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Session Physical Education

THE ATTITUDE OF STUDENTS TOWARDS PHYSICAL EDUCATION

Enescu George Alexandru Platini [1], Matei Daniel [1]

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Abstract

The specialized literature tells us that physical education was introduced as a discipline in schools in the second part of the 19-th century and is taught in all schooling subsystems, starting from nursery school up to university level.

American Association for Health, Physical Education and Recreation, quoted by Dragnea A. and collaborators (2006) states:" physical education is an integral part of total education, which contributes to the development of each individual by means of human movement."

Although it is one of the most attractive subjects in primary and secondary school, when it comes to high school this subject suffers. In high school, there is a tendency of students to run away from this class and even obtain medical exemptions. The older the student, the lower the interest in physical education classes.

This paper is a study that highlights the attitude of teenagers towards these classes.

Keywords: physical education, students, attitude, high school.

1. Introduction

Among students, especially highschoolers, there is a tendency to avoid Physical Education and Sports subject and by doing that, they even obtain medical exemptions. The older the student, the lower the interest in sports practiced in schools.

We believe that any problem has a solution, but, most important is to recognize it in its integrity. And by this we refer to all factors involved (students, teachers, parents). We can all contribute to the efficiency of physical education classes. We did our research among the high school students (grades XI-XII).

The purpose of this paper is to identify, through a scientific approach, the attitude of high school students towards physical education and sports

The hypothesis of the paper: Currently, students are less and less attracted to physical education due to the many opportunities to spend their free time and the lack of a family-level culture in this area.

Research objectives and tasks:

- identifying the causes of absences in Physical Education and Sports.
- identifying methods to improve attendance at Physical Education and Sports.

2. Methods and materials

- ✓ The research method used was the survey in the form of a questionnaire.
- ✓ This questionnaire was designed between 15 and 30 October 2019.
- ✓ It was applied to a total of 113 students aged 17-18, 55 girls and 58 boys.
- ✓ 105 students come from rural areas (commute to high school); 8 students come from urban areas.
- ✓ 5 classes from the Technological High School „Ferdinand I Curtea de Arges": 3 with theoretical profile (2 philology classes and 1 natural sciences class) and 2 classes with technological profile (1 mechanical profile class, 1 electrical profile class).
- ✓ Data processing and interpretation was performed between 15 and 25 November 2019
- ✓ The questionnaire had value-based questions as well as open-ended questions.

We present below the applied questionnaire

Questionnaire to identify students' attitudes towards the physical education lesson

Initial……age……

1. How important is Physical Education class in your daily schedule?

a) Not important b) not very important c) important d) very important

2. How much time do you spend on physical activity outside of physical education lessons in a week?

a) 0-1 hours b) 1-2 hours c) 3-4 hours d) 5 hours or more

3. Is the physical education lesson useful in everyday life? Argue the answer.

……
……
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4. If you were a physical education teacher, what methods would you use to attract students to your class?

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5. How would you like the physical education class to take place so that you can attend all the classes?

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6. Do you play any sports? If so, call him. If not, motivate.
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……
7. Name 10 sports you know.
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……
……
8. What sport would you like to practice?
……
……
……
9. Why don't students participate in physical education classes?
……
……..
10. How many hours of physical education should you have in your weekly schedule?
a)1 b) 2 c) 3 d) more than 3

3. Results and Discussions

Interpretation of the questionnaire

1. How important is physical education class in your daily schedule?

- Not important– 6
- Of little importance – 24
- Important – 61
- Very important – 22

From these answers we notice that theoretically students consider the hour of physical education important and very important.

2. How much time do you spend on physical activity outside of physical education lessons in a week?

1) 0-1 hours - 54
2) 1-2 hours - 38
3) 3-4 hours - 9
4) 5 hours or more - 12

Here it should be noted that out of the 54 students who answered that they give between 0 and 1 hour of physical education, half of them answered 0 hours.

3. Is Physical Education class useful in everyday life? Argue the answer.

- Yes, it is – 113 students.
- Arguments:

- it helps us have a healthy life, decreases the risk of disease / decreases the rate of obesity - 68 students
- it helps us keep our body in shape – 45 students

o All students answered YES to this question.

4. If you were a physical education teacher, what methods would you use to attract students to your class?

 I would only organize light activities – 6
 I would give high marks to those who are involved and low marks / I would leave corrective marks to those who do not want to exercise – 12
 I would start with basic exercises – 5
 I would ask the students what they want to do in class – 20
 I would organize more games / competitions between students of the same class or between classes – 10
 I would use music - 9
 I would use dance - 3
 I would force students to be disciplined and perform the exercises – 6
 I would also organize competitions for humanitarian purposes – 2
 I would explain more the benefits of physical education class – 6
 I would let students play football / handball / basketball at the end of the class (15 minutes) - 15
 I would make the class more fun, organizing more varied / interactive activities - 15
 no answer - 4

5. How would you like the physical education class to take place so that you can attend all the classes?

 I participate at all classes; I don't want to change anything - 30
 to better arrange the gym - 13
 to take place in the hall in winter, and on the field in summer - 15
 to be longer - 5
 to be stricter, more serious
 I don't care how it goes - 3
 to let us play more games - 15
 to have equipment at school so we don't have to bring it home - 16
 to be more fun – 13

6. Do you practice any sport? If so, name it. If not, motivate.

Yes – 29
 tennis – 2
 football – 10
 I go to the gym weekly – 6
 jogging- 6
 walking -2

 I exercise with my friends every week – 3
No - 84
- I don't like any sport in particular - 17
- I don't have a sports base near the house for the sports I would like to practice- 10
- I don't have the courage - 7
- I have no material possibilities - 15
- I find it difficult - 4
- after work hours - 4
- I have other hobbies in my free time - 13
- I had to start when I was little - 9
- did not motivate - 5.

7. Name 10 sports that you know.

- Football - 90
- Handball - 81
- Basketball - 76
- Tennis - 65
- Chess – 48
- Volleyball-48
- Rugby - 40
- Box- 35
- Patinaj-34
- Swimming -30
- Sports with 1-15 nominations: Karate, judo, athletics, table tennis
- Sports with 4-5-6 nominations: MMA, hockey, gymnastics, golf, fencing
- Other sports with 1-2-3 nominations: taekwondo, sport dancing, bodybuilding, badminton, skiing, mountaineering, wrestling, gymnastics, kemp, horse riding, rowing, cycling, Zumba, bowling, fitness, kangoo jump.
- They listed less than 10 sports - 20

8. What sport would you have liked to practice?

- Natation- 16
- Tennis - 15
- Handball- 11
- Basketball- 10
- Football -9
- Volleyball- 8
- Skating- 7
- Did not answer- 17 (those who said they were not interested in any sport)
- Other sports with 1-2-3 nominations: taekwondo, fencing, cycling, athletics, badminton, table tennis, bowling, rugby, dance sports, karate, boxing, Zumba, MMA, - 20
- It is noted that gymnastics is not among the nominations.

9. Why don't students participate in physical education classes?

 they come tired at school; they don't have the necessary condition - 18

 they do not consider it attractive / important - 16
 they do not want to make effort / convenience / is tiring - 15
 they haven't done in primary school and find it difficult / don't know exactly what to do - 14
 they are lazy in bringing their equipment - 10
 they lack equipment – 8
 they are afraid of catching a cold - 8
 they skip class in order to do homework for another subject- 6
 they fear to be mocked by others if sweating during the class- 6
 they are not aware of the beneficial effects of the class – 5
 too many rules - 4
 the class does not take place in a suitable space - 2
 they are not guided enough –

10. How many hours of physical education should you have in your weekly schedule?
a) 1 - 76
b) 2 - 23
c) 3 - 7
d) more than 3 – 7

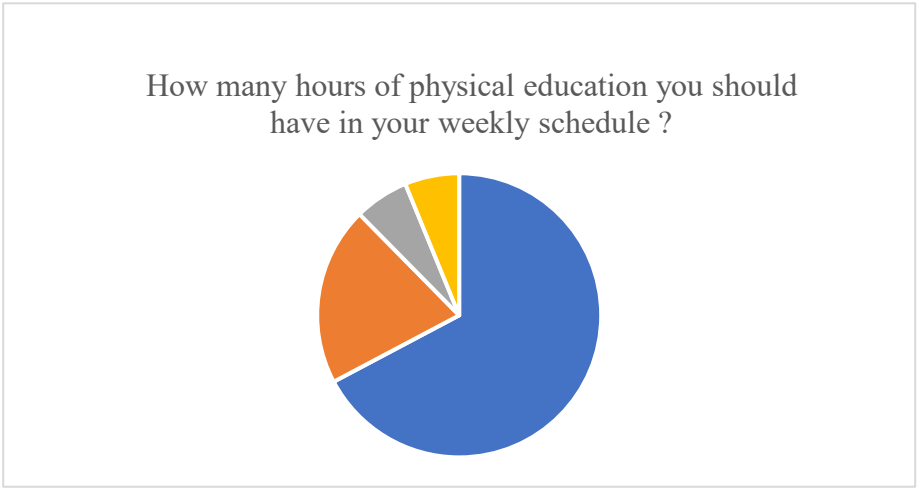

Figure 1 the number of physical education hours per week

4. Conclusions

Following the answers received, we came to the following conclusions:

1. Students do not participate in Physical Education classes for many objective and subjective reasons. Although they theoretically consider Physical Education important or very important for their health, they choose not to attend these classes. Most of the reasons are that:

- they come tired at school.
- they do not want to try.
- they don't find the class attractive.
- they have no basic notions.

2. From the students' answers I found that:

- in general, they are aware of the existence of a wide range of sports, but very few practice them due to lack of time, material conditions or simply are not interested.
- nor do families encourage them to have a lifestyle that includes weekly sports activities.
- Outside school, many students do not spend time doing sports.

3. As methods to improve attendance at physical education classes we identified with majority answers:

- The existence of a constructive dialogue between students and their teachers.
- Organizing activities as varied as possible.
- Involvement of students in class or inter-class competitions.
- Organizing classes in appropriate spaces.
- The existence of sets of sports equipment at school.

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SCIENTIFIC AND METHODOLOGICAL STUDY IN TRAINING YOUNG SWIMMERS AT THE INITIAL STAGE

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Abstract

An important role in the sports training of some qualities belongs to the effective way that presents a complex, well-organized process, which includes pedagogical, psychological, sociological, medico-biological research methodology, based on which we highlight prices and individual skills related to gender requirements of chosen sport.
The selection uses a complex system of criteria to identify the subjects that are closest to this ideal model. Sports selection is a long-term mixed process, which can be effective only if at all stages of training the athlete will be respected his individuality, using various research methods.

Key words: *stages of preparation, selection, testing, motor skills, coordination abilities*

1. Introduction

At the current stage, when the sports results in the swimming tests already exceed the human capacity as a species, it is very current to monitor, correct and rectify the functional status of the swimming athletes. The evolution of national and international achievements in swimming, inevitably, creates the need to develop existing methods, as well as creating new information techniques to guide the process of sports training (Platonov, 2000; Potdevin & Pelayo, 2012).

The **object of the research** is the completion of the scientific-methodical aspects of sports selection of young swimmers at the initial stage of training.

The **purpose of the research** consists in the scientific-practical study, systematization and concretization of the sports selection methodology for swimming at the preliminary stage of preparation.

Assumption. It was assumed that based on the multilateral study of the given problem will increase the efficiency of determining the most informative tests for qualitative selection in sports swimming and, thus, will improve the training of performance athletes.

Research objectives:

- Studying the literature on the selection of young athletes at the initial stage of training in various sports.
- Researching the most important selection criteria in sports swimming during the preliminary stage of preparation.
- Determining the most adequate tests for assessing the predispositions of movement for practicing sports swimming at the initial stage of preparation.

2. Material and method

In order to achieve these objectives, the following research methods were applied: the study and analysis of the specialized literature, the interview with the specialists, the anthropometry, the testing, the testing of the predispositions for sports swimming, the pedagogical experiment.

3. Results and Discussions

Sports selection is a complex process that takes place over a long period of time. The process lasts from the initial stage of training young athletes to the final stage of improvement and achievement of high sports performance (Barynina & Vaitsekhovskii, 1992). The methodological and theoretical bases of the problem of orientation and selection in sports are analyzed in the works of world-class researchers: Balsevich V.K., 1980; Bril M.S., 1983; Gujalovskiy A.A., 1986; Bulgakova N.J., 1986; Platonov V.N., 1986 etc.

The determination of the athlete's endowment is made up of the following general visions. The endowment is hereditarily determined by the innate aptitudes, referring to the structural, functional and psychological differences, which determine the human activity and behavior. Hereditary skills differ by a small change, but their training and education lead to a certain goal.

It should be mentioned that the human body is under the control determined by the genetic structure, and under the influence of learning and education, the predispositions turn into skills (Arden, Trzaskowski, Garfield, & Plomin, 2014).

It is recommended that the selection and completion of learning-training groups be carried out in 3 stages: initial, basic and concluding (Maglischo, 2003; Platonov, 2000).

During the experiment, methodological-pedagogical research was carried out in order to study the practical experience of coaches in organizing and promoting the instructive-educational process of young athletes. To perform this experiment were used: anthropometry to assess physical development based on measuring height, body mass, lung volume, breathing retention on inspiration and expiration.

In this context, the sociological survey of coaches from the sports schools of Municipality of Chisinau in the Republic of Moldova was undertaken, where 25 people took part in this action.

Based on the results of the sociological survey conducted among the coaches and athletes of the above-mentioned schools, it was determined that in the first stage of selection in the preliminary training groups priority is given to children with highlighted anthropometric symptoms, reflecting their morphology: body length upper and lower back, torso, shoulder and forearm, thigh and calf and the size of the sole and palm.

The data presented in Table 1 reflect the physical development of swimmers that differ depending on age and sexual development.

Table 1 *Indices of physical development of young swimmers of both sexes at the age of 7-15 years (average data)*

Physical development parameter	***Sex***	***Age (years)***								
		7	***8***	***9***	***10***	***11***	***12***	***13***	***14***	***15***
Height (cm)	***M***	130	135	140	144	148	153	160	170	176
	F	131	135	139	142	145	154	161	163	167
Weight (kg)	***M***	28	31	34	36	39	39	43	50	59
	F	28	30	31	33	38	43	49	51	57
Chest excursion (cm)	***M***	62	64	69	71	73	76	81	88	92
	F	61	62	64	68	71	76	81	84	87
Lung volume (ml)	***M***	1400	1500	2400	2500	2800	3200	3600	4600	5300
	F	1200	1370	2000	2300	2600	3000	3400	4100	4200
Hand dynamometer (kg)	***M***	12	14	19	22	24	28	33	39	44
	F	12	13	16	18	21	24	28	31	33

Girls start training earlier than boys, most sports girls - at the age of 7-9, and sports boys - at the age of 9-11.

At the initial stage of sports training, when the components of sports availability of children and adolescents are established, the basic method applied by the coach is the visual appreciation of the individual. For this, the 3-point system is used (Table 2). The effect of studying and perfecting the technique of sport swimming style largely depends on strength, speed, flexibility, endurance and other abilities.

Table 2 ***Assessment of somatic features, points***

Features	***1 point***	***2 points***	***3 points***
Muscles	poorly pronounce	average	developed
Tone	poorly developed	medium	well developed
Fat deposits	small	average	large
Bone structure	narrow	average	solid
The shape of the back	normal	normal	straight
The shape of the thoracic cage	flat shape	cylindrical	conical
The shape of the legs	normal	in the shape of the letter "X"	in the shape of the letter "O"
The shape of the sole	normal	flat shape	straight

Table 3 presents the results of testing the beginner level of motor skills for swimming.

Table 3 *Results of testing the motor skills of swimmers of both sexes, determining the usefulness of sports swimming occupations (average data)*

No. crit.	***Control test***	***Sex***	***Age (years)***				
			7-8	***9-10***	***11-12***	***13-14***	***15-16***
1	*Running 30m (sec)*	***M***	5.8-6.1	5.6-59	5.4-5.6	5.2-5.4	5.1-5.1
		F	6.0-6.2	5.7-6.1	5.5-59	5.4-5.7	5.3-5.6
2	*High jump (cm)*	***M***	30-32	34-39	41-45	46-48	50-54
		F	28-30	32-35	37-40	41-43	45-47
3	*Standing long jump (cm)*	***M***	130-142	145-155	160-175	170-185	185-208
		F	115-130	135-140	145-155	160-170	170-185
4	*Throwing the medicine ball (3kg) behind the head in a sitting position (cm)*	***M***	160-190	235-260	270-320	340-385	390-425
		F	155-180	190-210	215-250	275-310	320-350
5	*Flexion and extension of the trunk (no.)*	***M***	10-12	15-25	30-35	36-40	45-52
		F	8-10	10-15	20-25	25-30	35-41
6	*Appreciation of flexibility (bending forward, mm)*	***M***	10-15	15-25	20-30	35-50	51-60
		F	15-20	25-40	30-50	50-75	75-85
7	*Appreciation of the flexibility of the humeral joint (rotation with the stick, cm)*	***M***	70	65	63	62	64
		F	70	65	60	60	62
8	*Running 300m (sec)*	***M***	78-74	66-70	64-68	60-64	58-60
		F	82-88	70-75	68-70	60-68	58-61

Based on research, we determined that the maximum relative strength in girls after 15 years decreases slightly, and in boys it continues to progress. This criterion can be explained in terms of early genital maturation.

4. Conclusions

1. In swimming sports schools in the Municipality of Chisinau, the assessment of sports skills of children and adolescents is made by coaches based on the use of pedagogical, medical-biological, psychological and social research methods, which allow highlighting indices of quality, abilities and possibilities to deal with sports swimming until performance results are obtained.

2. In assessing the aptitudes of children and pre-adolescents for enrollment in initial training groups, special attention shall be paid to movement skills and the possibilities of coordinating movements.

3. In general physical training, in addition to strengthening health, complex education of movement skills is achieved as a result of very successful swimming activity.

4. The coaches of the sports schools from Chisinau mentioned in the paper pay

special attention to the initial training, to the preparatory exercises for the efficient acquisition of swimming procedures.

5. In the initial training groups are included first of all children who have hereditary predispositions of rapid movement, flexibility, endurance and coordination. Body height should be higher than average and high if there is proportionality between the upper and lower limbs, maximum oxygen utilization, body resistance to flexure. It was found that at the initial stage of training in sports swimming, students who achieved high results characterized by general development demonstrate special skills they possess for 2-3 years of training, compared to their peers who had low initial results.

6. A special importance in the initial selection of the groups, is given to the health, the general training according to the indices of hydrodynamics, morphofunctional and the individual psychic possibilities.

7. According to basic research on the peculiarities of the nervous system, coaches take into account that the power of movement, dynamism and balance of nervous processes allow the mastery of high-level sports swimming procedures, resistance to overweight and motivation to achieve the goal and objectives, during the training activity of young swimmers.

8. During training, coaches use various methods and means to form individual qualities that together determine the achievement of performance results.

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ASSESSMENT OF AGILITY IN MIDDLE SCHOOL STUDENTS BY USING THE BASKETBALL GAME METHODS

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Abstract

The purpose of this paper is to determine the level of agility development using basketball methods and the relationship of their indices with the anthropometric measurements in the 13-15-year-old girls of middle school. This scientific approach entailed the organization of an ascertaining pedagogical experiment carried out in the „Mircea cel Bătrân" Middle School of Pitesti, Romania. The subjects of the research were 26 girl students aged 13-15 years. Research methods: bibliographic study, method of pedagogical observation, method of tests, method of (ascertaining) pedagogical experiment, statistical-mathematical and graphical representation methods. Agility was tested by means of Witty SEM with 4 LEDs placed in the form of a 3x3 m square, with signal delay of 3 sec. along 10 impulses. Ball passing with two hands from the chest was used between impulses. Measured indices: total time (sec) and reaction time at each LED (Lap L1-10, sec). The results of the anthropometric measurements in the 13-15-year-old girls in the research were compared with the averages of the biometric potential values. The analysis of the results of agility test shows that the average value is 0.9 sec lower than the minimum values and 10.06 sec lower than the maximum value. The response at each LED reveals minimum values lower by 30%, reaction difference under 1.0 sec, 40% maximum values above 3.0 sec and the average shows 90% differences under 3.0 sec. The results of the correlation highlight 30% strong connections at $p<0.05$ between weight and execution time, 40% strong connections between height and execution time and 90% negative weak connections between BMI and agility indices. The agility test performed using basketball methods and the relationship of their indices with the anthropometric measurements of the 13-15 years old students established the development level and the value of the connections between the studied indices.

Key words: *spatial-temporal orientation, reaction speed, biomotor potential, game technique, correlative analysis*

1. Introduction

Basketball is one of the most frequently practiced sports games, especially in Romania, where it is included in the physical education school programs and the national competition system as well. The fact that basketball sport is the most widespread sport in the world after football is also due to its multiple characteristics: dynamism and speed, complex technique and tactics, spectacularity, participation of all teammates in attack and defense, tendency of universalism, organizational accessibility, very developed game theory and educational value (Sotiriu R. & Sotiriu, D., 2008).

Basketball game equally demands and develops the entire complex of biomotor skills. The motor skills (conditional and coordinative) are manifested in the following forms (Predescu & Moanță, 2001): dexterity, coordination and suppleness shown through fine movements, speed in all its forms (reaction, execution and movement), strength manifested by spring, agility, flexibility, general and specific endurance (Negulescu, 2002; Popescu & Porfireanu, 2003; Tarcău, Ciordaș & Boca, 2015).

One of the most important motor skills developed in school physical education is the combination of speed, coordination and balance referred to as agility nowadays (Szabo, Neagu & Sopa, 2020). Agility is one of the major determinants of performance in soccer, basketball, ice-hockey and handball (Little & Williams, 2005).

Technical and tactical improvement of modern basketball, speed of individual movements, high level of physical fitness, increased ability to work during the competition and the stability of willpower highlight the increasing responsibility of basketball players (Delextrat, Grosgeorge, & Bieuzen, 2015).

The technique of a sports game is "the ensemble of specific motor skills, also known as technical skills, technical procedures used in order to practice the game with maximum efficiency" (Predescu, 1999). The basketball game technique is the ensemble of specific movements that an athlete performs during a game, in conformity with the competition rules and tasks. Thus, the systematization of the technical elements and individual tactical actions in basketball game is carried out both according to the attack and defense phases and the technique of playing with and without ball (Ghițescu & Moanță, 2013).

Pubertal age represents an active proliferation stage in the evolution of the ossification process; ligaments and joints are still poorly developed. Size and weight undergo important changes in puberty stage. Skeletal musculature develops mainly through the elongation of muscle fibers. During the puberty period (13-15 years), muscle strength develops in a slower rate (Popescu & Porfireanu, 2003).

This paper intends to determine the agility development level with the help of basketball methods and the relationship of their indices with the anthropometric measurements in the middle school girl students aged 13-15 years.

2. Material and method

This scientific approach led to the organization of an ascertaining pedagogical experiment conducted within the „Mircea cel Bătrân" Middle School of Pitesti, Romania.

The subjects of the research were middle school girls aged 13-15 years (mean±SD), weight of 47.46±8.52 kg, height of 161.46±7.14 cm and body mass index (BMI) – 18.11±2.21 kg/m^2; all subjects have normal mass, according to the recommended age. BMI was automatically calculated, compared with the average BMI of other children (https://calculator-imt.com/ro-md/imc-copii/) and with the biometric

potential data from the National Research Sports Institute (http://www.biomotric.ro/). The following research methods were used: bibliographic study, method of pedagogical observation, method of (somatic and motor) tests, method of (ascertaining) pedagogical experiment, statistical-mathematical and graphical representation methods.

Figure 1. *Agility testing by basketball methods in girl students aged 13-15 years*

For agility testing, Witty SEM was used. It is a „ smart indicator" formed of a 7x5 LED matrix, which can display different symbols and colors. During the assessment, 4 LEDs placed in the form of a 3x3 m square were used, signal delay of 3 sec., duration of 10 impulses. Between the impulses, the task of two-handed ball pass from the chest was also performed. Measured indices: total time (sec) and reaction time at each Lap L1-10 (sec).

The statistical analysis was carried out by means of KyPlot 6.0 software, calculating the usual descriptive indices (min, max, avg (mean), SD – standard deviation, Cv – coefficient of variation). The correlational analysis was made using Pearson coefficient between anthropometric measurements and agility indices at $p<0.05$.

3. Results and Discussions

The results of the anthropometric measurements of the 13-15-year-old girls who participated in the research were compared with the averages of the three middle school grades (6^{th}, 7^{th} and 8^{th}) in terms of biometric potential values. The comparative analysis highlights the following values: *weight* of 47.46±8.52 kg, lower by 2.86 kg than the national average; *height* of 161.46±7.14 cm, higher by 3.42 cm; *body mass index* (BMI) – 18.11±2.21 kg/m^2 lower by 1.93 kg*m^2, which shows normal mass at 50% (18.9-20.2 kg/m^2).

Table 1 and figures 2 and 3 show the results of agility testing in students aged 13-15 years, using the basketball methods.

Table 1. *Results of agility testing in the girl students of 13-15 years old (n=26), using basketball methods*

Indices	Min	Max	Avg	Std Dev	Cv(%)
Time (sec)	42.94	52.13	42.07	2.28	4.74
Lap L1 (sec)	4.27	7.61	4.96	0.65	13.08
Lap L2 (sec)	4.09	8.30	5.03	0.82	16.28
Lap L3 (sec)	3.89	6.71	4.82	0.59	12.34
Lap L4 (sec)	4.28	5.91	4.83	0.43	8.85
Lap L5 (sec)	4.22	5.84	4.73	0.39	8.26
Lap L6 (sec)	3.93	5.32	4.58	0.33	7.24
Lap L7 (sec)	4.11	5.99	4.74	0.45	9.48
Lap L8 (sec)	4.15	6.86	4.86	0.59	12.32
Lap L9 (sec)	4.15	5.51	4.83	0.39	8.27
Lap L10 (sec)	3.91	5.47	4.69	0.37	7.78
Avg L1-10 (sec)	**4.10**	**6.35**	**4.81**	**0.50**	**10.39**

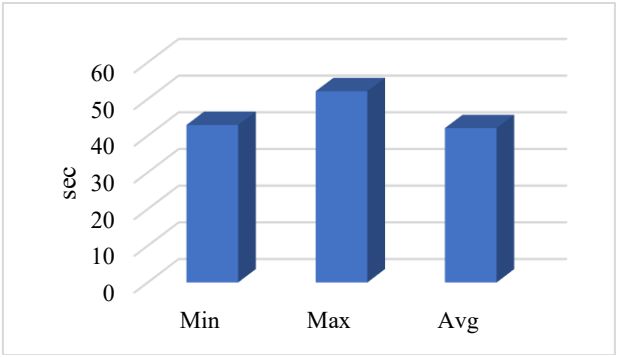

Figure 2. *Results of the minimum, maximum and average values of agility testing through basketball methods (students aged 13-15)*

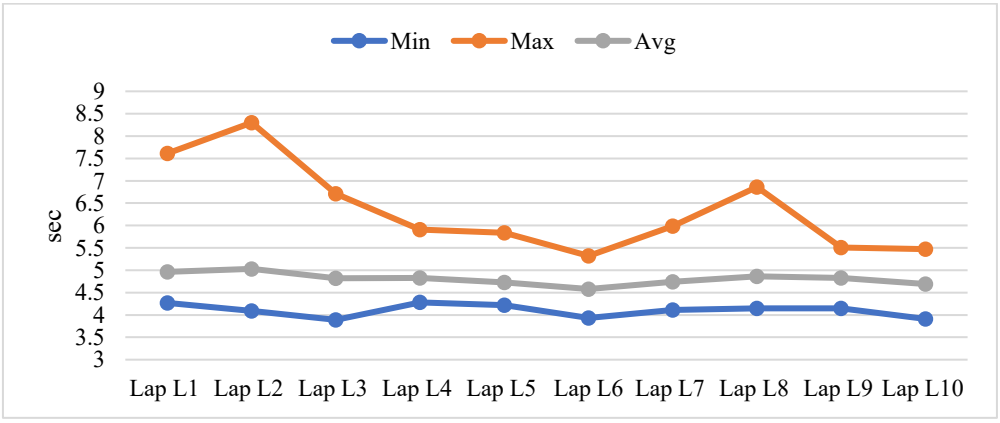

Figure 3. *Dynamics of minimum, maximum and average values of reaction time testing between LEDs during agility testing through basketball methods (students aged 13-15)*

The analysis of the results reveals the average value of 42.07±2.28 sec, closer to the minimum values and 10.06 sec above average maximum value (fig. 2).

Regarding the reaction time between LEDs, one can observe minimum values of 4.10 sec, maximum values of 6.35 sec and an average of 4.81±0.50 sec with Cv (%) – 4.74%.

As for the values at each LED from the 10 impulses at 3 sec response delay, one can notice lower minimum values with difference of reaction below 1.0 sec 30% at L3, L6 and L10, 40% of maximum values over 3.0 sec at L1, L2, L3 and L8; the average shows 90% differences under 3.0 sec (fig. 3).

Figure 4 shows the results of the correlational analysis between the agility and anthropometric indices in the middle school students aged 13-15 years.

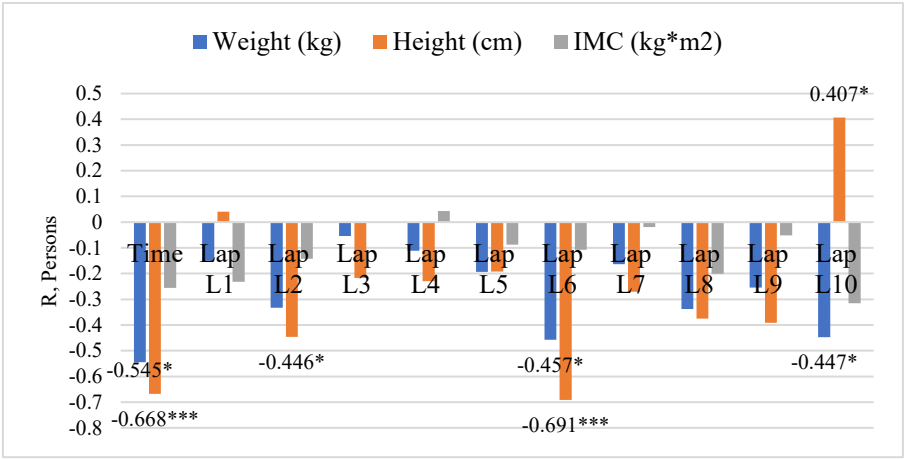

Figure 4. *Correlation analysis between agility and anthropometric indices in the middle school students aged 13-15 years*

Correlation results reveal 30% strong connections at $p<0.05$ between weight and execution time, Lap L6 and L10, response to minimum value under 1.0 sec), 40% strong connections between height and execution time ($p<0.001$) and with L2 and L6 at $p<0.05$, with response under 3.00 sec and 90% negative weak connections between BMI and agility indices.

The specialized literature highlights that the unilateral use of exercises specific to basketball game during training sessions contributes to progress in terms of movements coordination. But it was also highlighted that the inclusion of elements for global postural reeducation, along with coordination methods non-specific to basketball, improve this motor skill to a greater extent (Tarcău, Ciordaş, & Boca, 2015).

The Illinois Agility Test (IAT) is a popular and simple method that has been used for a long period to test the agility. The specialized literature highlights that there are coaches who are not yet acquainted with the modern motor tests meant to properly determine the agility. Therefore, these coaches still make the assessment

of agility and speed in sport games using the Illinois test only (Šimonek, Horička & Hianik, 2017).

A study was conducted in order to determine the effect of circuit training on agility and speed of teenaged male basketball players. The tests used for this purpose: 50 m sprint and 4x10 m shuttle run. Both the t-ratios were found to be significant at 0.05 level of confidence with 29 degrees of freedom (Shekhawat & Chauhan, 2021).

In modern team sports, agility has become more important than in the past, because the game is much faster than before. The agility in sport is a multifactorial parameter; it is correlated with body stability, rapidity and speed. In order to understand which parameters are more important, a pre-post case study, based on three different training protocols and a control group, was made for obtaining objective data (Izzo & Hosseini Varde'i, 2018).

Other studies pointed out the well-known importance of jumping ability in basketball, but the different jumping testing protocols in basketball players at advanced levels were not approached sufficiently (Pehar et al., 2017).

There were determined the reliability and validity of the simple test of agility (T-TEST) and of four newly developed basketball-specific agility-tests, in defining playing-positions and performance-levels in basketball (Sekulic et al., 2017).

A new test of planned agility in elite junior basketball players was analyzed to investigate the reliability and determinants of performance. The results highlighted a good reliability of the test. A gender effect on the determinants of planned-agility performance in young elite basketball players was found out. The results also suggest that straight-line sprint and unilateral jump tests must be implemented in the elite junior players testing program. The agility development and testing can improve sport performance (Sabin & Marcel, 2016).

Agility is highly important in the dribble. Research done on the playing field shows that a poor dribbling technique gives chance to the opponents to take the ball easily. There is a significant relationship between agility and dribble basic technique in playing basketball (Nuryadi, & Indah, 2019).

Some specialists analysed the difference between the dribble crossover method and the two ball dribble method and their results in basketball training and also the effects of high or low agility in basketball dribbling results. The method used is an experiment with 2x2 factorial design (Pratomo, Pramono & Soenyoto, 2019).

Another research identified and analyzed the difference in effects of two ball dribble and dribble of the wall exercise method on the dribble skills of basketball. The research also focused on the effects of the different agility levels of the players on the dribble skills (Afrilliyan, Pramono, & Soenyoto 2018).

There were also examined the exercise models with water and sand as exercise media meant to maximize the training ability of athletes. The experiment conducted for this purpose revealed a significant difference in the effect of the exercise methods (water exercise and sand exercise) on agility. The sand exercise training

method was better than the water exercise for increasing the agility of basketball players (Waffak, Sukoco & Sugiyanto, 2022).

4. Conclusions

The results of the anthropometric measurements of the 13-15-year-old girls included in the research were compared with the average values of the biometric potential, highlighting a normal body mass.

The analysis of the results of agility testing shows the average value lower by 0.9 sec than the minimum values and by 10.06 sec than the maximum value. The results of the responses at each LED reveals lower minimum values with 30% reaction difference under 1.0 sec, 40% maximum values above 3.0 sec, while the average has 90% differences below 3.0 sec.

The results of the correlation analysis highlight 30% strong connections at $p<0.05$ between weight and execution time, 40% strong connections between height and execution time and 90% negative weak connections between BMI and agility indices.

Agility testing with the help of basketball methods and the relationship of their indices with the anthropometric measurements in the middle school girl students aged 13-15 years determined their development level and the value of the connections between the studied indices.

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IMPORTANCE OF DEVELOPING THE SPEED ENDURANCE CAPABILITY BY APPLYING BASKETBALL METHODS TO MIDDLE SCHOOL STUDENTS

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Abstract

The study aims at finding a modern didactic technology for the development of the speed endurance capability by applying basketball methods to middle school students. For this purpose, a case study addressed to specialists (teachers of physical education and basketball coaches as well) was organized. The research used the method of survey based on the questionnaire developed in Google forms, consisting of 10 questions and sent on-line. The sociological survey was attended by 26 specialists, aged 22-72, with different teacher ranks and seniority in education. The results of the sociological survey highlight the following issues: insufficient allocation of the teaching time necessary for the physical education class; use of didactic technologies that provide an algorithmic content for achieving the intended objectives / competencies; importance of motor skills development in the physical education lesson; contribution of basketball game to speed development by using modern didactic technologies; creation of a methodological guide for motor skills development through the basketball game specific methods. All these opinions of the specialists can contribute to finding an efficient modern didactic technology for the development of the speed endurance capability by applying basketball methods to middle school students.

Key words: *opinions of the specialists, didactic technologies, learning units, motor skills, sports games*

1. Introduction

Basketball gained worldwide popularity and fascinated players and spectators as well thanks to its dynamic characteristics as a team sport. Modern basketball requires greater amount of speed, power, agility, strength, endurance and flexibility (Akilan, 2014). Speed is one of the most important qualities in basketball. High mobility of the nervous processes determines the rapid orientation of the players in the basketball court and the speed of execution of actions, as well as the speed of tactical thinking, which manifests itself in tactical engagement of players (Griban et al., 2018). The technical and tactical improvement of modern basketball, the speed of individual movements, the high level of physical fitness, the increased ability to work during the competition and the stability of willpower show more and more responsibility from the part of basketball players (Rasulovna, 2022).

Basketball is characterized by high dynamism in the development of situations, the constant alternation of defensive and offensive phases of the game, the continuous switching of players from one motor action to another, the variability of

the speed and direction of movement, the development level of the special physical qualities. The effectiveness of the rational actions of a basketball player requires the manifestation of speed-strength qualities and coordination abilities at the proper level, combined with the speed of movements and thinking. Special types of endurance are also important. Endurance is one of the most important qualities of the basketball players (Ismoilovna, Azamovich & Umidovich, 2022).

Using sports in the pre-university education in the form of physical education classes and sports training is a pedagogic process of education, training and improvement of the functional indices of the students. This process involves a constant pedagogic control and is carried out in a specific hygienic regime in order to obtain high sports results (Kasabova, L., 2020).

The development of good conditioning programs based on the specific physiological demands of each sport is considered a key factor to success. The basketball player needs to train multiple components of fitness. Thus, the athlete will concurrently perform various modes of training (e.g., strength, anaerobic exercise, endurance) (Chittibabu & Akilan, 2013).

The purpose of the work is to identify a modern didactic technology regarding the development of the speed endurance capability by using basketball methods for the middle school students.

2. Material and method

This scientific approach entailed the organization of a case study addressed to the specialists: teachers of physical education and sports and especially basketball coaches. In this sense, the survey method was used, based on the questionnaire developed in Google forms, consisting of 10 questions and sent online.

A number of 26 teachers-coaches participated in this study with an average of 40.92 ±12.39 years (age ranging from 22 to 72 years).

The analysis of the responses was calculated by means of KyPlot program regarding the descriptive indices: mean; standard deviation (±SD) and range of values (min and max).

3. Results and Discussions

Teachers with the following ranking participated in the study: 41.7% with full-time professional degree; 8.3% rank 2; 33.3% - rank 1 and 16.7% with academic didactic rank. As for the seniority of the specialists in the study, it is classified as 16.7% for beginners, 8.3% from 3 to 5 years, 16.7% from 6 to 10 years, 4.2% from 11 to15 years, 12.5% from 16 to 20 years, 12.5% from 21 to 25 years and 29.2% over 25 years.

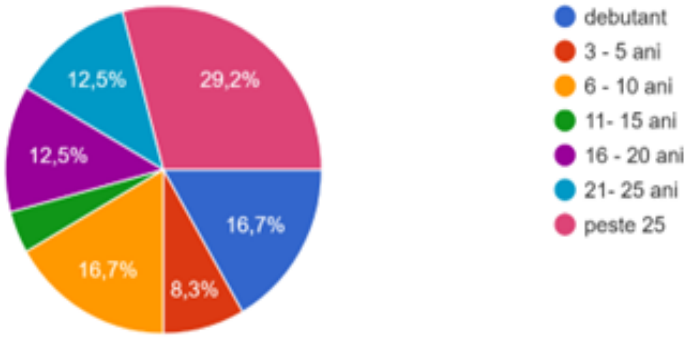

Figure 1. *Seniority in education of the specialists participating in the study*

Following the questionnaire applied, the results of the responses were automatically calculated through the Google Forms platform and entered into the table 1.

Table 1 *Results of the opinions of specialists on the importance of developing the speed endurance capability by applying the basketball methods to middle school students(n=26)*

No.	Items (questions – content)	Response, scores (%)				
		1	2	3	4	5
1	Do you consider that the teaching time allocated to the lesson of physical education is enough?	38.5	23.1	19.2	11.5	7.7
2	Are you currently using didactic technologies that offer an algorithmic content in the achievement of the learning units?*	12	0.0	20	40	28
3	Do you consider that the intended objectives / competencies are achieved through a well-developed didactic strategy?*	0.0	0.0	24	32	44
4	What importance do you attach to the development of the motor skills in the physical education lesson?	0.0	0.0	4	16	80
6	What weight do the sports games have in the lessons conducted by you?*	0.0	0.0	4	28	68
7	In your opinion, how much does the content of basketball game contribute to the achievement of the proposed objectives / competencies?	0.0	0.0	23.1	30.8	46.2
8	Do you think that playing basketball contribute to the development of speed in the regime of the other skills too?	0.0	0.0	11.5	38.5	50
9	Do you consider that the approach of the content using modern didactic technologies is necessary?	0.0	0.0	11.5	19.2	69.2

Note. * 1 response is missing; item 5 – has a closed response at choice;

The analysis of the responses to the items of the questionnaire highlights the following opinions:

- according to the opinion of the specialists, the teaching time allocated to the

physical education lesson is: 38.5% - insufficient; 23.1% - sufficient; 19.2% - good; 11.5% - very good; 7.7% excellent;

- using the didactic technologies that offer an algorithmic content within the achievement of the learning units: 28% - excellent; 40% - very good; 20% - good; only 12% - insufficient;
- the intended objectives / competencies are performed through an elaborated didactic strategy: 44% excellent; 32% - very good and 34% - good;
- importance of allocating time for motor skills development during the physical education classes: 80% - excellent; 15% - very good; 4% - good;
- the efficiency of motor skills development is achieved together with the other skills - 96%; it is achieved alone - 4%;
- the share of the sports games within the lessons carried out: 68% - excellent; 28% - very good; 4% - good;
- the contribution of the basketball game content to the achievement of the proposed objectives / competencies is: 46.2% excellent; 30.8% - very good; 23.1% - good;
- contribution of the basketball game to speed development in the regime of the other skills too is: 50% excellent; 38.5% - very good and 11.5% good;
- it is necessary to make the approach of the content by using modern didactic technologies: 69.2% - excellent; 19.2% - very good; 11.5% - good;
- it is necessary to create a methodological guide for the motor skills development through methods specific to the basketball game: 84.6% - yes; 15.4% - I do not know (fig. 2).

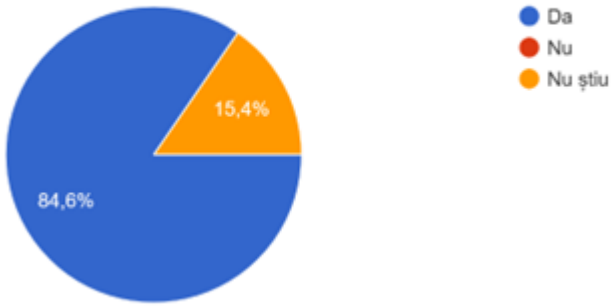

Figure 2. *Necessity of creating a methodological guide for motor skills development through methods specific to basketball game*

Regarding the survey items, a review of the specialized literature was made. Some studies investigated the effects of 8 weeks of regular physical exercise on the adaptation of enzymes to the level associated with the specific endurance training program. Findings show that 10 weeks of usual speed endurance training de increase the level of (LDH) in basketball players (Mohammed, Bachir, Eddine & Adel, 2018). Other specialists focused on the effect of 16 weeks of strength resistance training and general endurance training on the strength, speed, dexterity

and anaerobic capacity of the junior basketball players (Balčiūnas, Stonkus, Abrantes & Sampaio, 2006). It was also analyzed the implementation of a strength training in the preparation of a college basketball team. The testing program included the evaluation of speed and endurance, speed-resistance and strength. There was a significant increase in the physical fitness of the team players at the end of the competitive period (Brynzak & Krasnov, 2013).

The specialized literature sources do not contain research data able to characterize the specific organization of physical education of the students during extracurricular physical activities meant to preserve and strengthen their health. The results of the didactic experiment show that basketball-oriented physical education is more efficient under high radiation conditions than the traditional practices (Halaidiuk et al., 2018).

The effectiveness of a basketball-specific endurance training circuit on the aerobic capacity, heart rate and body composition of high school basketball players during the competitive phase was evaluated (Chittibabu & Akilan, 2013; Akilan, 2014).

It was also analyzed the factorial structure of the physical fitness in the 12-year-old children while playing basketball. The main aspect of the study was to test their different coordination skills. The distribution of factors confirms that the development of physical skills is a multifaceted process which allows the development of any particular physical skill without influencing others (Andrieieva et al., 2020).

4. Conclusions

The following methodological aspects were identified after conducting the sociological study about the modern didactic technology intended to develop the endurance speed capability by applying basketball methods:

- insufficient allocation of the didactic time necessary for conducting the physical education class;
- the use of didactic technologies in the implementation of the learning units in order to achieve the intended objectives / competencies;
- importance of allocating time for the development of the motor skills within the physical education lesson and achieving them together with the other skills;
- the weight represented by sports games in the physical education lessons and the accomplishment of the objectives / competencies through the contribution of the basketball game content;
- contribution of the basketball game to the speed development in the regime of the other skills too, by applying modern didactic technologies;
- necessity to create a methodological guide for the motor skills development during the physical education lessons, using the methods specific to the basketball game.

All these opinions of the specialists can contribute to finding an efficient modern didactic technology for developing the speed endurance capability by

applying basketball methods to the middle school students.

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COMMUNITY-SCHOOL-FAMILY COLLABORATION IN THE PROCESS OF DEVELOPMENT OF PHYSICAL EDUCATION SKILLS IN PRIMARY SCHOOL STUDENTS

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Abstract

Along different periods, physical education has been given greater or lesser importance, depending on the social-historical conditions. Recent research highlights that parents focus more carefully on child-education and support behaviors when they find out a welcoming school climate. Altogether, the community, parents and teachers support the educational partnership through collaborative behaviors, planning, communication, sustaining and evaluating the school skills, including physical education. The experiment was conducted during the academic years 2019 –2021 in the" Liviu Deleanu" Theoretical High School of Chișinău City. The research was structured in two stages. *Conclusions*. The educational partnership becomes an important socio-psycho-pedagogical factor in the improvement of the school-community relations for practicing physical education in the family only when the quality of the interactions and the quality of the results are taken into consideration. The family and school are the most important institutions concerning the achievement of physical education objectives in the event that these ones turn into good account their potential as actors, as educational agents and as partners in terms of developing the interest of the child in practicing physical exercises.

Key words: *collaborative strategies, school partnership, community-school-family, physical education skills, primary school students*

1. Introduction

In the primary school, Physical Education – as a discipline of the curriculum – is one of the most important subjects, given its role in the general physical development and health status. Physical education provides students with skills, abilities and knowledge that will help them to develop throughout all the cycles of education.

Exercising during the physical education lessons at curriculum level and in extracurricular activities, as well as the outdoor sports activities according to interest and needs, improves the human physical condition and the life quality. Practitioners of sports activities acquire a series of knowledge and abilities necessary both for them and the society they belong to (Curriculum, 2021; Carp, Kashuba & Riciok, 2017; Carp & Banari, 2009; Carp & Topchin, 2014; Uricheanu, 2020).

In the opinion of the authors (Carp, Kashuba & Riciok, 2017; Leșco, 2022), the relations with the school and the teaching staff of the students and the parents from disadvantaged socio-familial backgrounds are often difficult. This fact has a

negative influence on the process of physical education skills training. At the same time, the parents with a good socioeconomic and cultural status consider that the relation with the school is a benefice one, thus they keep a permanent contact with the school, teaching staff and school managers; they are also actively involved in various educational activities, including the physical education ones.

The matters mentioned above allowed to formulate the problem of the research: how can be made more efficient the training process of the physical education skills in the primary school students? How can be increased the motivation and interest in movement by means of the community-school-family partnership?

Purpose of the research – elaboration and proposal of strategies to optimize the community-school-family partnership for the development of the physical education skills in the primary school students.

Objectives of the research:

- Analysis of the theoretical benchmarks regarding the school-family partnership and the fundamental research carried out on the school-family partnership;
- Studying the manifestation of parents' interest in the development of students' skills for practicing physical exercises;
- Elaboration of the recommendations for the improvement of the school-family partnership in order to awaken the interest of children in practicing physical exercises.

2. Material and method

The experiment was conducted during the academic years 2019 –2021 in the" Liviu Deleanu" Theoretical High School of Chișinău City. The research was structured in two stages.

The *first stage* of the research (November-December 2019): the observation and sociological questionnaires were used. This stage of the research enabled: the study of the specialized literature data regarding the problem addressed; the identification of the level of involvement of parents in the knowledge and use of the strategies meant to attract children to physical exercises practice; learning the opinions of the teachers on the research topic.

The *second stage* (January – November 2020): a number of 20 parents of the students from the „L. Deleanu" Theoretical High School of Chișinău City were invited to participate in the ascertaining experiment. The parents were proposed to answer the questions of the „Questionnaire for parents". The questionnaire developed by us included 10 items with proposed answer variants.

Purpose of the questionnaire: diagnosing the level of involvement of the parents in school environment for developing the interest of the child in practicing physical exercises in family.

The *third stage* (February-May 2021), for finalization, in which the results obtained at the level of sociological survey and evaluation of the physical training indices in the primary school students were analyzed and interpreted.

3. Results and Discussions

The questionnaire results are presented and interpreted in tables and figures as shown below:

Table 1. Presentation of the results for the first item *„What does a healthy child mean to you?"*

Variant of answer	*No. of parents*	*%*
lively	8	40
without any disease	5	25
harmoniously developed	7	35

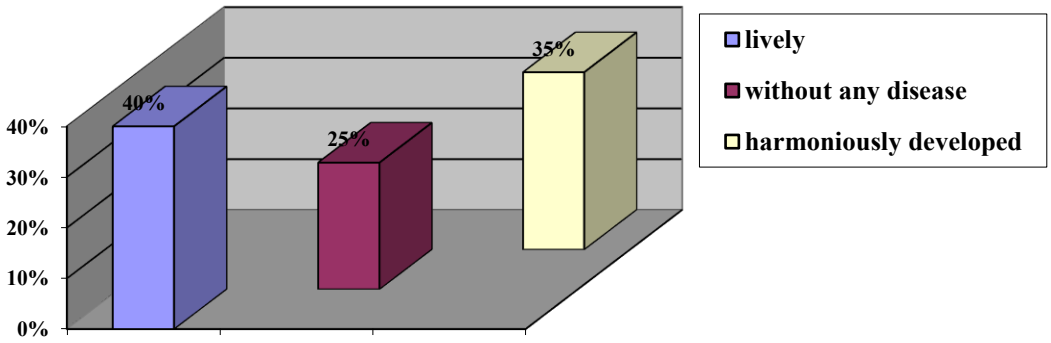

Figure 1. Distribution of the results for the first item *„What does a healthy child mean to you?"*

According to the results shown in figure 1, 8 parents out of 20 (40%) think that a healthy child means a lively child, who is in motion permanently and has a positive mood. A number of 7 parents out of 20 (namely 35%) consider that a healthy child is a harmoniously developed child. The lowest score, 25% of the parents (5 out of 20 parents) consider that a healthy child is one without any disease, who does not complain that something hurts or suffers an illness.

Table 2. Results for the second item *„Does your family practice morning gymnastics?*

Variant of answer	*No. of parents*	*%*
yes	2	10
no	10	50
sometimes	8	40

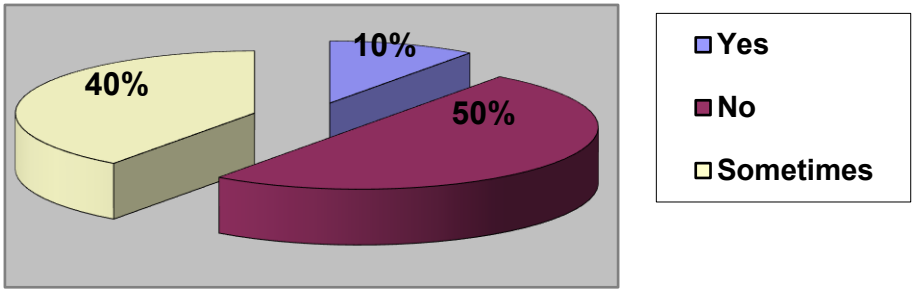

Figure 2. Distribution of results for the item *„ Does your family practice morning gymnastics?"*

Regarding the question of whether morning gymnastics is practiced in the family, 2 parents out of 20 answered „yes", which is 10%. Then 50% of the parents, namely 10 out of 20 parents admitted that morning gymnastics *is not practiced* in their family. There are 8 families out of the 20 ones interviewed, namely 40%, who mentioned that *sometimes* in their families the parents do morning gymnastics together with their children.

Table 3. Presentation of results for the item *„ Do you follow a healthy diet for your child?"*

Variant of possible answer	*No. of parents*	*%*
yes	3	15
no	5	25
partially	12	60

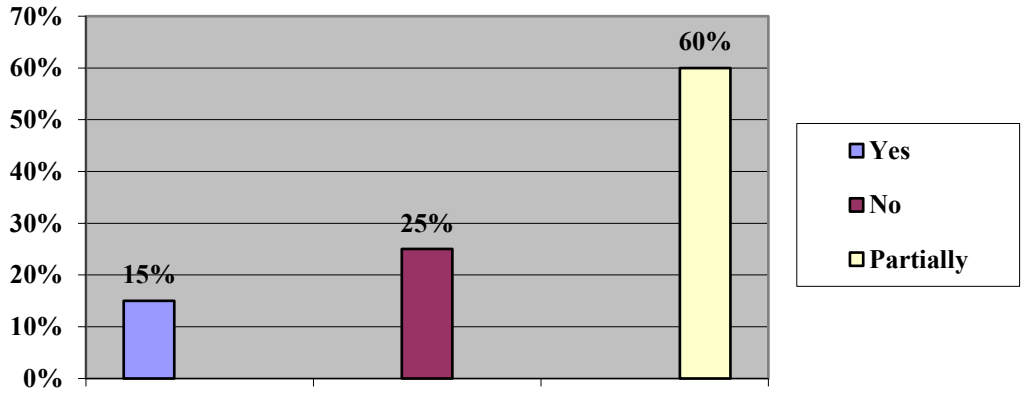

Figure 3. Distribution of results for the item *„Do you follow a healthy diet for your child?"*

Based on the results shown in fig.3, one can notice that the maximum score was obtained by 12 parents (60%) out of 20, who answered that they follow a healthy diet for the child – *partially*. Then 5 parents out of 20, namely 25%, answered that they *do not* follow a healthy diet for the child in family. Only 3 parents out of 20 interviewed - (15%), follow a healthy diet for the child.

Table 4. Presentation of results for the item *„Are the sleeping hours of the child respected?"*

Variant of possible answer	*No. of parents*	*%*
yes	8	40
no	3	15
rarely	9	45

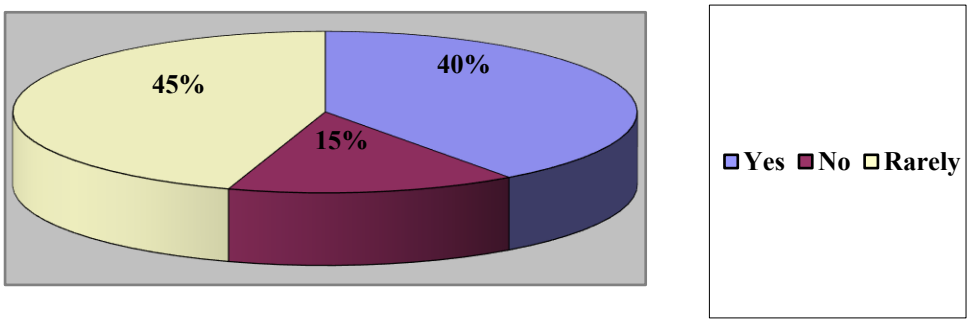

Figure 4. Distribution of results for item *„ Are the sleeping hours of the child respected?"*

Fig. 4 describes the situation regarding the observance of the child's sleeping hours in the family. Almost half of the parents (9 out of 20, namely 45%) answered that they rarely respect the sleeping hours of the child, while 40% of the parents, that means 8 parents out of 20, strictly observe the sleeping schedule of their children. Only 3 parents (15%) do not observe the sleeping hours of the children in the family.

Table 5. Presentation of results for the item *„Does your child need physical education?"*

Variant of possible answer	*No. of parents*	*%*
yes	12	60
no	5	25
not necessarily	3	15

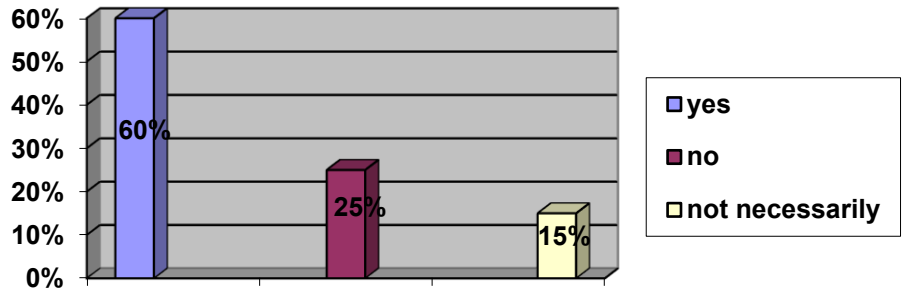

Figure 5. Distribution of results for the item *„ Does your child need physical education?"*

As for the question *Does your child need physical education,* more than half of the parents – 12 out of 20 parents, which is 60% - answered *Yes.* The variant *No* – was chosen by 5 parents out of 20 (25%) and only 3 parents mentioned the fact that physical education is not absolutely necessary for children. This situation is reflected in figure no. 5.

Table 6. Presentation of results for the item *„Do you think there is any connection between physical education and the health state of your child?"*

Variant of possible answer	*No. of parents*	*%*
yes, there is	18	90
no	2	10
I do not know	0	0

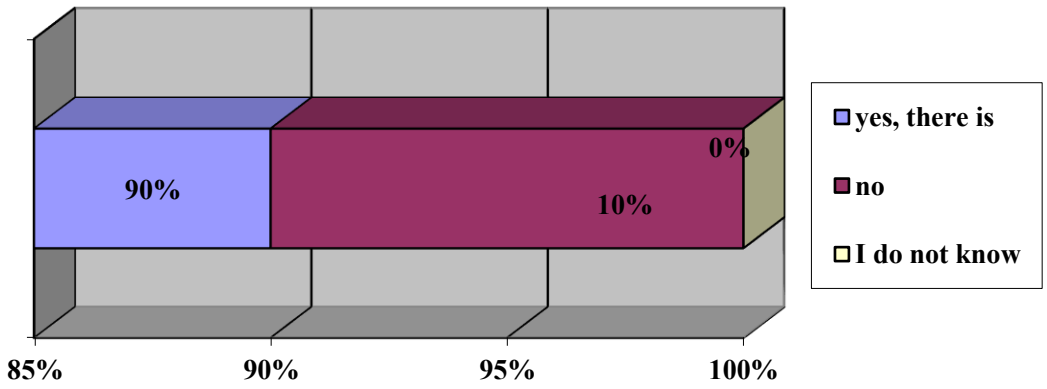

Figure 6. Distribution of results for the item *„Do you think there is any connection between physical education and the health state of your child?"*

„A healthy mind in a healthy body" says an old proverb. The state of health from a physical, mental and social point of view depends on the general state of the body. Referring to this side of the child's development, almost all parents (90%) - 18 out of the 20 respondents - answered *Yes.* The option *No* was selected only by 2 parents. No value was given for the answer option *I do not know.*

Table 7. Presentation of results for the item *„Do you encourage your child to practice a certain sport in the family?"*

Variant of possible answer	*No. of parents*	*%*
yes	9	45
no	11	55

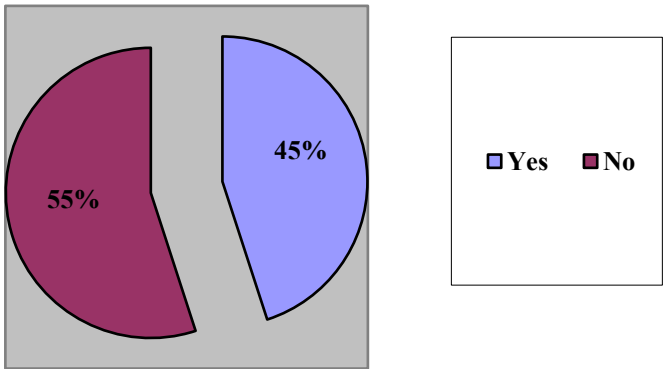

Figure 7. Distribution of results for the item *„ Do you encourage your child to practice a certain sport in the family?"*

Figure no. 7 presents the opinion of the parents in terms of encouraging the child to practice a certain type of sport in the family. There are 11 parents out of 20 (which is 55%) who admitted that they do not encourage their children to practice any type of sport in the family, either because of lack of time, or because the child is not interested in sport, but in other activities such as: painting, theatre, artistic culture, reading books etc. 45% of the parents-respondents mentioned the fact that they encourage the child to practice a certain sport in family, which is a gratifying thing.

Table 8 Presentation of results for the item *„Is the permanent presence of physical exercise necessary in the life of your child?"*

Variant of possible answer	*No. of parents*	*%*
yes	11	55
no	7	35
I do not know	2	10

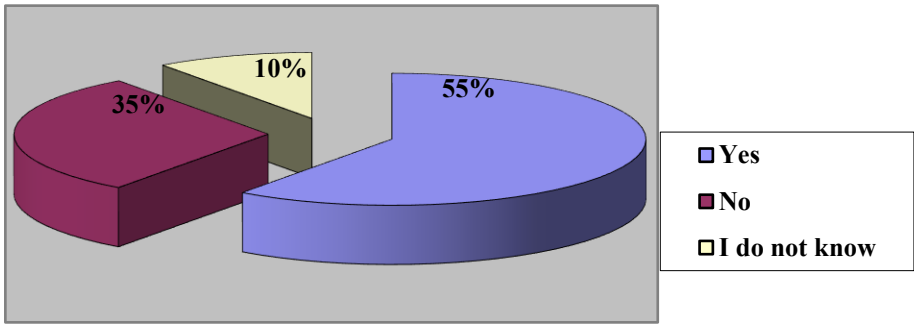

Figure 8. Distribution of results for the item *„ Is the permanent presence of physical exercise necessary in the life of your child?"*

Figure no.8 highlights the idea concerning the need for permanent presence of physical exercise in the life of the child. The parents preferred to answer this question in this way: *Yes* - answered 55%, that means 11 parents out of 20; 35% of the parents (7 out of 20 parents) answered *No;* 2 parents (10%) answered with the option – *I do not know.*

Table 9. Presentation of results for the item *„Is it necessary to develop a positive attitude for a healthy lifestyle in children even from preschool age?"*

Variant of possible answer	*No. of parents*	*%*
yes	12	60
no	6	30
I do not know	2	10

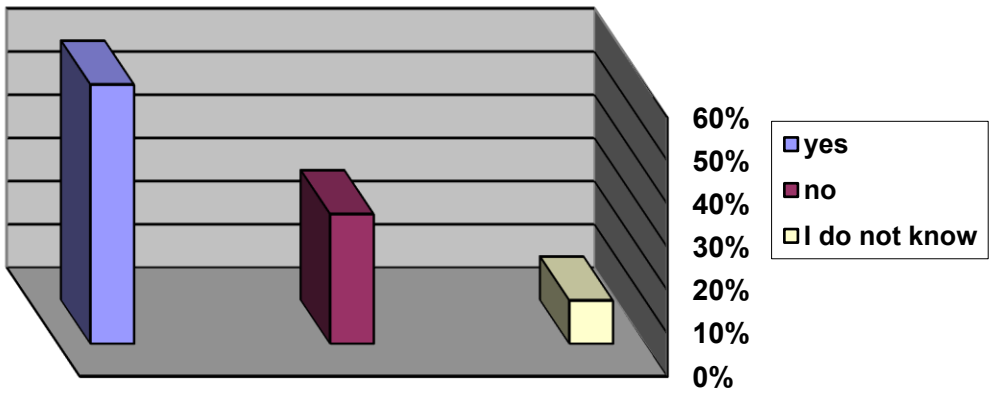

Figure 9. Distribution of results for the item *„Is it necessary to develop a positive attitude for a healthy lifestyle in children even from preschool age?"*

Thus, fig. no. 9 includes the results for the item *„Is it necessary to develop a positive attitude for a healthy lifestyle in children even from preschool age?"* More than half of the parents – 12 out of 20 parents (60%) – claimed that it is necessary to develop a positive attitude for a healthy lifestyle in children even from the preschool age. A number of 6 parents, that means 30%, answered *no.* Only 2 parents, namely 10 %, answered *I do not know*.

Table 10. Presentation of results for the item *„How do you collaborate with the school regarding the development of the interest of your child in practicing physical exercises?"*

Variant of possible answer	*No. of parents*	*%*
I attend the physical education classes	2	10
I often discuss on phone with the teacher	9	45
I participate in parent-teacher meetings	6	30
I have individual meetings with the teacher	3	15

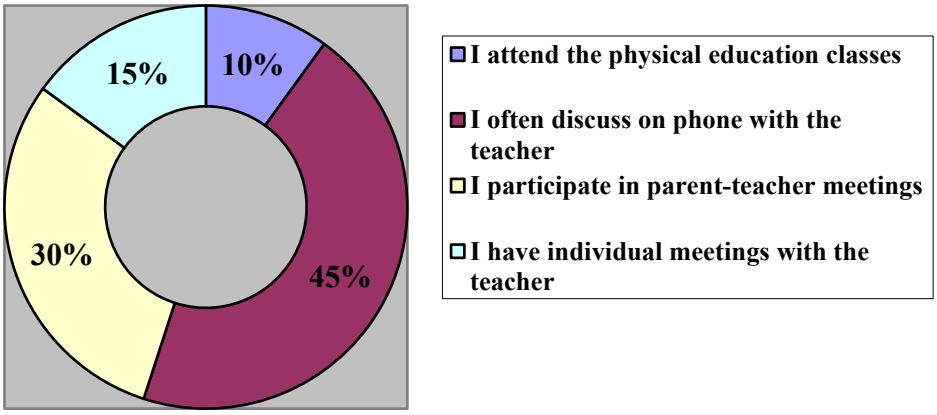

Figure 10. Distribution of results for the item *„How do you collaborate with the school regarding the development of the interest of your child in practicing physical exercises?"*

As for the question about *how the parents collaborate with the school to develop the interest of the child in practicing physical exercises,* almost half of the parents-respondents – 9 out of 20 (45%), mentioned that *the most frequently they communicate on phone with the teacher.* 30% of the parents, namely 6 out of 20 parents, selected the option *I participate in parent-teacher meetings*. A number of 3 parents out of 20 (15%) prefer the *individual meetings with the teacher.* Only 2 parents out of 20 (that means 10%), *attend the classes of physical education,* if possible.

4. Conclusions and recommendations

1. The educational partnership becomes an important socio-psycho-pedagogical factor in the improvement of the school-community relations for practicing physical education in the family only when the quality of the interactions and the quality of the results are taken into consideration.

2. The family and school are the most important institutions concerning the achievement of physical education objectives in the event that these ones turn into good account their potential as actors, as educational agents and as partners in terms of developing the interest of the child in practicing physical exercises.

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INFLUENCE OF SOMATIC PARAMETERS ON THE MANIFESTATION OF STATIC BALANCE IN THE 5-8-YEAR-OLD CHILDREN WHO PRACTICE DANCE AND OTHER SPORTS ACTIVITIES

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Abstract

This study highlights the relationship between somatic parameters and static balance indices in children aged 5-8 years who practice dance or other sports activities. An ascertaining research was organized with 73 children divided into two age categories: 5-6 and 7-8, in 2 groups: experimental group (EG) and control one (CG). EG group (n=24) includes children from National Children's Palace of Bucharest and CG (n=49) – from "Maica Domnului" Middle School, Bucharest. Research methods: bibliographic study; tests method; (ascertaining) experiment method; statistical-mathematical method and graphical representation. The body analysis was performed using Tanita scale. The Sensamove Mini Board platform helped to determine the static balance. The comparative analysis of somatic indices reveals insignificant differences between averages at $p>0.05$, highlighting the homogeneity of groups. The static balance results are better in CG by 6.73% in children aged 5 - 6 and 12.8% in children aged 7 - 8. The correlation analysis between somatic indices and static balance indices in children aged 5-8 shows 6.67% strong correlation between front deviations with height and fat free mass (kg) at $p<0.05$ in CG and 3.33% strong correlation between front deviations with fat mass (%) at $p<0.05$ in EG.

Key words: *anthropometric measurements, body composition, deviations, statistical analysis, performance*

1. Introduction

Currently, dance sport is a discipline with multilateral values for the education of athletes. As a sport in continuous development, it has various forms of activity, starting with grassroots sport, leisure sport and up to the competitive sport (Grigore, 2013). In this respect, the achievement of evolution, regardless of the characteristics of dances, is conditioned by the individual psychomotor qualities, the specific skills and abilities accumulated in the training process and also by the specific social and competitive environment (Grigore et al., 2010; Grigore, 2020).

Classical dance is based on choreographic creativity, combining music, rhythm, visual arts, theater and plasticity of movements. The artistic images are embodied through expressive movements of the performers, without verbal explanations (Vrânceanu & Cojocari, 2022).

The concept of psychomotricity crystallized over the past centuries, as a result

of the physiological and psycho-physiological research of scientists. The psychomotricity includes: body scheme; segmental and general dynamic coordination; laterality; static coordination – balance; perceptual-motor coordination (perception of space, rhythm and own movements); rapidity of movements; ideomotor process as a dynamic synthesis of body scheme and perceptual-motor coordination with the motor task (Horghidan, 2000; Epuran, Holdevici & Tonița, 2008).

According to the developmental theorists, physical activity during early childhood promotes fundamental motor skill proficiency (Temple et al., 2016). Children easily cross modes in artistic ways: colors evoke moods; lines of verse stimulate a dance or a song. Somatic meaning-making is performed while children are playing and drawing. For example, when playing a child mimics the roar of an engine while rolling a toy truck across the ground (Wright, 2010).

Finding ways to increase physical activity is critical for helping children to reach adequate levels throughout childhood. Fundamental motor skill proficiency and positive perceptions of physical competence were identified as factors that may contribute to physical activity enhancement (Crane, 2016).

The purpose of the study is to highlight the relationship between the somatic parameters and the indices of static balance manifestation in 5-8-year-old children who practice dance or other sports activities.

2. Material and method

The following research methods were used: method of bibliographic study; method of tests (somatic level – body analysis, static balance); method of (ascertaining) experiment; statistical-mathematical and graphical representation methods.

a) Control group b) Experimental group

Fig. 1. *Static balance (Sensamove Mini Board platform)*

The research was carried out with a group of 73 children of 5-8 years old. The participants were split into two categories of age: from 5 to 6 years old and from 7 to 8 years old, each category having 2 groups: experimental one (EG) and control one (CG). The EG (n=24) was formed of children from the National Children's

Palace of Bucharest while the GC (n=49) was composed of children from the "Maica Domnului" Middle School of Bucharest.

The body analysis was performed using Tanita scale in terms of anthropometric indices (weight, height) and body composition (fat mass, fat free mass and BMI). The static balance was determined by means of Sensamove Mini Board platform (fig. 1). Parameters that were obtained: performance (%), average of front-back deviations (degrees) and left – right (degrees).

The statistical analysis was made using KyPlot, 6.0 program as for the usual descriptive indices, X –standard deviation; SD –standard deviation; Z - Wilcoxon Rank Sum Test (Mann-Whitney U Test) for Unpaired Data; Pearson's linear correlation coefficient.

3. Results and Discussions

Table 1. *Results of the indices of somatic development and body composition in children aged 5-6 years*, (x±SD)

Indices	CG1, n=13	EG1, n=13	*Z*	P
Age (Years)	5.38±0.65	5.77±0.59	-1.72	0.091
Height (cm)	115.77±6.78	118.85±5.16	-1.54	0.129
Weight (kg)	21.25±3.14	21.99±3.69	-0.33	0.758
FATP (%)	21.02±4.33	18.86±5.74	0.95	0.356
FATM (kg)	4.53±2.19	4.31±1.95	0.64	0.538
FFM (kg)	16.72±2.19	17.68±1.98	-1.00	0.329
BMI (kg*m^2)	15.82±1.59	15.54±2.20	0.59	0.573

Notes. X –standard deviation; SD –standard deviation; CG1 – control group; EG1 – experimental group; Z - Wilcoxon Rank Sum Test (Mann-Whitney U Test) for Unpaired Data; * - $p<0.05$

The results analysis reveals an average of 5.38 years in the control group 1 and 5.77 years in the experimental group, in both groups of 5-6 years old. Regarding the height of the children, a higher average of 3.08 cm is found out in the experimental group and insignificant differences at $p>0.05$.

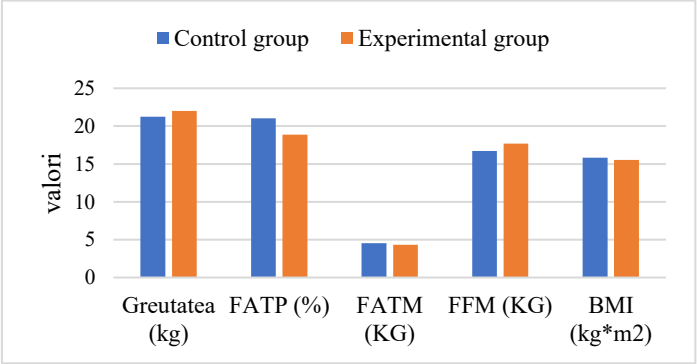

Fig. 2. *Indices of body composition in children aged 5-6 years*

Figure 2 shows the values of body composition indices in 5-6-year-old children from the control (CG) and experimental (EG) groups. The results of the comparative analysis highlight insignificant differences between averages at p>0.05, concerning the body weight (kg), fat mass (%, kg), fat free mass and BMI – Body Mass Index, which point out that the groups are homogeneous and have a similar level of physical development.

Table 2. *Results of somatic development and body composition in children aged 7-8 years*, (x±SD)

Indices	CG1, n=36	EG1, n=11	*Z*	P
Age (years)	6.97±0.84	7.82±0.75	-2.55	0.011*
Height (cm)	125.72±7.88	131.09±9.34	-2.007	0.046*
Weight (kg)	28.34±6.73	28.34±8.16	0.075	0.949
FATP (%)	25.08±7.69	19.45±6.87	2.211	0.028*
FATM (kg)	7.43±3.76	5.92±3.72	1.734	0.085
FFM (kg)	20.93±3.90	22.42±4.72	-1.357	0.178
BMI (kg*m²)	17.76±2.88	16.23±2.79	1.822	0.071

Notes. X –standard deviation; SD –standard deviation; CG1 –control group; EG1 –experimental group; Z - Wilcoxon Rank Sum Test (Mann-Whitney U Test) for Unpaired Data; * - p<0.05

The analysis of the results in both groups of 7-8 years old (fig. 3) shows an average of 6.97 years in CG2 and 7.82 years in EG2, with a greater share in (EG) and significant differences in p<0.05. In terms of height of the children, one can notice a bigger average of 5.27 cm in the experimental group and insignificant differences at p>0.05; the weight has close values of 28.93 kg (CG) and 28.34 kg (EG).

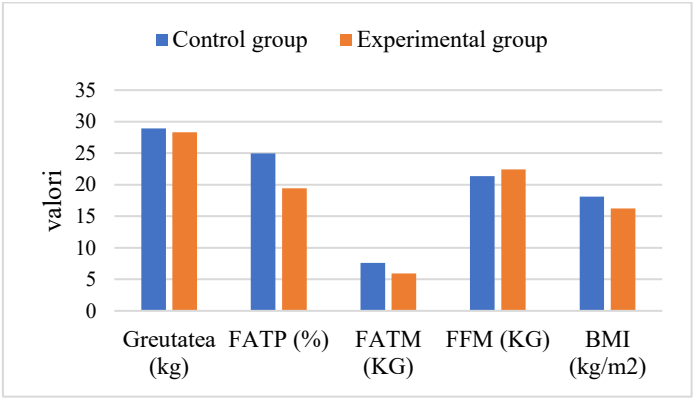

Fig. 3. *Indices of body composition in children aged 7-8 years*

The values of the body composition indices in the control (CG) and experimental groups (EG) 2 are listed in figure 3. The results of the comparative analysis between groups reveal significant differences between averages at p<0.05 for fat mass, with higher values of 5.54% in CG and BMI – Body Mass Index

better in EG and significant differences at p<0.05. This fact shows that the groups are different in terms of age, fat mass (%) and BMI, with better values in EG.

Table 3 and figure 4 show the results of the static balance sense testing in the children of 5-6 years old, concerning performance, front, back, left lateral and right lateral deviations.

Table 3. *Results of static balance testing indices in children aged 5-6*, (x±SD)

Indices	CG1, n=13	EG1, n=13	*Z*	P
Performance (%)	64.42±23.34	57.69±20.09	1.06	0.301
Front, avg. Deviat. (degrees)	1.12±0.80	1.91±0.81	-2.34	0.021*
Back avg. Deviat. (degrees)	-2.28±1.73	-1.80±0.94	-0.29	0.786
Left avg. Deviat. (degrees)	-1.77±1.68	-2.15±1.43	1.06	0.301
Right avg. Deviat. (degrees)	2.46±1.70	3.56±2.23	-1.14	0.265

Notes. X –standard deviation; SD –standard deviation; CG1 –control group; EG1 –experimental group; Z - Wilcoxon Rank Sum Test (Mann-Whitney U Test) for Unpaired Data; * - p<0,05

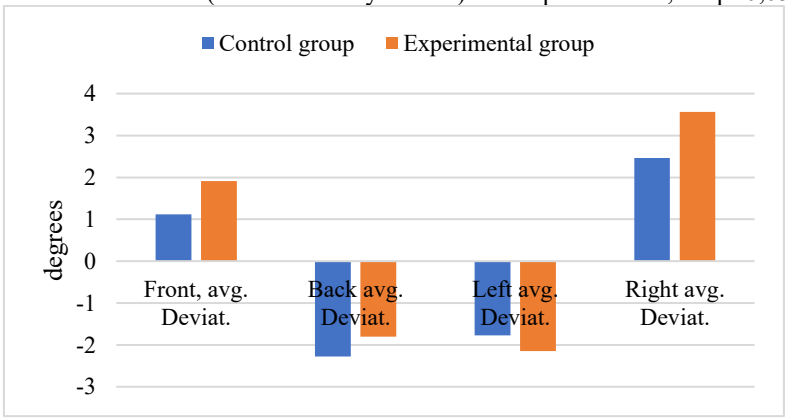

Fig. 4. *Results of deviations of static balance testing indices in children aged 5-6*

The analysis of the calculated results highlights that the performances are better by 6.73% in the control group, with significant differences at front deviations (p<0.05). It is observed that the deviations to the back and to the left have negative values. The other indices have insignificant differences at p>0.05, which show that the groups are almost identical as level of development of the static balance sense.

Table 4 and figure 5 present the static balance sense indices in children aged 7-8 in terms of performance, front, back, left lateral and right lateral deviations.

Table 4. *Results of static balance testing indices in children aged 7-8*, (x±SD)

Indices	CG2, n=36	EG2, n=11	*Z*	P
Performance (%)	70.53±16.02	57.73±20.07	1.85	0.066
Front, avg. Deviat. (degrees)	1.81±0.99	1.78±1.37	0.29	0.782
Back avg. Deviat. (degrees)	-1.59±1.12	-2.69±1.86	1.85	0.067
Left avg. Deviat. (degrees)	-1.54±1.03	-2.57±1.44	2.29	0.023*
Right avg. Deviat. (degrees)	1.91±1.42	2.33±1.18	-1.37	0.175

Notes. X –standard deviation; SD –standard deviation; CG2 –control group 2; EG2 –experimental group 2; Z - Wilcoxon Rank Sum Test (Mann-Whitney U Test) for Unpaired Data; * - p<0.05

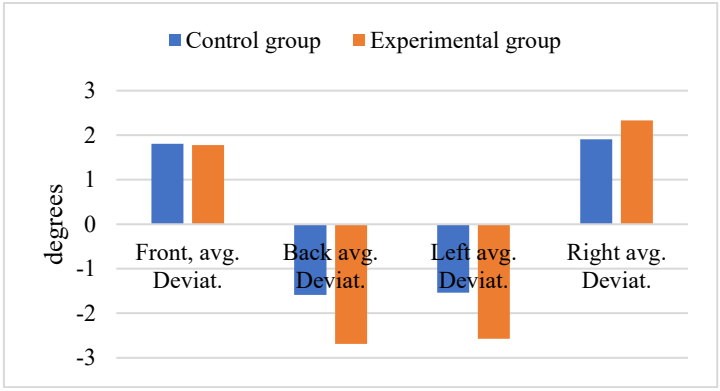

Fig. 5. *Results of the deviations of static balance testing in children aged 7-8*

One can notice from the analysis of the calculated results that the performances are better by 12.8% in the control group, with insignificant differences at the front deviations ($p>0.05$). The deviations to the back and to the left have also negative values; the other indices have insignificant differences at $p>0.05$ except for the deviation to the left ($p<0.05$), which proves that the groups are homogenous.

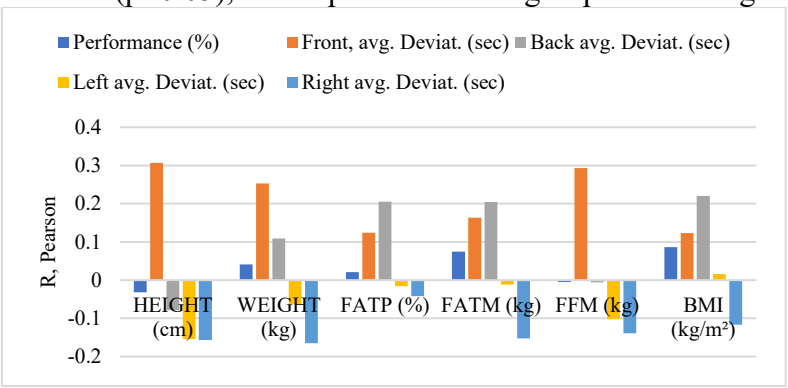

Fig. 6. *Results of the correlation analysis between somatic indices and static balance indices in children aged 5-8 years in the control group*, n=49

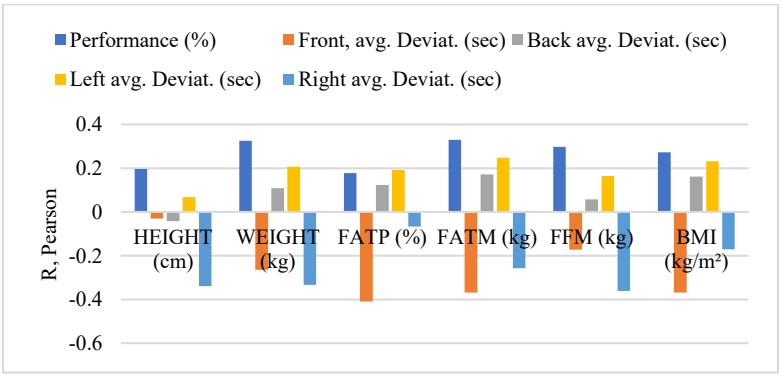

Fig. 7. *Results of the correlation analysis between somatic indices and static balance indices in children aged 5-8 years in the experimental group,* n=24

Figure 6 shows the results of the correlation analysis between the somatic indices and static balance indices in the children aged 5-8 years within the control group. Out of 30 correlations, 50% are negative and 50% - positive ones, where 6.67% strong correlation between front deviations with height and fat-less mass (kg) at $p<0.05$.

Figure 7 highlights the correlation analysis results between the somatic indices and static balance indices in the children of 5-8 years old from the experimental group. Out of 30 correlations, 43.3% are negative and 56.7% - positive, where 3.33% strong correlation between front deviations with fat mass (%) at $p<0.05$.

An ideal tool to assess obesity in children would rapidly identify those with excess body fat who are at risk of morbidity. BMI is not a static measurement, but varies from birth to adulthood, and is different between boys and girls (Wilson et al., 2003). The research on the relationship between PA, obesity and motor skills is limited. Nervik et al., (2011) examined the relationship between obesity and motor skills in children aged 3 – 5. A negative association between BMI and gross motor skills was reported. Thus, 58% of the overweight/obese group scored below average on the motor skills test compared to 15% of the non-overweight group (Wood, 2018). The research highlights that the somatic pattern of the junior I dancer appears to be the one of a long-shaped person, with long segments, low weight, toned muscles, with a low percentage of fat tissue, belonging to the category of normotrophic or underweight persons (Grigore, 2015).

The reactive postural control and anticipatory postural control in children are carefully analyzed in order to develop an intervention strategy meant to improve postural control in children with limitations in motor function (Westcott & Burtner, 2004). Some particularities of psycho-motor skills development in the children aged 7-10 years were identified through the means of swimming (Ninicu & Goncearuc, 2020).

A recent study clarified aspects of psychomotor skills improvement in children aged 10-13. The comparative results of the psychomotor indices highlighted better parameters after using a model for psychomotor skills development based on classical dance. The number of children able to control their own elementary movements, to keep their balance and spatial orientation increased considerably (Vrânceanu & Cojocari, 2022).

4. Conclusions

The comparative analysis highlights insignificant differences between averages at $p>0.05$ regarding body weight (kg), fat mass (%, kg), fat free mass and BMI – Body Mass Index, which proves that the groups are homogenous.

The results of static balance calculation highlight better performances in the control group, by 6.73% in the children aged 5-6 years and by 12.8% in the children aged 7-8 years.

The correlation analysis performed between somatic indices and static balance indices shows 6.67% strong correlation between front deviations with height and fat free mass (kg) at $p<0.05$ in the control group and 3.33% strong correlation between front deviations with fat mass (%) at $p<0.05$ in the experimental group. All these correlations reveal the connection level between the investigated indices in the experimental group (children who dance) and the control group as well (children who practice other sports activities).

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STRUCTURE OF THE DYNAMIC BALANCE INDICES IN THE 5-8-YEAR-OLD CHILDREN PRACTICING DANCE AND OTHER SPORTS ACTIVITIES

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Abstract

The study highlights the manifestation of static balance in 5-8-year-old children who practice dance or other sports activities. An ascertaining research was conducted with 73 children aged 5-8, split into two age categories: 5-6 and 7-8 years. Each category had two investigation groups: experimental (EG) and control (CG) one. GE (n=24) – children from National Children's Palace of Bucharest and CG (n=49) – "Maica Domnului" Middle School, Bucharest. Research methods: bibliographic study, tests methods, (ascertaining) experiment study, statistical-mathematical and graphical representation method. Dynamic balance was determined using Sensamove Mini Board platform. Parameters obtained: performance (%); front & back; inside at lateral balance (%) and left & right; inside at vertical balance (%) and avg. front – back deviations (degrees). The results show differences between groups regarding the indices of dynamic balance with lateral and vertical movement. The comparative analysis reveals: performance level; degree of keeping the front and back balance; direction of values (positive and negative) of deviations to the left and right; homogeneity of the groups aged 5-6; some significant differences in the groups of 7-8 years. Therefore, dancing and other sports activities have an important influence on the dynamic balance development in this age category.

Key words: *performance; front & back, inside; left & right, inside; deviations; age categories*

1. Introduction

Coordinative abilities (dexterity), based on the movement control and regulation processes, are fundamental in sports because they allow athletes to easily control their own motor actions and to learn complex movements rapidly. Balance is one of the main components of the coordinative abilities (Moseichuk et al., 2020).

Currently, both static and dynamic balance in young athletes is not sufficiently addressed in the specialized literature or during sports classes. Few authors focused on the strategies to improve this balance in children and on the influence that different sport activities have on posture at early ages. Postural control (or balance) can be defined statically as the ability to maintain a base of support with minimal movement, and dynamically as the ability to perform a task while maintaining a stable position (Ricotti, 2011).

Dancing movements are an important part of the competitive presentation in many sports (gymnastics, rhythmic gymnastics, synchronized swimming, figure

skating etc.). In dance sports, coordination is manifested in the achievement of various technical movements. Coordination, as a qualitative motor skill, integrates the manifestations of other motor skills too and plays a significant role in the overall performance of dancers (Ljubojević, Bijelić, Jovanović & Šebić, 2020).

Promoting physical activity (PA) in children can be highly useful for their development as increased PA in children is associated with many positive results for their health including improved quality of life (Marker et al., 2018), self-perception (Lubans et al., 2016), cardiovascular fitness (Tarp et al., 2016), metabolic function (Whooten et al., 2019) and cognitive development (Donnelly et al., 2016). Moreover, children who are physically active are also more likely to become healthy and active adults (Telama et al., 2014).

According to a systems theory of motor control, reactive postural control and anticipatory postural control in children are reviewed from several perspectives. The aim is to develop an intervention strategy meant to improve postural control in children with limitations in motor function (Westcott & Burtner, 2004).

Fundamental movement skills (FMS) are basic observable patterns of movement. Although FMS are positively associated with health, FMS levels among children worldwide are low. Therefore, interventions to improve FMS and markers of health among children are justified (Bolger, 2018).

It is necessary to study more thoroughly the manifestation of the dynamic balance in 5-8-year-old children who practice dance sport in comparison with children who practice other sports activities.

The purpose of this study is to highlight the particularities of the manifestation of dynamic balance in the children of 5-8 years old who practice dance or other sports activities.

2. Material and method

This scientific research entailed the organization of an ascertaining research with a group of 73 children aged 5-8 years. The participants of the study were divided into two categories of age: 5-6 years and 7-8 years. Each category has 2 groups: experimental one (EG) and control one (CG). The EG (n=24) is formed of children from the National Children's Palace of Bucharest while the CG (n=49) is formed of children from the "Maica Domnului" Middle School of Bucharest. The following research methods were used: method of bibliographic study; method of tests; method of (ascertaining) experiment; statistical-mathematical and graphical representation method. The dynamic balance was determined by means of Sensamove Mini Board platform. Duration of balance keeping 16 sec; shape size 20.00º, shape width 5.00º and maximum tilting 10.00º. Parameters obtained: Performance (%); lateral dynamic balance: Front & Back, inside (keeping in front and back the space) (%). In terms of vertical dynamic balance: Left & Right, inside (keeping to the left and right of the space) (%); Front & Back, avg. Deviat. (average of the front-back deviations, degrees) and Left & Right avg. Deviat. (average of the deviations to the left-right, degrees).

The statistical analysis was performed using KyPlot, 6.0 program, regarding the usual descriptive indices, mean –standard deviation; SD –standard deviation; Z - Wilcoxon Rank Sum Test (Mann-Whitney U Test) for Unpaired Data.

3. Results and Discussions

Table 1 and figures 1 and 2 show the results of the indices of the dynamic balance sense – lateral movement – in children of 5-6 years old, in terms of performance (%), keeping inside the space – front and back (%), front - back deviations (degrees), lateral – to the left and to the right (degrees).

Table 1. *Results of the indices of dynamic balance testing, lateral movement, in 5-6-year-old children*, (mean±SD)

Indices	CG1, n=13	EG1, n=13	*Z*	P
Performance (%)	69±17.49	61.92±19.99	0.93	0.369
Front, inside (%)	27.25±12.50	29.85±12.75	-0.63	0.549
Back, inside (%)	41.67±17.10	32.08±12.69	1.31	0.201
Front, avg. Deviat. (degrees)	1.67±0.61	2.03±0.86	-0.87	0.399
Back avg. Deviat. (degrees)	-1.96±0.73	-1.84±0.97	-0.46	0.663
Left avg. Deviat. (degrees)	-4.03±1.54	-4.07±1.85	-0.33	0.765
Right avg. Deviat. (degrees)	4.33±1.18	5.14±2.32	-0.84	0.414

Notes: mean –standard deviation; SD –standard deviation; CG1 –control group; EG1 – experimental group; Z - Wilcoxon Rank Sum Test (Mann-Whitney U Test) for Unpaired Data; * - $p<0.05$

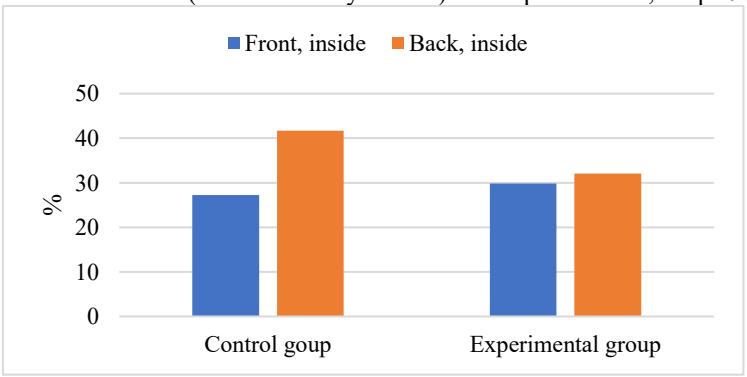

Fig. 1. *Results of indices of front-back inside movement in lateral dynamic balance (5-6-year-old children)*

The analysis of the calculation results highlights better performances in the control group by 7.08%, with insignificant differences in front deviations ($p>0.05$). The front space maintaining is better in EG while the back space is better in CG; there are insignificant differences ($p>0.05$). Backward and left deviations are negative. Backward deviations are smaller in EG due to the movement and posture specific to the dance. The other indices show insignificant differences at $p>0.05$, which point out that the groups are homogenous.

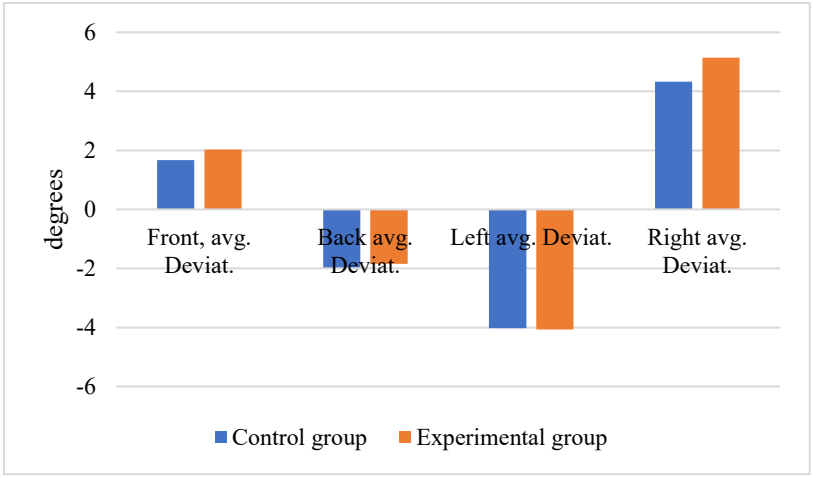

Fig. 2. *Results of indices of deviations in lateral dynamic balance testing (5-6-year-old children)*

In table 2 and figures 3 and 4 are listed the results of the indices of dynamic balance testing - lateral movement – in children aged 7-8 years, regarding performance (%), keeping inside space front – back (%), front and back deviations (degrees), lateral to the left and right (degrees).

Table 2. *Results of the indices of dynamic balance testing, lateral movement, in 7-8-year-old children,* (mean±SD)

Indices	CG1, n=36	EG1, n=11	*Z*	P
Performance (%)	68.91±18.75	60.55±18.39	1.44	0.153
Front, inside (%)	31.69±12.94	27.82±14.59	0.68	0.503
Back, inside (%)	37.23±12.11	33.00±10.04	1.35	0.180
Front, avg. Deviat. (degrees)	1.70±0.63	1.94±0.89	-0.36	0.728
Back avg. Deviat. (degrees)	-2.11±0.88	-2.44±1.28	0.438	0.671
Left avg. Deviat. (degrees)	-3.32±1.20	-4.35±1.09	2.23	0.027*
Right avg. Deviat. (degrees)	3.92±1.42	4.18±1.54	-0.85	0.403

Notes: mean–standard deviation; SD –standard deviation; CG1 – control group; EG1 –experimental group; Z - Wilcoxon Rank Sum Test (Mann-Whitney U Test) for Unpaired Data; * - $p<0.05$

The analysis of the calculation results highlights better performances in the control group by 8.36%, with insignificant differences at the front deviations ($p>0.05$). Movements while keeping inside the space forward and backward have better values in EG, due to the dance specific movements and posture. The other indices have insignificant differences at $p>0.05$, which shows that the groups are homogeneous.

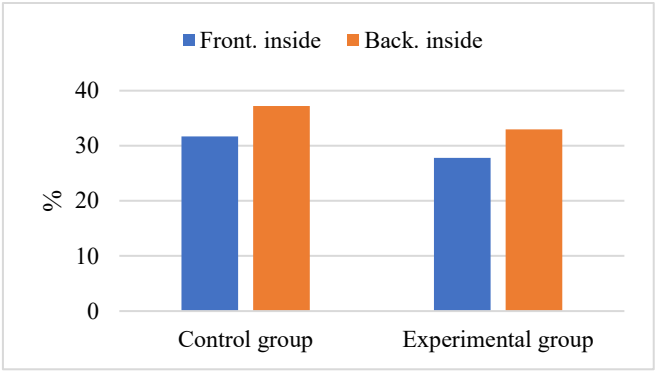

Fig. 3. *Results of the front-back indices inside movement during lateral dynamic balance in 7-8-year-old children*

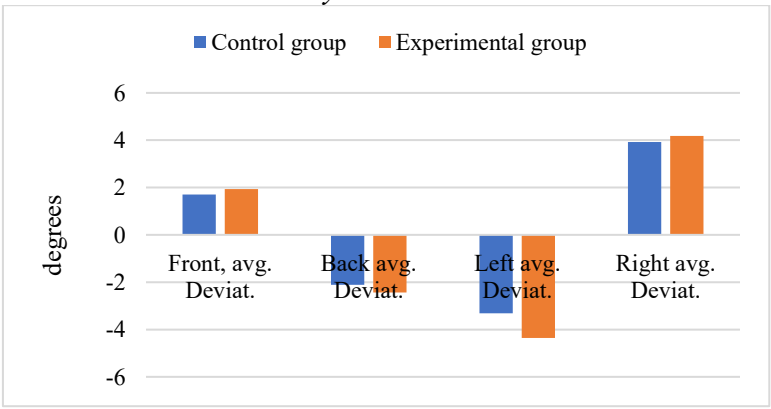

Fig. 4. *Results of deviations indices in lateral dynamic balance testing of 7-8-year-old children*

Table 3 and figures 5 and 6 present the indices of dynamic balance sense testing at vertical movement in the 5-6-year-old children, in terms of: performance; front – back inside; front, back, lateral to the left and right deviations.

Table 3. *Results of indices of dynamic balance testing – vertical movement – in 5-6-year-old children*, (mean±SD)

Indices	CG1, n=13	EG1, n=13	*Z*	P
Performance (%)	40.08±12.96	55.07±26.35	1.44	0.157
Left, inside (%)	36.75±11.44	26.54±13.84	2.01	0.047*
Right, inside (%)	33.17±11.59	28.38±15.60	0.93	0.368
Front, avg. Deviat. (degrees)	3.32±0.62	3.47±1.17	-0.44	0.683
Back avg. Deviat. (degrees)	-3.35±1.11	-3.12±2.32	-1.12	0.277
Left avg. Deviat. (degrees)	-1.90±0.55	-2.46±1.21	1.09	0.289
Right avg. Deviat. (degrees)	1.72±0.64	3.11±1.68	-2.23	0.028*

Notes: mean –standard deviation; SD – standard deviation; CG1 – control group; EG1 – experimental group; Z - Wilcoxon Rank Sum Test (Mann-Whitney U Test) for Unpaired Data; * - $p<0.05$

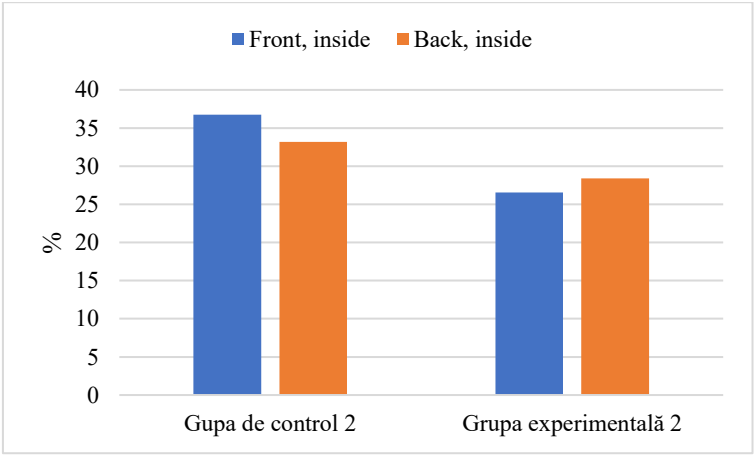

Fig. 5. *Results of front-back indices inside movement in vertical dynamic balance (5-6-year-old children)*

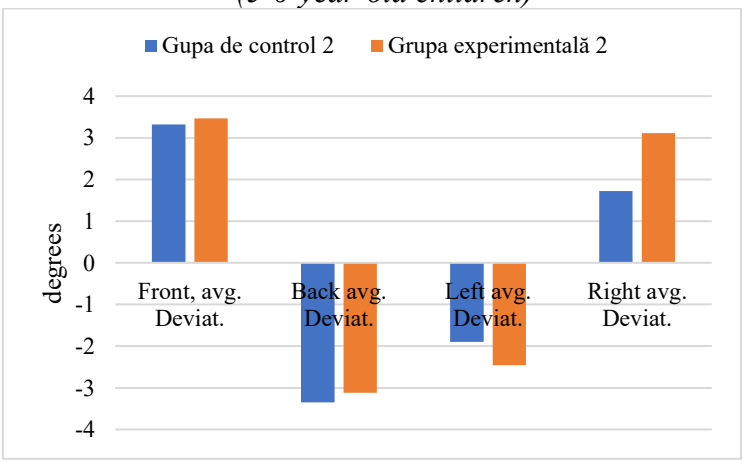

Fig. 6. *Results of the indices of deviations during the vertical dynamic balance testing in 5-6-year-old children*

The analysis of the calculation results reveals better performances in the experimental group by 14.99%, with insignificant differences at the front deviations ($p>0.05$). The deviations backward and to the left are negative. The forward inside deviations are smaller in the EG, with significant differences ($p<0.05$) and backward inside movement, due to the dance specific posture and movement. The other indices highlight insignificant differences at $p>0.05$, except for the deviation to the right where there are significant differences at $p<0.05$ with higher values in EG, which shows that the groups are almost identical in terms of development of the dynamic balance sense in lateral movement.

Table 4 and figures 7 and 8 present the indices of the dynamic balance sense testing in vertical movement in the care of children aged 7-8 years, regarding performance, front – back inside; front, back, lateral to the left and right deviations.

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Table 4. *Results of the indices of deviations during the vertical dynamic testing in 7-8-year-old children*, (mean±SD)

Indices	CG1, n=36	EG1, n=11	*Z*	P
Performance (%)	79.74±13.07	56.00±19.94	3.41	0.0006***
Left, inside (%)	36.23±10.07	27.64±13.12	2.12	0.036*
Right, inside (%)	43.37±12.27	28.45±9.58	3.13	0.002**
Front, avg. Deviat. (degrees)	3.19±1.17	3.24±1.49	-0.17	0.878
Back avg. Deviat. (degrees)	-3.29±1.29	-3.79±1.57	0.45	0.662
Left avg. Deviat. (degrees)	-1.48±0.56	-2.66±1.12	3.28	0.001072**
Right avg. Deviat. (degrees)	1.65±0.69	2.68±0.82	-3.28	0.001073**

Notes: mean –standard deviation; SD –standard deviation; CG1 –control group; EG1 – experimental group; Z - Wilcoxon Rank Sum Test (Mann-Whitney U Test) for Unpaired Data; * - $p<0.05$

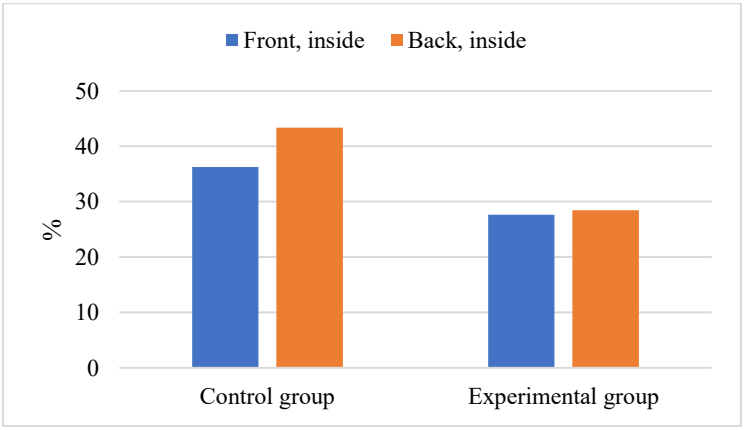

Fig. 7. *Results of the indices front - back – inside movement during vertical dynamic testing in 7-8-year-old children*

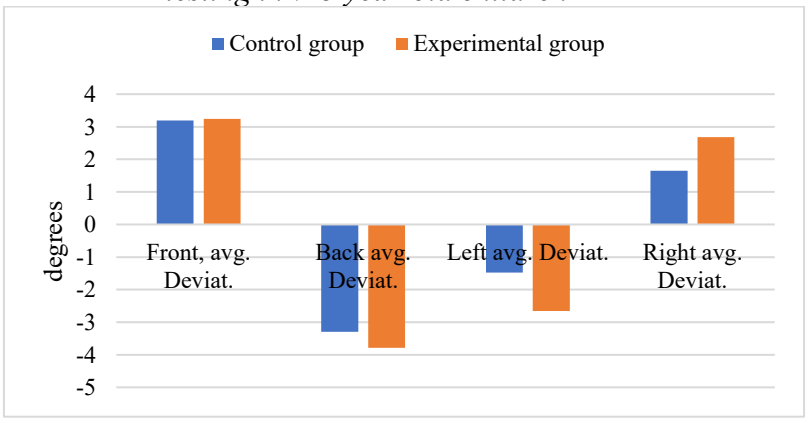

Fig. 8. *Results of the indices of deviations during the vertical dynamic balance testing in 7-8-year-old children*

The analysis of the calculation results shows poorer performances in the experimental group by 23.27%, with significant differences in front deviations ($p<0.001$). The movements to the interior of maintaining the front and back space have better values in EG and significant differences at $p<0.05$ and $p<0.01$; the deviations to the left and to the right have significant differences at $p<0.01$. These differences point out the particularities of dynamic balance manifestation specific to dance sport and other sports activities.

Research on physical activity (PA) as a stimulus for favorable growth and development is rapidly growing. It was found out that PA is positively associated with the motor competence in children and adolescents (Laukkanen, A., 2016).

Physical literacy can be understood as the relationship between the movement ability of the children, their motivation, confidence, knowledge and understanding. Interdisciplinary research must be conducted to better understand the pedagogical practices needed to develop the physical literacy in early primary school (Rudd et al., 2020).

Fundamental motor skills are significantly related to physical activity throughout childhood. The majority of studies examining the relationship between physical activity and motor skills focused on moderate to vigorous physical activities (Crane, 2016). Many children do not engage in adequate levels of MVPA necessary for their growth and health. Physical education (PE) is a key opportunity for children to learn movement skills that could help them in physical activity (PA) (Crotti, 2021). Other specialists tried to determine if the participation in community-based physical activity programs is sufficient to ensure the recommended MVPA for children and the proper skeletal development in 8-12 year-old girls (Kasianchuk, 2010).

Parents too have an important influence on sports experiences of the children. The interpretations of the parents regarding the abilities of their children are positively related to children's perceptions of their own competence (Holt & Knight, 2014). Some specialists studied if the dynamic balance of the persons with mental retardation (MR) may be improved by teaching them Greek traditional dances during a well-structured training program (Tsimaras et al., 2012).

4. Conclusions

The results of the study highlight the differences between the categories of age and the investigated groups in terms of dynamic balance testing (lateral and vertical movement) in the 5-8-year-old children.

The comparative analysis of the lateral dynamic balance results between the age categories reveals better performances in the control group (CG) by 7.08% (5-6 years) and 8.36% (7-8 years), better maintaining inside the forward space by 2% in the experimental group (EG) and by 9% backward in CG (5-6 years); the age category of 7-8 years has better values in CG by 4% forward and backward. There are negative front and back deviations. The other indices show insignificant differences at $p>0.05$, which proves the homogeneity of the groups.

The results of the comparative analysis of the vertical dynamic balance results between age categories point out higher performances in EG by 14.99% (5-6 years old) and lower by 23.27% (7-8 years old). In terms of keeping inside the space, there are better values in CG, by 10% to the left and 5% to the right; in the age category of 7-8 years, there are better values in CG by 9% to the left and by 15% to the right. The deviations are negative backward and to the left. The other indices have insignificant differences at $p>0.05$, with the exception of the deviation to the right where significant differences can be noticed at $p<0.05$ with higher values at EG, which highlights differences in the dynamic balance manifestation in the children aged 5-8 years who practice dance, compared with other sports activities.

In *conclusion*, the comparative analysis made between groups and age categories (regarding the indices of the dynamic balance) highlights the level of performance, the degree of maintaining the balance inside the front and back space, the direction of the values (positive and negative) of the left and right deviations, the homogeneity of the 5-6-year-old groups studied, with insignificant differences ($p>0.05$) and some significant differences in the 7-8-year-old groups. All these results prove the influence of practicing dance and other sports activities on the development of the dynamic balance in this age category.

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OPPORTUNITIES TO FACILITATE INTERPERSONAL RELATIONSHIPS BETWEEN STUDENTS THROUGH GAMES

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Abstract

The study aimed at identifying the interpersonal relationships within the group and facilitating them by using educational games in the primary cycle students. In this regard, an ascertaining pedagogical study was organized in the Middle School no. 20 of Bucharest. The sample of the investigation is formed of second grade students, divided into two groups: experimental group, n=26 and control group, n=24. Methods of research: bibliographic study, pedagogical observation method, sociometric test method, game method, method of individualized and group occupational therapy, experiment method, statistical-mathematical and graphic representation method. In order to know the interpersonal relationships within both groups, the sociometric test was applied to the school subjects: Communication in Romanian Language (CRL), Mathematics and Environmental Exploration (MEE) and Physical Education (PE). The sociogram was processed and analyzed using the software yEd Graph Editor, Layout organic with centralized measurements. The comparative results of interpersonal relationships inside the group in the investigated disciplines highlight the group leader/leaders in the choices of mutual and unilateral attraction, which expresses the groups cohesion level and the mutual and unilateral rejection relationships. Carrying out the sociometric analysis enabled a more detailed knowledge of the interpersonal relationships within the group. It also facilitated these relationships through the use of educational games for the primary school students.

Key words: *games, sociogram, communication relationships, mutual knowledge relationships, socio-affective relationships, therapy and recovery strategies*

1. Introduction

The fundamental motivation for social belonging and relationships is a key part of healthy human development given that social isolation, loneliness and low social support can have negative effects such as sickness, mental disorders and even death. So, understanding the factors that facilitate or impede the development of social relationships is really important for promoting health and well-being (Allen et al., 2022; Krammer et al., 2023)

Knowing the interpersonal relationships within the group is highly important for the performance and efficiency of the students. The positive preferential relationships and affinities existing between students help the collaborations and induce a relaxed working atmosphere (Ho, 1998; Drussell, 2012; De Felice, Hamilton, Ponari & Vigliocco, 2023). Experiential small group learning with opportunities for practice, reflection, self-evaluation and feedback is able to improve confidence and interpersonal skills in students (Skinner, Hyde, McPherson

& Simpson, 2016).

The impact of the interpersonal relationship's development is better reflected in the medium and long term in the classes cohesiveness, in the behavior of each individual student both in school and family environment and also in the optimal socio-professional integration (Kyle & Chick, 2004; Gonchar, 2019; Almeida, 2023). The criterion used for a possible classification of the interpersonal relationships in the class of students is represented by the general and psychological needs felt by the students when they relate to each other. Thus, it results the following types of interpersonal relationships in the class of students: mutual knowledge relationships, communication relationships, socio-affective (affective-simpathetic) relationships (Amanova, 2023; Hikmah, 2023).

Psycho-social-behavioral assessments must be conducted to establish the gap between chronological age and mental age in various areas of development. They help to design a personalized work program as a starting point for behavioral intervention, guiding the parents and specialists in their process of communicating with the child (Mihețiu et al.,2023a; 2023b). Children with autism spectrum disorders (ASD), also children with disabilities, with special needs are increasingly included in general education classrooms in an effort to facilitate their social involvement. Including children with ASD in popular activities together with other children, since early childhood, may be an essential preventive intervention to protect social relationships in late primary school grades (Rotheram-Fuller et al., 2010).

Social games for children are an easy and relaxing way of harmonizing the relationships within a group, favoring mutual knowledge, communication and cooperation. With the help of these games, an informal relationship framework is created, through which the facilitator encourages the students' spontaneity and freedom of expression (Chen et al., 2023; Rezayi, Tehrani-Doost & Shahmoradi, 2023).

The purpose of the study is knowing the interpersonal relationships within the group and facilitating these relationships by using educational games in primary school students.

2. Material and method

This scientific approach led to the organization of an ascertaining pedagogical experiment in the Middle School no. 20 of Bucharest. The investigation involved a sample formed of second grade students, divided into two groups: Experimental group, n=26 (15 boys and 11 girls) and Control group, n=24 (11 boys and 13 girls).

The following methods of research were used: bibliographic study, pedagogical observation method, sociometric test method, game method, method of individualized and group occupational therapy, experiment method, statistical-mathematical and graphic representation method. For identifying the interpersonal relationships in both groups, the sociometric test was applied to the school subjects: Communication in Romanian Language (CRL), Mathematics and Environmental

Exploration (MEE) and Physical Education (PE). The sociogram was processed and analyzed by means of the software yEd Graph Editor, Layout organic with centralized measurements.

Sociometric techniques are methods that qualitatively measure aspects of social relationships, such as social acceptance and social status. Based on the sociometric technique, students can rank their friends according to a certain criterion these ones meet (Elias, Vasilis, Katerina & Christine, 2017). Sociometry was used in some studies (Mamas, 2009) intended to reveal the social positions and interactions of the individuals with differences in primary school. In this study, the reason for using sociometry is the same: to reveal the interaction between students and their positions in the class.

Examples of games meant to optimize the interpersonal relationships:

1. *Autograph paper sheet*. Each participant is given a paper sheet and a pen or pencil. The participants are requested to draw a picture of themselves and to add a sentence that describes something unique about themselves, a preference, a skill, an achievement etc. (e.g., I like football, I speak Spanish, I am good at games on computer etc.). When everybody has finished, the paper sheets are collected and put into a bag, they are mixed and afterwards distributed randomly. If someone extracts his/her own paper sheet, they will change it. Participants are asked to find the holder of the paper sheet and get his or her autograph.

2. *Concentric circles*. The group is divided in two equal groups, which form two concentric circles. The players in the outer circle face inwards, the others face outwards, each player in one circle having a correspondent in front of him in the other circle. The two circles start moving to the music or at the command of the instructor: the outer circle moves clockwise, the inner circle counter-clockwise. The movement is done at low speed and when passing in front of a partner, the two students touch their palms and say "hello". When the music stops or the instructor gives the command "stop", the two circles do not move anymore and all players hug the opposite person, then they start talking: they introduce themselves, exchange information about themselves etc. After a while, the music starts again or the instructor gives the command "start", and the game continues as before.

Examples of games aiming at optimizing the communication relationships:

1. *Game of name*. A ball is necessary for this game. Each participant catches it and sends it forward to another classmate, saying his/her name. The game can be modified, depending on the age of children. It can be complicated for older children, asking them to introduce themselves as follows: „I am the smart Steve" , adding to the name a quality whose name should start with the initial letter of the name. Then the children pass the ball according to the model: „I am the smart Steve, you are the joyful Jane"

2. *If I were*… Everyone in the group is requested to choose by turn several objects or animals with which they identify and to justify their choice. For example: If I were a flower, I would be a … because…; If I were an animal, I would be a… because…; If I were a landform, I would be a … because…

Examples of games meant to optimize the socio-affective relationships:

1. Statues of „emotions". Students will play three roles: sculptor, statue and observer. The student who chose the role of sculptor selects a card with an emotion, looks for a student who chose the role of statue and will try to „model" the statue according to the emotion it has to represent, modelling its facial expression and posture. The student who has the role of observer will note all the ways in which the „sculptor" student tries to express the emotion. The other students must identify the emotion expressed by the student with the role of „statue".

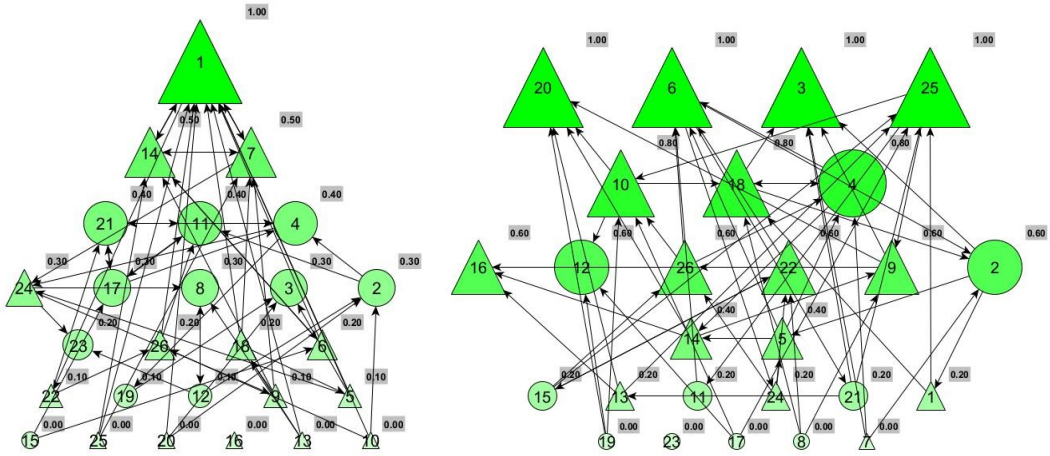
2. *The letter-box*. A box is built, with a cut made like in the mailbox, and "Letter-box" written on it. Children write a letter, with text and drawings, for a child friend in the same class. They put the "letter" in the envelope, stick the stamp and put the letter in the letter-box. One letter will be then drawn from the "letter-box" and read in front of the class. The child in question must recognize himself/herself, take the letter and look at it, guess who wrote it, say "thanks" and shake hands with the author of the letter saying: „You are my friend, you wrote the letter". The game continues in the same way.

Regarding the socio-affective development in terms of skills necessary for active and responsible participation in the social life of the students with special educational needs, *some examples of learning activities / contents* are recommended: active participation in the school activity; initiation of games in peer groups; expressing preference for choosing a certain type of game; to be responsible for a certain activity at home / school; respect of the rights and belongings of others; respect of the behavior rules in different contexts – family, school, public places, special occasions; to express their attachment to different persons; to express their emotions; to show interest in a person by observing the movements of this one; adequate approach of the unfamiliar people; to ask for help when needed; to request various objects of other children; to share certain objects/ food/ toys with other children (Castellary-López et al., 2023).

Therapy and recovery strategies used: conversation; demonstration; role play; illustrations; thematic books; various objects and different educational videos.

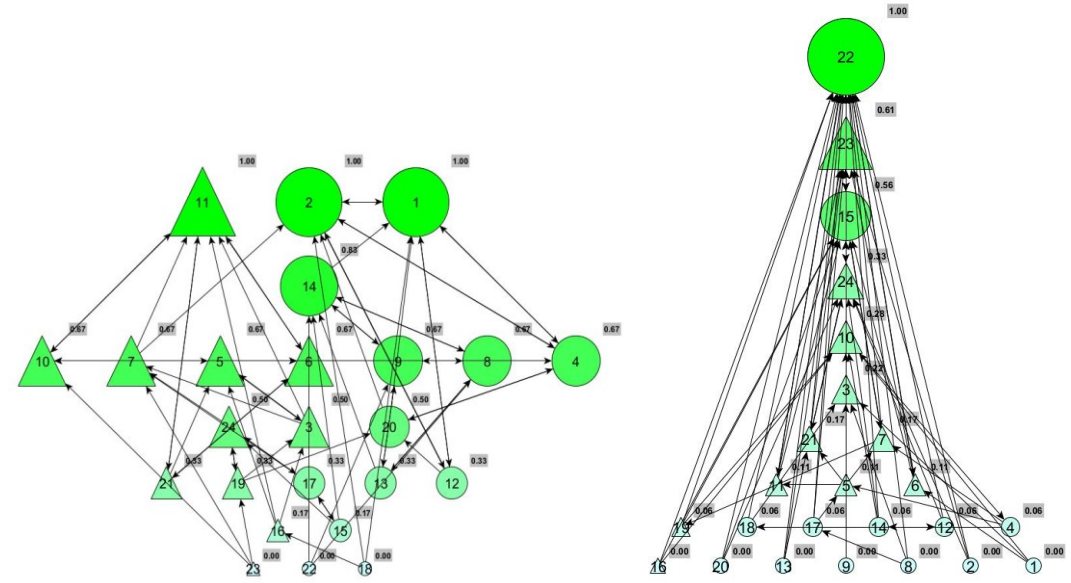
3. Results and Discussions

The results of the interpersonal relationships within the group in both investigated groups, measured by the sociometric test, are shown in figures 1-6.



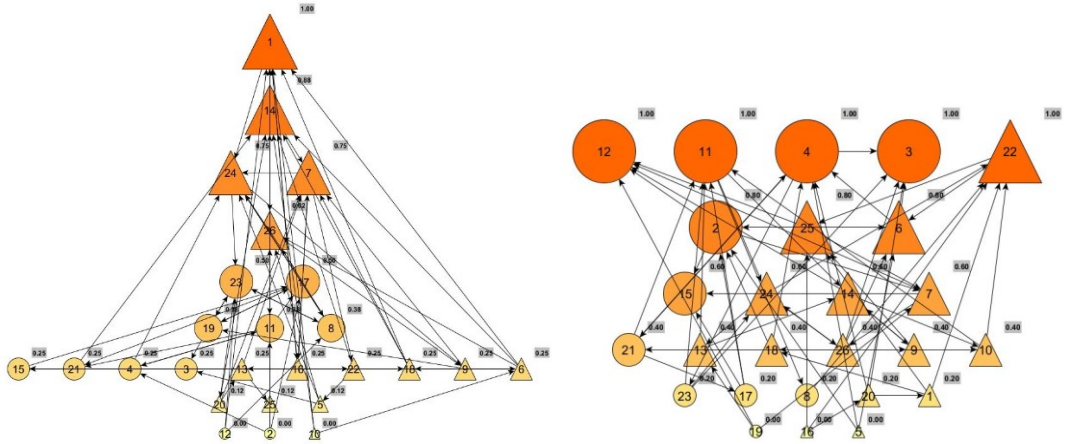
a) Choices in group b) Rejections

Figure 1. *CLR – playing roles in the experimental group; Δ - boys; ○ – girls; ⟷ mutual relation; ⟵ unilateral relation*



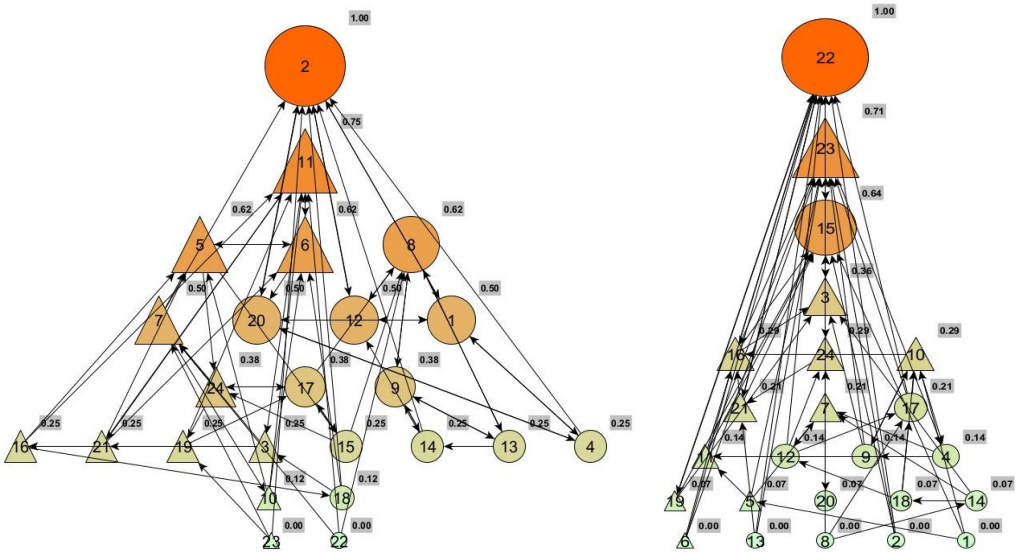
a) Choices b) Rejections

Figure 2. *CRL – playing roles in the control group Δ - boys; ○ – girls; ⟷ mutual relation; ⟵ unilateral relation*



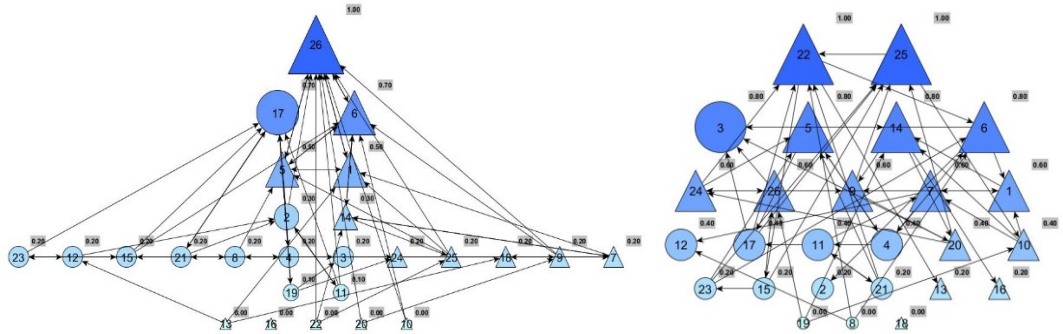
a) Choices b) Rejections

Figure 3. *MEE – team work in the experimental group Δ - boys; ○ – girls;*
⟷ mutual relation; ⟵ unilateral relation



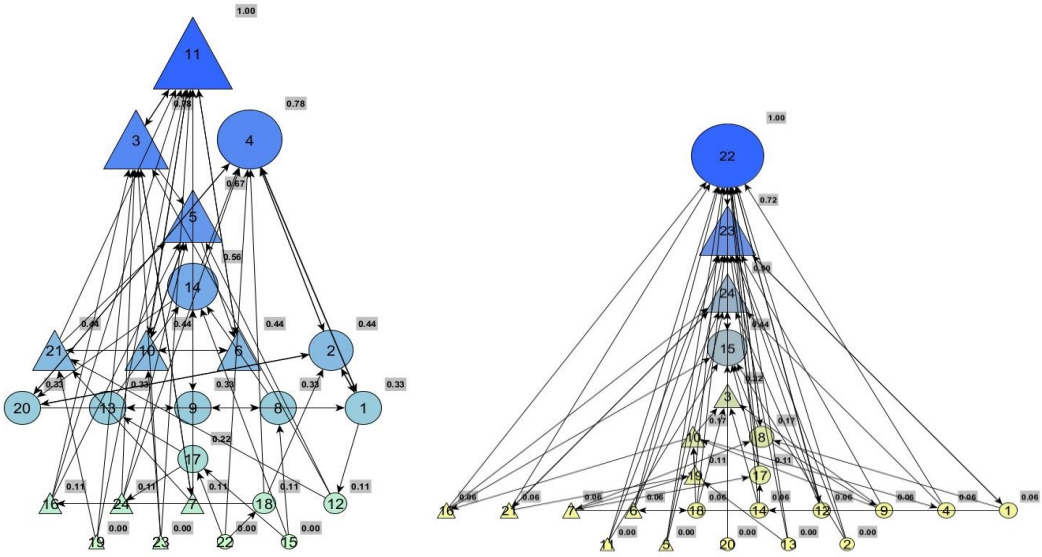
a) Choices b) Rejections

Figure 4. *MEE – team work in the control group Δ - boys; ○ – girls;*
⟷ mutual attraction relations; ⟵ unilateral attraction relations



a) Choices b) Rejections

Figure 5. *PE – team play in Physical Education - experimental group Δ - boys; ○ – girls; ⟷ mutual attraction relations; ⟵ unilateral attraction relations*



a) Choices b) Rejections

Figure 6. *PE – team play in Physical Education – control groupΔ - boys; ○ – girls; ⟷ mutual relation; ⟵ unilateral relation*

Interpersonal relationships within the group in CRL – role play in the experimental group and the control one are shown in figures 1 (a, b) and 2 (a, b), regarding attraction choices and mutual & unilateral rejections. The analysis of the results of attraction-based choices highlights a group leader 1 (boy) in the experimental group, in mutual relation with 14 and 7 (boys), followed by 21, 11 and 4 (girls). In the control group there are 3 leaders with mutual attraction a boy (11) in mutual and unilateral relationships with 10, 7, 5 and 6 (boys) and two girls (1 and 2) with 14 in mutual and unilateral relationships with 9, 8 and 4 (girls). As

for the rejection relationships in the experimental group, one can notice 4 boys (20, 6, 3 and 25) in mutual relationships with 10, 18 (boys) and 4 (girl). In the control group there is a student 22 (girl) with the most mutual and unilateral rejections, followed by 23 (boy), 15 (girl), 10 and 3 (boys). The other relations are unilateral.

Interpersonal relationships within the group at MEE discipline – team work in the experimental group and the control group are presented in figures 3 (a, b) and 4 (a, b), regarding attraction choices and mutual & unilateral rejections. The results of attraction choices in the experimental group reveal a group leader 1 (boy) in mutual relationship with 14, 24 and 7 (boys), followed by 25 (boy) with 23, 17, 19, 11 and 8 (boys); in the control group there is a leader 2 (boy) with mutual attraction 5 and 6 in mutual and unilateral relationships and a girl (8) with 20, 12 and 1 in mutual and unilateral relationships. Concerning the rejection relationships in the experimental group, there are 4 boys (12, 11, 4 and 3) and 22 (girl) in mutual relationship with 2 (girl) and 25 and 6 (boys). In the control group there is a student 22 (girl) with the most mutual and unilateral rejections, followed by 23 (boy), 15 (girl), 3 (boy) in rejections relationships with 16, 24 and 10 (boys). The other relationships are unilateral ones.

Interpersonal relationships inside the group at PE – team play in the Physical Education class in the experimental and control groups – are presented in figures 5 (a, b) and 6 (a, b), in terms of attraction choices and mutual & unilateral rejections. The analysis of the results of attraction choices in the experimental group identifies a group leader 26 (boy) in mutual relationship with 17 (girl) and 6 (boy), followed by 5 and 1 (boys). The control group has a leader 11 (boy) with attraction in mutual and unilateral relationships with 3 (boy) and 4 (girl), then 5 and 14 (girls). As for the rejection relationships, in the experimental group there are 2 boys (22 and 25) in mutual relationships with 3 (girl) and 5, 14 and 6 (boys). In the control group there is a student 22 (girl) with the most mutual and unilateral rejections, followed by 23 and 24 (boys) and 15 (girl). The other relations are unilateral.

Socio-affective (affective-sympathetic) relationships are the result of an interpersonal need, which involves the exchange of emotions, feelings and structures. Thus, a new type of interpersonal affective-sympathetic relationships appears, which supposes relations of sympathy and antipathy, preference and mutual rejection between the classmates.

Some specialists highlight that an improved understanding of handball game materials and of fair play model has a positive and significant effect on the social interaction skills of the students (Parwata et al., 2023).

Children were one of the groups most influenced by COVID-19- related social distancing; the lack of contact with peers can limit their opportunities to develop social and collective skills. Remote socialization and collaboration as an alternative approach is still a great challenge for children (Wu et al., 2023).

A study that analyzed the social media, especially the texting activities and the use of Facebook social network site (SNS) and its impact on the communication and conflicts solution skills reveals that people consider face-to-face interaction the

most efficient and preferable method to communicate and solve conflicts with others (Drussell, J. (2012). Typologies of primary school students concerning the possession and use of video games and the possible psycho-emotional and educational implications were also studied (Vázquez-Cano et al., 2023).

Although various conceptual and theoretical traditions provide reasons for cooperation activities, the most discussed difference between cooperative learning methods deals with the way to use certain reward and task structures for motivating the students to cooperate or compete. Generally, all cooperative learning techniques ask students to work together and help each other (Bossert, 1988).

4. Conclusions

Mutual knowledge relationships are generated by the need to know the other, to get information on his/her personality and way of being. The absence of mutual knowledge concerns within a class of students, the poor information about the other classmates can explain the existence of a possible atmosphere of suspicion and mistrust between the members of the class group.

The need of students to exchange information and to communicate with each other is based on communication relationships. The class, as a universe of the communication par excellence, is open to informational challenges for the students, with exchanges of messages and frequent appreciations of the intercommunication process within the group.

The comparative results of interpersonal relationships within the group in the investigated disciplines highlight the group leader/leaders in the mutual and unilateral attraction choices, which shows the groups cohesiveness and the mutual and unilateral rejection relationships.

The sociometric analysis allowed a more detailed knowledge of the interpersonal relationships in the group. These relationships were facilitated by using educational games in the primary school students.

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Session Sport Performance

RELATIONSHIP BETWEEN THE NUMBER OF FAULTS, DEPOSITS, CARDBOARDS AND THE VALUE LEVEL OF THE PREMIER LEAGUE

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Abstract

The study aimed to determine a possible causal relationship between a series of performance indicators represented by: the number of fouls, the number of dispossessions, the number of accumulated cards (yellow and red) and the value level of some football teams given by the place occupied in the rankings.

The selection and collection of data, on the mentioned performance indicators was carried out among football teams from the English Premier League in the 2020-2021 season, with a total of 190 matches registered.

From this championship we selected for the research part, five teams and the matches they played throughout the season.The teams targeted were: the top two (Manchester City and Manchester United); eighth and ninth place (Arsenal London and Leeds United); and the last ranked (Sheffield United).

In addition to the three selected performance indicators, specific to the defense phase (number of dispossessions, fouls and cards), we also included a basic offensive indicator, represented by the possession ratio. This approach had a double purpose, on the one hand to show us how much of the playing time, a team allocates it to the attack phase, compared to the defense phase (knowing that a valuable team usually has possession times on the other hand, and on the other hand we wanted to extract a series of additional data, which would help us in explaining the phenomena and formulating future conclusions.

The research methods used were: the case study method, the comparative analysis method, the statistical-mathematical method, the graphical method.

In order to simultaneously compare the selected teams and to verify the hypotheses, we used the unidirectional ANOVA parametric test, setting the threshold α ($p < 0.05$). To identify statistically significant differences between groups, we used a multiple post-hoc comparison procedure using the Tukey (HSD) test.

The results revealed that there is a link given by the performance indicators studied and the place occupied in the ranking at the end of the championship.

Keywords: *fouls, dispossession, cards, value level.*

1. Introduction

At the level of each coach, technician, researcher, sports analyst, there are divergent opinions regarding the key indicators with a major impact on performance in sports (Hughes et al. 2012).

Our study tries to discover to what extent the number of dispossessions, fouls

and accumulated cards (yellow and red), can influence the place occupied in the ranking at the end of the English first league football championship. Also, we started from the premise that the number of fouls and the number of cards is higher, the weaker a team is in terms of value and ranked lower in the ranking.

Few researches have focused in this direction, thus a study conducted by Anders and Rothof (2011), during five Bundesliga seasons, demonstrated that the probability of a victory increases with the increase in the number of fouls, in change the number of cards accumulated by a team (yellow and red) reduced the probability of a victory.

High value teams use the foul for tactical purposes (Wright and Hi-rotsu, 2003). The conclusion of the two authors is that stronger teams seem to benefit more from the tactical foul.

Another study found that the number of fouls can show different results depending on each season in the league (Sapp et al., 2018).

Other research considers that a large part of the number of fouls is due to mistakes in the interpretation of the tactical context (Gümüşdağ et al. 2011; Unkelbach and Memmert, 2008).

Since the three selected performance indicators (dispossessions, fouls and cards) are specific to the defensive phase, in their analysis, we also included an important basic offensive indicator (Pollard and Reep, 1997), represented by the possession ratio. It shows us how much of the game time was spent in the attacking phases, compared to the defending phases (Casal et al., 2017; Sarmento et al., 2014), and it can also predict how strong it is a team (Lago and Martín, 2007).

Possession can be a good indicator that describes the phase of the game and can have comparative value for the strength of teams (Pratas et al., 2018; Sarmento et al., 2014) or predict success when measured for an entire season (Casal et al., 2017).

2. Material and method

The study was based on the selection and collection of some performance indicators of some teams in the English first league football championship from the 2020-2021 season. From this championship we selected five teams for the research part: the first two ranked (Man-chester City and Manchester United), the eighth and ninth places (Arsenal London and Leeds United), as well as the last ranked at the end of the championship (Sheffield United). 190 games were analyzed, and the following performance indices were recorded: indices belonging to the defense phase: the number of fouls, cumulative cards (yellow and red), the number of dispossessions, and for the attack phase, we selected the percentage of possession.

The methods used were: bibliographic method, case study method, comparative method, statistical-mathematical method.

For the inferential statistics part, we used the one-way ANOVA test, which aimed to determine the existence of significant differences between groups, setting the

threshold α ($p < 0.05$), and to identify, between which teams these differences can be found, we called to a post hoc multiple comparison procedure using Tukey's test (HSD).

3. Results and Discussions

Regarding the number of fouls, the application of the ANOVA test (F), demonstrated the existence of significant differences between them and the teams' place in the ranking at the end of the season (F= 4.13). It can be seen from the analysis of table no. 1, based on both totals and averages, the number of fouls tends to increase once the team occupies a place located on the periphery of the standings. It is noted, however, that the team that registered the lowest number of fouls is represented by the Arsenal London team with an average of 9.07.

Table 1 *Basic statistical data on the number of fouls*

	Teams					
	1 Manchester City	**2 Manchester United**	**3 Arsenal Londra**	**4 Leeds United**	**5 Sheffield United**	**Total**
No.parties	38	38	38	38	38	190
Sum	392	461	345	432	459	2089
Mediate	10,31	12,13	9,07	11,36	12,07	10,99
Std.Dev.	5,64	3,59	2,99	3,72	3,14	4,65

From the analysis of the comparison test, we recorded significant differences between the teams: Manchester United vs Arsenal London (Q= 4.78); Arsenal London vs Sheffield United.

Table 2. *Results of the comparison test between groups regarding the number of fouls.*

	TREATMENTS					
	1 Manchester City	**2 Manchester United**	**3 Arsenal Londra**	**4 Leeds United**	**5 Sheffield United**	**Total**
No.parties	38	38	38	38	38	190
Sum	483	547	450	739	628	2847
Mediate	12,71	14,39	11,84	19,44	16,52	14,98
Std.Dev.	4,71	4,17	3,66	6.13	4,05	5,34

T1-T2	**T1-T2**	**T1-T4**	**T1-T5**	**T2-T3**
Q= 2,84	Q= 1,94	Q= 1,65	Q= 2,76	**Q= 4,78**
T2-T4	**T2-T5**	**T3-T4**	**T3-T5**	**T4-T5**
Q= 1,20	Q= 0,08	Q= 3,59	**Q= 4,70**	Q= 1,11

The second selected performance indicator, represented by the number of cumulative cards (yellow and red) revealed the existence of a significant difference (F= 3.21).

Table 3. Basic statistics on the number of card

	TREATMENTS					
	1 Manchester City	**2 Manchester United**	**3 Arsenal Londra**	**4 Leeds United**	**5 Sheffield United**	**Total**
No.parties	38	38	38	38	38	190
Sum	46	64	51	62	80	303
Mediate	1,21	1,68	1.34	1,63	2,10	1,59
Std.Dev.	1,16	1,21	1,14	1,02	1,39	1,22

Analyzing the basic statistics indicators present in table no. 3, it can be seen that both in terms of the number of accumulated cards and their averages, they obviously reflect the upward trend, once the teams are on a lower place in the ranking.

Table 4. Results of the between-group comparison test on the number of cards

T1-T2 Q= 2,45	**T1-T2** Q= 0,68	**T1-T4** Q= 2,18	**T1-T5** **Q= 4,62**	**T2-T3** Q= 1,77
T2-T4 Q= 0,27	**T2-T5** Q= 2,18	**T3-T4** Q= 1,50	**T3-T5** **Q= 3,94**	**T4-T5** Q= 2,45

The application of the group comparison test revealed the existence of statistically significant differences between the champion team, Manchester City and the last-placed team, Sheffield United (Q= 4.62) and the team ranked third th, Arsenal London compared to the last ranked, (Q= 3.94) aspects that can be analyzed with the help of table no. 4

Table 5. Basic possession percentage statistics.

	TREATMENTS					
	1 Manchester City	**2 Manchester United**	**3 Arsenal Londra**	**4 Leeds United**	**5 Sheffield United**	**Total**
No.parties	38	38	38	38	38	190
Sum	2444	2140	2009	2187	1566	10346
Mediate	64.3158	56.3158	52.8684	57.5526	41.2105	54.453
Std.Dev.	9.7235	10.8157	11.7408	9.4603	11.6135	13.0488

The one-way ANOVA test revealed that from a statistical point of view there is also a significant difference between the five selected teams (F= 23.86).

Regarding the group comparison test, presented in table no. 6, it can be clearly seen that the teams located higher in the ranking have a super low possession rate compared to the last ranked. Thus the application of the Tukey test (HSD) revealed a statistically significant difference between the champions, Manchester City, and the team ranked second, Manchester United, (Q= 4.60), the team ranked third th, Arsenal London, (Q= 6.59) and of the team located in the last position, Sheffield United-ed, (Q= 13.30).

Regarding the teams located in the second, eighth and ninth places, they registered significant differences compared to the last ranked (T2-T5: Q=8.69); (T3-T5: Q= 6.71); (T4-T5: Q= 9.40).

Table 6. The results of the between-groups comparison test on the percentage of possession.

T1-T2 **Q= 4,60**	T1-T3 **Q= 6,59**	T1-T4 Q= 3,89	T1-T5 **Q= 13,30**	T2-T3 Q= 1,98
T2-T4 Q= 0,71	T2-T5 **Q= 8,69**	T3-T4 Q= 2,70	T3-T5 **Q= 6,71**	T4-T5 **Q= 9,40**

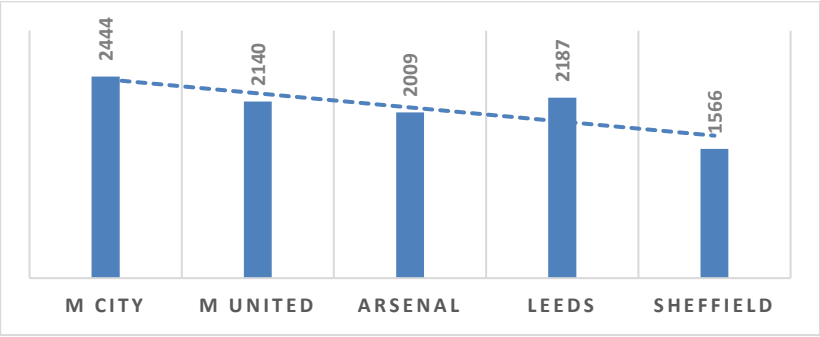

Figure. 1. Percentage of ownership.

4. Conclusions

The selected performance indices highlighted significant differences between the studied teams.

It can be concluded that teams in the upper part of the ranking commit fewer fouls, have a lower number of cards (cumulative yellow and red) and have more possession compared to those located in the lower areas of the ranking.

In terms of the number of dispossessions, there is a tendency for the teams located in the upper zone of the ranking to register a lower weight, compared to the teams located in the lower zones of the ranking.

Valuable teams have superior possession, which obviously contributes to the accumulation of fewer fouls and cards. In our opinion, these aspects have as a causal substrate the good organization of the teams both in the defensive phase and in the offensive phase. Choosing the form of pressing is another way to limit physical contact and implicitly the possibility of bearing a series of consequences, either in the form of penalties (accumulation of cards, eliminations, free kicks from dangerous areas), or of possible situations that can lead to injuries. These aspects can deprive the team of the contribution of some players who can be decisive for the performance, in the perspective of future confrontations.

We can see the tendency of the value teams to choose as the main form of re-capture of the ball, the interception to the detriment of the dispossession, thus avoiding physical contact.

This way of recovering the ball requires a good defensive organization, a superior coordination of the players materialized through a pressing action oriented to the action of compressing the playing space and blocking the passing lanes.

Although the performance indices studied have proven that they can be related to the place occupied in the ranking and can be useful tools in order to direct training, establish and apply game tactics, a future analysis that combines these quantitative aspects with descriptive data related to technical-tactical behavior, would represent an efficient method of analysis, evaluation and diagnosis of the value level of a team (Frățilă, 2021).

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SELECTION AND INITIATION IN FREESTYLE WRESTLING USING THE SPECIALIZED DYNAMIC GAMES

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Abstract:
Due the last years, sport specialists and trainers are researching to establish the optimal age, from a biological point of view, for starting to practice a certain type of sport. Considering that age is one of the biological criteria used in sport recruitment it can be classified in four types: chronological, morphological, physiological and sports age. The use of these criteria shows us the necessity of orienting athletes from the beginning as well as the possibility of forming homogenous and performant groups. The use of dynamic exercises in this process can help achieve forming homogenous and performant groups, and keep an alive interest to practice any kind sport.
Keywords: *selection, recruitment, dynamic games, age, optimal period, methods, freestyle wrestling*

1.Introduction

The characteristic feature of contemporary sport is the continuous growth of sports performance. This requires specialists to establish new ways of increasing the effectiveness of sports training. In this context, one of the factors that determine the quality of the training process is the sports selection.

The selection in sports fighting represents a complex and continuous process of assessing the integral level of training of the fighters, propelling those with possibilities of progress on the upward path of training, in order to obtain valuable sports performances. (Iu. Shahmuradov 2011) [16]. Therefore, the sports and fundamental scientific selection is an essential link in terms of obtaining future sports performances, obviously influencing the quality of the instructional training process, thus translating into a very topical concern. In the last two decades, high-performance sport has accumulated a lot of valences: biological, socio-economic, psycho-pedagogical, technological, etc., making insufficient only the natural selection (with very few exceptions) and boosting sports science towards the application of directed selection.

Its methodology, mechanisms and criteria have profound applications in the field of genetics and anthropology, physiology, biomechanics and psychology, sports medicine, cybernetics and informatics, pedagogy, and sports training methodology. Sports medicine, this component of sports science, the clinic of the

healthy person, has the task of capitalizing and synthesizing the multitude of data from biomedical, technical or informational sciences and to offer coaches, physical education teachers or methodologists an organized system, which operates with biological forecast indicators (structural or functional), in order to achieve a directed, objective selection for performance sports.

This biological component has absolute value only through correlation with the methodical-pedagogical part, with which it forms a unitary whole within a complex system. On the other hand, the biological side of the selection has great compensatory reserves, the biological criteria often being prioritized. The indicators of these norms and selection criteria represent the synthesis of the selection processing of objective data, at the center of which is the biological model of today's and tomorrow's performance. Life shows us that this model varies significantly from one decade to another, sometimes from one Olympics to another, just as a champion often deviates from the model, without thereby challenging the validity of the model.

The purpose of the work is to constitute an intermediate model, which produces those performance athletes that the national teams need, so that Moldovan wrestling is competitive on the world level.

*The object of the research***:** constitutes the selection process of children and adolescents for sports schools specialized in wrestling.

Hypothesis *f*rom which we started was that not all schools use the selection system in accordance with the requirements of modern wrestling, and the selection criteria can be improved from a somatic and motor point of view.

2. Material and methods

That is why in the concrete approach of the directed selection, one must show a lot of flexibility, a clear vision and an innovative spirit, even more so, as the science data itself evolves at an alert pace. It follows that the directed selection process has a continuous character, representing the essential factor of performance, permanently correlated with other types of criteria assembled in a system that sports theory and practice has created and strictly applies. The age at which we can start the selection of children for initiation and specialization must be differentiated according to several factors that refer to: the specifics of the respective sport, the nature of the effort, the frequency and duration of the training lessons, etc. As a selection criterion from the point of view of age, we can specify that practically we can use under four aspects:

1) Chronological age;
2) Morphological age;
3) Physiological age;
4) Sports age.

The modern conception of the organization of the training process has changed and improves from year to year, in step with the trends that appear permanently in this field, as a result of multidimensional scientific research. Sporting fights amplify day by day the problems that are rising on a practical and theoretical-methodical level, due to the widening of popularity among large masses of participants and spectators, including the multitude of sporting, educational, organizational and social valences. For the training of young fighters, identifying and motivating them towards the organized practice of free fights is the basic operation in performance sports.

Therefore, the teacher and the coach have a professional obligation to carry out these activities with a lot of pedagogical tact, patience and perseverance. At each lesson, so that the class to be attractive, so that none of the children leave the training frustrated and want to meet again as soon as possible, the teacher-coach must possess a series of personality characteristics: empathy, patience, tolerance, adaptability, consistency, communication, optimism, cheerfulness, determination. Children are flattered and appreciate the teachers and professors who participate in organizing or even conducting the games. However, he must keep in mind at all times that the final model of high-performance fighters operating at each stage of training with operational, intermediate models leads to the achievement of the final model.

For this, it is necessary to start from a scientific, judicial selection based on the main criteria (state of health, anthropometric indices, development of physical, motor, mental qualities, technical-theoretical skills) and that of quick learning, creative spirit and self-improvement. Achieving remarkable results at the contemporary stage is only possible for athletes who possess special morphological data and an exceptional combination of a complex of diverse skills, being at an extreme degree of physical development (Petrovski V.V.1978., Tumanean G. S.1972). [15,16]

3. Results

The forecasting importance of the physical training indices of young fighters

The development of the scientific system argued for the initial selection of young fighters is in direct relation with the demonstration of the selection of tests and indicators of athletes physical training. This selection is made based on establishing the degree of informativeness and prognostic significance of the indices used. Taking into account the low informativeness of the existing programs for testing novice fighters and the inclusion in these programs of tests, which basically characterize only qualities such as speed and strength, we carried out special investigations in order to determine the prognostic significance of the indices of young fighters physical training. Establishing the prognostic importance of the tests was carried out, as a rule, by testing the physical training of the young fighters of the first year of studies after 15 tests and indexes, more often used in the

practice of early selection. These tests were revealed through the theoretical analysis of special literature, the investigation of high-quality trainers and personal practical expertise. The detailed description of all tests and indexes, as well as the test procedure and the grades obtained based on them, are presented in the article. The credibility of the informativeness and prognosticity of the test results is due to the methods of multidimensional statistical analysis and, in particular, of factual analysis. The results of the different training category young fighters' testing are presented in table no. 1. Analyzing the data in the table, we find that the results of testing the physical training of the fighters increase depending on the duration of the sports wrestling practice.

Demonstrating the degree of prediction of various tests and indices based on a single test is not possible, because, first of all, some data (for example, morphological: height, weight, vital lung volume (VLV) include a natural increase in age , on which the practice of sports wrestling has little influence, and secondly, the degree of increase of any tests and indexes is quite specific and therefore differs considerably depending on many factors.

Morphological indices of young athletes

Table no. 1

No. crt.	**Tests and indices, units of measure**	**The importance of indices according to the years of training**	
		First year	**Second year**
1	Height (cm)	139,8±6,0	144,7±6,8
2	Weight (kg)	33,8±5,6	38,1±6,2
3	Body mass and height index (kg/cm)	0,23±0,2	0.25±0.1
4	Vital lung volume (ml)	2319±390	2550±545
5	Voluntary Apnea(s)	31,5±4,4	38,1±5,5

From table 1 we notice that the anthropometric and morphological indices improved when testing during the second year of training, thus: the "Height" test at the initial testing (first year) the students demonstrated the result of 139.8±6 .0 cm, and at the second test after one year these indices reached 144.7±6.8 cm. Respectively, 4.9 cm higher than in the previous test. In the "Body weight" category, when tested at the beginning of the first year, the value was 33.8±5.6 kg, and when tested after one year of training, it reached 38.1±6.2 kg, with 4, 3 kg more. In the "Body mass and height index (kg/cm)" test, the initial results of the athletes record an average value of 0.23±0.2 kg/cm, and after a year of 0.25±0.1 kg/cm. We find a difference between the results of 0.02 kg/cm. The "Vital lung

volume (ml)" at the beginning of the testing the athletes had an average of 2319±390 ml, but at the second testing an average of 2550±545 ml was recorded, the difference being 231 ml. and in "Voluntary Apnea" at the initial measurement the magnitude was 31.5±4.4 s, and at the testing after one year this result is 38.1±5.5 s, with a difference in magnitude of 6, 6 s.

This data has led to a number of divergent opinions, such as: is it good or not to start selection for wrestling at 9 years old. We would like to specify that the age at which students make particularly large progress in terms of motor skills is from 7 to 14 years. The practice and expertise of the last years of freestyle wrestling activity accentuates a rapid and spectacular evolution. One of the determining factors of the evolution of wrestling in Moldova and the successes reported worldwide is the own conception of the Moldovan wrestling school.

There is very little work that deals with the selection, initiation and training of fighters specifically at the novice stage. Detecting, selecting and initiating beginner children is a task of great responsibility for every teacher-coach, who is responsible to use more and more current methodological guidelines, to search for, to evolve their exercise structures and methods by which the little fighters can acquire in a relatively short time a multilateral technique (quick learning abilities, creative spirit and self-improvement), well-developed motor qualities and a rich baggage of tactical knowledge, necessary for perfecting fighting procedures.

Through these hypotheses presented in this article, we tried to make a certain contribution to solving the multitude of problems we encounter and detect during the execution, in the foreground being the selection and initiation of 9-10-year-old children in the daily activity of the teacher-coach, that trains, leading the specifics of beginner groups, through the prism of comparing professional experience with the data provided by the specialized bibliography and modern training requirements.

Studying and generalizing the specialized literary sources, we highlighted 4 groups of games:

- Touch Games (spotting): of the neck, arms, thighs, calves, combined.
- Attack hold games; arms, trunk, legs, body, combined.
- Territory Fighting Games: Backs Forward, No Hands; with hands.
- Games with elements, technical actions: "The third point of support", " Mattress Lifting", "Moving to the back", " Knee Fight ", "Cock- Fight ", "The most householder" etc.

Next, let's structure the characteristics, the content of the games and the methodology of their use.

1. ***Touch Games (spotting) the opponent***

Training objectives: knowing and training fighting positions, developing the sense of distance, the ability to maneuver on the mat.
Game task: Touching different parts of the opponent's body with the palm.
Game play: The players have their initial position standing face to face at a distance of 1-2 m. The coach announces the task: to keep the position facing the opponent and touch a certain part of the opponent's body.
Rules of the game: The game starts at the coach's signal. It is recommended to move freely on the mattress, increase and decrease the distance. After the touch, the players return to their initial position.
Appreciation: The first to touch the controlled part of the opponent wins: If both players touch simultaneously, the attempt is canceled and the game continues.

2. ***Attack hold games***

Training objectives: correct learning of holds, defense and hold releasing .
Game task: Execution of the hold of a certain part of the opponent's body.
Game play: The players are in front at a distance of 2 meters. The coach announces the task to execute a certain hold. After one of the players has succeeded in holding, they return to their initial position.
Game rules: the game starts at the coach's signal. The players are allowed to move freely on the mat, increase and decrease the distance, execute and releasing from the opponent's hold. If the players grabbed the same holds at the same time, they are canceled and the game is extended.
Appreciation: The winner is the player who first shot the opponent's hold.

3. ***Territory fighting games***

Training objectives: To learn the static and dynamic support positions, taking the opponent off the balance.
Game task: taking the opponent out of the playing area (square, circle).
Game play: Players stand in a circle or square. At the coach's command, the aim is to remove the opponent outside the circle (square). Pushing can be done with the back, with the hands or without. When pushing without hands the players are in contact all the time.
Game rules: the game starts at the coach's signal. It is forbidden to step on the opponent's feet. If both players have left the playing surface at the same time, then the attempt is not appreciated.
Winner Rating: Defeat the one who pushed his opponent over the line. The methodology of playing touch games, with hold grasping and defending the territory. The group is divided into pairs according to approximately equal height and weight. The coach explains the rules of the game, and sets the task. The game starts at the signal. The coach follows the execution of the tasks, the rules of the game, ensures the weak ones. During the game, partners change if they are not equal in strength. The game lasts 1-3 minutes. The winner is the player who has accumulated the most points.

Touch games, the fight for the attack hold and for the territory, can take place both indoors and outdoors. The games with the simplest combat elements have as their objective the formation of basic wrestling skills in standard conditions with a limited number of actions. We will run several game models with the simplest wrestling elements.

4. Games with elements, technical actions

a) The third point of support

Training objectives: Learning to unbalance the opponent.
Game task: To lead the opponent to touch the mat with his hand or knee.
Game play: The players stand face to face at a distance of 1-2 meters. At the trainer's command, the fighters force their opponent to lose their balance, having the third point of support.
Game rules: The game starts only after shaking hands. Throwing or hitting the partner, causing pain is prohibited.
Winner Rating: Defeat that player who has forced his opponent to lose his balance more than once in a certain time unit.

b) Lift off the mat

Training objectives: Learning how to enter the process.
Game task: Lifting the partner from the mattress.
Game play: The opponents stand face to face and on the command "grab the opponent's trunk lifting him off the mat".
Game rules: The game starts at the coach's command. Throwing, hitting, strangulation, and pain are prohibited.
Winner Rating: Defeat the player who has lifted (torn) the opponent off the mat more than once.

c) Moving to the Back

Training objectives: learning to land.
Game task: taking the opponent to the ground by moving to the back.
Game play: Standing face to face holding each other's right (left) arm. At the command of the coach, keeping the hold, each of the players tried to get behind the opponent, grabbing the trunk with the left hand at the level of the belt.
Game rules: The game starts and ends at the coach's signal. Both players stand face to face and grab the arm of the other side-stretched opponent. Throwing, hanging on and/or kicking is prohibited. The exchange of positions is done at the coach's command.
Winner Rating: Defeats the player who has passed behind the opponent's back several times (in position or ground floor).

The methodology of playing games with the most basic forms of wrestling

When playing games with elements (simple forms) of combat, the group is divided into two teams. Each captain takes turns naming the player who goes to the center of the mat, to impose himself on the opponent (weaker or stronger). The games with fighting elements are played on the mat as well as touch games, with the attack holds, with the division of the players into pairs. In the first period of the dynamic games, it is necessary to learn how to execute them, thus, the game often turns into a "who is stronger" competition or remains a simple exercise.

The qualities of the game organizer, the education of the player's abilities appear in the coach with the raising of the level and pedagogical mastery.

The games were selected following a thorough analysis of the objectives of the training program for freestyle fighters. Game time is distributed as follows:

*Touch games: neck-3 minutes, arms-3 minutes, thighs-3 minutes, in combination-3 minutes at each lesson.

*Games with attack holds; arms-3 minutes, trunk-3 minutes, legs-3 minutes, body-3 minutes, combined-3 minutes in each lesson.

*The territory fighting games: with the back-3 minutes, without hands-3 minutes, with hands-3 minutes, each other in turn for 3 minutes per lesson.

*Games with elements, technical actions: "Third point of support"-3 minutes, "Lifting from the mat"-3 minutes, "Moving to the back"-3 minutes, "Knee fight"-3 minutes, "Cock- fight" - 3 minutes, "The most householder " - 3 minutes at each weekly training.

The total time for games in a practice is from 12 to 18 minutes.

We have determined the 3-minute period for a game, characterizing it as the 2 minutes required for a children's game plus 1 minute for explanation, organization and making game totals.

4. Conclusions and recommendations

The study carried out, in accordance with the data obtained, their processing and interpretation confirms our hypothesis that through an appropriate use of the training program, the initiation into free wrestling can start from the age (9 years) considerably expanding the motor baggage of children, contributing to the acquisition and consolidation of various motor skills and harmoniously developing all the children's motor conditions.

The average values of the somatic parameters of the experimental group correspond to the athlete's performance model in general physical training.

The specialized accentuated games must be modeled in order to achieve the proposed instructional-educational objectives. For the correct acquisition of the basic technical procedures, the specialized games will be designed in such a way that they ensure a large number of repetitions, and the established rules lead to a correct learning. In the process of initiation and learning of the minimal technical-tactical content, the global teaching method must be used through specialized,

preparatory, movement games, as well as the practice of fragments and phases of technical-tactical procedures.

The present article is recommended to be an exhortation addressed to those who work with children (preparatory groups) for the use of specialized dynamic movement games, within the physical and specific training of young fighters.

Following the experiment undertaken and the results obtained, we suggest the following recommendations in order to regain the value of sport in the Republic of Moldova and to consolidate its mass base, such as:

1) Elaboration of a unified concept regarding the detection, orientation, selection and initiation of children in free wrestling;

2) The reduction of the selection age from 12 years to 9 years due to the phenomenon of "acceleration" and in some places, the stagnation of the selection at the beginning stage and the direct scaling in the U-15 groups.

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THE ASCERTAINING STUDY ON THE IMPROVEMENT OF ATTACKING GAME ACTIONS THROUGH FOOTBALL MEANS

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Abstract

The article aims to improve the kicking technique of junior footballers, especially when they are in attack position. Skill in football determines the maneuverability of a football player on the football field, the ability to fight in one duel or another and emerge victorious from them. Following the specific methods applied to the subjects, an improvement is observed in terms of completions, namely shots on goal frame. Therefore, the practical application of the methods to improve shots towards the goal had a positive impact on the quality of mastering shots towards the goal, these being the most complicated actions of the players at the time of the attack position. It should be mentioned that the methods were applied to the experimental group for three weeks, within the specialized training.

We detailed in the article two methods of improving and perfecting the "shots" specific to football, which were applied to football players from the Luceafarul Bucovina club, children who participate in the Under 15 district football championship.

Key words: *skill, training, juniors, football, methods*

1. Introduction

The technique represents the set of motor skills specific to the game, carried out based on the physical capabilities of the players, in order to satisfy some requirements of the defense or attack tactics. Throughout its history, football and its technique have developed due to all these causes. Currently, "technique is the main factor of the football game" without which football would not be what it is (Ionescu I.V., Florescu C., 1994; Motroc, I., Motroc, F., 1996).

Skill is one of the basic motor qualities, both in physical education and in performance sport along with other motor qualities such as: strength, speed, endurance and mobility. This quality is complex and largely depends on the level of development of other motor qualities listed above (Drăgan, A., 2009).

Skill can also be described as "form of complex expression of performance capacity by quickly learning new movements and quickly adapting to varied situations, according to the specifics of each sport or other basic and applied motor skills" (Dragnea, A., 2006, p. 25).

In football, skill development through specific exercises is a basic component of sports training and represents the activity of acquiring, consolidating and perfecting the specific procedures for handling the ball and moving the players on the field (Drăgan, A., 2007; Grosu B.M., 2019).

Across the junior level, the inaccuracy of hitting the ball (of shots) towards the goal cannot be attributed only to the deficient technique of hitting the ball or the insufficient volume affected in the last training period for this technical element, but more to the inaccuracy of its use in the condition's specifics of the modern football game imposed by:

- the total commitment of space and time;
- the crisis of space and time;
- the negative influence of the state of health;
- nervous load (Gallahue, D. L., Ozmun, J. C., & Goodway, J., 2011).

The playing technique of forward footballers must contribute to the solution of a series of complex tasks, to increasing the effectiveness in the exploitation of force, increasing the speed and precision of actions in the conditions of ever-changing situations (Dumitrescu, Gh., 2006; Drăgan, A., 2009).

2. Material and method

The methods used in the creation of the article are the study of specialized literature, the observation method, the research method. In the research we used two means of improving the "shot" toward the goal. The players in the experiment are part of the *Luceafarul Bucovina Suceava* club and they were given 2 specific methods of perfecting the ball hitting towards the goal. Those from the experimental group are engaged in the district football championship, under 15, while the athletes from the control group do not participate in the championship.

The experiment was carried out in the pre-competitive period and was applied for duration of 3 weeks after the end of the competitive period. The experimental group was given the shooting improvement methods at every training session (3/week), while the control group trained as planned for this training period. Two tests were carried out, the initial one immediately after the end of the under 15 championships, and a final test after the 3 weeks, where the players in the experimental group benefited from specific methods to improve their shooting during training.

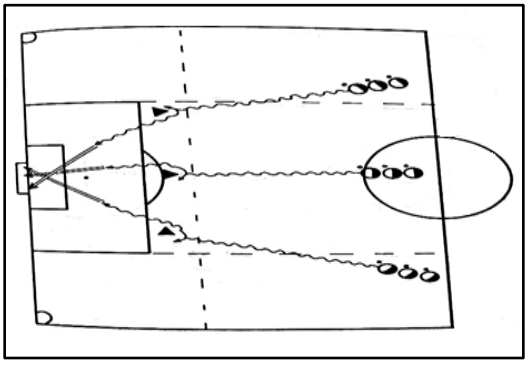

Figure 1. *Game action in attack with semi-active opponent*

Method number 1 goes like this: 3 lines each, with 3 players each facing the goal. One at a time, each player dribbles and sprints towards the goal, outrunning the semi-active opponent, and completes the entire phase with a shot (3 repetitions each).

Methodical instructions: the dribbling distance is 7 meters, the defender is active, but will not completely stop the action of the attacking player, the players will change, namely the dribbling starting areas (left, right, center), and for a large intensity is possible to work on both gates with several groups.

It is aimed that the dribbling is done towards the goal, the control of the ball to be a good one, the ball should not take too far from the foot. Dribbling can be done with either foot, but finishing with the right foot.

Method number 2: players are arranged in 3 groups, 3 players each. In front of them, at a distance of 7 meters slightly to the side, there is a teammate. There is also one opponent at the same level. The player passes hard and precisely to the teammate,enteres, gets the ball (similar *one-two*), exceeding the defender with the most efficient dribbling, then finishes (3 reps. each).

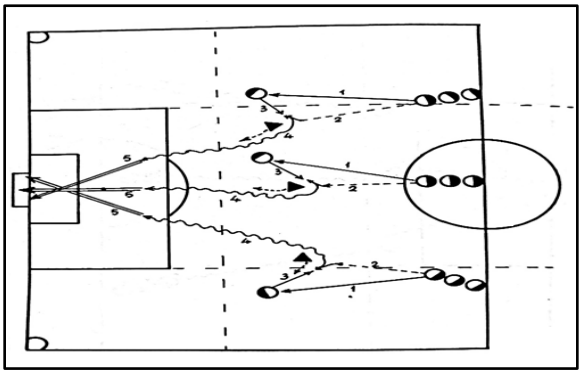

Figure 2. *Attacking game action with active opponent and teammate*

Methodical instructions: the two forwards must pass strongly to each other, precisely and with moderate intensity but the semi-active defender, after overtaking, tries to regain the ball.

It is watched as *one-two*- to be accurate, not to favour the shot towards the goal. The ball carrying over the distance of 7 meters must be fast and the ball must not move very far from the player's foot. The shot is made with the skilled foot.

3. Results and Discussions

After both initial and final testing, an improvement in ball kicking is noted. The number of actions completed with a shot on the goal frame of the attacking players was observed / monitored. After the experiment, we notice that the players in the experimental group passed the ball over the goal frame more times than those in the control group.

Table 1. *Results of exercise no. 1 – Control group*

Name surname	Initial testing	Final testing
S.M.	2	2
G.C.	1	2
L.I.	2	2
M.R.	1	1
M.T.	1	1
B.T.	2	2
J.T.	2	2
V.G	1	1
I.I	1	1

Table 2. *Results of exercise no. 1 – Experiment group*

Name surname	Initial testing	Final testing
G.G	2	3
V.I	2	2
M.I	1	3
C.D	1	3
C.M	2	2
L.M	1	2
T.C	1	2
L.L.	3	3
G.F	2	2

Table 3. *Average results*

Arithmetic average	Initial testing	Final testing
Control group	1,44	1,56
Experimental group	1,67	2,44

Table 4. *Results of exercise no. 2 – Control group*

Name surname	Initial testing	Final testing
S.M.	2	2
G.C.	2	2
L.I.	1	2
M.R.	2	1
M.T.	1	1
B.T.	1	2
J.T.	2	3
V.G	2	1
I.I	1	2

Table 5. *Results of exercise no. 2 – Experiment group*

Name surname	Initial testing	Final testing
G.G	2	2
V.I	1	2
M.I	2	3
C.D	1	2
C.M	2	2
L.M	2	2
T.C	1	3
L.L.	2	3
G.F	2	2

Table 3. *Average results*

Arithmetic average	Initial testing	Final testing
Control group	1,56	1,78
Experimental group	1,67	2,33

The article is important to identify more easily the methods of developing the sense of the goal and implicitly, it helps to improve the kicking of the ball (shot) towards the goal in phases and game actions in the attack. Following the recorded results, an improvement in the finishing actions on the goal is observed in the experimental group, with a better arithmetic average than the control group. The research in question can be put into practice and can contribute to the optimization of the training process, especially of the players in the forward position, expressed by increasing the level of technical training, as well as the quality of the game as a whole.

4. Conclusions

Following the methods for improving the shot towards the goal applied to the experimental group, an increase in the number of completions on the gate frame, between the initial and the final testing, is observed, which is higher than that of the control group, a fact that denotes the effectiveness of the exercises. The exercises were applied to the juniors within the *Luceafarul Bucovina* club over a period of three weeks.

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COMPARATIVE ANALYSIS OF THE PERFORMANCE FEMALE HANDBALL PLAYERS MOTOR CAPACITY VALUES IN A TRAINING MACROCYCLE

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Abstract

The progressive conceptual training model is a theoretical construction centered on the growth of motor and psychomotor capacities of female handball players in the initial advancement period the 5th year, necessary for the identification, analysis and exact capitalization of the circuits of scientific determination of training activities, in an annual training macrocycle accomplished at the system and process level. Its main purpose is to optimize the decisions to carry out the necessary training elements in a long term within a macrocycle, reflected in the global training units, each concrete activity, lesson, training hour, for periods of the sports training 5th advancement group.
In the development, implementation and improvement of the training process programming methodology, the approach of the progressive concept **based on the process** is promoted, starting from the idea that for the female handball players' training to work qualitatively and effectively.

Key words: *progressive conceptual model, motor and psychomotor training, technical-tactical training, performance female handball players, training process, macrocycle, sports training efficiency*

1. Introduction

Contemporary sports training are characterized, among other things, by a specific effort to synchronize motor training with the rhythm of the development of technical-tactical sports mastery (Șufaru, 2007). Regarding the instructive-educational process in handball, recently, on a national and global level, new methods are proposed to introduce the art of the system/model of effective planning of the annual macrocycle (Dumitriu, 1997; Eftene, 2004).

The organized pedagogic experiment aims to perfect sports-specific attributes, at the individual and collective level, in summary, in relation to coordination in physical training and objectives of improving the technical-tactical training of handball players.

Numerous theoretical studies and experimental research this positive influence of physical effort on the development of the motor capacities of the subjects in sports training at various ages, training levels, stages and training periods in an annual cycle [Dumitriu, 1997; Ulmeanu, 1966).

The aim of research consists in perfecting the training system for the period of an annual macrocycle for the motor and psychomotor training of performance handball players.

Research objectives:

1. The study on the theoretical-scientific and practical approaches in order to essentialize the motor and psychomotor dimensions of the training of female handball players for a period of 1 year;
2. Setting up the experimental methodology regarding the determination of the effective and necessary motor and psychomotor elements of modern handball, as well as the possibilities of their interaction, in order to obtain the highest results;
3. Appreciation of the efficiency of the developed experimental methodology and its argumentation for determining the optimal approach regarding the motor and psychomotor training of performance female handball players in an annual macrocycle;
4. Theoretical-experimental argumentation of the motor and psychomotor training program of female handball players for the 1-year macrocycle period.

The purpose and objectives of the research are directed towards the development of motor and technical-tactical expression possibilities, consequently, of great importance and actuality in women's handball, keeping the algorithm of the training of sportsmanship, with a view to creating a model or a system of operations in a strictly established order, regarding solving the problem of streamlining sports training in an annual macrocycle, starting with advanced training in the 5th year of training, to establish the coordination report, the existing relationship in motor and technical-tactical training between the initial training and the final training in an annual macrocycle. In order to implement the experimental structure and content, planning models were developed after which the process of ascertaining and basic training of the experimental groups was carried out. At the base of this "model" is the methodological system of the training process devoted to the motor training of female handball players in an annual macrocycle.

The values of the motor capacities of the performance female handball players during the initial period of advancement, the 5th year of training in the macrocycle, are presented in Table 1. The parameters of speed, strength in speed regime, coordination, explosive strength, necessary for the formation of technical-tactical skills, were recorded within the ascertaining experiment.

2. Material and method

Research methodology – the research of the theoretical-conceptual, methodological and practical essences exposed in the specialized literature; analysis of the documentary materials of sports training of female handball players in an annual cycle; longitudinal experimental observation, testing the level of motor training; the method of modeling sports training; method of ascertaining experiment; the statistical-mathematical method of processing the collected data; the Table method (Epuran, & Maroliceanu, 2002; Ulmeanu, 1966).

3. Results and Discussion

The method of testing psychomotor abilities was carried out in the process of systematic training, strictly programmed, planned and carried out during a macrocycle, having a systemic effect on the psychomotor evolution of performance female handball players (Ciubotaru, 2021; Eftene, 2004):

1. Speed run for 30 m (s)
2. Shuttle run 3 X 10 m (s)
3. Standing long jump (cm)
4. Lifting the trunk vertically from lying on the back for 30 s (no. of repetitions)
5. Throwing the handball at a distance (m)
6. Throwing the 2 kg medicine ball behind the head (cm)

The exercises of speed running, 3x10m shuttle, Standing long jumping were practiced for the development of the capacities to adapt running steps and jumping to the structure of the handball game, for the development of the motor and psychomotor qualities of speed, explosive force specific to the technical - tactical elements, for technical-tactical improvement in various situations of the handball game, in close correlation with most cases, in execution and the conditions provided in the regulation.

Since the experimental stage is of special importance for the analysis of the experimental results, we present below the main concrete modes of action with dependent and independent variables of the experimental groups and the control when testing motor parameters according to the algorithm established in the structure of the coordination report model regarding the initial advancement period-specific training methodology, the 5th year of training.

The key concept of the elaborated model is constituted from a holistic perspective, not only as a multitude of forms of streamlining individual technical-tactical training (for example, learning the execution technique, physical, tactical, basic training activities, etc.), forms of achieving training in the interaction process of handball players. The result is analyzed and diagnosed on several psychomotor and technical-tactical training plans with immediate trend value, microcycle, and long term, the Olympic cycle of the specific and global skill potential.

Through its psycho-pedagogical purposes of sports training, it advocates a progressive integrative conception of instructional assistance at all stages of equipping performance female handball players with specific knowledge and skills, and at the same time intends to progress the indicators towards a global evaluation at the end of the Olympic cycle.

The verification of the control parameters was carried out according to the tests in Table 1, with a team of 26 performance female handball players, for the motor tests mentioned in the table. In the 30m speed running at the initial advancement test, both groups were homogeneous. The calculated value of Student's **t** criterion compared to its tabular value indicates insignificant differences between the results of the experimental groups in advancement conditions ($t=1.89$, $P>0.05$).

At the final testing of the advancement training period the calculated value of **t** Student criterion highlights significant differences between the results obtained in the 30m speed run, the performances being superior 5.25" in the experimental group compared to the control group 5.54" with a difference of 0.30s (t=5.119, P<0.001) with a probability of 99.9%, the coefficient of variability being 3.71.

The progress of 15-year-old female handball players is due to the use of special running exercises during the preparation period of sports training, intended for 161 hours of training per school year, and general physical training exercises with 135 hours annually, planned in the first double macrostructure of the Olympic cycle.

The results of the 30m speed run obtained by the experimental group directly influenced the development of coordination running capacity in the 3x10m shuttle and the development of explosive force in the standing long jump, achieving significant results with a probability of 99.9%. One of the characteristics of scientific training in the experimental group is the gradual increase in effort, arm work. This was achieved by repeating the special athletics exercises systematically, in such a way that their intensity and duration gradually increased during the training period of the Olympic macrocycles.

The special exercises for increasing the intensity of the arm work positively influenced the development of the reaction capacities of the movements and the explosive force when throwing the handball at a distance and throwing the 2kg medicine ball behind the head, the results being significant with an increase from 384.78m to 396 .07m at the final test (t=6.187, P<0.001) in the experimental group.

Abdominal strength when lifting the trunk from lying on the back, for 30", the number of repetitions of the initial test action, the comparison of the results obtained by the two groups is insignificant. The calculated value of **t** Student is equal to an index of 1.919, at P>0.05. At the final test, the results increased significantly in both experimental groups, due to the increase in the neuromuscular system through coordinated movements, precise in time, rhythmic, rapidity in changing the states of contraction and short-term relaxation of the muscles.

Specifically, the experimental advanced group, the 5th year of training demonstrated superior performance in the 30m speed run, the long-distance handball ball throw, the 2kg medicine ball throw and the standing long jump compared to the control group. There is also a significant difference between the results obtained at the initial and final testing, calculated value (t=5.70-7.164) is at P<0.001 (Table 1).

The obtained data show us the result of a scientifically conducted training process; it is of major importance regarding the development of motor and mental qualities and a high acquisition of technical-tactical skills during the preparation period of the 1-year macrocycle.

Table 1 *Comparative analysis of the motor capacity value of female handball players during the initial advancement period, the 5th instruction year in the annual training macrocycle*

No. crt.	Parameters tested	Exp. gr.	Statistical significance		t	P
			Initial advancement testing	Final advancement testing		
			$\underline{x}$± m	$\underline{x}$± m		
1	Speed running 30m (s)	E	5,52 ± 0,055	5,24 ± 0,047	5,75	<0,001
		C	5,69 ± 0,0071	5,54 ± 0,035	2,62	<0,05
		t	1,89	5,119		
		P	> 0,05	<0,001		
2	Shuttle running 3x10m (s)	E	8,38 ± 0,102	8,14 ± 0,094	2,437	<0,05
		C	7,93 ± 1,152	7,68 ± 0,044	0,222	<0,05
		t	0,389	4,423		
		P	>0,05	<0,001		
3	Throwing the handball at a distance (m)	E	25,21 ± 0,627	29,00 ± 0,549	7,164	<0,001
		C	26,38 ± 0,621	27,67 ± 0,443	2,459	<0,05
		t	1,270	3,305		
		P	>0,05	<0,01		
4	Throwing the 2kg medicine ball behind the head (cm)	E	384,78 ± 0,941	396,07 ± 0,862	6,187	<0,001
		C	382,00 ± 1,152	384,58 ± 1,507	2,915	<0,05
		t	1,869	3,32		
		P	>0,05	<0,01		
5	Standing long jump (cm)	E	195,86 ± 1,019	200,86 ± 0,784	5,70	<0,001
		C	194,35 ± 0,532	195,08 ± 0,975	2,18	<0,05
		t	1,313	3,789		
		P	>0,05	<0,001		
6	Lifting the trunk vertically from lying on the back for 30 s (no. rep.)	E	17,14 ± 0,549	18,50 ± 0,627	2,571	<0,05
		C	16,00 ± 0,266	16,67 ± 0,355	2,32	<0,05
		t	1,919	2,53		
		P	>0,05	<0,05		

Note: n=14+12=26 f=24 t=2,064 2,796 3,745
Exp. - n=14 f=13 t=2,160 3,012 4,221 r=0,553
Cont .-n=12 f=11 t=2,201 3,1064,437 r=0,602
P=0,05-0,001
95.0%-99.9% probability

The continuity of female handball players motor training in terms of the development to a higher degree of the specific motor qualities of the female athletes they train in, advanced ones the 5th year, allows them to reach the working capacities to study in the first year of sports mastery.

4. Conclusions

1. The global study and the generalization of theoretical-scientific approaches in view of the general requirements and the determining factors of the performance capacity in an annual macrocycle and development in contemporary sports training have not been subjected to special research in the theory and practice of training 14- 15 year-old female handball players.

2. The somato-functional, motor and mental characteristics that handball advertises recommend an optimal age. This is given by the level of somatic parameters and the morpho-functional substrate, when reaching to high values, allow us to appreciate them further to achieve performance. With some approximation, it will be possible to establish even the level that these parameters will reach at the end of the growth period, which will lead to high performance results of female handball players with a probability of 99.9%.

3. The training of performance female handball players aims to improve the motor components of the performance, respectively the motor qualities: strength, speed, expansion, skill, resistance. The concept of training should not be limited only to the sphere of motor qualities, as it also includes anatomical-functional permits, coordination and regulation capacities, respectively somatic development, the development of the biological and psychological components of performance, as well as physiological functions.

4. The experimental group of advanced 5th year of training demonstrated superior performance in the 30 m speed running, long distance handball throw, 2 kg medicine ball throwing and in the standing long jump compared to the control group. There is a significant difference between the results obtained at the initial and final testing, the calculated value t= 5.70-7.164 is at P<0.001, with 99.9% probability.

5. The planning of the training process in handball represents the way of organizing the work and the material subject to learning, used by the coach in order to actively and consciously acquire the skills, abilities and knowledge necessary to achieve performance in the team handball game.

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JUNIOR HANDBALL IN LEARNING THE GAME CONTENT

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Abstract

Handball is a popular sport enjoyed by millions of people worldwide. The key aspects of the sport, dynamic, fast-paced, and quick changing game play, make for an exciting game to play and an attractive sport to watch. Handball adapts well to different conditions and needs, creating fun and engaging variations that can be played by just about anyone anywhere at any time. The results of the research permitted the identification of a new contents of training process in junior three handball players.

Key words: *handball, junior three, learning, contents*

1. Introduction

As part of this research, an opinion poll was conducted at the beginning of the 2020-2021 academic year, which provided us with the following information. Among the first year students of the Sports Faculty, only 1.8% got acquainted with handball in high school, and at the Faculty of Pedagogy only 0.7%, but without practicing it according to the school curriculum. The reasons were different: the lack of inventory, of gyms, but, most often, the teacher's initiative was missing. Therefore, we cannot talk about the acquisition of the university program at the handball course, nor about the performance.

2. Tasks

We decided that the acquisition of the course with some changes related to age, physical appearance, physiology, etc., should take place together with that of beginners in sports schools.

The contemporary concept of training beginner handball players has been reflected in a series of researches (Şufaru, 2004; Capaţina, & Verejan, 2012), but further research complements this heritage with another instructive diversity.

The pillar of diversity is made up of the annual macrocycle (of the first year of training) which, together with other components, highlights a multilateral training, which in the scheduled future would lead to a specialization in the team game position.

3. Research methods and Results

Exercises for *general physical training* (GPT) must include a complex of natural actions of the body: running, jumping, throwing, which in fact make up the elements of the game of handball.

The difficulty lies in the dosage and order of execution, which have already been brought to the attention of specialists (Budevici-Puiu, et al. 2012), but the problem remains to be solved with the duration and intensity of the stated component.

From our investigations we deduced that the locomotor system of novice handball players is intended to perform a wide range of exercises for GPT (Roman, & Biro, 2013).

Analyzing the constituent substances of the muscles subjected to the effort, it was determined that the energy required for muscle contraction results from the caloric value of the food ration, of the ratio between albumin, carbohydrates, proteins consumed. Starting from the caloric requirement according to sex and age, our contingent of 11-12 years needs 2500Kkal / day.

In children, who practiced handball at the age mentioned, applying the device "Polaris 3" was found telemetrically that energy consumption, resulting from macroenergic phosphates following the cleavage of ATP reached the threshold of 2600 Kkal, which produced early fatigue.

For these reasons, there was a need to adjust the intensity, which we calculated as optimal of 140 + 4.2 beats per minute, lowering it from 170-180 beats per minute. All data were recorded telemetry.

Thus, experimentally we found that the optimal PFG component should be around 1.5 months, immediately following the holiday.

We appreciated the content of the *coordination* activity from the definition of the process of formation of the motor stereotype, which in the given period is carried out initially from the account of static fixation of the organs, and then from the account of short differentiated impulses in determined muscle groups. In the final phases, the stereotype is outlined by the inertia appeared and directed towards solving the concrete situation.

In the final process of dynamic movements there is an automatic balancing of the inertia, without the intervention of additional impulses for correction. All the muscle aspects listed are coordinated by the cerebellum. Because the coordination capacities require a high intensity, they were programmed in the training plan after warm-up with a medium effort with a release of 2100-2250 Kkal and intensity of 160-170 b / min with a dosage of 7-10 minutes for 2 weeks in 2 out of 3 times 4 workouts per week (90 minutes).

Passing the ball is a means that unites players in a unique system of actions, which provides possibilities for rational transmission. Depending on the location of the partners, the forward, reciprocal and accompanying the passes are distinguished, which were easily appropriated by the disciples, according to the elaborated plan. The problem was the acquisition of the closed pass. Initially, a defender had to be overtaken in two forwards, then in three - two defenders, when the rival is between them. The solution came through repetitions that led to the improvement of the process, and the actions taken formed the substratum of group

actions. Passing the ball is not a tactic but a tactical option, which is actually an extension of the technique.

Only after 9 weeks I allowed the disciples exercises with the ball, the characteristics of the handball game itself.

In the next 50 days, the learning of six technical procedures was scheduled: possession of the ball, passing, dribbling, throwing at the goal, handling the ball and the screen.

The first technical procedure programmed for the experimental group was the possession of the ball, which starts with games for getting used to the ball (Roman, & Biro, 2013, p. 42-54), important being the place, dosage and methodical indications already published.

The handball player takes possession of the ball after: the partner's passing, interception, the opponent's inattention, etc., whose abilities are initially appreciated according to the indications of the body's latent reaction. Based on a reasoned system of specific means staggered in sports training, palpable results were obtained.

Dribbling is a complicated technical procedure, for which reasons it is recommended to start learning it by directing bigger balls (football, basketball), but not volleyball or others, because they are different in size or weight, while the first two are close in weight. The higher volume of the balls increases the probability of touching the playing surface of the palm and especially of the fingers with the surface of the ball more frequently and more correctly, which reduces the training time of the ball's *directing skill*, chiseling along this process. Initially it was proposed to drive on the spot, then to turn right (left), followed by rectilinear, oblique, left side (right). Then drive with the throwing hand (stronger) and the opposite hand weaker. We recommend directing two balls at the same time, including with different levels of height. When a satisfactory degree of directing technique is reached, we recommend debating exercises of the ball of the partner who drives a ball, or two at the same time and directing the ball over the obstacle (gym bench).

Throwing the ball. It is a technical process for finishing the technical training of novice handball players. The experiment showed us that the most productive way to learn and improve this process is to implement dynamic games in the training process. In this sense, we recommended the beginning of learning by implementing the game "The Hunter and the ducks", "Defending the Citadel", etc. (Guţu, Sava, & Leahu, 2012). It was more difficult to determine the location and dosage, but experimentally the time of 14-18 minutes was confirmed.

We started both the technique of throwing the ball and the passing on the spot, then after a step from the 4th hour of implementation for 10-12 minutes, and then after three steps, keeping the same interval of hours and time.

Handling the ball - a category of competitive exercises. Initially it was the overtaking of the passive rival, indicating the direction and method of overtaking, and then the active defender was included in the game, which prevents the actions

of the forward. According to the contemporary classification, we distinguish bypassing, learning by: step - stop, jump. The learning methodology starts from the first by imitation, followed by the others from the range of exercises already described.

The method of learning handling the ball through the stop-step is performed by arranging the cones [6] parallel (2-3 m) to the edge line at the same distances. The handball player, approaching the cone, imitates the trick, after which he throws at the goal, or passes the ball to his partner. Execution time is 15 minutes, intensity 50-60% of maximum effort, recovery time between repetitions is 15-20 seconds. Learning method: torrent and series [4].

The improvement of handling the ball is initially carried out by imitation with reciprocal actions within groups or teams.

The screen - the creation of the temporary numerical superiority of the attackers over the defense and its rapid realization to the attack actions. The action starts from any extreme by passing the ball to the corner player to the partners: right inter - center - left inter - left corner and its placement between defenders: right inter - right corner, after which the left corner passes the ball to the left inter and is placed to the right teammate, between the right corner and the left inter corner. If the defense does not react in any way, because both corner players are on the semicircle and by their movements distract the defense, then the left winger throws freely on the goal, if the opposing opponent in the defense takes a step, two forward, then his place is taken by one of the players corner placed here after the birds, receives the ball and throws it on the goal.

The learning methodology is difficult, for which reasons it is difficult to produce, but it is perfected during the subsequent years of training. These actions also use means such as "Passing and exit" crosses with 2 and 3 players. Initially the defenders are passive, then active. The actions occur in the second half of the training for 16-20 minutes.

The *reciprocal actions* are performed by passing the ball between the partners with realignments in a triangle, square or diagonal, as well as laterally left, right, forward, backward, oblique.

Initially, the actions are performed with a ball, then twice as many. In the mutual actions for beginners, it is recommended to perform simple crosses with the participation of two players, where the center observes the position of the pivot in front of the left integer, creating a position favorable to the integer, to throw from a distance. Then the midfielder starts firmly to the right, passes behind the center, from which he receives the ball at the right time and throws at the goal from the jump.

From the beginning, you learn only the simple crossing, in the same period, during the training and with the same dosage as in the case of the screen, but not at the same time.

At the end of the macrocycle, the novice handball players were tested (Table 1), and the clues convinced us of the timeliness of the scheduled content.

Table 1 *Indices obtained by junior handball players I at the end of the macrocycle (n = 14)*

No. crt.	Handball learning tests	Initial testing	Final testing	t	p
1	Running 30 m (sec)	5,4± 0,49	4,9±0,44	2,15	<0,05
2	Long jumps (cm) from the spot	180± 0,75	192± 0,71	2,12	<0,05
3	Pentasalt (m)	11,1±0,32	10,3±0,41	1,08	<0,05
4	Throwing the handball ball (m)	29±2,27	27± 2,39	3,03	<0,01
5	Dribbling cones (sec) distance 40 m, 13 cones	19,2±0,24	18,3± 0,13	0,85	<0,05

The *competition period,* which usually ends the annual training macrocycle of beginner handball players, is short, around 4-6 days, and takes place only in friendly matches, with their peers from other schools, with a shorter playing time. and with more simplified rules. If the competitions take place outside the time determined in the macrocycle, a sustained activity of physical training must be scheduled, in order to surpass the rivals in the physical component, because there is no time for technical training and learning new actions will produce a faulty game with psychic consequences for the disciples.

4. Conclusions

1. Highlighting the data obtained from the tests, the share of the main components in the training of novice handball players was established. Thus, 35% went to physical training, 50% to technical training and 15% to tactical training.
2. The motor skill abilities of the beginner handball players reached the following indices: strength - 21%; resistance -19%; speed -28%; skill -22%, suppleness -10%.
3. The technical and tactical training is performed in a volume of 69% of the total volume of the technical-tactical training, at the researched age.
4. The composed program and the obtained norms present the main authentic method, experimentally justified, for verifying the progress made by the junior handball players.

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STUDY ON THE OPINION OF SPECIALISTS RELATED TO THE ROLE OF ATTENTION CAPACITY AND CREATIVITY IN FOOTBALL GAME IN CHILDREN AGED 10-12 YEARS

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Abstract

This study focuses on the most efficient ways to improve the capacity for attention and creativity in the children aged 10-12 years during football games. Thus, a case study addressed to specialists (football coaches-teachers) was conducted. The research used the survey method based on a questionnaire elaborated in Google forms, including 12 questions and sent on-line. The sociological survey was attended by 16 specialists, aged 24-60, with different teacher ranks/ coach categories / UEFA license and seniority in this activity field. The survey results highlight: the greater weight of various training forms on the development of attention and creativity; the good and very good relationship between attention capacity and losing the position on the field; the speed of decision-making and the capacity for attention; information on the field and attention capacity; the adaptation of the training state by improving the functional parameters; assessment of attention and creativity by means of psychological tests; the use of video method during football games; the influence of the internal stress factors and the strengthening of the specific technical skills in terms of attention and creativity. These opinions and recommendations can help improving the attention and creativity of football players aged 10-12.

Key words: *video analysis, training forms, functional parameters, psychological tests*

1. Introduction

The football game is generally characterized by the joy of playing, the creativity, spontaneity and consumption of physical and mental energy, involving the total commitment of the athletes. The profile of the future football player requires a high level of intellectual skills development, also mental qualities such as creativity, anticipation and focusing (Vișan, Stoica & Dreve, 2022).

It is a game that always causes problems and the player must find solutions on his own, which often means to choose a tactical alternative or a technical option that has been successfully used in the past; for choosing the proper action, a certain level of intelligence is needed (Velea, 2022).

Actually, the sports literature highlights the essential role of focused attention, which plays a catalytic role in reaching sports performance (Grigore et al., 2015). Accumulating evidence indicates a positive influence of sport engagement and

physical activity on cognition, specifically complex attention and executive function in children. However, recent studies have reported that while football experience was associated with executive functions in footballers, age was more strongly associated with superior executive function performance in youth soccer players (Turner et al., 2022).

During a football match, for example, players perceive the environmental information and select an action, such as kicking the ball (convergent thinking). Their critical thinking will be reflected when analyzing their action and looking for improvements, such as in the adequacy of decision-making and in the ball kicking execution (Santos et al., 2016). When playing football, children develop their fundamental movement and core motor skills and, at the same time, they learn to be valuable football team members, how to show initiative, independence, perseverance and composure skills (Galan et al., 2021).

The purpose of the work is to find the most efficient ways to improve attention and creativity in the football game at the level of 10-12-year-old children.

2. Material and method

This scientific approach led to a study of case intended for the teachers of coaches of football. The research used the survey method on the basis of a questionnaire with 12 questions, made in Google forms and forwarded online.

A number of 16 teachers-coaches participated in this study, with an average of 39.5; ±10.72 years (range of age from 24 to 60); seniority in this activity: 14 years (2 – 27 years) and teacher rank / coach category.

The responses were calculated with the help of KyPlot program, concerning the descriptive indices: mean; standard deviation (±SD) and the range of values (minimum and maximum).

3. Results and Discussions

After applying the questionnaire, the results of the responses were automatically calculated through Google Forms platform and listed in table 1.

The following opinions were pointed out according to the analysis results of the responses to the questionnaire items:

- very high impact of the emotions, 37.5% on the attention capacity and the creativity in the football game played by children aged 10-12, and 43.7% on the stress;
- regarding the evaluation and development of the attention and creativity in football game, 25% of the responses highlighted that the football game would be suitable for evaluation while 31.25% consider it adequate for development (fig. 1);
- the greater share of the different training forms in the development of the attention and creativity of the 10-12 years old children is distributed as follows: 10% - physical training; 50% - technical training; 20% - tactical training; 20% - psychological training; 20% - theoretical training (fig. 2).

Table 1 *Results of the opinions of the specialists on the improvement of the attention*

capacity and creativity in the 10-12-year-old children during football games (n=16)

No.	Items (questions – content)	Response, scores (%)				
		1	2	3	4	5
1	What is the impact of emotions on the attention capacity and creativity in football game in the case of 10-12-year-old children?	0.0	0.0	12.5	50.0	37.5
2	What is the impact of stress on the attention capacity and creativity in football game in the case of 10-12-year-old children?	0.0	6.3	18.7	31.3	43.7
5	How do you assess the relationship between the loss of the position on the field and the attention capacity in the football game played by children aged 10-12?	0.0	0.0	37.5	43.75	18.75
6	How do you assess the relationship between the haste of decision-making and the attention capacity in the football game played by children aged 10-12?	0.0	6.3	37.5	18.7	37.5
7	How do you assess the relationship between information on the field and the attention capacity in football game in children aged 10-12?	0.0	12.5	18.7	31.3	37.5
9	To what extent do you consider that the evaluation of attention and creativity by means of psychological tests can serve as an indicator for monitoring the psychological training state in the football game of the children aged 10-12?	0.0	6.3	37.5	18.7	37.5
10	To what extent do you consider that the use of the video method during football games played by 10-12-year-old children can contribute to a more efficient analysis of the technical and tactical actions carried out in attack and defense?	6.3	6.3	31.2	31.2	25
12	What is the long-term impact of the improvement of attention and creativity on football performance of the children aged 10-12?	0.0	0.0	18.75	31.25	50

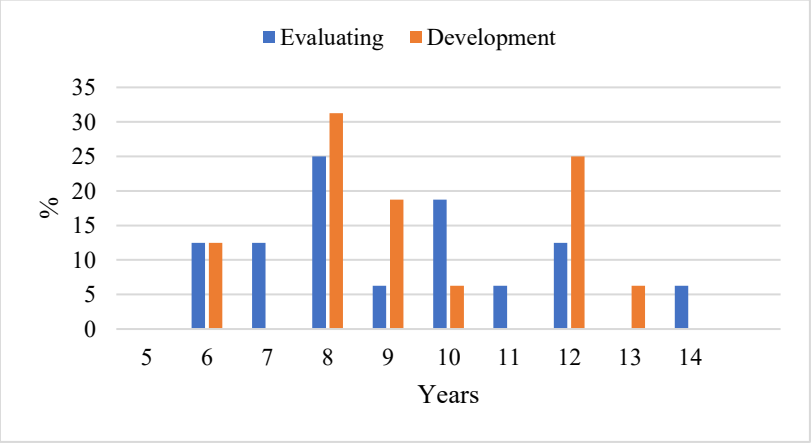


Figure 1. *Favorable period for evaluating the level and the development of attention and creativity in football game (Item 3)*

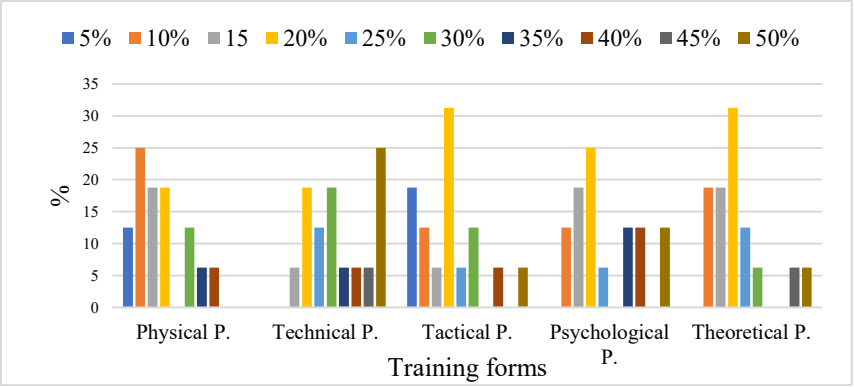


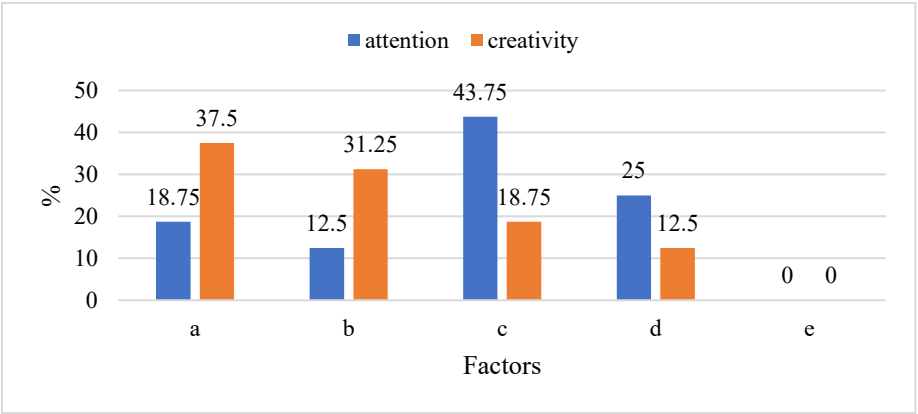
Figure 2. *Share of different training forms in the development of attention and creativity in the football game in children aged 10-12 (Item 4)*

- relationship between the loss of the position on the field and the attention capacity: good - 43.75% and very good- 18.75%. Very good relationship between the haste of decision-making and the attention capacity: 37.5%. Very good relationship between the information on the field and the attention capacity: 37.5%;

- 87.5% consider that the adaptation of the training state by improving the functional parameters will influence the level of attention capacity and creativity during the achievement of the technical and tactical actions of attack and defense;

- 37.5% believe that the assessment of attention and creativity using the psychological tests can serve as an indicator for monitoring the psychological training state in the football game played by the children aged 10-12;

- 25% have a very good opinion of using the video method in the football games played by 10-12-year-old children; this method can help to make a more efficient analysis of the technical and tactical actions in attack and defense.



Note. Factors: a) strengthening of the specific technical skills; b) offensive technical and tactical actions; c) internal stress factors; d) external stress factors (parents, teammates, coach); e) defensive positioning of players in difficult situations (of inferiority)

Figure 3. *Factors that influence the attention capacity and the creativity in football game in the children aged 10-12 (Item 11)*

- 43.75% - influence of the internal stress factors and 37.5% influence of the strengthening of the specific technical conditions on the attention capacity and creativity in the football game played by the children aged 10-12 (fig. 3).

The long-term impact of the attention and creativity qualities improvement in the 10-12-year-old children on the football performance is very big, of 50%. The ability to focus the attention throughout football games in the case of the children aged 8-10 was identified by highlighting two indices, namely their information processing speed index and the accuracy of their answers. In this sense, the Piéron test was used, which measures the level of development of the focused attention (Vișan, Stoica & Dreve, 2022).

In terms of planning and organization of the football training, a study was conducted in the Sports Clubs for Children and Youth under the Ministry of Public Education of the Republic of Uzbekistan. The age categories of the football players: 8 - 9, 10 - 11, 12 - 13, 16 - 17 years old (Choriyev, 2021). According to the results of the study it can be said that being a competitor in soccer young league has a positive effect on percentage of success in the reaction time and decision time in eye-hand coordination test (Aktop, Kuzu & Çetin, 2017). Regarding how decision-making and skills are developed in the elite football players, the training is based on dynamic systems and didactic games in order to make understand the approaches. The evolution of knowledge progresses from attack to defensive. Significant differences were found between the variables shown in attack and in defense (González-Víllora, García-López & Contreras-Jordán, 2015).

4. Conclusions

Following the sociological study on finding the most efficient ways to improve the attention capacity and creativity of the 10-12-year-old football players, the methodological recommendations listed below can be made:

- the greater share of the different training forms on the development of the attention and creativity: 10% - physical training; 50% - technical training; 20% - tactical training, psychological training and theoretical training;
- good and very good relationship between the loss of the position on the field and the attention capacity; between the haste of decision-making and the attention capacity; between the information on the field and the attention capacity;
- the adaptation of the training state by the improvement of the functional parameters will influence the attention capacity and creativity in carrying out the technical-tactical actions of attack and defense;
- the evaluation of attention and creativity with the help of the psychological tests can serve as indicator for monitoring the psychological training state. The use of the video method during the football games can contribute to a better analysis of the technical and tactical actions performed in attack and defense;
- the influence of the internal stress factors and of the strengthening of the specific technical skills on the attention capacity and the creativity of the 10-12-year-old football players.

In conclusion, it is possible to state that the opinions and recommendations of the specialists help to improve the attention capacity and creativity of the children aged 10-12 during football games.

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THE RELATIONSHIP BETWEEN SPATIO-TEMPORAL INDICATORS OF SPECIFIC AGILITY IN 12-13-YEAR-OLD FOOTBALL PLAYERS

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Abstract

This study is intended to highlight the relationship between the spatio-temporal indicators of agility in 12-13-year-old football players. The research was carried out within the Otopeni Municipal Sports Club, football department, with a group of 26 children, aged 12-13. Research methods used: method of bibliographic study; method of pedagogical observation; method of tests; case study method; statistical-mathematical method and graphical representation method. The Witty SEM intelligent traffic lights system was used to measure the segmental agility of the research subjects. To show the differences in segmental coordination, 4 traffic lights were placed like a 3x3 m square with 10 pulses to visual stimulus and a 3-second delay; the segmental response was unilateral or ambidextrous. Between the pulses, the kicking task was also used. Measured indicators: total time (sec) and reaction time at each Lap L1-10 (sec). The results of the spatio –temporal indicators of agility in the 12-13-year old football players highlight: total time values, minimum and maximum values of the individual responses to visual stimulus and interval size. The correlation analysis between total time and individual reaction time reveals 40% strong connections at $p<0.001$, 20% at $p<0.01$ and 20% at $p<0.05$, which confirms the influence of each response to the total testing time and on their performance.

Key words: *visual stimulus, segmental response, segmental coordination, correlation analysis, performance*

1. Introduction

A healthy lifestyle of children and adolescents includes exercising. Special care must be taken during intense physical training to not affect the proper physical development of young athletes (Barczyk-Pawelec, Rubajczyk, Stefańska, Pawik & Dziubek, 2022). Football is a sport based on speed and power, agility, ability to deal with repeated high-intensity efforts and a proper level of perceptual and cognitive skills (Oliva-Lozano et al., 2020; Sánchez et al., 2020).

A special requirement of football is the development of physical qualities and psychophysiological functions as well. Mental chronometry is studied by measuring the reaction time, which is the time elapsed between the occurrence of a sensory stimulus and the subsequent behavioural response (Lyzohub et al., 2016).

The impact of the stretching procedures on the athletic performance was carefully studied, demonstrating the effects of dynamic and ballistic stretching on

sprint performance, on power and velocity in vertical jumping and on football agility (Amiri-Khorasani et al., 2011; Little & Williams, 2006).

The purpose of the study is to highlight the relationship of the spatio-temporal indicators of agility in the football players aged 12-13 years.

2. Material and method

With this aim, ascertaining research was carried out in the Otopeni Municipal Sports Club, section of football, with a group of 26 children aged 12-13 years. Anthropometric data: weight of 41.14 kg and height of 151.5 cm.

There were used the following methods of research: method of bibliographic study; method of pedagogical observation; method of tests; case study method; statistical-mathematical method and graphical representation method.

The segmental agility of the subjects was measured by means of Witty SEM system with smart traffic lights. In order to show the differences in segmental coordination, 4 traffic lights were placed like a 3x3 m square with 10 pulses to visual stimulus and a 3-second delay; the segmental response was unilateral or ambidextrous. Between the pulses, the ball kicking task was also used. The following indicators were measured: total time(sec) and reaction time at each Lap L1-10 (sec).

Figure 1. *Assessment of agility in 12-13-year-old football players*

Calculated statistical indices: mean, ±SD – standard deviation, min – minimum (sec), max – maximum (sec), Δ max-min – size of the interval (sec).

3. Results and Discussions

To determine the agility in 12-13-year-old football players, the total time and reaction time were measured for each visual stimulus, calculating the minimum and maximum values, the size of the interval, mean, SD and CV (%).

Table 1. *Results of agility indices in 12-13-year-old football players*, n=26

Indices	Min	Max	Δ max-min	mean	SD	CV(%)
Time (sec)	44.501	53.085	8.584	48.158	2.618	5.436
Lap L1 (sec)	4.186	6.179	1.993	4.839	0.490	10.129
Lap L2 (sec)	4.204	5.568	1.364	4.833	0.394	8.153
Lap L3 (sec)	3.917	5.433	1.516	4.685	0.377	8.054
Lap L4 (sec)	4.068	5.974	1.906	4.818	0.525	10.886
Lap L5 (sec)	3.956	6.048	2.092	4.806	0.532	11.066
Lap L6 (sec)	4.38	5.999	1.619	4.930	0.457	9.266
Lap L7 (sec)	4.092	5.51	1.418	4.745	0.346	7.293
Lap L8 (sec)	3.994	6.123	2.129	4.810	0.486	10.097
Lap L9 (sec)	3.962	5.914	1.953	4.812	0.531	11.024
Lap L10 (sec)	4.094	7.398	3.304	4.880	0.688	14.092

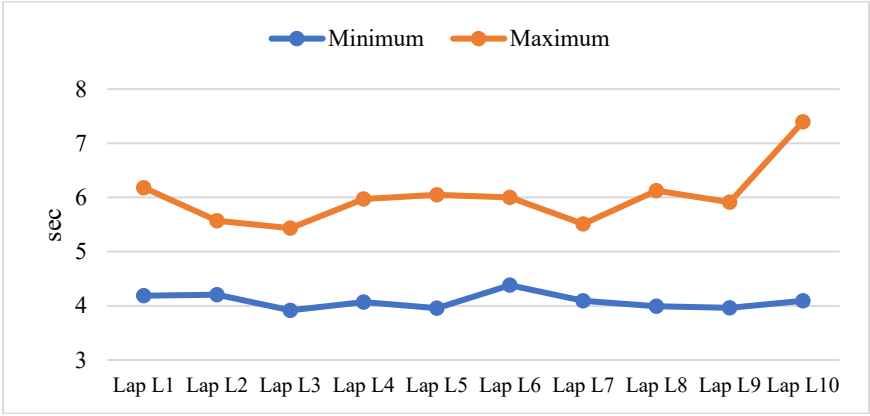

Fig. 1. *Results of the minimum and maximum average values of the agility in 12-13-year-old football players*

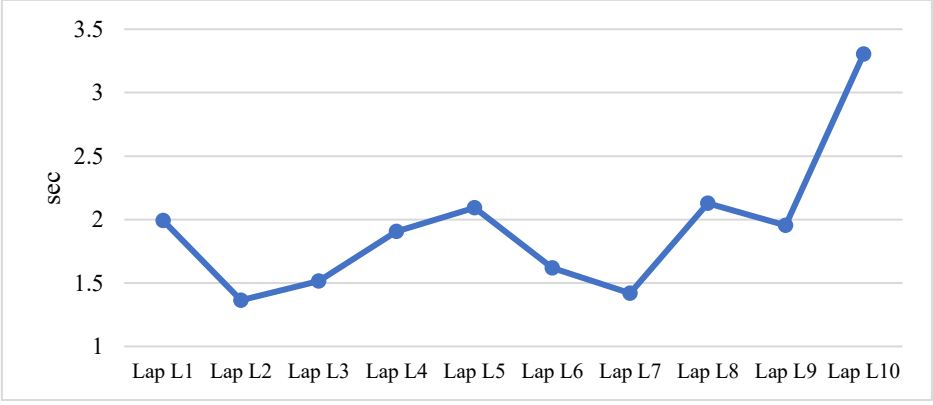

Fig. 2. *Size of the interval of maximum and minimum values of the agility in 12-13-year-old football players*

Table 1 and figures 1 and 2 present the results of the total time of 48.158±2.618 sec, with 8.584 sec the size of the interval between the maximum and minimum values and a high homogeneity. The minimum values of the individual responses to the visual stimulus can be noticed at Lap L3, L5, L8 and L9, while the maximum values are observed at Lap L2, L5, L8 and L10. Regarding the size of the interval, higher values are observed at lap L5, L8 and L10. These larger differences are due to the distance between the traffic lights and the athlete, the position of the body related to the traffic light and the attention capacity of the athlete at the given moment.

Table 2. *Results of the correlation analysis between the total time and the individual reaction time in 12-13-year-old football players*, n=26

R, Pearsons	Time (sec)
Lap L1 (sec)	0.272
Lap L2 (sec)	0.302
Lap L3 (sec)	0.589**
Lap L4 (sec)	0.675***
Lap L5 (sec)	0.453*
Lap L6 (sec)	0.52**
Lap L7 (sec)	0.658***
Lap L8 (sec)	0.691***
Lap L9 (sec)	0.778***
Lap L10 (sec)	0.485*

Notes. * $p<0.05$; ** $p<0.01$ and *** $p<0.001$.

The results of the correlation analysis between the total time and the individual reaction time in the football players aged 12-13 highlight strong connections 40% at $p<0.001$, 20% at $p<0.01$ and 20% at $p<0.05$ (table 2). These significant correlations confirm the influence of each response on total test time and performance.

Development of skills in young football players depends on the constant improvement in various important sensorimotor cognitive abilities. Thus, future research on identification and selection of talented children should adopt a multidimensional approach (Bloomfield et al., 2007; Ljac et al., 2012).

Unlike other fitness tests, the Functional Movement Screen (FMS) test focuses on assessing and measuring the asymmetry of the body through the study of basic movement patterns. This test helps to identify the source of movement problems, detecting the inadequate levels of movement efficiency (Łyp et al., 2022).

Some specialists showed that the soccer instep kick is an open-chain movement consisting of a series of stretch-shortening-cycle muscle actions involving the hip and the knee joint (Andersen & Dörge, 2011). It is a basic element in both soccer and futsal games (Castagna et al., 2009; Naser & Ajmol, 2016) that require speed and accuracy as well. It was also investigated the important effect of static,

dynamic and ballistic stretching exercises on global coordination and accuracy in soccer instep kicks in different psychological stress conditions (Frikha et al., 2017). It was noticed that the changes in psycho-physiological indicators along 3 months of football training were more obvious in the age group of 12–13 years than in the group aged 15–16 years due to the fact that psycho-physiological functions change faster at the age of 12-13 than at an older age (Lyzohub et al., 2016). It can also be explained by the training process type: generally, more exercises meant to develop the psychophysiological functions (such as games, competitions, exercises for agility and speed) are used to train the football players aged 12–13 years (Kozina et al., 2019).

In order to predict the playing status in junior Australian Football (AF) and to identify potential talents, the athletes undergo eight tests, namely: 20 m sprint test; agility test; stationary vertical jump; dynamic vertical jump on dominant leg; dynamic vertical jump on non-dominant leg; 20 m multistage fitness test (MSFT); standing height and body mass (Woods et al., 2015).

The Australian Football League (AFL) use the AFL Draft Combine (a gathering of prospective talent) as an opportunity to conduct standardised testing of the athletes and to predict subsequent career success (Burgess, Naughton & Hopkins, 2012).

Specialists highlighted that the ideal age to learn motor skills is from 10 to 11-12 years in the case of girls and between 10-13 years for boys. Mainly the sprint, aerobic endurance and agility develop at this age (Başkaya, Ünveren & Karavelioğlu, 2023).

4. Conclusions

The results of the spatio –temporal indicators of agility in football players aged 12-13 years show the values of the total time, the minimum and maximum values of the individual responses to visual stimulus and the interval size. The larger differences can be explained by the distance between the traffic light and the athlete, the position of the body related to the traffic light, the segmental coordination and the attention of the athlete at the given moment.

The correlation analysis between the total time and the time of the individual reactions in the 12-13-year-old football players shows 40% strong connections at $p<0.001$, 20% at $p<0.01$ and 20% at $p<0.05$. Therefore, the influence of each response to the total time of testing and on the performance is confirmed.

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STUDY ON THE IMPORTANCE OF USING BIOMECHANICAL CRITERIA IN THE TECHNICAL TRAINING OF JUNIOR FENCERS

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Abstract

The study is meant to find the most effective indicators of technical training improvement of the performance fencers based on biomechanical criteria. A case study was conducted for this purpose, involving teachers and coaches of fencing. The research was based on the survey method, using Google forms questionnaire, consisting of 12 questions and sent on-line. The sociological survey was attended by 10 specialists. The results of the survey highlight: the weight of training factors in different periods of performance fencing preparation; duration of the fencing training sessions; number of training sessions per week carried out in different training periods; structure and weight of fencing training in terms of general physical training, special physical training, technical-tactical training, relationship between work with the coach, work with a partner and free assault; approach of individual lesson model in different periods of personalized training determined by the physical and technical training of the athlete and the pattern of the coach; importance of the biomechanical parameters in the movement phasic structure during the simple and compound actions execution (valid touch); importance of the biomechanical criteria in the technical training of the performance fencers. The opinions of the specialists can contribute to the improvement of the fencing actions by ameliorating the indicators based on biomechanical criteria. The development of algorithmic diagrams can lead to a better technical training of the performance fencers.

Key words: *training factors, individual lesson, movement phasic structure, biomechanical parameters, performance athletes*

1. Introduction

Fencing is a well-recognized Olympic sport, with over 150 member federations, but it still has less known elements to be explored by sport science. Fencing is one of the finest individual sports, both competitive and recreational, that imposes high physiological demands in terms of neuromuscular coordination, strength, power and impact on the musculoskeletal system, because of its unique asymmetry in movement (Ackland, Elliott & Bloomfield, 2009; Turner, 2016; Chen et al., 2017; Watanabe et al., 2022).

The physical demands of fencing competitions are high, involving the aerobic and anaerobic metabolisms. The anthropometrical characteristics of fencers show a typical asymmetry of the limbs specific to this sport that requires a high level of special function, strength and control (Roi & Bianchedi, 2008; Ntai et al., 2021).

Learning and development of motor skills and techniques in fencing are based on perceptual processes involving the senses of vision, hearing and touch. The same stimuli can generate defensive or offensive actions related to strategy and tactics (Borysiuk & Waskiewicz, 2008).

Fencing is one of the most complex sports, thus a professional expert is necessary for teaching its methods. The teacher is a mentor and observer who ensures a real-time feed-back regarding the body and speed performance of the fencer, sometimes using a high-frame rate video recording for making more accurate analyses (Mawgoud, Abu-Talleb & Eltabey, 2016).

The improvement of the technical and tactical training of women epee fencers can contribute to the increase of effective training and competitive activity results of the fencers in the specialized basic training stage (Barth & Beck, 2007; Semeryak et al., 2013).

The development of modern fencing entails high demands on the training level of fencers. Because it is impossible to increase the training sessions, it is necessary to improve the process of preparing fencers with the latest means (such as the technical devices) that had not been used during training (Briskin et al., 2014).

The purpose of the study is to find the most efficient indicators for increasing the technical training level in the performance fencers by means of biomechanical criteria.

2. Material and method

This scientific approach entailed the organization of a case study intended for the specialists (fencing teachers-coaches). The study was made on the basis of a questionnaire in Google forms online, formed of 12 questions.

A number of 10 teachers-coaches participated in the study, with ages ranging as follows: 50% aged from 25 to 30 years; 30% between 45-50 years; 10% from 35 to 40 years and 10% - over 50 years; teacher ranks (full time professional degree, rank 1), coach category (the 1st and the 3rd) and coach of the European Women's Foil team.

Items (questions – content):

- How do you rate the weight of the training factors in performance fencing?
- What is the duration of the fencing training sessions in different periods of preparation?
- How many training sessions per week do you carry out in different training sessions?
- In your opinion, what is the structure and weight in the fencing training in different periods of training?
- How much weight do you think you should allocate to the technical-tactical component within the training lesson in different training periods?
- How do you approach the individual lesson model with your athletes in different periods of training?

- Do you identify – on a scale from 1 to 5 - the weight of the importance of the biomechanical characteristic's parameters in the execution of the basic technical – tactical actions?
- Which are the most important biomechanical parameters within the movement phasic structure for the efficiency of simple actions execution (valid touch)?
- Which are the most important biomechanical parameters within the movement phasic structure for the efficiency of compound actions execution (valid touch)?
- Which of the biomechanical criteria do you consider to be important in the technical training of performance fencers?

The analysis of responses was automatically calculated and centralized using Microsoft Office Excel.

3. Results and Discussions

The results of the questionnaire responses were calculated by means of Google Forms platform.

The following opinions are highlighted by the responses to the questionnaire items:

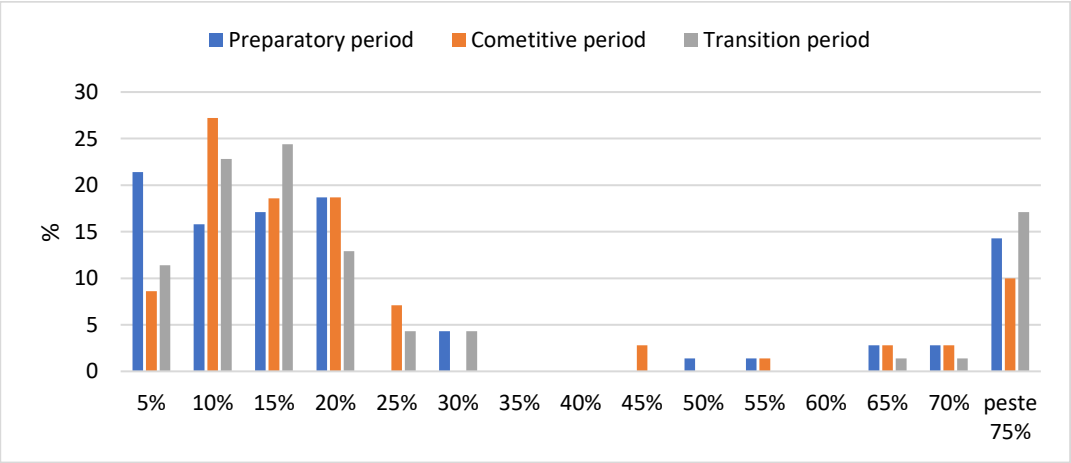

Figure 1. *Weight of the training factors in performance fencing*

Note. General physical training (PFG); Special physical training (PFS); Technical training (PTh); Tactical training (PTa); Technical-tactical training (Th-Ta); Psychological training (PPsih); Theoretical training (PTeor)

- weight of the training factors (general physical training –PFG, special physical training –PFS, technical training - PTh, tactical training –PTa, technical-tactical training– Th-Ta, psychological training – PPsih, theoretical training – PTeor) in performance fencing, in various training periods. According to the answers of the specialists: 77.20% have higher values, from 5 to 30% in the preparatory period and 80% in the competitive and transition period (figure 1);
- in terms of duration of the fencing training sessions in different training

periods, 60% of the specialists consider that it is 120 min in the preparatory period; 40% think that the duration is 100 min in the competitive and transition periods;

- number of training sessions per week conducted in different training periods: according to the opinion of 50% of the specialists, there are 12 training sessions / week in the preparatory period and 6 training sessions / week in the competitive period. 30% of the specialists consider that there are 3 / 6 / 9 training sessions / week;
- as for the structure and weight in the fencing training in different periods of training, the following values were found out: 40% PFG, 20% PFS and over 50% PTh-Ta; in relation to PFG and PFS, 30% - work with the coach and with a partner and 15% - free assault; in the competitive period 5% PFG, 10% PFS and over 50% PTh-Ta; in relation to PFG and PFS, 30% - work with the coach and with a partner and more than 50% - free assault; in the transition period - 20% PFG, 30% PFS and over 50% PTh-Ta; in relation to PFG and PFS, 30% - work with the coach, over 50% work with a partner and 20% - free assault (figure 2);

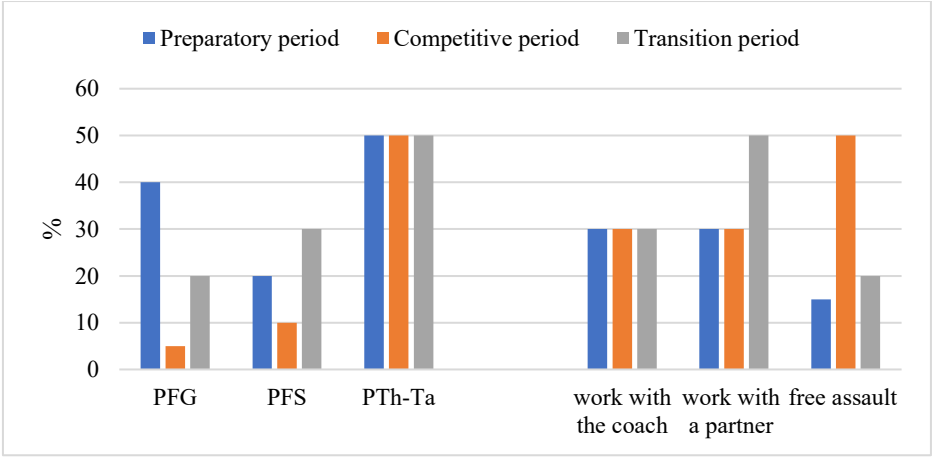

Figure 2. *Structure and weight in fencing training throughout different periods of training*

- the weight of the technical-tactical component within the training lesson in different periods of training as regards the work with the coach is 40% in the preparatory period, 35% competitive period and 25% in the transition period; work with a partner - over 50% in the preparatory, competitive and transition period; free assault - over 50% in the preparatory and competitive period and 20% in the transition period (figure 3);

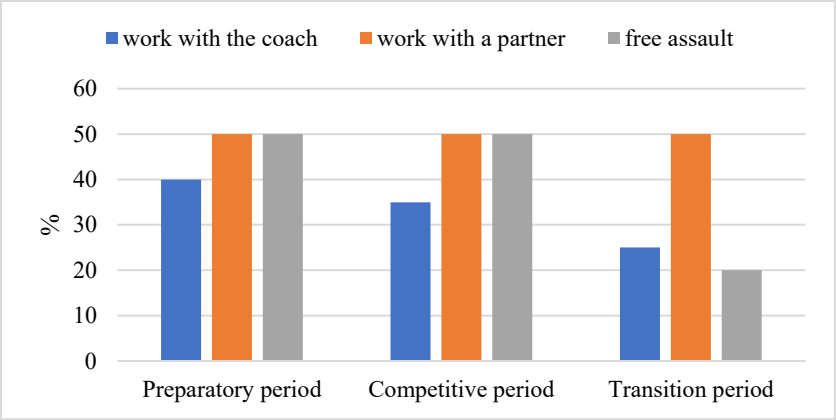

Figure 3. *Weight of the technical- tactical component within the training lesson in different periods of training*

- according to the opinion of the specialists, the approach of the individual lesson model is 10% personalized depending on the level of technical and physical training of the athlete in all preparation periods; 10% personalized depending on the level of technical training and the model imposed by the coach in the competitive period; a higher weight is personalized in conformity with the technical training level by 50% in the preparatory period and 70% in the competitive period and 40% in the transition period by the model of the coach;

- as for the identification of the biomechanical characteristics parameters in the execution of the basic technical-tactical actions, the opinion of the specialists is very good - 90% - at the trajectory of the hit and the trajectory of movement of the center of gravity (hip)- CGG in simple actions (attack and defense); 80% at the speed of execution of the hit and the speed of movement (CGG) in simple actions (attack and defense) and 80% at the explosive force: hit, lunge (front and back foot) in the simple actions (attack and defense);

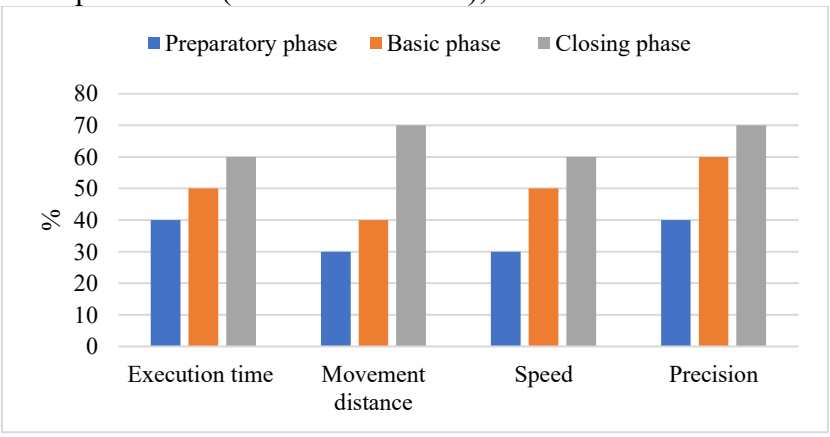

Figure 4. *Importance of the biomechanical parameters in the phasic structure of the movement for the efficiency of the simple actions' execution*

- regarding the importance of the biomechanical parameters in movement phasic structure for the efficiency of the simple actions execution (valid touch): execution time - moderate and good opinion 40% in the preparatory phase, good 50% in the basic phase and very good 60% in the closing phase; movement distance – very good opinion 30% in the preparatory phase, 40% - basic phase and 70% - closing phase; speed (execution and movement) very good opinion 30% in the preparatory phase, 50% - basic phase and 60% closing phase; movement precision is good 40% in the preparatory phase, very good 60% in the basic phase and 70% - closing phase (figure 4);

- the importance of the biomechanical parameters within the movement phasic structure in the efficiency of the compound actions execution (valid touch) is highlighted by the following values: for the execution time there is a weight higher than 50% closing-preparatory phase 2 and 80% closing phase; movement distance – all phases are important in the proportion of 50% and 80% - closing phase; speed (execution and movement) is more important 60% in the closing - preparatory phase 2 and 80% - closing phase (valid hit); movement accuracy 40% in preparatory phase, very good 50% in basic phase 1 and 2 and 70% - closing phase (figure 5);

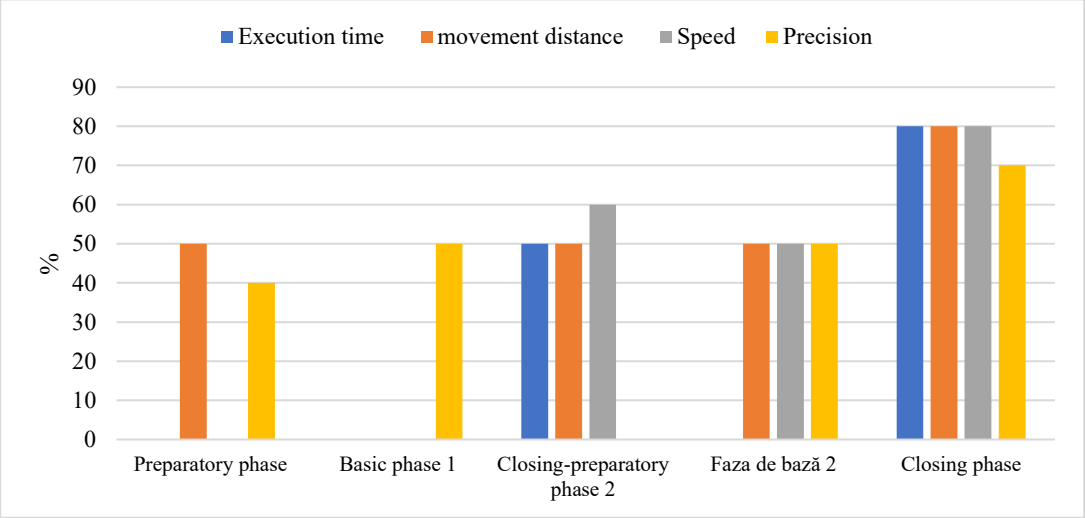

Figure 5. *Importance of the biomechanical parameters within the movement phasic structure in the efficiency of the compound actions execution*

- importance of the biomechanical criteria in the technical training of performance fencers regarding the spatial characteristics: 40% movement, 50% trajectory and 70% distance; temporal characteristics – 40% time, 60% tempo and 70% rhythm; spatio-temporal characteristics – 70% speed and 60% acceleration and force characteristics – 60% total force and resultant.

The study of the biomechanics of fencing is necessary for athlete development and injury prevention. In comparison with novice fencers, the performance fencers

have a sequential coordination of upper and lower limb movements with coherent patterns of muscle activation, with higher magnitudes of forward linear velocity of the body center of mass and weapon. Training should focus on explosive power (Chen et al., 2017). Another study tried to identify potential factors that may influence specific fencing offensive kinetic patterns in a large group of well-trained fencers; significant correlations were observed between lunge and step lunge velocity and long jump (LJ), countermovement jump (CMJ), drop jump (DJ), and reaction strength index (RSI). Different leg power abilities could be decisive factors in training programs (Ntai et al., 2021).

An investigation based on extensive studies of fencers in the introductory and specialist training stages showed that currently the psycho-motor factors have more impact on the sport mastery than the somatic and psycho-physiological factors. In the opinion of the leading fencing coaches, reaction time should be treated as a significant factor of effectiveness in learning complex motor habits, given that the reaction time to choose and the spatial anticipation are considered to be the major predictors of talent in fencing (Zbigniew & Nawarecki, 2008).

4. Conclusions

The following conclusions were drawn from the sociological survey.

The weight of the training factors in performance fencing is higher in juniors, from 5 to 30%, in different periods of training.

The duration of the training sessions ranges from 120 min in the preparatory period to 100 min in the competitive and transition periods.

Different values were highlighted in the structure and weight of the fencing training in different periods of preparation, regarding the general physical training, special physical training and technical-tactical training (work with the coach, work with a partner and free assault).

The personalized individual lesson model must be approached in conformity with the physical and technical training of the athlete and the pattern imposed by the coach in different training periods.

There were identified the biomechanical characteristics parameters related to the execution of the technical-tactical actions and their importance for the movement phasic structure and the efficiency of the simple and compound actions (valid touch) in terms of execution time, movement distance, speed (execution and movement) and movement precision.

All these opinions of the specialists can contribute to a better execution of the fencing actions by improving the indicators based on biomechanical criteria. The development of some algorithmic schemes for perfecting the fencing actions can lead to the improvement of the technical training of performance fencers.

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INFLUENCE OF RUNNING SPEED ON THE SPECIFIC JUMPS INDICES IN 6-9-YEAR-OLD FEMALE GYMNASTS

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Abstract

The paper highlights the influence of the sprint running indices on the specific jumps in the 6-9-year-old female gymnasts. For this purpose, an ascertaining study was conducted within the CSM Arad, women's artistic gymnastic department, with a group of 24 gymnasts aged 6 to 9 years. The jumps were tested by means of Opto Jump Next measurement system. There were used 3 tests (T): T1 - 20 m sprint running, measured indices: time (sec) and movement speed (m/s); T2 – the countermovement jump (CMJ), 3 jumps from standing position (R1-3), measuring the flight duration (s) and height (cm); T3 - Drop Jump: a jump from the bench (30 cm high) was performed with the following indicators: contact time (s), flight time (s), height (cm), power used (W/kg), pace (jump /s) and reactive strength index (RSI) (m/s). The results of the comparative analysis between the age groups show higher differences or better performances of the indices / parameters of the tests given to 8-9 years old group. All these differences in spatio-temporal characteristics are due to the training experience and training level. The correlation analysis between the indices of the tested jumps reveals 24 correlations at the age of 6-7 years: 33.3%. 66.7% at the age of 8-9 are significant at $p<0.01$ and $p<0.05$. The analysis of the relationship between the indices of sprint running and specific jumps in the 6-9-year-old gymnasts highlights strong and moderate connections, which shows both a positive and negative influence on the specific jumps in artistic gymnastics.

Key words: *correlation analysis, tests, indices / parameters measured, spatio-temporal characteristics, performances*

1. Introduction

Postural control underlies and restricts the performance of the fundamental movement skills (FMS). Self-perceived physical competence has been shown to be positively correlated with motor skills and engagement in physical activity. It has been suggested that children go through a critical period of perceptive motor development from 6 to 8 years old approximately. Gymnastics practicing at this critical stage could provide children with postural control and improved prospects for developing the FMS (Anderson, 2019).

Gymnastics as a sport, by the nature of the motor activity, is difficult to coordinate and requires athletes to demonstrate a wide range of motor skills and abilities. Technical training in gymnastics is associated with the need to master a large arsenal of motor actions in a relatively short time. There is still no scientifically based methodology of special motor training of the female gymnasts

for this type of sports activity. But separate recommendations have been empirically developed in addition to the methods and techniques for the development of physical qualities (Mamasoliyevich, 2023).

The research carried out by Yu. K. Gaverdovski (2005) in association with A.M. Shlemin (1997) and V.M. Smolevski (1999) reveals that the development of the physical skills in preschoolers and scholars who practice competitive gymnastics are connected with a number of particularities related to the growth and development of the body (Eshtaev, 2007; Umarov & Eshtaev, 2009).

This paper is meant to determine the relationship between the indices of the sprint running and specific jumps in the 6-9-year-old gymnasts.

2. Material and method

Hypotheses of the research: the comparative and correlational analysis between the age categories and the indices of the sprint running and specific jumps in the gymnasts aged 6-9 years will determine the level of the relationship and connection between them.

Procedures and methods of research: an ascertaining experiment was organized in the CSM Arad, women's artistic gymnastics department, in December 2022.

The subjects of the research were 24 gymnasts aged 6-9 years, divided into two age categories: a) 6-7 years (mean±SD, age of 6.40±0.52 years; height of 116.5±6.48 cm and weight of 21.2±2.96 kg); b) 8-9 years (8.07±0.72 years, height of 130.8±5.23 cm and weight of 28.7±4.34 kg). In conformity with the Declaration of Helsinki and the Ethics Committee of the Doctoral School of Sport Science and Physical Education within the University of Pitești, the club management, the coaches and the parents of the children too were informed about and gave their written and verbal consent regarding the acceptance of the voluntary participation in this research.

Research methods used: method of bibliographic study, method of tests, method of experiment (ascertaining, with a single investigation), statistical-mathematical method, tabular and graphical data presentation method.

The test method used the Wetty kit (wireless timer, photocells and reflectors, measuring the time and movement speed) and the Opto Jump Next measurement system for determining the maximum power (explosive force) of lower limbs, the coordination and height of the jumps.

Tests used (T): T1 - 20 m sprint running; measured parameters: time, (sec) and movement speed, (m/s); T2 - countermovement jump (CMJ), 3 jumps from standing position (R1-3), measuring the flight time (s) and height (cm); T3 - Drop Jump: a jump was executed from the gymnastics bench (height: 30 cm) with the following indices: contact time (s), flight time (s), height (cm), power used (W/kg), pace (jump /s) and the reactive strength index (RSI) (m/s).

The statistical analysis was done using the KyPlot program. The basic descriptive indices were calculated: mean, standard deviation, coefficient of

variation (CV%). The Pearson linear correlation coefficient was used to analyse the relationship between the sprint running and specific jumps indices; the significant data were compared at $p<0.05$.

3. Results and Discussions

The research results were centralized and graphically represented as follows: table no. 1 – sprint running; table no. 2 - the CMJ test; table no. 3 - Drop jump test; figures 1 and 2 – correlation analysis between the indices of running speed and of specific jumps tests.

Table no. 1 - *20 m sprint running in the 6-9-year-old gymnasts*

Efficiency	6-7 years, n=10			8-9 years, n=14		
	mean	±SD	Cv%	mean	±SD	Cv%
Time, (sec)	3.74	0.37	9.96	3.11	0.19	6.19
Speed, (m/s)	4.05	0.39	9.82	4.84	0.29	6.09

The comparative analysis of the 20 m sprint running test parameters in the 6-9-year-old gymnasts, presented in table no. 1, highlights a mean of 3.74 sec of the movement time at the age of 6-7 years, lower by 0.63 sec than the one at the age of 8-9 years, with a value of 3.11 sec. The movement speed has a mean of 4.05 m/s at the age of 6-7 years, higher by 0.79 m/s than at the age of 8-9 years, with a value of 4.84 m/s (table no.1).

Table no. 2 - *Results of the parameters of the CMJ test in the 6-9-year-old gymnasts*

Execution	Parameters	6-7 years, n=10			8-9 years, n=14		
		mean	±SD	Cv%	mean	±SD	Cv%
1	TFlight (sec)	0.345	0.03	8.89	0.411	0.04	10.90
	Height (cm)	14.67	2.53	17.26	20.91	4.36	20.86
2	TFlight (sec)	0.344	0.03	8.38	0.405	0.04	10.52
	Height (cm)	14.59	2.33	15.98	20.29	4.18	20.6
3	TFlight (sec)	0.344	0.03	8.94	0.409	0.04	10.93
	Height (cm)	14.51	2.42	16.66	20.73	4.25	20.51

The comparative analysis of the parameters of the CMJ test in the gymnasts of 6-9 years old, shown in table no. 2, reveals the following values: repetition no. (**R1**) – the flight time (TFlight) has a mean of 0.345 sec at the age of 6-7 years, smaller by 0.066 sec than at the age of 8-9 years, with a value of 0.411 sec; the flight height (Height) has a mean of 14.67 cm at the age of 6-7 years, by 6.24 cm lower than at the age of 8-9 years, with a value of 20.91 cm; at **R2,** the flight time has a mean of 0.344 sec at the age of 6-7 years, by 0.061 sec lower than at the age of 8-9 years, with a value of 0.405 sec. The flight height has a mean of 14.59 cm in the gymnasts of 6-7 years old, lower by 5.7 cm than the flight height at 8-9 years old, with a value of 20.29 cm; during **R3,** the flight time has a mean of 0.344 sec at

the age of 6-7 years, lower by 0.065 sec than at the age of 8-9 years, having a value of 0.409 sec; the flight height has a mean of 14.51 cm at the age of 6-7 years, by 6.22 cm lower than at the age of 8-9 years, with a value of 20.73 cm.

Table no. 3 – *Results of the indices at Drop Jump test in the 6-9-year-old gymnasts*

Indices	6-7 years, n=10			8-9 years, n=14		
	mean	±SD	Cv%	mean	±SD	Cv%
TCont. (sec)	0.367	0.31	85.02	0.249	0.05	21.42
TFlight (sec)	0.314	0.04	11.32	0.409	0.05	11.27
Height (cm)	12.24	2.81	23.01	20.83	4.59	22.03
Power (W/kg)	16.65	6.01	36.09	27.18	7.09	26.09
Pace (step/s)	1.621	0.39	24.27	1.528	0.14	9.28
RSI (m/s)	0.465	0.27	57.84	0.884	0.31	35.59

The comparative analysis of the parameters in the CMJ test for the gymnasts aged 6-9 years, presented in the table no. 3 highlights: the contact time (s) has a mean of 0.367 sec in the age group of 6-7 years, lower by 0.118 sec than at the age of 8-9 years, with a value of 0.249 sec; the flight time (s) has a mean of 0.314 sec at the age of 6-7 years, higher by 0.095 sec than at the age of 8-9 years; the height of the flight (cm) has a mean of 12.24 cm at the age group of 6-7 years, smaller by 8.59 cm than in the age group of 8-9 years, with a value of 20.83 cm; the power used has a mean of 16.65 w/kg at the age of 6-7 years, lower by 10.53 w/kg than at the age of 8-9 years, with a value of 27.18 w/kg; the pace (step/s) has a mean of 1.621 step/s at the age of 6-7 years, higher by 0.093 step/s than at the age of 8-9 years, having the value of 1.528 step/s. The reactive strength index (RSI) has a mean of 0.465 /s at the age of 6-7 years, lower by 0.419 m/s than at the age of 8-9 years. Analyzing all the indicators tested, it can be noticed that only in the flight time of the jump the values have good homogeneity in the age groups, which confirms the influence of the maximum power applied on the flight of the jump.

All these differences of the performances of the tested indices are due to the training experience and to the preparation level.

Figure 1 presents the results of the correlation analysis between the 20 m sprint running indices and the specific jumps indices in the gymnasts aged 6-7 years. S-au calculate A number of 24 correlations were calculated, where 33.3% are significant, namely: time and speed of movement with TFlight and Height in R2 ($p<0.01$) and R3 ($p<0.05$), while 66,7% are insignificant at $p>0.05$.

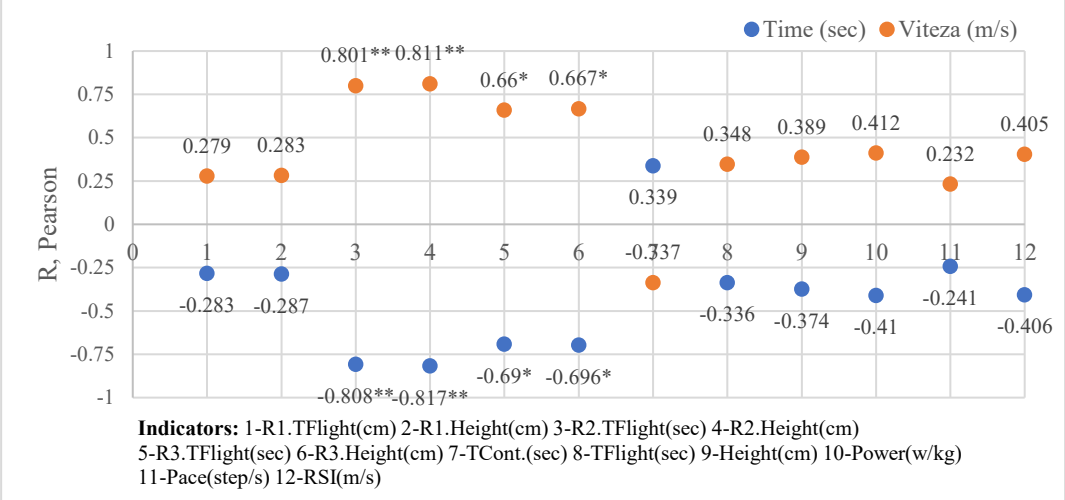

Figure 1. *Correlation analysis between the indices of 20 m sprint running and specific jumps in the 6-7-year-old gymnasts*

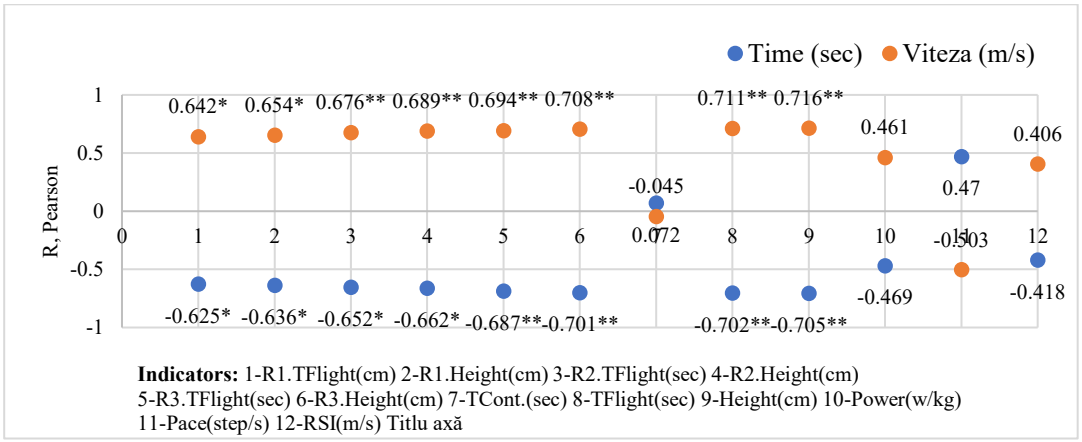

Figure 2. *Correlation analysis between the indices of 20 m sprint running and specific jumps in the 8-9-year-old gymnasts*

Figure 2 shows the results of the correlation analysis between the 20 m sprint running indices and the specific jumps indices in the 8-9-year-old gymnasts. 24 correlations were calculated, where 66.7% are significant ones, namely: movement time that has 16.65% at $p<0.01$ and 16.65% at $p<0.05$; the movement speed has 50% at $p<0.01$ and 16.67% at $p<0.05$, while 33.3% are insignificant at $p>0.05$.

4. Conclusions

The analysis of the relationship between the indices of the sprint running and specific jumps in the 6-9-year-old gymnasts highlight a level of strong and moderate connections, which show a both positive and negative influence on the

execution of the specific jumps in artistic gymnastics.

The results of the comparative analysis of the parameters in the 20 m sprint running reveal a lower movement time and a higher movement speed in the gymnasts aged 8-9 years.

The comparative analysis of the maximum power, assessed by means of the CMJ test and measured in 3 repetitions, highlights lower values in the flight time at the age of 6-7 years and higher values in the flight time at the age of 8-9 years. By using the Drop Jump test measured with a maximum repetition, a lower contact time is highlighted; the values are higher in the flight time, flight height, power used and reactive strength index in the age group of 8-9 years.

The correlation analysis between the indices of the sprint running and tested specific jumps shows 24 correlations at each age category with 33.3% at 6-7 years and 66.7% at the age of 8-9 years, significant at $p<0.01$ and $p<0.05$.

The analysis of the relationship between the indices of sprint running and specific jumps in the 6-9-year-old gymnasts highlights strong and moderate connections, which shows both a positive and negative influence on the specific jumps in artistic gymnastics.

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ANALYSIS OF THE RELATION BETWEEN THE INDICES OF SQUAT JUMP TEST SPECIFIC TO MARTIAL ARTS

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Abstract

The paper is intended to do a correlation analysis of the indices of the Squat jump test specific to the senior martial arts athletes. Ascertaining research was conducted to this effect. The research involved 11 senior athletes practicing Pankration martial arts, aged from 20 to 40 years, within the Shin Daito Sports Club of Bucharest, in collaboration with the Romanian Federation of Pankration Athlima. Research methods used: method of bibliographic study, method of tests, method of experiment, statistical-mathematical method, tabular and graphical presentation of data method. The test method used the Tanita scale for body composition analysis and the Opto Jump Next system for determining the maximum power (explosive strength) at the level of lower limbs, spatio-temporal coordination and jumps height. The results of the research highlight the anthropometric data, the body composition and the values of Squat Jump test indices in terms of flight time and height in senior martial arts athletes. The results of the correlation analysis between the indices of the Squat Jump test highlight strong connections 80% at $p<0.001$ and 20% at $p<0.01$. The relation between the anthropometric indices and the Squat Jump test indices shows 33.3% strong connections (at $p<0.01$ and $p<0.05$); the other connections are insignificant at $p<0.05$. In conclusion, the correlation analysis between the Squat Jump test indices, anthropometric indices and body composition indices in the senior martial arts athletes highlighted the degree of the relation between the test indices and the influence of the anthropometric data on these ones.

Key words: *spatio-temporal indices, maximum power, anthropometric indices, body composition, correlation analysis*

1. Introduction

Mixed Martial Arts (MMA) is a combat sport and a form of martial art which combines striking and fighting skills. Due to the fact that there are no restrictions between striking and grappling, this sport requires multiple skill sets usually derived from different martial arts (Lenetsky & Harris, 2012; Lahti, 2016).

The problems of the Pankration martial art have been fragmentarily studied in the modern scientific works. At the same time, some scientists emphasize the importance of the structure of an adequate training process. Generally, the authors highlight that is impossible for an athlete to achieve a high-performance level in Pankration without self-regulation, self-discipline, balance and restraint (Ojeda-Aravena et al., 2022).

Explosive strength and speed of direction change are relevant physical skills in karate. In fact, it was proved that lower body explosive power, usually assessed indirectly by the maximum height reached in Squat Jump (SJ) and Counter-Movement Jump (CMJ), among other strength tasks, reveals a significant relation ($p < 0.05$) between acceleration, impact and punching techniques in the male and female karate athletes (Loturco et al., 2014; Mustain, 2021).

Vertical jump is an index representing leg/kick power. The explosive movement of the kick is the key to scoring in martial arts competitions. It is important to determine the factors that have an influence on the vertical jump to help athletes improve their lower limbs power (Abidin & Adam, 2013).

The purpose of the paper is to perform the correlation analysis between the indices of the Squat jump test specific to the senior martial arts athletes.

2. Material and method

Hypotheses of the research: by performing a correlation analysis of the Squat Jump test indices, anthropometric indices and body composition indices in the senior martial arts athletes it will be highlighted the level of relation between the test indices and the anthropometric data influence on these ones.

Procedures and methods of research: ascertaining research was organized, involving 11 senior athletes, aged 20-40 years, who practice Pankration martial arts. The study was carried out in December 2022, in the Shin Daito Sports Club of Bucharest, in collaboration with the Romanian Pankration Athlima Federation. The research was conducted in accordance with the Helsinki Declaration and was approved by the local ethics committee of the Doctoral School of Sports Sciences and Physical Education, University of Pitesti.

Research methods used: method of bibliographic study, method of tests, method of experiment (ascertaining, with a single investigation), statistical-mathematical method, tabular and graphical method of data presentation.

The test method used the Tanita scale for analyzing the body composition and the Opto Jump Next measurement system for determining the maximum power (explosive strength) at the level of lower limbs, spatio-temporal coordination and jumps height.

Tests used: anthropometric test and analysis of body composition; *Squat Jump* test with a single jump on both legs, on right leg and left leg, measuring the flight time (s) and height (cm) (Komi & Bosco, 1978; Markovic & Jaric, 2007; Mustain, 2021).

The statistical analysis was done using the KyPlot program and calculating the basic descriptive indices: mean, standard deviation, coefficient of variation (CV%), minimum and maximum values. The Pearson linear correlation coefficient was used to analyze the relation between the indices of the Squat Jump test and the influence of the anthropometric factors on these ones; the significant data were compared at $p<0.05$.

3. Results and Discussions

The tables 1, 2 and 3 present the results of the research regarding the anthropometric data, values of the Squat Jump test indices and correlation analysis of the test indices. Figure 1 shows the results of the correlation analysis between the anthropometric data, body composition and Squat Jump test indices in the senior martial arts athletes.

Table 1 *Results of anthropometric data in senior martial arts athletes, n=11*

Indices	Age (years)	Height (cm)	Weight (kg)	Body Fat (%)	Body Fat (kg)	BMI (kg/m^2)
mean	32.91	174.1	79.06	19.3	16.05	25.92
±SD	11.24	6.72	16.67	8.49	9.95	4.28
Coef. Var. (%)	34.10	3.86	21.08	43.99	62.02	16.54
min	20	158	58.6	8.6	5.0	19.1
max	40	180	109.4	32.2	35.2	33.8

Table 1 shows the anthropometric data and the analysis of the body composition of the senior martial arts athletes. The analysis of the calculations reveals an average age of 32.91 years, average height of 174.1 cm and average weight of 79.06 kg. In terms of body fat mass ratio, it can be noticed a share of 19.3% and 16.04 kg, with BMI of 25.92 kg/m^2, where 60% have a normal weight, with values ranging from 18.50 to 24.99 kg/m^2, 40% with disease risk, 27.3% - overweight and 18.2% - class 1 obesity.

Table 2 *Results of the Squat Jump test in senior martial arts athletes, n=11*

Indices	Squat Jump, both legs		Squat Jump, right leg		Squat Jump, left leg	
	TFlight [sec]	Height [cm]	TFlight [sec]	Height [cm]	TFlight [sec]	Height [cm]
mean	0.457	25.83	0.289	10.39	0.299	11.21
±SD	0.04	4.71	0.04	2.62	0.04	3.19
Coef. Var. (%)	9.18	18.24	12.56	25.18	14.44	28.43
min	0.392	18.8	0.242	7.2	0.232	6.6
max	0.516	32.6	0.356	15.5	0.363	16.2

The results of the Squat Jump test indices specific to the senior martial arts athletes are listed in table 2. The analysis of the studied indices highlights the following values: in the case of the jump with both legs, the flight time has a mean of 0.457 sec for a flight height of 25.83 cm; the jump on the right leg has a duration of the flight time of 0.289 sec at a height of 10.39 cm; as for the jump on the left leg, the flight time is 0.299 sec at a height of 11.21 cm. The comparative analysis reveals more power on the left leg, as supporting leg, and kicking with the right leg.

Table 3 *Results of the correlation analysis between the indices of the specific Squat Jump test in senior martial arts athletes, n=11*

Indices / R, Pearson		Both legs		Right leg		Left leg	
		TFlight [sec]	Height [cm]	TFlight [sec]	Height [cm]	TFlight [sec]	Height [cm]
Both legs	TFlight [sec]		0.999***	0.833**	0.829**	0.871***	0.877***
	Height [cm]			0.838**	0.835**	0.873***	0.881***
Right leg	TFlight [sec]				0.998***	0.948***	0.954***
	Height [cm]					0.940***	0.951***
Left leg	TFlight [sec]						0.997***
	Height [cm]						

Note. *** - p< 0,001; ** - p<0,01; * - p<0.05

Table 3 shows the results of the correlation between the indices of the specific Squat Jump test in senior martial arts athletes. By analyzing the results, strong connections are highlighted between flight time and height in the jump on both legs, on right leg and left leg 80% at p<0.001 and 20% at p<0.01.

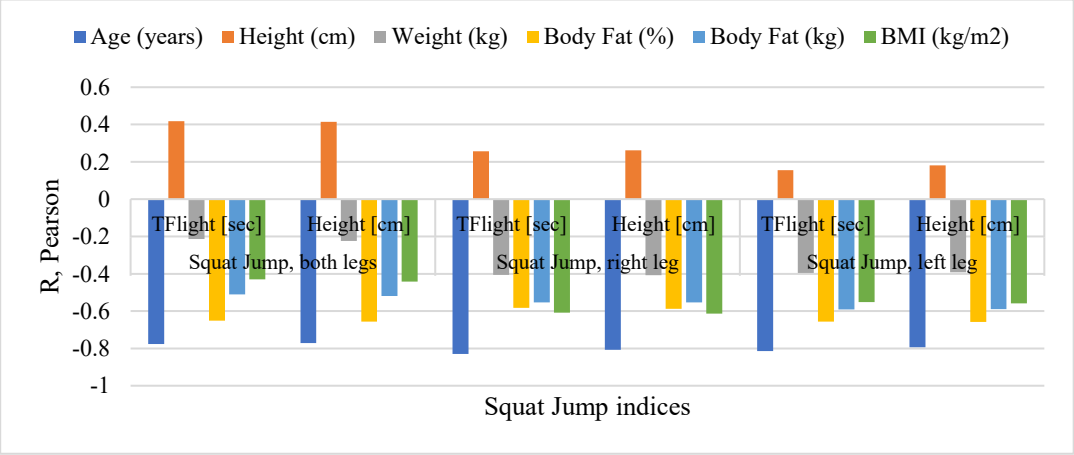

Fig. 4 *Results of the correlation analysis between the anthropometric indices, body composition indices and specific Squat Jump test indices in senior martial arts athletes, n=11*

Figure 1 presents the results of the correlation analysis between the anthropometric, body composition and specific Squat Jump test indices in the senior martial arts athletes. The correlation analysis reveals 33.3% strong connections, namely at p<0.01 between Squat Jump test indices and the age of athletes (16.6%, R=-0.829 and -0.771), at p<0.05 with the fat mass (11.1%, R= -0.658 and -0.651) and BMI (5.6%, R = -0.609 and -0.613); the other connections

are insignificant at $p<0.05$. These negative significant correlations are due to the higher values (good performances) at the Squat Jump test indices and to the lower values of the fat mass and MBI (normal weight).

The results of this type of research have been addressed in the specialized literature. Thus, it is highlighted a study aiming at the identification of the anthropometric factors that influence the height of the vertical jump in the male and female martial arts athletes. The results of this study show that the % of body fat has a significant negative relation with the height of the vertical jump ($P < 0.001$). The gender too has a significant effect ($P < 0.001$): on average, men jumped by 26% higher than women. It is recommended to reduce body fat through proper diet planning, which will help to improve legs power (Abidin & Adam, 2013); in addition to this study, references can be made to the analysis of the existing knowledge about the anthropometric and physiological characteristics in MMA (mixed martial arts) (Sekulic et al., 2013; Spanias et al., 2019). Helping to define the correlation between the anthropometric and bio-motor attributes and the special fitness test in judo (SJFT), the study results reveal an inverse relation with SJFT ($P<0.05$), while a stronger relation ($P<0.01$) was found out regarding the fat-free mass. Furthermore, a significant direct correlation was noticed between body fat percentage and SJFT (Arazi, Noori & Izadi, 2017). To identify the physical and physiological profile of the elite wrestlers, a study was conducted in which the measured specific and general adaptation indices were correlated. All tests provided relevant information about the performance of the wrestlers. It was shown that there are different physical, physiological and anthropometric variables that can be modified according to the style of the wrestler (Cárdenas et al., 2019). A study was conducted in order to investigate the effects of a short-term, high-intensity and low-volume training program for strength and conditioning, specific to mixed martial (MMA). The study proves that such training designed in conformity with the requirements of MMA competitions can result in significant improvements of the performance of the wrestlers (Kostikiadis et al., 2018). Another study focused on the relation between the punching impact and the selected strength and power variables in amateur pugilists. Correlations between strength/power variables and punching impact indices range from 0.67 to 0.85. Thanks to the strong associations between punching impact and strength/power variables, this study provides valuable information for coaches, enabling them to specifically design better training strategies (Loturco, I. et al., 2016). A study dealt with the relations between power, strength (components of the National Strength and Conditioning Association – NSCA – performance index) and peak power in mixed martial arts. This study proposed to commonly use MMA techniques such as: cross, rear knee and the double leg takedown (Walker, 2011). Other specialists contributed to the improvement of the structure and content of the annual training macrocycle in the 15-16-year-old Pankration athletes, taking into account the specifics of their competitive activity. The results recommend an experimental program meant to facilitate the earlier achievement of the adaptation processes to

Pankration specific physical activity (Ojeda-Aravena et al., 2022). Although there are previous studies that used simple correlation analysis to identify the relations between speed and power as predictors of agility, other research focused also on the analysis using multiple regression calculated between metric variables, speed, balance and power qualities (predictors) and agility measures(criteria) (Pityn et al., 2021).

All these studies presented and analyzed above complete the results of our research regarding the relation of the indices of Squat Jump test applied to the senior martial arts athletes (Pankration).

4. Conclusions

The results of the anthropometric data and the analysis of the body composition in the senior martial arts athletes highlight the average age related to height and weight, the ratio and share of the body fat mass in terms of BMI.

The results of the Squat Jump test indices show the values of flight time and flight height regarding the jump on both legs, on right leg and on left leg.

The analysis of the correlation of Squat Jump test indices specific to the senior martial arts athletes reveal strong connections between the time and the height of the flight during the jump on both legs, on right leg and on left leg.

Also, the analysis of the correlation between the anthropometric indices, the body composition indices and the specific Squat Jump test indices highlight 33.3% strong connections between the Squat Jump test indices with the age, fat mass and BMI of the athletes.

The correlation analysis between the Squat Jump test indices and the anthropometric factors in the senior martial arts athletes showed the degree of the relation between the test indices and the influence of the anthropometric data on these ones, which confirms the proposed hypothesis of the research.

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DYNAMICS OF TRAINING MEANS DURING THE COMPETITIVE PERIOD IN JUNIOR III WEIGHTLIFTERS (9-12 YEARS)

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Abstract

The purpose of the paper is to highlight the dynamics of the training means during the competitive period in junior III weightlifters (9-12 years old). That is why a case study was organized within the RAPID Sports Club of Bucharest, Weightlifting department, during the period May - June 2021, corresponding to the competitive period. The subject of the study was a 12-year-old athlete with a training experience of 6 months. The training means of technique and strength were monitored throughout the training sessions lasting 120 minutes. Three weekly training microcycles (MiC), namely 9, 10 and 11, were chosen for the study. The results of the study have the following values: in MiC 9 and 10, the training has a share of 35% technique (140 reps) and 65% strength (260 reps), in MiC 10 – 35% technique (160 reps) and 65% strength (240 reps) while in MiC 11 – 40% technique (120 reps) and 60% strength (180 reps). Regarding the relation between the parameters of effort, volume and intensity in MiC 9 and 10, the training means 1 (M.P.1) used 20.25% (81 reps) with a higher share of the volume by 55.5% (45 reps) at the intensity of 80%; M.P.2 – 29.27% (117 reps) with 45.3% (53 reps) at the intensity of 80%; M.P.3 – 24.75% (99 reps) with 49.5% (49 reps at the intensity of 90%; M.P.4 – 25.75% (103 reps) with 33.9% (35 reps) at the intensity of 80%. In MiC 11, M.P. 1 used 20% (60 reps) with a higher share of the volume by 63.3% (reps) at the intensity of 80%; M.P.2 – 27.67% (83 reps) with 50.6% (reps) at the intensity of 80%; M.P.3 – 29% (87 reps) with 50.6% (44 reps) at the intensity of 80% while M.P.4 – 23.33% (70 reps) with 62.8% (44 reps) at the intensity of 80%. The optimal relation between the effort parameters in terms of volume and intensity of the technical and strength training means during the competitive period of the junior III weightlifters (9-12 years) contributed to the improvement of the sports fitness by maintaining the level of muscle strength and perfecting the technical execution.

Key words: *training means, technical training, strength training, effort parameters*

1. Introduction

Nowadays, weightlifting is an Olympic popular sport among young people. Weightlifting is a competitive sport consisting of the performance of snatch or clean and jerk styles in competitions, in conformity with the rules of the International Weightlifting Federation (IWF). Weightlifting should not be confused with weight lifting, endurance training or powerlifting. During competitions, weightlifters achieved some of the highest absolute and relative peak powers reported in the specialized literature. Weightlifting training programs include

adequate choices of exercises meant to develop technical skills and explosive strength besides competition-specific exercises integrated with recovery phases and proper diet (Lloyd et al., 2012; Storey & Smith, 2012; Huebner et al., 2022). Following the appearance of the long-term athlete development (LTAD) model and its acceptance by a range of sporting organizations, the strength and conditioning coaches are encouraged to expose young athletes to specific training stimuli at various stages of development, when they are most susceptible to accelerated adaptation (Balyi & Hamilton, 2004).

This circumstance attracts the attention of specialists to the development and scientific substantiation of the theory and methods of training athletes of different ages and qualifications. The requirements for performing skills have increased, therefore many specialists had to pay special attention to the quality basic and specialized training of weightlifters. The main goal of this training is to technically improve the mastery of various elements, connections and combinations (Bugaev, Dzhym & Boltenkova, 2018).

Planning is the activity of detailed and accurate elaboration of the training and performance objectives, of the appropriate means, methods and forms of organization and of the targeted goals. During the competitive period, the specific means are diminished and leave the main place to the competitive means. In weightlifting, these means refer to technical training and strength training (Potop & Ulareanu 2011).

Coaches and specialists in weightlifting training try to identify the most effective relation between several indices of training variables such as volume (for example, total number of repetitions performed), intensity (average relative intensity expressed as a percentage of 1 repetition maximum [1RM] that represents absolute kilograms lifted divided by the number of repetitions performed), frequency and weightlifting performance (González-Badillo, Izquierdo & Gorostiaga, 2006).

This study intends to highlight the dynamics of the training means throughout the general preparatory period of the junior III weightlifters (9-12-year-old).

2. Material and method

The research was conducted in the RAPID Sports Club of Bucharest, Weightlifting department, from May to June 2021, corresponding to the competitive training period.

The subject of the study was a 12-year-old athlete, with 6 months of training experience, who had not participated in competitions up to the present time. The technical and strength training means were monitored during the 12 preparation microcycles (MiC); the duration of the training sessions was 120 min. In order to show the dynamics of the means in the training MiC, the MiC 9, 10 and 11 were selected.

Means used in MiC 9 for technical training 35% = 140 reps, strength training 65% = 260 reps and number of reps (N.R.) = 400.

Means used in MiC 10 for technical training 40% = 160 reps, strength training 60% = 240 reps and N.R. = 400.

Means used in MiC 12 for technical training 40% = 120 reps, strength training 60% = 180 reps and N.R. = 300.

3. Results and Discussions

The results of the planning of technical and strength training during the competitive period are shown in tables 1, 2 and 3, corresponding to microcycles (MiC) 9, 10 and 11.

Table 1. *Monitoring and planning of the training means in microcycle no. 9, competitive period*

Week days	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**
Volume (%)	**18.50**	**16.00**	**18.25**	**14.75**	**19.00**	**13.50**
Int.(%), NR (M.P.1)	**SM TH (17)**	**PP FF + AR FF (15)**	**SM TH (14)**	**SM FF (10)**	**SM TH (15)**	**SM power (10)**
80	3;2;3	(1+2)x 3	3x2	3x2	3x2	5x2
85	3x2	(1+2)x 2	3x2	2x2	3x2	
90	2x1		2x1		2x1	
95	1x				1	
Int. (%), N.R.	**PP TH+ AR TH (21)**	**TR AR (19)**	**PP TH + AR TH (23)**	**PP FF + AR FF (18)**	**PP TH + AR TH (24)**	**AR împins DS (12)**
80	(2+2)x 2		(1+2)x 3	(2+2)x 3	(2+2)x 3	6x2
85	(1+2)x 3		(2+2)x 2	(1+2)x 2	(1+2)x 2	
90	(1+1)x 2	3x3	(1+1)x 2		(1+1)x 2	
95		3x2	(1+1)x 1		(1+1)x 1	
100		2x2				
Int. (%), N.R.	**TR, SM (16)**	**Genuf. Piept (17)**	**TR SM (16)**	**TR AR (15)**	**TR SM (18)**	**Genuf. Piept (17)**
80		2;3;2				3x3
85		3x2				2x2
90	3;2;3;2	2x2	3;2;3;2	3x3	4x3	2x2
95				3x2		
100	3x2		3x2		3x2	
Int. (%), N.R.	**Back squat (20)**	**Bending (13)**	**Back squat (20)**	**Chest squat (16)**	**Back squat (19)**	**TR AR (15)**
80	3x3		3x3	3;2;3	3x3	
85	2;3;2		2;3;2	2x2	3x2	
90	2x2	3;2;3;2;3	2x2	2x2	2x2	3x3
95						
100						3x2
	Development	Development	Development	Development	Development	Development
Total N.R.	**74**	**64**	**73**	**59**	**76**	**54**

Notes. M.P. – training means; NR –reps no.; Int. – intensity; SM TH – technical snatch; PP FF – high pull, no lunge; PP TH – technical high pull; AR FF – clean & jerk, no lunge; AR clean DS – jerk from racks; TR AR – clean & jerk pulls; TR SM – snatch pulls;

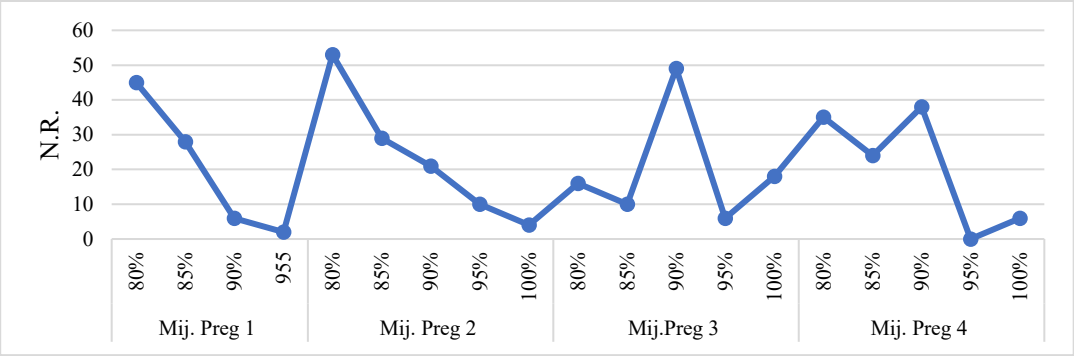

Fig. 1. *Relation between volume - intensity in MiC 9 of training*

Table 2. *Monitoring and planning of the training means in microcycle no. 10, competitive period*

Week days	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**
Volume(%)	**18.50**	**16.00**	**18.25**	**14.75**	**19.00**	**13.50**
Int. (%), N.R.	**SM TH (17)**	**PP FF + AR FF (15)**	**SM TH (14)**	**SM FF (10)**	**SM TH (15)**	**SM power (10)**
80	3;2;3	(1+2)x 3	3x2	3x2	3x2	5x2
85	3x2	(1+2)x 2	3x2	2x2	3x2	
90	2x1		2x1		2x1	
95	1x				1	
Int. (%), N.R.	**PP TH+ AR TH (21)**	**TR AR (19)**	**PP TH + AR TH (23)**	**PP FF + AR FF (18)**	**PP TH + AR TH (24)**	**AR împins DS (12)**
80			(1+2)x 3	(2+2)x 3	(2+2)x 3	6x2
85	(2+2)x 2		(2+2)x 2	(1+2)x 2	(1+2)x 2	
90	(1+2)x 3	3x3	(1+1)x 2		(1+1)x 2	
95	(1+1)x 2	3x2	(1+1)x 1		(1+1)x 1	
100		2x2				
Int. (%), N.R.	**TR, SM (16)**	**Chest squat (17)**	**TR SM (16)**	**TR AR (15)**	**TR SM (18)**	**Chest squat (17)**
80		2;3;2				3x3
85		3x2				2x2
90	3;2;3;2	2x2	3;2;3;2	3x3	4x3	2x2
95				3x2		
100	3x2		3x2		3x2	
Int. (%), N.R.	**Back squat (20)**	**Bending (13)**	**Back squat (20)**	**Chest squat (16)**	**Back squat (19)**	**TR AR (15)**
80	3x3		3x3	3;2;3	3x3	
85	2;3;2		2;3;2	2x2	3x2	
90	2x2	3;2;3;2;3	2x2	2x2	2x2	3x3
95						
100						3x2
	Development	Development	Development	Development	Development	Development
Total NR	**74**	**64**	**73**	**59**	**76**	**54**

Notes. NR – number of reps; Int. – intensity; SM TH – technical snatch; PP FF – high pull, no lunge; PP TH – technical high pull; AR FF – clean & jerk, no lunge; AR clean DS –jerk from racks; TR AR – clean & jerk pulls; TR SM – snatch pulls;

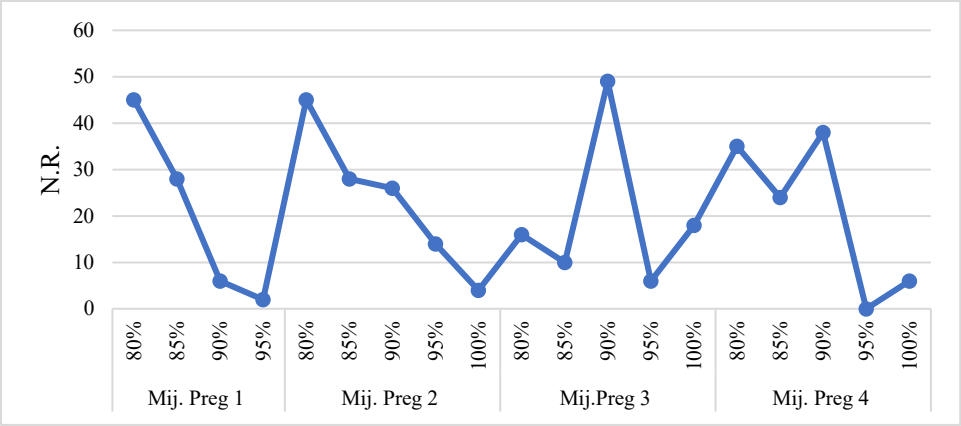

Fig. 2. *Relation between volume - intensity in MiC 10 of training*

Table 3. *Monitoring and planning of the training means in microcycle no. 11, competitive period*

Week days	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**
Volume(%)	**18.66**	**13.33**	**17.66**	**17.00**	**18.00**	**15.33**
Int. (%), NR	**SM TH (10)**	**PP FF + AR FF (12)**	**SM TH (10)**	**SM FF (10)**	**SM TH (10)**	**SM power (8)**
80	3x2	(1+2)x 2	3x2	3x2	3x2	4x2
85	2x2	(1+2)x 2	2x2	2x2	2x2	
Int. (%), NR	**PP TH+ AR TH (14)**	**TR AR (15)**	**PP TH + AR TH (14)**	**PP FF + AR FF (14)**	**PP TH + AR TH (14)**	**AR împins DS (12)**
80	(2+2)x 2		(1+2)x 2	(2+2)x 2	(2+2)x 2	6x2
85	(1+2)x 2		(2+2)x 2	(1+2)x 2	(1+2)x 2	
90		3x3				
95		3x2				
Int. (%), NR	**TR, SM (16)**	**Chest squat (17)**	**TR SM (16)**	**TR AR (15)**	**TR SM (14)**	**Chest squat (17)**
80	3;2;3;2	2;3;2	3;2;3;2		3;2;3	3x3
85	3x2	3x2	3x2		3x2	2x2
90				3x3		
95				3x2		
Int. (%), NR	**Back squat (16)**		**Back squat (13)**	**Chest squat (17)**	**Back squat (16)**	**TR AR (13)**
80	3x3		3x3	3;2;3	3x3	3x3
85	2;3;2		2x2	2x2	2;3;2	2x2
	Development	Development	Development	Development	Development	Development
No. of reps	**56**	**40**	**53**	**51**	**54**	**46**

Notes. NR – number of reps; Int. – intensity; Sm FF - Snatch without lunge; Ar. Th suporți – technical clean & jerk from racks; Sm. Th – technical snatch; Tr Sm – snatch pull; Tr. Ar – clean & jerk pulls; high pull without lunge+ clean (PP FF+Ar împins).

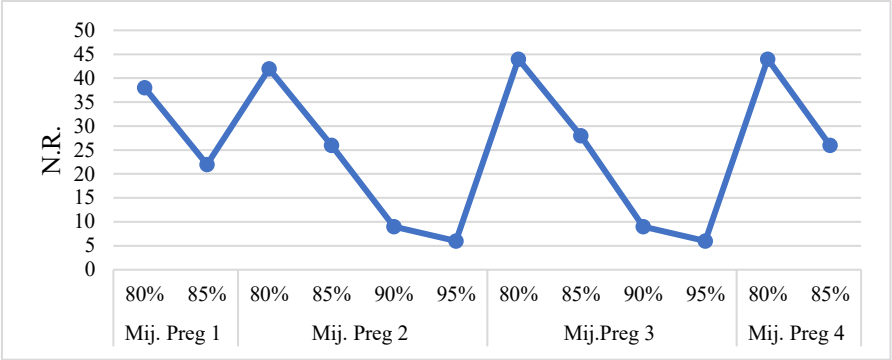

Fig. 3. *Relation between volume - intensity in MiC 11 of training*

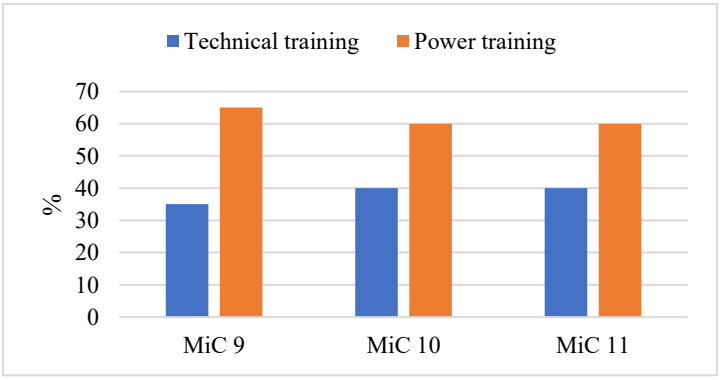

Fig. 4. *Share of technical and strength training within the preparation MiC-s during the competitive period in the weightlifters aged 9-12 years*

Fig. 4 presents the share of technical training and strength training in the preparatory microcycles of the weightlifters aged 9-12 years. The means used for technical training in MiC 9 were 35% = 140 reps, for strength training 65% = 260 reps, with the number of reps (N.R.) = 400. The MiC 10 had the following values: means used for technical training 40% = 160 reps, strength training 60% = 240 reps and N.R. = 400. The microcycle MiC 11 used technical training means 40% = 120 reps, strength means 60% = 180 reps and N.R. = 300.

The results of the monitoring and planning of the training means in the preparatory period reveal the relation of effort parameters (volume – intensity) in each one of the training means used throughout the microcycles (MiC).

In MiC 9 (table 1, fig. 1), for the training means 1 (**M.P.1**) there were used **20.25%** (81 reps) at an intensity of 80% - 45 reps, at 85% - 28 reps, at 90% - 6 reps and at 95% - 2 reps; **M.P. 2** used **29.25%** (117 reps) at the intensity of 80% - 53 reps, 85% - 29 reps, at 90% - 21 reps, at 95% - 10 reps and at 100% - 4 reps; for **M.P. 3** there were used **24.75%** (99 reps), at an intensity of 80% - 16 reps, at 85% - 10 reps, at 90% - 49 reps, at 95% - 6 reps and at 100% - 18 reps; **M.P. 4** used – **25.75%** (87 reps) at 80% - 35 reps, 85% - 24 reps, at 90% - 38 reps and at 100% - 6 reps.

MiC 10 (table 2 and fig. 2) shows the following values: for the training means 1 (**M.P.1**) there were used **20.25%** (81 reps) at the intensity of 80% - 45 reps, at 85% - 28 reps, at 90% - 6 reps and at 95% - 2 reps; for **M.P. 2** there were used **29.25%** (117 reps) at the intensity of 80% - 53 reps, 85% - 29 reps, at 90% - 21 reps, at 95% - 10 reps and at 100% - 4 reps; **M.P. 3** used **24.75%** (99 reps), at the intensity of 80% - 16 reps, at 85% - 10 reps, at 90% - 49 reps, at 95% - 6 reps and at 100% - 18 reps; as for **M.P. 4** – **25.75%** (87 reps) at 80% - 35 reps, 85% - 24 reps, at 90% - 38 reps and at 100% - 6 reps.

MiC 11 (table 3 and fig. 3) highlights that **M.P. 1** used **20%** (60 reps) at an intensity of 80% - 38 reps and at 85% - 22 reps; **M.P. 2** used **27.67%** (83 reps) at the intensity of 80% - 42 reps, at 85% - 26 reps, at 90% - 9 reps and at 95% - 6 reps; for **M.P. 3** there were used **29%** (87 reps), at the intensity of 80% - 44 reps, at 85% - 28 reps, at 90% - 9 reps and at 95% - 6 reps; in the case of **M.P. 4 – 23.33%** (70 reps) at 80% - 44 reps and at 85% - 26 reps.

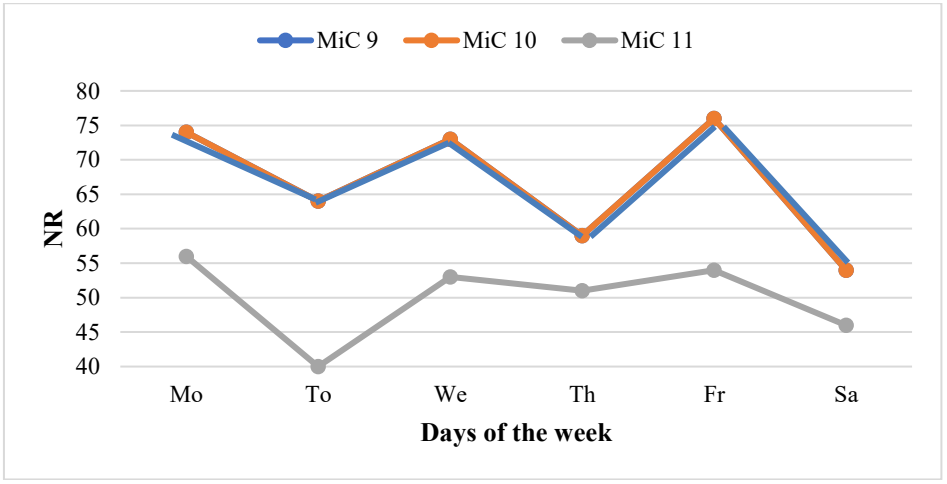

Fig. 5. *Dynamics of the number of reps during the training microcycles in the preparatory period of the 9-12-year-old weightlifters*

Fig. 5 highlights the dynamics of the number of repetitions throughout the training microcycles during the competitive period in the weightlifters of 9-12 years old. Fig. 6 presents the diagram of the relation between volume and intensity of effort within the training microcycles during the competitive period of the 9-12 years old weightlifters.

The analysis of the available scientific and methodological literature dedicated to the training of the weightlifters shows that many aspects are already approached quite thoroughly. For example, there is a study that examines the matters as follows: (a) weight training as a prerequisite to plyometric training, (b) combined weight training and plyometric training, and (c) complex training (Ebben & Watts, 1998). The influence of the experimental technique on the motor skills

development in the weightlifters aged 10–12 years was also analyzed (Bugaev, Dzhym & Boltenkova, 2018).

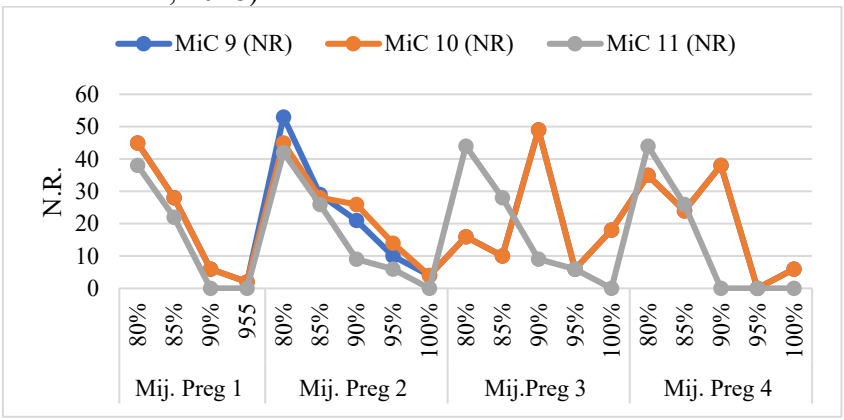

Fig. 6. *Relation of effort intensity and volume during the training microcycles in the preparatory period of the 9-12-year-old weightlifters*

Other specialists, like Hakkinen et al. (1987), found out an improvement in weightlifting performance during a 4-month training period, when the number of lifts performed in the intensity range of 80–90% and 90–100% of 1RM was increased. The use of moderate volumes of high relative intensity in the short-term resistance training produces better performance results in the young competitive weightlifters compared with the use of low and high volumes (González-Badillo, Izquierdo, & Gorostiaga, 2006). During the stages of long-term athlete development (LTAD), resistance training (RT) is an important means for stimulating the athletic development, tolerating the demands of long-term training and competitions and also promoting the long-term health effects (Granacher et al., 2016). An important factor in practicing performance sports is reducing the risk of injuries. Some studies focus on the identification of the right moment to initiate an integrative neuromuscular training in youth, meant to decrease the sports-related injury risk and to encourage lifelong regular physical activity (Myer et al., 2011). Research was carried out for substantiating experimentally the algorithm of teaching the competitive exercises technique in strength sports based on the example of weightlifting and powerlifting. Thus, the quality of mastering the competitive exercises technique increased in the athletes at initial training stage

(Tovstonoh et al., 2015). There are specialists who initiated a comparative analysis of the performance results indicators in the weightlifters of 9-12 years old. This analysis highlighted that high performance in weightlifting can be reached only if the performance capacity indicators are known and studied from the very beginning of the competitive activity, enabling the coaches to anticipate and plan the training correctly (Ulăreanu, Murărețu & Potop, 2019). An optimum relationship between the technical training means and the power training ones in the general preparatory period of Junior weightlifters III (9-12 years old) entails the

increase of muscle strength and the improvement of technical performance parameters (Ulăreanu et al., 2021, 2022).

4. Conclusions

The share of technical and strength training during the preparation MiC-s in the competitive period of the 9-12-year-old weightlifters highlights the increase in the volume of technical means and the decrease in the strength means.

The analysis of the relation between the volume and intensity effort parameters in the competitive training microcycles points out a higher share of the technical training means by increasing the number of reps in the technical training and decreasing the number of reps in the strength training.

The optimal relation between the effort parameters in terms of volume and intensity of the technical and strength training means during the competitive period in the junior III weightlifters (9-12 years) contributed to the improvement of sports fitness by maintaining the muscle strength level and perfecting the technical execution.

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LOADS OPTIMIZATION MECHANISMS IN STRENGTH TRAINING IN MIXED MARTIAL ARTS

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Abstract

The study purpose. To study the peculiarities of the influence of different load regimes on the training level of MMA athletes. *Materials and methods*. 75 athletes aged 19-20 years participated in the study. The research lasted 12 weeks. The study participants were divided into 3 homogeneous groups. Each of the groups used training load regimes with different volume and intensity parameters. The integral method of quantitative estimation of load capacity and the method of testing the level of kicking techniques are used in the research. *Results.* The 3rd group athletes who used high-intensity load regime (Ra=0.72) had by 16.5% and 39.4% higher initial parameters of the projectile working mass compared to the results of the 1st and 2nd groups of bodybuilders. The load amount indicator in a set was on average by 49.9% higher in conditions of the low-intensity load regime, Ra=0.53 (group 1) compared to other groups. Despite a more pronounced increase in leg strength in group 3 athletes (by 1.5 times), there remained a similar difference between load indicators. During the study this group athletes had 3 times higher level of kicking technique (number of kicks with maximum force for 20 seconds). *Conclusions.* Anaerobic-alactate loads with the maximum muscle strength of 72-75% of 1RM are optimal for increasing the level of kicking technique in MMA athletes at the stage of specialized basic training.

Key words: *MMA, kicking technique, load regimes, intensity, volume*

1. Introduction

Both coaches and scientists pay great attention to the problem of studying modern mechanisms for optimizing power loads in mixed martial arts, which will allow influencing on the level of athletes training (Kirk et al., 2021; Tota & Wiecha, 2022). The main aspect of solving this issue is the search for effective ways of combining a certain variability of load indicators, the level of the body resistance to the stressful stimuli, and the athlete's adaptive reserves (James et al., 2016; Chernozub et al., 2022; Giboin & Gruber, 2022).

There is no clear definition of the optimal load parameters which allow to increase the maximum speed, power of kicks in the process of strength training in MMA. A significant number of scientists and practitioners, in their research to solve this issue, used classical strength training programs for most martial arts (Matthews et al., 2017; Liu et al., 2022). In some cases, depending on the qualifications of the athletes and weight categories, there were used loads typical for powerlifting and weightlifting (Kirk et al., 2021). However, the mechanism for assessing the load volume in these sports and the conditions for their correction do

not take into account the peculiarities of special training in MMA. In bodybuilding and power fitness there is a more detailed control of load parameters considering the training direction and the individual body capabilities of athletes (Coratella et al., 2020; Polechoński & Langer, 2022).

Thus, the *purpose of the research* is to study the peculiarities of the influence of different load regimes used in power fitness and bodybuilding on the level of training of MMA athletes.

2. Material and method

75 athletes aged 19-20 took part in the study. The participants were divided into 3 groups, 25 bodybuilders in each group. The load regimes were different in volume and intensity parameters for each group. Quantitative indicators were calculated using the integral method of quantitative estimation of load capacity (Chernozub et al., 2018), which characterizes the features of the proposed load regimes in detail. Thus, group 1 athletes used a low-intensity regime (Ra=0.53). The representatives of the 2nd group had medium-intensity loads (Ra=0.65). Participants of the 3rd group used high-intensity loads (Ra=0.71) during the research. The difference between the components on which the intensity of the power load regime depends is presented in Table 1.

Table 1 *Power load regimes used by MMA athletes in the process of strength training during the study*

Intensity of power load regime	Peculiarities of power load regimes
Low intensity (R_a=0.53)	Anaerobic-glycolytic mode of energy supply for muscle activity. Full amplitude of movement with fixation at the peak point. The duration of a repetition is 4 seconds. 12 repetitions in a set. The maximum duration of work in a set is 48-55 seconds. Rest between sets lasts 60 seconds. The projectile working mass is 53-55% of 1RM.
Medium intensity (R_a=0.65)	Anaerobic-glycolytic mode of energy supply for muscle activity. Full amplitude of movement without fixation at the peak point. The duration of a repetition is 5-6 seconds. 8 repetitions in a set. The maximum duration of work in a set is 40-43 seconds. Rest between sets lasts 60 seconds. The projectile working mass is 65-67% of 1RM.
High intensity (R_a=0.72)	Anaerobic-alactate mode of energy supply of muscle activity. Partial (90%) amplitude of movement. The duration of a repetition is 8-9 seconds. 4 repetitions in a set. The maximum duration of work in a set is 32-35 seconds. Rest between sets lasts 45 seconds. The projectile working mass is 72-75% of 1RM.

Using the methods of determining the maximum strength (1 RM) and estimating the power load, the projectile working mass parameters (m) and load volume (Wn) were calculated. Determination of these indicators took place during the exercise "leg press" at the beginning of the study and after every 4 weeks.

Using the method of testing the level of kicking technique, the number of "Roundhouse kicks" performed by athletes for 20 seconds with maximum force until complete muscle fatigue was determined. Monitoring of the studied indicators dynamics took place every 30 days during 12 weeks of the study.

Statistical analysis of the research results was performed using the IBM *SPSS*Statistics 26 program package (StatSoftInc., USA). Non-parametric methods of mathematical statistics were used.

3. Results and Discussions

Figure 1 presents the results of changes in load indicators in the athletes of the examined groups performing the exercise "leg press" during the study.

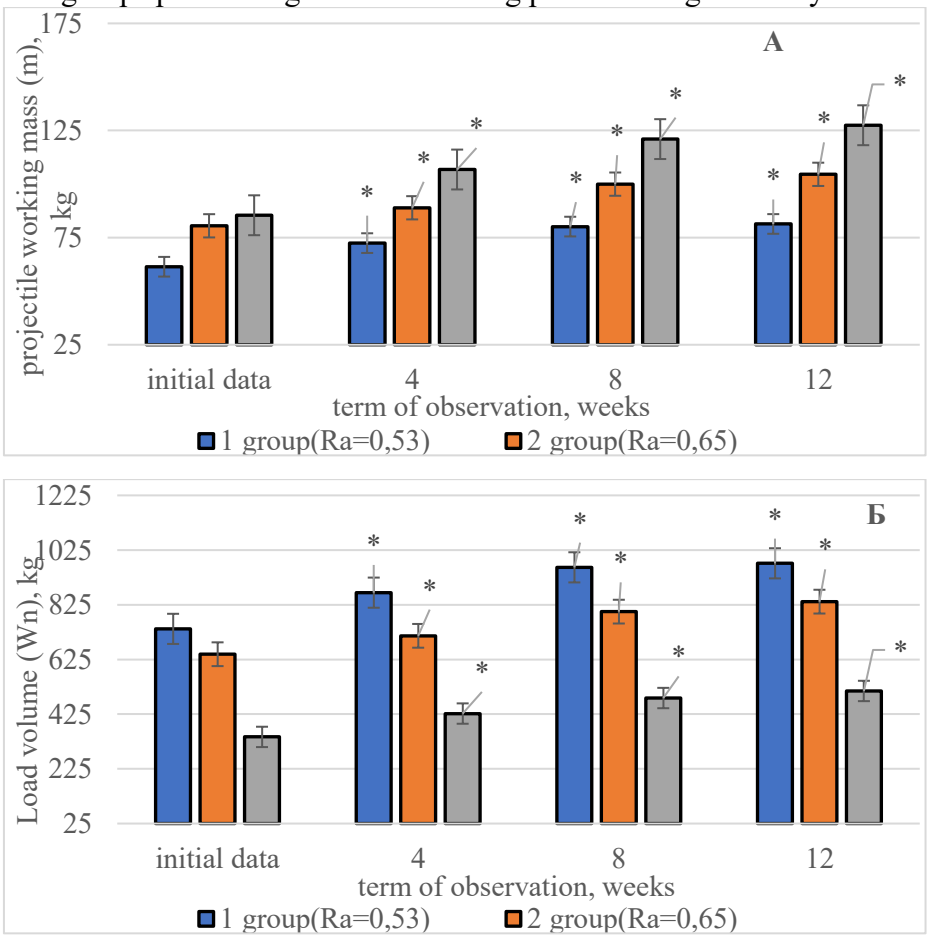

Figure 1. *The results of the projectile working mass (A) and the load volume (B) indicators used by study participants performing the exercise "leg press".*

Note: * ($p<0.05$) - compared with previous results

The analysis of the results shows that the initial parameters of the projectile working mass was by 16.5% and 39.4% higher in group 3 athletes (Ra=0.72)

compared to the results of group 1 and 2 athletes, respectively. Although indicators of the maximum strength development (1 RM) were practically identical in athletes of all groups at the beginning of the study. The 3rd group athletes increased the power capabilities of their legs by 1.5 times during the research period, compared to the results of other two groups. However, the initial difference in the projectile working mass in groups only increased during 12 weeks of the study. Control of the dynamics of the load volume indicator in a set showed a completely different ratio among groups both at the beginning of the study and during the entire period. Thus, this indicator was from 42.3% to 50.2% higher in group 1 athletes who used low-intensity load regime (Ra=0.53) compared to the results in other groups. This difference was observed during all 12 weeks of research.

Thus, the obtained results coincide with the studies of MMA specialists regarding the effectiveness of using methods for estimating the load volume indicators (Matthews et al., 2017; Liu et al., 2022). The patterns between the projectile working mass indicator and the load volume in training regimes of different intensity confirm the research results of scientists in bodybuilding and power fitness (Coratella et al., 2020; Polechoński & Langer, 2022).

Figure 2 shows the results of performing the number of "Roundhouse kicks" for 20 seconds with maximum force until full muscle fatigue by the athletes of the examined groups during the study.

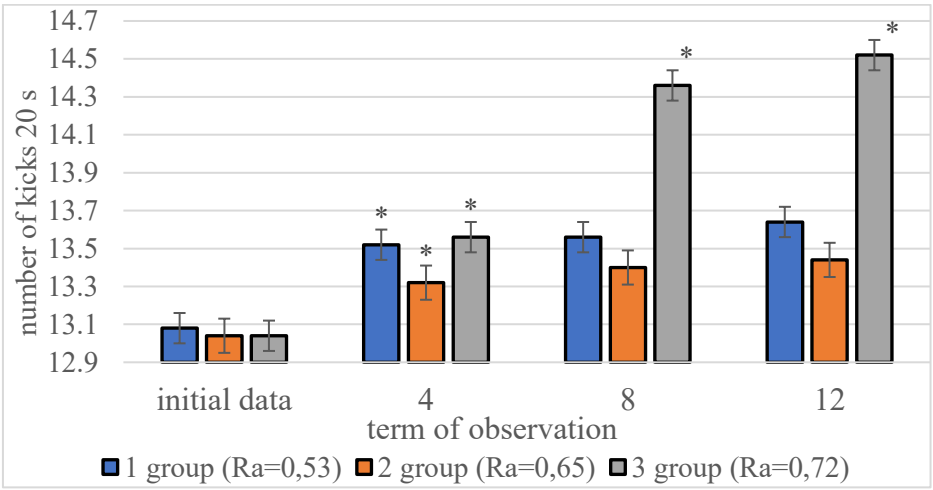

Figure 2. *Results of the number of "Roundhouse kicks" performed for 20 seconds with maximal strength until complete muscle fatigue by the study participants during 12 weeks of the research, n=75*

Note: * ($p<0.05$) - compared with previous results

The results analysis demonstrates that group 3 athletes had the highest increase in the studied indicator by 11.3% compared to the initial data. The lowest increase

in the number of kicks in this exercise was observed in group 2 participants (by 3.1%) over the same period of time.

The obtained results proved that using a high-intensity load regime (Ra=0.72) by MMA athletes helped to increase the indicators of the level of kicking technique by 3.6 times compared to other proposed options. These changes are associated with an increase in the level of intra-muscular and inter-muscular coordination in the conditions of the anaerobic-alactate mechanism of energy supply (James et al., 2016; Chernozub et al., 2022).

The results presented in this paper allow a more in-depth consideration of the problem of special strength training in MMA. To reveal the regularities of using training loads, the value of which is not only an assumption of the coach or an athlete. Load indicators should be scientifically justified on the basis of mathematical calculations, taking into account the adaptive body reserves, training tasks and the stage of preparation (Kirk et al., 2021; Tota & Wiecha, 2022).

4. Conclusions

Anaerobic-alactate load regime with an external stimulus volume of 72-75% of 1RM is optimal for increasing the level of kicking technique of MMA athletes at the stage of specialized basic training. Indicators of the projectile working mass and the load volume can be used as informative criteria of the load regime intensity for further mechanisms of its correction in the MMA training process.

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ASSESSMENT OF HEART RATE VARIABILITY AND STRESS INDEX OF MIDDLE DISTANCE RUNNERS

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Abstract.

This article presents the practical results of assessing the heart rate variability and stress index before and after the load of runners at a distance of 800 m and 1500 m, as well as building subsequent loads based on the results obtained. In experimental group, there was an at-tempt to implement several tasks to achieve the set goal and a training program was developed based on the obtained data on Heart Rate Variability and stress index, the reaction of the cardiovascular system to physical loads in different intensity zones, as well as duration of the recovery process after completed, so called "distances". To obtain indicators of the functional state of athletes, as well as the level of the functional state, it was carried out using a chest monitor based on electrocardiogram "POLAR h10" technology and a wrist watch "POLAR M430" based on photoplethysmography technology.The results of this work can be useful for coaches and athletes in the rational distribution of training loads in the 800m and 1500m runs.

Key words: heart rate variability, stress index, middle distance running, intensive training.

1. Introduction

In recent years, in the training system for training runners at 800m, 1500m in Uzbekistan, the ability to determine the level of preparedness of athletes with innovative technologies has become increasingly popular, which makes it possible to obtain timely information in digital format. Assess heart rate variability and stress index after intense exercise in 800m, 1500m runners (Bozhokin S.V. (2008) p. 80-87).

In the theory and methodology of physical culture, the training load is divided into classes. This division is called the classification of training loads. The nature of the fulfillment of loads can be training and competitive, specific and non-specific. They are also divided into small medium and large, which is an indicator of the magnitude of the loads. To determine the impact of the load on the athlete's body in pedagogy, training loads are divided into "external" and "internal" sides. The "outer" side of the load is understood as a certain physical activity in which muscle groups are involved that perform long-term or physical work in various zones of intensity (Iordanskaya F.A. (2020), p. 31-33). In turn, the "external" side of the load is interconnected with the "inner" side, namely, it is an indicator of changes in the functional state of the body. This is a kind of indicator of the reaction to the "outside" side of the load.

For a rational ratio of volume and intensity of training loads, according to many scientists (Voronina G.A. (2011), p. 235-2358), (Kalinichenko I.A. (2011), p.

265-266) it is necessary to focus on the parameters of "external" and "internal" sides of training loads, to determine the lower and upper limits of the body's adaptive capabilities to loads. The distribution of intensity and volume of training loads also depends on the degree of fatigue.

However, in the study of training and competitive loads, it was found that sprinting at a competitive pace allows you to develop the speed properties of athletes without exposing their body to acidification and production of lactic acid, which is also a clear indicator of the constancy of heart rate during intense loads in middle-distance running(Velibekov Ya.V. (2008), pp. 63-65). Heart rate (HR) depends on training loads, where 4 different training modes have been identified. The following is proposed: 1 zone - where the heart rate fluctuates around 130 beats / min. This zone is well suited for warm-up and recovery procedures. In the 2nd zone (heart rate from 130 to 150 beats/min) aerobic energy supply of the body dominates. In the 3rd zone (pulse from 150 to 180 beats/min), the mixed energy supply mode prevails, this mode is also called the near-limit zone, where the heart rate reaches about 180 beats/min. In the 4th energy supply zone, which is called the maximum zone (pulse 180 beats / min or more), where the athlete performs physical work in an oxygen-free mode and the duration of such work usually does not exceed 30-40 seconds. According to studies, the training load in this zone should be carried out with a competitive or repeated method, since other methods of training are considered to be less effective. The total amount of training loads in this zone reaches no more than 1% of the total intensity in the annual training cycle. The main factor that has a great opportunity to increase the functional reserves of athletes and has an impact on shifts in the level of readiness to perform physical work of submaximal intensity is a rational combination of volume and intensity of loads, taking into account the price of adaptation of the body. In this period, an even more important stage of preparation is singled out - this is the stage of direct pre-competitive preparation, where high and stable results are achieved.

2. Material and method.

The studies were carried out from February 2020 to June 2021. From February 2020 to December 2020, an analysis of literary sources and scientific works of both domestic and foreign experts devoted to the problems of optimizing the training loads of athletes was carried out. The analysis also included scientific works in various cyclic sports, similar in nature to the performance of physical activity, such as: swimming, cycling, speed skating and skiing. The generalization of the data obtained contributed to the determination of the degree of knowledge of this issue and made it possible to identify the relevance of the problem of optimizing the training load. Based on the data, the goal was set, as well as the objectives of the study. During this period, with the use of modern devices and gadgets, a phased plan for the implementation of practical research was drawn up, which was carried out on qualified middle-distance runners on the basis of the Uzbek State University of Physical Culture and Sports. All participants in this

study were athletes in the 800m-1500m run and during the pedagogical experiment were aged 18-23 years, had a sports category and experience in participating in competitions, and were athletes at the stage of improving sportsmanship. Given the above, this group of athletes can be classified as qualified middleweights. The experiment began in January 2021, after a transitional period. It was the beginning of the preparatory period of the semi-annual macrocycle of preparation for the main competitions. Anthropometric data were taken and indicators of the functional state of the body at the current moment were obtained. In the period from January to June 2021, an innovative way of distributing the running loads of middle-aged athletes was applied. The data obtained from the pedagogical test at the end of the study made it possible to identify the effectiveness of the methodology we developed, in contrast to traditional methods for optimizing the running means of 800m-1500m runners. Assessment of heart rate variability and stress index by cardiography using a chest heart rate monitor. This method of studying the athlete's cardiovascular system, as well as its response to stress and recovery time after exercise, provides a great opportunity to correctly identify the current state of the athlete and plan a training program. Runners are determined by heart rate variability and stress index before the race and after competitive activity. Also in digital format, the level of energy consumption before the race for a runner at 800m, 1500m is revealed. This method revealed the opinions and statements of domestic and foreign experts in the training of runners at 800m-1500m, where a comparative analysis was made with other sports of similar physical work power. The works of the authors who devoted their works to the problem of optimizing the training load were studied. The opinions and experience of domestic, as well as foreign coaches and specialists, the methods and means used to increase the level of fitness of athletes were analyzed. In total, 6 literary sources were analyzed, of which 3 were foreign, including textbooks, and scientific articles. All sources are presented in the list of references.

3. Results and Discussions.

With intense load, athletes have high wave structures, where HF is 54.8% (the norm is 40-55%), but it is on the verge of the upper limit of stress. This suggests that the athlete has excessive stress. If the HF values drop sharply to 3.17%, then a sharp drop means the predominance of the sympathetic department. But the activity of the sympathetic department at rest suggests that the body is overstressed and subsequent loads can only aggravate the condition of the runner.

TP - the total power of the heart and its normal functioning is calculated by the formula: HF>LF>VLF. If the data obtained after exercise show the opposite, where HF<LF<VLF this indicates that the body is in a state of overexertion and a long rest of 24 to 72 hours is needed (Velibekov Ya.V. (2008), p.63-65). If an athlete comes to training and before the start of training, the measurement gives identical indicators, where HF<LF<VLF means that the athlete is in a state of overtraining and more passive rest time is required for recovery, and it can take up to 2 weeks.

Video analysis of the athletes' running showed that in the second half of the distance the athletes slowed down the pace of running, and there was clearly a disorder in the running technique at the finish line. The heart rate reached a maximum of 206 beats per minute. When running technique is disturbed, athletes lose seconds, which ultimately affects the result of the races. It was also found that athletes have a very large variation in HRV, MxDMn - 150ms. (scatter of cardio intervals), this means that in the nervous system of a middle-distance runner there is a predominance of the sympathetic department and energy consumption increases due to the fact that the heart rate is in a large zone of intensity before starting the running activity. The SI indicator (stress index) is in the range of 569.3s. Normally, trained athletes should have from 25 to 100 seconds. In this situation, the level of stress exceeds the marginal norm. It is in such situations that a period of fatigue quickly sets in. This condition leads to an overstrain of the nervous system and the effect of the training process is negative. Having data on heart rate variability, namely the reaction of the cardiovascular system to previous loads and measuring the current state of heart rate variability and stress index, it is possible to timely correct the training process in the direction of progress, and save the athlete's body from overstrain of the nervous system and overtraining in general.

This is of great importance when layering training effects on top of each other. At the next load, the indicators of heart rate variability and the stress index should be in the optimal zone and the variation in variability should be minimal and there should be a wave-like dynamics of the growth of variability to the acceptable norms of the histogram. If the spread of heart rate variability is minimal, but there is no wave-like growth dynamics, and instead stability of heart rhythms is observed, this means overwork, as the nervous system does not adequately respond to the load. In this situation, it is necessary to completely stop the training process and send the athlete for recovery procedures: massage, sauna, water treatments and 8-hour sleep. If the athlete has a reaction of the cardiovascular system to the load in the submaximal zone, then the functional state of the athlete is assessed as high. Following these data, it is possible to increase the intensity of the load within adequate limits. The minimum spread of heart rate variability MxDMn is 400 ms, and there is a positive wave-like dynamics of the increase in variability >0.5. SI (stress index) is in the range of 55.2s.

This phenomenon indicates that the athlete has a high stress-resistant state to loads and a functional state. In this situation, the runner is ready to perform higher intensity loads in the submaximal zone

When assessing the response of the cardiovascular system to the load, a third test is needed, which consists in a rational combination of heart rate variability and stress index.

4. Conclusion.

Thus, by raising the load level higher, we increase the requirements for the body, forcing it to gradually adapt to the increased load. From the state of the athlete, we can conclude that the results of athletes depend directly on the previous load and the level of recovery, and the assessment of HRV and IS allows rational planning of the training process for 800m and 1500m runners. To identify the optimal and quantitative values of the volume and intensity of training loads in the preparatory process, it is recommended to use digital technologies to determine effective loads by heart rate. Modern gadgets and various innovative devices greatly simplify the work of a coach by helping to determine the level of preparedness and dosage of training loads, and are also effective in selecting means and methods of training in different periods of training.

To develop training programs containing the optimal volume and intensity of training loads, it is recommended to take into account the individual characteristics of the cardiovascular system of athletes, as well as its response to stress and recovery. When using heart rate monitors and special software that help determine heart rate variability and stress index, it is recommended to select effective training means by testing the body for load and recovery. To develop the speed qualities of athletes, it is recommended to optimize the rest interval (up to 180 seconds) between series when performing intense running loads, where the heart rate should not exceed 170 beats per minute, to perform repeated movements when the heart rate reaches 110-120 beats per minute. This is the recovery rate for 800m-1500m runners.

The use of modern innovative devices for measuring and monitoring the cardiovascular system is recommended to configure each device individually for each athlete, otherwise the indicators will give erroneous data and the training effect will get a negative result. When choosing heart rate monitors, you need to pay attention to the connection protocol with mobile devices that support the Bluetooth function. If the heart rate monitor works only with the Ant+ protocol, then you need to make sure that the mobile device with which the heart rate monitor will be paired also has the Ant+ connection protocol. In the absence of a protocol on a mobile device, you must try to download via "PlayMarket" for the Android operating system and from the "AppleStore" for the iOS operating system.

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PERFORMANCE IMPROVING OF 400 m RUNNERS WITH A REPEATED PROGRESSIVE TRAINING METHOD

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Abstract

In this article, the author analyzed athletes from three indoor competitions from different countries in 400m women running, where it was found that runners from Uzbekistan significantly lose speed in the second 200m compared to German and Asian athletes (National Championship of Germany, Asian indoor Athletics Championship and Uzbekistan Championship). According to the obtained results, a training plan was developed and applied using high intensity, high-intensity interval and repetitive progressively training. The aim of the first method was to increase athletes 'velocity. The second method directed to improve special endurance of 400m runners. The third method was directed to improve aerobic capacity for 400m. Duration of experiment consists of 4 weekly micro cycles where groups were divided on control and experimental groups. After pedagogical experiment the results of experimental groups were improved by running first 200m slower than in the beginning of experiment but improved the second lap of distance on 2 seconds. as well as the results for 400m running dash.

Key words: 400m running, indoor competition, analysis, lose speed, method of high intensity training

Introduction. Modern athletics is a sport that includes exercises such as walking, running, jumping, throwing, and all-around, composed of the listed exercises. Sports competitions are held in numerous athletics exercises, training of athletes is organized. Athletics is an important means of physical education for young people. The positive impact of track and field exercises on the health and physical development of those involved predetermined their wide inclusion in the physical education program for students of secondary specialized educational institutions. Short-distance running (sprint) is characterized by the performance of short-term work of maximum intensity. It includes running at distances from 30 to 400 m. For the convenience of studying the running technique, it is customary to conditionally divide it into four parts: the beginning of the run (start), starting run, distance running and finishing. A special role in the development of sports belongs to the most important section of sports pedagogy - methods of teaching sports motor actions. The scientific and technological revolution makes it possible to take a fresh look at the learning process, to present teaching methods in a different light, which are significantly changing in connection with modern requirements. Therefore, there is a need to modify these methods, to develop, expand and supplement them. The widespread introduction of mathematical methods into sports pedagogy, which is characteristic of modern science, is carried out in many ways, among which two directions can be distinguished: the first is the creation of models that reflect the essential features of an athlete's movements (for example, in

athletics, generalized human motor actions and the second is the widespread use of mathematical - statistical methods and computer technology for processing information about the characteristics of movements In most sports exercises, the result depends on the level of development of the athlete's physical qualities, on the perfection of the technique of performing motor actions, and on the athlete's ability to perform movements using motor potential close to the maximum possible. scientific and methodological works devoted to these issues, there are quite a lot of publications on increasing the level of development of the motor qualities of athletes, improving the technique of movements, and very few - on improving the ability of athletes to perform sports exercises using motor capabilities close to the maximum. At the same time, in sports practice, one can observe how an athlete with a very good technique of movements and a high level of development of physical qualities shows poor results. Often this is explained by the fact that he does not know how to perform sports exercises with close to the maximum use of his capabilities. In this regard, a problematic situation arose in the theory and methodology of sports training in track and field athletics, the essence of which is determined by the contradiction between the potential capabilities of an athlete in achieving a high sports result and the lack of scientific and methodological knowledge about the ways to implement these capabilities. On this basis, we believe that the development of methods to improve results in running based on the regulation of the duration of overcoming sections of the distance with the optimal use of the athlete's motor potential, close to the maximum, is an urgent problem, the solution of which can be of great importance for the theory and practice of sports pedagogy. The object of the study is the theory and methodology of sports training of 400m runners. The subject of the study is the tactical training of 400m runners. The aim of the study is the theoretical and technological substantiation of an innovative approach to improving the tactical readiness of 400m runners based on optimizing the duration of overcoming sections of the distance. It's no secret that in the 400m the competition starts after 350m, because no matter how fast you start, everything can change at the last moment, the fight starts in the last 50m, at the finish line, it's important how you managed to keep the speed to show the good result.

Material and method. The results taken from the protocols of three indoor competitions in 2023 were analyzed: the national competitions of Germany, the Asian Championship and the Championship of Uzbekistan. The results of 6 finalists were taken and the average time of each competition was calculated. Also for our study, we separated the distance into two laps (because it's indoor competition) and found the average time of each lap of all three competitions, then calculated the difference between the two laps. We used special device (*Polar m430*) to record speed and heart rate during the last competition in the 400m run at the championship of Uzbekistan on one of the athletes, on whom we then applied our training. Based on these results, training sessions were planned to improve the second 400m lap time.

Results and discussion. As a result of the analysis of the protocols of indoor competitions in the 400m run, German athletes show an average result of 53.56 ± 0.6 sec., while they passed the first lap in 24.74 ± 0.6 sec, and the second in 28.55 ± 0.3 sec , it was calculated that the difference between two laps was 3.81±0.3 sec.

Athletes at the Asian Championship showed an average result of 55.06 ± 0.9 sec, they completed the first 200m in 25.25 ± 0.3 sec, the second in 29.80 ± 0.9 sec, and the difference was 4.55 ± 0.6 sec.

At the competitions of Uzbekistan indoors championship, 400m runners showed an average result of 59.58 ± 1.5 sec, passed the first lap in 27.23 ± 0.9 sec, and the second in 31.52 ± 0.6 sec, where the difference was 4.35 ±0.3sec. Based on these results, it was clearly seen that the athletes of Central Asia significantly lose speed in the second 200m.

On the figure (Fig. 1), it can be seen that the athlete from Uzbekistan gains the maximum speed in the first 70m, while the heart rate does not exceed 127 bpm, then she tried to maintain this speed at the entrance to the second curve, the speed dropped sharply, despite the fact that the runner tried to recover the loss, she could not keep this pace and the speed to the finish line significantly faded, and the heart rate increased to 183 bpm. It can also be seen from Figure 1 that the athlete spent more than half of her distance in the submaximal zone, as evidenced by the red line indicating the heart rate. It should be noted here that the strength fitness of the athlete is not high enough, since in the preparatory period special attention was paid to speed endurance, but practice has shown that speed-strength fitness is also of great importance, especially at the finish line.

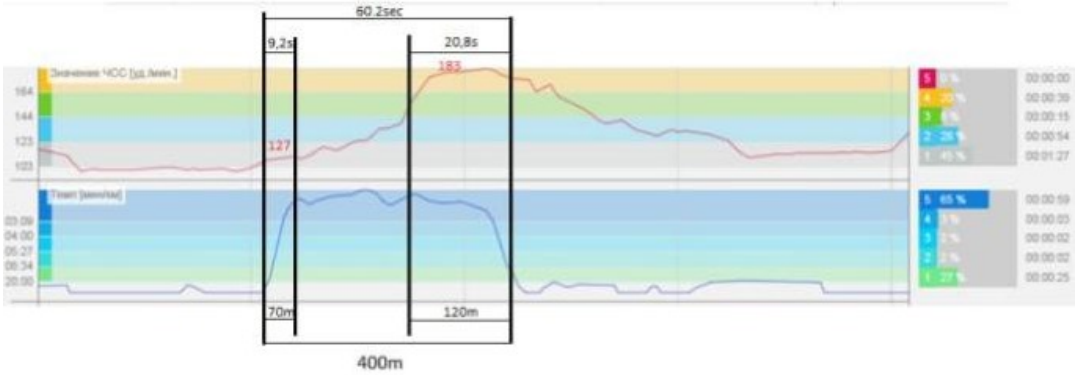

Figure 1. Reaction of Cardiovascular System to the running speed during 400m running

It was found that after a 200m run, the foot weakly repelled from the surface of the track, but as it approached the finish line, the hips did not rise and did not maintain the required angle to effectively maintain running speed. It was noticeable how the athlete loses speed and upsets her running technique. Presumably, due to

high oxidative processes in the body, the muscles that played the main role at the finish line could not cope with their task and part of the load was taken over by indirect muscles that were not involved at the beginning of the run. To correct this problem, a monthly training plan was developed, where three main training methods were applied: High Intensity Training Method (Fig .2) The main objective of this method is to perform work at high intensity (CJ. Guo, QC. Sai 2004, p 62-64) but for a short duration while maintaining an increased frequency.

Figure 2. High intensity training methods' results

Figure 2 shows that the athlete was in the submaximal zone for a long time, where the heart rate was at a maximum value of 185 beats / min, and the running pace was 12.55 sec / km, approximately at this speed, the athlete ran a distance with a cadence with a frequency of 102 steps per minute, but at the same time, it is clear that throughout the entire distance, the heart rate of the athlete varied from 159 to 175 beats / min, and the pace of running varied from 6.53 km / h to 3.50 km / h. But on the repeated segments of the vilenas, there is a clearer dynamics of the variability of the training load, where the heart rate of the athlete does not exceed 127-135 beats / min, and the running pace varies from 9.22 -6.53 min / km, while the running cadence has changed a lot in the average value and was 120-180 steps per minute. The duration of such a workout does not exceed 50 minutes, and the rest period between series is about 3 minutes.

The method of interval intensive training (Fig .3), where the duration of the load is short, and the intensity is high, due to which the physical fitness of the athlete improves.

Due to high-intensity and high-intensity interval training, we raised the frequency in short distances (up to 200m), while creating conditions for the body to adapt to a given load and frequency due to repetitions. Fig3 shows that the body has adapted to the load and the heat rate no longer increases, but the tempo increase. At the same time, in order to correct the problem with a quick start at 400m, during training we paid attention to a gradual increase in speed. That is, the maximum speed was gained in the last 50m of each repetition.

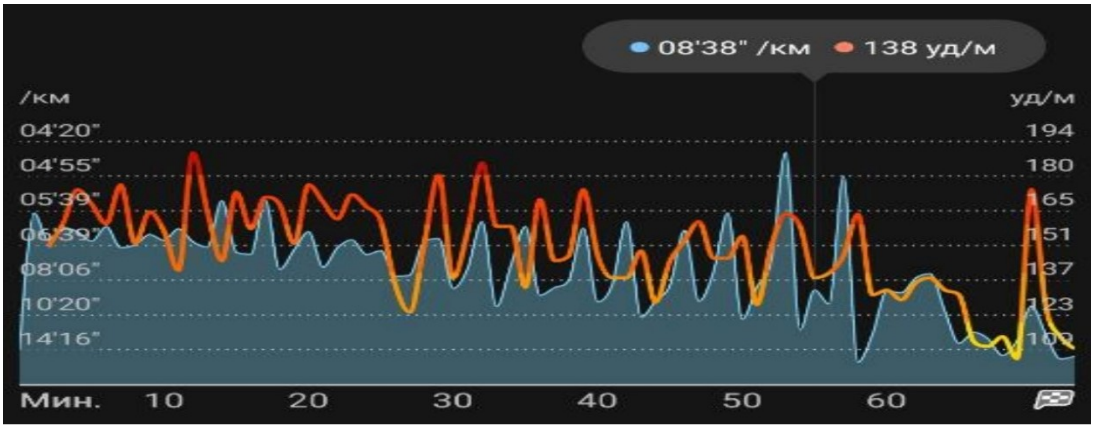

Figure 3. High intensity training method's results

After that, the method of re-progressive training was applied, where we tried to maintain this frequency, but increased the distance. And during these trainings, it was possible to observe at what stage of the distance the performance decreases and what we should work on next. The speed was also gained gradually and the step frequency increased in the last meters.

And the method of re-progressive training (Fig. 4) objective of it is to increase the length of the distance while maintaining the speed of running. And to understand in which section the speed drops.

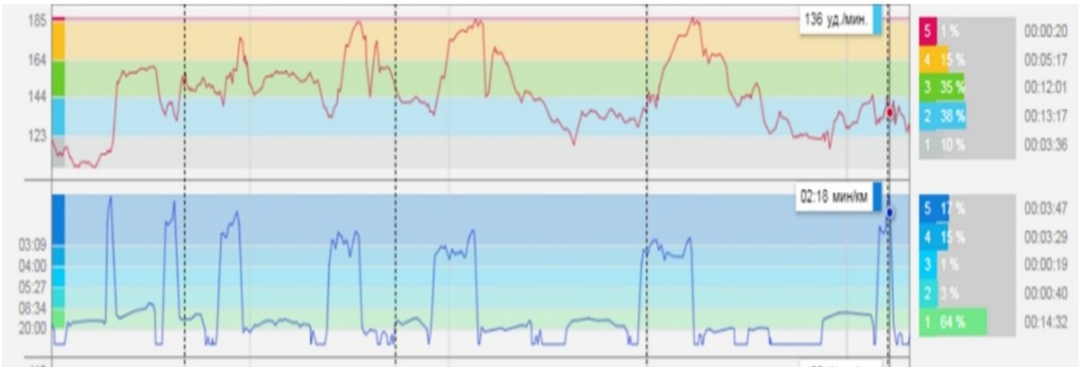

Figure4. Repetitive progressively training method's results

It was found that after high intensity training, the organism recovers after 72 hours, and after training at medium intensity after 48 hours, based on these researches and results of others (Austin S., Sherman W,2008, p.17-19), we trained an athlete for 400m one meso cycle.

Conclusion. In conclusion, we can note the positive effect of all three methods of training. The first method is useful for building speed at the start of a race and helps overcome the barrier that is created for the runner on the outside of the load. This means that the athlete learns to overcome external resistance with the least expenditure of energy and strength, and the preservation of such parameters is important at the finish line. The second method is characterized by the development of speed-strength qualities that are applicable to maintain a given running speed at the beginning and at the end of the distance. The effectiveness of this method also lies in the fact that when overcoming external resistance, the athlete tries to make less contact with the surface of the track, which in turn positively affects the running speed and the flight phase in the run. The third method is aimed at overcoming the athlete's efforts arising against the background of fatigue, and is also aimed at increasing speed endurance. From Figure 4, it can be seen that the heart rate also rises with several repetitions with an increase in the pace of running, but already adapts to the load starting from the 6th repetition. The effectiveness and convenience of this method lies in the fact that the coach can make timely corrective changes in the training process of the runner and thereby quickly control the athlete and the training load. In conclusion there is the fact that we got that the first 200m 400m runner began to start one second slower, whereby we kept the speed on the 2nd 200m and lactic acid began to accumulate more slowly and time for 400m was improved and the difference between the first and second laps was not 4sec, as it was before our training, but 3 sec.

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INCREASING THE PHYSICAL LEVEL OF MIDDLE DISTANCE RUNNERS

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Abstract.

This article is devoted to determining the physical qualities and fitness of athletes running 800 meters, based on special tests. The focus is on improving the physical fitness of 800m runners and pre-competition training. A study was made of the effectiveness of the innovative technology of load planning using local strength, jumping and sprint exercises in the preparation of middle-distance runners. Athletes aged 15–17 took part in the study. The results were evaluated according to the methods of the step test, pedagogical testing and experiment. The higher efficiency of the innovative technology with the use of running training is proved to be several times less than the usual load planning option. A comparative analysis of the results obtained before and after the study is given.

Keywords. 800 m, running athletes, physical fitness, physical qualities, speed endurance, functional training, annual training.

1.Introduction

Training of highly skilled athletes in athletics and ensuring their participation in international sports competitions is one of the main tasks facing specialists today. Especially middle-distance running requires special speed endurance from the athlete. To do this, the athlete needs to improve his physical form, I train physical qualities. This is one of the urgent tasks of modern athletics, which has both theoretical and practical significance. In the process of analyzing the scientific and methodological literature, it was established that the results of studies on the study of scientific research aimed at developing the physical fitness of middle-distance runners in our country have not been studied as a scientific object. Therefore, based on the results obtained in determining the level of physical fitness of athletes, middle-distance runners, it was necessary to develop training programs for them on a scientific basis. In order to prepare athletes for competitions, it is carried out by carrying out the loads given in training, showing the effectiveness of each training method in competitions. Athletics middle-distance running (800m) requires athletes to maintain their physical fitness and functional condition in a uniform state ready for constant competitions. The correct distribution of loads in the system of training athletes directly depends on the results of athletes. Adaptation of the body to loads of athletes is of great importance in showing high sports results. Therefore, the training of middle-distance running athletes is

considered one of the tasks in the training system of qualified athletes. Athletes of this type of athletics perform a certain volume of loads to participate in competitions throughout the year. Carrying out training loads in the annual cycle in accordance with the athlete's level of preparation allows to achieve the desired result in the next competition. The occurrence of fatigue in the body of athletes directly affects the results of the athlete in the competition. It is the task of the trainer and the specialist to correctly distribute the loads performed by the athlete during the training and competition activities, to strengthen his special physical fitness during the training, and to adapt it to the competition activities. Also, it is necessary to emphasize the improvement of physical fitness, functional condition, and technical and tactical training necessary to achieve a high result during the competition. Because his performance in training determines his readiness for the competition.

2.Material and method

For determination of the level of physical fitness of athletes in the 800 m running. Analytical study of scientific and methodological literature on the formation of the level of physical fitness of middle-distance runners. Determination of the physical fitness of middle-distance runners. In the course of the research, we studied the efficiency of carrying out loadings, physical and functional training, technical and tactical training of 10 middle-distance runners, the amount of loadings in the annual cycle. During the annual cycle, the training and competition activities of 10 athletes running 800 m were studied. In training, middle-distance runners are given exercises in sections of 200, 400 and 600 meters, as well as runs of 120-150 meters, and sometimes runs of 80 or 100 meters are provided with the quality of special training equipment. This determines the specific tasks of each given exercise. In the course of the research, it is necessary to develop a methodology for solving and eliminating various obstacles that arise in the sportsmen's fatigue through the use of special training tools in their training and competition activities.

3.Results and discussion.

The ability of middle-distance runners to maintain a high level of sportsmanship achieved at a stable level during all cycles of the competitive period and to achieve a high sports result depends on the level of physical fitness of the athlete. If any quality of this physical preparation is not developed enough, this may limit their ability to fully show their athletic performance. Therefore, the development of physical fitness of athletes during training is considered the main factor in the system of training athletes (Spencer M.R. (2001). p.157–162). For our

part, we focused on determining the physical fitness of athletes. In the course of the study, the results of our study were studied on the basis of a comparative analysis of model indicators that reflect the level of physical fitness of athletes, 800-meter runners(Prendergast K. (2002), p.3–8).

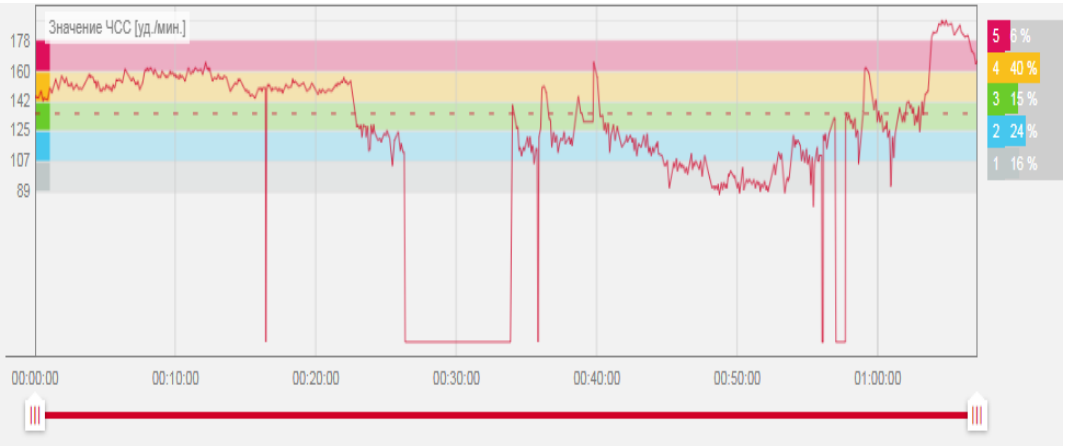

Figure 1. Dynamics of heart rate increase at a pace of running and interval training.

Figure 1 shows that the athlete started the training load with a heart rate of 142 beats/min and continued to increase the heart rate to 172 beats/min for 10 minutes. This load was made in order to raise the heart rate to about the maximum level, but at the same time, the athlete had to feel comfortable in running without enrolling in tempo running. Such a load is necessary in order to saturate the runner's body with enough oxygen so that he rationally performs the load in due time using the interval training method. In this situation, the athlete was near the limit zone of intensity, as indicated by the yellow color on the graph. Then the athlete continued to maintain the pace of running for up to 15 minutes, which is equivalent to a 2800-3000m distance and, finishing the last kilometer, slightly slowed down the pace of running to 153 bpm. Being a little in the yellow zone, the athlete continued to saturate the body with a sufficient amount of oxygen and at the 26th minute of the tempo run began to slow down the heart rate to beats per minute, thus slowing down the run. Having stopped running and switching to walking, the athlete also continued to be saturated with oxygen and thus prepare for the upcoming physical work in the intensive work zone. After resting in the moderate intensity zone for 4 minutes and restoring the heart rate by lowering it to 80 beats/min, the athlete was ready to perform the load in the submaximal intensity zone. His first load was to

run 600m without increasing the heart rate of 170 bpm, then re-run 600 m after 3 minutes of rest, but already increasing the heart rate to 175-180 bpm. As you can see, the athlete performs this task and does not exceed the pulse rate above 180 beats / min, which is evidence that the athlete is preparing himself and his body for the final race. In this regard, it is necessary to pay special attention to the athlete's recovery process, since in this zone the body can fall into a state of overtraining, and this situation will lead to the destruction of the training plan as a whole. In this regard, it is necessary to quickly control the training loads and carefully follow the instructions of the coach. With the advent of innovative technologies, it has become easier for the coach to plan and control the training process and the recovery dynamics of the athlete, as modern gadgets provide momentary digital information about the athlete's condition. And here you can clearly see how the athlete, reducing the heart rate, goes to the recovery procedure by jogging, relaxing all the muscles. It is especially important for a runner to be able to relax exactly those muscle systems that are necessary when performing intense loads. Also pay attention to the hydration of the body, especially in countries with hot climatic conditions like Uzbekistan. Given the above, an athlete needs to perform the maximum load at a competitive pace, which will contribute to the physiological shift of the body due to the loads and turn on the process of adaptation to the loads. It can be seen from the graph that the athlete, having lowered the heart rate to a moderate zone of 80 beats / min, ran a physical load in the submaximal and at the end in the maximum intensity zone. Polar recorded the following values: during the 800 meters run in the first 80-100 meters, the athlete had a high running pace, but the heart rate was in the low and high intensity zones with a value of 125-142 bpm. But as soon as the athlete covered 100 meters at high speed and continued to increase the pace of running, it was found that the heart rate grows in accordance with the speed of running and the maximum heart rate was reached at 300 meters. It was from this point that the athlete's heart rate began to increase, and the pace of the runner began to fall. It was revealed that runners run the first 400m at a distance of 800 meters faster by 3 seconds than the second round. It was also revealed that runners run the first 400 meters with a maximum heart rate, and the second 400 meters lack special speed endurance. In this regard, it was decided to extend the lactic acid production time and thereby improve the time of the 800m runner. It was decided to run 1 lap for 1-2 seconds worse than at the usual pace for the athlete.

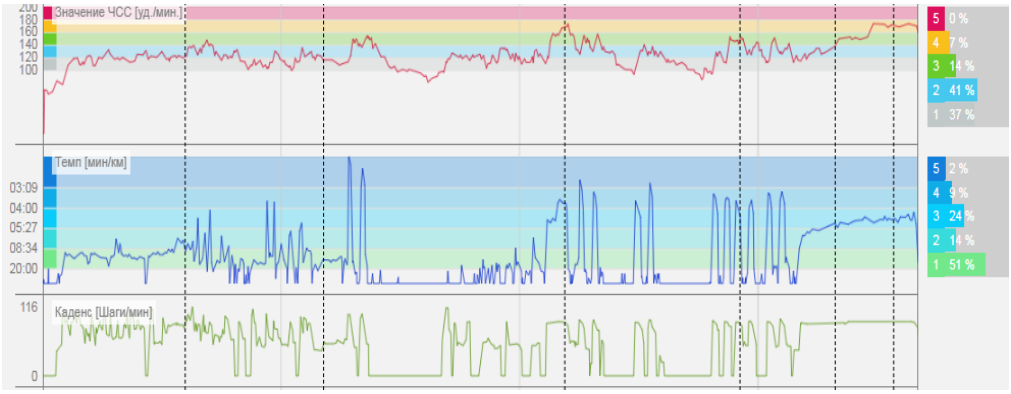

Figure 2. The dynamics of the increase in pace, running cadence and heart rate in an 800 m runner.

After a long workout, we still managed to increase the pace of running despite the increase in heart rate in the maximum intensity zone. Figure 2 shows that in order to increase the pace of running, the athlete increased his cadence and increased it to 116-120 steps per minute. In this regard, the heart rate also increased, but presumably the athlete's oxygen utilization was also increased, since it was found that at a maximum heart rate of 178 beats / min, the athlete's pulse no longer rose, but the running pace increased until the end of the distance of 800m. It should also be noted that the game cross (the game of speeds during training in tempo running) had a positive result on the athlete's sports performance. Thus, applying this training plan, we came to the conclusion that a game cross with a variable speed of running over a distance gives a positive effect and increases the performance of a runner by 800 meters. The repeated interval method increases the speed abilities of athletes, and high-intensity interval running with a short time to complete the maximum load also has a positive effect on the performance of the 800-meter runner.

As a result, 100 m is 12.3 ± 0.75 sec, 200 m 24.5 ± 0.82 sec, 300 m 36.6 ± 2.11 sec, 400 m sec, 52.11 ± 5.10 sec, 600 m 82, 40±7.52s 800m 112.6±8.82s , 1000m 152.4±13.8s The results of long-term observations show that in the period from 2000 to 2021, more than 200 athletes met the criteria for a candidate master of sports at a distance of 800 m, but only 1% of them met the criteria for a candidate master of sports. The main reason for this is that multi-year running and cross-country running did not have a place in the training program of athletes during their annual training. This means that they do not have fully developed special qualities of endurance.

4.Conclusions

Based on the results of a study to determine the physical fitness of athletes, runners at a distance of 800 m, the following conclusions were drawn. In order to increase the pace of running and at the same time maintain a low heart rate, it is necessary to

vary the training process and, if necessary, change the location of the training process. It was found that the body reacts more easily to changing circumstances during intensive training. The positive effect of high-intensity interval training for increasing running speed has also been noted, the purpose of which is to increase the pace of running but the duration of the time is short. In this regard, the athlete's body does not acidify, and the level of skill grows. When analyzing the literature on determining the physical fitness of athletes, 800 m runners, it was found that there is not enough evidence-based information about the physical fitness of athletes. In the end of pedagogical experiment comparative analysis of the results of 800 m runners with a model indicator of physical fitness found that our athletes are lagging behind in all respects. The results of the study show that it is necessary to develop and implement an optimal plan for the annual training of middle-distance runners.

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STRENGTH TRAINING FOR HIGH PERFORMANCE SPORT

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Abstract
As known, among the main physical qualities, the strength training of cyclists is of the most important practical importance. Strength in a bun is defined as the ability to overcome or resist external resistance that occurs through muscle tension. Based on this, the purpose of the scientific article is to develop a methodology for developing the quality of endurance strength with the help of special weightlifting exercises chosen by cyclists on its basis and in research. Prior to the study, an analysis of local literature showed that cyclists were determined to develop strength qualities through weightlifting exercises, regardless of whether training or programs were conducted at that time. In the annual cycle of training cyclists in the climatic conditions of Uzbekistan, the development of strength qualities falls on January, December of the year. Taking into account the climatic conditions and age characteristics of cyclists, the study developed a training program for the development of cyclists in the style of weightlifting exercises in a closed gym and overcoming the resistance of the muscles of the legs, waist, arms and shoulders on simulators.
Key words: strength, physical qualities, cyclists, weightlifting exercises.

1. Introduction

As known, strength is a basic physical quality that is directly related to the level of human biological development. The effect of training, which has the property of strength, causes functional and metabolic changes that are pronounced in the body of those engaged, leads to a much greater load on all organs and systems. It can be seen from this that the ability of athletes and athletes of different ages to master the power loads of their composition and adequately respond to them is not the same.

With the development of sports in adolescents, the age-related aspects of the development of physical qualities, including, first of all, strength, have been enriched by scientific developments. The justification of the fact that adolescent children can study in classes with weights dictated the conduct of serious research(2,3,4,5,8).

Dvorkin LS it is noted that purposeful training, which is carried out with weights that have the property of strength, has a positive effect on the functional state of the cardiovascular system in athletes aged 15-16 years, contributes to its adaptation to physical exertion, as well as to the body as a whole(20).

In the annual cycle of training cyclists in the climatic conditions of Uzbekistan, the training of strength qualities falls on January, December of the year. During these months, cyclists develop the strength qualities of the muscles of the legs, waist, arms and shoulders in the technique of overcoming resistance, mainly in weightlifting exercises and on simulators in indoor sports facilities. But

before this period, not a single methodological manual or article on preparing meals for cyclists was published in our republic. This creates many problems in the training of young cyclists for many years. For example, coaches who are engaged in cycling, weightlifting and train in the gym make many mistakes when performing exercises. This leads to a state of tension and extreme tension of the body of young athletes, as well as a sharp decrease in the dynamics of sports results. In this regard, the topic we have chosen is one of the most urgent problems of today.

Many scientific and methodological works on cycling have been created in Uzbekistan, including Chernikova EN, Karimov II, Halmuradov OY co-author of the book "Theory and methodology of cycling", Minakov SM and LI Abrakamova's textbook "Features of the period of training of highly qualified cyclists", II Karimov's master's thesis "Improving the process of training young cyclists at the initial preparatory stage" and textbooks on improving pedagogical skills in cycling, as well as in weightlifting, the book by Matkarimov RM and Pakova AV "Planning of training loads during the preparation and competition of weightlifters of the mass category" (methodological guide), Matkarimov RM "Division of weightlifting among young people", Matkarimov RM, Yunusov SA, Khodjaev AZ "Technology of using additional exercises at the stage of becoming a master of sports", RM Matkarimov's textbook "Weightlifting" is also from this list.

But there was no detailed information about strength training in cycling, about the subjects of developing strength qualities with the help of weightlifting exercises or about dissertations.

Aim of the experiment to study the cyclist's annual training plan, using the selected special weightlifting exercises, it is necessary to develop a methodology for developing the endurance and strength qualities of cyclists and base them on research.

Goals of the experiment:

1. On the basis of theoretical and practical knowledge, the study of the structural features and content of training processes in the strength training of cycling students was carried out.
2. Identify weightlifting exercises that teach cyclists the qualities of strength, and develop a training program that develops the quality of strength.
3. Test and base your Cycling students on the experience of a style designed to improve their strength qualities through weightlifting exercises.

2. Material and methods

The analysis of scientific and methodological literature is carried out in order to determine the factors that increase the efficiency of movement on a bicycle path in control and measurement training. The method of theoretical analysis included the study of scientific and methodological literature and the processing of the results of the entire study. In total, 12 scientific and methodological sources were studied, 3 of which are foreign, and 9 are local literature. Pedagogical observations were

carried out in January and December at all stages of training in the preparation process and at the stages of strength training of cyclists on the track. In the course of pedagogical observations, students of the cycling specialty studied the stage of strength training and control and measuring exercises, the volume of training, the duration of movement along the bicycle-highway corridor during competitions. During the training process, the following indicators were recorded and analyzed: the program of special strength training of cyclists from January to December, as well as the methods and means used; it was studied whether the applied loads affect the special performance of the athlete. In the control and measurement training, the rationality and reliability of strength training and the performance of movements by athletes, control was achieved. The data obtained as a result of pedagogical observations were recorded and analyzed. The results of the observations showed that the degree of dependence of the bicycle chassis on the dynamics of the growth of strength qualities during competitive exercises was studied.

We have developed a training program aimed at developing strength training in cycling training. This training program was conducted in January 2021 on the basis of control measurements of students in the specialty cycling. 8 students of the State University of Physical Culture and Sports of Uzbekistan, specializing in cycling, were attracted to participate in the pedagogical experience. The examiners were trained 3 times a week, 2-3 academic hours (depending on the size of the planned academic load) continued in natural learning conditions.

Members of an experienced group of cyclists participated in the training program developed by US. In the mathematical processing of data obtained in the course of scientific research, generally accepted statistical characteristics were taken into account: the arithmetic mean ($\overline{X}$) was calculated in percentage terms (%), the average value.

3. Results and discussion

As you know, such qualities as strength and endurance are important for a cyclist to achieve high results. But in order for the cyclist's muscles not only to withstand loads, but also to stand out at high speed in the prologue of road cycling, it is certainly advisable to use kettlebells in the correct order and in training in accordance with the instructions. Thus, strength is also important for a cyclist, that is, specific endurance.

Therefore, the training of a cyclist should be organized in such a way that when considering various physical indicators, aspects of endurance and strength should be prioritized. The strengthening of the technique and its improvement regularly continues in the practical activity of the cyclist. Failure to comply with the technical regulations for conducting competitions and special auxiliary classes may subsequently negatively affect sports training.

Based on the analysis of the long-term plans of other sports classes, as well as the many years of preparatory experience of Uzbekistan State University of Physical Culture and Sports students in cycling, the coaches, in cooperation with the students themselves, reflect from all sides and develop plans for the future for the next few years, will help the trainees prepare for Responsible competitions on a clear and planned basis.

Cyclists of the I and II categories can give some tips on how to make a long-term plan to coaches who work with students. First of all, the results that an athlete has achieved in one season should be strengthened and further improved in the next season. If the training plan is correctly distributed, then a properly structured multi-year training plan eliminates any short-term rapid training to achieve high results in the shortest possible time. Only as a result of many years of continuous training, the physical and technical training of a cyclist improves, willpower improves and the highest technical and sports results are achieved.

Based on our topic, it should be noted that the development of strength and endurance qualities by means of weightlifting in combination with the correct organization of cycling training leads to a positive increase in the volume of loads, taking into account the physical fitness of the athlete, as well as a positive effect of training. In athletes, the manifestation of muscle strength is associated with the accumulation of the nervous system, which controls muscle activity. At the same time, it should be taken into account that the parameters of the working power of a cyclist with categories I-II are small. Given this, the development of strength in cyclists should be carried out carefully and gradually. To do this, it is desirable to use weights with a maximum result of no more than 75-80%, used in training.

1. Jerky lifting is not only dynamic, but also associated with the static performance of work. For example, cyclists experience static tension after half the distance on the highway, especially at the waist and legs. Holding the squat in any position will cause static tension of the athlete's muscle groups of strength. Taking into account the need to develop muscle strength and endurance to static loads, cyclists are introduced to exercises with static characteristics using exercises with weights. The training process is aimed at developing strength qualities. Thanks to the research conducted by many experts, it has been proved that such exercises provide great advantages for increasing strength and special endurance in athletes(14,15,16,19,20). It is important for cyclists to choose such static exercises, this should contribute to the development of muscle strength when performing special auxiliary exercises. Due to this, the task of correctly normalizing the load when performing static stresses is minimized. In the development of the quality of strength of cyclists, attention is mainly paid to the strength of the waist, legs, arm muscles, the main qualities of strength and endurance play a huge role while driving on the negaki bicycle chassis.

2. Based on the above programs, the cyclists were presented with a training plan for January-December and they were involved in practice, it should be noted that the cyclists mainly focused on the development of leg and waist muscles in the exercises. In the same series of exercises, we noticed this aspect, in the middle of the exercise, which was devoted to the same muscular forces of the legs, exercises were used that were distributed to the strength of the muscles of the arms and waist. Because when the leg muscles change the position of the exercise, a state of recovery occurs, even if it is not much, until the exercises are distributed to the next leg muscle. In the 1-week training plan, we see that the NBL reached 580, in the 2-week 772, in the 3-week 862, and in the 4-week this indicator reached 800. For cyclists, sitting with a barbell on the shoulder for 1 week started with 50 kg, and for the 4th week it rose to 65-70 kg.

Walking with a barbell on the shoulders, lifting to the tip of the foot with a barbell on the shoulder, squats with a barbell on the shoulders, squats with a barbell on the chest are mainly aimed at developing the muscular strength of the legs, this will not only have an effect on increasing the number of turns of the pedals on the bike highway , but also, as the number of repetitions increases, will have a positive effect on speed and endurance. Exercises lifting to the tip of the foot with a barbell on the shoulder are a type of exercises that aimed at developing the musculature of the foot. Deadlift, tilting forward with a barbell, lifting back to 90° with a barbell on the shoulder and lifting the barbell from the knees to the back in the position of bent knees will have a positive effect on the strength of the lumbar muscle, the reason why these exercises are given is that cycling requires an athlete to sit in the saddle for a long time on the same track, which, in turn, leads to static tension of the waist muscles.

Table 1. *Indicators of physical fitness and special training of students-cyclists of the experimental group before and after the study*

	Full name	Running for 100 meters *(s)*		Jump from the standing position to the length *(cm)*		Pull ups	
		BE	AE	BE	AE	BE	AE
1.	RR	13.3±0.1	12.9±0.1	210±1	215±2	9±1	12±1
2.	TL	13.4±0.3	13.1±0.2	200±5	207±2	8±2	10±2
3.	DD	13.0±0.1	12.8±0.1	209±4	214±2	10±1	12±1
4.	NG	12.9±0.4	12.5±0.2	220±1	226±2	12±2	14±1
5.	AO	12.8±0.2	12.4±0.2	224±2	229±3	8±2	11±1
6.	OO	13.0±0.1	12.5±0.3	210±1	217±4	7±1	10±1
7.	SS	13.1±0.1	12.6±0.2	205±1	212±2	9±1	11±2
8.	SA	13.5±0.2	12.7±0.5	205±2	214±3	8±1	11±2
X-average		13.1±0.1	12.6±0.2	210±4	216±1	8.7±4	11.6±2.1

Note: *BE- before the experiment, AE- after the experiment*

Table 2. Continue table 1

№	Full name	Twisting the legs while lying on the simulator		Squats with a barbell on the shoulders		Squats with a barbell on the chest		Deadlift		Lifting the barbell while lying down	
		BE	AE	BE	AE	BE	AE	BE	AE	BE	AE
1.	RR	14±1	17±1	12±1	16±1	10±1	14±1	12±2	15±1	10±2	13±2
2.	TL	15±2	18±1	13±1	17±3	11±1	16±2	11±2	14±2	10±1	13±1
3.	DD	17±2	22±2	14±2	19±1	12±2	16±2	10±1	14±2	11±2	14±2
4.	NG	18±2	22±1	14±1	19±2	11±3	15±1	10±1	13±1	12±2	16±1
5	AO	15±1	19±2	13±2	19±1	10±3	15±2	10±2	14±2	11±2	15±1
6.	OO	13±4	17±2	11±2	18±1	10±2	16±1	11±2	15±2	9±2	11±1
7.	SS	14±3	18±2	11±2	19±2	9±1	15±1	8±3	13±1	9±2	12±3
8.	SA	12±3	16±2	10±2	16±2	9±2	14±2	7±3	11±1	8±1	10±1
X-average		14±3	18±1	12±3	17±2	11±4	15.±2	9±2	13±2	10±1	13±2

As can be seen from the tables above, we see that after the study, the indicators of physical fitness and specific training of cycling students in the experimental group increased significantly, If before the experiment, the 100-meter run X-averaged 13.1±0.1 seconds, then after the experiment we could see that this indicator improved to an X-average of 12.6±0.2 seconds. If before the experiment, the jump from the standing position to the length was on X-average 210±4 cm, then after the experiment, the indicator increased to an X-average of 216±1 cm. Weekly loads, that is, NBL, were compared with cyclists by the number of average loads, taking into account the state of his fatigue and recovery during training. 75-80% of the weightlifting exercises included in the training program are aimed at developing the strength of the lumbar muscles of the foot.

The minimum skill in each training session is about 4 points (average) and 8.5 points (high). It was considered 5.5 points (above the middle), 7.5 points (below the high).

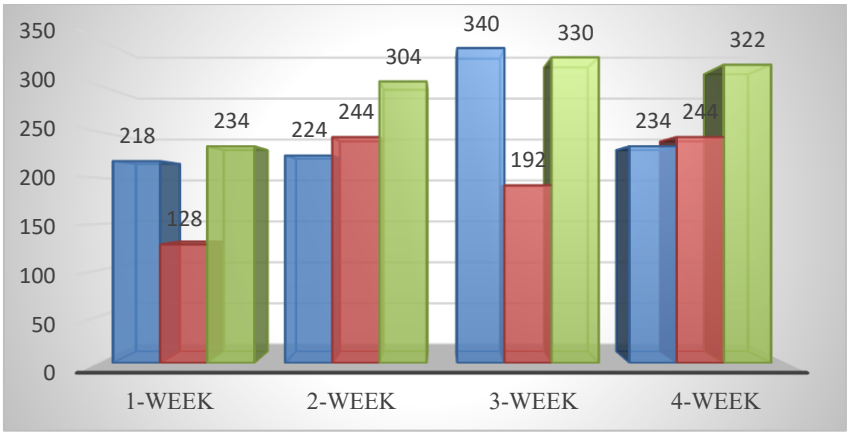

Figure 1. *The rate of increase in training loads*

The figure showed the ability to work out the NBL 150-200, while the special ability to work out the NBL 300 was lower than the average.

In the experiment, the specific performance under the influence of a training volume (if the NBL is more than 300) decreased by 5.5 points, in the case of a small volume (NBL 130) increased by 8.5 points. Thus, from these indicators, we can conclude that the smaller the volume of loads (NBL) during training, the higher the specific performance of the athlete. If we use the criterion of subjective assessment of specific performance with the correct compilation and adjustment of training loads for weekly cycles.

4. Conclusion

1. It is established that training program loads have a positive effect on the specific working capacity of the body of young cyclists.
2. During the training of cyclists, highly effective sports exercises in weightlifting were identified, aimed at developing strength qualities. A training program was developed for the identified exercises. Weekly and monthly training plans have been developed in the style of overcoming resistance with the help of barbells and simulators.
3. The program that we developed was implemented in the training of Uzbekistan State University of Physical Culture and Sports cyclists and cycling students and allowed us to achieve a high sports result.
4. Summing up the results of the training conducted on the basis of the program developed in the study, the program that we developed in the development of the quality of strength of cyclists had a positive impact on their physical development, as well as on the growth of the quality of strength.
5. In the course of the study, it was found that the correct distribution of NBL during training, a sharp increase in the dynamics of the cyclist's sports results and a positive effect on the special performance of cyclists were found.
6. During the training of cyclists, highly effective sports exercises in weightlifting were identified, aimed at developing strength qualities.

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THE STUDY ON THE DEVELOPMENT OF PSYCHOMOTOR SKILLS THROUGH METHODS AND MEANS SPECIFIC TO RHYTHMIC GYMNASTICS AT THE INITIAL TRAINING STAGE

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Abstract

Psychomotor abilityy must be understood as an educational purpose that indicates the degree of development of the student's motor skills to perform technically correctly physical exercises (expressive, economical, resultant performance). Those who want to assert themselves in gymnastics must always perform physical difficulties (jumps, balances, turns), dance steps, dynamic turn and throwing elements, mastery with portable objects, more difficult, original, spectacular, in order to be performed with great skill. The level of artistic mastery in aesthetic sports events, in most cases, places great value on skill, intellect, physical ability, motor coordination, musical backgrounds, originality of costumes, portable objects, as well as psychomotor skills. Through its complex content of jumps, pirouettes, balances and handling of portable objects (rope, circle, ball, clubs and ribbon), rhythmic gymnastics makes a significant contribution to solving the tasks provided in the specialized regulations. The experimental results highlight the fact that the indices of psychomotor abilities, obtained by 7–8-year-old gymnasts of the experimental group, represent the incipient activity of training motor skills.

Keywords: *anthropometric measurements, body composition, deviations, statistical analysis, performance.*

1. Introduction

Contemporary sport is characterized by a rigorous dosing of the volume and intensity of physical effort and by an early specialization.

Currently, rhythmic gymnastics meets new modern trends regarding the content and appreciation of exercises. The new changes to the scoring code, aimed at the difficulty of technical elements and the handling of portable objects, i.e., awarding points for each difficulty and, last but not least, specifying the requirements for each technical-artistic procedure, which will determine new guidelines regarding the volume and intensity of physical effort in the process of instruction and training.

It is absolutely necessary and useful to pay special attention to the development of psychomotor skills in the training process of female gymnasts at the initial stage. This contributes to the education of virtuosity, elegance, creativity, aesthetics, plasticity and expressiveness of the movements, combined at the same time with the rhythm and the emotional-motor message, all expressed on the basis of perception the expressiveness means of the rhythmic gymnastics' compositions (Dumitrescu, 2001; Reaboi, 2016; Viner, 2003).

The possibility of practicing exercises in rhythmic gymnastics in all extracurricular institutions, almost throughout the year, as well as their accessibility, even for children in general education schools argues in favor of their inclusion in physical education lessons.

This work aims to bring out as much as possible what is particular and specific in the development of psychomotor skills at training lessons, at the initial training stage, as well as the methods and means of its development.

It is known that the development of motor skills is a basic objective in the activity of the instruction and training process, and special and scientific action for the development of psychomotor skill also implies positive indirect effects on others, and the level of development conditions the duration of the acquisition process (Diacikov, 1978 ; Dragnea, 1995).

The work consists in the fact that the young female gymnasts who practice this sports event where the beauty of plastic movements is combined with the psychomotricity improvement, cannot perform correctly, extensively and aesthetically most of the exercises in rhythmic gymnastics provided by the Scoring Code. In order to achieve the aim and objectives of this work, a pedagogical research was organized with the young female gymnasts aged 7-8 from Sports School of the Olympic Reserves, Chisinau.

2. Material and methods

Starting from the theoretical arguments of approaching psychomotor skills as a fundamental observable behavioral attribute, in order to achieve an acceptable level of performance and to demonstrate the formative effects in practice - we set out to research the emergence of psychomotor products and the possibility of evaluating these products/parameters at the initial training stage.

To carry out the research tasks, the following scientific methods were used: theoretical analysis and generalization of specialized literature data; record and control in sports training: pedagogical observation; test method; tabular method; the pedagogical experiment; the statistical-mathematical method of processing and interpreting the recorded data.

3. Results and Discussions

To achieve the proposed goal, we applied the specific means for the development of the psychomotor qualities, principles and motor skills of the experimental group that are necessary for the high-level practice of rhythmic gymnastics. Further, the statistical analysis of the most relevant calculated indicators is found in Table 1.

Table 1. Comparative analysis of the development level of the psychomotor skills of the female gymnasts, control and experimental groups aged 7–8 (n=16)

No. crt.	Parameters tested	Group	Statistical data		t	P
			Initial testing	*Final testing*		
			$\overline{X} \pm m$	$\overline{X} \pm m$		
1	Right forward balances (no/rep – 20 s)	C	13.00 ± 0.38	13.12 ± 0.44	0.483	>0.05
		E	12.75 ± 0.41	14.25 ± 0.25	5.878	<0.001
		t	0.48	2.22	-	-
		P	>0.05	<0.05	-	-
2	Left forward balances (no/rep – 20 s)	C	12.25 ± 0.41	12.50 ± 0.50	0.500	>0.05
		E	12.00 ± 0.38	13.37 ± 0.26	6, .101	<0.001
		t	0.447	1.55	-	-
		P	>0.05	>0.05	-	-
3	Right backward balances (no/rep – 10 s)	C	7.37 ± 0.27	7.50 ± 0.26	0.767	>0.05
		E	7.50 ± 0.27	8.40 ± 0.24	5.665	<0.001
		t	0.333	2.48	-	-
		P	>0.05	<0,05	-	-
4	Left backward balances (no/repetitions – 10 sec.)	C	8.12 ± 0.29	8.37 ± 0.26	1.435	>0.05
		E	8.25 ± 0.31	9.37 ± 0.18	5.720	<0.001
		t	0.29	3.12	-	-
		P	>0.05	<0.01	-	-
5	Standing on left toe, right bent forward (s)	C	4.22 ± 0.22	4.53 ± 0.21	2.386	<0.05
		E	4.23 ± 0.21	5.08 ± 0.13	6.269	<0.001
		t	0,03	2.25	-	-
		P	>0,05	<0.05	-	-
6	Two vertical spins, two side flips and forward rolls (s)	C	9.83 ± 0.30	10.26 ± 0.28	2.394	<0.05
		E	9.90 ± 0.30	8,75 ± 0,28	6.397	<0.001
		t	0.15	3.82	-	-
		P	>0.05	<0.01	-	-
7	Five forward throws with the gym ball in the right hand (points)	C	8.12 ± 0.40	8.37 ± 0.37	1.047	>0.05
		E	8.00 ± 0.42	9.50 ± 0.33	6.056	<0.01
		t	0.21	2.260	-	-
		P	>0.05	<0.05	-	-
8	Five forward throws with the gym ball in the left hand (points)	C	6.00 ± 0.38	6.12 ± 0.35	0.554	>0.05
		E	5.75 ± 0.41	7.12 ± 0.29	5.633	<0.001
		t	0.45	2.18	-	-
		P	>0.05	<0.05	-	-
9	Rhythmic capacity in coordination mode (points)	C	6.25 ± 0.41	6.37 ± 0.37	0.511	>0.05
		E	6.12 ± 0.44	7.62 ± 0.32	5.770	<0.001
		t	0.78	2.44	-	-
		P	>0.05	<0,05	-	-
10	Motor coordination capacity (points)	C	2.78 ± 0.18	2.72 ± 0.17	0.550	>0.05
		E	2.74 ± 0.17	2.25 ± 0.14	4.790	<0.01
		t	0.16	2.15	-	-
		P	>0.05	<0.05	-	-
11	Creative, musical	C	7.12 ± 0.44	7.37 ± 0.42	0.942	>0.05

	and expressive capacity (points)	E	7.07 ± 0.41	8.59 ± 0.37	6.199	<0.001
		t	0.18	2.15	-	-
		P	>0.05	<0.05	-	-

Note:	(g=14)	*Combined samples*		(f=7)	*Combined samples*	
C = 8; r = 0.811	*P – 0.05;*	*0.01;*	*0.001*	*P – 0.05;*	*0.01;*	*0.001*
E = 8; 2r = 1.622	2.145;	2.977;	4.140	2.365;	3.499;	5.408

Psychomotricity is considered in specialized literature (Dragnea, 1995; Jeleascov, 2000; Ulmeanu, 1996) as a complex function, an aptitude that integrates both aspects of motor activity and manifestations of perceptual functions.

By using the Student "t" criterion and the significance threshold P, there were found values that show that the difference between the averages of the parameters evaluated at the initial testing in the case of the researched samples is significant. In the case of the research, the scientific requirements regarding the homogeneity of the experimental groups were met with a probability of 95%, at the threshold of P<0.05. The parameters characterizing the psychomotricity of the female gymnasts were tested. Testing forward and backward right (left) balances that engage the entire segment (arm, leg, trunk) in a wide range of motion, led from the scapulo-humeral and coxo-femoral joints and at the far end of the described segment of the curved line. The tested parameters prove to us that balance exercises develop joint mobility, muscle strength and the ability to keep the balance of the body in support conditions – standing on one leg, on the sole or toe, with the knee extended or bent, and by direction – forward, backward with the leg extended or bent.

At these tested parameters, the statistical data show us that the indicators of balances in the control group at the final test have progressed insignificantly in four parameters of *forward and backward balances* compared to initial testing. The "t" values, Student criterion range between 0.48 and 1.43 at the significance threshold P>0.05.

At the final testing, there were no significant differences between the parameters tested in both experimental groups at *left forward balances* (P>0.05). In six out of seven parameters, the results obtained by the control group and the experimental group are significant at the threshold of 0.05.

Regarding the performance of the experimental group compared to the initial testing, the number of repetitions of forward and backward balances for 20 s increased significantly. At the final test, the Student's t criterion variables are at the significance threshold P<0.001.

Compared to the experimental group of 5–6 years, in the gymnasts of 7–8 years, the number of repetitions of forward balances for 20 s increased by 31.03% of the right leg and 46.57% of the left leg, which proves to us a superior performance of the development of the mobility ability, strength, speed and motor coordination of 7–8-year-old female gymnasts.

When testing *the Right and left backward balances* - progressed significantly at the threshold P<0.001. Compared to the 5–6-year-old experimental group, the 7–8-year-old female gymnasts possess a better ability in the execution of backward

balances at speed for 10 s, performing 34.40% more times with the right leg and 31 .58% more repetitions with the left leg.

The ways in which the balance technique is acquired are recognized and used in a certain order, considering the specificity of these movements. During the balancing movements, the inertia of the whole body is used, which will mainly require joint and muscle mobility and elasticity and the neuro-muscular ability to relax the antagonist muscles (Ulmeanu, 1996).

The amplitude of the backward balance leg extension is the greater the more extended the knee, and the more limited the more flexed the knee. To stretch the rectus femoris muscle, coxo-femoral mobility must be at a higher level, which the 7–8-year-old child requires difficulties in the level of psychomotor training and development. Balances are movements that specifically use inertia (Reaboi, 2016). Exercises with muscle contractions (active and passive balances) from all positions and directions were used, thus using external inertial forces in close correlation with internal ones (muscle chain contractions), which determine the alternation of certain degrees of muscle contraction with relaxation.

Maintaining position *in Standing on left toe, right bent forward* characterized by static balance, it forms the qualities necessary to maintain body stability and helps with difficult pirouettes taken from the Scoring Code for 7-8 year-old gymnasts.

This parameter requires a perfect coordination of the activity of the large muscle groups, because the preservation of the body stability is achieved in conditions of reduced support, in the case of our research, in standing on toe, the right leg bent forward, changing the weight control of the body, in relation to the supporting point. In this position, the 7–8 year-old experimental group at the final testing maintained for 5.08±0.13 s compared to the initial testing 4.22±0.22 s with 0.85 s maintained equilibrium longer, the result being significant at the threshold of $P<0.001$.

In the test *Two vertical spins, two side flips and forward rolls (s)* performed in time, demonstrate the coordinative capacity (orientation in space) of the experimental samples. The conditions for the execution of the parameter are more difficult in the actions that require changes in the positions of the body and different moving segments, requiring the change of the center of gravity of the gymnast's body.

The statistical data show us that both experimental groups obtained significant results, at the final test, but the t variable, the Student criterion in the control group is 2.39 at the threshold of $P<0.05$, in the experimental group the value of the t criterion increases to 6.397 at the $P<0.001$ threshold, with 99.9% probability.

Rhythm represents the ability to organize the nervous processes of excitation and inhibition at the level of the cerebral cortex, to systematize them, through the formation of proprioceptive reflexes at certain time intervals, which directly influence the motor act and its coordinated and aesthetic effect execution (Jeleascov, 2000; Mociani, 1985). The diversity of the actions applied in the 7-8 year-old experimental group led to the increase of the possibilities of combining movements without an object to the possibility of the performer to know, select and

apply only those movements that are more suitable to psychomotor structure (psychic, physical and motor).

At the tested parameter, *five forward throws with the gym ball in the right and left hand,* 7–8 year-old gymnasts of the experimental group at the final test achieved better results, compared to the control group. The Student's t-test value demonstrates an indicator of 2.26 for right-handed throwing and 2.18 for left-handed throwing, in both cases the $P<0.05$ significance threshold is due to chance or significant differences.

At the final testing, 7–8 year-old female gymnasts of the experimental group when throwing the gymnastic ball forward constituted an extension of the movement of the trunk and arm, to carry out in the direction of throwing, motion being the end point of the ball flight on the required trajectory. Motions of portable objects track all possible planes, directions, angles and throwing trajectories. According to the Scoring Code, the object must be handled with both the right and left hand. This variety of procedures increases the degree of virtuosity and mastery of the gymnast.

The knowledge and understanding of the technique of execution of the test allowed to obtain higher results in the evaluation of competence, obtaining in the final test 9.50±0.32 points for right-handed throwing and 7.12±0.29 points for left-handed throwing. In both cases compared to initial testing, data are significant at the threshold of $P<0.01 – 0.001$.

According to the results *rhythmic capacity in coordination mode* were performed better by the female gymnasts of the experimental group, obtaining at the final test 7.62±0.32 points compared to the initial result 6.12±0.44 points. The calculated value of $t= 5.770$ points is greater than the tabulated value at $P<0.001$. Compared to the control group, the table value of "t" is 2.44, $P<0.05$. In order to highlight the means used in forming gymnasts' composition, we present coordinated exercises with different body segments, exercises on an unusual surface, exercises with an accuracy to demonstrate a movement according to the parameters of time and space, exercises with various objects, exercises with reaction speed .

In the control group the *motor coordination capacity* refers to the existence of insignificant distributions at the final testing compared to the results obtained at the initial evaluation. Student's t-test value is 0.550 at the significance threshold of $P<0.005$. Given the fact that the results obtained by the female gymnasts of both samples are significant ($t=2.15$; $P<0.05$).

The experimental group has a more developed motor coordination. In the initial testing it obtained an average of 2.73 points, in the final testing 2.24 points, requiring less difficulties in execution, the difference between them is significant at the threshold of $P<0.01$, the specific hypothesis being valid. By using specific means in the learning and training process of the experimental group, it is experienced and demonstrated how creativity can be productive in a systematic and deliberate manner.

In order to educate a creative-musicality, modern dance steps or jazz rhythm were used (plie, pointed with bent knees, rolled and arched, crossed, single and double, etc.); sports dance steps performed on different rhythms and tempos (samba – in 2/4 measure; cha–cha – in 3/4 measure; rock and roll or jive – in 4/4 measure; tango – in 2 measure /4) and folk-dance steps. This group of movement structures, such as dance steps, broadens the content of rhythmic gymnastics and gives great plasticity and power of artistry with a value in sports compositions of 0.30 points.

For 7–8-year-old female gymnasts *the creative type capacity, musicality and expressiveness* has an artistic value in the performance of competition compositions in close accordance with the music, in terms of creative content, compositional form, intensity, tempo and melody. Solving problem situations, developing various simple, original compositions. The practical application of skills being fixed. In the content of the action composition, the dominant idea of the piece of music is expressed. The 7–8-year-old gymnasts have a higher capacity for creativity, musicality and expressiveness, obtaining an average of 8.59±0.37 points in the final test, compared to the initial test of 7.07±0.41 points, being at a significance threshold of $P<0.001$. The difference between the final testing of the control group and the experimental group is significant. The variable value t, Student's criterion is 2.16, at the significance threshold of $P<0.05$.

The creativity capacity, musicality and expressiveness are fundamental psychological, physiological, psychomotor phenomenaa, to imprint bodily movements with a certain creative character done in time with an individual improvisation, in relation to the quality of the auditory principles through which the form elements of music (rhythm, tempo) as well as content music elements (dynamics and character) are perceived. The following varieties of steps and walking specific to rhythmic gymnastics were used: light, sharp, arched, lunge, high, dance, jumps, gallop, polka, waltz, mazurka, thus contributing to the emphasis of artistic expressiveness, as well as to increase plasticity, expressiveness in execution.

In order to achieve the proposed goal, it is necessary to develop psychomotricity on which a stepped action of intensity is carried out without violating the anatomical potential.

4. Conclusions

1. The psychomotor qualities of the 7-8-year-old female gymnasts in the experimental group progress significantly, having the value $P<0.01$ – $P<0.001$, compared to the control group, in 2 of the 9 parameters: $P<0.05$.
2. The obtained data confirm the major value of the methodology used in the training process of young gymnasts at the initial training stage in rhythmic gymnastics.

3. Existing practice highlights the fact that it has not been taken into account the way 7-8-year-old gymnasts form their psychomotor skills, starting from the initial training stage .
4. Following the analysis and synthesis of the opinion of specialists in the field of rhythmic gymnastics, some difficulties were found, especially related to certain sequences of application of objectives centered on the development of psychomotor skills.
5. The content of sports training should be supplemented with special exercises for the development of psychomotor skills. The efficiency in this regard is high if early action is started with the young female performers.

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THEORETICAL-METHODOLOGICAL CONCEPTS OF TECHNICAL TRAINING IN MIXED MARTIAL ARTS (MMA)

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Abstract

The present article addresses issues of MMA fighters' technical training during in-depth specialization stage and orientation towards high performance.
Currently, the content of research carried out on technical training is supplemented by the full use of the knowledge of many similar disciplines: physiology, theoretical mechanics, mathematics, psychology, electronic computing and others, in order to assess the effectiveness of both the instructional means and the results obtained in following their application. Therefore, the continuous improvement of the special skills of MMA fighters requires continuous training, which must be oriented and carried out based on the methodical line of practicing mixed martial arts, in accordance with the complex tasks and requirements of the development of this sport on an international level and closely related to competitive activity. Likewise, researchers in the given field claim that the content of technical training in MMA fighting must be formulated based on the rules of competitive activity and the general principles of technical training in martial arts.
Thus, the need to determine and scientifically argue the theoretical and practical issues of technical training in fighters mixed martial arts at the stage of in-depth specialization and orientation towards high performance in the Republic of Moldova is outlined.

Key words: *technical training, mixed martial arts, sports performance, technical procedure, methodical aspects, physical skills.*

Introduction

Mixed martial arts are a sport that combines kicks and fighting movements technique through a complexity of emotional components, constantly tending towards the improvement of the most representative side - the side of technical training.

Technical training is at the top of the pyramid which is made up of other types of training. The content and methods of technical training in MMA are practically not studied, the solution to this problem can be achieved, as mentioned in the specialized literature, by studying and analyzing the training methodology of MMA fighters at various stages of sports training (Adam, Smaruj, Pujszo, 2012; Boesteanu, Moraru, Scobioala, Spinu, Ciubaciuc, 2008; Gheorghiu, Carp, 2017).

Mixed martial arts began primarily as a result of fights between representatives of various fighting types, such as: Boxing, Kickboxing, Muay Thai, Jiu Jitsu, Judo, freestyle wrestling, Greco-Roman wrestling and Sambo wrestling.

Thus, it is considered that a theoretical argumentation and a coherent methodological substantiation of this subject can update the technological aspect of training specific motor skills and abilities, directing the training laws in order to achieve the maximum achievement of the requirements of the technical training of

athletes in performance mixed martial arts (Matveev, 1991; Segarceanu, 1998; Ashkinazi, 2014).

Material and methods

The *purpose of this research* is to improve the theoretical-methodological bases regarding the technical training of athletes in performance mixed martial arts.

The objectives are theoretical research activities, methodological argumentation of the concept "technical training" in performance mixed martial arts; the study of the technological and methodological background of the MMA element technique; highlighting the most significant approaches in order to describe the essence of this notion.

An appreciation of the technical training consists in the fact that the technical training involves the scheme or the detailed plan of the movement system that ensures the rational realization of the appropriate motor task.

The foundations of technical training, as confirmed by all specialists in the field, are laid in the first stages of the training and instruction process (Epuran, Holdevici & Tonita, 2008; Segarceanu, 1998; Ashkinazi, 2014).

Results and discussion

The basic mechanism of *the technical process* represents the logical sequence of motor acts, necessary objectives, in order to perform it efficiently. The spatio-temporal and dynamic characteristics of the respective process must also be associated with this mechanism, namely the most suitable trajectories of the body or its segments during the phases of the movement, the final efforts or focus of different moments in the action performance. As a result, the basic mechanism of a technical process must be understood as a system of factors (spatial, temporal, dynamic and energetic), in close correlation, which determines an increased efficiency.

Learning the technique in mixed martial arts is generally characterized by the laws and stages of learning motor acts and actions, of course, with some differential, specific notes, determined by the particularities of this sporting event and especially of the competition regulations. The learning of technical procedures generally goes through the stages of learning any act or motor action, according to the following stages:

a) *the stage of informing and forming the representation of the movement* in which the athlete creates, based on explanations and intuitive means, an image of the procedure to be learned. The information can be:

- *oral*, transmitted precisely, with the role of ordering, supporting and improving the thinking and imagination processes in all forms of mental and ideomotor training, as well as participating in discussions, evaluating the executions of others, etc.;

- *visuals*, through the use of films, photographs, images of all kinds, which can clarify, specify and motivate the athlete through the mediation of real and perspective values;

- *tactile-kinesthetic information*, necessary in high-risk complex technical executions, which have the role of conferring safety and increasing trust. The utilization of information requires a very good perception, based on attention, concentration, sensory qualities, and their volume must take into account the athlete's individual processing capacity. As a result of these, the athlete develops an action project, determined to a large extent by the previous motor experience, the level of development of the motor qualities, the effort capacity and the spirit of observation that he masters.

Methodical aspects were the basis of the information stage and the formation of the movement's representation:

- preliminary information extends the time available for training and adjustment thus bringing safety, being able to promote anticipation at the same time they can perform the function of an "early warning system, which can calm or unsettle the athlete, depending on the situation and personality;

- in the information processing process, athletes must be actively involved;

- self-analysis will be improved by means of questions aimed at a well-defined goal (what are you focusing on?);

- increasing the sensitivity regarding the relevant perceptions of movement can be achieved by applying some constraints (for example, closing the eyes);

- the athletes' autonomy will be closely related to the ability of self-observation and self-appreciation.

b) *the stage of "gross" movements*" or insufficiently differentiated, characterize the first practical executions of the respective technical procedure, the main information received by the athlete is constituted by the coach's verbal instructions.

The related phenomena of this stage are: excessive effort, jerky (improper) rhythm, low amplitude and precision, etc. This stage is decisive in learning the technique correctly. If motor acts are acquired with inappropriate trajectories or inappropriate amplitudes, they constitute as many mistakes, which, later on, will be very difficult to correct. As such, special motor measures and methods favoring correct practice are required. These will mainly refer to the components of the basic mechanism of the technical process.

Thus, we established the methodical aspects at the stage of "gross" movements:

- the organization and processing of information will always be done according to the proposed objective;

- the coach's oral encouragements can become supporting, directing and motivating impulses;

- the short and concise indications will focus on a center of interest, nodal, important aspects of the correct execution;

- the information received systematically through several sensory channels are effective components for the learning process in the real-nominal comparison;

- the coach has to notice the mistakes (concerning the structure of the movement), possible deficiencies (insufficient level of development of some motor qualities, directly involved in the effort) or deviations from the normal technical values;

- the correction of mistakes will initially be achieved by explanation and even demonstration, by changing the external factors to the action, especially through the conscious collaboration of the athlete.

c) *the stage of fine coordination and consolidation of technical procedures* has as essential features: the correct performance of the movement, usually in standard or stereotyped conditions, varied (only in certain situations, reduced in number); execution with increased strength, speed and endurance conditions; fluent execution, with appropriate rhythm, precision and amplitude.

Effective at this stage are the indications aimed at the perception and sense of movement, because this information can be transposed directly and coordinately by the athletes. Particular attention will be paid to the formation of perceptions, with special reference to the internal processes of motor skills: the improvement of differential perceptions, kinesthetic-vestibular responses, as well as the intensive training of conditional coordinative performance premises.

From a pedagogical point of view, the athlete must also be led in the correction process towards autonomy and automaticity, thus ensuring independence from external corrections. Through improved self-awareness, he can appreciate his executions and adjust his movements during subsequent repetitions. At this stage, the information transmitted by the coach will refer to the improvement of some details of the movement, which determine the fine execution of the technical procedure.

d) *the stage of perfecting and overlearning the technical process,* it is characterized by its performance in varied conditions, with higher efficiency indices.

At the mentioned stage, the athlete is able to adapt his executions at any time to the most varied external conditions, done by the opponent. Overlearning is an effect and condition determined by the need for a large number of repetitions.

The learning of any technical procedure is carried out on the basis of models established by specialists following numerous and in-depth biomechanics studies. These mainly refer to the basic mechanism of the process and the execution details specific to the different styles.

Going through the stages of learning involves the permanent reporting of the execution to the model, the analysis of the positive and negative ascetics of the execution and the establishment of corrective measures; circuit (feed-back) that is repeated until the overlearning stage. The feedback is carried out in three phases:

- the pre-motor phase (which corresponds to the first stage before the repetition) in which the athlete becomes aware of the learning objectives, depending on which the intention appears and a project is established containing the desired parameters of the execution;

- the motor phase (corresponding to the second stage) when moving on to the actual execution of the procedure with the inevitable mistakes;
- the post-motor phase, of evaluating the execution (corresponding to stages III, IV) in which the mental scheme desired to be executed is compared with the model presented by the coach.

The specificity of technical training in MMA lies in the fact that the rules of competition for various types of complex martial arts allow the use of a wide arsenal of technical actions, which includes almost the entire arsenal of combat sports.

At first glance it may seem that the technique of complex martial arts simply consists of different technique types of martial arts. However, the analysis of the competitive activity has convinced us that the equipment and their characteristics have undergone significant changes, adapting to the new competitive conditions. There was an evolution in the technology of martial arts, which, due to the synthesis of techniques, changed its qualitative aspects. For example, the chance of the opponent's kicks changed the throwing technique, preparatory actions, and also made adjustments to the position and movement of athletes.

Figure 1 shows the contents of the technical arsenal of complex martial arts.

Sections "A", "B", "C" are technical actions borrowed from different types of fights. At the same time, these sections overlap with each other, since all these types of fighting also have the same technical actions that are identical or similar in terms of biomechanical characteristics. Sections "D", "E", "F" are technical actions borrowed from "shocks" types of fighting sports, having a lot in common.

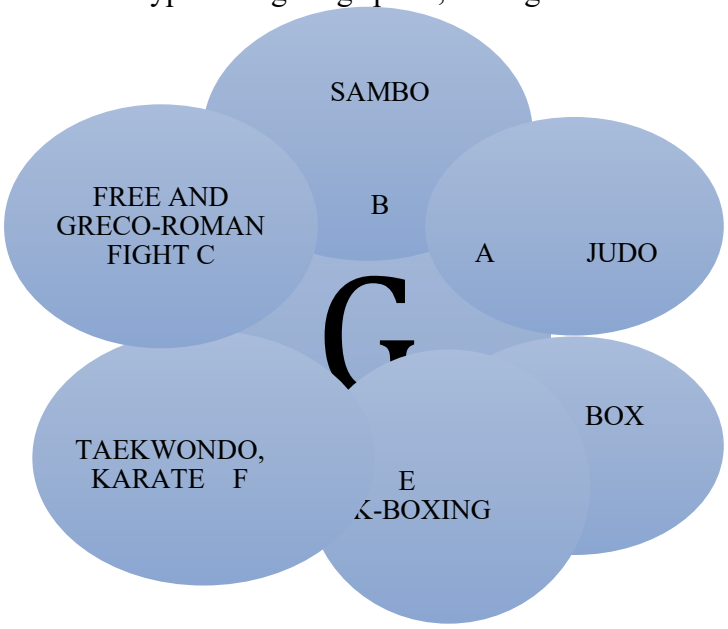

Fig. 1. *The content of the technical arsenal of complex martial arts*

In addition, the section "G" in this figure indicates the presence in the arsenal of complex technical actions of martial arts that are not found in other types of fighting, for example, combinations that involve joining the kicks and throws technique.

The technique of such actions was formed spontaneously - empirically and with no single model. The specificity of complex martial arts is reflected in physical fitness necessary for the athletes. First of all, athletes for successful performance in competitive matches must demonstrate a high level of development of coordination skills, especially the ability to combine movements different in structure and muscle efforts. Secondly, for a successful solution of technical tasks, it is necessary to demonstrate at a high level both the physical qualities characteristic of "fighters" (endurance at speed) and the qualities characteristic of "boxers" (reaction speed). Third, the demands on the body's adaptive abilities, including the drastic change in muscle activity ways that are constantly increasing.

Conclusion

Both these and other legalities and characteristics from a motor and mechanical point of view have been and continue to be researched and each time they are supplemented with new information in order to rationalize, optimize and perfect the phenomenon of technical training in mixed martial arts.

As a result of the analysis and synthesis of the theoretical-methodological research on the issue of the technical training of MMA fighters at the stage of in-depth specialization and orientation towards high performance, it can be stated that this subject can be permanently supplemented with new views on the technical side depending on several factors, and all of these could condition the methodology of organizing and conducting sports training in this technical sports event.

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MODEL OF DEVELOPMENT OF FUNCTIONAL FLEXIBILITY IN SAMBO AT THE STAGE OF SPORTS SPECIALIZATION

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Abstract

The study is devoted to the study of the effectiveness of the model of the development of functional flexibility in SAMBO wrestlers at the stage of sports specialization. It was assumed that an integrated approach to the development of mobility in joints could create conditions for improving the quality of mastery of wrestling techniques by athletes. Priorities have been identified, including a combination of high-amplitude, strength and coordination exercises in the training process aimed at developing active dynamic flexibility. An experiment was conducted with the participation of 23 athletes. It has been experimentally proved that there is a high correlation between the indicators of mobility in the joints and the quality of performing special exercises of a wrestler.

A pedagogical experiment with the participation of girls 13-14 engaged in sambo wrestling at the stage of sports specialization proved that the use in the training process of a model for the development of functional mobility of joints based on a combination of high-amplitude, strength and coordination exercises integrated into the special training of athletes has a positive effect on the indicators of flexibility in the hip, shoulder joints, as well as in the thoracic the spine. The integration of high-amplitude, strength and coordination exercises had a positive impact on the quality of performing special exercises of the wrestler.

Key words: *wrestling, sambo, flexibility, functional training.*

Introduction

The issues of improving the quality of physical training of sambo wrestlers remain relevant for many years. A special place is occupied by flexibility and the methodology for its development. Directly at competitions, an athlete often lacks a few centimeters in movement in order to successfully complete an attacking action or resist an opponent's attack to the end. For a sambo wrestler, it is important to demonstrate mobility in the joints to perform wrestling techniques, however, it is also important to maintain control over mobility in order to avoid injury, as well as to exclude a decrease in such indicators as stability, explosive strength and speed of movement. The age of 13-14 years is favorable for the development of strength, speed-strength qualities of movements. At the same time, indicators of flexibility and dexterity decrease (Wu R et al, 2016, p. 57). The stage of sports specialization is aimed at mastering a large number of techniques by an athlete and gaining competitive experience. For this, the training of a wrestler must be integrated. Thus, it is necessary to create favorable conditions for the complex development of physical qualities, as well as increasing their functionality. The study shows the

results of the integration of classes on the development of flexibility in the educational and training process of sambo wrestlers at the stage of sports specialization.

Material and method

The purpose of the study is to study the effectiveness of the model for the development of functional flexibility in sambo wrestlers at the stage of sports specialization. *Research hypothesis:* it is assumed that an integrated approach to the development of mobility in the joints can create conditions for improving the quality of mastering the wrestling techniques by athletes. *Research methods:* literature analysis, pedagogical experiment, exercises-tests to assess the level of development of flexibility (forward bending while standing (sm), extension of the shoulder upwards - the distance from the fingers to the shoulder blade (sm), torso tilt back - the distance from the sphenoid bone to the floor (sm) and techniques for performing special wrestling exercises (10 runs on the wrestling bridge (sec), flips on the wrestling bridge (sec), 10 hip flips (sm)), methods of mathematical statistics (Spearman correlation, T-Student test). The study involved girls aged 13-14, who are engaged in sambo wrestling in educational and training groups of the first year of study. The pedagogical experiment was carried out on the basis of the sports school of the city "Mihai Viteazul" of the city of Calarasi (Republic of Moldova) in 2022. The pedagogical experiment lasted 3 months. 12 girls were involved in the experimental program. The control group consisted of 11 girls.

Results and Discussions

The mobility of charters in sambo wrestling has its own characteristics. Thus, the presence of increased indicators of muscle activity in the shoulder joints, thoracic spine, hip joints, wrist joints, and ankle joints is important (Curry Brad S. et al, 2009, pg. 1811-1819). As a rule, at the age of 13-14 years, children experience a decrease in flexibility, especially in the shoulder and hip joints, as well as in the thoracic spine (Wu R. et al, 2016, pg. 57). Flexibility in the process of martial arts is mainly manifested in an active and dynamic form. In this connection, when preparing a wrestler, it is important to use active and dynamic movements. According to recent scientific studies, it is active dynamic movements with high amplitude that do not lead to a decrease in speed-strength indicators and do not negatively affect the state of the nervous system of athletes (Herda TJ, 2008, p. 809-917; Hough PA, 2009, g. 507-512).

At the same time, the age of 13-14 is generally favorable for the development of strength. It is logical to use strength advantages for the accentuated development of joint mobility in young wrestlers (Wu R et al, 2016, pg. 57). By increasing the range of motion in the joints that are important for an athlete, it is necessary to build on some principles of functional training, which consists in creating conditions for improving the quality of an athlete's movements. These are closely related movement characteristics: stability, mobility and control (Boyle, 2016, pg.

24-25). Stability is determined by indicators of optimal strength and, in our case, by the muscle tension necessary to create a high amplitude in the joint. Also, muscle strength is needed to ensure the stability of those joints in which it is unacceptable to develop mobility: the cervical spine, lumbar spine, knee and elbow joints. Movement control lies in muscular coordination. Thus, in order to develop flexibility, it is inappropriate to use only movements with a high amplitude in the training process of sambo wrestlers. It is also important to develop coordination of movements and muscle strength (Cook, 2011, pg. 133-134).

An attempt was made to create a model for the development of functional flexibility in sambo wrestlers, based on the integrated effect of strength exercises and exercises on movement coordination. For each of the joints, exercises were selected that solve three problems: developing strength, increasing amplitude in the joint, and improving control by the analyzers. An important condition for maintaining the functionality of the classes was the constant updating and complication of tasks. Also, given the conditions of martial arts, the movements should be asymmetrical and multi-joint. Mastering the exercise program should eventually be implemented in competitive movements in wrestling. It is necessary to follow the principles of physical education, which consist in the gradualness and availability of loads. The load for each athlete was selected individually, based on the initial level of training (Table 1).

Table 1. *Model of development of functional joint mobility*

Joints	**Examples of effects on the joints and their focus**		
	Stability	**Mobility**	**Control**
Hip joint	Strength development of the buttocks.	Flexion, extension, abduction, pronation, external rotation.	Squats on one leg, lunges with asymmetric weights, game tasks in dynamics.
Shoulder joint	Development of the strength of the muscles of the shoulder, trapezius muscle, chest muscles.	Extension, external rotation.	Rope climbing, exercises with rubber, throwing a small ball, game tasks in dynamics
Thoracic spine	Development of the strength of the rhomboid muscle, muscles of the scapula, extensors of the spine.	Bending back while standing, kneeling, lying on your stomach.	Bridges on one leg, bridges on one arm, wrestling bridge, game tasks in dynamics.

Before the start of the pedagogical experiment, the participants demonstrated an approximately equal level of physical fitness and the quality of the wrestler's special exercises. No significant differences were found in exercise tests. An

inverse relationship was found between the indicators of flexibility and the quality of wrestler's special exercises. An increase in the range of motion in the shoulder joint and thoracic spine correlates with exercises on the wrestling bridge (p=0.720, significantly at the level of 0.01). A high correlation was also found between indicators of forward torso tilt and the results of throwing through the hip (p=0.680, significant at the level of 0.01).

After the completion of the pedagogical experiment, an assessment was made of changes in the results of control exercises (Table 2).

Table 2. *The effectiveness of the model for the development of functional joint mobility*

Control exercises	**Experimental group (n=12)**			**Control group (n=11)**			**T**	**P**
	X	δ	m	X	δ	m		
10 wrestling bridge runs (sec)	24,4	3,3	1,1	27,3	4,4	1,5	2,2	<0,05
10 flips on the wrestling bridge (sec)	32,8	4,35	1,3	34,5	4,2	1,4	2,06	<0,05
10 hip throws (sec)	38,4	5,25	1,6	42,7	5,7	1,9	2,1	<0,05
Shoulder extension up (sm)	5,5	1,1	0,4	7,5	1,8	0,6	2,9	<0,01
Forward Tilt (sm)	12,6	2,4	0,6	8,7	1,9	0,6	4,1	<0,01
Tilt back (sm)	15,5	2,8	0,7	12,3	2,1	0,7	3,1	<0,01

* Differences are significant at t = 2,08 (0,05), 2,82 (0,01); (df=21)

The development of functional flexibility in the hip, shoulder joints, as well as in the thoracic spine had a significant impact on mobility in the joints (p<0.01). Strength and coordination load, thus, enhances the influence of high-amplitude movements in the training process of sambo wrestlers. It should also be noted that the changes in the quality of the wrestler's special exercises were significant (p<0.01). These indicators confirm the hypothesis that an integrated approach to the development of mobility in the joints can create conditions for improving the quality of mastering the wrestling techniques by athletes.

Conclusions

The study of the features of the manifestation of flexibility in sambo wrestlers aged 13-14 made it possible to single out active and dynamic movements as a priority for the training process of these athletes. It is also recommended to use special power and coordination tasks to increase the influence on the wrestler's flexibility indicators in specific conditions of martial arts.

It has been experimentally proven that there is a high correlation between the indicators of mobility in the joints and the quality of the wrestler's special

exercises.

A pedagogical experiment with the participation of girls aged 13-14 engaged in sambo wrestling at the stage of sports specialization proved that the use of a model for the development of functional joint mobility in the training process, based on a combination of high-amplitude, strength and coordination exercises integrated into the special training of athletes, has a positive effect on indices of flexibility and quality of wrestler's special exercises performance.

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Session Physical Therapy and Recovery

KINETOTHERAPEUTIC TECHNOLOGIES IN RECOVERING CERVICO-BRACHIAL SYNDROME PEOPLE

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Abstract

The paper considers a study based on theoretical knowledge, experimental data and intuition. The study aims to combat pain and inflammation, correct body posture and alignment, joint flexibility and muscle tone in a group of patients diagnosed with cervicobrachial syndrome.
The patients included in the group were selected according to the x-ray stage of the cervicobrachial syndrome and mobility threshold, between 40 and 60 years old.
This study is to monitor the evolution of patients with cervicobrachial syndrome undergoing a complex recovery treatment (physiotherapeutic and kinetotherapeutic) and to highlight the benefits of kinetotherapy in the study group compared to the control group which, for various reasons did not participate in the recovery kinetic program. By applying physiotherapeutic and kinetotherapeutic treatment, the quality of life of subjects with cervico-brachial syndrome can be improved.

Key words: *cervicobrachial syndrome, recovery, kinetotherapy, conditions, treatment*

1. Introduction

Cervicobrachial neuralgia (C.B. N.) represents a complex clinical syndrome determined by irritation or compression of the cervical nerve roots. Cervicobrachial neuralgia is often preceded by chronic cervical pain, it can have an acute onset or it can remain moderate, getting progressively worse (Popescu & Ionescu, 1994; Sbenghe, 1981; Sbenghe, 1987).

It is unilateral and can radiate to the shoulder and upper limb respectively, the trajectory of the brachialgia depends on the affected root of the brachial plexus, as it is known that the last four cervical nerve roots are more vulnerable, which sometimes makes it difficult to specify the radicular topography. When the C5 root is affected, external shoulder and upper arm pain occur; C6 radiculalgia is characterized by a pain located on the anterolateral side of the arm and forearm and at the level of the phalanx and index finger (1st and 2nd finger); damage to the C7 root results in a pain that radiates to the back of the arm, forearm and hand, towards fingers IInd, IIIrd and IVth (the three middle fingers); C8 radiculalgia is located on the inner side of the arm and forearm, reaching up to the Vth finger.

Thoracic, posterior or anterior radiations (simulating pectoral angina) or cervico-occipital radiations, producing headaches, can sometimes be present.

The purpose of this paper is to highlight the efficiency of a correct and competent physical-kinetic treatment carried out under the conditions of a

Recovery Department, or Recovery Cabinets that have a diversified endowment: electrotherapy rooms, massage rooms, occupational therapy and kinetic rooms, swimming pool with the possibility of practicing hydrokinetotherapy.

Rheumatic diseases are considered a real social scourge both among the young population and among the elderly population (Cristea, 1990; Șdic, 1982).

In recent years, important progress has been made, the rehabilitation of rheumatic patients being a basic concern, which determined that mortality and morbidity in various forms of rheumatism decreased significantly (Popescu & Ionescu, 1994; Sbenghe, 1996).

Cervical spondylosis due to the complexity and variability of symptoms can cause a series of syndromes: vertebrobasilar syndrome (dizziness, vertigo, visual disturbances), Barre Lieou syndrome, cervicobrachial neuralgia, cervico-coronary syndrome, etc.), which over time lead to decrease in work capacity, reduction in the possibilities of performing daily activities, decrease in family support.

In order for the cervicobrachial syndrome recovery to be faster and the progress to be more visible, we have associated the physiotherapeutic treatment with the kinetotherapeutic treatment.

Objectives of the research:

- evaluation of the physical therapy programs effectiveness (electrotherapy and massage), respectively physical-kinetic therapy (electrotherapy, massage and specific kinetotherapy) applied in periods of pain decompensation of chronic cervicobrachial conditions;
- consulting specialized literature in order to establish the actuality of the topic and the level of research in the field;
- establishing the research hypotheses, as well as the method by which they will be checked;
- detecting and selecting some representative cases that serve to achieve the proposed goal and objectives;
- organizing the concrete recovery activity following the logical and necessary sequence in its stage, so that the activity in progress is based on the previous one and prepares for the next one:
- permanent recording of the obtained results and their interpretation, in order to highlight the evolution of the subjects in its dynamics;
- the drafting of a paper that includes the development of the final results of the research in order to popularize them among specialists in the field.

Brief presentation of the current stage of the work and selective references

The research activity took place during the period (November 2019-October 2020), we carried out an interventional therapeutic study over a 6-month monitoring period, on patients with chronic cervicobrachial syndromes who followed specific recovery therapy in Specialized Medical Centers or Recovery Cabinets, Suceava.

The subjects were informed about this study and signed the informed consent. Of the 12 subjects initially included in the study, 6 withdrew along the way and 6

subjects remained. Of these, 6 subjects remained - 3 subjects followed only physiotherapeutic treatment and constituted the control group, 3 subjects followed kinetotherapeutic treatment and constituted the experimental group.

The control group, the 3 subjects who followed physical treatment (electrotherapy and massage), 10 sessions/2 weeks in the Specialized Ambulatory, later, after 6 months, being considered the control group and the group consisting of 3 patients who followed physical-kinetic treatment (electrotherapy, massage, specific physical therapy), 10 sessions/2 weeks in the Specialized Ambulatory, followed by specific exercise program at home for 6 months.

As stages of this study, we can list:

The first stage in which the theoretical documentation was done by exploring the specialized literature.

The second stage included close collaboration with patients, in order to select a group of subjects to be included in the research.

Stage III, methods of exploration and evaluation were applied, with the aim of witnessing the evolution of the patients within the investigated parameters, in order to make a comparison between the initial and final tests, to verify the efficiency of the applied means.

Stage IV, treatment programs were applied that were modified at intervals depending on the evolution of the patients, as it results from the research.

Stage V, the obtained results were processed and interpreted.

The data recording was the basis for the development of the individual measurement records in the initial and final stage.

2. Methods of therapeutic approach

Physiotherapy and kinetotherapy recovery programs applied to subjects in the experimental group, diagnosed with cervicobrachial syndrome, were formulated based on the personal data of the patients according to age, gender, personal antecedents, location, severity of injuries, as well as initial tests.

Recovery therapy in cervicobrachial syndromes:

All patients included in the study initially benefited from a program of 10 sessions, in a regime of 1 session/day, carried out in the Medical Recovery Ambulatory.

Group 1 followed a program consisting of electrotherapy and therapeutic massage, group 2, with the addition of a specific progressive kinetotherapy program started under the supervision of the kinetotherapist and continued individually for 6 months at home.

Each subject in the study group was given a balance record and joint and muscle clinical examination, in order to highlight the dynamics of their evolution following the application of rehabilitation programs through physiotherapy and kinetotherapy.

The therapeutic methods were: electrotherapy, TENS (Transcutaneous Electrical Nerve Stimulation) in regional applications, analgesic forms, interferential currents

in regional bipolar and/or tetrapolar applications, in analgesic and decontracting formulas, ultrasound - mobile field applications at the trapezius muscle level , classical regional manual massage applied by specialized physiotherapists, the intensity and techniques being set by the masseur depending on the diagnosis, symptomatology and condition of the patient, program of therapeutic exercises. In developing the exercise program, we took into account the possibility that it can also be practiced at home or in a gym, after mastering it under the supervision of a specialized physiotherapist. The program was focused on exercises for toning the cervico-dorso-humeral muscles, complemented by mobilization exercises and light running, thus totaling 30 minutes and achieving a global approach with increasing the level of physical activity.

In order to achieve progressive training, the number of repetitions has been increased, respectively, the load level depending on the individual level of tolerance.

After the initial 10 daily sessions, the patients in group 2 followed the exercise program at a minimum of 3 sessions/week, for 6 months at home.

The obtained data were processed statistically.

3. Results and Discussions

Physiotherapy and kinetotherapy recovery programs applied to subjects in the experimental group, diagnosed with cervicobrachial syndrome, were designed based on the personal data of the patients according to age, gender, personal history, location, severity of injuries, as well as initial tests.

We studied 6 clinical cases.

Only 3 of them underwent physiotherapeutic treatment, they representing the control group, the other 3 constituting the true study group.

Each subject in the study group was given a balance record and joint and muscle clinical examination, in order to highlight the dynamics of their evolution following the application of rehabilitation programs through physiotherapy and kinetotherapy.

Only the initial and final tests were done to the patients in the control group, without kinetotherapy.

Joint testing of the cervical spine in the control group:

Table 1 *The joint balance performed with the metric tape*

		SUBJECTS			
INDICES	TESTING	A.D.		C.I.	M.R.
M.S. I.	I.	6		5	5
	F.	4		3	4
O. W.I.	I.	3		4	4
	F.	2		3	2
T.A. I.	I.	Right	9	6	4
		Left	7	6	3
	F.	Right	8	5	2

		Left	6	4	1,5
M.A. I.	I.	Right	8	6	4
		Left	10	5	4
	F.	Right	6	4	2
		Left	8	4	3

The legend:
I - Initial testing; F - Final testing
M.S. I. - Menton - stern index O. W.I. - Occiput- wall index
T.A. I. - Tragus – acromion index M.A. I. - Menton– acromion index

Table 2 *Joint balance performed with the goniometer*

		SUBJECTS			
MOTION	TESTING	A.D.		C.I.	M.R.
Flexion	I.	21^0		20^0	18^0
	F.	25^0		22^0	26^0
Extension	I.	20^0		27^0	24^0
	F.	24^0		31^0	26^0
Lateral curvature	I.	Right	25^0	42^0	31^0
		Left	30^0	40^0	34^0
	F.	Right	28^0	45^0	34^0
		Left	32^0	42^0	38^0
Rotation	I.	Right	35^0	35^0	42^0
		Left	39^0	37^0	40^0
	F.	Right	40^0	38^0	45^0
		Left	42^0	39^0	43^0

Muscle testing of the cervical spine in the control group.

Table 3 *Muscular testing*

		SUBJECTS			
MOTION	TESTING	A.D.		C.I.	M.R.
Flexion	I.	F_3 (+)		F_2 (++)	F_3 (-)
	F.	F_3 (++)		F_3 (+)	F_4 (-)
Extension	I.	F_3 (-)		F_2 (+)	F_2 (+)
	F.	F_3 (++)		F_3 (++)	F_3 (++)
Lateral curvature	I.	Right	F_2 (++)	F_3 (-)	F_3 (+)
		Left	F_3 (+)	F_3 (+)	F_2 (+)
	F.	Right	F_3 (+)	F_4 (-)	F_4 (+)
		Left	F_3 (++)	F_4 (+)	F_3 (++)
Rotation	I.	Right	F_2 (+)	F_3 (-)	F_2 (-)
		Left	F_3 (-)	F_2 (++)	F_2 (+)
	F.	Right	F_3 (+)	F_4 (-)	F_3 (++)
		Left	F_4 (-)	F_4 (-)	F_4 (-)

Legend:
$F_2(-) = 1$ $F_2(+) = 2$ $F_2(++) = 3$ $F_3(-) = 4$ $F_3(+) = 5$ $F_3(++) = 6$
$F_4(-) = 7$ $F_4(+) = 8$ $F_4(++) = 9$ $F_5(-) = 10$ $F_5(+) = 11$

4. Conclusions

Limits of the study are related to the 6-month follow-up period.

Monitoring the patients for a period of at least one year after the physical or physical-kinetic therapeutic intervention would be useful to follow the long-term therapeutic effects.

Considering the favorable results of the therapeutic options, we propose as a way of therapeutic approach for patients with chronic, recurrent pain a treatment program in Specialized Medical Recovery Centers at 6-month intervals (physical or physical-kinetic therapy described in the study), completed practicing the exercise program for the cervicobrachial muscles in these intervals.

The recommended exercise program can be applied in any location (a gym or the patient's home) with minimal costs.

Primary healthcare doctors have a significant role in the early detection of musculoskeletal problems and the development, together with the doctor in recovery, of some prophylactic programs focused on ergonomic education and encouraging the practice of physical activities.

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DIRECTING THE RECOVERY OF POST-TRAUMATIC HAND ABILITY THROUGH KINETIC MEANS

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Abstract

The hand represents the most complicated segment of the limb in the body. Both its structure and function are adapted to the complexity of human activity. The complex composition of the hand, both from the anatomical and functional point of view, makes that most often, in the case of a trauma, the resulting lesion to include tissues of different structures, which require in order to obtain a correct therapeutic result, their separate solution, but with the purpose of obtaining a global finality, both functional and aesthetic. Both traumatic and inflammatory injuries of the hand, fingers and neck of the hand can be followed by sequelae of varying degrees, ranging from simple functional disorders to true disabilities. Apparently paradoxically, for these segments, certain functional sequelae are just as harmful to the use of the hand as a mutilation - for example, the disarticulation of a phalanx or a finger in vicious ankylosis may become necessary precisely to allow a better use of the hand. The need to regain the ability of the hand remains the main purpose of recovery and it can only be obtained in the training specific to the human activity of the hand. The method used is "occupational therapy".

Key words: *fracture, treatment, exercises, occupational therapy*

1. Introduction

The upper limb ends with a particularly perfected segment, indispensable for the complicated processes of grip and work, the hand.

The hand is equipped with a special mobility, as well as with special qualities of sensitivity, due to the rich myodynamic and myostatic innervation that ensures its movements of finesse and precision. At the same time, the police make possible the particular opposition movement that can be executed with each finger, ensuring the grip movement so peculiar to man and thanks to which, in large part, the hand has become one of the few organs specific to it, which fully conditions the entire activity (Balint T., 2007). The hand also has the ability to support and push, completing or sometimes even filling, up to a point, the grip.

The recuperative treatment of the functional deficit of the hand is difficult; it requires promptness, accurate knowledge of functional anatomy, experience and a lot of perseverance.

The hand hardly endures immobilization, even of short duration, the redoubts and retractions subsequently becoming hardly reducible. It is very difficult to always find the right balance and ratio between immobilization and remobilization of the traumatized hand (Kiss I., 2007).

Unfortunately, however, negative results in the therapeutics of traumatic injuries of the hand and fingers are still quite frequent, and this not only due to the

severity or complexity of the lesions themselves, but also to the deficiencies of the initial clinical examination, which, as a whole, underestimates the risk of infection, which in general leads to the application of an incomplete or incorrect primary treatment and to the lack of supervision of the evolution until complete healing (Mark V., Dan M., 2010).

Fractures (Stănescu M., Popescu A.B., 2018):

a) Fractures of the metacarpal bones occur as a result of a direct or indirect shock, which causes the recovery or accentuation of the previous curvature of the bone. Metacarpals 3 and 4 are more frequently interested;

b) Fractures of the phalanges occur especially in the radial part, in the following order of frequency: the third, first and second phalanges.

Fractures of the neck of the hand (Voicu D.F., 2016):

a) Fractures of the distal extremity of the radius are the most common injuries in bone traumatology, representing 1/10 of the fractures, usually produced by an indirect mechanism - most often the fall on the hand in hyperextension.

b) Distal epiphysal take-off of the radius is a lesion characteristic of childhood age and occurs as a result of falling on the hand 1-2 cm above the growth cartilage with subperiostic localization.

c) Fracture of the scaphoid bone occurs by an indirect mechanism, represented by the fall back on the hand in extension and radial inclination.

SEQUELAE LESIONS are: Posttraumatic diffuse algia; Posttraumatic painful osteoporosis; Posttraumatic edema or Secreten edema (Sbenghe, T., 2005).

2. Material and method

The goal of the research is to find the most effective means of recovering the functionality of the hand.

The hypothesis of the research. If a balance and a ratio between immobilization and posttraumatic remobilization of the hand (depending on the type of trauma) could be found, hard-to-reduce redoors and retractions could be prevented.

Research tasks:

- study of the specialized bibliography;
- consultation of specialists on the topic of research;
- systematization of the types of traumas at the level of the fist and hand;
- establishment of the general means of complex treatment.

3. Results and Discussions

4 patients aged between 23 and 55 years with various fractures of the hand were investigated. The characteristics of each subject are listed in the individual recovery sheets in the annexes. Due to the differentiated character of the clinical form in which the subjects were presented, the ways of acting have been customized, and the methods are passed at the end of the recovery sheet for each subject.

The subjects presented themselves for recovery for a period of 4 months, performing two gymnastic sessions per day (gym + pool), their testing being done at the beginning and at the end of the treatment. Depending on the stage of the disease, the patient's cooperation and the response to treatment, it was acted with means specific to each individual.

The research was conducted between February and May 2022. Each type of movement has elementary mobility functional coefficients which by summaries determine an overall functional coefficient. In order to find out the functional mobility coefficient, multiply the figure found at goniometry by the respective coefficient of the joint movement sector.

Mobility disorders have the highest diagnostic value and, as such, they must be known and appreciated very correctly. In the strict sense, the joint balance represents the measurement of the amplitudes of movement in the joints, on all directions of movement (Zamora E., 2005). In a broad sense, with the execution of these measurements, other assessments are made on the respective joint (abnormal movements, increased temperature, volume increase), observations to which the radiological examinations will be added.

Along with the joint balance sheet, the muscular one is part of the main "semiology" of the specialty of physical medicine and medical recovery. Muscle balance (muscle testing) is a system of manual examination techniques for evaluating the strength of each muscle or muscle group.

The means of actuation have in their composition a number of 74 exercises selected as the most effective. Their selection is made individualized, depending on the clinical stage of the subject and is structured respecting the stages of motor control in the respective recovery sheet.

Although the movements of the fist are executed in full harmony with those of the hand, they will be described separately. The exercise program will always have an individuality being applicable to a particular patient and not to a particular disease.

FIST (neck of the hand)

I. Restoring mobility

A. Re-education of flexion

a. by adopting posts

Exercise 1 - The hand is supported by the inclination of the forearm and its fixation with the collateral hand.

Exercise 2 - Apply the back of the hand on a wall, exerting pressure in the axis MS.

Exercise 3 - The patient sits with his hand under the thigh, the palm in contact with it; the elbow extension brings the forearm closer to the body, emphasizing the flexion of the fist.

b. through passive mobilization

Exercise 4 - Supinated forearm, in support on the table; with one hand the teacher makes an outlet on the forearm (thumb on the radius) maintaining the

supination position and with the other on the palm of the patient, the P flexion is performed with a slight radial inclination.

Exercise 5 - Reversal of the position, holding the forearm in the pronation, the sockets are reversed and the position of the thumb.

Exercise 6 - From the neutral position of the forearm, the flexion of the fist with the elbow extension will be executed.

Exercise 7 - Mobilization, bimanual outlet.

Exercise 8 - Mobilization in flexion, differentiated, mediocarpian joint (the fixation being made on the first row of carpals) by a slightly more distal flexion, on the second carpal row, with the other socket fixing unitarily the first carpal row and the forearm, the mobilization in the mediocarpal joint is obtained.

c. by self-overcoming mobilization

Exercise 9 - In sitting, with the elbow on the table, the forearm vertically in supination; with the other hand that makes the socket on the affected hand, the fist flexion is executed.

Exercise 10 - Same, pronate forearm.

Exercise 11 - Elbow flexed a lot, arm carried in adduction, hand touches the shoulder; the opposite hand plugs in the affected hand, forcing the flexion.

d. by active movements

Exercise 12 - Mobilization of fist flexion in various positions (supination, pronation, neutral) of the forearm, with fingers flexed, semi-polished or stretched.

e. by facilitation methods

Exercise 13 - Fist flexion enters the scheme of the Kabat diagonals of the upper limb:

D1F - fist + fingers, extension + cubital deviation, thumb, adduction;

D2E - fist + fingers, flexion + cubital deviation, thumb, opposable to fingers.

Exercise 14 - Hold-relax technique.

B. Re-education of the extension

a. by adopting posts

4. Conclusions

1. The hand represents the most complicated segment of the limb in the body, so the recovery treatment of the functional deficit of the hand is difficult, it requires promptness, accurate knowledge of the functional anatomy, experience and a lot of perseverance.
2. Early, complete and efficient recovery will eliminate the risk of apathy and persistence of some sequelae whose treatment would require increasing the recovery time.
3. Post traumatic hand recovery should be done both in medical recovery centres and at home.
4. The recovery period was about 4 months, the patients being able to resume their socio-professional activity a few days after discharge.

5. The most effective treatment is the complex one (medicinal and kinetic) followed by a strict treatment of kinetic means.
6. Along with the kinetic programs, massage is an efficient method of recovery and relaxation, although the most appropriate remains the physical exercise program with a gradual number of repetitions, performed 2-3 times a day, 30-40 minutes each, the experiment performed supporting this statement.
7. In the kinetic programs, psychotherapy has an important role, it hastening and making the recovery less stressful, at the same time convincing the patient to accept the pain and the severe regimen of the therapy.

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IMPROVING THE QUALITY OF LIFE OF PEOPLE WITH A PRIMARY MEDICAL DIAGNOSIS OF PARKINSON AND WITH A PRIMARY MEDICAL DIAGNOSIS OF ALZHEIMER

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Abstract

From the analysis of specialized literature, the majority of specialists in the medical field state that improving the quality of life of neurological patients can be carried out based on criteria that can be taken as a model in the effective development of recovery through kinetic means.
Physical therapy, in Alzheimer and Parkinson diseases, addresses both cognitive and motor functions, thus becoming a necessity. Studies have demonstrated the protective effect of physical exercises against cognitive impairment, thus a correctly designed and carried out physical therapy program from the onset of the disease has a significant positive potential for delaying its onset.
Limitation of activities in the elderly is recognized as a major risk factor for the installation of the inability to perform daily activities by decreasing muscle strength and mass, frequently associated with postural balance disorders and impaired walking. These, along with frequent bone demineralization, predispose the individual to serious traumas, through falls, increasing functional limitations and the frequency of metabolic disorders.

Key words: *physical therapy, Alzheimer diseases, Parkinson diseases, risk factor, functional limitations*

1. Introduction

From the analysis of specialized literature, the majority of specialists in the medical field state that improving the quality of life of neurological patients can be carried out based on criteria that can be taken as a model in the effective development of recovery through kinetic means.

2. Material and method

The experiment was performed in the period immediately following the restrictions caused by SARS COV - 2 on four patients aged between 46 and 76 years (Table 1), of which 2 patients with the main medical diagnosis of Parkinson and 2 patients with the main medical diagnosis of Alzheimer, who performed in average 78 sessions to recover through kinetic means (approximately 6 months). The recovery was carried out at the patient's home.

Table no. 1 *Patients with the main medical diagnosis*

Nr. Crt.	Name and surname/ sex	Age	Number of sessions	Diagnostic
1	C. G / M	68	78	Parkinson Stadiul 3.0 Hoehn & Yahr F00.1 Dementia in late-onset Alzheimer disease
2	C.P. / M	65	77	Parkinson Stage 2.0 Hoehn & Yahr
3	P.G. / F	46	76	F00.0 Dementia in early-onset Alzheimer disease
4	L.M. / F	74	78	F00.2 Dementia in Alzheimer disease, atypical or mixed form
total	**2M/2F**	**66,25**	**77,25**	**2 P / 2A**

From the Table no 1, it can be seen that the 4 patients (2 women and 2 men) were aged between 46 and 74 years with an average of 66.25 years and performed between 76 and 78 recovery sessions with an average of 77.25 /

In order to check the influence of kinetic means on increasing the quality of life of patients with neurological diseases, we used the IADL and ADL index for each patient, they were tested at the beginning and at the end of the experiment.

1) The patient with the initials C.G., diagnosed with Parkinson's and Alzheimer's has indications represented by the result of the initial and final tests:

- IADL 1,2 and finals. 2.9 with an increase of 1.7
- Initial ADL 7 – assisted independent and finally increased to 8 quasi-independent

2) The patient with the initials C.P., diagnosed with Parkinson has indications represented by the result of the initial and final testing. indices represented by the result of the initial and final tests:

- IADL 1.5 and finals. 2.9 with an increase of 1.4
- Initial ADL 7 – assisted independent and finally increased to 9 quasi-independent

3) The patient with the initials P.G., diagnosed with Alzheimer has indications represented by the result of the initial and final tests:

- IADL 3.2 and finals. 5 with an increase of 1.8
- Initial ADL 7 – assisted independent and finally increased to 9 quasi-independent

4) The patient with the initials L.M., diagnosed with Alzheimer, has indications represented by the result of the initial and final tests:

- IADL 2.9 and finals 4.7 with an increase of 1.8
- Initial ADL 7 – assisted independent and finally increased to 8 quasi-independent

By studying the arithmetic mean of the subjects from the initial testing and the final testing, significant differences between the two examinations are observed. The results obtained will represent the deficiencies that we observed and corrected, a fact proven by the progress achieved, progress that we called the quality of life improvement factor and was influenced by the judicious application of kinetic means.

3. Results and Discussions

The Table no 2 shows the results recorded in the IADL and AD examinations in the 4 patients. The table presents the results of the tests (separately for the two conditions, but also in general) that were carried out at the beginning and at the end of the experiment, as well as the gain achieved.

For the 2 patients with Parkinson's in the data recorded at the two tests (initial and final), as can be seen in the tables, the average IADL at the initial test was 1.35, and the average at the final test was 2.9 with a gain of 1.55 units. The mean at initial ADL testing was 7 and at final testing was 8.5 with a gain of 1.5 units.

For the 2 patients with Alzheimer's in the data recorded at the two tests (initial and final), as can be seen in the table, the average IADL at the initial test was 3.05, and the average at the final test was 4.85 with a gain of 1.8 units. The mean at initial ADL testing was 7 and at final testing was 8.5 with a gain of 1.5 units.

Comparing the average gain of the two groups (patients with Parkinson's and patients with Alzheimer's) of both IADL and ADL, an approximate result equal to 1.5 is observed, a difference between means of 0.3 in favour of the group with Alzheimer's when examining IADL.

Table no.2 *The results recorded in the IADL and AD examinations*

		IADL			ADL		
Nr. Crt.	**Name and surname**	**Initial testing**	**Final Testing**	**Gain**	**Initial Testing**	**Final Testing**	**Gain**
1	CG	**1,2**	2,9	1,7	**7**	8	1
2	CP	**1,5**	2,9	1,4	**7**	9	2
	Average parkinson	***1,35***	***2,9***	***1,55***	*7*	***8.5***	***1.5***
3	PG	**3,2**	5	1,8	**7**	9	2
4	LM	**2,9**	4,7	1,8	**7**	8	1
	Average alzheimer	***3,05***	***4,85***	***1,8***	*7*	***8,5***	***1,5***
	Overall Average	**2,2**	3,9	1,7	**7**	8,5	1,5

Finishing the analysis of the results it can be said that:

- The age of the patients between 46 and 74 years falls within the standard age of onset and development of Parkinson's and Alzkeimer's diseases indicated by the specialized literature.

• The final results of the IADL and ADL examinations are superior as a result of the use of kinetic means after approximately 77 recovery sessions (6 months with 3 sessions/week).

• Arithmetic averages at the IADL examination, initial (2.2) and final (3.5), with an increase of 1.7 units, and initial (7) and final ADL (8.5), with an increase of (1 ,5) units clinically indicate:

- increasing joint and segmental functionality,
- recovery of usual movements from daily activities,
- increasing muscle tone,
- increasing tolerance to general and specific effort,
- improving the mental state of the subjects,
- the favorable evolution,
- good prognosis regarding their evolution and recovery.

- As a result of the results obtained at the final tests and the fact that the averages were clearly higher than those predicted, it can be deduced that the contribution brought by physical therapy to increasing the quality of life of the patients is great, slowing the evolution of the disease.

4.Conclusions:

* Physical therapy, in Alzheimer and Parkinson diseases, addresses both cognitive and motor functions, thus becoming a necessity. Studies have demonstrated the protective effect of physical exercises against cognitive impairment, thus a correctly designed and carried out physical therapy program from the onset of the disease has a significant positive potential for delaying its onset.
* Limitation of activities in the elderly is recognized as a major risk factor for the installation of the inability to perform daily activities by decreasing muscle strength and mass, frequently associated with postural balance disorders and impaired walking. These, along with frequent bone demineralization, predispose the individual to serious traumas, through falls, increasing functional limitations and the frequency of metabolic disorders.
* Physiotherapy has as its main objective, as much as possible, maintaining the patient's autonomy to carry out daily activities.
* Certain activities such as reading books, magazines, playing books or other games, solving puzzles, or even actively watching TV or listening to the radio can help to improve the symptoms of Alzheimer's and Parkinson's diseases.
* Graphical representation of arithmetic averages at initial (2.2) and final (3.5) IADL examination, with an increase of 1.7 units, and initial (7) and final (8.5) ADL with an increase with (1.5 units) clinically indicates:

- increasing joint and segmental functionality,
- recovery of usual movements from daily activities,
- increasing muscle tone,
- increasing tolerance to general and specific effort,
- improving the mental state of the subjects,

- favorable evolution,
- good prognosis regarding their evolution and recovery.

* Physiotherapy is indicated to be done immediately after finding out the diagnosis with maximum efficiency to slow down the onset of the disease and all its implications (deconditioning, depression, anxiety, etc. - which in turn increase the recovery time, significantly decreasing the chances of success).
* The research showed us that our proposal is a realistic approach, well tolerated by the patients, which determined the obtaining of certain improved results.

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IMPROVING THE QUALITY OF LIFE OF THE CANCER PATIENT THROUGH MELOTHERAPY

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Abstract

Objective: The effects of psychotherapy through music to reduce the degree of depression in the cancer patient. The bilateral procedural relationship psychologist - patient, depends on the way in which the "beneficiary" is involved where he becomes the "subject" of his own transformation, overcoming his state of "object" of the training in order to reach the proposed habit.
Material and methods: The present study was conducted between November 1, 2019 - October 15, 2020 on a number of 32 patients, counselling sessions being weekly. The assessment of the patient's depression was assessed using the Beck depression test - 21 items
Results. To determine the degree of improvement in the quality of life of the cancer patient, 32 patients were studied. The analysis of the data obtained in the non-parametric U Mann-Whitney test for independent samples shows that there are differences at a significance thres hold p = 0.000, in terms of the comparison between the initial stage and the final stage. The results show that in the initial stage the level of depression is high with an average of 48.50 scores, compared to the level of depression in the final stage with an average of 16.50, this underlining the impact of the personalized music therapy plan in the full stage..
Conclusions. The results of the research allow as to state that the application of melotherapy to the oncological patient can make him approach the "well-being" through a reduction in the degree of depression.

Key words: *depression; psychotherapy; melotherapy; life quality; cancer patient;*

1. Introduction

Psycho-oncology is a side of holistic medicine, but also a side of oncology. And in relation to the latter, it represents, equally, the interface of oncology and psychology. As for the psychological side of cancer treatment, given that it aims to decouple the patient (s) from the obsession with the disease and attract them to the act of healing, we could consider this therapy a form of manipulation. Obviously, only from a "technical" point of view and only insofar as "manipulation" is a form of social influence.

In Romania, Psycho-Oncology has existed in an incipient form and only for a few years, although in Europe, but especially in the United States, the field is very developed and continues to grow, there are, globally, both study possibilities and specialization in psycho-oncology, as well as practice in various hospitals, clinics and psycho-oncology centres.

Starting from the basic definition of psychology, that this is a science that studies the psyche, using a complex of objective methods, the description aiming, explaining, integrating, optimizing and improving human existence, psycho-oncology deals with the study of the patient's psyche in the context of oncological disease.

Just as it is necessary to take care of our own physical well-being, it is equally important to take care of our own emotions. We may think that we are not ready to talk about our moods, but this blockage must be overcome. For the disease is not an exclusively physical problem, it is a problem of the whole human being, including: the body, the mind, the emotions of the sick person. at the same time, it will increase the quality of life of everyone, including their own person.

Melotherapy is a certain "way" to proceed, depending on the phases of depression in cancer, the methodological guidelines being the result of the evolution of theory and practice in the medical field, determined by the achievements of science and technology.

The bilateral procedural relationship psychologist - patient, is conditioned (as efficiency) by the way in which the "beneficiary" is involved in this process, where he tends to reach the phase in which he becomes "subject" of his own transformation, overcoming his state. in which it is only the "object" of training to achieve the major goal, of great importance - "well-being".

The recovery of the oncological patient, the reintegration in the family, in the daily and professional activity represents a major desideratum, of maximum interest both for the patient and for the family and the whole interdisciplinary team around him, respectively: doctor, nutritionist, psychologist, etc.

This paper is a daring act given the variety and multitude of materials, research, concerns related to cancer and depression in cancer, so I set out to make a personal contribution, embodied in the introduction of the means of melotherapy in the treatment of depression, this representing the element of novelty and originality of the work.

I believe that any addition of knowledge is a major benefit to the field, and the confirmation of the research hypothesis is a starting point for new research.

The paper combines personal experience with specialized literature, based on an extensive bibliography, national and international, which includes both established materials over time and breaking news.

In all cancer patients, complex psychological changes usually occur, such as: denial of the disease, intense anxiety, severe depression accompanied by loss of hope for recovery, delusional ideation, but also confusion. Currently, the ideas of death, suicide, feelings of emptiness and despair also appear. They are always accentuated by severe physical symptoms caused by the disease and by harsh treatments such as: chemotherapy, surgical therapy, radiotherapy.

The issue related to the treatment of depression in cancer patients through melotherapy is not sufficiently treated in studies and research, so we considered it necessary a theoretical study, but especially practical in order to select, develop and

experiment with therapy strategies by means specific and non-specific aspects of psychology that shorten the recovery period and eliminate possible recurrences.

Studies in the literature and clinical practice have shown that the optimal treatment for major depression is to judiciously combine pharmacotherapy with psychotherapy. Thus, even if the oncologist or family doctor prescribes a pharmacological treatment to treat depression, psychotherapy or counselling should also be considered.

Melotherapy - as a form of therapy, it is based on the fact that the song has a great influence in the field of the listener's affectivity but also that these possibilities of suggestion of the song are vast. Among the most important psychotherapeutic effects of music, we mention:

a) mental relaxation achieved through catharsis, this includes deflation but also the possible occurrence of ecstasy; sedation (mainly favours the installation of sleep in many cases); euphoria (which is sometimes generated compensatory in connection with the rapid disappearance of the entire negative affective content);

b) achieves the psychic stimulation especially by increasing the cognitive efficiency (respectively memory and ideation); euphoria;

c) achieves the decrease of the pain threshold but also the modification of the psychomotor excitability;

d) has an anxiolytic action

The premise from which this work was started is that by applying the means of psychotherapy as early as possible, especially (or combined) melotherapy to the cancer patient can make him more easily accept the disease and especially the effects of chemotherapy.

As tasks the present paper has proposed the following:

- systematization of the methodology for assessing the patient's state of depression through analytical methods of psychological testing (Beck depression test - 21 items)
- presentation of the methodology for drawing up treatment plans and recovery programs according to the Beck Depression Score respecting the principles of individualization of the program.
- filling in the evaluation forms;
- following the evolution of the subjects;
- data collection, processing, analysis and interpretation;
- subsequently, after the application of the tools, the data obtained will be centralized and analysed with the Statistical Package for the Social Sciences (S.P.S.S.). Thus, I will later calculate, for the verification of the hypotheses in question, the starting statistical indices (mean, median, mode and standard deviation), the t test for independent samples and the nonparametric variant U-Mann Whitney test for independent samples, and I will extract graphical representations in the form of histograms, pie charts and point clouds.

Research objectives

Melotherapy is a certain "way" to proceed, depending on the phases of

depression in oncological diseases, the methodological guidelines being the result of the evolution of theory and practice in the medical field, determined by the achievements of science and technology. The bilateral procedural relationship psychologist - patient, is conditioned (as effective) by the way in which the "beneficiary" is involved in this process, where he tends to reach the phase in which he becomes "subject" of his own transformation, overcoming his state. In which it is only the "object" of training to achieve the major goal, of great importance - "well-being". The aim of this study was to reduce the rate of depression, compliance with cancer treatment, reducing negative thinking.

A. *The general objective* of this study is to evaluate the effect of music in such a therapeutic strategy, which we believe will have the following effects:

- improves the ability to communicate both with the psychologist but especially with other people;
- relieves conditions such as reactive depression, anxiety, obsessions, asthenia, insomnia, has catharsis effect;
- helps to reduce the states of temporary mal adaptation;
- improves self-knowledge;
- produces a cathartic effect.

B. *Specific objectives*:

- is to reduce depression after a diagnosis of cancer;
- identification and comparison of depression intensity in patients diagnosed with cancer, before and after the melotherapy program.

C. *Therapeutic objectives*:

- decreased depression index
- compliance with cancer treatment
- reducing negative thinking

Research hypotheses

The main hypothesis *H* of the study, wants to highlight the progress of patients in reducing depression, after they have followed a personalized plan of music therapy:

H1: It is assumed that there are significant differences between the degree of initial depression and the degree of final depression, after complete completion of the personalized music therapy plan (complete stage).

Secondary hypothesis *I* of the study, wants to highlight the correlation between the degree of depression and the number of hours spent in the personalized music therapy plan, in order to establish its effectiveness,

i: It is assumed that there is a significant negative correlation between the degree of depression and the number of therapy hours completed.

2. Material and method

The background of the melotherapy was a melodic compilation performed on the Kalimba cocoon. The melodic program was given to the patient at home, even recommending finding a period of time to listen to the melotherapeutic program.

The present study was performed at the CF 2 Clinical Hospital, Oncology Department between November 1, 2019 - October 15, 2020 on a number of 32 patients aged between 42 and 60 years, the counselling sessions were weekly, individual and personalized by 40-50 minutes.

The study proposed for the systematization of the methodology for assessing the patient's depression by analytical methods of psychological testing using the Beck-21 item depression test required the establishment of the experimental group and the appropriate processing of the results obtained. For a clear presentation we used the comparative study of the data collected at the initial examination with those obtained during the experiment.

All these assessments were performed before the start of treatment (initial measurements), at the end (final measurements).

In conducting this research, we used a series of systematized methods as follows:

- *the method of bibliographic study,* which allowed us to compare the results obtained with the results of previous research on the same topic**.**
- *The anamnesis* aims togather as much information as possible about the main events experienced by the individual in hi sexistence, in order to know the "personal history" of each subject.

With her help I harvested:

- data regarding the patient's identity, name, surname, age
- data on the form, the treatment applied, the moment of instituting the treatment and the therapeutic means used.
- non-compliance with treatment
- family support

Observation as a scientific method of research consists in the intentional, careful, methodical pursuit of aspects of facts, processes of phenomena and the exact, systematic integration of their various manifestations, as they take place in natural, ordinary conditions, in order to know them. Under their essential aspects in an existing situational context. (Marian Niculescu)

With the help of this method we appreciated the degree of involvement of the patients in the program, the general and local reactions to the applied therapeutic means, the conscientiousness with which the patients followed the indications, etc.

- ✓ *Beck depression test* - 21 items
- ✓ *Statistical mathematical processing*

The use of mathematics is performed using different mathematical formulas: graphical representation of data collected and processed through mathematical relationships - ratio, percentage, ration, etc. And then by the statistical processing of some coefficients and their statistical significance. Therefore, statistics appear as an indispensable auxiliary tool for any research, insofar as the studied phenomena contain a certain degree of unpredictability, of probability.

For data processing we used:

- the statistical method by which we calculated the arithmetic mean (x), the deviation Δx and the dispersion (S_2), the standard deviation S and the coefficient of variability C_v

- graphic method: graphs that represent different values resulting from the clinical study.

- Patient presentation and outcomes were centralized in the form of tables and graphs and were analysed with the Statistical Package for the Social Sciences (S.P.S.S.). Thus, the starting statistical indices (mean, median, modulus, standard deviation), the t test for independent samples and the non-parametric variant U-Mann Whitney test for independent samples were subsequently calculated for the verification of the hypotheses in question, and I will extract and graphical representations in the form of histograms, pie charts and point clouds.

3. Results and Discussions

In this paper we used a non-probabilistic sample with rational selection, consisting of 39 subjects, 17 men and 22 women, aged between 45 and 60 years, who were involved in recording information about themselves, in within the instrument used.

We mention that after measuring the initial degree of depression, the sample was reduced to 32 subjects, 7 of the original number dying. Therefore, we will make the comparisons only for the 32 subjects that make up the form of the final sample.

The weighting by age and gender is shown in the following graphical representations:

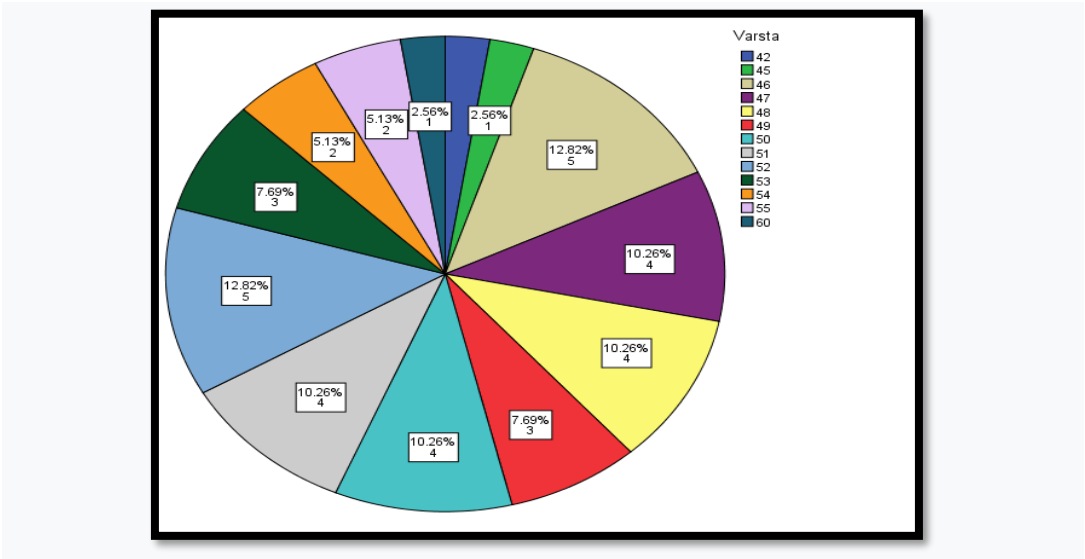

Figure 1 *Distribution of participants by age*

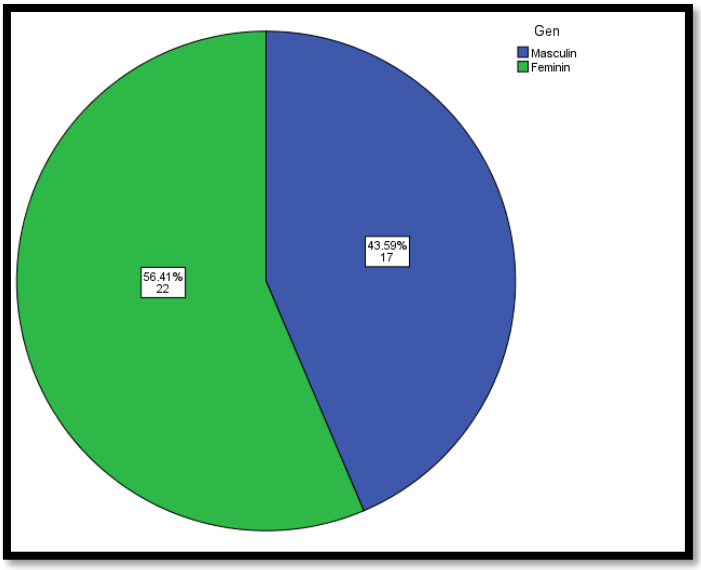

Figure 2. *Distribution of participants on the basis of gender*

For a more complex analysis in the first stage, we divided the sample into two groups depending on the degree of depression: moderate - LOT1 and severe - LOT2.

1. Comparative presentation and interpretation of data LOT 1 - moderate depression and LOT 2 - severe depression

Analyzing the data from table no.1 it is observed that the averageage of the 17 subjects was 51 years, the distribution by sex approximately equal - 9 women and 8 men, and the sociological index on average 8.84 with a minimum of 4 (family at risk raised) and a maximum of 10 (healthy family). The initial Beck score was on average 21.35 (moderate depression) with a minimum of 17 and a maximum of 24, intermediate on average 13.23 (mild depression) with a minimum of 11 and a maximum of 16 and final average 6 , 35 (normal) with a minimum of 5 and a maximum of 7.

Table no. 1- centralization of lot 1

Crt. No.	Patient code	Sex M	Sex F	Age	Beck Score		
					Initial	intermediate	final
1	P1	x		53	21	12	5
2	P2		x	54	20	11	5
3	P3	x		47	19	14	6
4	P4		x	46	23	11	7
5	P5	x		55	23	12	7
6	P6		x	52	20	13	5
7	P7	x		50	22	15	6
8	P8		x	53	23	12	7
9	P9		x	50	23	15	6
10	P10	x		54	22	14	7
11	P11		x	49	24	16	6
Crt. No.	Patient code	Sex M	Sex F	Age	Beck Score		
					Initial	intermediate	final
12	P12	x		46	22	14	7
13	P13		x	48	18	13	7
14	P14	x		52	17	12	7
15	P15	x		60	21	13	6
16	P16		x	47	22	15	7
17	P17		x	51	23	13	7
TOTAL /average x		*8M*	*9F*	*51*	*21,35*	*13,23*	*6,35*
					$Dx_1 = 1,59$	$Dx_2 = 1,27$	$Dx_3 = 0,69$
					$S^2x_1 = 3,64$	$S^2x_2 = 2,17$	$S^2x_3 = 0.58$
					$Sx_1 = 1,91$	$Sx_2 = 1,47$	$Sx_3 = 0,76$
					$Cv_x = 8,95$	$Cv_x = 11,11$	$Cv_x = 11,97$

Legend - maximum–minimum

Analyzing the data from table no. 2 patients with severe depression observed that the averageage of the 15 subjects was 49.20 years with and the distribution by sex approximately equal, 8 women and 7 men, and the sociological index on average 7.60 with a minimum of 5 (family high risk) and a maximum of 10 (healthy family). The initial Beck score was on average 47 (severe depression) with a minimum of 43 and a maximum of 51, intermediate on average 22.53 (moderate

depression) with a minimum of 19 and a maximum of 25 and final average 9.06 (normal state) with a minimum of 8 and a maximum of 10.

Table no.2- *centralization of lot 2*

Crt. No.	Patient code	Sex M	Sex F	Age	Beck Score		
					Initial	intermediate	final
1	P20		X	45	47	22	8
2	P21	X		49	50	23	9
3	P22		X	50	46	19	9
4	P23		X	47	48	21	10
5	P24	X		48	43	23	9
6	P25		X	52	45	23	9
7	P26	X		51	46	23	8
8	P27		X	46	48	23	9
9	P28	X		52	47	23	10
10	P29		X	51	51	25	10
11	P30	X		53	44	23	10
12	P31		X	49	46	23	9
13	P32	X		51	49	23	9
Crt. No.	Patient code	Sex M	Sex F	Age	Beck Score		
					Initial	intermediate	final
14	P33		X	46	46	22	9
15	P34	x		48	49	22	8
TOTAL		*7M*	*8F*	*49,20*	*47,00*	*22,53*	*9,06*
					$Dy_1 = 1,87$	$Dy_2 = 0,85$	$Dy_3 = 0,49$
					$S^2y_1 = 5,07$	$S^2y_2 = 4,58$	$S^2y_3 = 0.46$
					$Sy_1 = 2,25$	$Sy_2 = 1,25$	$Sy_3 = 0,68$
					$Cv_y = 4,79$	$Cv_y = 5,49$	$Cv_y = 7,51$

Legend - maximum–minimum

From the statistical calculations that aimed especially at the standard deviation (S) and the coefficient of variability (Cv) results a high homogeneity of the groups of subjects at the initial testing*, the values of the Beck score being:*

a) average 21.35-moderate depression in group 1 and 47-severe depression in group 2.

b) at the standard deviation - 1.91 in the case of lot 1 and 2.25 for lot 2;

c) at thecoefficient of variability - 8.95, in the case of lot 1 and 4.79 for lot 2.

From the statistical calculations that aimed especially at the standard deviation (S) and the coefficient of variability (Cv) results a high and average homogeneity of the groups of subjects, the values at the ***intermediate test*** were:

a) in group 1 Beck score on average 13.23 - moderate depression decreasing compared to the initial test and in group 2 - Beck score on average 22.53 - moderate depression decreasing compared to the initial testing.

b) for the standard deviation - 1.47 in the case of lot 1 and 1.25 for lot 2;

c) at the coefficient of variability - 11.11 in the case of lot 1 and 5.49 for lot 2.

From the statistical calculations that aimed especially at the standard deviation (S) and the coefficient of variability (Cv) results a high and average homogeneity of the groups of subjects, the final values in Lot 1 - were:

a) Beck score on average 6.35 (normal state) decreasing compared to the initial and intermediate testing and in group 2 - were at Beck Score on average 9.06 (moderate depression), decreasing compared to the initial and intermediate tests.

b) at the standard deviation - 0.76 in the case of lot 1 and 0.68 for lot 2;

c) at the variability coefficient - 11.97 in the case of lot 1 and 9.06 for lot 2.

From the centralized tables on batches, the graphs below show that all the indicators registered *significant* decreases from a statistical point of view, which shows that the progress obtained between the evaluations was determined, in a controlled way, and does not belong to chance.

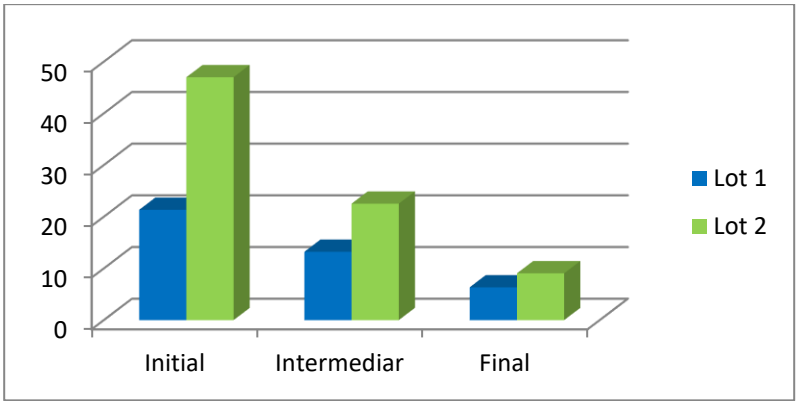

Figure 3.*Comparative graph Lot 1, Lot 2 - Beck score*

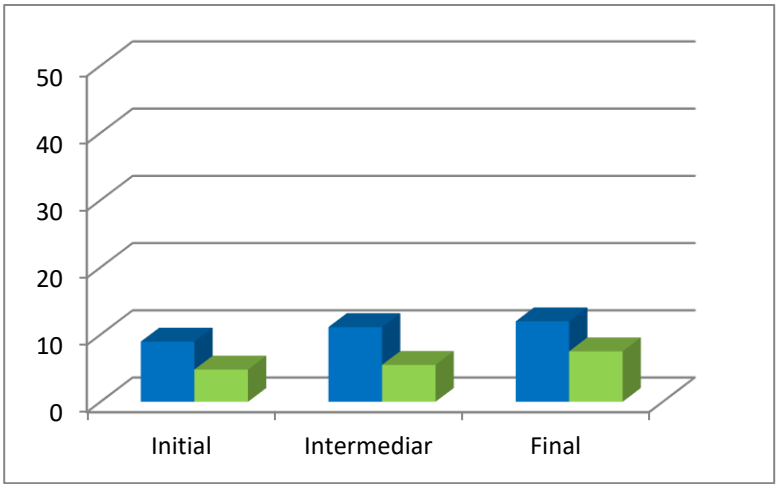

Figure 4. *Comparative graph Lot 1, Lot 2 - Coefficient of variability*

HYPOTHESIS H1

H1: It is assumed that there are significant differences between the degree of initial depression and the degree of final depression, after complete completion of the personalized music therapy plan (complete stage).

To test this hypothesis we used the Beck Depression Inventory.

Table no. 3. *Initial indices for the variable Degree of depression - complete stage*

Statistics		
Degree of depression FULL STAGE		
N	Valid	64
	Missing	0
Mean		20.50
Median		13.50
Statistics		
Degree of depression FULL STAGE		
Mode		7
Std. Deviation		15.964
Variance		254.857
Skewness		.859
Std. Error of Skewness		.299
Kurtosis		-.826
Std. Error of Kurtosis		.590

The average for the variable *The degree of depression* in the complete stage is 20.50 and the standard deviation is 15.964.

To interpret this hypothesis we checked if there is a normal distribution of data. We used the Kolmogorov - Smirnov test to test the normality of the

distribution.

Table no.4. *Normality test for the variable Degree of depression - stage 2*

Tests of Normality							
	Description StageComplete	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Degree of depression FULL STAGE	Initial stage	.293	32	.000	.772	32	.000
	Final stage	.187	32	.006	.917	32	.018
a. Lilliefors Significance Correction							

From the interpretation of the statistical data obtained it is observed that the result obtained in the Kolmogorov-Smirnov test has a significance threshold less than sig 0.05, in the case of both stages, both the initial and the final, which means that the distribution is not normal for any from the two stages to be compared.

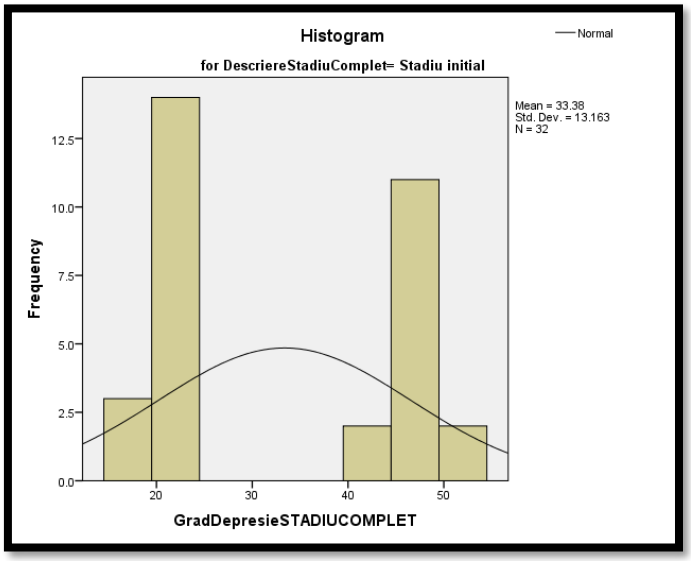

Figure 5 *Distribution histogram for the variable Degree of depression - Initial stage*

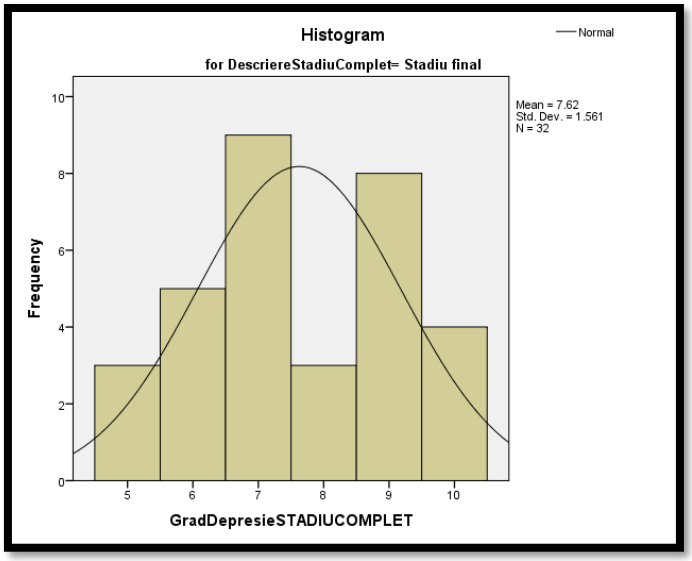

Figure no. 6 *Distribution histogram for the variable Degree of depression - Final stage*

The figures above show the shape of the distribution in the case of both measured stages, the initial and the final.

Because the distributions of the scores obtained in the two stages are not normal, we applied the U Mann-Whitney nonparametric test for independent samples:

Table no. 5 *Mann-Whitney comparison table for independent samples - initial stage and final stage*

Ranks				
	Description StageComplete	N	Mean Rank	Sum of Ranks
Degree of depression FULL STAGE	Initial stage	32	48.50	1552.00
	Final stage	32	16.50	528.00
	Total	64		

Test Statistics[a]	
	Degree of depression FULL STAGE
Mann-Whitney U	.000
Wilcoxon W	528.000
Z	-6.897
Asymp. Sig. (2-tailed)	.000
a. Grouping Variable: Degree of depression FULL STAGE	

The analysis of the data obtained shows that there are statistically significant

differences at a significance threshold p = 0.000, in terms of comparison between the level of depression in the initial stage and the level of depression in the final stage.

From this perspective, the results show that in the initial stage the level of depression is much higher with an average score of 48.50, than the level of depression in the final stage with an average score of 16.50, this underlining the impact of the personalized music therapy plan, in the complete stage.

Hypothesis H1 is confirmed according to the above statistical data which means that there is a statistically significant, considerable difference between the level of depression measured in the initial stage and the level of depression measured in the final stage.

HYPOTHESIS I1

I1: It is assumed that there is a significant negative correlation between the degree of depression and the number of therapy hours completed.

To test this hypothesis, we used the *Beck Depression Inventory* and the counting of therapy hours that patients underwent.

Table no.6 *Start indices - Degree of depression, Hours of therapy*

Statistics			
		Degree of Depression After Starting Therapy	Duration of Therapy Weeks
N	Valid	64	64
	Missing	0	0
Mean		12.61	40.19
Median		10.50	40.50
Std. Deviation		6.189	13.165
Variance		38.305	173.329
Skewness		.713	.001
Std. Error of Skewness		.299	.299
Kurtosis		-.886	-2.045
Std. Error of Kurtosis		.590	.590

In the table above, the starting statistical indices are presented: mean, median, mode and standard deviation, for the research subjects.

Considering the existing reality, respectively the data series, with the help of the Statistical Package for the Social Sciences (S.P.S.S.) program, the normality of the distribution was first verified, for the variables taken into account.

Table no.7 *Normality test - Degree of depression, Hours of therapy*

Tests of Normality						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Degree of Depression After Starting Therapy	.163	64	.000	.865	64	.000
Duration of Therapy Weeks	.315	64	.000	.695	64	.000
a. Lilliefors Significance Correction						

The significance threshold is not higher than 0.05, so the data are not normally distributed for any of the variables considered.

In this context, the next step was to apply the Spearman Test of rank correlation, a non-parametric method.

Table no.8 *Correlation test between Degree of depression and Therapy hours*

Correlations				
			Degree of Depression After Starting Therapy	Duration of Therapy Weeks
Spearman's rho	Degree of Depression After Starting Therapy	Correlation Coefficient	1.000	-.765**
		Sig. (2-tailed)	.	.000
		N	64	64
	Duration of Therapy Weeks	Correlation Coefficient	-.765**	1.000
		Sig. (2-tailed)	.000	.
		N	64	64
**. Correlation is significant at the 0.01 level (2-tailed).				

The table above confirms the presumption that there is a significant negative correlation between the two variables.

A significant negative correlation was identified between the Degree of Depression and *the Hours of Therapy*, which has a value of -0,765, at a significance threshold of less than 0.05, which means that the more the number of hours of melotherapy followed increases, the more the level of depression decreases significantly.

In this case, hypothesis I1 can be considered valid.

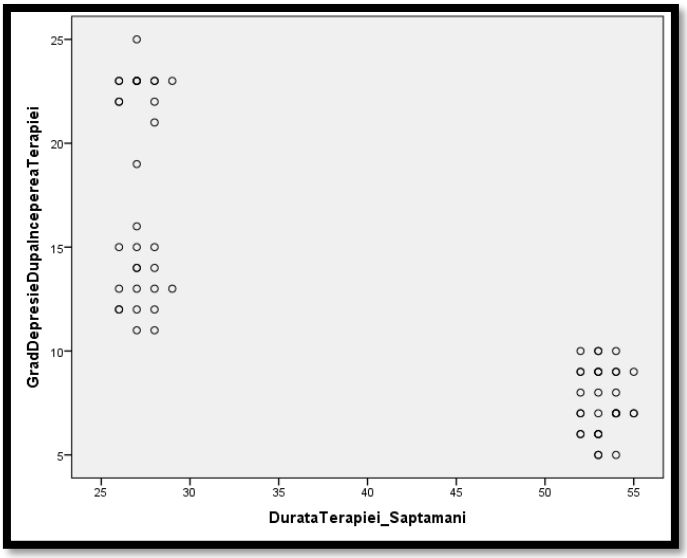

Figure no. 7.*Correlation point cloud Degree of depression - Hours of therapy*

4. Conclusions

1. Psychological counselling of cancer patients is an integral part of the concept of a multidisciplinary care team. In this relationship, mutual respect, mutual trust between the psychologist and the patient and the empathy of the psychologist are the key to defining a successful collaboration.

2. In this paper we used a non-probabilistic sample with rational selection, consisting of 39 subjects, 17 men and 22 women, aged between 45 and 60 years, who were involved in recording information about themselves, within the instrument used. We mention the fact that after measuring the initial degree of depression, the sample was reduced to 32 subjects, 7 of the original number dying (final sample 32 subjects)

3. In the study, patients benefited from an approximately equal number of individual counselling sessions based on the structure of a general psychological counselling plan, lasting 40-50 minutes, except for the intermediate and final test sessions which were sessions dedicated exclusively to the evaluation process.

4. Statistical data processing demonstrated what we found during our experiment and formulated as hypotheses, namely that the use of melotherapy in the treatment of depression in cancer patients leads to improved recovery results. The methods were selected in such a way as to support each other, to recommend the use of statistical processing tests, to complement and reinforce the results obtained. (Statistical Packager for the Social Sciences).

5. The statistical calculation shows:

a. all indicators showed significant decreases, which shows that the progress made between evaluations (initial and final) was determined in a controlled way and does not belong to chance, emphasizing the impact of the music therapy plan in

the complete stage;

b. a significant negative correlation between the degree of depression and the hours of therapy (which has a value of - 0.765 at a significance threshold of 0.05), which means that the level of depression decreases significantly with increasing hours of melotherapy;

6. The first step towards oncological recovery is the help of a psycho-oncologist who will deal with emotional problems, helping him to acquire new behaviours, to understand his own emotions and to acquire a new quality of life, according to his current needs, not being neglect and family support.

7. Patients' own beliefs, related to the idea of psychological counselling, attitude, feelings, lifestyle and diet have a major contribution in each stage of treatment.

8. This study shows that this musical background had the role of accelerating the healing process and obtaining the optimal psychological environment for resolving physiological disorders, and makes the interaction between patient and psychologist much easier, providing a state of relaxation that facilitates openness to the new, but especially increases the patient's receptivity to the techniques worked while creating an "anchor" in the patient's subconscious. The results of the research allow us to state that the application of psychotherapy as early as possible, especially melotherapy to the oncological patient, can make him more easily accept the disease and especially the effects of chemotherapy.

9. Following the theoretical, practical and research experience gained, we launch a series of proposals:

- We propose the use, adaptation, individualization of melotherapy and its use in the treatment of all forms of depression in cancer.
- We also consider it useful to extend the use of these means to other diseases.
- We propose the introduction of melotherapy for preventive purposes, because each condition (more or less disabling) has a tendency towards a specific depressive pathology.
- We further propose the publication of research results and their knowledge, both in the medical and psychological spheres.
- We propose to continue the research, on a larger number of patients and a long period of time with a much more detailed monitoring of the effects of using melotherapy in the treatment of depression in cancer, to support, complement and continue our approach, making known results.

Thanks

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ASPECTS REGARDING THE RECOVERY AFTER TRAINING AND COMPETITION

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Abstract

The recovery framed in the training complex – recovery or competition – synergistically applies the natural and artificial means in order to super-compensate. Recovery after effort aims especially at the physical, cardio-respiratory, metabolic recovery, with the appropriate means, but also the neuropsychic one, through relaxation techniques, suggestion, etc. That is why it is recommended to use the means that can respond to this desideratum, including nutrition and medication. Restoring exercise capacity is an essential condition of the training program. Without a good and complete recovery, large volumes of training and maximum intensities cannot be achieved, which determine the continuous increase of the performance capacity. The efforts made in trainings and competitions often involve a rapid restoration of physical and mental capacities so that, after certain periods of time – even a few hours sometimes, athletes are able to act in the fullness of physical forces and fullness of capacity.

Key words: *performance, recovery, means, effort*

1. Introduction

Sports performance is multiple determined and no one can say with certainty which factor has the highest weight when its figures are at the upper limits of the subjects' capacity. She is the source of success of the competitor.

Training, starting with the great performers, is a unitary process that is carried out according to the general laws of performance development, depending on the development of motor qualities, intellectual capacities and characteristic features of the psyche (Nicu, A., 1999).

The importance of restoring the body after the effort in training and competition determined the specialists of the field to treat it as a component of the training process (Encuţescu, A., Muraru, A., 2005). In the theory and practice of modern training, the concept of recovery is generalized, its significance being approximately the same in the language of specialists of everywhere.

After every workout or effort in a competition, it is very important to recover. Recovery is very little taken into account, especially in young athletes, who are growing and who need an optimal level of nutrients to be able to cope with the effort (https://www.claudianicolae.ro/recuperarea-dupa-antrenament-sau-competitie-sfaturi-de-nutritie-sportiva-b447).

Unlike recovery, which is located in the area of sports pathology, the recovery is integrated in the current regime and planning of the training day, acquiring more and more the significance of a distinct process, which succeeds the training and which actually expresses the pronounced decrease of the energy reserves at the level of the different devices, systems and organs of the body (it is the state of physiological fatigue, a state called by some authors "pessimum" and which in the end is a genuine alarm system, which triggers and potentiates the intensity and variation of the natural recovery processes that take place in the body).

If at this moment the functional possibilities of the organism are exceeded, the premises for entering a phase of functional disinergism are created, with all the possible consequences (pathological fatigue, functional pathology) (Sabău, E., 2017):

- at the level of the central nervous system, the post-effort cortical inhibition occurs, a process that follows the hyperexcitability that prevailed during the sports effort; it irradiates on the entire cerebral crust and thus favours the metabolic dominance of anabolic type, reconstructive;

- on the vegetative and metabolic level, bradycardia, bradypnea, increasing the alkalinity of the internal environment, the predominance of vagal and cholinergic effects, are expressions of the decoupling of the general catabolism induced by effort and the creation of favourable conditions for the installation of anabolic processes;

- at the muscular level, the recovery is expressed by the restitution of the glycogenic reserves, of myoglobin, the intensification of the enzymatic processes aimed at increasing the synthesis of proteins, etc..

In the conditions of sports effort (intensities and large volumes of work), this recovery is no longer possible, being compensated by the directed recovery.

Directed restoration, biological rebalancing or trophic regeneration is considered a complex methodical-pedagogical and medico-biological process, in which, through the directed use of physiological means (natural or synthesis), coming from the internal or external environment, it is aimed to return to the "homeostasis" of the organism, at the level had before the effort and even to overcome it by achieving "overcompensation" (Helal, H., 2003).

It follows, therefore, that by reaching the threshold of overcompensation, the recovery turns into a biological supporter of the effort.

Being a consequence of sports training, the recovery broadly follows its regularities (physiologically); psychophysical effort and restoration-recovery are two facets of a unique process – sports training – between which there are interconditioning relationships.

≈►The natural recovery of the body, the dependence on the central nervous system, is the main form of restoring the body after training or competitions (Mihăilescu P.D., 2011). Within this natural restoration there is a certain order; thus, the vegetative parameters return to the unit of time of the order of minutes,

the metabolic ones in hours and the neuro – endocrino - hormonal, enzymatic ones return to the unit of time of the order of days.

≈►Directed restoration accelerates natural recovery, addressing mainly those biological substrates that have been affected by effort and cannot be restored naturally until the next effort (Cretu, A., 2003).

The means used are classified either by the biological substrate on which they act with priority (cardio-respiratory, neuromuscular, neuropsychic), or by appearance.

2. Material and method

The purpose of the study is to make a synthesis of the methods and means of recovery, which specialists recommend in the specialized literature.

Hypothesis of the study. The use of means of recovery both after training and after competition, can lead to superior performance of athletes, including juniors.

3. Results and Discussions

From a practical point of view, we approach recovery: in training, after training, in a daily cycle, in a weekly cycle, after a stage, in an annual cycle, in an Olympic or pre-competitive, intra-competitive and post-competitive cycle (Encuţescu A., Muraru A., 2005).

Directed restoration is applied to healthy organisms affected by effort, while recovery is applied to diseased, morphologically or functionally handicapped organisms.

≈►The pharmacological recovery remains conditioned by the prescription and medical surveillance, by the peculiarities of the natural recovery, directed, depending on the age, sex, environmental factors (altitude, climatic or time zone variations), by success or failure in competition (Dragan, I., Stroescu., V., 1993).

The objectification of the recovery is necessarily carried out in the field when it is appreciated: behaviour (training disposition, performance and asthenia state), sleep (qualitative and quantitative), clino-orthostatic test, weight curve, urine test, dynamometry and myotonometry, reaction speed, vital capacity, inspiratory and expiratory apnea, etc.

Recovery basically means combating the fatigue that occurs during the effort and diminishes the sporty performance. Recent studies consider that local metabolic fatigue is due to the following factors (Marinescu, Gh., Şalgău, S., 2005):

- Accumulation of lactic acid in muscles – in efforts between 35 sec and 4-5 min;
- Decrease of muscle glycogen and accumulation of ammonia in the efforts made for 10-90 min;
- Depletion of muscle glycogen and accumulation of lipid peroxides in efforts between 70 and 360 min.
- Neuropsychic factors that effort.

The modern slogan to train as much and as "hard" as possible (8-10 hours daily, with intensities of 85-100%) shows that the spontaneous, natural restoration of the body is overcome, exposing the athlete's body to risks that can go up to the installation of a severe morbid state – neurosis of overload, overtraining (Dragnea, A., Bota, A.,1993).

The recovery in these conditions is considered as a genuine "feed-back" that is reflected on the previous moment, ergotrope, becoming a means of support even, with the role of regulating the effort that follows, of boosting the biological and psychic performance.

The recovery is subject to physiological regularities of the training and must be trained, to which it is added that the recovery addresses some organisms of morphological or functional integrity. Directed restoration does not replace the natural, physiological restoration, but complements it, strengthens it, accelerates it; the efficiency of both forms of restoration is conditioned by the integrative role, coordinator of the neuro-endocrino-vegetative system (Dragan, I., Stroescu., V., 1993).

The recovery, like the effort, has an individual character, taking into account the age, sex, level of training, environmental conditions, the branch of sport, the state of stress, the nature and duration of the effort, the level of sports mastery, the moment of application within the macro, meso or microcycle, etc.. The recovery must be directed by specialized staff, by the doctor, especially in case of replacement of losses or exaggerated consumption.

The means used in the recovery are staggered in (Sabău, E., 2017): specific (which is medically directed) and nonspecific (pedagogical, hygienic) that can be applied by the coach and the athlete.

CLASSIFICATION OF MEANS OF RECOVERY (Şalgău, S., 2007):

A. After the effects exerted:
- ✓ neuropsychic;
- ✓ Neuromuscular;
- ✓ cardio-respiratory.

B. By membership:
  - ✓ balneophysiohydrotherapeutics;
  - ✓ psychotherapy;
  - ✓ dietary;
  - ✓ pharmacological;
  - ✓ active rest – passive rest (sleep).

Means that accelerate neuropsychic recovery (Dragan, I., Stroescu., V., 1993):

- o psychotherapical (talks, Yoga, suggestion, etc.);
- o acupuncture, acupressure;
- o oxygenation (natural, artificial);
- o negative aeroionisation (natural, artificial);
- o active rest – passive;

- hot hydrotherapy;
- massage;
- medication.

Means that accelerate neuromuscular recovery (Nicu, A., 1999):

- hot hydrotherapy, sauna, massage;
- autogenous training, Yoga, acupuncture, acupressure;
- active rest – passive;
- diet (glucose, glycol, Na, K, Ca, P, Mg, vitamins – B and C, ATP, myorelaxants, foleisteine, carnitine, etc.);

Means that accelerate the endocrino-metabolic recovery (Cretu, A., 2003):

- oxygenation and negative aeroionization;
- neuro-muscular relaxation techniques;
- water rebalancing; massage, acupuncture;
- medication (piracetam, pyrovitam, Mg aspartate, vitamins, etc.);

Means that accelerate cardio-respiratory recovery (Mihăilescu, P.D., 2011):

- oxygenation (natural, artificial);
- hydroelectrolytic rebalancing;
- active and passive rest;
- hot hydrotherapy;
- sauna (15 minutes / week), massage (daily);
- autogenous training;
- alkaline, carbohydrate, vitaminized diet;
- pharmacology (ATP, Ca, P, K, Na, Mg, glucose, vitamins – B, C, E).

The means of recovery shall be applied according to their accessibility and effectiveness, with priority for those devices and systems required in the effort. This hierarchy, although it has a great scientific value, practically does not provide concrete models that can be easily applied by coaches. The respective means are applied in a coordinated manner, according to the structure of the training, day, week, mesocycle, macrocycle (Nicu, A., 1999).

Within the means used for the above purpose are not included means with a doping character or artificial, non-physiological growth of biological efficiency.

The recovery process is closely related to the physico-chemical changes of the internal environment, which occur as a result of effort and manifest themselves under different forms of fatigue, a normal physiological state of defence of the body. Fatigue disappears after proper rest. Over-tensioning is a physiological state that can acquire pathological aspects. Overtraining is the result of chronic fatigue, characterized by the obvious decrease of the effort capacity and the impairment of the athlete's health.

Conceptually, recovery should be regarded as having at least equal value to the effort in training or competition. The effective application of recovery measures requires knowledge of theoretical principles that frequently occur in training (Helal H., 2003):

- natural, spontaneous recovery must ensure the possibility of repeating the effort against the background of a morpho-functional stability;
- the order of natural recovery is as follows – in the first 45-60 seconds after effort, the vegetative functions (pulse, tension, breathing) are restored, between 2-6 hours after effort the metabolic functions are restored, and after 24-48 hours the enzymatic hormonal parameters are restored;
- recovery by pharmacological means is directed only by the doctor;
- the stages of recovery are carried out in parallel with the periodization of the training;
- the formation of the stereotype of restoration is a distinct task.

Training positively influences sports performance. The time allocated to him reached the maximum ceiling, thus increasing the importance of finding new ways to improve the quality of training (Marinescu, Gh., Şalgău, S., 2005). In this context, special attention had to be paid to the restoration, but also to other parameters related to sports performance, throughout a competitive year.

Conclusions

1. The analysis of the scientific-methodical literature mentions the fact that, in general today in the practice of sports training, the increase of performances is based on the elaboration of training models, which use traditional methods and in which the recovery is specified as a decisive factor, but it is highlighted the lack of unitary concepts in order to apply it in the training of athletes.

2. The fact that sports training is based on several areas of activity that are intertwined, has led to the possibility of interpreting the side of training as a complex, dynamic, multifactorial system.

3. Although many specialists in charge of the training of athletes are of the opinion that the restoration contributes significantly to the improvement of the performances, they limit the means of restoration to pharmacology 100%, active rest 64,8%, sports diet 35,3%, physio-hydro-kinetobalneology 23,4%, psychotherapy 17,6% and prophylactic and altitude spa recovery cure 5,9%.

4. The most effective means of recovery are: sports diet, psychotherapy, physio-kinetic means, active rest, but without minimizing the role of the other means.

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Session Varia

GENDER CHARACTERISTICS OF THE INTEGRATIVE BRAIN FUNCTION DYNAMICS IN SCHOOLCHILDREN UNDER THE INFLUENCE OF STUDY LOADS

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Abstract

Gender characteristics of the central nervous system reaction of 11-12-year-old schoolchildren to educational loads were studied. Stability of the reaction, level of functional capabilities and functional level of the system were determined according to the data of the visual sensorimotor reaction. Studies of functional state of the central nervous system of adolescents revealed large variability of data, especially those for stability of the reaction, which reflected one of the age-related features of the central nervous system reactions of adolescent children. As to stability of the reaction and level of functional capabilities of the brain in girls, deterioration of indicators was registered, which was characterized by increase in the percentage ratio of the examined with strained adaptive reactions. For boys, on the contrary, positive dynamics of this value was registered during the year. However, according to functional level of the system, as an integral indicator of the central nervous system, a positive reaction was observed in schoolchildren of both sexes. So, the results of the study established that girls aged 11-12 were already in the period of puberty. The boys' body was still in the pre-pubescent period.

Key words: *central nervous system, sex, schoolchildren, stability of reaction, level of functional capabilities, functional level of the system*

1. Introduction

Optimizing the educational process in secondary school, in particular physical education, the main task of which is to strengthen health, increase work capacity and success of schoolchildren, resistance of their organism to the action of adverse environmental factors, is extremely relevant, as evidenced by the Law of Ukraine "On Comprehensive General Secondary Education" and other regulatory documents.

Scientific studies have shown that from the beginning to the end of the school year, pupils and students undergo adaptation processes with negative trends, which are characterized by deterioration of the functional state of many physiological systems of the body. The central nervous system (CNS), as an organizer and regulator, performs an integrative function and, therefore, should hypothetically have greater shifts under the influence of mental and physical stress. However, there are contradictions in the sense of the expressed opinion, and there are no

normative data on similar reactions and methodical approaches to their assessment (Bosenko, & Shumeiko, 2007; Zagni, Simoni, & Colombo, 2016; Bosenko, Bobro, Topchii, & Kholodov, 2019; Shmarhun, 2017; Topcii, & Bosenco, 2017).

The *purpose* of the completed study was to research the dynamics of functional state of the central nervous system of schoolchildren aged 11-12 during the school year.

2. Material and method

The study was conducted in the laboratory of functional diagnostics named after Professor Tetyana Mykolaivna Tsoneva, Department of Biology and Health Care, in compliance with all rules of bioethics. 18 schoolchildren aged 11-12 years (10 girls and 8 boys) were examined at the beginning and at the end of the school year. According to the medical examination, all schoolchildren were almost healthy, had no acute or chronic diseases and health complaints.

In such studies, especially of children and young people, it is desirable to determine physical development, which was studied according to the following anthropometric characteristics: body length in standing and sitting positions (cm), body weight (kg), chest circumference at rest, in the inhalation and exhalation phases (cm), vital capacity of the lungs (ml), standing strength (kg), muscle strength of the right and left hand (kg). Assessment of physical development of the organism was carried out using the method of standards.

Dynamics of functional state of the central nervous system was monitored by the reflexometry method according to T.D. Loskutova's method (Bosenko, et al., 2023), which is based on the analysis of statistical distribution of the repeatedly measured time of a simple visual-motor reaction and is a quantitative characteristic of functional state of the central nervous system.

According to the totality of reaction time values, the following indicators were determined: the most frequently occurring reaction time value expressed in seconds (T mod); the maximum probability that corresponds to the limits of the modal class in fractions of one (P max); the reaction time range at the level of 0.5 Pmax in seconds (ΔT 0.5); the value of the reaction time, which corresponds to the middle of the range ΔT 0.5 in seconds (T 0.5).

The obtained results make it possible to calculate such characteristics of the general functional state (GFS) of the brain as functional level of the system (FLS), stability of the reaction (SR), level of functional capabilities (LFC). Owing to the author's developed devices "Molniya" and "AVR-BOSH-1" (Bosenko, & Shumeiko, 2007), which provide for programmed control and execution of the test, automated registration of 60 values of the latent period of a simple visual reaction with further analysis of the results, the method has become more perfect and operational. GFS of the brain was recorded at the beginning and at the end of the academic year. Testing was carried out in a state of relative muscle rest before and during the fifth minute of recovery after physical exertion in a closed cycle

according to the method of D.M. Davydenko and co-authors (Bosenko, Bobro, Topchii, & Kholodov, 2019; Bosenko, et al., 2023).

Statistical analysis of data was carried out using the Excel program, the statistical package SPSS 16. The critical level of significance for reverification of statistical hypotheses was taken as $p \leq 0.05$.

A simple sensorimotor reaction is implemented through formation of a functional system, the work of which depends on coordination, synchronicity of the temporal and spatial parameters of this system and coincidence of excitation rhythms in nerve cells (Baevsky et al., 2009; Zagni, Simoni, & Colombo, 2016; Bosenko et al., 2019).

3. Results and Discussions

The analysis of reflexometry data shows that the background functional state of the brain of most teenagers approached the level characteristic of the physiological norm of an adult (Bosenko, & Shumeiko, 2007). At the same time, there were no reliable changes between the values of brain GFS in girls and boys both between groups and on test tasks (table 1).

Table *Gender characteristics of general functional state of the central nervous system in schoolchildren aged 11-12 in a state of relative muscle rest at the beginning and at the end of the school year*

Sex	Indicators (c. u.)		
	FLS	SR	LFC
Beginning of the school year			
Girls (n=10)	4.43±0.14	1.50±0.24	3.0±0.27
Boys (n=8)	4.32±0.12	1.27±0.17	2.82±0.17
End of the school year			
Girls (n=10)	4.26±0.15	1.28±0.21	2.8±0.24
Boys (n=8)	4.28±0.11	1.31±0.18	2.88±0.18

It should be noted that T.D. Loskutova in her research divided the examined into three main groups – with low, medium and high levels of GFS of the brain. However, unfortunately, in our case, it is impossible to subdivide the examined children according to the gradation for adults. Therefore, there is a problem of the need to develop age and sex criteria for assessment of GFS of the brain, which requires examinations of a statistically necessary number of individuals.

Studies of functional state of the central nervous system of adolescents revealed large variability of data, especially those for stability of the reaction, as indicated by the coefficient of variation that for this indicator ranged from 31 to 57%, which reflected one of the age-related features of the reactions of the central nervous system of adolescent children.

Under the influence of muscle activity with a change in load, the studied indicators in children changed differently: in some cases, the values increased, in

others, on the contrary, they decreased. At the same time, increase occurred at low values, and decrease – on the contrary, at high values. Similar dynamics was also established in studies on children and young people conducted earlier at the Department of Biology and Health Care (Topcii, & Bosenco, 2017; Bosenko, Bobro, Topchii, & Kholodov, 2019; Bosenko, et al., 2023).

To assess the dynamics of functional state of the central nervous system before and after loads, we suggest using the methodological proposals of R.M. Baevsky and co-authors (Baevsky, 2009): shift in indicators within ±25% should be considered as an activation reaction, within ±50% – as a stress reaction, and fluctuations over ±50% – as pre-pathology with possible transition to a disease state.

Our studies of GFS of the brain showed multidirectional dynamics of criteria among teenagers of different sex. As to stability of the reaction at the beginning of the school year, for 40% of girls shifts in the range of ±25% were registered, in half of the girls there was a strain of adaptive reactions, and in 10% of cases – pre-pathology was registered. At the end of the school year, the pre-pathological level was already registered in 60%, and the activation reaction – in 30% of schoolgirls (Figure 1).

For boys, the activation reaction, as to stability of the reaction, was registered in 37.5% of cases both at the beginning and at the end of the school year. A pre-pathological reaction was noted in 62.5% of adolescent boys, which was characterized by shifts in stability of the reaction within the range of more than ±50%. However, at the end of the school year, the majority of children with a pre-pathological level transferred into a state of stress (37.5%).

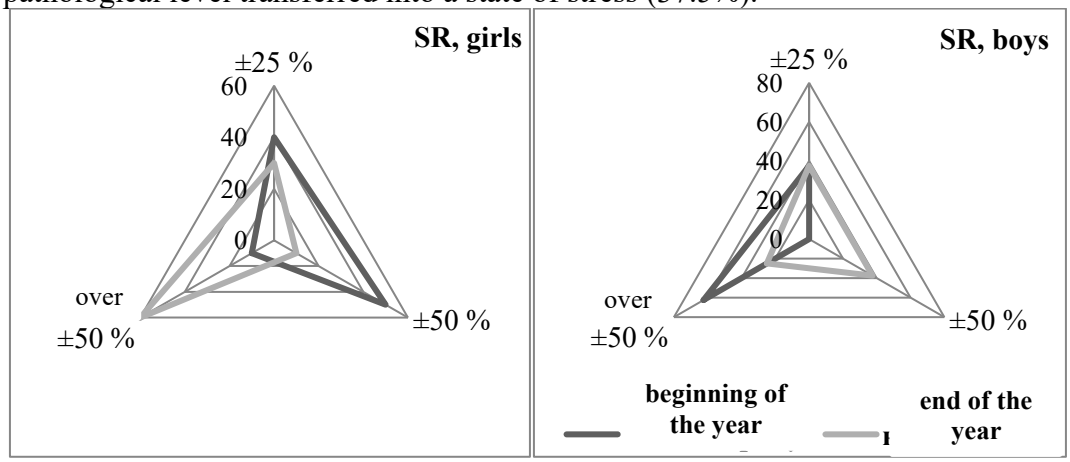

Figure 1. *Gender characteristics of changes in stability of the visual-motor reaction in schoolchildren aged 11-12 during the school year*

According to the level of functional capabilities, which characterizes the ability of the brain to form a high functional level and sustain it, gender characteristics were also recorded.

At the beginning of the school year, 80% of girls and 37.5% of boys registered a shift of this indicator after physical exertion within ±25% (Figure 2). Pre-pathological LFC was not defined. The survey at the end of the school year revealed higher percentage of boys with an activation reaction and, accordingly, lower percentage with the stress of regulation processes. In girls, on the contrary, percentage of individuals with shifts in the range of ±25% decreased and cases of pre-pathology appeared (30%).

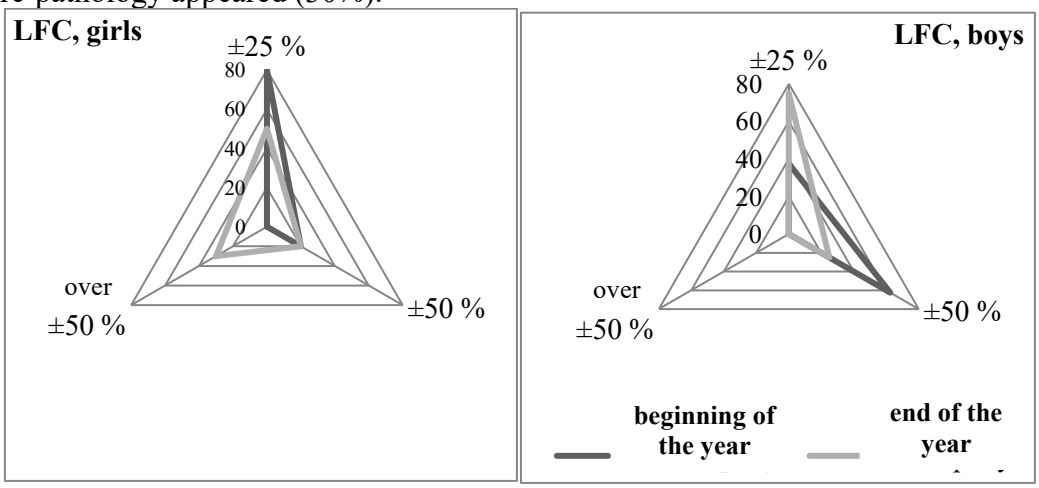

Figure 2. *Gender characteristics of dynamics of the level of functional capabilities of the brain in schoolchildren aged 11-12 during the school year*

Only for the integral index of GFS of the brain – the functional level of the system, which allows assessing the nervous system ability to form and maintain a functional system for a long time – a positive reaction was observed, both in girls and in boys. In all examined schoolchildren, deviations of this criterion were within ±25% (Figure 3).

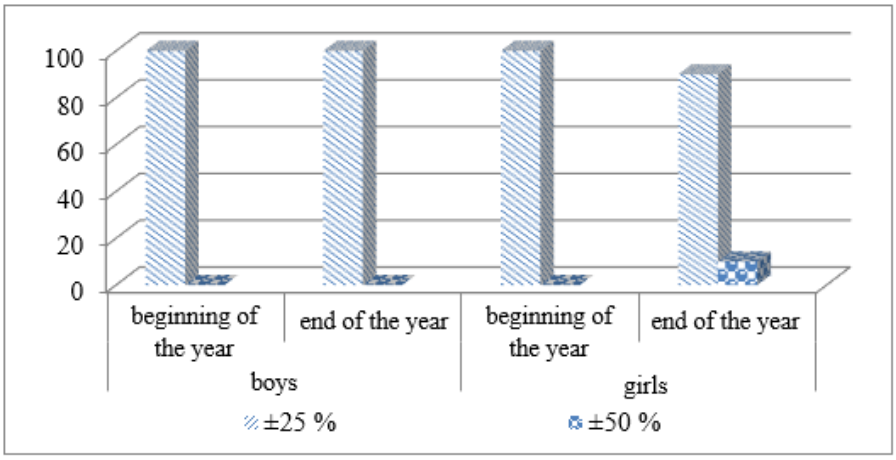

Figure 3. *Range of changes in GFS of the brain in schoolchildren aged 11-12, according to the functional level of the system, at the beginning and at the end of the school year*

So, the results of studying the dynamics of functional state of the brain in schoolchildren aged 11-12 from the beginning to the end of the school year showed, firstly, that schoolchildren, as to the integral criteria of GFS of the brain, had no reliable changes both in the state of rest and for dosed physical activity. Secondly, better functional capabilities of the central nervous system were recorded and preserved in boys compared to girls of the given age period, which may be related to the onset of puberty in the latter.

So, the results of studying the dynamics of functional state of the brain showed that boys had better functional capabilities of the central nervous system, unlike girls of this age period. In our opinion, this may be related with the fact that girls of that age enter puberty. And in this period, instability of the central nervous system is observed. Adolescent boys, as a rule, lag behind girls of the same age.

This is consistent with the data of A.M. Zimkina (Topcii, & Bosenco, 2017), that violation of cerebral homeostasis can be accompanied by shifts in levels of excitability, lability, and reactivity, their fluctuations beyond physiological limits, slow recovery or dissociation of regulatory systems. The obtained research results agree with the data of our previous examinations of persons of different age and sex groups. This confirms universality of evaluation of the brain GFS reactions with individual dependence of its direction and depth on the initial level and strength of external factors.

4. Conclusions

The results of the study established better functional capabilities of the central nervous system in boys, in contrast to girls of this age period. Gender features were identified and it was established that girls aged 11-12 were already in the period of puberty. The boys' body was still in the pre-pubescent period.

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KEEPING CHILDREN SAFE IN SPORTS

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Abstract

Safeguarding in sport is defined as the organization's responsibility to ensure that sport is a safe, positive and enjoyable experience for all children and that all children are protected and protected from abusive or potentially harmful and/or harmful experiences when they are involved in sports activities, depending on their physical and mental capacity and at any level of involvement (performance, table sports, recreational environment).
The responsibility that organizations have is to ensure that their staff, operations and programs do not harm children, i.e. do not expose children to the risk of harm and abuse, and that any suspicions that the organization has related to the non-compliance with the safety of children, in the sports environment in which they are active, is reported to the appropriate authorities (def. according to the International Coalition "Keeping Children Safe").

Key words: *safeguarding, sport, children*

1. Introduction

Safeguarding in sport is defined as the organization's responsibility to ensure that sport is a safe, positive and enjoyable experience for all children and that all children are protected and protected from abusive or potentially harmful and/or harmful experiences when they are involved in sports activities, depending on their physical and mental capacity and at any level of involvement (performance, table sports, recreational environment) (Terre des homes, 2021).

The responsibility that organizations have is to ensure that their staff, operations and programs do not harm children, i.e. do not expose children to the risk of harm and abuse, and that any suspicions that the organization has related to the non-compliance with the safety of children, in the sports environment in which they are active, is reported to the appropriate authorities (def. according to the International Coalition "Keeping Children Safe").

Safeguarding in sport refers to the actions we take to ensure that all children benefit from safety conditions and are protected from any harm when they are directly or indirectly involved in our sports programs and activities (Gazeta sporturilor, 2021).

Children must be protected from any form of violence and exploitation that may occur in the context of sporting activities. And the situations can be numerous: either the staff communicates intimidatingly with the children, or an inappropriate space provides unwanted access to the children's privacy, or the training exceeds certain unwanted physical and psychological limits
(http://www.romaniapozitiva.ro/educatie/mai-multa-siguranta-in-sport-pentru-

copiii-din-romania/).

2. Material and method

Safeguarding procedures include:

• Preventive measures are measures designed to reduce the risk of a child being harmed

• The response measures are the measures intended to ensure that, in the event of the occurrence or suspicion of an incident, this is not overlooked and that actions are taken to concretely respond to any potential risk situations, ensure and check the assistance of the child and prevent the recurrence, as far as possible, of similar situations.

• Monitoring and evaluation measures are intended to follow the process of solving some incidents and to verify that the safeguarding procedures are respected in the context and properly implemented (Terre des homes[3], 2021).

3. Results and Discussions

Preventive measures

• Adoption of safeguarding procedures

- Roles and responsibilities: the protection and promotion of the child's well-being in the sports environment is the responsibility of all adults who interact with children. However, in order to ensure the implementation of the procedures, the school/club must identify and designate at the administrative level a person responsible for safeguarding who will ensure that the policy and procedures are respected within the organization and that the connection is made with the persons responsible for safeguarding from other organizations, including national associations and affiliated amateur and professional clubs (Gazeta sporturilor, 2021)

The role of the person responsible for safeguarding is that of the resource person, who transmits information, supports and offers assistance to the organization in the implementation of safeguarding procedures, including those that respond to suspicions of abuse and risky situations.

- Code of conduct: a clear code of conduct will be imposed on all people who work with children. It establishes clear expectations regarding the child's safety and provides details regarding both desirable behaviors and absolutely prohibited behaviors (Terre des homes[2], 2021).

- The disciplinary process in cases of non-compliance: if an abuse is identified, the organization will take the necessary measures against the aggressor who violated the rights of the child or did not comply with the regulation.

- Information, awareness: the organization will publish these procedures and mention them to all those involved in sports activities.

- Risk assessment: the specific vulnerabilities and needs of children will be taken into account during risk assessments and specific measures will be taken for the provision, care and supervision of children (Terre des homes[2], 2021).

Intervention measures

• Dealing with incidents and concerns regarding child protection. All incidents and concerns regarding the safety and well-being of children will be treated seriously and resolved according to safeguarding procedures.

• Incident reporting. The written records of all reports received will be stored in a safe, confidential place by the person responsible for the safety of the child, regardless of the outcome of the report. In the event of the need to report the observed situation, if there is a suspicion of violence against the child, the general directorate of social assistance and child protection in the respective county/sector is informed, in order to ensure the protection and safety of the child, the respective national legal framework and the best interest of the child.

• Whistleblower protection clause. Reported violent situations will be investigated by internal or external professionals depending on their nature and severity (Terre des homes[3], 2021).

Monitoring and evaluation measures. The school/club undertakes to continuously improve the safeguarding procedures. They are in a continuous evolution and will be modified periodically following the accumulated experience (Terre des homes[1], 2021).

4. Conclusions

Ensuring an adequate and safe environment during children's sports activities, namely performance, recreational or table sports-specific activities.

Ensuring that all children we come into contact with are protected and that their well-being is promoted, and the implementation of our sports programs and activities does not cause children any harm to their physical and/or emotional health.

Nomination of a resource person at the level of each sports club to be responsible for safeguarding, i.e. the safety of the child.

Its number will be displayed on the wall inside the club.

If, for example, a child is having problems with a coach or is being bullied by peers, he or she will be able to turn to that resource person.

"The idea is to intervene quickly, to remove the child from the risk situation and to find the best way to respond. And in some cases, to connect with the Child Protection Authority or the emergency services",

All children have the right to a childhood. It's that simple.

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CHILD ABUSE IN SPORTS

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Abstract

Child abuse occurs in sports as well. We may be shocked, horrified, and embarrassed, but it occurs. When we consider the possibility of unsupervised contact with young children, it is perhaps unsurprising, but it is a betrayal of trust that can be devastating and long-lasting. Children who participate in sports are vulnerable to both physical and emotional abuse. Sport Maltreatment: Sport provides numerous physical, psychological, and social benefits to the child athlete. Because sport is a highly child-populated domain, it is critical to implement child-protection measures to reduce the possibility of child maltreatment in sport.
Concern for the protection of children in sport has a history as old as modern sport itself; however, concern for children's experiences of relational forms of abuse and neglect in this domain has only recently emerged. As a result, the purpose of this article is to review current developments in sport in terms of child-protection policy, education, and research. The authors believe that an athlete-centered philosophy of sport is perhaps the best way to address child safety in sports. The philosophy of an athlete-centered sport model is described, and recommendations for future implementation of child-protection measures are made through the integration of an athlete-centered approach to sport.

Key words: *abuse, sports, child, abuse in sports, safeguarding, IOC*

1. Introduction

Sport provides numerous physical, psychological, and social benefits to the child athlete. However, a growing body of evidence suggests that sport participation may pose inherent risks to the child's well-being. In recent years, there has been an increase in scientific research on the topic of child safety in sports. There is a growing emphasis on identifying who is involved in abuse, the context in which it occurs, and the various forms of abuse that occur in the sporting domain. The International Safeguarding Children in Sport Founders Group presents safeguarding principles, as well as eight underlying pillars that support the successful adoption and implementation of safeguarding strategies. This safeguarding is intended to assist sport organizations in creating a safe sporting environment in which the child athlete can flourish and reach their athletic potential while having fun (Fraser-Thomas, J, Cote, J., 2007).

When it comes to child sports participation, a balanced approach that is neither hypercritical or cynical, nor too romantic about the positive outcomes is required. While it is well known that participation in sports has positive health

benefits for children, the benefits of sport are not automatic, and a person's well-being cannot be guaranteed simply by their active participation in sports. Sport participation may have inherent underlying threats or dangers in an unhealthy sport culture where abuse and harassment occur, despite the many potential positive health and social benefits for child athletes in a healthy sporting environment (Alexander, K, Stafford, A, Lewis, R., 2011; Mountjoy, M., Armstrong, N., Bizzini, L. et al., 2008).

The purpose of this research is to present a summary of the scientific literature on the threats to children in sports, to introduce a framework for categorizing these threats, to identify research gaps in the field, and to provide safeguarding recommendations for sport organizations. Youth sport, as one of the largest segments of the sport industry, provides programmes for tens of millions of children. With the expansion of youth sports programmes, concerns about participant safety have grown. One topic that has received a lot of attention is the societal problem of child maltreatment and abuse, as well as how administrators of youth sports programmes handle potential incidents of maltreatment within their programmes.

2. Material and method

To carry out this study, we used the analysis and generalization of specialized literature, as well as work documentation related to child safety in sports.

3. Results and Discussions

The International Olympic Committee has created two documents that explain why athletes should be protected in sports. The Olympic Charter, which outlines the key principles of Olympism, discusses the IOC's role in protecting athletes' health and combating discrimination. The Olympic Movement Medical Code is the second document, and it emphasizes that all stakeholders "should take care that sport is practiced without danger to the health of the athletes and with respect for fair play and sports ethics... [and should take] measures necessary to protect the health of participants and to minimize the risks of physical injury and psychological harm."

The IOC has been active in its mission to protect the health of athletes, particularly children, with these two guiding documents. The International Olympic Committee (IOC) has issued consensus statements on "Training the Elite Child Athlete," "Fitness and Health of Children," and, most recently, "Youth Athletic Development."

Furthermore, the IOC's commitment to athlete health has been demonstrated through the development of athlete and coach educational tools on injury prevention, sexual harassment and abuse in sport, and healthy body image.

The invited expert scientists, physicians, and youth athlete sport specialists unanimously agreed that safeguarding the child athlete within sport should be

incorporated as an integral component of the Youth Athletic Development Model for the IOC Consensus Statement. This paper serves as the foundation for the recommendations in the IOC Consensus Paper on Youth Athletic Development.

Abuse classifications

Abuse is defined as actions that "frighten, isolate, or control another person." Abuse can occur as a pattern or as a single incident." The five types of abuse:

• Physical abuse includes assault and forcible confinement, such as hitting, strangling, or physically restraining.

• Sexual abuse is defined as unwanted sexual contact — forced sexual acts.

• Threats and intimidation, such as gaslighting or making the victim doubt their own sanity, are examples of psychological abuse.

• Financial abuse is defined as abuse that involves deception and extortion by withholding funds or controlling the budget.

• Neglect is abuse in which the necessities of life are withheld, causing malnutrition, unsanitary living conditions, and other problems.

The World Health Organization defines 'violence' as the intentional use of physical force or power, threatened or actual, against oneself, another person, or a group or community that results in or has a high likelihood of resulting in injury, death, psychological harm, maldevelopment, or deprivation.

While this broad definition of violence is useful in many contexts, it may be problematic in sports. The definition is broad and fails to mention that many actions in sports, while not necessarily violent, can be interpreted as violent in a variety of ways and for a variety of reasons. As a result, in many cases within the sporting context, violence becomes normalized. As a result, we'll go over clear definitions of what's and isn't acceptable behavior in sports below.

Examine the scientific literature on child safety in sports.

In recent years, there has been an increase in research interest in protecting child athletes from violence in sports. The broadening of this body of work in terms of three important considerations: who is involved in the violence, where it occurs, and what forms of it are studied, has been a key trend.

Who: According to research, anyone, including coaches, parents, and peers, can be a perpetrator of violence in sports. Research has traditionally focused on the coach as the perpetrator and the athlete as the victim. According to recent research, the perpetrator in a significant number of cases is a peer athlete. Peers are frequently the perpetrators of some forms of violence, such as bullying and hazing.

Where: According to research, preventing violence is important in all sports. The context in which violence can occur has expanded beyond the confines of training or petition. According to recent research, athletes are subjected to online abuse via social media. Furthermore, it is critical to recognize that child athletes may disclose negative experiences that occurred outside of sport to someone within the sport. As a result, sport organizations must be ready to offer appropriate advice and support.

What: Perhaps the most significant broadening in terms of scope has occurred in terms of the range of safeguarding concerns studied. This body of research aims to better define violence in sports by defining unacceptable behaviors that endanger athletes. Individual, relational, and organizational violence can be classified as different types of violence. Participating in sport can be associated with a variety of safeguarding concerns regarding an athlete's health and well-being in terms of the individual athlete. Depression, self-harm, and disordered eating are examples of these.

There are a variety of potential threats or forms of violence against child athletes that are related to the critical relationships that are formed with other key individuals in sport. The first relational threats to children identified in the literature were sexual abuse and harassment in sports (Brackenridge, C, Rhind, D.J., 2014; Brackenridge, C., 2015).

Another serious threat to child athletes is the use of systematic doping. Historical examples include systematic institutionalized doping in sports such as athletics and swimming in the former East German regime in the 1970s and 1980s. It is an accepted and frequently imposed behavioral expectation in some weight category sport cultures to "make weight at all costs". This type of violence has also occurred at the elite level in youth athletes. For example, there were two antidoping rule violations for diuretics used to reduce weight in order to make a weight category in wrestling during the 2010 Singapore Summer Youth Olympic Games (ages 14-18 years). One antidoping rule violation was also reported for a diuretic in the weight category sport of Taekwondo at the 2014 Nanjing Summer Youth Olympic Games. Finally, a 16-year-old weight lifter violated another diuretic antidoping rule at the 2014 Commonwealth Games in Glasgow. Doping can also be classified as a relational form of violence if the junior athlete is coerced into doping by a coach, a member of the athlete's entourage, or a senior teammate.

Another organizational threat to the child athlete is medical mismanagement. The excessive and often systematic use of analgesic medication by team physicians in elite youth football is specifically mentioned. Another organisational threat to the child athlete is the provision of insufficient medical coverage during training and competition by relying on insufficiently trained coaches to manage medical issues. With the commodification of sport and thus athletes, there are some new integrity threats, such as match fixing, athlete trafficking, and gene doping, to add to cheating through the use of systematic organizationally sanctioned performance-enhancing drugs.

Sport organisations should follow these recommendations for safety.

As awareness of potential threats or forms of violence faced by child athletes has grown, so has understanding of how these risks can be reduced. Sport organizations have a moral, ethical, and legal obligation to implement programmes to protect children's health and well-being in sports.

The inappropriate violent behavior in sport can help mitigate or overcome these barriers to the adoption of safeguards in sport (Vanden Auweele, E.Y., 2010).

The recent formalization and internationalization of sport safety has made the issue more pressing for organizations that work with child athletes. The International Safeguarding Children in Sport Founders Group has spearheaded the effort. The International Safeguards for Children in Sport were developed in collaboration with over 50 organizations.

These safeguards outline the actions that all organizations involved in sports should take to keep children safe. They were informed by research that included a wide range of perspectives from various countries and stakeholder groups.

The eight safeguards are as follows:

1. Creating your policy
2. Procedures for dealing with safety concerns
3. Advice and assistance
4. Reducing risks to children
5. Behavior guidelines
6. Recruiting, training, and communication
7. Collaboration with partners
8. Evaluation and monitoring

During a year-long piloting phase, data was collected from a variety of sources, including interviews with each organization's safeguarding lead, online group discussions, and feedback from the Founder Members Group. Based on this information, eight key pillars that support the successful implementation of the safeguards were identified.

As a result, while the International Safeguards for Children in Sport provide a framework for organizations to follow, the impact of these measures will be influenced by how well they are tailored to the local context. This can be aided by constructing a system based on the pillars outlined above.

Relationships between athletes and healthcare providers are discussed in this section, as well as best practices for informed consent, confidentiality, and privacy. Furthermore, best practices for athlete health protection and promotion during training and competition are clearly defined. The Olympic Movement Medical Code specifically addresses the unique characteristics of the child athlete, who, unlike adult athletes, has variable stages of growth, maturation, and psychosocial development that pose distinct physical, psychological, and social health risks if not respected in the sport context. The vulnerability of the child athlete to adult pressures in the sporting environment is also highlighted.

Sports or physical activities that are inappropriate for the stage of growth, development, general health, and level of training of children should be discouraged by health care providers.

Sport organizations should encourage multidisciplinary collaboration in the organization of multisport events for child athletes in order to effectively implement event-safety principles. Partnering safeguarding organizations with team physicians and on-field healthcare professionals, in particular, will allow for more effective management of allegations and closer surveillance and identification of

concerning injury patterns or evidence of violence (acts of omission or commission).

Finally, in order to further protect children in sports from the dangers of performance-enhancing drugs, sports organizations should adopt and adapt the World Anti-Doping Association Code's rules and principles.

4. Conclusions

Sport organizations can develop a healthy culture within their sport system by minimizing the individual, relational, and organizational threats to children from violence in sport by implementing the safeguarding recommendations outlined above. Sport organizations can move beyond basic strategies aimed at identifying and mitigating risks by implementing the eight-key pillar approach to a philosophy based on understanding and meeting the needs of children. Sport organisations can better address the goal of making sport an enjoyable and pleasurable experience for children while allowing them to reach their athletic potential by paying attention to these important principles.

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PERFORMANCE IMPROVING OF 400 m RUNNERS WITH A REPEATED PROGRESSIVE TRAINING METHOD

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Abstract

In this article, the author analyzed athletes from three indoor competitions from different countries in 400m women running, where it was found that runners from Uzbekistan significantly lose speed in the second 200m compared to German and Asian athletes (National Championship of Germany, Asian indoor Athletics Championship and Uzbekistan Championship). According to the obtained results, a training plan was developed and applied using high intensity, high-intensity interval and repetitive progressively training. The aim of the first method was to increase athletes 'velocity. The second method directed to improve special endurance of 400m runners. The third method was directed to improve aerobic capacity for 400m. Duration of experiment consists of 4 weekly micro cycles where groups were divided on control and experimental groups. After pedagogical experiment the results of experimental groups were improved by running first 200m slower than in the beginning of experiment but improved the second lap of distance on 2 seconds. as well as the results for 400m running dash.

Key words*: 400m running, indoor competition, analysis, lose speed, method of high intensity training*

1. Introduction

Modern athletics is a sport that includes exercises such as walking, running, jumping, throwing, and all-around, composed of the listed exercises. Sports competitions are held in numerous athletics exercises, training of athletes is organized. Athletics is an important means of physical education for young people. The positive impact of track and field exercises on the health and physical development of those involved predetermined their wide inclusion in the physical education program for students of secondary specialized educational institutions. Short-distance running (sprint) is characterized by the performance of short-term work of maximum intensity. It includes running at distances from 30 to 400 m. For the convenience of studying the running technique, it is customary to conditionally divide it into four parts: the beginning of the run (start), starting run, distance running and finishing. A special role in the development of sports belongs to the most important section of sports pedagogy - methods of teaching sports motor actions. The scientific and technological revolution makes it possible to take a fresh look at the learning process, to present teaching methods in a different light, which are significantly changing in connection with modern requirements. Therefore, there is a need to modify these methods, to develop, expand and supplement them. The widespread introduction of mathematical methods into sports pedagogy, which is characteristic of modern science, is carried out in many ways, among which two

directions can be distinguished: the first is the creation of models that reflect the essential features of an athlete's movements (for example, in athletics, generalized human motor actions and the second is the widespread use of mathematical - statistical methods and computer technology for processing information about the characteristics of movements In most sports exercises, the result depends on the level of development of the athlete's physical qualities, on the perfection of the technique of performing motor actions, and on the athlete's ability to perform movements using motor potential close to the maximum possible. scientific and methodological works devoted to these issues, there are quite a lot of publications on increasing the level of development of the motor qualities of athletes, improving the technique of movements, and very few - on improving the ability of athletes to perform sports exercises using motor capabilities close to the maximum. At the same time, in sports practice, one can observe how an athlete with a very good technique of movements and a high level of development of physical qualities shows poor results. Often this is explained by the fact that he does not know how to perform sports exercises with close to the maximum use of his capabilities. In this regard, a problematic situation arose in the theory and methodology of sports training in track and field athletics, the essence of which is determined by the contradiction between the potential capabilities of an athlete in achieving a high sports result and the lack of scientific and methodological knowledge about the ways to implement these capabilities. On this basis, we believe that the development of methods to improve results in running based on the regulation of the duration of overcoming sections of the distance with the optimal use of the athlete's motor potential, close to the maximum, is an urgent problem, the solution of which can be of great importance for the theory and practice of sports pedagogy. The object of the study is the theory and methodology of sports training of 400m runners. The subject of the study is the tactical training of 400m runners. The aim of the study is the theoretical and technological substantiation of an innovative approach to improving the tactical readiness of 400m runners based on optimizing the duration of overcoming sections of the distance. It's no secret that in the 400m the competition starts after 350m, because no matter how fast you start, everything can change at the last moment, the fight starts in the last 50m, at the finish line, it's important how you managed to keep the speed to show the good result.

2. Material and method

The results taken from the protocols of three indoor competitions in 2023 were analyzed: the national competitions of Germany, the Asian Championship and the Championship of Uzbekistan. The results of 6 finalists were taken and the average time of each competition was calculated. Also for our study, we separated the distance into two laps (because it's indoor competition) and found the average time of each lap of all three competitions, then calculated the difference between the two laps. We used special device (*Polar m430*) to record speed and heart rate during the last competition in the 400m run at the championship of Uzbekistan on

one of the athletes, on whom we then applied our training. Based on these results, training sessions were planned to improve the second 400m lap time.

3. Results and Discussions

As a result of the analysis of the protocols of indoor competitions in the 400m run, German athletes show an average result of 53.56 ± 0.6 sec., while they passed the first lap in 24.74 ± 0.6 sec, and the second in 28.55 ± 0.3 sec , it was calculated that the difference between two laps was 3.81±0.3 sec.

Athletes at the Asian Championship showed an average result of 55.06 ± 0.9 sec, they completed the first 200m in 25.25 ± 0.3 sec, the second in 29.80 ± 0.9 sec, and the difference was 4.55 ± 0.6 sec.

At the competitions of Uzbekistan indoors championship, 400m runners showed an average result of 59.58 ± 1.5 sec, passed the first lap in 27.23 ± 0.9 sec, and the second in 31.52 ± 0.6 sec, where the difference was 4.35 ±0.3sec. Based on these results, it was clearly seen that the athletes of Central Asia significantly lose speed in the second 200m.

On the figure (Fig. 1), it can be seen that the athlete from Uzbekistan gains the maximum speed in the first 70m, while the heart rate does not exceed 127 bpm, then she tried to maintain this speed at the entrance to the second curve, the speed dropped sharply, despite the fact that the runner tried to recover the loss, she could not keep this pace and the speed to the finish line significantly faded, and the heart rate increased to 183 bpm. It can also be seen from Figure 1 that the athlete spent more than half of her distance in the submaximal zone, as evidenced by the red line indicating the heart rate. It should be noted here that the strength fitness of the athlete is not high enough, since in the preparatory period special attention was paid to speed endurance, but practice has shown that speed-strength fitness is also of great importance, especially at the finish line.

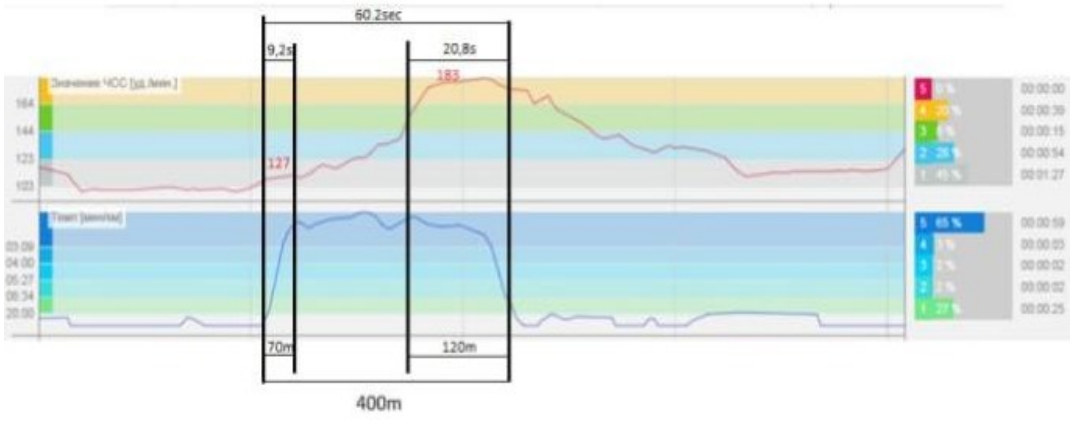

Figure 1. *Reaction of Cardiovascular System to the running speed during 400m running*

It was found that after a 200m run, the foot weakly repelled from the surface of the track, but as it approached the finish line, the hips did not rise and did not maintain the required angle to effectively maintain running speed. It was noticeable how the athlete loses speed and upsets her running technique. Presumably, due to high oxidative processes in the body, the muscles that played the main role at the finish line could not cope with their task and part of the load was taken over by indirect muscles that were not involved at the beginning of the run. To correct this problem, a monthly training plan was developed, where three main training methods were applied: High Intensity Training Method (Fig .2) The main objective of this method is to perform work at high intensity (CJ. Guo, QC. Sai 2004, p 62-64) but for a short duration while maintaining an increased frequency.

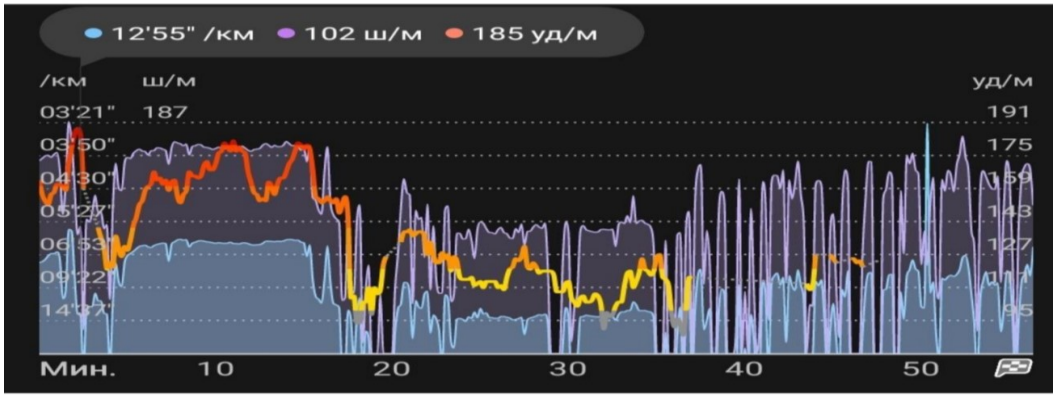

Figure 2. *High intensity training methods' results*

Figure 2 shows that the athlete was in the submaximal zone for a long time, where the heart rate was at a maximum value of 185 beats / min, and the running pace was 12.55 sec / km, approximately at this speed, the athlete ran a distance with a cadence with a frequency of 102 steps per minute, but at the same time, it is clear that throughout the entire distance, the heart rate of the athlete varied from 159 to 175 beats / min, and the pace of running varied from 6.53 km / h to 3.50 km / h. But on the repeated segments of the vilenas, there is a clearer dynamics of the variability of the training load, where the heart rate of the athlete does not exceed 127-135 beats / min, and the running pace varies from 9.22 -6.53 min / km, while the running cadence has changed a lot in the average value and was 120-180 steps per minute. The duration of such a workout does not exceed 50 minutes, and the rest period between series is about 3 minutes.

The method of interval intensive training (Fig .3), where the duration of the load is short, and the intensity is high, due to which the physical fitness of the athlete improves.

Due to high-intensity and high-intensity interval training, we raised the frequency in short distances (up to 200m), while creating conditions for the body to adapt to a given load and frequency due to repetitions. Fig3 shows that the body has adapted to the load and the heat rate no longer increases, but the tempo increase. At the same time, in order to correct the problem with a quick start at 400m, during training we paid attention to a gradual increase in speed. That is, the maximum speed was gained in the last 50m of each repetition.

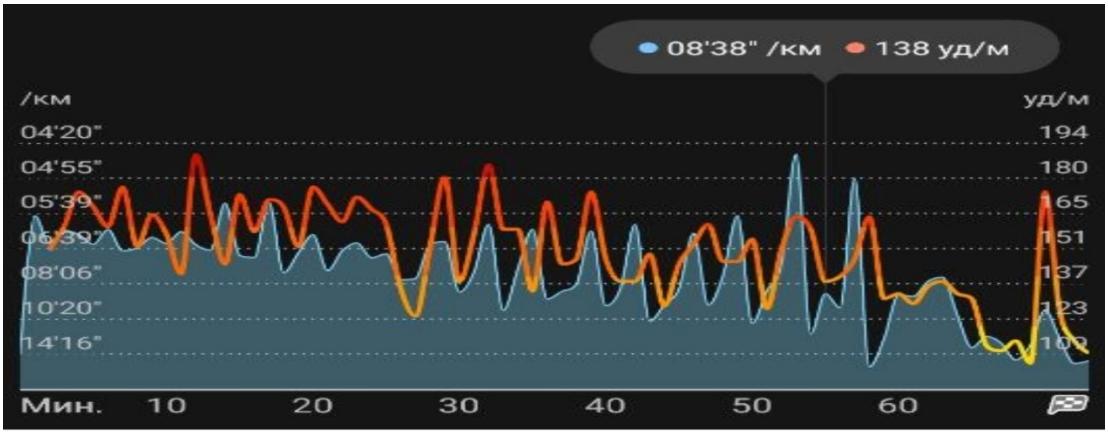

Figure 3. *High intensity training method's results*

After that, the method of re-progressive training was applied, where we tried to maintain this frequency, but increased the distance. And during these trainings, it was possible to observe at what stage of the distance the performance decreases and what we should work on next. The speed was also gained gradually and the step frequency increased in the last meters.

And the method of re-progressive training (Fig .4) objective of it is to increase the length of the distance while maintaining the speed of running. And to understand in which section the speed drops.

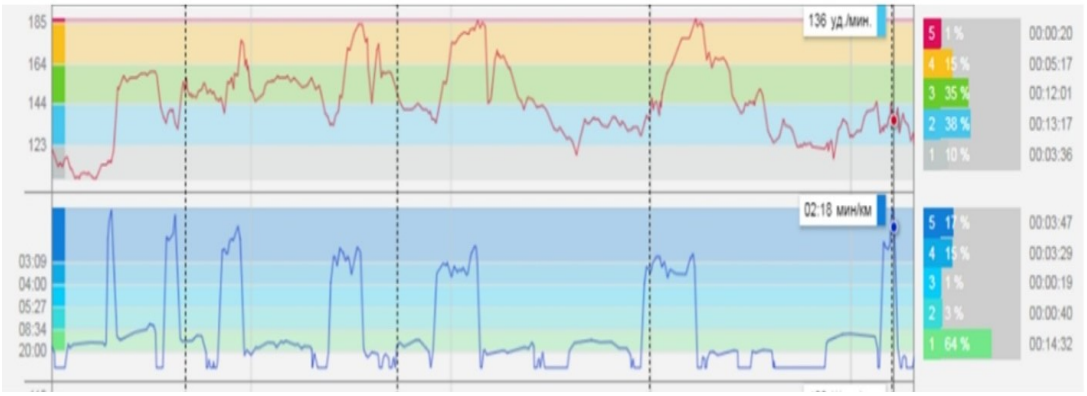

Figure 4. *Repetitive progressively training method's results*

It was found that after high intensity training, the organism recovers after 72 hours, and after training at medium intensity after 48 hours, based on these researches and results of others (Austin S., Sherman W,2008, p.17-19), we trained an athlete for 400m one meso cycle.

4. Conclusions

In conclusion, we can note the positive effect of all three methods of training. The first method is useful for building speed at the start of a race and helps overcome the barrier that is created for the runner on the outside of the load. This means that the athlete learns to overcome external resistance with the least expenditure of energy and strength, and the preservation of such parameters is important at the finish line. The second method is characterized by the development of speed-strength qualities that are applicable to maintain a given running speed at the beginning and at the end of the distance. The effectiveness of this method also lies in the fact that when overcoming external resistance, the athlete tries to make less contact with the surface of the track, which in turn positively affects the running speed and the flight phase in the run. The third method is aimed at overcoming the athlete's efforts arising against the background of fatigue, and is also aimed at increasing speed endurance. From Figure 4, it can be seen that the heart rate also rises with several repetitions with an increase in the pace of running, but already adapts to the load starting from the 6th repetition. The effectiveness and convenience of this method lies in the fact that the coach can make timely corrective changes in the training process of the runner and thereby quickly control the athlete and the training load. In conclusion there is the fact that we got that the first 200m 400m runner began to start one second slower, whereby we kept the speed on the 2nd 200m and lactic acid began to accumulate more slowly and time for 400m was improved and the difference between the first and second laps was not 4sec, as it was before our training, but 3 sec.

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ASPECTS OF MOUNTAIN TOURISM

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Abstract

Hiking is most likely the most popular activity among nature lovers everywhere. The equipment required for hiking varies greatly depending on the difficulty of the chosen route. For the mountain boots are a must for most hiking trails, along with special clothing and other useful accessories. Winter hiking requires proper equipment, thicker, layered clothing, jacket, hat and gloves, which should not be missing from the equipment of any hiker on the mountain. It is important to know what are the particularities of each type of trails, what are the objective risks in each case, but also notions related to the minimum equipment and experience necessary to safely approach each type of mountain trail. Last but not least, every traveller of the mountain must follow the rules of the mountain. The mountain offers, in addition to the special landscapes and the fresh, unpolluted air and a high degree of satisfaction to those who respect it and adopt an appropriate behaviour.

Keywords: *tourism, equipment, rules*

The permanent desire for knowledge, the need for a continuous exchange of spiritual values, the desire for movement and at the same time for escape from the throbbing rhythm of modern life have determined the emergence of an activity with wide social implications for man: Tourism (Teodorescu V., 1995).

Being a social activity, tourism, carried out in order to enrich the knowledge system, recreate and strengthen health, involves certain principles and rules of organization, certain skills and motor skills (Ghimisliu F.G., 2004).

Tourism is the activity or set of activities carried out by human beings, which consist of travel for pleasure outside their usual environment. In other words, the action includes travel, stay or stay for a certain period of time in a particular place, which does not correspond to the usual one (https://rom.awordmerchant.com/turismo).

Tourism is an important form of practicing physical exercise, being that mode of travel carried out with a certain purpose, as a result of one's own efforts: on foot, by bicycle, by boat, by skiing.

Forms of manifestation of tourism:

1. The walk, specific to kindergarten children and children's camps, can be carried out daily lasting between 1-4 hours.
2. The hike represents the walk with a longer duration (up to 1 day).
3. The trip, which represents the touristic activity that involves ensuring accommodation, supply and transport.

Special forms of excursion practice (Cătănescu A.C., 2015):

a. Cycling, which involves knowing the technique of cycling, determining the distances to be covered, the number of rest breaks and their duration, depending on the peculiarities of age and the level of training of the participants.
b. Nautical tourism that involves providing the material base (boats), knowing the characteristics of the watercourse on which the trip is carried out.
c. Ski tourism involves providing equipment, knowing the technique of skiing, the characteristics of the route, knowing the specific dangers of mountain areas in winter and the causes that can cause accidents.

Regardless of the activity concerned, the one who makes a hike or a trip must research the accommodation places and their capacity, the marking signs specific to the area where the activity will take place, the distance of the route and its approximate time of travel, the possibilities of water and food supply and last but not least, the weather conditions during the period concerned to carry out the trip/hike.

The hiking tourist markings are in four shapes and three colours, totalling 12 kinds of tourist markings that are used to mark the hiking tourist routes. These markings are specific only to Romania, each country usually having its own tourist marking system (https://www.eco-romania.ro/blog/cele-mai-des-intalnite-marcaje-in-natura-marcaje-oficiale/).

The purpose of mountain signs is to prevent tourists from wandering and to decrease the possibility of their injury. The markings on the mountain indicate to the hikers: the place where they are located, the direction, altitude, the season, the time of walking to the next landmark and the degree of difficulty. These signs can be found on: trees, cliffs, stones, pillars, special tablets, etc. and guides mountain lovers to a place of camping or shelter (refuge, cottage, locality, etc.) (https://turism.drajna.ro/index.php/turism-drajna/drumetii/item/119-semnele-utilizate-pentru-marcarea-traseelor-turistice-montane.html).

Tourist markings are very important in hiking in nature because they are designed to show us the way to be followed to get safely from one place to another. Following the markings, you can climb the peaks, reach tumultuous waterfalls, crystalline lakes, caves or other natural tourist attractions. Markings lead to chalets and refuges, hostels or campsites (https://www.eco-romania.ro/blog/cele-mai-des-intalnite-marcaje-in-natura-marcaje-oficiale/).

In cases where the trip is planned to spend the night in tents, it is necessary to establish a list of equipment. This will include:

- Clothing, which must be comfortable, do not impede blood circulation and allow proper ventilation. You should not miss the boots, stockings, trousers (shorts or long depending on the season), T-shirts, hoodie, hat and gloves in winter and not only, thinner or thicker jacket, raincoat.
- The tent is a temporary, removable and moveable dwelling, consisting of a rigid reinforcement covered with fabric. The tent is intended for camping in different places and hosting one or more people

(https://www.google.com/search?q=ce+este+cortul&oq=ce+este+cortul&aqs=chrome..69i57j0i15i22i30.3998j0j4&sourceid=chrome&ie=UTF-8).

- The sleeping bag should be effective at low temperatures if you have to sleep outdoors.
- Isoprene is an essential accessory for camping at the tent, which complements the sleeping bag, managing to keep the body temperature between the values of thermal comfort.
- Cap.
- LED front flashlight.
- Sunglasses - even if it does not reach a very high altitude, where solar radiation is extremely strong, eye protection remains necessary.

Whether you are preparing for a hike or for a somewhat longer holiday in the mountains and whatever the season, it is advisable to have the following objects with you:

- First-aid kit, which must contain: sterile compresses, surgical gloves, gauze-type bandage, patches and plaster, disinfectant solution, scissors, tweezers, antibiotic ointment, medicines for the stomach and for pain, anti-inflammatories and analgesics, antidiarrheal and antihistamines, survival foil;
- Map and compass;
- Water, food: it must be a source of energy, be easy to digest, do not spoil and be easy to transport. The best foods are: fresh fruits (e.g. apples, bananas) and candied fruits, seeds, biscuits, vegetables, energy bars, chocolate, canned meat / fish / liver, sandwiches. Alcohol throughout the route is contraindicated;
- Pocket Knife;
- Whistle, to keep wild animals at bay;
- A waterproof lighter/matches or magnesium bar to be able to make the fire in case of emergency or for the preparation of food;
- Toilet kit containing soap, toothpaste and toothbrush, comb, medicinal spirits, deodorant, hand cream, moisturizing lip balm useful to prevent dryness and cracking of the lips, moisturizing cream, including one for frostbite;
- Fully charged phone and external battery - the phone is essential, because in emergency situations it can save your life;
- Garbage bags to carry with you down from the mountain the garbage you make;
- The backpack can have different sizes and shapes (preferably the one that closes with lace and is covered by the lid), must be chosen depending on the duration of the trip (the longer it is, the more spacious it must be). Bags, suitcases, etc. are not recommended because the hands must remain free to help move on cables, ropes, for support, etc.

Choosing a mountain backpack is made taking into account three main things: carrying capacity (expressed in litres), functionality (this includes belts, compartments, materials, construction, etc.) and matching with your physiognomy.

In the backpack, things will be arranged in a certain order, which is recommended not to be changed from one day to another, from one stop to another (Teodorescu V, 1995):

a. On the bottom of the backpack will be placed heavy objects such as spare shoes, spare clothes, kits;
b. Sweaters and spare clothes will be placed towards the back, folded / rolled, to create a soft layer that does not embarrass;
c. Under the lid of the backpack will be placed items of first necessity (sweater, raincoat);
d. On the lid of the backpack will be placed the tent and isoprene, when accommodation will be made in tents.
e. The water bottle will be put in one of the side pockets of the backpack.

RULES OF CONDUCT ON MOUNTAIN TRIPS

Be civilized: DO NOT leave garbage, DO NOT destroy (marking elements, billboards, plants, trees, refuges), DO NOT make unnecessary noise, DO NOT use shortcuts because they will damage the path in time, follow the rules of the chalets, read and heed the information boards, do not disturb the other hikers! (https://www.meetsun.ro/jurnale-trasee-montane/drumetie-o-zi-lista-echipament-incepatori/).

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PEDAGOGICAL ANALYSIS OF THE PARTICIPATION OF THE NATIONAL TEAMS OF UZBEKISTAN (TOKYO 2020)

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Abstract

Aim: Assessment of technical and tactical training of highly qualified weightlifters of Uzbekistan and China at the XXXII Summer Olympic Games in Tokyo 2020. **Methods:** The criteria for evaluating the technical and tactical training of weightlifters are evaluated by indicators of their effective use of the opportunities provided at competitions. That is, excellent if opportunities above 85% are used, good if opportunities above 70% are used, satisfactory if opportunities above 60% are used, unsatisfactory if opportunities below 60% are used. **Results:** At the XXXII Summer Olympic Games of the Uzbekistan national weightlifting team, held in Tokyo, Japan, in 2020, 4 weightlifters who started the snatch completed 7 of 12 approaches, which was 58.3%. **Conclusion:** Scientific and pedagogical comparative analysis of the results of the last Olympic cycle of 2017-2021 in all international competitions of members of the national team of Uzbekistan of all ages (boys, teenagers, adults) with the results of the strongest teams in the world (China, Iran, Georgia, USA).

Keywords: highly qualified weightlifters, lifting sets, lifting squats, pedagogical analysis, effective attempts, technical and tactical training.

1. Introduction

The formation of a healthy lifestyle in our society, the creation of conditions that meet the modern requirements of the population, especially the younger generation, for regular physical education and mass sports, strengthening confidence in their will, strength and capabilities among young people through sports competitions, improving courage and patriotism, a sense of loyalty to their native land, as well as the systematic organization of physical culture and sports.

Resolution of the President of the Republic of Uzbekistan № PD-3031 dated June 3, 2017, "On measures for the further development of physical culture and mass sports" PD-2821 dated March 9, 2017, "On preparations for the XXXII Summer Olympic Games and the XVI Paralympic Games in Japan", helps in wide promotion of Olympic ideas, further improvement of Olympic sports in the country, as well as the formation of a healthy lifestyle in society, the involvement of broad segments of the population, especially young people, in physical culture and sports, athletes of the country at the Olympic and Asian Games, World and Asian Championships and other major international competitions. A number of measures are being taken to prepare for sports competitions and ensure their successful participation in these games.

Only the generation in whose veins flows the blood of great ancestors, such as Jaloliddin Manguberdi, Amir Temur, Pahlavon Mahmud, Zahiriddin Babur, worthy of them in all respects, will be able to accomplish such great things. It was recognized that women's sports are developing in our country. This is evidenced by

the participation of 28 athletes in the Olympic Games in Tokyo. This is a record result in the history of independent Uzbekistan. The President also mentioned 19-year-old Kumushkhon Fayzullayeva, the youngest athlete in weightlifting (On August 13, President of the Republic of Uzbekistan Shavkat Mirziyoyev met with athletes and coaches who took part in the XXXII Summer Olympic Games).

In particular, Olympic sports in the country are divided into priority, promising and developing, and additional measures are being taken to further develop these sports. In recent years, the Uzbekistan national weightlifting team has successfully participated in major international sports competitions. Due to the fact that weightlifting is included in the list of priority Olympic sports in our country, the pedagogical results of the participation of the national weightlifting team of Uzbekistan in the 2020 Olympic Games in Tokyo were analyzed The successful participation of weightlifters in international competitions depends on many factors, including their technical and tactical training. A specific factor in the training of weightlifters in weightlifting is the desire for the correct application of the starting weight at competitions and the successful use of three approaches to the barbell in each exercise, and in the final approach - to demonstrate the maximum possible result. The correct implementation of the three approaches in the snatch and clean&jerk exercises is largely determined by the technical and tactical readiness of the athlete, in particular, the reliability of his stability when performing competitive exercises. The absence of loose rings in the chain of components that make up competitive training is crucial for the ability of weightlifters to compete steadily and reliably.

2. Methods

A special pedagogical analysis was conducted to assess the technical and tactical readiness of the national teams of Uzbekistan and China. Highly qualified weightlifters were videotaped participating in the XXXII Summer Olympic Games in Tokyo, Japan, in 2020. With the help of pedagogical observations, the order of the initial weights at competitions, weight gain, effective use of time between approaches with a barbell, weaknesses and their causes were studied. In this pedagogical analysis, the results of the men's and women's national teams at the XXXII Summer Olympic Games were taken into account.

Table 1. Performance of the men's national team of Uzbekistan at the Summer Olympic Games in Tokyo 2020

№	Full name	Snatch				Clean&jerk			
		1	2	3	Approaches used	1	2	3	Approaches used
1	Ergashev Adkham	~~139~~	139	~~144~~	1	173	~~184~~	~~184~~	1
2	Jurayev Akbar	~~189~~	189	193	2	227	~~234~~	237	2
Total:		**0**	**2**	**1**	**3**	**2**	**0**	**1**	**3**

№	Exercises	Unsuccessful approaches		Successful approaches	
		number	%	number	%
1	Snatch	3	50.0	3	50.0
2	Clean&jerk	3	50.0	3	50.0
Total:		**6**	**50,0**	**6**	**50.0**

Table 2. *Performance of the women's national team of Uzbekistan at the Olympic Games* (XXXII Summer Olympic Games in Tokyo, Japan, 2021)

№	Full name	Snatch				Clean&jerk			
		1	2	3	Approaches used	1	2	3	Approaches used
1	Nabiyeva Muattar	95	~~98~~	98	2	~~114~~	114	~~117~~	1
2	Fayzullayeva Kumushkhon	97	~~101~~	101	2	122	126	~~230~~	2
Total:		**2**	**0**	**2**	**4**	**1**	**2**	**0**	**3**

№	Exercises	Unsuccessful approaches		Successful approaches	
		number	%	number	%
1	Snatch	2	33.3	4	66.7
2	Clean&jerk	3	50.0	3	50.0
Total:		**5**	**41.7**	**7**	**58.3**

Results

At the XXXII Summer Olympic Games in Tokyo, Japan, in 2020, 4 weightlifters who started in the snatch exercise 6 out of 12 approaches were successfully completed, which was 50%.

Conclusions based on the results of the pedagogical analysis of the results of the Uzbekistan national weightlifting team at the XXXII Summer Olympic Games in Tokyo 2020

1. According to the results of the pedagogical analysis of the Uzbekistan national weightlifting team at the XXXII Summer Olympic Games in Tokyo 2020, the following indicators were identified in the snatch exercise. If 50.0% of boys used unsatisfactory opportunities at the Olympics. 66.7% of girls satisfactorily took advantage of the opportunities at the Olympic Games.

2. According to the results of the pedagogical analysis of the athletes of the national weightlifting team of Uzbekistan in the clean & jerk exercise at the XXXII Summer Olympic Games in Tokyo 2020, the following indicators were identified. Boys had an unsatisfactory chance of participating in the Olympic Games of 50.0%, while girls also had an unsatisfactory chance of participating in the Olympic Games of 50.0%.

3. The results of the pedagogical analysis showed that the athletes of the national team have an unsatisfactory level of technical and tactical training in the snatch and clean&jerk. The team members did not fully use the opportunities in snatch and clean&jerk exercises, which showed that the team members have a large reserve of physical fitness, but there are technical errors and shortcomings.

Table 1. *Performance of the men's national team of China at the Summer Olympic Games in Tokyo 2020*
(XXXII Summer Olympic Games in Tokyo, Japan, 2021)

№	Full name	Snatch				Clean&jerk			
		1	2	3	Approaches used	1	2	3	Approaches used
1	LI Fabin	~~137~~	137	141	2	166	172	~~178~~	2
2	CHEN Lijun	145	~~150~~	~~151~~	1	175	187	---	2
3	SHI Zhiyong	158	163	166	3	188	~~192~~	198	2
4	LYU Xiaojun	~~165~~	165	170	2	197	204	~~210~~	2
Total:		**2**	**3**	**3**	**8**	**4**	**3**	**1**	**8**

№	Exercises	Unsuccessful approaches		Successful approaches	
		number	%	number	%
1	Snatch	4	33.3	8	66.7
2	Clean&jerk	3	25.0	8	66.7
Total:		**7**	**29.1**	**16**	**66.7**

Table 2. *Performance of the women's national team of China at the Summer Olympic Games in Tokyo 2020*
(XXXII Summer Olympic Games in Tokyo, Japan, 2021)

№	Full name	Snatch				Clean&jerk			
		1	2	3	Approaches used	1	2	3	Approaches used
1	HOU Zhihui	88	92	94	3	109	114	116	3
2	LIAO Qiuyun	92	95	97	3	118	123	126	3
3	WANG Zhouyu	~~115~~	115	120	2	145	150	~~160~~	2
4	LI Wenwen	130	135	140	3	162	173	180	3
Total:		**3**	**4**	**4**	**11**	**4**	**4**	**3**	**11**

№	Exercises	Unsuccessful approaches		Successful approaches	
		number	%	number	%
1	Snatch	1	8.3	11	91.7
2	Clean&jerk	1	8.3	11	91.7
Total:		**2**	**8.3**	**22**	**91.7**

At the XXXII Summer Olympic Games in Tokyo, Japan, in 2021, the Chinese national weightlifting team of 8 starting weightlifters successfully completed 19 out of 24 snatch approaches, which is 79.2%.

At the XXXII Summer Olympic Games in Tokyo, Japan, in 2020, out of 8 weightlifters who started in the clean&jerk, 20 out of 24 approaches in weightlifting were successfully completed, which is 83.3%.

Conclusions based on the results of the pedagogical analysis of the results of the Chinese national weightlifting team at the XXXII Summer Olympic Games in Tokyo 2020

1. According to the results of the pedagogical analysis of the athletes of the Chinese national weightlifting team during the snatch exercise at the XXXII Summer Olympic Games in Tokyo 2020, the following indicators were identified. At the same time, 66.7% of boys satisfactorily took advantage of the opportunities at the Olympics. 91.7% of girls at the Olympic Games took advantage of excellent opportunities.
2. The results of the pedagogical analysis of the athletes of the Chinese national weightlifting team in the clean&jerk exercise at the XXXII Summer Olympic Games in Tokyo 2020 revealed the following indicators. Boys satisfactorily used 66.7% of their chances at the Olympic Games, and girls - 91.7% of their chances at the Olympic Games.
3. The results of the pedagogical analysis showed that the athletes of the national team are technically and tactically well prepared for the snatch and clean&jerk. In the snatch and clean&jerk exercises, the members of the men's national team did not take full advantage of the opportunity, demonstrating their technical and tactical training. We revealed that the members of the national team have a large reserve of physical fitness, but they are significantly inferior to the women's team in terms of the efficiency of using opportunities.

Based on the results of a comparative analysis of national teams in international competitions, it is necessary to develop and implement a model description of the participation of national teams in national and international competitions for all national teams of Uzbekistan.

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