STUDIA UNIVERSITATIS
BABEŞ-BOLYAI

EDUCATIO ARTIS GYMNASTICAE

1/2018

STUDIA

UNIVERSITATIS BABEŞ-BOLYAI

EDUCATIO ARTIS GYMNASTICAE

1/2018

DOI:10.24193/subbeag.63(1)

EDITORIAL BOARD
STUDIA UNIVERSITATIS BABEŞ-BOLYAI EDUCATIO ARTIS GYMNASTICAE

EDITORIAL OFFICE OF EDUCATIO ARTIS GYMNASTICAE:
7th Pandurilor Street, Cluj-Napoca, ROMANIA, Phone: +40 264 420709, e-mail: studia.fefs@yahoo.com
http://www.studia.ubbcluj.ro/serii/educatio/index_en.html

YEAR **Volume 63 (LXIII) 2018**
MONTH **MARCH**
ISSUE **1**

S T U D I A

UNIVERSITATIS BABEŞ-BOLYAI

EDUCATIO ARTIS GYMNASTICAE

1

STUDIA UBB EDITORIAL OFFICE: B.P. Hasdeu no. 51, 400371 Cluj-Napoca, Romania, Phone + 40 264 405352

CONTENT – SOMMAIRE – INHALT – CUPRINS

ŠIMONEK JAROMÍR, Do Today´s Pupils Fall behind Their Peers from 15 Years Ago? 5

MILO NAVOT, GROSU EMILIA F., MILO MICHAELA, The Acute Effect of Yo-Yo Intermittent Endurance Test Level 1, on Vertical Jump Height of Volleyball Players 13

CUCUI GHEORGHE GABRIEL, CUCUI IONELA ALINA, The Concept of Managerial Strategy and Their Components in the Sporting Organization (Note I) * *Conceptul de strategie managerială și componentele acesteia în organizația sportivă* 27

ISIDORI EMANUELE, FAZIO ALESSANDRA, BRUNI ELSA MARIA, Physical Activity and Early Childhood Education: Towards a Critical Sports Pedagogy 35

TRANDAFIR MARIUS, BALINT LORAND, Comparative Study of Ice Hockey Players, from Russian and Romanian Teams * *Studiu comparativ al jucătorului de hochei pe gheaţă pe posturi la echipele din Rusia şi România* 47

BĂDOI ALEXANDRU RADU, MONEA GHEORGHE, Developing Resistance through Means and Methods Specific for the Football Play vs Developing Resistance through Means and Methods Specific for Athletics During Physical Education Classes in Highschool * *Dezvoltarea rezistenţei prin mijloace şi metode specifice fotbalului VS dezvoltarea rezistenţei prin mijloace şi metode specifice atletismului în orele de educaţie fizică la liceu* 57

BARBOŞ ION-PETRE, CIOCOI-POP DUMITRU-RARES, GHERTOIU DAN MIHAI, SURLĂ IULIAN, Statistics of Higest Score from Major International Competitions in 2016 * *Statistica scorului procedeelor de judo la marile competiţii internaţionale în 2016* 69

BÎCA IOAN, The Specific of Tourism and Leisure Activities in High Mountains Areas. Case Study: Mont Blanc and Elbrus Massifs * *Specificul activităţilor turistice şi agrementale în munţii înalţi. Studiu de caz: masivele Elbrus şi Mont Blanc* 79

STUDIA UBB EDUCATIO ARTIS GYMN., LXIII, 1, 2018, pp. 5 - 11
(RECOMMENDED CITATION)
DOI:10.24193/subbeag.63(1).01

DO TODAY´S PUPILS FALL BEHIND THEIR PEERS FROM 15 YEARS AGO?

ŠIMONEK JAROMÍR[1]*

ABSTRACT. ***Introduction.*** Authors in their contribution deal with the issue of testing physical abilities of children at schools. The aim of the survey was to find out the level of general motor abilities of pupils of 1st grade of elementary schools in the region of Nitra. ***Material and method.*** The sample of pupils consisted of 169 pupils (male = 96 and female = 73). The observed general motor performance was compared with the findings of other authors (Moravec, et al., 2002; Sedláček, 2009; Zapletalová, 2002). ***Results.*** Based on the comparison we came to the conclusion that the level of general motor performance of pupils of grade 1 of elementary school has decreased in both genders comparing to the previous decades. ***Conclusion.*** We expect that implementation of regular testing of elementary school pupils would contribute to the increase in the amount of physical activity of children and consecutively in the level of their motor abilities.

Keywords: *testing, pupils of 1st and 3rd grades, elementary school, physical abilities.*

Introduction

The Slovak government authorized the Conception of state policy on sport under the title "Slovak Sport 2020" in 2012. The main aim of this document was to improve the selection and preparation of sport talented youth. Attention of sport talented youth is currently executed in the organizations of talented youth in sport unions (clubs). The Conception states that the current status of extensive way of care of talented youth is not favourable, which is manifested by a decreasing number of athletes in Olympic sports, who are able

[1] Constantine the Philosopher University, Faculty of Education, Nitra, Slovakia
** Corresponding author: jsimonek@ukf.sk*

to reach excellent results in the permanently growing world competition. The result is that more and more often sport preparation is attended by children without any talent. Indication of the kind of sport for which the child is talented, is thus very important. Talent selection in Slovakia is realized already in the early age (very often in pre-school age or younger school age). In this period up to 11-12 years children show physiological prerequisites for reaching elite performances, mainly in the so called "coordination sports". Central nervous system matures to the level of 95% of adulthood at this age and all coordination abilities are on a high qualitative level. Testing individual fitness factors (strength, speed, endurance and flexibility) at the age of 11-12 years feasibly does not reflect talent of children for individual sports, especially not for the ones belonging among "coordinative sports". When selecting talents for sport i tis inevitable to find out "talent" of children using tests and test batteries reflecting the level of coordination abilities (rhythmic, reaction, balance, spatial orientation and kinaesthetic-differentiation). However, this is not carried out in practice based on different reasons. Teachers and coaches very often do not know the suitable motor tests for this reason. Similarly, the talent identification based on a cross-sectional single testing of motor abilities may not reveal the real talent of children. Such selection does not take into consideration further important factors, such as tempo motor learning – the so-called "docility", previous experience of children, and so on. Based on this it is clear that talent selection should be based on up-to-date scientific knowledge in the given field. In the top literature, as well as in practice (Botkin et al., 2015; Webborn et al, 2015; Williams et al., 2014) the method of selection of talents for sport based on genetic analysis is used. However, currently there are not enough financial means for that and we use mainly testing motor performance of children in the early ages.

The aim of the full-area testing of motor prerequisites of pupils attending 1st and 3rd grades of elementary schools in line with the new Act on Sport is not to search for most talented children, but to recommend children (and also their parents) those kinds of sport (events), in which children can be successful and performing the kind of sport will interest them. If sport will attract them, children will be motivated and will be willing to perform. Why are these tests planned to be executed at the age of 6-9 years? From the point of view of selection of talented children for sport, it is late to carry out testing for sport talent identification at the age of 9-11 years. At this age period, children are frequently involved in different sport clubs carrying out sport preparation. Initial testing of children in 1st grade (ages 6-7) is therefore is intentionally integrated in this age category, since they have not started with the controlled sport preparation yet (or they have been involved in it only for a short time). This is the stage when the impact of social environment on the development of motor prerequisites is

minimal. Stability of revealed sport prerequisites or individual sport profiles in time is suitable to verify in 3rd grade of elementary school, when puberty in children has not started yet. **National testing of motor prerequisites of pupils for identification of sport talent will be executed in accordance with the law started from September 1, 2018.** Based on this all children attending 1st and 3rd grades of elementary school in Slovakia have to undergo testing of somatic parameters (body height and body weight, BMI), as well as motor abilities (8). Motor tests were selected and verified nationally in a two-year-long pilot study by a group of experts. Resulting methods of testing and evaluating the reached performances in tests were approved. Results of pupils in individual tests will be ranked in the national database and compared with the standards for common population elaborated by the members of the operating team based on testing of more than 1,000 children of the given age. Annual testing can contribute to reaching information by parents and coaches on the level of talent of children from the national point of view, but it also can show the way children improve or stagnate. This way coaches should not miss any talented child. Obviously, it is clear that talent identification is just a half of the success. Another chapter is the rate of success of working with the talent as well as interest of the child during his/her complete youth period. It is very frequent that talented children currently leave from sport before they reached elite performances. Some of the reasons are: inadequate interest in sport attracted by the coach, excessive strictness and impersonality of coaches, offer of other more attractive (and very often sedentary activities like computers, mobiles, etc.), or negative impact of partner and schoolmates.

Aim of the survey

In our survey, we focused on comparing the performances of pupils of 1st grades of elementary schools in Nitra with the standards for common population. This aim has been chosen because we can find very repugnant information about the trends in motor development of children in literature.

Limits of the survey

We are fully aware that our sample (n=169) represents only a marginal available selection of the population year and we cannot do any far-reaching conclusion out of it. Among other limits is the use of population norms from the year 2002. However, we can presume that certain trends in the motor development of children can be seen from this survey.

Material and Method

Quantitative cross-sectional research was used to fulfil the aims of the research.

Participants: 169 pupils (96 male and 73 female) attending grade 1 of three randomly selected elementary schools in the town of Nitra, Slovakia were objects of testing. The age of tested pupils was 6-8 years (mean age=7.36; SD=0.69). Basic characteristics of the group is presented in table 1.

Table 1. Basic characteristics of the tested group

Tested group (n=169)	Decimal age (y.)	Body height (cm)	Body weight (kg)	BMI (i)
Boys (n=96)	7.39	126.91	26.75	16.52
Girls (n=73)	7.34	125.34	25.24	15.98

Set of motor tests used to assess the level of motor performance of pupils

The following motor tests were used for the identification of motor abilities of first year pupils: Repeated Bar Exercise, Bent Arm Hang, Standing Broad Jump, 4x10 m Shuttle Run, Sit-Ups For 30 s, Seated Forward Bend, Rolling 3 balls, Multi-Stage Fitness Test (20 m) and 50 m Dash. The tests were selected and verified by the experts committee constituted by the Slovak Ministry of Education, Science, Research and Sport in 2016. Description of tests can be found in the guide to EUROFIT (Moravec, 1996) tests and in the book by Šimonek (2015).

Course of survey organization

Testing took place in the school year 2016/17 at selected elementary schools in the town of Nitra in the morning during lessons of physical education. 4 P.E. Teachers and 2 student-recorders were instructed in advance and used standard testing procedure. Material provision was ensured by the testing team in accordance with the requirements of individual tests.

Results

Results of testing and comparison of the school population with the measurements performed 15 years before are presented in tables 2 a 3.

Table 2. Comparison of the selected male pupils´ results with other authors (Moravec, et al., 2002; Sedláček, 2009; Zapletalová, 2002)

BOYS	Mean age (y.)	Repeated Bar Exercise (s)	Bent Arm Hang (s)	Standing Broad Jump (cm)	4x10m (s)	Sit-Ups for 30 s (n)	Seated Forward Reach (cm)	Rolling 3 balls (s)	Multi-Stage Fitness 20m Test (n)	50m Dash (s)
Nitra (2017) (n=96)	7.39 (sd=0.46)	32.11	7.07	120.10	15.67	21,00	1.45	114.87	19.03	11.16
Moravec (2002) (n=73)	7.37 (sd=0.38)	-	9.90 (sd=10.3)	132.52 (sd=16.38)	-	19.01 (sd=5.09)	19.85 (sd=5.01)	-	31.70 (sd=11.11)	11.3
Zapletalová (2002) (n=153)	7.41 (sd=0.45)	-	-	130.10 (sd=17.48)	-	-	-	-	-	10.46 (sd=0.77)
Sedláček (2009)	7.52 (sd=0.61)	-	8.05	125.00	13.60	17.00	18.00	-	31.00	10.6
Comparison	-	-	↓	↓	↓	↑	↓	-	↓	↕

Table 2 points to the fact that the selected population of boys from Nitra in comparison with the pupils from similar measurements carried out 15 years before (Moravec, et al., 2002; Sedláček, 2009; Zapletalová, 2002) falls behind in the tests Bent Arm Hang, Standing Broad Jump, 4x10 m, Seated Forward Reach and Multi-Stage Fitness Test (20 m). On the other hand, in 50 m Dash test (according to Moravec 2002) and Sit-Ups for 30 s the current 7-year-old pupils from Nitra reached better results. Results in the tests Repeated Bar Exercise and Rolling 3 balls could not have been compared with the Slovak population since in literature there were no previous measurements presented.

Table 3 shows that the selected population of pupils from Nitra in comparison with the peers measured 15 years before (Moravec, et al., 2002; Sedláček, 2009; Zapletalová, 2002) falls behind in the tests Bent Arm Hang, Standing Broad Jump, 4x10 m, Multi-Stage Fitness Test (20 m) and 50 m Dash. On the other hand, in the test Sit-Ups for 30 s todays population of 7-year-old female pupils from Nitra recorded better results. Similarly as in boys, results in the tests Repeated Bar Exercise and Rolling 3 balls could not have been compared with the Slovak population due to the same reasons.

Table 3. Comparison of the selected female pupils´ results with other authors (Moravec, et al., 2002; Sedláček, 2009; Zapletalová, 2002)

GIRLS	Mean age (y.)	Repeated Bar Exercise (s)	Bent Arm Hang (s)	Standing Broad Jump (cm)	4x10m (s)	Sit-Ups for 30 s (n)	Seated Forward Reach (cm)	Rolling 3 balls (s)	Multi-Stage Fitness 20m Test (n)	50m Dash (s)
Nitra (2017) (n=73)	7.34 (sd=0.52)	30.52	6.92	110.67	16.23	23.00	3.73	114.42	18.30	11.38
Moravec (2002) (n=71)	7.29 (sd=0.39)	-	8.92 (sd=6.87)	123.46 (sd=15.76)		17.61 (sd=5.86)	20.83 (sd=5.78)	-	27.31 (sd=8.50)	11.25
Zapletalová (2002) (n=153)	7.11 (sd=0.31)	-	11.38 (sd=10.82)	124.90 (sd=16.28)	-	-	-	-	-	10.89 (sd=0.93)
Sedláček (2009)	7.58 (sd=0.76)	-	8.50	120.50	14.10	16.00	19.00	-	26.00	11.0
Comparison	-	-	↓	↓	↓	↑	↓	-	↓	↕

Conclusions

Results of testing motor prerequisites of pupils of 1st grade of elementary schools in Nitra showed that in the majority of motor tests todays´ pupils (both male and female) from Nitra fall behind their peers from years 2002 and 2009. By implementing obligatory testing of motor abilities of pupils of 1st and 3rd grades of elementary schools of all Slovak schools (about 50.000 children) we shall obtain a database of performances of pupils in tests. These results will be classified according to the particular groups as to qualitative standard and the best talented pupils will be identified and recommended for sport. However, motor testing is only half of success, sport clubs and coaches will have responsibility for the content of training and only then the talent of pupils will be developed to the required level. Parents will have the chance to ask for genetic analysis, which will assess the degree of talent of children for a certain group of sports (Horváth, et al., 2010; Horváth, et al., 2016). We thus facilitate effectiveness of selection of talents for sport. However, it is questionable whether the nationally obtained results in individual tests will be available to the P.E. teachers and coaches in sport clubs. In case it will be possible, it is not sure that the results of tests will be used by the coaches upon selecting the athletes to the teams.

REFERENCES

Botkin, J.R., Belmont, J.W., Berg, J.S., et al. (2015). Points to consider: ethical, legal, and psychosocial implications of genetic testing in children and adolescents. *Am J Hum Genet, 97,* 6–21.

Horváth, R., Bernasovská, J., Boržíkov, I., et al. (2010). *Diagnostika motorickej výkonosti a genetických predpokladov pre šport*. Prešov: Vydavateľstvo Prešovskej univerzity. ISBN 978-80-555-0270-0.

Horváth, R., Bernasovský, I., Biroš Hronská, D., et al. (2016). *Výber športových talentov*. Prešov: Vydavateľstvo Prešovskej univerzity. ISBN 978-80-555-1751-3.

Koncepcia práce so športovo talentovanou mládežou na roky 2015 – 2020 (Schválené vládou SR uznesením č. 564 zo 14. októbra 2015).

Moravec, R., et al. (1996). *EUROFIT. Telesný rozvoj a pohybová výkonnosť školskej populácie na Slovensku*. 1st ed. Bratislava : SVSTVŠ. ISBN 80-967487-1-8.

Moravec, R., et al. (2002). *Eurofit. Telesný rozvoj a pohybová výkonnosť školskej populácie na Slovensku*. 2nd ed. Bratislava : Slovenská vedecká spoločnosť pre telesnú výchovu a šport. ISBN 80-89075-11-8.

Sedláček, J., & Cihová, I. (2009). *Športová metrológia*. Bratislava: ICM Agency. ISBN 978-80-89257.

Webborn, N., et al. (2015). Direct-to-consumer genetic testing for predicting sports performance and talent identification: Consensus statement. *Br J Sports Med 49,* 1486-1491.

Williams, A.G., Heffernan, S.M., & Day, S.H. (2014). Genetic testing in exercise and sport—have direct-to-consumer genetic tests come of age? *Sci Sport Curr Trends*, *2,* 3–9.

Zapletalová, Ľ. (2002). *Ontogenéza motorickej výkonnosti 7 – 18 ročných chlapcov a dievčat Slovenskej republiky*. Bratislava: Slovenská vedecká spoločnosť pre telesnú výchovu a šport. ISBN 80-89075-17-7.

Zákon č. 440/2015 Z. z. o športe a o zmene a doplnení niektorých zákonov.

STUDIA UBB EDUCATIO ARTIS GYMN., LXIII, 1, 2018, pp. 13 - 26
(RECOMMENDED CITATION)
DOI:10.24193/subbeag.63(1).02

THE ACUTE EFFECT OF YO-YO INTERMITTENT ENDURANCE TEST LEVEL 1, ON VERTICAL JUMP HEIGHT OF VOLLEYBALL PLAYERS

MILO NAVOT[1], GROSU EMILIA F.[1], MILO MICHAELA[1]

ABSTRACT. The purpose of this study was to compare volleyball block jump (VBJ) and volleyball attack jump (VAJ) height capacity after performing a conventional warm-up (CWU) and immediately after performing a Yo-Yo Intermittent Endurance Test-Level 1 (YYIE1). After two weeks of the preparation season, each one of thirty-experienced female and male volleyball players, ranged from regional to national level, performed eight VAJ and eight VBJ two minutes after CWU (pre-test), immediately continued with YYIE1, until reaching 80% of VO_2max, then after two minutes rest, they performed again eight VAJ and eight VBJ (post-test). Results show a significant positive difference in both VBJ and VAJ between post- and pre-test. Statistical significance is present when comparing average and highest measures. In addition, the first jumps at post-test, which were performed immediately after YYIE1, were significantly higher than the first jumps at pre-test, which were performed immediately after CWU. We conclude that vertical jump (VJ) of volleyball players at a regional and national level, is higher when carried-out immediately after performing YYIE1 until reaching 80% of VO_2max, than after CWU. Therefore, it should be considered as a warm-up for volleyball block and attack jump drills.

Key words: *vertical jump, volleyball block jump, volleyball attack jump, yo-yo intermittent endurance test-level 1, conventional warm-up.*

[1] *University of Babeș-Bolyai, Cluj-Napoca*
** Corresponding autor: milom@yahoo.com*

Introduction

Volleyball is considered one of the most explosive and fast-paced sports (Stanganelli, Dourado, Oncken, Mançan & da Costa, 2008). For example, according to data examined among elite male players, found to have performed between 250 to 300 actions requiring explosive force production during a five-game match. The vertical jump (VJ) constitutes most of these actions (Hasegawa, Dziados, Newton, Fry, Kraemer & Häkkinen, 2002). Of these activities, the attack and block situations represent 45% of the total actions of the game and are also responsible for 80% of the points obtained within international matches (Voigt & Vetter, 2003). Setting for spike in high level volleyball, is also performed by VJ to shorten the flight time of the ball in the transition from passing to attack or from defense to offence (Borràs, Balius, Drobnic & Galilea, 2011). All of this implies that the ability to exhaust the highest VJ among volleyball players is of the utmost importance

The conventional warm-up (CWU) and preparation for optimal utilization of VJ capacity, including volleyball attack jumps (VAJ) and volleyball block jump (VBJ) mostly consists of few minutes of jogging, few minutes of stretching and few minutes of various types of running, skipping, hopping and vertical jumps on a 10-15 meter track (Mirzaei, Asghar, Norasteh, Saez de Villarreal & Asadi, 2014; Herrero, Izquierdo, Maffiuletti & Garcia-Lopez, 2006; Pearce, Kidgell, Zois & Carlson, 2009; Sheppard, Cronin, Gabbett, McGuigan, Etxebarria & Newton, 2008). However, some volleyball players have reported that after an exhaustive or near-exhaustive run of approximately 15 minutes, with almost no recovery gap, they can jump higher than after CWU.

In addition, researches have shown that immediately after an exhausting or near-exhausting 20-40 minute of intermittent, intervals or endurance run, athletes, most of them endurance runners, experienced an immediate and acute VJ enhancement, by comparison to results that achieved after CWU (Vuorimaa, Virlander, Kurkilahti, Vasankari & Häkkinen, 2006; Boullosa & Tuimil, 2009; Boullosa, Tuimil, Alegre, Iglesias & Lusquiños, 2011; Juarez, Lopez de Subijana, Mallo & Navarro, 2011; Cortis, Tessitore, Lupo, Pesce, Fossile, Figura & Capranica, 2011; García-Pinillos, Soto-Hermoso & Latorre-Román 2015; García-Pinillos, Soto-Hermoso & Latorre-Román, 2016). On the other hand, when measurements of VJs height performed immediately after longer than 40 minutes endurance run, there was reduction in VJ height by comparison to VJ pre-tests (Nicol, Komi & Marconnet, 1991; Elissavet, Ioannis, Gregory & Konstantinos, 2016). VJ post-test reduction was found also after 20-min exhausting cycling (McIntyre, Mawston & Cairns, 2012).

Among the researches that demonstrate an endurance run induces VJ enhancement, the larger difference between pre-test (30.9cm) to post-test (35.1cm) was achieved after 40 minutes of tempo run on treadmill, while running speed was adjusted to 80% VO_2max of the subject's capacity. The 40 minutes running protocol was performed by two minutes running and two minutes of walking rest, at total running time of 20 minutes (Vuorimaa et al., 2006). In addition, Juarez et al (2011) also found CMJ difference: between pre-test (41cm) to post-test (43cm) that was performed immediately after 20 minutes run at 80% of VO_2max capacity among young soccer players. As far as we know, this phenomenon has not been tested with volleyball players, when VJ is a major component of their physical capacity. Therefore, the purpose of this study is to validate the assumption that an endurance run at increasing speed until 80% of subjects' VO_2max, not exceeding 15 minutes for females and 20 minutes for males, leads to a higher immediate acute enhancement of VJ capacity by comparison to VJ capacity after CWU, among volleyball players.

Methods

In many of field tests that examine maximal voluntary contraction (MVC) of legs muscles, we measure and compare VJ as a simple and effective method. Most of the studies test MVC by three traditional types of VJ: Squat-Jump (SJ), usually performed from a knee bending angle of °90, without the eccentric phase of the jump; Counter movement jump (CMJ), which is an ordinary standing VJ, usually performed by hands kept on the waist; Drop jump (DJ), like CMJ but performed by jumping downward, mostly from a height of 40 cm, preceding to immediate VJ (Bosco, Viitasalo, Komi & Luhtanen, 1982; Bosco, Atteri, Fekete, Apor & Rusko, 1986). However, in researches that conducted on volleyball players, the specific volleyball VJ (i.e. VAJ, VBJ) were tested in addition or separately from the traditional VJ tests: CMJ, SJ, DJ (Newton, Kraemer & Haekkinen, 1999; Newton, Rogers, Volek, Häkkinen & Kraemer, 2006; Ziv & Lidor, 2010).

Stanganelli et al (2008), took it even farther and suggested that using VAJ and VBJ tests seem to be more sensitive to the training-induced adaptations and better reflect the specificity of volleyball game then the traditional VJ tests. In fact, VBJ is performed similarly to CMJ without arm swing and VAJ is a combination of DJ and CMJ. These VJ can be a valid measurement instrument, instead of the traditional VJ among volleyball players (Sattler, Sekulic, Hadzic, Uljevic & Dervisevic, 2012). Therefore, in this study VAJ and VBJ was chosen as the dependent variable.

Part of the researches of the phenomenon of endurance run induces VJ enhancement, performed Montréal University test (Berthoin, Baquet, Rabita & Blondel, 1999; Leger & Boucher 1980; Boullosa & Tuimil, 2009; Boullosa et al., 2011), which examine aerobic and anaerobic capacity in endurance run at an increasing speed. The Montréal University test used as the exhausting running before VJs post-test (independent variable). However, in this study it was necessary to find a measurable increasing speed endurance run test, which will fit into a volleyball gymnasium, in aim to reduce the transition time between the end of the run to the measurement of the first VJ. The Yo-Yo tests were found as a useful tool for evaluating aerobic capacity in intermittent sports like volleyball (Bangsbo, Iaia & Krustrup, 2008). In addition to the evaluation of aerobic capacity, for our purpose, the Yo-Yo Intermittent Endurance Test-Level 1 (YYIE1) was also found suitable as an indoor measurable exhausting endurance run before the VJ measurement. The YYIE1 has proven to be affected by submaximal cardiorespiratory fitness-related variables (Castagna, Impellizzeri, Belardinelli & Abt, 2006; Bradley, Bendiksen, Dellal, Mohr, Wilkie, Datson & Krustrup, 2014) and is also correlated with the Montréal University test (Dupont, Defontaine, Bosquet, Blondel, Moalla & Berthoin, 2010).

Subjects

Thirty experienced female and male volleyball players (12 female and 18 male), ranged from regional to national level, volunteered to participate in this study. The subjects' age ranged from 17 to 32 (mean 24.5 years of age). Their heights ranged from 165 to 178 cm (mean 171.5 cm) for women, and from 172 to 191 cm (mean 181.5) for men. Their body weights ranged from 45 to 75 kg (mean 60 kg) for women, and from 65 to 95 kg (mean 80 kg) for men. All of them underwent a medical examination required by the Sports Law in the State of Israel. All the subjects have been playing volleyball for at least six years and they are very well trained and skilled in VAJ and VBJ technique.

Table 1. Mean (range) of anthropometric values

Age (year) n=30	Women's age n=12	20.5 (16-25)
	Men's age n=18	24 (16-32)
Height (cm) n=30	Women's height (cm) n=12	171.5 (165-178)
	Men's height (cm) n=18	181 (172-191)
Mass (kg) n=30	Women's mass (kg) n=12	59.5 (46-73)
	Men's mass (kg) n=18	81(66-97)

Study design

The study included four parts as follows: 1) Nine minutes of CWU, similar to Pearce et al (2009), Start by three minutes running and then running drills on a 20 meters track, as shown in table 2; 2) Two minutes after CWU, performing VJ pre-test of eight VAJs and eight VBJs, half of the subjects in reverse order (Stanganelli et al., 2008), 15 seconds interval between jumps (Pereira, Almeida, Rodacki, Ugrinowitsch, Fowler & Kokubun, 2008); 3). Three minutes after the last jump, performing YYIE1, until reaching 80% of VO_2max, and 4). Two minutes after the end of YYIE1-80, performing VJ post-test of eight VAJ and eight VBJ (the subjects had to perform VAJ and VBJ in the same order as in pretest).

Procedures

The VJ test was conducted two weeks after the beginning of the preparation term for the game season. The subjects performed the test at the beginning of a practice unit and the data collected from all the subjects along a whole week. The test was performed at the evening and after a day of rest from exercise. Subjects were asked to sleep seven or eight hours at the night before the test and not eating during the three hours proceeding to the test. Other than that, other daily habits were not controlled. The test was performed on a parquet volleyball court.

Monitoring 80% of VO2max in YYIE1

80% of VO_2max was found in proximity to anaerobic threshold (Dwyer & Bybee, 1983). One of the simple and valid way to monitor anaerobic threshold in endurance running intensity is the talk test. The talk test performed when the examiner asks the subject to report verbally about her or his ability to talk comfortably couple of times when the intensity of the effort is increasing. When flow of the talk is interrupted by increasing of breathing, or when the subject reports speech discomfort, the level of effort is exciding anaerobic threshold and approximately 85% of VO_2max (Reed & Pipe, 2014; Reed & Pipe, 2016). The talk test is considered a useful tool to monitor ventilatory anaerobic threshold under field conditions (Rodríguez-Marroyo, Villa, García-López & Foster, 2013; Quinn & Coons, 2011). Therefore, in this study, the talk test was chosen to monitor the 80% of VO_2max as the intensity of YYIE1 is increasing.

Vertical Jump (VJ) measurement

The VJ height was measured using VERT Wearable Jump Monitor. The Vert (Mayfonk Athletic, Florida, USA) is a small inertial sensor measuring 6 × 3 × 0.5 cm. Inserted Into an elastic waistband, the sensor time stamps and calculates the vertical displacement of each jump. Data is subsequently streamed to a tablet via Bluetooth. (Charlton, Kenneally-Dabrowski & Spratford, 2017). VERT Wearable Jump Monitor was found to by a valid measurement instrument. (Charlton et al., 2017; Borges, Moreira, Bacchi, Finotti, Ramos, Lopes & Aoki, 2017; MacDonald, Bahr, Baltich, Whittaker & Meeuwisse, 2017). The VERT Wearable Jump Monitor can be connected to eight sensors and measures and counts the jump heights and number of jumps of each of eight volleyball players at the same time, ether during volleyball practice or during matches. All the data is recorded and saved by the VERT system.

Table 2. Exercise order of CWU

1. Three minutes light jogging	
2. running exercise on a 20 meters track:	Times of performances
• Skips with forward arm circles, easy jog return	2
• Skips with backward arm circles, easy jog return	2
• Run with high knees, easy skipping return	1
• Butt kicks run (hill to butt), easy skipping return	1
• Backwards run, easy skipping return	2
• Carioca drill, back and forth	2
• Power skips, walking return	1
• Bounding, walking return	1
• Sprint, walking return	2

Statistical analysis

To test our hypothesis, we conducted three types of statistical tests. First assuming that our sample is normally distributed, we conducted a paired t-test to test the difference between VBJ and VAJ pre-test to post-test. Next, assuming no inference can be made on the distribution of samples, we conducted the Wilcoxon signed rank test. Finally, when testing statistically the effect of the various tests on jumping improvement, traditional statistical tests that measure the effect on the average or median are improper, because the tests usually improve those parameters by a relatively small scale that a simple *t* test or Mann-Whitney U test cannot detect.

For example: In the case of jumping, improvement of volleyball player jumping at spike (attack) from 65 cm to 68 cm, would probably not be considered statistically significant, even if all subjects show such improvements. A simple *t* test would simply not recognize a significant difference between an average of 75 cm. and 80 cm. with a relatively small sample of subjects. In addition, the statistical test measures mathematical distances, and cannot realize that a 3 cm. difference may be considered significant in volleyball. For this reason, we apply the sign test that measures the number of improvements within the sampled group.

Under the null hypothesis, the intervention plan has no effect on the results. Therefore, we would expect the VBJ and VAJ pre-test results to be somewhat similar to those with higher post-test results (which reflects no significant differences overall). If, on the other hand, we find that the post-test results are significantly higher, we should – at least at some point – conclude that performing YYIE1 until reaching 80% of VO_2max has a significant positive effect on higher VBJ and VAJ capacity.

Results

The average result of the YYIE1 80% of VO2max was 1,400 m, with standard deviation of 635.56, stage 8.0.2 (females: 980m, with standard deviation of 362.75, stage 7.0.3; males: 1,680 m, with standard deviation of 623.6, stage 8.5.6). The YYIE1 test increased VJ in both VBJ and VAJ. Table 3 shows the values of pre-test and post-test VBJ and VAJ. The table also shows the difference between pre- and post-test values and the significance levels of three different statistical tests: the parametric t-test, and the non-parametric Wilcoxon signed rank and the sign tests. For the statistical tests, we measured VBJ and VAJ separately in two different ways. In the first, we measured the average of all jumps of each subject (A-VBJ and A-VAJ). In the second, we used the highest jump from each treatment (H-VBJ and H-VAJ). Table 3 provides the values of each measure. The table shows significant differences of both A- and H- measures across the entire subjects.

According to Table 3, the average of the first jumps performed immediately after the YYIE1 are significantly higher than the average of the first jumps after CWU, for both VBJ and VAJ. Table 4, shows the difference and the significant advantage of the average of the first VBJ (among17 subjects) and VAJ (among13 subjects), immediately after YYIE1 (post-test), compared to the first jumps before YYIE1 and after CWU.

Table 3. Average values and standard deviations of A- and H- VJs for pre-test and post-test separately immediately after YYIE1, and percentage change between them (Δ%).

Variables	Pre-test	Post-test	Δ %	p-value t-test	p-value Wilcoxon signed rank test	p-value sign test
VBJ (cm) Average	Ave. 46.67 SD. 9.18	Ave. 47.27 SD. 9.38	1.21	0.010	0.030	0.045
VAJ (cm) Average	Ave. 59.63 SD. 11.58	Ave. 60.49 SD. 11.27	2.16	0.001	0.004	0.100
VBJ (cm) Highest	Ave. 50.29 SD. 10.08	Ave. 50.55 SD. 10.2	0.71	0.278	0.320	0.137
VAJ (cm) Highest	Ave. 63.23 SD. 12.13	Ave. 64.33 SD. 11.88	1.83	0.046	0.082	0.201

Table 4. Average values and standard deviations of the subjects' first VJ height of pre-test compared to post-test immediately after YYIE1. Percentage of changes (Δ%) are also reported.

Variables	Pre-test	Post-test	Δ %	p-value t-test	p-value Wilcoxon signed rank test	p-value sign test
First VBJ (cm)	Ave. 46.32 SD. 9.4	Ave. 48.35 SD. 11.77	3.67			
First VAJ (cm)	Ave. 58.5 SD. 11.95	Ave. 60.13 SD. 10.64	3.38			
VBJ & VAJ (cm)	Ave. 51.61 SD. 12.06	Ave. 53.46 SD. 12.59	3.55	0.005	0.021	0.045

Discussion

In line with VJ height enhancement, achieved by Vuorimaa et al. (2006); Boullosa & Tuimil (2009); Boullosa et al., (2011); Juarez et al., (2011); Cortis et al., (2011); Garcia et al., (2015); Garcia et al, (2016), and as shown in table 3, our study found also a significant enhancement in VJ immediately after endurance run at increasing speed until reaching 80% of VO_2max, using YYIE1. As far as we know, this study examined, for the first time, population of volleyball players and tested them in VBJ and VAJ, that represent the natural VJ of this sport (Stanganelli et al., 2008; Sattler et al., 2012).

Although there is no clear explanation for the phenomenon of exhausting or near exhausting-run induces vertical jump enhancement, the researchers attempted to explain it. According to Vuorimaa et al (2006), the explanation for the phenomenon is that after an intensive run, a different coordination strategy counteracts strength loss and even improves power in extension movements, performed vertically with both legs, like VJ. They also suggested that the increase in VJ height could be the result of an increased utilization of muscle elastic energy during the stretch-shortening cycle (SSC),[2] which is better active immediately after prolonged exhausting or near exhausting run (Bosco et al., 1982). In addition, Komi (2000), indicates that moderate SSC fatigue may result in slight potentiation, which in our case, stimulates higher VJ.

Another explanation is provided by Boullosa & Tuimil, (2009) and Boullosa et al (2011): They attribute the phenomenon of exhausting-run induces vertical jump enhancement to post-activation potentiation (PAP),[3] when instead of reaching fatigue, an enhancement of power generation (potentiation), appears a few minutes after an exhausting or near exhausting effort. This phenomenon has generally attributed to the reinforcement of power generation in leg extensors, immediately after set of resistance exercise at intensity of approximately 3RM (Batista et al, 2007). Boullosa et al (2011), add and claim that the feasibility of PAP immediately after exhausting run,

[2] Stretch-Shortening Cycle (SSC) is a combination of two mechanisms. First, a mechanism like a spring in activities such as VJ. It includes the (1) eccentric phase of flexing the joints and in which the elastic energy is stored in the muscles and in the musculotendinous junction, which leads to (2) isometric transition phase, which leads to (3) the fast and explosive concentric phase. The elastic energy in the SSC joins the second mechanism: The stretching reflex, that begins in the eccentric phase while stretching muscle spindles and Golgi tendon organs, which provide the neural signal for operating a reflex arc which is increasing the recruitment and the contraction of fast twitch (FTb) motor units in the concentric phase. The SSC explains why VJ that preceded by a countermovement or a pre-stretch, increases vertical displacement above SJ in which the eccentric phase is eliminated (Turner & Jeffreys, 2010; Komi, 1984; Nicol, Avela & Komi, 2006).

[3] Post-activation potentiation (PAP) refers to the fact that instead of the appearance of fatigue after a concentric contraction in an exhausting resistance of RM3 or less, ror example, when performing squats in such resistance, power increasing (potentiation) appears a few minutes after the exhausting action (Wilson, Duncan, Marin, Brown, Loenneke, Wilson, & Ugrinowitsch, 2013; Bomfim Lima, Marin, Barquilha, Da Silva, Puggina, Pithon-Curi & Hirabara, 2011). The explanation for this is related to the following reasons: First, enhancement in the efficiency of ATP production in the phosphogenic energy pathway (ATP-CP) (Hodgson, Docherty & Robbins, 2005); Second, increasing the recruitment of fast twitch b (FTb) motor units and optimizing the electrochemical (neural) array involved in the recruitment (Enoka, 2002; Aagaard, Simonsen, Andersen, Magnusson & Dyhre-Poulsen, 2002; Aagaard, 2003).

does not contradict the reinforcement of stored elastic energy as part of SSC in fast twitch muscle fibers immediately after protocol of increased and prolonged exhausting or near exhausting run of 20-30 minutes.

However, a later study of Garcia et al (2016), suggest that as an effect of exhausting run, not the PAP is the reason for VJ enhancement, but another compensatory strategy may induce a re-organization of the movement structure and a new coordination pattern may appear, letting athletes maintain or even reinforce VJ performance, despite high levels of exhaustion. In addition, our study shows that the first and immediate VJ, that performed two minutes after the YYIE1 test, was significantly higher than their first jump performed immediately after the CWU (table 4). These results are supported by Boullosa & Tuimil, (2009), who found higher VJ, two minutes after the end of prolonged incremental run, than the height of VJ that performed seven minutes after the end of the same run. These findings also raise doubts about PAP as the reason for the increase in VJ height immediately after exhausting running, because according to Wilson et al (2013), and Bomfim Lima et al (2011), approximately five minutes are required for the beginning of the PAP effect.

Conclusions

This study was conducted among volleyball players, which are not well-trained for endurance run that is similar to the YYIE1. Nevertheless, the subjects experienced acute VJ enhancement in both VBJ and VAJ. Therefore, we conclude that VJ of volleyball players at a regional and national level, will be higher when carried-out immediately after performing YYIE1 until reaching 80% of VO2max, than after CWU. Therefore, it may be considered as a good warm-up for volleyball block and attack jump drills. In addition, it is hypothesized that performing multi-repetition of YYIE1 test immediately preceding VBJ and VAJ drills will create long term and chronic VBJ and VAJ enhancement among volleyball players.

REFERENCES

Aagaard, P. (2003). Training-induced changes in neural function. *Exercise and sport sciences reviews*, *31*(2), 61-67.

Aagaard, P., Simonsen, E.B., Andersen, J.L., Magnusson, P., & Dyhre-Poulsen, P. (2002). Neural adaptation to resistance training: changes in evoked V-wave and H-reflex responses. *Journal of Applied Physiology*, *92*(6), 2309-2318.

Bangsbo, J, Iaia, FM, and Krustrup, P. (2008). The Yo-Yo intermittent recovery test: A useful tool for evaluation of physical performance in intermittent sports**.** *Sports Med '38*: 37-51.

Batista, M.A., Ugrinowitsch, C., Roschel, H., Lotufo, R., Ricard, M.D., & Tricoli, V.A. (2007). Intermittent exercise as a conditioning activity to induce postactivation potentiation. *The Journal of Strength & Conditioning Research*, *21*(3), 837-840.

Berthoin, S., Baquet, G., Rabita, J., & Blondel, N. (1999). Validity of the Universite de Montreal Track Test to assess the velocity associated with peak oxygen uptake for adolescents. *Journal of sports medicine and physical fitness*, *39*(2), 107.

Bomfim Lima, J., Marin, D., Barquilha, G., Da Silva, L., Puggina, E., Pithon-Curi, T., & Hirabara, S. (2011). Acute effects of drop jump potentiation protocol on sprint and countermovement vertical jump performance. *Human Movement*, *12*(4), 324-330.

Borges, T.O., Moreira, A., Bacchi, R., Finotti, R.L., Ramos, M., Lopes, C.R., & Aoki, M.S. (2017). Validation of the VERT wearable jump monitor device in elite youth volleyball players. *Biology of Sport*, *34*(3).

Borràs, X., Balius, X., Drobnic, F., & Galilea, P. (2011). Vertical jump assessment on volleyball: a follow-up of three seasons of a high-level volleyball team. *The Journal of Strength & Conditioning Research*, *25*(6), 1686-1694.

Bosco, C., Atteri, F., Fekete, G., Apor, P., & Rusko, H. (1986). The effect of fatigue on store and re-use of elastic energy in slow and fast types of human skeletal muscle. *Acta Physiologica*, *128*(1), 109-117.

Bosco, C., Viitasalo, J.T., Komi, P.V., & Luhtanen, P. (1982). Combined effect of elastic energy and myoelectrical potentiation during stretch-shortening cycle exercise. *Acta Physiologica*, *114*(4), 557-565.

Boullosa, D.A., & Tuimil, J.L. (2009). Postactivation potentiation in distance runners after two different field running protocols. *The Journal of Strength & Conditioning Research*, *23*(5), 1560-1565.

Boullosa, D.A., Tuimil, J.L., Alegre, L.M., Iglesias, E., & Lusquiños, F. (2011). Concurrent fatigue and potentiation in endurance athletes. *International journal of sports physiology and performance*, *6*(1), 82-93.

Bradley, P.S., Bendiksen, M., Dellal, A., Mohr, M., Wilkie, A., Datson, N., ... & Krustrup, P. (2014). The Application of the Yo-Yo Intermittent Endurance Level 2 Test to Elite Female Soccer Populations. *Scandinavian journal of medicine & science in sports*, *24*(1), 43-54.

Castagna, C., Impellizzeri, F.M., Belardinelli, R., & Abt, G. (2006). Cardiorespiratory responses to Yo-yo Intermittent Endurance Test in nonelite youth soccer players. *Journal of Strength and Conditioning Research*, *20*(2), 326.

Charlton, P.C., Kenneally-Dabrowski, C., Sheppard, J., & Spratford, W. (2017). A simple method for quantifying jump loads in volleyball athletes. *Journal of science and medicine in sport*, *20*(3), 241-245.

Cortis, C., Tessitore, A., Lupo, C., Pesce, C., Fossile, E., Figura, F., & Capranica, L. (2011). Inter-limb coordination, strength, jump, and sprint performances following a youth men's basketball game. *The Journal of Strength & Conditioning Research*, *25*(1), 135-142.

Dupont, G., Defontaine, M., Bosquet, L., Blondel, N., Moalla, W., & Berthoin, S. (2010). Yo-Yo intermittent recovery test versus the Universite de Montreal Track Test: relation with a high-intensity intermittent exercise. *Journal of Science and Medicine in Sport*, *13*(1), 146-150.

Dwyer, J., & Bybee, R. (1983). Heart rate indices of the anaerobic threshold. *Medicine & Science in Sports & Exercise*, *15*(1), 72-76.

Elissavet N. Rousanoglou, Ioannis A Bayios, Gregory C. Bogdanis, Konstantinos Boudolos. (2016). Alterations of Vertical Jump Mechanics after a Half-Marathon Mountain Running Race. *J Sports Science Med; 15*(2): 277–286.

Enoka R. (2002). Neuromechanics of human movement. *3rd ed. Champaign (IL): Human Kinetics*.

García-Pinillos, F., Molina-Molina, A., & Latorre-Román, P.Á. (2016). Impact of an incremental running test on jumping kinematics in endurance runners: can jumping kinematic explain the post-activation potentiation phenomenon?. *Sports Biomechanics*, *15*(2), 103-115.

García-Pinillos, F., Soto-Hermoso, V.M., & Latorre-Román, P.A. (2015). Acute effects of extended interval training on countermovement jump and handgrip strength performance in endurance athletes: postactivation potentiation. *The Journal of Strength & Conditioning Research*, *29*(1), 11-21.

Hasegawa, H., Dziados, J., Newton, R.U., Fry, A.C., Kraemer, W.J., & Häkkinen, K. (2002). Periodized training programmes for athletes. *Strength training for sport*, 69-134.

Herrero, J.A., Izquierdo, M., Maffiuletti, N.A., & Garcia-Lopez, J. (2006). Electromyo-stimulation and plyometric training effects on jumping and sprint time. *International journal of sports medicine*, *27*(07), 533-539.

Hodgson M, Docherty D, Robbins D. (2005). Post-activation potentiation: underlying physiology and implications for motor performance. *Sports Med; 35*(7):585-595.

Juarez, D., Lopez de Subijana, C., Mallo, J., & Navarro, E. (2011). Acute effects of endurance exercise on jumping and kicking performance in top-class young soccer players. *European Journal of Sport Science*, *11*(3), 191-196.

Komi, P.V. (1984). Physiological and biomechanical correlates of muscle function: effects of muscle structure and stretch-shortening cycle on force and speed. *Exercise and sport sciences reviews*, *12*(1), 81-122.

Komi, P.V. (2000). Stretch-shortening cycle: a powerful model to study normal and fatigued muscle. *Journal of biomechanics*, *33*(10), 1197-1206.

Leger L, Boucher R. (1980). An indirect continuous running multistage field test: the Universite de Montreal track test**.** *Can J Appl Spt Sci; 5*: 77 -84.

MacDonald, K., Bahr, R., Baltich, J., Whittaker, J.L., & Meeuwisse, W.H. (2017). Validation of an inertial measurement unit for the measurement of jump count and height. *Physical Therapy in Sport*, *25*, 15-19.

McIntyre, J.P., Mawston, G.A., & Cairns, S.P. (2012). Changes of whole-body power, muscle function, and jump performance with prolonged cycling to exhaustion. *International journal of sports physiology and performance*, *7*(4), 332-339.

Mirzaei, B., Asghar Norasteh, A., Saez de Villarreal, E., & Asadi, A. (2014). Effects of six weeks of depth jump vs. Countermovement jump training on sand on muscle soreness and performance. *Kineziologija*, *46*(1), 97-108.

Newton, R.U., Kraemer, W.J., & Haekkinen, K.E.I.J.O. (1999). Effects of ballistic training on preseason preparation of elite volleyball players. *Medicine and science in sports and exercise*, *31*, 323-330.

Newton, R.U., Rogers, R.A., Volek, J.S., Häkkinen, K., & Kraemer, W.J. (2006). Four weeks of optimal load ballistic resistance training at the end of season attenuates declining jump performance of women volleyball players. *Journal of Strength and Conditioning Research*, *20*(4), 955.

Nicol, C., Komi, P.V., & Marconnet, P. (1991). Fatigue effects of marathon running on neuromuscular performance. *Scandinavian journal of medicine & science in sports*, *1*(1), 10-17.

Nicol, C., Avela, J., & Komi, P.V. (2006). The stretch-shortening cycle. *Sports Medicine*, *36*(11), 977-999.

Pearce, A.J., Kidgell, D.J., Zois, J., & Carlson, J.S. (2009). Effects of secondary warm up following stretching. *European journal of applied physiology*, *105*(2), 175-183.

Pereira, G., Almeida, A.G., Rodacki, A.L., Ugrinowitsch, C., Fowler, N.E., & Kokubun, E. (2008). The influence of resting period length on jumping performance. *The Journal of Strength & Conditioning Research*, *22*(4), 1259-1264.

Quinn, T.J., & Coons, B.A. (2011). The Talk Test and its relationship with the ventilatory and lactate thresholds. *Journal of sports sciences*, *29*(11), 1175-1182.

Reed, J.L., & Pipe, A.L. (2014). The talk test: a useful tool for prescribing and monitoring exercise intensity. *Current opinion in cardiology*, *29*(5), 475-480.

Reed, J.L., & Pipe, A.L. (2016). Practical approaches to prescribing physical activity and monitoring exercise intensity. *Canadian Journal of Cardiology*, *32*(4), 514-522.

Rodríguez-Marroyo, J.A., Villa, J.G., García-López, J., & Foster, C. (2013). Relationship between the talk test and ventilatory thresholds in well-trained cyclists. *The Journal of Strength & Conditioning Research*, *27*(7), 1942-1949.

Sattler, T., Sekulic, D., Hadzic, V., Uljevic, O., & Dervisevic, E. (2012). Vertical jumping tests in volleyball: reliability, validity, and playing-position specifics. *The Journal of Strength & Conditioning Research*, *26*(6), 1532-1538.

Sheppard, J.M., Cronin, J.B., Gabbett, T.J., McGuigan, M.R., Etxebarria, N., & Newton, R.U. (2008). Relative importance of strength, power, and anthropometric measures to jump performance of elite volleyball players. *The Journal of Strength & Conditioning Research*, *22*(3), 758-765.

Stanganelli, L.C.R., Dourado, A.C., Oncken, P., Mançan, S., & da Costa, S.C. (2008). Adaptations on jump capacity in Brazilian volleyball players prior to the under-19 World Championship. *The Journal of Strength & Conditioning Research*, *22*(3), 741-749.

Turner, A.N., & Jeffreys, I. (2010). The stretch-shortening cycle: Proposed mechanisms and methods for enhancement. *Strength & Conditioning Journal*, *32*(4), 87-99.

Voigt, H.F., & Vetter, K. (2003). The value of strength-diagnostic for the structure of jump training in volleyball. *European Journal of Sport Science*, *3*(3), 1-10.

Vuorimaa, T., Virlander, R., Kurkilahti, P., Vasankari, T., & Häkkinen, K. (2006). Acute changes in muscle activation and leg extension performance after different running exercises in elite long distance runners. *European journal of applied physiology*, *96*(3), 282-291.

Wilson, J.M., Duncan, N.M., Marin, P.J., Brown, L.E., Loenneke, J.P., Wilson, S.M., ... & Ugrinowitsch, C. (2013). Meta-analysis of postactivation potentiation and power: effects of conditioning activity, volume, gender, rest periods, and training status. *The Journal of Strength & Conditioning Research*, *27*(3), 854-859.

Ziv, G., & Lidor, R. (2010). Vertical jump in female and male volleyball players: a review of observational and experimental studies. *Scandinavian journal of medicine & science in sports*, *20*(4), 556-567.

STUDIA UBB EDUCATIO ARTIS GYMN., LXIII, 1, 2018, pp. 27 - 34
(RECOMMENDED CITATION)
DOI:10.24193/subbeag.63(1).03

THE CONCEPT OF MANAGERIAL STRATEGY AND THEIR COMPONENTS IN THE SPORTING ORGANIZATION (Note I)

CUCUI GHEORGHE GABRIEL[1*], CUCUI IONELA ALINA[1]

ABSTRACT. The culture of the sporting organization is the most recent notion introduced in the field of organizational theory. In a changing environment, the strategy is the flexible projection of the organization's future, based on scientific forecasts and forecasts, as a central concept but with content that can be modified and adapted to changes in organizational and competitive environment. The success of the strategy modeling process within a strategic scenario to improve organizational adaptability has a strong human coordination, being closely linked to the participation, motivation, involvement of the human resource, and the capitalization of knowledge, skills and managerial capabilities of all members of the organization. Both theoretically and practically, the strategy has become an essential component of management. The use of strategic planning has beneficial consequences: it improves performance, contributes to improved management efficiency which translates into a better ability to identify and exploit opportunities in the life of the organization as well as encouraging employees to have a positive attitude towards an environment in continuing transformation.

Keywords: *management, sport organization, strategy*.

REZUMAT. ***Conceptul de strategie managerială şi componentele acesteia în organizaţia sportivă.*** Cultura organizaţiei sportive este cea mai recentă noţiune introdusă în domeniul teoriei organizaţiei. Într-un mediu în continuă schimbare, strategia este proiecţia flexibilă a viitorului organizaţiei, elaborată pe baza previziunilor şi prognozelor ştiinţifice, ca un concept central dar cu un conţinut ce poate fi modificat şi adaptat în funcţie de schimbările şi condiţiile mediului organizaţional şi competitiv. Succesul procesului de modelare a strategiei în cadrul unui scenariu strategic, în slujba îmbunătăţirii adaptabilităţii

[1] *University "VALAHIA" of Târgovişte, România*
[*] *Corresponding author: gabi_cucui@yahoo.com*

organizaţionale are o puternică coordonată umană, fiind strâns legată de participarea, motivarea, implicarea resursei umane şi valorificarea capitalului de cunoaştere, competenţe şi capabilităţi manageriale ale tuturor membrilor organizaţiei. Atât în plan teoretic, cât şi practic, strategia s-a impus ca o componentă esenţială a managementului. Utilizarea planificării strategice are consecinţe favorabile: îmbunătăţeşte performanţa, contribuie la îmbunătăţirea eficienţei managementului care se traduce printr-o mai bună abilitate de a identifica şi fructifica oportunităţile apărute în viaţa organizaţiei precum şi încurajarea angajaţilor pentru a avea o stitudine pozitivă faţă de un mediu aflat în continuă transformare.

Cuvinte cheie: *management, organizaţie sportive, strategie.*

Introduction

Defining the concept of strategy has been widely debated in the literature, the common element of definitions by field specialists was that the strategy is based on the mission of the organization and the planning of actions to achieve the objectives.

Barget, Vailleau (2008) talk about an "organizational hybridisation" of the concept of strategy in sport which states that:

- the sporting organization bases its mission (Speckbacker, 2003);
- the sports organization determines managers to reflect on a convergence between the needs, goals and aspirations of the parties involved (Bayle, 2007).

Sports organizations must address the position of any organization, regardless of the field of activity (Cucui, Cucui, 2014).

In a rapidly changing environment, the strategy is flexible design of the future organization, developed based on projections and forecasts science as a central concept but with content that can be modified and adapted to the changes and environmental conditions organizational and competitive in all of its phases described below.

Substantiation of organizational strategy must be based necessarily on the identification, analysis, implementation analysis, forecasts and projections made in a scientific manner, based on data taken from the environment in which the organization.

Strategy development is a complex phase. Mission statement and core objectives are the hard core of the strategy, but given the rapidly changing operational steps for its preparation should allow flexibility and change Partial level operational objectives, strategic options, sizing resources, setting or relaxing partial periods or final, setting partial strategies.

Implementation of the strategy is an important step because it prepares and contributes to minimizing resilience to organizational change, if necessary, and operating the planned strategic changes.

The success of the strategy modeling process within a strategic scenario to improve organizational adaptability has a strong human coordination, being closely linked to the participation, motivation, involvement of the human resource, and the capitalization of knowledge, skills and managerial capabilities of all members of the organization.

Both theoretically and practically, the strategy has become an essential component of management. In the sense of Nicolescu and Verboncu (2008) the strategy defines all the major objectives of the organization on a long-term basis, the main ways of realization together with the allocated resources, in order to obtain the competitive advantage according to the mission of the organization.

Defining features of the strategy:

- The strategy envisages the achievement of defined goals, specified as mission and objectives, the latter representing the motivational and action basis of the strategy, and the future performance of the organization is given by the quality of the objectives.
- The strategy targets the future period of the organization's life (2-5 years). That is why it increases the degree of risk and uncertainty that is associated.
- The organization as a whole or its major parts is the scope of the strategy. The content of the strategy is summed up on the key elements, focusing on major developments in the organization, whether or not it is a change from the previous period.
- The strategy is based on the core approach of the organization and the environment in which it operates.
- The strategy reflects, to a certain extent, the interests of at least part of the stakeholders, ie shareholders, managers, employees, customers or suppliers; the more comprehensive and strong the reflection, the better the success of the strategy's successful operationalization. The strategy envisages the prefiguration of a competitive behavior for the long-term organization, taking into account its culture as well as its contextual evolutions. The culture of the organization represents the beliefs of an organization's organization of the group's ability to compete in a market, to act on the perceptual system. A performance strategy projects a certain behavior that reflects the culture of the organization in an ameliorative approach.
- Getting greater synergy is always the goal of strategy development.

- As the strategy is conceived, it is necessary to pursue an intense process of organizational learning. This not only means acquiring knowledge by an organization's employees, but also turning them into new skills that are reflected in their behaviors and actions, and the organization's rhythm of learning is the only one that supports maintaining the long-term competitive advantage.
- The principle of equivalence is at the heart of the strategy's approach that there are several ways or combinations of resources and actions to ensure that a certain goal is achieved.
- The strategy is a result of explicit or implicit negotiation of shareholders; it is advisable to address win-loss negotiation, generating latent or open conflicts, and switching to win-win negotiation where both parties are winning something. On this basis, it is easier to harmonize the interests of the parties involved, favoring the development of a culture and a relational system conducive to achieving high performance in the long run.
- The main purpose of strategy development and the most important criterion for assessing its quality is to obtain the competitive advantage, referring to the cost or quality of the product. A strategy that does not target and does not ensure the competitive advantage does not in fact prove useful to the organization.

Following the strategy definitions, four components of any strategy are distinguished:

- The field covered, referring to the present and future interactions of the organization with the environment;
- The deployment of resources, which takes into account the level and structure of the organization's resources, as well as the improvement of the skills that contribute to the achievement of objectives and goals. Sometimes the references to this component are referred to as the "distinguishing component of the organization";
- Competitive advantage, which refers to the unique position an organization develops in relation to its competitors through the structures of the evolution of resources and / or the decisions regarding the field approached;
- Synergy, defined as the expected synthetic results as a result of implementing decisions and utilizing the organization's resources.

A sporting organization is managed on the basis of strategic (conscious or unconscious) elements using non-financial and non-material, material and non-material resources that make it the basis of specific management, meaning that sports organizations:

- have specific product or service oriented production;
- are found in the commercial or non-commercial private sector or in the public sector;
- may or may not be the support of a physical practice appropriate to the activity being managed. This practice may be free professional (Barget, Vailleau, 2008).

Strategic management is the process by which leaders determine the long-term direction and performance of the organization, ensuring careful formulation, accurate implementation and ongoing evaluation. There are many models of the strategic management process. The most widely accepted model is the one developed by Rue and Holland (1989) which presents the constituent phases:

- Analysis of current situation, vision and mission;
- Examining perspectives;
- Setting strategic alternatives, comparing and choosing them;
- Implementing the adopted strategy;
- Evaluating and controlling the strategy.

The first phase, current situation analysis, starts from the identification of the organization's vision and mission, aiming at identifying the present and past strategy, in order to find out if it meets the present and future conditions and if possible the past and the current strategy should be maintained, corrected or changed. It is also in this phase that a diagnosis of past and present performances is made in order to assess whether the applied strategies have given the expected results.

In the second phase, examining perspectives, based on the conclusions reached in the first phase and the analysis of the external environment of the organization and its internal environment, a set of long-term objectives is established.

The third phase, establishing strategic alternatives and comparing them, aims at developing several strategies alternatives, comparing them and adopting the strategy considered the most appropriate for the future. The analysis of the different strategic alternatives must take into account their degree of feasibility, the limitations imposed by the existence of resources, the possibilities of expansion, the capacity to face the inherent risks.

The fourth phase, implementation of adopted strategy, implies the adoption of all measures that will allow the strategy to be used to the maximum, both by clearly defining the functional strategies and by applying the technical and organizational measures regarding the institutionalization of the strategy. Implementation of the strategy takes place through programs, budgets and procedures.

The fifth phase, strategy evaluation and control, essentially involves analyzing and monitoring through operational controls the components of the strategy that do not function properly or that impede its application and, on this basis, taking measures to eliminate them. Strategy evaluation and control must be of an active and operative nature, the conclusions drawn need to be followed by technical and organizational measures to correct the strategy, if any, or to remedy the identified shortcomings.

Research methods

Taking into account the complexity of the studied phenomenon and its implications in the transposition of the strategic management into the sports organization as well as its influence on the performances, the approach, the construction and the realization of the research fall within the scope of the exploratory researches in order to establish some coordinates regarding a complex managerial process, realize conceptual theoretical and scientific fundamentals for future research in the field as well as a concluding character through which the actors can identify the best way of action in order to apply the strategic management on the performances of the sports organization.

Discussions

By using the managerial tools to diagnose the internal environment and the external environment of the sports organization, by carefully identifying the important aspects that can lead to the improvement of managerial activity within the sports organizations and the application of managerial strategies in order to redesign the management system, sports.

From the analysis of sports organizations we find that there is a need for a program of measures at the organizational level to improve the management of sports clubs.

In this respect, the recommended measures at the organizational level include:

- To identify management problems, find solutions and recommendations, managerial consultancy can be sought;
- Given the fact that the human factor is the only resource that competition can not imitate, a strategic management of human resources is necessary.la nivelul organizaţiei este necesar un management ştiinţific, ce presupune o metodologizare managerială riguroasă;

- In the current context, the redesign of the management system can be used.

By identifying the particularities of sports club management and the program of measures, it is intended to raise awareness, even in the last hour, of the contribution of sports organizations to the formation of athletes who can develop in the great performance, a contribution that can only be sustained through their scientific management .

Applying management without solid theoretical foundation and without a systemic view within sports organizations can lead to syncope within the management system.

The organization must be capable of maintaining and evolving beyond the requirements of the external environment and adaptability to changes in the internal environment (Cucui, 2016).

Managerial intervention will optimize the work carried out within the sport organizations to achieve the proposed objectives (Cucui & Cucui, 2016).

Conclusion

The analysis of the specialized literature and the systematic observation of the everyday reality at the level of the sports organizations is called for a major interest in the way of manifestation of the management process considering that the organizational, foresight and coordination functions are the most important in the life of the sports organization.

Therefore, in order to achieve the established objectives, it is necessary to plan, organize and coordinate the activity rigorously and systematically.

The issues faced by sports organizations can be improved and depend on the ability of the manager (a strategist with economic vision and managerial knowledge) to seize the essential role of scientific management, thus providing favorable premises both for the survival of sports clubs and for their development.

REFERENCES

Barget, E., Vailleau, D. (2008). *Management du sport,* Edition de Boeck Université, Bruxelles.

Bayle, E. (2007). *Essai de définition des organisations sportive: objet, Champ, niveaux d'analyse et spécificités des practiques managériales*, STAPS, no. 75.

Cucui, Gh. G., Cucui, I. A. (2014). *Research on the Management of Sports Organizations,* Procedia - Social and Behavioral Sciences, Volume 140, 22 August 2014, Pages 667-670, doi.org/10.1016/j.sbspro.2014.04.490.

Cucui, Gh. G. (2016). *Systemic Vision – Its Necessity in the Management of Sports Organizations,* The European Proceedings of Social & Behavioural Sciences, *http://dx.doi.org/10.15405/epsbs.2016.06.45.*

Cucui, Gh. G., Cucui, I. A. (2016). *Event Management Process within the Sports Structures,* WLC 2016, The European Proceedings of Social & Behavioural Sciences, *http://dx.doi.org/10.15405/epsbs.2016.09.34.*

Nicolescu, O., Verboncu, I. (2008). *Metodologii manageriale,* Editura Universitară, Bucureşti.

Rue, Leslie W., Holland, Phyllis G. (1989). *Strategic Management: concepts and experiences*. New York, McGraw Hill.

Speckbacker, G. (2003). *The Economics of Performance Management in Non.Profit Organisations,* Non-profit management & leadership, vol.3, no. 3.

STUDIA UBB EDUCATIO ARTIS GYMN., LXIII, 1, 2018, pp. 35 - 45
(RECOMMENDED CITATION)
DOI:10.24193/subbeag.63(1).04

PHYSICAL ACTIVITY AND EARLY CHILDHOOD EDUCATION: TOWARDS A CRITICAL SPORTS PEDAGOGY

ISIDORI EMANUELE[1]*, FAZIO ALESSANDRA[1], BRUNI ELSA MARIA[2]

ABSTRACT. So-called "Bolonia Process" has reformed national education systems in Europe and introduced the figure of a general teacher in primary schools and kindergartens. This has also happened in Italy, where early childhood educators and primary teachers are trained in University departments of Educational Sciences to become general educators and teachers in both Kindergartens and primary schools without any specific training, for example, in physical/ sports education. This lack in the preparation of kindergarten educators and primary school teachers is causing a decrease of interest for the teaching of physical activity and sports education by kindergartens educators. Usually, an educator who has scarce or not-enough developed competencies in a specific subject matter of the curriculum does not like to be involved in such a kind of activities. The consequences of this can be seen in the reduction of the level of physical and motor competencies and skills in the children attending kindergartens. Starting from this genesis, the primary aim of this paper is to reflect upon the consequences of the new reform of European educational systems on the teaching of physical activity in the kindergarten and early childhood, and upon the educational challenges they imply for teachers. In conclusion, will show the key role that the general teacher with specific competencies and skills in physical and sports education can play, along with family, to foster physical and sports education in early childhood and sketch a possible model for teaching it.

Keywords: *childhood, physical activity, education, teacher, kindergarten*

[1] *University of Rome Foro Italico, Roma, Italy*
[2] *University G. D'Annunzio of Chieti-Pescara, Italy*
**Corresponding author: emanuele.isidori@uniroma4.it*

Introduction

Bolonia Process has identified in pre and primary school teachers' education one of the main strategic actions to reform the educational system of European countries and operate a different kind of changes in education and professionalization of educators and teachers. The importance of pre-school teachers as key factors to put these changes into place is testified by the interest of European Education systems in fostering their education through new educational actions aimed to increase teachers' level of professional qualification. Actually, in all Europe, pre-school teachers' and kindergarten educators' training takes place at a higher education level, mainly in universities. This also happens in Italy, where kindergarten's teachers are trained in university departments and attend second level master's degree courses for teaching.

In Italy and other Mediterranean countries, Bolonia Process has allowed going beyond the limitations of old education models used for the training of teachers and improved their education regarding quality and knowledge. To be clear, the process has allowed situating the qualification of kindergarten's teachers at the second cycle level of European education system and recognized the importance of these agents who enhance the quality of childhood education as crucial factors for the development of European and Italian society.

Moreover, the new education models used for the training of pre-school and primary school teachers are helping them to root their practices in a more scientific pedagogy addressed to the early education of children. These new models are giving particular attention to the integration of educational research and its methodologies in the teaching practice. The new training models are carried out so to help pre-school teachers develop into specialists capable of using all methodologies of educational research and apply them into their every-day teaching practice. Action-Research, Experimental Research, Intervention Project management and design methodology, or similar to Reggio-Emilia Approach methodologies, Donald Schön's Reflective Practitioner Model are only some of the many methodologies these teachers are trained in.

There is no doubt that Bolonia Process has significantly reinforced the scientific dimensions of individual training for the pre-school teacher and helped her/him to integrate the methodologies and methods of the educational research in the professional practice. This integration is aimed to help teachers develop skills capable of giving a response to the new challenges occurring in contemporary education and professional performances. These challenges are, mainly: the critical interpretation about the educational reality; the

identification of problems dealing with contemporary childhood education; the development of a research attitude opened to reflection on knowledge and challenges related to the context of teachers' professional reality.

However, this increasing in the quality of pre-school teachers' education about what it refers to the didactics of all subject matters taught in the pre-school curriculum, it has not been reciprocated with an enhancement in the quality about the teaching of physical activity and sports education. For example, in Italy, the need for training a pre-school teacher provided with general competencies and skills in all subject matters of the curriculum had led to leave out by the educational departments of most of Italian Universities the training for specific motor and sports competencies in the teachers. From the results of a survey conducted in Educational departments of Italian Universities, it has emerged that more than 90% of future pre-school teachers attending the master's degree course for qualifying as pre-school teachers don't attend any specific course or carry out any educational activity (Isidori, 2017). Therefore, they don't enhance their skills and competencies for the teaching of physical activity or sport education in the pre-school. Consequently, when they become teachers working in kindergartens, they tend not to get their pupils involved in physical and sport education activities.

Usually, it can be assumed that educators or teachers who have no or not-enough developed competencies in a specific subject matter of the curriculum tend not to like to be involved in the specific activities relating to that (in our case, physical activity and sports education). Because of this, one can easily deduce that this can cause a lowering of the level of physical and motor competencies and skills in the children attending kindergartens (Bernardi, Krug, 2008). Moreover, it is easy to think of other and more devastating consequences deriving from this lack of involvement in physical and sports activity on the future development and growth of the children (Telama, Yang, 1998).

In this study, we reflect on the key issues dealing with the teaching of physical activity in the pre-school to identify a pedagogical model capable of helping the pre-school teacher develop her/his competencies and face the challenges emerging from contemporary early childhood education (Carlson, 2016). For this reason, to carrying out this research, we have used a hermeneutical methodology. This methodology has focused on the following main steps: a) description and interpretation of the existing scientific literature and situation related to physical activity for early childhood in the kindergarten; b) a penetration of the reasons that brought the existing situation to the current form (analysis of problems this situation implies); c) a possible agenda for improving a more effective teaching of physical activity in

kindergartens by identifying main strategies and competencies areas to carry out and develop by pre-school teachers; d) evaluation of how to put the model into practice (Louis, Lawrence, & Keith, 2007).

Characteristics of physical and sports activity for early childhood education

The lack of specialized teachers and educators in Italian kindergartens determines, consequently, the incorrect use of physical education and sports activities in kindergartens. To be clear, this lack does not allow the implementation of all potentialities, both healthy preventive and social, of this kind of educational activities (Torres-Luque et al., 2016). Actually, physical activity in childhood education moves between health and fair play; that is to say, between the achievement of goals dealing with healthy nutrition and lifestyles in children and those related to social values and play/game. We know that physical activity is an integral part of the growth and development for all children. In infancy and early childhood, physical activity plays a fundamental role in the psychosocial, bodily and mental development of all children. In the kindergarten, physical and sports education is usually performed through informal both individual and group activities self-initiated. These activities provide the child with the opportunity to experience her/his own body in a wide range of ways. These ways allow the child to develop the specific set of motor skills essential for the adoption of a healthier lifestyle and future participation in sports activities (Miragaya, 2017).

The health benefits of physical activity for children include the prevention of both overweight, obesity and cardiovascular disease; improvement in skeletal health; enhancement of heart functions, and better psychophysical health. In the kindergarten, physical activity represents the perfect environment where to help children develop physical skills for a healthy lifestyle and lay the foundations for regular physical activity participation into adulthood. The commonly identified adult health problems have their entire genesis in the pediatric years of pre-school education.

Physical activity combined with a balanced diet based on sound nutritional practices represents a valid option in the prevention of chronic diseases in the child. One of the primary function of early physical activity is to teach children the educational principles of a balanced diet to control overweight and obesity. The recognition of the importance of physical activity as an educational means to the health and well-being of children is of paramount importance in early childhood education, and pre-school teachers are required to cooperate with families to use this mean in the best feasible way.

Well-being and health express one of the main objectives of early childhood education in which they become more and actual because all main essential values for life are no longer taught exclusively in the school but in all children's life course by several educational agencies. This calls for a pedagogical effort by the pre-school teacher, who must focus on well-being as a permanent search for better teaching of the values of physical activity and sports education. For this reason, the development of the competencies in physical activity for well-being and health must be milestones in pre-schools teachers' education (Wright, Stork, 2013). Without these competencies, it will be impossible to think of an effective childhood education in European kindergartens.

To be clear, health and well-being are umbrella terms which contain emotional and ethical experiences such as happiness, satisfaction, and the harmonious balance of mind and body; that is to say, all the main objectives that early education has to achieve and that gives sense to it. As well-being is an individual experience, physical activity can help children face all main problems associated with contemporary living in a technified and media-dominated world, which can lead them towards a non-active lifestyle.

In using physical activity as a tool for the well-being of the child, the pre-school teacher must use it as a means for self-implementation and self-actualization (Martin, 2001). Her/his intervention in the kindergarten consists of identifying prerequisites, and helping children develop abilities and sharing experiences, providing them with external conditions, arranging and preparing learning situations, and motivating them to enjoy the values of playful physical activity and sports education.

What pedagogy of physical activity for early childhood education?

Physical activity does not directly lead to well-being, but it provides opportunities to enrich children's everyday life making it more satisfying and fulfilling. As a promoter of these opportunities in the kindergarten, the teacher plays a fundamental role. Therefore, to play this role, she/he must be capable of framing her/his action within the theory and principles of an early childhood phenomenological pedagogy. The principles of this specialized (sports) pedagogy as a tool to promote well-being in the child can be summed as follows.

1) Sports pedagogy applied to early childhood must orients education towards both activity and experience. Sport conceived of in broadly sense offers children the possibility to attain well-being through active and playful experiences, which start from the body as a dynamic center of energy and

power. Experience acts as a set of activities that allow children to establish insights and permanent habits towards the searching and experimenting with healthy lifestyles. Sports pedagogy shows the best way towards well-being, offering the child, in its several and various forms and levels, situations which can make understandable and available the meaning, value and effect of the human movement. In the early childhood education, physical activity and sport are fields for both education and socialization.

2) Sports pedagogy must use the body, movement and play/game as a means to provide the child with physical and social experiences. Sports pedagogy is committed to providing children with immediate bodily experiences through movement, play, and game. Among the experiences related to their emotional self and physical condition, the possibility to experience the world as the environment around must be highlighted as one of the most important goals of childhood education (Ayoub, 2005).

3) Sports pedagogy has to use playful physical activity for helping children understand that well-being experienced through their own body is always a social and communicative experience. The principal and specific task of physical activity as a means to well-being for children is to provide early social experiences, social contact, and interaction, providing typical situations of that context (earlier forms of games and competitions). That is to say, teaching children to take part in contests, and to win or lose, to act cooperatively, to find friends, to know where one belongs.

The main aim of physical activity for children is to use all activities dealing with the sport to build a bridge between the body of the child and the social interaction, communication, and inclusion (Gomez, 2001). Through these earlier forms of physical activity and games performed in the kindergarten, children can actually integrate themselves into a social system of partnership and communication possibilities. Also, through them, they can start to gain not only social experiences, self-awareness, and self-fulfillment, but also the feeling of belonging to a group, and respect for (and from) others, and start to learn earlier skills for future and more complex social interaction (Gabbard, 1988).

Physical activity and its challenges for pre-school teachers

Actually, physical activity plays a central role in effective prevention, treatment, and management of many diseases. The dramatic increase in obesity and overweight in the childhood highlights the need for a better taking awareness of the role of physical activity in weight management. Early childhood and infancy is, among the growing years of a child, one of the most

critical periods when the risk of onset and persistence. An insufficient level of physical activity during the growing years is the major contributing factor to overweight and obesity (Barnett et al., 2016).

The fight against overweight represents a crucial challenge that requires specific efforts by the kindergarten teacher. In the pre-school, the teacher has to promote strategies capable of emphasizing a playful perception of physical activity and make children's families aware of the importance of this kind of activity for their daughters and sons. This lack of awareness and inaction can be very pronounced in both families and the children. One of the main concern could be that many children do not participate in appropriate levels of physical activity. We know that a low level of habitual physical activity along with poor eating behaviours in children are significant determinants of obesity. The persistence of these conditions actually perpetuates what one can call the "vicious cycle" of limited physical activity and experiences, non-active behaviours and poor eating habits.

Therefore, the pre-school teacher has to develop coordinated and systemic educational actions capable of coupling both prevention and promotion through playful physical activities in the kindergarten. Children, along with their parents, need to appreciate the importance of healthy, playful and enjoyable physical activity and use it as a platform for their growth and development (Everhart, 2003).

The educational intervention of the teacher has not to be focused only on the physical activity in the kindergarten but be combined with sound nutritional practices. This kind of intervention requires specific competencies that pre-school teachers must develop since their training years in the University. To be clear, family's attitudes, the encouragement of family-based physical activity, and the use of adequate and practical strategies to facilitate the engagement of children in the physical activities are other crucial challenges for the pre-school teacher. This challenge has to face with the lifestyle of contemporary society, in which the use of new media can determine a low level of engagement in sport and physical activity by children.

Action areas should include multi-strategy and multi-setting intervention programs; community-wide communications programs; national coordination of prevention effort; and – finally – an appropriate and sustained training of pre-school teachers in the University. All children should be physically active daily (for a minimum of 60 minutes). Physical activity opportunities for children must be part of their daily life and be taken through the play, physical education in the kindergarten, the sports and games, active transport (by walking and cycling to school), recreation, and exercises. The activity must be undertaken in within the family, school, and broader community settings (Schneider, Lounsbery, 2008).

The beneficial outcomes of physical activity and sports games have important implications for practice in early childhood education settings. Early childhood educators understand that physical development is important and encourage it in the children under their care. However, it can frequently happen that they are unaware of relevant teaching strategies, do not understand the centrality of movement in child development, and tend to employ inappropriate measures for promoting children's physical activity status and progress. For sure this is due – as stressed above – by a lack of their preparation and training.

Principles for the development of pre-school teachers' competencies in physical activity

Pre-school teachers should be trained, since the time of their education in the university, for the development of specific skills aimed to be more efficient in the planning and promotion of physical activity and movement. These competencies should help teachers to plan structured activities that are based on children's needs and interests and offer a variety of movement patterns by using their partial movement skills to scaffold more complex or purposeful skills. Moreover, teachers should have competencies to selects or modify equipment to produce semi-predictable outcomes, planning activities that accommodate individual differences, including readiness, deficits, and diversity.

The pre-school teacher has to be capable of integrating physical activities with other domains of learning and to set up the environment. Effective teachers must consider the environment and the way it can be structured and utilized to optimize the physical activity experiences of children. In this regard, the environment must be conceived of as a set of opportunities and means aimed at facilitating increased physical activity and offering a wide range of affordances, maximizing not only existing resources but including manufactured and natural features and adding new components. The teacher has to set up the play space and equipment to enhance opportunities for children to be safe an active. This environment must be consistent not only with children's varying abilities and interests but also providing multiple levels of complexity by facilitating unstructured play (Temple et alii, 2016).

This unstructured play has not to be directed and controlled by adults in the situation but by children, their interests, and imagination. The facilitation of unstructured play can be achieved through sportscasting (for example, narrating play in real time), responding to children's activity, extending play tasks by boosting children's perception and participation; participating (we refers here to the teacher) in child-initiated play as a collaborator, reinforcing and extending

emerging skills in child-initiated play, facilitating participation of children of all abilities and supporting social interactions among children (Rigney, Felbermeyer, 1995).

Moreover, the pre-school teacher must facilitate structured play through demonstrating specific actions in ways that present movement challenges, identifying and sharing the activity's purpose, reinforcing redirecting, and refocusing children's efforts toward the activity's goals by using language specific to movement literacy and allowing children to make self-referenced adaptations (Braithwaite, 2014).

Teachers, through purposeful movements throughout the space, providing equitable feedback and encouragement, utilizing effective eye contact, vocal inflection, as well as facial expressions, and communicating emotional support, must master the interaction teacher-child. Structured activities should also challenge children to use a range of motor skills and adapt them to their level of maturation, motivation, and experience.

Conclusion

At least, teachers in early childhood education settings should exercise keen observation and study the play interests of children and their families, determining the existing motor skills of children and planning experiences addressed to specific deficits, facilitating greater social participation and conversation, and scaffold play experiences. Regarding in-service education and professional development, the competencies and skills identified in this study should help early childhood teachers become more efficient and better prepared to promote physical activity in the kindergarten. Bologna Process has provided pre-school teachers with highly qualified competencies in general but also determined a lack of the specific background, training, and pedagogical skills in the area of physical activity/education.

For this reason, it is necessary to reinforce the curriculum of pre-school teachers' education through modules aimed at teaching them how integrating such strategies into their daily practice (Tsangaridou, 2017). The pedagogical model should help teachers, families, and institutions which working closely with early childhood centers promote children's physical development by integrating this framework into their efforts to support healthy development and sound educational experiences for all children. There seems little doubt that healthy habits originate in childhood and physical activity is a means to their sound development. There is much debate about the mature of early-childhood physical activity program, whether they

should be mostly exploratory and supervised by teachers who provide support, encouragement, and reinforcement, or they should be aimed at developing specific skills in the child. Actually, there is not enough evidence to decide what is better to solve the issue. However, what is essential is to provide all pre-school teachers, since their training years, with the best competencies and commitment to teaching children to be engaged in physical activity and play activities as key activities for enriching their educational experiences and growth as human beings

REFERENCES

Ayoub, E. (2005). Narrando experiencias com a educacao fisica na educacao infantil. / Narrating experiences with physical education in early childhood education. *Revista Brasileira De Ciencias Do Esporte*, 26(3), 143-158.

Barnett, L.M., Zask, A., Rose, L., Hughes, D., & Adams, J. (2015). Three-Year Follow-up of an Early Childhood Intervention: What about Physical Activity and Weight Status? *Journal of Physical Activity & Health*, 12(3), 319-321.

Bernardi, A.P., & Krug, H.N. (2008). Saberes docentes e a organização didático-pedagógica da educação física na educaçao infantil / Teaching knowledge and didactic-pedagogical organization of the physical education in infantile instruction. *Revista Mackenzie de Educacao Fisica e Esporte*, 7(2), 85-101.

Braithwaite, D. (2014). Teaching of physical education in early childhood settings. Physical Educator. *Journal of Physical Education New Zealand*, 47(1), 15-18.

Carson, V., Hunter, S., Kuzik, N., Wiebe, S.A., Spence, J.C., Friedman, A., & Hinkley, T. (2016). Systematic review of physical activity and cognitive development in early childhood. *Journal of Science & Medicine in Sport*, 19(7), 573-578.

Everhart, B. (2003). Comparison of physical activity patterns of Early Childhood Education and Kinesiology majors / Comparaison des pratiques d'activite physique entre les etudiants en education de la petite enfance et les etudiants en education physique. *International Journal of Physical Education*, 40(3), 103-108.

Gabbard, C. (1988). Early childhood physical education: the essential elements. *Journal of Physical Education, Recreation & Dance,* 59(7), 65-69.

Gomez, R. (2001). Early childhood physical education: curricular organization and physical competencies. *ICHPER -- SD Journal*, 37(4), 23-30.

Isidori, E. (2017). Le scienze motorie nelle scuole elementari italiane. Una riflessione a partire da un report di ricerca. Roma: Laboratorio di Pedagogia Generale, Università di Roma Foro Italico.

Louis, C., Lawrence, M., & Keith, M. (2007). Research methods in education. New York: Routledge.

Martin, E. (2001). Preschool Physical Education. *Teaching Elementary Physical Education,* 12(5), 4.

Miragaya, A. (2017). Lifelong Physical Activity for All Starting in Childhood through Inclusive Programmes of Physical Education and Sporting Activities - The Values-based Case of Brazil. *ICSSPE Bulletin* (17285909), (73), 28-35.

Rigney, A., & Felbermeyer, C. (1995). Learning to move & moving to learn: play and physical activity in early childhood. *Aussie Sport Action*, 6(3), 34-35.

Schneider, H., & Lounsbery, M. (2008). Setting the Stage for Lifetime Physical Activity in Early Childhood. *JOPERD: The Journal of Physical Education, Recreation & Dance,* 79(6), 19-23.

Telama, R., & Yang, X. (1998). Physical activity from childhood to young adulthood: significance of early socialization. In Sugman, R. (ed.), Zbornik: mednarodno znanstveno srecanje ob 100-letnici olimpionika Leona Stuklja "Sport - zdravje - starost", Ljubljana, University of Ljubljana - Faculty of Sport, 1999, p.280-282.

Temple, V.A., Crane, J.R., Brown, A., Williams, B., & Bell, R.I. (2016). Recreational activities and motor skills of children in kindergarten. *Physical Education & Sport Pedagogy*, 21(3), 268-280.

Torres-Luque, G., Beltrán, J., Calahorro, F., López-Fernández, I., & Nikolaidis, P.T. (2016). Análisis de la distribución de la práctica de actividad física en alumnos de educación infantil / Analysis of the distribution of physical activity in early childhood education students. *Cuadernos de Psicología del Deporte*, 16(1), 261-267.

Tsangaridou, N. (2017). Early childhood teachers' views about teaching physical education: challenges and recommendations. *Physical Education & Sport Pedagogy*, 22(3), 283-300.

Wright, P.M., & Stork, S. (2013). Recommended Practices for Promoting Physical Activity in Early Childhood Education Settings. *JOPERD: The Journal of Physical Education, Recreation & Dance,* 84(5), 40-43.

STUDIA UBB EDUCATIO ARTIS GYMN., LXIII, 1, 2018, pp. 47 - 56
(RECOMMENDED CITATION)
DOI:10.24193/subbeag.63(1).05

COMPARATIVE STUDY OF ICE HOCKEY PLAYERS, FROM RUSSIAN AND ROMANIAN TEAMS

TRANDAFIR MARIUS[1]*, BALINT LORAND[2]

ABSTRACT. In 1954, at the first participation in a World Ice hockey championship, the representative team of the Soviet Union becomes the world champion. That year, the Soviet domination begins in international hockey in the second half of the twentieth century. One of the factors that determined the success of these teams is the scientific basis on which the training programs were founded and which differentiated and customized the Soviet athletes and teams. The laboratory study of the factors influencing the sports performance, the morpho-functional characteristics, the study of the game techniques of major teams determined the elaboration of innovative training programs, adapted to the environmental conditions and to athletes, become, in the light of the athletes ' success, the object of study and reference for coaches in the rest of the world.

Keywords: *creativity, tactics, strategy, differentiation*

REZUMAT. ***Studiu comparativ al jucătorului de hochei pe gheaţă pe posturi la echipele din Rusia şi România.*** În 1954, la prima participare la un Campionat Mondial de Hochei pe Gheaţă, echipa reprezentativă a Uniunii Sovietice devine Campioană Mondială. În acel an începe dominaţia sovietică în hocheiul mondial din cea de-a doua jumătate a secolului al XX-lea. Unul dintre factorii care au determinat succesul aceste echipe este baza ştiinţifică pe care s-au fundamentat programele de antrenament şi care au diferenţiat şi particularizat sportivii şi echipele sovietice. Studiul în laboratoare al factorilor care influenţează performanţa sportivă, al caracteristicilor morfo-funcţionale, studiul tehnicilor de joc ale marilor echipe au determinat elaborarea unor programe inovative de antrenament, adaptate condiţiilor de mediu şi sportivilor, devenite, prin prisma succesului sportivilor, obiect al studiului şi referinţă pentru antrenorii din restul lumii.

Cuvinte cheie: *reativitate, tactică, strategie, diferenţiere*

[1] *Dunărea de Jos University of Galaţi, Romania*
[2] *Transilvania University of Braşov, Romania*
[*] *Corresponding autor: marius77trandafir@yahoo.com*

Introduction

Achieving performance in any field of activity is determined by various factors that are favorable, which include precursors (such as native abilities, body conformation, mental and psychomotor skills), the environment where activities take place and individual or team effort. In search of determinants of sports success, Joyce and Lewindon show that "an elite athlete must possess a combination of technical and tactical skills, physical capacities and a large reserve of psychological and emotional strength, in a variable structure, determined by social culture (Joyce and Lewindon, 2014, p. ix)

In the history of ice hockey, the middle of the twentieth century is marked by the newly established Soviet Union team, which has become a champion ever since its first participation in world competitions: 1954 World Champion and Olympic Champion in 1956, the team that was one of the most powerful international teams until 1990, when the Soviet Union was dissolved, depriving the Canadian team from world supremacy.

Romania, a member of the International Ice hockey Federation since 1924 (Crihan, 1982, p. 9), participates for the first time in an international competition in 1931, at the 5th edition of the World Ice hockey championship in Krynica, Poland, where it loses all matches, including the match with the experienced United States team by a historical score of 0-15 and ranked the last out of ten participating teams. Romania's ice hockey team participated in four editions of the Winter Olympics, the best ranking being in Innsbruck, 7th out of 12 teams and winning the second group (Official Report, 1976, p. 145), in the same year being first in group B at the world Championship, obtaining a gold medal and advancing in the first group, in which it played in the 1977 season.

In November 2017, according to the International Ice Hockey Federation, in Romania 1282 athletes are registered, representing 5.93% of the total population (220 seniors, 953 juniors, 109 seniors) and 9 ice skating rinks (3 outdoors, 6 covered), and in Russia 105059 players are registered, representing 7.38% of the total population (14241 seniors, 88442 juniors, 2376 seniors) and 3143 skating rinks are equipped (2583 outdoors, 560 covered). At the end of the 2016-2017 season, the senior team of Romania's Hockey Nationale was ranked 29th of 48 in the world rankings, and that of the seniors ranked 36th of 38 teams, while Russia's teams are ranked at the top: the the senior men's team in 2nd place and the senior women's team in fourth place.

The **purpose** of this research is to identify and highlight the similarities and differences between the game style of the Romanian ice hockey team and the Russian team, the one that had a unique ascent in the history of this sport.

Research Methods

To complete the study, I studied ice hockey literature and sports training to bring the scientific arguments underlying ice hockey training as well as the differences between the representative team of Romania and Russia. Thus, the documents studied showed that the two teams had different styles of approach to training and competitions.

The method of pedagogical observation complements the above mentioned method by watching videos from competitions and trainings and participating in the matches of the two teams. Thus, following technical and tactical analysis, significant, technical and tactical differences were observed.

Results and Discussions

It is already known that one of the factors which transformed the former Soviet Union into a dominant nation in world sport is the scientific basis on which training programs were based and which differentiated and customized athletes and teams. Bourne states that "coaches have spent hundreds of hours learning about the general theory of sport and the fundamentals of sports training, and scientists there have worked in tandem with coaches and athletes to put their research into practice" (Bourne, 2008, p. 358).

The present Russia is the heir to a different and innovative sports training system for the hockey players, the Soviet one. Coaches from the former socialist countries would work together with researchers, who, instead of only looking at physiological responses during the physical programs, had a holistic approach. As the discoveries made in the research laboratories in the Eastern Bloc became known, they determined the revolution of sports training around the world, individualizing and consolidating a school of athletic training. Technical training is a factor of success in sports training, specific to the former Eastern Bloc countries, supported by the identification of basic, core technique, which progressively built superior techniques (Mackenzie, 2004).

Unlike the Canadian hockey, considered by Europeans as extremely brutal, in the Soviet hockey, there is much less violence. Tarasov incorporated elements from the Russian football, ballet and science, with the team's cohesion as the main quality demanded by Russian coaches, developed through training. Anatoli Tarasov sought to achieve harmony, the effort of the players being a means to attain perfection of the gesture, through endless repetition. The notion of "block of five" was thus cultivated, making it similar to the five fingers of the hand, aiming at collective progress. All players of the same line should possess similar qualities, they must play at the same pace and therefore skate at comparable speeds, including defenders.

Ice hockey is a sport played at high speed, with tremendous intensity, in which the collaboration of teammates is compulsory for the success of the game, any personality surplus or selfishness resulting in individual actions doomed to failure, both in attack and in defense. During the game, on the field, there are three forwards, two fullbacks and one goalie. Exchanges are very short, characterized by accelerations in two seconds and decelerations in approx. 2.1 seconds, players running, depending on their position, up to five kilometers each game. In general, the fullbacks actually play about 50% of the match in time span and the attackers only approx. 35% (Donskov, 2016, p. 3). Acting in synergy, players valorize their individual abilities by engaging in team play situations, generating both team and individual success, teamwork, as an "absolutely essential to success" factor, being recommended since 1911 by Claude H. Miller (Miller, 1911; Teodorescu, 1972; Kovka, 1975; Bertagna, 2016).

In the *Ice Hockey and Ice Polo Guide*, in 1898, features of ice hockey players, that are still valid today were presented: "An ice hockey player must be very energetic while standing, fast-handed, agile with his eyes and with all its capacities on the alert "to be" an expert on skates [...] for easy turns and sudden stops, "they can" start quickly and play fast and slow, thereby avoiding to be put to the ground by an opponent by pushing, locking or interfering, " to be able to twist and avoid fast obstacles, to overcome an opponent who blocks the path to the gate ", to be an athlete" with exceptional endurance and to have much strength of character and boldness" (Tuthill, 1898, pp. 9-11).

Forwards are the most mobile players on the ground, being subjected to a very large anaerobic lactic effort, which is why an exchange lasts a maximum of 90 seconds of actual play. They must be extremely precise and swift in passing the puck, constantly seeking to capture the opponent. The success of the game is determined by the players ' ability to capture their opponents and exploit the little defensive breaches. The forward center must be very fast, with a great game capacity and an overview of the entire game, so as to decide in fractions of a second which are the effective actions at that time of the game, moment which in reality is a continuous time. He is the team's coordinator, with the task of synchronizing his attack actions, with a highly developed sense of responsibility and superior technical and tactical training. Alexandru Teodorescu considers that "the profile of this type of player imposes a series of qualities that, taken separately, do not represent high level values, but which put together show a special creative force, which finds its most favorable circumstance in the complex situations of the game" (Teodorescu, 1972, p. 114).

The distributive attention and peripheral visual acuity help to collect information from the sources that surround him so that he can be in the place where he anticipates the presence of the puck, to pass the puck at the best

possible place at that moment, without putting his teammates in offside. The extremes are, in the opinion of Vladimir Kosta, the fastest and most skilled skaters on the ground. They are players who master the best feints and hand-to-hand fighting with opponents as well as all the procedures to shoot at the gate, often being in very good positions to score (Teodorescu, 1972; Kosta, 1975; Gliga, 2010; Bertagna, 2016).

Fullbacks are taller and heavier than the forwards, representing, according to Jack Parker (Bertagna, 2016, p. 78), "the cornerstone of a successful team". They also need to be strong and agile at the same time, with good coordination of movements and the ability to skate both forwards and backwards with high travel speed, especially on short distances. Being responsible for protecting the gate and blocking the opponents' attacks, the fullbacks must have an appropriate weight and a special physical strength, which allows them to stop the opponent's attack and be able to win in direct combat with him. They have to be skilled in the game with the club, being able to start an offensive action, sending the puck to a teammate who can control it in the direction of the opponent. The fullbacks collaborate with the goalkeeper to prevent the opponent from scoring, being well prepared mentally, calm, showing self-restraint to maintain concentration. Given that there is a need to remain in the field longer periods of time in the hardest situations, the fullbacks must have a general endurance, otherwise specific to all hockey players (Teodorescu, 1972; Kosta, 1975; Gliga, 2010; Bertagna, 2016).

The goalkeeper stays on ice for the entire game. Alexandru Teodorescu considers that this is the most important player. The goalkeeper's mistakes are usually more obvious and result in the scoring of goals by the opponents. In addition to the special qualities in terms of reaction speed, skating technique, skill and precision of movements, the goalkeepers must also have a great deal of self-confidence and exceptional concentration. In order to achieve his highest level of competence and performance, a goalkeeper must understand the game and the situations in the field, what opponents do, with or without the puck and anticipate their actions, where they are placed and what his teammates do. By his role in the coordination of defence, he can be considered, to some extent, the replacement of the coach on ice (Teodorescu, 1972; Kosta, 1975; Crihan, 1982; Gliga, 2010; Bertagna, 2016).

In 1980, the Romanian Ice Hockey Federation, analyzing the anthromorphic characteristics of the players from the Romanian Olympic group in 1980, compared them to the USSR, the world champion of 1979 and to the second team in the same year, Czechoslovakia (Table No. 1) developed a *unified method for training and game*, by which it also set selection criteria for ice hockey players.

Table 1. Average values of hockey players in 1979-1980 (unitary method, 1980, p. 1-2)

Positions	Age			Height			Weight		
	ROU	URS	CZE	ROU	URS	CZE	ROU	URS	CZE
2 goalkeepers	26	25,5	29	175,5	176,5	178	73,5	80	83,5
7 fullbacks	24	25,8	27,3	180,6	180,6	180	82,7	88	82
12 forwards	25	27,8	25,1	174,7	179,4	179,8	78,4	83,9	82

NOTE: An international abbreviation was used: ROU-Romania; URS-Union of Soviet Socialist Republics; CZE-Czechoslovakia

In 1981, S.Y. Deryabin, from the Central Institute of Physical Culture, presented to coaches the fact that the Soviet juniors should put emphasis on "... speed, acceleration and extremely fast direction change, on the ability to drive the puck and especially on endurance, specific to hockey; In the Soviet hockey, everything builds on sudden sprints and speed returns. " (Blatherwick, 1994, p. 10).

Platonov notes that "the level of performance in today's sport is so high that, in order to overcome it, the athlete must possess some rare morpho-functional data, a unique blend of skills and driving qualities and mental abilities" (Platonov, 2015, p. 279).

Researchers are still trying to identify the factors of success in sports among the morpho-functional characteristics. Thus, through a retrospective study with data for three consecutive years (2001-2003), using the values obtained at the Combine test and the performance of the athletes, Jason D. Vescovi and colleagues (2006) sought to identify through the analysis of covariation, the extent to which sports performance can be foreseen and at what stage of the player's development, without reaching relevant conclusions on the accurate prediction of performance capability (Vescovi, 2006). Through a study conducted in 2009 and 2010, on 23 players, participating in the selection for the United States representative team at the Olympics in Vancouver, Lynda B. Ransdell and Teena Murray identified a set of values of the antromorphic parameter of high-performance hockey players in the United States compared to other Canadian hockey players, students (Ransdell, 2011).

Roczniok, R and colleagues (2016) identified, through a study conducted in the period 2012-2013, that the main factors that differentiated the selected players were: the percentage of body fat, the time needed to achieve peak power, the relative strength, VO_2max and specific physical training on ice, with the exception of the 30 m sprinting back, factors that the authors consider to be "the best predictors" of the hockey players' success (Roczniok, et al., 2016).

The success of the Soviet hockey players was attributed to the contribution of coaches Arkady Chernishev, the one who led the team to the World Championships in 1954, and Anatoli Tarasov, a coach promoting a military, but innovative and highly analytical method. Tarasov refused to invite Canadian coaches, arguing that " the original is always better than a copy" and created what became the "Soviet system" of the game: a game of speed, endurance and with a strong desire to win. Differentiation was one way to beat the Canadians at their own game. Tarasov calculated and analyzed everything: the percentage of entries in the attack area; the percentage of lost pucks; the percentage of the lost counterattacks, etc., proposing new combinations of attack and defense, enriching the tactics of the game.

Creativity is one of the factors that differentiated the Soviet hockey from the rest of the teams, the creativity of coaches reflecting on their game. Anatoli Tarasov, on being asked which would be the biggest failure or mistake of his players, replied: "To play without creativity". The new training programs in Canada included among the objectives of the sports training the development of creativity: The execution with creativity of some exercises (handling the puck, 1 against 1; 3 against 2 etc.), encouraging the hockey players to be their own opponents, to compete with themselves, to use the entire surface of the rink. Former NHL player Wayne Gretzky remarked that: "It is too much focus on the system and not enough on creativity." (*https://www.hockeycanada.ca*) For a sportsman like Michael Jordan, "the art of creativity means that sometimes you surprise yourself" (Blatherwick, 1994, p. 59).

The national training program for the Russian hockey players relies on those elements that provide them with success factors: team training, so that the team can act on ice as a whole; the practice for reaching the highest level of sport mastery in management and passage of the puck and the execution of shots in speed and from any position; Encourage the creative decisions of players in competitions, the mistakes being highlighted by omission and not by commission. (Kovka, 1975; Blatherwick, 1994; Soares, 2008; Bourne, 2008; Bertagna, 2016; Branchu, *https://russkiyhockey.wordpress.com*)

The Soviet Union developed a radically different game, a hockey on the "horizontal" (compared to the "vertical" one, played in Canada), a game of possession, in which the player seems to make a perpetual ballet, controlling the puck and advancing through passages, always on the move, without sending the puck to the attack zone and go after it. "Tick-Tac-Toc" evokes the sound of the puck that comes directly from the constant movement of the stick and the puck kicks, the Canadians describing this way the game of the Russian team. When a Russian striker approaches the opposing defenses, his feet fly, his stick does not stop moving on the inside and outside and his head and shoulders sway, from

one side to the other, suddenly surpassing the opposing defense and heading towards the gate. The passes are given and received in curves while skating at high speed. It uses the tactics of the player's stringing to create breaches in the defensive team.

Conclusions and Perspectives

The success of the national team of the Soviet Union can be attributed to both the Soviet players ' development system and Coach Anatolie Tarasov's methods, which created characteristic style of Soviet hockey, defined by agility and speed, and through a system of early recruitment and training of young athletes.

Although, as Bompa said and demonstrated, as for the Soviet system for the preparation of the hockey players, "the training system must not be imported, even if this serves to study in advance other systems before developing its own system," because in " the creation or development of a good system one must take into account the cultural and social conditions of a country "(Bompa, 2002, p. 8), the adaptation of successful models and their systemic integration can be a stage in the creation of a national program. As Mike McNamee observes, "in some cases, it is not necessary to reinvent the wheel [...] Simply adopting what others are already doing successfully can be quite effective" (McNamee, 2008, p. 34).

Currently, the effectiveness of the sports training process is not only given by the results of a competition, but also by the use of control tools, which allow the evaluation of the level of stage preparation, offering guiding marks to both athletes and their coaches, necessary in making possible corrections to the training plan and optimizing the process. The evaluation can be done by comparing a set of reference indices, specific to each sport. The evaluation of the competitive results is done by comparing to the planned results and by specific indicators similar to those in the preparation period (Platonov, 2001, p. 507, p. 546).

REFERENCES

Bertagna, J. (2016). *The hockey coaching bible*. Human Kinetics.
Blatherwick, J. (1994). *Over-speed: Skill training for hockey. USA Hockey.*

Bompa, T.O. (2002). *Periodizarea: teoria şi metodologia antrenamentului*. Editura Ex Ponto.

Bourne, N.D. (2008). *Fast Science: a History of Training Theory and Methods for Elite Runners Through 1975*, Doctoral Thesis, University of Texas at Austin.

Crihan, V. (1982). *Hochei pe gheaţă*. Bucureşti: Editura Sport- Turism.

Donskov, A. (2016). *Physical Preparation for Ice Hochey: Biological Principles an Practical Solutions*. Author House.

Federaţia Română de Hochei (1980). *Metodica unitară de pregătire şi joc în hocheiul din Republica Socialistă România*.

Gliga, M. (2010). *Optimizarea performanţelor sportive în hocheiul de gheaţă modern prin noi strategii de selecţie şi iniţiere la vârsta de 12-14 ani*. Teză de doctorat, Universitatea de Piteşti.

International Ice Hockey Federation, *http://www.iihf.com*, accesed in 1.11.2017.

Joyce, D; & Lewindon, D. (2014). *High Performance Training for Sports*. Human Kinetics

Kostka, V. (1975). *Hochei: jocul modern*. Bucureşti: Editura Sport-Turism.

Mackenzie, B. (2004). *Coaching Methods. Retrived from: https://www.brianmac.co.uk/articles/scni9a1.htm,* accesed in 27.07.2017.

McNamee, M. (2008). *Sports, Virtues and Vices Morality plays*. Routledge Taylor & Francis e-Library.

Miller, C.H. (1911). *Outdoor Sports and Games***,** *Garden City New York*, retrived from**:** *https://www.gutenberg.org/files/16316/16316-h/16316-h.htm#XII.*

Minor Hockey Development Guide, Skill Development Model, Retrived from: *https://www.hockeycanada.ca,* accesed in 13.07.2017.

Neumann, B. (1976). *Endbericht herausgegeben vom Organisationskomitee der XII*. Olympischen Winterspiele Innsbruck 1976.

Platonov, V.N. (2001). *Teoría general del entrenamiento deportivo olímpico*. Editorial Paidotribo.

Platonov, V.N. (2015). *Periodizarea antrenamentului sportiv*: *teoria generală şi aplicaţiile ei practice*. Editura Discobolul.

Ransdell, L.B.; & Murray, T. (2011). A Physical Profile of Elite Female Ice Hockey Players from the United States. *Journal of Strength and Conditioning Research*, 25 (9), 2358-2363. doi: *10.1519/JSC.0b013e31822a5440.*

Roczniok, R; Stanula, A; Maszczyk, A; Mostowik, A; Kowalczyk, M; Fidos-Czuba, O; & Zając; A (2016). *Physiological, physical and on-ice performance criteria for selection of elite ice hockey teams*, în Biology of Sport, 2016 Mar; 33(1): 43–48, accesat online la doi: *10.5604/20831862.1180175*, accesat la 08.08.2017.

Russkiy Hockey, *https://russkiyhockey.wordpress.com,* accesed in 22.07.2017.

Soares, J. (2014). *Difficult to Draw a Balance Sheet: Ottawa Views the 1974 Canada-USSR Hockey Series*. Cold War International History Project, Woodrow Wilson International Center for Scholars, retrived from: *www.cwihp.org*, accesed in 02.08.2017.

Teodorescu, A. (1972). *Hochei: tactica jocului*, Editura Stadion.

The Editors of Encyclopædia Britannica, Anatoly Tarasov. In Encyclopædia Britannica, rerived from: *https://www.britannica.com,* accesed in 19.07.2017.

Tuthill, J.A. (ed.) (1898). *Ice Hockey and Ice Polo Guide, Spalding's Athletic Library*. American Sports Publishing Company.

Vescovi, J.D., Murray, T.M., Fiala, K.A., & VanHeest, J.L. (2006). Off-Ice Performance and Draft Status of Elite Ice Hockey Players. *International Journal of Sports Physiology and Performance*, 1:207-221.

STUDIA UBB EDUCATIO ARTIS GYMN., LXIII, 1, 2018, pp. 57 - 68
(RECOMMENDED CITATION)
DOI:10.24193/subbeag.63(1).06

DEVELOPING RESISTANCE THROUGH MEANS AND METHODS SPECIFIC FOR THE FOOTBALL PLAY vs DEVELOPING RESISTANCE THROUGH MEANS AND METHODS SPECIFIC FOR ATHLETICS DURING PHYSICAL EDUCATION CLASSES IN HIGHSCHOOL

BĂDOI ALEXANDRU RADU[1,2], MONEA GHEORGHE[2]

ABSTRACT. *Purpose*. Optimizing the Development of the Vital Capacity by Means and Methods Specific to Football. The experimental checking of the efficiency of the means and methods of football in the optimization of the vital capacity; Developing general resistance and resilience specific to football; Developing the general and football-specific ability to play. It is assumed that the systematic and correct implementation of physical and sports education in a system of soccer means and methods can further develop the level of high school students' ability, rather than using traditional means specific to athletics. The experiment was conducted on a study level with 681 subjects out of 28 combined classes from four high schools. Four experimental and four reference samples were randomized. The experimental samples worked in lessons with specific means of playing football for one school year, and the reference ones with traditional means specific to athletics. The subjects of all samples were predictively and summatively evaluated at functional vitality sample. As a result of the implementation of the means and methods of football, the subjects of the experimental samples obtained better results in the summative evaluation compared to the subjects of the reference samples. The difference was significant at the threshold $p < 0.05$, so the null hypothesis is invalidated and the hypothesis formulated is accepted. The experiment, through statistical and mathematical calculations, confirms the major impact of the use of means and methods of football in optimizing the vital capacity of high school students compared to the use of traditional means of athletics.

Keywords*. Optimization, impact, vital capacity, means and football methods.*

[1] Regina Maria Pedagogical National Highschool, Deva, Romania
[2] Babeș-Bolyai University, Faculty of Physical Education and Sport, Cluj-Napoca, Romania
**Corresponding author: alex_colosseum@yahoo.com*

REZUMAT. ***Dezvoltarea rezistenței prin mijloace și metode specifice fotbalului VS dezvoltarea rezistenței prin mijloace și metode specifice atletismului în orele de educație fizică la liceu.*** *Scop***.** Optimizarea dezvoltării capacităţii vitale prin mijloace şi metode specifice jocului de fotbal. Verificarea experimentală a eficienţei mijloacelor şi metodelor fotbalistice în optimizarea capacităţii vitale; Dezvoltarea rezistenţei generale şi a rezistenţei specifice jocului de fotbal; Dezvoltarea capacităţii de mişcare generală şi specifică jocului de fotbal. Se presupune că implementarea sistematică şi corectă în lecţiile de educaţie fizică şi sportive a unui sistem de mijloace şi metode fotbalistice poate dezvolta mai mult nivelul capacităţii vitale a elevilor liceeni, decât folosind mijloace tradiţionale specifice atletismului. Experimentul s-a desfăşurat pe nivel de studiu cu 681 subiecţi din 28 de clase cumulate din patru licee. Au fost alcătuite randomizat patru eşantioane experimentale şi patru de referinţă. Eşantioanele experimentale au lucrat în lecţii cu mijloace specifice jocului de fotbal timp de un an şcolar, iar cele de referinţă cu mijloace tradiţionale specifice atletismului. Subiecţii tuturor eşantioanelor au fost evaluaţi predictiv şi sumativ la proba funcţională capacitate vitală. Urmare a implementării mijloacelor şi metodelor fotbalistice subiecţii eşantioanelor experimentale au obţinut rezultate mai bune la evaluarea sumativă, comparativ cu subiecţii eşantioanelor de referinţă. Diferenţa a fost semnificativă la pragul $p<0,05$, deci ipoteza de nul se infirmă şi se acceptă ipoteza formulată. Experimentul, prin calcule statistico-matematice, confirmă impactul major al folosirii mijloacelor şi metodelor fotbalistice în optimizarea capacităţii vitale a elevilor liceeni, comparativ cu varianta folosirii mijloacelor tradiţionale din atletism.

Cuvinte cheie: *optimizare, impact, capacitate vitală, mijloace și metode fotbalistice.*

Introduction

The experiment with the above title is intended to verify the following hypothesis: it is assumed that the systematic and correct implementation of a system of means and methods specific to football play in the physical and sports education lessons can further develop the level of high school students' using traditional means specific to athletics. It is supported by the work and experience of a professor at the department, where after a long observation of students' behavior during their work to develop the resistance of their bodies by traditional means specific to athletics and the finding of an increase in the number of students who did not like them, I came to the conclusion that a change i is all the more useful as it manages to stop the emergence and

development of negative consequences: physical and mental involvement appropriate to the development of resistance, deliberate abandonment due to impotence, procurement of medical relief, and decrease in the resistance index. The necessity of changing the means and methods of action, specific to athletics, imposed by the teacher, with the accepted means and methods of football and the pupils was required. The optimization of the vital ability of high school students in free fall in the context of abusive use of computers and our involvement in mass sports activities has become, as a physical education teacher, a basic preoccupation during the lessons. By implementing in the experiment the independent variable (of the integrated work, which calls for the merging of the technical elements of the football game and the physical ones, in which the optimization of the development of the vital capacity was determined as a constant for the improvement of the pupils' quality of life) we aimed to improve the vital capacity of high school students, and by statistic-mathematical calculus to justify the validity of the formulated hypothesis, thus based on a rigorous scientific ground. According to P. Popescu Neveanu, from a psychological perspective, the effort is a "mobilization, concentration, accelerating of the physical and psychic forces within a system with self-conscious and unconscious self-regulation [...] the effort implies a certain finality, and therefore it is characterized_by focus, adherence to the obstacle, strain and unification of physical, mental, intellectual resources "(Bota, 2000). Taking into account these considerations, we used the elements of the game of football as a means of physical school education, knowing that they are loved by pupils and that they mobilize them to concentrate on depositing all the physical and mental capacity for the success of the most correct executions effective way to bring success to execution and the game. Based on the rationalization and standardization of football-specific exercises, I succeeded in mobilizing and capturing the interest of students in making a sustained effort specific to the development of their body resistance, in order to increase the level of vital capacity, which I have succeeded.

Using experimental elements and methods of football game, as a means of school physical education, based on the rationalization and standardization of exercises, I managed to attract pupils to a specific effort to develop the resistance of their bodies, resulting in increased vital capacity.

The need to increase the effectiveness of the means of action for the development of resistance has become the main reason for our research. Knowing that football is coveted by students and demanding a lot of fatigue in the body, I decided to confirm or deny my suspicion that the means and methods specific to football, rationalized and standardized, can optimize the vital capacity, the ability of the high school students to work. To pass on the

research we formulated the working hypothesis, which was a provisional assumption that we verified by confronting reality with a longitudinal scientific experiment, during which thinking was channeled to the observation of the impact of the implementation of the variable independent of the vital ability of high school students.

Objectives

The objectives of the research were: experimental verification of the efficiency of the means and methods specific to the game of football in the optimization of the vital capacity; the development of general resistance and resilience specific to the game of football; the development of the general and football-specific ability to move.

Methods

The methods used for the development of vital capacity were those based on uniform efforts, on intervals and on variable efforts, and the research methods used in the experiment were: pedagogical observation, survey by questionnaire, experimental method, test and measurement method, comparison method, analysis and synthesis method, statistical-mathematical method, registration method, graphic method and statistical significance method and validation.

Hollmann and Hettinger define the effort as "a systematic repetition of motor actions aimed at improving performance without obvious morphological changes (Bota, 2000)". As a result, in order to solve the theme of our research, which involved the improvement of the students' vital capacity, we relied on the construction of the means of football, the choice of working methods and their systematic implementation throughout the school year, both in physical education classes, as well as in sports teams. From a physiological perspective, the effort "causes a series of disturbances in the body that affect major functions, adapting apparatus and systems being dependent on its nature" (Demeter, A., Bota, 2000). For a positive adaptation of the apparatuses and systems of the students' body, in the sense of optimizing the vital capacity, we worked during lessons with the means and methods specific to football, rationalized and dosed accordingly to the achievement of the established goals. The variables obtained in the predictive and summative evaluation were recorded, tabulated, statistically mathematical and compared.

In order for the resistance development activity to be effective, it must be attractive and conducted in lessons by means and methods agreed upon by pupils (finding over the years of teaching), which is why I conducted a 28-questions that had an investigative role among students, simple and clear. In setting up the questionnaire I also set the type of questions. The requested answers were closed (yes or no), free and in fan. "Specifying the type of questions: with induced pre-modified responses "yes", "no"; with post coded free answers; with fan responses, that gives us more answers from which the subject holds one or two that matches his way of being; to think, to act, to interpret events, etc. (Niculescu, 2002)". To provide us with objective data, we

Table 1. The statistics of the answers given by the 681 students surveyed by questions that directly refer to the preference to work in lessons with athletics or football, to develop vital capacity, effort, the resistance of their body.

Answers		**Preferences for athletics**		**Football Preferences**	
		Nr.	**%**	**Nr.**	**%**
Number of questionnaire questions addressed to students	**3**	124	18,209	557	81,791
	5	146	21,439	535	78,561
	6	123	18,062	558	81,938
	7	160	23,495	521	76,505
	8	133	19,530	548	80,470
	9	86	12,628	595	87,372
	11	153	22,467	528	77,533
	12	151	22,173	530	77,827
	13	133	19,530	548	80,470
	17	117	17,181	564	82,819
	23	92	13,510	589	86,490
	24	107	15,712	574	84,288
	25	145	21,292	536	78,708
	26	124	18,209	557	81,791
Average		**128**	**18,82**	**553**	**81,18**
The ranking of preferences		**II**		**I**	

interviewed a representative sample of 681 pupils from IX to XII grades studying in the four local high schools chosen for the experiment. We used this mode of investigation because we were interested in the views of the students regarding their preferences over two kinds of means by which to develop vital capacity, exercise capacity, body resistance during physical education classes, and sports: means specific to football or specific means of athletics. The result of the questionnaire survey was enlightening: the preferences of the students for football were 81.18% and for the athletics only 18.82%. By the method of investigation we had the opportunity to get reassured once again about the practical reality observed previously in the instructive-educational activity with the pupils that they are making greater efforts when they agree to the means with which they work during the lessons. The data obtained through the investigation gave us more certainty about the truth when we wanted to find out opinions, answers of individuals and "the purpose of most surveys is only to provide information" (Epuran & Marolicaru, 1998).

In conclusion, on the basis of the overwhelming number of students who prefer football to the detriment of athletics, we can say that the specific means of football play are more appreciated by the high school students than the traditional means specific to athletics. These, used in physically-education classes, with appropriate dosage, can optimise the vital capacity of the student's body.

Results

Approaching integrated work using football-specific means and methods to optimize vital capacity, effort capacity in physical education lessons has been to the liking of the students, has a positive effect on their involvement in sustained effort. Being loved and practiced with pleasure by students, it was found that the deliberate abandonment ceased. In this context, we noticed a much better participation in the sustained effort and an increase in time of the index of the resistance of their body, which confirms the opinion supported by Massimo Giacomini: "The development of resistance is limited by other factors, the first of which is the psychological factor: children are adapting hard to slow-running, which stretches over a longer period of time. In recent years, intermittent methods of resistance training have developed a lot, especially in team sports, so long and slow exercises for the development of aerobic resistance have been

almost completely abandoned " [...]". To train the resistance, use ball-specific exercises, exercise cycles or mixed exercises (with and without a ball), matches and other activities designed to maintain a high level of motivation. The physical-objective game to be achieved is the doctrinal framework that must be at the core of physical training programs (F.R.F.- *Technical guide of the football school (children and juniors))*". This has increased functional performance, vital and, implicitly, driving power. At the same time other requirements of the physical education program have been solved: the development of general and specific skill, the development of the lower train force, the improvement of the speed, the increase of the courage to fight with the opponent to win, to acquire a pleasant and useful way of spending leisure time and discovering and promoting new talents for performance football.

The success of the integrated model using preparatory means and methods of football was its simplicity, the fact that it can be applied in any school unit with or without a special sports base, but also in its general character that prevents stigmatization of any pupil. Using the means and methods specific to the game of football in order to optimize the vital capacity, the effort capacity, has stopped the deliberate abandonment of the students. In this context, we noticed a much better participation in sustained effort and an increase in the resistance index of their body.

As a result of the experiment applied on eight representative samples (4 experimental and 4 reference), made up by years of study in the 681 high school students in four local high schools, there were biological and motor growths attributed to work with the independent variable (with specific means and methods of football play) introduced into the experimental sample and working with specific means of athletics on the reference samples. The greater progress achieved by the subjects in the summative evaluation of the experimental samples compared to the one recorded in the reference samples is due to the implementation, during a school year, of the means and methods specific to the football game. These proved to be more effective than those specific to athletics with which the subjects of the reference samples worked over the same period, as can be seen from the tables and graphs below on the study level (9^{th} and 10^{th} grades only, due to the 12-page restriction) with the rigorous comments, which were based on the statistical and mathematical calculations applied to the variables collected from the experiment to the vital capacity sample.

The level of the 9th grades

Table 2. The indicators of the 9th-grade statistical parameters, the blank sample and the pilot sample, at T1 and T2, cumulated from the four high schools, at the functional sample Vital Capacity

Indicators of statistical parameters		VITAL CAPACITY (ml)	
		Classes 9th Control	**Classes 9th Experiment**
T1	amount	267.800,000	275.500,000
	minimum	1.700,000	1.400,000
	maximum	4.100,000	5.000,000
	number	100,000	103,000
	Half	50,000	52,000
	arithmetic mean	**2.678,000**	**2.674,757**
	median	2.600,000	2.500,000
	standard deviation	611,160	671,864
	amplitude	2.400,000	3.600,000
	coefficient of variation	22,821	25,119
	the Student test	43,818	39,811
T2	amount	307.700,000	345.200,000
	minimum	1.700,000	1.600,000
	maximum	4.600,000	5.500,000
	number	100,000	103,000
	Half	50,000	52,000
	arithmetic mean	**3.077,000**	**3.351,456**
	median	3.000,000	3.300,000
	standard deviation	679,684	802,407
	amplitude	2.900,000	3.900,000
	coefficient of variation	22,089	23,942
	Student Significance Index	45,271	41,768
	The Pearson correlation coefficient	**0,980**	**0,953**
	Epsilon Test	9,751	9,628
	Test Z	36,270	4,239

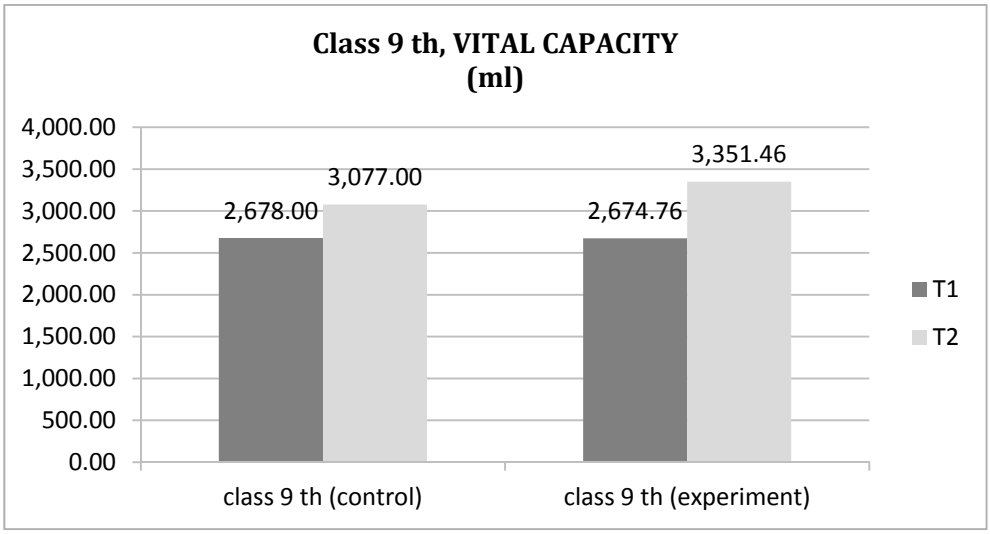

Figure 1. Arithmetic mean values of Vital Capacity Level, calculated in classes 9th, control and experiment samples, predictive (T1) and summative (T2) testing

The mean VITAL CAPACITY level at baseline was 2678 ml in the control and 2674,757 ml in the experiment class. It increased to final testing to 3077 ml, respectively increased to 3351,456 ml. In the control class there was an increase in the average level by 399 ml, and in the experiment class an increase of 676,699 ml. This results in greater efficiency (+ 70%) in the experiment group assigned to work with the independent variable.

The level of the 10th grades

Table 3. Indicators of the statistical parameters of the 10th grades, the control sample and the experiment sample, at T1 and T2, cumulated from the four high schools, at the functional capacity Vital Capacity.

Indicators of statistical parameters		VITAL CAPACITY (ml)	
		Classes 10th Control	**Classes 10th Experiment**
T1	Amount	256.100,000	267.600,000
	Minimum	1.600,000	1.400,000
	Maximum	4.400,000	4.700,000
	Number	101,000	103,000
	Half	51,000	52,000
	arithmetic mean	**2.535,644**	**2.598,058**
	Median	2.400,000	2.500,000
	standard deviation	640,944	678,087
	Amplitude	2.800,000	3.300,000
	coefficient of variation	25,277	26,100
	the Student test	**39,561**	38,315
T2	Amount	296.700,000	342.500,000
	Minimum	1.600,000	1.600,000
	Maximum	5.000,000	5.400,000
	Number	101,000	103,000
	Half	51,000	52,000
	arithmetic mean	**2.937,624**	**3.325,243**
	Median	2.900,000	3.200,000
	standard deviation	733,208	842,294
	Amplitude	3.400,000	3.800,000
	coefficient of variation	24,959	25,330
	Student Significance Index	40,065	39,478
	the Pearson correlation coefficient	**0,975**	**0,950**
	Epsilon Test	9,751	9,591
	Test Z	32,215	3,432

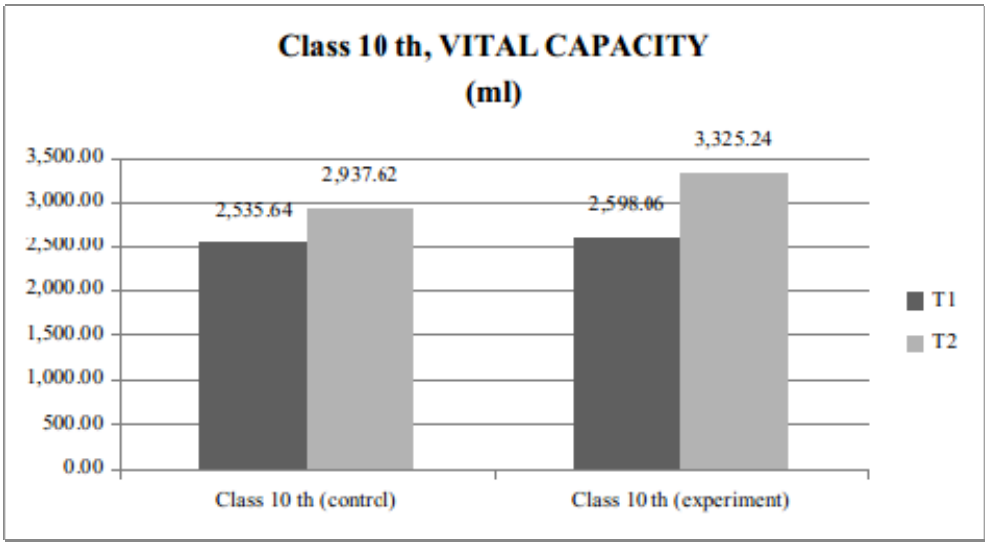

Figure 2. Arithmetic mean values of Vital Capacity Level, calculated in 10th grades, control and pilot samples, predictive (T1) and summative (T2)

The mean VITAL CAPACITY level at baseline was 2535.644 ml in the control and 2598.058 ml in the experiment. It increased to final testing to 2937.624 ml, respectively increased to 3325.243 ml. In the control class there was an increase of the average level by 401.98 ml, and in the pilot class an increase of 727.184 ml. It results in greater efficiency (+ 81%) in the pilot group assigned to working with the independent variable.

In class 11th, the mean VITAL CAPACITY level at baseline was 2859.494 ml in the control and 2976.106 ml in the pilot. It increased to final testing to 3360,759 ml, respectively up to 3732,743 ml. In the control class there was an increase in the average level by 501,266 ml and in the pilot class an increase of 756,637 ml. It results in greater efficiency (+ 51%) in the pilot group assigned to work with the independent variable.

In class 12th, the mean VITAL CAPACITY level at baseline was 2913,793 ml in the control and 2392,308 ml in the pilot. It increased to final testing to 3348,276 ml, respectively increased to 3013,462 ml. In the control class there was an increase of the average level by 434,483 ml, and in the pilot class an increase of 621,154 ml. This results in greater efficiency (+ 43%) in the pilot group assigned to work with the independent variable.

Conclusions

For the four experimental samples (made up of the 9th, 10th, 11th and 12th grade students) at the VITAL CAPACITY sample, we can state that due to working with the means and the specific methods of the game of football applied in the experiment, there resulted a higher efficiency than the reference ones who worked with the traditional means of athletics. The mean values of the vital capacity level had increases in the summative evaluation of the experimental and reference samples, but higher in the experimental samples. The Pearson correlation coefficient was positive in the positive sense and has a high correlation. The Student Significance Index is higher than the critical table value (1.96) at the threshold $p < 0.05$, so it is significant with a probability of 95%. The progress of the maximum expired air volume is due to increased chest elasticity and ventilation capacity, which have been improved by our intervention in training with specific means of football play, the independent variable introduced into the experiment. The systematic development of exercise capacity through football means enriches the content of physical education and creates important physiological and psychological effects for general physical training, providing valuable impulses for self-improvement.

Finally, we can say that the impact of the use of football means and methods in high school students' physical education is favorable to the optimization of vital capacities compared to those specific to athletics.

REFERENCES

Bota, C. (2000). *Ergo Physiology (*pp.7). Bucharest: Globus.

Epuran, M., & Marolicaru, M. (1998) *Methodology of Physical Activity Research* (pp. 72). Cluj – Napoca: Risoprint.

F.R.F. *Technical guide of the football school (children and juniors)* (pp.133-135).

Niculescu, M. (2002) *Methodology of Scientific Research in Physical Education and Sport* (pp. 331-332). Bucharest: A.N.E.F.S.

STUDIA UBB EDUCATIO ARTIS GYMN., LXIII, 1, 2018, pp. 69 - 78
(RECOMMENDED CITATION)
DOI:10.24193/subbeag.63(1).07

STATISTICS OF HIGEST SCORE FROM MAJOR INTERNATIONAL COMPETITIONS IN 2016

BARBOŞ ION-PETRE[1*], CIOCOI-POP DUMITRU-RAREŞ[1], GHERTOIU DAN MIHAI[1], SURLĂ IULIAN[2]

ABSTRACT. The statistic of procedures scores to the great international judo competitions in 2016. Current Judo has many difficulties in approaching for most coaches. What do we start with (what techniques do we approach at first)? What is the optimal age to participate in competitions? From what age do we begin the first weaknesses? But especially, what are the best tactics to resist higher-level competitions (J.O, World Championship, European Championship). In order to better understand the evolution of the current judo, related to the technical, tactical and psychological level, the Faculty of Physical Education and Sport, UBB-Cluj, in collaboration with Universitatea Dinamo-Cluj, conducted a study at two major international competitions: Grand Prix Havana 2016 held on January 22 and Cadet European Cup - Cluj-Napoca, Romania from 7-8 May. For the first competition we used the images and data taken from the International Judo Federation, as well as TV-JUDO, a television station of the Romanian Judo Federation. For the second competition we used the data collected by the team of veterans within the "Universitatea-Dinamo-Cluj" club, compared to the ones made by the International Judo Federation. Every weight category, both boys and girls were made statistical estimates for the number of points accumulated (Ippon, Wazari, Yuko) and statistical estimates on the number of penalties obtained by each category. After completing the data, the graphical presentation of the data was presented as a column diagram.

Keyword: *Ippon, Wazari, shido, koka, Gold Score, Judo, Hansokumake, O-Goshi, Uchi-Mata, Ko-uchi-Gari.*

[1] *Babeş-Bolyai University, Faculty of Physical Education and Sport, Cluj-Napoca, Romania*
[2] *School of Sport Program, Focşani, Romania*
[*] *Corresponding author: petrebarbos@yahoo.com*

REZUMAT. ***Statistica scorului procedeelor de judo la marile competiţii internaţionale în 2016.*** Judo-ul actual prezintă numeroase dificultăţi de abordare pentru majoritatea antrenorilor. Cu ce începem judo (ce tehnici abordăm la început)? Care este vârsta optimă de a participa la competiţii? De la ce vârstă începem primele slăbiri? Dar mai ales, care sunt tacticile cele mai bune pentru a da faţă unor competiţii de nivel superior (J.O, Campionat Mondial, Campionat European). Pentru a înţelegere mai bună a evoluţiei judo-ului actual, raportat la nivelul tehnic, tactic şi psihologic, Facultatea de Educaţie Fizică şi Sport UBB-Cluj, în colaborare cu „Universitatea-Dinamo-Cluj" a desfăşurat un studiu la două mari competiţii internaţionale: Grand Prix Havana 2016 desfăşurat în 22 ianuarie şi Cadet European Cup – Cluj-Napoca, Romania din 7-8 mai. Pentru prima competiţie ne-am folosit de imaginile şi date preluate de la Federaţia Internaţională de Judo, precum şi de la TV-JUDO, post de televiziune al Federaţiei Romane de Judo. Pentru cea de-a doua competiţie ne-am folosit de datele culese de echipa de veterani din cadrul clubului „Universitatea-Dinamo-Cluj", comparate cu cele realizate de Federaţia Internaţională de Judo. S-a urmărit fiecare categorie de greutate, atât de băieţi, cât şi de fete, şi s-au făcut estimări statistice legate de: numărul de puncte acumulate (Ippon, Wazari, Yuko) şi estimări statistice legate de numărul de penalizări obţinute de fiecare categorie în parte. În urma finalizărilor datelor s-a trecut la prezentarea grafică a acestora, sub formă de diagrama coloană.

Cuvinte cheie: *Ippon, Wazari, shido, koka, Gold Score, Judo, Hansokumake, O-Goshi, Uchi-Mata, Ko-uchi-Gari., statistic, procedures, Judo, International Judo Federation, Grand Prix Havana 2016.*

Introduction

In the recent years we have observed a significant evolution technical processes of judo. They gave up some in favor of others full of spectacle, but sometimes some risk of injury.

The year 2016 athletes' judoka offered the chance to participate in a number of big reputable international competitions that offered a chance to accumulate points needed to participate in the Olympic Games in Rio de Janerio in 2016.

The award points (Ippon, Wazari or Yuko) is generally subjective, but the only form of assessment of athletes judoka.

The present research tries to present, in conjunction with data from the International Judo Federation, a number of points accumulated statistics on each category of weight and gender (male and female).

We paid attention to two major competitions:

Grand Prix Havana 2016 from 22 January;

Cadet European Cup – Cluj-Napoca 2016, Romania from 7-8 May.

In Cluj-Napoca, the host city, the recordings were made by Team Judo athletes veterans, "U-Dinamo-Cluj" and compared with those made by the International Judo Federation (JIF).

These results will be compared with those that will be recorded at the Olympic Games in Rio de Janierio 2016. In order to guide us to what extent judoka intended to achieve the best score (Ippon) or are content with lower scores, but the important thing is to win.

Grand Prix Havana 2016 - 22 January

In *Havana, Cuba*, in the period January 22 to 24 was organized "*Havana Grand Prix 2016*". Participated in the competition 386 judoka, of whom 251 judoka male and 155 judoka female, from 66 countries.

Weight categories and number of judoka were:

Male	Female
60 kg – 35 judoka	48 kg – 19 judoka
66 kg – 24 judoka	52 kg – 25 judoka
73 kg – 48 judoka	57 kg – 31 judoka
81 kg – 36 judoka	63 kg – 19 judoka
90 kg – 40 judoka	70 kg – 25 judoka
100 kg - 37 judoka	78 kg – 23 judoka
+100 kg – 31 judoka	+78 kg – 14 judoka

By weight category have the following result:

MAN

- 60 kg – From the statistical point of view we have:
  Ippon – 54,29% ; Wazari - 22,86%; Yuko – 14,29%
- 66 kg – From the statistical point of view we have:
  Ippon - 50%;20 %; Wazari - 12,50 %.

- 73 kg – From the statistical point of view we have:
  Ippon - 56, 25%, Wazari - 18,75%, Yuko - 20,83%
- 81 kg – From the statistical point of view we have:
  Ippon - 47,22%, Wazari - 19,44%, Yuko - 11,11%
- 90 kg – From the statistical point of view we have:
  Ippon – 55%, Wazari – 10%, Yuko -15%
- 100 kg –From the statistical point of view we have:
  Ippon – 55%, Wazari – 10%, Yuko -15%
- +100 kg – From the statistical point of view we have:
  Ippon – 50%, Wazari - 12,5% , Yuko - 12,5%

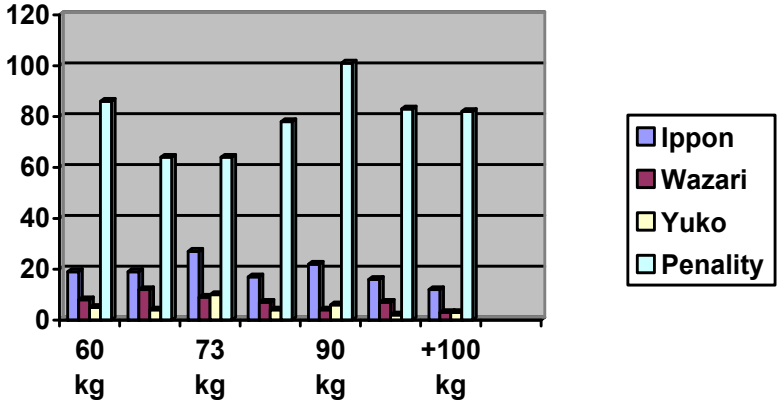

Fig. 1. The statistical result of Man judoka – in the competition

From 253 judoka Man – 135 win with Ippon (53,36%), 51 with Wazari (20,16%) and 35 with Yuko (13,83%), Penalty – 6 Shido (25%).

An important consideration to achieving by Ippon techniques it was, in our opinion, exceptional physical qualities of sportsmen. Height medium over 1.75 m. The force strong in the back and foot. The techniques used by they were more Uchi-Mata, O-Goshi, Ippon-Seoi-Nage.

The low weight categories, 60 and 66 kg, speed of execution techniques have made a larger execution. The techniques used by they were more Tai Sabaki and Ippon-Seio-Nage; Tai-Sabaki and O-Goshi; O-Uchi-Gari.

Resultes of WOMEN competion:

- 48 kg – From the statistical point of view we have:
  Ippon – 61,11%, Wazari – 27,78%, Yuko – 5,56%
- 52 kg – From the statistical point of view we have:
  Ippon – 32%, Wazari - 36%, Yuko - 16%, Penalty – 18,52%
- 57 Kg –From the statistical point of view we have:
  Ippon - 41,94% , Wazari - 25,81%, Penalty – 21,74%
- 63 kg – From the statistical point of view we have:
  Ippon -36,84% Wazari- 15,79%, Yuko - 5,26% , Penalty - 36,36%
- 70 kg – From the statistical point of view we have:
  Ippon -56%, Wazari - 16%, Yuko - 12%, Penalty - 22,22%
- 78 kg – From the statistical point of view we have:
  Ippon- 58,33%, Wazari - 20,83%, Yuko – 0, Penality – 20,83%
- +78 kg – From the statistical point of view we have:
  Ippon- 62,5%, Wazari - 8,33% , Yuko – 4,17% , Penality – 25%

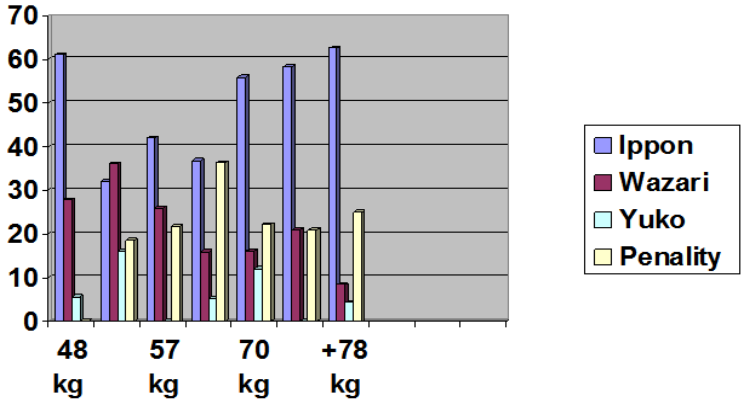

Fig. 2. The statistical result of WOMEN judoka – in the competition

From 155 judoka women – 65 win with Ippon (41,94%), 34 with Wazari (21,94%) and 16 with Yuko (10,32%), Penalty – 39 Shido (24,84%).

We noticed a greater caution in the entrances to processes to turns his back (Ippon-Seoi-Nage, Koshi-Nage). This was as a fear of not being counter-attacked by the opponent. The medium heights of judoka was 1.70 m. Lower weight categories had an medium height of 1.65 m. The force strong on the legs. The techniques used by the boys were more Uchi-Mata, O-Goshi.

The higher weight categories, the fight was much slower, with techniques much less spectacular. The fear and delays of entry to the techniques have made to finalize the match in normal time limit (5 minutes). The techniques used by they were more Uchi-Mata, Koshi –Guruma, O-Goshi and Kesa-Gatame.

CADET EUROPEAN CUP – CLUJ-NAPOCA, ROMANIA-7-8 MAY 2016.

The sports hall "Horia Demian" from Cluj-Napoca, Romania, took place Championship "CADET EUROPEAN CUP". Participation age was between 17-20 years.

In this international competition participated 442 judoka: 289 men judoka and 153 women judoka from 23 countries (*www.Federatiaromanadejudo.ro*).

Also in this competion we have this weight category and numbers of participation:

Male judoka:	Women judoka:
50 kg – 41 judoka	40 kg – 14 judoka
55 kg – 57 judoka	44 kg – 19 judoka
60 kg – 65 judoka	48 kg – 29 judoka
66 kg – 60 judoka	52 kg – 32 judoka
73 kg – 62 judoka	57 kg – 29 judoka
81 kg - 40 judoka	63 kg – 36 judoka
90 kg – 26 judoka	70 kg – 25 judoka
+90 kg – 17 judoka	+70 – 10 judoka

By weight category have the following result:

Male:

- 50 kg – From the statistical point of view we have:
  Ippon – 51,22%, Wazari – 21,95%, Yuko– 24,39%, Penality: 0
- 55 kg – From the statistical point of view we have:
  Ippon – 54,39%, Wazari – 19,30% , Yuko – 12,28%, Penality: 0
- 60 kg – From the statistical point of view we have:
  Ippon – 76,92%, Wazari -7,69% , Yuko – 7,69%, Penality: 0

- 66 kg – From the statistical point of view we have:
  Ippon – 76,67%, Wazari – 11,67%, Yuko – 5,00%, Penalty – 6,67%
- 73 kg – From the statistical point of view we have:
  Ippon – 67,74%, Wazari – 6,45%, Yuko – 12,9%, Penalty – 12,9%
- 81 kg – From the statistical point of view we have:
  Ippon – 57,5%, Wazari – 12,5%, Yuko – 10%, Penalty – 20%
- 90 kg – From the statistical point of view we have:
  Ippon – 57,69%, Wazari – 15,38%, Yuko 15,38%, Penality: 0
- +90 kg – From the statistical point of view we have:
  Ippon – 58,82%, Wazari -23,53% , Yuko – 11,76%, Penality: 0

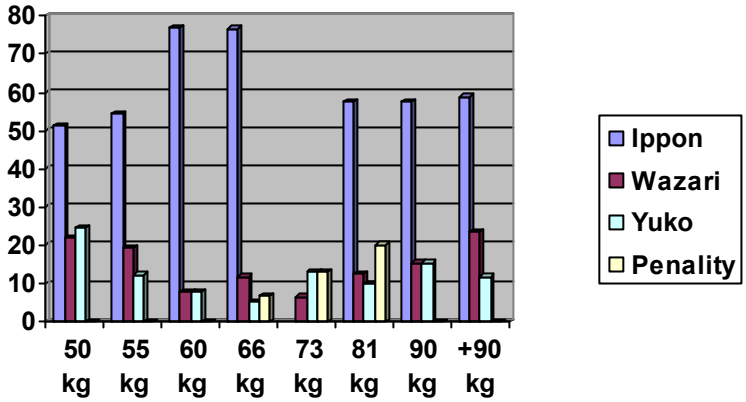

Fig. 3. The statistical result of Man judoka – in the competition

We noticed a small number of projection techniques. A pronounced attention to technique force, in which principles of judo not be found. Also here a greater caution in the entrances to processes to turns his back. This was as a fear of not being counter-attacked by the opponent. The force of these judoka are in developed, they have not reached it to the maturity.

Ground fighting (Ne-Waza) without completing the spectacular, with a special focus on strangulation (Shime-Waza), that is why the number of accidents higher.

Women judoka:

- 40 kg – From the statistical point of view we have:
  Ippon- 21,43%, Wazari - 7,14%, Yuko - 28,57%, Penalty – 16
- 44 kg – From the statistical point of view we have:
  Ippon - 52,63%, Wazari - 21,05%, Yuko - 5,26%

- 48 kg – From the statistical point of view we have:
  Ippon - 51,72%, Wazari - 13,79% Yuko – 13,79%, Penalty – 15
- 52 kg – From the statistical point of view we have:
  Ippon - 50%, Wazari - 18,75% , Yuko- 21,88%, Penalty – 3
- 57 kg – From the statistical point of view we have:
  Ippon - 64,10%, Wazari - 15,38%, Yuko - 10,26%, Penalty – 31
- 63 kg – From the statistical point of view we have:
  Ippon - 66,67%, Wazari - 8,33% , Yuko - 13,89% , Penalty – 21
- 70 kg – From the statistical point of view we have:
  Ippon - 64%, Wazari - 12%, Yuko - 16%, Penalty – 13
- +70 kg – From the statistical point of view we have:
  Ippon - 40%, Wazari - 10%, Yuko - 10%, Penalty - 31

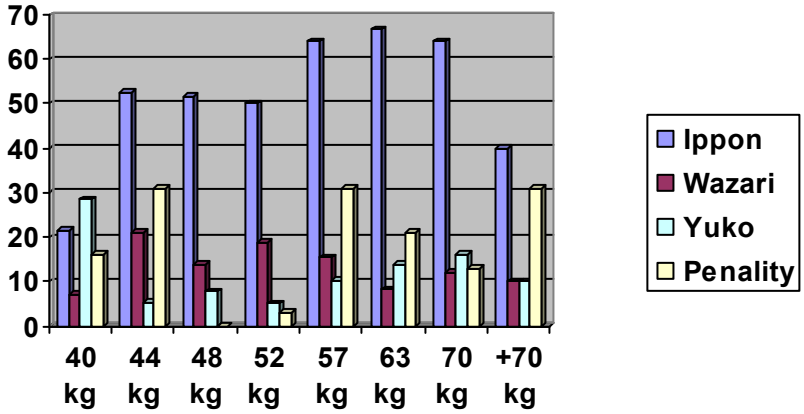

Fig. 4. The statistical result of Women judoka – in the competition

We noticed more displacement than at boys by many changes positions. Numerous attacks with Uchi-Mata, O-Uchi-Gari and Ko-Uchi-Gari. A pronounced attention to fight at Ne-waza (ground fighting), more on defense and less on an attack or counter-attack, therefore we less completions on the ground, compared with the fight standing up (Ne-Waza).

Discussion

The statistical interpretation was made according to the techniques of data collection (Bocsan, 1995).

Verification of dates with those of the International Judo Federation was made using the methods presented by Tudorel and Stancu (1995). We were able to achieve the following general information.

We consider it important to underline the number of relatively low techniques in "Grand Prix Havana- 2016", only three: Uchi-Mata, Harai-Goshi, O-Goshi; Even if we have countries with tradition in judo. In this competition were 66 country, 231 judo *men* won 130.

As statistic we have winner by Ippon (54,62%), Wazari (13,87%), Yuko (30%).

At women we have from 157 judoka won by Ippon (49,04%). The most frequently of the techniques used are: Uchi - Mata, Harai - Goshi, O-Uchi-Gari, Yoko – Shiho - Gatame, Mune-Gatame from Wazari (12,74%). The most frequently of the techniques used are: Tai-Otoshi, Ko-Uchi-Gari, Uchi-Mata from Yuko (13,38%). The most frequently of the techniques used are: Tani-otoshi, O-Soto-Gari, Seoi-Otoshi. Kesa-Gatame.

Even if Hungary achieved the fifth place among the nations, it has managed to win the most matches by Ippon (75,8%), also by Wazari (52%) and by Yuko (8%) .

In CADET EUROPEAN CUP – CLUJ-NAPOCA, from 368 *judoka men* – 238 judoka won by Ippon (6,67%); won by Wazari (13,32%) and by Yuko (11,68), Penalty (10.33%).

At Women from 204 judoka – 113 won by Ippon (55,39%), Wazari (13,73%), Yuko 30 (14,71%), Penalty (16,18%).

Most of the countries medal won Italy by Ippon (63,6%), Wazari (59,2%), Yuko (14,4%).

These results will be compared with those that will be recorded at the Olympic Games in Rio de Janierio 2016. In order to guide us to what extent judoka intended to achieve the best score (Ippon) or are content with lower scores, but the important thing is to win.

Conclusion

Future competitions will give us a framework for comparison, especially as 2017 comes to changes in rules of judo. We were expecting a greater number of techniques as a result of quitting Yuko and Koka. The quality of techniques could be improved if coaches pay more attention techniques less spectacular, but more effective, but more effective and lower risk of making mistakes they will be punished. Continuing the monitoring of major competitions would lead to a better management of how to prepare all judokas, especially those in the incipient phase.

REFERENCES

Bocsan, Gh. (1995). *Estimarea parametrilor modelelor statistice.* Timişoara: Universitatea de Vest.
Bardin, L. (1977). *L'Analyse de contenu*. Paris: P.U.F.
Durkheim, É. (1974). *Regulile metodei sociologice*. Bucureşti: Editura Ştiinţifică.
Ferréol, G. (ed.) 1995 (1998). *Dicţionar de sociologie.* Iaşi: Editura Polirom.
Johnson R. (1984). *Elementary Statistics*. Boston: Duxbury Press.
Nowak, Şt. (1977). *Methodology of Social Research*. Varşovia: Polish Scientific Publishers.
Riley, Matilda W. (ed.). (1963). *Sociological Research. A Case Approach*. New York: Harcourt, Brace & World, Inc.
Rotariu, T., & Iluţ, P. (1997). *Ancheta sociologică şi sondajul de opinie publică. Teorie şi practică*. Iaşi: Editura Polirom.
Tudorel, A., Stancu, A. (1995). *Statistica – Teorie si Aplicatii.* Editura All.
Yule G. Udny, Kendall, M.G. (1969). *Introducere in teoria statisticii*. Bucureşti: Editura Stiintifica.
www.Federatiaromanadejudo.com
www.judointernationalfederation.com

STUDIA UBB EDUCATIO ARTIS GYMN., LXIII, 1, 2018, pp. 79 - 95
(RECOMMENDED CITATION)
DOI:10.24193/subbeag.63(1).08

THE SPECIFIC OF TOURISM AND LEISURE ACTIVITIES IN HIGH MOUNTAINS AREAS. CASE STUDY: MONT BLANC AND ELBRUS MASSIFS

BÎCA IOAN[1]

ABSTRACT. The high mountains, situated over 3000 m altitude, induce specific features of tourism and leisure activities. Their level of equipment for tourism restricts because of difficult access, rugged terrain, and adverse weather conditions. The main activities are those with extreme features, like skiing, snowboarding, ski touring, ski paragliding, wingsuit and mountaineering. This study is the result of research conducted in the highest massive of Europe, Mont Blanc (4810 m) and Elbrus (5642 m), on several issues, such as: tourism infrastructure, the organization of tourism activities, tourist flows, leisure activities fetures, management of mountain expeditions, and behavior of body to altitude.

Key words: *mountaineering, bioclimat, climate tourism, trekking, scrambling, ice climbing, aerobic endurance, adventure lifestyle, mountain risk, acute mountain sickness, high-altitude pulmonary edema, high-altitude cerebral edema, hypoxia*

REZUMAT. ***Specificul activităţilor turistice şi agrementale în munţii înalţi. Studiu de caz: masivele Elbrus şi Mont Blanc.*** Munţii înalţi, situaţi la peste 3000 m altitudine, induc caracteristici specifice activităţilor agrementale şi turistice. Gradul lor de echipare pentru turism se restrânge datorită accesului greu, reliefului accidentat şi condiţiilor climatice nefavorabile. Activităţile principale sunt cele cu caracter extrem, respectiv schi, snowboarding, schi de tură, schi paragliding, wingsuit şi mountaineering. Studiul de faţă reprezintă rezultatul cercetărilor efectuate în cele mai înalte masive din Europa, Mont Blanc (4810 m) şi Elbrus (5642 m), asupra mai multor aspecte, cum ar fi: infrastructura turistică,

[1] *Babeş-Bolyai University, Faculty of Geography, Cluj-Napoca, Romania*
** Corresponding author: john_grimo@yahoo.com*

modul de organizare a activităților turistice, fluxurile de turiști, activitățile agrementale specifice, managementul expedițiilor și comportamentul organismului uman la condițiile impuse de altitudine.

Cuvinte cheie: *alpinism, bioclimat, turism climatic, trekking, scrambling, cățărare pe gheață, anduranță aerobă, stil de viață aventuros, risc montan, rău de munte acut, edem pulmonar, edem cerebral, hipoxie*

Introduction

Mountainous regions located over 3000 m altitude, presents specific geographical features (rugged terrain, cold climates, eternal snows, glaciers) that have a big impact on tourism and leisure activities. Tourism infrastructure, may be missing or may be represented in the vicinity of tourist resorts by installation of lifts (cable cars, gondolas, chairlifts), accommodations (hotels, lodges, shelters), trails or via ferrata routes climbing, ski slopes, and the leisure activities are geared towards relaxation and adventure, such as: hiking, trekking, scrambling, rock and ice climbing, paragliding, wingsuit flying, ski touring, alpine skiing, extreme skiing and snowboarding.

Within these regions it can distinguish at least two sectors, which are under the influence of bioclimatic conditions:

- The sector from 3000 m to 4000 m, where the hypoxemia (decreased oxygen levels in the body) and hypoxia (low oxygen levels in the tissue) is less felt and leisure activities can be carried out relatively well;
- The sector up to 4000 m, where the amount of oxygen in the air increasing, and the air pressure is low, which influences the human body, hampered recreational activities.

Mountain entertainment is an aerobic activity, with big consumption of oxygen, so it is important to maintain the balance between the oxygen demand and supply of oxygen. At high altitudes, this balance changes and increases the need for oxygen. The parameter which illustrates this balance is the heart rate:

- If the hearth rate=130 beats / minute, then the effort is carried out in a perfect stable conditions;
- If the hearth rate=170-180 beats / minute, then the effort occurs in the relative stable state;
- If the hearth rate=140-150 beats / minute, is attained only 70-75% of the maximum consumption of oxygen, without producing lactic acid in the blood.

Cardio-vascular and breathing resources mobilization is very important, so it is necessary that the pace of movement and equipment to be oriented to effort economy, to extend the activity and increase the resistance of body.

Leisure activities involve the same the psychological factor, in order to fulfill its purpose, namely climbing a slope, crossing a ridge or reaching the peak. Motivation and will play an important role in this context, managing to overcome obstacles imposed by high mountain environment less hospitable.

Considering all these aspects, the study aims to highlight the particularities of tourism and entertainment activities in the two regions with high mountains, Elbrus (Caucasus) and Mont Blanc (Alps) in terms of organizational / managerial and practical aspects.

Material and methods

The present study is based on information obtained from research conducted as part of organized expeditions to Elbrus and Mont Blanc massifs during 06 - 27 August 2017. The interest concerned fields were: tourism infrastructure, the organization form of recreational activities, types of leisure, tourist flows and impacts to mountain environment.

To carry out these mountain expeditions there was several stages, relevant from methodological and organizational perspective, such as:

a) Route planning:

- There was chosen the normal routes to Elbrus (5642 m) and Mont Blanc (4810 m) peaks, relevant to the research topic;

b) Prior physical training:

- It was made by fitness exercises, hiking, trekking and cycling;

c) The choice of equipment:

1) For base camps approach and acclimatization: light equipment (flexible boots, hiking pants, softshell jacket);

2) For the summit day: because the lower temperatures there was chosen a warmer equipment consists of plastic boots, baselayer (merino underlayer) midlayer (T-shirts, fleece) and upper layer (down thermic jacket, hardshell jacket), gloves, mask, hat, accessories (backpack 30 l, crampons, helmet, ice ax, trekking poles, goggles, harness, rope, carabiners, first aid kit);

d) Establishing of food supplies:

- There was chosen high-energy foods, low weight and small volume: plain water, lime water, protein (dry meat, cashew nuts), carbohydrates (chocolate, energy bars, dry fruits), carbohydrate (dry bread, crackers);

e) Consulting the literature on the issues covered by the project:

1) Leisure activities in the areas of study (Baragunova, Kaloeva, 2014; Andreyanova, Igorevna, Ivolga, 2016; Philip, 2009);

2) Bioclimatology and mountain medicine (Stanhill, 1994; Auliciems, 1998; Peacock, 1998; Blazejczyk, 2001; Shell, 2004; Parcevaux, Hubert, 2007; Valliere, O`Reilly 2007; Richalet et al., 2012);

3) Training for sports and leisure activities in mountain areas (Costill, Fink, Pollock, 1979; Dudley, Abraham, 1982; Holloszy, Coyle, 1984; Daniels, 1989; Costill, Thomas, Robergs, Pascoe, Lambert, Barr, Fink, 1991; Foster, Hector, Welsh, Schrager, Green, Snyder, 1995; Baechle, Earle, 2000; Hawley, 2002; Șandor, 2014);

4) Sport tourism/mountain tourism (Ewert, 1985; Barry, 1992; Marsigny, B., Jammes, F.L., Cauchy, Emm., 1999; Godde, Price, Zimmermann, 2000; Beedie, Dyck, Schneider, Thompson, Virden, 2003; Hudson, 2003; Weed, Bull, 2004; Lee et al., 2006; Pomfret, 2006; Unbehaun, Pröbstl, Haider, 2008; Taher, Jamal, 2012; Tsaur et al., 2012; Richins, Hull, 2016; Elliot, Kreziak, 2017; Kennedy, 2017; Lutter, Sheikh, Schöffl, Schöffl, 2017).

Collection of information was done by direct observation, and further processing of their had didactic finalities (use of information in teaching), scientific finalities (climatic conditions, glaciers, landforms, human body behavior at altitude) and practical finalities (management of mountain expeditions and leisure activities).

Study areas

The two mountain ranges chosen for the conduct of research are the highest points of the European continent, constituting two milestones in mountaineering and adventure.

Mont Blanc massif is situated in the Alps, is part of a Graian Alps and reaches an altitude of 4810 m, and Elbrus belongs to the Caucasus Mountains, the Greater Caucasus, has an altitude of 5642 m, and it is considered the highest peak in Europe. Due to this, the Elbrus peak is part of the circuit 7 Volcanic Summit, which involves climbing the highest volcano on every continent (fig. 1).

Mont Blanc is a folding mountain system characterized by great altitudes, declivities and fragmentation, steep slopes, sharp ridges (arête), peaks towering (domes, aiguilles, horns), and deep saddles (col), glacial mark crevasses and seracs, glacial and periglacial spectacular landforms (circuses, through, rock glaciers, ridges, cliffs, chimneys, needles, towers, debris).

Orographic configuration of the Mont Blanc massif itself, dominated by the 4810 m elevation, is radial-divergent, from the top unhooking the three main ridges: northwest ridge (Les Bosses), north-northeast ridge (Trois Monts), and southeast ridge (Mont Blanc du Courmayeur- Brouillard), whose flanks descend steeply to glaciers Bossons (N), Mont Blanc (SV) Freney (SE) and Brenva (E). The flanks of Mont Blanc are developed for tourism (tourist routes, shelters, gondolas), leisure activities gravitating towards the two tourist centers, Chamonix, north, and Courmayeur, south (fig. 2).

Fig. 1. Geographical localization of Elbrus and Mont Blanc massifs in Europe (*https://commons.wikimedia.org/wiki/Europe physical map-with changes*)

Fig. 2. Mont Blanc area
(*https://www.mountain-forecast.com/peaks/mont-blanc/forecasts/4810-with changes*)

Elbrus massif is a stratovolcano, with two peaks, representing the two craters residues. Western peak is 5642 m and the eastern peak has 5621 m. In terms of orographic, the mountain building is characterized by two morphological levels: the conical proeminence at more than 4,000 meters, and basalt plateau located around the peak, at 3000-4000 m, highly fragmented by the tributaries of Baksan, Kuban and Malka rivers, and covered with glaciers (Azau, Garabashi, Terskol, Illukon, Karachaun, Illycyran, Kyukyurtlyu, etc.).

Southern flank of the mountain Elbrus is affordable and is designed for tourism (shelters, cable cars, gondolas), and at its foot, in Baksan Valley, there are several tourist resorts (Terskol, Cheget, Azau Poliana) (fig.3).

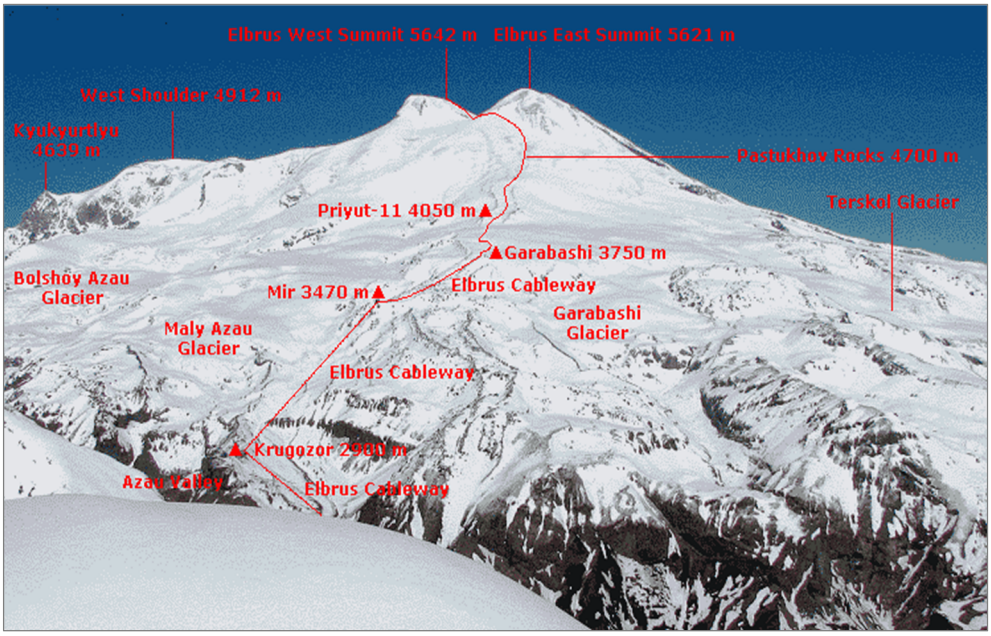

Fig. 3. The Southern flank of Elbrus massif
(*http://www.ersh.sp.ru/caucasus/ski10-photo.html*)

Results and discussions

A) Tourism issues

a) Mont Blanc area

Mont Blanc is a milestone for european and world mountaineering. The tourist infrastructure is very developed, and tourist flows are very high. At the foot of the mountain are numerous resorts (Argentiere, Chamonix, Les Houches, Courmayeur), and in the high area operating modern shelters (Cosmique Grand Mulets, Tre-la Tete, Nid Daigle, Tete Rousse, Gouter, Vallot etc.). According to Petzl Foundation (2017), in Mont Blanc operates 120 tourist companies (50 Italian side, 70 on the French side, of which 20 in Chamonix), there are 350 km of tourist routes, the number of visitors is between 20 000-35 000 per year, and on the top of Mont Blanc reach 20000 climbers each year.

The access to the high area is facilitated by high mountain cableways, via gondolas operating on the route Chamonix-Plan de l`Aiguille-Aiguilles du Midi, and Courmayeur-La Palud-Le Pavilion-Rifugio Turin-Helbronner-Aiguille du Midi. It should also be mentioned the narrow railway transport, represented by the Tramway du Mont Blanc (cogwheel train) on the route: Le Fayet-Saint-Gervais-les-Bains-Nid d`Aigle (12.4 km).

Leisure activities carried out are: hiking, muntaineering, rock climbing, skiing, alpine skiing, snowboarding and extreme skiing, paragliding skiing. One of the many sporting events that are held in the Mont Blanc is Ultra Trail du Mont Blanc (UTMB), with five distance categories: 53, 101, 119, 166 km and 300 km.

b) Elbrus area

In Elbrus reach 260 000-350 000 visitors annually, entering the Baksan Valley to Ceghet, Terskol (2079 m) and Azau (2350 m) resorts, where high up with the cable car (Polyana Azau-Krugozor, 3000 m), gondolas (Polyana Azau-Krugozor-Mir, 3400 m), and chair-lift (Mir-Garabashi, 3800 m). At altitude, for tourist accommodation there are there are some container shelters, but the conditions are poor: Diesel Hut-Barrels (3750 m), Pryut 11 (4100 m), LEAPRus (3912 m) etc.

The leisure activities are: hiking, ice climbing, mountaineering, hang-gliding, paragliding (Ceghet), alpine skiing, ski touring, snowboarding. Since 2014 it initiated the modernization of the ski slopes being allocated 1 million rubles for modernization if Azau-Elbrus ski area, totaling 23 km of slopes (Baragunova, Kaloeva, 2014). In the period 2014-2015 the Elbrus recorded 140 000 skiers (fig. 4). Among the sporting events that are held in summer in Elbrus should be noted Adidas Elbrus World Race, with five distance categories 11, 34, 46, 59 and 112 kilometers.

Due to high altitudes, leisure activities in two mountainous areas takes place under threat of many risks, as follows:

a) Avalanches:

- on the southern flank of the mountain Elbrus, avalanches are rare;
- in Mont Blanc, the situation is more dramatic, in 2012 year 28 climbers have lost their lives, 11 on the route to Mont Maudit;

b) Acute mountain sickness:

- AMS is felt in both massive, and is most evident in the Elbrus from 5000 m up, when air pressure registers 420 mmHg, and the amount of oxygen in the air is 55% than above sea level;

- in Mont Blanc, at 4000 m, air pressure is 475 mmHg, the amount of oxygen in the air is 63% than at sea level, and the partial pressure of oxygen in blood is 85 mmHg than 160 mmHg as it is at sea level;

In this context, altitude sickness is worse in Elbrus, which is manifested by headaches, nausea, stomach pain, sleeplessness, confusion, exhaustion, fainting. If there is not a proper acclimatization, mountain sickness generates pulmonary and cerebral edema.

Fig. 4. Azau-Elbrus ski area
(*http://kavkazskitur.com/skiing-mount-elbrus*)

c) Rockfall and escalating accidents:

- in Elbrus, rock fall are rare, but can occur in Polyana Azau-Garabshi sector, where there are steep slopes and volcanic ridges affected by weathering;

- in Mont Blanc, the phenomenon is present in Grand Couloir, between Tete Rouse and Gouter refugees, where from 1990 to 2011 there have been 74 deaths and 180 injured (Petzl Foundation, 2011);

d) Sliding on ice and fall into crevices:

- is a risk that must be taken into account in both massive;

- in Elbrus, large crevices are rare, but in Mont Blanc they are present in large numbers on the route Gouter-Mont Blanc.

e) Over-crowded on routes and peaks:

- in both massifs, the number of tourists is very high, both on the way to the peaks and the peaks, being held between 350 and 400 tourists / day during the summer;

- in the summit day, were recorded on Elbrus 100 climbers in one hour (09-10 a.m.), and in Mont Blanc only 30 climbers in one hour (09-10 a.m.) due to adverse weather conditions (fog and strong wind).

f) Depletion due to poor physical condition, the weather conditions and inadequate acclimatization:

- in the two massifs record 80-100 rescue interventions each year for rescuing tourists;

- in Mont Blanc killed 20 people in 2014 and 11 people in 2017 (Petzl Foundation, 2017);

- Elbrus massif is the highest, most accessible, but dangerous because of the altitude;

- Mont Blanc massif is smaller, inaccessible, and dangerous because of the weather (storms, fog, strong wind.

h) Sunstroke, ophthalmia:

- in sunny days due to snow, reflection is very high and can have serious consequences on the eyes, unless protective measures are taken (sunglasses, goggles glaciers);

- also, the wind can cause certain eye diseases unless wearing goggles.

B) The management of expeditions

To achieve two research expeditions to Elbrus and Mont Blanc were several stages as follows:

a) Prior physical training:

-by fitness exercises, hiking, cycling, running through the forest, mountain climbing;

b) Establishing routes:

-was chose standard routes where traffic and tourism infrastructure are better represented and relevant to specific research;

c) The segmentation of the route>

-to covering distances and differences in level, for the determination of effort and good acclimatization the routes was divided into several phases (Mont Blanc: 4 stages; Elbrus: 4 stages);

d)selecting suitable equipment:

1) To travel to the shelters: flexible boots, softshell pants, shirts, fleece, sofshell jacket, trekking poles, helmet, backpack 80 l;

2) To summit day:

-due to lower temperatures warmer equipment was chosen consists of: plastic boots, baselayer (merino), midlayer (primaloft jacket, feece) and upper layer (thermic jacket, hardshell jacket), gloves, mask, hat, accessories (backpack 30 l, crampons, helmet, ice ax, goggles, harness, rope, carabiners, first aid kit);

Conducting expeditions had also several steps:

a) Approaching to mountainous areas:

-plane and bus to Baksan Valley from Elbrus;

-car to Chamonix, Mont Blanc;

b) Moving toward the base camps:

- In Elbrus: moving to the altitude refugees with gondola and chairlift, route Polyana Azau-Garabashi (3800 m);

1) In Mont Blanc: moving to shelters was made with Tramway du Mont Blanc (Le Fayet-Nid d`Aigle), and by trekking-scrambling, route Nid d`Aigle-Tete Rousse-Gouter (3835 m);

c) Acclimatization:

1) in Mont Blanc, due to the lower altitude, acclimatization was done by trekking to the shelters, in two stages:

-day 1: from Nid d`Aigle (2334 m) to Tete Rousse (3167 m) and overnight at the shelter;

-day 2: displacement from Tete Rousse refuge to Gouter refugee (3835 m) and overnight;

2) In Elbrus acclimatization was done in four stages:

-day 1: climbing Ceghet peak (3700 m), starting from Terskol resort (2079 m);

-day 2: climbing up to the base camps Garabashi (4200 m), and sleep lower in Terskol resort;

-day 3: Garabashi ascent base camp (4200 m) and then up to 5000 m, descent and overnights at the shelter;

-day 4: up to 5000 m ascent, descent and overnight at the shelter;

d) Summit day:

1) starting climbing to Mont Blanc peak from Gouter refugee (3835 m) at 02 a.m.;

-to achieve the summit two steps were completed: Gouter-Vallot refugee (4635 m) and Vallot-Les Bosses ridge;

2) Starting climbing to Elbrus peak from Garabashi refugee (4200 m) at 12.30 a.m.;

e) Recovery day in base camp:

-after the withdrawal of the two peaks followed a day of recovery to the base camps;

f) Lowering the massive base:

-the descent of Mont Blanc was made by trekking from Gouter to Nid d`Aigle, where was taken Tramway du Mont Blanc to Le Fayet station;

-the descent from Elbrus was made by chairlift and gondola to the Polyana Azau resort (2350 m).

C) Comparative analysis of standard routes to the top of the two massifs

Standard routes of the two massive, leading to the highest peaks, are designed for climbing and are more secure and frequented by many climbers. They are listed as less difficult, and they have the following technical characteristics:

A) Elbrus:

a) Route:

1)Poliana Azau (2350 m)-Mir-Garabashi (3800 m):

-cable car, gondola, chairlift, cars;

-hiking: on the main road;

2) Garabashi-High Camp 4200 m:

-ice hiking;

-ice climbing;

-snowmobile, ratrack;

3) High Camp-Elbrus summit (5642 m):

-ice climbing;

-ice trekking;

b) The level difference: 1450 m (between Polyana Azau and Garabashi), 1842 m (between Garabashi and Elbrus summit);

c)duration: 10-12 hours;

d) Terrain features: ice and snow;

e) Difficulty: less difficult (route length, slope, altitude sickness);

f) Stages:

-Poliana Azau-Garabashi;

-Garabashi-High Camp 4200 m;

-High Camp-Elbrus summit and return (fig. 5);

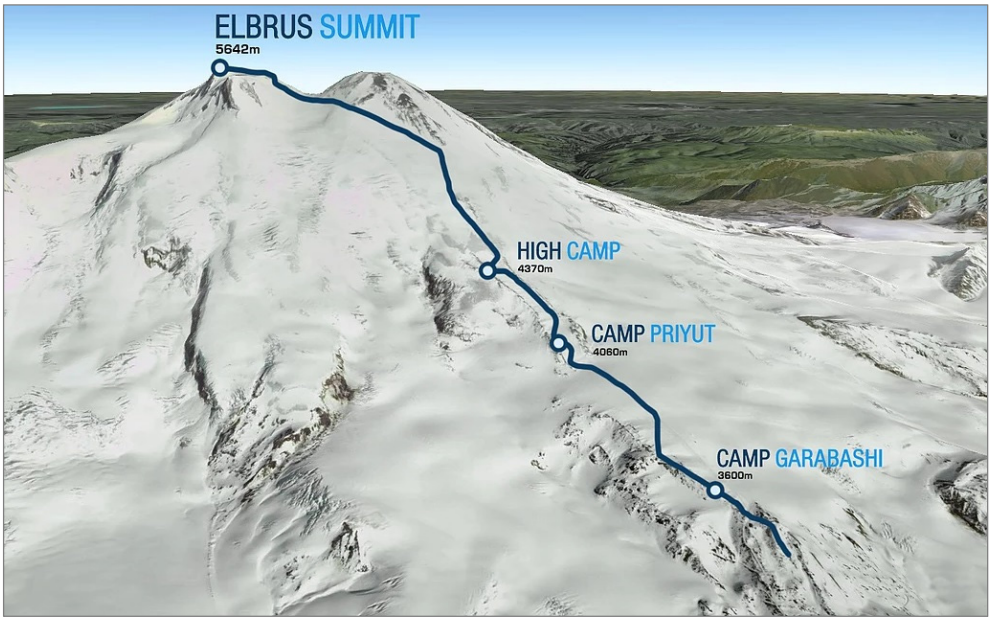

Fig. 5. Normal route to Elbrus peak (Garabashi-Elbrus sector) (*https://www.torkjelhurtig.no/elbrus*)

B) Mont Blanc:

a) Route:
1) Le Fayet-Nid d`Aigle:
-tramway du Mont Blanc (12,4 km);
-hiking;
2) Nid d`Aigle-Tete Rouse:
-hiking, trekking;
3) Tete Rousse refugee-Gouter refugee:
-scrambling on Gouter Face;
4) Gouter refugee-Mont Blanc summit:
-ice climbing;

b) Level difference: 2643 m from Nid d`Aigle (2167 m) to Mont Blanc summit;

c) Time: 12-14 hours;

d) Technical features: rough terrain, rocky walls, ridges, rocky couloirs, ice ground, crevasses;

e) Difficulty: less difficult (long route, varied terrain, heavier features, weather variables);

f) Stages:

-Le Fayet-Nid d`Aigle-Tete Rousse;

-Tete Rousse-Gouter refugee;

-Gouter refugee-Vallot refugee-Mont Blanc summit and retourn (fig.6);

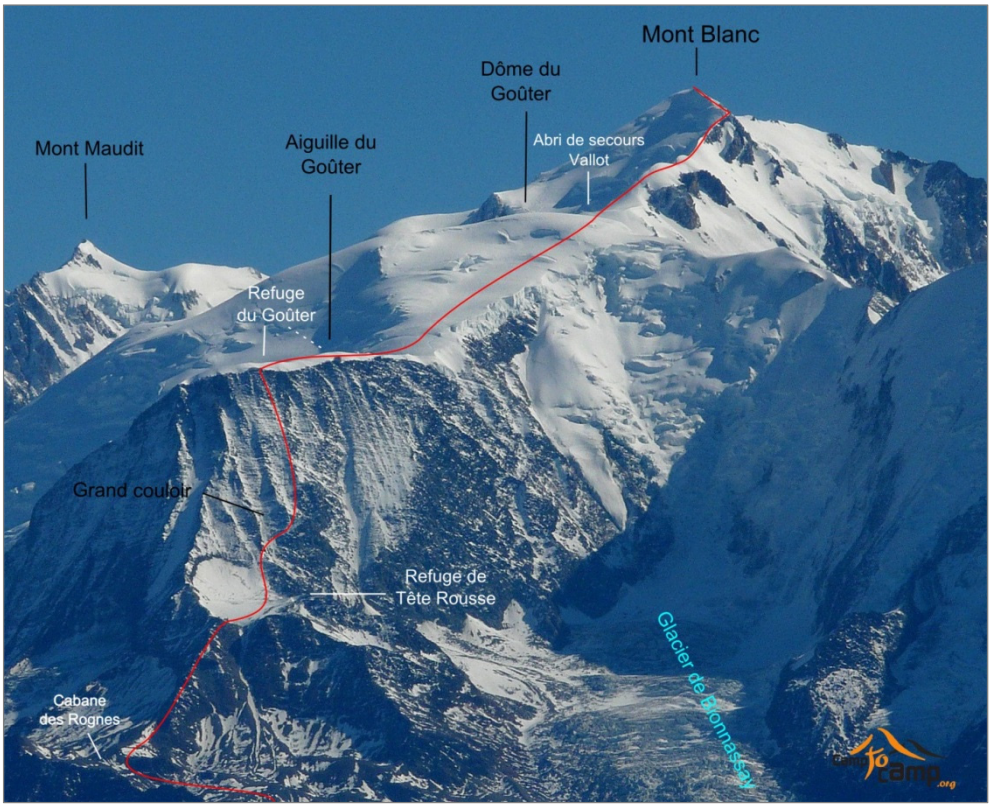

Fig. 6. Normal route to Mont Blanc summit (Tete Rousse-Mont Blanc sector) (*https://commons.wikimedia.org/wiki/File:Mont_Blanc_-Gouter_route.jpg*)

Conclusions

Elbrus and Mont Blanc massifs are part of high mountains, which induce certain characteristics in leisure and tourism activities within them.

Factors that determine the types of activities, their practice and their chances of success are:

-altitude: expressed by the need for acclimatization and altitude sickness manifested in lack of good acclimatization;

- terrain: rock, snow and ice;
- landformsl: inclined slopes, height differences, steep increases;
- wheater: stable or unstable weather.
- phisycal and mental fitness: obtained through prior aerobic training.

Both massifs are equipped for altitude mountaineering, with differences imposed by the overall economic development, and traditions, and predominant leisure activities is climbing the two main peaks, Mont Blanc (4810 m), and Elbrus (5642 m). In this context, an important role have the managing ascents process, which involves physical training, route planning, optimal selection of equipment, establishment of food supplies and segmentation of route in stages.

REFERENCES

Igorevna, A.S., Grigorievna, I.A. (2016). The Tourism potential of the north Caucasus: the formation, characteristics and development prospects, in Tourism in function of development of The Republic of Serbia, Spa Tourism in Serbia and Experiences of Other Countries, *1st International Scientific Conference,* Vrnjacka Banja, Serbia, p. 258-276.

Auliciems, A. (1998). *Advances in bioclimatology 5. Human Bioclimatology*. Springer-Verlag Berlin Heidelberg.

Baechle, T.R., Earle, R.W., (2000). *Essentials of Strength Training and Conditioning: 2nd Edition.* Champaign, IL: Human Kinetics.

Baragunova, L.V., Kaloeva, Z. Yu. (2014). Prospects of tourism development in the Kabardino-Balkar Republic, *JSRP.* №8 (12), p. 544-547.

Barry, G.R. (1992). *Mountain Weather&Climate*, 2nd edition, Routlege.

Beedie, P., Hudson, S. (2003). The emergence of mountain based adventure tourism. *Annals of Tourism Research*, 30 (3):625–643.

Blazejczyk, K. (2001). Assessment of recreational potential of bioclimate based on the human heat balance. In: Matzarakis A, de Freitas CR (eds). *Proceedings of the first international workshop on climate, tourism and recreation.* 5–10 October 2001, Greece. International Society of Biometeorology, Commission on Climate Tourism and Recreation, pp. 133–152.

Costill, D.L., Fink, W.J., Pollock, M.L. (1979). Muscle fibre composition and enzyme activities of elite distance runners. *Med Sci Sports*, 8:96-102.

Costill, D.L., Thomas, R., Robergs, R.A., Pascoe, D., Lambert, C., Barr, S., Fink, W.J. (1991). Adaptations to swimming training: influence of training volume. *Med Sci Sports Exerc.* 23 (3): 371-7.

Daniels, J. (1989). Training Distance Runners – a Primer. *Gatorade Sports Sci. Exch.* 1:1-5.

Dudley, G.A., Abraham, W.M., (1982). Terjung RL. Influence of exercise intensity and duration on biochemical adaptations in skeletal muscle. *J Appl Physiol*. 53 (4):844-50.

Dyck, C., Schneider, I., Thompson, M., Virden, R. (2003). Specialization Among Mountaineers and Its Relationship to Environmental Attitudes, *Journal of Park & Recreation Administration,* Vol. 21 Issue 2, p. 44-62.

Ewert, A. (1985). Why People Climb: The Relationship of Participant Motives and Experience Level to Mountaineering. *Journal of Leisure Research; Arlington*, Vol. 17, Iss. 3, 241.

Foster, C., Hector, L.L., Welsh, R., Schrager, M., Green, M.A., Snyder, A.C. (1995). Effects of specific versus cross-training on running performance. *Eur J Appl Physiol Occup Physiol*. 70 (4): 367-72.

Frochot, Isabelle, Elliot, S., Kreziak, D. (2017). Digging deep into the experience – flow and immersion patterns in a mountain holiday. *International Journal of Culture, Tourism and Hospitality Research*, Vol. 11 Issue: 1, pp.81-91.

Godde, P.M., Price, M.F., Zimmermann, F.M., (editors) (2000). *Tourism and Development in Mountain Regions.* Wallingford, United Kingdom: CABI.

Hawley, J.A., (2002). Adaptations of skeletal muscle to prolonged, intense endurance training. *Clin Exp Pharmacol Physiol.* 29 (3): 218-22.

Holloszy, J.O., Coyle, E.F. (1984). Adaptations of skeletal muscle to endurance exercise and their metabolic consequences. *J Appl Physiol.* 56 (4): 831-8.

Kennedy, M. (2017). What belongs in medical kits for climbers and hikers? *Journal of Travel Medicine.* Retrieved from: *https://www.reuters.com/article/us-health-mountaineering-medical-kit/what-belongs-in-medical-kits-for-climbers-and-hikers-idUSKBN163265*.

Lee, W-C., Chen, Sh-M., Hou, Ch-W., Lai, Y-Ch., Laio, Y-Hu., Lin, Ch-Hu., Kuo. Ch-Hu. (2006). The Role of Dehydroepiandrosterone Levels on Physiologic Acclimatization to Chronic Mountaineering Activity, *High Altitude Medicine & Biology*. 7(3): 228-236.

Lutter, C., Sheikh, Y-El., Schöffl, I, Schöffl, V. (2017). Sport climbing: medical considerations for this new Olympic discipline*. British Journal of Sport Medicine*, vol. 51, nr. 1.

Marsigny, B., Jammes, F.L., Cauchy, E. (1999). Medical mountain rescue in the Mont-Blanc massif. *Wilderness & Environmental Medicine*, Volume 10, Issue 3, p. 152-156.

Parcevaux, S., Hubert, L. (2007). Bioclimatologie - Concepts et applications. Ed. Quae.

Patrick Maher, P. (2015). *Mountaineering Tourism*. Routledge.

Peacock, A.J. (1998). ABC of oxygen. Oxygen at high altitude. *British Medical Journal*, 317(7165): 1063–1066.

Philip, D. (2009). Interaction between rock avalanches and glaciers in the Mont Blanc Massif during the late Holocen. *Quaternary Science Review*, 28, 11, p.1070-183.

Pomfret, G. (2006). Mountaineering adventure tourists: a conceptual framework for research. *Tourism Management*, Volume 27, Issue 1, pages 113-123.

Pomfret, G. (2011). Package mountaineer tourists holidaying in the French Alps: An evaluation of key influences encouraging their participation. *Tourism Management*, Volume 32, Issue 3, p. 501-510.

Richalet, J-P., Larmignat, Ph., Poitrine, E., Letournel, M., Canouï, P.F. (2012). Physiological Risk Factors for Severe High-Altitude Illness. A Prospective Cohort Study. *American Journal of Respiratory and Critical Care Medicine*,Vol. 185, No. 2.

Richins, H., Hull, J.S., (editors) (2016). *Mountain Tourism: Experiences, Communities, Environments and Sustainable Futures.* Wallingford United Kingdom: CABI.

Stanhill, G. (1994). *Advances in bioclimatology 3. Human Bioclimatology,* Springer-Verlag Berlin Heidelberg.

Şandor, I. (2014). *Antrenamentul la altitudine*. Cluj-Napoca: Ed. Risoprint.

Shell, A.W. (2004). Physiology of sport rock climbing. *British Journal of Sports Medicine*, 38:355–359.

Taher, S.H.M., Jamal, S.A. (2012). Determinants of mountaineers' decision to climb: An innovative marketing for mountaineering tourism. *International Conference on Innovation Management and Technology Research (ICIMTR), IEEE.*

Tsaur, Sh-H., Yen, Ch-Y., Shu-Ling Hsiao, Sh-L. (2012). Transcendent Experience, Flow and Happiness for Mountain Climbers. *International Journal of Tourism Research.*

Unbehaun, W., U., Pröbstl, W. Haider. (2008). Trends in winter sport tourism: Challenges for the future. *Tourism Review* 63:36–47.

Valliere, D., O'Reilly, N., (2007). Acclimatization in high-altitude sport: predictive modeling of oxygen saturation as an expedition management tool. *The Sport Journal*, vol. 10, no. 2.

Weed, M.E., Bull, C.J.(2004). *Sport Tourism: Participants, Policy and Providers*. Oxford, United Kingdom: Butterworth Heinemann.

Source for figures:

https://www.seeker.com/how-to-prepare-for-mountain-climbing-the-exercise-regimen-that-will-ge-1765466422.html (accessed at 18.10.2017)
https://www.sport-fitness-advisor.com/aerobic-endurance-training.html (accessed at 18.10.2017)
https://www.livescience.com/32750-why-do-athletes-train-at-high-altitudes.html (accessed at 20.10.2017)
(http://www.chamonix.com/pdf/ascension-du-mont-blanc.pdf (accessed at 13.10.2017)
http://climbing-mont-blanc.com/project/1 (accessed at 10.09.2017)
https://www.petzl.com/fondation/projets/accidents-couloir-gouter (accessed at 05.09.2017)
https://www.runultra.co.uk/Events/Elbrus-Mountain-Marathon (accessed at 10.11.2017)
http://utmbmontblanc.com/en/ (accessed at 15.12.2017)