

## ❖ SPORT AND PERFORMANCE

### MODEL OF TESTS FOR ASSESMENT OF SPRINT RUNNING PROFICIENCY

BABIĆ VESNA<sup>1</sup>, BLAŽEVIĆ IVA<sup>2</sup>, KATOVIĆ DARKO<sup>1</sup>

#### Abstract

**Purpose.** The main goal of this research was to establish the model of tests that every PE teacher could use independantly and effortlessly to easily and simply select and direct talented children in sprint running.

**Methods.** The differences in motor abilities' tests between different subsamples of girls were analyzed and the assessment model was established by valorization of results' achievements using tables and frequency diagrams categorized in six point groups.

**Results.** Statistically significant differences in motor abilities' tests were found in all subsamples. The assessment model for valorization of results' achievements was established.

**Conclusions.** Scientifically based models for easier selection of children talented for spint running and track and field sport have not yet been known of in Croatia. This model could have a multiple use both for selection, and for new competition systems.

**Key words:** sprint running, motor abilitie tests, selection, girls.

#### Introduction

Selection is everpresent in every segment of people's actions. In sports, selection refers to the acts of talented individuals selection for which it is assumed under the certain criteria that they could accomplish high sports' result. Timely and qualitative orientation and selection is needed for elite sports. By orientation and selection of talented children to some of the track and field groups or to a specific track and field event, children begin their track and field sports' path, much sooner than a track and field athlete achieves a noteworthy result (V. Babić, 2001). Child's accomplishment in track and field depends on many factors such as his morphological characteristics, motor abilities, starting time of certain sports' engagement, hereditary factors, environment and etc. Selection in track and field is a long-term process that begins at the ages from 6 to 10 years and continues incessantly up until junior category where the changes are still possible. Based on early selection assessments not only a child's potential ability for certain track and field event is being determined, but also the processes of encouraging and directing talented individuals in sports begin. Talented individual sometimes chooses independently to engage in certain sports but more often this happens due to an initiative from an expert, mostly PE teacher. Besides teaching, PE teachers monitor development of different school children generations, they notice the changes in different segments of their anthropological statuses, they also notice predispositions of individuals who have prediction of a success in the events of sprint running in the 5<sup>th</sup> grade girls (V. Babić, 2001; V. Babić and N. Viskić Štalec, 2002; V. Babić et al. 2010 a and b). Therefore, the main goal of this research was to establish the model of tests that every PE teacher could

opportunities for accomplishments in certain sports; all in all, PE teachers have one of the most important roles in sports' development and promotion and in any other form of kinesiological activity.

#### Research study's problem and goal

It is a well known fact that for every motor ability there is the best developmental period, the so called sensible developmental phases that must be taken into account. For speed development the best developmental period is from the ages of 7 to 11 years, that is, from the ages of 13 to 14 years in girls and from the ages of 7 to 10 and 15 to 16 years in boys (H. Sozanski and T. Witczak, 1981). When it comes to timely selection and orientation of children into track and field sprint events it is important to be able to conduct quality, simple, fast, and also importantly, cheap testing of those motor abilities that have significant influence on track and field accomplishments.

In children aged from 11 to 13 years, researchers have mostly investigated relations and influence of different anthropological dimensions on sprint running accomplishments (V. Šnajder, 1982; S. Kurija, 1982; N. Zagorac, 1984; V. Babić, 2001; M. Bračić, K. Tomažin, M. Čoh, 2009; I. Blažević, 2010). The negative influence of subcutaneous fat on sprint running result was determined, as well as the influence of tests used to predominantly asses explosive strength. Earlier research studies tried to establish tests of those motor abilities that have significant role in the

use independantly and effortlessly to easily and simply select and direct talented children in sprint running or in any other track and field event.

**There are more partial goals of this research study:**

<sup>1</sup>Faculty of Kinesiology, University of Zagreb, CROATIA

<sup>2</sup>University of Juraj Dobrila Pula, CROATIA

Email: vesna.babic@kif.hr

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1. Since the competition systems include two grades' groups to compete in the same category, it will be determined if there are statistically significant differences in motor abilities of the 5<sup>th</sup> and the 6<sup>th</sup> grade girls.

2. It will also be determined if there is a difference in motor abilities between more and less successful girls in sprint running.

3. Lastly, it will be determined if there are statistically significant differences in motor abilities' tests of the selected 5<sup>th</sup> and 6<sup>th</sup> grade girls, that is, in those girls who have been selected considering their 60m running result.

#### **Hypothesis of this research are:**

1. There are statistically significant differences in motor abilities between the 5<sup>th</sup> and the 6<sup>th</sup> grade girls.

2. There are statistically significant differences in motor abilities' tests between the girls that have shown through more selection levels to be more successful and the less successful girls.

3. There are statistically significant differences in motor abilities' tests between the 5<sup>th</sup> and the 6<sup>th</sup> grade girls that have passed more selection levels.

The results of this research could facilitate the future sprint running talents search and encourage PE teachers to direct the individuals recognized as sprint running talents into the track and field sport.

The sports' competition examples in countries that are nurturing and developing track and field sport are complying to competitions within the age group. In track and field the age groups are defined by the beginning, that is, by the end of the calendar year. In Croatian school competition system, the competitions are organized within two grades' groups.

#### **Research methods**

##### **Participants sample**

The 5<sup>th</sup> and the 6<sup>th</sup> grade girls from 40 Zagreb elementary schools were tested on the 60m sprint running. For this research study, the sample of 185 girls, aged 11 – 13 years, was extracted from the overall sample of 8184 5<sup>th</sup> and 6<sup>th</sup> grade girls. The sample of 185 girls were divided into few subsamples:

1. The 5<sup>th</sup> grade girls sample (79 girls, average age 11.63 yrs  $\pm$  0,51; average height 151,62 cm  $\pm$  7,05; average body mass 40,57 kg  $\pm$  7,72), and the 6<sup>th</sup> grade girls (106 girls, average age 12,43 yrs  $\pm$  0,55; average height 156,15 cm  $\pm$  6,07; average body mass 45,32 kg  $\pm$  7,26).

2. Among the first sample there were two subsamples: one subsample consisted of 83 successful

(selected) girls that have passed more selection levels (from classes' and school's championship to regional championship) and that were among the most successful in the 60m sprint running at the city championship – selected girls (average age 12,12 yrs  $\pm$  0,67; average height 155,34 cm  $\pm$  6,82; average body mass 43,90 kg  $\pm$  7,04), while the second subsample consisted of 102 girls that were not successful in the 60m sprint running at their own schools (average age 12,07 yrs  $\pm$  0,66; average height 153,30 cm  $\pm$  6,80; average body mass 42,79 kg  $\pm$  8,36).

3. The sample of the successful girls is especially interesting for this research, from 83 selected girls: 38 were 5<sup>th</sup> graders (average age 11,66 g  $\pm$  0,53; average height 152,89 cm  $\pm$  7,31; average body mass 40,97 kg), and 45 were 6<sup>th</sup> graders (average age 12,51 g  $\pm$  0,51; average height 157,42cm  $\pm$  5,68; average body mass 46,38 kg  $\pm$  5,90).

For all participants parental consent forms were obtained in accordance with scientific ethical principals.

##### **Variables' sample**

The variables' sample consisted of the battery of one criterion variable. *60m running (s)* and eight predictor variables that are most often used in monitoring and assesment of school children's motor abilities: *Side strides (s)*, *Standing long jump (cm)*, *Supine position medicine ball throwing (m)*, *Obstacle course backwards (s)*, *Bent arm hang (s)*, *Sit-ups in 60 s from lying with the legs bent (quantity)*, *20 m running (s)* and *Long jump (m)*. The 60m sprint running test and the standing long jump test are the elements that PE teachers most often longitudinally monitor in practice.

All measurements for all participants were conducted by educated individuals, students of the last year at the Faculty of Kinesiology that specialized in track and field, as well as the employees of the Faculty of Kinesiology, University of Zagreb.

##### **Statistical analysys**

Descriptive parameters were calculated from the obtained results. T-test for independent samples was used to determine statistically significant differences between subsamples. Valorization of results was obtained using tables and frequency diagrams categorized into six point groups and was assessed by points and grades. All results were analyzed using program package Statistica for Windows ver. 7.0 at the Faculty of Kinesiology, University of Zagreb.

## Results and discussion

VARIABLES	5 G (N=79)		6 G (N=106)		t - test	p
	AM	SD	AS	SD	df = 183	
Side strides (s)	12,73	0,84	12,29	0,68	3,96	<b>0,00</b>
Standing long jump (cm)	168,52	17,12	174,21	16,33	-2,30	<b>0,02</b>
Supine position medicine ball throwing (m)	3,61	1,04	4,24	1,08	-3,92	<b>0,00</b>
Obstacle course backwards (s)	13,77	2,90	13,09	2,46	1,74	0,08
Bent arm hang (s)	35,65	22,59	34,00	21,23	0,51	0,61
Sit-ups in 60 s from lying with the legs bent	38,94	6,26	39,27	6,05	-0,37	0,71
20 m running (s)	4,01	0,25	3,92	0,22	2,46	<b>0,01</b>
Long jump (m)	2,78	0,45	2,93	0,46	-2,13	<b>0,03</b>
60 m running (s)	10,10	0,81	9,88	0,77	1,86	0,07

**Table 1.** Basic descriptive parameters (AM-arithmetic mean and SD- standard deviation) and differences analysis (t-test, df- freedom degrees, p-alpha level) between the 5th (5 G) and the 6th (6 G) grade girls.

VARIABLES	SEL (N=83)		NESEL 5/6 G (N=102)		t - test	p
	AM	SD	AM	SD	df = 183	
Side strides (s)	12,20	0,68	12,70	0,79	-4,48	<b>0,00</b>
Standing long jump (cm)	181,81	13,02	163,63	15,18	8,63	<b>0,00</b>
Supine position medicine ball throwing (m)	4,33	1,01	3,68	1,11	4,18	<b>0,00</b>
Obstacle course backwards (s)	12,40	1,92	14,18	2,92	-4,77	<b>0,00</b>
Bent arm hang (s)	41,52	22,08	29,15	19,96	3,99	<b>0,00</b>
Sit-ups in 60 s from lying with the legs bent	39,92	6,23	38,49	5,99	1,58	<b>0,12</b>
20 m running (s)	3,80	0,15	4,09	0,22	-10,21	<b>0,00</b>
Long jump (m)	3,12	0,40	2,66	0,40	7,82	<b>0,00</b>
60 m running (s)	9,29	0,30	10,53	0,61	-16,87	<b>0,00</b>

**Table 2.** Basic descriptive parameters (AM-arithmetic mean and SD- standard deviation) and differences analysis (t-test, df- freedom degrees, p-alpha level) between successful (selected) and less successful girls (5/6 G).

VARIABLES	SEL 5 G (N=38)		SEL 6 G (N=45)		t - test	p
	AM	SD	AM	SD	df = 81	
Side strides (s)	12,46	0,74	11,99	0,54	3,37	<b>0,00</b>
Standing long jump (cm)	177,72	12,59	185,26	12,49	-2,73	<b>0,01</b>
Supine position medicine ball throwing (m)	4,00	0,91	4,62	1,01	-2,93	<b>0,00</b>
Obstacle course backwards (s)	12,61	1,99	12,22	1,86	0,94	0,35
Bent arm hang (s)	45,92	25,11	37,80	18,65	1,69	0,10
Sit-ups in 60 s from lying with the legs bent	39,87	7,19	39,96	5,38	-0,06	0,95
20 m running (s)	3,84	0,13	3,77	0,16	2,02	<b>0,05</b>
Long jump (m)	3,02	0,35	3,20	0,43	-2,01	<b>0,05</b>
60 m running (s)	9,41	0,23	9,19	0,32	3,55	<b>0,00</b>

**Table 3.** Basic descriptive parameters (AM-arithmetic mean and SD- standard deviation) and differences analysis (t-test, df- freedom degrees, p-alpha level) between **selected** 5<sup>th</sup> grade girls (SEL 5 G) and 6<sup>th</sup> grade girls (SEL 6 G)

The analysis of descriptive parameters' results showed that in the overall sample of the 5<sup>th</sup> and the 6<sup>th</sup> grade girls (Table 1), as well as in the selected sample of girls (Table 3), the only variable whose results did not improve in the 6<sup>th</sup> grade was bent arms hang (s) although it is expected that all motor abilities in children of that age improve. Additionally, it can be seen that selected girls had statistically significant better results in the same test than the girls who were less successful (Table 2). This result could be due to the average body mass increasement by approximately 5 kg which certainly makes the performance of this test more difficult since the static arms's strength is being tested by this test. The results of this study recommend more attention to be paid in the PE classes of the 5<sup>th</sup> grade girls to contents that influence on arms' and shoulders' strengthening. The results of all other variables, in all analyzed samples, show better, progressive values in regards to the age group.

T-test results' analyses indicate: 1. statistically significant differences in all measured tests between the selected and the less successful girls (Table 2); 2. statistically significant differences in the arithmetic means of the following tests: *side strides, standing long jump, supine position medicine ball throwing, 20m running, long jump* in regards to the grade categorization between the sample of girls that, on average, are in the 5<sup>th</sup> and the 6<sup>th</sup> grade –girls aged from 11 to 13 years (Table 1), as well as between the selected samples of the 5<sup>th</sup> and the 6<sup>th</sup> grade girls (Table 3). The analysis of the criterion variable *60m running* in the samples of selected girls showed to be statistically significant in favor of the older girls.

In regards to the proven statistically significant variables, the results' values (norms) were presented, alike Likert scale, through 6 point groups and organized through 3 grades/categories: excellent, very good and good (Table 4).

VARIABLES	GIRLS N = 183	SEL 5 G N = 38	SEL 6 G N = 45	POINTS	GRADE/CATEGORY
60 m running (s)	8,00 - 8,69	8,70 - 8,89	8,20 - 8,49	10	EXCELLENT
	8,70 - 9,49	8,90 - 9,09	8,50 - 8,69	8	
	9,50 - 10,29	9,10 - 9,29	8,70 - 8,99	6	VERY GOOD
	10,30 - 10,99	9,30 - 9,49	9,00 - 9,19	4	
	11,00 - 11,79	9,50 - 9,69	9,20 - 9,39	3	GOOD
	11,80 - 12,60	9,70 - 9,80	9,40 - 9,70	2	
Side strides (s)	10,70 - 11,39	10,80 - 11,49	10,80 - 11,29	10	EXCELLENT
	11,40 - 12,19	11,50 - 12,09	11,30 - 11,69	8	
	12,20 - 12,89	12,10 - 12,79	11,70 - 12,09	6	VERY GOOD
	12,90 - 13,69	12,80 - 13,49	12,10 - 12,49	4	
	13,70 - 14,49	13,50 - 14,09	12,50 - 12,99	3	GOOD
	14,50 - 15,20	14,10 - 14,80	13,00 - 13,40	2	
Standing long jump (cm)	198 - 212	199 - 208	201 - 211	10	EXCELLENT
	184 - 197	188 - 198	191 - 200	8	
	169 - 183	178 - 187	181 - 190	6	VERY GOOD
	155 - 168	167 - 177	171 - 180	4	
	141 - 154	157 - 166	162 - 171	3	GOOD
	126 - 140	146 - 156	151 - 161	2	
Supine position	6,90 - 8,10	5,70 - 6,39	7,00 - 8,00	10	EXCELLENT

medicine ball throwing (m)	5,70 - 6,89	4,90 - 5,69	6,00 - 6,99	8	VERY GOOD
	4,50 - 5,69	4,20 - 4,89	5,00 - 5,99	6	
	3,40 - 4,49	3,40 - 4,19	3,90 - 4,99	4	
	2,20 - 3,39	2,70 - 3,39	2,90 - 3,89	3	GOOD
	1,00 - 2,19	1,90 - 2,69	1,90 - 2,89	2	
20 m running (s)	3,30 - 3,49	3,50 - 3,59	3,30 - 3,49	10	EXCELLENT
	3,50 - 3,79	3,60 - 3,69	3,50 - 3,69	8	
	3,80 - 3,99	3,70 - 3,79	3,70 - 3,79	6	VERY GOOD
	4,00 - 4,19	3,80 - 3,89	3,80 - 3,99	4	
	4,20 - 4,49	3,90 - 3,99	4,00 - 4,19	3	GOOD
	4,50 - 4,70	4,00 - 4,10	4,20 - 4,40	2	
Long jump (m)	3,70 - 4,20	3,60 - 3,90	3,80 - 4,20	10	EXCELLENT
	3,20 - 3,69	3,40 - 3,59	3,50 - 3,79	8	
	2,70 - 3,19	3,10 - 3,39	3,10 - 3,49	6	VERY GOOD
	2,20 - 2,69	2,80 - 3,09	2,80 - 3,09	4	
	1,60 - 2,19	2,60 - 2,79	2,50 - 2,79	3	GOOD
	1,10 - 1,59	2,30 - 2,59	2,10 - 2,49	2	

**Table 4.** Points and grades for valorization of the 5<sup>th</sup> and the 6<sup>th</sup> grade girls' successfulness (overall sample of girls) and the selected girls of the 5<sup>th</sup> (SEL 5 G) and the 6<sup>th</sup> grade (SEL 6 G) of the elementary school in chosen (statistically significant) tests of basic and specific motor abilities.

The suggested range of results, points and grades can serve to PE teachers, as well as to practitioners kinesiologists, especially those that identify and select children, as a model for selecting sprint running talented children. Similarly, besides for comparison of girls' results in every individual test through suggested points and grades system for one or more tests, this model can be used for periodical assessments, for motivational and practice purposes, as in the class, so in the group that undergoes different training and selection levels. Using this model, PE teachers and practitioners can independently assess the predispositions of the girls for successfulness primarily in the sprint running events, but likely in the other track and field events as well. It is to be expected that this model will make the talent identification easier for PE teachers and practitioners and if this model is to be actively applied in practice, more girls will be directed into the track and field sport.

According to available information, this is the first suggestion of the model for tests' valorization and for the long-term valorization of practice effects in the 5<sup>th</sup> and the 6<sup>th</sup> grade girls (girls aged from 11 to 13 years). The application of this model can positively influence on the cooperation between the PE teachers and track and field coaches, furthermore, it can contribute to the track and field development in Croatia, as well as to the sport culture development in children and maybe in their family members too.

#### Conclusions

Up until nowadays, the scientifically based models to facilitate the selection of sprint and track and field talented children have not been known of in Croatia.

It is well known from the practical experiences that the selection is a sensitive, yet quantitatively measurable process. The results of this research showed statistically significant differences in motor abilities' tests between the girls of different grades and between the selected girls of different grades. The suggested model of results' ranges, points' categories and grades may establish a new way of valorization and diagnostics of potential candidates for track and field sport, and especially for sprint running events. The suggested model may in the same way be used for valorization of accomplishments in track and field events and for additional tests. The system of new competition types may be developed (modified track and field multievents) that could be valorized by this suggested model.

The obtained results showed that there were statistically significant differences in the measured tests between the 5<sup>th</sup> and the 6<sup>th</sup> grade girls (Table 1), between the successful and less successful girls in sprint running, as it was expected (Table 2), and lastly, statistically significant differences were determined between selected girls as well (Table 3). These are all arguments attesting that the competition system should be reorganized and conducted within each age group. This might be more difficult to conduct and control in school competition systems but however, in that case,





competition conduction within one grade group is recommended.

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## CORELATIVE ASPECTS REGARDING THE FUNCTIONAL EXERTION AND THE TECHNICAL DIFFICULTY ELEMENTS IN HIGH PERFORMANCE AEROBIC GYMNASTICS

BOTA AURA<sup>1</sup>, URZEALĂ CONSTANTA<sup>1</sup>, MEZEI MARIANA<sup>1</sup>

### Abstract

**Purpose.** The purpose of this study is to identify the correlative aspects between the functional exertion and the technical difficulty elements in junior aerobic gymnastics.

**Methods.** Next to the bibliographical study, the pedagogical observation, we used a heart rate monitor, routines' video, referees' sheets, training programs analysis and statistical processing methods.

<sup>1</sup> National University of Physical Education and Sports, Bucharest, ROMANIA

Email: aurabota@gmail.com

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**Results.** Data collected prove high intensity levels for each of the required technical elements, fact which has implications for the selection of the training means.

**Conclusions.** Aerobic gymnastics requires continuous objectivation of effort parameters expressed in a rationalized training content correlated to the athletes' biological echoes.

**Key words:** functional stress, technical elements, training, aerobic gymnastics.

### Introduction

Fifty years ago knowledge of athletes' preparation was far from complete and the physiological background was based on a relatively small amount of objective research findings. Since then, sport science has experienced tremendous changes in terms of assessing functional processes and states, responsible for the incredible sports results, beyond any imagination.

Generally speaking, aerobic gymnastics is the ability to perform continuous, complex and high intensity movement patterns to music. This originates from traditional aerobic exercises in terms of continuity, but not in terms of energy pathways.

The routine must demonstrate flow, strength, flexibility and the utilization of the seven basic steps with perfectly executed difficulty elements.

In a physiological perspective, combinations of aerobic steps together with arm movements, all performed to music create dynamic, rhythmic and continuous sequences of high and low impact structures. Routines should provide a high level of intensity. All three energy systems contribute at the start of the routine, but the contribution depends on the individual characteristics, the effort applied or on the rate at which energy is used.

The Romanian aerobic gymnastics has been a constant presence in the world elite since 1991 and today we can definitely assert that a modern training methodology was conceived by Romanian renowned specialists, leading to more than 95 medals in World, European championships and World Games. Performance Aerobic Gymnastics is a highly technical-combinative sport, with complex cinematic elements, demanding functional levels

To meet the artistic requirements, a routine and its choreography must demonstrate creativity and sports specific content. It should also show a variety of movements and a high degree of correlation between the music, movements and the competitors expression. The routine must show a balance between airborne, standing and floor-work difficulty elements and between high and low impact aerobic movements. A maximum of ten

difficulty elements for the individual events must be performed by each competitor. Technical elements from the four fundamental groups are rated a difficulty quotient between 0 – 1 point (FIG Code of Points, 2009-2012).

closed to physiological limits. Under the circumstances, the training programs requires a special attention directed to reaching a fine motor control requested in most of the technical elements, especially in high intensity routines (R. Schmidt, T. Lee, 2005).

From the training perspective, the focus seems to be directed on two levels: *the biomechanical constraints* which need to be thoroughly analyzed in order to determine performance proficiency and *the functional demands* of the 1'30 min. specific effort in the individual events (A. Bota, 2007). The present study will focus on the second approach, our aim being to identify the effort zones for different parts of the routine, expressed by the heart rate values attached to each technical element. One can find relevant the knowledge concerning physiological costs in competition settings, so that the trainers should adjust the training means and methods leading to enhancement of the technical accuracy under functional stress conditions and avoiding trauma or overtraining (J.H. Willmore, D.L. Costill, 1998).

Although research data is not highly consistent, most of the studies reveal that from the energetic point of view, competition effort is included in the short endurance category, considered as a lactic anaerobic type, the energy being supplied by the muscle glycogen (A. Dragnea, S. Teodorescu, 2002, G. Popescu, 2005).

Beyond 30sec., anaerobic glycolysis uses glucose (and glycogen) as a fuel in the absence of oxygen, the consequence of rapid glucose break down being the formation of lactic acid.

In individual aerobic gymnastics composition includes: technical elements, specific steps, arm movements and transitions.

The balance of the upper and lower body movements should be evenly distributed. When both upper and lower limbs movements are performed simultaneously, the routine will become more complex and creative.

All these requirements have an important influence upon the composition of the routine, each coach having the possibility to be creative in valorizing the technical and artistic skills of the gymnast.

### Methods

To conduct this study, next to the bibliographical study, the pedagogical observation and the case study, we used a computerized method

for assessing the effort zones by means of a Polar ProTrainer 425C heart rate monitor, as well as the routines' video, referees' sheets, training programs analysis and statistical processing methods.

The subject of this research is a 12 years old gymnast from CS UNEFS Bucharest who has highly relevant performances being the best athlete of her age group, at the national level. Her technical skills and body type are considered important clues, relevant for her future development as a senior gymnast. At the same time, we can assert that she is, to a great extent, the result of a consistent training strategy, whose functional approach is emphasized in this case study.

The subject was applied the heart rate monitor, during three consecutive routines, in order to analyze the specific effort curve in the individual event. The effort curve was correlated with the structure of the routine (from the video analyses), allowing us to identify the technical elements with the most demanding functional costs, and therefore

susceptible to be optimized both in technical and physical training.

The research took place in October 2011, before the National Championships, in the UNEFS gym hall, during a test training. Given the training period, the gymnast potential was at her peak, fact that sustained our research purpose, that is to correlate the effort intensity levels with the technical elements' performance accuracy.

After the competition, the referees' sheets were analyzed in order to identify which and how many technical elements were validated by the judges, thus proving that proper training content for each of them can lead to excellent performance even if the gymnast does her routine at maximal exertion levels.

### Results

The technical elements included in the subject's routine were attached the following heart rate values, as measured with the Polar Trainer:

Table 1 – Correlation between technical elements and functional exertion

No.	Technical element	Difficulty group	Average HR	Effort intensity	Difficulty quotient
1.	Frontal split jump to push up	C - 735	168 - 170	Maximum intensity	0,50
2.	Straddle support 1 ½ turn	B - 105	190 – 192	Above maximum	0,50
3.	1 ½ turn tuck jump	C - 265	192 – 194	Above maximum	0,50
4.	1 ½ turn to vertical split	D - 115	194 – 196	Above maximum	0,50
5.	L support 1 ½ turn	B - 145	194 - 196	Above maximum	0,50
6.	Lifted wenson push up	A - 144	192 - 194	Above maximum	0,40
7.	Helicopter to wenson	A - 306	196 - 198	Above maximum	0,60
8.	Free illusion	D - 195	194 - 196	Above maximum	0,50

All technical elements included in the choreography, were validated by the judges: frontal split jump to push up, straddle support 1 ½ turn, L support 1 ½ turn, lifted wenson push up, helicopter to wenson, 1 ½ turn tuck jump, 1 ½ turn to vertical split, free illusion.

We mention that the gymnast fulfilled her performance objective, by winning the National Aerobic Gymnastics Championship, in individual, trio and group events.

### Discussion and conclusions

The average heart rate in the three consecutives routines registered values between maximum intensity and above maximum intensity

for all the technical elements, according to the FIG four corresponding groups:

- Group A dynamic strength (wenson push up and plio push up families, helicopter family)
- Group B Static strength (straddle support family, L - support family)
- Group C Jumps (frontal split family, tuck family)
- Group D Balance (turn family, illusion family)

The graph below shows that the gymnast performed in heart rate intervals between 130 – 198 beats/min., with high cumulated plateaus of 190 -



198 b/min., which according to the Polar software signifies an effort intensity above maximum. In the first part of the routine (0-30 sec.), the composition elements gradually raise the heart rate so that the first difficulty element (sec. 22) is performed with 168 -170b/min., given the fact that the gymnast has not reached the state of fatigue, yet.

Starting from sec. 35, the subject registered above maximum intensities which determined heart rate values not lower than 191b/min., till the end of the routine.

No matter the technical group family requesting dynamic, static strength, jumps or balance, the functional stress remained intense during almost 1 min., this plateau being also enhanced by the specific steps sequences preceding each element.

The specific steps and the transitions, having a duration between 3 and 12 sec., determine heart rate values from 145 (at the beginning of the routine) to 195 beats/min. The transitions are preacrobatic gymnastic elements, described as the passages from high positions, to medium and lower ones, explaining thus their slightly lower intensity levels, but also giving the gymnast the possibility to „escape” from the isometric prolonged periods of muscular contraction. In this respect, the FIG Code

of points requires specific criteria concerning the technical execution, underlining the position and the stability of the upper body, back, limbs, pelvis, abdominal muscles and the whole proper body alignment. Thus for the leg movements the gymnast must perfectly control the height, angle, plane, range of motion, level length, speed, rhythm change, traveling directions, orientation. For the arm movements, which contribute to a more substantial increase of the effort intensity, athletes will master height, angle, plane, range of motion, level length, speed, rhythm change and unilateral (asymmetrical) /bilateral (symmetrical).

From the effort curve perspective we can assert that the subject's routine is a difficult and stressful one, due to the choreographic vision, which implied a high density of technical elements in the second part of the routine. Thus the most functional stressful (196-198b/min.), but best rated element (0,6 points) is placed at the end of the routine, in min. 1,27. We can also explain high intensities by the doubled steps sequences (in which two movements are performed in one beat).

Regarding the recovery capacity, in the first minute post-effort, the heart rate lowers up to 171b/min. and at the end of the second minute, up to 139b/min.

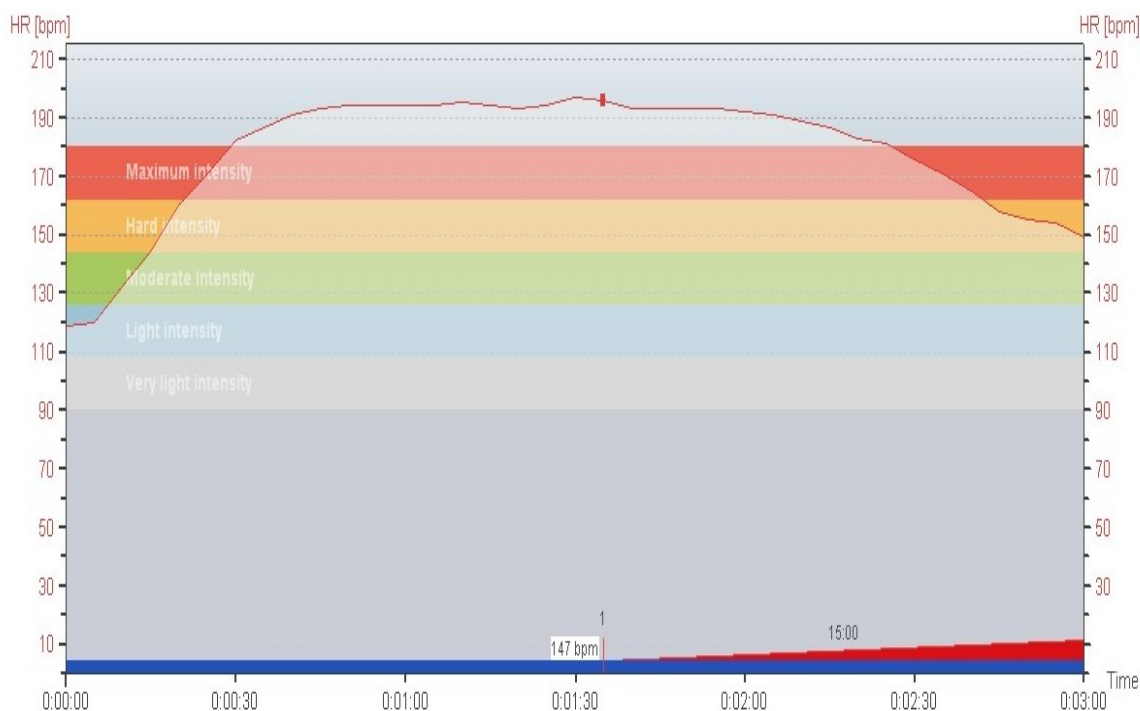


Figure 1 Effort curve during one aerobic gymnastics routine – individual event

The referees' sheets from The National Championships were analyzed in order to emphasize both the technical elements properly performed and the fulfillment of the artistic criteria.

The difficulty quotient in the subject's routine has values between 0,4 and 0,6 points, cumulating a total of 4 points. All eight difficulty elements from the composition were rated, this meaning a percentage of 100%. Still, gymnast committed execution errors in one dynamic strength group elements (helicopter to wenson) and in one B static strength element (L support 1 ½ turn). We might explain these execution errors by an inconsistent neuromuscular control due to the accumulated fatigue. Despite this, her execution score was the best in the competition.

Regarding the execution score, the gymnast obtained 8.65 points out of 10, most of the deductions resulting from an inadequate execution of those two difficulty elements, mentioned before, invalidated by the judges. (helicopter to wenson, L support 1 ½ turn). Also, in the steps sequences the subject does not perform a perfect biomechanics especially in jumping jack, lurch and knee lift.

Concerning the artistic score, the gymnast obtained 8.65 points out of 10, most of the deductions resulting from the insufficient effective use of the competition space and placement of the movement in the routine. Also some of the judges do not rate with excellent scores the presentation and use of the music criteria.

Generally speaking, the gymnast has high scores at the complexity/creativity level, having difficult transitions and linkings between the technical elements.

Summarizing, the gymnast cumulated a total score of 19.300 points, with the highest value for the artistic components and for the difficulty.

Data collected with the heart rate monitor as well as the results obtained in the target competition demonstrate that the trainer has a deep knowledge of the gymnast individual bio-motor profile and a keen understanding of the ratio between the effort parameters throughout the training periods and sessions, in order to meet the functional demands of the competition event.

In this regard, planning documents for the pre-competitive period were analyzed and subsequently, relevant aspects were revealed:

- the effort dynamics meets general criteria for enhancing the performance capacity, necessary for getting peaks performance at the right time; thus, the volume varied between 70% and 50% (of the core trainings' duration) as the competition was approaching, while the intensity had an average increase from 70% to 95% of the maximum levels;
- specific and competition means conceived for the last part of the preseason mesocycle aimed at performing all repetitions in high intensity plateaus (170-190b/min.). The distinctive characteristic of the workouts consisted of coupling/linking technical elements with at least one 1x8 steps sequence, before and after these, according to the choreography. Both steps sequences and technical elements were performed at sub-maximal and maximal intensities, without ignoring the technical accuracy demands;
- the preseason mesocycle included even from the first session full and partial routines workouts, fact which lead to a high level adaptation state and to an increased specific endurance.

In the following we present examples of operational means aiming at refining the technical execution as well as reaching a higher level of functional adaptation.

Table 2 Content for the core part of the training lesson – lesson 15

<i>Means</i>	<i>Effort administration</i>
<b>Warm – up</b>	20', I - 80%, p - 3'
<b>Core part:</b>	
- leg balancing while moving + kick 180°;	4 L, I - 85% , p - 30"
- vertical jumps from standing position and while moing;	8 L, I - 85%, p - 30"
- specific steps linked to technical difficulty elements from the trio event: 1 x 8 steps preceding the element + technical element	5 x 8 secv., I - 90%, p - 1'
+ 1 x 8 steps succeeding it (individual event)	
- first half of the routine (trio)	2 x, I - 100%, p - 2'
- second half of the routine (trio)	2 x, I - 100%, p - 2'
- whole routine (trio)	2 x, I - 100%, p - 6'
- specific steps linked to technical difficulty elements from the trio event: 1 x 8 steps preceding the element + technical element	5 x 8 secv., I - 90%, p - 1'
- 1 x 8 steps succeeding it (trio event)	
- first half of the routine (group)	2 x, I - 100%, p - 2'
- second half of the routine (group)	2 x, I - 100%, p - 2'
- whole routine (group)	2 x, I - 100%, p - 6'
<i>Physical training:</i> circuit training	3 x, I - 80%, p - 2'
<b>Cool down:</b> stretching	12', I - 50%

Intensitaty - 93,63%,  
Total volume - 60,68%

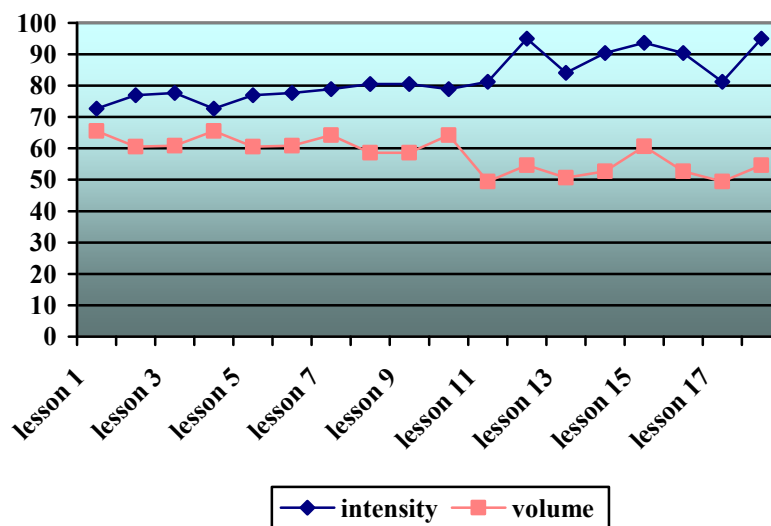


Figure 2 Manipulation of the intensity – volume parameters in the preseason mesocycle

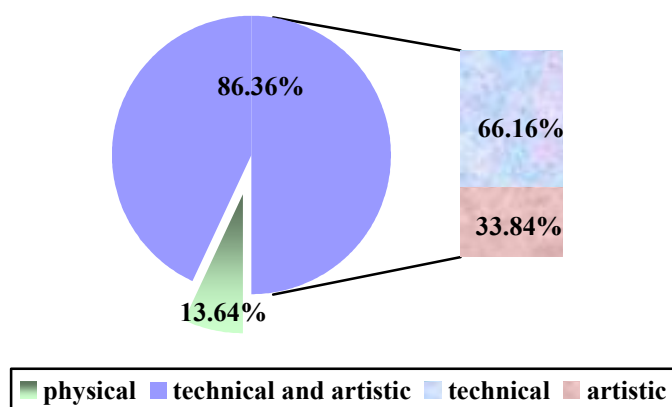


Figure 3 Ratio between training components in the preseason mesocycle

During the preseason mesocycle technical training next to the artistic training are predominant so that 66.16% of the means is directed towards the technical accuracy and 33.84% concerns the artistic abilities.

As one can notice in Table no 2, the investigated subject participates in three events (individual, trio and group), so that the administered means cumulate in volumes at high intensities, fact which represents an advantage in terms of specific endurance.

We conclude that speaking about aerobic gymnastics training program, the coach will always adjust influential components according to the competition model, including the physiological profile of the event. This approach involves a rigorous framework consisting in: the choice of exercises, order of exercises, resistance or load, number of sets per exercise, number of exercises per muscle group, repetition range, type of contraction, speed of movement, rest periods between sets, rest periods between training sessions and nutritional status.



In order to have a complete idea about the functional profile of the individual events in aerobic gymnastics, this study should be continued with the assessment of the oxygen uptake or lactate concentration, information needed for a consistent metabolic training. Measuring heart rate and VO<sub>2</sub> max helps professionals to prescribe exercise safely and effectively to athletes

Elite sports specifically requires continuous objectivation of effort parameters especially in events with severe functional costs, expressed in a rationalized training content correlated to the athletes' biological echoes.

To summarize, data emerging from this study confirm an adequate training methodology in terms of technical, physical and artistic components, related to the competition model and the highly demanding criteria leading to sports excellence at international level.

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## THE EFFECT OF SMOKING ON RESPIRATORY FUNCTIONS, ARTERIAL BLOOD PRESSURE AND MELATONIN LEVELS OF TRAINED SPORTSMEN

DEMİRCİ NEVZAT<sup>1</sup>, BEYTUT EBRU<sup>2</sup>

### Abstract

The aim of the study was to investigate the negative effects of smoking upon respiratory function, blood pressure, pulse rate and the levels MaXVO<sub>2</sub> and melatonin in sportsmen, and to investigate the importance of exercise in respect of these values.

The research subjects were 14 male basketball players. The research group has divided into two groups; one comprising smokers (n=7) and the other non-smoker (n=7). During the research, both groups followed a training programme consisting of warming up, exercise and rest for 120 minutes every day, three days a week for two weeks.

The systolic and diastolic blood pressure and the pulse rate at smoker sportsmen before and after training were significantly different from those of the non-smokers (p<0.05, p<0.01 and p<0.001 respectively). The VC, MaXVO<sub>2</sub>, FVC and FEV1 values of the smokers, before and after the training, were found to be significantly lower than those of the non-smokers (p<0.001 and p<0.01, respectively). The melatonin levels increased noticeably immediately after the training, but returned to the pre-training levels 2 hours after training. These increases and decreases were found to be statistically significant (p<0.001). Moreover, the levels of melatonin in the smoker-sportsmen in the second week of training when compared to the first week, were also significantly higher than those at the non-smokers (p<0.001).

In conclusion, it was determined that whereas smoking plays a role in increasing systolic and diastolic, blood pressure and pulse rate in sportsmen, it plays a role in decreasing respiratory function, MaXVO<sub>2</sub> and melatonin levels. On the other hand, it has been shown that systematic exercise has a regulatory influence upon such negative effects of smoking as the reduction in sportive performance, respiratory capacity and melatonin levels.

**Key words:** Cigarette, Respiratory function test, blood pressure, pulse, Melatonin.

### Introduction

Smoking is one of the most important risk factors for cardiovascular, respiratory and malignant diseases, and is a cause of preventable disease and death. It has long been known that there is a direct relationship between smoking, cigarettes and smoking-related diseases. Epidemiological studies have suggested that cardiovascular diseases and cause of death are related to the amount, type of cigarette

smoked and the age of smoking (AC. Guyton., JE. Hall, 1996).

Active or passive smoking are known to result in chronotropic incompetence of the heart, reduced heart-rate during exercise, atherosclerosis in veins, (T. Conwy., TA. Cronan, 1992) decrease in alveolar ventilation, deterioration in diffusion capacity, increase in respiratory resistance (G. Tortora., SR. Grabowski, 1996) and reduced oxygen-carrying capacity of the

<sup>1</sup>Department of Physical Education, Faculty of Education, University of Kafkas, Kars - TURKEY

<sup>2</sup>Department of Physiology, Faculty of Veterinary Medicine, University of Kafkas, Kars - TURKEY

Email: Nevzatdemirci44@hotmail.com

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blood. All these changes reduce quality of life of smokers by directly affecting exercise capacity or physical activity level. It is indicated that smoking also limits physical activity by decreasing the exercise tolerance level (G. Metin et al, 2005). The heart has an adaptation mechanism, which can change its performance according to different temporal, physiologic and environmental conditions. In this adaptation, either peripheral or central source neuronal and hormonal factors, such as melatonin, play a role (A. Altun et al 2001). Melatonin is known to have a lowering effect on blood pressure, vascular tonus and norepinephrine levels. This lowering effect of melatonin on blood pressure can be associated with sympathetic nervous system inhibition and postsynaptic  $\alpha_1$  adrenergic receptor blockage (A. Laflamme., J.Wu L, de Champlain, 1998). Despite different experimental results, it is indicated that there can be differences between exercise and melatonin level according to light exposure and the time of exercise during the day (G. Atkinson et al, 2003).

Furthermore, melatonin has the characteristics of directly detoxifying free radicals which have oxygen in their structure and their related reactants. Harmful radicals in cigarette smoke increase the oxidative group was composed of seven non-smokers. This study met the ethical standards suggested by Harriss and Atkinson (DJ. Harriss., G. Atkinson, 2009), and ethics approval was obtained from the local institutional Review Board.

Throughout the study, the two groups were administered 120-minutes training three days a week for two weeks. The training program was organized specifically for the groups, in order to acquire the most convenient physiologic effects. This included type, volume, duration and frequency of the exercise. The training program was composed of three sections: warming up, exercise and cooling down. Weight and height were measured precisely, according to the method of Tamer (K. Tamer, 2000).

From the start of the study, blood samples were taken into tubes with EDTA before, immediately after and two hours after training. The blood samples were centrifuged in a cooling centrifuge at 3000 rpm for ten minutes. The remaining plasma was taken into covered polypropylene tubes; the samples were kept at  $-20^{\circ}\text{C}$  until the melatonin level was tested. Melatonin hormone levels were measured as cited in ELISA DRG KIT.

Systolic and diastolic blood pressures of the sportsmen were measured from a. brachialis of the right arm before and immediately after the training.

Participants' heart-rates were measured during relaxation, before the training and after the training (following the relaxation) using the method described by Tamer (K. Tamer, 2000).

Vital capacity (VC), force vital capacity (FVC), forced expiratory volume ( $\text{FEV}_1$ ) and average flow rate in the half of the forceful expiration rate (FEF 25-75%) parameters were measured with a spirometer

damage in cells and tissues by deteriorating the oxidant-antioxidant balance; can affect plasma lipid profile and antioxidant enzyme level by leading to catabolism of cellular membranes and the inadequacy of physiologic functions (A. Altun et al 2001). In brief, smoking can increase lipid peroxidation by exposing the liver tissue to oxidative damage in sportsmen. Considering all this information, the present study investigated the harmful effects of smoking on respiratory functions, arterial blood pressure and melatonin levels of sportsmen and whether or not these effects have an exercise limiting role.

## Materials and Methods

The present study included 14 volunteer licensed male basketball players with the following characteristics: age range of 19 to 24 years, weight range of 65 to 85 kg and height range of 1.75 to 1.92 m. The subjects were asked to provide medical reports indicating that there is not any medical harm for them to exercise. Participants were classified into two groups, the first group was composed of seven sportsmen who had smoked a minimum of ten cigarettes per day for at least one year; the second before and after the training. Spirometric data were revised according to Body Temperature and Pressure Saturated (BTPS) values (K. Tamer, 2000). European Coal and Steel norms were used in calculating the target values for age, height, weight, gender and race criteria.

A 12-minute walk/run test (Cooper) was used as an indirect method to predict maximum volume of oxygen consumption ( $\text{MaXVO}_2$ ). The results were determined by multiplying the number of tours and the distance of each tour (400m) and adding the distance of the completed tour (meter).  $\text{MaXVO}_2$  values were determined using the Balke formula (B. Balke, 1961).  $\text{MaXVO}_2 \text{ ml/kg-min} = 33.3 + (X - 150) \times 0.178 \text{ ml/kg-min}$ , where

X= the distance run in one minute.

## Statistical Calculations

The MINITAB statistical package was used to calculate the average ( $\bar{X}$ ) and standard deviation ( $s\bar{X}$ ) of the data (Minitab Inc. Pennsylvania, Version 12.1 USA). The General Linear Model function of the same program was used to detect the analyses in the study. Analysis of variance (ANOVA) was used to compare the melatonin levels of smoking and non-smoking groups in the first and second week, immediately following training. Tukey's test was administered to identify statistical differences between groups.

## Findings

### 1. Systolic and diastolic blood pressure levels of smoking and non-smoking sportsmen before and immediately after training (Graphic 1):

The increase in the systolic and diastolic blood pressures of smoking sportsmen during the pre-training period and immediately after training was statistically





significant when compared with the non-smoking group (respectively,  $p < 0.05$ ,  $p < 0.01$ ).

**2. Pulse rates of smoking and non-smoking sportsmen before and immediately after two-week training (Graphic 2):**

The increase in the pulse rates of smoking sportsmen during the pre-training period and immediately after training was statistically significant when compared with the non-smoking group ( $p < 0.001$ ).

**3. VC levels of smoking and non-smoking sportsmen before and after two-week training (Graphic 3):**

The decrease in VC values of smoking sportsmen during the pre-training period and immediately after training was statistically significant when compared with the non-smoking group ( $p < 0.001$ ).

**4. FVC levels of smoking and non-smoking sportsmen before training and after two-week training and statistical differences between the levels (Graphic 4):**

When the pre-training and post-training FVC levels were compared, they were significantly lower in the smoking group than the non-smoking group ( $p < 0.01$ ).

**5. FEV<sub>1</sub> levels of smoking and non-smoking sportsmen before and after two-week training and statistical differences between the levels (Graphic 5):**

The decrease in FEV<sub>1</sub> levels of the smoking group was statistically significant when compared with the non-smoking group ( $p < 0.01$ ).

**6. FEF 25-75% levels of smoking and non-smoking sportsmen before and after two-week training and statistical differences between the levels (Graphic 6):**

There was no statistically significant difference between the smoking and non-smoking groups, in terms of FEF 25-75% levels before and after training ( $p > 0.05$ ).

**7. MaXVO<sub>2</sub> levels of smoking and non-smoking sportsmen before and after two-week training and statistical differences between the levels (Graphic 7):**

The decrease in MaXVO<sub>2</sub> levels of smoking sportsmen was statistically significant when compared with the non-smoking group ( $p < 0.001$ ).

**8. Melatonin levels of smoking and non-smoking sportsmen before two-week training, immediately after training and two hours after training and statistical differences between the levels (Graphic 8):**

Although the melatonin levels of non-smoking sportsmen were higher before training when compared with smoking sportsmen, the differences between the levels were not statistically significant ( $p > 0.05$ ). Nevertheless, significantly increasing melatonin levels of the smoking and non-smoking sportsmen immediately after the training decreased to pre-training

values after two hours. These increases and decreases were statistically significant ( $p < 0.001$ ).

**9. Melatonin levels of smoking and non-smoking sportsmen immediately after the 1<sup>st</sup> and 2<sup>nd</sup> week of training and statistical significances between the levels (Graphic 9):**

The increase in melatonin levels of smoking and non-smoking sportsmen immediately after the 2<sup>nd</sup> week of the training was on  $p < 0.001$  level in non-smoking group.

## Discussion

Insufficient exercise and smoking are important risk factors for ischemic heart diseases. Furthermore, it is indicated that smoking limits physical activity by decreasing the exercise tolerance level. Smoking a cigarette can increase the recovery heart rate by 10-20 beats per minute. It can increase the systolic and diastolic blood pressures, resulting in reduced maximum respiratory capacity among smokers (N. Akgün, 1986).

A study by Akgün (1986), it was reported that smoking decreases the systolic and diastolic blood pressure by reducing sporting performance. Similarly, the present study detected a significant increase in the systolic and diastolic blood pressures of smoking sportsmen in the pre-training and post-training periods (Graphic 1). This increase can be associated with the increase of blood pressure due to catecholamine, which is released by the adrenal glands with the effect of nicotine in cigarettes.

Heart rate is one of the most important factors in sporting performance. The present study also found that the increase in the pulse rates of the smoking sportsmen in the pre-training and post-training periods was statistically significant when compared with non-smoking sportsmen ( $p < 0.001$ ) (Graphic 2). Similarly, Düzen (1996) observed that the pulse rates of non-smokers who were actively involved in sport were significantly lower than those who smoke and do not participate in sport. According to these results, regular and graded training not only gives rise to a physiologic dilatation and hypertrophy in the heart of the sportsmen, but it was also established that it regulates the circulation and reduces the pulse rate, which increases immediately after the training to normal. Furthermore, it can be indicated that smoking, which decreases the beta-adrenergic receptors, increases the pulse in relation to increasing catecholamine and causes a negative effect by repressing the sympathetic system and lowering the noradrenalin response during exercise.

Vital capacity measurement provides beneficial information on the strength of respiratory muscles and lung functions (PG. Burstyn, 1990, FA. Wilson, 1985). In the present study, the decrease in the VC values of smoking sportsmen before and after training was significant when compared with non-smoking sportsmen ( $p < 0.001$ ) (Graphic 3). Özgün et

al. (1998) also found that passive smoking decreases VC volume. On the other hand, Pringle et al. (2005) reported significant increases in VC values before and after a 10-km run. Consequently, it can be concluded that there are some differences in the physical capacity, organ and system functions of trained and untrained people over time and these differences always occurs in favor of people engage in physical exercise.

Some researchers (M. Doherty., L.Dimitriov, 1996, T. Holmen et al. 2002), reported a significant decrease in the FVC levels of smokers when compared with non-smokers, and also found a positive correlation between physical activity, fitness and lung capacity. The present study also detected significant decreases in FVC levels of smoking sportsmen before and after training (Graphic 4). Consequently, it was established that these harmful effects of smoking on the respiratory system can result from toxic metabolites and the pharmacologic effects of nicotine in cigarettes. It is also known that the smoking lowers the respiratory and O<sub>2</sub> carrying capacity by reducing sporting performance. The present study found a significant reduction in the FEV<sub>1</sub> levels of smoking sportsmen before and after training (Graphic 5). The FEV<sub>1</sub> levels of sportsmen who regularly exercise and do not smoke were significantly higher than those of sportsmen who exercise but smoke. These results support the theory that smoking reduces sporting performance by reducing respiratory capacity. However, pre-training and post-training FEF 25-75% levels were not statistically significant in smoking and non-smoking sportsmen ( $p>0.05$ ) (Graphic 6). In that case, it can be concluded that the respiratory superiority of sportsmen is generally related to the ability to use lung capacity and low respiration is related to insufficient exercise and smoking.

MaXVO<sub>2</sub> value is accepted as one of the most important indicators of sporting performance. Previous studies have found this to be higher in non-smokers (PO. Astrand, 1988). These findings are consistent with the results of the present study (Graphic 7). The present study also found a significant decrease in pre-training and post-training MaXVO<sub>2</sub> levels of smoking sportsmen when compared with non-smoking sportsmen ( $p<0.001$ ). Based on all these findings, it can be concluded that smoking lowers the maximum respiration capacity, reduces sporting performance, lowers the O<sub>2</sub> carrying capacity of blood, and increases the heart rate and flow per minute.

On the other hand, exercise can damage the balance between free radicals identified as oxidative stress and antioxidants. During exercise, O<sub>2</sub> consumption can be greater than during relaxation and, as a result, the free radical producing capacity of the mitochondria increases temporarily. A study by Buxton et al. (1997) reported that in gentle exercise minimum O<sub>2</sub> consumption was 40-60% in 3 hours and maximum O<sub>2</sub> consumption was 75% in 1 hour and that significant increases were detected in melatonin levels.

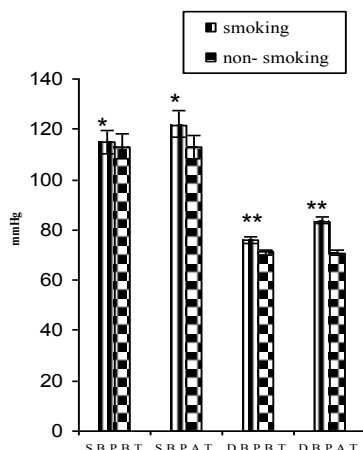
In the present study, although the pre-training melatonin levels of non-smoking sportsmen (Graphic 8) were higher than the smoking sportsmen, the differences between these levels were not statistically significant ( $p>0.05$ ). When the pre-training melatonin levels of smokers and non-smokers were compared, it was found that melatonin levels, which increased immediately after training, returned to normal levels two hours later. These increases and decreases were found to be statistically significant ( $p<0.001$ ). A statistically significant increase was observed in the melatonin levels of smoking and non-smoking sportsmen after the 2<sup>nd</sup> week of training ( $p<0.001$ ) (Graphic 9). Similarly, Özgüner et al. (2005) investigated the melatonin levels of female students who smoke 21 cigarettes a day and those who do not smoke. It was found that the melatonin levels of the smoking students were lower than those of non-smoking students. In another study, Pilaczynska et al. (2004) compared the melatonin levels of people who undertake intense physical activity and those who undertake light physical activity. They observed a negative correlation between plasma melatonin levels and light physical activity; a positive correlation between intensive exercise and plasma melatonin levels. The data indicates that regular physical activity increases melatonin level. These findings indicate that physical activity increases plasma melatonin level.

It is established that the production of oxidants increases during exercise. Excessive physical activity is one of the particular factors that induce the formation of reactive oxygen species (ROS) in the organism. Depending on increasing metabolic activity, O<sub>2</sub> consumption increases and, consequently, ROS emerges. In case of any problems during the removal of these oxidants, significant oxidative damage can occur in the cellular biomolecules. Nevertheless, regular exercise protects myocytes from the harmful effects of oxidants and enables the adaptation of skeletal muscles to antioxidant capacity in order to prevent cellular damage (T. Şinforoğlu et al. 2006). Furthermore, it can be stated that smoking reduces the exercise tolerance level and limits physical activity and that regular exercise raises maximum respiratory capacity. In the light of all this information, the volume, duration and the time of exercise is very important in determining the effect of the exercise on melatonin; melatonin can also show a powerful antioxidant effect against oxidative damage in the lungs by reducing free radical damage caused by smoking.

Consequently, it was found that cigarette has an increasing effect on the systolic and diastolic blood pressure and pulse rate a decreasing effect on VC, FVC, FEV<sub>1</sub>, FEF 25-75%, MaXVO<sub>2</sub> and melatonin levels. Nevertheless, regular and gradual training has been shown to have a regulating role on the negative effect of smoking on sporting performance, respiration capacity and melatonin.

**Graphic 1. Systolic and diastolic blood pressure levels of smoking and non-smoking sportsmen before and after training**

Sigara içen: Smoking  
İçmeyen: Non-smoking



\*:p<0.05, \*\*:p<0.01

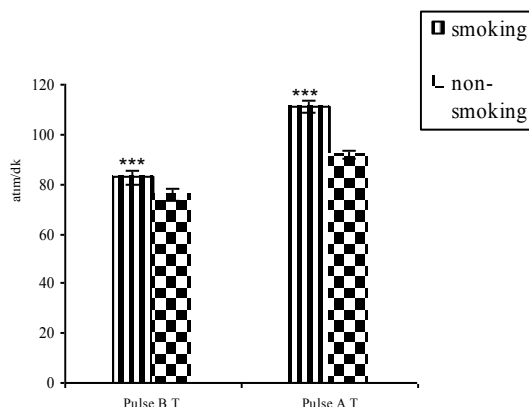
S.B.P.B.T: Systolic Blood Pressure before Training

S.B.P.A.T: Systolic Blood Pressure after Training

D.B.P.B.T: Diastolic Blood Pressure before Training

D.B.P.A.T: Diastolic Blood Pressure after Training

**Graphic 2. Pulse rates of smoking and non-smoking sportsmen before and after training**

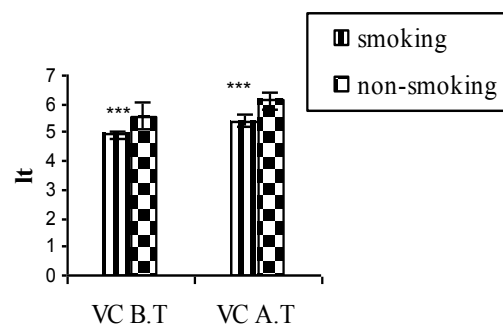


\*\*\*: p<0.001

Pulse B.T: Pulse before training

Pulse A.T: Pulse after training

**Graphic 3. VC levels of smoking and non-smoking sportsmen before and after training**

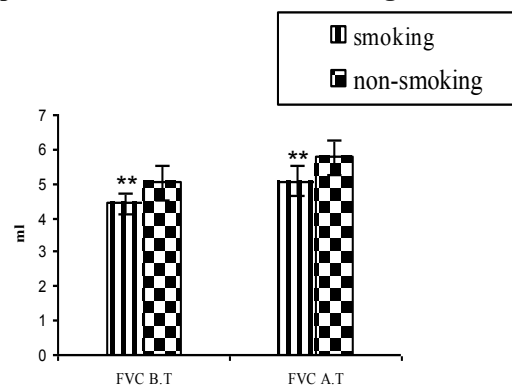


\*\*\*: p<0.001

VC B.T : Vital capacity before training

VC A.T : Vital capacity after training

**Graphic 4. FVC levels of smoking and non-smoking sportsmen before and after training**

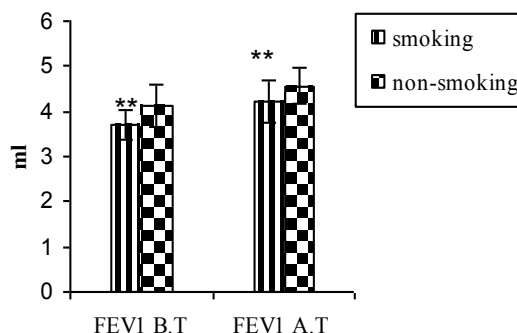


\*\* :p<0.01

FVC B.T : Force vital capacity before training

FVC A.T : Force vital capacity after training

**Graphic 5. FEV<sub>1</sub> levels of smoking and non-smoking sportsmen before and after training**

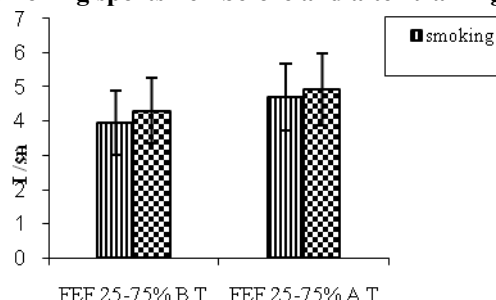


\*\* :p<0.01

FEV1 B.T : Forced Expiratory Volume before training

FEV1 A.T : Forced Respiratory Volume after training

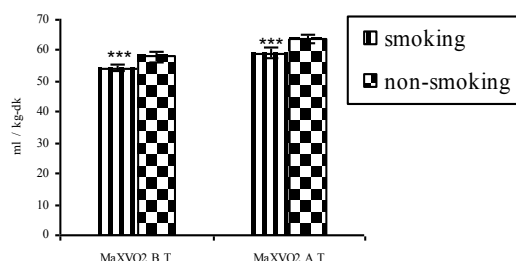
**Graphic 6. FEF 25-75% levels of smoking and non-smoking sportsmen before and after training**



FEF 25-75% B.T: average flow rate in the half of the forceful expiration rate before training

FEF 25-75% A.T: average flow rate in the half of the forceful expiration rate after training

**Graphic 7. MaXVO<sub>2</sub> levels of smoking and non-smoking sportsmen before and after training**

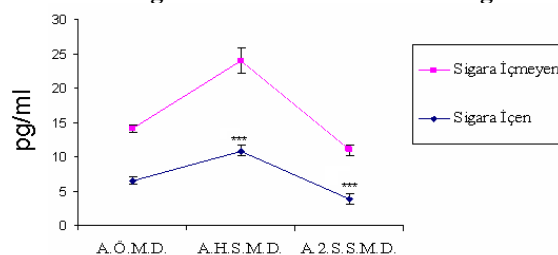


\*\*\*:p<0.001

MaXVO<sub>2</sub> B.T: Maximum Oxygen consumption before training

MaXVO<sub>2</sub> A.T: Maximum Oxygen consumption after training

**Graphic 8. Melatonin levels of smoking and non-smoking sportsmen before training, immediately after training and two hours after training**



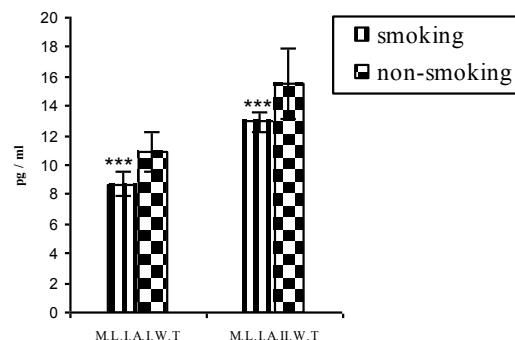
\*\*\*:p<0.001

M.L.B.T: Melatonin level before training

M.L.I.A.T: Melatonin level immediately after training

M.L.2.A.T: Melatonin level two hours after training

**Graphic 9. Melatonin levels of smoking and non-smoking sportsmen immediately after the 1<sup>st</sup> and 2<sup>nd</sup> week of the trainings**



\*\*\*:p<0.001

M.L.I.A.I.W.T: Melatonin level immediately after the 1<sup>st</sup> week of training

M.L.I.A.II.W.T.: Melatonin level immediately after the 2<sup>nd</sup> week of training

## Acknowledgments

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## ANTHROPOMETRIC FEATURES AND BALANCE AMONG ELITE HANDBALL PLAYERS

GÜRKAN ALPER CENK<sup>1</sup>, ALTUNSOY MUSTAFA<sup>2</sup>, DEMİRHAN BİLAL<sup>3</sup>, SEVER OZAN<sup>2</sup>, ÖZCAN MÜJDAT<sup>4</sup>, GÖKDEMİR KADIR<sup>2</sup>

### Abstract

**Purpose:** The aim of this study was to investigate the balance and body fat values of a team playing in the Turkish Handball Super League and to compare them with the international values and also to contribute the national norm to develop for the handball players.

**Methods:** Male players from a team playing in the Turkish Handball Super League as experimental group (n=12) and university students as control group (n=12) participated in the study. The relationship among static balance, body fat percentage and some anthropometric parameters of subjects whose average age was  $\bar{x} = 29.3 \pm 4.1$  years for experimental group and  $\bar{x} = 23.2 \pm 2.1$  years for control group was investigated. The statistical significance was accepted as  $p < 0.05$ .

**Results:** The sport age, height and weight values of the handball players were significantly higher than the values of university students. The body fat percentage of handball players ( $13.3 \pm 3.1$ ) was also higher than of the university students ( $12.2 \pm 2.1$ ). As the balance values of handball players ( $8.2 \pm 3.1$ ) were better than the values of control group ( $8.9 \pm 7.5$ ) on the right foot, the values of control group ( $6.0 \pm 2.6$ ) were better than of elite handball players

<sup>1</sup>Gaziantep University School of Physical Education and Sport,

<sup>2</sup>Gazi University School of Physical Education and Sport,

<sup>3</sup>Bartın University School of Physical Education and Sport.

<sup>4</sup>Çankaya Belediyesi Anka Handball Sport Club

E-mail: o\_sever@hotmail.com

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(7.4±2.3) on the left foot.

**Conclusion:** As a result, even if it could be found some differences between the elite handball players and the control group among the static balance values, body fat percentage and anthropometric parameters, these differences weren't statistically significant. The physical and anthropometric features of elite handball players showed similarities with the other international players.

**Key Words:** Handball, static balance, body fat percentage.

## Introduction

Handball is a sport which is rapidly gaining more and more popularity and this is inevitable. However,

European and North African countries. Team handball, combining aspects of basketball, soccer and baseball, is one of the most popular sport in the world. The game is unique, with a rapid and physical yet simultaneously skillful and strategic style of play (Sporis, Vuleta, Vuleta, & Milanovic, 2010). There is a paucity of research on the physiological,

physical, and anthropometric profiles of elite and sub-elite handball players. Profiling can be valuable means of identifying talent, strengths and weaknesses, assigning player positions, and helping in the optimal design of strength and conditioning programmes (Chaouachi et al., 2009). It will not be a wrong comment when the handball is compared

with the other sport branches that the reasons of the insufficient studies about elite handball players are seen as the narrowness of the area where it is played and it has been commonly playing recently. Handball is a complex sport branch requiring strength, resistance and speed to be successful. Balance is, like the other sport branches, one of the most important measurable values of coordination in handball. Even if handball is seen as an aerobic activity, the explosive activities consisting of speed, coordination and agility are crucial for success. Handball players have to have lower body fat percentages in order to use aerobic and anaerobic capacity effectively in the game. The lower body fat percentage can be taught as a sub-component of power because it develops the relative muscular strength and also as a sub-component of speed and agility because it affects the active muscle mass ratio. The aim of this

Americans are accustomed to watching such sports as football, basketball, soccer and baseball, handball is a popular sport especially in

study is to investigate the balance and body fat values of a team playing in the Turkish Handball Super League and to compare them with the international values and also to contribute the national norm to develop for the handball players.

## Method

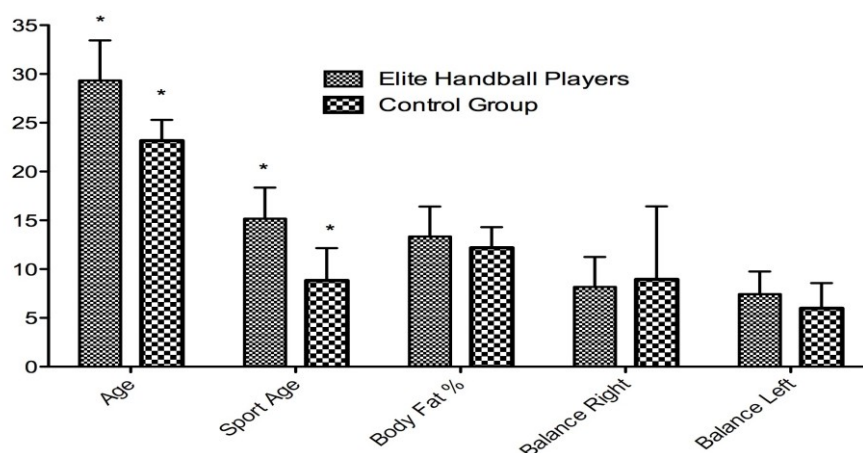
This study was performed on the Çankaya Belediyespor male players (n=12) playing in the Turkish Handball Super League and a control group consisting of the male university students from School of Physical Education and Sport (n=12) were included in the study to compare the data. The subjects firstly were informed about the tests and signed the voluntary participation form. Flamingo balance test was used to measure the balance. The subjects were asked to stand on the beam (50cm long, 5cm high and 3cm wide) on one leg like a flamingo for 60 seconds and it was applied for each leg. The number of attempts after the falls during 60 seconds was accepted as the balance score. In the first 30 seconds of test, if the subject had more than 15 attempts, the test was terminated and a core of zero (0) was given. The body fat percentage was found by using Sloan-Weir formula ( $BD=1.1043 - (0.00133 \times \text{thigh skin fold in mm}) - (0.00131 \times \text{subscapular skin fold in mm})$ ). The height and weight of the subjects were measured by Seca (Seca, Hamburg, Germany) scale and stadiometer. Graphpad Prism (Chicago, USA) was used for the descriptive statistics and statistical comparisons.

## Findings

**Table 1. The Physical Features and Other Parameters of Elite Handball Players and Control Group (average ± ss)**

	Elite Handball Players	Control Group
Age	29.3±4.1*	23.2±2.1*
Sport Age	15.2±3.2*	8.8±3.3*
Height (cm)	189±6.6*	181.1±7.7*
Weight (kg)	96.2±13.3*	79.8±10.7*
Body Fat %	13.3±3.1	12.2±2.1
Balance right	8.2±3.1	8.9±7.5
Balance left	7.4±2.3	6.0±2.6

\* Statistically significant  $p < 0.05$



**Figure 1. The age, sport age, body fat %, balance values of the elite handball players and control group (\*p<0.05)**

The values between the groups were compared by using Mann-Whitney U test and the statistical significance was accepted as  $p<0.05$ . In the age variable, it can be seen that the average age of handball players ( $29.3\pm4.1$ ) playing in the Turkish Handball Super League is significantly higher than of the control group ( $23.2\pm2.1$ ). In addition to these, as it can be seen in Table 1, the sport age, height and weight values of the elite handball players are significantly higher than the values of control group. The body fat percentage value of elite handball players ( $13.3\pm3.1$ ) is also higher than the value of control group ( $12.2\pm2.1$ ). As the balance values of handball players ( $8.2\pm3.1$ ) are better than the values of control group ( $8.9\pm7.5$ ) on the right foot, the values of control group ( $6.0\pm2.6$ ) are better than of elite handball players ( $7.4\pm2.3$ ) on the left foot. The differences in the variables of body fat percentage, left and right foot balance values between the groups are not statistically significant.

### Discussion

It can be seen that elite handball players with the average age of  $29.3\pm4.1$  are significantly older than the control group. It is understood that this value is quite higher than the value of Tunisian National Male Handball Team ( $24.3\pm3.4$ ) in the study by Chaouachi et al. (2009), the value of France national league players (21.0) in the study by Buchheit et al. (2009) and the value of Croatian National Male Handball Team ( $26\pm3.8$ ) in the study by Sporis et al. (2010). The average age of Iranian national team who has obtained the silver medal in 2010 Asian Games is  $24\pm3.8$  (Shahbazi, Rahimizadeh, Rajabi, & Abdolmaleki, 2011).

In this study, the average sport age of elite handball players is seen as  $15.2\pm3.2$  and it is determined that this value is significantly almost two times more than the value of the students from School of Physical Education and Sport whose average sport age is seen as  $8.8\pm3.3$  years. In literature review, any value about the sport age of handball players is not found, nevertheless it is thought that the value of their

sport age maybe high depending upon the value of their age.

It can be seen that the elite handball players whose average height is  $189\pm6.6$  cm is significantly different from the control group whose average height is  $181.1\pm7.7$ . In the review study by Ziv and Lodor (2009) which is aimed to compare the physiologic and performance features of handball players playing in national leagues and national teams, the average of data from nine studies is seen as 182.6 cm. Because of the fact that the raw data isn't obtained, the statistical comparisons can't be applied, yet the average height value of Handball Super League team in our study is not only significantly higher than value of the control group but also is higher than the average height of international players.

In this study, the average weight of super league handball players is seen as  $96.2\pm13.3$  kg and this value is significantly higher than the value of control group. In the review study by Ziv and Lodor (2009), the average weight of six teams playing in the similar levels is 87.4 kg. The weight value of our study in direct proportion to the height is higher than the world average.

In our study, the body fat percentage of experimental group is found as  $13.3\pm3.1$  and this value isn't statistically significant. In some similar studies the values are like that; the body fat percentage of Tunisian National Male Handball Team is seen as  $15.4\pm3.7$  in the study by Chaouachi et al. (2009), besides the body fat percentage value is also seen as 14.1 in the study by Gorostiaga, Granados, Ibanez, Gonzalez-Badillo, and Izquierdo (2006) which is aimed to investigate the physical changes of an elite team participating European Handball Champions League. When we compare our study with both the control group and the similar studies in the literature, it is understood that the body fat value of experimental group is within accepted limits and in a better condition.

In flamingo balance test, the low values except zero (0) is accepted as the better balance score. It can



be seen that as the balance values of experimental group ( $8.2 \pm 3.1$ ) are better than the values of control group ( $8.9 \pm 7.5$ ) on the right foot, the values of control group ( $6.0 \pm 2.6$ ) are better than the values of elite handball players ( $7.4 \pm 2.3$ ) on the left foot. There isn't any statistically significance between the groups in flamingo test. It can't be seen any study or data about balance of handball players in literature review.

### Conclusion

In this study performed on a team playing in the Turkish Handball Super League, the physical values are significantly different from the control group consisting of the students from School of Physical Education and Sport positively. The physical data of elite handball players are compared to the international studies especially on the handball players in the similar level. It is obviously understood that the average age value of experimental group in our study is higher than the international values (Gorostiaga et al., 2006; Shahbazi et al., 2011; Sporis et al., 2010; Ziv & Lidor, 2009). The standstill period of Turkish Handball after its rapidly development between the dates 1990-2005 and the failure of youth setup works can be seen as the some probable reasons of it. Besides, it is determined that the elite handball players begin to play handball at the age of 14 and even if this value is enough, it results from the high average age value of handball players. Because of the fact that to make the handball players begin to the sport earlier or to canalize the promising players to the handball will bring much more success to this sport branch.

In height and weight variables, the elite handball players are seen in a better condition in comparison to both the control group and the players in the similar levels. Although the elite handball players of Turkey, who are physically higher values, are very successful individually, we can't equally get succeed in international area.

It is impossible to say anything accurate about the relationship between the physical data and the international success with this study only. Since this study doesn't measure other motor features and it is not also aim of the study. Further studies which measure the motor features have to apply and they will give detailed information about the characteristic features of elite handball players in Turkey and enable to compare them with the international opponents.

Despite of the fact that the body fat percentage value of players is higher than the control group, it shows great similarity to the values in the international literature and it is also within accepted limits. When the flamingo balance value of players is compared with the control group, it can be seen that the balance value is better for right foot, but it isn't better for left one. So it can be said that it is essential not to accept these

values as norm values because of the fact that the number of people in the groups aren't quite adequate for this.

The participation of the limited number of people and the lack of measuring some motor features such as speed, strength, resistance, flexibility can be seen as the limitations of the study. This is because of the limited time and possibilities. Finally, further studies must be performed on a great number of subjects and also motor features mentioned above, besides measure some shooting and speed parameters peculiar to handball.

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## EVALUATION OF COMMUNICATION SKILL LEVELS OF CANDIDATE TEACHERS IN TERM OF PLAYING SPORTS OR NOT

HUSEIN KIRIMOGLU<sup>1</sup>, ILHAN EKREM LEVENT<sup>2</sup>, AYSEGUL ŞUKRAN OZ<sup>3</sup>

**Purpose.** The aim of the research was to evaluate levels of communication skills of the candidate teachers who studied at the Faculty of Education and School of Physical Education and Sports Teacher of Mustafa Kemal University in terms of playing sports or not.

**Methods.** The sample of the research was made up by a total of 884 candidate teachers selected from the population [175 candidate teachers (53 female and 122 male candidate teachers) from Department of Physical Education and Sports Teaching and 669 candidate teachers (424 female and 245 male candidate teachers) from the Faculty of Education]. Personal Information Form developed by the researchers and Communication Skills Evaluation Scale developed by Korkut (1996a) were used.

**Results.** The communication skill scores of the participant sample group were compared in terms of gender variable, it was noted that there was not any statistically significant difference between female students and male students ( $P>0.05$ ). There was statistically significant difference between the communication skills scores of participants in terms of faculty and departments where they studied ( $P<0.05$ ) and it was found out that candidate teachers who studied at Department of Physical Education and Sports Teaching had significantly higher communication skill scores compared to those who studied at the Faculty of Education ( $P<0.05$ ).

**Conclusion.** Physical education and sports affect positively the improvement of communication skills of the candidate teachers.

**Keywords:** Communication skill, Sports, Candidate Teachers.

### Introduction

Communication has been defined as “a process of making the meaning common by sharing it (meaning)” Aydın (1998), “transmission of feelings, thoughts or information to others via all possible ways” (Robbins 2005), “an exchange of inter-related messages between two units” Cüceloğlu (2006), “process of production, transmission and interpretation of information” Dökmen (2004); on the other hand, the aim of the communication has been defined as producing a partnership of information, thoughts and attitudes between the receiver and sender (Açıkgöz, 1996). An effective communication occurs only if the receiver understands the meaning of the message in the way that the sender means (Erözkan, 2009).

We can suggest that the fact that various approaches are observed in the definition of the communication may be resulting from the fact that it (communication) covers a broad range of different settings and different units. Therefore, communication can be defined differently when it occurs between different units. For instance; there are different communication forms such as self-communication, relations with mass media, international relations (Korkut 2005).

In this sense, it may be proposed that the most remarkable thing in the process of teaching and learning may be interpersonal communication because the school environment and its service area is a big community of teachers, students, their parents and school managements and they are in a position to use interpersonal communication during the process of supplying and demanding the services. For Balcı (1996); the success of those who perform a profession

related to human relations relies on their effective use of communication skills.

Interpersonal communication has been defined as the ability to understand the meanings between two people at least (cited by Korkut, 2005), as the ability to consider others valuable in order to listen to and understand each other and as the ability to create sameness out of differences (Özer, 2006) and the source and aim of the interpersonal communication has been made up by humans (Dökmen, 2004).

There are three criteria to define a communication as “interpersonal communication”: face to face position of the people who participate in interpersonal communication (within a certain proximity), all of the participants should send messages to other members of the group and accept the incoming messages from them and the messages should be verbal or non verbal messages (Tubbs & Moss (1974); cited by Dökmen (2004).

Interpersonal communication becomes particularly important in educational settings and is accepted as one of the indispensable components of teaching profession because the communication between the teacher and student during the teaching-learning process carries a vital significance for the target behavior to be learnt. It is essential to develop and to maintain a healthy communication -particularly- in the educational settings because the communication process affects both individuals' behaviors and their learning because the individual learns new information and skills not only via his own experiences but also via others' experiences presented by the communication (Tabak, 1999).

A healthy education requires effective

<sup>1</sup>Mustafa Kemal University, Physical Education and Sports Department, Hatay, TURKEY

<sup>2</sup>Gazi University, Physical Education and Sports Department, Ankara, TURKEY

<sup>3</sup>Department of Special Education, Mustafa Kemal University TURKEY

E-mail: leventilhan@gazi.edu.tr

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communication among -particularly- teachers and students and managers and other workers (Çilenti, 1998). A healthy teaching and learning means a healthy communication. Communication in classroom settings occurs so that instructor can share the behaviors of a particular subject and the behaviors can be adopted by the students (Bangir and Senemoğlu 1999; Birol 1996; Deryakulu 1992).

“Much of the communicational information can be transferred to the receiver through bodily contact during the communication process and thus meanings are explained.” (Akoğuz, 2002). Mehrabian (1967) emphasized that non verbal elements in the communication constitute an important part of the communication. The most evident factor in these non verbal elements is physical contact. Physical contacts - such as patting one’s back, shaking hands after a nice movement, getting up after a foul with the help of the opponent player, apologizing after a foul by patting the player’s back and etc.- can receive appreciation but it is, also, normal to get disapproval for somebody who demonstrates his reactions using physical aggression (Kılıçgil et al., 2009).

“It will provide a healthier communication process in human relations if people who are employed in any kind of profession acquire communication skills. However, it is inevitable to know these communication skills for the professions whose nature is made up by strong human relations. It is thus very important that physical education teachers, trainers and sports managers who are charged with physical education and sports organizations should acquire these skills. Besides, shaping human’s ability to act (whose nature is made up by actions and thus communication through action is unavoidable) with the help of positive physical education programs and sports organizations may render interpersonal relations healthy and continuous.” (Tepeköylü, 2007).

The most effective and fastest communication is verbal and face to face communication. Feelings, thoughts and information-transfer become healthier and more fluent because sender (speaker) and receiver (listener) are in close relation with each other in verbal communication. Feedback occurs instantly in verbal (face to face) communication and thus, it is checked if the message is correctly understood or not (Cengiz, 2009). Therefore, the most preferred and commonly used communication is verbal and non verbal communication in school settings and consequently both verbal and non verbal communication (mimics, gestures, postures, eye contact) occur between the teacher and the student and teaching and learning process proceeds.

In this sense, it is very important for the teachers (who undertake important tasks in educating the future generations with bodily, psychologically and mentally improved characteristics in a healthy way in every aspect and in transforming them into good individuals) to acquire healthy communication skills at a desirable level.

Therefore, it is of importance to explore the level of communication skills of the candidate teachers who constitute the future teaching teams and whether participation in physical activities improves their communication skills or not.

The aim of the present research was to investigate the levels of communication skills of the candidate teachers who studied at Faculty of Education (Primary School Teaching Program, English Language Teaching Program, Fine Arts Teaching Program, Computer and Instructional Technologies Teaching Program, Science Teaching Program, Turkish Language Teaching Program, Special Education Teaching Program) and Department of Physical Education and Sports Teaching of Mustafa Kemal University during 2009-2010 academic year.

## **MATERIAL AND METHODS**

### **Model**

General screening model, one of the descriptive research methods, was used in this research. (Karasar, 2005) defines this model as an approach that aims at describing a present situation as it is.

### **Population of the research**

The population of the research was totally consisted of 1371 candidate teachers (785 female candidate teachers and 586 male candidate teachers) who studied at Faculty of Education (Primary School Teaching Program, English Language Teaching Program, Fine Arts Teaching Program, Computer and Instructional Technologies Teaching Program, Science Teaching Program, Turkish Language Teaching Program, Special Education Teaching Program) and Department of Physical Education and Sports Teaching of Mustafa Kemal University during 2009-2010 academic year.

The sample of the research was made up by a total of 884 candidate teachers selected from the population [175 candidate teachers (53 female and 122 male candidate teachers) from Department of Physical Education and Sports Teaching and 669 candidate teachers (424 female and 245 male candidate teachers) from the Faculty of Education].

There were 1371 candidate teachers who currently studied at Faculty of Education and Department of Physical Education and Sports Teaching of Mustafa Kemal University during 2009-2010 academic year. 785 candidate teachers were female and 586 were male.

1371 teaching program students who made up the population, 844 students participated in the research and 477 of the participants were female and 367 were male candidate teachers. Data were obtained from the office of student affairs of Faculty of Education and Department of Physical Education and Sports Teaching of Mustafa Kemal University.

### **Data collection tool**



Personal Information Form developed by the researchers and Communication Skills Evaluation Scale developed by Korkut (1996a) were used. Communication Skills Evaluation Scale (CSES), developed by Korkut (1996a) in order to understand how individuals evaluate their communication skills, was first introduced for high school students and later administered to university students and 61 adults. CSES is a Likert type scale with a 1-to-5 rating. It consisted of a total of 25 items and the highest score from the scale is 100 and the lowest score is 0. The rating is 5 "always", 4 "often", 3 "sometimes", 2 "rarely" and 0 "never". There are not any reversed items on the scale and higher scores mean that individuals consider their communication skills as positive. The validity and reliability trials of the scale were performed by Korkut and alpha internal consistency coefficient was found as .80. In the current study alpha internal consistency coefficient was found as .77.

#### Data Analysis

SPSS statistics software Version 16.0 was used for the data calculations and evaluations. The data were summed with means and standard deviations. Normality test of the data was performed using One-Sample Kolmogorov-Smirnov test and it was assumed that data followed a normal distribution. Therefore, the data were analyzed with Independent sample-t test of the parametric tests. Error threshold in the present research was accepted as 0.05. These techniques used for the data analysis belonged to descriptive statistics (Büyüköztürk, 2006).

#### Results and discussions

According to the results which shown on the table shown below, when the communication skill scores of the participant sample group were compared in terms of gender variable, it was noted that there was not any statistically significant difference between female students and male students ( $P>0.05$ ).

On the other hand, there was statistically significant difference between the communication skills scores of participants in terms of faculty and departments where they studied ( $P<0.05$ ) and it was found out that candidate teachers who studied at Department of Physical Education and Sports Teaching had significantly higher communication skill scores compared to those who studied at the Faculty of Education ( $P<0.05$ ).

**Table 1: The comparisons of the communication skills of the participants in terms of gender, faculty, playing sports as registered players and sports branch variables**

Also, the sample group revealed that there was statistically significant difference between the communication skill scores of candidate teachers in terms of playing sports as registered players ( $P<0.05$ ). This comparison demonstrated that the communication skill scores of those who played sports as registered players were statistically significantly higher than those

who played sports as non registered players ( $P<0.05$ ). When candidate teachers of the sample group were compared in terms of playing individual sports and team sports, candidate teachers who played team sports had significantly higher communication skill scores than those who played individual sports ( $P<0.05$ ).

#### Discussion and conclusion

According to the findings obtained from the research, it was seen that that there was not any statistically significant difference between communication skill scores of the participant sample group in terms of gender (female-male) ( $P>0.05$ ). When other researches about the same subject (Baykara Pehlivan 2005; Bozkurt Bulut 2004; Ersoy 2006; İlaslan 2001; Tulunay Ateş, 2005; Razi 2009; Tessier, et al 2010). were analyzed, there was not any significant difference between females and males according to the findings obtained after the comparison of the communication skill levels in terms of gender variable; which concurred with our findings.

The fact that there was not any significant difference in terms of gender variable may be attributed to the fact that the attitudes of mothers, fathers and social environments (that have been changing) towards girls are becoming a more democratic and understanding behavior style in our society and thus they develop a healthier communication with the girls. According to Nazlı (2000), it is possible for parents to educate responsible, collaborative, self-disciplined, constructive and creative individuals only when they develop a healthy communication environment with them.

Other researches that investigated communication skill levels in terms of gender variable found communication skill scores of women significantly higher compared to men (Tessier et al. 2010; Alkaya 2004; Black, 2000; Korkut, 1996(b), 1997, 2005; Reed, McLeod & McAllister, 1999; Tepeköylü, 2007). Also, it is reported that women teachers behave more positively than men teachers when they communicate with students (Bedur 2007).

We can say that there are different findings about women and men in the researches that compared communication skill in terms of gender variable and some support women and some do not show any difference in terms of gender variable as in our research. These different findings may be resulting from the differences of demographic characteristics of the sample groups.

Another finding of the research yielded a statistically significant difference between communication skill scores in terms of faculty and department where the students studied ( $P<0.05$ ). It was found out in this comparison that the communication skill scores of candidate teachers who studied at Department of Physical Education and Sports Teaching were higher compared to those who studied at the Faculty of Education ( $P<0.05$ ).

This significant difference is an important finding for the aim of the research. In fact, the aim of the present research was to determine whether the levels of communication skills of the candidate teachers changed according to teaching departments or not and to explore what type of variables caused this change if any. The finding that the communication skill scores of candidate teachers who studied at Department of Physical Education and Sports Teaching were higher compared to those who studied at the Faculty of Education (Primary School Teaching Program, Turkish Language Teaching Program, Science Teaching Program, Foreign Languages Teaching Program, Fine Arts Teaching Program, Computer and Instructional Technologies Teaching Program, Special Education) made us conclude that it was due to the general feature of physical education and sports.

Humans want to have behaviors that enable them interaction with others and are socially acceptable. These behaviors are generally called social skills. Social skills play an important role in the life of individual because it is an important characteristic that facilitate communication with others (Yüksek, 2001). Physical education and sports play a key role in socialization of the individuals and helps them find their personality and proceed on the correct path (Aracı, 1998) and contribute to the communication with their environment through sports culture (Özdoğan, 2005). Sports help numerous social values to be established and to be continued. These values include hard work, sacrifice, justice, loyalty, responsibility, reliability, tolerance and self discipline (Küçük and Koç, 2003).

When we think about the course syllabus of the department of physical education and sports teaching and special ability examination used for the student selection; it is known that some courses include individual sports trainings and team sports trainings and are taught through applied courses, candidate teachers participate in inter-university sports competitions and most of the candidate teachers of the departments of physical education and sports teaching have a sportive CV; which improve communication skills of these students in the educational settings through physical education and sports and their participation in sportive competitions enable them to enter different social environments. These positive environments offer more advantages in order to improve their communication skills compared to other candidate teachers.

It was discovered in the study of Pepe et al. (2005): Alkan and Erdem (2011) Evaluation of Contribution Levels of the courses studied at the Departments of Physical Education and Sports Teaching for the Students- that the courses taught at Departments of Physical Education and Sports Teaching improved communication skills. This finding supported ours.

It was found out in the study of Özerbaş et al. (2007): Yuksel Sahin, (2008) –Evaluation of the

Communication Skill Levels as Perceived by the Candidate Teachers- that there was not any statistically significant difference between the communication skills of the candidate teachers in terms of departments where they studied. The sample group of this research was consisted of such different disciplines as English Language Teaching Department, Social Sciences Teaching Department, Science Teaching Department and Mathematics Teaching of Primary School and it was not found any significant difference in the levels of communication skills. Candidate teachers of our sample was partly similar to the sample group of the above mentioned research and the fact that communication skill levels of the candidate teachers who studied at the Faculty of Education were not significantly different supported the finding of our research.

Actually, considering our findings although communication skill levels of intra group (candidate teachers who studied at the Faculty of Education) were not significantly different; communication skill levels of the candidate teachers who studied at the Department of Physical Education and Sports Teaching were found significantly to be higher; which was the cause of the difference of the research findings. However, it was said in the conclusion of the study of Hergüner et al. (1997) that “sports did not affect communication skill levels of the university students”; which may have resulted from uncommon and unpopular mass media and sportive university activities of the time unlike today.

According to another finding of the research, there was statistically significant difference between communication skills of the candidate teachers of the sample group in terms of playing sports as a registered player ( $P<0.05$ ). It was found out in this comparison that candidate teachers who played sports as registered players had significantly higher communication skill scores than those who played sports as non-registered players ( $P<0.05$ ); which may be resulting from the fact that registered players are competitors and meet different communication environments due to the participation in sportive competitions in different cities.

When communication skills of the participants were compared in terms of playing individual sports and team sports, it was found out that communication skill scores of the team sports players were higher than those of individual sports players ( $P<0.05$ ); which supported both the thesis of the present research –that physical education and sports contributes positively to communication skills- and other findings proving that participation in physical activity improves communication skills.

According to Sunay et al. (2004), those who are engaged with team sports are more motivated in terms of socialization and reaching team success with the group; which both supports our research findings and demonstrates that those who are engaged with team sports have better communication skills because

communication is much more widespread and collaboration need is greater in team sports. Again, according to the findings of the research [titled as "Evaluation of The Level of Physical Activity Participation on Academic Success, Communication Skills and Life Satisfaction of University Students" and conducted with a total of 694 university students (347 females and 347 males) who studied at the central Campus of Cumhuriyet University]; it was found out that the lowest mean communication skill scores were drawn from "sedentary" students (those not playing sports) ( $X=3.90$ ) and the highest mean communication scores were obtained from "highly active" students ( $X=4.18$ ); which suggested that the hypothesis that there is a difference between communication skills depending on the level of the physical activities among the university students is accepted. It was found out that there was moderately positive and significant correlation between physical activity levels and communication skills of the students. Thus, it was concluded that as levels of physical activity increase so do communication skill scores (Fişne, 2009). This finding supported our findings.

### CONCLUSIONS

As a result, as long as the candidate teachers of the present research were concerned, it was found out that;

- The comparison of communication skill scores revealed that there was not any statistically significant difference between females and men in terms of gender variable ( $P>0.05$ ),

- Communication skill scores of the candidate teachers who studied at the Department of Physical Education and Sports Teaching were significantly higher than those who studied at Faculty of Education ( $p<0.05$ ),

- Communication skill scores of the candidate teachers who played as registered players were significantly higher than those who did not ( $p<0.05$ ) and

- Communication skill scores of the candidate teachers who played team sports were significantly higher than those who played individual sports ( $p<0.05$ ).

In light of these results, we may suggest that physical education and sports affect positively the improvement of communication skills of the candidate teachers.

Thus, increasing the class time of "Physical Education and Sports", increasing the number of the sportive activities and making "Physical Education and Sports" course compulsory (which is now an optional course in university education) may have a positive effect on improving communication skills of candidate teachers at the Faculty of Education.

**Table 1: The comparisons of the communication skills of the participants in terms of gender, faculty, playing sports as registered players and sports branch variables**

VARIABLES			Mean	SS	T	P
Gender	Male	67	102,57	11,168	1,747	0,081
	Female	77	103,85	10,155		
School / Faculty	Physical Education	75	105,63	8,957	3,699	0,000*
	Faculty Of Education	69	102,68	10,937		
Are You a Registered Player?	Yes	24	105,74	8,941	3,183	0,002*
	No	20	102,87	10,833		
Sport Branch	Individual Sports	0	103,28	9,753	2,085	0,041*
	Team Sports	4	107,00	8,365		

\* $P<0.05$

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## INVESTIGATION OF STRUCTURAL AND BIOMOTORIC FEATURES OF YOUNG VOLLEYBALL PLAYERS AND DETERMINING THE POSITION BY DISCRIMINANT ANALYSIS

İBRAHİM KILIÇ<sup>1</sup>, MELTEM BİNBOĞA<sup>2</sup>

### Abstract

The aim of this study is to analyze structural and biomotoric features of male and female setter and smasher volleyball players in 15-17 age group. The study was carried out in Afyonkarahisar City Center; measurements were made on totally 113 volunteer volleyball players. There were 29 smashers and 15 setters from 5 male teams participated in Youth Group Volleyball Matches; while there were 49 smashers and 20 setters from 8 female teams. T-test was used for comparing young volleyball players' structural and biomotoric features according to sex and position. Relation between variables of structural and biomotoric features were determined by correlation analysis. On the other hand, discriminant analysis was carried out in order to classify players according to position in terms of biomotoric features and to determine the important/unimportant variables in this classification. At the end of the research, it was determined that flexibility values of setters were higher than smashers while smashers were better than setters in terms of other biomotoric features. There were found to be significant relation between biomotoric features (except flexibility) and

<sup>1</sup>Afyon Kocatepe University, Department of Biostatistics, Afyonkarahisar, Turkey

<sup>2</sup>Afyon Kocatepe University, School of Physical Education and Sports, Afyonkarahisar, Turkey

E-mail: kilicibrahim@hotmail.com, meltembinboga@yahoo.com

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height-weight. Additionally, in the classification of players as setter and smashers, the most significant variable for female players were found to be left hand grasping power and flexibility, while for male players the most significant variable was right hand grasping power.

**Key words:** Biomotoric feature, structural feature, volleyball, smasher and setter, discriminant analysis.

## INTRODUCTION

It is a widely known fact that sports activities that individuals make during their physical development process have significant effects on their physical, structural and biomotoric features. It is especially revealed by many researches that (C. Açıkkada, 1990, M.H. Rice, et al, 2000, H. Köylü, 2001, N. Apostolidis, et al, 2004, A.Özkan, et al, 2005, G. Wulf, 2007, J. Sheppard, et al, 2007, A. G. Faigenbaum, 2007, S. Jakovljević, 2010) structural and biomotoric development of young individuals have direct relations with performance no matter what the sports branch is. Training science is based on maximizing the performance and keeping the maximum performance level (F. Kılınç, et al, 2011). G. Wulf (2007), stated that the aim of all kinds of sports is to develop biomotoric features of the related sports branch by permanent metabolic adaptation thus increase the performance of player. Biomotoric features that reflects the basic movement feature in players includes many variables such as; strength, speed, flexibility, jumping and endurance (F. Ergül, 1995, I. Mihajlović, 1996, Y. Akkoyunlu, et al, 2010) and these are the significant issues in volleyball like in other sports branches.

Volleyball has become one of the most favorite sports branch with increasing interest in volleyball in recent years. There are millions of active sportsmen in International Volleyball Federation (FIVB) which was established by 14 founder countries with the congregate on 18-20 April 1947 in Paris and the Federation includes more than 200 countries. When volleyball is played at a professional level, it requires many features such as quick power, jumping, hit, sprints, endurance, speed, dynamism, coordination, technique and reflex (M.E. Öztürk, et al, 2005). Especially modern volleyball includes individual movements that require many synchronous combinations with highly dynamic activities (D. Bonacin, et al, 2009).

Strength is a significant feature that should be taken into consideration in making technical movements special to volleyball. W. Hollman (1972), said that strength is the endurance ability of muscles when they face any resistance; S. Plisk (2003), stated that it is the ability to use power in maximal efforts and to repeat the sub-maximal efforts. These definitions put forward the volleyball players' leg and especially grasping power biomotoric features. Besides this, jumping, which has a direct relation between hit, block and hit service, is a significant biomotoric feature (J. Sheppard, et al, 2007). On the other hand, flexibility and dynamism of joints (T. Siatras, et al, 2003, S.B.

Thacker, et al, 2004) are the basic determinant factors in making different movements in all positions with warm-up (W. Cornelius, et al, 1992, A.G. Nelson, et al, 2005, M. Çolak, et al, 2010). In addition to these, watching the environment, guessing the speed and distance of ball, making the right movement on the right time besides motivation, coordination, quickness and balance are the important features of volleyball which is a technical game.

The aim of this study is to analyze structural and biomotoric features of male and female setter and smasher volleyball players in 15-17 age group.

## MATERIAL AND METHODS

The data group of the study were structural (height, weight, sports age) and motoric features (jumping, flexibility, leg strength, right grasping strength, left grasping strength) of 15-17 aged male and female players in setter and smasher positions who attended Youth Group Volleyball Games in Afyonkarahisar city center. Totally 113 volleyball players voluntarily attended the study. 29 smashers and 15 setters from 5 male teams attended the study (*Antalya Karatay High School, Isparta Anatolian High School, Denizli Çivril High School, Kayseri Aydınlık Evler High School and Burdur Private Alpaslan Ali Can High School*) while 49 smashers and 20 setters from 8 female teams attended the study (*Kocaeli Private Karşıyaka High School, Isparta Fine Arts and Sports Girls High School, Kayseri Atatürk Girls' Vocational High School, Nevşehir Hacı Bektaş Girls' Vocational and Technical High School, Denizli Anatolian High School, Antalya Konyaaltı High School, Karaman Akçaşehir High School, Burdur Anatolian Teacher High School*).

In terms of structural features of volleyball players, height and weight measurements were made with Seca 769 electronic height meter adult scales. Body Mass Index –BMI– was calculated by dividing the body weight (kg) to the stature in square meters. In measuring right and left hand grasping strength biomotoric features, Takei hand dynamometer that measures 0-100 kg strength was used. During measurements, players were standing up and their hands were at the position of 45 degree angle with their bodies and they were required to squeeze the dynamometer with maximum force without touching their body with their hands. Seat-Reach test flexibility table was used for measuring flexibility; electronic Jump-meter (Takei Physical Fitness Test Jumping) was used for measuring vertical jumping; back and leg dynamometer was used for measuring leg strength.

Measurements were done 3 times for each player at intervals and the best values were determined.

SPSS 14.01 package program was used for analyzing the data of the study. T-test was used for comparing young volleyball players' structural and biomotoric features according to sex and position. Pearson correlation analysis was used for determining relation between the variables of structural and biomotoric features of volleyball players.

Discriminant analysis was carried out in order to classify male and female players according to their positions (setter and smasher) in terms of biomotoric features and to determine the important/unimportant variables in this classification. Classification function of discriminating each sex into positions were determined that can be used as alternative in grouping the new members.

The aim of using discriminant analysis is firstly to determine effective variables in classification of two or more groups in terms of analyzed features; to find discrimination function/functions according to these variables and to put new members into a group with minimum mistake. Discriminant analysis is divided into two basic groups as linear and quadratic discrimination analysis. Discriminant analysis' linear discrimination function for both groups can be calculated with the formulas mentioned below (K. Özdamar, 2004):

Covariance matrixes of two group linear diskriminant analysis are equal ( $S_1=S_2$ ) and common covariance matrix is (S);

$$S = \frac{(n_1 - 1)S_1 + (n_2 - 1)S_2}{n_1 + n_2 - 2} \quad (1)$$

calculated with this formula. Classification functions of both groups are written as ( $Y_i$ );

$$Y_i = b_{i0} + b_{i1}X_1 + b_{i2}X_2 + \dots + b_{ip}X_p \quad (2)$$

$$(b_{i0} = -(1/2)X' S^{-1} X ; b_{ij} = S^{-1} X_j)$$

In equality;  $i=1,2$  stands for group number,  $b_{i0}$  stands for constant,  $b_{ij}$  ( $j=1,2,\dots,p$ ) stands for linear component (canonic variables) and  $p$  stands for variable number.

## RESULTS

Comparison of some structural features of young volleyball players attended in the study in terms of sex and each sex group according to position variable is given in Table 1. Comparison of their biomotoric features is given in Table 2. According to these data, it was determined that there was a meaningful difference between players' structural features according to sex ( $p<0.05$ ); male players' average values were higher than female players for all variables. Besides this, it was determined that there weren't significant differences between male players'

height, weight and body mass index according to position ( $p>0.05$ ); male setters' ( $X=6.53$ ) sports age were significantly higher than smashers ( $X=5.0$ ). As an exact opposite of this situation, female volleyball players' sports age didn't have a significant difference according to position ( $p>0.05$ ), and female smashers' height, weight and body mass index were higher than setters.

According to the findings in Table 2, it can be seen that there were significant difference between volleyball players' biomotoric features except flexibility ( $p>0.05$ ), in terms of sex ( $p<0.05$ ); and there were significant differences between biomotoric features between sex groups ( $p<0.05$ ). When average values of groups were analyzed, it was seen that male and female players' flexibility values were very close; besides this, male players had obvious superiority in terms of all other biomotoric features, as expected. On the other hand, setters' flexibility values were higher than smashers in both male and female groups; in terms of other biomotoric features (jumping, leg strength, right and left hand grasping strength), smashers were better than setters.

Correlation matrix that gives the relation of players' structural and biomotoric features' values are presented in Table 3. According to this, there weren't found to be any significant relation between structural features of players and flexibility ( $p>0.05$ ). In addition, from structural features; there wasn't found to be a significant relation between sports age and jumping, flexibility, leg strength ( $p>0.05$ ). There were found to be significant relation between sports age and right-left hand grasping strength; the relation was weak ( $0.20<r<0.39$ ) and positive ( $p<0.05$ ). The correlation matrix in Table 3 shows that there were significant relations between biomotoric features (except flexibility) and height-weight-BMI. The biomotoric feature that had the highest level of relation with these variables was right hand grasping strength. When biomotoric features' relation within one another were analyzed, there was found to be a significant weak negative relation ( $r=-0.256$ ) between flexibility and jumping. There were found to be medium, strong and very strong significant relations between other variables of biomotoric features ( $p<0.05$ ).

Results of discriminant analysis in classification of young male and female volleyball players' biomotoric features according to their positions and determination of important/unimportant variables are given in Table 4. According to this, the group covariance matrixes were homogenous (Box's  $M=25.204$  and  $26.760$ ;  $p>0.05$ ) which shows that two groups linear discriminant analysis is applicable. It was determined that units can be divided in both groups by one discriminant function and discriminant power of this function is significantly high (Wilks'  $\Lambda=0.771$  and  $0.719$ ;  $p<0.05$ ). In other words, discriminant function has an important role as a discriminator in determining the positions of players.



Canonical correlation values are  $r=0.479$  for female,  $r=0.530$  for male.

When significant variable structure matrixes that are given in Table 4 are analyzed, the most significant variables in classification of players in smasher and setter positions are left hand grasping strength and flexibility for female players; while they are right hand grasping strength and left hand grasping strength for males. The least important variables in discriminating players as setter and smasher are leg strength for female; flexibility for male.

At the end of the analysis, it was determined with two groups linear discriminant function that female can be classified at 81.0% and male at 87.3% ratios according to their positions in terms of biomotoric features.

### Discussion and conclusion

In this study, young players' structural and biomotoric features were analyzed and the obtained data were associated to present literature and evaluated. When the sampling of the research (15-17 aged young players' structural features) was analyzed, it was seen that male players' average values were higher than females as expected. The average height and weight of male players were 1.79 m and 74.16 respectively while female players' average height and weight were 1.67 m and 57.86 kg. The values determined by the study were very close to the values in literature while female values were a little lower. G. Helveci (2005), found that average height of young female players is 1.72 m body mass index is 58.04 kg. P. Demirel (2005), found that average height of young female players is 1.70 m and 62.56 kg. F. Kılınç, et al (2006), determined that young female national team players' average height is 1.82 m while their average weight is 67.6 kg. In his study about adolescence period (9-14 ages) of children volleyball players, E. Sönmez (2006), determined that female volleyball players' average height value is 1.44 m, while this value for male players is 1.47 m. Average weight of female players is 36.4 kg, while this value of male players is 35.4 kg. E. Kutlay, et al (2003), determined 13-15 age group female volleyball players' average height in the middle of season is 1.67, while these value is 1.70 at the end of season. In their study, M. E. Öztürk, et al (2005), found that 16-18 age group male volleyball players' average height is 1.77 m and their body mass is 67.58 kg.

In this study, although female players' average flexibility value (27.86 cm) was determined to be higher than males (26.18 cm), this difference wasn't found to be statistically important. Besides this, male values were determined to be higher in all other motoric features as expected. S. Akarsu (2008), determined that 14-18 age group male players' average flexibility is 25.84 cm, female players' average flexibility is 25.61 cm; A. Kalkavan, et al (1996), determined that 16 aged young male volleyball players' average flexibility 19.6 cm; R. Kürkcü, et al (2008), determined that 10-11 age group male volleyball players' average flexibility 20.40 cm; E. Sönmez

(2006), determined that adolescence female volleyball players' flexibility is 31.3 cm, male players' flexibility is 26.3 cm; H. Koç, et al (2007), determined that average flexibility of 21 volleyball players in handball and volleyball leagues whose training age are 5 or above is 18.3 cm. T. O. Bompa (2000), determined that flexibility varies according to age and sex, young female players at a certain level are more flexible than males; besides this, maximum flexibility level is reached at the age of 15-16 but inadequacy of muscle strength can have a negative effect on flexibility. M. Matvienko (2002), mentioned that there are many factors that affect strength and flexibility which should be evaluated separately; D.S. Özer, et al (2000), said that anatomical and functional changes in joints affect the flexibility measurements. On the other hand, according to the results, both male and female volleyball players in setter positions are more flexible and their jumping is lower when compared to smashers. This result can be explained as a setter position requires dynamism for multi dimensional pass against any kind of bump. At the end of analysis of volleyball games in terms of jumping percentages, it was determined that there were 100-150 jumping was done 1/3 of which was attack, 2/3 was block (M. Letzelter, et al, 1982, A. Kalaycı, 1996). This situation can be explained with the fact that smasher who are more active at the top of the net attack and block organizations have more capacity of jumping.

In the study, young female volleyball players' average linear jumping height was found to be 44.77 cm while average male value was 27.0 cm. average linear jumping height of Ankara first league team female volleyball players was found to be 47.5 cm by H.U. Önder (2007), elite female volleyball players' linear jumping height was determined to be 27.0 cm; M. Thissen, et al (1991), found that this value for female volleyball players in high schools are 43.6 cm; F. Kılınç, et al (2006), determined this value to be 48.5 for young national team female volleyball players. G. R. Nalçakan (2001), in his study with female players found that minimum linear jumping height is 40 cm while maximum height is 61 cm. male volleyball players' average linear jumping height was found to be 65.72 cm by M. E. Öztürk, et al (2005), 104.6 cm for university student players by K. Göral, et al (2009), 34 cm for 12-15 age group male players by A. Kalkavan, et al (1996). In the study, while female average leg strength was determined to be 91.36 kg, this value for male players was 139.09 kg. In his study on determining the leg strength of 14-18 age group young male players in different branches, S. Akarsu (2008), found that the value is 160.04 kg, while the value for female players is 93.44 kg. This value for university student male players was determined to be 155.7 kg by K. Göral, et al (2009). A. Kalkavan, et al (1996), determined that 12-15 aged male players' leg strength is 70.3 kg.

Jumping is an ability that includes complicated movements and related to the strength of leg muscles,





explosive force, muscular contraction speed, development of muscle strength, flexibility of muscles in jumping action and jumping technique (M. Letzelter, et al, 1982, M. Günay, et al, 1994, A. Kalaycı, 1996). Jumping, one of the basic movements in volleyball requires the need for leg strength. T. Housh, et al (1988), said that muscular strength quickly increases in male players starting from adolescence but this is not the same for female players. He also mentioned that 15-16 aged females have 2/3 of male muscular strength. As can be seen from the above mentioned similar studies, strength factor has a bigger role in male players' linear jumping when compared to female players.

In this study, right hand grasping strength of female volleyball players were found to be 29.03 kg, while left hand grasping strength of volleyball players were found to be 28.23 kg; these values for males' right hand were determined to be 43.41 kg, while for left hand, these values were 40.82 kg. Male volleyball players' right hand grasping strength was found to be 44.12 kg, left hand grasping strength was found to be 37.62 kg by M. E. Öztürk, et al (2005), young male volleyball players' right hand grasping strength was found to be 32.7 kg by A. Kalkavan, et al (1996), right hand grasping strength was found to be 40.02 kg, left hand grasping strength was found to be 35.44 kg by K. Göral, et al (2009), 10-11 aged male volleyball players' right hand grasping strength was found to be 11.28 kg while their left hand grasping strength was found to be 11.28 kg by R. Kürkçü, et al (2008), young female volleyball players' right hand grasping strength was found to be 28.10 kg while their left hand grasping strength was found to be 27.08 kg by P. Demirel (2005), M. Pense (2002), found out that hand grasping strength of female basketball players' are 25.69 kg.

In this study, relation between structural and biomotoric features of sportsmen were analyzed and there were determined to be significant relations between biomotoric features (except flexibility) height-weight. There are some studies in literature which determined that hand grasping strength is physiological variable that is affected from various factors such as age, sex and body size and there is a strong relation between hand grasping strength and some anthropometrical features such as weight, height, and hand length (R. M. Malina, et al, 1987, S. Chatterjee, et al, 1991, C. H. Ross, et al, 2002). J. T. Viitisalo, et al (1992), and M.J. Duncan, et al (2006), determined in their studies that body structure and composition of children affect the linear jumping distance and linear jumping increase according to low body fat percentage in volleyball players.

Physical structure has a big significance on maximum physiological strength. If the physiological structure is not proper for the sports branch, it impossible to have a complete performance (C. Açıkada, et al, 1986). Especially performance and strength development have a direct relation with height, body mass index, length of arm, leg and other

body parts besides joint mobility and flexibility level (M. Günay, 1998). Height and weight are some of the anthropometrical preconditions that are needed for choosing and development of players (Y. Sevim, et al, 1993). The relation between development and performance are generally related to anthropometrical factors and contribute to development of performance (D. G. Baktaal, 2008). It is determined that jumping abilities are well in case height values that are effective in determining the performance in volleyball are high in male (in terms of sex) and in smashers (in terms of position). In other words, there is determined to be a significant relation between linear jumping success and height (M. Sayın, et al, 1995).

In our study, a positive relation was found to be between variables of biomotoric features except flexibility. Block, hit and net movements that are in basic techniques of volleyball require jumping namely explosive force (N. Ergun, et al, 1994). In this context, the necessity of volleyball players' jumping many times in a game shows that there is a positive relation between jumping and leg strength. Although weak, a negative relation was found to be between flexibility and jumping. When it is taken into consideration that that setters are more flexible and their jumping level is lower (Table 2), it wouldn't be false to say that this result is expected.

Discriminant analysis was carried out in order to classify players according to their positions (setter and smasher) in terms of biomotoric features and to determine the important/unimportant variables in this classification. According to these analyses, the most important variables in discrimination of females as setter and smashers were found to be left hand grasping strength and flexibility while the most important variables in discrimination of male players as setter and smashers were found to be right and left hand grasping strength. On the other hand, it is found out that by using the obtained discriminant function and biomotoric features, it is possible to classify female with 81.0% ratio and male with 87.3% ratio. In the study carried out in this context, it can be possible to determine new players' positions by measuring their biomotoric features with the discriminant function that can be identified by other studies on measuring anthropometrical and biomotoric features. More clearly, the study can be an important source of information and even a basic determinant in choosing the position of a player as smasher or setter. This is why, it can be suggested that statistical techniques such as discriminant analysis which gives the opportunity to use evaluation of more than one variable simultaneously rather than only one variable.



**Table 1.** Comparison of structural features according to sex and position

Structural Features	Sex	n	X	s.d.	p	Position	n	X	s.d.	p
Height(m)	Female	69	1.67	0.07	0.000***	Setter	20	1.63	0.05	0.002**
						Smasher	49	1.69	0.07	
	Male	44	1.79	0.06		Setter	15	1.77	0.05	0.132
						Smasher	29	1.80	0.07	
Weight(kg)	Female	69	57.86	7.49	0.000***	Setter	20	52.25	5.01	0.000***
						Smasher	49	60.14	7.15	
	Male	44	74.16	13.32		Setter	15	75.13	16.39	0.732
						Smasher	29	73.66	11.73	
BMI(kg/m²)	Female	69	20.61	2.16	0.000***	Setter	20	19.56	1.68	0.004**
						Smasher	49	21.04	2.21	
	Male	44	23.05	3.86		Setter	15	23.80	4.61	0.354
						Smasher	29	22.65	3.43	
Sports age(year)	Female	69	4.22	1.83	0.002**	Setter	20	4.30	1.53	0.793
						Smasher	49	4.18	1.95	
	Male	44	5.52	2.35		Setter	15	6.53	1.85	0.038*
						Smasher	29	5.00	2.43	

\* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$  BMI: Body Mass Index

**Table 2.** Comparison of biomotoric features according to sex and position

Biomotoric										
Features	Sex	n	X	s.d.	p	Position	n	X	s.d.	p
Jumping(cm)	Female	69	44.77	5.77	0.000***	Setter	20	42.60	3.34	0.012*
						Smasher	49	45.65	6.32	
	Male	44	58.29	8.54		Setter	15	54.73	8.80	0.045*
						Smasher	29	60.13	7.94	
Flexibility(cm)	Female	69	27.86	5.33	0.180	Setter	20	30.40	3.84	0.009**
						Smasher	49	26.82	5.54	
	Male	44	26.18	7.85		Setter	15	29.33	4.02	0.018*

					Smasher	29	24.55	8.85		
Leg strength(kg)	Female	69	91.36	21.30	0.000***	Setter	20	84.45	14.52	0.040*
						Smasher	49	94.18	23.05	
	Male	44	139.09	29.52		Setter	15	126.60	21.01	0.042*
						Smasher	29	145.55	31.47	
Right hand grasping strength(kg)	Female	69	29.03	3.97	0.000***	Setter	20	27.25	3.59	0.016*
						Smasher	49	29.76	3.92	
	Male	44	43.41	6.57		Setter	15	40.40	5.50	0.027*
						Smasher	29	44.96	6.62	
Left hand grasping strength(kg)	Female	69	28.23	3.86	0.000***	Setter	20	26.10	3.38	0.003**
						Smasher	49	29.10	3.73	
	Male	44	40.82	6.55		Setter	15	38.00	5.08	0.039*
						Smasher	29	42.27	6.82	

\*  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$

**Table 3.** Correlation matrix of structural and biomotoric features

Variables	Jumping	Flexibility	Leg strength	Right hand grasping strength	Left hand grasping strength
Height	0.488**	-0.099	0.559**	0.631**	0.591**
Weight	0.448**	-0.070	0.500**	0.596**	0.568**
BMI	0.272**	-0.043	0.289**	0.368**	0.355**
Sports age	0.165	-0.040	0.160	0.221*	0.228*
Jumping	-	-0.256**	0.638**	0.646**	0.556**
Flexibility	-	-	-0.163	-0.149	-0.122
Leg strength	-	-	-	0.672**	0.613**
Right hand grasping strength	-	-	-	-	0.900**
Left hand grasping strength	-	-	-	-	-

\*  $p < 0.05$ ; \*\*  $p < 0.01$

**Table 4.** Discriminant analysis result of classification according to position

Variables	For female			For male		
	The structure matrix of important variable in	Canonical discriminant function	Linear discriminant function coefficients	The structure matrix of important	Canonical discriminant function	Linear discriminant function coefficients

	discriminant	coefficients	Setter	Smasher	variable in discriminant	coefficients	Setter	Smasher
<b>Jumping</b>	0.456 <sup>4</sup>	0.391	1.318	1.400	0.509 <sup>4</sup>	0.412	1.008	1.073
<b>Flexibility</b>	-0.590 <sup>2</sup>	-0.585	1.173	1.037	-0.488 <sup>5</sup>	-0.450	0.707	0.631
<b>Leg strength</b>	0.391 <sup>5</sup>	0.003	-0.029	-0.029	0.517 <sup>3</sup>	0.474	0.119	0.140
<b>Right hand gr.st.</b>	0.551 <sup>3</sup>	0.045	0.614	0.628	0.565 <sup>1</sup>	0.030	0.125	0.131
<b>Left hand gr.st.</b>	0.696 <sup>1</sup>	0.647	1.403	1.614	0.526 <sup>2</sup>	0.586	0.918	1.038
<b>Constant</b>	-	-	-72.017	-78.005	-	-	-66.139	-75.786
Box's M=25.204; p=0.096 Canonical correlation (r)=0.479					Box's M=26.760; p=0.086 Canonical correlation(r)=0.530			
Wilks' Lambda=0.771; Chi-square =16.840; p=0.005					Wilks' Lambda=0.719; Chi-square=13.043; p=0.023			
Group centroids: Setter= -0.843 Smasher=0.344					Group centroids: Setter= -0.850 Smasher=0.440			
Correctly classification ratio=81.0%					Correctly classification ratio=87.3%			

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## EVALUATION OF SOCIAL SKILL LEVELS OF THE HEARING-IMPAIRED FOOTBALL PLAYERS

ILHAN EKREM LEVENT<sup>1</sup>, HUSEYİN KIRIMOĞLU<sup>2</sup>, AYSEGÜL SUKRAN OZ<sup>3</sup>

### Abstract

**Purpose:** The aim of the present research was to evaluate social skill levels of the hearing-impaired football players in terms of various variables.

**Methods:** The football players (n: 142) of 9 football clubs (1<sup>st</sup> league: 4 teams, 2<sup>nd</sup> league: 5 teams) who were selected with random sampling method were included in the research. The ages of the players ranged from 18 to 33. The social skill levels of the research group were assessed in terms of "age, economic status and league category". As the data collection tools, Personal Information form and Social Skills Inventory developed by Riggio (1986) the Turkish adaptation of which was performed by G. Yüksel (1997) were used. For the statistical comparisons; "One-Way Anova" and "Independent-Samples T Test" test were used during the analysis the significance level was 0.05.

<sup>1</sup>School of Physical Education and Sports, Gazi University, TURKEY

<sup>2</sup>School of Physical Education and Sports, Mustafa Kemal University, TURKEY

<sup>3</sup>Department of Special Education, Mustafa Kemal University TURKEY

E-mail: leventilhan@gazi.edu.tr

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**Results:** As a result, it was found out that social skills of the football players with hearing-impairment were at a moderate level ( $229.82 \pm 26.34$ ). Besides, it was noted that as age and income status increased, so did social skill levels. As for the league category, there was a significant difference in “emotional expressivity and social expressivity” subscales on behalf of the football players in the 1<sup>st</sup> league ( $P < 0.05$ ).

**Conclusions:** Every sport activity is primarily a social experience for the disabled people. Additionally, it affects every individual who is in its natural ambience in different levels and supports all kinds of the developments.

**Keywords:** Hearing-impaired, social skill, football

### Introduction

It is known that even individuals who have no disability or health problem experience numerous problems during the process of socialization and development and are affected by these problems negatively (F. Akkok, 1991; H. Yavuzer, 2002).

The most important characteristic of human beings is to live together with others and to make social interactions. Skills used during social interaction enable people to communicate each other. People must collaborate with other people in order to continue their lives. As the result of these relations, socio cultural integration takes place among them (R. Gelles and A. Levine, 1991).

Social development is the whole process of relations established with other people from birth to adulthood and social characteristics such as interest in others, emotions, attitudes and behaviors about others (C. Binbasioğlu, 1995).

Socialization, considered as a way to organize social life, is defined as an integration and adaptation process as the result of mutual interaction of the individuals, too (F. Aksoy, 2000; S. Donmez, 1990; H. Yavuzer, 2000). In other words, socialization is the process through which one develops a behavior which is suitable for valid rules and value judgments in the society (C. Binbasioğlu, 1995). Socialization is not only associated with childhood period but also covers a period that continues during the individual's life (H. Yavuzer, 2000).

With socialization, individual learns how to behave in different settings, time and situations by observing himself and other people.

For T. Sukerman (2000), individual should have social skills in order to continue his life in the society. These skills help individual become socially acceptable and enable him establish satisfactory interactions as a person (D.R. Knapczyk and P. Rhodes, 1996; L. Korinek and P.A. Popp, 1997).

K.L. Elksinin and N. Elksinin (2001) deals with social skills in three basic dimensions. These are interpersonal behaviors, peer acceptance and communication skills.

1. **Interpersonal Behaviors:** covers such social relations as making friendship, presenting oneself, participation, asking for help-request, paying compliments, apologizing.
2. **Peer Acceptance:** covers asking for and giving information, participation in an activity, understanding other people's emotions.
3. **Communication Skills:** covers such skills as being a good listener, having a nice chat /

conversation, continuing the chat / conversation and feedback.

Inability to express feelings and thoughts in a comfortable way; inability to make friendship; unsociability in relations with opposite sex; restrictions of social communication and interaction experienced in such settings as school, work place, family, -all of which are regarded as communication problems today- have made social scientists and psychologists deal with social skills over the past years (B. Tegin, 1990).

The hearing-impaired people have disadvantages in point of development of social skills due to the communication difficulties.

There may be problems in social lives of the individuals with hearing-impairment. Sometimes, drawbacks / disadvantages are noted in terms of social skills. It is suggested that one of the factors responsible for lack of social skills may be resulting from the drawbacks or delays in theory of mind (C.C. Peterson and M. Siegal, 1999; Howley M. and C. Howe, 2004).

According to S.D. Antia, K.H. Kreimeyer and N. Eldredge (1993), peer interaction of the hearing-impaired people is at the minimum level due to the disabilities in the communication skills.

Although the individual with hearing impairment is directly affected by this disability, it turns out as a social fact because it also affects his family and his social environment. Hearing, language and speaking are basic components of communication and are interwoven with each other in the daily life. Any breakdown in this mechanism prevents learning language and speaking in a normal way and complicates the acquisition of the communication skills. Besides, it is emphasized that lack of social skills may lead to low academic success, too (F. Ogilvy, 1994).

People with hearing-impairments experience various problems in their interactions with other people, in their academic works, in their professional lives and in their emotional and behavioral areas during their lives. It is necessary for individuals with hearing-impairments to integrate with the society by increasing their social skill levels in order to solve these problems above (G. Anderson et al. 2000; S. Antia and K. Kreimeyer 1988).

Because sports are social activity that makes individuals participate dynamic social environments, it plays a key role in socialization of the individual. The individual try to find a place in the social environment through games and sports (E. Kılıçgil, 1998).

When it is considered that sports are mainly a collective activity in modern societies, individuals who

are interested in sports establish social relations with different people through sportive activities. By saving the individual out of his small world; sports enable the individuals communicate with different people who have different beliefs, ideas in different settings and help them be affected by them and affect them. In this sense, it may be argued that sports play a key role in making new friendships, in strengthening these new friendships, in supporting social integration and especially in integrating the disabled individuals into the society (A. Yetim, 2005).

Sports improve physical, psychological and social development of the disabled people and facilitate their integration into the society( C.B. Eichsteadt and B.W. Lavay, 1995). Therefore, sports may be considered as a tool to realize integration of the disabled individual into the society, to speed up this process and to contribute their socialization (J.M.Dunn and H. Fait, 1997).

In the past, sportive activities were seen as rehabilitation instrument for the disabled people. Today, it is understood that sports not only contribute to rehabilitation of the disabled individuals but also they affect their physical, cognitive, social and psychological developments positively and makes their adaptation to social lives much more easier (A. Gur, 2001).

Sports expand the social environment that disable person has and help them increase communicational skills (A. Gur, 2001). Besides, it is emphasized that sports are one of the easiest ways for the disabled people to communicate with the society (J. Banta, 2001, R. Vilhialmsson,1992).

The studies conducted indicate that individuals with hearing-impairments experience

insufficient social skills since their childhood (H. Avcioglu, 2001; S.P. Tuy, 1999; G. Cartledge et al. 1996; S. Antia et al.1993; T. Sukerman, 2000).

The disabled individuals experience various difficulties in their educational lives, environments and professional lives due to the insufficient social skills. The social skills of the disabled people should be evaluated and improved so that they can be sufficient in their social interactions, be accepted and live independently.

In light of these explanations, the main aim of the present study was to investigate social skill levels of the footballers with hearing-impairment in terms of different variables (age, income level and league category).

## Methodology

### Research Group

The football players of 9 football clubs (The Hearing Disabled of Antalya Metropolitan Municipality , The Hearing Disabled of Konya, The Hearing Disabled ofSincan, The Hearing Disabled ofKırşehir, The Hearing Disabled of Keçiören, The Hearing Disabled ofKarşıyaka, The Hearing Disabled ofYüreğir, The Hearing Disabled of Aydın, The Hearing Disabled ofKahramanmaraş Sports Club) (1<sup>st</sup> league: 4 teams, 2<sup>nd</sup> league: 5 teams) who were selected with random sampling method were included in the research (n=142). The ages of the players ranged from 18 to 33. The social skill levels of the research group were assessed in terms of “age, economic status and league category”. Table 1 shows quantitative characteristics of the research group in terms of independent variables of the research.

**Table 1: Characteristics of the research group in terms of independent variables**

Variables		f	%
Age groups	18-22 years of age	64	45
	23-27 years of age	51	36
	28 and older	27	19
Economic status	Low	32	23
	Medium	76	53
	High	34	34
League category	1 <sup>st</sup> league	65	46
	2 <sup>nd</sup> league	77	54

### Research Model

The research is a descriptive study in screening model. When the literature was analyzed, it is seen that various techniques are used for evaluation of the social skills. These techniques are socio metric techniques, self assessment techniques, rating techniques, behavioral role playing techniques, observation and interview techniques (K.W. Merrell, 2003;K.W. Merrell and G.A. Gimpell 1998; T.J. Zirpoli and K.J. Melloy, 2000).

Self assessment technique was used in the study. Self assessment is a technique where the

individual reports about himself. It is commonly used technique since application, answering and evaluation of the technique are easy (H. Bacanlı, 1999). Individual evaluates his social behaviors using this technique and thus information about social self-perception of individual is obtained.

### Data Collection Tools

Personal information form developed by the researchers and Social Skills Inventory (SSI) were used as the data collection tools. Social Skills Inventory-SSI was developed by Riggio in 1986 and revised for the modern version in 1989. Its Turkish

adaptation was performed by G. Yuksel (1997). Social Skills Inventory-SSI is a small self-reportscale to measure basic social skills, containing 90 items. SSI is known as Self-Description Inventory in the manual. SSI is developed for "personality" and "social psychology" researches (G. Yuksel, 1997).

It is a five-point Likert type scale and each subscale is consisted of 15 items and thus 90 items in total. Scoring of these items is obtained by reverse scoring. SSI assesses the social communication skills under six subscales at affective and social level and expressivity, sensitivity and control is associated with each level. Expressivity means individual's ability to communicate with others where a sensitivity means individual's ability to interpret the messages coming from others; as for control, it means individual's ability to

organize communicational process in various social cases (G. Yuksel, 1997).

There are six subscales as follows:

1. Emotional expressivity
2. Emotional sensitivity
3. Emotional control
4. Social expressivity
5. Social sensitivity
6. Social control

### Analysis of the Data

For the statistical comparisons; "One-Way Anova" and "Independent-Samples T Test" test were used during the analysis and the significance level was 0.05.

### Findings

**Table 2: Mean Subscale Scores and Mean Total Scores of Social Skills of Hearing Impaired Footballers**

	N	$\bar{X}$	S	Min.	Max.	Highest and lowest scores that can be obtained from the inventory
Emotional expressivity	142	34.38	5.73	21.00	58.00	15-75
Emotional sensitivity	142	42.13	6.42	25.00	71.00	15-75
Emotional control	142	35.88	4.60	23.00	61.00	15-75
Social expressivity	142	41.17	6.14	28.00	63.00	15-75
Social sensitivity	142	39.21	5.96	27.00	66.00	15-75
Social control	142	37.05	6.95	28.00	61.00	15-75
Social Skill Total	142	229.82	26.34	173.00	318.00	90-450

When we analyzed Table 2, it was seen that mean total score of social skills of Hearing Impaired Footballers was  $229.82 \pm 26.34$ ; which indicated that mean scores of social skills of the research group were at moderate

level compared with the minimum and maximum scores that could be obtained from the scale, yet, it was near lower limit of moderate level.

**Table 3: Mean Scores of Social Skills of the Hearing Impaired Footballers in terms of age groups**

	Age groups	N	$\bar{X}$	S
Emotional expressivity	18-22 years of age	64	34.12	5.13
	23-27 years of age	51	34.09	6.39
	28 and older	27	35.56	5.76
Emotional sensitivity	18-22 years of age	64	41.98	6.07
	23-27 years of age	51	42.12	5.41
	28 and older	27	42.48	7.15
Emotional control	18-22 years of age	64	35.72	4.68
	23-27 years of age	51	36.13	4.28
	28 and older	27	35.78	5.14
Social expressivity	18-22 years of age	64	41.09	6.57
	23-27 years of age	51	41.27	5.17
	28 and older	27	41.18	5.66
Social sensitivity	18-22 years of age	64	38.96	5.29
	23-27 years of age	51	39.37	6.48
	28 and older	27	41.22	5.86
Social control	18-22 years of age	64	36.75	6.07
	23-27 years of age	51	36.84	7.21
	28 and older	27	38.14	6.35
Social Skill Total	18-22 years of age	64	228.51	26.81
	23-27 years of age	51	228.72	24.27
	28 and older	27	234.96	29.36



When we analyzed Table 3, it was seen that mean total scores of hearing impaired footballers increased in direct proportion to age in terms of age variable. And also, it was observed that mean scores

increased in some of the subscales (Emotional sensitivity, Social sensitivity, Social control) of the social skills as age advanced. Mean scores of other subscales were irregular.

**Table 4: Comparison of the Social Skill Levels of the Hearing Impaired Footballers in terms of age groups**

	Source of variation	Sum of Squares	df	Mean Square	F	p
Emotional expressivity	Between Groups	46.209	2	23.104	0.704	0.496
	Within Groups	4562.187	139	32.821		
	Total	4608.396	141			
Emotional sensitivity	Between Groups	4.750	2	2.375	0.065	0.938
	Within Groups	5113.819	139	36.790		
	Total	5118.568	141			
Emotional control	Between Groups	5.096	2	2.548	0.102	0.903
	Within Groups	3477.837	139	25.020		
	Total	3482.932	141			
Social expressivity	Between Groups	0.922	2	0.461	0.013	0.987
	Within Groups	4888.759	139	35.171		
	Total	4889.681	141			
Social sensitivity	Between Groups	147.142	2	73.571	2.121	0.124
	Within Groups	4820.648	139	34.681		
	Total	4967.790	141			
Social control	Between Groups	40.086	2	20.043	0.467	0.628
	Within Groups	5968.819	139	42.941		
	Total	6008.905	141			
Social Skill Total	Between Groups	884.860	2	442.430	0.633	0.532
	Within Groups	97146.789	139	698.898		
	Total	98031.649	141			

When we analyzed Table 4, the ANOVA test results showed that there was not any significant difference in total score and all of the subscale scores

of social skills of the hearing impaired footballers in terms of age groups ( $P > 0.05$ ).

**Table 5: Mean Scores of Social Skills of the Hearing Impaired Footballers in terms of income status**

	Economic status	N	$\bar{X}$	S
Emotional expressivity	Low	32	34.12	6.13
	Medium	76	33.90	5.33
	High	34	35.67	6.61
Emotional sensitivity	Low	32	41.87	6.28
	Medium	76	41.94	6.70
	High	34	42.76	6.25
Emotional control	Low	32	35.46	4.26
	Medium	76	35.97	5.16
	High	34	36.05	4.94
Social expressivity	Low	32	40.78	5.39
	Medium	76	41.22	6.22
	High	34	41.45	5.71
Social sensitivity	Low	32	38.96	5.37
	Medium	76	38.35	6.71
	High	34	41.11	5.88
Social control	Low	32	36.65	6.11
	Medium	76	36.77	6.23
	High	34	38.02	7.15
Social Skill Total	Low	32	227.87	27.91

Medium	76	228.18	28.97
High	34	235.32	26.58

When we analyzed Table 5, it was seen that mean total social skill scores of the hearing impaired footballers increased in direct proportion to income level in terms of income variable. There was an increase in some of the mean scores of the subscales

(Emotional sensitivity, Emotional control, Social expressivity, Social control) of the social skill as the income level increased. Mean scores of other subscales were irregular.

**Table 6: Comparison of the Social Skill Levels of the Hearing Impaired Footballers in terms of income level**

	Source of variation	Sum of Squares	df	Mean Square	F	p
Emotional expressivity	Between Groups	76.247	2	38.123	1.119	0.330
	Within Groups	4,737.391	139	34.082		
	Total	4,813.637	141			
Emotional sensitivity	Between Groups	18.389	2	9.194	0.217	0.805
	Within Groups	5,878.403	139	42.291		
	Total	5,896.792	141			
Emotional control	Between Groups	7.238	2	3.619	0.137	0.872
	Within Groups	3,659.934	139	26.330		
	Total	3,667.173	141			
Social expressivity	Between Groups	7.718	2	3.859	0.110	0.896
	Within Groups	4,878.180	139	35.095		
	Total	4,885.898	141			
Social sensitivity	Between Groups	180.409	2	90.205	2.317	0.102
	Within Groups	5,411.707	139	38.933		
	Total	5,592.116	141			
Social control	Between Groups	43.060	2	21.530	0.520	0.596
	Within Groups	5,755.305	139	41.405		
	Total	5,798.366	141			
Social Skill Total	Between Groups	1,354.590	2	677.295	0.853	0.428
	Within Groups	110,406.960	139	794.295		
	Total	111,761.549	141			

When we analyzed Table 6, Anova test results showed that there was not any significant difference in total score and all of the subscale scores of social skills

of the hearing impaired footballers in terms of income level ( $P > 0.05$ ).

**Table 7: Comparison of the Social Skill Levels of the Hearing Impaired Footballers in terms of league where they played**

	League category	N	$\bar{X}$	S	sd	t	p
Emotional expressivity	1 <sup>st</sup> league	65	35.44	5.36	140	2.003	0.047*
	2 <sup>nd</sup> league	77	33.48	6.16			
Emotional sensitivity	1 <sup>st</sup> league	65	42.93	5.93	140	1.377	0.170
	2 <sup>nd</sup> league	77	41.44	6.81			
Emotional control	1 <sup>st</sup> league	65	36.38	4.47	140	1.184	0.238
	2 <sup>nd</sup> league	77	35.45	4.82			
Social expressivity	1 <sup>st</sup> league	65	42.21	5.84	140	2.039	0.043*
	2 <sup>nd</sup> league	77	40.29	5.37			
Social sensitivity	1 <sup>st</sup> league	65	39.89	6.12	140	1.249	0.213
	2 <sup>nd</sup> league	77	38.63	5.87			
Social control	1 <sup>st</sup> league	65	37.84	6.68	140	1.229	0.221
	2 <sup>nd</sup> league	77	36.38	7.35			
Social Skill Total	1 <sup>st</sup> league	65	234.41	26.20	140	1.883	0.061
	2 <sup>nd</sup> league	77	225.94	27.11			

When we analyzed Table 7, independent t test results showed that as far as league category variable was concerned there was a significant difference on behalf of the footballers of the 1<sup>st</sup> league in terms of the subscales of "Emotional expressivity, Social expressivity" ( $p < 0.05$ ). Besides, mean scores of other subscales and mean total scores of social skills of the footballers who played in the 1<sup>st</sup> league were found to be higher than those of the players of the 2<sup>nd</sup> league but there was not a significant difference ( $p > 0.05$ ).

### Discussions and conclusions

One of the basic findings of the research was that mean total social skill score was  $229.82 \pm 26.34$ ; which indicated that mean scores of social skills of the research group were at moderate level compared with the minimum and maximum scores that could be obtained from the scale, yet, it was near lower limit of moderate level.

The study of H. Kirimoglu, L. Ilhan and H.S. Caglayan (2011) in which the physically disabled people - another disability group- who played wheel-chair basketball were investigated in terms of social skill levels reported that mean total social skill score of the research group was  $285.15 \pm 18.439$ ; which demonstrated that sports players with physical disability had higher (better) social skill characteristics compared to the footballers who had hearing impairments but no functional movement restrictions.

Comparison of these two groups of the disabled players has demonstrated how important communicational sufficiency is in terms of the development the social levels of the social skill of the individuals.

Loss of hearing leads to insufficient ability to speak and emotional and social problems at various levels (M.C. Girgin, 2003). However, negative attitudes and different prejudices adopted by the individuals who have no hearing impairments against the people with hearing impairments make the communication with these people harder (M. Nikolarazi and M. Makri, 2005).

Cartledge et al. (1996) emphasize the necessity to strengthen social skills of the people with hearing impairments in order to increase the interaction. Sports, recreation and pastime activities have a key role in social integration. Socialization and social interaction may be improved by the participation in various activities. Participation in physical activities affects social development and the ability to establish social relations of the individuals positively (R. Vilhjalmsson, 1992).

Some studies pointed out a positive relation between age and social skills (J.L. Matson et al. 1986; S.P. Tuy, 1999). It was found out that mean total social skill scores of the footballers with

hearing impairments, who made up our research group, was in direct proportion to age.

Mean scores of some subscales of the social skills (Emotional sensitivity, Social sensitivity, Social control) were associated with an increase as the age advanced. Mean scores of other subscales were found to be irregular. Besides, it was concluded that the difference that occurred in total score and scores of all of the subscales of the social skill in terms of age groups was not considered as significant ( $p > 0.05$ ).

H. Avcioglu (2001) states that intervention programs should be designed and implemented at an early age so that social skills of the people with hearing impairments can be improved.

The increased level of social skills at the later ages may be related to sportive age, too. In other words, it may also be concluded that the level of the social skills of the adult sports players who do sports regularly for years and benefit social dynamics of the sports may be higher than that of the young sports players who have just started the sports depending on the time spent doing sports.

E. Charlson et al. (1992) points out that - in addition to the present feeling of loneliness-hearing disability may make social adaptation problems of the children who belong to 13-18 age group insoluble. M. Suarez (2000) emphasizes that programs that will strengthen social skill levels should be designed and implemented so that areas where people with hearing impairments are insufficient can be developed after the social skill levels have been determined.

Every kind of sportive activity is a social experience and usually includes emotions. An individual who participates in sportive activities finds opportunities to express his emotions using games and movements. That movement ability of human who moves by his nature and thus communicates through movements should be shaped by a rich physical education program and sportive organizations may facilitate healthy interpersonal relations and may enable these relations continue (H. Araci, 1999). When it is considered that sports contribute social skill levels of the individuals a lot, individuals' socialization should be realized at an early age and physical education and the sportive activities need be done habitually; it is necessary that sports and socialization should be dealt with at the same ages. Different games and sports are the mirrors of the society because what is necessary for socialization process in a society exists in many games and sports.

The study of D.J. McMahon (1998) produced the importance of recreational activities for the disabled individuals in terms of integration with society and environment, making friendship and formation of social acceptance.

It was found out that social skill levels of the footballers with hearing impairment increased in direct proportion to income levels according to income variable. It was seen that some subscales (Emotional sensitivity, Emotional control, Social expressivity, Social control) of social skills increased as income level increased. Mean scores of other subscales were irregular. The differences between the groups were found to be insignificant ( $p>0.05$ ).

Another independent variable of the research was league category. It was noted that there was a significant difference on behalf of the footballers who played in the 1<sup>st</sup> league in terms of subscales of "Emotional expressivity, Social expressivity" in relation to league category ( $p<0.05$ ). Besides, mean total score of the social skills and mean scores of the other subscales of the social skills of the footballers who played in the 1<sup>st</sup> league were higher than those who played in the 2<sup>nd</sup> league but there was not a significant difference ( $p>0.05$ ).

In the study of F. Arslan et al. (2006) conducted with the students who studied at the School of Physical Education and Sports, it was concluded that students who played sports at amateur and professional level were more extroverted than those who did not actively play sports and that students who played sports at professional level were more extroverted than those who played sports at amateur level. F. Ozturk and K.S. Sahin (2007) determined that mean scores of emotional expressivity and mean scores of social control of elite players were significantly higher than those who were not elite players. These findings concurred with ours.

As a result, it was found out that social skills of the football players with hearing-impairment were at a moderate level ( $229.82\pm26.34$ ). Besides, it was noted that as age and income status increased, so did social skill levels. As for the league category, there was a significant difference in "emotional expressivity and social expressivity" subscales on behalf of the football players in the 1<sup>st</sup> league.

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## PILOT WORK ON EVALUATION OF WOMEN WATER POLO TACTICS PATTERN

IZZO RICARDO<sup>1</sup>, DI TORE ALFREDO<sup>2</sup>, RAIOLA GAETANO<sup>2</sup>

### Abstract

In water polo lacks a codified methodology for tactics training, which is thus only left to coach's discretion. Nine women water polo matches, during season 2011/2012 (Italian female Serie A1), have been analyzed by a

<sup>1</sup>University of Urbino, ITALY,

<sup>2</sup>Università of Salerno, ITALY,

Email: raiolagaetano@libero.it

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water polo coach, helped by a statistician and a performance analyst. Purpose of the analysis process was to identify single events during the matches, to examine the tactical pattern implemented in this events, to obtain by the coach an evaluation on tactical pattern compliance and then to put this compliance in relation to event's outcome. Aim of the work is to verify the efficacy of different attack patterns, when they were well-performed, in order to create a codified methodology for teaching water polo through tactics.

The research approach is integrated and consists of 3 distinct methods: case study (9 matches of the Italian Serie A1 Women's Championship, season 2011/2012, played by the Volturmo sc) for the analysis of matches, action research method for coach contribution, and theoretical-argumentative method to deduce a theoretical framework in which define the data processing.

The research team examined matches with Dartfish TeamPro, isolating single keyframes relative to attack events, identifying the implemented attack pattern, then the coach expressed an evaluation on attack pattern compliance.

The results showed a general efficacy of tactical patterns (when they are well performed), but showed significant differences within correlation coefficients of single patterns, confirming the need for developing a common methodology for teaching waterpolo through tactics.

**Keyword:** performance analysis, case study, action research.

## Introduction

In water polo lacks a codified methodology for tactics training, which is thus only left to coach's discretion.

This pilot work represents an attempt to develop methods and consequential tools to analyze, and then train, tactical water polo side, knowing that "the coaches of team sports analyze matches and performances of team and opposing teams to get useful data in coaching" (M. D. Hughes&I. Franks, 2008) and that, "currently, the process of training, its organization, and teaching methodology need more knowledge on the qualitative aspects of sports performance (R. Schmidt, C. Wrisberg 2008)".

Nine women water polo matches, during season 2011/2012 (Italian female Serie A1), have been analyzed by a water polo coach, helped by a statistician and a performance analyst. It is vital that the reliability of a data gathering system is demonstrated clearly and in a way that is compatible with the intended analyses of the data. The data must be tested in the same way and to the same depth in which they will be processed in the subsequent analyses (M. Hughes, 2004; G. Raiola & A. Di Tore, 2011). Purpose of the analysis process was to identify single events during the matches, to examine the tactical pattern implemented in this events, to obtain by the coach an evaluation on tactical pattern compliance and then to put this compliance in relation to event's outcome. Aim of the work is to verify the efficacy of different attack patterns, when they were well-performed, in order to create a codified methodology for teaching water polo through tactics. The data, collected via Dartfish TeamPro Software, were analyzed trough a "Waterpolo Tactics Analyzer" software, developed as a web-based application at University of Salerno and

released under GNU/GPL license, which returned basic descriptive statistics and the correlation coefficient of each pattern with events outcomes. The results show a positive and statistically significant correlation ( $p > 0.9$ ) coefficient between tactical compliance and events outcome, and highlight the need for developing a common methodology for teaching water polo through tactics, confirming once again that "the practical value of performance analysis is that well-chosen performance indicators highlight good and bad techniques or team performances " (M. Hughes, 2007).

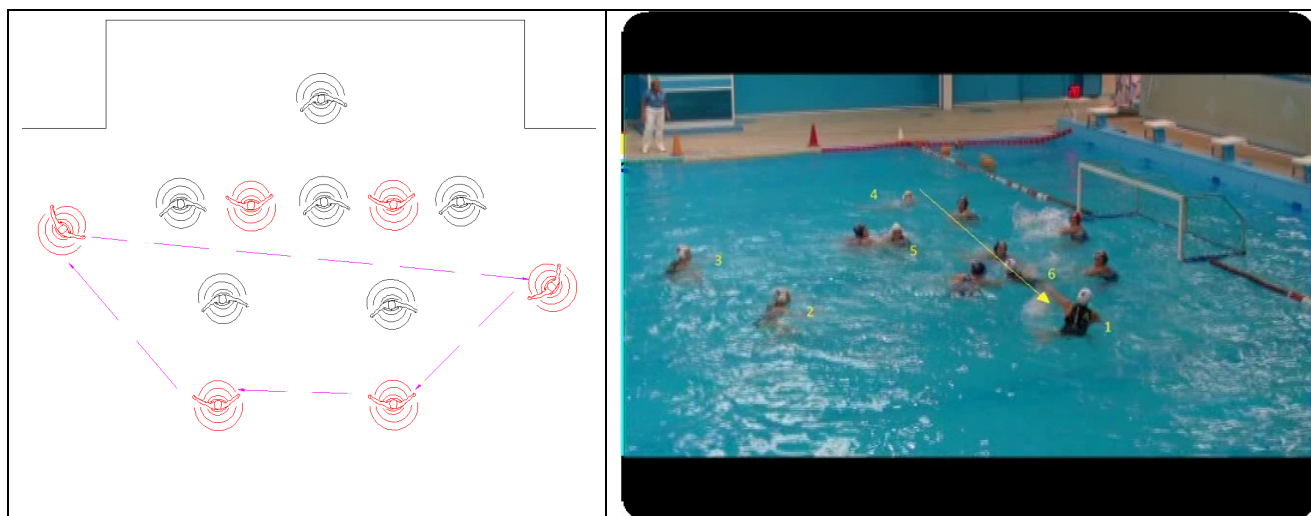
## Method

The research approach is integrated and consists of 3 distinct methods: case study of 9 matches of the Italian Serie A1 Women's Championship, season 2011/2012, played by the Volturmo sporting club) for the analysis of matches, action research method for coach contribution, and theoretical-argumentative method to deduce a theoretical framework in which define the data processing. The survey of data is entrusted to performance analysis, carried out with the help of a water polo coach, a statistician and a performance analyst.

The tool used for measuring is the Dartfish TeamPro software.

The assessment of compliance for the tactical patterns is entrusted to the coach, on the basis of the video analysis-aided confrontation of attack pattern design against attack pattern effectively implemented during match.

The research team examined matches with Dartfish TeamPro, isolating single keyframes relative to attack events, identifying the implemented attack pattern, then the coach expressed an evaluation on attack pattern compliance. Figure 1 illustrates evaluation process.



**Figure no. 1 - confrontation between pattern design and effectively implemented pattern during match for attack pattern named "schema1"**

A spreadsheet containing, for each row, the match id, the event id, the attack pattern id, the coach's evaluation (compliant/non compliant) and the event outcome (goal / non goal) was filled.

This data sheet is processed through the "water polo Tactics analyzer software", which produces basic descriptive statistics and the correlation coefficient of each well-implemented attack pattern with events outcomes.

In total, 7 attack patterns on 73 events during 9 matches were analyzed. The analyzer software output is discussed by the research team, with consciousness of internal validity, allowed by action research method, of this kind of qualitative analysis.

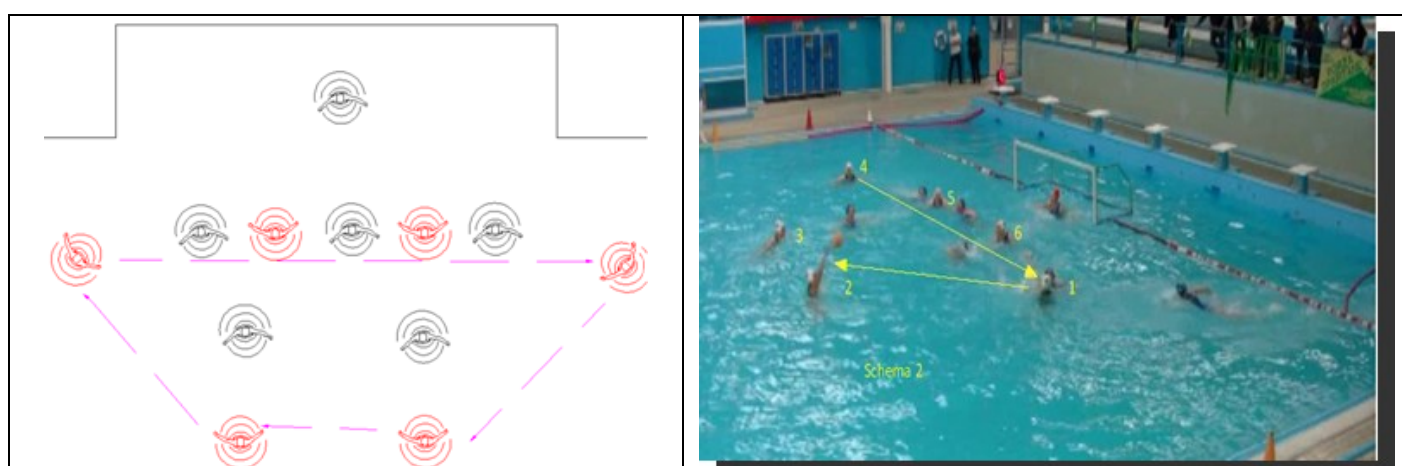
### Results

The performance analysis concerned 7 attack patterns on 73 events during 9 matches.

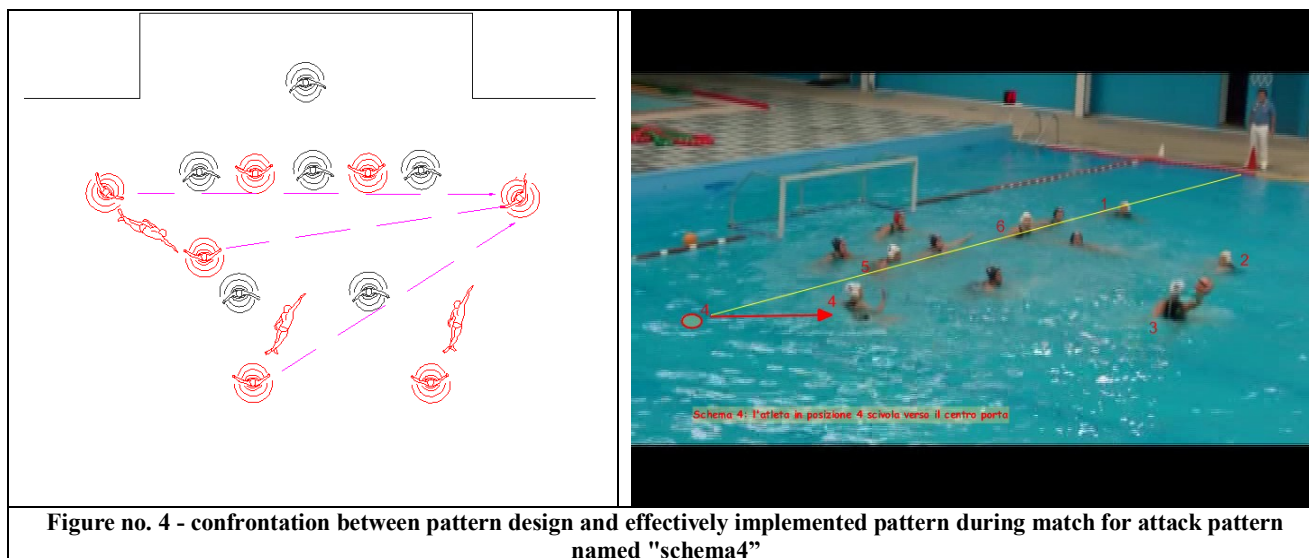
An evaluation table was constructed by combining, for each single event, the Boolean evaluation of the coach on the compliance of patterns with the event final outcome.

Here are reported:

- confrontations, as an example, of pattern design with Dartfish screenshot of pattern implemented during game, followed by coach's evaluations2;
- Correlation coefficients between "compliant" attack pattern and event outcome for each attack pattern ;



**Figure no. 2 - confrontation between pattern design and effectively implemented pattern during match for attack pattern named "schema2"**



pattern	occurrence	"compliant " occurrence	goals
schema 1	15	10	6
schema 2	6	3	3
schema 3	8	3	2
schema 4	8	4	3
schema 7	25	21	13
schema 1.2	7	5	1
schema 6	4	4	2

schema_1			
Match	Pattern occurrence	Compliant pattern occurrence	goals
volturmo vs orizzonte ct	2	1	0
volturmo vs fiorentina fi	0	0	0
volturmo vs ortiga sr	3	2	1
volturmo vs firenze pn	2	2	2
volturmo vs padova	1	0	0
volturmo vs messina	1	1	1
volturmo vs imperia	2	1	1
volturmo vs pro recco	2	2	0
volturmo vs bologna	2	1	1

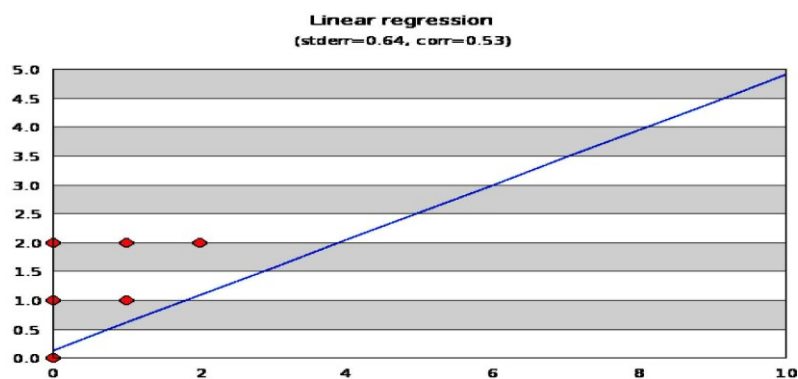


Figure no. 3 - linear regression for schema\_1



schema_2			
Match	Pattern occurrence	Compliant pattern occurrence	goals
volturmo vs orizzonte ct	2	1	1
volturmo vs fiorentina fi	2	1	1
volturmo vs ortiga sr	0	0	0
volturmo vs firenze pn	0	0	0
volturmo vs padova	0	0	0
volturmo vs messina	0	0	0
volturmo vs imperia	0	0	0
volturmo vs pro recco	0	0	0
volturmo vs bologna	2	1	1

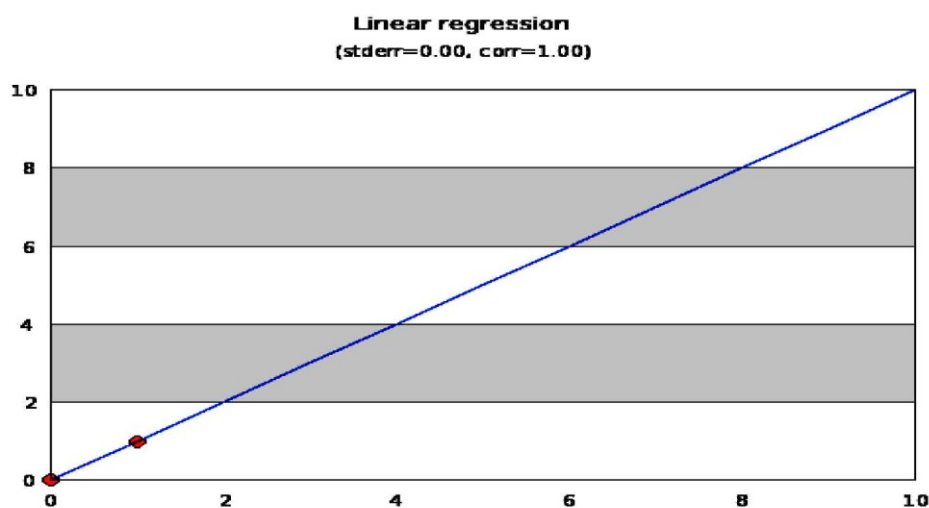


Figura 4 - linear regression for schema\_2

schema_3			
Match	Pattern occurrence	Compliant pattern occurrence	goals
volturmo vs orizzonte ct	1	1	1
volturmo vs fiorentina fi	1	1	1
volturmo vs ortiga sr	0	0	0
volturmo vs firenze pn	1	0	0
volturmo vs padova	1	0	0
volturmo vs messina	3	1	0
volturmo vs imperia	0	0	0
volturmo vs pro recco	0	0	0
volturmo vs bologna	1	0	0

schema_4			
Match	Pattern occurrence	Compliant pattern occurrence	goals
volturmo vs orizzonte ct	1	0	0
volturmo vs fiorentina fi	1	1	1
volturmo vs ortiga sr	0	0	0
volturmo vs firenze pn	0	0	0
volturmo vs padova	0	0	0



volturmo vs messina	0	0	0
volturmo vs imperia	1	0	0
volturmo vs pro recco	0	0	0
volturmo vs bologna	5	3	2

schema_7			
Match	Pattern occurrence	Compliant pattern occurrence	goals
volturmo vs orizzonte ct	2	2	1
volturmo vs fiorentina fi	4	3	2
volturmo vs ortiga sr	2	1	1
volturmo vs firenze pn	3	2	2
volturmo vs padova	3	2	1
volturmo vs messina	3	3	2
volturmo vs imperia	2	2	2
volturmo vs pro recco	3	3	1
volturmo vs bologna	3	3	1

schema_1.2			
Match	Pattern occurrence	Compliant pattern occurrence	goals
volturmo vs orizzonte ct	1	0	0
volturmo vs fiorentina fi	0	0	0
volturmo vs ortiga sr	2	1	1
volturmo vs firenze pn	0	0	0
volturmo vs padova	0	0	0
volturmo vs messina	1	1	0
volturmo vs imperia	1	1	0
volturmo vs pro recco	0	0	0
volturmo vs bologna	2	2	0

schema_6			
Match	Pattern occurrence	Compliant pattern occurrence	goals
volturmo vs orizzonte ct	0	0	0
volturmo vs fiorentina fi	1	1	0
volturmo vs ortiga sr	1	1	1
volturmo vs firenze pn	1	1	0
volturmo vs padova	0	0	0
volturmo vs messina	1	1	1
volturmo vs imperia	0	0	0
volturmo vs pro recco	0	0	0
volturmo vs bologna	0	0	0

#### Confrontation between correlation coefficients of single patterns

Attack pattern	Stderr	correlation (compliant patterns / compliant patterns)
schema_1	0.43678760300431	0.76332253361379
schema_2	0	1
schema_3	0.30860669992418	0.75592894601845
schema_4	0.11624763874382	0.98810492932246
schema_7	0.54916964736528	0.22360679774998
schema_1.2	0.34684398780965	0.22941573387056
schema_6	0.37796447300923	0.5976143046672

Figure no. 5 - standard error and correlation coefficient for each pattern

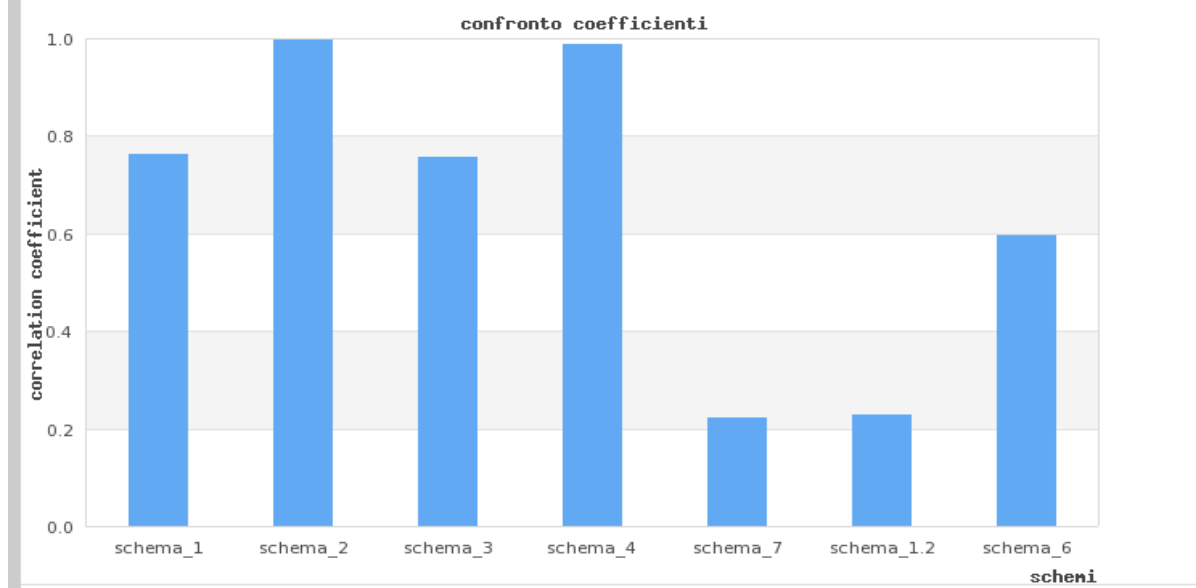


Figure no. 6 - confrontation between correlation coefficients of single patterns

The results show a positive and statistically significant correlation ( $\rho > 0.9$ ) coefficient between total occurrence of well-performed patterns and outcomes of events in which tactical patterns are compliant, but the graph in figure 8 shows significant differences between the correlation coefficient of single patterns.

#### Discussion

The results showed a general efficacy of tactical patterns (when they are well performed), but showed significant differences within correlation coefficients of single patterns, knowing that "the correlation coefficient indicates magnitude or amount of a relationship and the direction of relationship" (Morrow, Jackson).

A more consistent data base is needed, in order to establish direct, evident and general relationship between so calculated coefficient and pattern efficacy, and the research team is conscious of internal validity of this kind of qualitative analysis, which can't extend, without adjustments, to other teams.

Although, analysis results represents a tool for the coach, in order to better train team in next season, which were an aim of action research, and showed a general trend on tactical pattern efficacy, which will be deeply investigated in future works.

Furthermore, the results confirm the need for developing a common methodology for teaching waterpolo through tactics.

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## CONSIDERATIONS REGARDING THE TEAM COHESION IMPACT ON HANDBALL PERFORMANCE

MACOVEI SABINA<sup>1</sup>, TONIȚA FLORENTINA<sup>1</sup>, ALEXANDRESCU NICOLETA<sup>1</sup>, POPESCU LAVINIA<sup>1</sup>

### Abstract

**Introduction.** From the perspective of our paper, we consider that creating an optimum cohesion in the handball team can have favorable influences on performances.

**Purpose.** The present study describes the theoretical premises related to the concept of “cohesion” within the handball team.

**Content.** The cohesion influence on the group productivity has been intensely studied. High cohesion groups can easily establish performance standards and offer a wider range of awards to its members. M.E. Shaw (1981) discovered that highly cohesive groups are cooperative, friendly and they use a democratic form for the behavior control. In low cohesion groups, members are hostile and aggressive, they are pleased when their colleagues make mistakes and they adopt a decision-making autocratic style.

**Conclusions.** Relationships among teammates are decisive to ensure the group cohesion and the efficiency of a team activity depends on the quality of these relationships.

**Keywords:** cohesion, handball, performance.

### Introduction

Nowadays, high performance Romanian handball has results under the level of those obtained in the glorious period of the years 1960-1970. The titles of World champions, together with the Olympic medals and the winning of European Cups, have turned the Romanian handball school into an example for numerous countries. In the present big international competitions, teams such as France, Spain and Brazil, weaker by far than the Romanian teams of those times, have become nations more and more redoubtable.

How did they manage to ascend to the world elite? With whom? Through what? Such questions are often raised by the Romanian coaches, players and even by the specialists in different sports branches.

Numerous experts from many countries of the world have been seriously concerned with the handball training optimization. These preoccupations lead to the conclusion that it would be necessary for them to adopt the best orientation, from the methodological, psycho-pedagogic and didactic points of view, so that people practice the handball game regardless of their purpose and skill level.

Handball and everything it involves is continuously changing, is evolving, certainly with a permanently progressive dynamics. As for the dynamics specific to the group of athletes composing “a team”, changes are also permanent, due to the heterogeneity generated by age, nationality, religion, motivation, temper, personal interests (D. Colibaba-Evuleț, I. Bota, 1998).

From the perspective of our paper, we consider that creating an optimum cohesion in the handball team can have favorable influences on performances.

### Purpose of the study

From our working experience with different sports groups and teams, inclusively in handball, we can assert there are teams that, although made up of extremely valuable athletes, don't obtain the expected results, by meeting difficulties when they have to create the group cohesion and reach the intended performances.

That is why the topic of our study refers to the team cohesion impact on the group performance/achievement.

This topic is part of an ampler research that aims at studying the practical-methodical modalities to develop cohesion in junior handball teams.

The present study describes the theoretical premises related to the concept of “cohesion” within the handball team.

### Content

“Cohesion can be considered the most important group variable, because just due to it the group exists, persists and works as a relatively independent coherent entity” (P. Golu, 1974). The cohesion phenomenon reflects the degree to which the group is attractive to its members; for instance, people like one another and want to remain members of the group.

Group cohesion, described by D. Cartwright and A. Zander (1968) as the feeling of belonging or of mutual attraction, involves the self-sacrifice in order to complete the group objectives. This cohesion generates *conformism, stability and the group behavior control*.

M.E. Shaw (1981) underlines that, throughout the years, cohesion had three different meanings:

- intra-group attraction relies on the individuals' similarities related to the group collective configuration. The social aspect was emphasized by sociometric measurements, the

<sup>1</sup>National University of Physical Education and Sports, Bucharest, ROMANIA

Email: sabina\_macovei@yahoo.com

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pair's nominalization and the partner's choices. The personality aspect was highlighted by the effects of the homogeneity of needs: authority or dominance;

- group's self-confidence or motivation level;
- basis of the group effort coordination.

The cohesion influence on the group productivity has been intensely studied. High cohesion groups can easily establish performance standards and offer a wider range of awards to its members. M.E. Shaw (1981) discovered that highly cohesive groups are cooperative, friendly and they use a democratic form for the behavior control. In low cohesion groups, members are hostile and aggressive, they are pleased when their colleagues make mistakes and they adopt a decision-making autocratic style.

We can certainly state that the sports group activity efficiency depends on the quality of the relationships among its members (M. Epuran et al., 2001).

Moreno is that who proposed the sociometric technique, destined to measure the group relationships. Each group member has, toward each one of the others, an acceptance, indifference or antipathy attitude. The way of actually expressing these attitudes determines both the group cohesion degree and its internal organization (around one or two leaders, on small sub-groups, on isolated individuals). In sports activity (Rioux and Chappuis, quoted by M. Epuran et al.,

2001), there are two types of preferential relationships: affective and operational ones.

*Affective preferential relationships* have a subjective character and express sympathy, rejection or indifference (they being either unilateral or mutual) among the team members.

*Operational preferential relationships* have a practical character and reveal with whom each one wants to cooperate in order to complete the group specific purpose. In sports, the action efficiency and the common goal must be beyond sympathy or antipathy.

To know the quality and quantity of the preferential relationships within a team is essential to coach's work and, implicitly, to performance reaching. Quality is given by the character of the relationships: choices, rejections or indifferences, while quantity is given by the number of choices: the more the expressed choices are numerous, the higher the group expansiveness degree; the greater the number of composed pairs, the higher the cohesion index; the more the athlete's expressed choices are numerous, the higher his sports expansiveness and social integration index.

Cohesion, which is born from and built on the positive preferential relationships, depends on a series of factors characteristic to each team (M. Epuran et al., 2001, A. Mureşan, 2005).

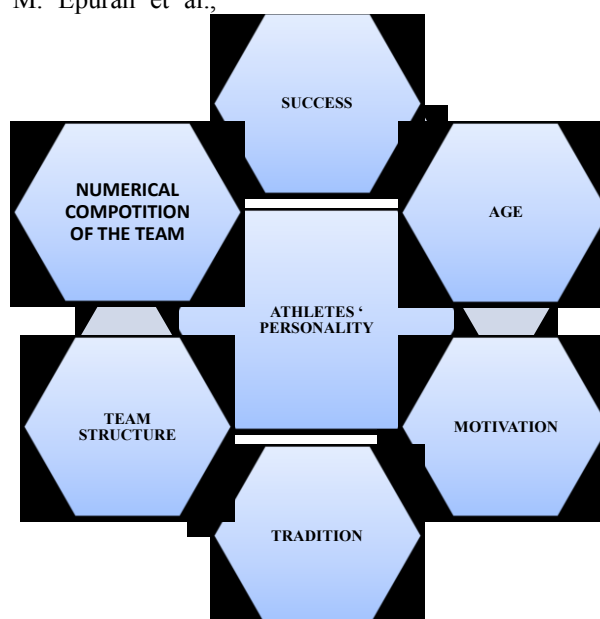


Fig. 1. Team's cohesion factors (adapted after M. Epuran et al., 2001; A. Mureşan, 2005)

*Numerical factor.* In general, a smaller number of persons (6 to 10 or 12 at the most) can be easily united; in a larger group, information are more difficultly spread (they are partially lost or distorted) and the bond strength is weaker. The handball team is framed in the medium group category, with an approximate number of 18 to 20 players. If we refer to the basic group of players, their number is comprised

between 9 and 10. Under these conditions, the raised question is how to ensure an optimum cooperation among all the team members, both full and substitute players, so that we avoid conflicts and create harmonious relationships among them.

The team members should be close to the same *age*, because the too big differences are sometimes expressed through different attitudes and aspirations. In

handball, the big age differences are characteristic to seniors. These ones are given by the presence in the team of the some very skilled seniors, together with the very gifted juniors. The junior age has, from this point of view, an advantage, because the game regulations stipulate the athletes' distribution on age categories. The admitted differences are of 2 years at the most.

Athletes' *character* represents an important factor, together with their temperamental traits and their personality. This aspect is applicable to any sports discipline.

*Personality* of the sports group members. Some athletes, through their negative traits, can divide the group, by creating thus sub-groups and generating disagreement and suspicion. The coach must know well each athlete's personality. By taking into account the fact that certain athletes are aggressive, dominating and destructive, while others, on the contrary, are timid, passive, isolated and obedient, he must use the instructive-educative methods the most suitable to his athletes' personality specificity, in order to ensure their integration into the group and, implicitly, the group cohesion.

The *team structure* refers to the members' way of organization within the group. Handball teams are organized by respecting the regulations and the positions on the field, but they are much dependent on players' individual value. The specialization on positions occurs by the end of the junior age, according to each athlete's qualities.

*Sports tradition*. It represents the supporting "armature" for the group. Tradition is that which impregnates the atmosphere, the work, life and leading styles, the habits, all of them being imposed to the members when they join the group and determining a better group stability. In Romania, handball has always been a team sports with many fans, a sports discipline with an important tradition, which had periods of European, World and Olympic glory, at any competitive level. Traditional clubs that have teams for all the sports classification levels, also have the best results in relation to the group stability.

*Motivation* is one of the cohesion central factors, because it reunites the teams around a common goal called performance, which meets the athletes' different trends.

According to D. Colibaba-Evuleț and I. Bota (1998), "we must know that the team's general motivation is sports performance".

*Sports success* is, in its turn, a factor reinforcing both motivation and group cohesion. We all know that if a team loses too frequently, the dissensions among athletes and between athletes and their coach are inevitable.

The sports group performance (M. Epuran et al., 2001) depends on the way of harmonizing the two functional requirements of the group, namely the goal completing and the cohesion preservation.

**Table 1.** Functional requirements of the group (M. Epuran et al., 2001)

Factors that ensure the goal completing	Factors that ensure the cohesion preservation
Competitiveness Sports discipline Role rigidity Utilitarian relationships Formal communication Vertical decisions Hierarchy Authoritarianism	Cooperation Spontaneous participation Affective relationships Spontaneous communication Group decisions Group Democracy

The coach is confronted to a situation requiring him not necessarily to choose one of the variants, but to study the concrete conditions related to time, space, the group interpersonal relationships and to act so that he obtains at any moment the group maximum efficiency under the given conditions.

One of the models that can guide the coach when diagnosing a team's moment or stage is the Team Performance Model (Drexler, Sibbet and Forrester,

1988). This model can be used by coaches to delimit the stage of the relationships among players and it can also facilitate their opportune intervention in each specific situation.

The first three stages are called "creation stages" and the other four are called "support stages":

**Table 2.** Team Performance Model (acc. To Team Performance Model - Drexler, Sibbet and Forrester, 1988)

STAGE	PROBLEM	RESOLVED	UNRESOLVED
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1. Orientation	“why am I here?”; tacit worry: “do I want to be here?”. Does this group makes something that incitates everyone to be part of it and that has a sense (goal) for each individual in the group?	Purpose, team identity and membership	Fear and disorientation
2. Trust building	“who are you?”; tacit worry: “what will you expect from me?”. Group members must give answers to key-questions that will show if they are competent and open.	Mutual regard, forthrightness and reliability	Mistrust, caution and facade
3. Goal clarification	“what are we doing?”; tacit worry: “reviewing all the options, identifying all the problems”.	Explicit assumptions, clear integrated goals and shared vision	Apathy and irrelevant competition
4. Commitment	“how will we do it?” This decision-making is the most difficult issue any team is confronted to. The team must define to what direction it will go and the main methods to share the responsibilities among its members.	Assigned roles, allocated resources and decisions made	Dependence and resistance
5. Implementation	“who does what, when, where?” the challenge consists of integrating an amount of different tasks into a fluent operation.	Clear purposes, alignment and disciplined execution	Conflict/ confusion, non-alignment, missed deadlines
6. High performance	“wow, we’ve made it!” High performance is relatively difficult to attain, but this can be done when the team members are capable to reach this synergy level. Team members are able to communicate in a really balanced system, with no frictions.	Spontaneous interaction, synergy and surpassing results	Overload and disharmony
7. Renewal	“why continue?” Revision of stage 1, in order to evaluate if the work deserves the effort, if it still needs to be continued and if it still provides a personal value and sense for each of the team members.	Recognition and celebration, change mastery and staying power	Boredom and burnout

### Conclusions

Relationships among teammates are decisive to ensure the group cohesion and the efficiency of a team activity depends on the quality of these relationships.

Athletes’ education since the early junior age to the direction of the team spirit building has positive influences on the obtained performances.

The use of some tools to assess the team stage (for instance, the Team Performance Model) can provide the coaches an objective modality to diagnose the stage of the relationships among players and it can also facilitate their opportune intervention in each specific situation.

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## STUDY ABOUT THE ENERGY EXPENDITURE ASSESSMENT IN RHYTHMIC GYMNASTICS

MANOS MIHAELA<sup>1</sup>, GRIGORE VASILICA<sup>1</sup>, POPESCU LAVINIA<sup>1</sup>

### Abstract

**Purpose.** Determining the effort functional demands in the rhythmic gymnastics activity, in order to optimize the relation between the training stage requirements and the female athletes' specific individual support; drawing up a model focused on the competitive situation characteristics, starting from the involved energetic processes and the achieved specific technical actions.

**Methods.** The experiment was conducted on a group of 10 female gymnasts, components of the Romanian national squad. The used methods aimed at measuring/ assessing the oxygen consumption and the other physiological indicators, under lab, training and simulated competitive conditions.

**Results.** The obtained results emphasize the following aspects:

- the team gymnasts present relatively homogeneous aerobic capacities ( $VO_2 \text{ max } 52.7 \pm 2.29$ ), by having in view their morphological characteristics and their age (15 to 17 years old);
- the mean lactate and its peak, registered after 1 minute of effort, confirm the fact that, in competitions, gymnasts work under conditions close to their maximal aerobic power;
- the registered lactacidemia highlights the same hierarchy within the team in both of the group events, except for the substitute gymnasts, who are in difficulty to supply the requested effort;
- the lactic acid higher concentration explains the important exertion of the lactacyd anaerobic system;
- a higher lactacidemia is registered in the group titular gymnasts performing with 2 hoops and 3 ribbons ( $x = 11.31 \pm 1.54 \text{ mmol.l}^{-1}$ ) and in the rope individual event ( $x = 11.08 \pm 2.37 \text{ mmol.l}^{-1}$ ), as compared to the values obtained in the 5-ball group event ( $x = 10.33 \pm 1.45 \text{ mmol.l}^{-1}$ ). This might result from the requirements imposed by the FIG Code of Points as for the number, the degree of technical difficulties and the corporal group specific to each apparatus.

**Conclusions.** The repeated analysis of the heart rate evolution registered during the training lesson, in different preparatory stages, enabled us to objectively determine the characteristics of the demands and of the supplied effort. To accomplish the top-level technical-artistic content in group events, gymnasts must cope with higher energy expenditure, therefore with a strong exertion of the lactacyd anaerobic system, which can become the source of technical errors and can influence both coordination and emotional balance. To lessen this part of the metabolic process in the energy input needed by the effort sustaining in rhythmic gymnastics, it would be necessary to develop first of all gymnasts' aerobic potential, so that they become able to cope with the training effort, to increase their recovery possibilities and delay the lactic acid production.

**Keywords:** sports exercise, rhythmic gymnastics, performance sports.

### Introduction

The requirements of the new Code of Points issued by the International Gymnastics Federation (FIG) emphasized, after the first international contests in the present Olympic cycle, that gymnasts have been more exerted as a result of the increased number of technical exigencies specific to competitive events. The increased number of technical difficulties in the composition of competitive routines involves an extremely great effort for the gymnasts, with negative consequences on the difficult technical productions. At the same time, this can generate a confusing and less esthetical image, a lack of concordance between the corporal movement and music during some compositional sequences.

Because of the created situation, the President of the Rhythmic Gymnastics Technical Committee recommends the coaches "to compose the exercises according to gymnasts' real capacities, in order to

protect their health, their passion for this sport, by facilitating thus the obtaining of high scores and, last but not least, to assure a quality show, which is very important to enjoy the media appreciation and support" (E. Abruzzini, 2004).

The energetic potential measurement depends on the accurate standardization of the testing protocols that should rely on scientifically proved objective criteria (P.O. Astrand, K. Rodahl, 1986). The tested parameters have a certain specificity and data interpretation and assessment should be made in the context of a sports behavior specific to rhythmic gymnastics (RG).

The aerobic power measurement relies on the premise that the significant differences between maximal aerobic power (MAP), lactate threshold (LT) and anaerobic power - determined by gender, age and genetic factors, can be influenced by training, are interdependent and their importance varies depending

<sup>1</sup>National University of Physical Education and Sports, Bucharest, ROMANIA

Email: manosmihaela@yahoo.com

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on the performed sport (J.M. Hagberg, 1980).

The MAP direct measurements and their correlation with other easier to quantify variables (heart rate - HR) engendered a diversity of approaches for the aerobic fitness estimation. However, the correlation between the recovery HR and the aerobic effort objective measurements is too weak for the creation of some normative charts useful to the MAP assessment (J.L. Ivy, R.T. Whitlers, P.J. Vanhandel, D. Elger, D.L. Costill, 1980). But the MAP and the recovery capacity repeated testing over a certain training period could provide useful information about the approached training program efficacy.

The concept of "lactate threshold" represent a much debated topic on the phenomenon in itself and the technology used to identify it. Some authors have divergent opinions about the concept practical applications to sports (G.A. Brooks, 1985; 1991, J.A. Davis, 1985), but others assert that the blood lactate provides valid information with applications to sports (N.L. Jones, R.E. Ehrsam, 1982). However, the test utilization requires precision when describing the measurements of the absolute and relative power values achieved by the athlete, but also the effort threshold duration and the modalities for the LT identification (B.W. Kinderman, G. Simon, J. Keul, 1979; W. Kinderman, M. Schramm, J. Keul, 1980; H.J. Green, R.L. Hughson, G.W. Orr, D.A. Ranney, 1983; J.L. Ivy, R.T. Whitlers, P.J. Vanhandel, D. Elger, D.L. Costill, 1980 and others).

#### Purpose

- Making a comparative study between the demands specific to the rhythmic gymnastics activity and the tested gymnasts' individual functional possibilities, then drawing up a profile significant from the methodological point of view.
- Defining the effort orientation, in order to formulate a physical training program adapted to RG training, for the gymnasts competing both in individual and group events (vs. team events).

#### Hypotheses

If the gymnasts' competitive work takes place under conditions close or superior to their maximal aerobic power and if their training effort intensity corresponds to the competition demands.

If the energetic expenditure for an exercise composed according to the requirements imposed by the new Code of Points differs depending on the corporal group specific to each apparatus (jumps, pivots, balance, flexibility elements/ wave) and on the quantity of difficult technical elements used by the gymnast.

#### Methods

The used methods aimed at measuring/ assessing the oxygen consumption and the other physiological indicators, under lab, training and simulated competitive conditions.

The experimental plan was meant to:

- determine the physiological indices in the lab;
- assess the energetic expenditure (oxygen consumption), starting from the biological indices registered in the gym;
- analyze the technical content performed in training and competition.

**Subjects:** 10 female gymnasts aged 15 to 17 years old and distributed as follows: 6 components of the national group squad and 4 individual performers.

#### Results

The results obtained after the assessment of the three mentioned situations were the following:

- Lab physiological indicators (table 1).
- Physiological indicators in a simulated competition, after the application of the new Code of Points requirements related to the maximum number of technical difficulties in the competitive exercise composition (table 2).
- Physiological indicators in a simulated competition, in relation to the lab indicators (tables 3, 4 and graphs 1, 2).

**Table 1:** Mean values of the lab physiological indicators

Event	VO <sub>2</sub> max ml.min <sup>-1</sup> Kg <sup>-1</sup>	Lactate mmol.l <sup>-1</sup>	Max HR beats/ min	Aerobic threshold ml.min <sup>-1</sup> Kg <sup>-1</sup>	Anaerobic threshold in % of the VO <sub>2</sub> max
Individual	41.27 ± 4.47	8.53 ± 1.56	182.8 ± 3.21	32.65 ± 5.38	76.08 ± 6.52
Group	55.20 ± 2.29	11.65 ± 2.87	185.66 ± 2.30	37.65 ± 6.54	75.65 ± 7.25

**Table 2:** Mean values of the physiological indicators in a simulated competition

Event	Exercise	VO <sub>2</sub> max ml.min <sup>-1</sup> Kg <sup>-1</sup>	Lactate mmol.l <sup>-1</sup>	Max HR beats/ min
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Senior individual	ball	50.27 ± 2.35	8.35 ± 1.58	180.6 ± 1.52
	hoop	51.58 ± 4.25	9.65 ± 0.51	184.3 ± 2.21
	rope	55.36 ± 3.69	11.08 ± 2.37	186.2 ± 0.45
	clubs	53.10 ± 2.56	8.82 ± 3.24	186 ± 1.32
Senior group	5 balls	52.40 ± 4.22	10.33 ± 1.45	182.2 ± 4.99
	3 ribbons + 2 hoops	54.10 ± 4.36	11.31 ± 1.54	186.3 ± 10.4

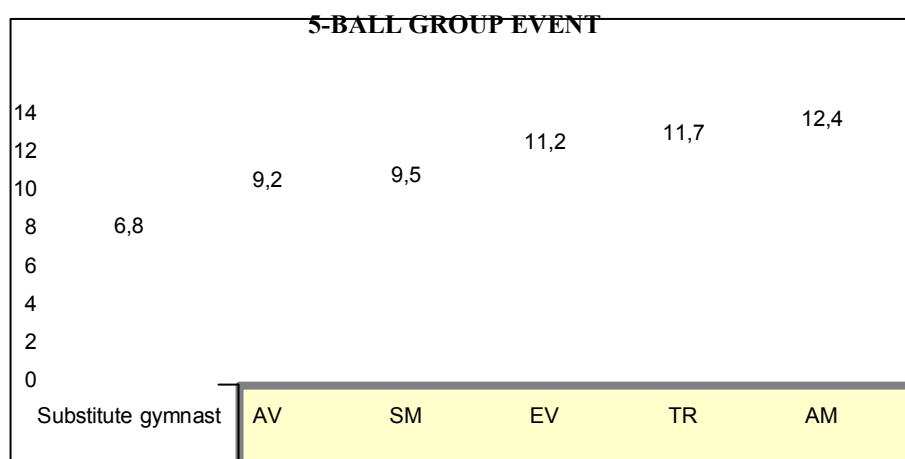
**Table 3:** Mean values of the effort indicators under lab and simulated competitive conditions

Physiological indicators Simulated competition	Individual routines	Group routines
max HR % max HR – lab	184.2 ± 10.5 95.5%	184.2 ± 6.07 95.5%
mean HR % max HR – lab	171.4 ± 5.59 88.9%	168.2 ± 4.59 88%
maximal lactate lactate peak after the effort	> 6.58 ± 1.94 after 1 minute	7.34 ± 1.7 after 1 minute

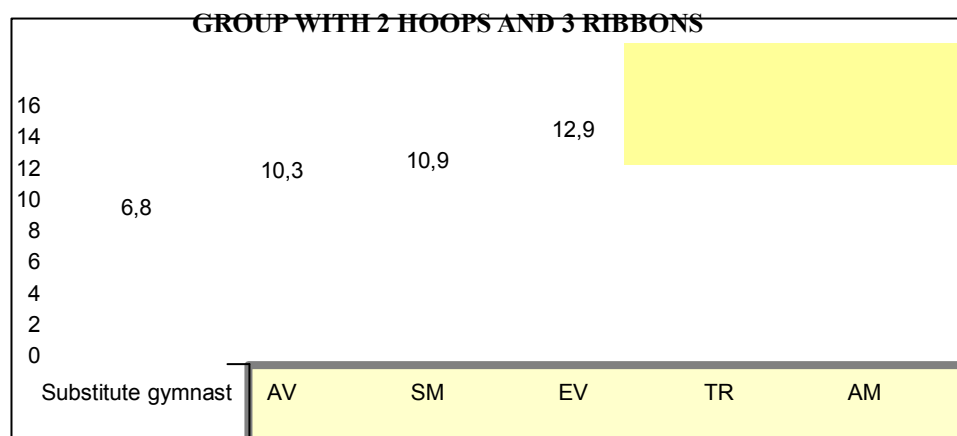
**Table 4:** Physiological indicators registered under simulated competitive conditions in both of the group events (mean values)

Simulated competition	5-ball group event	Group performing with 2 hoops and 3 ribbons
max HR – field % max HR – lab	182.2 ± 4.99 95%	186.3 ± 10.4 96.7%
maximal lactate	10.7 ± 1.45	12.2 ± 1.54

**Graph 1:** Maximal lactate measured in competition in the 6 gymnasts – 5-ball group event



**Graph 2:** Maximal lactate measured in competition in the 6 gymnasts performing in the group event with 2 hoops and 3 ribbons



Results emphasize the following aspects:

- the team components present relatively homogeneous aerobic capacities ( $VO_2 \text{ max } 52.7 \pm 2.29$ ), by having in view their morphological characteristics and their age (15 to 17 years old);
- the mean lactate and its peak (table 3), registered after 1 minute of effort, confirm our predictions according to which, in competitions, gymnasts work under conditions close to their maximal aerobic power (MAP);
- the registered lactacidemia (fig. 1) for each team component highlights the same hierarchy in both of the group events, except for the substitute gymnasts, who are in difficulty to supply the requested effort;
- the lactic acid higher concentration explains the important exertion of the lactacyd anaerobic system;
- a higher lactacidemia is registered in the group titular gymnasts performing with 2 hoops and 3 ribbons ( $x = 11.31 \pm 1.54 \text{ mmol.l}^{-1}$ ) and in the rope individual event ( $x = 11.08 \pm 2.37 \text{ mmol.l}^{-1}$ ), as compared to the values obtained in the 5-ball group event ( $x = 10.33 \pm 1.45 \text{ mmol.l}^{-1}$ ). This might result from the requirements imposed by the FIG Code of Points as for the number, the degree of technical difficulties and the corporal group specific to each apparatus.

Physiological indicators registered under training conditions (table 5).

**Table 5:** Mean values of the physiological indicators registered under training conditions

Training physiological indicators	Group routines
min HR	75.4 ± 5.6
max HR	179.8 ± 5.7
% max HR	93.2% integral routines
mean HR	130.1 ± 6.2
% max HR	67.4%
% HR < 50% MAP	65.9% ± 12.4
50% < HR % aerobic threshold	27.9% 11.7
% HR < aerobic threshold	93.8%
aerobic threshold < % HR < aerobic threshold	5.85%
% HR > aerobic threshold	0.38% 0.45
lactate at rest mmol/l	0.59% 0.23

Table 5 shows us that the training intensity is not sufficient to maintain the MAP in this competitive period, a heart rate high percentage being below the aerobic threshold ( $< 95\%$ ). The maximum heart rate values registered under training conditions, during the integral evolutions in the group event ( $179.8 \pm 5.7$ ), are pretty close to those obtained in the simulated competition ( $184.2 \pm 10.5$ ).

pretty close to those obtained in the simulated competition ( $184.2 \pm 10.5$ ).

The repeated analysis of the heart rate evolution registered during the training lesson, in different preparatory stages, enabled us to objectively determine the characteristics of the demands and of the supplied effort (table 6).

**Table 6:** The HR mean values registered in the lessons with a technical and choreographic content.  
Pre-competitive period

Before the effort	Improvement of the apparatus handling technique	Combinations of difficult technical elements	Exercise parts	Half-integral exercises	Integral exercises	Recovery after 1 minute	Capacity of recovery
(BE)	(AHT)	(Dif TC)	(EP)	(H-IE)	(IE)	(R1)	-4.2
78	125	130	140	152	180	114	Very good

#### External indicators

By analyzing the technical content of the competitive events (table 7), we shall notice a great variety of the performed elements. This is not surprising if we consider the exigencies of the new Code of Points that clearly establishes the requirements regarding the number and the degree of technical difficulties.

But, if we compare the exercises presented by the World top gymnasts (Russia, Belarus, Ukraine), we shall see that the density of corporal elements performed by them is greater for an approximately identical duration of the competitive routines ( $2'20''$  to  $2'30''$ ), while the Romanian gymnasts mostly use combinations of three elements in order to increase the difficulty value, which doesn't change the problem data

**Table 7:** Technical content of the group routines – Romanian team vs. Russian team

Group routines (technical content)	Romanian team Ranked 3 <sup>rd</sup> at the European Championships Ranked 10 <sup>th</sup> at the World Championships	Russian team Ranked 1 <sup>st</sup> at the European Championships Ranked 1 <sup>st</sup> at the World Championships
Number of corporal elements	57.81%	65.9%
Jump difficulties Pivot difficulties Balance difficulties Flexibility difficulties	mean diff. 8; higher diff. 6 mean diff. 5; higher diff. 2 mean diff. 5; higher diff. 2 mean diff. 5; higher diff. 2	mean diff. 6; higher diff. 10 mean diff. 3; higher diff. 5 mean diff. 3; higher diff. 5 mean diff. 4; higher diff. 6
Mean duration of a difficulty	14''3	12''7
% diff. time/ mean duration	17.4%	14.4%
Combinations of 2 elements Combinations of 3 elements Apparatus exchange with corporal difficulty	5 value diff. 1 point 58% 6 value diff. 1 point 35.2% 9 value diff. 0.60 points 8.4%	7 value diff. 1 point 72.4% 7 value diff. 1 point 17.6% 7 value diff. 0.60 points 3.4%





### Conclusions

1. To accomplish the top-level technical-artistic content in group events, gymnasts must cope with higher energy expenditure, therefore with a strong exertion of the lactacyd anaerobic system, which can become the source of technical errors and can influence both coordination and emotional balance.
2. To lessen this part of the metabolic process in the energy input needed by the effort sustaining in rhythmic gymnastics, it would be necessary to develop first of all gymnasts' aerobic potential, so that they become able to cope with the training effort, to increase their recovery possibilities and delay the lactic acid production.

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## MUSCLE STRENGTH IN RELATION TO BODY COMPOSITION IN THE TURKISH MALE NATIONAL JUDO TEAM

MELEKOĞLU TUBA<sup>1</sup>, ÖCAL DEFNE<sup>1</sup>, BAYDİL BILGEHAN<sup>1</sup>, SÖNMEZ M.<sup>1</sup>

### Abstract

**The Objectives:** The aim of this study was to examine the strength differences in weight categories. For this purpose we have investigated the relationship between body fats and strength of The Turkish National Male Judo Team.

**The Methods:** Thirty-nine members of The Turkish Male National Judo Team [n=39, age  $19.34 \pm 2.71$  yr, body mass  $81.63 \pm 21.67$  kg, height  $175.26 \pm 8.67$  cm] were participated as subjects. For body composition profiles, body mass, standing height, lower extremity length (LE), skinfold thickness (biceps, triceps, subscapular, thigh, supraspinale), body fat percentage (BF %) and body mass index (BMI) were measured. Body fat percentage was estimated by using Brozek method. The strength values were measured from leg and back. The relationship between variables was determined by the Pearson Coefficient Correlation at the significance level of  $p < 0.05$ .

**The Results:** Statistical significant correlations appeared in the leg and back strength with age, height, weight, lower extremity length, BF %, BMI. A negative correlation was found between training history and skinfold thickness. On the other hand, there was no significant correlation between strength values and training history. Also, no correlation was found between weight and skinfold thickness.

**Conclusions:** As judo is a weight classified sport, the correlation of weight and strength is important. The present study demonstrated that age, height, weight, lower extremity length, BF % and BMI effect leg and back strength. Judo players in higher weight classes present higher BF% and strength.

**Keyword:** Judo, Anthropometry, Strength, Body Fat Percentage.

<sup>1</sup>Kastamonu University, Physical Education & Sports College, TURKEY

E-mail: defneocal@yahoo.com

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## Introduction

Judo is a body contact sport with requirements such as strength, judo specific techniques, tactical excellence, motor control and high degree of total body fitness.

Muscle mass is a considerable part of the human body weight. In addition, it has been reported that the muscle strength is highly correlated with muscle mass, muscle structure, body mass and neurophysiological factors (J. Janiak, B. Krawczyk, 1995). Therefore, among equally trained individuals, those with greater body weight demonstrate greater strength (V. M. Zatsiorsky, W.J. Kraemer, 2006). Also, it has been reported that, the correlation between the muscle strength and the lean body mass content in combat athletes were much higher than non-combat athletes (J. Janiak, B. Krawczyk, 1995). On the grounds that the muscle mass is the major determinant of strength, weight classes are designed for strength sports to promote competition between athletes of roughly equal size (L. Burke, 2007).

As judo is a weight classified sport, the correlation of weight and strength is important (M. Takahashi et al., 2005). It has been submitted that elite judoists should have low body fat and high muscle mass percentage (P.N. Ali, P. Hanachi, N.R. Nejad, 2010, E. Franchini, F.B. Del Vecchio et al., 2005, R. Callister, et al., 1991 ). E. Franchini, M.Y. Takito et al. (2005) reported that muscle mass percentage is about % 45 of body weight in high level judoists. Also, it has been suggested that elite judo athletes had a larger fat-free mass than the non-elite judoists (V. Kankanala, E.A. Gunen, A.S. Igah, 2010; J. Kubo, T. Chishaki, N. Nakamura, 2006).

The aim of this study was to examine the strength differences in weight categories. For this purpose we have investigated the relationship between body fats and strength of The Turkish National Male Judo Team.

## Material and Methods

### Subjects:

Thirty-five members of Turkish National Male Judo Team participated in the study as subjects. All participants volunteered for the study, after being informed about the procedures of research. The physical characteristics and training history of subjects assessed in training camp in preparation for 2010 European Championship.

The participants were trained athletes (at least 7 years) and practiced between 12 and 20 hr per week (Table2). The subjects were divided in weight categories according to the conventional division into categories (D. Boguszewski, 2009, T. Okada et al., 2007) such as lightweight (-60kg, -66kg, -73kg), middleweight (-81kg,-90kg) and heavyweight (-100kg, and +100kg).

**Table 1. The physical parameters of the subjects**

Variables	Subjects (M $\pm$ SD)
	Males (n=35)
Age(years)	19.34 $\pm$ 2.71
Height (cm)	175.26 $\pm$ 8.67
Weight (kg)	81.50 $\pm$ 21.79
IMC (kg/m <sup>2</sup> )	26.19 $\pm$ 4.72

IMC, body mass index; M, average; SD, standard deviation; n, number of subjects.

### Anthropometrical Measurement:

Body heights were measured to the nearest 0.1 cm by using a Harpenden stadiometer (Holtain. Ltd.). Body weight was measured in minimal cloths to the nearest 0.1 kg by digital scale.

After having body weight, standing height, lower extremity length; skinfold thicknesses were measured at two times from five sites (triceps, biceps, subscapular, thigh, supraspinale) with a Harpenden caliper (Holtain. Ltd.). The average of two readings was recorded. Total body fat percentage was calculated according to equation of Brozek et al. (1963) ( W. Jagiello et al. 2007). Body mass index (BMI) was calculated as weight/height<sup>2</sup> and expressed as kg/m<sup>2</sup>. All anthropometric measurements were done by the same experienced anthropologist using standard international procedures (ISAK).

### Strengths:

After 15 min warm-up exercises including leg, abdomen and back muscles; the subjects performed measurements of maximal muscle strengths. Back and leg isometric strengths were assessed by using a Takei leg dynamometer. For the measurements, subjects were instructed to take position on the platform with the trunk straight and the knees flexed for leg strength (LS) and a stiff leg dead lift position with trunk flexed only slightly forward at the hip joints for back strength (BS). The subjects were not allowed to lean backward on the heels (C.J. Gore, 2000). The best result was recorded after three trials.

### Statistics:

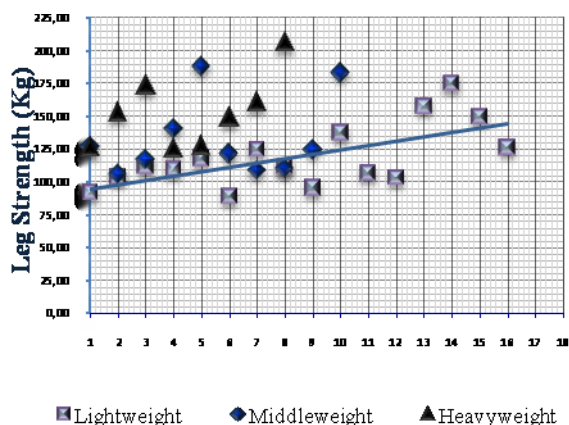
SPSS software for windows was used for statistical measurements. Means and standard deviations were calculated to express the results. Mann Whitney U test was performed for analyze the difference between groups. The correlation degree among the variables was evaluated on the basis of the values of the Pearson correlation coefficient, the level of  $p < 0.05$  and  $p < 0.01$  being considered significant.

### Results

Thirty-five members of The Turkish National Male Judo Team participated in the study as subject and divided by three weight categories.

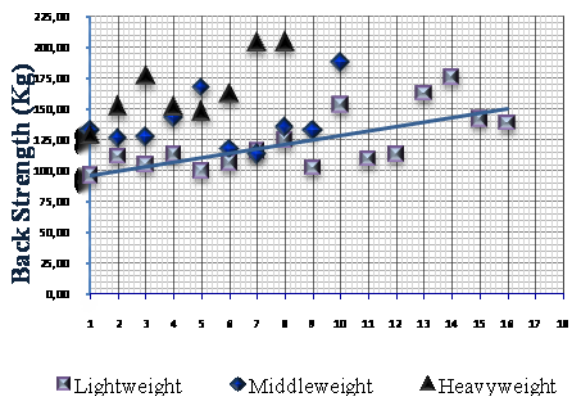
The training history, including years of active sports-specific training (TY) and hours of total training per week (TH) of the subjects are shown in

Table 2. In The Turkish Male National Judo Team, the training year averages of judoists in all weight categories were determined as not less than 7 years.

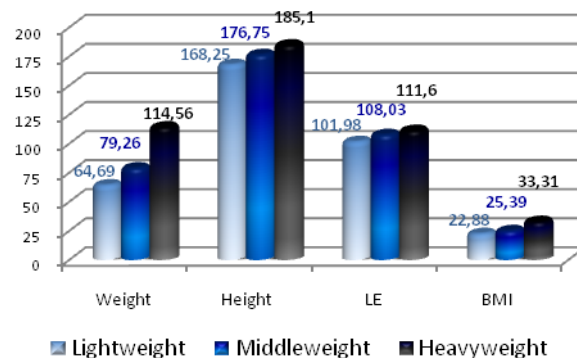


**Figure 1.** Distribution of leg strength values of subjects in weight categories.

There were significant differences between LW and MW ( $p < 0.05$ ) and between LW and HW ( $p < 0.01$ ). Also there were significant differences in strength variables (LS and BS) among lightweight (LW), middleweight (MW) and heavyweight (HW) judoists.

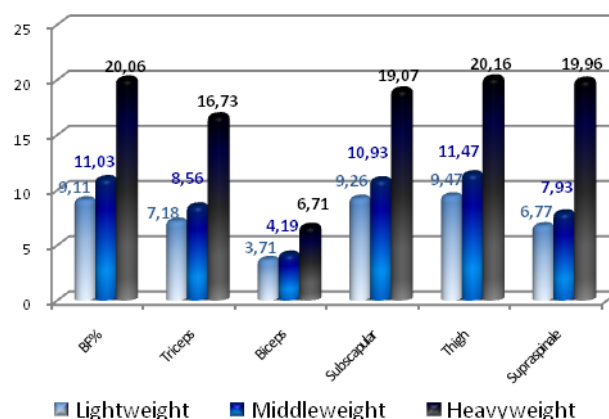


**Figure 2.** Distribution of back strength values of subjects in weight categories. There were significant differences between all weight categories ( $p < 0.01$ ).



**Figure 3.** Weights, heights, lower extremity lengths and body mass indexes of subjects.

There were significant differences in weight, height, LE and BMI between all weight categories.



**Figure 4.** Skinfold measurements and body fat percentages of subjects.

No significant differences ( $p > 0.05$ ) were remarked for BF% and skinfold measurements except subscapular ( $p < 0.05$ ) between LW and MW. However, when comparing MW and HW, significant differences in skinfold measurements and BF% ( $p < 0.01$  and  $p < 0.001$ ) were detected (Table 3). In addition, there were significant differences between LW and HW in skinfold measurements and BF% ( $p < 0.001$ ).

When comparing the weight categories, we were detected significant increase in strength values (LS and BS) parallel to the increase in weight. There were positive correlations between weight and leg strength, weight and back strength and weight and BF% ( $p < 0.01$ ).

Table 4 shows the correlation between anthropometrical and strength parameters of The Turkish Male National Judo team. According to the results there was negative correlation between BF% and TY ( $p < 0.05$ ). Also, there were positive

correlation between age and strength variables (LS and BS) ( $p < 0.01$ ).

Table 5 shows the correlation between anthropometrical and strength parameters of LW and MW judoists in The Turkish Male National Team that their BF% was not significantly different (LW and MW,  $9.11 \pm 1.78\%$ ,  $11.03 \pm 2.82\%$ , separately,  $p > 0.05$ ).

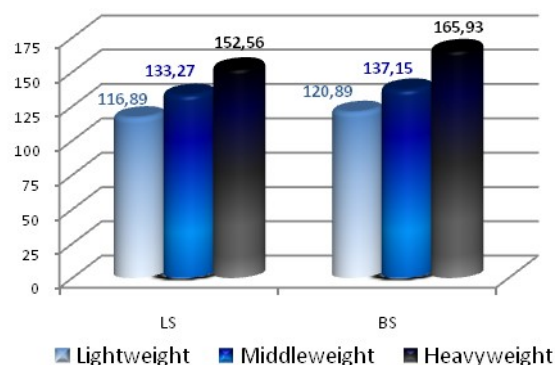


Figure 5. Leg and back strengths of subjects.

Table 2. Training history of subjects by weight categories in The Turkish Male National Judo Team

Variables	Subjects by Weight Categories							Total
	Lightweight			Middleweight		Heavyweight		
	-60 kg	-66 kg	-73 kg	-81 kg	-90 kg	-100 kg	+100 kg	
Age (year)	19.00 ± 2.64	18.60 ± 2.88	19.88 ± 2.89	18.00 ± 2.16	19.66 ± 2.80	18.75 ± 3.50	20.75 ± 2.75	19.34 ± 2.71
TY (year)	10.00 ± 3.46	9.20 ± 2.86	9.88 ± 2.52	8.75 ± 1.50	10.33 ± 4.27	7.25 ± 4.78	8.25 ± 1.70	9.25 ± 3.05
TH (hour/week)	14.66 ± 4.61	20.00 ± 0.00	18.88 ± 2.26	15.50 ± 5.74	20.16 ± 0.40	15.00 ± 3.46	20.00 ± 0.00	18.20 ± 3.35

Table 3. Anthropometrical and strength parameters of judoists by weight divisions

Variables	Subjects				Mann-Whitney U			
	Lightweight (n=14)		Middleweight (n=13)		Heavyweight (n=8)		Lightweight	
	(M $\pm$ SD)	Z	(M $\pm$ SD)	Z	(M $\pm$ SD)	Z	(M $\pm$ SD)	
Age (year)	19.42 $\pm$ 3.00	0.147	19.00 $\pm$ 2.27	0.332	19.75 $\pm$ 3.10	0.242	19.42 $\pm$ 3.00	
TY (year)	9.78 $\pm$ 2.86	0.074	9.61 $\pm$ 2.27	1.469	7.75 $\pm$ 3.37	1.442	9.78 $\pm$ 2.86	
TH (hour/week)	18.57 $\pm$ 2.97	0.220	18.23 $\pm$ 3.83	0.823	17.50 $\pm$ 3.50	0.741	18.57 $\pm$ 2.97	
Weight (kg)	64.69 $\pm$ 3.67	4.417***	79.26 $\pm$ 5.54	3.767***	114.56 $\pm$ 20.01	3.823***	64.69 $\pm$ 3.67	
Height (cm)	168.25 $\pm$ 3.35	3.568***	176.75 $\pm$ 4.78	2.174*	185.10 $\pm$ 9.59	3.210***	168.25 $\pm$ 3.35	
LE (cm)	101.98 $\pm$ 3.81	2.795**	108.03 $\pm$ 4.98	1.781	111.60 $\pm$ 5.35	3.381***	101.98 $\pm$ 3.81	
BS (kg)	120.89 $\pm$ 24.92	2.525**	137.15 $\pm$ 20.68	2.536**	165.93 $\pm$ 27.13	2.867**	120.89 $\pm$ 24.92	
LS (kg)	116.89 $\pm$ 24.70	1.990*	133.27 $\pm$ 26.23	1.738	152.56 $\pm$ 27.94	2.766**	116.89 $\pm$ 24.70	
Triceps (mm)	7.18 $\pm$ 1.61	1.359	8.56 $\pm$ 2.78	3.261***	16.73 $\pm$ 4.39	3.686***	7.18 $\pm$ 1.61	
Biceps (mm)	3.71 $\pm$ 0.65	1.458	4.19 $\pm$ 0.92	3.047**	6.71 $\pm$ 1.85	3.620***	3.71 $\pm$ 0.65	
Subscapular (mm)	9.26 $\pm$ 1.36	1.967*	10.93 $\pm$ 2.20	3.188***	19.07 $\pm$ 7.29	3.619***	9.26 $\pm$ 1.36	
Thigh (mm)	9.47 $\pm$ 2.63	1.359	11.47 $\pm$ 4.01	2.753**	20.16 $\pm$ 6.64	3.276***	9.47 $\pm$ 2.63	
Supraspinale (mm)	6.77 $\pm$ 1.18	1.262	7.93 $\pm$ 2.37	3.260***	19.96 $\pm$ 8.48	3.550***	6.77 $\pm$ 1.18	
BF% (%)	9.11 $\pm$ 1.78	1.747	11.03 $\pm$ 2.82	3.114**	20.06 $\pm$ 6.37	3.276***	9.11 $\pm$ 1.78	
BMI (kg/m <sup>2</sup> )	22.88 $\pm$ 1.65	3.057**	25.39 $\pm$ 1.77	3.766***	33.31 $\pm$ 4.13	3.322***	22.88 $\pm$ 1.65	

$p < 0.05^*$ ,  $p < 0.01^{**}$ ,  $p < 0.001^{***}$

Table 4. Correlation of anthropometrical and strength parameters of judoists





## Pearson Correlation (n=35)

Variables	Age	TY	TH	Weight	Height	LE	BS	LS	Tric.	Bic.	Subsc.	Thigh	Supra	BF%	BMI
Age	-														
TY	0.778*	-													
TH	0.102	0.064	-												
Weight	0.192	-0.188	0.084	-											
Height	0.103	-0.045	0.248	0.814*	-										
LE	0.002	-0.071	0.306	0.668*	0.838*	-									
BS	0.501*	0.066	0.105	0.740*	0.543*	0.532*	-								
LS	0.627*	0.183	0.123	0.595*	0.426*	0.350*	0.903*	-							
Triceps	-0.008	-0.303	-0.009	0.860*	0.654*	0.544*	0.459*	0.314	-						
Biceps	-0.038	-0.304	0.060	0.858*	0.665*	0.572*	0.482*	0.279	0.927*	-					
Subscapular	0.143	-0.269	0.120	0.915*	0.648*	0.539*	0.677*	0.511*	0.846*	0.904*	-				
Thigh	-0.164	-0.360*	0.014	0.752*	0.661*	0.554*	0.327	0.164	0.803*	0.739*	0.716*	-			
Supraspinale	0.096	-0.286	0.046	0.911*	0.637*	0.506*	0.611*	0.437*	0.909*	0.931*	0.945*	0.768*	-		
BF%	-0.016	-0.339*	0.072	0.897*	0.708*	0.590*	0.535*	0.358*	0.887*	0.882*	0.920*	0.932*	0.921*	-	
BMI	0.816	-0.253	-0.039	0.945*	0.589*	0.488*	0.735*	0.593*	0.838*	0.819*	0.900*	0.682*	0.902*	0.849*	-

p&lt;0.05\*, p&lt;0.01\*\*

Table 5. Correlation of parameters between lightweight and middleweight judoists

## Pearson Correlation (n=27)

Variables	Age	TY	TH	Weight	Height	LE	BS	LS	Tric.	Bic.	Subsc.	Thigh	Supra	BF%	BMI
Age	-														
TY	0.839*	-													
TH	0.094	-0.023	-												
Weight	0.038	0.021	0.162	-											
Height	-0.172	-0.036	0.213	0.699*	-										
LE	-0.137	-0.044	0.293	0.634*	0.767*	-									
BS	0.510*	0.217	0.113	0.518*	0.187	0.322	-								
LS	0.600*	0.261	0.135	0.443*	0.120	0.157	0.907*	-							
Triceps	-0.301	-0.092	-0.054	0.466*	0.319	0.456*	-0.125	-0.259	-						
Biceps	-	-0.188	-0.023	0.438*	0.310	0.479*	-0.152	-0.338	0.820*	-					
Subscapular	0.000	-0.067	0.167	0.728*	0.356	0.463*	0.395*	0.285	0.522*	0.604*	-				
Thigh	-0.316	-0.200	-0.163	0.360	0.352	0.260	-0.220	-0.284	0.644*	0.566*	0.511*	-			
Supraspinale	-0.142	-0.077	-0.090	0.554*	0.191	0.377	0.133	-0.035	0.676*	0.693*	0.742*	0.635*	-		

<b>BF%</b>	-0.228	-0.177	-0.048	0.561*	0.404*	0.380	0.002	-0.089	0.702*	0.558*	0.781*	0.936*	0.766*	-	
				*					*	*	*	*	*		
<b>BMI</b>	0.191	0.059	0.052	0.825*	0.174	0.266	0.575*	0.520*	0.384*	0.351	0.705*	0.201	0.593*	0.435*	-
				*			*	*			*		*		

p<0.05\*, p<0.01\*\*

### Discussion

The aim of this study was to examine the strength differences in weight categories. For this purpose we have investigated the relationship between body fats and strength of The Turkish National Male Judo Team.

Body fat percentage is a very important marker for the assessment of physical fitness especially in weight classified sports. A lower BF% may increase performance by improving the strength to weight ratio (W.D. McArdle, F. I. Katch., V.L. Katch, 2001). It has been indicated that body fat has significant inverse association with strength and muscle quality (A.B. Newman, et al., 2003). Researchers reported that elite judoists except for the heavyweight ones have generally low body fat (E. Franchini et al., 2005, R. Almansba et al., 2007). It has been reported that lighter categories have a higher performance of lean muscle mass with respect to the heaviest (R.E. Molina, et al. 2009).

We found that the BF% of the elite Turkish Judoists increase in proportion to their weight ( $P_{x,y}$ :0.897,  $p<0.01$ ). And BF% values were found for all weight categories are similar to those found in other studies with elite judoists. The means of the BF% for LW, MW and HW were  $9.11 \pm 1.78$  %,  $11.03 \pm 2.82$  % and  $20.06 \pm 6.37$  %, respectively. Several studies (R. Almansba et al., 2010, S. Sterkowicz et al., 1999, E. Franchini et al., 2007, K. Sterkowicz-Przybycien, R. Almansba, 2010) showed that BF% levels for elite male judoists in the range of % 10-15, similarly with our findings. R. Almansba et al. (2010) reported that the BF% of Algerian Olympic Judoists were  $12.28 \pm 4.16$  %. Ş.S. Balci measured the Turkish male judoists in The Youth National Team aged  $18.13 \pm 0.77$  years and he reported BF% such as  $12.38 \pm 8.95$  % for  $80.59 \pm 13.43$  kg weighted judoists. D.A. Santos et al. (2010) reported body fat percentage  $9.2 \pm 4.1$  % at the period of stability and  $8.0 \pm 3.8$  % prior to competition for elite male judoists. E. Franchini et al (2007) compared the morphological and functional characteristics of the male judo players of the Brazilian Team A with the judo players of Team B and C. They found BF%  $11.4 \pm 8.4$ % for Team A and  $10.1 \pm 5.7$ % for Team B and C.

Since judo is rather a grappling martial art to throw the component, BMI has a significant impact on judo players (J. Pedro, 2001). In our research we found that elite male judo players have  $22.88 \pm 1.65$  kg/m<sup>2</sup>,  $25.39 \pm 1.77$  kg/m<sup>2</sup> and  $33.31 \pm 4.13$  kg/m<sup>2</sup> BMI values for LW, MW and HW, separately. According to our results, P.J. Nande, V. Mudafale

and S.A. Vali (2009) reported BMI value such as  $21.6 \pm 2.0$  kg/m<sup>2</sup> for lightweight judoists ( $61.2 \pm 6.3$  kg). R. Almansba et al. (2010) reported BMI value  $29.32 \pm 6.30$  kg/m<sup>2</sup> for  $91.85 \pm 25.06$  kg weighted judoists. Earlier research on 27 elite male judoists (D.A. Santos et al., 2010) notified BMI as  $23.6 \pm 2.3$  kg/m<sup>2</sup>.

Muscle strength is highly correlated with lean body mass. Among trained individuals with a similar body percentage, those with greater body weight demonstrate greater strength (V. M. Zatsiorsky, W.J. Kraemer, 2006). Therefore, in weight classified sports such as judo, BMI and strength correlation has importance. In our study, we found a positive correlation between BMI and strength variables. We found leg strength values  $116.89 \pm 24.70$  kg,  $133.27 \pm 26.23$  kg and  $152.56 \pm 27.94$  kg for LW, MW and HW, separately.

When we compare the groups that their BF% was not significantly different (LW and MW,  $9.11 \pm 1.78$  %,  $11.03 \pm 2.82$ %, separately,  $p>0.05$ ), a positive correlation revealed between BMI & leg strength ( $P_{x,y}$ :0.520,  $p<0.01$ ) and BMI and back strength ( $P_{x,y}$ :0.575,  $p<0.01$ ). Concurring with several other authors (J. Kubo, 2006, E. Franchini, 2007), we found that the strength variables increases in proportion to their BMI ( $p<0.01$ ).

### Conclusion

In this study, some anthropometrical variables, and strength levels of The Turkish Male National Judo Team were characterized. It was found that BF% of the elite Turkish Judoists increased in proportion to their weight. Also, we determined that leg strength and back strength were correlated with body weight and body mass index. Thus, it can be said that decreasing BF% and increasing fat-free mass cause the strength variables for the same weight category to increase. However, as much as gaining strength and body fitness, judo specific techniques and tactics are also important for predicting sport performance.

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## THE INVESTIGATION OF STATE ANXIETY LEVEL OF WRESTLING NATIONAL TEAM ATHLETES IN NATIONAL TEAM AND CLUB COMPETITIONS

MURAT KUL<sup>1</sup>, ALPASLAN GÖRÜCÜ<sup>2</sup>, MEHMET ÖZAL<sup>4</sup>, NİGAR YAMAN<sup>1</sup>, ERKAN ÇETINKAYA<sup>3</sup>, HARUN  
GENÇ<sup>5</sup>, BİLAL DEMIRHAN<sup>1</sup>

### Abstract

**Objective:** The aim of this research is to determine the levels of state anxiety of those athletes who take place in international competitions for national teams and those who take place in the national league competitions for clubs.

**Methods:** 50 national team athletes, whose sport ages are from 1 to 8, participated voluntarily in the study. In order to collect data, personal information forms and Spielberger State Anxiety Inventory were used. Inventory was applied on athletes 20-30 minutes before the competition.

**Results:** According to the results of this study; there obtained significance in sport age state anxiety and, international matches / national league matches state anxiety. On the other hand, there obtained no significance between those athletes who whether won a medal before or not.

**Conclusion:** In conclusion, the national team athletes can administrate their levels of state anxiety better and easier in international matches than league matches.

**Key words:** Wrestling, national team, club, state anxiety.

### Introduction

In today's sport, the excellence of physical capacity is not sufficient alone to extract athletic performance to higher levels. An athlete has got also a psychological capacity which is at least as important as his/her physical capacity. Athletes, whom emotional states change, although their physical preparation is well, cannot be successful as expected him/her and it's described as a reason of psychological capacity (U. Erkan, 1998, L. Tavacioglu, 1999).

Besides the physical and physiological capacities of many top level athletes, they should also have excellent psychological skills such as to be motivated, to manage their anxieties, to be concentrated and to have purpose (H. KOÇ, 2004). In order to enhance athletic performance, psychological dimension should not be neglected.

There are many psychological phenomena that affect performance in sport. One of the most important psychological phenomena is anxiety. Anxiety can be identified as "a waiting state in which people are sad and troubling about the future and the state of excitement mixed with a sense of insecurity" (Premise, 2000; Y. Coskun and A. Duct, 2009). Likewise anxiety can be identified as a sense of a person who faces a possibility of a threat from the outside world or any state perceived as dangerous by the person (F. Alisinanoğlu and I.

Ulutaş, 2000).

The state anxiety is defined as "a form of anxiety which is depended on environmental conditions caused by a stress, and also depended on logical reasons, and generally understood by others. It's a form of anxiety that each individual experiences it temporarily." (N. Oner, A. Le Compte, 1998, H. Selya, 1998, E. Kuru, 2000). According to Spielberger, state anxiety; involves a sense of acute anxiety and tension characterized with fear, apprehension and tension. It's detected as a threat for some certain environmental situations and trends to respond to these situations with the growing of state anxiety (RH. Cox, 1994).

State anxiety is an important criterion to understand athlete in a sportive activity. In ongoing contests it's an important apprehension for athletes both before and after the competitions and it's also related to athlete's personality (C. İkizler, 1993).

According to the level of anxiety, an athlete would move away from making right decision and exhibiting his/her abilities. It means the effect of anxiety level is so important for athletes to obtain the desired or expected performance. Anxiety level affects the outcome of competition and athlete's performance negatively (E. Baser, 1998). On the other hand, athletes, who are under extreme pressure, may do some wrong actions. By the effect of excessive anxiety, athletes

<sup>1</sup>School of Physical Education and Sport, Bartın University, Bartın, TURKEY

<sup>2</sup>School of Physical Education and Sport, Selcuk University, Konya, TURKEY

<sup>3</sup>School of Physical Education and Sport, Süleyman Demirel University, Isparta, TURKEY

<sup>4</sup>Youth and Sport General Management, Ankara, TURKEY

<sup>5</sup>Mürüvet Bekir Elmaağaçlı İ.Ö.O., Ankara, TURKEY

Email: bdemirhan@bartin.edu.tr

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may forget the movements they knew very well and did for times in training period (M. Gümüş, 2002).

In each competition the athletes have to exhibit their performance under an anxiety condition while they enter to the field of competition. The most powerful reasons that cause anxiety are concerned to fear of failure, loss of prestige and conceit (A.M. Bird, B.K. Cripe, 1986), (C. Akarçesme, 2004).

Each competition carries a great importance for the athlete, both socially and economically. In such an environment it doesn't matter how excellent is Athlete's physical properties and how perfect is his /her training process, to achieve success, the ability to cope with anxiety is an extremely important criterion. Psychological preparation must be suitable with the nature of sport types and different from each others. It is considered that intensity of anxiety in athletes who perform individually is much more than those who do team sports (E. Konter, 1998).

In the case of athletes' accomplishment -to actualize their capacity with all the potentialities and to achieve maximal performance values- in general their ability to cope with stress and in special their skills to manage the anxiety of the competition, play an important role (E. Konter, 2002). In addition, sport psychologists agree that to achieve high performance, a certain level of anxiety is necessary for athletes. (E. Başer 1998).

In the light of these knowledges the aim of our study is to determine the state anxiety levels of Turkish youth national team wrestlers, in national and international competitions at the same season.

### **Method**

#### **Population and Sample**

The population of this research consists of Turkish wrestling junior national team athletes, and the sample consists of 50 national athletes who participated in the International Republican Tournament from 16 countries as national team athletes. 46 athletes of the same sportsmen participated also in Turkey wrestling league competitions on behalf of their clubs.

#### **Measuring Tools**

Personal information form was used in order to collect information about the participants and Spielberger State Anxiety Inventory was used to determine the levels of anxiety.

#### **Spielberger's Continual-State Anxiety Inventory**

The scale, which was developed by Spielberger and colleagues in 1964 to measure the state and continual anxiety levels of normal and abnormal individuals, adapted in Turkish by (N. Oner, A. Le Compte 1983). State Anxiety Scale, measures people's anxiety at a specific time, which is described as what they feel in their inside. Trait Anxiety Inventory, according to the feelings of people how often they define themselves in daily

anxiety measures. State Anxiety subscale of the inventory was used in this study. This scale is a kind of self evaluating scales that consists of short statements. SAI is a Likert-type scale which consists of 20 items and grades from 1 to 4. State Anxiety Inventory consists of 10 positive and 10 negative questions (inverted expression). These are: 1, 2, 5, 8, 10, 11, 15, 16, 19 and 20<sup>th</sup> items. Total scores of direct and reverse expressions are calculated.

A predetermined constant number is added to this value. This value for State Anxiety Inventory is 50. The most recent value obtained from the score is the point of individual's anxiety. The total point values vary between 20 and 80. Great points indicate higher level of anxiety and small points indicate lower level of anxiety. Cronbach's alpha coefficient is between 0.83 and 0.92 and it is expressed that this result is counted as an indication with high validity of the scale (N. Oner 1977). In addition, the scale results obtained from normal and patient samples in studies have reported the reliability coefficient between .87 and .83 (Ö. Aydemir, E. Koroğlu, 2000), (N.H.Şahin, A.D. Batıgün, S. Uğurtaş, 2002).

#### **Personal Information Form**

This form is developed by the researcher to gather personal information about athletes. There are three questions in personal information form; athletes age, athletes' sport age, and whether they have a degree if they participated to any tournament on behalf of the national team or not.

#### **Application**

State Anxiety Scale was applied on 50 Turkish national team athletes, who participated in an international tournament in Turkey, in which other athletes from 16 countries participated. The scale was applied on match day while the athletes were competing on behalf of national team. The Scale was applied on athletes in training hall, immediately before warming, 20-30 minutes prior to competitions. Under the same conditions and at the same season the scale was applied on 46 of 50 national team athletes, who were competing also on behalf of the clubs in the national league competitions. The athletes participated voluntarily in this application.

#### **Data Analysis**

The following statistical procedures were done for data analysis. The data obtained in this study were transferred to SPSS 17.0 package program. According to sport category, before the analyzing of state anxiety levels, sport age, and whether or not to have a medal, the athletes have been checked whether they provide parametric tests pre-conditions or not. If parametric tests pre-conditions weren't provided, Mann-Whitney U-test was used. If parametric tests pre-conditions were provided, the analysis method -independent group t-test- was used.

## Results

Table 1 gives information about a comparison of state anxiety levels, according to the variable of sport age, before competition. The state anxiety levels of national team athletes, who participated in the study, were examined before international competitions and according to the sport age differences and statistically significant difference was obtained ( $p < 0.05$ ). Athletes whose sport age is 1-4 years have a lower level of state anxiety before competition than those whose sport age is 5-8 years.

In Table 2, before competition in international tournaments, the state anxiety levels of athletes who have a medal were compared with those who don't have and no statistically significant difference was obtained ( $p > 0.05$ ). State anxiety levels of medalist wrestlers before competition were similar with those wrestlers who don't have medal.

Table 3: A Comparison of Athletes' Pre-Competition Anxiety Levels in National Team Competitions and Club League Competitions

Before the analyzing of Pre-sport competition state anxiety levels, according to sport category, Levene test was applied on study group and homogeneity of variances was examined. Since the result of Levene Test was found as  $p < 0.05$ , it is understood that parametric tests pre-conditions were not fulfilled. For this reason, Mann-Whitney U-test was used.

In this study national team athletes' state anxiety levels before international competitions were compared with their state anxiety levels before league competition (Table 3), and statistically significant difference was obtained ( $p < 0.05$ ). The state anxiety levels of athletes, who compete with foreign athletes on behalf of national team, before completion were significantly lower than those who compete with domestic athletes in club league.

## Discussion and Conclusion

The pre-competition state anxiety level of athletes, who were selected for wrestling national team and want to compete in an international competition on behalf of national team with athletes from a foreign country, was examined and according to their sport ages statistically significant differences were obtained. The pre-competition state anxiety level of athletes whose sport age is 1-4 years has been found lower than athletes whose sport age is 5-8 years.

Low state anxiety level on athletes with lower sport age and higher state anxiety level on athletes with higher sport age obtained from the study, may be due to a sense of responsibility and expectations and also because of being an athlete who compete on behalf of national team. As (M. Engur, 2002) transferred from Simon and Martens, personal assessments and high level of expectation increase the state anxiety level. It is known that

national team athletes with lower sport age have less experience than others. Therefore, athletes with low national team experience could not access sufficient maturity to represent a country. On the other hand, they do not know what material and spiritual gains have to be a national team athlete as well. So, it can be said that for these reasons their state anxiety level before competitions is low. Higher state anxiety level of athletes with higher sport age can be explained by their more experience to be national team athletes. National team athletes' awareness of being national team athletes and feeling responsibility for this, to be aware of what positive and negative gains would have when they compete on behalf of national team, and difficulty to accept defeat psychology, can be considered as some of the factors to the high level of state anxiety.

In all available sources, there was not found such a study in which the aim was to determine the state anxiety level of athletes, who all are national team athletes. However, there are some studies in different age groups and in different branches. (N.F. Başaran, O. Tasgin, A. Sanioglu, A.K. Taskin, 2009), examined athletes' (basketball, volleyball, soccer, taekwondo, wrestling) state anxiety point according to their sport age. After examining, the state anxiety point of athletes with lower sport age found significantly higher than those with higher sport age. Similarly, (A. Gacar, Z. Coskuner, 2010), in their study, have found that anxiety point of wrestlers decreased with increasing their sport age. (M.K Erbas, 2005), studied on the effects of state anxiety levels in the performance of senior male basketball athletes and according to age of training, divided them into two groups. There was no a significant difference between two groups.

Wrestling national team athletes' state anxiety before an international tournament was examined according to whether they have an international medal or not, and statistically no significant difference have revealed. The state anxiety levels of athletes who did not receive any medals with those who had, have found similar.

Research findings are supported by the findings of some research about the area. (M. Engur 2002) in his study, he examined the relationship between state anxiety of 279 athletes from different sport branches with their sport experiences, and did not find significance.

To be an international medalist or not, does not have any effect on national team athletes' state anxiety level, so it can be thought that the process of training and the period of camp may affect their state anxiety level. Whether to get medals before or not, all athletes pass a similar process. All training types, camp fields, and other applications are at the same properties for all athletes. The similarity of expectations from all athletes without considering at to be a medalist or not, is another factor. National

team athletes compete on behalf of their nation and asked to show the best representation. All these reasons were found effective to have similar state anxiety before competition.

The pre-competition state anxiety levels of Athletes, who participated in this study, were examined in both national and international competitions and statistically significant differences obtained. National team athletes' pre-competition state anxiety levels were found significantly lower than those who compete on behalf of their clubs in national league.

The results obtained from the research have shown that the low pre-competition state anxiety level of national team athletes, and higher pre-competition state anxiety level of athletes, who compete on behalf of their clubs can be related to several different reasons. National team athletes, who are struggling at a high-level, should be equipped with highest qualifications. In addition they should have a limited and manageable level of anxiety. As (H. Koc, 2004) determined, many top level athletes' skills are related not only to their physical and physiological capacities, but also related to their psychological characteristics. These athletes have excellent skills to prepare themselves for competition psychologically, to be motivated, to manage their concerns, to be concentrated, and for

detection goals. They can show such qualifications at the highest level when they compete on behalf of National team.

High state anxiety level of the same athletes, when they compete On behalf of clubs in national league competitions, can be related to different reasons. In national league competitions they compete on behalf of their team and their clubs not on behalf of themselves. Therefore, the gaining of victory or defeat affects directly their teams not only themselves. One case of defeat, may affect their revenues they get from the club, adversely. On the other hand, whether or not to be selected for national team depends on their performance in league competitions. All these reasons can be evaluated as causes of having high state anxiety level in league competitions.

### Conclusion

In conclusion, the state anxiety level of athletes, who compete on behalf of clubs, is higher than national team athletes' state anxiety level, and it imposes some responsibilities to club coaches and managers. Related units should learn the ways to cope with the athletes' anxieties. Preparing athletes for competitions as well and providing necessary psychological support will make them more successful.

**Table 1:** Comparison of Athletes' Pre-Competition State Anxiety Levels According to Sport Age Variable

Dimensions	Wrestling age	N	X	SS	t testi		
					t	sd	P
Pre-Competition	1-4 yıl	24	32.33	3.29	-2.46	48	0.01
Average of State Anxiety	5-8 yıl	26	35.42	4.77			

\*p<0,05

**Table 2:** Comparison of Athletes' Pre-Competition State Anxiety Levels According to Variable of Being an International Medalist or Not

Dimensions	Medal Status	N	X	SS	t testi		
					t	sd	P
Pre-Competition	Yes	30	34.87	4.53	1.88	48	0.06
Average of State Anxiety	No	20	32.55	3.83			

P>0.05

**Table 3:** Comparison of Athletes' Pre-Competition Anxiety Levels According to National Team and Club Competitions Variable

Size	Sport Category	N	Mean Rank	Sum of Ranks	Mann Whitney U	P
Pre-Competition	International Competition	50	39.23	1911.50	636.500	0.00
Average of State Anxiety	club league competition	46	59.66	2744.50		

\*p<0,05



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## BASKETBALL CONTRIBUTION TO THE DEVELOPMENT OF PLAYERS' PERSONALITY

POPESCU FLORENTINA<sup>1</sup>, PORFIREANU MARIA-CRISTIANA<sup>2</sup>, CRISTIAN RISTEA<sup>2</sup>

**Abstract:** If we know the basketball players' personality traits, training can be organized and developed so that it stimulates the improvement of their psychic capacity, as a constitutive element of the performance capacity in its whole.

**Purpose of the research:** This experimental study aims at determining to what extent the predominant use of technical-tactical actions and combinations within the oppositive relations can develop the junior 1<sup>st</sup> basketball players' personality.

**Methods of research:** scientific documentation, observation, statistical-mathematical method and graphical method

**Results.** Intelligent motor learning concerns the solving of problematic situations occurred during the activity or the actions, situations created by the opponent and specific to sports games.

<sup>1</sup> Spiru Haret University, Bucharest, ROMANIA

<sup>2</sup> National University of Physical Education and Sports, Bucharest, ROMANIA

E-mail: flory\_bk@yahoo.com

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**Conclusions.** The investigated athletes are emotionally stable, conscientious and sensitive. They have an enterprising spirit, are enthusiastic and sociable. We think that the development of a top performance basketball player's personality relies on all these qualities.

**Key words:** basketball, player, relation game, personality.

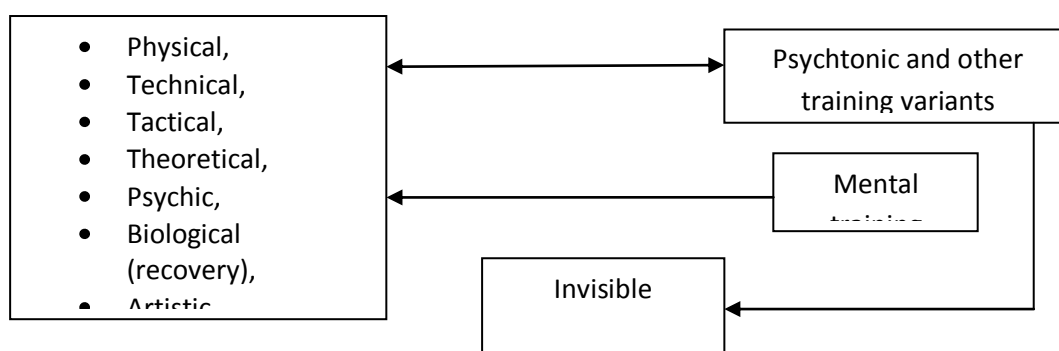
## Introduction

Specialists in the field have acknowledged long time ago that high performance doesn't simply require top- level motor qualities, but also personality traits comparable to the exigencies and the psychic tension generated by sports competition.

Simultaneously with the performance sports expansion, the psychological factor in performance

athletes' training is more and more frequently taken into consideration.

The athlete, regarded as a bio-psycho-social entity engaged in the performance activity, determines a holistic approach of the training process. The training content, proposed by M. Epuran (1982) and completed by A. Dragnea and S. Mate-Teodorescu, is presented in the following figure:



Sports training content (A. Dragnea, S. Mate-Teodorescu, 2002)

Psychology helps the coach know his athletes' personality traits considered from a developmental differentiated standpoint, so that his intervention in the training process can lead to the improvement of their psychic capacity, according to the performance sports requirements.

Training is preparation, instruction, education and a prerequisite for sports performance.

Because sports performance is determined by many factors, it is hard to specify which one is more important when the individual's capacity higher limits are reached (M. Epuran, I. Holdevici, F. Tonița 2001).

Sports performance, just as the performer, results from the systemic fusion of three components, namely the biological, psychological and social ones.

The biological component consists of the somatic, biochemical and physiological aspects; the psychological component includes the athlete's personality in its whole, his aspirations, ideals, will and creativity; the social component encompasses culture and civilization, science, technics and particularly human relationships (M. Epuran, I. Holdevici, F. Tonița 2001).

Sports performance aptitudes merge: genetic components - predispositions, attributes of the central nervous activity, somatic qualities; psychic components - thinking, will, creativity, motivation for performance, emotional control; social components - education, instruction, instructional technologies, organization of the selection for performance sports, management, all of them in a wide and rich

combination that renders even more difficult the coach's activity in performance reaching.

## Purpose of the research

This experimental study aims at determining to what extent the predominant use of technical-tactical actions and combinations within the opposite relations can develop the junior 1<sup>st</sup> basketball players' personality.

## Tasks of the research

The focus of our study was:

- To co-opt and co-interest the coach in our research approach.
- To know the teams included into our research program.
- To know the proposed performance objectives meant to develop an appropriate training program.
- To draw up the instruction program and apply it according to our research general purpose.
- To know the junior 1<sup>st</sup> players' age particularities.
- To conduct our intervention by means of the "16 PF" Personality Inventory.
- To formulate conclusions and edit the material.

**Methods of research:** scientific documentation, observation, statistical-mathematical method and graphical method

## Content of the experiment

The experiment was conducted in Bucharest on two junior 1<sup>st</sup> teams made up of 24 players, in the competition year 2010-2011, and it used the

psychomotor test called “Cattell’s 16 PF” Personality Inventory.

In the contemporary sports training theory and methods, specialists speak more and more about the “total training”. This concept has in view the individual’s and the team’s global development. Performance maximization can’t be achieved nowadays without the athlete’s personality maximization. That is why coaches invoke techniques for the self-confidence development, relaxation techniques etc.

The human personality system is structurally composed of: temperament - the personality dynamical-energetic side; aptitudes - the efficient operational systems; character - as a system of volitional attitudes and traits.

For this reason, the coach must prescribe his athletes specific exercises meant to build up their psychic habits and skills, together with the development of their self-assessment and self-instruction capacities.

Technical instruction is a motor learning process of different kinds: the so-called motor learning, perceptive motor learning and intelligent motor learning.

Intelligent motor learning concerns the solving of problematic situations occurred during the activity or the actions, situations created by the opponent and specific to sports games. Because the learning process - the human adaptation, in fact, consciously follows some well-defined self-control goals, all the types of learning are “intelligent”.

Intelligent motor learning is characteristic to *tactical instruction*, but we shouldn’t ignore that in sports games any technical element and procedure is learned in connection with the real tactical situations issued within the opposite relations. The learning results are concretized in *technical-tactical type open skills with a self-conducted but also a hetero-conducted character* - when the opponent takes the initiative (M. Epuran, I. Holdevici, F. Tonița 2001). The generated skills can be algorithmic, if the subject has learned the tactical action schemes, or heuristic, if the subject has learned to creatively solve the situations.

We should remind that tactics is the mental-actional activity of solving the problematic situations and that the psychic factors involved in the tactics behaviors are informational, decisional and regulatory.

Tactical training means to provide the athletes with tactical knowledge, abilities and skills, all of them understood as schematic, but also creative, inventive, heuristic modalities of solving the tactical situations.

Psychic training, just as general training, progressively develops in a spiral form, on higher and higher levels. Its components permanently influence one another within the psychic system.

The physical, technical, tactical or theoretical training means have an impact on the psychic sphere and can achieve the psychological training if they are oriented toward its goals, goals realistically but also

correctly formulated (M. Epuran, I. Holdevici, F. Tonița 2001).

The development of the psychic qualities and personality traits required by sports activity is focused on:

1. the basic stages, specific to the sports branch and to the competition training;
2. the psychomotor and socio-motor, intellectual cognitive, affective and volitional training, the development of personality components;
3. the use of physical, technical, tactical, theoretical, general and specific training means;
4. methods and techniques: modeling, exercise, approval and disapproval, maximum exertion, autogenous and psychotonic training.

By using the “Cattell’s 16 PF”, we can collect, in a relatively short time interval, in-depth information about the athletes’ personality traits. The Personality Inventory is not limited to the study of an isolated trait, but aims at covering the differentiated aspects, as emphasized by the factorial research it was constructed on. This questionnaire-based tool has a known saturation for each of the factors to be measured. It was proved that each factor of the inventory corresponds to some personality primary factors that can be met, with their significance and importance, in a great number of the real life situations. They include intelligence, but also the temperamental factors of the fundamental dynamic traits.

According to Cattell, the personality traits can be divided into two categories:

- primary superficial traits - that can be more or less found in a number of individuals and in a number of situations;
- origin traits or source traits - that are highlighted through positive correlations, approximately constant in a number of variables (element traits).

Origin traits also contain in their structure temperamental elements independent of the motivations and less modeled by the environment. Origin traits can be either common or unique (the common ones can be differentiated from the cultural setting).

This inventory is an introspection tool based on 187 indirect questions. As showed by its name, it includes 16 essential personality factors marked with the alphabet letters (A-Q).

The nature of these factors isn’t completely elucidated yet. Some of them seem to be hereditarily determined, such as the A, B, C, F, G and I factors. Others, such as the F and L factors, seem to be determined by the experience during the childhood. The A, F and G factors correspond to the concepts formulated by clinicians.

Each factor comprises 10 to 13 items (questions).

All questions have an equal weight. Each item is allotted 0, 1 or 2 points, except for the “B” factor items, where “0” points are allotted for the wrong answer and 1 point for the correct answer. The brute grades for each factor are related to the standard, by

obtaining thus standard grades serving to the construction of the respective psychic profile.

In our experiment, we also used as assessment tests the school-games, check games, thematic games and

the athletes' and teams' highest assessment test, namely the official game.

## Results

**Table 1: Results obtained by the basketball players in the 16 personality factors (A-Q<sub>4</sub>) of the "16 PF" test**

No.	Subjects	PERSONALITY FACTORS															
		A	B	C	E	F	G	H	I	L	M	N	O	Q <sub>1</sub>	Q <sub>2</sub>	Q <sub>3</sub>	Q <sub>4</sub>
1	P.C.	6	5	4	8	8	1	7	1	8	3	1	6	5	5	4	9
2	N.M.	6	0	1	8	8	2	6	1	6	4	5	3	5	7	3	7
3	M.I.	4	1	6	2	4	5	7	3	6	1	9	5	5	5	7	5
4	B.A.	9	0	4	3	8	6	4	1	8	2	5	4	5	5	4	9
5	L.I.	5	0	3	8	9	0	8	0	8	4	4	3	9	6	5	9
6	A.S.	8	2	5	3	9	4	8	2	4	2	8	4	2	1	6	5
7	P.D.	4	1	5	5	6	5	5	8	4	7	1	7	6	3	4	7
8	P.A.	6	8	3	6	4	6	6	7	7	2	7	5	5	3	1	7
9	D.R.	6	2	0	8	8	2	8	5	6	2	4	5	4	4	8	9
10	C.R.	6	8	4	8	6	6	6	7	6	2	6	4	6	5	5	8
11	C.B.	6	8	2	8	8	1	9	0	9	2	5	0	7	2	1	9
12	D.C.	6	0	6	9	9	3	6	3	6	2	5	3	6	5	6	9
13	M.D.	4	0	4	9	7	0	6	3	9	4	4	6	6	6	1	9
14	C.R.	7	1	3	7	5	4	7	5	6	1	4	7	3	7	4	9
15	B.A.	8	1	4	7	8	3	6	2	7	4	4	6	7	2	3	5
16	Z.B.	8	2	6	5	8	2	8	2	8	3	4	2	6	2	4	5
17	Ş.A.	9	1	3	2	0	8	5	7	5	2	7	5	1	4	9	8
18	L.C.	6	3	6	3	5	4	7	3	7	1	8	3	1	4	5	7
19	M.M.	6	3	2	9	6	4	6	3	8	0	3	7	5	3	2	4
20	B.V.	8	0	8	6	8	4	7	7	6	2	4	5	5	6	7	5
21	R.V.	5	4	7	6	5	9	7	7	2	4	7	2	5	2	5	3
22	B.I.	5	0	2	7	4	0	3	2	8	3	3	8	6	4	4	6
23	B.H.	7	8	4	9	8	1	7	1	7	0	5	7	8	5	1	8
24	B.A.	5	1	3	8	7	4	3	6	6	4	7	6	5	3	4	7

**Table 2: "16 PF". Frequency weight in percents**

Athletes	Standard grades	A%	B%	C%	E%
24	0-5	29.16-7	83.33-20	75-18	29.16-7
	6-10	70.83-17	16-66-4	25-6	70.83-17
	$\bar{X}$	6.25	2.45	3.95	6.41

**Table 2: - continued**

Athletes	Standard grades	F%	G%	H%	I%
24	0-5	29.16-7	79.16-19	20.83-5	70.83-17
	6-10	70.83-17	20.83-5	79.16-19	29.16-7
	$\bar{X}$	6.58	3.5	6.33	3.58

**Table 2: - continued**

Athletes	Standard grades	L%	M%	N%	O%
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24	0-5	16.66-4	95.83-23	66.66-16	62.5-15
	6-10	83.33-20	4.16-1	33.33-8	37.5-9
	$\bar{X}$	6.29	2.54	5	4.70

Table 2: - continued

Athletes	Standard grades	Q <sub>1</sub> %	Q <sub>2</sub> %	Q <sub>3</sub> %	Q <sub>4</sub> %
24	0-5	58.33-14	79.16-19	75.18	29.16-7
	6-10	41.66-10	20.83-5	25-6	70.83-17
	$\bar{X}$	5.12	4.12	4.29	7.04

The personality factor-analysis reveals the following:

#### FACTOR A

- 17 subjects are open, warm, cooperative in their interpersonal relationships.
- 7 subjects have a moderate tendency to reserve, to critical detachment.

#### FACTOR B - abstract thinking

- In this case, subjects are much dispersed along the standard, namely from 0 to the 8<sup>th</sup> class.

#### FACTOR C

- 11 subjects receive the 8<sup>th</sup> class - a marked and obvious tendency to emotional stability, calm, strong ego.
- 11 subjects receive the 4<sup>th</sup> class - a moderate tendency to lower emotional stability and ego strength.
- 2 subjects have a low emotional stability and ego strength.

#### FACTOR E

- 4 subjects receive the 9<sup>th</sup> class - strong, aggressive, stubborn, dominant.
- 6 subjects receive the 8<sup>th</sup> class - a marked tendency to aggressive, stubborn, dominant, strong character.
- 4 subjects receive the 7<sup>th</sup> class - an obvious and moderate tendency to stubborn, aggressive, dominant, strong character.
- 3 subjects receive the 6<sup>th</sup> class - a tendency to aggressive, stubborn, dominant, strong character.
- 7 subjects receive the 3<sup>rd</sup> class - an obvious and marked tendency to modest, deferent, conciliating, submissive, docile.

#### FACTOR F

- 3 subjects receive the 9<sup>th</sup> class - impulsive, enthusiastic, cheerful, lively.
- 11 subjects receive the 8<sup>th</sup> class - a marked and obvious tendency to enthusiastic, impulsive, cheerful, lively.
- 6 subjects receive the 6<sup>th</sup> class - a moderate tendency to enthusiastic, impulsive, cheerful, lively.

- 4 subjects receive the 4<sup>th</sup> class - a moderate tendency to prudent, taciturn, less communicative.

#### FACTOR G

- 4 subjects receive the 9<sup>th</sup> class - conscientious, perseverant, serious, strong ego.
- 1 subject receives the 8<sup>th</sup> class - a marked tendency to conscientious, perseverant, serious, strong ego.
- 5 subjects receive the 6<sup>th</sup> class - a moderate tendency to conscientious, perseverant, serious, strong ego.
- 4 subjects receive the 4<sup>th</sup> class - a moderate tendency to indifferent, opportunist, low ego.
- 5 subjects receive the 2<sup>nd</sup> class - an obvious and marked tendency to indifferent, opportunist, low ego.
- 5 subjects receive the 1<sup>st</sup> class - indifferent, opportunist, low ego.

#### FACTOR H

- 1 subject receives the 9<sup>th</sup> class - venturesome, enterprising, sociable.
- 11 subjects receive the 8<sup>th</sup> class - an obvious and marked tendency to venturesome, enterprising, sociable.
- 9 subjects receive the 6<sup>th</sup> class - a moderate tendency to venturesome, enterprising, sociable.
- 3 subjects receive the 4<sup>th</sup> class - an obvious and moderate tendency to shy, intimidated, suspicious.

#### FACTOR I

- 6 subjects receive the 8<sup>th</sup> class - an obvious and marked tendency to tender, sensitive, affectively dependent.
- 3 subjects receive the 6<sup>th</sup> class - a moderate tendency to tender, sensitive, affectively dependent.
- 9 subjects receive the 3<sup>rd</sup> class - an obvious and marked tendency to strong, realistic, no-nonsense.
- 6 subjects receive the 1<sup>st</sup> class - strong, realistic, no-nonsense.

#### FACTOR L



- 2 subjects receive the 9<sup>th</sup> class - distrustful, suspicious, stubborn.
- 6 subjects receive the 8<sup>th</sup> class - an obvious and marked tendency to distrustful, suspicious, stubborn.
- 3 subjects receive the 6<sup>th</sup> class - a moderate tendency to distrustful, suspicious, stubborn.
- 2 subjects receive the 4<sup>th</sup> class - a moderate tendency to trusting, cooperative.
- 11 subjects receive the 2<sup>nd</sup> class - a marked tendency to trusting, cooperative.

#### FACTOR M

- 1 subject receives the 7<sup>th</sup> class - an obvious tendency to imaginative, bohemian, liberal, dreaming.
- 9 subjects receive the 4<sup>th</sup> class - a moderate tendency to practical, conscientious, ceremonial.
- 14 subjects receive the 2<sup>nd</sup> class - a marked tendency to practical, conscientious, ceremonial.

#### FACTOR N

- 1 subject receives the 9<sup>th</sup> class - fine, perspicacious, clear-sighted, lucid.
- 6 subjects receive the 8<sup>th</sup> class - an obvious and marked tendency to fine, perspicacious, clear-sighted, lucid.
- 6 subjects receive the 6<sup>th</sup> class - a moderate tendency to fine, perspicacious, clear-sighted, lucid.
- 7 subjects receive the 4<sup>th</sup> class - a moderate tendency to forthright, naive, sentimental, natural.
- 4 subjects receive the 3<sup>rd</sup> class - an obvious tendency to forthright, naive, sentimental, natural.

#### FACTOR O

- 5 subjects receive the 8<sup>th</sup> class - an obvious and marked tendency to anxious, depressive, self-blaming.
- 9 subjects receive the 6<sup>th</sup> class - a moderate tendency to anxious, depressive, self-blaming.
- 10 subjects receive the 4<sup>th</sup> class - a marked tendency to calm, self-confident.

#### FACTOR Q<sub>1</sub>

- 1 subject receives the 9<sup>th</sup> class - open, critical, liberal.
- 8 subjects receive the 8<sup>th</sup> class - an obvious and marked tendency to open, critical, liberal.
- 10 subjects receive the 6<sup>th</sup> class - a moderate tendency to open, critical, liberal.

- 1 subject receives the 4<sup>th</sup> class - a moderate tendency to conservative, stable, respecting traditional ideas.
- 2 subjects receive the 3<sup>rd</sup> class - an obvious and marked tendency to conservative, stable, respecting traditional ideas.
- 2 subjects receive the 1<sup>st</sup> class - conservative, stable, respecting traditional ideas.

#### FACTOR Q<sub>2</sub>

- 11 subjects receive the 7<sup>th</sup> class - an obvious tendency to self-reliant, resourceful.
- 4 subjects receive the 4<sup>th</sup> class - a moderate tendency to group-oriented, follower dependent.
- 8 subjects receive the 3<sup>rd</sup> class - an obvious and marked tendency to group-oriented, follower dependent.
- 1 subject receives the 1<sup>st</sup> class - group-oriented, follower dependent.

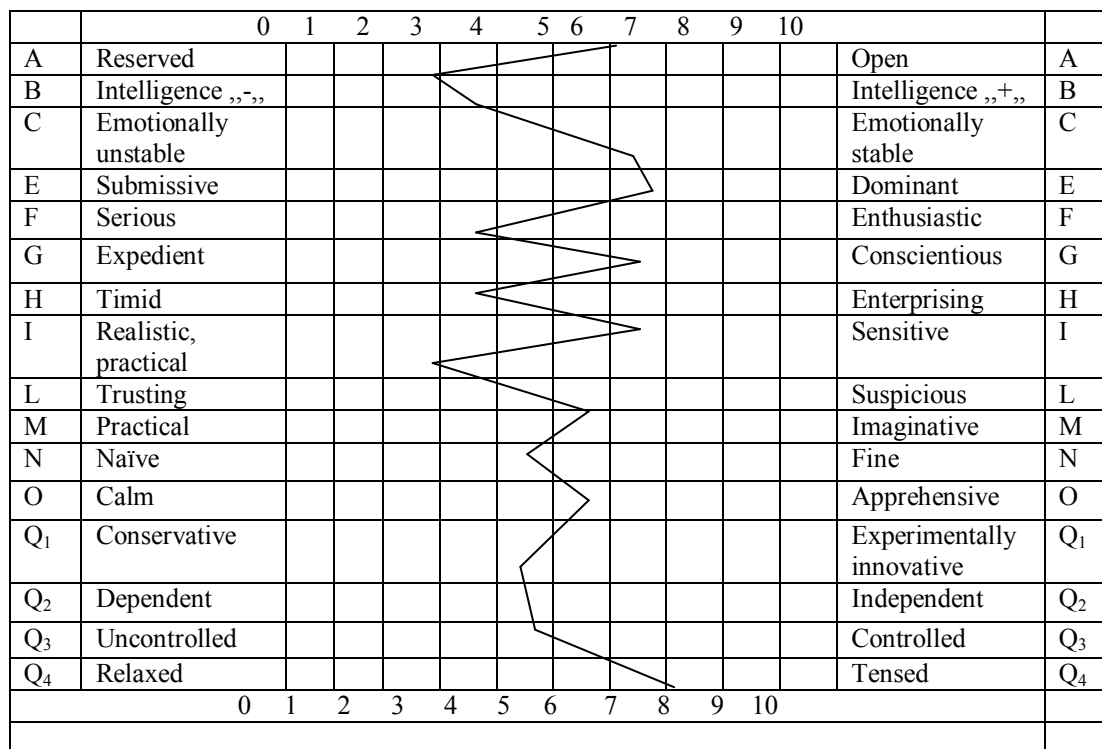
#### FACTOR Q<sub>3</sub>

- 1 subject receives the 9<sup>th</sup> class - self-disciplined, prudent, ambitious, socially precise.
- 8 subjects receive the 8<sup>th</sup> class - an obvious and marked tendency to self-disciplined, prudent, ambitious, socially precise.
- 6 subjects receive the 6<sup>th</sup> class - a moderate tendency to controlled, prudent, ambitious, socially precise.
- 3 subjects receive the 4<sup>th</sup> class - a moderate tendency to uncontrolled, impulsive, instinctive.
- 4 subjects receive the 3<sup>rd</sup> class - an obvious tendency to uncontrolled, impulsive, instinctive.
- 2 subjects receive the 2<sup>nd</sup> class - a marked tendency to uncontrolled, impulsive, instinctive.

#### FACTOR Q<sub>4</sub>

- 3 subjects receive the 9<sup>th</sup> class - tensed, frustrated, prudent.
- 7 subjects receive the 8<sup>th</sup> class - an obvious and marked tendency to tensed, frustrated, prudent.
- 5 subjects receive the 7<sup>th</sup> class - a tendency to tensed, frustrated, prudent.
- 7 subjects receive the 6<sup>th</sup> class - a moderate tendency to tensed, frustrated, prudent.
- 1 subject receives the 4<sup>th</sup> class - a moderate tendency to relaxed, calm, low energy.
- 1 subject receives the 3<sup>rd</sup> class - an obvious tendency to relaxed, calm, low energy.

**Graph 1: Profile of the personality traits**



A	B	C	E	F	G	H	I
6.25	2.45	3.95	6.41	6.58	3.5	6.33	3.58
L	M	N	O	Q <sub>1</sub>	Q <sub>2</sub>	Q <sub>3</sub>	Q <sub>4</sub>
6.29	2.54	5	4.70	5.12	4.12	4.29	7.04

### Conclusions

The profile of the personality traits in junior 1<sup>st</sup> basketball players (average grades) reveals a group great homogeneity in relation to the personality psychic factors.

The investigated athletes are emotionally stable, conscientious and sensitive. They have an enterprising spirit, are enthusiastic and sociable. We think that the development of a top performance basketball player's personality relies on all these qualities.

The obtained results validate the hypothesis of our research.

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## MENTAL TOUGHNESS: A COMPARATIVE STUDY ON KFUPM UNIVERSITY TEAMS

RAKESH TOMAR<sup>1</sup>, SANDEEP TIWARI<sup>2</sup>, SANDHYA TIWARI<sup>2</sup>, MOHAMMED HAMDAN<sup>1</sup>

### Abstract

Mental toughness is an attribute that is often associated with successful performance in competitions. Mental toughness and its importance in competitive Sports have been documented in literature (A.S. Goldberg, 1998; K. Hodge, 1994; J. Tunney, 1987; R.M. Williams, 1988). In sports, many things are left to chance as, sports are predictably unpredictable. Sports persons who enter the competitive arena soon realize that there is more to competition than simply learning the physical skills. It is one thing to possess the physical and mental skills and yet another to be able to use them when needed. Every athletic contest is a contest of control of the delicate mind-body connection, which is dramatically clear within the competitive arena (J.E. Loehr, 1982).

**Purpose:** 1. To compare the mental toughness between King Fahd University of Petroleum and Minerals (KFUPM) Judo and Karate teams; 2. To compare the mental toughness between KFUPM Swimming and Track & Field teams.

**Methods** A total of 26 players who are part of KFUPM Judo, Karate, Swimming and Track & Field University teams (2011-12) with age ranging from 18-20 years were selected as subjects for study and were divided into four groups namely; Judo (N= 6), Karate (N= 5), Swimming (N= 8) and Track & Field (N= 7). Mental toughness questionnaire of Tiwari and Sharma (2006) was administered to the subjects. The questionnaire consists of 48 statements and has six sub- scales namely: Self Confidence, Attention Control, Motivation, Goal Setting, Visual Imagery and Attitude Control. T- Test was applied to compare means between the groups. Statistical significance was set at 0.05 levels.

**Results** T- Test failed to reveal significant difference on mental toughness (MT) between KFUPM Judo and Karate teams ( $p = .7 > .05$ ). T-Test also failed to reveal significant difference on MT between KFUPM Swimming and Track & Field teams ( $p = .122 > .05$ ). T-Test revealed significant difference on Self Confidence between KFUPM Swimming and Track & Field teams ( $p = .039 < .05$ ), Track & Field team scored significantly higher on Self Confidence ( $M \pm SD = 30.71 \pm 3.7$ ) than Swimming team ( $M \pm SD = 26.1 \pm 4.01$ ). No significant difference were found on other sub- scales (Attention Control, Motivation, Goal Setting, Visual Imagery and Attitude Control) of mental toughness between Judo & Karate Teams and Swimming & Track & Field teams.

**Discussion** No significant difference was found on Overall Mental Toughness and its sub- scales between Judo and Karate team members of KFUPM. This could be largely due the similar nature of both the sports. Significant differences were not found on overall mental toughness and its sub scales except self-confidence between swimming and track & field team members of KFUPM. Track & Field team members of KFUPM found to be more self-confident as compared to swimming team members. Team preparation and training prior to competition could have increased the self-confidence of track & field team. According to L.C. Green and J. Wildman (2003) mentally tough athletes will be successful in accomplishing their goals and their confidence may be derived from past performance successes and mental and physical preparations, encouragement from coaches and peers.

**Key Words:** mental toughness, judo, karate, track & field, swimming.

### Introduction

In sports, many things are left to chance as, sports are predictably unpredictable. Sports persons who enter the competitive arena soon realize that there is more to competition than simply learning the physical skills. It is one thing to possess the physical and mental skills and yet another to be able to use them when needed. Every athletic contest is a contest of control of the delicate mind-body connection, which is dramatically clear within the competitive arena (J.E. Loehr, 1982).

Sports persons are also feeling the increasing pressure in sports and the negative consequences of these pressures. Players during match situations feel scared, because they fear

failure at every corner, due to which they become nervous, their muscles get tense, their stomach pains, body becomes tight, hands become clammy, and negative thoughts predominate them and hence they start believing that they will never win a big match (E. Bhambri, P.K. Dhillon & S.P. Sahni, 2005).

Considering the importance of mental toughness, coaches have agreed that mental toughness is a factor that could determine the success of an athlete (D. Gould, et al., 1987) and it is also seen as an important element that could shape a successful athlete to be a champion (E.K. Norris, 1999).

Mental toughness can be considered as a

<sup>1</sup>Lecturer, Department of Physical Education, King Fahd University of Petroleum and Minerals, Dhahran, SAUDI ARABIA

<sup>2</sup>Associate Professor, Indira Gandhi Institute of Physical Education and Sport Science (University of Delhi), New Delhi, INDIA

E-mail: rtau@rediffmail.com

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mental skill factor. Some research findings has identified mental skills as a psychological construct that distinguishes between more and less successful performance across a number of sports; for example, golf (P.R. Thomas, R. Over, 1994), and equestrian, (M.C. Meyers et al., 1998).

Mental toughness and its importance in competitive Sports have been documented in literature (A.S. Goldberg, 1998; K. Hodge, 1994; J. Tunney, 1987; R.M. Williams, 1988). (E.K. Norris, 1999) also emphasized the importance of mental toughness in the making of a champion athlete. (D. Gould et al. 2002) studied the psychological characteristics of Olympic champions, and identified mental toughness as a significant contributor to sports performance enhancement.

The relationship between mental state and athlete's physical performance has been for concern for coaches and even for athletes for long time especially with the knowledge that the mental state does have enormous impact on athlete's performance (R.S. Weinberg, 1988).

The factor of mental toughness concludes that the athletes need to equip themselves with a package of a combined psychological skills starting in the early stage of involvement, training session, during and after the match (G. Jones, S. Hanton, D. Connaughton, 2007). This could be a factor that could determine both their success and failure. The mental psychology explained in this study focused more on the mental toughness of the athletes.

Mental toughness is an important skill to every athlete as this could help to prepare themselves when they are facing different situations in a tournament and it is also directly related to the athletes' performance and achievement (D. Anderson, 1995; A. Eric, 2006).

There are a lot previous studies on the relationship of the athletes' trained mental skills and how these skills influence each other (T.J. Davenport, 2006; J. Golby, M. Sheard, 2004; K.L. Kruer, 2002; K. Gary, R. Jolly, 2007; D. Lorentzen, 1981; A.R. Nicholls et al., 2008). This clearly shows that previous studies done also agreed that mental toughness could influence one's achievement in sport. Therefore, it is important to acknowledge the role of mental toughness and its influence in the achievement of the football team.

The concept of mental toughness in sport has long been explored and developed (A.S. Golberg, 1998; J.E. Loehr 1986). Both athletes and coaches admitted that at least fifty percent of the success is influenced by psychological factors that are related to mental toughness (J.E. Loehr, 1982; 1986).

There are also some researchers who found out that when two teams who share the same strength, skills and tendency to win, 90% of the determining factor to be the champion depends on the mental aspect (B. Gouldsmith, 2006).

M. Rana (2009) examined the mental toughness and its influence on performance outcomes in competition. For this study 60 Indian Male National Wrestler competing in National championships at Indira Stadium Una Himachal were selected as sample. The Sample was further divided in two groups as per performance outcomes in competition one being successful wrestlers who had won the medals (n=30) and other group being non-successful wrestlers who had not won any medals in national Championship 2009. Psychological Performance Inventory (PPI; J.E. Loehr, 1986) was administered to measure the mental toughness to both the groups in this study. Analysis of the fundamental areas of mental toughness revealed that the successful wrestlers scored significantly higher on all sub-scales of mental toughness and significant differences were observed between two groups (successful and non-successful) in self-confidence ( $p = 0.001$ ), negative energy control ( $p = 0.019$ ). Attention Control ( $p = 0.011$ ), Visual / Imagery Control ( $p=0.266$ ), Motivational Level ( $p = 0.002$ ), Positive Energy ( $p = 0.001$ ) and Attitude Control ( $p = 0.012$ )

Mental toughness has recently emerged as an important psychological construct that is related to successful sports performance (D. Gucciardi, S. Gordon, J. Dimmock, 2009; G. Jones, S. Hanton, D. Connaughton, 2007; S. Bull, C. Shambrook, W. James, J. Brooks, 2005; D. Gould, K. Dienffenbach A. Moffett, 2002; P.J. Clough et al. 2002) suggested mental toughness is a trait-like construct that allows individuals to remain relatively unaffected by competition or adversity. A factor often associated with successful performance in competition is mental toughness.

### Objectives of the Study

1. To compare the mental toughness between King Fahd University of Petroleum and Minerals (KFUPM) Judo and Karate teams
2. To compare the mental toughness between KFUPM Swimming and Track & Field teams.

### Methods

A total of twenty six male sportspersons were selected as the subjects for the present study. The age of the subjects were ranging from 18-21 years. All the selected subjects represented KFUPM in the Inter University competitions in Saudi Arabia during the academic year 2011-12. Out of 26 Subjects, 6 represented KFUPM Judo team, 5 in KFUPM Karate team, 8 in KFUPM Swimming team and 7 in KFUPM Track & Field team. Each team formed one group. Comparison was made between Judo and Karate teams and Swimming and Track & Field teams. Mental toughness questionnaire of Tiwari and Sharma



(2006) was administered. The data was collected during training camp in the King Fahd University of Petroleum and Mineral campus.

### Instrument

Mental toughness questionnaire of Tiwari and Sharma (2006) was administered. The questionnaire consists of 48 statements. These 48 statements are further divided into 6 sub-scales namely; Self Confidence, Attention Control, Motivation, Goal Setting, Visual and Imagery and Attitude Control which were designed to measure factors that reflect mental toughness of sports person.

### Data Analysis

Descriptive statistics were computed for all measures. The data obtained were analyzed with the help of statistical software (SPSS 16 version). The mean, standard deviation along with t test were computed to check the differences between samples mean of Judo and Karate groups and Swimming and Track & Field groups. The level of statistical significance was set at 0.05 levels.

### Results

**Table 1**  
**Mean and Standard Deviation of KFUPM**  
**Karate and Judo Team**

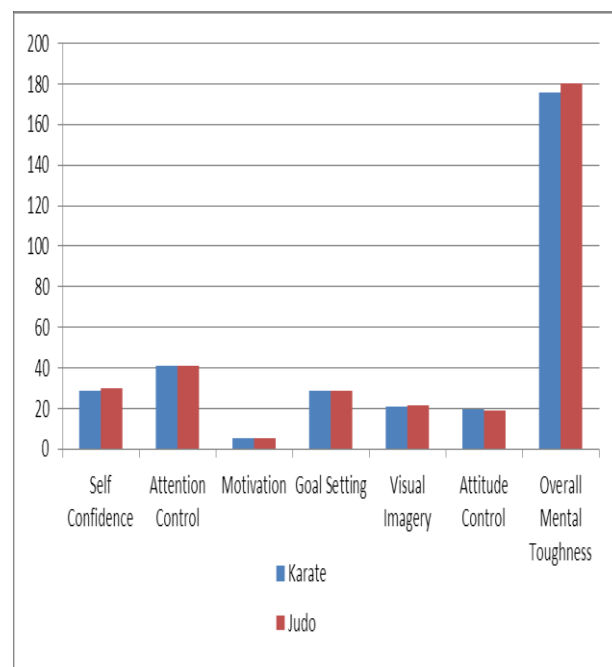
Sub Scale	Karate Team N = 6		Judo Team N = 5	
	Mean	SD	Mean	SD
Self Confidence	28.66	4.5	30.2	2.86
Attention Control	41.33	6.74	41.2	3.11
Motivation	5.68	2.32	5.14	2.3
Goal Setting	29	3.74	29	3.31
Visual Imagery	21.16	3.54	21.8	2.04
Attitude Control	19.83	2.92	19	2.23
Overall Mental Toughness	175.5	21.22	180	17.10

**Table 2**  
**Mean and Standard Deviation KFUPM Track &**  
**Field Team and Swimming Team**

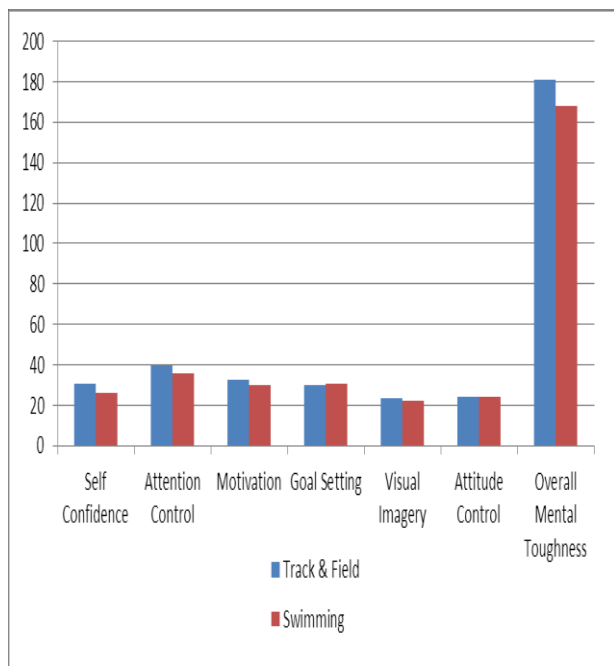
Sub Scale	Track & Field Team N = 5		Swimming Team N = 8	
	Mean	SD	Mean	SD

Self Confidence	30.71	3.7	26.1	4.01
Attention Control	39.71	3.4	35.62	5.75
Motivation	32.57	7.22	29.75	3.05
Goal Setting	30.14	3.28	30.37	2.26
Visual Imagery	23.2	3.25	22	2.77
Attitude Control	24.42	4.35	24.25	3.19
Overall Mental Toughness	180.85	14.46	168.12	15.31

**Fig.1 Mean Scores of Karate and Judo Teams**



**Fig. 2 Mean Scores of Track & Field and Swimming Teams**



**Table 3**  
**Comparison of Mental Toughness between**  
**KFUPM Judo and Karate Teams**

Sub Scale	T- value	df	P- value
Self Confidence	-.656	9	.528
Attention Control	.040	9	.969
Motivation	-1.060	9	.317
Goal Setting	.000	9	1.00
Visual Imagery	-.352	9	.733
Attitude Control	.521	9	.615
Overall Mental Toughness	-.398	9	.700

Analysis of results from table 3 revealed following:

**Self Confidence:** T test could not reveal any significant difference on self-confidence (SF) between KFUPM Judo & Karate teams ( $p = .528 > .05$ ).

**Attention Control:** T test could not reveal any significant difference on attention control (AC) between KFUPM Judo & Karate teams ( $p = .969 > .05$ ).

**Motivation:** T test could not reveal any significant difference on motivation (MO) between KFUPM Judo & Karate teams ( $p = .317 > .05$ ).

**Goal Setting:** T test could not reveal any significant difference on goal setting (GS) between KFUPM Judo & Karate teams ( $p = 1.00 > .05$ ).

**Visual Imagery:** T test could not reveal any significant difference on visual imagery (VI) between KFUPM Judo & Karate teams ( $p = .733 > .05$ ).

**Attitude:** T test could not reveal any significant difference on attitude (AT) between KFUPM Judo & Karate teams ( $p = .615 > .05$ ).

**Overall Mental Toughness:** T test could not reveal any significant difference on overall mental toughness (MT) between KFUPM Judo & Karate teams ( $p = .700 > .05$ ).

**Table 4**  
**Comparison of Mental Toughness between**  
**KFUPM Track & Field and Swimming Teams**

Sub Scale	T- value	df	P- value
Self Confidence	-2.294	9	.039*
Attention Control	-1.641	9	.125
Motivation	-.955	9	.357
Goal Setting	.161	9	.874
Visual Imagery	-.827	9	.423
Attitude Control	-.091	9	.929
Overall Mental Toughness	-1.655	9	.122

Analysis of results from table 4 revealed following:

**Self Confidence:** T test revealed significant difference on self-confidence (SF) between KFUPM Swimming and Track & Field teams ( $p = .039 > .05$ ).

**Attention Control:** T test could not reveal any significant difference on attention control (AC) between KFUPM Judo & Karate teams ( $p = .125 > .05$ ).

**Motivation:** T test could not reveal any significant difference on motivation (MO) between KFUPM Judo & Karate teams ( $p = .357 > .05$ ).

**Goal Setting:** T test could not reveal any significant difference on goal setting (GS) between KFUPM Judo & Karate teams ( $p = .874 > .05$ ).

**Visual Imagery:** T test could not reveal any significant difference on visual imagery (VI) between KFUPM Judo & Karate teams ( $p = .423 > .05$ ).



**Attitude:** T test could not reveal any significant difference on attitude (AT between KFUPM Judo & Karate teams ( $p = .929 > .05$ ).

**Overall Mental Toughness:** T test could not reveal any significant difference on overall mental toughness (MT) between KFUPM Judo & Karate teams ( $p = .122 > .05$ ).

### Discussions

No significant difference was found on Overall Mental Toughness and on all the sub scales between Judo and Karate team members of KFUPM. This could be largely due the similar nature of both sports. Significant difference was not found on overall mental toughness and on all its sub scales except self-confidence between swimming and track & field team members of KFUPM. Track & Field team members of KFUPM found to be more self-confident as compared to swimming team members. Team preparation and training prior to competition could have increased the level of self-confidence of track & field team members. According to L. Green and J. Wildman (2003) mentally tough athletes will be successful in accomplishing their goals and their confidence may be derived from past performance successes and mental and physical preparations, encouragement from coaches and peers. The past performance and success of KFUPM Track & Field could have affected and increased the level of self confidence in the team members.

### Conclusions

1. There were no significant differences on Attention Control, Motivation, Goal Setting, Visual and Imagery, Attitude Control and Overall mental toughness between KFUPM Judo and Karate team members.
2. There were significant differences on Self Confidence between KFUPM Swimming and Track & Field team members.
3. There were no significant differences on Self Confidence, Attention Control, Motivation, Goal Setting, Visual and Imagery, Attitude Control and Overall mental toughness between KFUPM Swimming and Track & Field team members.

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## STUDY APPROACH OF THE ALBANIAN COMPETITION INTO THE GREEK-ROMAN AND FREE STYLE WRESTLING FOR TEENAGERS (14 -15 YEARS)

SHEHU ZYLFI<sup>1</sup>, TARE MIMOZA<sup>1</sup>, FERUNAJ PERPARIM<sup>1</sup>

### Abstract

Analysis and evaluation of the teenagers' situation in various categories in free style and Greco-Roman wrestling, the complete collection and full accuracy of some of the data for calculating different technical-tactical parameters and coefficients, so to come up with comprehensive findings on the organization and implementation of the training process in the future activities. Through specific observations, comparisons of the analysis of two wrestling activities were made. The research is summarized in ten tables and four graphs, completed with figures and facts, which fit well on the various arguments in the fields of training and competition. To find the classification of each team, we analyze and treat processes such as the number of match participation in each weight category and teams; amount of sporting events, the final result of each match, the first, second, third and fourth place earned by each team, points earned from each weight category. Based on these data we argue on the current situation, providing relevant conclusions on where we should concentrate more for training the new teenagers so to increase the quality level of this sport discipline.

**Key words:** Teenagers, free style wrestling, Greco-Roman wrestling.

### The scope of the study

In this study, through results observation, we try i) to analyze two wrestling activities of the Albanian national cup for teenagers in both the Greco-Roman and the Free style wrestling; ii) to

argue on the current situation, by providing relevant conclusions on where to concentrate more in the future, so to increase the quality level of this sport discipline. Through the statistical data, this study will highlight the performance and achievements of

<sup>1</sup>University of Sports in Tirana, ALBANIA

E-mail: kampion\_absolut@yahoo.com

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teenagers' wrestlers, and will argue the current situation and where future training needs to focus on this age category. The main purpose of this study is the accurate and the full collection of the data which are fundamental for the calculation of various technical and tactical parameters and coefficients. The organization of these activities creates opportunities and reflects the current state of the sports in a particular discipline and influence in improving the future training by setting some favorable milestones in terms of raising quality. The study will provide valuable conclusions and recommendations for teachers of physical education in general and in particular to the wrestling coaches.

#### Method

These two sports activities, the Greco-Roman and free style wrestling, for purposes of

study, were followed closely and very carefully monitored by us. For each of the carried out match, in both wrestling styles, the following data were exactly taken: the number of athletes participating for each weight category, the number of participating athletes from each team, the number of matches, the final outcome of each match, the first, second, third and fourth place earned by each participating team, points received for each weight to calculate the team classification, the table of champion teams reflecting weight and place they have taken (G.J. Kokoneci, A.Lame, 1999).

#### Results

##### *The Style of Greco-Roman Wrestling*

In the activities of the Greco-Roman wrestling for teenagers, taking place in Kukes on 28 to 29 May 2010, five Albanian teams took part.

**Table1. Participating teams and the number of sportsmen (FILA, 2007)**

Teams	32 kg	35 kg	38 kg	42 kg	47 kg	53 kg	59 kg	66 kg	73 kg	85 kg	Total
Perparimi	1	1	1	1	1	1	1	1	1	1	10
Dinamo	1	1	1	1	1	1	1	1	1	1	10
Beselidhja	0	0	1	0	1	1	1	1	1	0	6
Partizani	1	1	1	1	1	1	0	0	0	0	6
Flamurtari	0	1	0	1	0	0	1	1	1	0	5
Total	3	4	4	4	4	4	4	4	4	2	37

In the table no. 1, we show the categories of weights, the participating teams, the number of sportsmen, and the total number of participating sportsmen for each weight category. The Team of Perparimi and Dinamo have more athletes per each

weight, while the other teams have fewer. Categories of weights 32 kg and 85 kg have the smaller number of athletes. The total number of all participating sportsmen is 37.

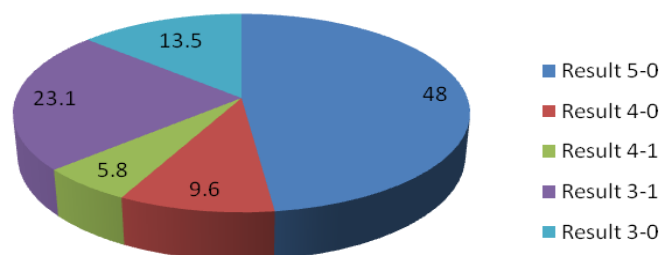
**Table2. Results and number of matches**

	32 kg	35 kg	38 kg	42 kg	47 kg	53 kg	59 kg	66 kg	73 kg	85 kg	Total
No. match	3	6	6	6	6	6	6	6	6	1	52
Result 5-0	2	4	2	5	4	4	2	0	1	1	25
Result 4-0	0	1	0	0	0	1	0	2	1	0	5
Result 4-1	0	0	0	0	0	1	0	1	1	0	3
Result 3-1	1	1	3	0	2	0	2	2	1	0	12
Result 3-0	0	0	1	1	0	0	2	1	2	0	7

In Table 2 we show the number of matches, results for each weight category and their total

weight. The total number of matches taken place is 52, where 25 matches have ended with the score 5-0, 12 matches with the score 3-1, 7 matches

with the score 3-0, 5 matches with the score 4-0, and 3 matches with results 4-1.



**Graph1. Percentage of the results of the matches**

In graph No. 1 we present the percentage of the results of the matches taken place. The highest percentage score is 5-0, respectively 48%, while

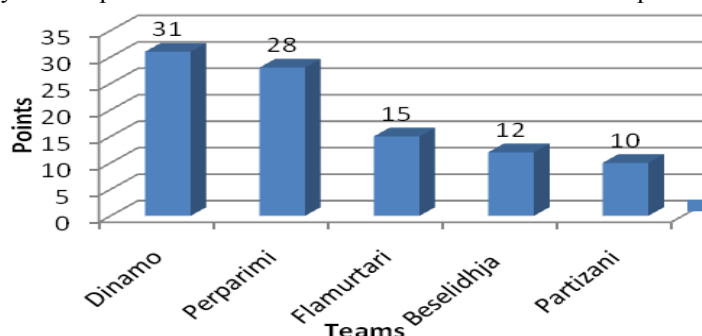
the lowest percentage 5.8% is in the score 4-1. The result 3-1 is 23.1%, 3-0 score is 13.5%, and the result 4-0 is 9.6%.

**Table3. Classification of team and points taken in each weight (FILA, 2007)**

Team	32 kg	35 kg	38 kg	42 kg	47 kg	53 kg	59 kg	66 kg	73 kg	85 kg	Points
Dinamo	2	4	4	2	4	4	3	2	2	4	31
Perparimi	4	3	3	4	2	2	2	4	1	3	28
Flamurtari	0	2	0	3	0	0	4	3	3	0	15
Beselidhja	0	0	2	0	1	3	1	1	4	0	12
Partizani	3	1	1	1	3	1	0	0	0	0	10

In Table No. 3 it is shown the team ranking and points that are taken for each weight. Dinamo team won the first place where it received a total of 31 points, followed by the Perparimi team with 28

points, while Flamurtari is ranked in the third place with 15 points. Dinamo team in all weight categories has no fourth place, while the team of Partizan has no first place.



In the graph No. 2 it is shown the ranking of teams according to their total points gained.

**Table4. Number of seats won for each team**

No.	Teams	Place			
		First	Second	Third	Fourth
1.	Dinamo	5	1	4	0
2.	Perparimi	3	3	3	1
3.	Flamurtari	1	3	1	0
4.	Beselidhja	1	1	1	3
5.	Partizani	0	2	0	4

	<b>Total</b>	<b>10</b>	<b>10</b>	<b>9</b>	<b>8</b>
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**Table5. The places taken from champion team for each weight**

<b>Champion Team</b>											
<b>Place</b>	<b>32 kg</b>	<b>35 kg</b>	<b>38 kg</b>	<b>42 kg</b>	<b>47 kg</b>	<b>53 kg</b>	<b>59 kg</b>	<b>66 kg</b>	<b>73 kg</b>	<b>85 kg</b>	<b>Total</b>
<b>First</b>	0	1	1	0	1	1	0	0	0	1	<b>5</b>
<b>Second</b>	0	0	0	0	0	0	1	0	0	0	<b>1</b>
<b>Third</b>	1	0	0	1	0	0	0	1	1	0	<b>4</b>
<b>Fourth</b>	0	0	0	0	0	0	0	0	0	0	<b>0</b>

In Table No. 5 it is given the places won for each weight category, the total first, second, third and fourth places of the champion team. The first places are won in weights 35 kg, 38 kg, 47 kg, 53 kg and 85 kg, the second place is won in weight 59

kg, while the third place is won by weights 32 kg, 42 kg, 66kg and 73 kg.

#### *Free Style Wrestling*

In the matches organized on 28 to 29 May 2010 in Kukes for free style wrestling for teenagers, seven Albanian teams took part.

**Table6. Participating Teams and sportsmen number (FILA, 2007)**

<b>Teams</b>	<b>32 kg</b>	<b>35 kg</b>	<b>38 kg</b>	<b>42 kg</b>	<b>47 kg</b>	<b>53 kg</b>	<b>59 kg</b>	<b>66 kg</b>	<b>73 kg</b>	<b>85 kg</b>	<b>Total</b>
<b>Perparimi</b>	1	1	1	1	1	1	1	1	1	1	<b>10</b>
<b>Korabi</b>	1	1	1	1	1	1	1	1	1	1	<b>10</b>
<b>Apollonia</b>	1	1	1	1	1	1	1	1	1	1	<b>10</b>
<b>Kamza</b>	1	1	1	1	1	0	1	1	1	1	<b>9</b>
<b>Vllaznia</b>	1	1	1	1	1	1	1	1	1	1	<b>10</b>
<b>Besa</b>	1	1	1	1	1	1	0	0	0	0	<b>6</b>
<b>Teuta</b>	0	1	0	1	1	1	1	0	1	0	<b>6</b>
<b>Total</b>	<b>6</b>	<b>7</b>	<b>6</b>	<b>7</b>	<b>7</b>	<b>6</b>	<b>6</b>	<b>5</b>	<b>6</b>	<b>5</b>	<b>61</b>

In table no. 6 it is reported the weight categories, the participating teams, and the total number of participating sportsmen for each weight category. The teams of Perparimi, Korab, Apollonia and Vllaznia have athletes for each weight, while other

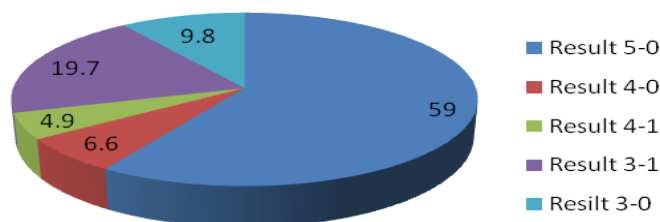
teams have fewer. Categories of weights 66 kg and 85 kg have the smaller number of athletes. Total number of all participating sportsmen is 61.

**Table7. Results and number of matches**

	<b>32 kg</b>	<b>35 kg</b>	<b>38 kg</b>	<b>42 kg</b>	<b>47 kg</b>	<b>53 kg</b>	<b>59 kg</b>	<b>66 kg</b>	<b>73 kg</b>	<b>85 kg</b>	<b>Total</b>
<b>No. match</b>	6	7	6	7	7	6	6	5	6	5	<b>61</b>
<b>Result 5-0</b>	2	6	4	4	5	2	4	2	3	4	<b>36</b>
<b>Result 4-0</b>	1	0	1	0	0	1	0	1	0	0	<b>4</b>
<b>Result 4-1</b>	0	0	0	2	0	0	1	0	0	0	<b>3</b>
<b>Result 3-1</b>	1	0	1	1	2	2	1	1	2	1	<b>12</b>
<b>Result 3-0</b>	2	1	0	0	0	1	0	1	1	0	<b>6</b>

In Table No. 7 it is shown the number of matches, match results for each weight category and their total. The total number of games taken place is 61, where 36 matches have ended with the score 5-0, 12 games with the score 3-1, 6 match with the

score 3-0, 4 match with the score 4-0, and 3 match with result 4-1.



**Graph3. Percentage of matches' results**

In graph No. 3 we present the percentage of the results of the games taken places. The highest percentage is in score 5-0, 59% respectively, while

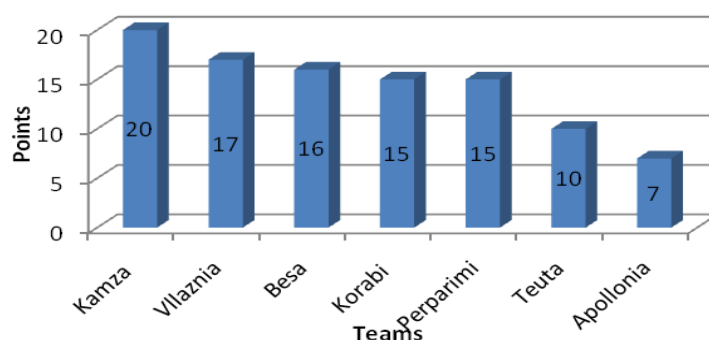
the lowest percentage 4.9% was in the score 4-1. The result 3-1 is 19.7%, 3-0 score is 9.8%, and the result 4-0 is 6.6%.

**Table8. Classification of teams and points gained for each weight (FILA, 2007)**

Team	32 kg	35 kg	38 kg	42 kg	47 kg	53 kg	59 kg	66 kg	73 kg	85 kg	Points
Kamza	1	4	0	4	0	0	1	2	4	4	20
Vllaznia	0	0	0	2	2	3	3	4	3	0	17
Besa	3	3	2	0	4	4	0	0	0	0	16
Korabi	4	0	4	3	0	0	0	1	1	2	15
Përparimi	2	1	1	1	0	2	4	3	0	1	15
Teuta	0	2	0	0	3	1	2	0	2	0	10
Apollonia	0	0	3	0	1	0	0	0	0	3	7

In Table No. 8 we show team classification and points gained for each weight. Kamza team won the first place with a total of 20 points, followed by Vllaznia team with 17 points, while Besa is ranked third with 16 points. Kamzes team in all weight

categories has no second place, while team Apollonia and Teuta have no first place. Team Korab and Perparimi have equal points, but Korab is ranked fourth because it has more first places and results of matches with the highest technical points.



**Graph4. Team Classification and points**

In graph No. 4 it is shown the ranking of teams according to their total points.

**Table9. Number of places won for each team**

No.	Teams	Place			
		First	Second	Third	Fourth
1.	Kamza	4	0	1	2
2.	Vllaznia	1	3	2	0
3.	Besa	2	2	1	0
4.	Korabi	2	1	1	2
5.	Përparimi	1	1	2	4



6.	Teuta	0	1	3	1
7.	Apollonia	0	2	0	1
	<b>Total</b>	<b>10</b>	<b>10</b>	<b>10</b>	<b>10</b>

In Table No. 9 it is shown the number of first, second, third and fourth places for each team and their total. Kamzes team has won 4 first places, 1 third place and 2 fourth places. Vllaznia team has

won 1 first place, 3 second places and 2 third places. Apollonia team that is ranked last has won 2 second places and 1 fourth place.

**Table10. Places taken from champion team for each weight**

Champion Team											
Place	32 kg	35 kg	38 kg	42 kg	47 kg	53 kg	59 kg	66 kg	73 kg	85 kg	Total
<b>First</b>	0	1	0	1	0	0	0	0	1	1	<b>4</b>
<b>Second</b>	0	0	0	0	0	0	0	0	0	0	<b>0</b>
<b>Third</b>	0	0	0	0	0	0	0	1	0	0	<b>1</b>
<b>Fourth</b>	1	0	0	0	0	0	1	0	0	0	<b>2</b>

In Table No.10 it is given the place for each weight category, the total first, second, third and fourth places of champion team. The first places are won by weights 35 kg, 42 kg, 73 kg and 85 kg, the third place is won by weight 66 kg, while the fourth by the weight 32 kg and 59 kg.

### Discussions

In these two activities it is applied the regulation of wrestling (FILA, 2008) where matches were held in three periods, from 1 minute and 30 seconds each. In the style of the Greco-Roman wrestling, the matches were held with the circular system, due to the low number of participants, while the Free style matches took place with elimination system since participation in all categories of weights was greater.

Matches that have been completed with the results:

- 5 points for the winner and 0 points for the loser:* victory by fall (with or without technical point for the loser), injury, withdrawal, not appearance, disqualification or three notice errors against regulation.
- 4 points for the winner and 0 points for the loser:* victory with technical superiority (6 points difference during the two periods) and the loser does not mark any technical points.
- 4 point for the winner and 1 point for loser:* victory with technical superiority (6 point difference during the two periods and the loser scores technical point).
- 3 point for the winner and 1 for loser:* if during two periods the match ends with a victory with points during the regular time or 1 point glinc and the loser scores one or more technical point.
- 3 points for the winner and 0 for the loser:* when, during three periods, wrestler wins 2 periods with difference 1 to 5 point and the loser does not mark any point.

In both activities of wrestling, Greco-Roman and free style, among other things we showed the seriousness and commitment of wrestler and coaches to be represented well in these activities.

They show the annual preparation and their intentions to increase the sporting qualities.

For a better participation with teenagers it is needed that attention should be focused on some key issues: the establishment of associations of teenagers with focus on wrestling sport, the broader dissemination of sports teams in the education system, improving the legislation to increase investment opportunities in the materials base and infrastructure in this sport, the approach of interested donors to invest in this sport.

### Conclusion

Although there was high level of performance in several weight categories of weight, in some other still much work remain so to have a dignified representation and for the fulfillment of all weight categories of the participating teams. Matches were characterized by fighting spirit, but in the most cases passive fight remains an element of achieving tactical advantage from the coaches and sportsmen themselves. This element often resulted in loss of the match in one period whereas with active fight it could have been sure victory. The level of high quality clasp remains still a duty of experts and teenager wrestlers to be apply in a massive way in the latter activities, since it was observed that in general simple clasp were taken. What will lead to the increase of more quality sports is the better preparation in physical and tactical aspect, which played a key role in the loss of the matches.

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## STRATEGIES AND GUIDELINES FOR THE SELECTION AND TAKING DEBUTANTES WOMEN'S FOOTBALL

STĂNCULESCU GEORGE<sup>1</sup>, MELENCO IONEL<sup>1</sup>, MUSAT GEORGE<sup>1</sup>, POPA CRISTIAN<sup>1</sup>, PETCU DAMIAN<sup>1</sup>, DAMIAN GEORGE COSMIN<sup>2</sup>, OANCEA BOGDAN<sup>2</sup>

### Purpose

From its inception until today, the game of football has seen considerable progress without limits foresee this. Considering that nearly all countries in the world is developing a national championship football, we conclude that it - football game - is the most popular sport development area in the world.

But achieving high performance in football is conditional on early detection as real girls practicing the qualities for soccer, the application of scientific criteria in their selection and not least, a quality education.

Because until now, as our knowledge in our country there is a selection model for women's football, we believe that our scientific approach puts the "cornerstone" necessary for achieving it.

### Methods

In addition to data from the study of literature, to have a complete selection and initiation of female debutantes in football, I had a poll, the coaches who run these teams. Through this survey we wanted to see how it is perceived among the coaches, the importance of selection in women's football.

The questionnaire contains questions designed, including the importance of selection issues in women's football and to highlight ways of achieving this and was administered to 15 female football coaches in the Women's Football League in Romania.

### Conclusions

- After analyzing the responses to the questionnaire were applied to the following conclusions:
- main component of training at this level is the technical training followed by the physical;
  - training methods preferred by coaches at this age are moving games (relay circuits with different technical elements, etc.);
  - assessing the physical and technical player frequency is satisfactory - the beginning and end of each preparation;
  - most important measures that should be applied for that girls who choose to turn to football training does not stop after just a few weeks are science-based selection, the actual results obtained from the tests and trials and the application training of modern and attractive.

### Introduction

Football, the sport that enjoys the widest spread in the world, has come from its appearance until today a long period of development and progress. This social phenomenon called "football game", led development of numerous research studies addressing the various aspects of his from methodological ones, to physiological and psychological ones.

That women's football has won a secure place among the sports performance proves that football practice rate among girls has increased in recent years and numerous international competitions (European championships, world championships, Olympic games) organized for different age - players under 17 years under 19 years, senior.

The beginnings of women's football are reported between 960 and 1297 in China under the Tang and Song Dynasty. Be held early 70s female football practice in Europe and New Zealand. Many countries, to raise the competitive resorted to introduce women's football in schools, organizing competitions at this level and calling for qualified coaches, expanding the selection area to 11-12 years.

Today, USA - World champions in 1991, has over 6 million active players in legitimate national championship in three geographic regions.

Sweden - has over 33,000 legitimate player. I ranked women's football in popularity. China - in 1980 became an international force in women's football. Their national division has 12 teams. The rest of football activity takes place in divisions of 2, 3rd and 4th. Germany - has celebrated women's football in 1970 and has over 520 000 players legitimized working in teams over 3000. Championship consists of two series of 11 teams. For girls and juniors are held regional championships (I.Motroc, 1995).

In Romania, the Romanian Soccer Federation was founded in 1990 and has over 40 affiliated clubs (about 1000 legitimate player), organized a series of Division A, with 12 teams and three rounds of division B, also with 12 teams each. Following difficulties of the transition number of teams participating in the National Championship has been reduced dramatically. Between 2000 and 2005 there were only 8 teams affiliated (about 200 players) and female football national championship is held districts. Basically there were two groups: South and North, each with 4 teams, the champion from Romania deciding disputed play-off. From 2005-2006 competitive year, with membership of about 4 teams decided transition to round-trip, existing male football. However, Romanian champion, deciding everything from disputed play-

<sup>1</sup>Faculty of Physical Education and Sport, University Ovidius Constanta, ROMANIA

<sup>2</sup>Univ Transilvania Brasov, ROMANIA

E-mail: stanculescu\_george@yahoo.com

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off.

Currently, women's football is an Olympic sport that has a competitive system very well developed, both the Senior Women and junior level.

Although the game of football does not require much different skills than other sports, "good footballers appear especially where family, circle of knowledge and wider community of which the individual, believe in the usefulness of the opportunity football, showing a cult for this activity" (M. Epuran, E. Horn, 1985).

In countries where women's football has achieved notable successes internationally (Netherlands, France, Germany, Norway, USA) primary selection is done at the age of 6-7 years. The current level of international football player place coordinates of high skill, strength and speed, the trends continue to increase technical virtuosity and psycho-physical basis for harmonious development.

### Topicality

From its inception until today, the game of football has seen considerable progress without limits foresee this. Considering that nearly all countries in the world is developing a national championship football, we conclude that it - football game - is the most popular sport development area in the world.

But achieving high performance in football is conditional on early detection as real girls practicing the qualities for soccer, the application of scientific criteria in their selection and not least, a quality education.

Because until now, as our knowledge in our country there is a selection model for women's football, we believe that our scientific approach puts the "cornerstone" necessary for achieving it.

### Motivation for choosing the theme

Football is primarily a team game, team, which involves direct contact with the opponent, and seeking multilateral athlete, the complexity of movements, as well as its various working conditions. Mastery level corresponds to executions that rely primarily on skills highly automated, with elements of originality, risk, execution giving a high rating. And all this also applies to girls who want to practice football. Therefore and girls must implement the idea that, without proper selection and training in our country, there will be soccer women to live up to internationally competitive.

For this reason, the scientific approach taken by us wants to bring forth evidence and need to develop rules that would represent a selection model to the debutantes in women's football and the development of training plans that take into account the particularities psycho-physiological girls 10-12 years, start-ups in football, but football performance model that should be reached after the final selection.

### Purpose and objectives

In addition to data from the study of literature, to have a complete selection and initiation of female debutantes in football, I had a poll, the coaches who run these teams. Through this survey we wanted to see how it is perceived among the coaches, the importance of selection in women's football.

The questionnaire contains questions designed, including the importance of selection issues in women's football and to highlight ways of achieving this and was administered to 15 female football coaches in the Women's Football League in Romania.

### Results and analysis

Of the 16 questions of the questionnaire, 4 aim to highlight the role of scientific selection in football debutantes, 4 refers to importance of the approach of the girls who choose to practice football and how the game is perceived nationally and internationally, 4 refer to the importance of each component of sports training, 2 shows the means of preparing player and 2 refer to the age and level of training of trainers.

Questionnaire length is large making it easy to tackle without inducing boredom receiver. All they emerge from the analysis of the questionnaire which was easy because of accessibility, as I watched it when I designed this research tool.

Question No. 1, "In your opinion, female football in Romania is given proper attention?" A number of 12 coaches responded no, 2 chose the answer "do not know", and only one considered that in our country, women's football is given due consideration (Chart 1). These responses demonstrate the fact, today's reality, a reality that coaches who want to do something in this direction, often clash: in Romania, women's football is still one of the sports marginalized with little cachet.

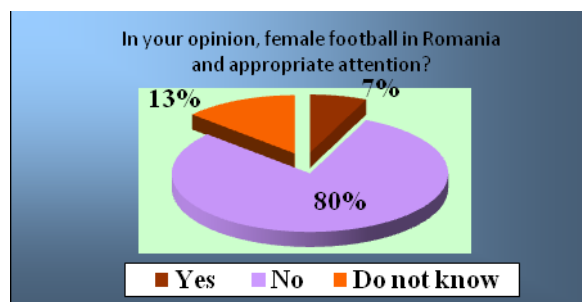


Chart 1

Question No. 2, "Do you think that age 11 is appropriate to begin selection for women's football?", 8 of those surveyed felt that this age is right, 5 is not supported, and two said they do not know (Chart 2).

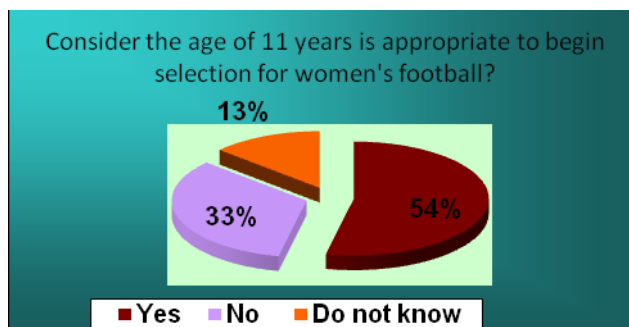


Chart 2

Responses to this question show that most coaches surveyed (54%) believes that in 11 years, girls can cope successfully requests that involves playing football.

To question. 3, "What, in your opinion, a major impediment in attracting girls to practice the game of football?", 5 coaches responded "poor coverage of the game", 4 chose "misconception parents about what women football" player "hardness football game" and "lack of interest in financially supporting sponsors soccer teams female" were chosen by two coaches and one said to the "poor material bases" and "others", the latter answered "inability parents to help girls from the point of view "(graph no. 3).

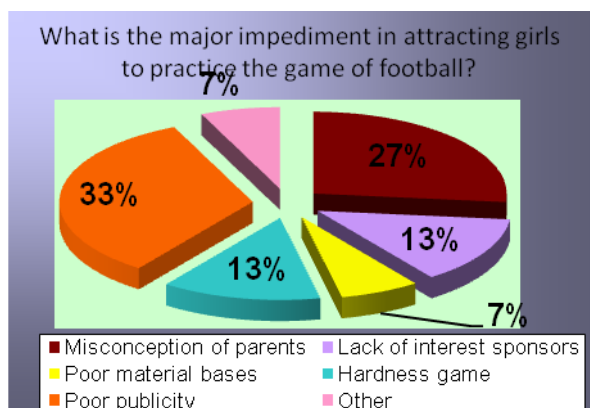


Chart 3

Analysis of answers to this question shows that the first two positions, in the opinion of the coaches surveyed found poor coverage of women's football game (response according to the first question) and parents misconception about what women's football. Basically, the two (the concept erroneous parents) is a result of the first (poor media coverage of women's football).

To question. 4, "What are the most important measures that should be applied for that girls who choose to turn to the sport do not stop training after a few weeks?" Coaches surveyed chose the following responses: 7 - selection based on scientific, actual results obtained from the tests and trials, 7 - training modern methods, 1 - system of rewards and sanctions (graph no. 4). None of

those questioned expressed different opinions on this issue.

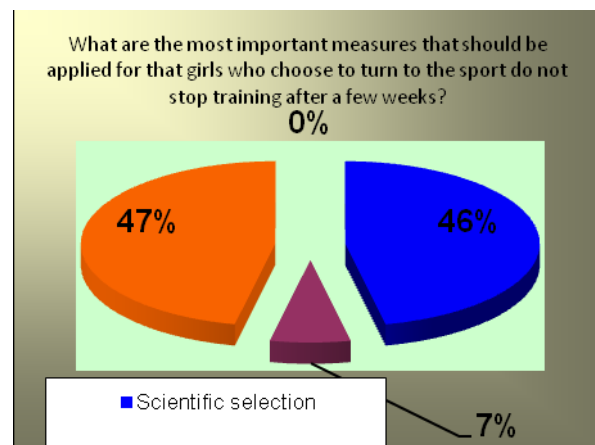


Chart 4

Question No. 5, "What is the development of female football in Romania compared to Western countries?", 12 football coaches have found that the women in Romania is lower than in Western countries, and 3 that it is at the same level. None of those interviewed felt that the female football in Romania would be better than the first Western countries.

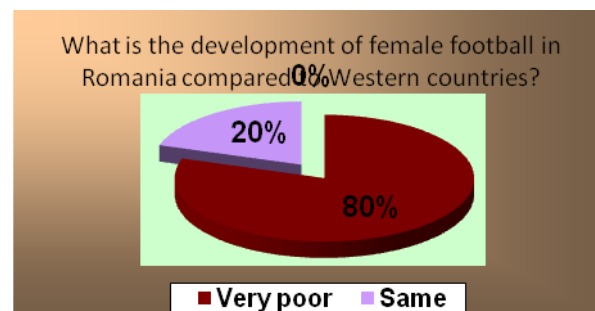


Chart 5

Question No. 6, "What are the appropriate tests or methods of testing that we manage the selection jucătoarelor football?", 5 chose bilateral game, four running speed 30 m, 3 to maintain the balloon, and two expansion one considered the most relevant would be a circuit in which the focus on management, acquisition and shot on the run.



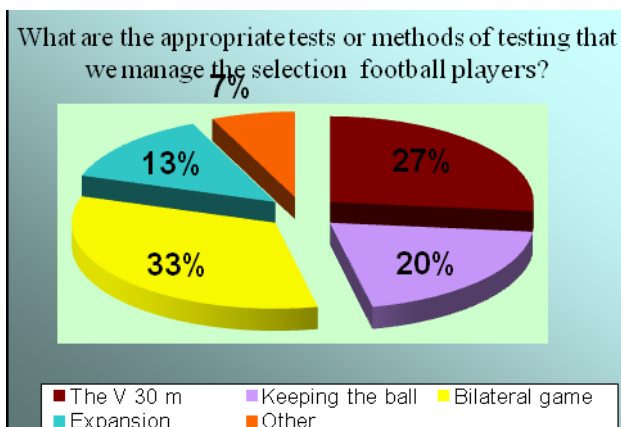


Chart 6

Analysis of these responses shows that coaches in charge of women's football have a clear vision on what scientific selection. Besides the one who noticed the need for multiple procedures followed in making the selection, others were content to choose one as driving or technique. Although most have opted for "bilateral game" as a means of selection, it is hard to believe that in 11 years and at a first meeting with the girls, those coaches will be able to select the best items. We believe that application of certain tests to guide coaches and those requiring more skills and motor skills is not only necessary but useful.

At question 7, "What, in your opinion the most important component of athletic training at this level (debuted in football)?" Six of the coaches surveyed said technical training, 5 - physical training, 2 theoretical and one tactical and psychological preparation (graph no. 7).

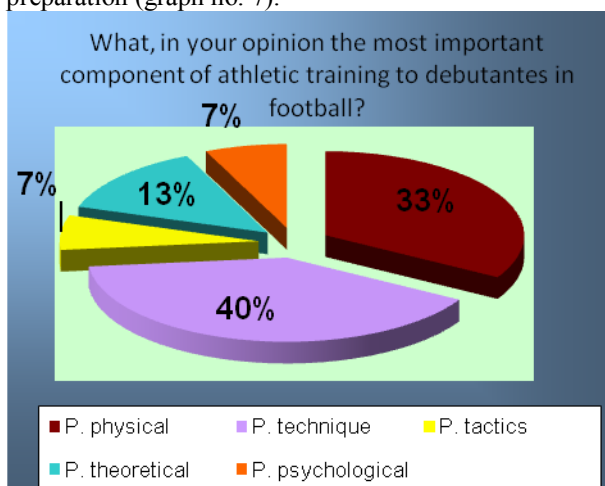


Chart 7

Responses coaches are consistent with data from the literature, which at this age, focus on technical training followed closely by the physical.

To question. 8, "Do you think you need to prepare a unitary player newcomers?", 11 answered "Yes", 2 have chosen "No" and all two said "I do not know" (graph no. 8).

Do you think you need to prepare a unitary football newcomers?

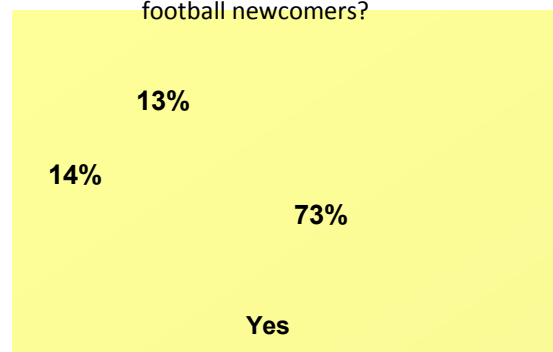


Chart 8

So, most coaches Whereas a training unit as shown in training player even newcomers.

To question. 9, "What in your opinion, specific motor skills that require attention at this age?", 5 speed chosen coordinate X, 4 X force opted for speed, three specific speed and one for the other - flexibility, and endurance specific force X speed (graph no. 9).

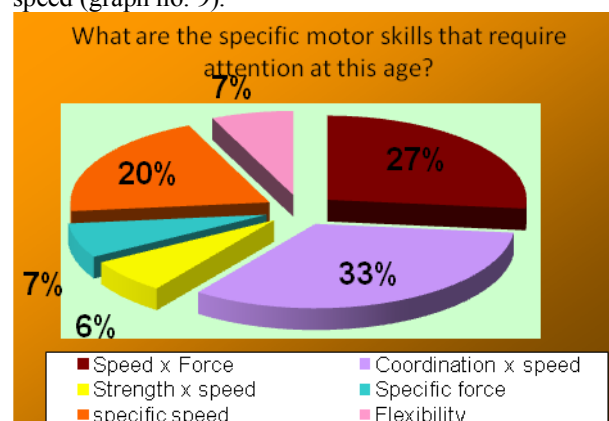


Chart 9

So most of the coaches surveyed chose X coordinate speed, specific speed and strength X speed.

To question. 10 "Which of the following procedures and special needs attention at age 10 -13 years?" Disposition chose one ball, five hit the ball, taking five balls, 2 the ball and two other deceptive movements (graph no. 10).

Most coaches considered paramount, hitting and taking the ball, basic techniques and very important in the subsequent purchase of other techniques.



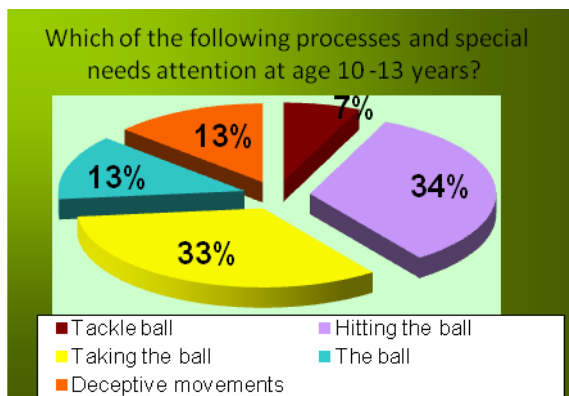


Chart 10

In question No. 11, "What training methods considered to be more effective in training debutantes in football?" Chose eight games of movement, 3 - method of individualization, 2 - analytical method and aqntrenamentul one circuit and the intervals (Chart11).

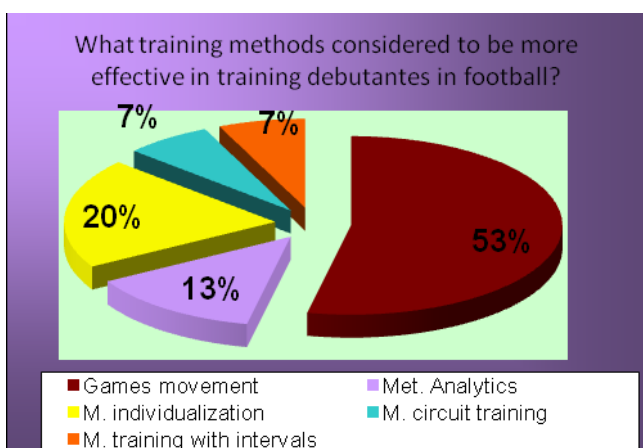


Chart 11

Notice that most coaches surveyed (53%) have opted for "free movement", which is in accordance with literature recommends working with beginners, using methods and means to keep children awake attention throughout the conduct of training. And at the same time be fun (to induce a state of good-humor) can be used for a long time without cause boredom among children and, of course, and achieve their goal - acquiring basic techniques the game of football.

Question No. 12, "How often evaluate the physical and technical preparation player woman team you work?" Coaches in number of 9 responded that they do so at the beginning and end of each period of training, 5 - at the beginning and end preparatory period, and one argued that this type of assessment performed after each training player woman training (graph No. 12).

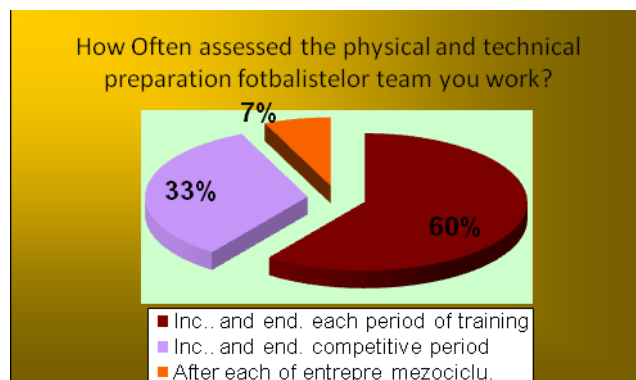


Chart 12

The analysis of answers to this question originates in the fact that most coaches are concerned with the assessment of the physical and technical aspects of their jucătoarelor and especially the frequency of these assessments is really satisfying - at the beginning and end of each preparation, which means at least four evaluations per year competitive.

Question No. 13, "In your opinion physical training plays an important role in preparing player newcomers?", 10 of those surveyed said yes, four said no, and one chose to answer "do not know" (Chart . 13).

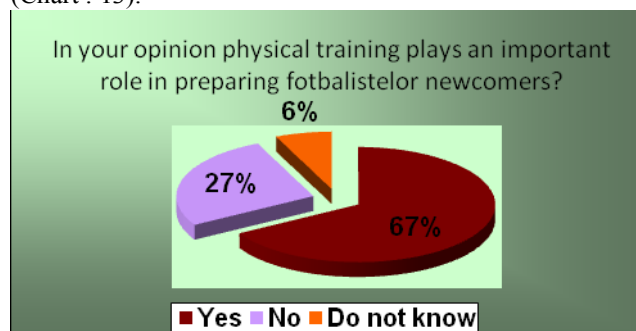


Chart 13

So, most coaches surveyed (66%) stated that the debutantes in football, physical training is one of the basic components of training.

The same question is found in the case of No. 14, on the importance of technical training in football debutantes. To this question 11 coaches said yes, 2 negative and 2 have chose to answer "do not know" (graph no. 14).

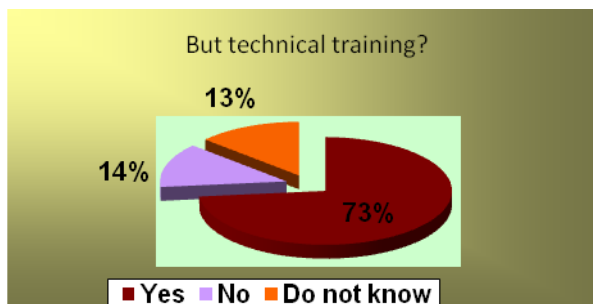


Chart 14

- Again, most coaches (74%) felt that the training debutantes in football, one of the most important components is executed. This is a natural one, in this period of apprenticeship, with a single technology foundation. An analysis of these questions such that the coaches we have a common view, namely the onset period in football - be they girls or boys - is characterized by a great high percentage of training in which technical components and physics plays an essential.

No questions. 3:16 p.m. respondents wanted to characterize subjects in terms of work experience. Thus they qualify as professional experience in the following categories:

- between 0-5 years - 2 subjects (13%);
- between 5 to 10 years - 4 subjects (27%);
- between 10 to 15 years - two subjects (13%);
- between 20 to 25 years - two subjects (13%);
- over 25 years - a topic (7%) (chart no.15).

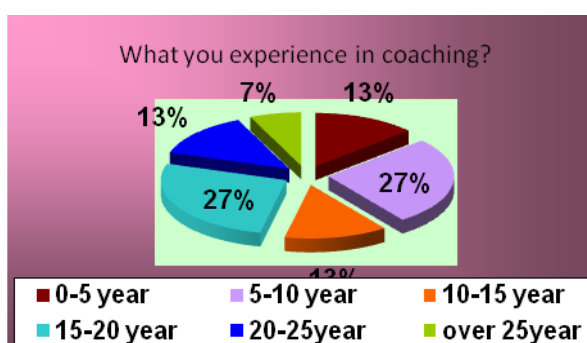
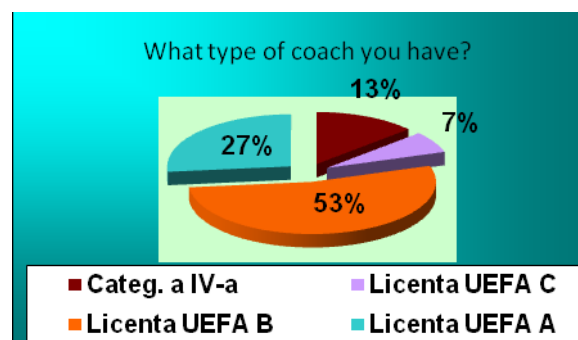


Chart 15

Analysis of question No. 16, "What type of coach you have?" Shows that the female football, coaches have the specialization necessary to lead

educational process, so 8 of those questioned UEFA B license, 4 - UEFA A license, 2 - UEFA C license, and only one of them is the coaching book category IV (graph no. 16). As can be noted none of them have book sports instructor, but all specific specialized courses for working with children and juniors. In addition, all were certified to participate in training courses organized by FIFA women's football coaches.



Graficul nr. 16

#### Conclusions

After analyzing the responses to the questionnaire were applied to the following conclusions:

- main component of training at this level is the technical training followed by the physical;
- training methods preferred by coaches at this age are moving games (relay circuits with different technical elements, etc.);
- assessing the physical and technical player woman frequency is satisfactory - the beginning and end of each preparation;
- most important measures that should be applied for that girls who choose to turn to football training does not stop after just a few weeks are science-based selection, the actual results obtained from the tests and trials and the application modern training methods and attractive.

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## ❖ PHYSICAL EDUCATION AND SPORT

### AN EXPLORATION OF CANDIDATE TEACHERS' SOCIAL SKILLS LEVELS: AGE, GENDER AND OTHER DIFFERENCES

AKPINAR SELAHATTİN<sup>1</sup>, VEYSEL TEMEL<sup>1</sup>, KAZIM NAS<sup>1</sup>

#### Abstract

The aim of this study is to search whether there are variables on social skills levels, gender, age, class, accommodation, receiving education credit or not, monthly income, educational status of each parents, sibling number, occupations of each parents, sport points of students and places where they spent most of their lives of students who studies at Karamanoğlu Mehmetbey University, Sport Teaching Department in Physical Training and Sport School.

142 student questionnaires were taken under review who study at Karamanoğlu Mehmetbey University, Physical Training and Sport School in 2011-2012 spring term so as to set forth social skills of students who attended the study. "Social skills inventory" which was improved by R.E. Riggio in 1986 and adopted to Turkish by Yüksel was carried out. The inventory is a Likert type scale which consists of 90 items that are marked as 1 to 5. On evaluating data statistically, SPSS programme for frequencies, T-test and one way analysis of variance; Anova for independent groups and Scheffe-F test for retaining variables were used.

On the consequence of study, it is comprehended that students who studies at Physical Training and Sport Teaching have social skills beyond a moderate level ( $\bar{X}=285,45$ ). It is found that while there is no meaningful difference on students' gender, accommodation, receiving education credit or not, educational status of father, sibling number, occupations of each parents, interest levels of sport and places where they spent most of their lives; there is a meaningful difference on social skill levels on their age, class, monthly income, education status of mother.

**Key Words:** social skills, student, university, physical education and sport.

#### Introduction

In these days, we live rapid changes and these changes affect social life. These developments reflect interpersonal communications in period of change. Human is a social existence just when s/he has relations with others. The skills of thinking and transferring thoughts to others are the basis of communal living. Interpersonal relations and the quality of these relations have important places in human life. This situation effects the relations of people with their environment. People tend to establish and improve relations with their environment.

Thus, people are in relation and interaction with surroundings. Establishing healthy relations in this interaction process can only be possible by gaining enough social skills. Gained social skills have important roles on emotional, social and behavioral coherence on human relations. These elements offer an opinion on human relations namely social relations (S. Adsız, 1986).

In order to establish successful and satisfying relations, people should acquire good communication skills (C. Özcep, 2007). Skills such as having social skills, performing different social roles and effective communication lead a positive social image on people (A. Bandura, 1977).

Person who has social skills on these areas are socially active and this situation causes raising social status and raises self confidence. One who has social skills is reliable on social relations for, these people put their social status on internal reasons rather than external ones (R.E. Riggio et al., 1991). The researches about social skills and abilities started with the study of defining and measuring social intelligence by Thorndike in 1920s (G. Yüksek, 1997).

The concept of social skills is "Social Skills" and the words origin is in English. There are many definitions about this concept (H. Bacanlı, 1999). M.L. Combs and D.A. Slaby (1997) defined social skills as the ability of forming interactions socially which are beneficial individually and at the same time beneficial for others principally and acceptable socially with others (M.L. Combs and D.A. Slaby, 1997).

Sergin states that social skills are the ability of contacting compatible and effective relations with other people (C. Sergin, 2001).

Social skills are behaviors that are getting social knowledge in between people, analyzing and reacting conveniently and vary in respect of target-driven and social context; and also involve both observable and non-observable cognitive and affective elements and are learnable behaviors (G. Yüksel, 2004).

<sup>1</sup> Physical Education And Sports High School, University of Karamanoglu Mehmetbey, Karaman, TURKEY  
E-mail: temelacademic@gmail.com

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Liberman, Mueser, Wallace, Jacobs, Eckman ve Massel (1986) referred that social skills comprise skills such as receiving social messages correctly, capacity of solving social problems and ability of sending messages; and defined that social skills are behaviors which are cognitive, verbal and non-verbal that are essential for living in a society and sufficient quality life (D.I. Altunoğlu, 1997).

R.E. Riggio (1986) defined social skills in six sub-dimensions (R.E. Riggio, 1986).

1.1. Emotional Expressivity: The emotional expressivity measures non-verbal communication skills of people especially emotional sending messages. Emotional expressionist person is lively and cheerful and can affect others with these skills. Example: "I often laugh loudly."

1- 2- Emotional Sensitivity: Emotional sensitivity is a skill which receiving and interpreting others' non-verbal communications. Emotionally sensitive people interpret others' emotional implications correctly and right. Example: "I am concerned with what makes people happy."

3- Emotional Control: Emotional control is a skill which is for organizing and controlling people's emotional and non-verbal reactions. This also involves skills that combine principle senses with skills and conceal these senses under a mask. Example: "I can save my real senses from others."

4- Social Expressivity: Social expressivity is a skill which is verbal communication and communicating and attending socially with one another. Social expressivity person is outgoing and social and has an ability of initiating and orienting a chatting in any subject. Example: "I am the person who always initiates dialogues."

5- Social Sensitivity: Social sensitivity is the skill which interpreting others' verbal communications. Social sensitivity people care social norms while displaying social behaviors and are conscious of behaving conveniently. Example: "I am considerably affected by people who have somber aura around".

6- Social Control: Social control is a skill of playing social role and self-manifesting socially of person. Person who has developed social control behaves aptly in any social case and are self-confident and can easily settle on social cases. Example: "I am at ease with any kind of person."

### Material and method

A method which is for depictive scanning and relational scanning was used to reveal current situation in the study. The nature of the study consists of 213 students who study at Karamanoğlu Mehmetbey University, School of Physical Education and Sport at the department of Physical Education and Sport Teaching in spring term of 2011-2012 education year. The sample of the study was given to all students in the nature but 142 questionnaires were taken under review.

The Social Skills Inventory which was improved by Riggio in 1986 and adopted to Turkish by Yüksek (G. Yüksek, 1997) was carried out in the study. The Social Skills Inventory involves six sub-scales which measure two levels as emotional and social and "expressivity", "sensitivity" and "control" are evaluated with each level. Expressivity expresses the skills of persons' communicating each other, sensitivity is the skill of interpreting messages that are receives from others and control is the skill of organizing communication process on social occasions.

In the social skill inventory there are 90 questions and is measured by 1 to 5 Likert type. The each social skills inventory consists of 15 questions which have six sub-dimensions. These are emotional expressivity, emotional sensitivity, emotional control, social expressivity, social sensitivity and social control. The 1<sup>st</sup>, 3<sup>rd</sup>, 5<sup>th</sup>, 9<sup>th</sup>, 10<sup>th</sup>, 15<sup>th</sup>, 17<sup>th</sup>, 18<sup>th</sup>, 21<sup>st</sup>, 24<sup>th</sup>, 25<sup>th</sup>, 30<sup>th</sup>, 36<sup>th</sup>, 37<sup>th</sup>, 39<sup>th</sup>, 41<sup>st</sup>, 43<sup>rd</sup>, 48<sup>th</sup>, 49<sup>th</sup>, 54<sup>th</sup>, 56<sup>th</sup>, 60<sup>th</sup>, 64<sup>th</sup>, 66<sup>th</sup>, 67<sup>th</sup>, 69<sup>th</sup>, 72<sup>nd</sup>, 73<sup>rd</sup>, 76<sup>th</sup>, 81<sup>st</sup>, 84<sup>th</sup> and 85<sup>th</sup> questions in the inventory are the questions which are marked inversely. The least mark is 1 and the highest mark is 5 in the answer key. One can only get minimum 90 and maximum 450 points from the total skills inventory. In each sub-scales minimum 15 maximum 75 points can be taken (on the occasion of being 15 questions in each sub-scale). High mark means having high social skill levels and low marks means having low social skills levels (G. Yüksek, 1997). The statistical evaluations were analyzed with SPSS for Windows version 15,00 packet programme.

### Findings

Gathered information in this study, which was done to reveal the social skill levels of students who study at Physical Education and Sport Teaching, was interpreted thus. Participatory students' personal characteristics were determined on the primordium of the study.

According to this, the sex distribution of the participants is 59 (541,40) women and 83 (%58,50) men. The age distribution of the participants is 2 (%1,40) 17 years and under, 43 (%30,30) between 18 and 20 years, 57 (%40,10) between 21 and 23 years and 40 (%28,20) 24 years and over. The class distribution of the participants is 42 (%29,60) 1<sup>st</sup> year, 42 (%29,60) 2<sup>nd</sup> year, 32 (%22,50) 3<sup>rd</sup> year and 26 (%18,30) 4<sup>th</sup> year.

The accommodation distribution of the participants is 90 (%63,40) of them at student house, 19 (%13,40) of them at state dormitory, 19 (%13,40) of them at private dormitory and 14 (%9,80) of them at family stay. 82 (%57,70) students get education credit while 60 (%42,30) of them do not get education credit. The monthly income distribution of the participants is 30 (%21,20) between 0 and 250TL, 50 (%35,20)



between 251 and 500 TL, 29 (%20,40) between 501 and 750 TL and 33 (%23,20) 751 TL and over.

The mother education disturbition of the participants is 36 (%25,40) illiterate, 67 (%47,10) graduated from primary school, 22 (%15,50) graduated from secondary school and 17 (%12,00) graduated from high school. The father education disturbition of the participants is 11 (%7,70) illiterate, 44 (%31,00) graduated from primary school, 40 (%28,20) graduated from secondary school, 31 (%21,80) graduated from high school and 16 (%11,30) graduated from university. The sibling number disturbition of the participants is 1 (%0,70) singleton, 17 (%12,00) two siblings, 44 (%31,00) 3 siblings, 25 (%17,60) 4 siblings, 16 (%11,30) 5 siblings, 13 (%9,20) 6 siblings and 26 (%18,30) 7 siblings. The father occupation disturbition of the participants is 46 (%32,40)

retired, 24 (%16,90) officials, 18 (%12,70) worker, 13 (%9,20) tradesmen, 21 (%14,80) farmer and 20 (%14,10) self employment. The mother occupation disturbition of the participants is 7 (%4,90) retired, 1 (%0,70) officials, 2 (%1,40) tradeswomen and 132 (%93,00) housewives.

The sports position distribution of the participants is 24 (%16,90) patricipated in international competitions, 47 (%33,10) participated in national competitions, 62'i (%43,70) do sport without going in competitions and 9 (%6,30) spectator or supporter. The places where they spent most of their lives distribution of the participants is 87 (%61,30) city center, 34 (%23,90) district center, 8 (%5,60) town and 13 (%9,20) village. Students' social skills were tied to be determined in the second stage of the search. As for that;

**Table1: The general results of sub-dimentionions of social skills and total scores of participators**

Sub-dimentionions of Social Skills	n	$\bar{X}$	Ss	Min	Max	The highest and the lowest points that can be taken in the inventory
Emotional Expressivity	142	44,20	5,99	29	61	15 - 75
Emotional Sensitivity	142	50,34	8,75	28	71	15 - 75
Emotional Control	142	44,04	7,88	25	66	15 - 75
Social Expressivity	142	46,86	10,59	21	71	15 - 75
Social Sensitivity	142	46,45	7,28	31	64	15 - 75
Social Control	142	53,53	8,52	26	71	15 - 75
Total Score	142	285,45	28,57	202	358	90 - 450

Social skills sub-dimentionions of participant students and the mean of total social skills scores are analyzed in Table 1. At the end of this analysis it is seen that the emotional expressivity sub-dimension is  $\bar{X} = 44,20$ , the emotional sensitivity s

ub-dimension is  $\bar{X} = 50,34$ , the emotional control sub-dimension is  $\bar{X} = 44,04$ , the social expressivity sub-dimension is  $\bar{X} = 46,86$ , the social sensitivity sub-dimension is  $\bar{X} = 46,45$ , the social control sub-dimension is  $\bar{X} = 53,53$  and the total social skill has  $\bar{X} = 285,45$  mean score.

When  $\bar{X} = 285,45$  total score of social skills inventory of participated student and the max and the min values (Min 90-Max.450) that can be taken from the inventory are considered it can be said that students have middle level of social skills. When the min and max levels of sub-dimensiontions (Min15-Max.75) of the inventory are considered, because the means of scores which were taken from students' social skills sub-dimensiontions differs from  $\bar{X} = 44,20$  and  $\bar{X} = 53,53$ , it can be said that they have social skills over the middle level in terms of social skills sub-dimensiontions.

**Table 2: The social skills inventory sub-dimentionions according to participants' monthly income levels and total f-test results**

	Monthly Income	n	$\bar{X}$	Ss	Sd	F	p-Rate
<b>Sub-Dimensions of Social Skills</b>							
Emotional Expressivity	Between 0 and 250 TL	30	42,63	6,32	3,138	1,530	0,210
	Between 251 and 500 TL	50	43,92	5,98			
	Between 501 and 750 TL	29	45,86	5,52			
	More than 751 TL	33	44,60	5,95			
Emotional Sensitivity	Between 0 and 250 TL	30	46,40	9,19	3,138	2,824	0,041
	Between 251 and 500 TL	50	51,78	8,75			
	Between 501 and 750 TL	29	50,48	8,24			
	More than 751 TL	33	51,63	8,04			
Emotional Control	Between 0 and 250 TL	30	42,90	7,24	3,138	1,281	0,283
	Between 251 and 500 TL	50	42,94	7,26			
	Between 501 and 750 TL	29	45,17	9,28			
	More than 751 TL	33	45,78	7,91			
Social Expressivity	Between 0 and 250 TL	30	43,16	9,48	3,138	3,322	0,022
	Between 251 and 500 TL	50	46,40	10,40			
	Between 501 and 750 TL	29	46,48	11,64			
	More than 751 TL	33	51,27	9,70			
Social Sensitivity	Between 0 and 250 TL	30	46,16	8,54	3,138	1,557	0,203
	Between 251 and 500 TL	50	47,06	7,59			
	Between 501 and 750 TL	29	44,10	4,59			
	More than 751 TL	33	47,84	7,31			
Social Control	Between 0 and 250 TL	30	51,20	8,55	3,138	4,129	0,008
	Between 251 and 500 TL	50	52,52	8,73			
	Between 501 and 750 TL	29	58,17	7,13			
	More than 751 TL	33	53,12	8,14			
Total Score	Between 0 and 250 TL	30	272,46	28,57	3,138	3,591	0,015
	Between 251 and 500 TL	50	284,62	28,46			
	Between 501 and 750 TL	29	290,27	28,66			
	More than 751 TL	33	294,27	25,23			

Social skills sub-dimensions of participant students and the mean of total social skills scores according to participants' monthly income level variables are analyzed in Table 2. When participants monthly income level varieties of social skills are analyzed it is seen that social skills scores are between  $\bar{X} = 272,46$  and  $\bar{X} = 294,27$  and when considered the value that can be taken from inventory (Min 90-MAX450) it is seen that participants are at the middle and over level of their social skills.

A meaningful difference was found statistically in terms of emotional sensitivity, social expressivity, social control and social skills' total scores according to participants' monthly income levels. Under these circumstances it is understood that participants whose economic conditions are better have high level of social skills than those who aren't. In this study it is stated

that monthly income level affects social skills level.

A meaningful difference was found in terms of social expressivity and social skills total score statistically when analysed the social skills inventory sub-dimensions and social skills total score according to participants' age variable. According to this, students' social expressivity levels of 21-23 age group students is  $\bar{X} = 49,35$ , the social expressivity score of 24 age and over students is  $\bar{X} = 46,92$ , the social expressivity levels of 18-20 age group students is  $\bar{X} = 44,58$  and the social expressivity levels of 17 age and under students is  $\bar{X} = 24,00$ . When analysed the scoring related to social skills inventory total scores, likewise social expressivity, social skills level rises with age. It is seen that social skills level

risers with age. It can be said that education raises social skills level.

It is found that there is a meaningful difference on emotional sensitivity when considered social skills according to class variable. It is found that students' emotional sensitivity level is  $\bar{X} = 53,34$  who are at the 4<sup>th</sup> class,  $\bar{X} = 52,06$  who are at the 3<sup>rd</sup> class,  $\bar{X} = 49,35$  who are at the 2<sup>nd</sup> class and  $\bar{X} = 48,16$  who are at the 1<sup>st</sup> class. It can be said that the more grade level the more social skills level.

It is found that there is a meaningful difference when analyzed social skills according to participants' mother education variable. It is found that the social sensitivity score of participants' mother who are graduated from high school is  $\bar{X} = 50,05$ , the social sensitivity score of participants' mother who are graduated from secondary school is  $\bar{X} = 47,63$ , the social sensitivity score of participants' mother who are graduated from primary school is  $\bar{X} = 44,77$  and the social sensitivity score of participants' mother is illiterate is  $\bar{X} = 42,77$ . It is seen that mother education level effects social skills level and children of persons with high education level have higher level of social skill than others.

Meaningful differences were found statistically on participants' gender, accommodations, receiving education credit, father education level, sibling numbers, mother occupation, father occupation sport interest levels and places where they live.

### Discussions and conclusions

This study was done with the aim of determining the students' social skills levels and whether they change or not for personal specialties who study at the department of Physical Education and Sport Teaching.

It is understood that students are over the middle level when looked at social skills inventory total score and total score values that can be taken. At the same time, when considered the maximum and the minimum score that can be taken from social skills inventory sub-dimensions, students are over middle level on all sub-dimensions.

On this study it is found that whether there is not a meaningful difference on participants' gender, accommodations, receiving education credit or not, father education level, sibling numbers, mother occupation, father occupation sport interest levels and places where they live; there is a meaningful difference on age, class, monthly income facts and mother education levels on social skill levels.

On the study which is for determining "social skills level of students who are at the department of physical education and sport" that was done by Z. Avşar and K.F. Öztürk (2007); it is found that students' social skills level was found mid level

who study at Uludağ University, Education Faculty, Physical Education and Sport Department (Z. Avşar, K.F. Öztürk 2007). On another study named "Determining social skills level of Education Faculty students" done by M. Sağlan and others (2005); students' social skills level was found as mid level (M. Sağlan and others). Yet another study named "Examining social skills level of university students in terms of some variables" done by M.E. Deniz (2003); students' social skills level was found as mid level (M.E. Deniz, 2003). On a study of Özcepe, in the year 2007, on the subject of "A comparison of social skills level of physical education and class teachers working at primary school in terms of several variables" it is come out that while emotional expressivity, emotional sensitivity, social expressivity and total differ in accordance with branch variable of physical education and class teacher social skills, emotional control, emotional sensitivity and social control do not differ (C. Özcepe, 2007). On the study of analyzing deciding styles, social skills levels and forms of coping with stress of students who are at physical education and sport vocational school by Çetin (2009) in terms of some variables; students' social skills level was set as mid level (C.M. Çetin, 2009). The five studies above show parallelism with this study aimed to set forth the students' social skills level.

In a research, done by Huprich (2004), named "Interpersonal social skills level of individuals in the relationship between the degree of commitment and to determine the risk of depression" it is determined that the risk of addiction and depression rise and social skills level decreases (S.K. Huprich, 2004).

In an other study, done by Eliot and his friends (2001), they examined "the effects of social skills on education and its effects on motivation of learners especially on learning atmosphere" and they concluded that there are important relations between social skills, academic success and social support and the relationship between these three factors should be taken into account on studies done for primary and high school students (H. Eliot and others, 2001).

On Sergin's study (2001) named "Relations between university students' social skills and negative life events" it is concluded that there is a relation between social skills and negative life events and individuals who have low level of social skills live more negative life events (C. Sergin, 2001). On Banju's study (2004) named "An analysis of social skills of students who attend physical education class at secondary school in terms of gender, class and orientation", it is found that male students have more self-confidence than female students and female students can maintain friendships more than male students (S. Banju, 2004).

As a result, it is understood that students' social skills inventory total score mean is over mid level considering total score values that can be taken. At

the same time, considering the maximum and minimum social skills inventory sub-dimension scores that can be taken students are over mid level on all sub-dimensions.

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## THE STUDENTS' INTEREST IN INTRODUCING PHYSICAL EDUCATION CLASSES AT FACULTIES

MITIĆ DUŠAN<sup>1</sup>, STOJILJKOVIĆ STANIMIR<sup>1</sup>, PANTELIC SAŠA<sup>2</sup>, ČOKORILLO NEBOJŠA<sup>3</sup>

### Abstract

**Introduction.** In the period from 1963 to 1998 regular PE classes were organized for all first year students at the universities in Serbia. At the University of Belgrade, non-swimmers attended compulsory swimming lesson, while the swimmers were given a choice of other activities such as skating, exercises accompanied with music, sports games, etc. The compulsory part of the course implied the weeks of preparation for cross country race and its realization and all students participated in it. We wanted to examine whether the students' would be interested in attending PE classes as an optional course.

**Methods.** A survey method was applied, i.e., we made the transversal cross section of the students' attitudes and interests. Basic research technique was the survey carried out by the means of a standardized *cloze-type questionnaire*. The research was performed in May and November 2010, on the sample of 2160 students from Belgrade, plus 300 students from Novi Sad and 300 students from Niš. The average students' age in this study was 21.5.

**Results.** Belgrade university students were mostly interested in swimming (51.33%), then in basketball (48, 00%), mountaineering (40.00%), fitness (36.33%), volleyball (36%), etc. The students at the University of Novi Sad

<sup>1</sup>Faculty of Sport and Physical Education University of Belgrade, SERBIA

<sup>2</sup>Faculty of Sport and Physical Education University of Nis, SERBIA

<sup>3</sup>Faculty of Sport and Physical Education University of Novi Sad, SERBIA

E-mail: dusan.mitic@fsfv.bg.ac.rs

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showed interest in almost the same sports and recreational activities. These students showed the greatest interest in swimming (44.21%), followed by volleyball (33.84%), basketball (27.04%), fitness (19.72%) etc. The students at the University of Niš also displayed the greatest interest in swimming (36.30%). About 42.5% of the respondents exercise at least once a week. It can be noticed that the frequency of doing physical exercises decreases with age. Over 56% of students exercise at least once a week, whereas this percentage reduces to 40% among the employed and among the retired it reduces to about 32%. On the basis of the obtained data it may be stated that a great number of students do not meet the minimum criterion of the weekly exercise frequency which should be at least three times a week.

**Conclusion.** On the basis of the data obtained from the survey carried out on the sample of students at the universities of Belgrade, Novi Sad and Niš, we can conclude that the students at all three universities are largely interested in having organized regular PE classes at their universities. The survey confirmed that there is a variety of interests in particular sport-recreational activities among the students at different universities.

**Key words:** Physical Education, Recreation, Students' Interest in Physical Education.

### Introduction

Starting a faculty represents a significant change in lifestyle and qualitative organization of the way of studying. Attending faculty lectures does not have such a level of obligation as during high school, there is no homework which has to be done every day and there is no constant pressure due to knowledge testing. Those young people who come to a different place to study are seemingly free, without constant parental care and they feel that they are the masters of their free time and life organization. Adolescents who still have no stable working habits and search for their own identity gladly get involved in experimenting in the domain of social behavior and searching for self-assurance. For the greatest number of students studying at faculty means examining problems and searching for the secrets of the profession which is their vocation. They find practical lessons, seminar papers, public discussions and debates as a valuable source of necessary knowledge.

From 1963 to 1998 lessons of physical education were regularly organized for all first year students at the universities in Serbia. Swimming was compulsory at the University of Belgrade and swimmers were given the option to choose among other activities such as ice-skating, exercising with music, sports games and others. The compulsory part of the programme included cross-country races which

took several weeks to prepare. Our aim was to examine students' interest in organizing the lessons of physical education as an optional subject.

The research was done in May and November 2010 on the sample which included 2160 students from Belgrade and Serbia + 300 students from Novi Sad + 300 students from Niš.

According to the data obtained by conducting the survey on the students of all three universities, it can be concluded that a great number of them are interested in organizing regular lessons of physical education at their faculties. The students

belonging to the University of Novi Sad showed the greatest interest in those lessons (48.33%). The students belonging to the University of Belgrade showed somewhat lower interest (47.13%), while the interest of the students belonging to the University of Niš was the lowest (41.00%). About 1/3 of the students belonging to all three universities would introduce the lessons of physical education partially (Beograd 30.79%; Novi Sad 33.67%; Niš 38.67%), while about 1/5 of the students do not agree with this. The obtained results are in accordance with the results of other researchers. In the research done by Širić, Blažević and Vladović (2009), 53.1% of the respondents said that the lessons of physical education at their faculties should be compulsory since they felt that students are not involved in doing physical exercises enough. The researchers claim that possible reasons for insufficient exercising possibly lie in the financial situation, the fact that the students are not informed enough about the types of sports and recreational activities, too many obligations they have at their faculties, or simply their indifference to exercising. It is interesting that the part of the students who at least sometimes do physical or recreational activities want to have some kind of organized programme, probably due to the fact that space and sports equipment are ensured that way.

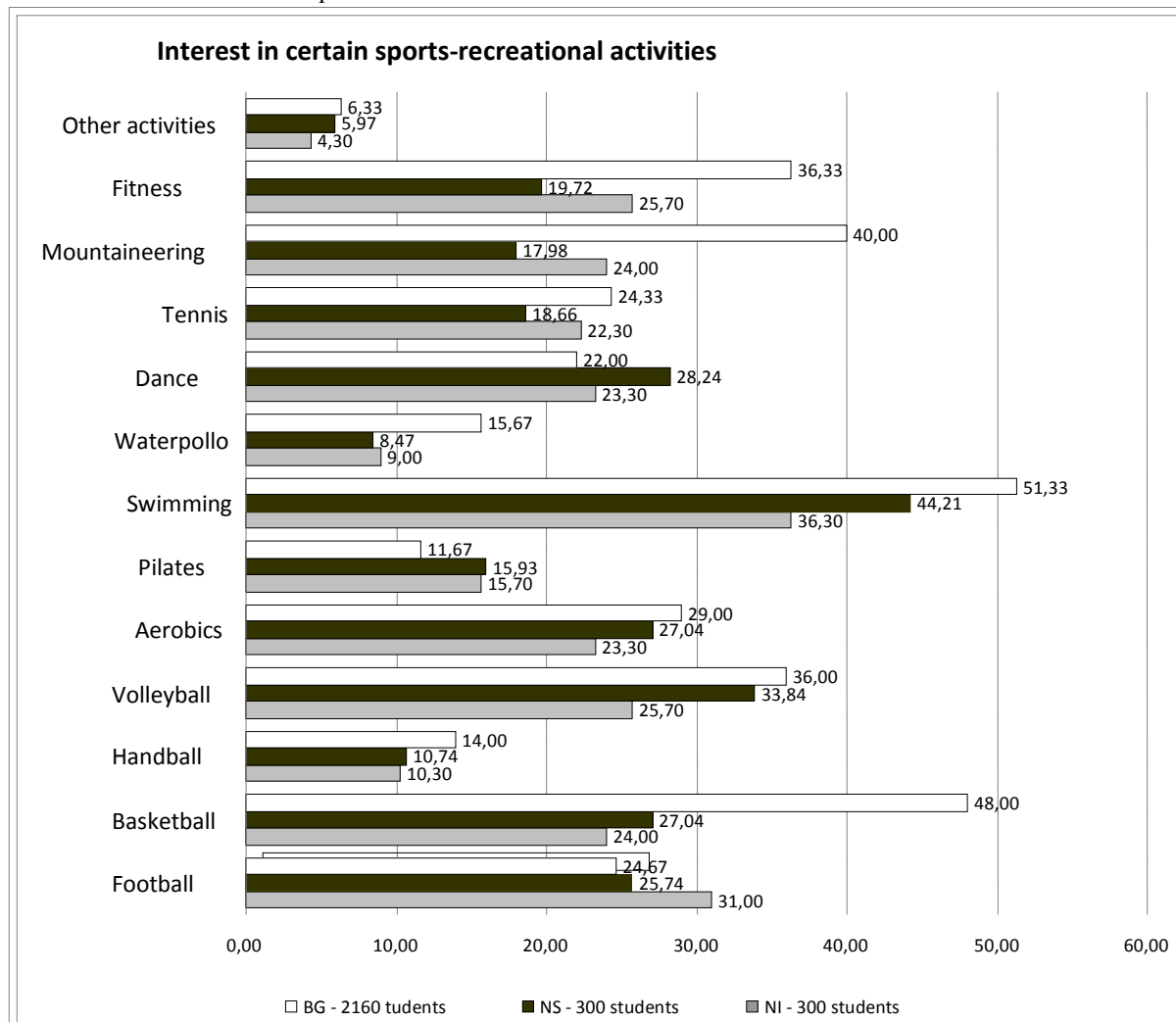
### Methods

A survey method was applied, i.e., we made the transversal cross section of the students' attitudes and interests. Basic research technique was the survey carried out by the means of a standardized *cloze-type questionnaire*. The research was performed in May and November 2010, on the sample of 2160 students from Belgrade, plus 300 students from Novi Sad and 300 students from Niš. The average students' age in this study was 21.5.

### Results

Table 1. Interest in different sports activities

The activities which students most often



The survey confirmed that there is a difference between the degrees of interests showed for certain sports-recreational activities among the students from different universities. The students belonging to the University of Belgrade are most interested in swimming (51.33%), followed by basketball (48%), mountaineering (40.00%), fitness (36.33%), volleyball (36%) etc. Students from the University of Novi Sad showed almost the same interests: swimming (4.21%), volleyball (33.84%), basketball (27.04%), fitness (19.72%) etc. The greatest interest in swimming was also showed by the students from the University of Niš (36.30%). Taking other sports-recreational activities into account, they are mostly interested in football (31%) and fitness (25.70%), followed by other sports. Students from the University of Belgrade showed the slightest interest for Pilates (11.67%), while water-polo is the least interesting for the students belonging to the universities of Novi Sad and Niš (8.47% and 9.00%, respectively).

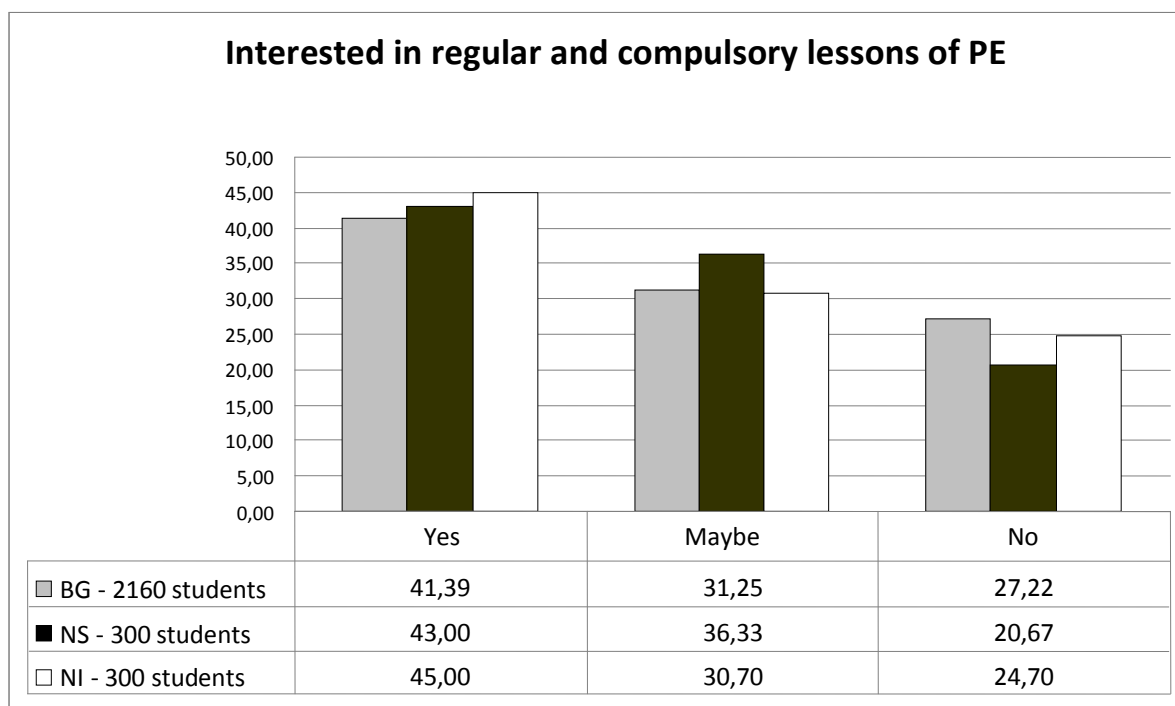
chose in other research are: aerobics (6.03%), exercises with free weights (5.02%), running (3.26%), dancing structures (2.26%), cycling (1.75%) and Pilates (1.75%) (S. Ćurković, I. Bagarić, O. I. Straža and Š. Šuker, 2009).

The results obtained this way most probably are the consequence of current financial-technical and spatial conditions under which the choice of sports-recreational activities is made.

According to the results obtained by conducting survey on the students from all three universities, it can be concluded that the students belonging to all of the above mentioned universities want to have organized and compulsory sports activities. Possible reasons for this lie in the fact that students first of all want to improve their health and physical appearance (V. Širić, S.I. Blažević and Z. Vladović, 2009).

Table 2. The level of interest in introducing compulsory physical education at faculties

In the research done by V. Širić, S.I. Blažević and Z. Vladović (2009) similar results were



The greatest interest in compulsory physical education was showed by the students of the University of Niš (45%), but the results showed that the students from other two universities are also interested in implementation of the lessons of physical education in the curricula at their faculties (41.339% students from Belgrade and 43.00% students from Novi Sad). 1/3 of the examined students from all three universities partially agree that physical education should be implemented as compulsory, which is shown in the table 2.

Table 3. Sports activities as an optional subject

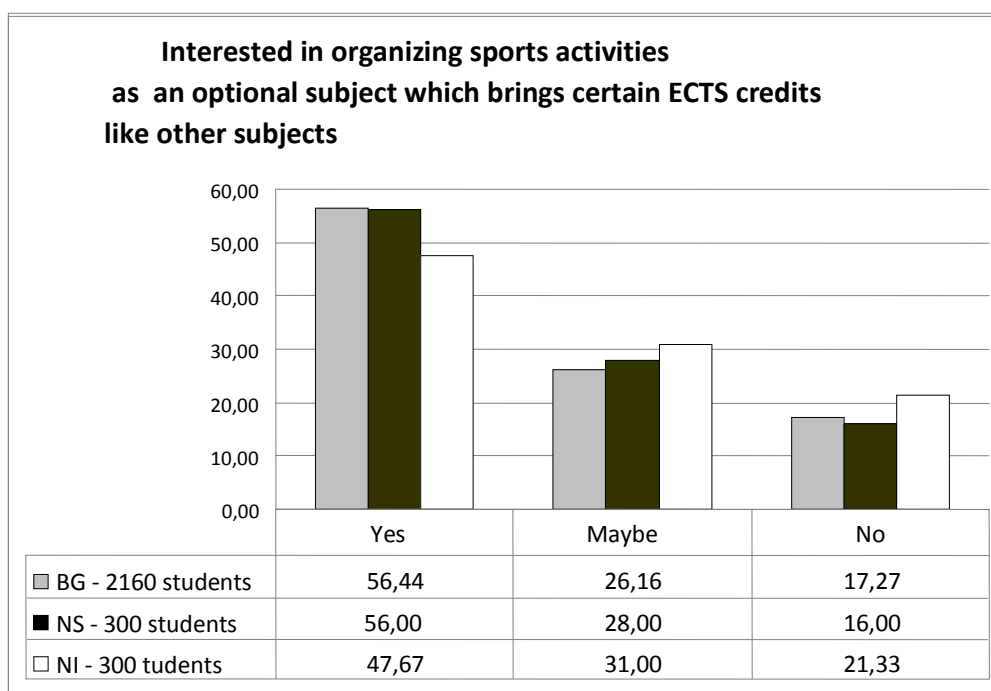
obtained. The authors state that 53.1% of the examined students claim that the lessons of physical education should be introduced as compulsory at faculties.

The data obtained by conducting a survey showed that almost half of the respondents from all three universities think that it is necessary to organize sports activities as an optional subject which would bring them certain ECTS credits.

The students from the universities of Belgrade and Novi Sad showed the greatest interest in the implementation of physical education as an optional subject (56.44% and 56.00%), while the

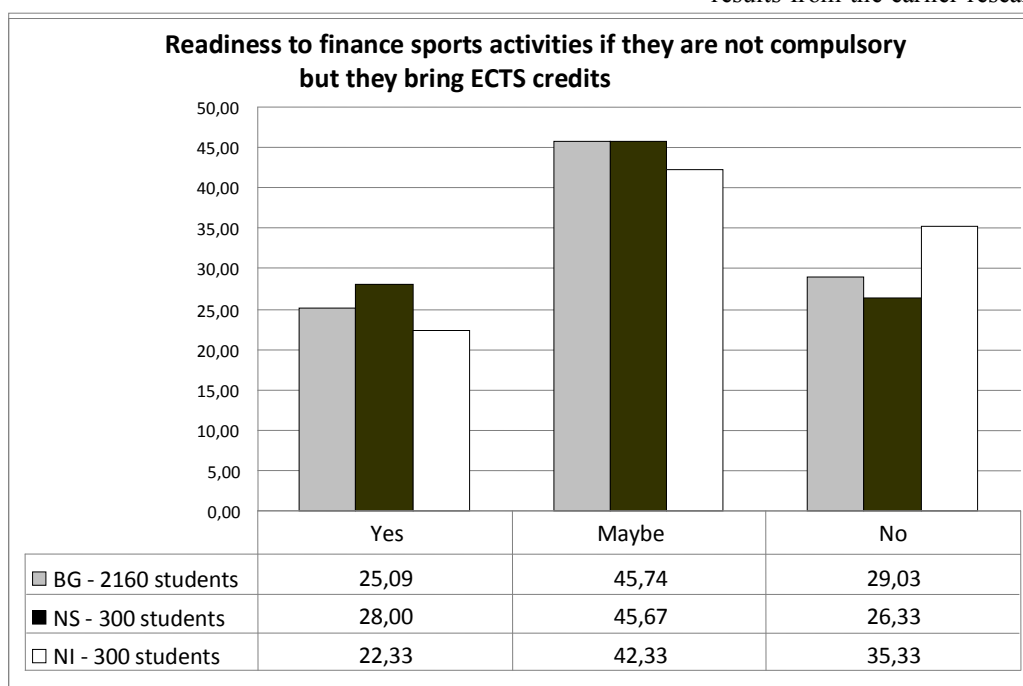
students from the University of Niš showed somewhat smaller interest (47.67%).

Similar data, but in somewhat lower values were also obtained for the students who partially agree that it is necessary to organize sports activities at faculties as an optional subject. The greatest number of these students come from the University of Niš (31.00%), while the percentage of the



students from other two universities is somewhat lower (Belgrade 26.16% and Novi Sad 28%). However, there is a certain number of students who do not support the implementation of sports activities at faculties as an optional subject. The greatest lack of support is showed by the students from the University of Niš (21.33%), followed by the students of the University of Belgrade (17.27%) and Novi Sad (16%).

Table 4. Readiness to finance sports activities if they are not compulsory.



According to the results obtained by conducting the survey on the students from the universities of Belgrade, Novi Sad and Niš it can be concluded that the greatest number of the students from all three universities are partially ready to finance sports activities if they are not compulsory, but they bring certain ECTS credits. Almost half of the respondents said that they might finance such participation in sports activities. Similar attitude was expressed by the students of the universities in Novi Sad and Belgrade (45.67% and 45.74%, respectively), while the students from the University of Niš showed somewhat different opinion (42.33%). The fact that almost 1/3 of the respondents are not ready to partially finance sports activities unless they are compulsory should be observed with concern. The greatest percentage of the students who share this opinion come from the University of Niš (35.33%); a little bit fewer students come from the University of Belgrade (29.03%), while the smallest number of them come from the University of Novi Sad (26.33%).

In other studies (A. Daskapan, E. Handan, T. Eker & L. Eker, 2006) it was established what prevents students from doing physical exercises. The

results of the survey showed that the most frequent objective obstacles students encounter are the lack of time due to their obligations at faculties, the fact that parents pay more attention to their academic success than physical exercises and the lack of time due to their family and social obligations. The most frequent inner obstacles are the lack of energy and their incapability to do exercises.

The average age of the students who took part in this project was 21.5 years.

Students' free time on average is 4.1 hour. The obtained results are in accordance with the results from the earlier research. Buntić (2006) made

an estimation of students' physical activities in the structure of free time, with the purpose of finding out how much free time they spend on sports activities, which sports activities they prefer and whether that choice of spending free time and the faculties they attend affect the perception of their subjective shape and health. The results of the survey indicated significant

differences between

male and female population. Female students had worse results since they spend most of their free time studying and have no habit of doing physical activities.

About 42.5% of the respondents do some kind of physical exercises at least once a week (table 9). It can also be noticed that the frequency of doing physical exercises decreases with the age. Over 56% of students do physical exercises at least once a week, while this percentage decreases to 40% for the employed, and for the pensioners it is about 32%. We repeat that the World Health Organization prescribes doing exercises at least three times a week, and our sample contained far less students who behave in accordance with that recommendation. In the first place we must mention the students who exercise 3-4 times a week (a little bit over one quarter of them), while in the case of the employed and retired the percentage decreases to 16 and 14, respectively. We believe that the results obtained in our research reflect the general state in the population of Serbia. The results once again indicate an unsatisfactory, we could say even very serious, situation, as well as the necessity to take serious measures directed at

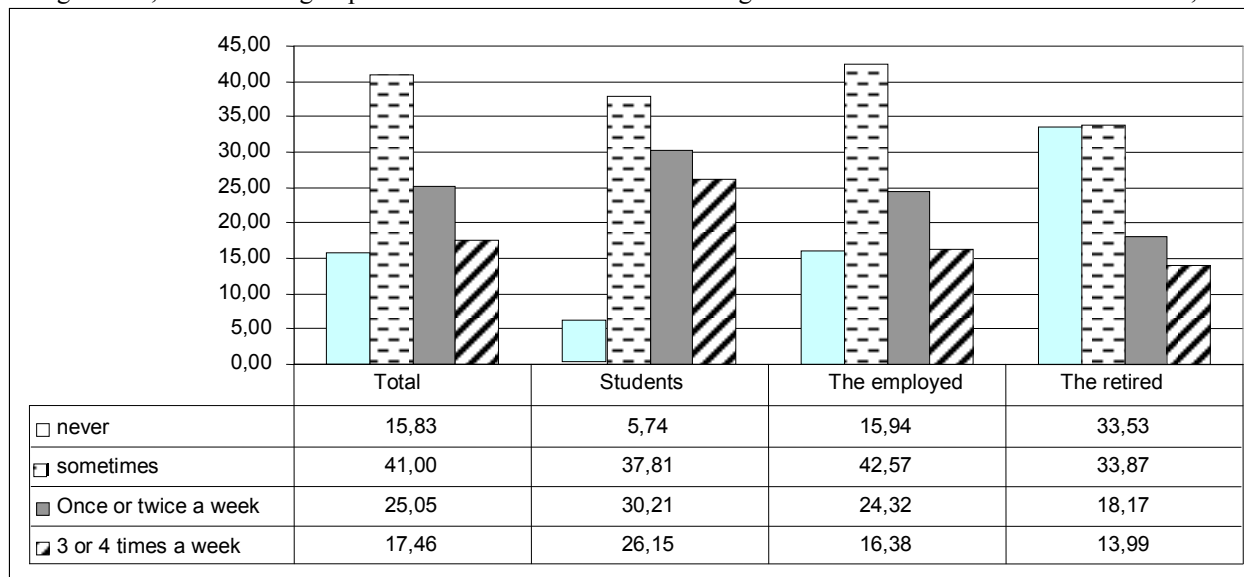


increasing the number of people who exercise covering all age groups.

The data from the survey show that the greatest number of students occasionally do sports-recreational activities (37.81%), or once or twice a week (30.21%), which is insufficient for staying healthy and in good shape. Only about  $\frac{1}{4}$  of the respondents do exercises regularly (26.15%), while there are also those who never take part in any physical activities (5.74%).

Other researchers obtained similar results. Buntić (2002) claims that the frequency of doing exercises 2-3 times a week was notified in 59.83% in the case of male students, while the percentage is higher for female students (63.47%) who have done some kind of physical activity once a week in the past six months to one year. A. Daskapan, E. Handan, T. Eker & L. Eker (2006) did research which showed that out of 303 respondents (222 female students and 81 male students) there were 174 female and 36 male students who were physically inactive. The research done by other authors also indicate a rising physical inactivity in the population of students (A. Vuillemin *et al.*, 2005., M. Fogelholm *et al.*, 2006). Stojanović, Višnjić and Mitrović (2008) established that there is a greater inactivity of female students (66.90%) than male (36.32%).

Table 5. Recreational and sports activities students do during a week, divided into groups



In the research done by Širić, Blažević and Vladović (2009), which included the population of students, 53.1% of the respondents claimed that physical education should be introduced as a compulsory subject at faculties.

Insufficient physical activity represents a risk factor responsible for a series of health problems: obesity, cardiovascular diseases and cancers, while significant positive effects on health and life quality and length in general can be achieved by participating

in any physical activity lasting 30 minutes a day, at least three times a week (ACSM, 2005). The effects of an activity realized in such a way depend on the scope and intensity of the activity, the increase in the scope of the activity brings the increase of positive effects. According to the obtained data it can be concluded that a large number of students do not meet a minimum criterion of the frequency of doing physical exercises during one week, which should be at least three times (ACSM, 1998; P.O. Astrand, 1999; S.N. Blair, M.J. LaMonte & M.Z. Nichaman, 2004, R. Pate, M. Pratt, S.N. Blair, W.H. Haskell, C.A. Macera & C. Bouchard, 1995)

### Discussion and conclusion

According to the data obtained by conducting a survey on the students belonging to the universities of Belgrade, Novi Sad and Niš, it can be concluded that the students belonging to all three universities are largely interested in introducing regular lessons of physical education at their faculties again.

The average age of the students in this research was 21.5, the employed 37.2 and the retired 66.3.

On average, our examinees have three hours of free time a day, which is in accordance with all global statistics which state that the amount of free time should be between 2 and 4 hours (table 4). It is completely expected that retired people have the largest amount of free time on their hands, but 3-4

hours of free time that students and employed people have proves the fact that most citizens have enough time for exercising, which should occupy one hour at least three times a week.

About 42.5% of the examinees do physical exercises at least once a week. It can be noticed that the frequency of doing this type of exercises decreases with the age. Over 56% of students exercise at least once a week, while this percentage decreases for the employed to 40, and for the retired to 32. We repeat the fact that the World Health

Organization recommends doing physical exercises at least three times a week, while the number of examinees who respect that is far smaller in our sample. Of course, students come first in this area since a little bit over  $\frac{1}{4}$  of them exercise 3-4 times a week, while for the employed and retired this percentage decreases to 16 and 14, respectively. We believe that the results obtained this way reflect the state in general in the population of Serbia. The results once again indicate an unsatisfactory, we could say even very serious, situation, as well as the necessity to take serious measures aimed at increasing the number of people who do exercises in all age groups.

According to the obtained results it can be concluded that a large number of students do not meet the minimum criterion of the frequency of doing exercises, which should be 3 and more times a week.

Comparing the results obtained in the last ten years, we can see that these numbers have had pretty stable values in different years. The differences which still occur are unfortunately negative. Not taking into account the results obtained in Vojvodina this year, but on a relatively small sample (in comparison to other subsamples), it can be concluded that, unfortunately, the number of people who never do exercises rises, simultaneously followed by the fall in the number of those who exercise most regularly (3-4 times a week).

These data once again clearly indicate that there is a necessity to take an extensive action of promoting beneficial effects of doing physical exercises regularly, as well as permanently motivate people to exercise and create conditions necessary for doing physical exercises for all categories of citizens. All relevant factors must be included in this action, first of all the Government through its competent ministries, scientific and professional institutions, sports federations, media, etc.

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## PROFESSIONAL DEVELOPMENT OBJECTIVES OF THE PHYSICAL EDUCATION AND SPORTS TEACHERS FROM TELEORMAN COUNTY

STĂNESCU MONICA<sup>1</sup>, CIOLCĂ CORINA<sup>1</sup>, VASILIU ANA MARIA<sup>1</sup>, STOICESCU MARIUS<sup>1</sup>

### Abstract

**Purpose.** At the European level, there were identified some general objectives for the implementation of practical actions into education and training: encouraging the acquisition of new knowledge, school approaching to the economic sector, combating social exclusion, equally treating capital investment and training. The purpose of this paper is to identify which objectives of the professional development are characteristic to our occupational domain and can be transferred to the adult training programs permanently tailored to the social requirements.

**Methods.** As research methods, we used the study of specialty bibliography, the survey (questionnaire) and statistical-mathematical processing. The global questionnaire was made up of 17 items, but for this research we processed only the item concerning the objectives for professional development. The sample consisted of 102 physical education and sports teachers from Teleorman county.

**Results.** A high quality professional development is essential to increase educators' knowledge, skills, attitudes and beliefs, so that they could assure an educational process to the requested level. In all the categories of investigated subjects, we identified a priority able to improve the teaching skills. We consider that this option is a characteristic of physical education and sports teachers who want to be well informed about the latest methodical and psycho-pedagogical approaches. For each category of teachers, we identified a dominant option, even if this one wasn't significantly different from the others.

**Conclusions.** In order to design attractive educational continuing programs, the promoter must be informed about the particularities of the professional development process in different categories of specialists. As we shall see, each category has a specific way to approach the lifelong learning process. To draw up consistent programs and provide an attractive educational offer, institutions have to take into account all the professional and social aspects that can influence the continuing educational process achievement in physical education and sports area.

**Keywords:** professional development, physical education and sports, initial training, continuing education, teachers.

### Introduction

This paper is part of the POSDRU project 19/1.3/G/13096 *Professionalization of the teaching career in physical education and sports from the lifelong learning perspective*, co-financed by FSE through POSDRU 2007-2013, its beneficiary being UNEFS and its implementation being achieved in partnership with the Teaching Staff Houses of Giurgiu, Teleorman, Olt and Dambovită, but also with the Bucharest Municipal School Inspectorate, over a 2-year period (2010-2011).

Through the program topic, the project contributes to the professional identity consolidation in physical education and sports, by emphasizing the specific competencies of this profession and by creating the feeling of belonging to a strong professional group precisely delimited from other didactic specialties (M. Stănescu, M. Stoicescu, 2010).

Professionalization of the teaching career represents a priority of the Romanian higher education system, in order to get it aligned to the European quality standards, in all the domains (N. Vințanu, M. Stănescu, R. Bejan, 2003).

Investing in the development of human

resources and valorizing their superior skills both contributes to competitiveness in the field of physical education and sports and increases the education quality.

The term "professional development" means a comprehensive, sustained and intensive approach to the improvement of teachers' effectiveness in physical education and sports instruction.

Professional development generally refers to continuing learning opportunities for teachers and other education staff, provided by their schools and counties. Effective professional development is usually seen as vital to school success and teacher satisfaction, but it has also been criticized for its cost, its often unclearly determined goals and the lack of data about the teacher and school resulting improvement that characterizes many efforts.

"Strategies for improving effective access to learning and training throughout life, in order to eliminate the deficit of competence, must ensure the coordination of shared responsibilities of the public authorities, social partners and individuals with a relevant contribution in the civil society. Social partners are requested to negotiate measures, in order to improve education and continuing training and

<sup>1</sup>National University of Physical Education and Sports, Bucharest, ROMANIA

E-mail: monica\_iulia@yahoo.com

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increase their flexibility". (A. Modrescu, 2002) There is a growing recognition that teacher learning and the effective policies and structures to support it should be at the core of government policies that aim at improving the educational standards.

The professional development process can include activities such as courses, workshops, networks and conferences focused on completing the learning goals and objectives settled by educators at the school level and improving the school-based continuing professional development. These activities can be provided by profit and non-profit entities outside the school, for instance by universities, education service agencies, technical assistance providers, specialists in the content area and other education organizations and associations.

Professional development is an extensive and collaborative process; upon completion, an evaluation of progress is usually performed (S.A. Westfal, 2007).

Since the nineties, a qualitative literature has started supporting a roughly consistent alternative to the workshop model of professional development. This preferred approach holds that for teacher learning to truly matter, it needs to take place in a more active and coherent intellectual environment, in which ideas can be exchanged and an explicit connection to the bigger picture of school improvement is made. This vision holds that professional development should be sustained and coherent, take place during the school day, become part of the teacher's professional responsibilities and focus on student's results (R.C. Wei et al, 2009).

Trainers should provide new opportunities in terms of professional development. Education and training, if conducted in a formal or informal education system, represent the necessary key that controls the future career and personal development. The investigations carried out over the years by the National Council for Adult Education led to the identification of three major factors crucial to the society transformation, namely: the impact of informational society, the impact of scientific and technical knowledge and the impact of internationalization.

At the European level, there were identified five general objectives for the implementation of practical actions into education and training: encouraging the acquisition of new knowledge, school approaching to the economic sector, combating social exclusion, developing communication skills in three community languages and equally treating capital investment and training (A. Modrescu, 2002; J. Varlejs, 2007; R. Tudorică, 2007).

Training and professional development refers to different concepts and definitions. Training is a learning process during which learners acquire the theoretical and practical knowledge necessary to carry out their daily work; professional development

is a more complex process, its objective being the acquisition of the theoretical and practical knowledge required by the learners' current but also future position (anticipated employment). Training aims at developing new competencies, while professional development aims at improving the existing capabilities, it being considered as a training stage, as an accumulation of professional knowledge additional to the basic training (C. Ticu, 2004, K.M. Armour, R. Duncombe, 2004).

From this perspective, competence involves the existence of the following components: acquired knowledge, according to the nature of the tasks to be fulfilled within the respective profession/ job; practical experience in task-solving; a set of skills needed to achieve on an appropriate level the tasks required by the respective profession/ job; a set of attitudes leading to the person's mobilization toward goals related to the effective implementation of the required tasks (O. Sinelnikov, 2012).

### Purpose

The purpose of this paper is to identify which objectives of the professional development are characteristic to our occupational domain and can be transferred to the adult training programs permanently tailored to the social requirements.

### Methods

As research methods, we used the study of specialty bibliography, the survey (questionnaire) and statistical-mathematical processing (results are expressed either in percents or by the mean of the answer ranks). The global questionnaire was made up of 17 items, but for this research we processed only the item concerning the objectives for professional development. Thus, we analyzed the relationship between the objectives and the teaching staff from the following categories: beginner teachers, permanently appointed teachers and teachers holding the 2<sup>nd</sup> and 1<sup>st</sup> degrees. At the same time, we correlated the obtained information with their years of experience in physical education teaching. Subjects assessed on a scale from 1 to 5 the importance of the objectives to their professional development. The six objectives covered by the questionnaire were: improving the teaching performance (1), encouraging and maintaining the professional enthusiasm (2), improving skills in the teaching discipline (3), developing professional relationships with other colleagues (4); improving the networking with colleagues (5); professional advance (6).

### Subjects

The research was conducted on 102 school and high school physical education and sports teachers from Teleorman county, who had attended the continuing education courses within the above-mentioned grant *Professionalization of the teaching career in physical education and sports from the lifelong learning perspective*.

### Results and interpretation



The sample consisted of 102 teachers. As to their distribution by gender, we found out that most of the respondents were female teachers (65.68%), while the percentage of male subjects was lower by more than twice (30.39%).

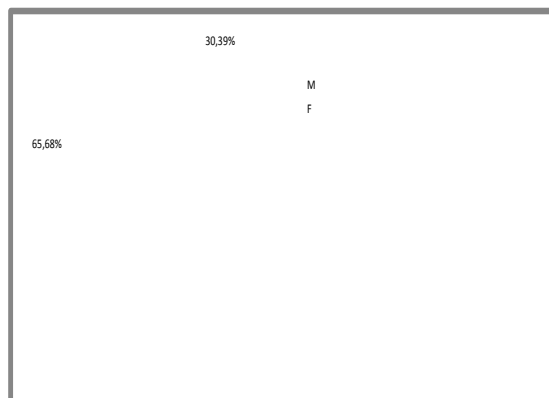


Figure no. 1. Sample distribution by gender

Teachers were classified according to their teaching experience measured in years. Their distribution is showed in figure no. 2, where we can notice that the highest percentage (29.41%) comes to the teachers with an average teaching experience (11 to 15 years).

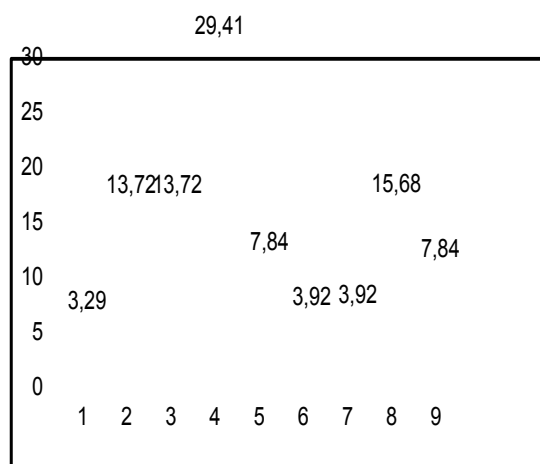


Figure no. 2. Distribution by teaching experience

Legend: 1. no answer, 2. 1-5 years, 3. 6-10 years, 4. 11-15 years, 5. 16-20 years, 6. 21-25 years, 7. 26-30 years, 8. 31-35 years

Regarding their distribution by teaching degrees, we found out that most of the subjects were 1<sup>st</sup> degree teachers (51.96%), followed by 2<sup>nd</sup> degree teachers (22.54%), permanently appointed teachers (19.60%) and beginner teachers (1.96%), as showed in figure no. 2.

As we can see in figure no. 3, most of the options are related to skill improvement in their teaching discipline (objective 3, described in the

method section) (ranking mean is  $x = 4.33$ ). Therefore, most of the teachers expect their professional development to have an important contribution to their specialty teaching level. Another important objective is the development of professional relationships with other colleagues. That is why the specialists in our field need to be in a closer professional contact with their colleagues. Concerning the beginner teachers, we can notice that their priorities are the following: improving their teaching performance ( $x = 4.90$ ), professional advance ( $x = 4.85$ ) and improving their skills in the teaching discipline ( $x = 4.82$ ).

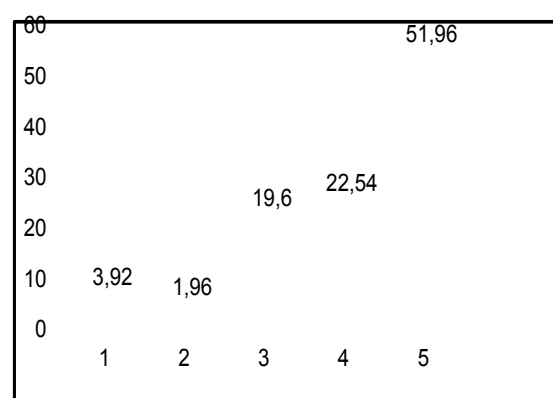


Figure no. 2. Subjects' distribution by teaching degrees

Legend: 1. no answer, 2. beginner teachers, 3. permanently appointed teachers, 4. 2<sup>nd</sup> degree teachers, 5. 1<sup>st</sup> degree teachers

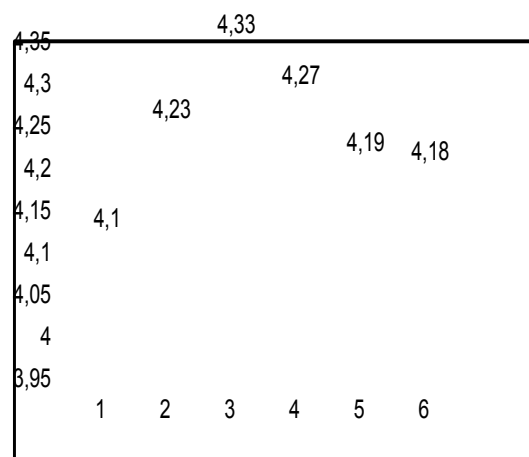
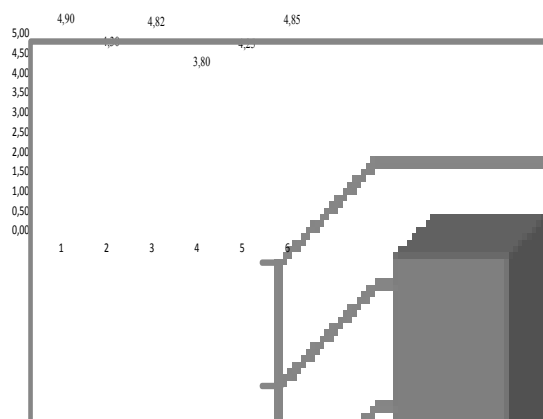


Figure no. 3. Mean of the option ranks for each professional development goal

Legend: improving the teaching performance (1), encouraging and maintaining the professional enthusiasm (2), improving skills in the teaching discipline (3), developing professional relationships with other colleagues (4), improving the networking with colleagues (5), professional advance (6)

Obviously, the beginner teachers identify that the way to promote in the professional career depends on their professional training level. We think this is a positive attitude and an important factor for the teaching career professionalization in physical education and sports field (figure no. 4).

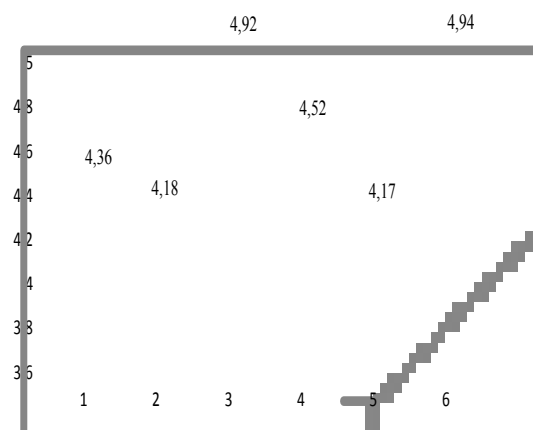
Maintaining the professional enthusiasm ( $x = 4.30$ ) and networking with colleagues ( $x = 3.80$ ) are not very important to this category of subjects. For the beginner teachers, the learning community doesn't represent an element essential to their career. In order to remediate this situation, we proposed the initiation of some sites able to promote and update professional information related to our field.



**Figure no. 4. Mean of the option ranks for the beginner teachers' professional development goals**

Legend: improving the teaching performance (1), encouraging and maintaining the professional enthusiasm (2), improving skills in the teaching discipline (3), developing professional relationships with other colleagues (4), improving the networking with colleagues (5), professional advance (6)

The most important objective for the permanently appointed teachers is their professional advance ( $x = 4.94$ ), as an illustration of their professional development. This category of teachers is composed of those who have decided to follow the teaching career, so they also need to advance for increasing their financial resources. Even in the education field, professional advance to a higher degree is very well described and supposes a certain number of years of experience, the young teachers considering it as a priority for their professional development. Other important objectives: improving skills in their teaching discipline ( $x = 4.92$ ) and developing their professional relationships with other colleagues ( $x = 4.52$ ) (figure no. 5).



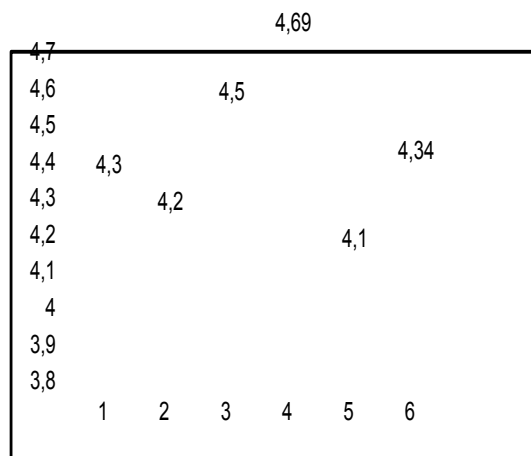
**Figure no. 5. Mean of the option ranks for the permanently appointed teachers' professional development goals**

Legend: improving the teaching performance (1), encouraging and maintaining the professional enthusiasm (2), improving skills in the teaching discipline (3), developing professional relationships with other colleagues (4), improving the networking with colleagues (5), professional advance (6)

In this category, we identified many teachers' consistent attitude to improve their specialty training level. We consider their intention to valorize the professional relationships as a premise indicating that they accept to get integrated into a professional community. The lowest percentages are represented by their professional enthusiasm stimulation and maintaining ( $x = 4.18$ ), but also by the improvement of their networking with colleagues ( $x = 4.17$ ). Being in their first years of career, the permanently appointed teachers don't feel yet the need to be in a closer contact with their colleagues. Usually, they are still in touch with their faculty mates.

The most important goal for the 2<sup>nd</sup> degree teachers is to develop their professional relationships ( $x = 4.69$ ), followed by the skill improvement in their specialty area ( $x = 4.50$ ) (figure no. 6). For the first time, we identified in this category a special focus on an open attitude toward the other colleagues having the same specialty. Here is a good premise for a collaborative learning approach: teachers have already accumulated information about the physical education and sports field, that is why after 5 to 10 years of experience, they need to exchange professional ideas and debate on some specific issues. Improving the teaching skills represents a constant in this category of teachers, too. Another important option refers to their professional advance ( $x = 4.34$ ). The lowest percentages concern their professional enthusiasm stimulation and maintaining ( $x = 4.2$ ) and the improvement of their networking with colleagues ( $x = 4.1$ ), which is similar to the previous category. We think this is a factor keeping to the professional vocation. They are still enthusiastic about their work,

although their financial and the material resources are not always at a satisfactory level.

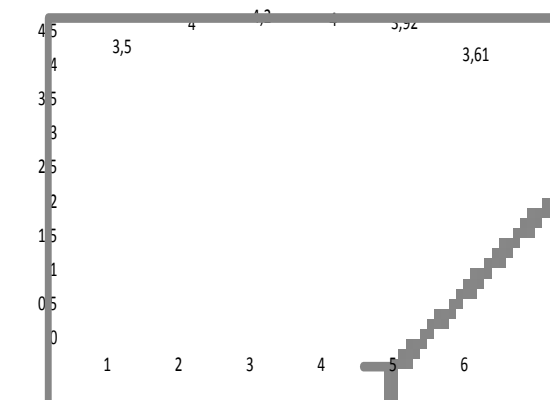


**Figure no. 6. Mean of the option ranks for the 2<sup>nd</sup> degree teachers' professional development goals**

Legend: improving the teaching performance (1), encouraging and maintaining the professional enthusiasm (2), improving skills in the teaching discipline (3), developing professional relationships with other colleagues (4), improving the networking with colleagues (5), professional advance (6)

As to the 1<sup>st</sup> degree teachers, we found out that improving their teaching skills was still a priority for them ( $x = 4.2$ ). We think that this option reveals their permanent interest in being updated with the latest pedagogical and specialty approaches (figure no. 7).

This professional development objective is followed by their professional enthusiasm stimulation and maintaining ( $x = 4$ ), the development of their professional relationships with other colleagues ( $x = 4$ ) and the improvement of their networking with colleagues ( $x = 3.92$ ). Consequently, for this category it is more important to keep at a high level both the enthusiasm when teaching physical education and sports and the professional exchanges. For the 1<sup>st</sup> degree teachers, the improvement of their relationships with the colleagues is very important. We consider that the alumni associations could help the teachers consolidate the relations among them and create a social community, not only a professional one.



**Figure no. 7. Mean of the option ranks for the 1<sup>st</sup> degree teachers' professional development goals**

Legend: improving the teaching performance (1), encouraging and maintaining the professional enthusiasm (2), improving skills in the teaching discipline (3), developing professional relationships with other colleagues (4), improving the networking with colleagues (5), professional advance (6)

### Discussions and conclusions

A high quality professional development is essential to increase educators' knowledge, skills, attitudes and beliefs, so that they could assure an educational process to the requested level. In all the categories of investigated subjects, we identified a priority able to improve the teaching skills. We consider that this option is a characteristic of physical education and sports teachers who want to be well informed about the latest methodical and psycho-pedagogical approaches. For each category of teachers, we identified a dominant option, even if this one wasn't significantly different from the others.

Beginner teachers are interested in performance teaching (all types of teaching skills - psycho-pedagogical, but also methodical ones), in teaching skills specific to their specialty area and in their professional advance. Such an option expresses their desire for increasing their professional level. Consequently, we consider that the continuing education program should be focused on information, which can consolidate/ improve their specialty skills.

Permanently appointed teachers are more oriented toward the professional advance. We think that their interest is particularly connected to their need of reaching a certain professional status level (which also determines a better financial status). For this category of teachers, we propose some continuing educational programs able to develop their competencies. We refer here to providing them the latest information about how to teach new sports branches or how to better teach the already known information. Such an approach can help them become more engaged in extra-school sports activities, organized as leisure activities. They can also help the



teachers develop a business of their own and get extra-money.

Personal relationships are a priority for the 1<sup>st</sup> and 2<sup>nd</sup> degree teachers and for the professional advance of the junior and permanently appointed teachers.

We consider that the 2<sup>nd</sup> degree teachers, who appreciate the professional relationships, should be provided continuing education programs able to better satisfy the cooperative and collaborative learning. Thus, they are supposed to promote a student-focused learning process, but also to use some specific teaching methods. For this category, we propose the initiation of an e-learning teaching system assigned to develop new competencies.

It is very important for the 1<sup>st</sup> degree teachers to be provided an educational climate in which they can find professional and social influences. They need more than the other categories to find professional ways that can challenge them to approach a new teaching perspective. At the same time, they need to be part of a professional and social community, that is why the continuing educational program must provide them the opportunity to participate in events organized by the alumni associations.

In order to design attractive educational continuing programs, the promoter must be informed about the particularities of the professional development process in different categories of specialists. As we saw, each category has a specific way to approach the lifelong learning process. To draw up consistent programs and provide an attractive educational offer, institutions have to consider all the professional and social aspects that can influence the continuing educational process achievement in physical education and sports area.

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## PHYSICAL ABILITY OF THE STUDENTS PRACTICING BASKETBALL GAMES – COMPARATIVE STUDY

STOICOVICIU ADRIANA<sup>1</sup>, GANCIU MIHAELA<sup>1</sup>

#### Abstract

**Purpose.** One of the main objectives in the educational process in physical education and sport in higher education is to increase the overall level of physical ability. The aim of this work is to assess the physical ability and the quality of technical exercises and tactical action of the students who have been practicing basketball and to compare these with the results of the students evaluated five years ago.

**Material and methods.** The study was conducted on two groups of subjects, control group (male and female students from Bucharest University-tested in the academic year 2004-2005) and the experimental group (male and female students from Bucharest University-tested in the academic year 2011-2012). In order to measure the general motor ability the following tests were used: 30 m sprint, abdominal muscle strength exercise testing (in 30 seconds), push-ups (30 seconds), standing vertical jump, resistance running (800 m-girls-boys

<sup>1</sup> University of Bucharest, ROMANIA

E-mail: a.stoicoviciu@yahoo.com

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1500 m). For assessing the learning of technical and tactical elements we used Knox test. The obtained results from the experimental group have been compared with the results of control group, and to find out if the differences between the results averages are statistically significant we used the Anova test.

**Results.** For most of the parameters a decrease of values can be observed in the experimental groups for both girls and boys. Note that all the examinations that test general motor ability, the female students tested in the 2011-2012 academic year had lower results than the subjects tested in 2004-2005. For the male students the results obtained at the examinations that test speed, strength and abdominal muscle strength, are below the average of the 2005 generation, while the examinations that test leg strength and expansion the values have remained stable. In examinations that test skills (dribbling), complex motor skills (dribbling and shooting) and specific resistance ("small marathon"), the results were also below those obtained from subjects tested in 2005, both girls and boys.

**Conclusions.** We consider that the subjects tested in the present stage have a lower level of general physical ability, obtaining poorer results at the tests carried out. Also, we note that the sum of physical and technical skills is lower than that of subjects tested in 2005.

**Keywords:** physical ability, skills and motor skills, evaluation, higher non-profile education.

### Introduction

One of the main objectives in the educational process in physical education and sport in higher education is to increase the overall physical ability.

Physical ability is one of the themes conveyed in the specialized literature. If motility is a global feature, which distinguishes subjects between them is the level at which motor function is expressed, insofar as it determines the subject to adapt and it makes him capable of adapting to complex and diverse environment situations. This level is represented by the physical ability. Etymologically, the word comes from Latin *capacitas*. In modern meaning, the term can designate the ability of individuals to successfully perform a task or profession. Motor capacity evolves as an ascending curve, which expands and restructures through maturity, training and education. Its evolution is not linear but sinuous, types of motor capacity, namely: general motor capacity, consisting of basic physical skills, habits and basic skills and tool-applied, and ability-specific motor skills consist of specific motor sports industry, specific driving skills and abilities.

In preparatory process one starts from the premise that even in very different proportions, motor ability can develop and can educate. It aims to achieve optimum availability, high capacity for each component of physical ability.

Physical skills are components that are learned in the educational process through voluntary practice becoming fully automated or partially automated, defined in the specialized literature as being, automated components of voluntary activity ". Can be considered as physical actions, that through practice have come to a high degree of stability, precision, efficiency.

### Purpose

We have proposed in this work to evaluate the level of motric capacity and the executions

with moments of stagnation and decline. Constant features are given by the presence of qualities, physical skills, while decline or stagnation are due to motivation or emotional states. So, ability is always demonstrated and easy to demonstrate this being the reason for which some authors have coined the term manifest motor capacity (A. Dragnea, 1994), in that it materializes in points, positions in the classifications, results from different tests, etc.. It is important that subjects correctly evaluate their own capacity without over- or underestimate it, and this is achieved by applying certain sets of tests (A. Bota., 2007).

Physical ability is a complex of mainly physical manifestations conditioned by the level of development of motor qualities, morpho-functional indices, chemical processes and metabolic processes, all comprised, correlated, conditioned, resulting in the effective actions and physical activities. In sports we talk about two

Formation of motor skills depends on the way of perceiving and understanding of information, being the cumulative result of the action of the sense organs, the cortex activity, the body muscles, bones, ligaments, joints and other internal organs. (G Rata. 2008).

According to M. Epuran, taking into account the participation of the nervous system in the their formation and revaluation, in sports games we can talk about smart-motor skills when there is an appositive and intentional opponent . Reference is made to complex skills that are partially automated.

These skills are acquired in practical life, being based on voluntary activity of the individual within a specially organized training process.

technical and tactical quality of the students who practice basketball and to compare the results with those of the students evaluated five years ago.

## Methods and materials

The test has been made on two groups of subjects: control group (male and female students from The University of Bucharest-tested in 2004-2005) and experimental group (male and female students from the University of Bucharest - tested in 2011-2012).

In order to measure the general motric capacity, we have appeal to the tests:

- 30 m sprint
- exercise for the strength of abdominal muscle ( in 30 seconds)
- push-ups ( 30 seconds)
- standing vertical jump
- resistance running (800 m – girls; 1500 m – boys)

To evaluate the level of acquirement of the technique-tactic elements we used Knox test.

### KNOX TEST

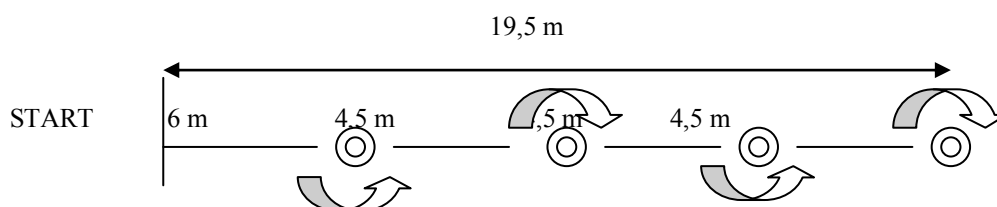


Fig.1

2- *FAST PASSING*. On a distance of 1,5 m from the wall is marked a line on the ground. The player with the ball sits behind the line and on the mark he starts to pass the ball to the wall fastest as he can, 15 times, with both hands from the chest. The time in seconds in which the 15 passes are made is the final score.

3- *DRIBBLING AND SHOOTING*. In this trial we use the same route as in the speed dribbling, but instead of four obstacles we have three and the player has to shoot the ball before he returns to the start (fig.2). The score of this trial is equal with the necessary time for the fullfilment of the task, in seconds

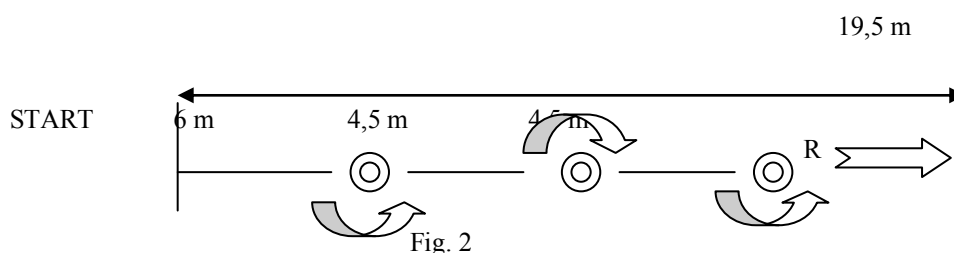


Fig. 2

To these trials we added trials that test the resistance to speed regime and also the precision of free throwing.

1- *LITTLE MARATHON*. The player covers the route from fig.3, recording the time resulted in seconds.

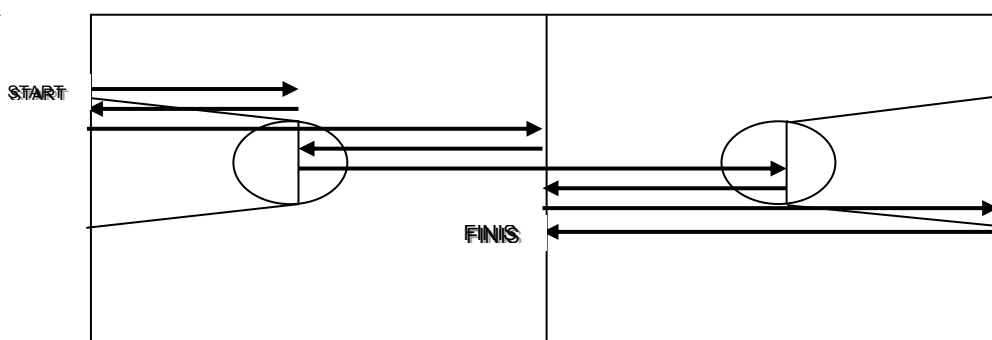


Fig. 3

1- *FREE THROWINGS* . The player executes 10 free throwings from the mark for free throwings. It's recorded the number of succeeded throws.

The obtained results from the experimental group have been compared with the results of control group, and to find out if the differences between the results averages are statistically significant we used the Anova test. The p value represents the probability of a significant statistically difference and it's compared with the fixed risk probability.

## Results

**Table 1.** THE EVALUATION OF GENERAL MOTRIC CAPACITY- female students

Motric capacity	Task	Year 2005	Year 2011	Difference
Acceleration and movement speed	30 m sprint	5,61 seconds	6,02 seconds	0,41
Strength of abdominal muscles	Torso lifting from dorsal lying	16,30 repeats	15,30 repeats	-1
Strength of upper limbs muscles in endurance regime	Push-ups on knees (30 seconds)	17repeats	14 repeats	-3
Explosive strength of the lower limbs- expansion	Standing vertical jump	28 centimeters	25 centimeters	-3
Resistance	Endurance (800 m)	4,42 minutes	5,10 minutes	0,68

Average compared results obtained on the experimental and control group

Indicator	Contr. group	Exp. Group	P
Speed	5,61	6,02	0,01
crunches	16,30	15,30	0,01
Push-ups	17	14	0,03
expansion	28	25	0,03
Resistance	4,42	5,10	0,01

**Table 2.** EVALUATION OF GENERAL MOTRIC CAPACITY- students

Motric capacity	Task	An 2005	An 2011	Diferența
Acceleration and movement speed	Speed running – (30 m)	4,52 seconds	4,50 seconds	0,02
Strength of abdominal muscles	Torso lifting from dorsal lying	22,50 repeats	21,50 repeats	-1
Strength of upper limbs muscles in resistancy regime	Push-ups on hands (30 seconds)	20 repeats	20repeats	0
Explosive strength of the lower limbs- expansion	Vertical jump without momentum	41centimeters	41centimeters	0
Resistance	Endurance running (1500m)	5,56 minutes	6,20 minutes	0.64

Average compared results obtained on the experimental and control group

Indicator	Contr. group	Exp. group	P
Speed	4,52	4,50	0,23
crunches	22,50	21,50	0,01
resistance	5,56	6,20	0,01

**Table 3.** EVALUATION OF SPECIFIC MOTRIC CAPACITY- female students

Task	Description	Year 2005	Year 2011	Difference
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Speed dribbling	Crossing a track among four milestones(situated to a distace o 4,5 meters) while dribbling	9,21 seconds	9,33 seconds	<b>0,12</b>
Fast passing	On a 1,5m distance from the wall, are executed 15 passes with both hands from the chest	11,22 seconds	11,31seconds	<b>0,09</b>
Dribbling and shooting	Crossing the track from the first test but instead of four obstacles we have three, and the player has to throw to the basket	13,30 seconds	14,30 seconds	<b>1</b>
Free throwing	Ten free throws	4 scored baskets	4 scored baskets	<b>0</b>
Little marathon	Movement on the track of little marathon (98 meters) in maximal speed	31,20 seconds	34,20 seconds	<b>3</b>

Average compared results obtained on the experimental and control group

Indicator	Contr. group	Exp. group	P
Speed dribbling	9,21	9,33	0,04
Fast passes	11,22	11,31	0,02
Dribbling and shooting	13,30	14,30	0,01
Little marathon	31,20	34,20	0,01

**Table 4.** EVALUATION OF GENERAL MOTRIC CAPACITY- students

Task	Description	Year 2005	Year 2011	Difference
Speed dribbling	Crossing a track among four milestones(situated to a distace o 4,5 meters) while dribbling	8,16 sec.	9,18seconds	<b>1,02</b>
Fast passes	On a 1,5m distance from the wall, are executed 15 passes with both hands from the chest	9,53 sec.	10,12 seconds	<b>0,19</b>
Dribbling and throwing	Crossing the track from the first test but instead of four obstacles we have three, and the player has to throw to the basket	12,26 sec.	13,26 seconds	<b>1</b>
Free throws	Ten free throws	4 scored baskets	4 scored baskets	<b>0</b>
Little marathon	Movement on the track of little marathon(98 meters) in maximal speed	28,30 seconds	29,38 sec.	<b>1.08</b>

Average compared results obtained on the experimental and control group

Indicator	Contr. group	Exp. group	P
Speed dribbling	8,16	9,18	0,01
Fast passes	9,53	10,12	0,02
Dribbling and throwing	12,26	13,26	0,01
Little marathon	28,30	29,38	0,01

### Discussions

The evaluation of the motor potential as well as the motor skills was done by comparing the motor parameters and establishing the differences between the values of the two generations and was based on the following criteria: measuring the test

groups in standard conditions using the test set, interpreting the results using the performance average and comparing these with statistical-mathematical calculations.





For the majority of parameters there's a decrease in the recorded values for the experimental groups for both male and female students.

Regarding general motor capacity, we notice that for all the trials the female students in the 2011-2012 university year scored lower than the subjects from the 2004-2005 year.

The values of *p* show that there are significant differences between the two groups.

For male students, the values obtained in abdominal muscle strength and stamina trials are below the 2005 averages, the statistic calculations show us there is a significant difference with a lower *p* value than the fixed risk probability. On trials that test lower limbs strength and jumping height the values remained constant whereas the speed trial showed no statistically significant difference.

With regard to the level of specific motor skills, it is apparent that in the case of proficiency trials (dribbling), more complex motor skills (dribbling and throwing), as well as stamina (small marathon), the results are also below the values obtained by the 2005 test subjects, both in males and females. The calculations show that the differences are statistically significant.

#### Conclusions

We consider that the test subjects from the current phase have low levels of general motor capacity, scoring

less on the trials. Also, we see a lower set of motor and technical skills compared with the 2005 test group.

This could be due to changes in the study programs of pre-university schools, namely cuts in the number of P.E. weekly classes, these measures having negative effects on the capacity for effort in young people, with long-term negative consequences sanogenetically and also on the capacity to get involved in professional and daily activities.

Another cause could be the preference of young people for popular activities (computer games, internet, meeting friends in clubs etc.) over sports.

The absence of physical exercise from the lifestyles of many youngsters is also a consequence of a wrong attitude towards exercising.

In this context, during classes the professors have the role to explain to the students the importance of organized, systematic and continuous physical exercise and the consequences physically and psychically.

It is a well known fact that in modern societies, engaging in physical exercise according to the individual possibilities and particularities is an essential prerequisite for a healthy life, while also being considered a form of corrective therapy. The systematic practice of any form of exercise will lead, through various means, to maintaining and strengthening the health, raising biological value, vitality and work endurance.

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## ❖ KINETOTHERAPY

### IMPORTANCE OF INTRACEREBRAL HEMORRHAGE VOLUME AND THE ROLE OF MEDICAL AND KINETHOTERAPEUTIC TREATMENT

DOCU AXELERAD ANY<sup>1</sup>, DOCU AXELERAD DANIEL<sup>2</sup>

#### Abstract

Intracerebral hemorrhage is focal bleeding from a blood vessel in the brain parenchyma that may extend to ventricles,) is the second most common cause of stroke, following ischemic stroke. It accounts for **8-13%** of all stroke cases. It is the **third leading cause** of death and the leading cause of disability in the US. In cases of cerebral hemorrhage, death results from extensive bleeding that causes increased pressure on the brain resulting in neurological damage.

Predilection sites for Intracerebral hemorrhage include the basal ganglia (40-50%), lobar regions (20-50%), thalamus (10-15%), pons (5-12%), cerebellum (5-10%), and other brainstem sites (1-5%).

<sup>1</sup>Ovidius University from Constanta, General Medicine Faculty, ROMANIA

<sup>2</sup>Ovidius University from Constanta, Physical Education and Sport Faculty, ROMANIA

E-mail: docuaxi@yahoo.com

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The role of kinetotherapy procedure is less known in principal the day of beginning of them.

**Material and methods:** For statistical analysis of Intracerebral hemorrhage in order to know its prognosis and evolution, retrospective type of study has been chosen and done in Spitalul Judetean Constanta included all patient hospitalized between 01.01.2011-01.06.2011

#### Results:

- All the patients who have ICH had medical treatment. Some undergo surgical removal too. According to theory, patients needed medical treatment with labetalol, nitroprusside or hydralazine for blood pressure control, Mannitol or osmotherapy for increase ICP, fluid management for hydroelectrical balance, phenytoin for prevention of seizures and also control of body temperature and other symptomatic treatments with Algomalmin Metoclopramide, Quamatel, Vit b complexes etc.
- Kinetotherapy treatment  
Rehabilitation programme objectives: induce of volutar motor activity; prevent wrong movement; prevent muscle retractures and joints diformities, decrease spasticity. Rehabilitation programme: we used physical programme for reduce pain, spasticity and also kinetic method for each objective. In each month we followed the evolution using specific scale assessment. We must say that during the acute period they did not came at rehabilitation programme.

#### Conclusions

- Although we are assisting a new and highly established medical drugs and interventions in the field of modern medicine, ICH are unfortunately common in Neurology department. It is the second most common cause of stroke, following ischemic stroke.
- HTA is the major risk factor, morbidity and mortality is increased with the size of hematoma, location of hematoma, ventricular extension presence, blood glucose level and advanced age. Also GCS score is important in evaluation of prognosis in patients with ICH.
- Evolution of patients with ICH is not good. Majority had Hemiplegia, aphasia, facial palsy and dysphagia. Death rates are high for IVHs.
- The best method of prevention of ICH is good control of HTA, careful follow up of cases and removal of risk factors and education of public with respect to risk of development of ICH.
- Intracerebral hemorrhage will continue to be an important problem as the population ages in the world. Treatment is limited currently and is primarily supportive. Despite historically poor outcomes in ICH, there is considerable hope that the identification of factors involved in neurologic morbidity, early hemostasis, and removal of intracerebral hematomas will improve the short-term treatment of ICH.

All patient with stroke have hemiplegia, an for all we started a recuperation program in hospital in acute stroke with kinetotrapeut and we recommend for home a battery of exercise if the condition state permitted.

**Keywords:** hemorrhage stroke, hemorrhage volume, kinethotherapy, prognostic.

#### Introduction

**Definition:** Intracerebral hemorrhage is focal bleeding from a blood vessel in the brain parenchyma that may extend to ventricles.

**Incidence:** Intracerebral hemorrhage (ICH) is the second most common cause of stroke, following ischemic stroke. It accounts for **8-13%** of all stroke cases (SHEP Cooperative Research Group, 1991).

It is the **third leading cause** of death and the leading cause of disability in the US. In cases of cerebral hemorrhage, death results from extensive bleeding that causes increased pressure on the brain resulting in neurological damage.

**Sites:** Predilection sites for Intracerebral hemorrhage include the basal ganglia (40-50%), lobar regions (20-50%), thalamus (10-15%), pons (5-12%), cerebellum (5-10%), and other brainstem sites (1-5%) (J.P. Broderick, S. Connolly, E. Feldmann et al., 2007).

**Etiology:** The cause is usually hypertension (Hypertension Detection and Follow-up Program Cooperative Group, 1982). Other frequent causes are Vascular malformations, Intracranial tumors, bleeding

disorders, anticoagulant and fibrinolytic treatments, cerebral amyloid angiopathy(CAA) etc.

**Prognosis** is generally poor after an intracerebral hemorrhage, although some patients can recover most function. Long-term mental and physical disability usually occurs (S.M. Davis, J.P. Broderick, M. Hennerici et al., 2006).

*Its clinical importance derives from its frequency and high mortality. Although the latter is strongly dependent on hematoma size and to a lesser extent location, the overall mortality for this stroke subtype varies between 25% - 60 % (J.P. Broderick, S. Connolly, E. Feldmann, et al., 2007).*

**Typical symptoms** ;include focal neurologic deficits, often with abrupt onset of headache, nausea, and impairment of consciousness.

**Diagnosis** is by CT or MRI and other usual diagnostic tools.

**Treatment** ; Intracerebral hemorrhage is a severe condition requiring prompt medical attention. It may develop quickly into a life-threatening situation. Treatment includes BP control and control of seizures, anticoagulation, supportive measures, and for some

patients, surgical evacuation. Choice between Medical and Surgical Therapy should be carefully made. The role of kinetotherapy procedure is less known in principal the day of beginning of them.

**Complications** includes; Neurological deficits, Seizures Hydrocephalus, Spasticity, Urinary complications, Deep venous thrombosis (DVT), Pulmonary emboli, Cerebral herniation, Loss of cognitive function, Loss of movement of arm(s) or leg(s), dysphagia, dysphasia, vision loss etc.

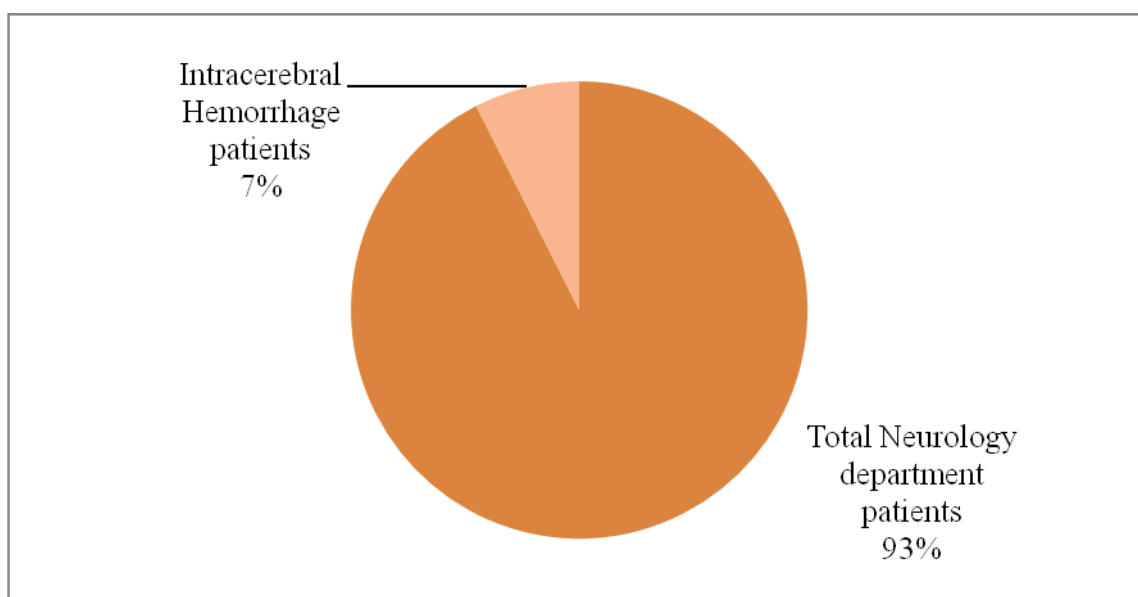
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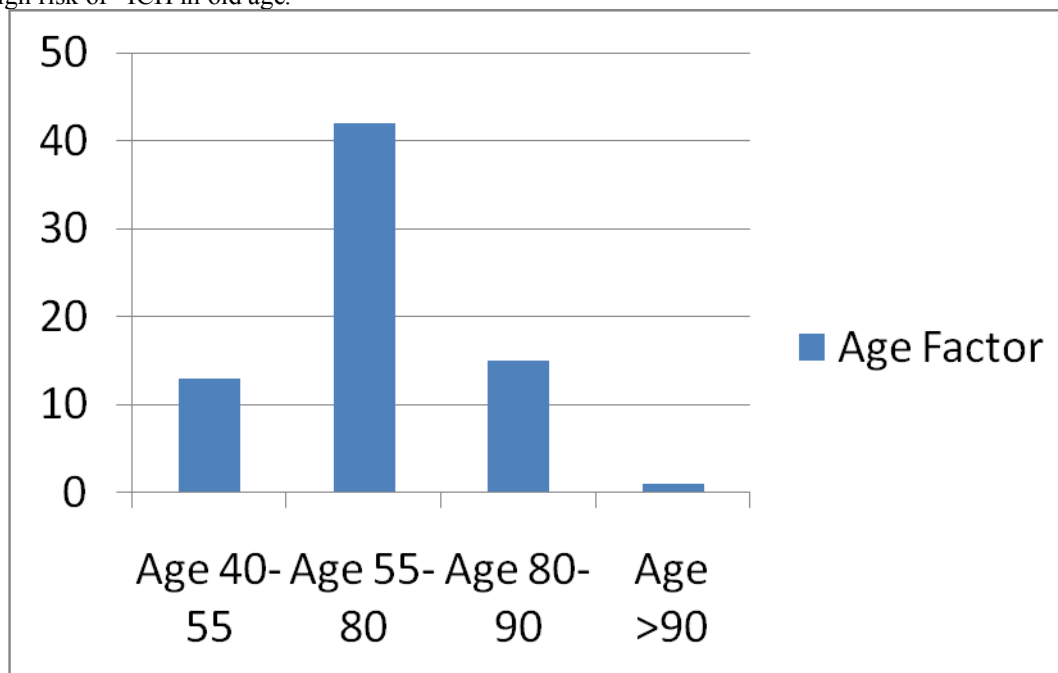
#### Results:

##### **Incidence of ICH :**

- 70 patients had developed ICH out of total 868
- patients admitted to Neurology department.



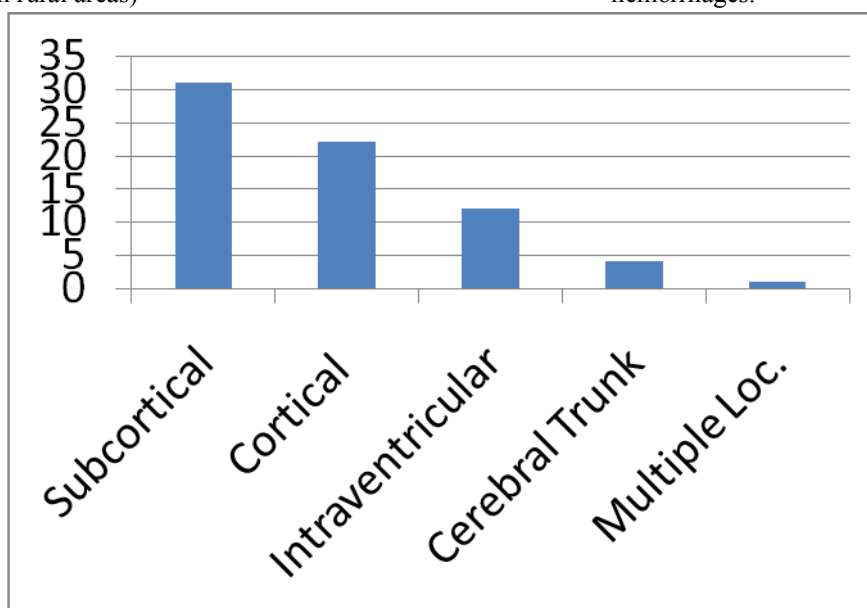
- The most frequent ages for Intracerebral Hemorrhage is between 55-80 years.
- High risk of ICH in old age.



- There is no sex difference in the incidence of ICH as it is quite balanced between two sexes.

Males	Females
35 Patients	35 Patients

- Comparing urban with rural residency it is found that increased number of ICH patients are from countryside due to poor medical assistance. (57 % patients affected by ICH are from rural areas)
- Localization of ICH
- Different locations of Cranium are affected by ICH .The most common one is Subcortical regions of Brain including putaminal hemorrhages.



- As an average, patients of ICH have stayed for 2 weeks at hospital.
  - Some patients either progress to death or received by their relatives due to worsening evolution and therefore duration of stay was not more than 1-7 days.
- However some stayed for more than 2 weeks for treatment and control

#### Risk Factors

- Hypertension(HTA):*  
*\*HTA is the most known risk factor for ICH.*  
*\*Hypertensive ICH most commonly occurs in nonlobar locations .*

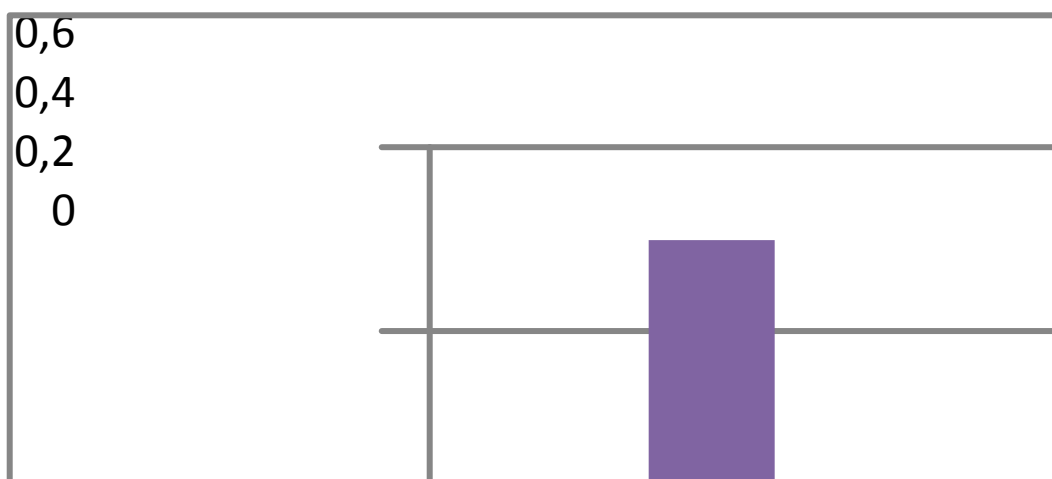
*\*Out of 70 patients studied, 33 patients were having Hypertension grade II and grade III. 14 patients were having systolic blood pressure above 160mm-hg*

- Other risk factors:  
*Dislipidemia, Alcoholism, Diabetes mellitus, Obesity and Cardiopathy are other major risk factors for ICH (H. Iso, D.R. Jacobs, D. Wentworth, J.D. Neaton, J.D. Cohen, 1989)..*

#### Motives of Presentation to Hospital

*All patients with ICH are symptomatic with sudden loss of consciousness or altered general state, persistent headache, vomiting and nystagmus. Some had seizures. Usually patients suffer from progression of neurological symptoms.*





Paraclinical Examinations :

CT scan give 90 % correct diagnosis.  
Other paraclinical tests include:

- HLG
- Glycemia
- ESR/Fibrinogen
- Biochemistry(AST/ ALT, Cholesterol , LDH etc.)
- Coagulation Profile( PT,APTT,INR )
- Urine analysis

#### Lab TESTS

- Almost all patients have some abnormalities in hemoleucogram.
- On Biochemistry examination LDH is usually elevated along with fibrinogen, CK and elevated ESR.
- Abnormal PT level is sometimes seen.
- Urine analysis showed usually normal results with exception of some patients with few blood, leucocytes and glucose in Urine.

- Volume or dimension of hematoma on CT scan has the greatest value in prognosis and evolution of ICH but also to decide about the treatment plan
- Presence of IVH signifies high mortality and worse prognosis. Ventricular extension usually seen with Caudate, thalamic, large putaminal and large lobar hemorrhages.
- Presence of midline shift >5 mm is indication of surgical consultation.

#### Evolution

- Overall evolution for ICH is not good as it has high mortality due to severe consequences and higher frequency due to HTA. Most of the patients die due to complications and worse prognostic factors. Patients who survive have following consequences or sequelae as observed:
- **Number of patients**

Left sided hemiplegia

Right sided Hemiplegia

Aphasia

Bubisnki sign

Facial Palsy

## Medical Treatment

- All the patients who have ICH had medical treatment. Some undergo surgical removal too. According to theory, patients needed medical treatment with labetalol, nitroprusside or hydralazine for blood pressure control, Mannitol or osmotherapy for increase ICP, fluid management for hydroelectrical balance, phenytoin for prevention of seizures and also control of body temperature and other symptomatic treatments with Algalmin Metoclopramide, Quamatel, Vit b complexes etc.
- Kinetotherapy treatment  
Rehabilitation programme objectives: induce of volutar motor activity; prevent wrong movement; prevent muscle retractures and joints diformities, decrease spasticity. Rehabilitation programme: we used physical programme for reduce pain, spasticity and also kinetic method for each objective. In each month we followed the evolution using specific scale assessment. We must say that during the acute period they did not came at rehabilitation programme.

Indications for treatment with medical drugs are:

- Hematoma < 10 cubic cm or with minimal neurological deficits
- Very good or very bad prognostic feature presence

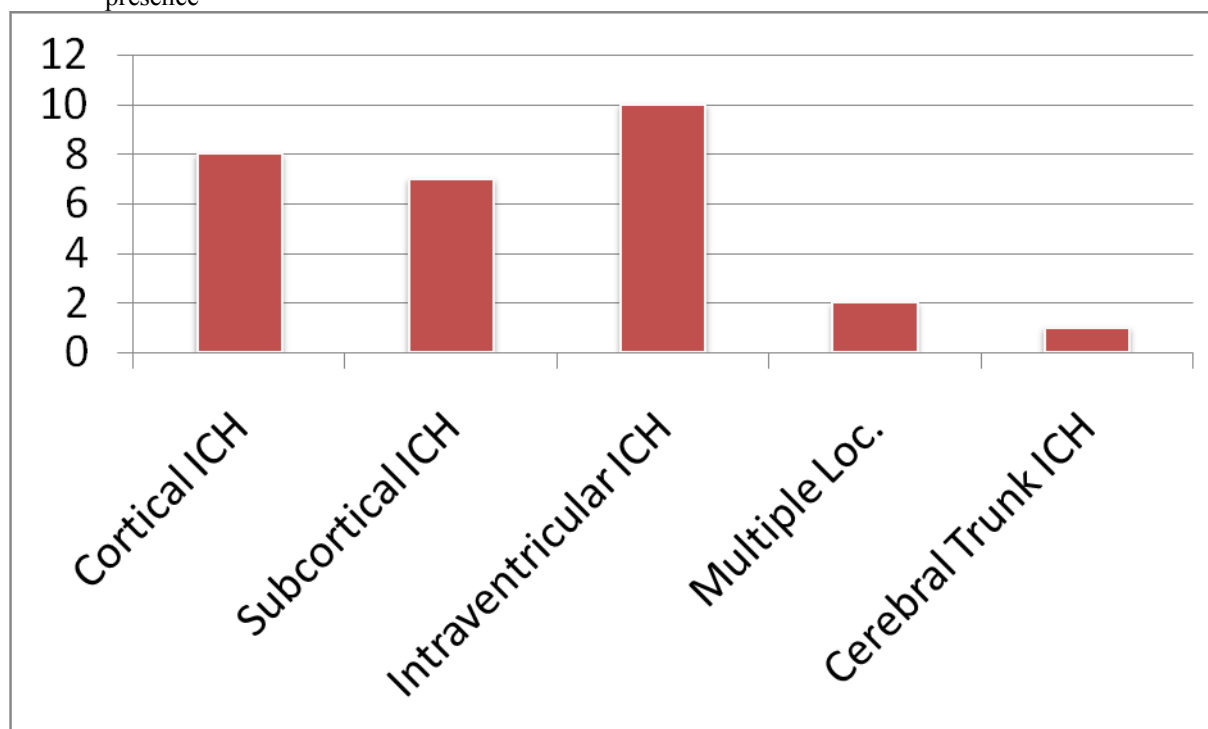
- Diverse hemorrhages with great neurological deficits or large lobar hemorrhages
- GCS <5 or GCS > 10
- Patients with intense coagulopathy or previous chronic disease
- Very old patients who cannot tolerate operation > 75 years
- Deep hemorrhages like Basal ganglia or thalamic hemorrhages
- Pons hematoma
- NEUROSURGICAL CASES( Only 6 cases Out of 70 needed neurosurgical consultation)

ICH is managed and treated by medical therapy in most cases however there are certain indications of neurosurgery:

- \* Progressive loss of consciousness
- \* Aneurysm , AVM or presence of tumor in Angiography
- \* >15 cubic cm in cerebral hemorrhage or > 3cm in cerebellar hemorrhage
- \* Midline shift or brain stem compression effect
- \* Obstructive Hydrocephaly
- \* Lobar and cerebellar hematoma
- \* Hematoma in nondominant hemisphere

## Mortality Rates

- ICH has high mortality outcome.
- Intraventricular hemorrhage is the most dangerous type of ICH for the life of patients.



## Mortality Factors

- Large volume of hematoma

- Intraventricular location of hematoma (2 fold increase in death)
- Associated disease and risk factor presence; like HTN
- Lower GCS (GCS less than 8 with 30 days of mortality rate)
- Presence of aneurysm
- Patient receiving oral anticoagulant therapy (OAT)
- Abnormal lab findings of cholesterol or blood glucose
- Previous history of Stroke
- Advanced ages (above 65 years)
- Poor Response of patients to medical or surgical treatments

### Conclusions

- Although we are assisting a new and highly established medical drugs and interventions in the field of modern medicine, ICH are unfortunately common in Neurology department. It is the second most common cause of stroke, following ischemic stroke.
- HTN is the major risk factor, morbidity and mortality is increased with the size of hematoma, location of hematoma, ventricular extension presence, blood glucose level and advanced age. Also GCS score is important in evaluation of prognosis in patients with ICH.
- Evolution of patients with ICH is not good. Majority had Hemiplegia, aphasia, facial palsy and dysphagia. Death rates are high for IVHs.
- The best method of prevention of ICH is good control of HTA, careful follow up of cases and removal of risk factors and education of public with respect to risk of development of ICH.
- Intracerebral hemorrhage will continue to be an important problem as the population ages in the world. Treatment is limited currently and is primarily supportive. Despite historically poor outcomes in ICH, there is considerable hope that the identification of factors involved in neurologic morbidity, early hemostasis, and removal of intracerebral hematomas will improve the short-term treatment of ICH.
- All patient with stroke have hemiplegia, an for all we started a recuperation program in hospital in acute stroke with kinetotrapiut and we recommend for home a battery of exercise.

### Clinical Status at discharge of patients from Hospital

- There are large ratios of patients who get worse at the clinic due to failure of every intervention and then die due to development of complications usually within 2 days.
- ICH is a disabling syndrome, therefore patients at presentation with coma get better only with accurate control of HTN and ICP, however most of them develop consequences of ICH that remains throughout their life .
- Patient's clinical status can be: Ameliorated(27%),aggravated(33%),death(40 %).

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## VALUE MOTIVATIONAL AND ATTITUDINAL ORIENTATION OF THE KINETOTHERAPIST STUDENTS IN THE PHYSICAL EDUCATION AND SPORT FACULTY

MICLE MIHAI IOAN<sup>1</sup>, NICULESCU GEORGETA<sup>2</sup>, SABĂU ELENA<sup>2</sup>, GEVAT CECILIA<sup>3</sup>

### Abstract

**The purpose** of this study is to investigate the motivational and instrumental content among physical therapy students. The focus of the study has been the presentation and the analyses of the theories and principles of physical therapy, the definition and satisfaction and the value of attitude.

**Methods** we have used two surveys: employees' motivation test (EMT) of Mihai Ioan Micle, 2009 and the professional values inventory by D. E. Super, 1994. The group of subjects consisted of 54 students of physical therapy, second year. The objectives of this study are: establishing the structure of the motivational factors, attitude factors and the significant relationships among them, establishing the role of the respective factors in the professional orientation of the physical therapy students.

**The results** we obtained have both theoretical and practical implications. As far as the theory of our study yielded the identification of the motivation content and of the professional values among students, as they exist in the post-modern Romanian society.

**Conclusions** As far as the application the results of the study present a series of aspects that can be valuable for future researches. Example: personality-interests-motivation-values as well as the selection process of the specialized institutions.

**Key words:** therapy, motivations, values, satisfaction.

### Introduction

The therapy by motion and its peculiar principles, technics and methods validated its perennality along almost 5000 years. T. Spenghe, 2008, considers „the human being long before noticed the benefits of the motion exercises to restore health” (p. 7). With time, won fame the evolution of theories and techniques for the application of this therapy. Even if the kinetotherapeutic practice did not register in the last 10-20 years spectacular changes, we have to underline such period „represented an unchallenged progress in the basic theoretical matters of the motion, muscular contraction, motor control as well as in the aerobic activity and its consequences induced to the body” (ibidem, p.17). Now, the kinetotherapy is a well known and highly appreciated area by people needing to consolidate or to restore functions of some parts of the human body affected by disease or traumatism. The kinetotherapy, component of physical medicine, a therapeutic individualized form, has been defined, in a general way, as a science which studies the motion of living organisms, the structures to realize such motions, having as aim to restore a reduced function, to raise the functional level for a great number of body dysfunctionalities. The kinetotherapy is applicable in the profilactic therapeutic, curative and restoring programs. It can be found in three sections of the medical assistance: **profilactic kinetotherapy** – including all methods and means to carry out treatments aiming to keep a satisfactory functional level, to raise the functional level (primary prophylaxis

or maintenance gymnastics, hiking in nature, jogging, aerobic gymnastics), to maintain the state of health, to use programs preventing worsening or complications in chronic diseases (secondary prophylaxis); **curative kinetotherapy** – associated with the prophylactic and restoring areas and the **restoring kinetotherapy** – the most important section in the program of medical restoring. In the last 10 years, the increasing number of people having different problems requiring, for the functional reequilibration of the body, kinetotherapeutic services, indicated also a deficit, on the labour market, of specialized persons. It is also a consequence of the opportunities offered by the University Diploma to the people graduated in the Kinetotherapy Department, to find insertion in the labour area, to carry out professional activities in hospitals, polyclinics, sanatoriums, special institutions, special schools, spas, health centers or houses, restoring of sport teams, private surgeries, etc. and therefore increased the number of studying people, their orientation to get diploma of kinetotherapist. Below we will succinctly present the perspectives in which in the specialized literature are defined and explained the motivation, the value attitudinal component and the satisfaction.

### Motivation–conceptual

**DELIMITATIONS.** Clearing up the motivation process involves a lot of difficulties. The conceptual ambiguities are underlined by the existence of so many opinions and theories about an important subject for the organisations. Each kind of focusing

<sup>1</sup> Institute of Philosophy and Psychology “Constantin Rădulescu Motru”, Bucharest, ROMANIA

<sup>2</sup> Spiru Haret University, Bucharest, ROMANIA

<sup>3</sup> Ovidius University, Constanta, ROMANIA

E-mail: mihai\_micle@yahoo.com

offers its contribution to explain the human conduct, having at the same time its own limits. Although some authors argued such term can't be defined (D.A.Dewsbury, 1978), P.R. Kleinginna a.o. (1981) in a multidisciplinary approach (1981) have been identified 140 attempts to define the motivation. **The motivation is sometimes considered as an internal factor** – „an internal state of necessity – a motivational state (necessities, wishes, impulses) which mobilizes, stimulates and directs the body to a certain way of meeting” (J.Nuttin, 1975); an internal travel to satisfy an unsatisfied necessity (J.M.Higgins, 1994); the internal force directing individuals to get their personal and organizational aims (J.R.Lindner, 1998), or as an expression of the manner to direct an action to one sense: „a proclivity to realize some actions or tending to certain goals” (H.Pieron, 1963, p.249); a proclivity to conduct oneself in a proposed manner, to reach specific, desired necessities (J.A.Buford, A.G.Bedeian, J.R.Lindner, 1995) or pure and simple as a mental prepared and directed necessity to its goal – the desire to be successful (Bedeian, 1993). **Most of the authors consider the motivation as a psychological process** which gives the aim and the direction of the behaviour (R.Kreitner, 1995) – „a process which activates, orientates, stimulates and maintain the individuals' conduct to reach the expected goals (P.Roussel, 2000, p.5). From the perspective of the psychological contribution, the most convincing is the definition of Vallerand and Thill (1993, p.18): „the concept of motivation represents a hypothetical construction, used to describe the internal and/or external forces producing the release, the direction, the intensity and the persistence of the behaviour”. In conclusion, „the motivation in the activity can be defined as an internal disponibility to intensify and up-to-date an energy giving sense, direction and continuity to the behaviour. It can be understood as an anchor in the individual self-regulation process. It allows to explain why the same external influence produces different effects in the same persons in different moments of their existence” (M.Micle, 2007, p. 184).

#### Classic models

From the historical point of view, the studies aiming to find a theoretical ground to the concept of motivation for the activity have come a similiary way to the development of different approaches of the scientific management. The main questions have been: Which is the origin of the motivation and how does it work. How, when and in which sense it manifests itself? In time have been elaborated a lot of theories, each one analyzing parts of the same theme – the motivation – but by different ways. K.L.Leboyer 2002, P.M.Muchinsky, 2000 show by one hand such theories maintained the interest of the managers, of the leaders in the area of organizations and human resources and on the other hand, many theories had a limited contribution to explain the investigated phenomenon and implicitly offered few strategies serving as ground for the employees' motivation. Starting with the works

of J.P.Campbell and colab. 1970, followed by D.Hellrigel, at all. 1992, G.Johns (1998), etc., **the taxonomy of motivation theories makes distinction between the content motivational theories and the process motivational theories.**

**Content motivational theories.** From the perspective of the theories regarding the content A.H.Maslow, 1967, D.C.McClelland, 1985, C.P.Alderfer, 1969, J.W. Atkinson, 1978, the motivation is a result of the stable moods. Such theories of the necessities consider an internal psychical tension represents the origin of the behaviour start. The necessity creates a lack of balance and the behaviour tries to restore the balance. In the Herzberg's theory (1967), the motivation is connected to the presence of some particular characteristics of the work. These specific characteristics of the job potentiate and up-to-date in every individual certain psychological states which influence the motivation and the efficiency of the employee. These theories have attracted criticism: they tend to arrange the factors of motivations in lists to be universal; they are poorly validated, in an empiric way, as the metodological steps are unsufficient; they, generally simplifying, offer more explanation for the satisfioin than for the motivation, which they explain by satisfying the necessities, aims and values; the explanation for the motivational processes is not complete (M.Micle, 2007). On the whole, the above discussed theories gave rise to many empiric researches owing to difficulty to define and to rationalize the necessities and to anticipate the effects. Although, they have been applicated especially in the activities concerning the work reorganization.

**Process motivational theories.** The processual theories sound the behaviour and focus on highlighting the mechanisms of motivation, trying to answer the question: „How people can be motivated to work?”. **The processual motivational theories** (V.H.Vroom's theory of expectations, 1964; L.V. Porter's and E.E.Lawler's Model of expectations, 1968; D.A.Nadler's and E.E. Lawler's Model, 1977; Theory of J.S.Adams, 1963, 1965, about the equity; Theory of fixing objectives – Locke, 1968; Theory of attribution –F. Heider, 1958 – cf. Hewstone, 1958) try to understand the operating mechanism of motivation (relation between expectation and valencies), which are the processes leading to release the behaviour, to the actions and to reach the objectives according to the organization's expectation. From the perspective of these theories, the motivation is defined as a consequence of a rational choice. These theories have attracted criticism of specialists: the difficulty to make operational such theories; the excesive quantification tends sometimes to convert in rational arguments perceptual data (the authors reserve although an essential role to the games of perceptions in the motivational process); the intermitent aspect of theories, especially in those of expectation. M.I.Micle, 2007, precise that the **content motivational theories**



and the process motivational theories are not complementary, each one having certain limits and being object of alternative conclusions. The content of different theories of motivation highlight, in the structure of professional motivation, a diversity of factors: necessity to perform, necessity to be affiliated, necessity to realize, necessity of statute, necessity of power, necessity of earning, necessity of appreciation, necessity of satisfaction in the work, etc.

**Values, attitudes and satisfaction.** Values represent states or modes of action which are considered as unanimously accepted. They have an important role in orientating the human actions, in establishing objectives and aims, strategies, action methods and ways. They represent „the appreciation one subject has for an object (thing, idea, attribute, relation), according to the socially accepted criterion of satisfaction, of a necessity or ideal (C.Zamfir, Vlăsceanu, 1993, p. 661). D.Hofstede (1980) consider values as a „general tendency to prefer some states of affairs in relation to other ones” (p.19). Such definition clarify the emotional and sentimental content of values, the distinction between one person consider preferently to be good or bad. In this respect, for the simple reason people has not the same values, it is indispensable to classify them in some categories: intellectual, economic, estetic, social, politic and religious (Spranger, 1928, apud Johns, 1996). The professional values represent an axiologic subsystem; they refer to particular aspects of the professional activity, more or less wanted (D.E., Super, 1970, apud Chelcea, 1994, p. 102). As a result of psychophysiological researches, D.E. Super identifies 15 professional values integrated in Work Values Inventory, designed to advise students and to professional selection (S.Chelcea, 1994, apud M Huteau ; D. Pouzols, 1974). The 15 professional values are differently appreciated in concrete professional situations. **Attitude** is a synthetic psychical construction gathering intellectual, affective and volitive elements. Is an internal manner to refer to different sides of the social life, to other people, to oneself, to the activity and to express the behaviour (M. Zlate, 1994). It's a fact of consciousness and also a behaviour reaction, „it's the invariant upon which an individual realizes a selective orientation, a preferential self-regulation and adapts himself/herself by evolution” (ibidem, p. 110). Meassiscev, 1963, p. 430, precise the attitudes contain two fundamental segments: 1. the incitative - orientative segment, implicitly selective – evaluative and 2. The effector, executive segment, preponderantly operational. The relation between these segments assures the unity of character. The attitudes are expressed in the behaviour through character features – „sets of covariant behaviour acts or phychical particularities which are part of the personality structure” (M.Zlate, 1994, p. 111). **Satisfaction** is one of the factors of the general efficiency in the work. The employees are or are not satisfied, in different levels and manners, according to their participation into activities. The work is perceived

by the employee not only as a mean to obtain the necessary resources but also as a possibility to have emotions, nice and positive feelings. The mood of satisfaction or unsatisfaction positively/negatively influences many personal and organizational employees' attitudes. (M.I.Micle, 2009). Despite the fact that it's difficult to register the satisfaction, in the course of time have been noticed perspectives and attempts to define it. **From the attitudinal perspective**, the satisfaction is seen as the employee's attitude to different aspect of work and such attitudes have both affective and cognitive elements (Weight și Cropanzano, 1997, apud Côte, S. 1999). The attitudes which are considered as relevant in the work process are represented by the following dimensions: promotion, salary, the work itself, recognition, benefits, work conditions, overseeing, workmates and managerial politics (E.A.Locke, 1976). **From the psychological perspective**, the satisfaction is defined as „a positive emotional state, resulting from the evaluation of the carried out work or from the experience got in the work” (E.A.Locke, 1976, p.1300); „a positive or a pleasant emotional state further to the correspondence between what an individual expects from his/her work and what he/she is receiving instead” (A.Ripon, 1987, p.421). **From the psychosociological perspective**, the job satisfaction (SM) is the result of the difference between what individuals obtained as work reward (o.r) and what they estimated to be obtained (e.o.). Even has been elaborated a calculation formula for the satisfaction mood. So, the satisfaction is put in a mathematical relation with what an individual considers to obtain (expectations, projected objectives) and what he/she objectively gets from his/her work (realized objectives) (C.Zamfir, 1980, p.231). As a conclusion, the satisfaction can be defined as an internal good state, a positive emotional feeling, a result of evaluating the carried out activity as well as a synchronisation between the employee's expectations and the received compensations (economic, recognition, statute, etc.) (ibidem, p. 50). The unsatisfaction appears when the employee's expectations regarding his/her activity are different of those obtained, when he/she is disappointed. In the evaluation process are important his/her sentiments, feelings towards the obtained results.

### Research

**Methodology.objectives:** The objectives to be reached during the research connectd with this stydy are: 1. To determine the structure of the value motivational, attitudinal factors and the significant correlations between them. 2. To detect the role of the value motivational and aptitudinal factors in the professional orientation of the kinetotherapeutist students.

**Hypothesis.** The classification of motivational factors depends on the existing two kinds of motivation – the intrinsic and the extrinsic. 2. The structure of the value attitudinal and satisfaction factores depends on

the manner in which the survey subjects perceive the motivational and satisfaction variables. 3. Inside of each category - motivation (TMRU) and satisfaction (IVP) – there are variables in an interrelation position. 4. There is a number of significant correlations and correlation tendency between the TMRU and IVP variables.

**Methods.** Have been used 2 categories of tests: Test regarding the employees' motivation (TMRU) {(TMRU) (69 items) was created by Micle, 2009}.

– **test of motivation.** In this study we used, from the original survey, 30 items, structured in six dimensions/sides of the employees' motivation: Professional motivation (9 items) with 3 subdimensions – 1. Personal factors, aptitude and character characteristics (A/C)(3 items); 2. Occupational characteristics, interesting present job (Ma) (3 items); 3. Occupational characteristics, feedback from chiefs – work recognition (Rm). Affective motivation (Mafec.) integrated by three items. Cognitive motivation (Mcog.) which has in its structure the same number of items (three). Economic motivation (3 items) dealing with the remuneration and „other incentives” (prizes, profit share, food coupons, etc.) got by the employees. The psychosocial motivation (9 items) has in its structure 3 subdimensions regarding: Working group, (Gm); Independence/autonomy, (I/A); Prestige (P) . The mentioned subdimensions have in their composition each one 3 items. Extra-organizational motivation (F.extra) with three items. Examples of items in the „Test regarding the employees' motivation” (TMRU): In the kinetotherapist profession

I will receive a salary according to the difficulty of the accomplished task (economic motivation); I will have an activity which will offer me opportunity to be informed, to know many new things (cognitive motivation); I will deserve appreciations for the fulfillment of the future work task. So, I will feel great/appreciated (affective motivation); My family and my friends will support me in all my activities (extra-organizational motivation); The good understanding, collaboration and cohesion with my work mates will stimulate my activity (psychosocial motivation – Group of work); My future job will give me independence and freedom to fulfill my tasks (psychosocial motivation – Independence); For me matters to have a job, where I should be admired by other people ( psychosocial motivation – Prestige); etc. B. Inventory of professional values (IVP) – **test of satisfaction.** The survey”The Work Values Inventory (WVI)”, elaborated by D.E.Super has been adapted for our country by S. Chelcea( S. Chelcea presents these values following the work „Etude de l'inventaire des valeurs professionnelles”, by M. Huteau and D. Pouzols, 1974., 1994. The inventory contains 45 items structured to highlight 15 value dimensions: Altruism (A); Aesthetics (E); Intellectual stimulation (Si); Professional success (R); Independence (I); Prestige (P); Leadership (Co); Economic advantages (Ae); Professional confidence (Sp); Physical environment (Am); Relations with chiefs (Rs); Relations with colleagues (Rc); Way of life (Mv); Variety (V); Creativity (C). To evaluate each value dimension have been established three items. There are seven possible answers to these test items.

<i>I fully agree</i>	<i>I agree</i>	<i>I partially agree</i>	<i>I don't know</i>	<i>I slightly disagree</i>	<i>I disagree</i>	<i>I fully disagree</i>
+ 3	+ 2	+ 1	0	- 1	- 2	- 3

## PLACE of RESEARCH and INVESTIGATED SUBJECTS

The research was carried out in Faculty of Physical Education and Sport, Kinetotherapy Program. In the test group were 54 subjects (30 – females and 24 – male). Subjects' age was between 21 – 35 years and the average was 28.

**EXPERIMENTAL DESIGN.** The experimental design incorporated the following steps: 1. Specialized theoretical documentation. 2. Study of evaluating instruments. 3. Presentation and discussion of the the results by instruments: Determination of factor structure for each evaluation instrument: correlational analysis.

**Table 1. Statistical data summary – TMRU**

<i>Predictors</i>	<i>N</i>	<i>Minimum</i>	<i>Maximum</i>	<i>Mean</i>	<i>Std. Deviation</i>
<i>Cognitive motivation (MI)</i>	54	3	9	7,35	1,456
<i>Extra-organizational factors (M Ex.)</i>	54	4	9	7,31	1,371
<i>Aptitudes, character, personal factors (MI)</i>	54	3	9	6,80	1,433
<i>Present job – interesting – Intrinsic motivation (MI)</i>	54	1	9	6,70	1,958
<i>Recognition of work – Occupational characteristics (MI)</i>	54	3	8	6,61	1,642

**PROCEEDINGS.** The study involved the use of a package based on descriptive, inferential and correlational statistics. In this regard we resorted to a specialized statistic package: SPSS (Statistic Program for Social Sciences).a

**PRESENTATION and DISCUSSIONS about THE RESULTS BY INSTRUMENTS. STATISTICAL DATA SUMMARY.**The classic validation strategy of predictors supposes to operate at the level of correlation (validity) coefficients, the criterion data and the test data (M.Albu, 1999, both types, predictive and concurrential (H.D.Pitariu, 1983). Have been used a motivational test (TMRU) and a test of satisfaction (IVP).

<i>Affective motivation (M Ex.)</i>	54	4	9	6,54	1,819
<i>Job group – Psychosocial motivation (M Ex.)</i>	54	4	8	6,54	1,819
<i>Prestige (M Ex.)</i>	54	4	8	6,43	1,678
<i>Independence, autonomy (M EX.)</i>	54	1	8	6,30	1,958
<i>Remuneration – Economic motivation (M EX.)</i>	54	0	11	6,06	3,254

As can be seen ( Table 1), the data frequency distribution is normal, with one exception – the remuneration – economic motivation (M Ex.). On the first place among the motivational factors in the options of the investigated students – Second course of Kinetotherapy – is the **cognitive motivation** – intrinsic motivation (MI), following, in a mean descending order, the dimension of **extra-organizational factors** – extrinsic motivation (M.Ex.), the dimension of **professional motivation** with its three subdimensions: aptitudes, character - personal factors (intrinsic motivation, MI); present job – interesting (MI), recognition of work – occupational characteristics (MI), the **dimension of affective motivation** (M Ex.), the **dimension of psychosocial motivation with three subdimensions**: job group (M.Ex), prestige (M.Ex.), independence and autonomy (M.Ex.). On the last place, among the motivational factors for the investigated subjects appears the **dimension of remuneration – economic motivation** (M. Ex.).

From the analyse of these motivational factors is found: students are motivated at the highest level, in their decision to complete the courses, being persuaded they should assimilate information, knowledge, which, according to their perception, would enrich their cognitive level - **cognitive motivation**. According to the discussions with the investigated students, we could find most of them completed courses of complementary disciplines – social assistant, masseur or they practice performance sports. It validates their orientation to such kind of motivation. On the second place is the **extra-organizational motivation** – the students consider the enlarged family as an important supporting factor in their aspiration to finish their studies, while the **economic motivation** is on the last place among the motivational factors. The average of this value – **economic motivation** – is smaller then the standard deviation and it validates the dissipation of students' answers. A possible explanation could be the national economic situation and the fact such discipline has not an evaluation, in the profession list, according to its real value. The professionally motivated students consider they have abilities, aptitudes and moral orientation to reach the performance level required by the the responsibilities of their function/job – kinetotherapist (aptitudes, character - personal factors), considering the future profession as attractive and interesting and they are persuaded they should benefit practising it, thanks to an objective recognition and evaluation of the real value of their job. In the case of the first five motivational factors = excepting the

**extra-organizational motivation** –( M.Ex.) – the other four kind of motivation represent intrinsic motivational factors (hypothesis I, checked), being favorable to realize higher and in time more estable performances than the extrinsic motivations. The following kinds of motivation - **the affective motivation** and **the psychosocial motivation** with the three dimensions – job group, prestige and independence – are on the 6th, 7th, 8th sand 9th positions in the motivational options of subjects (extrinsic motivational factors – hypothesis I, checked). In their opinion, for the successful achivement of the afferent responsibilities of job tasks, their affective, empathic involvement in the relationship with the future beneficiaries, the job group – the colleagues – should constitute a motivational factor. Prestige and independence as motivational predictors got lower values among the investigated subjects. The profession of kinetotherapist did not „gain”, doesn't have, in the opinion of specialists or the investigated subjects, a value and an objective position according to its benefits. From the independence point of vue – decisions, choice of technics and intervention proceedings, the investigated subjects considered their power of decision is limited. The figures reached in the Inventory of Professional Values– IVP (Table 2) indicate the investigated subjects. Kinetotherapist students can be satisfied first of all by their attitude to offer support, aid to people needing to consolidate or to restore the functions of some parts of the human body which have been affected by diseases or traumatismes. The professional success, intellectual stimulation, physical environment in their future job, variety of interventions, technics and proceedings to be used, harmonious relations, full of respect and consideration, with their colleagues and chiefs, the organization, professional security, confidence in the future job and way of life represent dimensions which are perceived by the subjects as values giving satisfaction. It's evident the structure of value and satisfaction attitudinal factors according to the manner in which the subjects perceive the satisfaction variables (hypothesis 2, checked). In the case ot these dimensions, the frequency distribution of data is normal with regard to the standard deviation. The last positions in the descending order of averages correspond to the following value dimensions: prestige, creativity and aesthetics. The average of these values is low with regard to the standard deviation and it validates the dissipation ot the subjects' answers. These dimensions/values can't be found in the subjects' zone of interest, as it doesn't give satisfaction. As long

as the students are not motivated by the economic dimension, they do not consider to have any satisfaction on this regard. The lack of independence,

leadership, prestige, creativity, etc. explain the low interest of students, who should prefer precise tasks, a higher strictness, more attention and exactness.

**Table 2. Statistical data summary – IVP**

Predictor	N	Minimum	Maximum	Mean	Std. Deviation
Altruism - IVP	54	4	9	7,65	1,615
Professional success – IVP	54	3	9	7,13	1,812
Intellectual stimulation – IVP	54	2	9	6,85	1,571
Physical environment– IVP	54	3	8	6,50	1,342
Variety – IVP	54	3	9	5,83	1,539
Relations with colleagues – IVP	54	1	8	5,74	1,662
Relations with chiefs – IVP	54	1	8	5,31	1,979
Professional security – IVP	54	1	8	5,11	2,221
Way of life – IVP	54	1	8	5,02	1,986
Economic advantages – IVP	54	1	8	3,43	2,070
Independence– IVP	54	0	5	1,94	1,188
Leadership – IVP	54	-1	4	1,46	1,177
Prestige – IVP	54	-1	4	,94	1,071
Creativity – IVP	54	-1	2	,46	,926
Extetic – IVP	54	-3	1	-1,63	1,121
Valid N (listwise)	54				

**Correlational analysis.** The next step in the validation proceedings was the study of variable correlations in the applicated tests. In this sense, we highlighted the following conclusions: In each category - motivation (TMRU), satisfaction (IVP) – there are a number of variables in interrelation position (hypothesis 3, checked). The number and variety of these interrelations differ according to the different weight of the motivation and satisfaction variables in the employees' perception. The table containing the correlations of motivational variables (TMRU) with satisfaction variables (IVP) shows significant correlations of coefficients (Hypothesis 4, checked). Between motivation and satisfaction there is a relation of inter-influence. Examples of correlations (see Table 3): **Cognitive motivation** (Mcog.) in significant correlation with the variable of intellectual stimulation (Si) ,280\*, professional

success (R) ,281\*, environment (Am) ,358\*\* and appears a strong correlation tendency to correlation with the value regarding the relations with chiefs (Rs) ,208 and with the value of prestige (P) ,245. **The extra-organizational factors** (Fextra) as motivational variable have a significant correlation with the satisfaction values: Independence (I) ,346\* and Way of life (Mv) ,346\*. The motivational variable **aptitudes, character – personal factors** has a significant correlation with Altruism (A) ,301\* Professional success (R) ,402\*\*. As observed in the bellow table there are also between the other dimensions of the two surveys (TMRU & IVP) correlations and significant correlation tendency.

In conclusion, the motivational and attitudinal value factors of satisfaction have an important role in the professional orientation of the kinetotherapist students (Objective 2)

**Table 3 Correlations of motivation (TMRU) and satisfaction (IVP)**

	A	E	Si	R	I	P	Co	Ae	Sp	Am	Rs	Rc	Mv	V	C
F.extra.	-,054	-,004	-,147	,080	,346*	-,179	,038	,026	-,161	-,398*	-,281*	,087	,346*	-,181	,007
A și C	,301*	,093	,083	,402*	-,052	-,085	,087	-,301*	-,210	-,053	-,086	-,025	-,221	,016	,074
Ma	-,133	,052	,000	,057	-,318	-,063	-,013	-,017	,066	,272*	,012	-,170	-,183	,197	,163
Rm	,111	-,116	,206	,171	-,026	,199	,045	-,053	,005	,153	,128	-,188	,016	,165	-,147
Mafe c.	-,190	,215	,138	-,092	-,236	,083	-,035	-,116	-,027	,233	,104	-,172	-,048	,084	-,027
Mcog	-,100	,008	,280*	,281*	-,227	,245	-,177	-,020	,039	,358*	,208	-,209	-,243	,075	-,090
Rt	,175	,139	-,197	-,147	-,071	,255	-,301*	,013	-,016	-,106	-,194	,231	,054	,273*	-,007
Gm	-,190	,215	,138	-,092	-,236	,083	-,035	-,116	-,027	,233	,104	-,172	-,048	,084	-,027
I/A	-,068	,094	,109	-,097	,305*	,144	-,118	,384*	-,237	,086	,060	,020	,185	,044	,168





								*							
P	,229	,086	-,083	-,182	-,001	,063	-,235	,220	,077	,054	,310*	-,131	,027	-,179	-,117

\*\*Correlation is significant at the 0.01 level (2-tailed).

\*Correlation is significant at the 0.05 level (2-tailed).

**Conclusions.** The value motivational and attitudinal factors of satisfaction have an important role in the professional orientation of the kinetherapist students. The motivational factors can be classified in conformity with the two kinds of motivation: intrinsic and extrinsic motivation. The structure of the attitudinal factors regarding the value and satisfaction depends on the manner in which the investigated subjects perceive the motivational and satisfaction variables. In each

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category - motivation (TMRU), satisfaction (IVP) – there are interrelation variables. There are significant correlations as well as tendency of correlation between the TMRU and IVP variables. From the applicative point of view, the results of this study suggest some aspects which could be used in next researches, for instance about the relation between personality – interests – motivation – values, as well as in the trial process carried out by the organizations.

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## ASSESSMENT OF FUNCTIONAL DISORDERS OF THE LOWER LIMB AFTER SURGERY

TANASE IONUT GABRIEL<sup>1</sup>, TANASE NARCISA<sup>1</sup>

### Abstract

**Purpose.** Today we live in an era of speed with a growing rate of accidents, especially traffic that is associated more frequently with complex trauma, in particular of lower limb, is within the classification of type III open fractures B / C. These injuries are often accompanied by great loss of tissue in the leg, requiring complex reconstructive surgery.

**Methods.** I took the 158 study patients with complex lesions in the calf-ankle-foot defects were accompanied by significant loss of skin, muscle and bone, only those cases which required microsurgical reconstruction type. We selected and pursued these cases because of their severity, many of them to amputations limit, and trying to prove that the evolution of science by introducing microsurgery in orthopedics and emergency services can change the destiny of man, athlete or not.

**Results.** Thus at the patient hospitalization, mean limb function made up  $28.36 \pm 2$  points for third proximal calf  $24.17 \pm 2$  points for the middle third leg, and  $20.12 \pm 2$  points for distal third leg.

At 18 months postoperatively, in the group of patients overall result was satisfactory. The average score of function in proximal third of leg was made at  $5.09 \pm 1$  ( $p = 0.029$ ), middle third of -  $5.20 \pm 1$  ( $p = 0.024$ ) and distal third of leg -  $6.31 \pm 1$  ( $p = 0.011$ ). Distal third leg was more modest final results compared to the middle and the proximal, which is determined by placing lesions in close proximity to the joint talocrurale.

**Conclusions.** Finally we can say that the assessment of lower limb functional disturbance shows that solving through reconstructive microsurgery techniques these serious cases with significant loss of tissue (skin, muscle, tendon, bone), leads not only to shorten hospitalization and reduce costs, but also a good psycho-social and professional reintegration.

**Key words:** lower limb, limb function, loss of tissue.

### Introduction

Today we live in a fast paced era where the increasing rate of accidents, especially traffic accidents, is associated more frequently with severe traumas, serious lower limb injuries that fall into the classification of compound fractures type III B/C. Most of the times, these traumas are characterized by considerable loss of lower limb tissue that require complex reconstructive surgery (B. Ponten, 1981; M. Saint-Cyr, C. Wong, M. Schaverien, A. Mojallal, R.J. Rohrich, 2009).

The reconstruction of the soft tissue was performed at an early stage, within the first 72 hours in most of the cases, fact that lead to a decrease of the infection rate, lower costs and shorter admission periods for patients and better results on the long term. The surgical method to be used for resolving the defects is subject of the affected area, the type and seriousness of the injury, the patient's age and, in the case of professional athletes, whether they are considering continuing their sporting career or not (B.M. O'Brien, 1990; F. Zhang, W. Dorsett-Martin, K. Fischer, M.F. Angel, H.J. Buncke, 2001).

The study comprises 158 patients suffering from complex calf - ankle - foot injuries accompanied by serious tissue, muscle and bone defects; all cases required microsurgical reconstruction. We have screened and followed up these cases due to their complexity, many of them

risked amputation, and we have tried to demonstrate that the scientific evolution by introducing microsurgery when providing emergency orthopedic care may change one's destiny, whether an athlete or not.

In order to put together a Study Model regarding the functional evaluation of the lower limb, we have considered the following parameters (T.P. Whetzel, M.A. Barnard, R.B. Stokes, et al., 1997):

- Ankle immobility - dorsiflexion and plantarflexion -  $90^\circ$  = position 0 - rated with 5 points = mobile ankle.
- Ankle stability - evaluated by using antero-posterior translations and rated with 4 points - stable = 0; stable but showing capsular ligament lesions; unstable, malleolus sprain; unstable, with fractures and sprains.
- Muscle force / movement activity - classically rated with 5 points, but in inverse proportion where the normal movement activity compared to the lateral limb is rated with 0;
- Muscle retraction - especially the Achilles tendon or muscle hypotonia (chronic cases) - rated with 5 points; lack of retraction = 0;
- Pain score - visual analogue scale - from 0 to 10, 0 meaning the lack of pain and 10 highest degree of pain.
- Skin sensitivity - 5 points - sensitive = 0, low hypoesthesia, mild hypoesthesia, severe

<sup>1</sup> Emergency County Clinical Hospital of Constanța, Faculty of Medicine, Univ. "Ovidius" Constanța, ROMANIA

E-mail: tanaseionut@yahoo.fr

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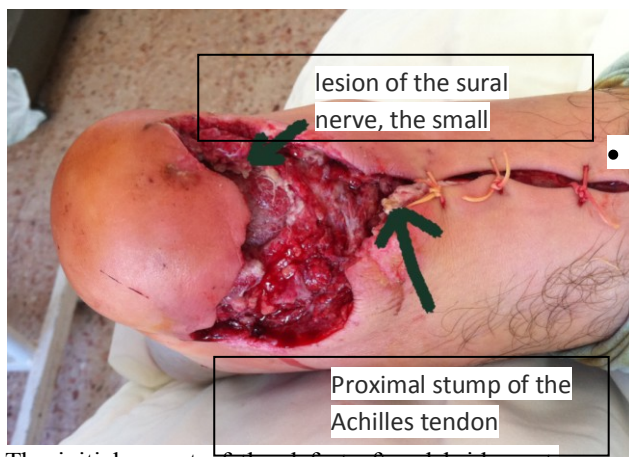
hypoesthesia, insensitive, several skin areas affected.

Starting from ideal circumstances, that is a healthy limb = 0 points, and acute trauma with loss of soft tissue and bone = 34 points, we may evaluate the dysfunction of the injured lower limb according to the anatomic position of the lesion:

- When stationary, the average score of limb function was  $28,36 \pm 2$  points for the third proximal part of the calf ( $p=0,040$ );  $24,17 \pm 2$  points ( $p=0,033$ ) for the third middle part of the calf; and  $20,12 \pm 2$  points ( $p=0,019$ ) for the third distal part of the calf.
- 18 months after the surgery, the overall result on the group of patients was satisfactory. The average score of the functions were: for the third proximal part of the calf  $5,09 \pm 1$  points ( $p=0,029$ ), the middle third  $5,20 \pm 1$  points ( $p=0,024$ ) and the distal third -  $6,31 \pm 1$  points ( $p=0,011$ ). The third distal part of the calf showed slightly less favorable outcome as compared to the middle and proximal ones, due to the fact that the lesions were in the vicinity of talocrural joints.

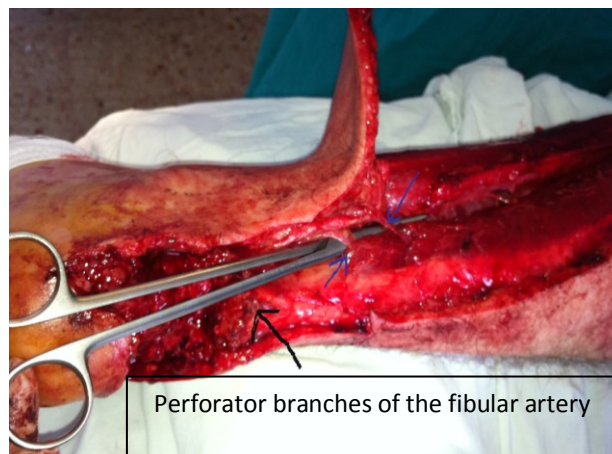
**STUDY CASE.** 23 years old male (football player), injured in a scooter accident, showing a severe heel wound at the outer malleolus, with a serious soft tissue defect (skin, muscle and Achilles tendon). Under the circumstances, it is decided to proceed with the cutting of the vascularized fasciocutaneous flap by fibular perforators. The wound shows a 4 cm defect of the Achilles tendon:

**Figure1.**



- The initial aspect of the defect after debridement. The major Achilles tendon defect is noticeable, as well as the lesion of the sural nerve and the small saphenous vein.

**Figure 2.**



- A fasciocutaneous flap is cut in the shape of a „tennis racket”, two fasciocutaneous branches of the fibular artery are distally identified; these will vascularize the future flap.

**Figure 3.**



- Once the perforator flap is cut, it is then rotated around the identified vascular arteriovenous axis.

**Figure 4.**





- The flap is sutured to cover entirely the defect. The continuity of the Achilles tendon is made by positioning the fasciocutaneous flap between its edges.

It should be noted that the Achilles tendon defect was solved by positioning and suturing the fascio flap to the two proximal stumps and distal of the tendon. The evolution is favorable and the both the tegument and the Achilles tendon defects are solved

**To conclude**, we may note that the evaluation of the dysfunction of the lower limb proves that solving these severe cases with serious loss of tissue (skin, muscle, tendon, bone) through reconstructive microsurgical techniques, as we mentioned earlier, leads not only to a shorter admission period and cost reduction, but also to restoring the patient's social, psychological and professional life in a positive manner.

Thus, I suggest my fellow colleagues to use surgery for immediately solving these injuries by making full use of the existing local and regional resources (perforator flaps) or by using the free tissue transfer (tissues removed from other parts of the body), and I hereby submit to you the functional results and movement recuperation of these patients.

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## ❖ SPORT AND HEALTH

### SUBJECTIVE ASSESSMENT OF FATIGUE IN 12 YEARS OLD CHILDREN

GIDU DIANA VICTORIA<sup>1</sup>, ENE-VOICULESCU CARMEN<sup>1</sup>, STRATON ALEXANDRU<sup>1</sup>,  
HRITAC FLORENTINA<sup>2</sup>

#### Abstract

**Purpose.** The aim of this study was to test the ability of self-estimation subjective degree of fatigue in 12 years old children.

**Methods.** Therefore, the heart rate (HR) of our children was recorded after different times within physical education lesson (immediately after 10, 20, 30, 40 and 50 minutes). At the same time with HR evaluation, pupils were asked to indicate a specific figure on the Borg Scale.

**Results.** The results showed that pupils at this age have the tendency to underestimate the intensity of effort.

**Key words:** subjective assessment of fatigue, Borg Scale, pupils 12 years old.

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<sup>1</sup> Ovidius University of Constanta, Faculty of Physical Education and Sport, Constanta, ROMANIA

<sup>2</sup>Theoretical High School „Mihail Kogalniceanu”, Constanta, ROMANIA

E-mail: campiap@yahoo.com

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## Introduction

The Borg Scale (G. Borg, 1982) is a simple method of rating perceived exertion (RPE) and can be used by coaches to measure athlete's level of exercise intensity in training and competition. Also, the RPE Scale is used worldwide by professionals in exercise physiology, sports medicine and psychology, wellness and ergonomics (Borg, G., 1998)

Subjective fatigue level perception recorded during the course of exercise is a trained capacity. In 1973, psychologist Gunnar Borg proposed a scale to estimate subjective perception of physical fatigue (appendix 1). Borg scale (Borg scale or RPE = Rate of Perceived or Exertion) is a valid reliable instrument with which could be performed a subjective assessment of exercise intensity (G. Dumitru, 2006).

The RPE Scale is used in some research studies for the respective purpose, but may also be used in training programs to describe the intensity of training sessions. Also RPE may be used to predict relative metabolic demand, especially at higher workloads and could be a useful tool for supervising intensity of solicitation during vigorous exercise.

Perceived exertion is how hard you feel your body is working. It is based on the physical sensations that a person experiences during physical activity, including increased heart rate, increased respiration or breathing rate, sweating, and muscle fatigue. Perceived exertion is the best subjective indicator of the degree of physical intensity.

Although the RPE is a subjective measure, is proved that a person can realize a fairly good estimate of the actual heart rate during physical activity (G. Borg, 1998). The Borg RPE Scale is a tool for estimating effort and exertion, breathlessness and fatigue during physical work

A large number of papers (G. Dumitru, 1993; M.J. Chen, X. Fan, S.T. Moe, 2002; <http://www.cdc.gov/physicalactivity/everyone/measuring/exertion.html>, <http://www.brianmac.co.uk/borgscale.htm>) have showed that subjective estimating of the effort is strongly correlated with exercise loads, heart rate (HR), oxygen uptake ( $VO_2$ ) and pulmonary ventilation.

There are three versions of this scale:

1. Borg 6-20 - the original scale as developed by Borg, with the ratings between 6-20 which can correspond to 1/10 of the exercise heart rate.
2. Borg CR10 - an updated combined category and rating scale by Borg with the ratings between 0 (nothing at all) and 10 (very very hard).
3. Rob's RPE-5 Hand Scale - a new scale with some advantages over the other scales. For this RPE Scale, the subject just holds up the fingers of their hand to indicate the intensity level - from 1 to 5 (<http://www.topendsports.com/testing/rpe.htm>).

Some investigations recognize the potential methodological and semantic limitations of existing category perceived exertion scales when used in children.

The results of the review (A. Gros Lambert, A.D. Mahon, 2006) show that the cognitive developmental level of children aged 0-3 years does not allow them to rate their perceived exertion during a handgrip task. From 4 to 7 years of age, there is a critical period where children are able to progressively rate at first their peripheral sensory cues during handgrip tests, and then their cardiorespiratory cues during outdoor running in an accurate manner. Between 8 and 12 years of age, children are able to estimate and produce 2-4 cycling intensities guided by their effort sense and distinguish sensory cues from different parts of their body. However, most of the studies report that the exercise mode and the rating scale used could influence their perceptual responsiveness.

However, for a long time, the fact that children can achieve more or less correct self-estimation degree of fatigue that come from performing a particular exercise was ignored.

The ratings of perceived exertion are commonly employed within both a clinical and exercise setting to quantify, monitor and evaluate an individual's exercise tolerance and level of exertion. Recent advances in the area of perceived exertion have led to novel applications in the use of the ratings of perceived exertion scale as a means of predicting an individual's maximal functional capacity ( $VO_{2max}$ ) for exercise (D.M. Lambrick, 2010). Yet the utility of such procedures with children has received little or no research attention. It is often presumed that like adults, a child's perception of exertion rises linearly with increases in exercise intensity, despite a limited amount research suggesting otherwise (D.M. Lambrick, 2010).

## Hypothesis

It was assumed that middle school children are able to correctly assess the degree of fatigue generated by the exercise performed during school physical education lessons.

## Material and methods

The purpose of this study was to determine the degree of fatigue self-esteem capacity during physical education lessons for 12 years old children.

In the first phase, the experiment consisted in an application of an opinion questionnaire that contained questions about how children perceived physical exertion during the physical education lesson. The second phase of the experiment was conducted one week after the application of questionnaires, and consisted in the assessment of heart rate (HR) of the pupils, at different moments of the lesson (immediately, after 10, 20, 30, 40 and 50 minutes).

In the moment of HR evaluation, the Borg Scale was presented to children. According to preliminary instructions, the children indicated a certain number on the scale that best described the perceived fatigue after effort performed, until that moment.

The study was conducted on 24 children (12 girls, with a mean age of  $12.41 \pm 0.29$  years and 12



boys with a mean age of  $12.55 \pm 0.30$  years), from Nicolae Tonitza School in Constanta.

For the statistical treatment of data we used the following parameters: average, standard deviation, the difference meaning between average and Bravais-Pearson correlation coefficient. The threshold for significance was set at  $p < 0.05$ .

### Results and discussions

Analysis of questionnaire responses revealed the following: in item 2, "How do you think are physical education classes? a) very difficult b) difficult c) moderate d) mild e) very light ", 35% of the girls considered that physical education lessons were mild, while 20% of them said difficult; the remaining 45% were undecided. 70% of the boys indicated that physical education lessons were light, and only 15% of the boys considered that physical education lessons were heavy; the remaining 15% of the boys were undecided. So, for 53% of the sixth grade children, physical education lessons were not considered exhausting, while for 18% of them, this was not true (fig. 1).

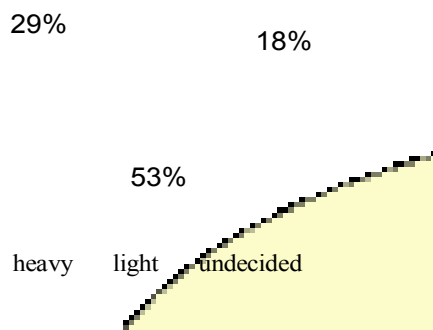


Fig. 1. Responses of the sixth grade children to item no. 2.

In question no. 9. "During physical education lessons I feel tired: a) very soon b) soon c) moderate d) later e) very late", 30% of the sixth grade girls said that the effort in physical education lessons induced a soon fatigue, while 25% of them said the opposite. In boys, only 15% of them believed that the effort in physical education lessons induced a soon fatigue and 65% of them were not supportive for this.

Overall, in the sixth grade, 45% of pupils surveyed said that physical education lessons were not so demanding as to lead to rapid fatigue, and only 23% of them, said that the opposite was valid (fig. 2).

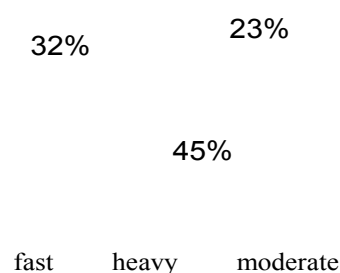


Fig. 2. Responses of the sixth grade children to item no. 9.

For both sixth grade girls and boys, the tendency was to under-estimate the level of exercise performed, regarding the subjective perception of exercise intensity on Borg scale. The real HR values evaluated by the experimenter was significantly higher ( $p < 0.001$ ) than the subjective HR estimated by the children, at various moments of the lesson (fig. 3).

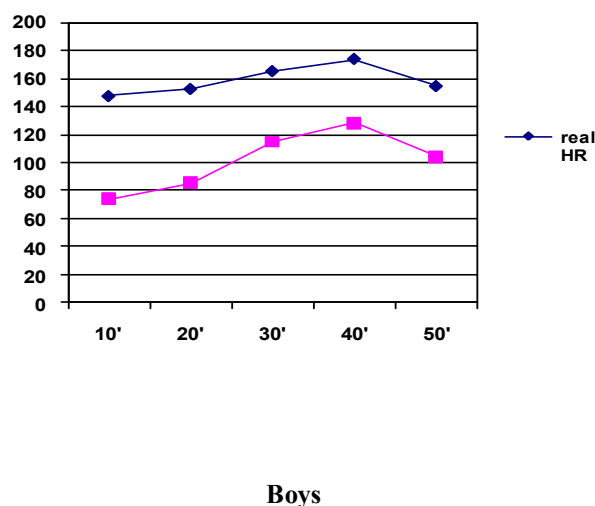
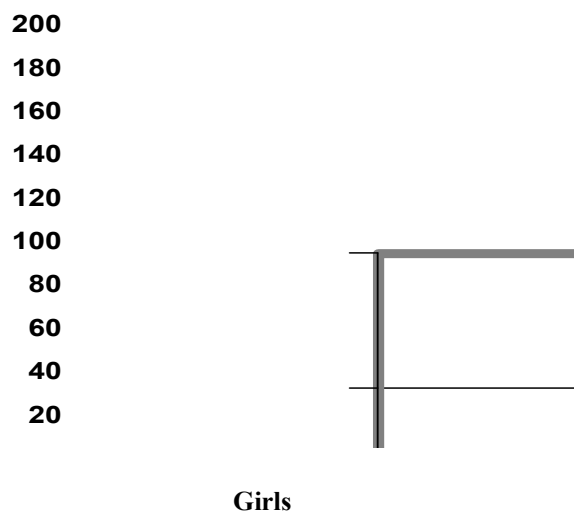


Fig. 3. Real and subjective HR (beats/min) of six grade children recorded during various moments of physical education lesson.

Correlations made between children responses to the questionnaire and the actual intensity of exercise in physical education lesson (based on the real HR) were not significant ( $r_{\text{girls}} = 0.434$ ,  $r_{\text{boys}} = 0.058$ ). Also, between the questionnaire responses and exercise intensity perceived by subjects based on subjective HR values, correlations were not significant ( $r_{\text{girls}} = -0.021$ ,  $r_{\text{boys}} = -0.036$ ), although both types of data were subjective estimates. Results confirm that at this age (12 years old), children does not have a good self-estimation capacity of the performed exercise intensity.

Studies of D.M. Lambrick, (2010) provide evidence to suggest that a child's perception of exertion may rise linearly or curvilinearly in relation to increasing work, during either cycle ergometry or treadmill exercise. These studies support the utility of a unique, curvilinear, paediatric ratings of perceived exertion scale in obtaining accurate exertional responses from young children, across differing modes of exercise.

In according with A. Gros Lambert, A.D. Mahon, 2006, RPE appears to be a cognitive function that involves a long and progressive developmental process from 4 years of age to adulthood. While much is known about RPE responses in 8- to 12-year-old children, more research is needed to fully understand the influence of cognitive development on perceived exertion in children, adolescents and elderly individuals.

### Conclusions

The hypothesis is not confirmed, because 12 years old pupils, regardless of gender, are tempted to underestimate the intensity of effort realized in physical education lessons.

Therefore, physical education teachers must educate the ability, in children, of exercise intensity correct self-estimation, in other words to appreciate how their body responds to exercise.

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## THE EFFECT OF EIGHT WEEK EXERCISE PROGRAM ON PHYSICAL FITNESS AND SOME BODY COMPONENT PARAMETERS FOR MIDDLE AGE SEDENTARY WOMEN

IBIS SERKAN<sup>1</sup>, SERKAN HAZAR<sup>1</sup>, KÜBRA GAMZE KÜÇÜK<sup>1</sup>, MUHSIN HAZAR<sup>2</sup>

### Abstract

**Purpose:** The purpose of this study was to determine the effects of the some body component parameters on the middle age sedentary women, during 8 weeks step-aerobic exercises program.

**Method:** Fifteen sedentary women volunteer who have not done any sport up to date join this study. Volunteers mean age is 32,9±7,8 years, the average height of 161,7±0,5 cm, weight average of 68,7±9,2 kg. Eight week exercise program was applied to this working group three days in a week and during this period we applied %50-60 intensity of heart rate, 45-55 minutes of step aerobic exercise. All measurements and tests were taken twice two days before and two days after exercise.

Research group's height was measured milimetric scale; weight measurement was taken using Ankel brand electronic scale. Body mass index, body fat and segmental analysis of research group was measured by Tanita BC-418 MA Body Composition Analyzer. Wilcoxon Signed-Rank Test was conducted for comparison of before and after exercises values. Statically significant level was set at 0.05 and 0.01.

**Result:** In this study according to the results of Wilcoxon Signed Ranks test there have significant decrease in total fat percentile, total fat mass and trunk fat mass after the exercise program ( $p<0.01$ ). Additionally, the decreases of right leg fat percentile, right leg fat mass, left leg fat percentile, left leg fat mass and trunk fat mass was statically significant ( $p<0.05$ ). Changes in other parameters were not statistically significant.

**Conclusions:** As a conclusion, the usage of body fat in the metabolism as an energy source in the moderate intensity and long duration aerobic exercises may be the reason of the positive decrease in physical fitness parameters and body components of women subjects.

**Key words:** Aerobic exercise, Bioimpedance, Women.

### Introduction

Today exercise is considered as one of fundamental principle of life. From birth to growth, development and during aging process there are lots of feature such as power, stability and quality of life seem to weaken.

Entrance of machines in daily life results easy life in terms of facilitate house works, easy transportation, usage of computer and watching TV restricted physical activities and energy consumption.

Especially when we get elder the need of energy consumption is reduced as result of less physical activities None active life is a kind of dangerous illness for human.

In many industrial countries many protection policies developed to protect people from principle risk factors (high cholesterol, high blood pressure and cigarette).

None active life style is considered and suggested as fourth risk factor for cardiovascular risk.

As a result of technological development physical activities reduced in many job.

Therefore necessities of physical activities come to the fore (F., Colakoğlu, 2006).

Correctly regulated physical activities play an important role to protect many illnesses and provide quality life.

Further more physical activities provide better and economic working of organic system. The work capacity of a person depends of oxygen capacity given to working muscles.

According to this issue there is a direct relationship between performance and breathing, efficiency of muscles, force, strength, and body fat (K.T., Borer, et al, 2002).

Sedentary life style seriously causes some health problems (Y.,S., Biçer, 2005, F.F., Çolakoğlu, 2006).

Especially during middle age and later period some risk factors such as high blood pressure, obesity, muscles weakness, and diabetes and crooner artery increase. We also see some further problems on flexibility, force, strength, looseness of motor capability, easy injury, deficiency of concentration of mineral in bone and finally looseness of functional ability. In order to avoid all of these problems we have to do exercise to have healthy life and body. In order to have healthy life we have to follow well designed exercise program (S., Kurt, et al. 2010, G., Dönmez, 2000).

Step-exercise programs have been one of fundamental exercise program for sport center. For that reason in this study it is important to increase effect of physical adaptive parameter by using this common exercise program.

Within this study we aim to investigate the effect of 8 week exercise program on physical fitness and some body component parameters for middle age sedentary women.

### Method

Twelve sedentary women volunteer who have not done any sport up to date join this study. Volunteers mean age is 32,9±7,8 years, the average

<sup>1</sup>Niğde University Department of Physical Education and Sports, TURKEY.

<sup>2</sup>Gazi University Department of Physical Education and Sports, TURKEY.

E-mail: serkanibis@nigde.edu.tr

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height of  $161,7 \pm 0,5$  cm, weight average of  $68,7 \pm 9,2$  kg.

### Exercise Program

Heart rate was determined by the method of Karvonen. 12 week exercise program was applied to this study group three days in a week and during this period we applied %50-60 intensity of heart rate, 45-60 minutes of step aerobic exercise.

Exercise intensity is improved by 5% every two weeks. However, it has not passed %70 of maximal heart rate (6,7). Target heart rates were monitored with polar clock.

### Applied Tests

Height and body weights were measured with bare feet and fine clothes. Was measured with 0.01 kg precision weigher.

Evaluation of body composition of research group was measured with Tanita Body Fat Analyzer, model Tanita BC-418 MA brand Bioimpedance. Bioelectric impedance analysis (BIA) was performed with a foot-up bioelectric impedance analysis.

Device body fat percentage (%), fat weight, free fat mass, basal metabolic rate (estimated), the average energy requirement (estimated), body mass index, body against the flow passage resistance (impedance) was determined with the BIA (M.C., Barbosa, et al., 2003 ).

All measurements and tests were taken two days before and two days after exercise.

### Statistical analysis

Analysis of the data was performed using SPSS statistical package program. the was determined of all data is the minimum and maximum values, arithmetic means and standard deviations. Wilcoxon Signed-Rank Test was conducted for comparison of before and after exercises values. Statically significant level was set at 0.05 and 0.01.

## Results

**Table 1:** Descriptive Statistics

Variables	N	Minimum	Maximum	Mean $\pm$ SD
Age (year)	12	21	45	30,90 $\pm$ 8,41
Height (cm)	12	153	175	161,30 $\pm$ 7,0

**Table 2:** Bioimpedance values of the components of women's body

Variables		Minimum	Maximum	Mean $\pm$ SD.	Z	Sig.
Weight (kg)	Before Ex. Prog.	52,50	83,50	66,34 $\pm$ 8,55	-1,683	,092
	After Ex.Prog.	53,10	80,80	63,94 $\pm$ 8,50		
BMI (kg/m <sup>2</sup> )	Before Ex. Prog.	22,10	29,30	25,47 $\pm$ 2,47	-1,482	,138
	After Ex.Prog.	21,00	29,30	25,05 $\pm$ 2,60		
BMR (kcal)	Before Ex. Prog.	1229	1599,00	1381,60 $\pm$ 96,67	-0,561	,575
	After Ex.Prog.	1218	1573,00	1363,40 $\pm$ 104,57		
Fat Percentile (%)	Before Ex. Prog.	25,70	38,70	31,79 $\pm$ 4,68	-2,805	,005**
	After Ex.Prog.	23,60	38,20	29,96 $\pm$ 4,89		
Fat mass (kg)	Before Ex. Prog.	13,50	31,40	21,41 $\pm$ 5,74	-2,603	,009**
	After Ex.Prog.	12,60	29,40	19,46 $\pm$ 5,65		
Free fat Mass (kg)	Before Ex. Prog.	39,00	52,10	44,94 $\pm$ 3,39	-0,102	,919
	After Ex.Prog.	39,90	51,40	44,50 $\pm$ 3,49		
Visseral Fat Rating	Before Ex. Prog.	1,00	7,00	4,00 $\pm$ 2,26	-1,633	,102
	After Ex.Prog.	1,00	7,00	3,60 $\pm$ 2,11		
Right leg Fat Percentile	Before Ex. Prog.	31,70	42,70	36,12 $\pm$ 3,84	-2,397	,017*
	After Ex.Prog.	30,20	39,20	34,65 $\pm$ 3,11		
Right leg Fat mass (kg)	Before Ex. Prog.	3,20	5,50	4,40 $\pm$ ,84	-1,995	,046*
	After Ex.Prog.	3,00	5,40	4,13 $\pm$ ,77		
Right leg Free fat Mass (kg)	Before Ex. Prog.	6,80	9,30	7,71 $\pm$ ,66	-0,238	,812
	After Ex.Prog.	6,90	9,10	7,70 $\pm$ ,70		
Left leg Fat Percentile	Before Ex. Prog.	32,40	42,00	36,36 $\pm$ 3,43	-2,293	,022*
	After Ex.Prog.	31,40	40,30	35,11 $\pm$ 3,37		



<b>Left leg Fat mass (kg)</b>	Before Ex. Prog.	3,20	5,40	4,36±,80	-2,153	,031*
	After Ex.Prog.	3,10	5,40	4,10±,75		
<b>Left leg Free Fat Mass (kg)</b>	Before Ex. Prog.	6,60	9,00	7,54±,63	-0,060	,952
	After Ex.Prog.	6,50	8,90	7,49±,74		
<b>Trunk Fat Percentile</b>	Before Ex. Prog.	20,10	37,50	28,36±5,88	-2,701	,007*
	After Ex.Prog.	17,90	36,70	26,10±6,38		
<b>Trunk Fat Mass (kg)</b>	Before Ex. Prog.	5,60	17,20	10,36±3,54	-2,449	,014*
	After Ex.Prog.	5,30	16,10	9,17±3,56		
<b>Trunk Free Fat Mass (kg)</b>	Before Ex. Prog.	22,10	28,70	25,33±1,76	-0,307	,759
	After Ex.Prog.	22,50	28,30	24,98±1,73		

\*:  $p < 0,05$  \*\*:  $p < 0,01$

In this study according to the results of Wilcoxon Signed Ranks test there have significant decrease in total fat percentile, total fat mass and trunk fat mass after the exercise program ( $p < 0.01$ ). Additionally, the decreases of right leg fat percentile, right leg fat mass, left leg fat percentile, left leg fat mass and trunk fat mass was statically significant ( $p < 0.05$ ). Changes in other parameters were not statistically significant.

### Discussion and Conclusion

Improper diet, excessive eating, hormonal disorders and physical inactivity create positive energy balance which caused obesity. Obesity in children and adolescents is due to lack of physical activity more then excessive eating (K., Ozer, 2005). Several studies in the literature about this type of exercise affect body components in a positive way (G., Babayiğit. et al. 2002, A., Blake, et al., 2000, M.Y., Chien, et. al. 2000)

Women participated in the study whose mean height is  $161.30 \pm 7.00$  cm,  $66.34 \pm 8.55$  kg of body weight before the exercise and  $63.94 \pm 8.50$  kg after the exercise program, while., BMI measurement is  $25,47 \pm 2.47$  kg/m<sup>2</sup> before the exercise program and  $25.05 \pm 2.60$  kg /m<sup>2</sup> after the exercise program on the other hand BMR measurements is  $1381.60 \pm 96.67$  kcal, before the exercise program and  $1363.40 \pm 104,57$  kcal after the exercise.

After the application of 8-week step-aerobic exercise program, women's body weight, BMI, shows decreasing while BMR shows increasing but these increasing and decreasing were not significant statistically ( $p > 0.05$ ).

Courtney and colleagues studied obese women and found that white women had BMI values to be  $22 \pm 1.9$  kg / m<sup>2</sup> (L., Courtney, et al. 2010).

Kurt and colleagues in their study, 8 weeks and 3 days a week, 50-60% of maximal heart rate intensity for 45-55 minutes of the step-aerobic exercise, they found that there was no significant reduction both in body weight and body mass index. This situation is explained and they interpreted the reason because of the duration of exercise or short exercise time less than 8 weeks might cause this result (S., Kurt, et al. 2008).

World Health Organization and the American heart and lung institute said that in BMI calculation kg/m<sup>2</sup> will be used (National Heart Lung and Blood Institute 2000, WHO, 1998).

The reason for this insignificance in BMI and BMR is due to lack of insignificant change in body weight.

Women participated in the study whose body fat percentage is mean height is  $31.79 \pm 4.68\%$ , before the exercise and  $29.96 \pm 4.89\%$  after the exercise, while fat mass values are  $21.41 \pm 5.74$  kg and  $19.46 \pm 5.65$  kg before and after the exercise respectively.

So these values are interpreted that they are significant statistically ( $p < 0.01$ ). The change in free fat mass and visceral fat rating found to be insignificant ( $p > 0.05$ ).

Women participating in the research whose right-left leg and right-left leg percentile fat mass, trunk fat percentile, trunk fat mass values change significantly decreased after the aerobic exercise program ( $p < 0.05$ ).

Women participating in the research whose right-left leg free fat mass values were determined insignificant ( $p > 0.05$ ).

This shows that the source of energy for body is used more during an aerobic exercise program therefore it cause reduction in fat percentage of body components.

The reason for the lack of a change in muscle mass and bone mass in the content of FFMs is because of no resistance exercise applied in the exercise program.

In this study, we determined that there is decreasing in exercise capacity depending on increased fat rate (K., Watanabe, et. al 1994, P., Rump, et.. al. 2002).

In our study we also determined reduced fat rate. This shows that while this exercise program reduces the fat rate exercise capacity is increase.

As a result we can say that, three days a week and each of which 45-55 minutes of aerobic exercise program the reduction in fat rate and fat density is due exercise in metabolism, since fat which is in body is used as a source of energy and is subject to oxidation.



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## PHYSICAL ACTIVITY AND ITS RELATION TO HEALTH-RELATED PHYSICAL FITNESS IN STUDENTS

KAMINSKA IRĒNA<sup>1</sup>, MIHAILOVA ANNA<sup>1</sup>, BERNĀNE ANDA<sup>1</sup>

### Abstract

**Purpose.** The trend in physical fitness assessment during the past 35 years instead of stress motor performance and athletic fitness evaluation (i.e. speed, agility, power, and balance) focuses on assessment of functional capacities related to overall good health and disease prevention. Thus, a term of health-related physical fitness became topical with four its components: aerobic and/or cardiovascular fitness, body composition, abdominal muscle strength and endurance, and lower back and hamstring flexibility. This study was undertaken to evaluate physical activity relation to health-related physical fitness in students.

**Methods.** All participants filled in physical activity questionnaire about duration of their daily activities of slow

<sup>1</sup>The Faculty of Natural Sciences and Mathematics, Department of Anatomy and Physiology, Daugavpils University, LATVIA

E-mail: anna.mihailova@du.lv

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walking, fast walking, sport exercises at university and additional sport exercises. Health-related physical testing included several core components: 1) body composition evaluation (body weight, body mass index, waist-to-hip ratio, body fat, muscle mass), 2) abdominal muscles and hamstring muscles manual tests, 3) dynamometry, 4) hamstring muscles and *m. quadratus lumborum* elasticity evaluation tests, 5) Romberg balance test, 6) bicycle ergometer test.

**Results.** There were significant differences between physical activity level of Physical Education students and Physiotherapy students, and between men and women. Physical activity positively correlates with waist-to-hip-ratio, muscle mass, grip strength and cardiorespiratory fitness parameters, and negatively with body fat.

**Conclusions.** Physical activity significantly affects body composition, grip strength and aerobic capacity.

**Key words:** Health-related physical fitness, physical activity, students.

## Introduction

Health is defined as physical, mental, and social well-being, not simply absence of disease. Physical fitness includes attributes related to how well one performs physical activity (W.D. McArdle, 2006). Physical fitness refers to the full range of physical qualities, i.e. cardiorespiratory fitness, muscular strength, speed of movement, agility, coordination, and flexibility (J.R. Ruiz et al., 2006). The trend in physical fitness assessment during the past 35 years instead of stress motor performance and athletic fitness evaluation (i.e. speed, agility, power, and balance) focuses on assessment of functional capacities related to overall good health and disease prevention (W.D. McArdle, 2006). Thus, a term of health-related physical fitness became topical with four its components: aerobic and/or cardiovascular fitness, body composition, abdominal muscle strength and endurance, and lower back and hamstring flexibility.

Cardiorespiratory endurance is closely connected with lung, heart and muscle functions. A good level of aerobic capacity determines high economic and energetic processes (K. Gerner et al., 2009). Grip strength indicated general fitness, and is closely associated with chronic illnesses such as degenerative osteoarthritis. Abdominal muscular endurance, however, is linked to correct balance between the abdominal and lumbar muscles, and lumbar hyperlordosis may result in abdominal muscle weakness. With regard to balance, higher levels in this capacity reduce the possibility of falls (J.M. Saavendra et al., 2008). So, health-related physical fitness is defined as components of physical fitness associated with some aspect of good health and/or disease prevention (W.D. McArdle, 2006). Health-related physical fitness refers to the functionality of heart, lung, blood vessels, and muscles that are closely related to health (J.S. Cheng, 2011). Recent studies have shown that aerobic capacity and muscle strength are powerful predictors of cardiovascular and all-cause death and disease, both in men and in women (F. Ortega et al., 2005).

Health-related physical fitness cannot be viewed without taking into account the aspect of physical activity. Physical activity is defined as any bodily movement, produced by skeletal muscles, which requires energy expenditure (WHO, 2012; W.D. McArdle, 2006). Physical inactivity has been identified

as the fourth leading risk factor for global mortality causing an estimated 3.2 million deaths globally (WHO, 2012). The real data show, that nearly one half of those between ages 12 and 21 do not exercise vigorously on a regular basis and 14% report no recent physical activity – more prevalent among females (W.D. McArdle, 2006). Though, regular moderate intensity physical activity – such as walking, cycling, or participating in sports – has significant benefits for health. For instance, it can reduce the risk of cardiovascular diseases, diabetes, colon and breast cancer, and depression. Moreover adequate levels of physical activity will decrease the risk of a hip or vertebral fracture and help control weight (WHO, 2012).

In adults aged 18–64, physical activity includes leisure time physical activity (for example: walking, dancing, gardening, hiking, swimming), transportation (e.g. walking or cycling), occupational (i.e. work), household chores, play, games, sports or planned exercise, in the context of daily, family, and community activities. In order to improve cardiorespiratory and muscular fitness, bone health, reduce the risk of NCDs and depression adults aged 18–64 should do at least 150 minutes of moderate-intensity aerobic physical activity throughout the week or do at least 75 minutes of vigorous-intensity aerobic physical activity throughout the week or an equivalent combination of moderate- and vigorous-intensity activity. For additional health benefits, adults should increase their moderate-intensity aerobic physical activity to 300 minutes per week, or engage in 150 minutes of vigorous-intensity aerobic physical activity per week, or an equivalent combination of moderate- and vigorous-intensity activity (WHO, 2012).

Complex evaluation of health-related physical fitness and physical activity may show a wider insight in health promotion and disease prevention.

Current data on the physical fitness of Latvian students are not available, thus, this study aimed to evaluate physical activity relation to health-related physical fitness in students of Daugavpils University.

## Methods

A total of 91 students of Daugavpils University were recruited. The participants were students of two study programs: Sport Education and Physiotherapy. During the analysis phase, 9 participants were excluded because they didn't fit the required age range (adolescents with age from 19 to 25 years) or had





missed health-related physical fitness tests or hadn't filled in the questionnaire. Thus, the final study group consisted of 82 students (54 women and 28 men) with

an age range of 19 to 23 years. The anthropometric profiles of the study sample are shown in Table 1.

**Table 1. Antropometric Profile for the Study Sample**

Variables	Average (SD) for:		
	Women (n=54)	Men (n=28)	Total (n=82)
Age (y)	20.6 (0.9)	20.8 (1.1)	20.7 (0.9)
Height (cm)	166.5 (5.6)	180.7 (8.8)	171.3 (9.6)
Weight (kg)	62.3 (9.7)	78.1 (12.4)	67.7 (13.1)
Body Mass Index (kg/m <sup>2</sup> )	22.5 (3.1)	23.8 (2.8)	22.9 (3.0)
Waist-to-hip Ratio	0.73 (0.04)	0.83 (0.06)	0.77 (0.06)

Each participant attended several measurement sessions at Daugavpils University. During the first visit they filled in the questionnaire about their physical activity: duration of daily activities and sport activities and type of additional sport classes. Additionally to questionnaire, body composition and dynamometry measurement (see "Health-Related Physical Fitness Assessment") were taken on that day. During the second visit, individual assessment of muscle strength, elasticity and balance test (see "Health-Related Physical Fitness Assessment") was done. Final visit was devoted to aerobic fitness test on cycle ergometer.

#### Health-Related Physical Fitness Assessment

Health-related physical testing included a set of tests: 1) body composition evaluation (body weight, body mass index, waist-to-hip ratio, body fat, muscle mass), 2) abdominal muscles and hamstring muscles manual tests, dynamometry and hamstring muscles and *m. quadratus lumborum* elasticity evaluation tests for musculoskeletal fitness of the upper trunk and lower extremities, 3) Romberg balance test for motor fitness, 6) bicycle ergometer test for cardiorespiratory fitness.

Body composition was determined using medically approved portable body composition monitor with visceral fat indicator TANITA BC-420 using bioelectrical impedance analysis method. Body weight, body mass index, waist-to-hip ratio, body fat (%) and muscle mass (%) variables were received. Body height that was required to fill in the TANITA measuring protocol was measured to the nearest 1.0 cm. Waist and hip circumferences were measured to the nearest 1.0 cm with a flexible leather tape measure. Waist circumference was measured midway between the lowest rib and the iliac crest when participants were in standing position. Hip circumference was measured at the highest points of gluteal muscles when participants were in standing position (G.M. Adams, W.C. Beam, 2008).

Abdominal muscles and hamstring muscles manual tests were performed on the basis of guidelines on muscle testing of Palmer M. Lynn and Marcia E. Epler «Fundamentals of Musculoskeletal Assessment Techniques» (1998) (P. M. Lynn, M. E. Epler, 1998). *M. rectus abdominis* upper and lower parts, *m. obliquus abdominis externus et internus*, *m. semitendinosus et semimembranosus*, *m. biceps femoris* were tested for

strength (evaluated from 0 to 5 points) and *m. quadratus lumborum* and hamstring muscles were tested for elasticity in terms of flexibility. The grip strength of both hand was measured with hydraulic hand dynamometer (Saehan Corp., Korea, Model SH5001, SN 11010449) while the participants stood with their elbows extended (G.M. Adams, W.C. Beam, 2008). The best score of 3 trials was recorded for analysis.

Romberg balance test for static balance assessment was performed barefoot on the rough surface with subjects' eyes closed, hands being held in front of the body and one foot being placed in front of the other on one line. Total time of standing without staggering and opening eyes was recorded in seconds (maximal 60 seconds). Test was performed bilaterally changing the position of feet.

Cardiorespiratory fitness was assessed using cardiopulmonary testing system MasterScreenCPX (JAEGGER) and cycle ergometer Ergoselect 100P (Ergoline, SN 2008000567) with breath-by-breath analysis of expired air. Subjects performed submaximal test with three power stages each of 5 minutes (G.M. Adams, W.C. Beam, 2008). Start power for both women and men was 50W. Then power was increased by 25W in women and 50W in men. 1 minute before the test rest cardiorespiratory variables were recorded. Basic variables (heart rate, ventilation, breathing frequency, tidal volume, oxygen uptake, carbon dioxide output, respiratory coefficient etc.) were recorded at every respiratory cycle while test and recovery stages. Systolic and diastolic blood pressure was measured every second and fifth minute while performing the test and every minute while recovery. Anaerobic threshold and maximal oxygen consumption were calculated in MasterScreenCPX program automatically. They were taken as basic variables for aerobic capacity evaluation.

The level of physical activity was evaluated using self-assessment questionnaire, the 7-day recall physical activity questionnaire. This questionnaire asked questions about duration of their daily activities of sitting, slow walking, fast walking, sport exercises at university and additional sport exercises. Duration was expressed in hours and minutes. Physical activity duration score was calculated evaluating hour per week spent in vigorous activities and moderate activities. All



participants were divided into 4 groups according to a physical activity score: 1<sup>st</sup> group (low physical activity) included those, who do sport exercises at least 30 minutes per week, 2<sup>nd</sup> group of moderate physical activity – those who perform sport activities average 30 minutes to 2 hours per week, 3<sup>rd</sup> group of high physical activity – average 3 hours of sport exercises per week and 4<sup>th</sup> group of vigorous physical activity – 4 or more hours of sport activities per week.

#### Data analysis

The data were analyzed with the IBM SPSS statistical program (version 19.0 for Windows). An independent samples *t* test and two independent samples nonparametric test with Mann-Whitney coefficient were used to examine sex-related differences. Pearson Chi-Square was used to examine differences between body mass index, body fat, muscle mass and physical activity level groups. The Pearson correlation coefficient was used to find associations between health-related physical fitness variables and physical activity. Univariate analysis (General Linear Model) was used to test independent and complex influence of two factors: sex and physical activity level on health-related physical fitness components.

#### Results

Mean (SD) body mass index (BMI) was 22.5 (3.1) in women and 23.9 (2.8) in men ( $p=0.045$ ) (see Table 2). 9.3% of women was underweight (BMI < 18.5 kg/m<sup>2</sup>), 68.5% of women and 71.4% of men had a

normal BMI (BMI = 18.5-24.9 kg/m<sup>2</sup>), 20.4% of women and 21.4% of men was overweight (BMI = 25-29.9 kg/m<sup>2</sup>), and 1.9% and 7.1% of women and men respectively were obese (BMI > 30.0 kg/m<sup>2</sup>). The difference between BMI groups in women and men was not significant (Pearson Chi-Square  $p = 0.258$ ).

Mean (SD) body fat (BF) (%) was 25.4 (6.7) in women and 12.2 (5.0) in men ( $p<0.0001$ ). 22.2% of women and 21.4% of men had decreased BF. The most numerous group of BF in both women and men was with good range of BF with 61.1% and 71.4%, respectively. 14.8% of women and 3.6% of men had increased BF and 1.9% and 3.6% were obese, respectively. BF groups did not differ among women and men (Pearson Chi-Square  $p = 0.448$ ).

Mean (SD) muscle mass (%) was 70.5 (6.8) in women and 83.4 (4.7) ( $p<0.0001$ ). In both women and men most people met the criteria of good muscle mass range – 61.1% and 82.1% respectively. The difference between groups of muscle mass in women and men was not significant (Pearson Chi-Square  $p = 0.151$ ).

Men had higher values for *m. semitendinosus* et *semimembranosus* strength, handgrip strength, aerobic threshold, absolute and relative maximal oxygen consumption but lower values for flexibility (hamstring elasticity) than women (see Table 2). No sex-related differences were noted in abdominal muscle strength, *m. biceps femoris* strength, *m. quadratus lumborum* elasticity and static balance.

**Table 2. Descriptive Statistics of Health-Related Physical Fitness Components in Study Sample**

Variables	Mean (SD)		<i>P</i> -value adjusted by age
	Women (n=54)	Men (n=28)	
<b>Body composition</b>			
Body mass index (kg/m2)	22.5 (3.1)	23.9 (2,8)	p = 0.045 <sup>a</sup>
Waist-to-hip ratio	0.73 (0.04)	0.83 (0.06)	p < 0.0001 <sup>a</sup>
Body fat (%)	25.4 (6.7)	12.2 (5.0)	p < 0.0001 <sup>a</sup>
Muscle Mass (%)	70.5 (6.8)	83.4 (4.7)	p < 0.0001 <sup>a</sup>
<b>Musculoskeletal fitness</b>			
<i>m. rectus abdominis</i> (upper part) (points)	3.8 (0.8)	3.8 (0.7)	p = 0.776
Rotation to the right (points)	3.6 (0.8)	3.3 (0.8)	p = 0.131
Rotation to the left (points)	3.6 (0.8)	3.5 (0.8)	p = 0.481
<i>m. semitendinosus et semimebramosus</i>			
Right leg	4.78 (0.4)	5.00 (0.0)	p = 0.007 <sup>a</sup>
Left leg	4.81 (0.4)	5.00 (0.0)	p = 0.016 <sup>a</sup>
<i>m. biceps femoris</i>			
Right leg	4.76 (0.4)	4.82 (0.4)	p = 0.522
Left leg	4.83 (0.4)	4.86 (0.4)	p = 0.781
Hamstring muscles elasticity (°)			
Right leg	76.4 (10.9)	72.7 (8.3)	p = 0.04 <sup>a</sup>
Left leg	76.4 (11.4)	72.0 (10.6)	p = 0.093
Grip strength (kg)			
Right hand	29.6 (6.1)	53.0 (16.2)	p < 0.0001 <sup>a</sup>
Left hand	26.2 (5.8)	52.0 (11.7)	p < 0.0001 <sup>a</sup>
<b>Cardiorespiratory fitness</b>			
Anaerobic threshold (ml O2)	809.0 (244.9)	1402.0 (304.3)	p < 0.0001 <sup>a</sup>
Maximal oxygen consumption (l/min)	1.4 (0.3)	2.2 (0.2)	p < 0.0001 <sup>a</sup>
Relative maximal oxygen consumption (ml/min/kg)	21.9 (4.3)	29.3 (5.8)	p < 0.0001 <sup>a</sup>

<b>Physical activity duration</b> (hours per week)	1.0 (1.2)	3.3 (2.6)	$p < 0.0001^a$
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<sup>a</sup>  $p < 0.05$  compared between women and men

**Table 3. Sample Characteristics by Physical Activity Level**

Variable Mean (SD)	Physical Activity Level								P-value between the groups
	Low		Moderate		High		Vigorous		
	Women (n=26)	Men (n=3)	Women (n=22)	Men (n=10)	Women (n=3)	Men (n=5)	Women (n=3)	Men (n=10)	
<b>Body composition</b>									
Body mass index (kg/m2)	21.7 (2.9)	23.4 (4.0)	23.2 (3.0)	22.7 (2.0)	24.0 (5.9)	26.6 (4.4)	22.6 (0.8)	23.8 (1.4)	0.207
Waist-to-hip ratio	0.72 (0.1)	0.87 (0.1)	0.74 (0.03)	0.80 (0.06)	0.71 (0.03)	0.85 (0.05)	0.74 (0.04)	0.82 (0.03)	0.517
Body fat (%)	24.4 (6.6)	13.7 (10.9)	26.2 (6.3)	10.7 (3.3)	26.8 (13.7)	15.6 (4.0)	27.8 (0.5)	11,6 (4,5)	0.744
Muscle Mass (%)	71.8 (6.2)	82.0 (10.3)	69.3 (7.1)	84.8 (3.1)	69.7 (12.8)	80.2 (3.8)	68.5 (0.4)	84.0 (4.3)	0.866
<b>Musculoskeletal fitness</b> Hamstring muscles elasticity (°)									
Right leg	74.0 (9.4)	64.7 (5.0)	78.4 (11.7)	72.1 (9.2)	90.0 (8.7)	72.6 (6.6)	86.7 (5.8)	75.1 (8.2)	0.025 <sup>a</sup>
Left leg	73.5 (10.5)	61.7 (7.6)	77.3 (11.8)	71.1 (10.2)	88.3 (5.8)	69.8 (7.1)	83.3 (11.5)	77.1 (11.5)	0.043 <sup>a</sup>
Grip strength (kg)									
Right hand	30.1 (6.3)	50.7 (9.5)	29.0 (5.9)	43.4 (19.7)	25.7 (1.2)	53.6 (14.0)	34.0 (7.6)	63.0 (8.9)	0.015 <sup>a</sup>
Left hand	26.2 (6.1)	47.3 (11.0)	25.8 (5.7)	46.9 (11.6)	23.0 (1.7)	53.2 (14.2)	31.3 (4.6)	58.0 (9.0)	0.050 <sup>a</sup>
<b>Cardiorespiratory fitness</b>									
Anaerobic threshold (ml O2)	805.1 (273.1)	1218.7 (220.1)	786.8 (218.1)	1406.9 (276.7)	845.7 (240.2)	1593.2 (402.1)	969.0 (233.4)	1356.4 (291.2)	0.378
Maximal oxygen consumption (l/min)	1.3 (0.3)	2.1 (0.2)	1.4 (0.3)	2.2 (0.3)	1.7 (0.4)	2.4 (0.1)	1.6 (0.3)	2.2 (0.3)	0.025 <sup>a</sup>
Relative maximal oxygen consumption (ml/min/kg)	21.7 (4.0)	30.1 (8.6)	21.4 (4.9)	29.3 (4.8)	24.6 (4.0)	29.9 (7.9)	24.7 (1.7)	28.8 (5.8)	0.747

<sup>a</sup>  $p < 0.05$  compared between PAL groups

When the participants were grouped according to their physical activity level (PAL) 48.1% of women and 10.7% of men belong to low level of physical activity, 40.7% of women and 35.7% of men to moderate level of physical activity, 5.6% of women and 17.9% of men to high level of physical activity and 5.6% of women and 35.7% of men to vigorous physical activity level. Men were more physically active than women ( $p < 0.0001$ ) having a prevalence of vigorous, high and moderate PAL, comparing with prevalence in women of low and moderate PAL. The mean (SD) physical activity in women was 1.0 (1.2) hours per week, but in men 3.3 (2.6) ( $p < 0.0001$ ). Additionally, 29.6% of women and 75% of men did additional exercises apart obligatory sport activities at studies ( $p < 0.0001$ ). Men spent more time on their additional

leisure time sport activities than women (Mann-Whitney  $p < 0.0001$ ).

BMI, BF and muscle mass did not differ among the PAL groups adjusting by gender. However, using One-Way ANOVA analysis results showed significant differences between PAL groups for BMI, WHR, BF and muscle mass. Students with higher PAL had higher BMI (low PAL vs high PAL  $p = 0.032$  and low PAL vs vigorous PAL  $p = 0.006$ , moderate PAL vs vigorous PAL  $p = 0.048$ ). Students with higher PAL had lower BF (low PAL vs vigorous PAL  $p = 0.007$  and moderate PAL vs vigorous PAL  $p = 0.036$ ) and higher muscle mass (low PAL vs vigorous PAL  $p = 0.009$  and moderate PAL vs vigorous PAL  $p = 0.027$ ).

The proportion of hamstring muscle elasticity and grip strength increased with increasing PAL (see

Table 3). The same relation was observed in maximal oxygen consumption. Other cardiorespiratory fitness and musculoskeletal fitness parameters did not differ among PAL groups adjusting by gender.

No difference between PAL groups was found for abdominal muscles and hamstring muscles strength, static balance and *m. quadratus lumborum* elasticity.

Physiotherapy men had lower grip strength values than men of Sport Education study program (see Table 4). In women Physiotherapy students had lower hamstring muscles elasticity and *m. obliquus externus et internus abdominis* strength than women of Sport Education study program. No differences between

study programs were noted in BMI, WHR, body fat, *m. quadratus lumborum* elasticity, *m. rectus abdominis* and hamstring muscles strength, static balance, and cardiorespiratory parameters. Physical activity duration was significantly higher in Sport Education students ( $p < 0.0001$ ). Only 35% of Physiotherapy students comparing with 72.2% of Sport Education Students had additional sport activities in their leisure time ( $p < 0.0001$ ). Respectively, Sport Education students spent more time on additional sport activities in leisure time than Physiotherapy students (Mann-Whitney  $p < 0.0001$ ).

**Table 4. Health-related Physical Fitness of Physiotherapy and Sport Education students**

Variables	Mean (SD)				P-value adjusted by gender	
	Physiotherapy students (n=60)		Sport Education students (n=22)			
	Women (n=51)	Men (n=9)	Women (n=3)	Men (n=19)	Women	Men
<b>Body composition</b>						
Body mass index (kg/m <sup>2</sup> )	22.5 (3.2)	23.8 (4.0)	22.5 (1.0)	23.9 (2.2)	p = 0.972	p = 0.954
Waist-to-hip ratio	0.73 (0.04)	0.81 (0.08)	0.74 (0.04)	0.83 (0.04)	p = 0.885	p = 0.444
Body fat (%)	25.4 (6.8)	13.3 (6.6)	25.1 (5.0)	11.8 (4.2)	p = 0.934	p = 0.467
Muscle Mass (%)	70.4 (0.8)	82.4 (6.3)	71.1 (4.8)	83.9 (3.9)	p = 0.866	p = 0.451
<b>Musculoskeletal fitness</b>						
Rotation to the right (points)	3.6 (0.8)	3.2 (0.6)	4.5 (0.5)	3.4 (0.9)	p = 0.039 <sup>a</sup>	p = 0.496
Rotation to the left (points)	3.5 (0.8)	3.3 (0.8)	4.5 (0.5)	3.5 (0.8)	p = 0.035 <sup>a</sup>	p = 0.557
Hamstring muscles elasticity (°)						
Right leg	76.7 (10.8)	70.0 (7.8)	90.0 (0.0)	73.6 (8.5)	p = 0.014 <sup>a</sup>	p = 0.288
Left leg	75.6 (11.2)	69.0 (9.0)	90.0 (0.0)	73.4 (11.3)	p = 0.022 <sup>a</sup>	p = 0.313
Grip strength (kg)						
Right hand	29.5 (5.8)	42.4 (10.5)	32.0 (10.8)	58.0 (16.2)	p = 0.492	p = 0.015 <sup>a</sup>
Left hand	26.1 (5.6)	41.7 (11.5)	28.0 (10.4)	57.0 (8.2)	p = 0.579	p = 0.0001 <sup>a</sup>
<b>Cardiorespiratory fitness</b>						
Anaerobic threshold (ml O <sub>2</sub> )	794.9 (238.2)	1419.8 (341.2)	1049.0 (281.4)	1397.8 (295.2)	p = 0.081	p = 0.918
Maximal oxygen consumption (l/min)	1.33 (0.3)	2.18 (0.3)	1.65 (0.2)	2.26 (0.3)	p = 0.060	p = 0.451
Relative maximal oxygen consumption (ml/min/kg)	21.7 (4.4)	29.4 (6.8)	24.8 (1.7)	29.3 (5.5)	p = 0.242	p = 0.971
Physical activity duration (hours per week)	0.86 (1.0)	1.43 (1.0)	3.59 (1.2)	4.22 (2.6)	p < 0,0001 <sup>a</sup>	p = 0.005 <sup>a</sup>

<sup>a</sup>  $p < 0.05$  compared between women and men of Physiotherapy and Sport Education

Correlations between physical activity and health-related physical fitness components are shown in Table 5. Physical activity was correlated positively with waist-to hip-ratio ( $r=0.349$ ,  $p=0.001$ ), muscle mass ( $r=0.344$ ,  $p=0.001$ ), grip strength (right hand:  $r=0.587$ ,  $p<0.0001$ , left hand:  $r=0.575$ ,  $p<0.0001$ ) and

cardiorespiratory fitness parameters: anaerobic threshold ( $r=0.451$ ,  $p<0.0001$ ), absolute ( $r=0.551$ ,  $p<0.0001$ ) and relative ( $r=0.347$ ,  $p=0.001$ ) maximal oxygen consumption values. Physical activity was correlated negatively with body fat ( $r= - 0.354$ ,  $p=0.001$ ).

**Table 5. Associations among Physical Activity and Health-Related Physical Fitness Components**

Parameter	Correlation coefficient for Physical Activity	
	r	P-value
Body mass index	0.212	0.056
Waist-to-hip ratio	0.349	0.001 <sup>a</sup>
Body fat	- 0.354	0.001 <sup>a</sup>
Muscle mass	0.344	0.002 <sup>a</sup>
<i>m. rectus abdominis</i> upper part strength	0.113	0.313
<i>m. rectus abdominis</i> lower part strength	0.075	0.502
Rotation to the right	0.152	0.173
Rotation to the left	0.159	0.153
Hamstring muscles strength		
<i>m. semitendinosus et semimebranosus</i>		
Right leg	- 0.016	0.888
Left leg	0.044	0.693
<i>m. biceps femoris</i>		
Right leg	- 0.023	0.836
Left leg	0.049	0.665
Grip strength		
Right hand	0.587	0.0001 <sup>a</sup>
Left hand	0.575	0.0001 <sup>a</sup>
Static balance		
Right leg	- 0.075	0.504
Left leg	- 0.030	0.789
Hamstring elasticity		
Right leg	0.112	0.316
Left leg	0.142	0.204
Parameter	Correlation coefficient for Physical Activity	
	r	P-value
Anaerobic threshold	0.451	0.0001 <sup>a</sup>
Absolute maximal oxygen consumption	0.551	0.0001 <sup>a</sup>
Relative maximal oxygen consumption	0.347	0.001 <sup>a</sup>

<sup>a</sup> p < 0.05 (as determined by Pearson correlation)

### Discussions and conclusions

The purpose of this study was to evaluate physical activity relation to health-related physical fitness in students. The result showed that physical activity duration and physical activity level (PAL) has an influence on health-related physical fitness components in the study sample. Specifically, the proportion of muscle mass, hamstring muscle elasticity, grip strength and maximal oxygen consumption increased with increasing PAL in both genders but BF was lower in higher PAL. Physical activity was correlated positively with waist-to hip-ratio, muscle mass, grip strength and cardiorespiratory fitness parameters, and negatively with body fat. However, abdominal muscles and hamstring muscles strength, static balance and *m. quadratus lumborum* elasticity did not differ among the PAL groups.

Our findings showed, that women were less physically active than men, and physical activity

duration was higher in Sport Education students than Physiotherapy students. This finding is consistent with previous research. The female and male students of Physiotherapy characterized a much lower level of Physical Activity in comparison to the female and male students of Physical Education (K. Gerner, 2009). Additionally to this, our study showed that male Physiotherapy students had lower grip strength than Sport Education students, and female Physiotherapy students had lower hamstring muscles elasticity and *m. obliquus externus et internus abdominis* strength than Sport Education students. According to these findings, our results are different from Gerner et al. study. They found that the low level of physical activity among the male and female students of Physiotherapy was accompanied by a lower level of aerobic capacity, whereas high level of physical activity among the male and female students of Physical Education was accompanied by a higher level of aerobic capacity (K.





Gorner, 2009). Differences of results in BMI, waist-to-hip ratio and muscle mass can be explained by the prevalence of good range of variables in Daugavpils University students in both study programs.

Taking into account the fact that greater physical activity generally implies a higher level of health-related physical fitness according to previous studies of Erickssen G. and Myers J. et al., the results of our studies are in agreement with this statement indicating that students with higher physical activity had higher muscle mass, hamstring muscle elasticity, grip strength and maximal oxygen consumption. Additionally, we have found that physical activity duration positively correlates with muscle mass, grip strength and cardiorespiratory fitness variables, and negatively with body fat. So, more physically active people tend to have better body fat level, grip strength and aerobic fitness.

With regard to body composition, muscle strength, grip strength and muscle elasticity, the results are also in agreement with Cheng Jen-Son et al. study results which showed that college students who routinely engaged in exercise tended to weigh more, have superior muscular strength and stamina, and greater flexibility than did those who did not exercise on a regular basis (J.S. Cheng, 2011). Our results showed that students with higher PAL had higher BMI values, hamstring muscle elasticity and grip strength.

Cardiorespiratory fitness variables obtained from this sample showed a significant correlation with physical activity level and additional physical activities in leisure time. We found that maximal oxygen consumption, relative maximal oxygen consumption and anaerobic threshold values were higher in students with higher PAL and in those who spent more time on additional sport leisure time activities. The same findings were reported by Beets M. et al. and they noted a positive increase in cardiovascular fitness with the increase of taken sport activities. They found that adolescents enrolled in PE and participating in one or more school-sponsored sports exhibited greater cardiovascular fitness levels than adolescents participating solely in PE classes (M. Beets, 2005). This supports the fact that higher physical activity level contribute to better cardiorespiratory fitness and aerobic capacity. Adolescents should be motivated to take additional sport classes apart their studies and in particular those who have little physical activity during study process, e.g. Physiotherapy students.

Positive cardiorespiratory fitness and physical activity relation also were noted by the AFINOS study researchers, who examined the independent and joint associations of physical activity (PA), cardiorespiratory fitness (CRF) and muscular fitness (MF) with adiponectin and leptin in adolescents. They found that vigorous PA and moderate-to-vigorous PA were related to CRF, but only vigorous PA was related with MF after adjusting by age and sex (D. Martinez-Gomez et al., 2010). This supports our findings that the proportion of muscle mass and maximal oxygen consumption increased with increasing PAL in both genders.

This study had several strengths including its methodology and the simultaneous assessment of health-related physical fitness and physical activity. Current data on the physical fitness of Latvian students and its assessment in terms of health-related physical fitness were not recently available, so such a study has a basis for further investigations and study sample enlargement would be necessary. The work on study sample enlargement is now in progress in new research stage.

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## THE EFFECT OF SPORT ACTIVITY TO THE EDUCATION: ON SOCIAL DEVELOPMENT, MENTAL DEVELOPMENT, SCHOOLING DEVELOPMENT AND PHYSICAL DEVELOPMENT IN TURKISH STUDENTS OF PUBLIC ADMINISTRATION

VEYSEL TEMEL<sup>1</sup>, SELAHATTİN AKPINAR<sup>1</sup>, KAZIM NAS<sup>1</sup>

### Abstract

This study was done with the aim of searching whether the sport had an effect on education or not. The search involves 179 students studying at Karamanoğlu Mehmetbey University in 2011-2012 education year. Graded quintet Likert type questionnaire was used as a measuring means. In the first part of the questionnaire demographic features and in the second part a questionnaire was used which was developed by Aksoy and adapted by a researcher. SPSS 16.0 programme was used to measure all tests. Alpha coefficient was checked and found as %85 for reliability. Frequency analysis, t-test analysis were used for measuring students' answers given and cross-tabulation was done for some questions.

According to the results of this study students who do sport are more successful in education, have more advanced mental abilities and effect social development positively. When the effect of sport to the education was investigated, it was understood that there was a meaningful difference between girls and boys participants.

**Key words:** Education, Sport, Physical, Social and Mental Development.

### Introduction

Sport can be defined as main factor of enhancing psychical and mental health, ensuring the development of personality and character formation, facilitating adaptation to the environment by providing knowledge, skills and ability, providing solidarity, cohesion and peacemaking between people, societies and communities and are activities done the aim of struggling, getting excited, competing and outracing in the norm of competition with certain rules (A. Yetim, 2010).

The essential in sport is the nature of perceptions, accelerating them, noting indications and suspicions that based on perceptions and determining different factors that are helpful to perception or rather causing a retard by scrambling opponent's perception (S. Özbaylar, 1983). Sportive events are effective in terms of both personal and social on improving individual and social relations. Sport is not only an educatory activity for developing one's physical and psychological aspects. Besides, sport contributes to socializing of person by revealing the ability of organizing with responsibility and cooperation tendency.

Moreover, sport helps for the development of both individual and social proceeds (M. Erkan, 1996). Person is usually alone in mass society. For this reason, s/he wants to resolve loneliness by attending a team, a group etc. Therefore, psychiatrists look at stadiums with the eye of hospital. Stadiums are treatment places where subdued emotions are taken out, namely discharge of individual.

So they ensure satisfaction (M. Tezcan, 1982). One especially, edifies an extrovert personality by attending group sportive activity. One who obtain new friends and obey the rules on plays become respectful to laws and more sociable and

communal. The development of cooperation is a social qualification that can be achieved by attending sportive activities (M. Tezcan, 1982).

Physical education and sport, which have important roles on relations between people and countries in terms of social and economic in our day, and in virtue of predicating mutual love and peace, are important on forming education and democracy conscious. For this reason, physical education and sport are defined as inseparable parts of all personality nurture and general training back onto integrity principle of organism.

According to Alpman "Movements which is conscious and purposive have pragmatism value and qualification" (C. Alpman, 1972). A trainer who regards sportsmen's psychology as well as physical abilities and places importance on psychological can set more correct goals (M. Kuter, F. Öztürk, 1997).

The main objective of education struggles, no doubt, is to help accommodate children and adults to society with healthily and profitably. In order for actualizing this coherency individuals enhance their abilities via education borderline and human behaviors are changed in the direction of education aims (F. Varış, 1985).

On today's conditions young grow without deprivation or insecurity under demographic provisions. Young should enhance abilities, which shape their development, versatile but they shouldn't be patronized. Today we know that social activities, well directed education and mutual relations have a lot effects on individual development and the formation of personality (U. Dündar, 1995).

The successes of young on school and vocational schools are seen on sport field. They want to indicate these successes ideally on sport (S. Baumann, 1998). When these young are compared to

<sup>1</sup>Physical Education And Sports High School, University of Karamanoglu Mehmetbey, Karaman, TURKEY

E-mail: temelacademic@gmail.com

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unsuccessful young, latter ones have problems on school and work life and contradict with their fears and will be ineffective on sport (S. Baumann, 1998).

Accordingly, education carries some responsibilities as generating values that can maintain life and reconstruction of society with prudent and qualitative, preventing breaking up existing values and accommodating old and new values rather than redounding knowledge and skills to people.

These values affect students' behaviors and wish levels by education means. In the opposite case; as the individual reinforce education level, idea, sense and ethical attitudes, the education given to children and adolescents grades and strengthens basically (F. Varış, 1984). Education of people occurs through learning. In other words, human gain almost every personality characters acquire by learning. The acquired abilities of human are more than those which are brought from birth. Education tries to redound the desired properties by learning to people (I.E. Başaran, 1996:11).

Intellectual and spiritual processes have a very important role on administration of movements aimed at success in other stages of sport and life. These processes do not affect knowledge received from the mental abilities and skills that occur in intelligences such as perception, attention, learning and memory.

Here, intellectual and emotional factors act in unison and affect each other continually (C. İkizler, C. Karagözoğlu, 1997). Psychologically healthy individual is a person who is affectionate, beloved and consistent and has a place in the society and enhance relations with society. The person his/her abilities to certain aim and use them correctly and productively. S/he trust him/herself, does not give away to despair, is flexible and has a sense of tolerance (A. Yörükoğlu, 1980).

People at times comprehend his/her body with sport. In a sense sport is an expression of a need of the body itself. Especially, sport done on childhood will be required for the person through the life and provide gaining control power that concerns entire personality (M.V. MacLeod, 2002).

Some literature researches show that it was concluded that a healthy balance between academics and athletics is achievable (D.L. Jones, 2007). The positive effects of athletic participation for student-athletes: selfdiscipline, self-confidence, lower dropout rates, and smaller percentages of drug and alcohol abuse (L.S. Sitkowski, 2008).

The other Research purported the grade point average was a stronger predictor of future academic success than ACT scores (B. Bleyaert, 2010). Colleges and universities are augmenting the academic support they provide student athletes (J. Maher, 2007). Student athletes at one university demonstrated quantifiable gains in academic achievement (N. Voinis, 2009).

### **The Aim, Constraints and Hypothesis of the Search**

#### **The Aim of the Search**

The study aims to look into the effect of sport to the education of students who study Public Administration at Karamanoğlu Mehmetbey University and also the study aims to explore whether or not there is an effect of sport on social development, mental development, academic learning and physical development at sub-dimensions.

#### **The Constraints of the Search**

The study is restricted with students who study Public Administration at Karamanoğlu Mehmetbey University. The questionnaire, which was carried out on students, is bounded by social development, mental development, physical development and academic learning questions.

#### **The Hypothesis of the Search**

1- There are differences in terms of statistically on the aspect of students related to the effects of sport on education.

2. There is a difference in terms of statistically on the aspect of boys and girls, studying in the same classroom, related to the social development of sport.

3. There is a difference in terms of statistically on the aspect of boys and girls, studying in the same classroom, related to the mental development of sport.

4. There is a difference in terms of statistically on the aspect of boys and girls, studying in the same classroom, related to the physical development of sport.

5. There is a difference in terms of statistically on the aspect of boys and girls, studying in the same classroom, related to the academic learning of sport.

#### **The method of the Study**

##### **The Model of the Search**

Descriptive method of screening model was used with the aim of evaluating whether there is an effect of sport on physical development, mental development, social development and academic learning of students who study public administration at faculty of economic and administrative sciences in Karamanoğlu Mehmetbey University.

##### **Data Gathering**

Questionnaire method was used to test the questions asked in the search. Literature was made use which is oriented to measure the effect of sport on education and scale was taken advantage on preparing questionnaire questions (the questionnaire that was used by Aksoy on his master thesis in 1999).

The questionnaire consists of two parts. While the first part is for measuring demographic knowledge of participants, the second part consists of physical, social, mental and academic learning questions asked to subjects with the aim of evaluating the effects of sport on education. Second part questions were prepared due to quinted likert scale. Participants were wanted to choose the most suitable options for them as "I totally disagree", "I disagree", "I hesitate", "I agree" and "I totally agree" which were marked between 1 to 5. The marking of these options were 1,2,3,4, and 5 in turn.

## The Main Mass of the Search

The main mass of the search constitutes a community of 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> class students who are at morning and evening education and study public administration at faculty of economic and administrative sciences in Karamanoğlu Mehmetbey University. All the units that form main mass were included to the search skeleton. The skeleton consists of girl and boy students study public administration. 179 students, participated in the survey, formed the adequate sample size to measure the main mass.

## The findings of the Search

**Table 1:** Descriptive Statistics

GENDER	Frequency	%
Female	86	48,0
Make	93	52,0
AGE		
Till 18	11	6,1
Between 19 and 25	153	85,5
Between 26 and 30	15	8,4
SPORT RELATED STATUS		
Did by not entering competitions	50	27,9
Did by entering competitions	31	17,3
Interested as a spectator or active fan	71	39,7
Never interested	27	15,1
TOTAL	179	100

Looking at the table, men generate %52 of the participants and %48 of them are women. On looking age groups, till 18 age group is %6,1. With % 85,5 percentile 19-25 age group is quite rich. And it is seen that %8,4 of the group is generated by 26-30 age

Cronbach Alpha scale was found as ,98 after the reliability analysis of questions on the questionnaire. The definitive statistics gathered from the study was given on Table 1.

Additionally, the meaningfulness t-test, which is for measuring whether sport has effects on physical, social, psychological and academic learning or not, and analysis results are shown in Table 2. One way variance analysis which was done on the effects of sport on physical growing, social improvement, psychological improvement and academic learning according to age is shown in Table 3. Finally, the effects of sport on physical development were shown with cross-tabulation in Table 4.

group. When looking at the sport related status of the participants it seen that %27,9 of them did sport, %17,3 of them did it by entering competitions, %39,7 of them were a spectator or an active fan and %39,7 of them did not do any sport.

**Table 2:** The t-test results of sport effects on social, psychological and academic learning in terms of gender

	N	$\bar{X}$	SS	Sd	t	p
Social	86	13,441	2,694	177	-5,283	,000
	93	16,161	4,008			
Psychological	86	13,011	2,724	177	-3,663	,000
	93	15,290	5,138			
Academic	86	13,779	2,702	177	-7,303	,000
	93	17,741	4,308			

p<.05

The t-test analysis results of sport having effects on social, psychological and academic learning in terms of gender is shown in Table 2 above. It can be

said that the male students' view about having effects of sport on academic learning, social and psychological development is more than female ones. A meaningful



difference can be accepted when looking at answers

given by male and female students views (Sig.= p<.05).

**Table 3:** The one way variance analysis of answers of students, who study at Karamanoğlu Mehmetbey University, to the questions of these answers; “who do not join competitions”, “who join competitions”, “interest as a spectator or an active fan” and “never interest”.

Sub-dimensions of social skills	Group of Interest Status	N	$\bar{X}$	SS	F	p
<b>Social dimension</b>	Who do sports by not joining competitions	50	11,76	2,06	180,310	,000
	Who join competitions	31	15,48	1,28		
	Who are actively interested in	71	18,35	1,05		
	Who are never interested in sports and competitions	27	10,66	3,13		
<b>Psychological dimension</b>	Who do sports by not joining competitions	50	11,16	2,06	160,641	,000
	Who join competitions	31	15,45	0,50		
	Who are actively interested	71	17,97	2,64		
	Who are never interested in sports and competitions	27	8,44	2,56		
<b>Academic learning dimension</b>	Who do sports by not joining competitions	50	12,10	2,30	59,605	,000
	Who join competitions	31	15,96	0,79		
	Who are actively interested	71	19,08	0,89		
	Who are never interested in sports and competitions	27	14,97	6,69		

(p<.05)

Score means of social, psychological and academic learning dimensions variables of participants are seen in Table 3. It is seen that there is a meaningful difference on social, psychological and academic learning conditions of participant students in terms of sport interests. Scheffe test results were studied in order to search for the reason of differences between

groups. Although there is not a meaningful difference between the answers of people who do sport without joining competitions and who never interest in sport and competitions (,107>.05), a meaningful difference was found on the answers of people who join competitions and who are active fan (,00<.05).

**Table 4:** The cross tabulation of “I believe that sport affects psychological development” view in terms of age

Ages between	I TOTALLY DISAGREE	I DISAGREE	I AM UNDECIDED	I AGREE	I TOTALLY AGREE	Total
<b>0-18</b>	0	2	9	0	0	<b>11</b>
	% 0	%100	%100	% 0	% 0	<b>%6,1</b>
<b>19-25</b>	0	0	0	29	124	<b>153</b>
	% 0	% 0	% 0	%100	%91,9	<b>%85,5</b>
<b>26-30</b>	4	0	0	0	11	<b>15</b>
	%100	% 0	% 0	% 0	%8,1	<b>%8,4</b>



Total	4	2	9	29	135	179
	%100	%100	%100	%100	%100	%100

When checked the table it is observed that “I totally agree” category is the most significant one. % 91,9 of 19-25 age group participants marked the choice “I totally agree” to the view of “I agree that sports affects psychical development” given in this category. It is seen that most of the participants agree about the effect of sport on psychical development.

### Discussion and results

This study was done with the aim of searching sports’ effect on students who study at Karamanoğlu Mehmetbey University, Public Administration department and presenting the effects of sport on education with the social, psychological, academic learning and psychical development sub-dimensions. It can be asserted that there is a meaningful difference in terms of gender variable on looking t-test results. According to one way variance analysis test results of this study it seen that nearly all of the male participants accept the sports’ effects on education, the rate of this is less on female participants. This comes to mean that females have less habits of doing sport than males. On looking the table it appears that males’ view is far higher than female on the following conceptions; “Sports has effects on students’ academic successes”, “Sports has effects on social development” and “Sports has effects on psychological development”. In this direction it can be thought that as for male people are more successful on academic study, are social socially and are healthy and feel happy psychologically. On the other hand, as for females, success can not be achieved by sport but from other resources.

On the other hand, according to one way variance analysis results in Table 3, the reason of the differences is team culture or the contribution of competition culture on education or high mean results of both “competition joiners” and “being active fan” than other expressions such as “doing sport without joining competitions” and “never interesting in sport or competitions”.

Thus, it is understood that students, who join competitions and interest as an active fan, are far more developed on education. Summarily, most of the students who participated in the study share the same view of effects of sport on psychical development. Besides, they agree that sport effects social development. Socially deficient people maintain relations by sharing the same excitement, unhappiness and happiness with others by means of these activities done at schools.

Most of the participant students advocate that sport has effects on psychological development. Because sport keep some behaviors inside like defeating, failure, sharing and respecting and can be a means that can acquires these behaviors. On the other hand, while all the male participants agree that sport

has effects on education, females’ rate who have the idea of sports not having effects on education are pretty high. As well as these positive results, people who have the view of non-effects of sports are present when personally considered.

As a result, students are healthier with sport, are more sociable on education life with sport, can overcome downswing more easily with sport and are freer mentally. Therefore, school success rise, Due to all these good, students should be leaded to sport and the importance of sport should be emphasized. In this study it is understood that female has more negative view of sport than male. For this reason, they should be informed about sport and directed to sport much more.

Some writers found in parallel or non-parallel with the results of mine as informed below;

According to S.G. Ghooshchya and et al (2011), Results of this study indicated that there was significant difference between self-perception scores in athlete and non athlete girls (in all 3 aspects), athlete and nonathletic boys (self perception of parents), athlete boys and girls (total score) ( $P < 0.05$ ).

According to S. Dumana and E. Kuru (2010), when looked at social adaptation and sub-scale score averages of male and female students doing sports and not doing sports, gender has been found not to differ statistically with social adaptation scores.

According to P. Bayar, Z. Koruç (2000), Their research supports our study. Bayar and Koruc, in their research, investigated the characteristics of athletes and found that males doing sports were more adaptable, more active, more tolerated. (P. Bayar and Z. Koruç, 2000). On the other hand, The research, done by K. Ozduran (2001), differs from our study. As Özduvan’s research (2001), This research differ from our study. When the students participated in our study were examined according to school type, social adaptation scores of students doing sports have been found to be higher than the ones not doing sports. Most of the Turkish students living in Germany attend secondary school.

**Conclusions.** In our study, it was found that the number of the students attending these schools was higher. These schools having lower education level also cause adaptation problems. This situation shows that the problems in these schools are higher. In a research by Ozduran, no difference was found between females’ adaptation levels doing sports and not doing sports at secondary and high school levels.

### The acknowledgement

I am heartily thankful to my friends, Selahattin AKPINAR and Kazım NAS whose encouragement, guidance and support from the initial to the final level.

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## Requirements for the elaboration of the scientific papers (2009-2012)

### Structure of the experiment type paper:

- the title of the paper will be written with Majuscules, Times New Roman, Size 12, Bold, Align Left;
- the names of the author or authors of the research will be written with Times New Roman, Size 10, Bold, Majuscules, Align Left, one line under the title of the paper;
- under the author's name, the department /departments and institution / institutions it is e-mail address for the corresponding author;
- the source of the material support in the form of the GRANTS not more than 40 characters including spaces if need be, with Times New Roman, Size 10, Align Left;
- the Department name, institution name, contact address email *can be* as footnote;
- Abstract, Key words, Introduction, Methods, Results, Discussion, Conclusions, References.

### Abstract

The structured abstract and 3-5 key words will be written with Times New Roman, Size 10, Justified.

The abstract must not contain more than 150 words for unstructured abstracts essay type and 200-400 words for structured abstracts experiment type. The abstract must be elaborated in English language. In the abstract there will be no abbreviations used.

The structured abstract for **the experiment type paper** must contain:

- the aim / purpose / object of the research;
- the procedures and methods of research subjects, applied tests;
- the results / main results;
- discussions and conclusions;
- key words between 3 and 5 key words, which punctuates the interest areas of the article;

The aim, purpose, object, methods, results, discussions, conclusions and key words have to be written bold and minuscule.

---

### Introduction

**Procedures and methods** of research (subjects, applied tests)

### Results

### Discussion

### Conclusions

All of its will be written Times New Roman, Size 10, Justified, two columns;

### Bibliography

It will be written with Times New Roman, Size 10, two columns, First Line Indent 0 cm, Hanging Indent 1cm, Left Indent 1cm. The names of the articles / book will be written in italics.

Author's name has to be written with bold and majuscule ( eg. SMITHOSCKY, M.,2011)

### Structure of the essay type paper:

- the title of the paper will be written with Majuscules, Times New Roman, Size 12, Bold, Align Left;
- the names of the author or authors of the research will be written with Times New Roman, Size 10, Bold, Majuscules, Align Left, one line under the title of the paper.
- under the author's name, the department /departments) and institution / institutions) it is e-mail address for the corresponding author.
- the source of the material support in the form of the GRANTS not more than 40 characters including spaces if need be, with Times New Roman, Size 10, Align Left.
- the Department name, institution name, contact address email *can be* as footnote.
- **the unstructured abstract and 3-5 key words** will be written with Times New Roman, Size 10, Justified;
- **the introduction and the object of the research, the content, the conclusions** will be written with Times New Roman, Size 10, Justified, two columns;
- the **bibliography** will be written with Times New Roman, Size 10, two columns, First Line Indent 0cm, Hanging Indent 1cm, Left Indent 1cm. **The names of the papers/ articles will be written in italics.**

### For the abstract - essay type paper

- the aim/object of the research;
- the content of the research (short summary);
- conclusions (main conclusion);
- key words (between 3 and 5 key words, which punctuates the interest areas of the article);

**Details:****Introduction**

The introduction will only contain strict and pertinent references pro and cons) on the studies that have as a common subject the object of the research.

**Research methods and procedures****Subjects**

The subjects involved in the experiment are described, their distribution in groups, identifying the age, the sex and other important characteristics. The experiments on human subjects are produced in accordance with the national legislation for the human protection and the Helsinki Declaration of 1975, revised in 2004. The names and the surnames of the subjects are not used, especially in the illustrative materials.

The work methods are identified, the apparatus on which the experiment takes place presenting the name of the producer and the address between parentheses) and the statistic methods in detail. The new or considerably modified methods are described, motivating their choice and evaluating their limits. The hypotheses of the paper must be clear and concise.

**Statistical analysis**

The statistical methods are described with sufficient details, in order to understand and to check the results obtained. The names of the computer programs used for the statistical processing of the data are specified.

**Results**

The results are presented in a logical sequence, through tables and diagrams. The results expressed through text should not be found in the tables and/or diagrams and the other way around.

**Tables**

The tables cannot be introduced in the text as photographs. The tables must be numbered in the upper part, in succession in the order of the first text quoting, followed by a conclusive and succinct title.

**Table 1.** Physical characteristics of the subjects

Variables	Feminine subjects n=21	
	M±DS	CV %
Body height cm)	166,143±5,597	3,369
Body weight kg)	61,524±8,364	13,595
IMC kg/m <sup>2</sup> )	22,338±3,282	14,692
Body fat percentage %)	25,329±3,074	12,136
Fat mass kg)	15,182±4,066	25,715
*significant correlated with IMC, r=0,875.		
Established significance level at p<0,05.		
IMC, body mass index; M, average; DS, standard deviation; CV, variability coefficient; n, number of subjects.		

In the lower part of the table the following symbols will be used, in order to emphasize the differences or the significant correlations statistically, in the following order: \*, †, ‡, §, □, ¶, \*\*, ††, ‡‡, etc. Also in the lower part of the tables the significance level established by the researcher will be presented and the unusual abbreviations used in the table will be explained.

Each table must be quoted in the text. The tables from other publications must be used with the permission of the author authors), indicating the bibliographical source from where it was assumed.

**Diagrams illustrations)**

The diagrams must be numbered in the lower part, in succession in the order of the first text quoting, followed by a conclusive and succinct title, preceded by the unusual abbreviations used in the diagram or other observations.

**Measurement units**

Measuring the length, height, weight and volume must be expressed in metric units meter-m, kilogram- kg, liter- l, second- s, or decimal multiples). The temperature must be measured in Celsius grades (°C), and the arterial pressure in mmHg. Other measurement units must be expressed in the International Units System SI).





## Discussions

In the chapter Discussions the new and important aspects are emphasized, which result from the data processing. The data of other similar studies presented in the introduction chapter cannot repeat in detail. Also, the implications of the results found must be discussed, their limitations and the implications of these results, for the future studies. The observations found must be reported to other similar studies.

## Conclusions

The conclusions must be reported directly to the hypotheses of the paper and derive directly from the chapter Discussions. The conclusions that are not fully backed-up by the data found or that are based on unjustified affirmations must be avoided. New hypotheses can be concluded or attach some recommendations, if the case be.

## Thanks

In the section Thanks when the case appears) there can appear:

- the contribution of the people that are not co-authors;
- the name and surname of the people that have contributed intellectually to the accomplishment of the paper (with their agreement), but that are not co-authors- scientific counselor, data collector etc.;
- the financial help and the material support, specifying the nature of the support;
- the technical help in a separate paragraph called "Other contributions");

## Bibliography/References

### Bibliography and text quoting

The bibliography must be arranged in alphabetical order, the unpublished papers being quoted, but that are registered for publishing. In the bibliography all the authors quoted in the text are written. In the text all the authors are written if there are 6 or less. If there are 7 or more authors, the first three authors are written, followed by "et al." it comes from the latin "et alia" which means "and others"). If in the bibliography there are at least 2 papers that have an identical author (authors) and the publishing year, in the text, but in the bibliography as well, immediately after the publishing year, a letter will be written (in alphabetical order), in order to distinguish the papers in the bibliography (1998a), (1998b)). The name of the author / authors) must be followed by the initials of the surname.

In the text, the quotations will have the following structure:

- a) for one and/or two authors
  - at the end of the phrase T.S. Keller, and A.L. Roy, 2002);
  - in the phrase T.S. Keller and A.L. Roy 2002), T.T. Gomez, 2003 found significant differences of isometric force...
- b) up to including) 6 authors
  - at the end of the phrase T.S. Keller, A.L. Roy, Carpenter G, 2002)
  - in the phrase "Also, T.S. Keller, A.L. Roy, G. Carpenter, 2002) found significant differences of isometric force..."
- c) more than 6 authors
  - at the end of the phrase T.S. Keller, A.L. Roy, G. Carpenter et al 2002);
  - in the phrase "Also, T.S. Keller, A.L. Roy, G. Carpenter et al 2002) found significant differences of isometric force..."

Generally, for magazines, the bibliography will have the following structure:

**NAME OF THE AUTHOR- AUTHORS year of publication), Title of the article, Magazine, number of the volume yearly number (the number of the supplement part): number of pages.**

- a) standard magazine article
- b) organization as an author
- c) no author
- d) volume with a supplement
- e) number with supplement
- f) volume with part
- g) number with part
- h) number without volume
- i) no volume and number
- j) pages in roman numbers
- k) indicating the type of article if it is necessary

**DEURENBERG, P., WESTSTRATE, J.A., SEIDELL, J.C., 1991, Body mass index as a measure of body fatness: age- and sex-specific prediction formulas. British Journal of Nutrition. 65(2):105-114.**

For **books** the bibliography will have the following structure:

- a) personal author s)



- b) editor s) as author s)
- c) organization as author or the one that publishes
- d) chapter in a book
- e) license degree paper, dissertation or PhD. Thesis.

**RISTARU, M., 2005**, *The influence of pliometry on the muscular development at the lower limbs level* [dissertation]. Constanta, The Faculty of Physical Education and Sport.

For **unpublished materials but in the course of publication**), the bibliography will have the following structure:

For the **electronic materials**, the bibliography will have the following structure:

- a) article in electronic format
- b) computer program

Sending the manuscripts in electronic format

For the review of a research paper or a better organization of the research papers volume by the scientific board, the author authors) will have to send a copy in electronic format (ASCII) in the format Word Microsoft Office. The papers in Romanian will be written with diacritical signs in the format Romanian Legacy) of the computer keyboard. Also, the operating system used (Microsoft Windows XP, Microsoft Vista) and the processing program of the text (Microsoft Office XP, Microsoft Office 2003, Microsoft Office 2007) will be mentioned.

#### The evaluating/self-evaluating grid for the quality of the research paper by the reviewer/author s)

The evaluating/self-evaluating grid for the quality of the research paper by the reviewer/author s)		
1	The originality of the research theme	15 points
2	The quality of the research paper structure	5 points
3	The clarity and quality of the research hypotheses elaboration	10 points
4	The quality of the registration of the results and their presentation	10 points
5	The clarity and quality of the discussions directly linked to the results with reference to similar studies	10 points
6	The clarity and quality of the elaboration of the conclusions in accordance with the hypotheses of the paper	10 points
7	The applicability of the results found in the practical and scientific practice	10 points
8	The accuracy of the in text and bibliography quoting	10 points
9	The clarity and quality of the expression in the text	10 points
10	Strictly respecting the elaboration technical requirements	5 points
<b>Total</b>		<b>100 points</b>

Based on these reasons, the article will receive from the reviewers' board a number of points. A number lower than 60 will lead to the rejection of the article, between 60 and 90 points the article will suffer certain changes from the point of view of the structure, expression in the text, etc. in order to receive the accept for publication, and over 90 points the article will receive the accept for publication, after small changes in the elaboration (if the case may be).

The review of the article will be objective, clear and strictly formulated, in accordance with the **technical and scientific request for the elaboration of the scientific papers**, without discrediting the author s) of the article (manuscript).

#### The review process

##### Step 1

The article must be send in electronic format or on any media format (CD\_ROM, etc), in English (Abstract in English), through electronic mail at the address [contact@analefeffs.ro](mailto:contact@analefeffs.ro), alternative address: [gevatceccilia@yahoo.com](mailto:gevatceccilia@yahoo.com), or at the mailing address: Cpt. Av. Al. Serbanescu, no.1, Constanta, Romania, RO-900470 Tel./ Fax. +40 241 640 443 or 004 077 136 1179

##### Step 2

The article deposited for publishing must be accompanied by a short personal presentation and a professional CV, no more than 120 words, that must contain the detailed contact address, including phone number, fax number (if it exists) and the e-mail.

##### Step 3



At least two members of the Editorial Collective and of the Scientific Board will initially analyze the article and will nominate at least two reviewers to analyze the article in detail.

#### **Step 4**

The article will be officially analyzed by at least two reviewers with expertise in the thematics of the article deposited for publication. The article will receive a number of points from the reviewers' board.

#### **Step 5**

The articles that follow over 90 points) the scientific and technical standards for elaboration will be included into the waiting list for publication. The articles that need certain modifications between 60 and 90 points) will be returned with the reviewers' observations, for their modification by the author s). The articles that do not accomplish the minimum scientific and technical requests for elaboration 60 points) will be rejected by the reviewers' board.

#### **Step 6**

The articles will be included on the waiting approval) list for publication.

#### **Step 7**

After the approval, the article will be published in the magazine, and the author s) will receive a free copy of the magazine.

#### **Deadlines for handing in the articles**

Two numbers of the journal will be published per year and a supplement for number 2 of the journal in that year.

The deadline for handing in the articles for the first number of the magazine is 6<sup>th</sup> January, for the second number of the magazine is 15<sup>th</sup> of June and for the supplement of the magazine is 30 September. Based on the number of articles handed in, the Editorial Collective and the Scientific Board will be able to postpone the publishing of an article in a future number of the journal.

#### **Publishing / subscription taxes**

**The publishing fee is 10 euros just for online journal)**

**For purchase a number of the journal the fee is 15 euros for 2009, 2010, 2011 year)**

**For purchase a number of the journal the tax is 5 euros 2001-2010)**

**For subscription 3 annual numbers of journal 2011) the fee is 25 euros**