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Original scientific paper

DIFFERENCES IN ATTITUDES OF FOURTH GRADE AND SEVENTH GRADE FEMALE STUDENTS TOWARD PHYSICAL EDUCATION CLASSES[1]

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Abstract: The main aim of this research was to determine the differences in the attitudes of female students of fourth and seventh grade of elementary school toward Physical Education classes. The research has the transversal character and it was conducted at the elementary school "Oktoih" in Podgorica. The sample consisted of 50 students from the mentioned elementary school. Students were divided into two subdivisions, according to the age criteria and the grade they attended. The first sub-sample was composed of 25 female fourth grade students and the second was composed of 25 female seventh grade students. Anonymous standardized questionnaire survey, adapted to the needs of this research, was used. Questionnaire surveys were given to the girls who were explained how to fill them in. The questionnaires were observed and the received results were processed in a descriptive way and shown in a tabular way. Chi-squared test ($p< 0.05$) was used to determine statistically meaningful differences between fourth grade and seventh grade female students' answers. The results have shown the existence of statistically significant differences considering favorite places of conducting Physical Education classes and pleasure in terms of the quality of Physical Education classes.

Keywords: *teaching, Physical Education, female students, attitudes*

INTRODUCTION

Physical Education is a systematically organised and planned process of acquiring fine motor skills, knowledge and abilities, strengthening the health, and developing students' neuro-physical strengths and the abilities (Krulj et al., 2001). The basic aim of Physical Education classes in schools is that its content, using the educational process, affects the integral development of the personality of a child (Nikolić, 2019). This subject affects the development of the entire personality of the child, which is reflected in its aims, such as: boosting growth and development, acquiring specific knowledge, skills and habits, creating moral guidance and moral leadership qualities of students' personalities, acquiring and developing the awareness of the need to protect their health, the nature and the human environment (Višnjić et al., 2004).

It is known that Physical Education is considered one of the favorite school subjects, especially amongst younger grades of elementary school (Šekeljić & Stamatović, 2011; Đorđić & Tumin, 2008). Some of the reasons for that are certainly the natural urge of the child to be active, to play and to show its creativity, and this subject provides the biggest opportunities for that. However, not all students have positive attitudes towards this subject. In the teaching practice this becomes the most obvious during the period of entering adolescence, especially among girls. It is shown that the interest for attending these classes drops among a big number of the adolescent girls (Dunjić-Mandić, 2007; Arabaci, 2009). One of the reasons to avoid Physical Education classes could be the fact that the content of the subject is not adapted to the age, interests and the needs of the girls, so they start perceiving the

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subject as the "male subject" (Arabaci, 2009) and they often avoid any type of the activity connected to the subject, which carries a lot of bad consequences for their health. In order to persuade adolescents to practice physical activity and to feel its positive effects, it is necessary to develop positive attitudes towards Physical Education classes.

Adolescents' attitudes are also formed by the influence of some their internal judgements, through the effect of their environment, the groups they interact with and mostly by their peers (Stojaković, 2002). Particularly the adolescence is considered to be a period when the attitudes of the group we belong to become especially important (Koca et al., 2005). Because of it, the girls who normally have the positive attitudes towards Physical Education, show the tendency to change their attitude in order to be accepted among their peers. It's a fact that attitudes towards this subject depend on the gender and the age of students. Physical education and sports in general are traditionally considered as male areas and in the schools they were first introduced for male students and then, only in the late 19th century, for female students, too (Đorđić & Tumin, 2008). Even participation at sports events was reserved for men only, while women received their right to participate only later. Today women are competing equally, in many disciplines and in almost every sport. However, with adolescent females, the belief that sports career is related with "manhood", at least in terms of PE classes, is still present (Arabaci, 2009). Šekeljić et al. (2012) found differences in interests of boys and girls, meaning that a different concept of Physical Education is needed in terms of the curriculum. The attitude toward Physical Education, can indirectly indicate the quality of the realised curriculum and positive attitudes are possible to form through various interesting programs (Dragutinović & Mitrović, 2019).

Positive attitudes toward Physical Education would contribute to the physical activity happening more often, which would affect the balance of the physical and mental development of younger and adolescent girls. In relation to that, the subjects of this work are precisely the attitudes of the students of the fourth and the seventh grade of elementary school toward Physical Education classes. The main aim of this research is to determine the differences in the attitudes of the fourth and the seventh grade female students toward Physical Education classes and also to see if those differences depend on the age. To achieve that, we researched if the girls enjoy attending Physical Education classes, what they prefer to do at those classes, if they are satisfied with the presentation of Physical Education in their school, which games they find particularly interesting, etc.

METHOD

Study aim

The main aim of this paper is to determine the differences in the attitudes of the fourth and seventh grade female students toward this subject.

Study objectives

Objectives are concluded from the presented aim:
- Determine the attitudes of the fourth grade students towards Physical Education
- Determine the attitudes of the seventh grade students towards Physical Education

Study hypothesis

According to the given aim and objectives of the research, there are one main (Hm) and two auxiliary (H1 and H2) hypotheses:

Hm - It is presumed that the differences between the female students of the fourth and the female pupils of the seventh grade toward Physical Education exist.

H1 - It is presumed that female students of the fourth grade have positive attitudes toward Physical Education lessons.

H2 - It is presumed that female students of the seventh grade have negative attitudes toward Physical Education lessons.

Examinee sample

The sample in this research comprised 50 female respondents, students of the elementary school "Oktoih" in Podgorica. This sample was divided in two sub-samples. The first sub-sample was composed of 25 fourth grade

female students and the second sub-sample was composed of 25 seventh grade female students from the mentioned elementary school. This research has the transversal character and it was conducted in a single day at the beginning of June 2021.

Study techniques

Anonymous survey was used as the research technique. Standardised survey questionnaire (Dzibric et al., 2011; Dragutinović & Mitrović, 2019) was used as the research instrument. The research instrument was modified and adapted to this research (Survey questionnaire 1). This questionnaire involved 8 close-ended questions. Survey questionnaires with the explanation how to fill them were given to the girls.

Survey questionnaire 1

This is an anonymous survey questionnaire used for the purpose of making a scientific paper. Read it carefully, answer honestly and do not write anything that could reveal your identity.

(DO NOT WRITE your first name, last name, class number or anything similar.)

Gender M F Grade IV VII

1. Do you enjoy attending Physical Education classes?

a) Yes b) No

2. What do you prefer doing at Physical Education classes?

a) Running b) Playing games c) Exercising

3. How satisfied are you with Physical Education classes in your school?

a) Completely b) Partially c) Not at all

4. Do you think that exercise and the physical activity during PE classes have a positive effect on your health and development?

a) It contributes to my health b) It does not contribute to my health c) It is bad for my health

5. What would you prefer to have:

a) A nice and modern outfit b) A healthy and strong body

6. What is more important to you:

a) To execute PE exercises correctly b) To solve Mathematics problems correctly c) Both

7. Which games do you particularly like?

a) Classroom games b) School yard games c) Sports hall games

8. If you could change something in your PE classes, what would it be:

a) Nothing b) The conditions c) The curriculum

In the end, the survey questionnaires were reviewed. The received results were treated in a descriptive way and shown in a tabular form (in percentages). Statistically significant differences between the variables considering the age criteria were determined by the Chi-squared test with significance level $p<0.05$.

RESULTS

Table 1 shows the answers of the fourth grade female students to the questions presented in survey questionnaire. The values of the results were shown numerically and by percentage.

Table 1. *Attitudes of fourth grade female students toward Physical Education*

Questions	Answers	Number	Percentage
1. Do you enjoy attending PE classes?	a) Yes	22	88%
	b) No	3	12%
2. What is your favorite activity during PE classes?	a) Running	5	20%
	b) Playing games	13	52%
	c) Exercising	7	28%
3. How satisfied are you with Physical Education classes in your school?	a) Completely	15	60%
	b) Partially	8	32%
	c) Not at all	2	8%
4. Do you think that exercise and physical activity during PE classes have a positive effect on your health and development?	a) It does	22	88%
	b) It does not	3	12%
	c) It is harmful	0	0%
5. What would you prefer to have?	a) A nice and modern outfit	4	16%
	b) A healthy and strong body	21	84%
6. What is more important to you?	a) To execute PE exercises correctly	7	28%
	b) To solve Math problems correctly	7	28%
	c) Both	11	44%
7. Which games do you particularly like?	a) Classroom games	5	20%
	b) School yard games	8	32%
	c) Sports hall games	12	48%
8. If you could change something in your PE classes, what would it be?	a) Nothing	12	48%
	b) The conditions	5	20%
	c) The curriculum	8	32%

By looking at the Table 1, we can see that the majority of the fourth grade female students (88%) responded to the first question saying that they enjoy going to their PE class. The rest of the girls expressed a negative attitude towards PE classes (12%). Games are what they like the most about the classes - (52%) of them said that those are their favorite activities, while exercise (28%) and running (20%) are the activities that are interesting to fewer of the fourth grade girls. When it comes to enjoyment in Physical Education classes, most examinees are satisfied with organization of these classes (60%), but there are those who are partially satisfied (32%) and those who are dissatisfied with it (8%). Girls of this age are aware that physical education classes have a positive impact on their health and growth, which can be seen in the answers that they gave to the fourth and the fifth question. 88% of them understand that physical education positively affects their health, while fewer of them responded that physical education does not contribute to their health (12%) and none thought that it is bad for the health (0%). The fifth question also shows

that most girls understand the importance of healthy growth and development, so 84% of them answered that they want a healthy and strong body, while 16% of them would choose nice and modern clothes. By answering the sixth question, the fourth grade students considered solving math problems correctly and correct execution of exercises as equally important (28% each), while 44% of them answered that both are equally important. Considering the best environment for conducting PE classes, a majority of girls opted for a sports hall (48%). School yard games were chosen by 32% of them, and classroom games were chosen by 20% of the fourth grade female pupils. The overall satisfaction with PE classes was shown by the answer to the last question. Twelve girls (48%) answered that they wouldn't change anything, 8 (32%) would change the curriculum and 5 (20%) would change the conditions.

Table 2 shows the responses of the seventh grade students to the questionnaire. The values of the results were shown numerically and by percentage.

Table 2. *Attitudes of the seventh grade female students toward Physical Education*

Questions	Answers	Number	Percentage
1. Do you enjoy attending PE classes?	a) Yes	15	60%
	b) No	10	40%
2. What is your favorite activity during PE classes?	a) Running	5	20%
	b) Playing games	14	56%
	c) Exercising	6	24%
3. How satisfied are you with Physical Education classes in your school?	a) Completely	9	36%
	b) Partially	10	40%
	c) Not at all	6	24%
4. Do you think that exercise and physical activity during PE classes have a positive effect on your health and development?	a) It does	19	76%
	b) It does not	6	24%
	c) It is harmful	0	0%
5. What would you prefer to have?	a) A nice and modern outfit	9	36%
	b) A healthy and strong body	16	64%
6. What is more important to you?	a) To execute PE exercises correctly	6	24%
	b) To solve Math problems correctly	9	36%
	c) Both	10	40
7. Which games do you particularly like?	a) Classroom games	0	0%
	b) School yard games	3	12%
	c) Sports hall games	22	88%
8. If you could change something in your PE classes, what would it be?	a) Nothing	10	40%
	b) The conditions	3	12%
	c) The curriculum	12	48%

When we talk about the first question, the number and percentage of the seventh grade female students who enjoy attending Physical Education classes is significantly different from the number and percentage of the fourth grade female students. Fifteen pupils (60%) answered YES, and 10 pupils (40%) answered NO. Such a difference can be attributed precisely to the claims that support the assumption that girls' interest in PE classes weakens at the beginning of their adolescence (Arabaci, 2009; Đorđić & Tumin, 2008; Rowland, 1999). The fourth grade female students and the majority of seventh grade female pupils like playing games during these classes (56%), exercising (24%) and running a bit less (20%). Answering the third question, the seventh grade female students expressed that they are not completely satisfied (meaning that they are partially satisfied) with the organization of this class, whereas 36% are completely satisfied, and up to 24% are dissatisfied (which is about three times more than fourth

grade students). Their answers in relation to the influence of this subject on health and their growth, indicated that the seventh grade female students are also aware of the health benefits of carrying out physical activity. The fourth question was answered positively by 76% of the examinees, while the rest of them (24%) think that physical activity doesn't contribute to the health. Even with the fifth question, where they had a choice between health and fashion, they mostly answered positively about health (64%), while 36% of them gave the priority to nice and modern clothes. While answering the sixth question, the seventh grade students gave the priority to solving math problems (36%), while 24% chose correct execution of physical exercises. Nevertheless, most of them think that both are equally important (40%). When we talk about the seventh question, as much as 88% of the seventh graders answered that they prefer sports hall games, while the others (12%) preferred school yard games. This difference is expected and can be attributed to the usual practice that Physical Education classes in the higher grades of elementary schools is very rarely conducted in the school yard and almost never in the classroom, which is understandable considering how complex the teaching content of that subject is. With the eight question, as much as 48% of the respondents answered that they would change the curriculum for their PE classes, which contributes to the assumption that the content for the higher grades is not adapted for the girls.

Table 3 contains the results of the Chi-squared test for the small and independent samples, with the statistical significance of $p<0,05$.

Table 3. *Chi-squared test results*

Variables	Sig.
1. Do you enjoy attending PE classes?	.009
2. What is your favourite activity during PE classes?	.830
3. How satisfied are you with Physical Education classes in your school?	.059
4. Do you think that exercise and physical activity during PE classes have a positive effect on your health and development?	.127
5. What would you prefer to have?	.111
6. What is more important to you?	.967
7. Which games do you particularly like?	.002
8. If you could change something in your PE classes, what would it be?	.365

Legend: Sig. – Importance of Chi-squared test difference

What we can conclude based on Table 3 is that the statistically meaningful differences between the fourth and the seventh grade female students are noticed in the answers to the first and to the seventh question. In terms of the first question, statistically significant differences are presented in favour of the fourth grade students. On the other hand, the seventh question was connected to the venue where Physical education classes take place. In case of that question, hall games are predominant with both sub-samples, namely 48% of fourth graders, and 88% of seventh grade students selected that answer.

DISCUSSION

Girls' attitude toward PE classes are changing with their age, which is proven by some other studies (Arabaci, 2009; Smoll & Shutz, 1980). Fourth grade female students mostly have got the positive attitudes toward Physical Education classes (Šekeljić & Stamatović, 2011; Šekeljić et al., 2012), which was proved by this research, too. On the other hand, students of higher grades have got negative attitudes toward this subject (Arabaci, 2009). This research also followed the trend of deterioration of positive attitudes toward Physical Education classes with increasing age – a large number of the fourth grade female students had positive attitudes toward PE classes, while the number of the seventh grade female students proved to be smaller. This could be credited to the beginning of adolescence of the seventh grade girls, insufficient adjustment of the content to their interests and needs, as well as to their desire to fit better in the group of peers. What is highly concerning is that as much as 40% of the surveyed seventh grade

students do not enjoy attending PE classes, and the neglect of this subject is reducing the quality of the education and has a negative effect on the public health and health budget in the future (Đorđić & Tumin, 2008). That can be conditioned by some of their beliefs about these classes. Woman is traditionally seen as an intuitive, compassionate and gentle creature, focused on marriage and founding a family, and it is believed that "male" sports activities could ruin her femininity (Đorđić & Tumin, 2008), so it is possible that some seventh grade students have such beliefs because of the influence of their social environment. On the other hand, the dissatisfaction of the students with PE classes may depend on the teacher, their ability and innovativeness (Martinović & Branković, 2012).

Contents that are covered by PE classes, according to the Subject Curriculum for Elementary Schools (2011) are only apparently adapted to students' age and gender, but practice shows that football is much more practiced and played than modern dances, for example. Football will highly unlikely be particularly interesting to girls, but it would be good to increase the number of classes of modern dance or something similar that might interest them. In favour of this fact, 48% of the seventh grade female students responded that they would, when given the opportunity to change something, change the curriculum.

This paper pointed to the differences in the attitudes of the fourth grade and seventh grade female students of elementary school toward Physical Education classes. The results showed that there are significant statistical differences by the favorite venue for PE classes, and in terms of the satisfaction by the quality of PE class realisation.

CONCLUSION

The significance of this research is reflected in informing teachers about the students' attitudes toward Physical Education. The received results may provide an insight to the teachers about the present state, considering the students' attitudes toward Physical Education, and thereby contribute to the improvement of the teaching-education practice.

Physical Education is a subject that may influence healthy mental and physical development of children and young people. Quality Physical Education classes, an adequate selection of teaching content and positive attitudes toward Physical Education classes form the basis for engaging in physical activity and sports, not only in childhood and adolescence, but also throughout life. The choice and the structure of Physical Education contents at elementary school age should be adapted based on the age, interests, needs and gender of a child. Because of it, it is important that teachers adapt the content and make the lesson interesting to students of both genders, so that they (and especially female pupils in higher grades) could develop positive attitudes toward PE classes and thereby understand that this subject affects not only their looks, but also their health.

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Original scientific paper

PSYCHOMOTOR PATTERN FOR NEUROLOGICAL ASSESSMENT OF REFLEX IN KARATE AND TAEKWONDO

Manual muscle test under load – general model[1]

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Abstract: A reflex is an involuntary reaction of the nervous system to intrinsic and extrinsic stimuli. In athletes, it is largely damaged, which presents a serious problem. The psychomotor pattern for the neurological assessment of reflex in karate, taekwondo and other martial arts is based on the principles of physiology, neurology and biomechanics. Pattern can be defined as an inseparable entity of the physical (motor), psychological (mental-emotional) and energy factor, during manual muscle test under load used to assess muscle tonus, which is the subject of this paper. The aim of the paper is to determine neurological reflex activities of athletes' muscles when they are subject to load in order to fully exploit their potential. Investigating the reaction of the peripheral nervous system was based on the assessment of examinees' reflexes, among which were active athletes N = 50 and random sample of examinees N = 50, as well as on data comparison. The results indicated the damaged muscle innervation in 46% of athletes and 50% of random sample of examinees. The conclusion is that muscle tone virtually does not depend on whether someone is engaged in sport or not, and on the other hand, it sends a warning that it is necessary to balance the nervous system. Therefore, by restoring biological feedback, an adequate reaction of the nervous system improves health and athletes' training process. The authors provide a model of pre-exercise testing, which has the basic role of preventing muscle tone and a key role as a guardian of natural human functioning.

Keywords: *psychomotor pattern, examining reflexes, neurodynamics, karate, taekwondo*

INTRODUCTION

„Man manages movement, but not muscle tonus“ (Васильева, 2018).

The backbone of this paper is functional neurology based on the latest scientific research in medicine, biomechanics and psychology. The psychomotor pattern for neurological assessment of reflexes in karate, taekwondo and other martial arts is based on the laws of physiology, neurology and biomechanics. The psychomotor pattern for neurological assessment of reflexes for manual muscle test under load is based on the neurophysiological basis of muscle contractions and the motor reflex system, including the myotatic reflex as

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well as the inverse myotatic reflex. The pattern can be defined as an inseparable whole of physical (motor), psychological (mental-emotional) and energy factors, during manual muscle testing under load to assess muscle tone, which is the subject of this paper. The pattern has a primary functional role in establishing proper muscle innervation and the load testing itself. During the decade-long search, first of all, by Russian neurologists, the cause of the problem was discovered: it is impossible to detect a dysfunctional muscle with standard neurological testing at rest. Medical kinesiology, headed by the leading Russian academician, neurologist Dr Ludmila Vasilyeva, provides solutions for the neurodynamics of the body (Васильева, 2013). In order to move forward, according to Bojanin (2016), "in the very basis for accepting new knowledge, it is necessary to change one's opinion".

The main problem is the lack of a universal psychomotor pattern for manual muscle testing under load. Bearing in mind the fact that man is, above all, a visual being, the question arises, how to know where the muscles "do not work" if they do not give away clinical pain. This includes neurological examination. How to observe the respondent - before, during and after testing. It is necessary to assess the physical, mental and energy signs - neurodynamic status. Neurological examination is the basis in establishing a psychomotor pattern for neurological assessment of reflexes under load in karate, taekwondo, other martial arts and sports in general (Ахмерова et al., 2015).

Psychomotor pattern for neurological assessment of reflexes is essential. Why? Because the psychophysical factor is inseparable. The pattern itself is an inseparable whole and is based on that principle. It contains three tests: *physical* (motor), *psychological* (mental-emotional) and *energy* test. The psychomotor pattern is an inseparable physical, mental and energetic whole of normalization and activation of reflex patterns of the muscles of the peripheral nervous system. It implies prevention, which is reflected in the stabilization of the body before the reflex pattern is damaged and before the pain syndrome is experienced. We can't help but ask the basic question: *Do muscles provide answers to our questions?* If the answer is "*yes*", the question arises: "*how*"? By using muscle as an indicator (basic principle) (Васильева, 2018). In order to come up with an answer, it is necessary to start with the fact that the nervous system is one of the most complex and mysterious structures of the human body. Science has given us many answers separately, but as a synthesis of physiology, neurology, biology, biomechanics, psychology, we have the medicine of the future - medical kinesiology, which opens new horizons and provides adequate solutions. A new method, neurodynamic modeling of movement is another step in the development of "dynamic proprioceptive correction". By adhering to the laws of biomechanics and neurodynamics, the approach to manual muscle testing was further deepened, which enabled an increase in the efficiency of the use of proprioceptive correction method, which consists of static and dynamic movements (exercises).

The authors of this paper believe that the problem does not lie in the standard approach to testing and non-testing and scientific truths, but in our beliefs and certain patterns and perspectives. Therefore, the innovative approach in karate and taekwondo, as well as others martial arts is only the application of new findings and knowledge in order to adapt the nervous system to the load. The reflection of functional neurology is of vital importance for the formation of a general *Psychomotor pattern for neurological assessment of reflexes*, under load during manual testing of muscles in static condition and during movement. The problem considered in this paper is partially unknown in our practice from the aspect of manual muscle testing under load for neurological assessment of reflexes, and on the other hand it is largely unknown among sports professionals in general.

"In applicable kinesiology, movement reflex is assessed (manual assessment of the reflex ability of the nervous system under load in order to adequately react to mechanical, chemical and emotional influences). This is of great importance for sports rehabilitation, since the reaction of the nervous system is assessed not at rest, but under load" (Ахмерова et al., 2015, p. 8)[3]. Examination of biomechanical movements is not only a logical-methodological process, but also a specific psychological and energetic process (Savić, 1997). Recent research greatly changes our recent attitudes and recent knowledge about the functioning of the locomotor system and the influence of the psyche, thus enriching karate as a synthesis of anatomy, physiology, biochemistry, kinesiology and psychology (Savić, 2011). "Finally, movement analysis has developed greatly thanks to the application of new methods in the field of neurophysiology and electromyography, and is based on basic anatomical and mechanical laws that give extremely significant results in all biomechanical analyzes

[3] All citations of foreign authors (references) were translated by the autor of the paper.

applied in all sports" (Bubanj, 2000, p. 7). Here it is very important to understand the laws of nervous tissue biomechanics. It is forgotten that the nervous system is not a separate system. It has its own diagnostic criteria and its own individual methods of treatment and, most importantly, methods of rehabilitation. "In order to assess how an athlete's body is adapted to competitive and training load, it is necessary to dynamically assess the ability of the nervous system under load to adequately respond to physical, chemical and emotional influences" (Васильева, 2013, p. 10).

"According to K. Semenov, the method of neurodynamic modeling of movement is another step in the development of "dynamic proprioceptive correction". In it, adherence to the laws of biomechanics and neurodynamics deepened even more, which enabled an increase in the efficiency of the use of proprioceptive correction techniques. An essentially new and important idea was the implementation of movement in a closed kinematic chain" (Симутина & Захаров, 2017, p. 156). For the normal functioning of the nervous system, it is necessary to process a significant flow of sensory information, transform it and implement it in the form of optimal motor actions (Симутина, 2021). Elena Simutina made a great contribution to the development of the stabilization system through the formation of a complex kinesiological chain and antigravity mechanism. Through the practical use of neurokinesitherapy and the application of the method of neurodynamic modeling of movement "Hand-Brain", uses manual muscle testing under load, in static condition and during movement. The most interesting action of walking does not lie in its mechanics, but in its extra-mechanical features - its physiological structure of innervation. Bernstein formulated the concept of "movement system". He was obviously the first to draw attention to the fact that in the construction of motor actions, the convergence of all cognitive processes and types of thinking takes place. His conception of the motor task as the mental basis of action paved the way for the study of higher levels of consciousness in human motor activity (Бочаров, 2010). Bernstein drew attention to his experimental results of the neurological-physiological mechanism of movement by dividing the mechanism of movement into two phases, explaining the difference in the mechanisms of muscular response to load.

"Kinesitherapeutical effect of kata[4] elements on atrophic changes in muscles caused by post-fracture immobilization of the arm... From the healthy arm, which in this case performs a gyaku-zuki blow, impulses from the receptors of muscles, tendons and joints reach the central nervous system, from which trophic (stimulating) impulses are emitted into the muscles of the immobilized arm in a manner that is insufficiently explained in science, which alleviates the process of atrophy, and shortens recovery time. *Apparently, "even without the permission" of the CNS, which in this case acts on the principle of "self-protection, reaching the injured arm and there, although very weak, strong signals are trying to realize previously formed motor pattern, despite the fact that they are very weak"*[5] (Jorga et al., 1985, pp. 58-59). "Our body is a self-regulatory system. Therefore, it is necessary to react properly to the effects of the external and internal environment for health. If provided with accurate signals, the nervous system will react correctly, economically and quickly" (Васильева, 2018, p. 14). "What is important for us to know in karate is in the sphere of the so-called "Feedback". Scientists (neurologists, physiologists, above all), examining what is important for the efficiency of the conceived and then performed movement (in karate technique), concluded that it is necessary to have constant control over these movements. In order to achieve full control of movement and performed movement, constant sensory information is needed, such as feedback on the results of the movement that takes place. This feedback of sensory information about the movement and position of the body is called **proprioception**" (Bednij, 1975, in Mudrić & Simić, 2020, p. 197).

"The stimulus caused by the receptors spreads and reaches the central nervous system via sensory nerves, where it is transmitted to the motor nerve fiber and through it to the muscle, which immediately becomes a state of stimulation after receiving a sufficiently strong impulse, i.e. based on this, it is obvious that human movements are reflexive in nature" (Bubanj, 2000, p. 49).

Today's standards of training and exercise do not have a unique basic approach to understanding the human being, the organism as a single whole. We must not forget that every person is in the external environment and in oneself a whole. Too much attention has been dedicated to the division of body parts,

[4] Kata – in Japanese: form, composition, shape, etc.

[5] Part of the quotation is of vital importance in the study of the functioning and non-functioning of the nervous system, which was one of the main subjects of study of Russian scientists in the 1980s, where the results were identical. In the meantime, Ludmila Vasilyeva and her colleagues have been giving us long-awaited and unexpected factual answers since the beginning of 2000s to date.

neglecting the basic laws of biomechanics, and especially functional neurology. Thus, the tone of the muscles was not taken into account, above all, when under load. According to the authors of this paper, in our country and beyond there is no manual muscle testing under load, which reveals the reflex nervous system. That is, information coming from the muscles to the brain either reaches or does not reach and we either receive or do not receive feedback. Thus, the nervous system provides us with a response whether the body works or does not work optimally. A certain movement-technique of karate, taekwondo or in any other martial art, as in any other branch of sport, has an almost identical problem. Why? Because we deal with a certain part of the body (motor movement) either in the technique of attack or defense, as well as in movement, or psychological state, emotions and we deal with it, which the author of this paper believes to be utterly wrong.

"To understand the role of movement in the process of mental development of children, and in solving problems arising from the disharmonious course of neuropsychological development, we must have insight into the developmental process of the body and psychomotor in the context of awakening human mental functions and patterns of mental functioning" (Bojanin, 2016, p. 24). "Muscles have proved to be the most reactive structure, stereotypically responding by weakening and hypotension to imbalances in any part of the system" (Шмидт, 2004, p. 6). "In a recent article of the German tennis magazine (09/20) about the tennis world number one Novak Djokovic, the kinesiology test is described under the title "Delicate helpers ", and it has been shown that kinesiological test results can be objectified by the EMG method" (Buck, 2020, p. 2). "Muscle function should be taken literally, because the manual muscle test is the only neurological (neuromuscular) function test that is still available in medicine" (Garten, 2018, p. 8).

At the end of the introduction the authors point out an opinion of Ludmila Vasilyeva: **"Sometimes people need life to prove something new"** (Васильева, 2018, p. 9). And as a synthesis of this paper, the authors use the words of Svetomir Bojanin: **"Every scientific truth is only true until it is overturned by the discovery of new truths"**[6].

The subject of the psychomotor pattern for neurological assessment of reflexes in manual muscle testing is overcoming the assessment of reflexes at rest by assessing the reaction of the nervous system through statics and dynamics of the musculoskeletal system under load. It allows us to understand the biological connection of the body. It detects muscles that do not engage in movement properly, changes in muscle tone in different segments of the locomotor system, mental and energy ones.

The aim of the psychomotor pattern for neurological assessment of reflexes in manual muscle testing is prevention, which is reflected in body stabilization, assessing the maladaptation of the nervous system, establishing functional balance and its goal is to adapt inadequate physical-motor, mental-emotional and energy states (reactions) to external and internal situations (environmental influences) and restore muscle innervation. The aim of this paper is to determine the neurological reflex activity of athletes' muscles under load in order to make better use of their potentials.

METHOD

Method based on medical kinesiology

In today's theory and practice of manual muscle testing, neurological assessment of reflexes in static condition and during movement has not been used. Therefore, the *psychomotor pattern for neurological assessment of reflexes for general testing of muscle tone under load* in static conditions and during movement is an innovative implementation in pre-exercise process in karate, taekwondo and other martial arts. This implementation has a very significant impact on the health condition of the athlete and better use of their potential (Васильева et al., 2017).

The test was conducted on 50 active athletes (Group 1): 33 males and 17 females from different clubs, and 50 random examinees (Group 2): 27 males and 23 females from different cities. The respondents were divided into five age groups: first: 6-11 years; second: 12 - 14 years; third: 15 - 17 years; fourth: 18 - 50 years and fifth: over 50 years. The survey lasted for nine months (from July 2020 to April 2021), and the professional program IBM SPSS Statistics 25 was used to process the statistics.

[6] Author lecture of Svetomir Bojanin, 2015.

Manual muscle testing under load

The psychomotor pattern for the neurological assessment of reflexes under load implies compulsory physiological examination of normal muscle innervation prior to testing. A prerequisite for proper testing is whether the reaction of the nervous system is adequate. Before testing, perform three checks, as an inseparable whole, as follows:

1) physical (motor),
2) psychological (mental-emotional) and
3) energy check.

Before starting the test, it is necessary to examine the reaction of the nervous system. The reaction can be adequate, hyperreactive and hyporeactive. If an examinee demonstrates hypertonicity, hypotonicity, or inadequate reactions, they cannot be tested until these are eliminated (Васильева, 2013). The examination implies checking the muscles that give feedback on how the body reacts. Muscle as an indicator must meet certain requirements before the neurological assessment of the reflex. In this case, the deltoid (middle) muscle is used. The requirements are reflected in the basic principle to which the muscle should react in the following order: normal tone - the muscle responds well to force; after muscle contraction (along muscle fibers) it shows weakness; after stretching the muscle (along the muscle fibers) it shows strength. After this check, we can acknowledge that we are dealing with a normal, functional muscle as an indicator. What follows is a psychological (mental-emotional) check in the following order: for example, in case of a normal tone - when asked "*What is your name?*", and the examinee responds: "*My name is … (their real name),* the muscle indicates strength. When the examiner *repeats the question*, and the examinee *does not give their real name*, the muscle indicates weakness. In another example, in case of a normal tone - the muscle reacts well to an imaginary (mental image)[7], positive, beautiful and joyful life situation, indicating strength; in an opposite situation, to an imaginary negative, stressful, painful situation, the muscle reacts poorly, showing weakness. After this reaction, the muscle is established as an indicator. The following, third check is the energy check[8]: which, just like the second one, follows the first physiological check when we already have the indicator muscle. When the examiner moves his fist from the head to the abdomen (medially) directly in front of the examinee's body without contact, the examinee's muscle shows weakness; in the opposite direction, from abdomen to head, it shows strength. In this way, adequate work of the nervous system has been established. This is the way the muscle works and provides physiological feedback for further testing. Thus, we have an indicator muscle[9].

Then, we move on to the general model of manual muscle testing under load.

The methods for functional neurological assessment of reflexes are applied with the following basic positions:

Basic positions for general manual muscle testing under load:

- orthostatic position,
- sedentary position and
- supine position.

Basic elements of MMT under load: starting position, fixing, movement test, gravity, and manual load.

Basic instructions for testing under load

Examinee's position: Passive arm on the side, stretched out next to the body. The arm that is being actively tested is raised forward to shoulder height (flexion at the shoulder joint) at a 90° angle, elbow stretched, hand with stretched fingers and palm down.

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[7] Imagination (mental imaging) is a process that is based on the principle of biological electric currents and can disperse neurotransmitters into synapses in appropriate places in the brain. Thereby, it profoundly changes our moods, feelings and actions. Functional neurology gives us answers as to whether the body agrees with what we imagine (say) or not. This check requires sincere cooperation with the respondent, who must be ready to find out the outcome.

[8] Energy testing includes the human biofield, aura, electromagnetism. According to Sheldon Deal, electromagnetism is a property of the electromagnetic conductivity of all tissues of the human body, the nervous system, the skin, the muscles, etc. Electromagnetic balance is created through mechanical, chemical, emotional and energetic processes in the body, forming functional connections with each other and thus uniting organs and systems into a single whole.

[9] Muscle as an indicator - this process requires basic knowledge of physiology and anatomy.

Instructions for examiner: Stand on the side of the arm being tested. One hand is on the shoulder of the subject - for stabilization, and the other hand is placed over their hand just above the wrist. The test position of the hand of the examiner and the subject is at an angle of 90°.

For the testing method, the authors apply one of the **Methods of Manual Medicine in Sports Rehabilitation**, which was published at the First Moscow State Medical University (Ахмерова et al., 2015).

Initializing testing

At the signal of the examiner who provides resistance (isometric contraction), the examinee should offer appropriate resistance upwards. Without interruption, the examiner after 2.5 - 3 seconds of isometric contraction gives the second signal to the examinee to increase the resistance force upwards. The examiner opposes the examinee with isometric contraction by offering resistance in order to push the arm down, with an instantaneous stretching of the muscles by activating the myotatic reflex. The examinee's goal is not to allow the examiner to push the arm down by isometric contraction, providing resistance and activating concentric muscle contraction to instantaneous stretching (Ахмерова et al., 2015). It should be emphasized that testing movement with lunges is performed by the same arm with the same leg forward and the opposite arm from the leg forward (very similar to the position of the arms in karate: similar to *oi zuki* and *gyaku zuki*, and in taekwondo: *bandae jirugi* and *baro jirugi*). Normal muscle innervation when testing with lunges d is when the examinee shows strength when the opposite arm is extended from the leg, and weakness when the same leg and the same arm are forward.

Measuring

Assessment - muscle innervation is assessed in two ways, both good and bad: First, *good (strength)* - the examinee provides resistance, normal innervation, the muscle tone exists, as well as reflex. Second, *bad (weakness)* - does not provide resistance, innervation is impaired, weakness or muscle failure is detected. Muscles can be *hypotonic* - a muscle can be weak and not working at all and *hypertonic* - a muscle can be so strong that it does not respond to muscle contraction and stretching.

Potential errors

- initial position of the examiner or examinee,
- limb angle during testing, if the 90 degree angle is not preserved throughout testing,
- inadequate position of examinees, including synergists,
- the examinee holds their breath during the test,
- inadequate position of the examiner's body in relation to the tested arm,
- lack of fixation on the examinee's shoulder,
- the examinee touches a part of their body,
- error at the point of contact, the examiner touches the wrist of the examinee,
- it is not strength that is tested, but muscle strength (force), etc.

Note: In the testing process, functional hyporeflexia indicates the preservation of the first phase and the absence of the second phase of isometric contraction (unlike the standard testing method).

If there is a disorder in the standing or sitting position, it is the *somatic nervous system* (SNS) and if there is no neurophysiological reflex in all three positions, it means that it is the *vegetative nervous system* (VNS).

RESULTS

Testing reveals which peripheral nervous system (PNS) is in question. Knowing that the PNS is functionally divided into the somatic nervous system (SNS) and the vegetative nervous system (VNS). Based on the obtained results, we can conclude that the reflex disturbance occurred in both functional peripheral systems. Test results: neurological assessment of muscle tone under load in orthostatic, sedentary and supine positions, subjects were divided into 2 groups:

Group 1 (G1) - Out of the total number of male and female examinees, the following indicators were determined: in the orthostatic position 21 (42%) displayed normal innervation, and 29 (58%) impaired innervation-weakness; in the supine position 27 (54%) showed normal innervation, while 23 (46%) had impaired innervation-weakness. Inspecting the test results, we can conclude that out of the total number of examinees: a total of 27 (54%) displayed normal innervation, while 23 (46%) showed signs of impaired innervation; in 23 subjects the muscle tone of the left or right arm was disturbed, or both: the somatic nervous system 14 (28%) and the vegetative nervous system 9 (18%).

Group 2 (G2) - Out of the total number of male and female respondents, the following indicators were determined: in orthostatic and sedentary position 16 (32%) showed normal innervation, and 34 (68%) had impaired innervation (weakness); in the supine position 25 (50%) displayed normal innervation, 25 (50%) showed impaired innervation-weakness, and of the total number 7 examinees (14%) had impaired innervation of both left and right arm. Taking a look into the test results, we can conclude that out of the total number of examinees: a total of 25 (50%) had normal innervation, while 25 (50%) suffered from impaired innervation; in 25 subjects, muscle tone was impaired, namely: 18 in the somatic nervous system (36%) and 7 in the vegetative nervous system (14%).

Impaired innervation was revealed during testing, and since there is no physiological-neurological reflex in two positions – orthostatic or sedentary, it indicates that it is the s*omatic nervous system*; when all three positions are involved, the *vegetative nervous system* is in question.

G1–Active athletes and G2 – Random examinees are presented in Table 1.

Table 1. *Person's analysis of descriptive frequency*

G1 Neurological assessment of the PNS: Normal tone – Impaired tone

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strength: Normal tone	27	54.0	54.0	54.0
	Weakness: Impaired tone	14	28.0	28.0	82.0
	Total weakness: Impaired tone	9	18.0	18.0	100.0
	Total	50	100.0	100.0	

G2 Neurological assessment of the PNS: Normal tone – Impaired tone

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strength: Normal tone	25	50.0	50.0	50.0
	Weakness: Impaired tone	18	36.0	36.0	86.0
	Total weakness: Impaired tone	7	14.0	14.0	100.0
	Total	50	100.0	100.0	

In Group 1, weakness of the muscles of the peripheral nervous system was detected in 23 (46%) examinees, namely: 14 examinees (28%) had it in the somatic nervous system and vegetative nervous system.

In Group 2, 25 (50%) subjects were found to have muscle weakness, namely: 18 (36%) in the somatic nervous system, and 7 (14%) in the vegetative nervous system.

Correlation between variables - Neurological assessment of muscle tone under load – strength and weakness in G1: Active athletes and G2: Random examinees.

Probability samples are displayed in Table 2.

Table 2. *Results of Pearson's correlation of total score of G1 and G2 of normal tone and impaired tone*

		G1 Neurological assessment of PNS: Normal tone-Impaired tone	G2 Neurological assessment of PNS: Normal tone-Impaired tone
G1 Neurological assessment of PNS: Normal tone-Impaired tone	Pearson Correlation	1	.383**
	Sig. (2-tailed)		.006
	Sum of Squares and Cross-products	29.520	10.520
	Covariance	.602	.215
	N	50	50
G2 Neurological assessment of PNS: Normal tone-Impaired tone	Pearson Correlation	.383**	1
	Sig. (2-tailed)	.006	
	Sum of Squares and Cross-products	10.520	25.520
	Covariance	.215	.521
	N	50	50

**. Correlation is significant at the 0.01 level (2-tailed).

The Table 2 shows that there is a strong correlation of 0.383 at the level of 0.01 between the correlations of the variables on the number of G1 and G2 examinees on whom this coefficient was calculated. In addition, a partial analysis was performed with an isolated effect of the age category, where the correlation is 0.359. The effect of age is related to the age categories, and a separate analysis was performed for each category. The obtained results of the significance analysis the most significant positive correlation of the effect of age in the third category (from 15 to 17 years) - coefficient 0.730 with probability Sig. 0.062, while the level of significance of the negative linear connection is of medium intensity in the fifth category (over 50 years) - coefficient -0.316 of significance Sig. 541 where significance is greater than 0.05.

Also, the correlation between G1 and G2 was examined in orthostatic, sedentary and supine position, with neurological assessment of muscle tone under load, on the total result of muscle tone: strength (normal tone) and weakness (impaired tone) of PNS and they are presented in Table 3.

Table 3. *Results of Pearson's correlation for G1 and G2 in case of normal and impaired tone in orthostatic, sedentary and supine position*

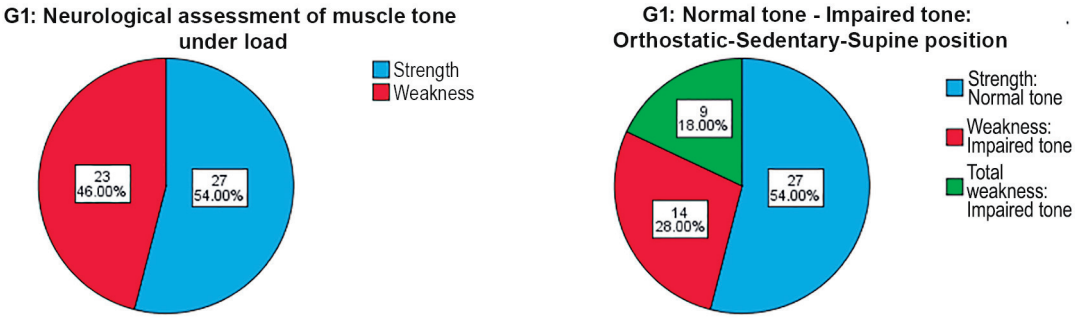
		Active athletes G1 Muscle tone, strength-weakness	Random examinees G2 Muscle tone, strength-weakness
Active athletes G1 Muscle tone, strength-weakness	Pearson Correlation	1	.281*
	Sig. (2-tailed)		.048
	Sum of Squares and Cross-products	12.420	3.500
	Covariance	.253	.071
	N	50	50
Random examinees G2: Muscle tone, strength-weakness	Pearson Correlation	.281*	1
	Sig. (2-tailed)	.048	
	Sum of Squares and Cross-products	3.500	12.500
	Covariance	.071	.255
	N	50	50

*. Correlation is significant at the 0.05 level (2-tailed).

Pearson's correlation coefficient is 0.281 with significance at 0.05.

Analyses of G1 – Active Athletes

Graph 1. and 2. *Pearson's analysis of graphic presentation of distribution*



Graphs 1 and 2 show the results of descriptive statistics of significance according to gender, a sample at the level of neurological assessment of muscle tone under load of the total score of weakness and strength and depending on position.

Pearson's correlation analysis: Relationship between variables - Neurological assessment of muscle tone under load, strength and weakness, and Normal tone-Impaired tone: Orthostatic-Sedentary-Supine positions are shown in Table 4.

From Pearson's coefficient we see that there is a strong correlation between the assessment of muscle tone in orthostatic, sedentary and supine position with the neurological assessment of muscle tone under load on the overall result of muscle tone: strength and weakness of the PNS. That is because Pearson's linear correlation coefficient is r = 0.902. Next, it was checked whether the effect of age has an impact on the mentioned variables.

Table 4. *Results of Pearson's partial correlation between G1 and G2 variables*

Partial Correlation				
Control Variables			G1 Neurological assessment of muscle tone under load	G1 Normal tone – Impaired tone: Orthostatic-Sedentary-Supine
Age	G1 Neurological assessment of muscle tone under load	Correlation	1.000	.898
		Significance (2-tailed)	.	.000
		df	0	47
	G1 Normal tone – Impaired tone: Orthostatic-Sedentary-Supine	Correlation	.898	1.000
		Significance (2-tailed)	.000	.
		df	47	0

When we isolate the effect of age from the partial analysis, we see that there is a very strong correlation, the coefficient is 0.898.

Then, the effect of age related to age categories was studied. Each category was isolated separately and an analysis was performed in all five categories. The result is that in the third category, the effect is the age of the respondents from 15 to 17 years most significantly correlates and amounts to 1,000.

DISCUSSION

This paper refers to the study of neurological and physiological reflex using the MMT method under load (general model), where testing enables the identification of muscle tone in active athletes and random examinees.

"Using the manual method for assessing the activity of the myotatic reflex (stretching reflex) of skeletal muscles - manual muscle testing, it is possible to conduct an express assessment of the functional state of the muscle: tone and excitability (normotonia, hypotonia and hypertension, normo-excitability, hypoexcitability and hyperexcitability)" (Крашенинников, 2013, p. 212). The nervous system responds adequately to mechanical, chemical and emotional influences when assessing movement reflexes. Manual assessment of the reflex ability of the nervous system under load is of fundamental importance for sports rehabilitation (Васильева, 2013). Breathing is also of vital importance for MMT under load. "The activity of the Dorsal Group of Respiratory (DGR) neurons lasts about **two seconds** in total, during which the duration of inspiration is maintained. After two seconds, the activity of the inspiratory group of neurons ceases and their inhibition occurs. As a result, impulses are no longer sent from the inspiratory group of neurons **to inspiratory muscles**, and inspiratory muscles relax, which causes expiration. Inhibition of DGR neurons lasts about **three seconds** and is maintained during expiration. The ventral group of respiratory neurons (VGR) consists of inhalation and exhalation neurons whose functional role is to innervate respiratory muscles during exhalation and as an aid to inspiration. VGR neurons are activated during physical exertion" (Đurić et al., 2018, p. 177). The significance of the aforementioned knowledge basically reminds us of the functional role and duration of certain breathing processes. It is important to remember that both under load (during contraction) and muscle relaxation during testing, their duration is three seconds. Also, we must not overlook the fact that examinees must not hold their breath during the testing process, because, according to the law of neurophysiology, respiratory myofascial chains are activated while holding the breath (air) during MMT under load.

For this research, the authors of this paper used data collected by testing active athletes and random samples from different towns. All obtained data were entered and processed in IBM SPSS Statistics 25. The comparison of weakness data from the total number of 50 active athletes - G1 and 50 random examinees - G2 100% of respondents with the results of neurological manual testing under testing load of active athletes 46% and random examinees (50%). The difference in normal tone is only 4% in favor of active athletes. This fact reminds us that there is virtually no difference. It is important to draw attention to the impaired vegetative nervous system: 9 examinees among active athletes (18%), and 7 among random examinees (14%). The difference in normal tone is 4% in favor of Group 2. This problem should be seriously addressed, because the normal innervation of the muscles, the hypotonicity of the muscles, practically does not depend on whether you are actively involved in sports or not. On the other hand, based on the obtained assessments of the vegetative nervous system, the situation is very alarming, because these are people with total weakness and they are in a serious problem. According to the authors of this paper, they should not exercise until the primary cause is discovered and the weakness is eliminated. Based on studies conducted in Russia, there is an indication that the death of athletes on the field, in arena, or during training, is caused by impaired vegetative nervous system.

Also, the somatic nervous system is not to be underestimated, there are 14 examinees with the problem of muscle weakness in group 1 (28%), and 18 in group 2 (36%). This speaks of a more favorable outcome of Group 1 by 8%. However, we must not neglect the fact that an inadequate reaction of the nervous system causes a violation of the coordination of work of a certain movement, i.e. a certain group of muscles, so it is necessary to restore the physiological reflex arc, muscle tone. It is interesting that both groups of subjects did not show muscle hypertonia (which does not mean that they will not in some other study). During the test, the case of muscle hypertonicity (general tension) did not appear, but it should be emphasized that there is no reaction to provocation in muscle hypertonia, because it occurs with damage to the central nervous system and is a structural disorder and not functional.

Data obtained by manual muscle testing under load of PNS muscle tone were obtained by variance analysis. The obtained results suggest that the sex of the subjects is not statistically significant for the muscle tone (reflex) of the peripheral nervous system ($F = 0.408$, $p = 1{,}000$). Pearson's linear correlation coefficient between the age of the examinees in G1 and G2, shows a strong correlation of 0.383, as well as a strong partial analysis of 0.359, while, according to Cohen's criterion (Cohen, 1988), this is a moderate correlation. Also, the effect of all five age categories was investigated: the first: 6 - 11 years; second: 12 - 14 years; third: 15 - 17 years; fourth: 18 - 50 years and fifth: over 50 years. The effect of age is most significantly related in the third category with a coefficient of 0.730, and in the fifth -0.316. When the correlation is positive - the movement of variables is conducted in the same direction. This means that increasing one variable affects increasing another and decreasing one affects reducing another variable. The correlation is negative when an increase in one variable affects a decrease in the value of another variable. The results obtained by using a p***sychomotor***

***pattern for neurological assessment of reflexes (tone),* during manual muscle testing under load** indicate an imbalance in the body that indicates two main problems with impaired peripheral nervous system, somatic and vegetative one.

"The contraction of skeletal muscle itself occurs in response to nerve impulses, which come to the muscle through special nerve cells - motoneurons. Muscles together with the nerves that innervate them form the human nervous-muscular apparatus" (Bubanj, 2000, p. 49). Inadequate reaction of the nervous system causes a violation of the coordination of movement, i.e. a certain group of muscles.

Therefore, this movement-technique of karate, taekwondo and other martial arts and any branch of sport is facing the problem of the existing functional connections, whether it is a somatic or visceral motor reflex. Both types of reflexes occur before the information reaches the brain. It should be particularly emphasized that the most important of them is the visceral motor reflex, because each internal organ is reflexively connected with the tone of a certain skeletal muscle. When a person has impaired internal organ function, certain muscles lose tone and simply do not get involved in movement. "Functional muscular hypotension, hypertension and excessive lightness-total weakness (hyperphasification) - functional (reversible) disorders of the organism, occur in conditions of neurological disorganization, which occurs when there is a lack or excess of afference (mechanical, chemical or energetic)" (Васильева et al., 2017, pp. 13-14). "The unconscious emotional component takes place in every somatic pathology. Using homeopathic complexes, the doctor gets a reliable and affordable means for deeper correction of the organism" (Гитбиндер, 2009, p. 33).

Various devices and tools were used to assess muscle strength. However, MMT is the most informative method, as each device can estimate only the total amount of force, and the researcher's hand is able to distinguish the type of contraction (concentric, eccentric, isometric) to capture muscle fiber involvement as applied force changes in order to establish positive reactions and other characteristics of muscle function, which are unattainable for the apparatus. Manual muscle testing, conducted under certain conditions, allows not only to determine the presence of muscle weakness, but also the cause of its occurrence (Шмидт, 2004). **The results of manual muscle testing in the load process were confirmed electromyographically, by the functional diagnostic method of the PNS** (Ахмерова et al., 2015). "It is inappropriate to observe a person from the aspect of separate body parts, individual organs and muscles, and the perception in the complex interaction of all organs and interconnected systems is neglected. Why? Because it is crucial to understand the biomechanics of movement and how the nervous system works. It is very important to find muscles that do not engage properly in movement and other muscles that do all the work (contract together). Muscles whose innervation is impaired, lose tone (lose the force of contraction) and do not participate in maintaining staticity" (Васильева, 2013, p.11). "Any violations in the activities of the human body cannot be isolated and exist independently. An organism can exist only if there are interconnections of different systems with each other and with the environment. All changes in the activity of the organism or the influence of external factors lead to a complex reaction of adaptation to part of all organs and systems in order to achieve maximum efficiency and effectiveness, the formation of functional chains that form functional rings with a compensatory role" (Васильева & Борисова, 2007, p. 5).

In line with the previous statement, *all reference papers are based on the final comparison of the results of testing after MMT under load, with testing during treatment and after treatment of athletes. Therefore, the comparison of the research results of this paper with the results of other relevant research studies is unknown to the authors.*

However, what can be done is a comparison with MMT under load, which was used as one of the diagnostic methods in order to rehabilitate athletes. Testing provided an insight into muscle innervation and their functional role in the state of PNS in detecting muscle weakness. With this innovative approach and adequate rehabilitation of a large number of individuals and small groups of elite athletes and Olympic representatives of the Russian Federation, their health condition visibly improved, as well as their competitive results. Studies have been published in the Proceedings of the All-Russian Scientific and Practical Conference with International Participation in Moscow (2013); at the Novokuznetsk Institute for the Training of Physicians at the Department of Neurology; the importance of neurological testing of MMT under load was emphasized (Шмидт, 2004); as well as at the First Moscow State Medical University I. M. Sechenov (Ахмерова et al., 2015). The research was conducted at the Department of Rehabilitation, Sports Medicine and Physical Education of the Russian State Faculty of Medicine, and included athletes from various sports (hockey, football, tennis, alpine skiing, judo, sambo, taekwondo, karate, etc.). Three research phases referred to: 1) injuries or lack of specific

psycho-physical abilities (one of the MMT tests under load), 2) diagnosis by specialists and 3) rehabilitation according to our methods (Russian). Based on the obtained results, the largest number of innervation impairment and injuries of the musculoskeletal system occurred on the lower limbs (in some types, up to 40%). After rehabilitation, the following results were obtained: pain in problem areas was stopped; muscle innervation was restored, as well as motor functions of damaged segments of athletes, and the range of motion in problematic joints was increased.

Based on the obtained results, we can conclude the following: the research of the authors of this paper has one thing in common compared with the research of others, and that is the way of neurological testing of muscles and reflex assessment using MMT under load (general model). It should be kept in mind that MMT under load was used with a combination of other diagnostic methods in order to rehabilitate athletes.

Medical kinesiology draws our attention to the fact that when an organ begins to hurt (no pain is felt), a certain muscle stops working. Therefore, neurological MMT under load assesses the activity of the nervous system. Based on the law of neurology, a hidden problem of muscle tone is revealed (no pain is manifested), because the weakness of that muscle is an indicator for finding a weak connection between the systems. This is only possible if perceived in the complex interaction of all organs and systems with each other. Organism should be viewed as a single whole of systemic functioning, and not just as a specific segment. This tells us that we just need to seriously "play", with understanding and practical action - to put together a whole. So, by discovering secondary problems, we must come to the main cause of nervous system disorders, when the primary problem is ascertained - by solving it, secondary ones are also solved, this is a universal principle.

In the end, we can state that the research presented in this paper is just the beginning of a new approach in the process of testing athletes, as well as improving their capabilities and more fully exploiting their potential.

CONCLUSION

Basically, the application of a psychomotor pattern for neurological assessment of reflex under load may play a functional role in establishing proper muscle innervation. Further testing is needed to find out the cause of the indicator muscle weakness and to establish the neurophysiological reflex. And especially finding those muscles whose innervation is impaired, that lose tone and do not participate in maintaining statics, and clinically do not manifest themselves in anything, presenting hidden syndromes. The practical significance is reflected in the given psychomotor pattern for neurological assessment of reflexes during manual muscle testing under load, where the physical, mental and energy states of the organism are combined. This greatly contributes to a new approach in the methodology of working on the training of athletes, in order to more fully exploit their potential. From a theoretical point of view, it may be worth considering the existence of an essential harmony between holistic and standard scientific approaches, for the purpose of the practical role of the mentioned way of testing through which human aspects would develop, i.e. the nervous system would be balanced for preventive purpose, providing restored muscle tone, biological feedback and the path to the development of psychophysical potentials. Thus, the health condition and learning process (exercise) of the athlete improves. Some other possibilities of the given pattern and the way of testing and discovering the causes and eliminating the disorders of the peripheral nervous system have yet to be discovered. Therefore, it is essential to work on functional disorders at the level when the pathology did not have time to develop. Thus, prevention should be the main goal of coaches, teachers, and instructors.

The findings of this study need to be further examined in some future studies, in order to draw a general conclusion about the effects of the proposed method in the assessment of neuromuscular function in sport. Therefore, additional research is needed to confirm the results of this paper.

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Review paper

MEDIA REPRESENTATION OF FEMALE ATHLETES AT THE MOST "GENDER-EQUAL" OLYMPIC GAMES[1]

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Abstract: The Tokyo 2021 Olympics are declared the first gender-equal games because almost 49% of the nearly 11,000 athletes in Tokyo were women, which is why they are very important for the analysis from the gender perspective. This paper aims to determine how much and in what way female athletes were represented in the media. The research is based on the hypothesis that female athletes are underrepresented compared to male athletes and that most media content about female athletes contains gender stereotypes. Quantitative and qualitative content analysis were applied. The corpus of research consists of a total of 730 articles published on the Serbian digital media "Blic Online". The authors conclude that only 30 percent of media space is dedicated to female athletes. The research also shows that 40 percent of articles about female athletes contain gender stereotypes or are not related to sports and professional results of female athletes. Despite the progress achieved in the Olympic Games' gender policy, the media image does not reflect it.

Keywords: *Olympic Games, media, representation, gender, female sport*

INTRODUCTION

Since women were first allowed to compete in the Olympic Games in Paris in 1900, there has been a gradual shift toward greater gender equality in sport. This was particularly noticeable at the 2012 London Olympics, the first Games in which women competed in every listed sports event, accounting for 44.2 percent of the athletes. For the first time since the modern Olympic Games began 125 years ago, gender parity is on the verge of being achieved. According to the International Olympic Committee, almost 49 percent of nearly 11,000 athletes in Tokyo were women. This is an increase from 45.6 percent at the Rio de Janeiro Games in 2016 (Minsberg, 2021). However, even though we witness increased participation and success in sport by both women and girls, sports are still perceived as androcentric. "Although traditional gender roles have been forcefully questioned in contemporary society, and despite the fact that women have emerged successfully in public (including athletic) settings, it seems that many discursive spaces of the sports world are highly and obstinately conservative" (Ponterotto, 2014, p. 106). Belief is still widespread that "sports are exclusively by, about, and for men" (Messner & Cooky, 2010, p. 23). Numerous studies indicate that the media not only

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reflect but also construct and sustain this belief, acting as both a megaphone and an echo of those in power. “The media serve this purpose in many ways: through selection of topics, distribution of concerns, framing of issues, filtering of information, emphasis and tone, and by keeping debate within the bounds of acceptable premises” (Herman & Chomsky, 2010, p. 198).

The media are not neutral transmitters of the message and do not have the ability to convey reality in its entirety. Therefore, the media resort to simplification, choosing the most important aspects that make up a certain event and transmit them to the audience, which, in accordance with their previous knowledge and beliefs, decodes and understands the message. This process of selecting important aspects and creating the media image of a certain event does not take place in a vacuum, but under the influence of strong ideological and economic forces. The cost-effectiveness of a particular way of reporting is also an influencing factor when creating a media narrative. In this way, not only is a message about a specific event transmitted, but also about the participants involved. Therefore, the media do not present, but represent the subjects and events – they do not mediate, but construct reality.

This is indicated by the constructivist theory of representation. According to Stuart Hall, this theory recognizes the social character of language, that is, the fact that things do not mean, but meaning is constructed using representative systems, concepts and signs. This process is constituted on the basis of "language codes" and "culture codes", and affects the transmission of messages and their interpretation. Thus, according to Hall's approach, representation is above all construction, while meaning is relative and unstable, open and subject to re-interpretations (Barker, 2004). This process is also obvious in the media, and most of all in the modern mass media, through a complex technology that circulates meanings between different cultures in scope and speed never seen before in history (Hall, 1997). Therefore, constructivist approach is applicable to the understanding of the media, which are based precisely on the policies of representation.

The media provide reduced extracts of reality by multiplying oversimplified images, repeating them frequently, and placing them in socio-political frameworks. These are simply parts of documented reality, whose comprehension is influenced by media-created context. They are built, processed, layered, and presented in such a way that the public does not doubt their authenticity and comprehensiveness. They are intended to provide succinct solutions to unasked questions. The process of representation is tendentious and ideologically saturated, and in media practice, it is often burdened with prejudices and stereotypes. The conventional distribution of power throughout history has influenced the present connection between power and gender, which manifests itself through a variety of social behaviors, including the repetition of deeply established patriarchal stereotypes in the media. Stereotyping, according to McQueen (2000), is the media's continual reinforcement of certain preconceptions about particular groups of people. It involves selecting a readily understandable set of qualities or features that are considered to belong to a group and then creating a representative feature of the entire group from them. These reduced conceptions of human appearance, character, and beliefs attain "official status" via years of repetition in the media and allusions in ordinary discourse.

Gender arises in public discourse as a direct result of the process of representation that occurs in mass communication media as well as new media. Gender is crucial to analyze since gender systems create an unequal redistribution of power, i.e. differences and inequalities between different gender identities, which are reflected in constructed and imposed responsibilities, access, and control over different types of capital, and decision-making opportunities, both in private and public spheres. In a culture dominated by patriarchy, media representations are used to build and sustain masculine dominance. "The term gender stereotypes describes generally accepted, most often incorrect attitudes related to the male or female gender. Reconstruction of gender roles in such a context implies the process of deconstruction of the ruling structure of patriarchal culture, which marked women as inferior in the role of objects of stereotypes” (Višnjić, 2016, p. 35).

By analyzing how female athletes are represented in the media, the authors actually examine the frames of their representation. "The process by which media coverage imposes certain socially and culturally constructed reality, through the selection of information, photos, quotes, thus moving away real types from the system of representation, is called framing in the media studies" (Vujović et al., 2017, p. 1121). Framing is the process of emphasizing certain aspects of reality while minimizing or eliminating others, resulting in a constructed framework for understanding a certain issue. Framing has its roots in sociology and psychology, namely the attribution theory of Austrian gestalt psychologist Fritz Heider. Attribution theory is concerned

with the manner in which a social observer uses information to arrive at causal explanations for specific events. It investigates what information is gathered and how it is used to make a causal judgment (Fiske & Taylor, 1991).

In communication theory, frame is the central organizational idea of media content, which provides context and suggests a problem, through the use of selection, emphasis, exclusion and elaboration (Tankard et al., 1991). According to Reese, "frames are organizing principles that are socially shared and persistent over time, that work symbolically to meaningfully structure the social world" (Reese, 2001, p. 11). There are two ways of interpreting frames - through the cognitive and cultural prism. Cognitively organized frames invite us to think about social phenomena in a certain way, often influencing fundamental psychological biases. On the other hand, cultural frames do not stop at just organizing one narrative, but invite us to establish cultural understanding and thus interpret it further, independent of immediate information (Reese, 2001). The concept of media framing is especially significant since it represents a more complicated and sophisticated concept than mere media bias. Arguments for and against, desirable and undesired, negative and positive, are all provided via framing. Additional, more complex emotional reactions, as well as the cognitive dimension - beliefs and behaviors - are enabled by framing. Furthermore, framing acknowledges the ability of a media text to describe a situation or an issue, as well as to establish a framework for debate (Tankard, 2001).

"Framing theory establishes that the framer has more agency than those being framed, thereby the theoretical connection between framing and hegemonic masculinity is that those framing female athletes through commentary and visual coverage of them will do so with a lens that keeps female athletes with less power in the venue of sport" (Smith & Bissell, 2014, p. 50). "When the consumers of media content once adopt this system of representation, they find it very difficult to change, because they constantly reapply it when processing any new information from a specific topic pre-framed by the media" (Vujović et al., 2017, p. 1121). This suggests that how female athletes are portrayed in the media will persuade and influence how consumers perceive those athletes. For example, females are generally framed in a way that highlights their femininity by using traditionally female-related epithets and comments on their body, sexuality, and emotionality. As a result, viewers may identify female athletes for these qualities rather than their athletic capabilities.

Diane Ponterotto's study on the press's representation of female athleticism reveals the presence of a discursive frame that tends to trivialize the body of female athletes. This frame is the result of two basic discourse strategies she identifies: a thematic strategy that eroticizes the female body and a metaphorical strategy that conceptualizes the female athlete as child-like. "In addition to responding to male subjectivities, codifying masculine ideals and confirming men's sense of their identity as men, they also encode an ideology of femininity, which in turn becomes hegemonic" (Ponterotto, 2014, p. 106). She claims that this type of representation is motivated by sexist stereotyping related to male hegemony's ideological interests.

Michael Messner agrees and states that organized sports have come to serve as a primary institutional means for bolstering a challenged and faltering ideology of male superiority. He explains that increasing female athleticism reflects a genuine desire by women for equality, control over their bodies, and self-definition, and thus poses a challenge to the ideological basis of male domination. As a result, "the socially constructed meanings surrounding physiological differences between the sexes, the present 'male' structure of organized sports, and the media framing of the female athlete all threaten to subvert any counter-hegemonic potential posed by female athletes. In short, the female athlete and her body has become a contested ideological terrain" (Messner, 1998, p. 197). "As a result of the co-dependent relationship between the mass media and sport, which has developed over time, the media have now become one of the key benefactors, and key beneficiaries, of institutionalized sport and, as such, have become a forceful site for constructing gender discourse and fashioning hegemony" (Toohey & Veal, 2007, p. 206).

By examining the literature on the topic of the imaging used to depict female athletes in the media, Sherry et al. (2016) conclude that a range of mechanisms contributes to the media constructions of women's sport, including the low volume of media attention, narrative focus, prominence of placement or scheduling, linguistic choices and visual representations of women's sport. They underline that their research has proven that the media continue to adopt an approach that maintains sexual difference through devaluing women's sports participation via a number of mechanisms operationalized through visual representations. "It has shown that, internationally, female athletes continue to receive a fraction of the photographic coverage of their male counterparts; that there remains a preference for the year-round coverage of women engaged in traditional,

gender-appropriate sport, a preference that is interrupted only by the occurrence of a sporting mega-event such as the Olympic Games; and that female athletes are regularly depicted in passive poses, that do little to inspire younger female athletes" (Sherry et al., 2016, p. 307).

In "Playing with the Boys: Why Separate is Not Equal in Sports", Eileen McDonagh and Laura Pappano state that sports are organized on a sex-segregated basis in a manner that largely renders invisible coercive sex-segregated practices. They contend that this segregation in sport is based on three faulty assumptions, which they label the "Three I's": "(1) inferiority of women compared to men, (2) injury prevention for women in competition with men, and (3) the immorality of women competing directly with men" (McDonagh & Pappano, 2008, p. 7). They argue that constructed differences in sports are problematic because they generate and reinforce traditional gender roles and have a negative impact on the perceptions of women's capabilities. This disparity in coverage creates deeply embedded, taken-for-granted assumptions that serve to confine women far beyond sport, resulting in a slew of economic, social, and political constraints that exacerbate the patriarchal power structure remaining so firmly entrenched in our culture (McDonagh & Pappano, 2008).

According to Jelena Višnjić, by defining and deconstructing media representation policies, the paradigmatic notion of women in one community is clarified. By revealing hidden meanings, the 'symbolic capital' imprinted in women's identities and bodies as spaces suitable for political, economic, and cultural inscriptions of power is deconfigured. "Deconstructing the media narrative is always a diagnosis of one society and epoch" (Višnjić, 2016, p. 175). The authors of this research strive to discover the extent to which women athletes are portrayed in the media, as well as how the media represents them, analyzing the reporting on the 2021 Olympic Games in the digital media "Blic Online".

METHOD

As the Tokyo 2021 Olympics are declared the first gender-equal games, they are extremely relevant for gender analysis. The study sought to ascertain how much and in what way female athletes are portrayed in the media in the context of the Olympic Games. The research focused on the articles about the Olympic Games published on the web portal "Blic Online" between July 23, 2021, and August 8, 2021. The authors of this paper analyzed "Blic Online" since it is a news portal with the most visits in Serbia, with approximately 915,000 readers daily, according to Gemius Rating (Domains - gemiusRating, n.d.). The analyses included all articles published in the section Tokyo 2021, a total of 730 narrative texts. Therefore, the research questions are as follows:

RQ1: How many narrative texts depict female athletes in the Tokyo 2021 section of digital media "Blic Online"?

RQ2: Are female athletes stereotypically framed in the Tokyo 2021 section of the digital media "Blic Online", and if so, how?

As a result of the foregoing, the objectives of the research were:

O1: To identify the total number of narrative texts, the number of articles relating to male athletes, female athletes, and mixed texts in the section Tokyo 2021;

O2: to identify and classify gender stereotypes in the articles relating to female athletes in the section Tokyo 2021.

Bearing in mind the results of previous research examining the same or similar topic, the hypotheses from which the researchers started were the following:

H1: News portal "Blic Online" had more articles about the Olympic Games in 2021 relating to male athletes than female athletes.

H2: The majority of articles in the digital media "Blic Online" about the Olympic Games in 2021 relating to female athletes are stereotypical.

The research has been conducted using the method of quantitative and qualitative content analysis. According to Macnamara (2005), quantitative content analysis collects data on media content such as topics or issues, scope of mention, keyword-defined "messages" in context, media circulation (audience reach), and frequency. The qualitative content analysis analyzes the relationship between text and its probable or possible meaning. In that way, qualitative content analysis recognizes that media texts are polysemic - open to many different interpretations by diverse readers. It pays attention to the audience, media, and contextual factors - not only to the text. Thus, qualitative analysis traces possible interpretations and the social conditionality of the analyzed phenomenon.

The qualitative part of the research was based on the methodology used in the paper "Women and the Olympic Games: Media Reporting" (Vujović et al., 2017). The study found that women in sports are stereotyped by being represented through media frames: (1) Female athletes are being shown in irrelevant texts, which do not refer to their sports activities; (2) Female athletes are being represented as feminine, beautiful or/and sexual objects; (3) Female athletes are being represented as someone's mother, wife, and girlfriend; and (4) Female athletes are being represented as infantile, emotional, and irritable. In the study, stereotypical articles depicting female athletes were classified into these categories. It is important to note, however, that some texts contained more than one type of stereotype. During the categorization, the most emphasized stereotype was taken into account, in accordance with the principle of the stereotype highlighted in the headline.

The research data were gathered using a code sheet. An example is shown below (Illustration 1):

Illustration 1. *Code sheet*

Article ID	
Article headline	
Publication date	
Subject/s of the article	
Female	
Male	
Both female and male	
Gender stereotypes (only articles with a female athlete as a subject)	
Feminine/beautiful/sexual objects	
Infantile/emotional/irritable	
Mother/wife/girlfriend	
Irrelevant to sports	
Non stereotypical	
Non applicable	
Description of identified gender stereotype (only articles with a female athlete as a subject)	
Non applicable	

RESULTS

The total number of articles analyzed is 730. The total number of articles relating to female athletes is 219, accounting for 30% of the sample, while there are 384 articles relating to male athletes, accounting for 52.6%, as illustrated in Table 1. In addition, 127 articles, or 17.39% of the sample, represent both female and male athletes.

Table 1. *Articles representing female athletes, male athletes, and mixed articles representing both in "Blic Online"*

Subject	%
Female	30.13
Male	52.46
Mixed	17.39
Total	100

These quantitative findings support the initial hypothesis that the web media “Blic Online” published more articles relating to male athletes than to female athletes in concern of the Olympic Games in 2021. Furthermore, more than half of all analyzed content focuses solely on male athletes.

Research showed that 66.36% of articles depicting women in sports are not stereotypical and 5.45% of stories regarding female athletes are published on topics unrelated to sports. As illustrated in Table 2, gender stereotypes in characterizing female athletes were found in 41.82% of published articles, according to a qualitative study.

Table 2. *Gender stereotypes about female athletes in "Blic Online"*

Representation	N	%
Feminine/beautiful/sexual objects	39	17.72
Infantile/emotional/irritable	38	17.27
Mother/wife/girlfriend	3	1.36
Irrelevant to sports	12	5.45
Non stereotypical	128	58.18
Total	220	100

These findings do not support the initial hypothesis that the majority of articles in the web media “Blic Online” about the Olympic Games in 2021 relating to female athletes are stereotypical. However, the percentage of stereotypical content is significant and it is important to point out their specifics.

DISCUSSION

Analysis shows that female athletes have been labeled with a variety of stereotypical terms. One of the most prevalent techniques of stereotyping female athletes is to portray them as infantile, emotional, or irritable. In this manner, female athletes are represented in 17.27% of articles related to the Olympic Games. The mental state of female athletes was emphasized when they were portrayed. Their emotional reactions, such as crying, were highlighted, whether caused by happiness or by defeat. It is also important to emphasize that female athletes are often being addressed by their first name, or with “young girl”, “young lady”, by which female athlete is infantized.

In 17.72% of articles, female athletes are presented through a focus on their appearance. They are depicted as feminine, beautiful, attractive, or as sexual objects. "Princesses" and "goddesses in bikinis" are some of the terms used to describe them. They are described in terms of male attention, emphasizing how men sigh for female athletes and are enthralled by their curves. Their physical appearance is criticized, particularly the size of their breasts and the clothing they wore. Some of the examples follow: "She is the owner of the best buttocks in sports, and now she sells naked pictures on an adult website! /video/" (Blic, 2021); "The most attractive Brazilian in sports had a marathon lovemaking at the Olympics the night before the competition, she was disqualified, and now she is back and looks like this! /video/" (Blic, 2021a); "Wiped out the competition:

In the discipline the most beautiful in the world, we already have the winner of the Olympic Games! /video/" (Blic, 2021b); "Well, she will ignite the Olympics: Brazilian skateboarder performs amazing tricks, and due to her enchanting curves, men sigh worldwide" (Blic, 2021c), etc.

When it comes to female athletes, the female body is a topic per se, virtually a phenomenon. A woman athlete's body is imbued with the connotations of the dominant patriarchal worldview. The physique is a topic, whether the muscularity of a female athlete's body is interpreted as appealing or as insufficiently feminine. The body is a topic, whether a female athlete is large or small. Whether a female athlete is wearing make-up or not, the body is once again the object of discussion. By gender-framing a female athlete, a woman appears to be punished for entering the traditionally male realm, and she is reminded through stereotype and discrimination that she is first and foremost a woman.

In 1.36% of the content, female athletes are presented as someone's mother, wife, or girlfriend, thus focusing on the private sphere instead of their professional results. For example, the title "The most beautiful Serbian female basketball player is fighting for a medal, and few of them know that she is enjoying her relationship with a water polo player! Here's what brought them together! /photo/" (Blic, 2021d), plainly implies that her relationship with her partner is more significant than her athletic achievement. As is her looks, given that female athlete is described as beautiful in the title, and called "attractive brunette" in the article. Also, when reporting on female athletes' Olympic triumphs, the importance of their male partners' contributions is also often stressed: "Little is known about Jovana Preković, but something has been discovered! This famous Serb is the boyfriend of our Olympic gold medalist and he contributed to her enormous success /photo/" (Blic, 2021e).

According to Stojiljković et al. (2020), the media "do not take interest in women in sports, and when they do, they do not do it in the right way" (p. 492). The majority of studies indicate that female athletes are not only marginalized in the media coverage of the Olympic Games, but also that stereotypes used to depict women deemphasized their athletic abilities and/or performance (Billings & Angelini, 2007; Vujović et al. 2017; Killoran, 2017; Smith & Bissell, 2014). This research also confirms such a trend. "Attractiveness, emotionality, femininity, and heterosexuality are a few traditional markers of gender representation" (Smith & Bissell, 2014, p. 50). Commentators in the media find subtle ways to describe female athletes more by their gender and less by their status as athletes (Smith & Bissell, 2014). They are portrayed in such a way that they evoke the image of a woman first and that of an athlete second. Typically, media coverage of female athletes focuses on their appearance, emotions, and relationships. Reporters have often taken many liberties in discussing a female athlete's height, weight, dress size, hairstyle, or outfit; Descriptions like this help separate women from men (Smith & Bissell, 2014), who are praised for their athletic prowess, physical skills, strength, and masculinity.

The findings of this study support claim of Vujović et al. (2017) that the media creates a gender hierarchy in sports through narrative and visual messages in which "strong" men dominate over "weak" women and men's sports are valued more than women's. "This could be explained by the pervasive patriarchal ideology, which persists in the 21st century. Man is made for the public sphere, which includes sports, and woman for the private domain" (Vujović et al., 2017, p. 1137).

CONCLUSION

As a major agent of social life, the media cannot be seen as value-neutral. At their root, they operate inside social, political, economic, and ideological frameworks that impose constraints on the meanings they produce and disseminate. The media position particular issues, ideas, persons, and identities in the consciousness of the public, or exclude them from it. As a result, the media construct a specific logic of interpretation, offer meanings, and value frameworks. Starting from Stuart Hall's thesis that representation is primarily a construction, and the framing strategy, according to which the audience interprets the reality based on indoctrinated patterns, the authors discuss the issue of media representation of female athletes.

The research on the Olympic Games media coverage provides significant insight into the degree of gender equality at the global level because it is possible to identify the society's current perception of masculinity and femininity by looking at media representations of male and female athletes. The study found that, despite the fact that the 2021 Olympic Games were declared the most gender-equal, the media representation of female athletes does not reflect this. Quantitative analysis showed that even though an approximately equal number of men and women competed in the Olympics, female competitors received less than a third of the media

coverage. Furthermore, more than 40% of the content about female athletes contains stereotypes or portrays a female athlete in a narrative that has nothing to do with sports. Female athletes are represented by epithets that have traditionally been assigned to women. Expressions emphasizing femininity, describing or evaluating appearance, and referring to emotionality and mental state are all common. Female athletes are frequently portrayed in relation to men, who are presented as central, reference figures. Female athletes are presented as mothers, wives, girlfriends, but also as sexual objects. The analysis of the media content gives the impression that the fact that sportswomen were Olympic athletes was secondary, as well as their results; what mattered the most was that they were women. This type of reporting continues a trend in the media coverage noted at the Olympics in the past.

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Professional paper

ROLE OF ACUTE PAIN WHEN ACHIEVING CUFFING POSITION USING MEANS OF RESTRAINT[1]

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Abstract: The paper indicates the role and importance of acute pain during the operation of cuffing. The application of means of restraint from the space of physical strength, which usually precedes the activity of cuffing, requires a good knowledge of individual fighting techniques, and especially levers which serve to bring the person into the cuffing position by creating the feeling of acute pain. In that sense, lever is a good choice, because by executing lever, a person can be kept under control both for a shorter and a longer period of time, i.e. as long as it takes for cuffing to be performed safely. For that reason, it is important to know and distinguish the factors that define the individual value of each lever: possible level of infliction of pain (availability of body part, possibility of precise support, required level of force, time required for realization, etc.), as well as basic consequences of lever application. The applied lever, whose execution is harmonized with the previously mentioned factors, will produce sufficiently intense acute pain. Pain is an unpleasant sensory or emotional experience that is caused by potential or existing tissue damage or one that is described in words that would correspond to the said damage.

Keywords: *pain, physical strength, establishing control, lever, special forces*

INTRODUCTION

A large number of papers have been written on the use of means of restraint, but despite that, there is a noticeable lack of information dealing with the importance of acute pain when using certain means of restraint, and primarily the importance of acute pain when bringing a person to a cuffing position. It is particularly important to point out that the state administrative bodies of the Republic of Serbia have the right to apply restraint, and only in exceptional circumstances can a citizen do so in situations previously prescribed by law. What is especially important to point out is the fact that restraint can be applied only in a situation when all other legal remedies have been exhausted, legally, proportionately, with composure and accompanied with a warning that restraint is to be used. In this sense, there are the following means of restraint: physical force, cuffing equipment, service batons, service dogs, service horses, special vehicles, blocking devices, devices for water jets, chemicals, special weapons and explosives and firearms (The Police Act, 2016). Assuming that the

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legal conditions for the use of means of restraint are met, they are used either individually or in combination of the aforementioned techniques.

1. PHYSICAL FORCE AS MEANS OF RESTRAINT

Physical strength is the simplest means of restraint and as such is most often the primary means used to bring a person into a cuffing position. A person who uses physical force is obliged to protect human life and cause as little material damage as possible, and what is particularly important for the current topic, to cause as few injuries as possible (Amanović, 2003). Thus, when using means of restraint from the space of physical force and cuffing equipment, a delicate situation arises when the person on whom means of restraint are applied can try to escape, commit self-harm or be really injured by the one who applies the means of restraint (due to inappropriate choice of a specific means of restraint). In order to avoid the undesirable previously mentioned situations, it is necessary that when bringing a person into a cuffing position, the person who performs the cuffing makes the correct choice of means of restraint from the domain of physical force. In addition, the dosage of the intensity of each individual martial art technique from the area of physical force is an important factor that can be crucial and which, if the intensity of the application of a particular technique is insufficient, will not give the desired result. In particular, an appropriate cuffing position will not be achieved when the person being cuffed does not comply with the order, and the intensity of application of the technique is not sufficient for the person to be brought into the cuffing position through acute pain.

On the other hand, if the intensity of the applied technique is too high, unjustified injury can be inflicted to the person who is brought into the cuffing position, which entails legal consequences. In that sense, the application of adequate martial art techniques as well as their dosing are exclusively means of achieving appropriate acute pain, so that a person who needs to be cuffed and who does not consent to this action voluntarily, can be safely brought into that position without exceeding official authority, and without being able to obstruct the said action. In this regard, the "final product" of the previously applied martial art techniques is certainly acute pain, which for the above reasons must not be too strong or too weak, but its intensity must justify the purpose and ensure the smooth performance of the above action. It has been shown that fear of pain is a better predictor of disabling a person than the medical status of pain itself (Mihajlović, 2015). Consequently, it often happens that the person over whom the act of cuffing should be performed consents to the action already after using some of the means of restraint, willingly taking the position for cuffing instructed as a necessary action by the person who is to perform the action.

2. ACUTE PAIN AS MEANS OF ESTABLISHING CONTROL DURING CUFFING

The person who needs to be cuffed may agree to the specified action or try to thwart it. When a person who is to be cuffed is prevented from escaping, offers active or passive resistance, attacks, performs self-harm, etc., using some of the martial art techniques (strikes, levers, throws, etc.), that person may find themselves in a position of lying on their stomach, back or standing, brought to cuffing using a certain lever (Mudrić, 2005). Precisely by applying the lever technique, "control" must be provided over the person who is to be cuffed. This control is performed by achieving a feeling of acute pain in the person being cuffed.

Martial art techniques represent all moving structures that directly or indirectly inflict pain to the person over whom they are used or prevent the onset of pain in the person who inflicts it. The main means of a large number of martial arts techniques is to create a feeling of pain by which the person to whom it is inflicted is "temporarily brought under control", having in mind the fact that the feeling of pain cannot be ignored. Pain is an unpleasant sensory or emotional experience that is caused by potential or existing tissue damage or that is described in words that would correspond to the mentioned damage (Arlov, 2007).

Pain is subjectively dimensioned and is related to the individual threshold of tolerance, but also to other factors such as gender and cultural context. The same person can feel pain differently, depending on the current mood, stress, as well as health status. The criteria based on which pain is classified are different. In relation to the duration and manifestation of the occurrence, acute and chronic pain can be distinguished. Acute pain is manifested through high blood pressure, sweating, loss of consciousness, etc., while in people who feel chronic pain in many cases, depression, anxiety, loneliness, reduced mobility, increased fatigue and poor sleep can be noticed (Mihajlović, 2015).

Bearing in mind the above as well as the importance of acute pain, and the effects that can be produced by it, it is important to clarify its connection and the role it plays in bringing a person into a cuffing position which is primarily done using lever techniques.

2.1. Implementing lever to establish control

Lever techniques are the best choice of techniques to bring a person under control, because using this group of techniques, the person who executes them can control the intensity of the lever, and thus the intensity of acute pain over the person over whom the lever is performed. Thanks to the existence of the feeling of pain, the person who feels pain is paralyzed and at least momentarily disoriented depending on the intensity of the pain (Mudrić & Gužvica, 2017). In that sense, when performing the lever, the one who performs it can, thanks to the produced feeling of acute pain in the person over whom the lever is performed, demand from that person to take a position that is suitable for cuffing. For this purpose, it is recommended that it be a position with the hands on the back. Without in-depth analysis of the individual techniques of levers that help achieve the cuffing position, because that is not the subject of this paper, it is important to emphasize that in most cases, both in standing and lying position on the stomach, this is achieved through levers on the shoulder joint.

Mechanically, a lever is a simple machine that requires the existence of a support and the action of at least two forces. In terms of martial arts techniques, levers represent specific techniques whose goal is primarily to control the opponent, by creating a feeling of pain, as a consequence of the potential dislocation of the attacked joint. The mentioned effects can be achieved in most joints of the human body with the following conditions: timeliness of initiating the realization; the shortest possible total realization time; precise support; unnatural movements or movements beyond the natural limits and significant action of forces on the arms during lever (Arlov, 2007).

2.2. Implementing strike to establish control as opposed to implementing lever

Unlike levers that provide control even in longer time intervals, which gives them an advantage over other groups of techniques, strokes would be a somewhat less suitable option, because the intensity of acute pain produced by a strike is noticed after the strike is executed. When it comes to strikes, contact with the target must be short, up to 5 milliseconds (Mudrić & Simić, 2020). In practice, this would mean that if the strike was too weak, the face would not be under control, because the feeling of acute pain would be too weak, or on the other hand, in the variant of a strike that is too strong, unnecessary injuries would occur in the person over whom the strike was performed, which could fall under the category of “unjustified”.

Strikes represent moving structures, which are realized using hands and feet (with the participation of other parts of the body), and whose goal is the destruction of the opponent. The efficiency in performing strokes depends on the following factors: the degree of adoption of the technique, which implies the movement of the actual parts of the body and the impact surface along the "ideal" or approximately ideal path, for a particular stroke; success rate in the rapid movement of the active body parts; the rate of contraction of the entire musculature of the body in the shortest possible period of time, in the final phase of the strike.

From all the above, the dilemma is clarified and it becomes absolutely clear why the lever techniques, and not striking techniques or any other technique intended to ensure the occurrence of acute pain is the most effective "tool" to put a person into a cuffing position after a successfully thwarted attack, if such an attack occurred (after thwarting escape, self-harm, etc.). In accordance with the above, it is important to emphasize that the "value" of each derived lever can be determined on the basis of certain criteria. The individual value of each lever is determined by: the possible level of infliction of pain (availability of body parts, the possibility of precise support, the required level of force, the time required for realization, etc.) and the basic consequences of lever application (Arlov, 2007). Based on the above criteria that will determine the value of each lever, and especially those levers that are used when bringing a person into a cuffing position, it is possible to state with certainty that the quality of leverage at this time is the detail that defines the success or failure of cuffing.

CONCLUSION

Lever techniques in certain segments of cuffing a person over whom it is necessary to perform this action represent an almost irreplaceable choice of martial arts techniques, primarily due to the effects that are achieved

through controlled acute pain. It is precisely this possibility of dosing acute pain in a person who is "controlled" in this way that ensures that the person "cooperates" and does not try to thwart the intention of being handcuffed or some other means of restraint. In this sense, the quality of training is very important in terms of meeting all the criteria that define the individual value of each lever, which were previously listed. It is particularly important to respect the gradualness of the training. One should not move on to learning a new technique until one has mastered the one demonstrated (Jotić, 2019). Only an extremely responsible approach in terms of quality training can ensure that members of the services who have a legal right to apply cuffing actions, perform this task safely for themselves and the surroundings, as well as for the person over whom this action is performed.

In addition to technical and tactical training, fitness preparation plays a very important role in the training of members of special population groups (who have the right to perform the action of cuffing) because the quality of this task will depend on this factor to a greater or lesser extent. Fitness preparation is a positive transformation of motor abilities. Especially in special units, a high level of motor skills is required for the successful realization of certain tasks (Golubović et al., 2021). One of the important characteristics of motor abilities is that they are evaluated with regard to their latency. Strength, flexibility, precision, speed, coordination, balance and agility can be assessed by means of field and/or laboratory tests.

Motor skills testing provides insight into the current state of ability levels. On the other hand, the implementation of periodic testing simply determines the progress caused by systematic training (Bojanić et al., 2018). Other forms of preparation (technical and tactical) will largely depend on the level of fitness preparation (Vasović, 2016). For these reasons, it can be stated with certainty that fitness training holds great importance for the overall training process.

A complex and responsible approach in the training of members of special population groups as well as respect for all principles and legality of the process in the long run will ensure quality execution of both less complex and the most complex tasks that are part of the security structures' duties. In this sense, the quality of training is one of the primary factors of success in performing tasks related to solving various problem situations. In order to respond successfully, i.e. find a positive solution in a certain problem situation related to the application of martial art techniques, long-term and continuous training is needed, especially situational training (Sopčić et al., 2019). Reliance on legal norms that define the circumstances of the use of means of restraint is also an important factor that members of special population groups must be well acquainted with in order not to break the law.

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Professional paper

DIGITAL HABITS OF GENERATION Z – STUDENTS OF SPORTS[1]

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Abstract: The new virtual reality of today's society and its interaction with members of the younger population is an increasingly common subject of research. The question is whether and to what extent it is possible to stop the domination of the digital. Is sport an activity that can compete with the new virtual reality and the world of video games? The paper presents online habits and inclinations towards video games of the first-year students of the Belgrade College of Sports and Health, not only qualitatively – in order to examine the time spent on video games and compare it with the time spent on sports and recreation, but also qualitatively, in terms of content – topics that occupy this particular segment of population, talented in sports and sports-oriented, but at the same time digitally-oriented.
The paper has demonstrated, on a selected sample of sport-oriented members of Generation Z, some deviations from the digital characteristics of the generation they belong to demographically, the generation in which the use and application of technology is dominant in obtaining any practical information, as well as in communication and entertainment. The sample consisting of students of sports academic courses has demonstrated that a very high percentage of these students practice sports on a regular basis defying the current sedentary lifestyle. Many of them do not belong to the present-day youth subculture – 'the gamers' community', and even those who do belong to the pop culture of computer games prefer sports computer games as their choice of virtual content.

Keywords: *Generation Z, sports, video games*

INTRODUCTION

Sport has built a reputation as a significant factor in society since its inception and is considered a social and cultural phenomenon whose effects extend even beyond the boundaries of sports arenas, stadiums and sports halls (Bratić, 2016). Children usually take part in sports activities to have fun, to try a new activity, to be in the company of their friends, but also because of the sense of satisfaction that sports success creates for them (Allender et al., 2006). During adolescence, which is a kind of transition between childhood and adulthood, education through sports can be crucial for the formation of a healthy adult. The period of adolescence is characterized by very intense biological, social, emotional and psychological development, so some psychologists call this period a period of "storm and stress" (Arnett, 1999). The presence of video games is evident in the culture of young people today. This phenomenon affects all young people, regardless of whether they are members of the gaming community or not, because the narratives and topos of video games have intertwined with pop culture in general, and the world of the Internet is inconceivable

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separately from the virtual world of games (Mazić, 2019). One of the main characteristics of young people today, born in 1995 and after, the so-called members of Generation Z, is that they are constantly connected, that they are permanently online and that they are present in both the virtual and real world. Such a way of life and the mentioned processes take place so fast that science does not manage to provide an answer as to how it all affects the brains of young people, their body, their emotions. It is clear that video games dictate a sedentary lifestyle. The fact is that the content of video games is usually violent, aggressive. Young people equally consume action games and their subgenre of "action games and shooters", then role-playing games, strategy games, puzzles, races, sports games, board games, and many others. The subject of research in this paper are members of Generation Z, born before 2012, before the alpha generation, i.e. current freshmen, born mostly in 2002 and 2003. This is a generation that values respect, responsibility, restraint, and these are young people with plans, structures and self-control. They value authenticity, save the money they receive for holidays and birthdays, embrace traditional values, and value the family that stays together (Labi, 2008, as cited in Williams et al., 2010). The most important characteristic of this generation is the use and application of technology for the use of all life information, communication and entertainment. Freshmen born in early 2000 live in a time of modernization and strong innovation of mobile digital devices that are developing in parallel with the aging of this generation. One of the key features is the need for peer acceptance, and one of the important "tools" used in this process are video games, in addition to music, fashion and cosmetics. Matić (2018) considers Generation Z an ambitious generation of distinctive individuals, which is becoming increasingly important in the research and thinking of the entire communication industry. The same author states that this generation lives the digital world in exactly the same way as the real one, knows no boundaries between the local and the global, and for them athletes, musicians, YouTubers, influencers and everyone else are equally important. Recognizable characteristics of this generation are that they are more tolerant toward others than any other generation, take less risk, they are less religious, more independent and do not care about institutions such as the Church or the Government, and they spend more time on Instagram than on Facebook and other social networks. It is a generation that prefers texting rather than "eye to eye" communication, reads books, newspapers and magazines less, grew up more protected than any other generation and often feels depressed and lonely (Daljevac, 2020). There are many characteristics of this generation, but certainly the ubiquity on the Internet and belonging to the "video game" community is one of the dominant ones. The American Psychological Association has developed criteria for characterizing internet gaming disorders. Of course, it does not mean that all gamers are "addicts" or that all members of Generation Z are gamers, as the results of research in this paper will show. It is important to point out through these criteria what should not be the main cause of video game consumption. Escape from negative moods - a game for the sake of getting rid of unpleasant feelings such as guilt, anxiety and depression. Playing video games despite the negative consequences - not getting enough sleep, being late for college, neglecting obligations. The need to play longer and longer, more and more exciting with more and more powerful equipment. Feelings of anxiety and sadness when there are no opportunities to play games. The existence of preoccupation, thinking about games and when not to play, planning when to play next time. Loss of interest and reduced participation in other recreational activities because of video games (Petry et al., 2014). Nurturing a healthy lifestyle today in the modern world of communications and modern technologies certainly includes regular physical activity. Sport is the most widespread form of modern physical culture. It is manifested in various forms of movement games and physical exercises, which are marked by great emotional satisfaction, as well as competitions between individuals or teams (Đurđević, 2010). We were interested in whether and how members of Generation Z, especially students in the field of sports, resist the pop culture of video games, the world of the Internet, and whether there are coincidences between the real world and the world of games. Is age and generation dominant in the choice of leisure activities or is the commitment to sports and recreation as the dominant lifestyle what differentiates students of sports, future sports coaches and managers, from other members of their generation.

METHOD

The subject of the research was the examination of preferences towards the contents of video games among students of sports in order to determine how much their habits in digital activities affect their sports activities. The starting point was the assumption that first-year sports students are members of Generation Z, one of the fundamental characteristics of which is that they are present on the Internet around the clock and permanently use its various contents and possibilities and that they are members of the digital gaming community. The first hypothesis was set, which was supposed to confirm that students of sports regularly play

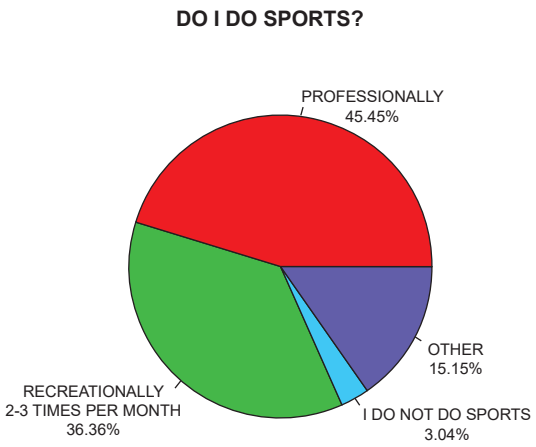
sports, professionally or recreationally. The second hypothesis was to examine whether first-year students from sports study programs play video games and to what extent they do so quantitatively. The third hypothesis was to examine qualitatively which video games students from sports study programs choose and to confirm or refute the assumption that they prefer to choose video games with sports content. In this scientific research, applied research, methods of theoretical analysis, descriptive method and comparative analysis were used. The analysis of different characteristics of Generation Z in today's time of parallel virtual and real reality and their life habits was performed. Previous research, scientific papers, professional papers, studies and textbooks directly related to the research problem were consulted. The descriptive method was used throughout the survey process and was used to gather students' views. A questionnaire especially constructed for research purposes was used as an instrument. Three special semi-closed type questionnaires were formed. The offered answers were given in each of them, but the possibility was left for the respondent to write their own answer. The questionnaires were filled out by 69 students of the College of Sports and Health in Belgrade, who enrolled in study programs for sports coaches and sports managers.

The surveys used for the research are available here: https://www.tvojstav.com/input/9Gtkwift5uKFP791wSSW. The Internet service of the Bureau for Social Research was used for statistical data processing. Questionnaires were delivered to students by e-mail at the beginning of January 2022, and their answers were recorded in the online database BIRODI - service Tvoj stav, Research Center.

RESEARCH RESULTS

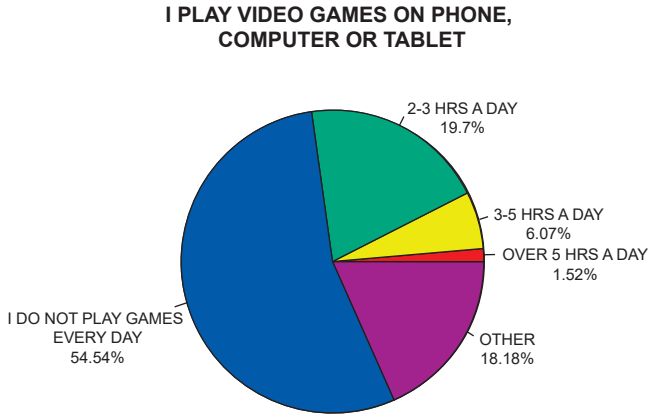
Research in the field of sports science indicates that not only is engagement in sports important, but also the intensity and scope of that engagement (Simpkins, 2005). On one hand, those who spend more time in sports and invest more effort in sports activities achieve greater benefits not only in sports but also in school, work and life in general, while on the other hand active professional athletes often cannot keep up with academic education. After finishing high school, some athletes decide to continue their education and acquire academic knowledge in the field of sports and continue with the sports lifestyle adopted in childhood. We were interested in the extent to which and in what way the students of sports are involved in sports. Graph 1 shows that 82% of students in these fields professionally or recreationally do sports two to three times a week, and to this percentage we can add 15% of those students who circled the answer "something else" because there are students who do recreational sports more than two to three times a week, i.e. daily or four to five times a week and there are also students who engage in sports through coaching. So 97% of students - future coaches and sports managers regularly play sports, regardless of the dominant characteristic of Generation Z, also known as zoomers, as the demographic group with the most intensive use of the Internet in the world, who have surpassed millennials and all previous generations regionally in the number of hours spent daily on social networking platforms and other digital content.

Graph 1. *Frequency of students' engagement in sports activities*



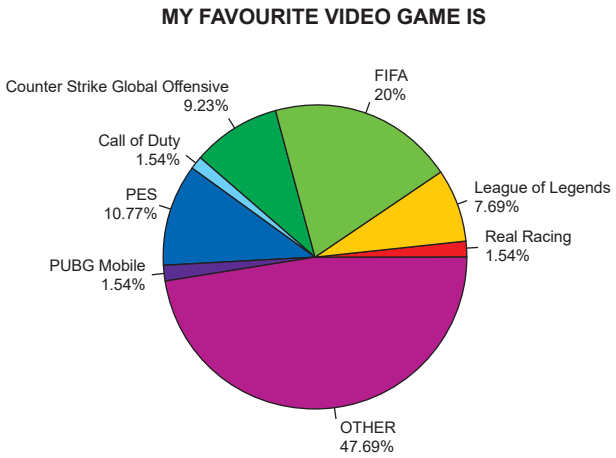
The high percentage of regular sports engagement among students of sports indicated in advance that this is a part of the population of Generation Z whose digital habits are somewhat different. Thus, in testing the second hypothesis (Graph 2), we received the answer that 55% of students do not play video games every day and 18% of those who circled the answer "something else" stated that they mostly never play video games or play them less than one hour. However, 26% of them play games every day for two to five hours a day, and 2% of them play video games for more than five hours a day. A study conducted in 2019 in Serbia for the needs of UNICEF, on the use of the Internet and digital technologies by children and young people showed that high school students spend four to five hours a day on their digital devices (phone, tablet, console, computer, etc.), and on weekends that number exceeds seven hours a day (Kuzmanović et al., 2019). Therefore, it is encouraging that in the selected target group of sports students, in the first year, we have 73% of those who do not play games every day or do not play them at all.

Graph 2. *Amount of time students spend playing video games*



The gaming community is becoming more numerous, the FIFA series is available in 18 languages and in 60 countries and it has been sold in more than 320 million copies (Konatarević, 2021), and every year, even in the current 2022, a new edition, FIFA 22, is published, which speaks in favour of it being the most popular as well as the best-selling video simulation of football. The increase in the number of gamers is continuous, although the World Health Organization published its new, 11th version of the International Classification of Diseases in 2018, which includes addiction to playing video games in its mental illness and addiction section (Zorić, 2021). Such data further provokes thinking about what the future of new generations will look like. The biggest fear of gamers' parents is that they might become addicted to video games, suffer from increased aggression or violent behaviour and numerous negative physical health consequences such as vision problems, neck pain, curvature of the entire musculature due to several hours of improper body position, formation of clots in the legs due to excessive sitting and many others (Vorobjev, 2020). All of the aforementioned symptoms are the result of a continuous gaming life and behaviour, when someone has already become addicted to a particular game like the aforementioned "Fortnight" which is classified as a survival game, where each game begins with players jumping off a "flying bus" and aiming to find weapons as soon as possible and eliminate other players. According to training sites, professional gamers have certainly invested more than 500 hours of play to reach the master level (Kako Reši Lako, 2022). What interested us in the third hypothesis of the paper is to note not only the consequences, i.e. the current choices and habits of young people in the world of video games, but also to find out whether their previous choices in life habits and styles, especially sports, affect their choice of online content. Does the commitment to sports in real life mean that they will choose the same content in the virtual world? They were offered seven popular video games with different content (Graph 3) to choose their favourite, with the possibility to add their own favourite. The largest number of sports students, 20% of them, said that their favourite video game is "FIFA" (a football video game).

Graph 3. *Video games that students play most frequently*



In second place of favourite video games with 10.77%, there is also a video game with sports content "PES", which is a series of football video games. In third place is "Counter Strike" (Counter Strike) shooting video game, which was chosen by 9% of students as their favourite game. In the sea of video game offers, it is not surprising that a high percentage of those, 47.69%, mentioned something else as their favourite video game. The answers include 30 different titles such as: "Dota 2", "Halo 2", "Call of Duty", "Warzone", "Rocket League", "GTA San Andreas", "Sudoku", "Assassin's Creed Valhalla", "International Basketball Manager 2022", "Forza Horizon", "Mortal Combat 11", "Naruto Shippuden Ultimate Ninja Storm 4", "Rocket League", "GTA", "NBA 2K22", "Need For Speed", "Slagalica" , "F1 2021", "World of Warcraft", "NBA", "Outlast" and others. What is important to note is that this percentage also contains a high percentage of sports content games that relate to basketball or to a particular series of football games, car races, or action games. Apart from "LOL" (League of Legends), video games, battle arenas, action strategy video games, which were also chosen by students as a favourite with 7.67%, other offered games do not exceed 1.54%.

DISCUSSION

The selected sample of first-year sports coach and sports management students showed that 97% of students - future sports coaches and managers regularly engage in sports, while 73% of them do not play games every day or do not play them at all. Among the favourite video games in the highest percentage, more than 31% are sports content games, football and basketball games, while other favourite, strategic, shooting and other games range in percentages from 1.5% to 9%. Very few studies address exclusively the sports habits of Generation Z. According to the 2019 survey of CeSID in Serbia, 38% of young people did not engage in sports activities, while 62% of respondents engage in sports either professionally or recreationally. Among those who do sports, 35% of them do only occasionally, 23% regularly but recreationally, and 4% also do sports professionally. The sample included 1,500 young people aged 15 to 30. Unfortunately, the same research shows that sports and recreation decrease in this population with older age. However, the mentioned results show that the majority of the youth population is involved in sports, even though they are members of the Generation Z, which is characterized as digital. Among those who do sports, 35% of them do it only occasionally, 23% regularly but recreationally, and 4% also do sports professionally. The sample included 1,500 young people aged 15 to 30. Unfortunately, the same research shows that sports and recreation decrease in this population comes with older age. However, the mentioned results indicate that the majority of the youth population is involved in sports, even though they are members of Generation Z, which is characterized as digital.

It is indisputable that sports students are also members of Generation Z and that digital activities are largely present in their lives. They transferred part of their habits and preferences from real life to virtual reality, which confirms their choice of sports content in video games. According to Mazić, a football player who misses a crucial penalty is frustrated in a similar way as a player when he "dies", i.e. loses a life in a

crucial place in the game. Most single player games allow for the possibility of correcting mistakes, however multiplayer games work on the same principle as team sports, as does the anger and nervousness that results from playing in a team sports game. It is possible that the digital generation is looking for the same feeling from sports fields in a virtual environment and gaming - the global entertainment industry is very successful in meeting such needs of young people. What is encouraging are the results of research on a sample of sports students from the College of Sports and Health, that such a digital offer did not reduce the percentage of regular engagement in sports in the selected category of students and did not increase the percentage of those who are regular consumers of video games.

This once again confirms sport as a real lifestyle and in the future even more virtual times to come, the commitment to sport in the broadest sense of the word is transferred to similar choices in the digital world.

CONCLUSION

Regular moderate physical activity is a way to preserve and improve health, relieve stress, improve the growth and development of young people, increase self-confidence, self-esteem, a sense of fulfilment and satisfaction, which all together affect the quality of life. Even in the periods of the COVID-19 pandemic, where the consumption of digital content increased globally, sports habits in the population that has such preferences and developed awareness of the importance of physical activity have not diminished (Markov Čikić, Ivanovski, 2021). Research shows that playing sports can be very useful and encourage responsible social behaviour, better school success, adoption of moral values and healthy lifestyle habits. For children and youth, sport is a chance to learn: it is a space where you practice for your life (Bačanac et al., 2009). If "practice for life" is practiced in early childhood, on sports fields, and the same preference is encouraged in youth, it becomes an accepted healthy lifestyle. What is characteristic of the local generation born in the last two decades, Generation Z or the so-called zoomers is certainly that they are the demographic group with the most intensive use of social networks, the Internet and all digital content in the world across the planet, and what remains unchanged is that games and sports are anthropological constants of their childhood and youth.

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SPORT – SCIENCE AND PRACTICE

INSTRUCTIONS FOR THE AUTHORS

The scientific journal SPORTS – SCIENCE AND PRACTICE is an official publication of the College of Sports and Health from Belgrade. It was established in 2009, and it publishes original scientific, review and professional papers from areas analogous with sports and health (http://sportnaukaipraksa.vss.edu.rs/snp-en.asp).

The journal is published online twice a year, in June and December, in Serbian and English. On the list of the Ministry of Education, Science and Technological Development of the Republic of Serbia, it is in the category of **national journals - M53** (https://mpn.gov.rs/nauka/nauka-i-istrazivanje-u-srbiji/kategorizacija-naucnih-casopisa/).

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A cover letter is sent with the manuscript, its aim being to present the authors and point to the essence, significance and original scientific and professional contribution of the paper. The letter is to include the first and last names of the authors, date of birth, the affiliation, academic title and position, email address (business email, if possible) and a phone number. **A paper can have a maximum of three co-authors**, and in case of original scientific papers that involve collective research on field, five co-authors are allowed.

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After receiving a positive review and formatting the final version of the paper in Serbian, the authors are obliged to submit the English version, which must be true to the original. Therefore, it is necessary to submit **quality and professionally translated papers**; otherwise, the translation will be returned for revision.

The papers are sent in *MS Word*, using the *Times New Roman 12pt* font. The papers should not exceed 15 A4 pages, including all tables, diagrams, charts, graphs and references. The texts are usually monospaced, and all four margins (upper, lower, left and right) are 2.54 cm.

THE STYLE AND STRUCTURE OF THE TEXTS

The following format is used for writing original scientific papers: INTRODUCTION, METHOD, RESULTS, DISCUSSION, CONCLUSIONS, REFERENCES.

The bibliographical-speculative method is used and deviations from the suggested structure for original research papers are allowed, while the author will adapt the structure to the contents of the prepared material, taking into account the proper marking of chapters and subsections. The numbering is the same as with the original papers (1. XXXX, 2. YYYY, 2.1. Yyyy, 2.2. Yyyy, etc.). Every claim, new classification, or synthesis of knowledge, should be based on the results of previous researches.

THE TITLE OF THE PAPER

The title should contain the following information:
- a precise and informative title which does not contain abbreviations
- in the case of empirical scientific papers, it is necessary to specify the variables and the nature of their links with the title
- the first and last names of all authors, without their titles
- the institution where the author works, as well as the city and state, should be noted underneath the name of every author
- a footnote notes the email address of the author for possible correspondence

ABSTRACT AND KEYWORDS

The abstract should include a general review of the topic. It must contain a defined aim and objective of the paper, a short description of the applied research proceedings, the most relevant results and conclusion. The abstract should be from 150-250 words.

Up to 5 keywords are given below the abstract.

INTRODUCTION

The introduction should contain a short review of the relevant research. **All the used bibliographical sources are to be mentioned in the references at the end of the article**, as well as in the text, noting the last names of the author and the year of publishing in parentheses. For example: (Lazarević and Havelka, 1981). Bibliographical sources SHOULD NOT be mentioned in the text in a footnote.

The topic and aim of research should be precisely defined, as well as the scientific validity and professional relevance of the researched topic.

In order for the paper to be more understandable to less informed readers, the editorial staff recommends that a short explanation of the basic concepts is given in this segment of the paper.

METHOD

This part should give a detailed description of the methodological procedure which would enable other researchers to repeat the testing.

It should contain the following subtitles: Samples, Variables, Techniques for data collecting, Testing procedures, Statistical analysis.

Every instrument used (survey, interview, scale, test etc.) must be shown in its integral form or illustrated in a shortened version.

RESULTS

In this part, it is necessary to concisely show the most important results, with short and clear instructions. It is possible to separate several parts, depending on the nature and complexity of the data. If shorter parts are used, it is necessary to label them precisely.

The results need to be presented and statistically processed (avoiding raw data). In the aim of a better assessment of results, it is optimal to use tables, graphs and images, and not repeat the data analyzed in the text. **Each table, graph, or image must be clearly numbered and mentioned in the text**. For example: Image 1, Graph 1, Table 1, Table 2, etc.

Tables, diagrams and images are always numbered precisely and consistently. They are an integral part of the text, and not an addendum. The numbering and labeling of the tables, diagrams and images (the name explains the contents), are given **above the diagrams**.

DISCUSSION

The discussion should comment on the results of the research in regards to the initial expectations and hypotheses set in the paper. It should also be professional and based on data obtained in the research.

CONCLUSION

The conclusion contains a short description of the research and a concise revealing of the main results, as well as the possible further line of research and the potential of a practical application of the obtained results.

REFERENCES

A reference list of the used bibliographical units mentioned in the text is given at the end of the paper, according to the APA referencing model: https://apastyle.apa.org/style-grammar-guidelines/references/examples

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- Every bibliographical source is numbered.
- Bibliographic sources that are not mentioned anywhere in the paper cannot be included in the list of references.

Examples of papers in periodical publications (journals, bulletins, etc.)

Author, A.A., Author, B.B., & Author, C.C. (year). Title of paper. *Title of journal*, volume(number), pages.

Amanović, Đ., Milošević, M., Dopsaj, M., & Peric, D. (2006). Modeling variability of the assigned level of force during isometric contractions of the arms extensor muscles in untrained males. *Facta universitatis – Series: Physical education and sport*, 4(1), 35-48.

Examples of non-periodical publications (textbooks, monographs, scripts, books, etc.)

Author, A.A., Author, B.B., & Author, C.C. (year). *Title of research paper*. Edited by: Editor.

Cohen, M., & Nagel, E. (1982). *An Introduction to Logic and Scientific Method*. Beograd: Zavod za udžbenike i nastavna sredstva.

Examples of chapters in non-periodical publications (textbooks, monographs, etc.)

Author, A.A., Author, B.B., & Author, C.C. (year). Title of chapter. U: A. Editor, B. Editor, C. Editor, *Book title*. Edited by: Editor (pp. xxx-yyy).

Puczkó, L., & Rátz, T. (2007). Trailing Goethe, Humbert, and Ulysses – Cultural Routes in Tourism. In: G. Richards, *Cultural Tourism – Global and Local Perspectives*. New York: The Haworth press, Binghamton (pp. 131-148).

Examples of references published in proceedings books from congresses and symposia

Author, A.A., Author, B.B., & Author, C.C. (year). Title of chapter. In: A. Editor, B. Editor, C. Editor (Eds.), *Name of conference, congress or symposium* (pp. xxx-yyy). Published by: Editor.

Perić, D. (2003). Factorial structure of modern basketball. In: A. Naumovski (Ed.), *International conference of sport and physical education* (pp. 256-260). Skopje: Faculty of physical culture.

Example of quoting sources from the Internet

Vujičić, I. (2020, July 21). *Kako pokreti ruku utiču na efikasnost trčanja?* Trčanje.rs. https://www.trcanje.rs/trening/uticaj-kretanja-ruku-na-trcanje/

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Designing and marking tables

- The tables must be simple and easy to understand.
- The data analyzed in the text should not be repeated in the tables.
- Refer the data mentioned in the tables to the text in the paper.
- Number the tables (for example: Table 1, Table 2).
- While marking the tables, after their numbering, make a mention of the data in the tables.
- The number and title of table are written above it.
- The tables are always marked and numbered in the same way.
- The tables are an integral part of the text.

Designing and marking diagrams

- It is desirable to include diagrams, charts, graphs, etc. in the paper.
- The data analyzed in the text should not be repeated in the diagrams.
- Refer the data in the diagrams to the text in the paper.
- Diagrams are to be listed by number (e.g.: Diagram 1, Graph 1).
- After their listing, mention the data they contain.
- The numbering and titles are noted under the diagram, chart, graph, etc.
- Diagrams are always numbered and marked in the same way.
- Diagrams are an integral part of the text.

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THE REVIEW OF THE BOOK

The journal can also publish a review of the relevant professional literature from the area corresponding to sports and health recently published. The review in a clear and fundamental way points to the significance and current validity of the book, as well as a review of the most important parts and contents. The title of the review must contain information references according to APA standards, these being the last name and initials of the author, the year of publication, the title (*italics*), the publisher, place of issue. Also included are the page number, the ISBN and COBISS number. The author of the book review signs it, along with a mandatory mentioning of the affiliation.

Example of the title of a book review:

Book review
Havelka N. and Lazarević Lj. (2011). *Psychology of sports management.*
Publisher: College of Sports and Health, Belgrade, Serbia; 384 pages;
ISBN 978-83687-14-5; COBISS.SR-ID 184385036