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DIFFERENCES IN PSYCHOLOGICAL CHARACTERISTICS OF ELITE JUNIOR HANDBALL PLAYERS

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ABSTRACT. The aim of the present paper is to investigate personality traits among junior handball players in different player positions and examine whether a standard can be established as to what personality traits the players in the individual positions should have. A Big Five Questionnaire survey was conducted in the early training period of 2016-2017 among elite Hungarian junior handball players (n=164, in terms of posts of playing players 25% were backcourt players, 23.2% wingers and 18.9% playmakers.). Big Five personality traits: Extroversion, Agreeableness, Conscientiousness, Neuroticism and Openness. Neuroticism showed significant differences by gender (t=3.9 p<0.001), where males reached significantly higher scores (Mmale=65.7, Mfemale=53.1). 16, 17 and 18 year-old players reported higher levels in each personality trait than 14-15 year olds (p<0.001). Playing posts did not indicate any significant differences. All personality traits showed significant and strong interrelations. Only Neuroticism resulted in significant interaction of gender and age (p<.05). The results of investigating personality profile characteristics by gender, age and posts have revealed crucial factors of handball players. It is important to underline that a sport psychological approach, dealing with personality profiles, has significant benefits in the development of players, particularly adolescent players.

Keywords: *handball, posts, BFQ, psychological characteristics*

Introduction

"Personality has been defined as the relatively stable organization of an individual's character, temperament, intellect, and physique, which shapes the individual's behavior and his or her actions in a given situation. For each individual, there are core personality components that are quite stable and unchanging." (Eklund & Tenenbaum 2014, p. 532) In a sense, our personality

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is the sum total of our actions which we make during our decisions (Zimbardo, Johnson & McCann, 2018). In adolescence athletes understand the complex tactical and strategic components of sport; they see an opportunity for individual performance and the team's interest; can consider possible consequences; they are also able to think about their thinking (Piaget & Inhelder, 2004).

Looking for new experiences in adolescence goes hand in hand with pushing boundaries (Gyömbér, Kovács & Ruzits, 2016). Previous researchers have confirmed that sport builds personality and has a positive effect on the psychological state of athletes (Kais & Raudsepp, 2005; Mayer, 2001). Today a sport psychologist (and sometimes coaches, too) provides young athletes with psychological preparation for competitions, but also with useful skills that they can later use in other areas of life and wish to create not only better athletes but also better people (Coté et al., 2010). In this respect, researchers highlight four basic skills (which can be learned through the sport): concentration (the ability to maintain focus on relevant stimuli for a period of time), confidence (a general term for a belief in one's capabilities), control (the ability to maintain emotional composure regardless of distractions), and commitment (the ability to continue working toward one's goals).

In their work on athletic and post-athletic career, Wylleman, Alfermann and Lavalee (2004) presented a developmental model which includes normative transitions faced by athletes at athletic, individual, psychosocial, and academic/vocational levels. The top layer represents the stages and transitions athletes face in their athletic development and a discontinuation stage added reflecting the transition out of competitive sport as a process which could have a relatively long duration. The second layer reflects the developmental stages and transitions that occur at psychological level. The third layer is representative of the changes which can occur in the athlete's psychosocial development relative to their athletic involvement.

The final layer reflects the stages and transitions at academic and vocational level, as well as the transition into vocational training and/or a professional occupation. Wylleman, Alfermann and Lavalee's model (2004) underlines not only the interactive nature of transitions in athletes' different domains of life, but also the fact that non-athletic transitions may affect the development of athletes' sports career. In our research we focused on 14-18 year old handball players, who are (according to the mentioned model) at the "Development" athletic level, "Adolescence" psychological level, "Peers Coach Parents" psychosocial level and "Primary and secondary education" academic vocational level. In what follows we wish to focus on the literature on youth athletes' and handball players' personality characteristics.

Youth Athletes and Non-Athletes

Youth sport has been viewed within a population health context. Declining participation in active free play and active transportation accounts for a large proportion of the low levels of youth physical activity (Eklund & Tenenbaum 2014). Sport has therefore become one of the primary vehicles through which children and adolescents engage in physical activity. Firstly, following the literature, we compare the personalities of athletes and non-athletes in youth sport.

Ivanović, Milosavljević & Ivanović (2015) considered the distinctive differences in certain dimensions of perfectionism between Serbian athletic and non-athletic adolescents. The survey contained the Positive and Negative Perfectionism Scale, Questionnaire regarding sport achievement, Competitive State Anxiety Inventory (CSAI-2) and the Sport Competition Anxiety Test. It was shown that athletes manifested the construct of adaptive perfectionism in greater numbers compared to non-athletes; maladaptive perfectionist athletes had more pronounced sport anxiety than clusters of adaptive perfectionists and non-perfectionists; the values of variables of maladaptive perfectionism had a positive correlation with sport anxiety, and also with adaptive perfectionism and self-confidence, whereas the variable of sport anxiety showed a substantially negative interaction with sport achievement. Velickovska et al. (2014) obtained similar results in their study among basketball players and non-athletes in middle adolescence. They focused on the psychological trait of anxiety as a feature and state of the personality (anxiety treated as a disposition, cognitive-anxiety, somatic anxiety, self-confidence).

Inter-group differences were determined in variables used in assessing anxiety among basketball players and non-athletes in the period of middle adolescence. Basketball players during middle adolescence show less cognitive, somatic and general anxiety, but non-athletes showed slightly higher confidence as compared to basketball players. Shariati & Bakhtiari (2011) also showed that athletes had more positive personality characteristics than non-athletes. They examined university students who were non-athletes or athletes based on the NEO Personality Inventory. There were significant differences between athletes and non-athlete students in terms of personality characteristics (neuroticism, extraversion, openness to experience, agreeableness and conscientiousness).

A study by Seznec, Lépine & Pélissolo (2003) described the personalities of the members of the French junior road cycling team, using the Temperament and Character Inventory (TCI), the three dimensions of temperament: Novelty Seeking, Harm Avoidance and Reward Dependence; and two main dimension of character: Self-Directedness and Cooperativeness. Racing cyclists (from the French junior national team) and young French males were compared. A significant

difference between the subjects and controls was revealed only for Reward Dependence, suggesting that the personality profile of young competitive cyclists is not abnormal (except for a high level of reward dependence).

Youth Athletes' Psychological Characteristics

In their study Alexandru, Ruxandra & Carmenb (2014) set out to identify psycho-motor factors, and their strength influencing the position of tennis players (13-18 year olds). They used the Concentrated Attention Test, Sport Motivation Scale, and the NEO Personality Inventory. In their results the players that featured highly developed psycho-motor skills also occupied a high position in the national rankings. Stewart & Meyers (2004) examined 66 elite, young male soccer players from two age groups. They completed the Sports Attitude Inventory and Levenson's Locus of Control Scale. The older players more motivated to avoid failure and were less likely to place locus of control on external or chance oriented sources than the younger players; but no differences were found by playing positions. According to Milavic et al. (2013) the least successful junior female volleyball players who constantly worry about performing poorly make mistakes, and are concerned about what other people would think about them if they were to make mistakes.

In their research, Holland et al. (2010) focused on the psychological characteristics of Olympic and World champion performers. 43 male youth rugby players participated in a series of focus groups. Their analysis revealed categories of psychological qualities: including enjoyment, responsibility, adaptability, squad spirit, self-aware learner, determination, confidence, optimal performance state, game sense, attentional focus, and mental toughness. The study investigated the current mental techniques employed by youth elite athletes: personal performance strategies, reflection on action, taking advantage of a supportive climate, and team-based strategies. Their results suggest that a large number of personal and team-based strategies are naturally employed by athletes without prior formal intervention.

446 French high school students were examined by Boiché and Sarrazin (2007). In wave 1 they assessed self-determined motivation toward sport, school and friendship, perceived conflicts versus instrumental relationships between sport and the other contexts, and sport participation during leisure time. One year later, participants completed the same self-report measure of sport practice. They revealed that self-determined motivation toward sport, education and friendship was significantly related to the levels of conflict and instrumentality between those contexts. Furthermore, competing relationship

between sport and education was negatively linked to sport participation at the second time. In their opinion the other contexts (like education) can undermine sport investment among adolescents.

Mouratidis and Michou (2011) investigated the sequence of relations between dimensions of perfectionism, autonomous and controlled motivation, and coping or exerted effort during training. The participants were 333 Greek adolescent athletes from various sports; they were assessed with respect to their dimensions of perfectionism, perceived competence, self-determined motivation, and sport-related coping skills. In parallel to this research another study had 63 adolescent athletes participating in a three-week summer basketball camp; they were first assessed (with respect to their perfectionism, perceived competence, and self-determined motivation) and then, every day after daily training sessions (with respect to their situational self-determined motivation and the effort they invest during training). In both studies, the personal standards were positively related to both autonomous and controlled motivation and concern over mistakes were uniquely related to controlled motivation. Autonomous motivation (as compared to controlled motivation) was linked to better coping and more effort. Athletes with high personal standards are in general more likely to report effective coping or put more effort if they become (or remain) autonomously motivated. Athletes with concerns over mistakes are more likely to exhibit controlled motivation, but on the other hand, are more likely to report poorer coping skills or put less effort compared to autonomous motivated athletes.

Personality in handball

More and more research has investigated psychological preparation, motivation, stress coping, adaptation skills and personality of handball players, since this is one of the favorite sports in Europe (Pollany, 2007; Bebestos, 2007; Casimiro, 2010, 2006; Gonzalez & Coronado, 2011; Marczinka, 2011). The aim of Bjørndal & Ronglan's study (2017) was to investigate athletes' contemporary experience of their pursuits toward adult elite level within a Scandinavian team sport setting. Youth handball players (with national experience) were involved in multiple teams led by different coaches. Their findings, based on an in-depth interview, revealed five main themes central to the players' pursuits: time pressure and prioritizing, complimentary influences, conflicting goals and demands, balancing load and recovery and coordination challenges. They showed what coaches must consider to facilitate individual development within and across different team settings. E.g. the importance of

balancing different developmental initiatives in ways that are complementary and provide appropriate influence, because all athletes described their lives as hectic, occasionally frustrating, and stressful.

A growing body of literature is being dedicated to analysing playing positions in handball. In their study Pandey and Patel (2015) focused on psychological characteristics, and showed that every handball player in different positions possesses average mental health. It was underlined in this study that goalkeepers reached the highest value on mental well-being scales, while pivot players achieved the lowest one. Rogulj and his colleagues (2005) examined psychological status by using the Eysenck Personality Questionnaire instrument. Differences were detected in the variable of assessment of extraversion - most pronounced in wings- and psychotic behaviour was a specialty in pivot positions. The study by Olmedilla and his colleagues (2013) investigated the psychological profile of 80 professional handball players, using the Psychological Characteristics Associated to Sports Performance Questionnaire (CPRD). The goalkeepers obtained the highest scores in all the psychological characteristics assessed, and the difference between the goalkeepers and wingers were significant in terms of stress control, and performance assessment. Differences between the playing positions were documented for coaches to take into account when they chose players for a post or plan their training.

Aim of the study

Through the help of sport psychology, young handball players can reach increased levels of performance and become more advanced adult players. The question arises; can we describe what kind of personality traits should players have in terms of handball playing positions? Hence, the aim of the present paper is to investigate personality traits among junior handball players in different player positions and examine whether a standard can be established as to what personality traits the players in the individual positions should have.

Material and Methods

Procedure

A questionnaire survey was conducted in the early training period of 2016 among junior handball players (n=164) by stratified sampling. The questionnaires were distributed in elite Hungarian junior handball teams. Participants were informed about the study objectives. Completing the questionnaires took

approximately 30 minutes. Voluntary and anonymous participation was ensured in the study, noting that the data that was being collected would be used for research purposes only.

Measurement instruments

Demographic features were measured in the first section of the survey. Besides gender (1=male, 2=female), age was recorded in years at the time of participation. Age groups were calculated for subsequent analyses - based on the distribution of years - in order to provide a satisfactory number of cases (1=under 15, 2=16 year-olds, 3=over 17). The posts of junior handball players were recorded. Playing posts were coded 1=goalkeeper (GK), 2=backcourt player (BP), 3=playmaker (PM), 4=winger (WI), 5=pivot (PI). Of the sampled players, 68.3 percent were female and the median age of the sample was 16 years of age (Mean = 15.96 years; S.D. = 1.2 years). In terms of posts of playing players 25% were backcourt players, 23.2% wingers and 18.9% playmakers.

Table 1. Sample descriptive

	Frequency
Gender	
Female	68.3
Male	31.7
Age	
14	7.9
15	27.4
16	36.0
17	20.1
18	8.5
Playing post	
Goalkeeper	17.1
Backcourt player	25.0
Playmaker	18.9
Winger	23.1
Pivot	15.9

For gathering data on psychological profile, the Big Five instrument was used. The Big Five Questionnaire (C. Barbaranelli, G.V. Caprara, A. Rabasca, 1993.) has 132 items and Big Five Questionnaire for Children (C. Barbaranelli, G.V. Caprara, A. Rabasca, 1993.) has 65 items that investigate different aspects

of personality and behavior patterns. Big Five personality traits: Extroversion, Agreeableness, Conscientiousness, Neuroticism and Openness (Cronbach's alpha= .952).

Analysis

Statistical analyses were carried out using IBM SPSS 22.0 software. For descriptive statistics and further analyses, frequencies, crosstabs, independent samples t-tests, Chi-square, correlation, and ANOVA tests were employed. The level of significance was set at 0.05.

Results

Big Five personality traits were examined and tested by demographics and player posts. Neuroticism showed significant differences by gender (t=3.9 p<.001), where males reached significantly higher scores (Mmale=65.7, Mfemale=53.1). Male junior handball players achieved higher scores, although non-significantly, in the other scales as well. Further significant differences could be captured by age (p<0.001), 16, 17 and 18 year-old players reported higher levels in each personality trait than 14-15 year olds. When observing the mean values in playing posts, players in goalkeeper position seem to reach the highest scores, and players in pivot the lowest ones. Playing posts did not indicate any significant differences, that is, Extroversion, Agreeableness, Conscientiousness, Neuroticism and Openness mean values did not vary significantly by juniors playing in different playing posts.

Table 2. Scale descriptive and group comparison

	Extraversion	Agreeableness	Conscientiousness	Neuroticism	Openness
Total sample	74.81 (18.3)	69.78 (16.7)	71.69 (19.2)	57.36 (19.2)	66.5 (17.6)
Gender[1]					
Female	74.13 (19.9)	68.43 (17.7)	71.34 (20.4)	53.07 (17.8)*	65.64 (18.9)
Male	76.12 (14.9)	72.39 (14.3)	72.35 (16.7)	65.69 (19.2)*	68.14 (14.7)
Age[2]					
14	52.90 (5.0)*	51.80 (4.8)*	48.20 (8.4)*	32.10 (5.5)*	44.70 (6.7)*
15	51.60 (5.9)*	48.55 (6.1)*	47.58 (6.3)*	35.15 (6.9)*	44.90 (6.0)*
16	86.55 (8.6)*	79.54 (9.1)*	83.38 (9.2)*	66.93 (11.9)*	77.09(10.2)
17	85.66(10.4*	81.97 (8.2)*	83.53 (11.4)*	71.59 (11.0)*	77.88(10.0)
18	86.67 11.5)*	77.50 (9.8)*	85.50 (8.5)*	69.83 (12.2)*	75.08 (9.6)*
Playing post[2]					
GK	78.38 (18.5)	71.58 (15.7)	74.35 (20.3)	58.42 (19.7)	67.88 (17.9)

	Extraversion	Agreeableness	Conscientiousness	Neuroticism	Openness
BP	76.86 (19.2)	70.00 (14.8)	73.17 (17.6)	58.33 (18.7)	68.19 (18.2)
PM	71.57 (20.2)	67.86 (18.9)	68.43 (19.7)	53.86 (19.6)	64.14 (17.6)
WI	75.83 (16.1)	71.20 (16.6)	73.00 (20.4)	60.46 (19.7)	66.14 (17.0)
PI	70.32 (17.4)	67.76 (18.3)	68.60 (18.6)	54.44 (18.8)	65.71 (18.3)

Note: Mean (S.D.) values shown in table; [1]independent samples t-test,
[2]one way ANOVA. * p<0.001 **p<0.05 [a]p≤0.05

Big Five personality traits were examined by correlation analyses. All personality traits showed significant and strong interrelations. When calculating the effect of playing posts by partial correlation analysis, the r values did not elevate or decline remarkably. The effect of Gender and Age slightly decreased the correlation values; however, they stayed stable and remained strong and significant.

Table 3. Correlation matrix of Big Five traits

	Agreeableness	Conscientiousness	Neuroticism	Openness
Extraversion	.824[a]	.893	.723	.868
	.825b	.892	.722	.869
	.656c	.779	.478	.746
Agreeableness		.860	.739	.798
		.859	.737	.798
		.726	.494	.618
Conscientious-ness			.748	.873
			.746	.872
			.533	.751
Neuroticism				.713
				.713
				.468

Note: p<0.001; [a]Bivariate correlation, Partial correlation - Control variable; b Player posts; c Sociodemographics

In the next step, a line of two-way analysis of variance was employed in order to thoroughly examine the influence of the different categorical independent variables (i.e. age, gender, playing posts) on the Big Five traits as continuous dependent variables. The main effect of each independent variable and their interactions were assessed. When testing the interactions, only

Neuroticism resulted in significant interaction of gender and age (p<.05). This means that age influences Neuroticism differently between males and females.

Table 4 shows that the independent variables were more likely to have an influence on the personality traits separately rather than in interactions.

Table 4. Interaction of demographics and player posts

Interaction	Extraversion	Agreeableness	Conscien-tiousness	Neuroticism	Openness
Gender*Age	1.84	0.21	1.36	2.60*	1.13
Gender* Playing Posts	0.82	0.43	0.95	0.34	0.56
Age*Playing Posts	0.94	0.63	0.60	1.14	0.56

Note: F values shown in the table; bold=significant effect of the independent variable on the traits; *p<0.05

Table 5 presents the mean values and standard deviations of personality traits in each selected group by gender and age. As we have stated previously, males tended to reach higher scores in each personality trait. When including the player posts, this male overrepresentation solely remains in playing posts of goalkeeper, winger and pivot. All other cases showed female overrepresentation in some scales. Concerning age, as indicated in Table 2 16, 17 and 18 year-old players reported higher levels in each personality trait than 14 -15 year-old ones. Age groups were recoded - based on the distribution of years of age - in order to provide a satisfactory number of cases for the analysis. After recoding the variable, the previously experienced differences remained, that is, under-15 juniors achieved lower scores on the Big Five traits than over-16s when considering player posts. Over 16 years of age, no linear line can be experienced, since mean values showed variety. Therefore, the statement “the older the player is, the higher scores they achieve on the personality traits” should remain unverified.

Table 5. Mean values of Big Five traits by groupings

	Extraversion	Agreeableness	Conscientiousness	Neuroticism	Openness
Playing post by gender					
Male GK	78.88 (16.4)	73.87 (23.2)	74.75(23.2)	66.38 (22.2)	68.00 (18.1)
Female GK	78.17 (19.9)	70.56 (16.5)	74.17 (19.6)	54.89 (18.0)	67.83 (18.3)
Male BP	76.29 (15.0)	71.79 (12.0)	71.57 (12.1)	66.71 (16.7)	69.00 (12.1)
Female BP	77.23 (21.8)	68.86 (16.5)	74.18 (20.5)	53.00 (18.3)	67.68 (21.5)
Male PM	66.89 (16.4)	66.33 (19.0)	62.00 (16.2)	57.56 (23.1)	62.11 (18.2)
Female PM	73.79 (21.09)	68.58 (19.4)	71.47 (20.9)	52.11 (18.2)	65.11 (17.89)
Male WI	80.00 (11.8)	77.82 (11.3)	77.91 (12.5)	71.82 (18.8)	73.36 (11.3)
Female WI	73.92 (17.7)	68.17 (18.1)	70.75 (23.0)	55.25 (18.1)	62.83 (18.3)
Male PI	77.89 (14.8)	71.44 (16.0)	75.00 (19.7)	64.11 (17.6)	66.56 (15.9)
Female PI	67.27 (17.7)	66.67 (20.0)	66.00 (17.7)	49.93 (18.0)	65.20 (20.0)
Playing post by age					
15 GK	51.14 (7.7)	50.43 (6.7)	45.71 (9.3)	34.14 (6.3)	43.86 (5.2)
16 GK	88.70 (9.4)	79.00 (6.3)	83.80 (10.1)	63.40 (17.0)	73.80 (12.0)
17 GK	88.11 (6.3)	79.78 (12.5)	86.11 (11.0)	71.78 (10.4)	80.00 (10.2)
15 BP	49.22 (7.8)	50.44 (5.8)	47.89 (7.7.)	31.33 (6.0)	41.56 (7.6)
16 BP	86.11 (10.1)	76.68 (11.9)	80.32 (9.0)	64.95 (10.7)	78.11 (10.0)
17 BP	86.00 (14.4)	76.13 (5.9)	84.63 (12.6)	73.00 (10.5)	74.63 (10.9)
15 PM	52.31 (4.5)	49.77 (7.7)	49.54 (6.8)	35.85 (8.0)	47.69 (5.6)
16 PM	92.71 (6.6)	83.71 (5.0)	88.86 (7.4)	65.14 (12.5)	76.71 (9.5)
17 PM	84.38 (13.5)	83.38 (11.0)	81.25 (10.1)	73.25 (9.1)	79.88 (11.0)
15 WI	54.64 (3.1)	48.55 (4.9)	46.55 (5.7)	35.55 (6.1)	43.82 (4.6)
16 WI	82.62 (5.6)	80.54 (7.6)	84.69 (9.2)	71.77 (11.1)	76.77 (5.9)
17 WI	89.00 (9.6)	82.82 (5.8)	85.64 (12.4)	72.00 (11.6)	75.91 (10.9)
15 PI	51.44 (5.6)	46.78 (4.1)	47.56 (5.7)	34.89 (6.9)	46.11 (6.1)
16 PI	85.86 (7.1)	82.00 (8.89	83.14 (9.1)	70.14 (5.5)	80.00 (16.1)
17 PI	80.75 (8.1)	81.00 (6.9)	81.88 (7.0)	65.13 (14.6)	75.25 (5.3)

Discussion

The objective of this paper was to examine the personality characteristics of handball players by age, gender and playing positions. The present research focused on specific personality characteristics based on the Big Five Questionnaire, and aimed to explore differences by demographic, psychological and sport characteristics.

Gender results

Our findings showed that, similarly to previous research findings (Frideman & Berger, 1991; Rózsa, 2004; Boglar et al., 2008; Hoar et al., 2010, Gyömbér et al., 2013). Different personality characteristics appeared in male and female, as well as younger and older athletes Males reached significantly higher scores on the Neuroticism scale, and achieved higher scores on the other scales as well. This difference can be explained by puberty, too, which undoubtedly shows gender differences, i.e. it occurs earlier in females. Furthermore, this may mean that coaching has different effects on players in terms of their gender. Coaches might encourage/stimulate/facilitate male players harder than females; or females become more stressful by coaching practice, e.g. disapproval. Males may cope with high tension situations better than female players.

Age results

16, 17 and 18 year-old players reported higher levels in each personality trait than 14-15 year-olds. Older players are more energetic, conscientious, friendly, open, and emotionally stable. Older players tend to do their assigned exercises and tasks; they endure criticism better; the opinion of their coaches are important to them; they like challenges; they are friendly with their teammates (the team is important to them) and very strong-willed. These differences may arise from the experience of older players.

Playing positions results

In terms of players' positions, several differences were found. Based on the results, it is worth taking personality traits and psychological characteristics into consideration when studying position selection and sport performance. Goalkeepers achieved the highest scores on the scales of Extroversion, Agreeableness and Conscientiousness. They had high values on Neuroticism and Openness scales. For the goalkeepers the team and their teammates were very important, they seem to be more sociable and open to friendships with teammates. Goalkeepers are more likely to recognize the support of the team, as others can increase their performance (for example, at the long range shot the defender player can cut down the attacking player's

shooting angel). The study showed that goalkeepers are very conscientious and perform their jobs. They are very stable emotionally, this is the main point in their personality. During the matches, in terms of the rate of bad and good solutions, they have more unsuccessful actions than successful ones. The Goalkeepers tend to show openness to experience.

Openness means searching for new methods, materials and following the coach's objective advice (for example: they believe the coach sees the game from another point of view). The backcourt players reached high scores on every Big Five Questionnaire's scale, with the highest scores achieved on the Openness scale. Accordingly, they are open to novelty, the unknown status represents a challenge for them. Finally, the playmakers, wingers and pivots achieved only average or - lower scores on the personality dimensions, the lowest ones among all handball playing positions. But when we focus on the assessment of the Big Fives Questionnaire dimensions, we can see that the handball players – in all playing positions – still reached high or very high results on every scale.

We know that in adolescence teenagers begin their quests for personality and self-dependence, and they really want to belong somewhere (Gyömbér, Kovács & Ruzits, 2016); in our study we experienced the same. As already mentioned, they are at the "Development" athletic level, "Adolescence" psychological level, "Peers Coach Parents" psychosocial level and "Primary and secondary education" academic vocational level (Wylleman, Alfermann & Lavalee, 2004). Hence it is important that coaches train their players in several positions during training; so the players have to try many types of exercises, and if coaches want to properly motivate their players, they have to know the personalities of players, helping them can speak a "common language".

Conclusions

In summary, the results of investigating personality profile characteristics by gender, age and posts have revealed crucial factors of handball players. It is important to underline that a sport psychological approach, dealing with personality profiles, has significant benefits in the development of players, particularly adolescent players. These results strengthen the assumption that, if coaches are familiar with the personalities of their players, they can foster and control them. Furthermore, coaches can call attention to an important and optimal composition of psychological features to achieve better performance.

Finally, coaches should keep these psychological characteristics in mind during the selection process of players, and put them into the appropriate playing positions based on their psychological profile.

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COMPARISON OF PHYSIOLOGICAL RESPONSES BETWEEN INTERVAL METHOD, 8V8 AND 4V4 GAMES AND TECHNICAL-TACTICAL EXERCISE IN SOCCER TRAINING

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ABSTRACT. ***Purpose:*** Football is a sport that requires strong player demands. During the workout of improving the endurance are used exercises with or without the ball as well as racing games. In the present study we analyzed the burden of 4 different types of exercise(intermittent without the ball, 8v8 game, 4v4 game, and technical exercises) to determine which kind is best suited for improving the specific endurance. ***Material***: The sample was 5 professional players (mean ± SD) of age (26± 2.9 years), height (1.79 ± 0,03m) and body weight (75± 3 kg). Prior to the experiment, a Test to determine the anaerobic threshold was performed. Measurements of lactic acid were made by using the Dr Lange photometer, while heart rate measurements by using POLARFT60 portable heart ratemeters. ***Results:*** The assumption of normal distribution was verified using the Kolmogorov-Smirnov test and it was found that in all variables the data follows the normal distribution. For the statistical treatment of the data a Analysis of Variance for repeated measure was used and for the detection of statistically significant differences between the measurement conditions was used the LSD multiple comparison test. The level of significance was defined as $p<0.05$. The analysis of the results showed that there is a statistically significant difference between the different types of exercise: a) the concentration of lactic acid ($F3,12) = 11,053$, $p<0,05$), b) in the min of heart rate >4mmol lactic acid ($F(3,12)= 21,331$ $p<0,05$). c) in the min of the heart rate at 3-4 mmol lactic acid ($F(3,12)= 3,584$, $p<0,05$) d) in the min of heart rate at 2-3mmol lactic acid ($f(3,12= 4,310$,$p <0,05$) and e) averages of the heart rate relative to ANK ($F (3,12)= 25,404$, $p<0,05$). ***Conclusion***: It seems that the 4 different types of exercise cause different metabolic processes of lactic acid production as well as different heart rate responses.

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The intermittent and 4v4 game schedule is better suited to improving the endurance the 8v8 game is suitable for improving aerobic endurance, while technical-tactical exercises do not produce sufficient stimuli to improve endurance but involve speed stimuli.

Keywords: *soccer, lactic acid, heart rate, interval training, 4v4, 8v8, technical exercises.*

Introduction

Football is a sport that requires from the footballers high standards of stamina. This can be confirmed by the fact that the average intensity of a football game is about the 80-84% of VO2max and 171-174 hr/min, percentages that are placed into the anaerobic threshold of the soccer players (Weineck 1992, Helgerud et al., 2001). We should consider the fact that the demands of stamina in team sports are named as "uncircled stamina burdens" , unlike the "cyclic endurance" which is being encountered in medium or long distances in the track field and this is the reason why is it important in team sports and especially in football to use exercises which at first are at uncircled form and at second, cause effects appropriate for the improvement of the specific uncircled endurance (Harre, 1982; Groesser et al., 1986; Zintl, 1988; Wienecke, 1998; Martin, 1979; Schrey and Feil, 2012).

According to Arcelli and Ferretti (1993), sprints 3-5% up to anaerobic threshold which last for a couple of minutes, cause a high production of lactic acid, are the best burden for aerobic training results, while Pate et al. (1984) report that high intensity trainings which are a bit higher from anaerobic threshold, seem to be more effective for the improvement of it. In soccer, for the boost of special endurance or the high intensity endurance are applied drills with or without the ball, with small or big number of players but also technical-tactical drills (Bangsbo, 2006; Fucci and Esposito, 2006; Sassi, 2008; Weineck, 1992; Capanna, 2000). In this research we analyzed the outcome of different drills with or without the ball which are used in football endurance training in order to find which kind offers the most reliable results for the improvement of special endurance in footballers.

Method

Sample: Our sample were five (5) professional footballers (mean ± SD) aged (26 ± 2,9 years old), height (1,79 ± 0,03 m) and overall weight (75 ± 3 kg) who are playing in Super League.

Experimental process

Before the experiment, footballers had passed the Feldstufentest test to identify their anaerobic threshold as well as the heart rate which were corresponded to it (Weinecke, 2007). Subsequently, per three days the players were taking part in four (4) different schedules of drills. Firstly, an interval training drill 3x8min with intermittent run in 110%-120% and 80% of anaerobic threshold (8min: 30sec fast/ 30 sec slow, 8min: 20 sec fast/40 sec slow, 8min: 2min fast/2min slow). Secondly a real condition drill of football game 3x8min (8v8 + 2GK back to back) in all the soccer training ground (100x68m), divided in three equal zones where in middle zone players were made to compete with only two touches and in the other two zones without restrictions but with man to man (Bangsbo, 2006). Thirdly a drill 5x5 min (in 33x40m)(4v4+2GK) with man to man and a technical-tactical drill which aims to the cooperation of 2 players in order to score (3 sets of 10 repeats) , high intensity lasting for 10seconds and 50 seconds rest. For the calculation of heart rate the footballers were wearing portable heart rate transmitters (PolarFT60), with "Polar wear Link" and the lactic acid calculation was made by the use of LP20 photometer of Dr. Lange.

Table 1. Training methods, quantity and intensity in different types of training

Training method	Quantity	Intensity
Interval training	3x8min	110-120% anaerobic threshold
8v8+2GK back to back	3x8min	Man to man (100x68m)
4v4+2GK	5x5min	Man to man(33x40)
Technical-Tactical training	3sets x 10 repeats X 10sec/50sec	100%

Statistical analysis

The review of normal distribution was made by the Kolmogorov-Smirnov test and it was found that in all variables the data are following the normal distribution. For the statistical treatment of the data a Analysis of

Variance for repeated measure was used and for the detection of statistically significant differences between the measurement condition was used the LSD multiple comparison test. The level of significance was defined as $p<0.05$.

Results

The analysis of the results showed that there is a statistically significant difference between the different types of exercise: a) the concentration of lactic acid (F3,12) = 11,053, p<0,05), b) in the min of heart rate >4mmol lactic acid (F(3,12)= 21,331 p<0,05). c) in the min of the heart rate at 3-4 mmol lactic acid (F(3,12)= 3,584, p<0,05) d) in the min of heart rate at 2-3mmol lactic acid (f(3,12= 4,310,p <0,05) e) averages of the heart rate relative to ANK (F (3,12)= 25,404, p<0,05) but f) in the min of heart rate <2mmol/l we didn't found some differences between the different kinds of exercise (F(3,12)+0,562,p<0,05).

Table 2. Lactic acid rates and min of heart rate to : >4mmol/l, 3-4mmol/l, 2-3mmol/l and <2mmol/l. Also the average heart rate into the different ways of exercise and the result in anaerobic threshold test

	Interval[1]	8V8+2GK back to back[2]	4V4+2GK[3]	Tech-Tact[4]	Average anaerobic threshod[5]	*F – rate*
Lactic Acid	5.8 ± 2.26 [2,4]	2.94 ± 0.30 [1,3]	5.92 ± 1.61 [2,4]	3.79 ± 1.23 [1,3]		*11.053**
HR>4 mmol	9.20 ± 8.59 [2,3,4]	1.00 ± 1.73 [1,3]	17.80 ± 3.56 [1,2,4]	0 ± 0 [1,3]		21.331 *
HR:3-4 mmol	9.20 ± 6.91 [4]	4.40 ± 3.44	5.80 ± 2.49 [4]	1.00 ± 0.71 [1,3]		3.584 *
HR:2-3 mmol	9.80 ± 4.60 [2]	14.40 ± 5.73 [1,3]	5.80 ± 2.23 [2]	12.00 ± 8.60		4.310 *
HR<2 mmol	23.80 ± 8.87 [2]	22.80 ± 6.91 [1,3]	25.20 ± 3.11 [2]	25.20 ± 9.01		0.562
Aver HR	169.00 ± 6.29 [2,4]	152.40 ± 8.56 [1,3,4,5]	175.00 ± 2.92 [2,4]	143.20 ± 6.98 [1,2,3,5]	172.20± 5.22 [2,4]	25.404 *

(*numbers indicate were is a statistically significant difference between the different types of exercise)*

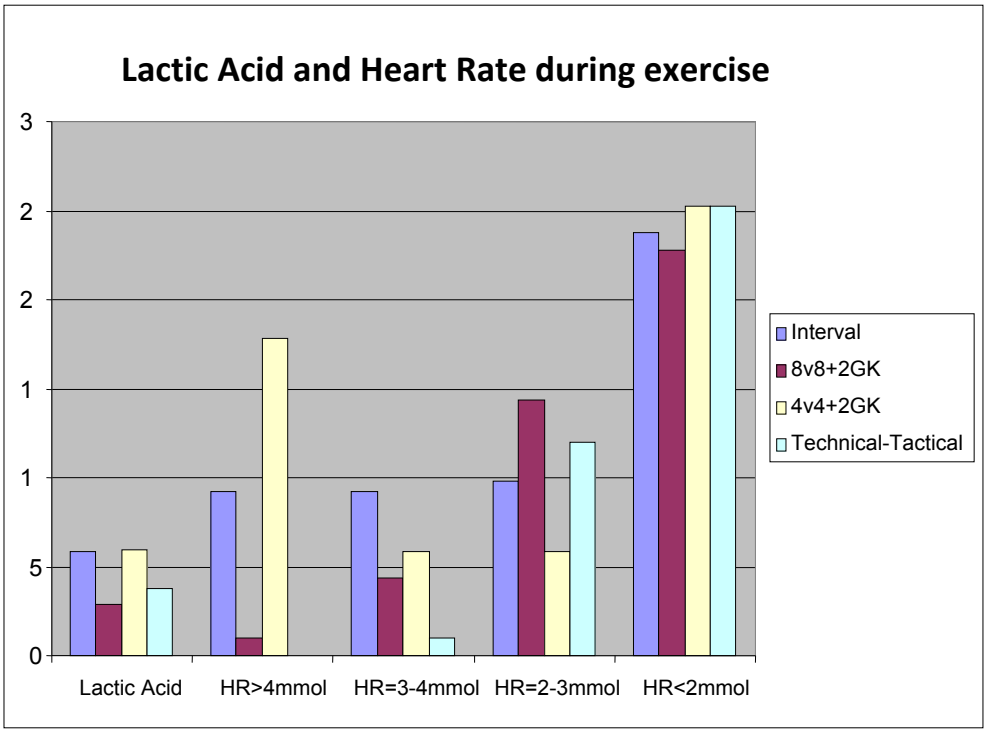

Fig. 2. Lactic acid mmol/l and min of heart rate to >4mmol, to 3-4 mmol/l, to 2-3 mmol/l and <2mmol/l

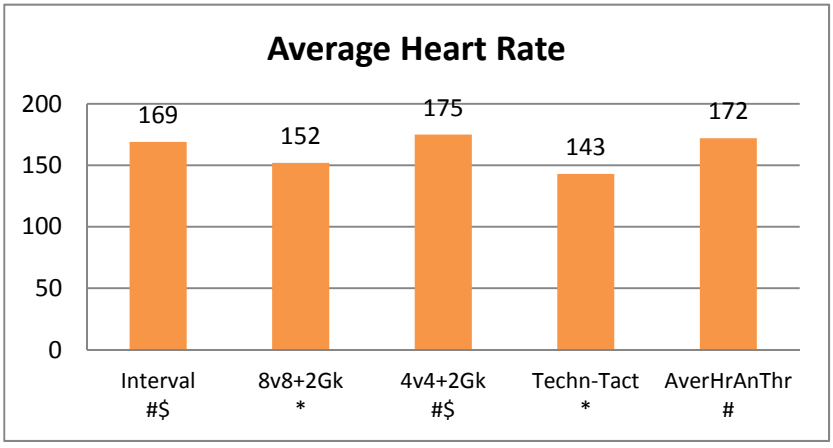

Fig. 3. Heart rate average of the exercises and anaerobic threshold

Note: *=statistically significant difference in contrast with: #, #S;
#$= not statistically significant difference, in contrast with #

Discussion and Conclusion

From the rates of lactic acid and the averages of heart rate in the different kinds of exercise, the higher rates resulted in Interval method (5,8± 2,6 mmol/l), (169±6,26 hr/min) and in 4v4+2GK (5,92±1,61mmol/l), (175±2,92 hr/min) in contrast with the 8v8+2Gk (2,94±0,30mmol/l), (152,4±8,56 hr/min) and technical-tactical training (3,79±1,23mmol/l), (143± 6,98 hr/min).

Similar results were found by Sassi and Tibaudi (2006) by studying similar training methods in football players: 1) Interval training 4X1000m with lactic acid and heart rate (7,9±3,4 mmol/l), (169±4hr/min) respectively, similar to our research, 2) game 4v4+2Gk with lactic acid and heart rate (6,2±1,4mmol/l),(174±7hr/min), similar to 4v4+2Gk of this study, 3) game 8v8+2Gk with lactic acid and heart rate(3,3±1,2mmol/l),(160±3hr/min), alike 8v8+2GK of our research and 4) a technical-tactical training with lactic acid and heart rate (2,9±0,8mmol/l), (140±5hr/min) respectively, same to our technical-tactical training of the study. Impellizeri et al. (2006) studying the effects of two kinds of exercise a) interval 4x4 min in 90-95% of Max HR and b) two real-condition games 3v3+2Gk, 4v4+2Gk (for a 12 week period /2 trainings per week the interference training) found differences only in the 95-100% of Max HR between the two kinds of exercise, when in the other rates of HR(Heart Rate) and in the averages of HR (90,7% and 91,3%) they didn't found any differences, results that partly agree with our research where no differences were found in averages of HR in the 4v4+2Gk game, the interval and in the rates that are corresponded to the anaerobic threshold. Rebello et al. (2016) observing the real-conditions games 4v4+2Gk and 8v8+2Gk found statistically significant differences in lactic acid rates (6,56±1,23and 4,59±1,48 respectively), fact that is confirmed by our research.

As far as that concern the average HR (170±2 and 169±3,5) weren't noted significant differences, facts that agree with Steven et al(2007) who report HR average (175±10hr/min and 168±6hr/min). These conclusions disagree with our research because they were found statistically significant differences of HR between our 4v4+2Gk and 8v8+2Gk games (175±2,92 and 152±8,56) due to the different game restrictions. Dellal et al. (2008) compared the burden which is caused by different kinds of interval training with different real-condition games (1V1, 2V2, 4V4+2GK, 8V8+2GK, 8V8, 10V10+2GK). From this research was concluded that interval training (30sec/30sec in 100%VO2max with active rest at 9Km/h) had a result in average HR(85,7% of MaxHR, statistically significant in relation with the 1v1 (77,6% of MaxHR), 4v4+2Gk (77,1% of MaxHR), 8v8(71,7 of MaxHR) and 10v10+2Gk(75,7 of MaxHR), facts that partly agree with our study where the HR average and the lactic acid in interval training and 4V4+2Gk game are statistically significant different in comparison with the

8v8+2Gk. This is happening due to the different game restrictions and the dimensions of the pitch where the training took place. Arcos et al. (2015) compared the effect of different kind 4v4 (with or without Gk, with Jolly e.t.c.) with an interval (3X4 in 90-95% of MaxHR with 3min constant run between them in 50-60% of MaxHR) according to some physical activity parameters like VAM and CMJ for a 6 week period.

As it emerged from the measurement of HR during the training, the time whose intensity was >90% of MaxHR was bigger than the time of the different kinds of 4v4 compared with the interval (12,7±6,4%, 7,2±3,8% respectively), in full agreement with our study. However, both of them didn't have an impact in VAM and CMJ. Hoff et al(2002) comparing the effect of one special interval training (parcours) and the 4v4+2Gk game in cardiopulmonary parameters found differences either in % MaxHR with rates 93,5% of MaxHR and 91,3 of MaxHR or the average rates of HR with rates of 185,5 and 181, rates that are higher than the corresponding rates of our research. Jastrebski et al. (2014) studying an interval training (7X3min with 15sec intensity/ 15sec jogging) and 3v3+2Gk (7X3 min) for a 8 week period with interfering application of the upper training 2 times per week found that the average HR in both types of exercise was about 85-90% of MaxHR (with only one little difference: 1,5% smaller than 3v3+2Gk game) while it caused different effects. The 3v3+2GK game caused big difference improving VO2Max, while the anaerobic threshold was improved by 12% in 3v3+2Gk game instead of interval which caused only 4% increase. According to Hoff et al. (2004) intensities around 90-95% of MaxHR in set 3-8min is an effective way to improve endurance and in-game performance. Also it is proved that 1 minute is demanded until heart rate (HR) reaches the required high zones (90-95%MaxHR) in order to have the required affects (Hoff et al. 2002). In different exercises with real-condition games (SSG) it was found that 4 minutes were enough to achieve high intensity exercise for at least 3min continuously (Fanchini et al., 2010).

In conclusion, according to the upper elements and from the kinds of exercise we examined, interval training and 4v4+2Gk compared with the 8v8+2Gk and technical-tactical training are the most suitable to improve high intensity endurance both from the metabolic side as well as for the activation of cardiopulmonary system. The 4v4+2Gk seem to cause higher quality results in the improvement of special endurance in contrast with interval. The 8v8 game seem to be more appropriate to improve basic endurance or low-intensity endurance compared with what is believed to improve (endurance of high –intensity) while technical-tactical drills contain agility stimulations and they don't burden the cardiopulmonary but the lactic acid operation-mechanism causing this training method suitable for the last days of competitive circle.

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SPORT CLUBS INTERACTION WITH THE FANS USING SOCIAL MEDIA COMMUNICATIONS. CASE STUDY AT SCM CRAIOVA

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ABSTRACT. Today, the process of communication has come to be seen all together differently to how it was viewed a few decades ago, because contemporary society has greatly changed the way people interact with each other. Communication has stretched its arms to all areas, starting with businesses, where the human relations sector is quite important, up to sport organizations in which communication with the fans is essential. Organizations in all areas have become aware of the need for communication, realizing the strategic role that communication plays in achieving goals. The communication strategy is the defining lines of the organization's attitude and conduct in order to achieve its communication goals and thereby performance goals. The paper aims to present some theoretical aspects regarding the notions of social media and the connection between social media communications and the sports clubs, emphasizing how this connection leads to the increase of the awareness, with a practical example at the handball club SCM Craiova.

Keywords: *social media, sports, marketing, internet, communication.*

REZUMAT. ***Interacţiunea cluburilor sportive cu fanii folosind comunicarea prin social media. Studiu de caz la SCM Craiova.*** Astăzi, procesul de comunicare a ajuns să fie privit în totalitate diferit faţă de modul în care a fost văzut în urmă cu câteva decenii, deoarece în societatea contemporană s-a schimbat foarte mult modul în care oamenii interacţionează unul cu celălalt. Comunicarea şi-a întins braţele în toate domeniile, pornind de la sfera afacerilor, unde sectorul relaţiilor umane este destul de important, până la organizaţiile sportive în care comunicarea cu fanii este esenţială. Organizaţiile din toate domeniile au devenit conştiente de nevoia de comunicare, realizând rolul strategic pe care îl joacă comunicarea în atingerea obiectivelor. Strategia de comunicare reprezintă liniile de

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definire a atitudinii și comportamentului organizației pentru a-și atinge obiectivele de comunicare și, prin urmare, obiectivele de performanță. Lucrarea urmărește prezentarea unor aspecte teoretice privind noțiunile de social media și legătura dintre comunicarea prin social media și cluburile sportive, subliniind modul în care această conexiune conduce la creșterea notorietății, prin prezentarea unui exemplu practic la clubul de handbal SCM Craiova.

Cuvinte-cheie: *social media, sport, marketing, Internet, comunicare*

Introduction

The online environment or the internet has developed rapidly over the last few years, and it is not a simple fashion or a fad at this moment, but a necessity, a way to discover virtually anything we care about (Weinstein and Lejoyeux, 2010). Moreover, every day the online environment tends to become more and more addicted, most of our day-to-day work being in close contact with it.

From simple communications to complex negotiations in any corner of the world, from sales to promotions in unlimited variants, from various presentations to the vast field of advertising, from simple information to elaborate broadcasts, all are possible due to the unprecedented development that known in the last few years to the online environment (Bauer and Stockburger-Sauer, 2008). At this point we can say that modern society is strongly anchored to the Internet, and it is found in any field of activity. Through the online environment we can make unlimited connections, we can find out and transmit almost instantly everything we care about, whether the information is of a general or custom nature.

Today social media has an increasing role, we can say it helps to create marketing miracles. Especially for businesses and organizations, social media is conducting not only to build a conversation with its customers or fans in the case of sports, but also to an interaction that no longer only takes into account the physical location, such interactions are taking place today especially on the Internet. The new way to achieve marketing and to advertise is now through social media networks (van Dijck, 2013).

Literature review

1. Social media communication

Social Media can be defined as a set of tools (web sites and software/ applications) that work with an Internet-connected device (computer, laptop, tablet, mobile phone) and built to facilitate communication Internet users and

creating, sharing and sharing content (text, photo, video, audio, multimedia presentations) between members of social groups (friends, colleagues, family). Unlike traditional media, Social Media is distinguished by quality, frequency and proximity. In today's society, the media play a crucial role in social life, becoming, over time, a growing and indispensable power with a strong influence on the segments of society. The presence of the media is felt in all the fields and sub-domains of society, and we can consider it an industry of its own (Stern, 2013).

Social media marketing is the new form of communication, being increasingly used as it leads to the growth of brand awareness and community building, requiring minimal investment and yet a way to measure maximum results. Social Media Marketing refers to how to interact, participate, and be at the heart of discussions, all of which have the goal of cultivating and developing trusted relationships with existing or potential clients (Fillis and Mackay, 2013).

Facebook, LinkedIn, Twitter, Instagram, and YouTube are the most popular social media tools, as they are based on users in Romania. Social Media Marketing as a general term refers to different types of sites that offer completely different ways of social interaction (Holmes et al., 2012). For example, Twitter is a social site that allows users to share news with other users in a very different way from other platforms. Twitter is useful in very dynamic environments such as journalism. Facebook, on the other hand, is a social network in its entirety that allows posting of news, events, pictures, movies and more. Facebook is the socialization platform most used in Romania.

2. The relationship between sport and social media communication

Without a strong promotion, the sport industry would not enjoy the commercial success that allows it to generate huge revenues. Therefore promotion and communication are extremely important in sport marketing (Barbu, 2010, Apostu et al., 2009).

All the changes in the social media landscape that have occurred over the last ten years have had a major impact on all aspects of our lives and sports industry is in no way an exception.

Without media coverage, sport is not as attractive as television, radio, the media and other media do not meet the audience unless they include sports content in their programs. Society is becoming increasingly diverse and addicted to information (Hookway, 2008).

Today, sports events and social media go hand in hand. We are witnessing an era where every team, league or sports association has at least one social media profile where they announce all the important information (Smith, 2012).

Moreover, it became impossible to scroll down your Facebook, Twitter, or Instagram account during a major sports event and not have your news feed overwhelmed with information, real-time gifs, vines, or memes about it. Whether we are talking about benefits or disadvantages, they are present in both areas, both in the media and in sports.

Social networks are in many cases seen as an excellent tool to avoid costly market research. They are known for offering a short, fast and straightforward way to reach an audience through a known person (Miah, 2017).

When it comes to sports, there are always two games: the field and the social media, where fans consume statistics, recapitulate and fight with other fans. Colleagues and professional sports marketing teams have long enjoyed the power of visual media to bring action on the field on the small screen to inspire, fill seats in matches, and even help increase the energy of the crowd, which in turn inspires athletes (Peters et al., 2013).

In order to orchestrate an adequate social media communication sport organisation need to establish a strong communication department (Constantinescu, 2008) in which the roles and responsibility of each member must be defined with precision (Bocean, 2008). The clarity of the external communication is reflected in the quality of internal communication (Somacescu and Barbu, 2017).

It is normal for many companies to have accounts on various social networks, because having a social media presence increases the visibility of the brand, which leads to a brand more accessible to its customers. When the brand has social media accounts on different social networks, it has access to a completely new customer base or fans and thus extends not only the domain of communication but also the image. Social media offers companies a platform to talk directly with consumers. Twitter, Facebook and Instagram are excellent examples where companies excel at this strategy of establishing a constant flow of communication (Smith, 2007).

So every post made on social media by a particular brand becomes important. Any post or ad can be an opportunity for fans to be up to date with all the news. Whether it's an image, a video, audio, gif or blog, it has the chance to attract fans to the social network. Brands became more humanized thanks to social networks. Brands are the relationship between the sport club and the fans (Florea et al., 2018). For sport clubs it is essential to have strong brands (Barbu and Popescu, 2018; Popescu, 2009).

Sport Club Municipal Craiova and social media

Sport Club Municipal Craiova, commonly referred to as SCM Craiova, is a Romanian women handball team from Craiova who plays in the National League, established following the decision of the Local Council of Craiova.

Sport Club Municipal Craiova also has a handball section, and the women's handball team was established in February 2007. The team promoted in the 2009/10 season in Division A.

SCM Craiova performs its own field matches in Polivalenta Hall, one of the newest and largest sports arenas in Romania. The hall has a capacity of 4,215 seats. Until the construction of the Polyvalent Hall was completed, in November 2012, SCCM Craiova played home matches at the Sports Hall in Filiaşi with a capacity of 250 seats.

SCM Handball Club Craiova communicates with its fans through several media, printers including the online media. To this end, the club has created a Facebook page where it informs its fans about all sports competitions, but also their timetable and timetable.

Also on the Facebook page, you can find more pictures and videos from the sports competitions, but also from the various events that the team does. By publishing these images, the club can get feedback and feedback from fans.

Also, for each post, whether it's a movie or a photo, fans can show their interest, appreciation, but also dissatisfaction about the event that is related to the images.

Using Facebook as a way of communication and promotion, the club increases its popularity among fans, and also increases the number of supporters participating in sports competitions. At the same time, fans suggest different activities or what they can perform during breaks in sports competitions, such as different dancers of the team or even mascot.

On the club's official site we also find events and their calendar, as well as various announcements and decisions about the club as a company, more than the hands-on game itself. Also on the official website we find a page dedicated to the results of the competitions, news about the club, press releases, conferences and a ranking with the club's position at the time. We can say that through the official website provide a more formal framework to communicate with fans and other media (televisions, newspapers, forums).

Another important feature of the official site is that it is kept up to date with all news and updates so that if a support wants to find out what happened in the previous competition, who scored but also other key points of the match can be informed by visiting the official website.

Considering the importance of the online media in today's life but also the rapidity with which it has developed and the degree of use, it is very important for a sports club to keep its supporters informed by all possible means.

Research methodology

Given the nature of research issues, this study was based on a survey, believing that this method is best suited to gaining insights and acquiring knowledge that is currently not so well grounded in the athlete's brand literature. Due to insufficient in-depth examinations in this area, our paper must be a starting point and a prelude to future investigations that can be based on the existing study. As research methods in this paper we used bibliographic study, where we concentrate on the analysis of specialized literature, and statistic-mathematical method in data processing.

This study was conducted between January 25 and February 23 on a sample of 187 people. The sample was selected from Facebook fans pages of SCM Craiova. The questionnaire was posted on these pages. The questionnaire contained 12 questions that first aimed at creating a profile of people questioned and then followed various aspects of social media and Sport Club Municipal Craiova.

Table 1. Descriptive statistics of the respondents

Variable	Classification of the variable	Percentage
Gender	Male	60%
	Female	40%
Age	20 – 30 years	43%
	40 – 50 years	20%
	Over 50 years	5%
Study	Highschool	31%
	College	48%
	Postgraduate studies	21%

We present in the following paragraphs the description of the socio-demographic structure of the subjects of the research.

The next question was about the degree of participation of the fans in the team matches, so most of them participates in all the matches that take place at home, 35% participate in both the home and the ones that take place in other cities, and 18% go about once a month to the team matches, while 5% respondents go less often (figure 1).

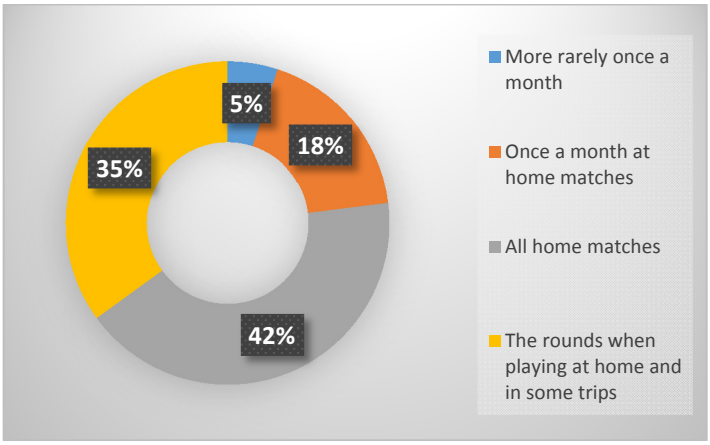

Fig. 1. Distribution based on the degree of participation of the fans in the team matches

Discussions

Regarding the level of information distributed by the fans' club via Facebook posts, our respondents had to choose between 4 variants of the answer. Thus most of them considered that the posts on the Facebook page of the club contain new and interesting elements, followed by the variant according to which the information contains novelty elements that can not be found in other sources, more than 40 people consider that the information provided does not bring anything new, and that almost 10% of posts are lacking in useful information (figure 2).

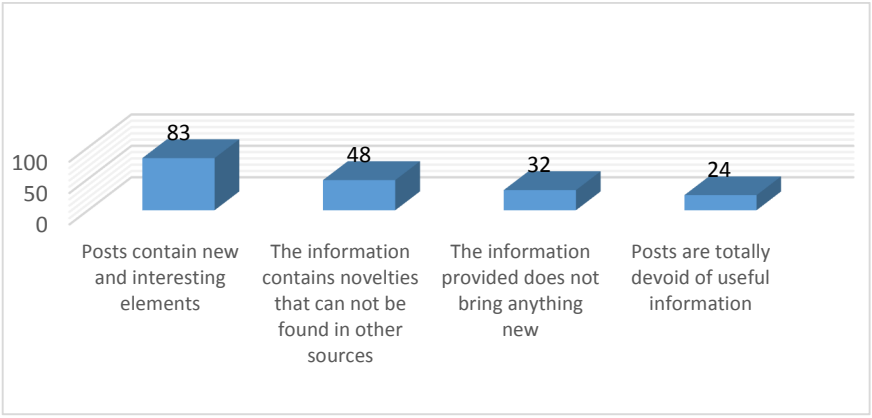

Fig. 2. Degree of information provided by the club in Facebook posts

The next question was about the degree of curiosity of the fans about the club's new posts regarding the handball team. Thus, the vast majority of people, namely 58% said they read all new posts immediately, while 22% do not read them immediately and leave them later and 20% ignore the posts (figure 3).

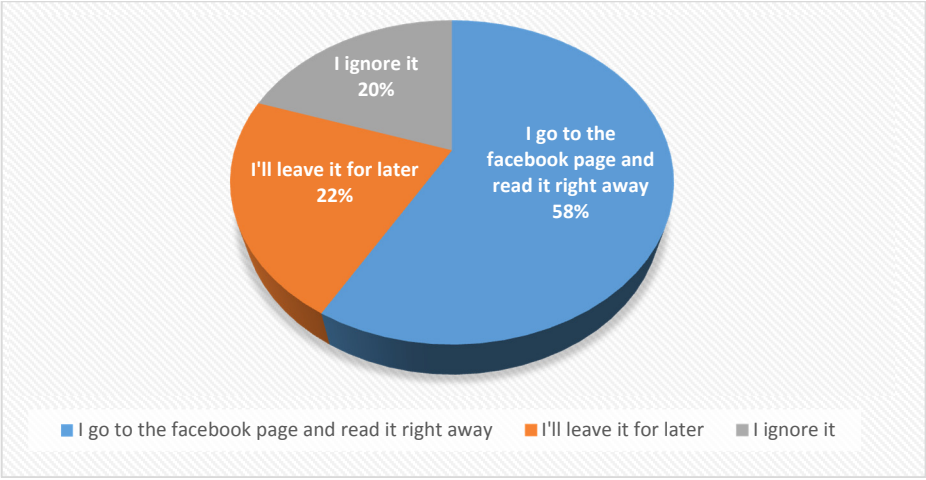

Fig. 3. Distribution of the degree of about the fans' interest in the club's posts

In this question we wanted to see the reactions of the fans after seeing different posts, so after reading the postings, 41% they gave a liking to each post, followed by 35% respondents who besides like, give a share of the announcement, 15% add comments on what is being posted, and just 9% may chat with friends in off-line environment (figure 4).

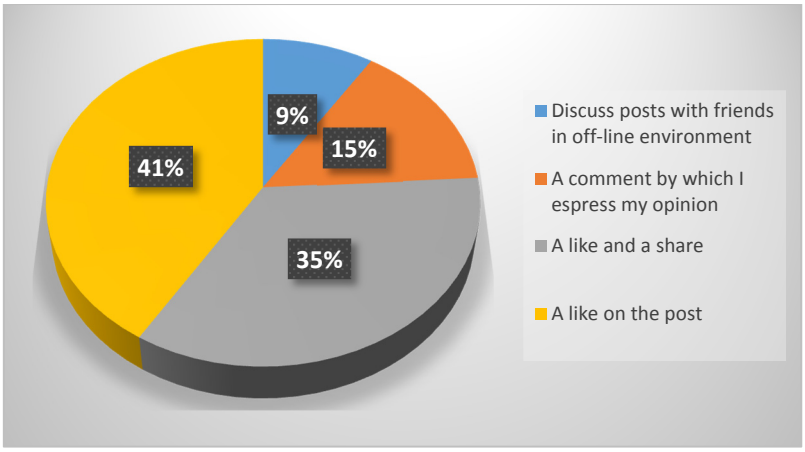

Fig. 4. Appreciation for the club posts

In our study, we wanted to see how much the Facebook page helps communication between supporters and the team, so 74 respondents consider that the page is updating supporters with the last news in a very short time by creating a new post, 69 believe that supporters can freely express their opinion about the buyouts and various events, 38 appreciate the communication as being quite active, and the fewer, in the proportion of 27 people, consider the site to respond promptly to supporters and provide clear information.

When they were asked if they used to invite other friends on the club page to find out about their favorite team, 42% of the respondents said they did this quite frequently, while 36% only occasionally invite other friends, while 22% do not ever do that (figure 5).

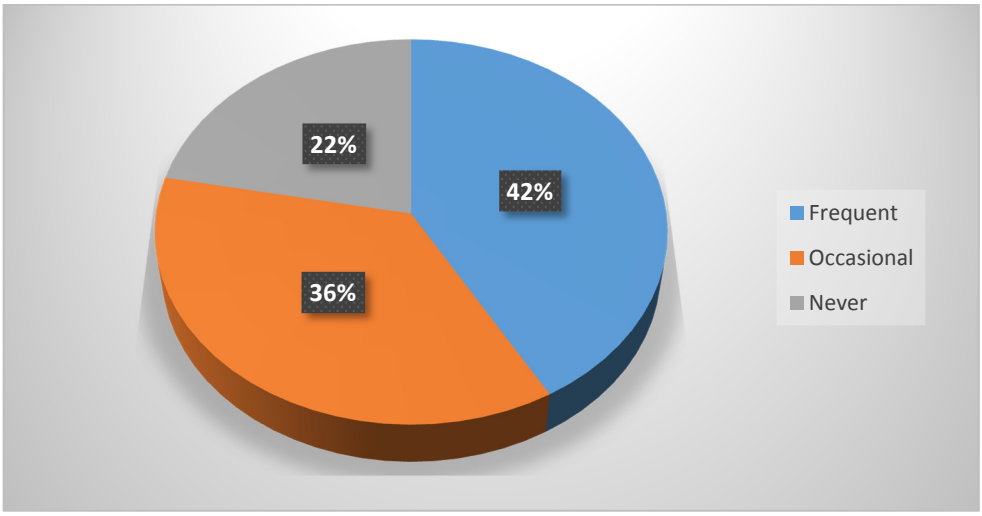

Fig. 5. Distribution based on the invitation level of friends on the club page

Regarding the degree of satisfaction with the involvement of the club in active communication with supporters, most of the fans are satisfied in a proportion of 47%, while only 34% are very satisfied, and at the opposite side there is only 17% respondents who are indifferent about this issue (figure 6).

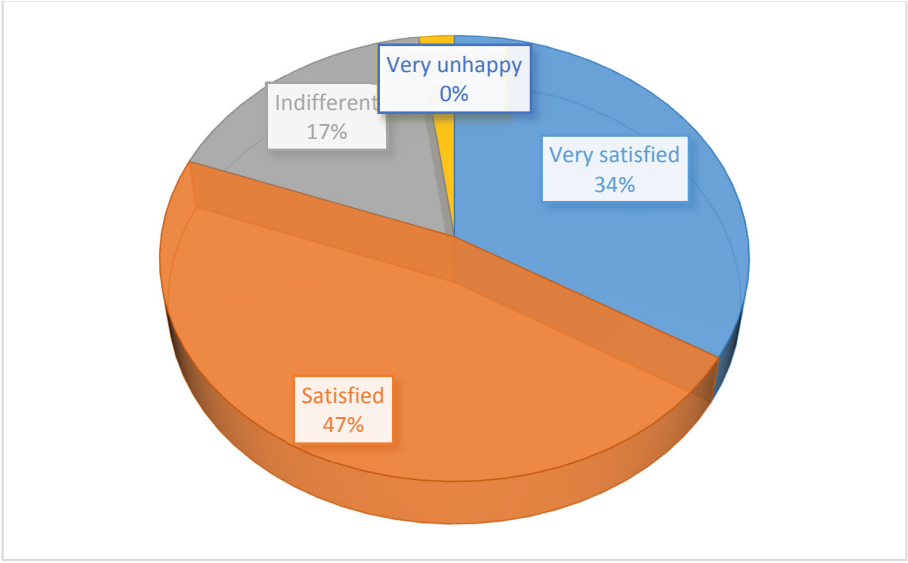

Fig. 6. The degree of satisfaction with the involvement of the club in active communication

Regarding the appearance of a more active involvement of the handball team on the club page, there is no doubt about what the fans want, 83% of whom want the players to be active on the social media, believing that the team would win a plus image and notoriety, while 17% do not want such activity from players (figure 7).

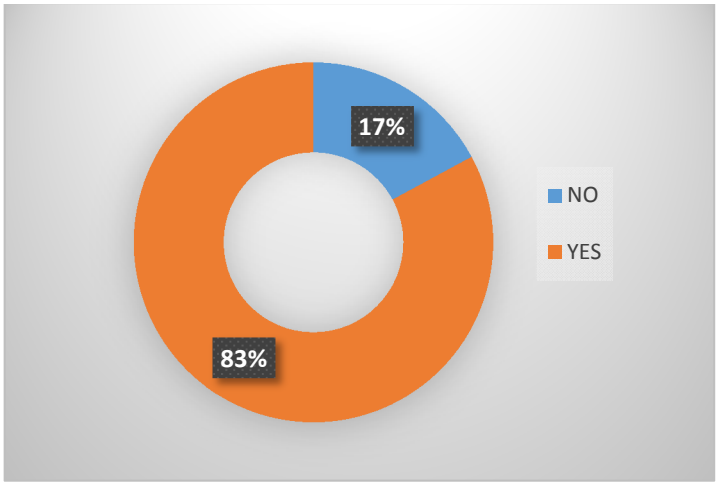

Fig. 7. Active involvement of the handball players on the club page

When we asked the participants in our study about the eventuality of organizing competitions for fans, where they can receive different types of prizes, 95% of respondents agreed, considering that this would lead to an increase in the number supporters on social media and an improvement in the interaction between the club and the fans (figure 8).

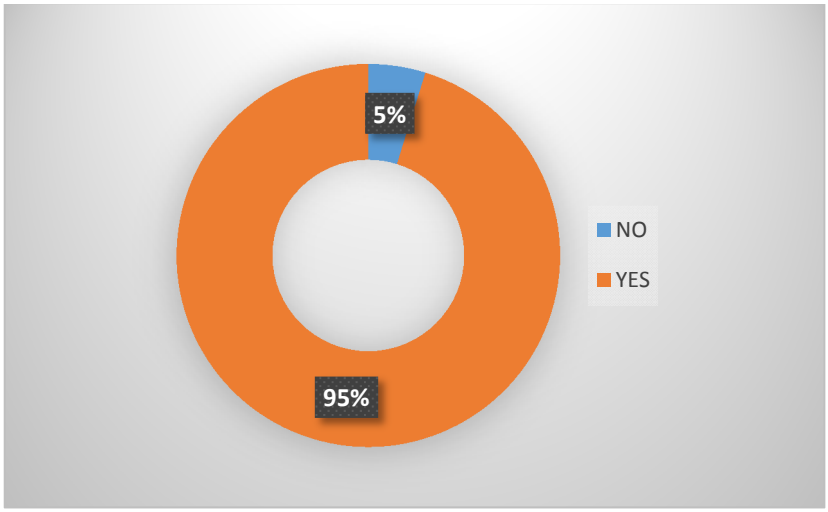

Fig. 8. Organizing competitions for fans on social media

Our study has shown that social media communication is essential for sport clubs to maintain and to develop their relationship with the fan base. Fans are spending more and more time connected and they want to interact quickly with the favourite clubs and favourite players. Social media is an excellent tool to connect all the parties interested in the sport world.

Using its Facebook page the handball club SCM Craiova was able to increase its fan base and to increase attendance both at home and away. The sports results are a great way to increase fans' participation but the power of sports results is multiplied when social media communication is used. When SCM Craiova won the EHF Cup in 2018 the fans interests for the tickets in the final stage sour also due to intense Facebook communication.

Conclusions

Social media communication is important for sports clubs as fans want to be connected with their favourite team. Our study reveals the fans would like a deeper involvement of the clubs on on-line communication with the fans. People integrated social media in their lives and they want that their favourite sport club follow the trend. There are various limitations that are normal and should serve as a starting point for future research. The first limitation in this paper is related to the size and structure of the case study. Thus, future studies could try to analyse several sports clubs in terms of social media communication, in the country or abroad and rely on larger samples to better understand the importance of social media in sport.

Future studies should also include different categories of sport organization. This type of study would provide a more in-depth picture of the importance that we need to show to social media and its connections with sport. Another point to be discussed in future research is to understand the importance of social media in different types of sports, the link between the athletes who represents brand, how this influences the fans behaviour and reaction.

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IMPROVING STUDENTS' FUNCTIONAL CAPACITY BY INTRODUCING AEROBICS IN THE WARM UP PART OF PHYSICAL EDUCATION LESSONS

CIULEA LAURA EDIT[1], SZABÓ-CSIFÓ BARNA[1*]

ABSTRACT. ***Introduction.*** The significance of this paper resides in the conception and introduction of a program of aerobics-specific exercises into physical education classes in order to prepare the body for effort, improving students' functional capacity. Aerobics is an attractive and efficient way of preparing the body for effort. Systematic practice of aerobics has complex long-term effects: muscle toning, the improvement of the activity of the cardiovascular and respiratory system. Due to the intensity of effort and to the fact that the entire body takes part in it, the benefits of practicing aerobics aim at improving functional capacity affecting body harmony by reducing fat and toning muscles. ***Methods.*** Students of the experimental group underwent various aerobic programs during warm up sessions while the control group used traditional warm up methods. To determine functional capacity of students the Ruffier test was applied and vital capacity was measured. ***Results.*** After introducing aerobic programs into the warm up part of physical education lessons of the experimental group there was a noticeable improvement in exercise capacity. The difference between the arithmetic means of the two, initial and final, tests was of 4.11 for the experimental group, which resulted from the mean of the initial test result 4.35, and the mean of the final test result 0.23 ***Conclusion.*** Research results evidentiate the efficiency of various aerobic programs, designed and implemented in order to improve functional capacity of students of the experimental group.

Keywords***:*** *aerobics, functional capacity, students, improvement*

REZUMAT. ***Îmbunătățirea capacității funcționale a studenților prin introducerea gimnasticii aerobice în lecțiile de educație fizică, în partea de încălzire. Introducere.*** Importanţa acestui studiu constă în conceperea şi introducerea unui program de exerciţii specifice gimnasticii aerobice, în cadrul orelor de educaţie fizică, în vederea pregătirii organismului pentru efort, care vor influenţa pozitiv dezvoltarea capacităţii funcţionale a studenţilor. Gimnastica aerobică reprezintă un mod atractiv şi eficient de pregătire a organismului pentru efort, de

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aceea considerăm oportună introducerea acesteia în cadrul lecţiilor de educaţie fizică, ca şi mijloc de încălzire a studenţilor. Practicarea sistematică a gimnasticii aerobice are efecte complexe şi de lungă durată: se produce tonifierea musculaturii, se îmbunătăţeşte activitatea sistemului cardio-vascular şi a celui respirator. Datorită intensităţii efortului şi a faptului că întregul corp este angrenat în efort, beneficiile percepute în urma practicării gimnasticii aerobice vizează îmbunătăţirea capacităţii funcţionale cu efect asupra armoniei corporale prin reducerea stratului de ţesut adipos şi tonifiere musculară. ***Metodă.*** Studenţilor din cadrul grupei experiment li s-au introdus programe variate de gimnastică aerobică în partea de încălzire, iar studenţii grupei experiment au lucrat cu mijloacele clasice de încălzire. În vederea determinării nivelului de dezvoltare a cacităţii funcţionale a studentelor a fost aplicat testul Ruffier şi măsurarea capacităţii vitale. ***Rezultate.*** În urma introducerii programelor de gimnastică aerobică, în partea de încălzire din cadrul lecţiilor de educaţie fizică, în cadrul grupei experiment, s-a constatat îmbunătăţirea capacităţii de efort a sportivelor din această grupă. Diferenţa dintre mediile aritmetice dintre cele două testări, iniţiale şi finale, este de 4,11 la grupa experiment, rezultată din valoarea mediei la testarea iniţială: 4,35 şi valoarea mediei de la testarea finală: 0,23. ***Concluzii.*** Rezultatele cercetării relevă eficacitatea programelor variate de gimnastică aerobică elaborate şi implementate în vederea îmbunătăţirii capacităţii funcţionale a studentelor din grupa experiment.

Cuvinte-cheie*: gimnastică aerobică, capacitate funcţională, studenţi, îmbunătăţire.*

Introduction

Physical condition is the sum of physical, mental and functional capacities of the human body that are necessary to optimally solve challenges posed by the living environment. Physical education activities with students require adjustments to innovative methods and means.

Specialists have turned their attention towards designing new methods for physical education classes with students in order to increase functional capacities of students.

Aerobics, through the means and materials it uses, has possibly the greatest impact regarding the improvement of students' motor and functional capacities (Ionescu, 1989). Aerobics emerged in the United States in the early '60s when Kenneth Cooper, a doctor at Houston Space Center, was given the task of physical training of American pilots and astronauts. He designed a series of gymnastic exercises which he called "aerobics" (maximal oxygen consumption of the body under maximal effort), intending to stimulate heart and lung activity.

Aerobic dance appeared around 1970 and was developed by fitness instructor Jacki Sorensen who combined running in place with jumps and dance steps (Ganciu, 2002).

"Aerobics consists of the sum of movements made to music, with varying complexity and intensity, with the purpose of creating a general feeling of well-being" (Bota, 2006, p. 183).

"Aerobics implies a set of basic gymnastic exercises and dance steps with musical accompaniment, made with the guidance of an instructor" (Laszlo, 2007, p.29).

Popescu G. (2005, p.29) defined aerobics as "an act of value creation, an act of culture which represents a factorial system that deeply influences the existence of the individual and the group".

The word *aerobics* comes from the Greek term *Αεροβική (aerobiki)* which implies the presence of oxygen, so aerobics can be defined as "gymnastics with oxygen".

An aerobic program consists of the execution of special exercises for each muscle group. The exercises are grouped into sets, each one having a well defined purpose (for abdomen, arms, thighs etc.) (Boyle, 2004). Aerobics helps to improve the flexibility of the body, muscle toning and the cardiovascular system.

Aerobics uses a wide range of free, logically grouped, actuating means, done as part of preparing the body for effort, and also as a fundamental part of training. Actuating means used in aerobics involve movements such as: running types, walking types with different paces, pedaling, dance etc. (Kramer et al., 1995). Specialists pursue the elaboration of new methods in order to increase functional capacities of students.

Objectives

This research aims at improving functional capacities of students by means of introducing aerobic programs into the warm up part of physical education lessons.

Hypotheses

This research started out from the general hypothesis that implementing various aerobic programs in the warm up part of physical education lessons brings about improvement in the fitness level of students.Aerobic programs introduced in the warm up part of the physical education classes will improve functional capacity parametres of students.

Methods

The research was conducted during the 2015-2016 academic year and included two groups: the experimental group made up of students from Tg.Mures University of Medicine and Pharmacy's Faculty of Pharmacy, and the control group which consisted of students from the Faculty of Dentistry of said university.

Students of the experimental group underwent various aerobic programs during warm up sessions while the control group used traditional warm up methods.

To determine functional capacity of students the Ruffier test was applied and vital capacity was measured. These were done at the beginning of the academic year, in October, as well as at its end, in May.

Vital capacity was measured at rest, in a state of physical relaxation, with a spyrometer. Vital capacity testing was conducted at Tg.Mures Sports Clinic. The results was interpreted with GraphPad Prism5 demo version and for the student-t test we took the level of significancy of 0,05.

Results

1. Functional capacity - Ruffier test

Table 1. Summary of RI index value

Group	Statistical indicators Testing	M	CV	t-Student	P
Experimental Group	Ti	4.35±0.20	15.94	14.24	0.0001
	Tf	0.23±0.19	268.92		
	Difference	**4.11**			
Control Group	Ti	5.53±0.24	14.40	2.92	0.007
	Tf	4.53±0.24	17.76		
	Difference	**1**			

p>.05*; p<.05***

Interpretation of results

The statistical analysis conducted allowed us to outline the following aspects:

• After introducing aerobic programs into the warm up part of physical education lessons of the experimental group there was a noticeable improvement

in exercise capacity. The difference between the arithmetic means of the two, initial and final, tests was of 4.11 for the experimental group, which resulted from the mean of the initial test result: 4.35, and the mean of the final test result: 0.23, as shown in table 1.

• For the control group, the difference between the arithmetic means of the two tests is 1.00, resulting from the initial test mean of 5.53 and the final test mean of 4.53.

• At the initial testing, the students of the experimental group fell within the *good* mark range as regards exercise capacity, while at the final testing 4 students reached the *very good*mark.

• Students from the control group have improved their marks from *average* to *good* as regards exercise capacity.

• The coefficient of variation shows a moderate homogeneousness of both groups.

• Statistical analysis of the t-Student test highlights a strongly significant threshold for the experimental group, $p<0.0001$, confirming thus the hypothesis of this research and rejecting the null hypothesis.

• For the control group, the statistical analysis of the t-Student test shows, as seen in table 26, a statistically significant difference, $p<0.5$, rejecting the null hypothesis in this case too.

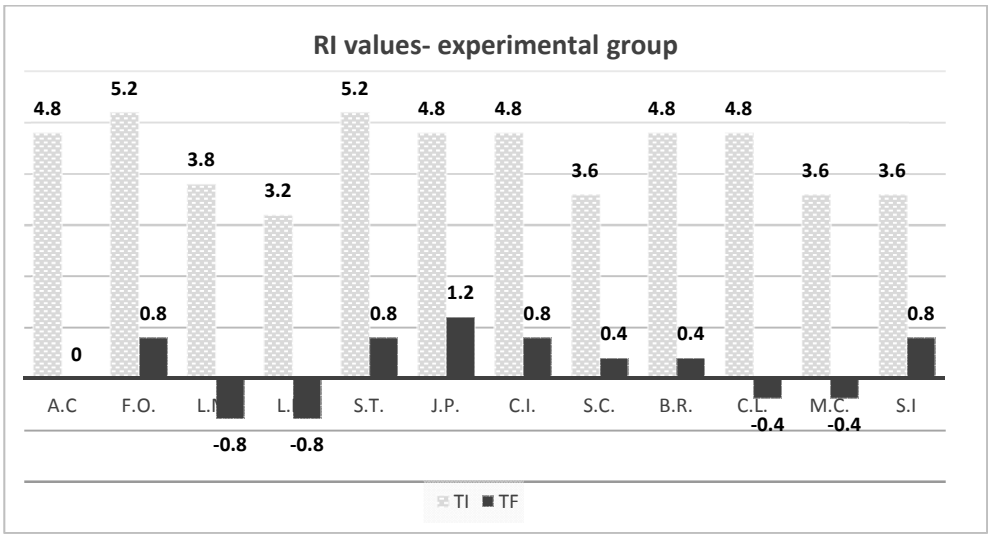

Figure 1. Graphical representation of RI values – experimental group

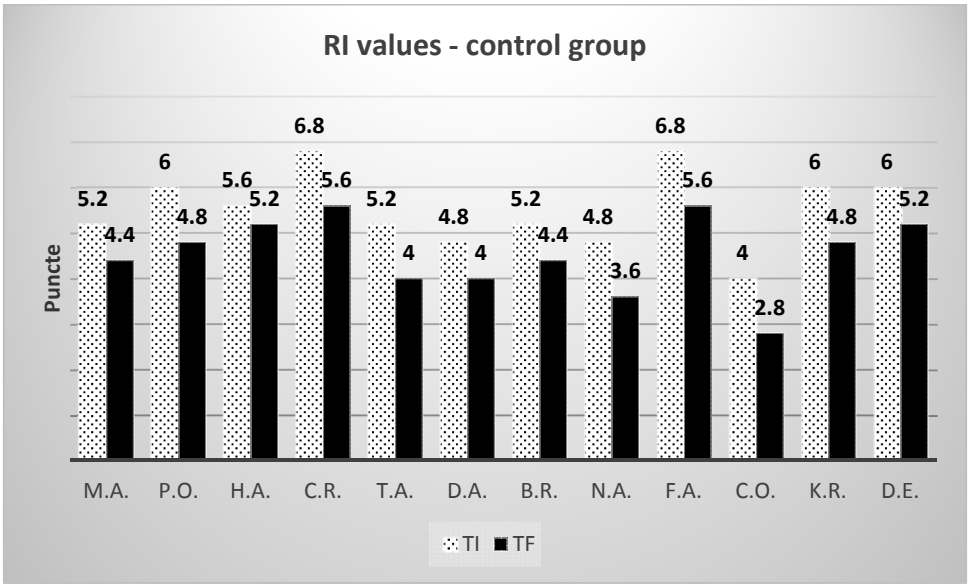

Figure 2. Graphical representation of RI values – control group

2. Vital capacity

Table 2. Statistical indicators for vital capacity

Group	Statistical indicators Testing	M	CV	t-Student	P
Experimental Group	Ti	4100±34.82	2.82	4.75	0.0001
	Tf	4358±41.67	3.04		
	Difference	**258.3**			
Control group	Ti	4083±47.41	3.85	1.81	0.08
	Tf	4208±49.94	3.94		
	Difference	**125**			

At the initial testing (Ti), the average value for students of the experimental group was 4100cm^3. Later this value increased to 4358cm^3. The difference between the two tests (258cm^3) can be credited mainly to the introduction of aerobic programs in the warm up part of physical education lessons that were aimed at improving students' functional capacity. With the control group the difference between the two testings was of 125cm^3. After calculating the coefficient of variation we were able to observe a high degree of homogeneousness, under 4%, for both groups.

After applying the t-Student test and calculating the correlation index p of the experimental group, a statistically strongly significant difference could be discerned, p (0.0001) <0.05, which leads us to accept the research hypothesis and reject the null hypothesis.

With the control group, the statistical analysis using the t-Student test revealed a statistically insignificant difference, p (0.08)>0.05, which confirms the null hypothesis.

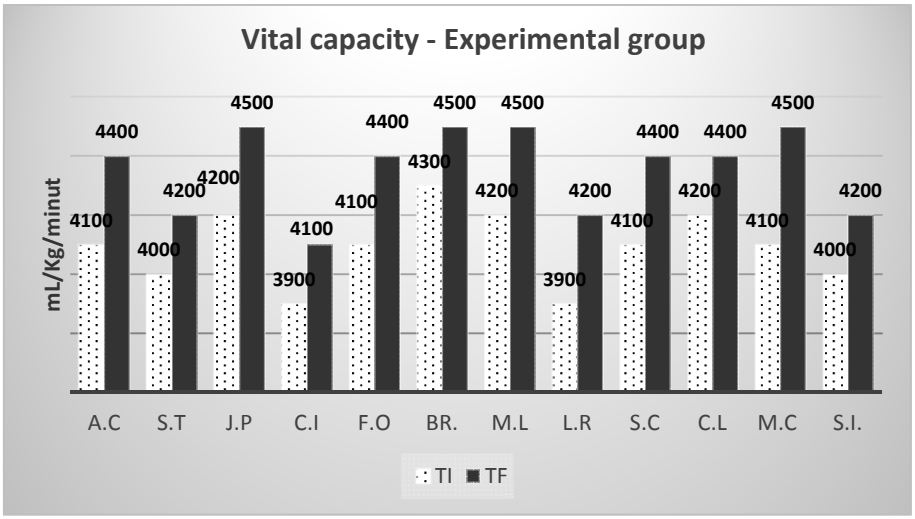

Figure 3. Graphical representation of vital capacity values - experimental group

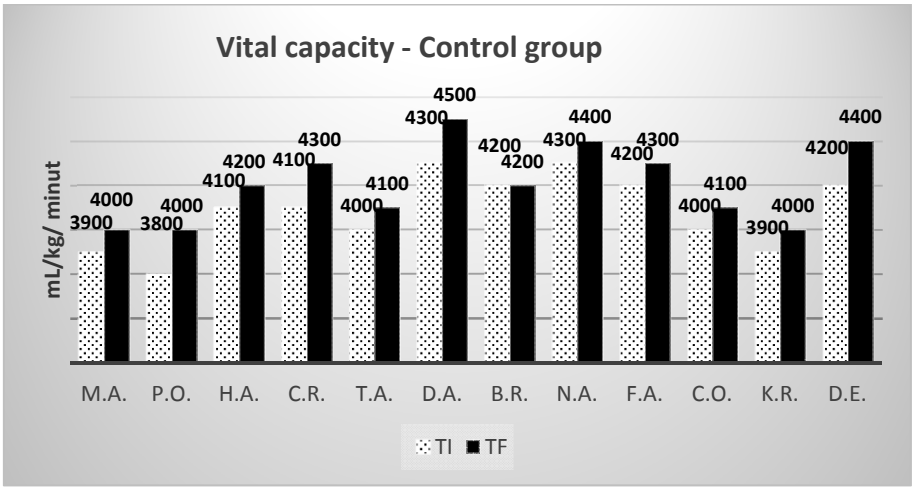

Figure 4. Graphical representation of vital capacity values - control group

Conclusions

The research has shown that students of the experimental group improved their functional capacity due to the introduction of various aerobic programs as a means of warm up.

Research results evidentiate the efficiency of various aerobic programs, designed and implemented in order to improve functional capacity of students of the experimental group.

The experimental group owes its superior progress to the aerobic program designed, adapted and implemented during warm up. The physical training program was created according to modern trends and based on recent research that highlighted the efficiency of aerobic programs as compared to classical methods some of which have become obsolete both methodologically and efficiency-wise.

The aerobic program designed and implemented as part of this research was focused on developing all functional components of the students. Thereby, using arguments, calculations and concrete statistical analyses, we have reached the following conclusions:

The working hypothesis, that the implementation of aerobic programs into the warm up part of physical education lessons will determine a long-term improvement of students' fitness level, is confirmed.

The results attained by students of the experimental group during functional tests confirms the hypothesis that aerobic programs will improve functional capacity parametres.

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ATTITUDES TOWARDS DOPING – A COMPARISON OF ATHLETES, NON-ATHLETES AND SPORT EXPERTS

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ABSTRACT. We are examining this topic in Hungary as a pilot study - the attitudes towards doping – a comparison of athletes, non-athletes, and sport experts. We know for a fact that the use of performance enhancing drugs has been around for several hundred years, but there has not been any major research on the attitudes towards doping. So we compared opinions on doping use by not only comparing athletes, non-athletes, and sport experts opinions but also by the gender and age of the participants' who filled out our survey forms. The aim of this study is to explore participants' attitudes towards doping use in sport. We also looked into the psychosocial effect of performance enhancing drugs on athletes.

Keywords: *doping, athletes, attitudes*

Introduction

The estimated range of various doping substances and procedures used in sports ranges from 10% to 90% (Yesalis & Bahrke, 2005). In the past years this topic has been researched mainly by the biomedical point of view, even though psychosocial approaches are also key factors in the fight against doping (Hanspeter, Lamprecht & Kamber, 2014). While this topic is well researched in international literature, we did not find any comprehensive articles on the attitude towards doping use here in Hungary. This scientific field is very important because doping is not only harmful to the physical health of athletes, it brings problems to their athletic identification as well (Kirby, Moran, & Guerin, 2011).

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Material and methods

For our research we sent out online surveys, which were anonymously filled out by 358 participants. From the information that we received, we divided the answers into different sections. Firstly, the social groups i.e. students at the University of Physical Education, the faculty at the University of Physical Education, and people who do not have any contact with the University. Secondly, the separation of gender, where there is a difference in male and females. Finally, we examine age groups, divided accordingly, <30, 30-50, >50. We used SPSS 22.0 program to analyse the answers received through our survey. After the frequency tables were made, a Chi square test was used to analyse cross tabulation of the survey data.

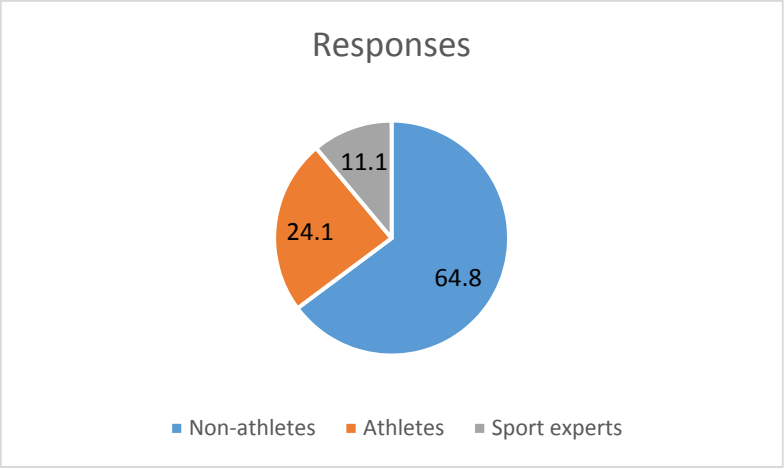

Fig. 1. Participants ratio

Results

Our research reports on attitudes towards doping in Hungary from various surveys aimed at the non-athletes of general population, elite athletes and sport experts. Analysis of the data showed that the opinions of men and women involved in the study reflected a clear difference in their attitudes toward the use of doping ($\chi 2=7.59$, $p<.006$). There was a question where we asked if they think doping use is existent in their own sport, and the results showed a difference between genders ($\chi 2=11.0$, $p<0.004$).

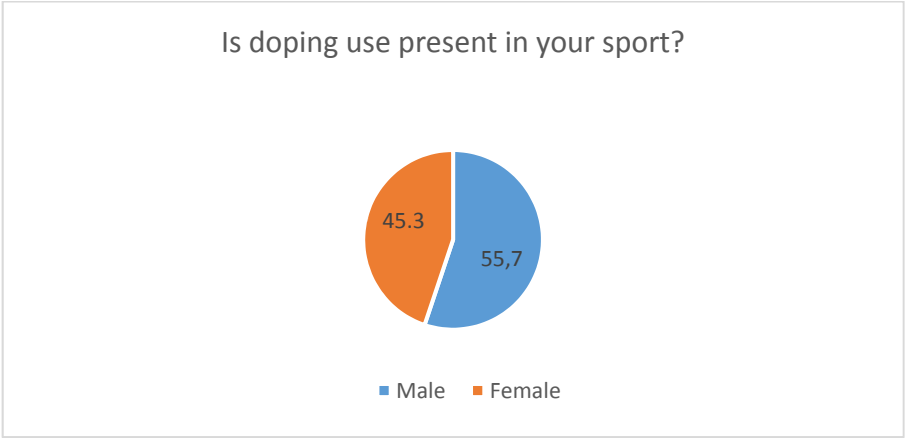

Fig. 2. The opinion on doping use in own sport, by gender

We got similar results when we asked if they would use doping substances if their international results would depend on it ($\chi 2=13.45$, $p<0.000$).

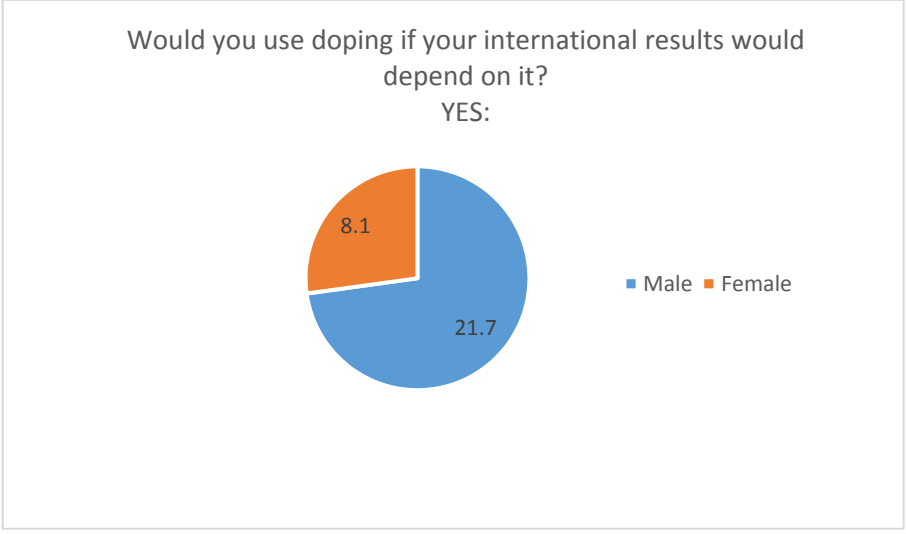

Fig. 3. Opinion on doping use for international results, by gender

This result is reflected in the different age groups. For example more people under the age of 30 would use doping, then those above the age of 30 ($\chi 2=8.36$, $p<0.015$).

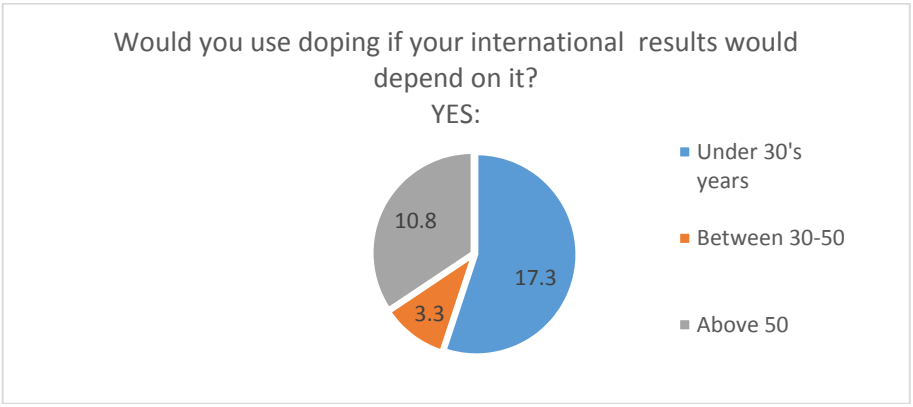

Fig. 4. Opinion on doping use for international results, by age

Non-athletes are less likely to think that Hungarian athletes use doping than student athletes ($\chi 2=13.63$, $p<0.001$). People who do not criticize doping, rationalize that it is essential in professional sports ($\chi 2=7.96$, $p<0.047$).

This was the 75% of the responses who's answered no for condemning doping use.

When we asked "Do you condemn doping use?" 85.9 % of the responders chose yes. We found that 90.4 % of women and 80,1% of men condemn the use of doping. So women are less tolerant of doping use than men.

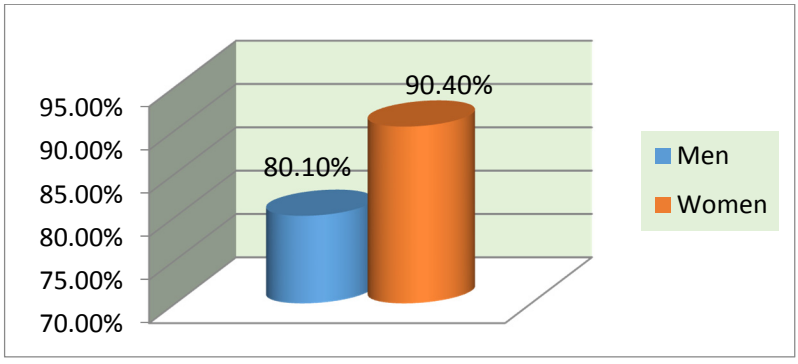

Fig. 5. Condemning the use of doping by gender

This result is reflected in the different age groups as well, people above age 50 condemn the use of doping more than the younger people.

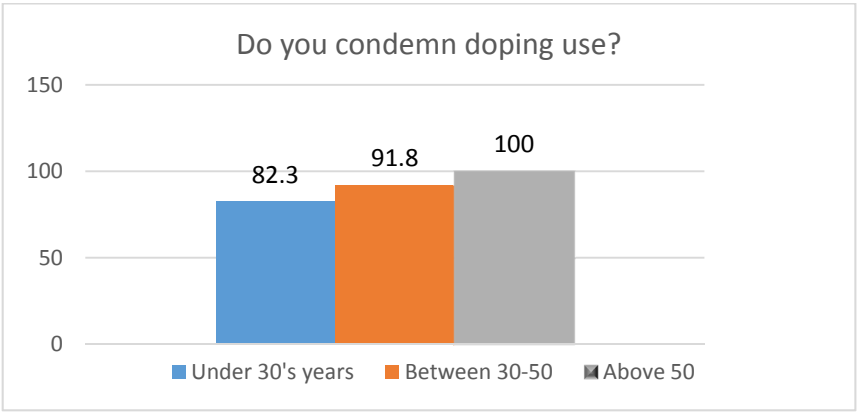

Fig. 6. Condemning the use of doping by age

Conclusions

Our findings suggest gender and age have an impact on attitudes regarding doping. Young males are more accepting of doping use. Our results conclusively show that doping is accepted because of the belief that it is indispensable at the top level of competition. This phenomenon is called a "false consensus effect", which often appears in subcultures as an egocentric bias (Ross, Greene & House, 1977). Our future research will develop further insights about attitudes towards doping. We will continue to explore the topic with standardized test of a representative sample.

According to our results, doping is accepted because of the belief that it is indispensable at the top level of competition. This phenomenon is called a "false consensus effect". In psychology, the false-consensus effect or false-consensus bias is an attribution type of cognitive bias whereby people tend to overestimate the extent to which their opinions, beliefs, preferences, values, and habits are normal and typical of those of others, basically they think that others also think the same way that they do. This cognitive bias tends to lead to the perception of a consensus that does not exist, a "false consensus". Lance Armstrong's story is one of the most known doping violations. Here is what he said an in interview at the Oprah Show.

Oprah: "Did you feel by any mean that you were cheating? "

Armstrong: "No, and that's terrifying. He had not felt like he was cheating because cheating meant to gain unfair rival over a foe, implying that all his rivals were also cheating.

The another story from the Russian Scandal, here is what they said after their caught on the ARD TV: "They tell the coaches that without doping, winning is impossible, and the coaches say the same thing to their athletes. Because of this, neither the athletes nor the coaches feel that they are doing something wrong."

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STUDY ON DEVELOPMENT OF EFFORT CAPACITY IN NEUROLOCOMOTH DEFICIENCIES

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ABSTRACT. Physical education and sport are considered to be of major importance in special education, because through its many forms of organization it succeeds in stimulating the positive development of children in special education, both physically and intellectually. In special education, schools have a method that they use in a lively and attractive environment for children, and they seek to form knowledge, skills and understanding to help them integrate into society. The study was conducted over a 4-week period in which we aimed to develop the exercise capacity of subjects by monitoring results from day to day with the help of bracelets that calculate both heartbeat and calorie, distance, and subject trajectory. Last week's values have seen a big increase compared to the first week, with students having a much higher level of effort.

Keywords: *physical education, cardiac frequency, special needs, special education, cardio bracelets, beats per minute.*

REZUMAT. ***Studiu privind dezvoltarea capacităţii de efort la deficienţii neurolocomotori.*** Educaţia fizică şi sportul sunt considerate a fi de importanţă majoră în învăţământul special, deoarece prin numeroasele sale forme de organizare reuşesc să stimuleze dezvoltarea pozitivă a copiilor în învăţământul special, fizic şi intelectual. În învăţământul special, şcolile au o metodă pe care o folosesc într-un mediu plin de viaţă şi atractiv pentru copii şi caută să formeze cunoştinţe, abilităţi şi înţelegere pentru a-i ajuta să se integreze în societate. Studiul a fost realizat pe o perioadă de 4 săptămâni în care ne-am propus să dezvoltăm capacitatea de exerciţiu a subiecţilor prin monitorizarea rezultatelor zilnice cu ajutorul brăţărilor care calculează atât ritmul cardiac, cât şi caloric, distanţa şi traiectoria subiectului. Valorile din săptămâna trecută au înregistrat o creştere semnificativă faţă de prima săptămână, elevii având un nivel mult mai mare de efort.

Cuvinte-cheie: *educaţie fizică, frecvenţă cardiacă, nevoi speciale, învăţământ special, brăţări cardio, bătăi pe minut.*

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Introduction

Physical education contributes to the harmonious development and integral education of the young generation, the students, to the strengthening of the organism and to their better development. Due to physical education, we learn that: "students acquire knowledge of rational procedures for driving. Being a physical activity, physical education responds to the requirements of the modern school that seeks to train students at work and skills" (Marolicaru, Balint & Macra-Oşorhean, 2011).

Almăşan (2001) defines education as "a set of pedagogical, moral, hygienic, scientific measures applied systematically in order to train man, his moral, intellectual and physical development with the aim of his individual formation, following his inclusion in society civilized".

The selection and systematization of the means is the basic preoccupation of the teacher for the assurance, the educational content of the lesson. For this it is necessary for him to know very well the educational valences of each physical exercise used. In choosing the means of action it must be taken into account that some simple exercises can influence the educational aspect of the lesson even at the learning stage, while other exercises need to be strengthened first (Cîrstea, 2000).

By deficiency we mean "loss of substance or alteration of a function or a psychological, physiological or anatomical structure" (Prodea, 2005). This may be the result of an accident or the conditions in which the person was born or raised.

Incapacity is the limitation or reduction of a person from a particular activity because of the poor issues he has. By this term, we can say that a person does not have the necessary training to accomplish the proposed activity, and that he does not have the necessary skill. (Prodea, 2005)

Classification of types of deficiencies by the criterion of morpho-functional structures damaged:

a. Sensory impairments:
- visual impairment;
- hearing impairment;
- language and communication deficiencies;

b. Neuromotor deficiencies: dated to central nervous system damage (paralysis, hemiplegia);

c. Mental deficiencies: oligophrenia;

d. Behavioral deficiencies;

e. Associated (multiple) deficiencies: - combined with several types of deficiencies (Prodea, 2005).

Objectives

Through this study, I aimed to capture the capacity of children with special needs in physical education and sports lessons and how they can progress through the development of effort capacity, following a plan conceived according to their particularities. We followed the differences of attitude, desire and perseverance, of 2 pupils with totally different deficiencies.

Materials and methods

This research was carried out in a narrow setting, focusing on particular cases of behaviour and resistance. In everyday life, we unreservedly accept the idea of understanding in our relationships, and the understanding of a particular case is actually the basis of our capacity for altruism and trust in the power of change of the other.

The study was conducted over a 4-week period in which we aimed to develop the exercise capacity of the subjects by monitoring the results from day to day with the help of bracelets that calculate both heartbeat and calorie, distance and subject trajectory. Dynamic games with different themes (basketball, football, table tennis, exercise and balance exercises) have been applied according to the students' preferences so that their desire and motivation are as high as possible. At the same time, it was intended that subjects develop their desire to practice the movement for as long as possible.

Figure 1. Cardio-frequency belt

The Dual Belt Cardio Frequency Belt emits the heart rate signal thanks to the two wireless communications technologies: ANT + and Bluetooth Smart. The strap is compatible with all devices that use the Smart Bluetooth protocol.

The materials used were customized according to the sporting branch practiced at Physical Education. Basketball balls, soccer, table tennis, inflatable fitness balls, and mattresses, treadmill, TRX, basketball basket, table tennis balls and small improvisations were needed. Dynamic and balance games have been used in stacks, mats, objects of different sizes and heights.

Intervention program

1. **Preparatory side**
   Heating elements: walking on decks with arms up;
   - walking on the heel with arms at the back;
   - walked;
   - light running;
   - ankle play;
   - stepped forward;
   - stepped up;
   - running with knees at the chest;

2. **Fundamental (thematic)**:
   Basket:
   - learning to keep the ball in the correct throw position;
   - Simulation of basketball throwing;
   - learning to throw the basket with a hand over the shoulder on the spot;
   - throwing the ball at the basket, with one hand, from different angles;
   - Bring the ball with two hands from the chest;
   - the ball to the target, circles traced on the ground, on the wall;
   - dribbling in place, with his left hand, then with his right hand;
   - dribbling on the run, and running smoothly with his right hand, then with his left hand;
   - dribbling bypassing obstacles;

3. **Ending part**
   - Breathing exercises;
   - stretching;
   - exercises for correcting body posture and physical deficiencies;

Subject 1

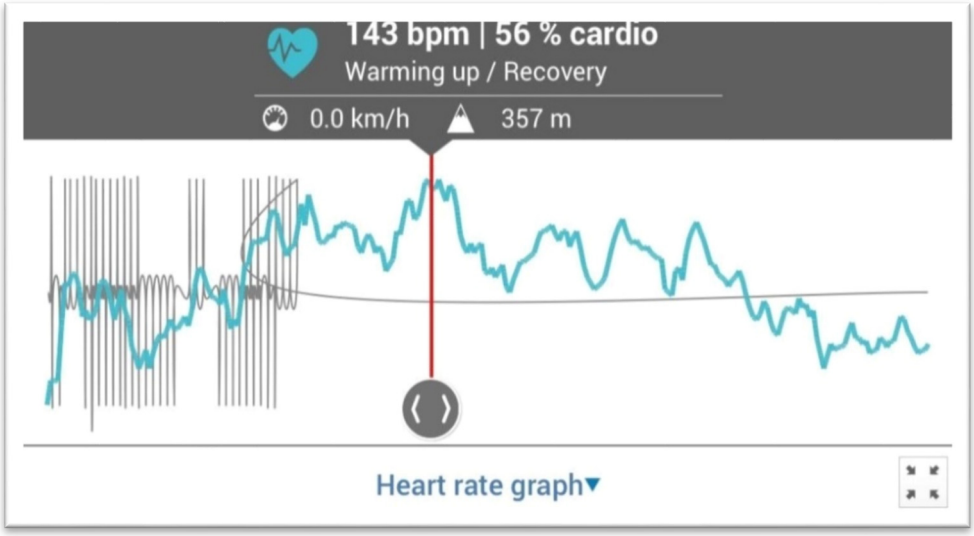

Figure 2. Cardiac frequency and time

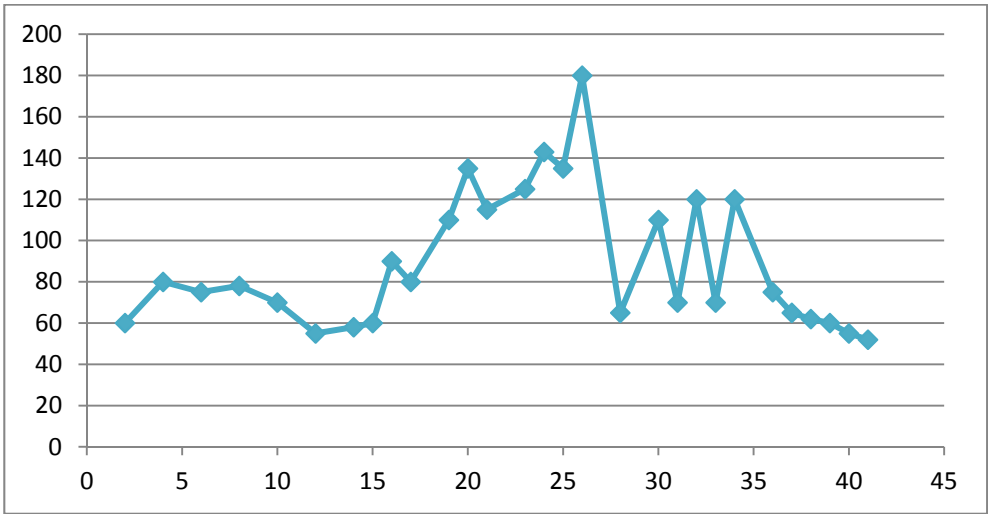

Figure 3. Evolution of physical activity

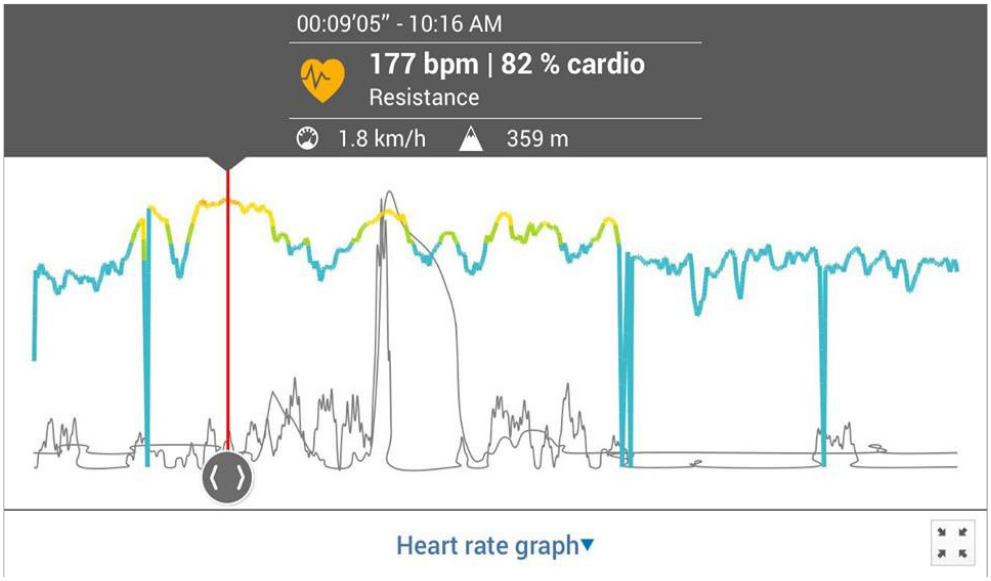

Figure 4. Cardiac frequency and time

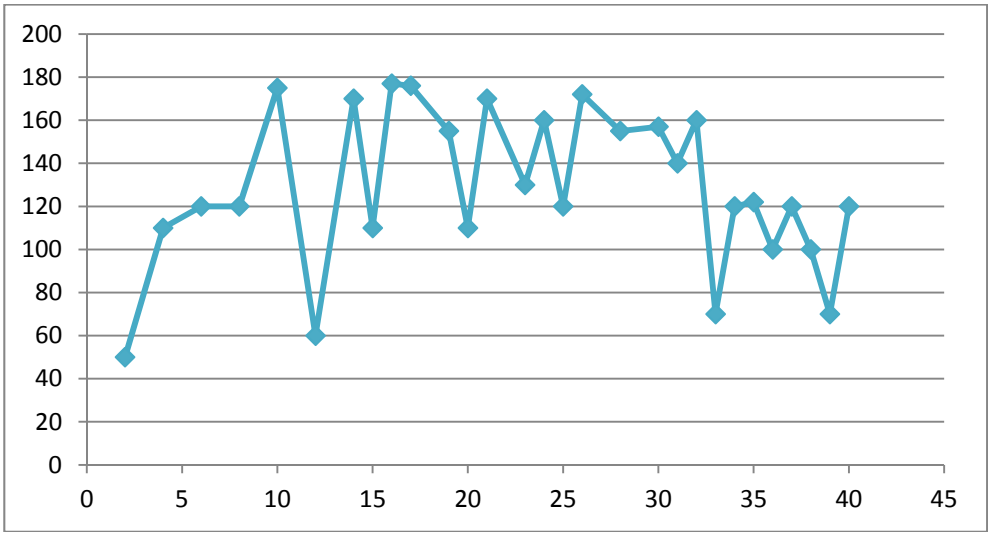

Figure 5. Evolution of Physical Activity

Subject 2

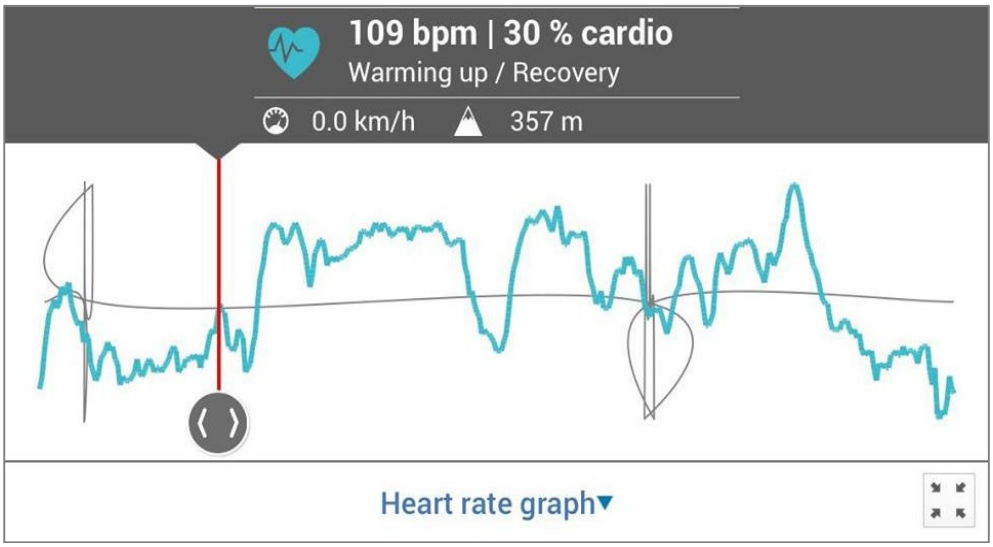

Figure 6. Cardiac frequency and time

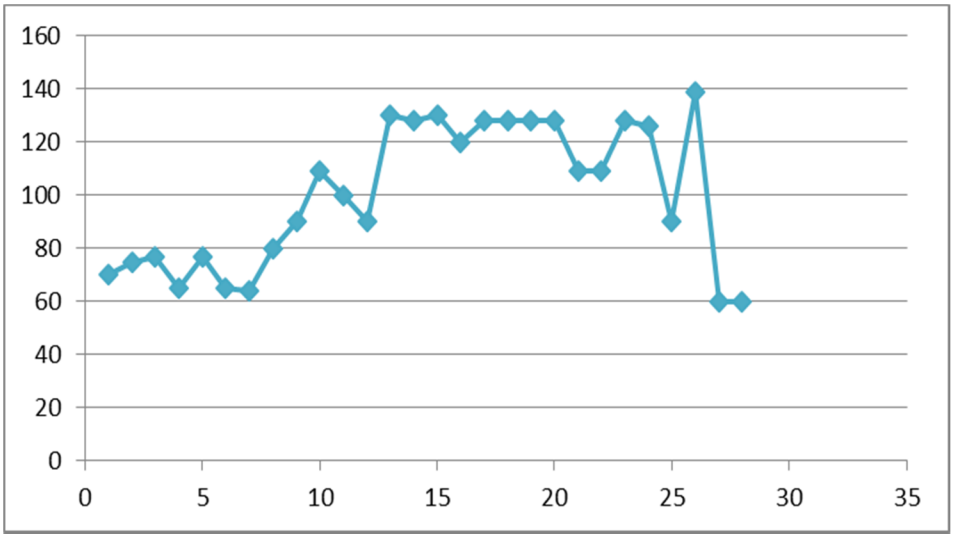

Figure 7. Evolution of Physical Activity

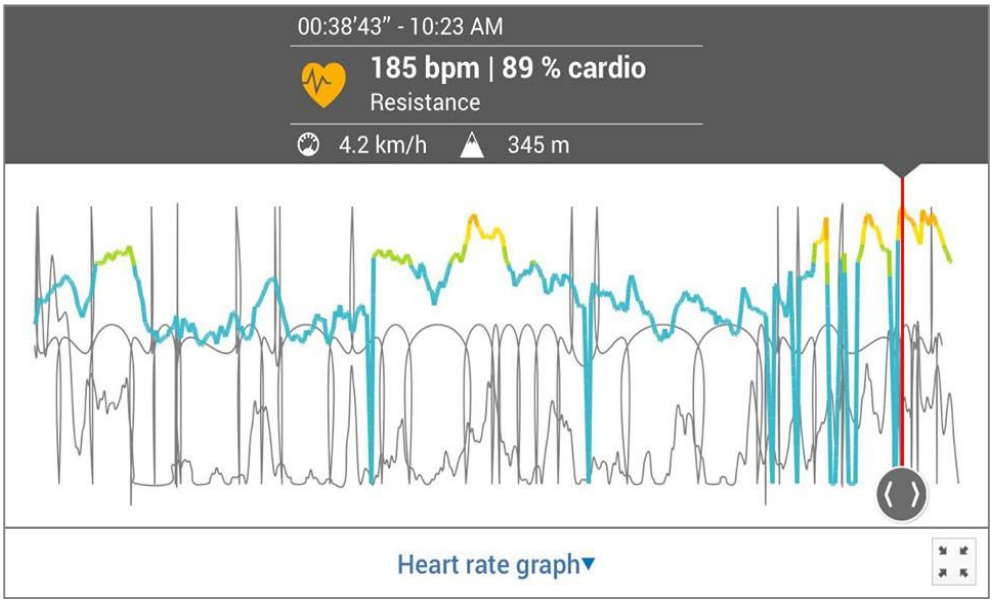

Figure 8. Cardiac frequency and time

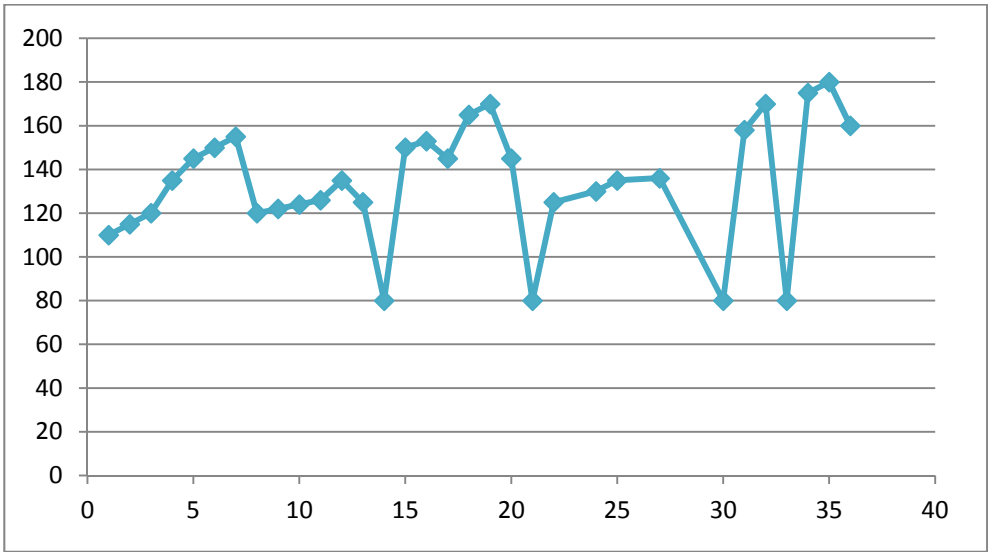

Figure 9. Evolution of Physical Activity

Results

Following the study of the two subjects, the following values of heart rate were obtained during the 4 weeks. As shown in Table 1, subjects had modest results, even in the case of their problems.

Table 1. Results of the first week

Week 1				
Subject 1			**Subject 2**	
Indices	Activity 1	Activity 2	Activity 1	Activity 2
Max. value	143	153	140	157
Med. value	90	117	100	122
Min. value	50	80	90	108

Table 2. Second week results

Week 2				
Subject 1			**Subject 2**	
Indices	Activity 1	Activity 2	Activity 1	Activity 2
Max. value	149	158	145	151
Med. value	115	120	105	110
Min. value	60	65	90	108

Table 3. Third week results

Week 3				
Subject 1			**Subject 2**	
Indices	Activity 1	Activity 2	Activity 1	Activity 2
Max. value	145	150	156	0
Med. value	120	110	125	0
Min. value	70	80	115	0

Table 4. Fourth week results

Week 4				
Subject 1			**Subject 2**	
Indices	Activity 1	Activity 2	Activity 1	Activity 2
Max. value	177	174	165	185
Med. value	135	140	130	140
Min. value	110	120	118	122

As shown in Table 1, at the start of the study, both subjects were at a level very close to effort. Both have the maximum effort in the first two days between 140-157 bmp. When looking at the description of each subject, we expect this difference to be much higher because one of them is immobilized in a wheelchair and the other is a physically healthy child, that is, until a crisis, this is a perfectly normal child.

Table 2 and 3 show that both subjects had a similar development, with heart rate values remaining in close proximity to each other. If in the first week the subjects had the maximum value between 140-157 bmp, in the next 2 weeks these values can be said to have been maintained (145-157 bpm), but this time the increase value can be seen in the case of the average value of the hour, which ranged from 105-125 bmp, during the first week ranging from 90-120. Thus, we can say that the subjects maintained a better level of effort, even if the maximum value did not increase considerably.

In Table 4 the results of the fourth week, we can say that there has been a substantial increase in all respects. The maximum effort level reached 177 bpm for subject I and the subject II reached 185 bpm. And, in the case of the average value of the lesson, we can see a very high increase, the values being between 130-140 this time, sign that the density of the lesson was very good, and the pupils were delighted with the exercises.

At the same time, we can also notice the differences between the first week of the study and the last. If in the first week the maximum reached by subject I was 153 bpm, in the last week it reached 177 bpm. Similarly to HR, in the first week, the maximum was 157 bpm, and in the last week it was 185bpm.

Conclusions

When we talk about a child in special conditions, that is, a child with special needs, we think about it being unable to perform certain tasks or accomplish them, but not entirely. Because of this "need," every child or person needs all our attention, understanding, support and availability.

Following the study of children with special needs, we can say that these children have tremendous potential in terms of movement, but often society is unjust with them and does not give them the attention they need to progress in this area. This study showed us that when the lesson of physical education is individualized for each pupil and the results will not cease to defend.

The purpose of this study was to develop the level of effort of children with mental and locomotor deficiencies so that these students can lead a physically healthy life. At the same time, the study wanted to track the maximum exercise capacity of a mentally disabled and one with locomotor deficiency during a physical activity.

The study was conducted using a heart rate measuring belt, which is located at the chest level, and monitors the subjects' activity. The research lasted 4 weeks, during which each week had a different density program.

That a final conclusion of this study, we can say that these children with special needs can progress much more, but for this it takes a long time for exercises and material bases specific to their needs.

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THE TRAINING PROCESS AS A CONTINUOUS METHOD OF INCREASING THE DEVELOPMENT OF ENDURANCE

ANDREI ANDREEA[1,*], CHERA FERRARIO BIANCA[1]

ABSTRACT. ***Aim:*** 5-6 years of training are necessary to obtain maximum results in freestyle wrestling. In order to reach a superior level, it is essential that effort should increase progressively within the training process. ***Objectives*****:** Studying evolution of strength and resistance of athletes in specific actions in freestyle wrestling, Analysing training organisation through effort methods, Studying and analysing execution techniques in sessions against the clock ***Methods:*** Dummy throws; going into the bridge position, duration**.** ***Results*****:** The recorded results point to an ascending evolution of values, which emphasises an improvement of the overall execution technique in better endurance conditions. ***Conclusions:*** Through constant and sustained training, we have achieved good progress, which shows that efficient means and correct methods of training were employed. Furthermore, the execution technique has also improved as a result of a large number of repetitions per time unit.

Keywords: *freestyle wrestling, resistance, cadets*

REZUMAT. ***Procesul de antrenament ca modalitate continuă de dezvoltare ascendentă a rezistenţei.*** Pentru obţinerea unor rezultate maxime în lupte libere sunt necesari 5-6 ani de pregătire. Pentru a atinge un nivel superior este necesar ca în cadrul procesului de antrenament creşterea efortului să se facă progresiv. ***Obiective*****:** Studierea evoluţiei forţei şi a rezistenţei sportivilor în acţiunile specifice din lupte libere, Analiza organizării antrenamentelor pe mijloace de efort, Studierea şi analiza tehnicii de execuţie în acţiuni contra-timp. ***Metode:*** Aruncări cu manechinul; Intrări în pod, durata***. Rezultatele*** indică o evoluţie ascendentă a valorilor, fapt ce evidenţiază o îmbunătăţire a tehnicii globale de execuţie într-un regim de rezistenţă mai bun. ***Concluzii:*** Prin antrenament repetat şi susţinut am obţinut o linie de progres bună, care demonstrează că s-au folosit mijloace eficiente şi metode corecte de antrenament. De asemenea s-a îmbunătăţit şi tehnica de execuţie, printr-un număr mai mare de repetări pe unitatea de timp.

Cuvinte-cheie: *lupte libere, rezistenţă, cadeţi*

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Introduction

5-6 years of training are necessary to obtain maximum results in freestyle wrestling. In order to reach a superior level, it is essential that effort should increase progressively within the training process.

Motivation of topic

Considering that the specialised literature (Siclovan, 1990) on wrestling deals less with the development of motor qualities of cadets, our intention is to approach the issue of the growth of endurance and thus to make a minimum contribution to clarifying some general and special resistance-related training rules.

Specialised concepts

The current bout for cadets consists of two periods of 2 minutes with a 30-second break, the duration determining the dynamic and decisive character of disputes (FRL, 2018). Basically, this means that one must be active from the first seconds after the gong sounds by attack, counterattack actions until the session ends (Cismaș, 1987).

The intensity of the current bout requires that the cadet should possess a superior development of all motor qualities and particularly of strength, speed endurance correlated with an efficient technique and a modern wrestling style (Siclovan, 1980).

For cadets aged 15-16, one can employ the means of developing endurance, grouped and standardised based on the criteria of tempo and functional strain level, which determine several stages of intensity: the stage of aerobic effort, the stage of low mixed effort, the stage of high mixed effort and the stage of anaerobic effort, without working to the detriment of speed, skill and mobility (Igumenoof, 1978). For this, the coach must make corrections to the different components of effort according to: age and individual particularities, anatomo-physiological and mental particularities of cadet wrestlers divided into weight categories. Compliance with these particularities will lead to the achievement of superior indices of the effort ability, thus avoiding fatigue and the overtraining phenomenon.

The complexity of the effort is related to the difficulty of acquiring and performing technical and tactical procedures, difficulties arising from the coordination movements that are part of their structure. The groups of procedures

that make up the freestyle wrestling technique are characterised by high complexity; therefore, regardless of the workload, the complexity of effort can never be low. The possibilities of carrying out a heavy workload or a specific activity of high intensity are subordinated to the level of development of the great central nervous system functions and to the morphological development of the body (Alexe, 1993).

In terms of the effort capacity, cadet athletes in high-performance groups are close to junior wrestlers. With them, the volume, intensity and complexity of effort will be increased considerably, avoiding excesses (Siclovan, 1990).

Objectives

- Studying evolution of strength and resistance of athletes in specific actions in freestyle wrestling
- Analysing training organisation through effort methods
- Studying and analysing execution techniques in sessions against the clock

Materials and methods

To carry out this study, we have investigated a batch of 10 athletes (girls), aged 15-16, who have been practising wrestling at the C.S PETROLUL PLOIEȘTI club for 5-6 years (Tabel nr.1). Each of these wrestlers has provided data and comments regarding the evolution of the development of effort endurance by means of certain tests.

Table 1. Group of subjects

No.	Subject names (Initials)	Age
1	A.B	15
2	N.L.A	16
3	M.N	15
4	N.C	15
5	M.S	15
6	S.D	16
7	I.D	15
8	V.V	16
9	P.E	15
10	P.A	15

The study

This experimental research aims to observe how technical results and wrestling style evolve within a 230 lesson-cycle, 6 training sessions per week, 1 February 2017 – 28 November 2017.

The place of the experiment was the training gym of C.S. Petrolul Ploiești.

Materials used for the experiment: record sheets, traction device, dummies, the Olympic barbell with weights, stopwatch, metronome, gymnastics benches; the gym, the mats and the dummies were in perfect hygienic conditions.

Methods of evaluation employed

1. *Dummy throws* – the procedure used was the dummy hip toss by holding the arm and the belt. It runs against time, for 3 minutes and the number of correct procedures is recorded.

2. *Going into the bridge position, duration: 60" - maximum number of executions – 33 repetitions*.

Tests were carried out during the following periods:

01-05.02.2017; 20-25.07.2017; 22 -29.07.2018.

Means used in training – methods and means were elaborated in order to ensure the level of development of the effort and endurance capacity required by current bouts.

Means to develop the aerobic effort capacity:

Periods of training:

- 01-05.02.2017; 20-25.07.2017; 22 -29.07.2018.

1. Long run 15-30' with an intensity of 4' per km.

2. Tempo run 3x800 with an intensity of 2'55"- 3'. Breaks between the series were of 5', ensuring the return of the heart rate to 110-120 bpm.

3. The increase of the aerobic effort capacity was achieved by combining specific wrestling means:

a. in order to improve technique and tactics, the fighting technique in the form of training engagements was employed, with an intensity lower than in competition, the training routine being as follows: 3x3' – 1' active break; 3x3' - 1'30" active break; 2x5' - 2' active break; 65-75% work intensity.

b. dummy throws were also employed, according to the following routine: 3x2' - 1'30" break; 3x3' - 5' break; 60% work intensity.

Means to develop the anaerobic effort capacity:

In order to increase the anaerobic effort capacity of the body, the following means were used:

1. Short distance speed run 20-30 m with 100% intensity - 1' active break. 6-8 repetitions were performed during one training session.
2. As regards mat training, engagements according to the effort alternation method were employed: 15' attack at maximum tempo; 1'30" attack at moderate tempo; 4-5 repetitions at maximum and moderate tempo were performed.
3. Dummy throws were executed in short periods, at maximum tempo: 5x20"- 1' active break.

To improve the glycolytic mechanism, engagements with different partners were employed as follows: 4x2' - 1' active break; 6x1' – 30" active break; 3x1' plus 2x3' – 1' active break; 70% work intensity.

Statistical evaluation can be realised by the next methods:

1. Arithmetic average: is an indicator whose purpose is to approximate the central value, based on data obtained through a real measurement. The more wings are closer, the more the approximation is better. It is carried out by assembling of each variable's value shared at the number of cases.

2. Standard deviation: represents the spreading grade around the average of the values. Homogeneity of a group is viewed hereby:

- high homogeneity if CV < 10%;
- low homogeneity if is CV between10% şi 20%;
- no homogeneity if CV > 20%.

3. Highest value represents superior wing of the group

4. Lowest value represents inferior wing of the group

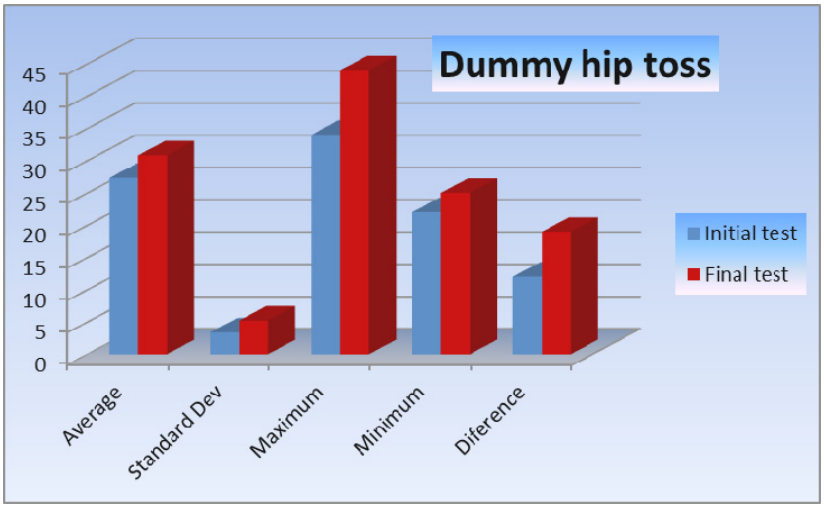
5. The difference represents mathematical value between highest and lowest value.

RESULTS

1. Dummy hip toss (Tabel 2) by holding the arm and the belt 2x2', number of performed repetitions in 2 minutes.

Table 2. Statistical results

Statistical results	Initial test	Final test
Average	27.3	30.8
Standard Deviation	3.38	5.21
Maximum	34	44
Minimum	22	25
Diference	12	19



Graphic no.1 – Statistical results

The following results were obtained after the tests:

The average was 27.3 repetitions in the initial testing and 30.8 repetitions in the final testing (Table 2). The analysis of results points to a positive evolution of the number of executions of throws, showing an increase in the physical condition and endurance specific to freestyle wrestling athletes. Standard deviation represents a value of 3.38 for the initial test end 5.21 for final test. These values prove that the group is homogeny because the athletes had same physical condition. (Table 2)

The maximum values increased from 34 repeats in the initial test to 44 repeats in the final test (Table 2). An increase of 10 repetitions was thus recorded, this being the result of a talented and passionate athlete.

The minimum value rose from 22 repetitions in the initial testing to 25 in the final (Table 2).

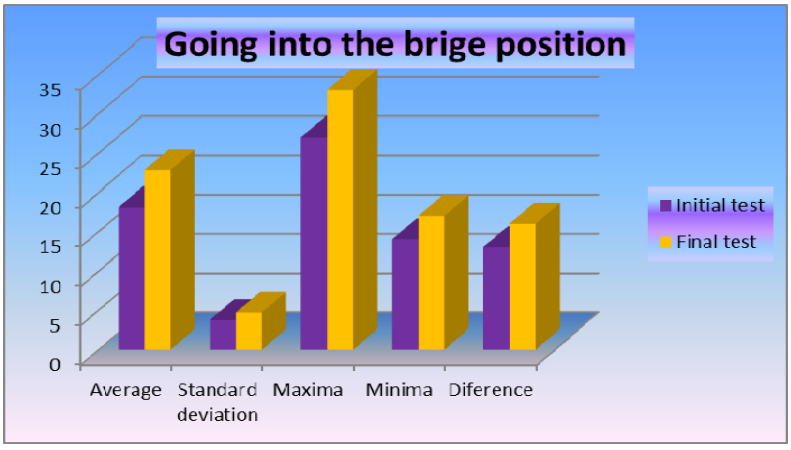
The increase of performance in the dummy toss event points to the improvement of high mixed effort stage, allowing the cadet wrestler to carry out a dynamic fight style which can be maintained throughout the bout.

The deference between the two trails involved 12 repeats for initial test and 19 repeats for final test. We can see an improvement over 50 % from the initial trial to final one. This fact proves that if training is carefully monitories and coordinated the level of the performance is higher. (Table 2)

2. Going into the bridge position, duration: 60" – maximum number of executions (Table 3)

Table 3. Statistical results

Statistical results	Initial test	Final test
Average	18.1	22.8
Standard deviation	3.70	4.66
Maxima	27	33
Minima	14	17
Diference	13	16



Graphic no. 2 – Statistical results

As regards the second event, the following results were obtained:

The average was 18.1 repetitions in the initial testing and 22.8 repetitions in the final testing (Table 3). Progress was thus recorded in this procedure as well, which indicates an increase in the athletes' resistance and also an improvement of the execution technique.

Standard deviation represents a value of 3.70 for the initial test end 4.66 for final test. We recorded at this test small values, because the athletes had a similar physical level that lead to the proof that we had uniformity in the group. (Table 3)

The maximum value increased from 27 repetitions in the initial test to 33 in the final test, this being a very good evolution of the athlete in our study (Table 3).

The minimum value increased from 14 to 17 repetitions, hence a positive evolution of the minimum values (Table 3).

The deference between the two trails involved 13 repeats for initial test and 16 repeats for final test. During our study it can be observed a progress of 25 % that defines conscious mobilization of the athletes as well as of the coach's.

Vitor Marques recorded results to an ascending evolution of values, which emphasises an improvement of the overall execution technique in better endurance conditions. "We found a significant positive correlation between aerobic power of the wrestling athletes and the strength and muscle endurance tests." (Vitor Marques et al., 2019)

Andriy Chernozub **observed, that power indicators of the group A, athletes show an** increase of 43.2% in comparison with the initial data, likewise in our study we recorded a progress between 30-50 % athlete's development of the strength and endurance. (Andriy Chernozub et al., 2018)

Conclusions

Through constant and sustained training, we have achieved good progress, which shows that efficient means and correct methods of training were employed. Furthermore, the execution technique has also improved as a result of a large number of repetitions per time unit.

For the training of cadet freestyle wrestlers, it is necessary to change the effort intensity and rationalise it according to the specific energetic metabolism required by the dynamics of current bouts.

It is also required that standardised exercises should be grouped in terms of tempo and functional strain level, so that several stages of high mixed effort and the stage of anaerobic effort should be achieved.

Recommendations

1. To determine the intensity and functional strain through exercises employed, the coach will assess the evolution of effort by recording the heart rate. This measurement is of major importance in permanently supervising the body reaction of cadet wrestlers, thus avoiding the negative effects of overtraining fatigue.
2. The athlete's training will be mainly oriented to the concept of total risk fight.

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TAIJIQUAN AS PHYSICAL EDUCATION FOR STUDENTS

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ABSTRACT. In recent years, with the opening of China's borders to the Western world, culture of this country have managed to attract millions of people. With a history of over 5,000 years, China has managed to amaze both through discoveries made, as by the martial arts, the most famous being the Shaolin School. Coming from Sholin schools, Taijiquan offered the chance to practice an accessible martial art as those with a superior physical training, as those who exercise a high intensity, has been banned for health reasons. Having in mind the numerous worldwide studies on Taijiquan. Faculty of Physical Education and Sport, Babeş-Bolyai University, Cluj, to implement a one-semester program (semester I, academic year, October 2018 -January 2019) of Taijiquan style, Yang short form (Long Box) (20 movements). The program included 46 students who did not practice sports. (23 students group witness and 23 students experimental group). Following this study one can say that Taijiquan exercises significantly improve balance and mental state (attention and memory).

Keywords: *Taijiquan, qi, Yang style, physical education, Chen style, Chen Wangting, Wu style.*

REZUMAT. ***TAIJIQUAN activitate fizică pentru studenţi.*** În ultimii ani, odată cu deschiderea frontierelor Chinei în lumea occidentală, cultura acestei ţări a reuşit să atragă milioane de oameni. Cu o istorie de peste 5.000 de ani, China a reuşit să uimească atât prin descoperirile făcute, cât şi prin artele marţiale. Cea mai cunoscută fiind Şcoala Shaolin. Venind din şcolile din Sholin, Taijiquan a oferit şansa de a practica o artă marţială accesibilă, atât pentru cei o pregătire fizică superioară, cât şi pentru cei care au interdicţie, din punct de vedere medical, pentru eforturile mari. Introducerea exerciţiilor de pregătire fizică şi a tehnicilor Taijiquan poate îmbunătăţi calitatea echilibrului şi a stării psihice a studenţilor. Verificarea eficacităţii utilizării mijloacelor de instruire din educaţie fizică, prin compararea cu datele obţinute în urma practicării Taijiquan-ului în cadrul orelor de educaţie fizică. Exeperimentul a avut loc în cadrul Facultăţii

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de educaţie Fizică şi Sport, UBB-Cluj, în perioada octombrie 2018 - ianuarie 2019. Subiecţii cercetării au fost două grupe de studenţi cu 23 de subiecţi pe fiecare grupă. În urma derulării acestui studiu experimental se poate confirma că exerciţiile de Taijquan pot îmbunătăţi echilibru şi starea mentală (atenţia şi memoria).

Cuvinte-cheie: *Taijiquan, Qi, stilul Yang, educaţie fizică, stilul Chen, Chen Wangting, stilul Wu.*

Introduction

Born from Shaolin schools, Taijiquan is a relatively young age, compared to the history of other Chinese martial arts. Taijiquan translates to "boxing supremacy." The first codified forms of Taijiquan appear in the Ming period (1368-1644), with a major influence Dao. Most schools will appear in the following period, the Qing dynasty (1644-1911), which will bring with them the influences of the Buddhist schools.

The most important schools are named after the families that created them.

Taijiquan Schools

There are five major Taijiquan schools. In order of appearance:

1. Chen - is the oldest school. It is also known as Chen Wang Ting or Zouting. It was created by Chen Wangting (1580-1660) a former commander of the special caravan protection troops.

2. Yang - belonging to the Yang Luchan family (1799-1872). He was known as Yang Wudi (invincible Yang). Yang Luchan was a simple countryman.

3. Wu Hao - belongs to the Wu Yuxiang family (1812-1880).

4. Wu - belongs to the Wu Yuxiang family, also known as Wu Yu-hsiang (1812-1880). He was an Officer of the Imperial Guard.

5. Sun - belongs to the Sun Lutang family (1860-1933).

The effects of Taijiquan

Even if the practice of this art is hundreds of years, scientific studies are recent, which can not give us a definitive answer as to what effects is obtained after practice.

Although research is at the beginning and results can not occur in a relatively short time, there are signs that the effects are positive on the central nervous system, the locomotor system and the sense organs (Song, Lee, Lam,& Bae, 2003).

Effects of Taijiquan is not achieved in a relatively short time, it involves a correlation between central nervous system and muscular system, with automatic nervous system, a process that takes many years.

However, on short-term effects can be seen even after a shorter period of practice. Among the most important benefits are those related to balance (Bandura, 1997, p. 604).

Reduction of mood disorders (Babyak et al., 2000. pp. 633-638; Barnes et al., 2004; Ospina et al., 2008).

Beneficial effects on the osteomuscular system (Song, Lee, Lam, Bae, 2003).

Hypothesis

I assumed that introducing physical training exercises and techniques Taijiquan can improve the quality of balance and mental state of students.

Research objectives

Verify the effectiveness of using physical education in higher education compared to Taijiquan use.

The purpose of the research

Consists of highlighting the means to improve balance and mental state in adults.

Organization of research

Duration: 70 minutes, once a week for 9 weeks.

Techniques used: Taijiquan, Yang form, Short Toul, 20 moves.

Subjects: 46 students (23 students - control group and 23 students experiment group) from the Faculty of Geography, UBB Cluj, with their agreement, during the second semester of the academic year 2017-2018.

Teacher: is certified as Taijiquan Yang style instructor from 2009

Place: Sports Park "Iuliu Haţieganu", sports grounds, and on bad weather, the gym hall.

Equipment: sportswear

Evaluation Techniques: Static equilibrium on both legs, from Ma Bu position, timed.

The study

***Balance evaluation**:* because this art requires 90% to keep the static and dynamic balance, we evaluated the initial duration of each subject. The evaluation position was from two distal shoulders, flexed knees to 90 degrees (Ma Bu. Fig 1.). The timer starts when the subject takes the correct position, and stops when the subject loses its balance.

Table 1. Control group

Nr.	First and Last Name	Initial Position - Ma Bu/Duration/sec	Final PositionMa Bu/Duration/sec
1	A.B.	0.10	0.15
2	B.A.	0.11	0.10
3	C.C.	0.13	0.11
4	C.B.	0.14	0.12
5	C.R.	0.13	0.14
6	D.D.	0.14	0.13
7	F.M.	0.13	0.12
8	G.S.	0.15	0.15
9	H.D.	0.16	0.16
10	I.I.	0.13	0.14
11	K.L.	0.14	0.13
12	L.M.	0.20	0.18
13	L.G.	0.13	0.10
14	M.Ş.	0.23	0.18
15	M.D.	0.19	0.19
16	M.C.	0.17	0.13
17	M.A.	0.12	0.16
18	O.A.	0.21	0.19
19	P.L.	0.19	0.12
20	P.S.	0.14	0.11
21	R.D.	0.10	0.12
22	S.P.	0.21	0.16
23	S.M.	0.39	0.22

The control group, after testing, did general physical education exercises without equilibrium exercises.

Table 2. Experimental group

Nr.crt.	First and Last Name	Initial Position Ma Bu/Duration	Final Position Ma Bu/Duration
1	A.Z.C.	0.14	0.45
2	B.E.	0.12	0.34
3	B.I.E.	0.17	0.54
4	B.J.	0.16	0.53
5	C.T.S.	0.13	0.34
6	D.K.E	0.16	0.46
7	E.K.	0.18	0.50
8	G.T.	0.15	0.49
9	H.F.S.	0.30	1,26
10	H.M	0.15	0.35
11	J.T.	0.13	0.43
12	K.E.	0.17	0.43
13	K.S	0.19	0.53
14	L.S.T.	0.33	1,02
15	M.H.	0.16	0.56
16	N.O.N.	0.15	0.53
17	P.S	0.13	0.46
18	P.E.	0.24	0.49
19	R.I.	0.24	0.59
20	S.Z.	0.16	0.49
21	T.L.	0.34	1,03
22	T.B.	0.13	0.49
23	Z.A.L.	0.17	0.59

The research paid attention the first on the balance and then the technique. The first criterion for selecting of students from both groups was none of them are not practitioners of any martial arts, so as not to influence the results of the research.

For those in the control group, each hour started with a warm up exercises of 10 minutes, followed by exercises of force and athletics, while the experimental group performed both exercise: mobility and breathing exercises.

The experimental group executed, in the second part of the hour class, the 20 techniques, worked on sections. Finally, the lesson ended with breathing exercises. The last 3 hours of the course were awarded to complete the 20 movements.

Tehnicile propuse

Fig. 1. Ma-Bu position

Fig. 2

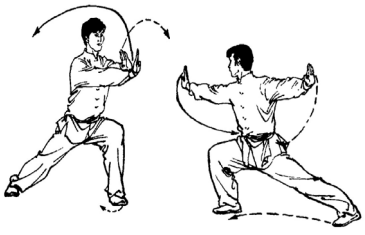
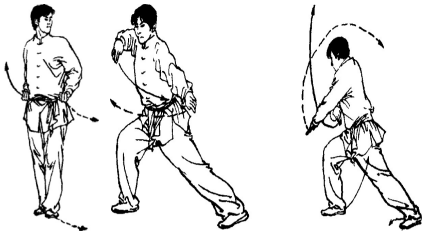


Fig. 3.



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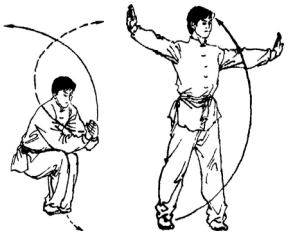

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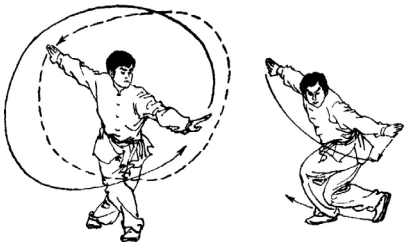

Fig. 8

Fig. 9

Fig. 10

Fig. 11

Results

After final evaluation, the control group achieved results less than or equal to the primary assessment, while the experiment group achieved a time superior to the primary assessment.

The experiment group has been positive in the way of performing techniques, where certain positions required a balance of the body at a higher level than other exertions of physical education. The experiment group, students have shown a high interest in this kind of exercise, especially since Taijiquan is not an easily accessible form, due to lack of coaches and instructors.

From a psychological point of view, the memory is the first psychological quality that contributes to the execution of Taijiquan techniques. The presentation of techniques, in natural motion, initially led to the idea of abandonment, but with the execution of segments of each technique, the students were able to memorize the order of each technique, and why it's running. Without recourse to memory can not reach any performance in this direction.

Attention was the second of the psychological qualities most commonly used in Taijiquan practice. The focused attention to execution, to keep the body in certain positions, the student correctly controls his body, preparing him for a series of linked movements (Toul). The attention to execution, to keep the body in certain positions, to understand the correct role of each movement, has made the 20 movements to be executed flowing, logical, and with a tendency to be effective in terms of martial arts.

These results confirm also the research conducted by Marko Nedeljkovic (Nedeljkovic, Ausfeld-Hafter, Streitberger, Seiler & Wirtz, 2012*).*

Table 3. Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	MabBu_Cntrl_Ini - MaBu_Cntrl_Fin	,01870	,04310	,00899	,00006	,03733	2,080	22	,049

Table 4. Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	MaBu_Exp_Ini	,1826	23	,06376	,01330
	MaBu_Exp_Fin	,5609	23	,22936	,04783

Table 5. Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	MaBu_Exp_Ini & MaBu_Exp_Fin	23	,881	,000

Table 6. Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	MaBu_Exp_Ini - MaBu_Exp_Fin	-,37826	,17577	,03665	-,45427	-,30225	-10.320	22	,000

A paired-samples t-test was conducted to compare MaBu_Cntrl_Ini and MaBu_Cntrl_Fin. There was a significant difference in the scores MaBu_Cntrl_Ini (M=0.16, SD=0.06) and MaBu_Cntrl_Fin (M=0.14, SD=0.03) conditions; t(22)=2.08, p = 0.049. These results suggest that Taijiquan training methods really do influence the balance of the control group.

A paired-samples t-test was conducted to compare MaBu_Exp_Ini and MaBu_Exp_Fin. There was a significant difference in the scores MaBu_Exp_Ini (M=0.18, SD=0.06) and MaBu_Exp_Fin (M=0.56, SD=0.22) conditions; t(22)=-10.32, p = 0.00. These results suggest that Taijiquan training methods really do have an effect over balance in the case of the experimental group.

A correlation test was conducted for both the control and the experimental group that showed, for each of the cases, a strong correlation between the initial and the final values of the experiment. For the control group the correlation was 0.75 and for the experimental group the correlation was 0.88.

According to the descriptive statistical analysis the biggest difference between the control and the experimental group was the value of the average values. For the control group the initial average was 0.16 and the final was 0.14, while for the experimental group the initial average was 0.18 and the final was 0.56.

Conclusions

As a result of studies made both by researchers in other countries, (as Wolf, S. L.; Barnhart, H. X.; Ellison (1998), or Wile, D. (1995), but also by us, we conclude that the practice of Taijiquan techniques in *Taoul* variant (model, shape), bring amateur physical exercise practitioners to significant improvements in balance.

This improvement in balance is only for a limited time, and can not be considered as a permanent acquisition. The lack of Taijiquan practice will lead, over time, to the loss of these motor skills, especially to those who practice physical exercise as a form of relaxation, occasionally.

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METHODOLOGICAL CONTRIBUTION IN THE FIELD OF MOUNTAIN LEISURE ACTIVITIES PRACTICING CASE STUDY: SCRAMBLING IN HIGH TATRAS

BÎCA IOAN[1,*], ZANCA RAOUL[1], SCHUSTER EDUARD[1]

ABSTRACT. Mountain leisure activities attract many participants because they are beneficial for health, maintain fitness, induce the feeling of performance and are spectacular. Among these activities, stands scrambling, which is part of the mountaineering and it is practice on the rock exposed surfaces (walls, ridges, chimneys, gully). One of the areas that offer excellent conditions for practicing scrambling is High Tatras (Vysoke Tatry) in Slovakia, where granite and gneiss rocks have created an attractive and favorable microrelief for this activity. This study aims at carrying out experimental methodological researches on the route Velička Dolina-Velicky zlab-Gerlachovský peak- Dolina-batizovsle Žlab-Batizovska Dolina-Batizovske Pleso-Sliezsky Dom regarding scrambling organization activity and mentation of specific climbing techniques in correlation with geologic factors (rocks, landforms). The subjects of this experiment were a group of students from the Faculty of Geography, from Babes-Bolyai University Cluj-Napoca (Romania), Tourism Geography specialization, without previous mountaineering experience on stony ground.

Keywords: *outdoor leisure activities, scrambling, climbing, mountaineering, Gerlachovsky peak*

REZUMAT. ***Contribuții metodologice în domeniul practicării activităților agrementale montane. Studiu de caz: Scrambling în Tatra Înaltă.*** Activitățile agrementale montane atrag numeroși participanți, deoarece sunt benefici pentru sănătate, mențin condiția fizică, induc sentimentul de performanți și sunt spectaculoase. Dintre aceste activități, se remarcă scramblingul, care face parte din mountaineering și se practică pe suprafețe cu roci expuse (pereți, creste, hornuri, gullys). Unul dintre arealele care oferă condiții deosebite pentru practicarea scramblingului este High Tatras din Slovacia, unde rocile granitice și gnaisice au creat un microrelief atractiv și favorabil acestei activități. Studiul de față are ca obiectiv efectuarea unor cercetări experimentale metodologice pe traseul Velicka Dolina-Velicky zlab-Gerlachovsky peak-Batizovske zlab-Batizovska Dolina-batizovsle Pleso-Sliezsky Dom privind organizarea activității de scrambling

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și aplicarea tehnicilor specifice de cățărare în corelație cu factorul geologico-geografic (rocă, microrelief). Subiecții acestui experiment au fost un grup de studenți de la Facultatea de Geografie a Universității Babeș-Bolyai din Cluj-Napoca (România) specializarea Geografia Turismului, fără experiențe montane anterioare pe terenuri stâncoase.

Cuvinte-cheie: *activități agrementale active, scrambling, escaladă, turism montan, Gerlachovsky*

Introduction

Scrambling is an recreational activity that involves walking on stony ground (slopes, couloirs, gullys, chimneys, rock walls, ridges, rock formations), to reach a higher point (peak, peak, summit, scenic points), with hands and feet, without using climbing equipment (ropes, harness, belay devices). By the techniques used and by requests, scrambling can be considered the first stage of climbing in all leisure activities that take place on exposed rock surfaces (bouldering, free climbing, rock climbing, mountaineering). As difficulty, scrambling routes specified in the various systems of classification, as follows:

- by Yosemite Decimal System (YDS), which has five classes of difficulty, the scrambling routes are classified in 2 and 3 classes, as a simple scrambling, with the occasional use of hands, and low potential hazard, or scrambling with increased exposure, when the hands are necessary, and the dangers are great;

- by British climbing system, the scrambling routes are considered as mild (E, grade 1), moderate (M, grade 2) or difficult (D, grade 3);

-by UIAA, scrambling routes are I, II, III and IV classes difficulty.

Some scrambling guides evaluate the routes as follows:

- generally easy routes, with a minimal exposure and opportunity to use one's hands (class I, according to UIAA);

- moderate routes, where it is necessary to use hands frequently (class II UIAA);

- difficult routes, requiring the use of hands constantly, and even an insurance rope, on shorter sections, with high exposure to hazards (falls, collapses of stones) (class III, according UIAA class 3, 4 and possibly 5 after YDS).

In Tatra, scrambling routes is included in I, II and III classes, and the climbing routes have the degrees of difficulty between IV and VI (according to UIAA).

Since outdoor activities attract more people who need theoretical and physical potential for different types of recreational mountain, in this case the scrambling, has started this study with methodological character and experiments, that followed a series of items relevant to the topic proposed (appropriation of geographical knowledge, acquiring skills walking on stony ground, acquiring methodological and organizational skills).

Research subjects

Working Group established to carry out this study consisted of 10 students (3 girls and 7 boys) in the second year of the Faculty of Geography, Babes-Bolyai University Cluj-Napoca, Geography of Tourism, aged 20 to 21 years, clinically healthy, with no previous mountaineering experience on stony ground. Participation in the event was voluntary.

Materials and Methods

To achieve this study we chose an experimental route in High Tatras, which was followed by scrambling technique between the Sliezsky Dom and Gherlachovsky peak (2655 m).

Before starting the study, it was established an initial protocol, which included the following elements: information about the route, climbing techniques, geographic and tourist elements, targets proposed, program, physical and theoretical preparation, setting items or tasks on each phase of the experiment.

To the initially protocol was allocated four days, distributed as follows:

- one day traveling from Romania to Slovakia (Bistrita-Baia Mare-Vasarosnameny-Kosice-Poprad-Nova Lesna);
- one day rise to the top of Gerlachovský peak (12 hours);
- one day for visiting the Tatras Piedmont resorts (Tatranska Lomnica, Stary Smokovec, Tatranska Polianka, Stribske Pleso);
- one day move from Slovakia to Romania;

Through this route has several objectives, such as:

- making of direct observations on which it was moving surface (rock type, hardness of rocks, fissures, micro-relief, slope), the demands imposed on the route and tourist flows;
- the application of different scrambling techniques, based on the ground features;
- organizing and management of activities, natural resources and time.

Theoretical advance was made by consulting the literature in mountain leisure activities and scrambling (Suman, Babadag, 1987; Chauvin, Coppolillo, 2017), in field of petrology (Davis, Reynolds, 1996; Gridan, 1983; Pârvu, 1983), and for the area of Tatras (Földváry, 1988; Grecula et al., 1997; Gaweda et al., 2012). Also, established the necessary equipment (backpack, clothing, footwear, accessories, food), risks were analyzed and settled the first aid measures.

Physical training to carry this experimentally study was the widening conditions that must be met for the practice of scrambling, such as strength in arms and shoulders to pull up the body, uphill rocky path, ability to sustain an extended physical and mental effort, body balance and flexibility. Therefore, training began a month before the start of the study, during June-July, and included cardio, fitness exercises, deployed in indoor and outdoor, indoor climbing exercises, outdoor running, indoor climbing, bike ride, hiking, all serving to strengthen the body and create specific skills to this activity.

Strength workout for rock scrambling presumed three days a week, performing three to four sets of each of the following strength exercises in a circuit: finger planks, lateral pillar bridge with lat pull, lateral pillar bridge with overhead press with band, pull-ups, push-up with single arm row, dyno step-up jump-to-squat landing, hanging leg lift, arm dip, wheelbarrow walk, oblique knee raise plank, kettlebell figure eight etc.

The items set for each stage of the study were: the organization, and adjusting the necessary equipment, the establish of the route and the collection of specific data for each stage of the route which is important for our study, application of the of acquired movement techniques, the appropriate dosage of effort by controlling the rate of movement and pauses in a pre-exercise volume effort for each stage, and also recording the impressions for each stage and at the end, the well being generated, the response and the motors, physiological and psychological effects on the subjects of this study.

Study Area

Tatra Mountains are located in Slovakia (610 km^2) and Poland (175 km^2), and are part of the Carpathians chain, stretching over 1200 km long, between Vienna basin and Timok valley. It is divided into three distinct sections: Tatra, Easthern Beskids, and Romanian Carpathians (fig. 1).

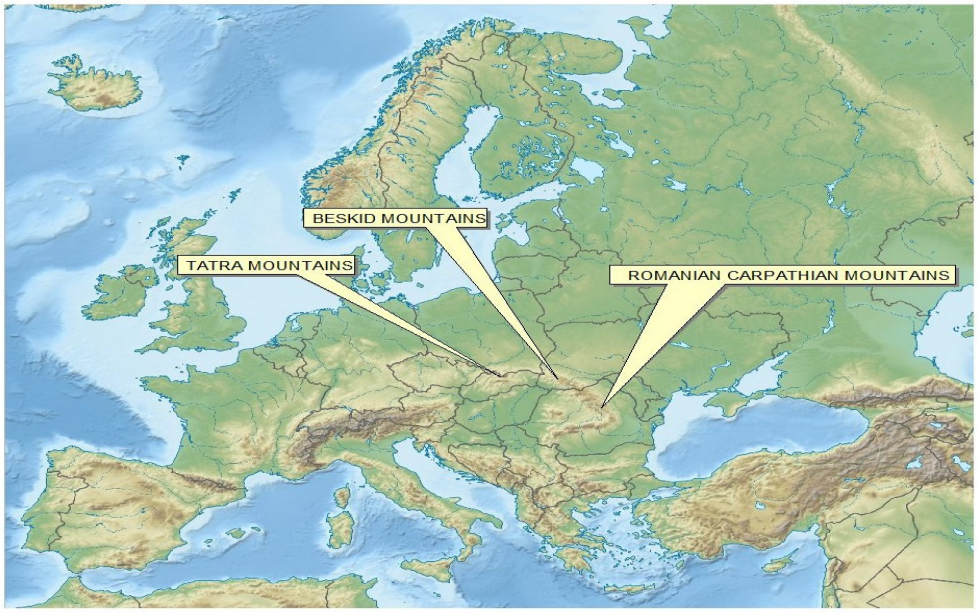

Fig.1. The major subunits of Carpathian Chain
(*source: https://geology.com/world/europe-physical-map.shtml-with changes*)

Tatra is the highest sector, and is divided, in turn, into two subunits:

1) High Tatras/Vysoke Tatry, north of Vah and Poprad valley;
2) Low Tatras, south valleys of Vah and Poprad (Dumbier peak, 2042 m).

The High Tatras sector is divided into three parts (Western Tatras, Central Tatra and Easthern Tatra or Belianske Tatra), and is distinguished by its alpine character, being considered the smallest alpine mountains in Europe (Fig. 2).

This is because the petrography constitution, represented by hard rocks (granite, gneiss), and glacial and periglacial chiseling that shaped spectacular landforms, with great attractiveness for tourism and leisure (glacial basins and valleys, ridges and peaks, steep slopes). The highest point of the High Tatras is Gerlachovský peak (2655 m).

From geomorphological perspective, the High Tatras massif has a main summit, held arched, with convexity to south side, of that fall secondary summits, like giant buttresses, separated by short and deep glacial valleys (dolina).

The main summit has a length of 80 km, and includes more than 25 peaks exceeding 2,500 m, of which 9 peaks are located at more than 2600 m: Gerlachovský, 2655 m; Lomnicky, 2634 m; Ladovy, 2627 m; Pysny, 2623 m; Zadny, 2616 m; Lavinovy, 2606; Ladovy Maly, 2602 m; Kotlovy, 2600 m).

The High Tatras mountain territory is covered by Tatra National Park, which covers the territory of Slovakia (Tatransky Narodny Park), and Poland (Tatrzanski Park Narodowy), with an area of 949 km^2. Slovakian sector of the park has 600 km of hiking trails, of which 16 trails marked and maintained for bicycles.

At the base of High Tatras massif, between 1000-1500 m, runs Tatra Piedmont, built from glacial materials in the form of long and large summits coated of forest that, is lost in the valley of Poprad. Gerlachovský Peak, which is the subject of this case study, is a secondary suumit located between Velička Dolina and Batizovska Dolina, being oriented NW-SE. The front of these summit is marked by a tremendous glacial basin (Gerlachovský kotol), opened to the Tatras Piedmont (fig. 3).

Fig. 2. Study area: High Tatras in Slovkia
(*source: http://www.freeworldmaps.net/europe/slovakia/map.html-with changes*)

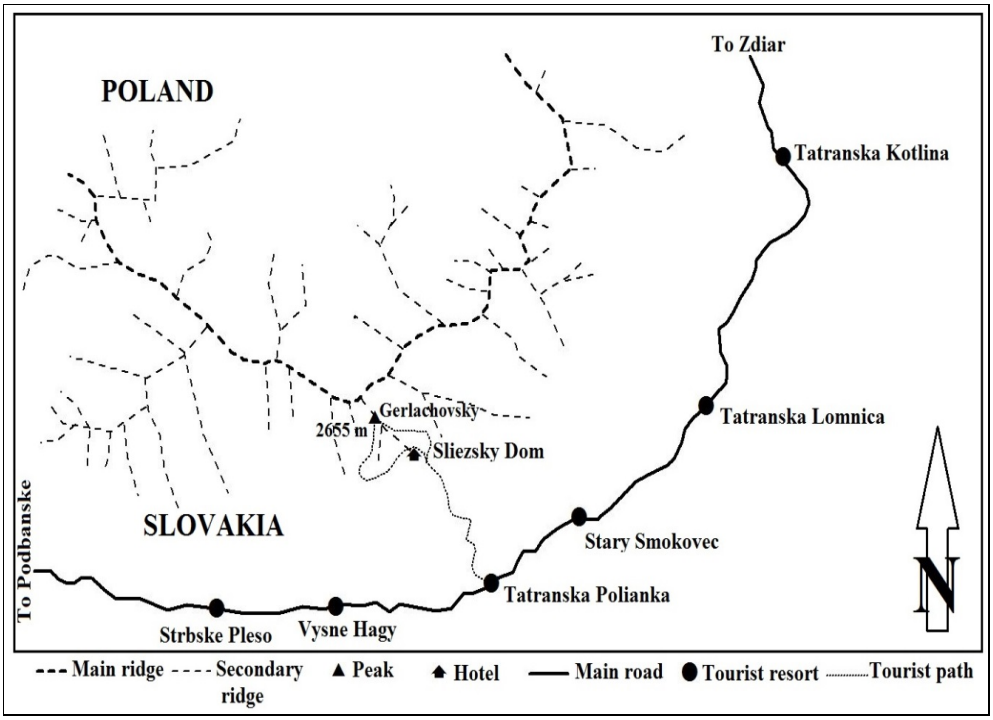

Fig. 3. The orographic map of High Tatras

Results and Discussions

a) Organization of tourism activities in the High Tatras

Because of high attractive potential, mountain tourism is well developed in the High Tatras Mountains, being represented by the numerous activities, such as: hiking, cycling, skiing, scrambling, rock climbing, dry tooling, paragliding, ecotourism. 2016 year recorded 3.5 million tourists in Tatra National Park, mostly coming from Slovakia, Poland and Hungary. Depending on the deployment of the relief, tourist facilities and recreational activities are arranged in steps, as follows:

1) in Poprad Valley:

- settlements with tourist functions: Poprad town (hotels, aquaparks, airoport), Podskalka Matejovce, Romska Osada, Maly Slavkov etc.;

2) in Tatra Piedmont:

- tourist major route 537;
- narrow railway (Tatranská elektrická železnica) on the route Poprad-Starý Smokovec-Štrbské Pleso (29.1 km), and Stary Smokovec-Tatranská Lomnica (5.9 km);
- tourist resorts at1000-1200 m altitudes: Tatranska Kotlina, Tatranska Lomnica (ski area), Tatranska Lesna, Stary Smokovec (ski area), Tatranské Zruby, Tatranska Polianka, Nova Polianka, Strebske Pleso (ski area), Podbanske;
- ski slopes, tourist roads and marked trails, shelters, huts and mountain hotels (Zelenom, Teryho, Zbojnicka, Sliezsky Dom, Popradské Pleso Rysmi, Soliskom);

3) in high nontain area, over 1200 m:

- hiking and climbing market routes, unmarked trails, ski slopes, cable cars (Tatranska Lomnica-Lomnicky peak);

b) Route segmentation according to the request and ground features:

The substrate on which was worked the scrambling activity in the High Tatras is represented by intrusive igneous rocks (granites) and metamorphic rocks (gneiss). These rocks are very hard, which has a rich fissures. The intersection of cracks systems were developed slabs, banks, block and prismatic separation. Crack and fractures systems, and rock separations are particularly important for climbing mountainous exposed sectors (slopes, walls, boulder fields, chimneys, gullys, ridges), because they are hand and footholds, favoring practicing climbing activities that require the use of fingers, hands and feet, and the location of belay devices (bolts, nuts, feathers, cams, tricame).

The resulting fragments by cracks intersection can be deployed by weathering and can accumulate at the base of walls and steep slopes, at the base of gullys, corridors and chimneys or within them, sometimes facilitating the movement, sometimes hindering it, because they are often mobile.

Depending on their physical characteristics, the cracks in the High Tatras, the Velicka Dolina-Gerlachovský kotol-Batizovska Dolina-Gerlachovský peak are several types:

- by length: long cracks, short cracks;
- by width: large cracks, narrow cracks;
- after plan deployment: parallel cracks, branched and intersected cracks;
- after depth: surface cracks, deep cracks.

In climbing, the fractures are classified according to their width, reported at the climber dimensions:

1) finger cracks: allow insert fingers inside them;

2) off-finger cracks: cracks are wider than the finger, but not wide enough to allow the introduction in the hand inside them;

3) hand cracks: allow the hand entering inside their;

4) off-widt cracks: cracks are wider than the rest, but not wide enough to allow the legs or upper body come inside them;

5) large cracks, horn-crackes, chimney cracks: they are large enough to allow their penetration into the whole body.

The hardness of the rock and the cracks lead generated a micro-relief of walls, steps, teeth, chimneys, couloirs, ridges and gullys. The walls are up to 900 meters, with an average of 2-300 meters, and is spread between 1800-2300 m.

Given these considerations, the expedition route was divided into the following sectors and technical activities (fig. 4):

a) Trekking: Tatranska Polianka-Sliezsky Dom (1670 m)-Velicky zlab (1900 m);

- features of the route: tourist path with grass and stone;

- required aptitudes: skills of walking, fitness;

- items to accomplish: the walking, choosing appropriate equipment (flexible boots, soft shell pants, shirts, fleece, backpack, poles), making observations on the organization of the High Tatras National Park (trails, lookout points, resting areas, indicators, route marks), setting the amount of effort, expressed in km (8 km) and elevation (680 m), keeping away a uniform rate of walking (about 4 km/h), recording important data for our study (geodiversity, biodiversity, tourism), the registration of impressions, of well being generated, of the response of the motor, psychological and physiological effects for the subjects of study for this stage;

-time of travel: 2h30min;

b) Scrambling:

1) Sliezsky Dom (1670 m)-Velicky zlab-Kvetnicova veza (2400 m)-Gerlachovsky kotol-Urbanova veza-Batizovka Dolina-Gerlachovky peak (2655 m);

2) Gerlachovsly peak-Batizovsky zlab-Batizovska Dolina-Batizovske Pleso (1884 m):

-features of the route: exposed walls, steps, ridges, chimneys, rocky protrusions;

- necessary aptitudes: walking skills on the rock, fitness:

- items to accomplish: displacement techniques to the rock and via ferrata (use of hands and feet), the use of appropriate equipment (flexible boots, breathable pants, shirt, climbing gloves, helmet), carrying out observations of the substrate (cracks, micro-relief, handholds), and of the glacial and periglacial landforms (fig.5), setting the amount of effort expressed in the difficulty of the route (I-III UIAA), length (4 km climb, 3 km descent), and the level difference (980 m), in compliance with movement of a uniform rate of approximately 1 km/h/300 m above sea level climb, registration of impressions, of well being generated, of the response of the motor, physiological and psychological effects upon the subjects of the study for this stage;

- travel -time: 3 h 30 minutes to climb, 3 hours to descent = 6 h 30 min total;

c) Trekking: Batizovske Pleso-Tatranska Magistrala-Sliezsky Dom-Tatranska Polianka:

- features of the route: tourist path with soil and stone slabs;
- required aptitudes: walking skills, fitenss;

-items to accomplish: walking, using specific equipment (flexible boots, soft shell pants, fleece, windstoper blouse, backpack, poles), making of observations to glacial landforms, mountain vegetation and on the organization of tourism activities in the National Park High Tatras (paved path, markers, signs), fixing the amount of effort expressed in km (5 km), keeping away a uniform way (about 4 km/h), registration of impressions, well being generated, response and motor, mental and physiological effects upon the subjects of this study, for this stage;

- travel time: 3 h.

Technicaly, some methodical steps were agreed:

- identify the optimal route, which will be safe and sufficient handholds for scrambling;
- check stability of handholds, by tapping with hands and feet;
- free walking only with hands and feet;
- stationary points, relaxation, configuration/reconfiguration of the route;
- touching the peak (fig.5).

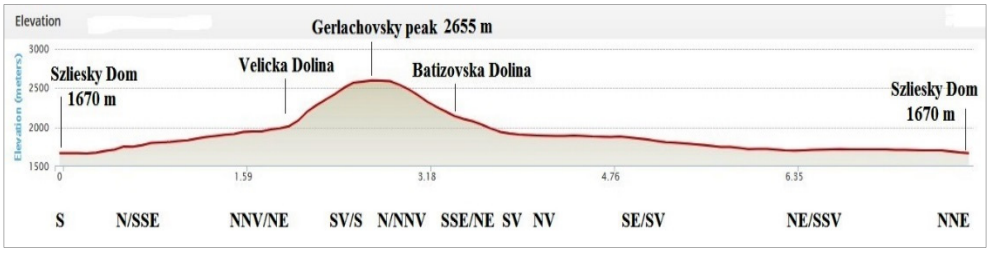

Fig. 4. Profile of the route
(*source: map myhike.com-with changes*)

Fig. 5. Gerlachovsky summit

In the process of displacement they were committed fingers, hands and feet in order to facilitate vertical and lateral movement and to ensuring stability and balance to the body. Therefore, techniques have been applied differently according to the micro-relief and slope, as follows:

a) fingers techique:
- catching the handholds with all fingers;
- catching the handholds with 2-3 fingers;
- introducing the hands/punch in the cracks;

b) hands technique:
- hands support;
- catching the handholds with the fingers;
- release a hand;
- hands synchronization;
- use alternate hands to maintain balance and seeking the handholds;

c) foot technique:
1) stepping/smearing:
1.1) climbing up:
- step the entire sole, where the rock surface was large, slightly sloping and relatively smooth;

- step the tip of the boot (edging), where the footholds were formed of the rock protrusions and cracks, and the rock surface was inclined;

- step the edge of the boot, internal or external, on the inclined surfaces, with the footholds formed by rock protrusions, rocky edge or cracks;

1.2) climbing down:

- step with the heel, on the areas with rock protrusions, which permit this action;

- step the entire sole, where the rock surface was not too inclined;

- step the tip of the boot (edging), and facing the rock wall, where the inclination of the route has been very high (ex. Batizovsky zlab);

2) legs movement:

- pushing the body vertically;

- tranzition of the legs by crossing;

- the change of the foot on the same foothold;

- the rotations of the foot/of the foot and the body on the same foothold;

- the tranzition of the pressure on one foot to another, each foot being on an foothold;

- rotation and transition of the pressure, with the possibility of release and the relaxation of one leg;

- distancing the legs for stability, and for support on the distance foothold (bridging);

d) body tchnique:

- balancing with hands and feet;

- leading the body by balance to a particulary foot/handhold;

- the vectorization/orientation of the body to a particulary foot/handhold;

- pushing the body outside the rocky surface, to redistribute the weight on the feet, and to catching a particulary foot/handhold with the finger or foot;

- closing the body inside the rocky surface, to redistribute the weight on the feet, and to catching a particulary foot/handhold with the finger or foot;

e) walking techniques:

- uphill;

- downhill: facing the rocky surface, back on rocky surface;

- traverse;

- leaping;

- rock hopping (ex. on the surfaces with boulders or large cracks).

Conclusions

High Tatras Mountains offers ample possibilities for extreme leisure, such as scrambling, by virtue of the geological surface, represented by the granite and gneise (rock walls, ridges, chimney, gullys, cracks and separations). The experimentally route chose for this study, running between Velička Dolina-Velicky Žlab-Gerlachovský peak-Batizovke Žlab-Batizovske Pleso favored analysis and application of scrambling specific methodological techniques for fingers, hands and feet, so that the results complete with reaching the peak and return to base safely. The data thus obtained will be used in similar leisure tourism activities for students and tour guides in any area with exposed surfaces.

At the end of this experimental expedition was found that all items have been completed, as follows:

- organizing the expedition: the route and every segments of the route was respected, and each member of the expedition was part of the group;
- setting and compliance program: each stage was run as scheduled without incident;
- the application and learning trekking and scrambling techniques: all members of the expedition managed to move away and scrambling techniques, reaching safely on top of Gerlachovský peak;
- making observations on the organization of the High Tatras National Park, and of the glacial landscape in the studied area: analytical observations were made on tourist infrastructure, tourist flows, leisure activities and the landscape shaped by glacial and periglacial processes in the High Tatras;
- successfully learned by the subjects of this study of methodological skills on organizing outdoor activities;
- the feedback generated by the experience accumulated by the subjects during the study, materialized by motor, psychological and physiological positive immediate effects, and long term will provide a stock of basic knowledge and experience necessary to practice and organizing various forms of mountain leisure.

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