions of the Regulation, paragliders can fly only if their parachutes are recorded in a special register. This applies to both Slovenian and foreign paragliders (Rules on Nationality, Registration and Other Marks on Civil Aircraft, 2014). Even before the rule entered into force, The Slovenia Free Flight Association pointed out the economic damage to tourism since Slovenia would be the only country in the EU demanding such a rule. The Federation also argued that it does not solve or bring any additional safety features, which was the main objective when the Ministry adopted the new rule. On all of these facts, the Ministry of Infrastructure of the Republic of Slovenia was also warned by the European Hang Gliding and Paragliding Union (2014). The Slovenia Free Flight Association (2014) also added that the Ministry, with such actions complicates the position of Slovenian providers in the paragliding sport as such. A possible solution lies in Article 153 of the Aviation Act (2006) authorized by the the Ministry to define exceptions to the paragliders and hang-gliders registration.

Two Mountain Rescue Services (MRS) operate in the Upper Soča Valley. The MRS Bovec station was founded in 1947 and the Tolmin Mountaineering Association with its MRS station was founded in 1948 (Slovenian Mountain Rescue Association, 2015). The information regarding paragliding accident statistics was obtained from the archives of MRS Tolmin. MRS Bovec data with reference to paragliding accidents was negligible,

as they had only three in the last five years (Cuder, personal communication, December 15, 2014). Table 2 presents the statistics on MRS Tolmin (2014) rescues in their area, which covers the area from the Italian border on the south side of the Kobariški Stol mountain, through Srpenica, Polovnik, Krasji top, Vršiči, Krnčica, Krn, the summits of Sand, Prehodci and Bogatin, over the entire ridge from Tolminsko-Bohinj to Lajnar, Porezna-Gradiške and then down to Sežana. All paragliding rescue operations that were not performed in the Upper Soča Valley were excluded from the analysis.

Table 2: Number of interventions MRS Tolmin, 2010-2014.

	no. of rescue operations involving paragliders	Slovenian paragliders	foreign paragliders	cancelled missions
2010	28	0	26	2
2011	44	4	35	5
2012	44	5	35	4
2013	20	3	15	2
2014	23	1	19	3

Source: Mountain Rescue Service Tolmin, 2015.

In 2010, the rescue team was involved in 28 cases, among them, eight cases demanded help from a helicopter. In two cases, the intervention was cancelled as the paraglider reported he was fine and safe. All the actions involved foreign paragliders, most of them were injured, and one died. In 2011 the rescue team had 44 missions (five times they proved to be a false alarm) and only in four cases the paragliders were Slovenians. In the same year the helicopter was used 12 times. In 2012, they had 44 missions as well. They had to rescue 5 Slovenians, cancel 4 missions and rescue 35 foreigners. In 2013, the number of rescue missions was reduced to 20 (3 Slovenians, 15 foreigners), 2 of the missions were cancelled as the paragliders had already been safe. The helicopter rescued paragliders in 6 cases. In the year 2014, the MRS Tolmin rescued 23 paragliders: 1 Slovenian, 19 foreign paragliders and in 3 cases the rescue process was stopped because the paraglider reported he was fine and safe. The helicopter intervened 11 times. The results of the analysis stressed that foreign nationals were involved in 90.91% of all mountain rescue missions (MRS Tolmin, 2015).

METHODS

The purpose of this study was to obtain a snapshot of the current state of paragliding and security in the Upper Soča area.

Subjects

In the study performed in 2015, we included 5 paragliders who have experience with flying in the Upper Soča area and are also the key players in the paragliding community. The first is a paragliding instructor, a competitor, as well as someone who offers accommodation and transport for tourists, therefore, he is familiar with all the aspects of paragliding safety and tourism issues. We also included two female representatives of the paragliding community who attended formal schooling and one of them has just started to compete. The last two interviewees have lots of experience flying as well as offering tandem flights to tourists. All the interviewees went through formal education and passed the paragliding exam which gave them the right to gain the license. Their knowledge was also upgraded with a number of theoretical lectures on the topic of security, meteorology and first aid, manoeuvring and controlling parachutes at different speeds and in different difficult situations. All of this led them to master the parachute on the ground and in the air, and gave them what they needed for independent flying.

Project Procedure

The research performed in 2015 used various methods for data collection. The main method was qualitative research with a semi-structured interview. The research includes interviews with key stakeholders, a case study of paragliding accidents, SWOT analysis and the impact of paragliding on tourism in the Upper Soča destination.

Data Analysis

The main method of research was a qualitative research in the form of semi-structured interviews, which gave us an insight into the safety through the eyes of the paragliding pilots. Through the interviews, we were trying to figure out the problems that might affect the security factor and tourism in valley. The interviews contained the questions from the following topics: paragliding career interviewee; challenges in the training of new paragliders (mastering techniques of flight, flight safety); safety in paragliding; accidents in paragliding; development of paragliding in the Upper Soča Valley. Furthermore, based on the findings of our study, we made the SWOT analysis and the synthesis of the key strategic factors.

RESULTS AND DISCUSSION

The interviewees shared the opinion that paragliding was a safe sport if you followed the correct steps and had the right approach:

- They stressed that every paraglider should be able to assess his or her own abilities, know the weather conditions and patterns, as well as to know the equipment, so the risks are minimal.
- When asked about the inherent dangers associated with flying in the Alps, they all agreed that knowing the local meteorology and the techniques of flying are the two main focuses for them. Also, that is something that too many of the foreign paragliders ignore or are just not aware of. Many times such paragliders arrive to the valley from the plains, where the flight mode is completely different. It is also important that the pilot is able to react correctly when a critical situation occurs (wind closing the parachute, a strong swing ...).
- The main problem when it comes to safety is in the badly organized and inexperienced foreigners that do not know and respect the local characteristics of the weather and the air currents. Prior to buying a paragliding ticket – a permit – every pilot should show a certificate of insurance in the event of an accident, which could provide cover for the cost of the rescue.
- Special attention should also be paid to the foreign instructors and their students because at the moment there is no proper supervision. There should be more effort invested in informing foreign pilots about the conditions of flying here and drawing their attention to greater precaution measures.
- One of the possible measures to increase safety is enabling a local paragliding association to ban any pilots who ignore or disrespect the weather conditions when they fly. Paragliding, according to the interviewees, developed in parallel with other sports in the Upper Soča valley. Given the fact that the Upper Soča area is among the ten best paragliding destinations in the world, this should be a pathway for further development (Placestoseeinyourlifetime, 2015).

On its own, the segment of foreign paragliding tourism in Tolmin and Kobarid represents around 25% of all foreigners who visit the two municipalities. This information could accelerate the number of new take-off sites, better road communications, the organization of paragliding events and additional activities on non-flying days. With the increased number of tourists and paragliders among them, we also notice more providers who offer their shuttle or sleepover services to paragliders, but lack any knowledge about safety questions. Most of them have no other connection with paragliding. That is why they should be informed and educated, so they could provide extra information to their guests regarding flying in this area.

The interviewees take accidents in paragliding as an integral part of the risk of sport, but emphasize that paragliding associations offer enough information to foreign pilots, however, they do not abide by the instructions. This is also confirmed by the fact that among those who were injured, 90% of cases come from outside Slovenia. The basic reason for getting themselves into trouble was ignoring the meteorology and the tech-

niques of flying in the Alpine world. All of the interviewees pointed out that paragliding was safe as much as the pilot was.

Based on the findings of our study, we made the SWOT analysis and the synthesis of the key strategic factors. The SWOT analysis provides a starting point to build on strengths, addresses the weaknesses, exploits the opportunities and avoids the risks. Strengths and weaknesses relate to internal factors, whereas opportunities / threats relate to external factors. The internal factors have their own area of influence to adapt, develop, or otherwise act. The external factors are beyond our control and we can do nothing else than to adapt to them. The external factors could act in our advantage if we accept them with flexibility. The SWOT analysis allows us to identify and reflect what will be key factors in the placement of the product / service on the market (Uran, 2006). In our case, we stressed the key opportunities and the advantages of paragliding in the Upper Soča region. Stakeholders of Upper Soča region should use strengths and opportunities as advantage in the market of paragliding destinations. On the other hand, tourism stakeholders should try with different policies and actions to overcome disadvantages and convert them into advantages. Threats should be converted into opportunities. The Upper Soča region has a potential for further tourism products development and paragliding is one of the most important ones. The SWOT matrix below shows a general overview of the strengths, weaknesses, opportunities and threats of our study.

Table 3: SWOT Matrix.

STRENGTHS	WEAKNESSES
• Ideal climate, weather and wind conditions for safe paragliding • The geographical features of the region enable safe paragliding • Qualified local paragliding instructors • A positive attitude of local people to paragliding in the case of an accident	Inadequate legislation regulating the safety and security of paragliding Limited activities due to the Triglav National Park protected area Misinformed tourism stakeholders regarding the main safety data for paragliding
OPPORTUNITIES	**THREATS**
Develop pilot-friendly compulsory insurance which would include rescue mission Mediate appropriate information and training for foreign pilots (flying characteristics of the region)	Ignorance of the weather and geographical features of the region Poor know-how of flying in the Alps Increasing number of new providers with strong commercial interest which often outweigh the safety factors Unsuitable paragliding equipment

Paragliding is becoming increasingly important for tourism in the Upper Soča region due to the increasing number of competition and paragliders. Paragliding events also attract other visitors.

The study confirmed the importance of relevant information for pilots provided by tourism stakeholders or accommodation providers and other tourism stakeholders in the region. The relevant information about climate conditions and geographical features are the key elements of safety and security in paragliding. Pilots need information for the flying plan preparation and the execution of courses.

The challenge to improve safety of pilots could be seen in the workshops for tourism stakeholders. The purpose of workshops for tourism stakeholders is to provide the flying expertise in the Upper Soča region by paragliding professionals. Local paragliding clubs, in collaboration with municipal authorities, should provide that kind of workshops free of charge. Furthermore, municipal authorities should support local paragliding clubs which take care and maintain the availability and suitability of take-off and landing places. The suitability of take-off and landing places is very important for paragliding safety.

One of the advantages of the Upper Soča region is its location in the protected area of Triglav National Park. On the other hand, being part of the Triglav National Park protected area is an obstacle and weakness because the Law on the Triglav National Park (2010) defined many prohibitions. In accordance with Article 13, it is not allowed (for paragliders, hang gliders or balloons) to land anywhere else except at appointed and designated locations, where such activity does not compromise the objectives of the National Park.

Paragliding clubs could offer trainings which relate to the characteristics of flying in this region. The main safety problems of paragliding in The Upper Soča are inexperienced foreign pilots who do not know the weather characteristics and wind conditions in the region. Flying registration permit should include insurance in the event of an accident, which covers the cost of rescue mission. Furthermore, proper supervision of the foreign instructors and their pupils should be assured in the future.

Risk assessment is the foundation and a core virtue in paragliding and is the main point of safe practice. It depends on human qualities and covers the acceptance of one's limits, the care for their own safety and excessive risk when demonstrating their skills (Revenko, 2006). That excessive risk while demonstrating skills against other pilots is one of the potential hazards that affect the pilot's attention, which was also highlighted by Mole (2015). He noted that in this way the likelihood of an accident increases. An assessment of where the limit is and what constitutes the danger differs from pilot to pilot. As said by Jacobs (in Revenko, 2006), it is more likely to be an experienced pilot who embarks on dangerous adventures, as an experienced pilot's perception of danger varies throughout the experience, which is associated with a greater degree of confidence in his / her own skills. But that does not mean that even the best pilots do not make mistakes. Measures to reduce these risks of an accident are: a realistic self-assessment of one's physical and mental condition, taking advice from senior pilots, analysing the weather, mastering all phases of the flight. The hazard assessment de-

pends on the pilot‘s experience. Da Paixão and Tucher (2012) stated in their study that paragliders highlight the importance of the procedures and actions that can minimize and predict imminent danger. This is also confirmed with Mole (2015), who emphasizes the development of a safe routine which must be followed each time one flies. Furthermore, Da Paixão and Tucher (2012) came to the conclusion that all paragliders place great emphasis on the management of all phases of their flight, as well as on high-quality equipment and its maintenance. At the same time, they give priority to established procedures over practice. The result of their research came to the conclusion that the biggest challenge paragliders face is the realization that their activity can harm or seriously injure them. In hi safety issue, Roti (2015) broke it down to these conclusions: the most important elements of a safe flight is to plan your flight first in your head and try to realize every possible scenario what could go wrong and your reactions to them, train your body and mind, and gradually upgrade your skills, know your equipment and keep in mind that most accidents in paragliding can be predicted and prevented. Mole (2015) adds the following instructions to the security features: focus your attention on the pre-take-off phase, go through a safety check, do not exceed boundaries during any phase of the flight, constantly analyse the situation, allow yourself an adequate margin of risk, do not exaggerate with excess equipment, analyse your own accident or emergency procedures and those of the others, consider and follow the warning signs and only fly using equipment adapted to your knowledge and your level of experience.

CONCLUSION

Paragliding is a recreational and a competitive sport. In recent years, the development of equipment, availability of the weather conditions data, and the web terrain analysis has transformed the sport in a way that the performance and safety have increased as well as the number of pilots that practice this sport. We have learned that many factors contribute to a safe take-off and landing. Every individual must primarily examine the conditions in which he or she flies and be aware of his or her own abilities and limits. These are the fundamental conditions for reducing the risk. But no matter how good the preparation is, it cannot overrule all the variables that can occur to the pilot during take-off, the landing phase or during the flight. Therefore, the main cause of many accidents is a sudden gust of wind or a human error.

The Upper Soča Valley is one of the best destinations to fly in the world. The study confirmed that there is a lack of inadequate expertise among those who offer accommodation to paragliders or the information provided is very poor. The opportunity to improve this situation is to provide free training for these accommodation providers. Help from the local and government authority to empower the local associations, so that they could work hand in hand with the municipality and strictly implement the control over permits and paragliders, could be a second contributing factor that would make a difference with respect to safety.

The analysis of the legislation showed that the required conditions for independent flying and those of pupils are properly defined with a licence and an instructor that has to be with his student during his initial flights. Also, the air space of Slovenia has prescribed corridors in which flying is allowed. It was also shown that the regulations endorsed by the government do not necessarily have an impact on safety. The last such rule was made in 2014 when the government wanted to indorse mandatory registration of hang-gliders and paragliders, which would represent something unique in Europe but was not implemented after the Association for Free Flying Slovenia had presented its arguments. They argued that such a rule would mean a loss of foreign and domestic tourists and not a contribution to safety (Srečko Jost, personal communication, March 11, 2015).

Paragliding tourism in the Upper Soča Valley is becoming increasingly important. An analysis of paragliding accidents has shown that this is the area where most of them happen. In the last five years, the mountain rescue services in Tolmin concluded 143 actions where a paraglider was in need of assistance, and only in 13 cases Slovenian paragliders were in need of help. The most common cause of accidents was the lack of knowledge of meteorology and flying techniques. As shown, the rescuers also had problems locating the injured paragliders. Thus, one of the aspects to look at when addressing safety is that all paragliders should use one official frequency so that rescuers could reach them easily. This is important because the pilots are flying over and in between mountainous terrain, where there is no complete coverage of the mobile signal. Currently, foreigners use other frequencies, making communication difficult. Another measure to increase security would also be the introduction of a mandatory commercial insurance similar to the ones applicable throughout Europe.

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4th INTERNATIONAL SCIENTIFIC CONFERENCE ON »EXERCISE AND QUALITY OF LIFE«

Novi Sad, Serbia, 22nd to 23rd April, 2016.

Faculty of Sport and Physical education, University of Novi Sad (Serbia), organized the 4th International Scientific Conference on EXERCISE AND QUALITY OF LIFE, which was held from 22nd to 23rd of April, 2016. The aim of the Conference was to promote and enhance communication across sub-disciplines of sports sciences, which largely contributes to the understanding of the impact of physical activity on the quality of life. This year, more than one hundred fifty scientist and researchers from fifteen countries presented their work from the fields of physical education, recreation, sport, health, sports psychology, pedagogy and sociology. The abstracts they submitted were published on the EQOL 2016 Abstracts CD-ROM.

The scientific programme included plenary sessions led by eminent international experts: Sandra Mandić (University of Ontago, New Zeland) and Tuija Tammelin (LIKES- Research centre for Sport and Health Sciences in Jyväskylä, Finland) who presented the organisational aspect of the research and the promotion of physical activity from the scope of multi-sectoral approach; Roger Harris (UK), Sergej Ostojić (University of Novi Sad, Serbia) and Daniela Caporossi (University of Rome "Foro Italico", Italy) exposed new evidences in the field of biochemical processes which come to effect during training and physical performance; while Rado Pišot (Institute of Kinesiology Research, University of Primorska, Koper, Slovenia) addressed his lecture to the role of kinesiology in the contemporary society.

Furthermore, it should be pointed out, that the 2016 edition of EQOL was also attended by eight members of Institute of Kinesiology Research, University of Primorska, who actively participated with the presentations of their scientific work. We can honestly say that our regular attendance in EQOL has become a tradition which reflects good cooperation between our Institute and Faculty of Sport and Physical education in Novi Sad.

Armin Paravlić

REPORTS AND REVIEWS/POROČILA IN OCENE, 81–88

4. MEDNARODNA ZNANSTVENA KONFERENCA »EXERCISE AND QUALITY OF LIFE«

Novi Sad, Srbija, 22.–23. april 2016

Fakulteta za šport in športno vzgojo Univerze v Novem Sadu (Srbija) je v času od 22. do 23. aprila 2016 organizirala že 4. mednarodno konferenco z naslovom EXERCISE AND QUALITY OF LIFE. Tokratna tema konference je bila promocija povezovanja med posameznimi poddisciplinami športnih znanosti, kar znatno pripomore k razumevanju pomena gibalne/športne aktivnosti za kakovost življenja. Več kot 150 znanstvenikov in raziskovalcev iz 15 držav je predstavilo svoja dela s področij športa, športne vzgoje, rekreacije, zdravja, športne psihologije, pedagogike in sociologije. Prispevki so bili kot zbirka povzetkov EQOL 2016 izdani v CD obliki.

V plenarnem delu prvega in drugega dne konference so svoje poglede na izbrane teme tudi tokrat predstavili nekateri eminentni gostje. Profesorici Sandra Mandić (Univerza v Ontagu, Nova Zelandija) in Tuija Tammelin (LIKES - Raziskovalni center za šport in vede o zdravju, Jyväskylä, Finska) sta predstavili organizacijski vidik raziskovanja in promocije gibalne/športne aktivnosti z uporabo večsektorskega pristopa na primerih tako odrasle populacije kot tudi šolskih otrok; profesorji Roger Harris (Velika Britanija), Sergej Ostojić (Univerza v Novem Sadu) in Daniela Caporossi (Univerza »Foro Italico« v Rimu) pa so izpostavili nova dognanja na področju biokemičnih procesov med vadbo in gibalno aktivnostjo, medtem ko je Rado Pišot (Inštitut za kineziološke raziskave, Univerza na Primorskem, Koper) poudaril vlogo kineziologije v sodobni družbi.

4. konference EQOL v Novem Sadu se je udeležilo kar osem raziskovalcev iz Inštituta za kineziološke raziskave Univerze na Primorskem, ki so predstavili svoje raziskovalno delo. Številna udeležba predstavnikov Inštituta za kineziološke raziskave je že tradicionalna, kar je le še en odraz dobrega sodelovanja med našim Inštitutom in Fakulteto za šport in športno vzgojo iz Novega Sada.

Armin Paravlić

REPORTS AND REVIEWS/POROČILA IN OCENE, 81–88

FOUNDATION ANNIVERSARY PROMOTION OF THE OLYMPIC COMMITTEE OF KOSOVO,

27th May, 2016

On 27th May 2016, the Olympic Committee of Kosovo (OCK) organized Olympic Day, which was intended to promote the anniversary of the OCK. The Institute of Kinesiology Research, University of Primorska, was invited to actively participate and promote the event. The main role of the Institute of Kinesiology Research was measuring anthropometric and motor skills of the children who were actively involved in various activities.

The measurements were attended by 23 children aged between the ages of 7 and 8. Anthropometric analysis included measurements of height, weight and body composition (body mass index, fat mass, muscle mass, free fat mass and total body water). Motor skills analysis included countermovement jump, 10-meter sprint, maximal voluntary isometric knee extension and flexion. All measurements followed each other in a logical sequence. The aim of the measurements was to compare the results of Kosovar children with children from more developed countries who took part in a similar analysis.

The main purposes why the Institute of Kinesiology Research, University of Primorska, participated at the Olympic Day in Kosovo were to obtain information about locomotor status of Kosovar children, to demonstrate the operating principles of the Institute in a developing country and to establish new contacts together with further opportunities for future cooperation with the OCK.

Matej Kleva

REPORTS AND REVIEWS/POROČILA IN OCENE, 81–88

PROMOCIJA OBLETNICE USTANOVITVE OLIMPIJSKEGA KOMITEJA KOSOVA

27. maj 2016

Olimpijski komite Kosova je 27. maja 2016 organiziral olimpijski dan, ki je bil namenjen obeleženju obletnice njegove ustanovitve. Inštitut za kineziološke raziskave Univerze na Primorskem je bil povabljen k aktivni udeležbi in promociji tega dogodka. Glavna vloga Inštituta za kineziološke raziskave je bila izvedba meritev antropometrijskih in gibalnih sposobnosti otrok, ki so sodelovali v različnih aktivnostih.

Meritev se je udeležilo 23 otrok starih 7 ali 8 let. Člani Inštituta smo v okviru antropomterijske analize izmerili telesno maso in višino ter analizirali telesno sestavo (indeks telesne mase, maščobna masa, mišična masa, pusta maščobna masa in odstotek vode v telesu). Analiza gibalnih sposobnosti je vključevala skok z nasprotnim gibanjem, leteči šprint na 10 metrov in največjo hoteno mišično kontrakcijo v smeri iztega in upogiba kolena. Vse meritve so si sledile v smiselnem zaporedju. Cilj meritev je bil primerjati rezultate kosovskih otrok z rezultati otrok iz bolj razvitih držav, ki so bili deležni podobnih meritev.

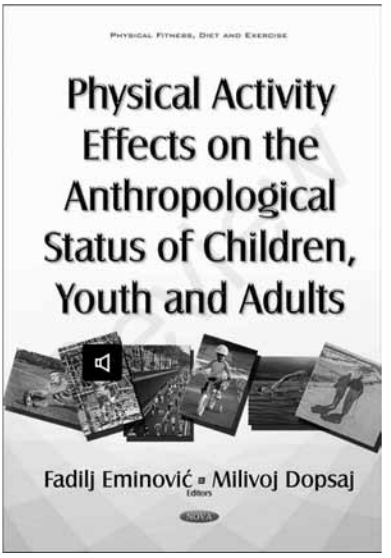
Primarni namen sodelovanja Inštituta za kineziološke raziskave Univerze na Primorskem na omenjenem dogodku je bil pridobiti informacije o gibalnem statusu kosovskih otrok, prikazati princip delovanja Inštituta državi v razvoju in vzpostaviti nove medosebne vezi ter možnosti za morebitno prihodnje sodelovanje z Olimpijskim komitejem Kosova.

Matej Kleva

REPORTS AND REVIEWS/POROČILA IN OCENE, 81–88

Book Review
FADILJ EMINOVIĆ and MILIVOJ DOPSAJ (eds.): PHYSICAL ACTIVITY EFFECTS ON THE ANTHROPOLOGICAL STATUS OF CHILDREN, YOUTH AND ADULTS

Hauppauge, NY, USA: Nova Science Publishers, Inc., 2016,
332 pages



The scientific monograph titled "Physical Activity Effects on the Anthropological Status of Children, Youth and Adults" by the editors Fadilj Eminović and Milivoj Dopsaj represents an important new contribution to interdisciplinary treatment of physical activity and its effects on physical and mental health of an individual in particular.

A lack of physical activity and a shift from the physically-active lifestyle are two important risk factors for the occurence of modern diseases and non-contagious chronic diseases, such as type 2 diabetes, cardiovascular diseases and obesity.

Regular physical activity and exercise have proven a significant positive impact on physical and mental health as well as on the overall physical performance and motor efficiency of an individual. Therefore, it is extremely important that the interdisciplinary research in the fields of kinesiology, medicine, rehabilitation, anthropology and others highlight both the positive effects of physical activity as well as the negative effects of physical inactivity and sedentary lifestyle.

The present monograph, in its 15 independent scientific articles, addresses the effects of physical activity on the various sub-systems of human organism and its functions. The monograph is particularly significant as it comprises articles written by various authors from around the world. Through the content of articles, the monograph offers many new approaches to the treatment of physical (in)activity regarding various age groups, environments and cultures. The chapters´ content is complementary. With the research on physical development, maintenance of health, optimal physical development and ensuring the overall quality of life, the monograph will prove to be an important contribution to the knowledge treasure in the field of physical activitiy tre-

atment, particularly since the findings are supported by the latest scientific approaches and findings.

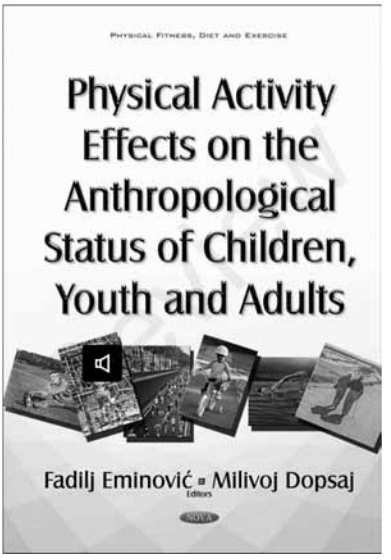
The monograph also contains an article entitled "The Effect of Regular Sport Exercise on Muscle Contractile Properties in Children" written by Slovenian authors Tadeja Volmut, Boštjan Šimunič and Rado Pišot, the researchers of the Institute for Kinesiology Research, at the Science and Research Centre of University of Primorska.

Matej Plevnik

REPORTS AND REVIEWS/POROČILA IN OCENE, 81–88

Recenzija knjige
FADILJ EMINOVIĆ in MILIVOJ DOPSAJ (ur.): UČINKI TELESNE AKTIVNOSTI NA ANTROPOLOŠKI STATUS OTROK, MLADINE IN ODRASLIH

Hauppauge, NY, USA: Založba Nova Science Publishers, 2016, 332 strani



Znanstvena monografija "Učinki telesne aktivnosti na antropološki status otrok, mladine in odraslih", urednikov Fadilja Eminovića in Milivoja Dopsaja, predstavlja nov pomemben prispevek na področju interdisciplinarne obravnave telesne aktivnosti in njenih učinkov na predvsem telesno in mentalno zdravje posameznika.

Pomanjkanje telesne aktivnosti in odmik od gibalno aktivnega življenjskega sloga je pomemben dejavnik tveganja za prisotnost bolezni .sodobnega življenjskega sloga oziroma nenalezljivih kroničnih bolezni, kot so med drugimi sladkorna bolezen tipa 2, srčno-žilne bolezni in pojav debelosti.

Redna telesna aktivnost in vadba ima dokazano pomemben pozitiven vpliv na telesno in mentalno zdravje, pa tudi na splošno telesno zmogljivost in gibalno učinkovitost človeka. Zato je izredno pomembno, da interdisciplinarne raziskave s področij kineziologije, medicine, rehabilitacije, antropologije in drugih, vedno znova osvetljujejo tako pozitivne učinke telesne aktivnosti kot tudi negativne učinke telesne neaktivnosti in sedentarnosti.

Pričujoča monografija v 15 samostojnih znanstvenih sestavkih obravnava učinke gibalne aktivnosti na različne podsisteme človekovega organizma in njegovega delovanja. Posebno težo monografiji daje dejstvo, da so v njej zbrani prispevki različnih avtorjev iz celega sveta. Skozi vsebino prispevkov ponujajo mnoge nove pristope k obravnavi telesne (ne)aktivnosti v različnih starostnih obdobjih, življenjskih okoljih in kulturah. Poglavja se vsebinsko nadgrajujejo. Z vsebinami, ki posegajo na področja razvoja in ohranjanja zdravja, optimalnega telesnega razvoja in zagotavljanja splošne kakovosti življenja, bo pomemben prispevek v zakladnico znanj na področju obravnave telesne aktivnosti, še zlasti, ker so ugotovitve podprte z najnovejšimi znanstvenimi pristopi in rezultati.

V monografiji so svoj prispevek z naslovom "Vpliv redne športne vadbe na kontraktilne elemente mišice pri otrocih" objavili tudi slovenski avtorji Tadeja Volmut, Boštjan Šimunič in Rado Pišot, raziskovalci Inštituta za kineziološke raziskave, Znanstveno-raziskovalnega središča Univerze na Primorskem.

Matej Plevnik

GUIDELINES FOR AUTHORS

1. Aim and scope of the journal:

Annales Kinesiologiae is an international interdisciplinary journal covering kinesiology and its related areas. It combines fields and topics directed towards the study and research of human movement, physical activity, exercise and sport in the context of human life style and influences of specific environments. The journal publishes original scientific articles, review articles, technical notes and reports.

2. General policy of Annales Kinesiologiae

Annales Kinesiologiae pursues the multi-disciplinary aims and nature of Kinesiology with the main goal to promote high standards of scientific research.

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d) The **title page** should include the title of the article (no more than 85 characters, including spaces), full names of the author(s) and affiliations (institution name and address) of each author; linked to each author using superscript numbers, as well as the corresponding author's full name, telephone, and e-mail address.

e) The authors are obliged to prepare two **abstracts** – one short abstract in English and one (translated) in Slovene language. For foreign authors translation of the abstract into Slovene will be provided. The content of the abstract should be structured into the following sections: purpose, methods, results, and conclusions. It should only contain the information that appears in the main text, and should not contain reference to figures, tables and citations published in the main text. The abstract is limited to 250 words.

f) Under the abstract a maximum of 6 appropriate **Keywords** shall be given in English and in Slovene. For foreign authors the translation of the key words into Slovene will be provided.

g) The **main text** should include the following sections: Introduction, Methods, Results, Discussion, Conclusions, Acknowledgement (optional), and References. Individual parts of the text can form sub-sections.

h) Each **table** should be submitted on a separate page in a Word document after the Reference section. Tables should be double-spaced. Each table shall have a brief caption; explanatory matter should be in the footnotes below the table. Abbreviations used in the tables must be consistent with those used in the main text and figures. Definitions of symbols should be listed in the order of appearance, determined by reading horizontally across the table and should be identified by standard symbols. All tables should be numbered consecutively Table 1, etc. The preferred location of the table in the main text should be indicated preferably in a style as follows: *** Table 1 somewhere here ***.

i). Captions are required for all **figures** and shall appear on a separate manuscript page, under the table captions. Each figure should be saved as a separate file without captions and named as Figure 1, etc. Files should be submitted in *.tif or *.jpg format. The minimum figure dimensions should be 17x20 cm and a resolution of at least 300 dpi. Combinations of photo and line art should be saved at 600–900 dpi. Text (symbols, letters, and numbers) should be between 8 and 12 points, with consistent spacing and alignment. Font type may be Serif (Times Roman) or Sans Serif (Arial). Any extra white or black space surrounding the image should be cropped. Ensure that participant-identifying information (i.e., faces, names, or any other identifying features) should be omitted. Each figure should be saved as a separate file without captions and named as Figure 1, etc. The preferred location of the figure in the main text should be indicated preferably in a style as follows: *** Figure 1 somewhere here ***.

j) References

The journal uses the Harvard reference system (Publication Manual of the American Psychological Association, 5th ed., 2001). see also: http://www.apastyle.org). The list of references should only include work cited in the main text and being published or accepted for publication. Personal communications and unpublished works should only be mentioned in the text. References should be complete and contain up to six authors. If the author is unknown, start with the title of the work. If you are citing work that is in print but has not yet been published, state all the data and instead of the publication year write "in print".

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Where available, DOI numbers should be provided in one of the following formats: DOI:10.1037/rmh0000008 or http://dx.doi.org/10.1037/rmh0000008.

Examples of reference citation in the text

One author: This research spans many disciplines (Enoka, 1994) or Enoka (1994) concluded...

Two authors: This result was later contradicted (Greene & Roberts, 2005) or Greene and Roberts (2005) pointed out...

Three to five authors:

a) first citation: Šimunič, Pišot and Rittweger (2009) found... or (Šimunič, Pišot & Rittweger, 2009)
b) Second citation: Šimunič et al. (2009) or (Šimunič et al., 2009)

Six or more authors:
Only the first author is cited: Di Prampero et al. (2008) or (Di Prampero et al., 2008).

Several authors for the same statement with separation by using a semicolon: (Biolo et al., 2008; Plazar & Pišot, 2009)

Examples of reference list:
The style of referencing should follow the examples below:

Books:
Latash, M. L. (2008). Neurophysiologic basis of movement. Campaign (USA): Human Kinetic.

Journal articles
Marušič, U., Meeusen, R., Pišot, R., & Kavcic, V. (2014). The brain in micro- and hypergravity : the effects of changing gravity on the brain electrocortical activity. European journal of sport science, 14(8), 813-822. DOI: 10.1080/17461391.2014.908959.
De Boer, M. D., Seynnes, O., Di Prampero, P., Pišot, R., Mekjavić, I., Biolo, G., et al. (2008). Effect of 5 weeks horizontal bed rest on human muscle thickness and architecture of weight bearing and non-weight bearing muscles. European Journal of Applied Physiology, 104(2), 401–407.

Book chapters

Šimunič, B., Pišot, R., Mekjavić, I. B., Kounalakis, S. N., & Eiken, O. (2008). Orthostatic intolerance after microgravity exposures. In R. Pišot, I. B. Mekjavić, & B. Šimunič (Eds.), The effects of simulated weightlessness on the human organism (pp. 71–78). Koper: University of Primorska, Scientific and Research Centre of Koper, Publishing house Annales.

Rossi, T., & Cassidy, T. (in press). Teachers' knowledge and knowledgeable teachers in physical education. In C. Hardy, & M. Mawer (Eds.), Learning and teaching in physical education. London (UK): Falmer Press.

Conference proceeding contributions

Volmut, T., Dolenc, P., Šetina, T., Pišot, R., & Šimunič, B. (2008). Objectively measured physical activity in girls and boys before and after long summer vacations. In V. Štemberger, R. Pišot, & K. Rupret (Eds.) Proceedings 5th International Symposium A Child in Motion "The physical education related to the qualitative education" (pp. 496–501). Koper: University of Primorska, Faculty of Education Koper, Science and research centre of Koper; Ljubljana: University of Ljubljana, Faculty of Education.

Škof, B., Cecić Erpić, S., Zabukovec, V., & Boben, D. (2002). Pupils' attitudes toward endurance sports activities. In D. Prot, & F. Prot (Eds.), Kinesiology – new perspectives, 3rd International scientific conference (pp. 137–140), Opatija: University of Zagreb, Faculty of Kinesiology.

4. Manuscript submission

The main manuscript document should be saved as a Word document and named with the first author's full name and the keyword *manuscript*, e.g. *"Pisot_Rado_manuscript.doc"*. Figures should be named as "*Pisot_Rado_Figure1", etc.*

The article should be submitted **online at the url address**:
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Reviewing process communication will proceed via e-mail.

5. For additional information regarding article publication, please do not hesitate to contact the secretary of Annales Kinesiologiae.


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