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STUDY ON THE DECLINE OF PERFORMANCE IN THE LONG JUMP TEST FROM THE PLACE DURING ONLINE SCHOOLING IN RURAL STUDENTS

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Abstract

In the field of school sports, emphasis has been placed on the use of general physical development exercises, due to their high degree of accessibility and the relative simplicity with which they can be transmitted to the student by the teacher, and mobility and local strength exercises, in order to prevent, or at least slowness, deterioration of students' physical abilities . Our study is intended to make a statistical analysis of the results obtained by the students of the Sagu-Fiscut juetul Arad Middle School in two standing long jump tests, before and after the interruption of the face-to-face didactic activity. 94 rural students between the ages of 8 and 14 participated in the tests between 2020 and 2021. The goal is that practicing any kind of physical training, whether in person or online, will result in less change of the performance in a sports test than stopping any physical training. The final conclusion is that at present, the transition to an education system via the Internet is not a reliable approach.

Keywords of standing long jump, online school, SARS-CoV-2 restrictions, student adaptability

Introduction

Due to the pandemic caused by SARS-CoV-2 a significant difficulty was observed in the normal course of sports activities, both in performance sports and in school sports, both systems being forced to are subject to operating rules that did not allow the use of training methods considered effective and desirable

The restrictions mentioned above included, among others, the interruption of face-to-face sports activities opting instead for their conduct in the electronic, online environment. Due to the students' difficulty in adapting to the new teaching system, a high percentage of absenteeism was observed remained constant throughout the distance teaching period despite the atempts by the schools administration.

In the field of school sports, emphasis has been placed on the use of general physical development exercises, due to their high degree of accessibility and the relative simplicity with which they can be transmitted to the student by the teacher, and mobility and local strength exercises, in order to prevent, or at least slow deterioration of students' physical abilities.

During the distance learning period, due to the variation of equipment available to each student and the impossibility of the teacher to provide effective help, general physical development exercises were predominantly used in the didactic activity.

General physical development exercises are one of the tools used not only in physical education but also in mass and performance sports

We can say about physical education that it is a social activity. (Săvescu Iulian, 2009; Andrei Vasile Liviu, 2010) It is practiced at all levels, professional or amateur, by all categories of people, age, social class, sex, etc. (Andrei Vasile Liviu, 2010; Cârstea Gheorghe. 2000)

In the practice of physical education we have at our disposal an almost infinite number of physical exercises, mainly due to the countless combinations of movements that the human body is capable of performing. Physical education has a formative character, producing physiological and psychological changes in the participants. It can be carried out in two ways: as an instructive-educational process, within sports centers and educational units, and as an independent activity, practiced by each individual who wishes for the benefits it offers. (Cârstea Gheorghe, 2000)

A specific terminology is used in physical education, in the following I will define some terms specific to it:

Motor capacity can be defined as the totality of the morphological, functional, and motor features with which an individual is born or develops during his life, they allow him to perform exercises and efforts varied in dosage and structure. (Nicu Alexe, 2002)

Motor quality is an attribute of an individual, both mental and physical, it is based on psychological, biochemical and physiological mechanisms, which ensure the execution of motor actions with specific indices of resistance, skill, speed and strength. (Nicu Alexe, 2002)

Motor skills are one of the component parts of the physical education model, which are formed, developed, perfected and even automated during the individual's life. Mandatory for their learning is their passage through the four phases of the motor learning process. These are initial acquisition, or initiation into the basics of the motor act, consolidation, refinement and, finally, evaluation, not necessarily formal. (Andrei Vasile Liviu. 2010)

In the stage of initial acquisition the basic concept of the learned motor skill is formed. It is necessary to express a high degree of concentration in order to correctly execute the movement and external support is often needed to correct it. A wrongly acquired motor skill is more and more difficult to correct as the learning process progresses. (Andrei Vasile Liviu. 2010; Cârstea Gheorghe, 2000; Nicu Alexe, 2002)

The second stage of learning is consolidation. This is dedicated to the correction of execution mistakes. The subject still has to put in extra effort by paying attention to the way of execution and avoiding mistakes, but we see an increase in the ability to withstand high-intensity effort compared to the initiation stage. Maintaining relatively constant running conditions and effort intensity become more important. (Andrei Vasile Liviu. 2010; Cârstea Gheorghe, 2000; Nicu Alexe, 2002)

Evaluation and improvement are the last two stages of the learning process and are considered perpetual, interdependent processes of checking and improving execution. The refinement of technique in execution is continuously interspersed with periodic evaluation, used to determine the validity of the direction chosen for the improvement of execution. Only during this period can automaticity be installed, if the complexity of the motor skill allows this. (Andrei V L. 2010; Cârstea Gh., 2000; N. Alexe, 2002)

Some characteristics should also be mentioned in the case of motor skills. Namely, that they are acquired in special processes of practicing physical exercises or in the practice of life, often without awareness on the part of the subject, they are classified as basic motor skills and found in every individual, and specific to a sport branch. The basic components of motor skills are the dynamic stereotypes formed through numerous repetitions, depending on the required effort and their degree of complexity, they can be partially or fully automated they are acquired unevenly, in the final phase of development we speak of the so-called senses, of the snow, the ball , water, etc., the individual acquires an intrinsic understanding of the condition of the external factors that change the execution and anticipates the possible changes, disadvantages and

opportunities created by them. (Andrei VL 2010; Cârstea Gh., 2000; N. Alexe, 2002, Popa L, 2015)

In large-scale sports the standing long jump test is used to compare the strength of a subject with the strength values of the population it belongs to; determining health status, i.e. level of recovery from injury, physical development and growth, etc.; for selection and forecasting in performance sport. (Galea I . D., 2014)

Minimal materials are required to apply this sample, such as a marked straight surface, preferably with markings every centimeter. Of course, more complex materials can be used, such as the sand pit in combination with the roulette and assistant to obtain more accurate measurements.

To obtain reliable results the test is performed after preparing the body for exercise. The subject is positioned in front of the surface on which the jump will be performed, the subject executes a single flexion of the thighs on the calves, followed by a quick and powerful extension of the lower limbs simultaneously with the swinging of the arms from back to front, resulting in a release from two feet and landing on two feet. To determine the results the distance between the subject's heels at the moment of landing, or the last mark in the sand in the case of using the sand pit, and the starting point of the jump is measured. Record the result in meters and centimeters. The test can be repeated twice, to ensure the most realistic representation of the subject's biomotor potential. (ID Gallery, 2014)

Material and methods

Our analysis included a number of 94 students who took the standing long jump test in the 2020-2021 school year in the Sagu-Fiscut Secondary School, Arad county, before and after the distance learning period. Data was collected during the 2020-2022 school year. It should be emphasized that the analysis refers only to students from rural areas.

We used scatterplots to determine how subjects are distributed with respect to age, gender, and their hourly attendance rate.

We also used the correlation index (Pearson) to see if there are possible relationships between the different results and the attendance rate of the subjects

And last but not least, we used the graphic method of presenting the obtained data.

Result and discussions

In order to be able to carry out an effective didactic activity through the means of distance teaching, in both performance and school sports, it is necessary:

To ensure unrestricted access to all students to platforms, resources and materials that allow them to participate in courses:

After the tests, the following results were obtained:

Table no.1 Results obtained by students attending online courses (group 1) reported with mean and standard deviation

	Sample 1	Sample 2
Mediate	138.80	137.54
Standard Deviation	37.83	37.13

Table no. 2 Results obtained by students without attendance at online courses (group 2) reported with mean and standard deviation

	Sample 1	Sample 2
Mediate	151.59	138.91
Standard Deviation	38.39	37.03

Table no. 3 Results obtained by boys attending online courses (group 1 boys) reported with mean and standard deviation

	Sample 1	Sample 2
Mediate	144.53	142.03
Standard Deviation	39.42	39.46

Table no. 4 results obtained by boys without attendance at online courses (group 2 boys) reported with the mean and standard deviation

	Sample 1	Sample 2
Mediate	158.36	143.04
Standard Deviation	39.01	39.16

Table no. 5 Results obtained by girls attending online courses (group 1 girls) reported with mean and standard deviation

	Sample 1	Sample 2
Mediate	121.27	121.36
Standard Deviation	27.28	26.65

Table no. 6 Results obtained by girls without attendance at online courses (group 2 girls) reported with mean and standard deviation

	Sample 1	Sample 2
Mediate	131.84	122.63
Standard Deviation	28.84	28.36

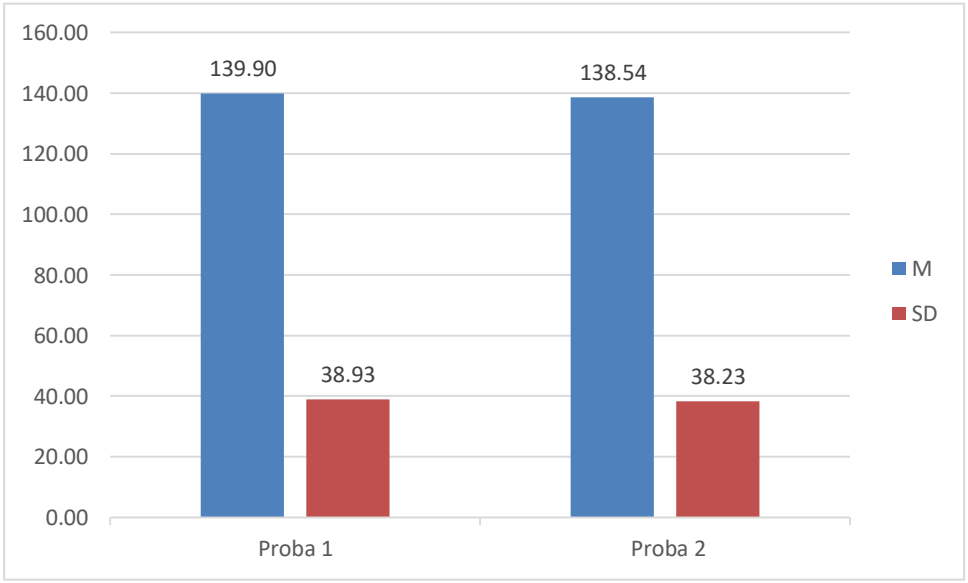

Fig.1 Group 1 results, reported with M and SD.

From fig. 1 we observe that, after the online training period, group 1 shows a decrease, on average, in the length of the jump of 1.36 cm or 0.97% and a decrease in the standard deviation of 0.70 points or 1.79%.

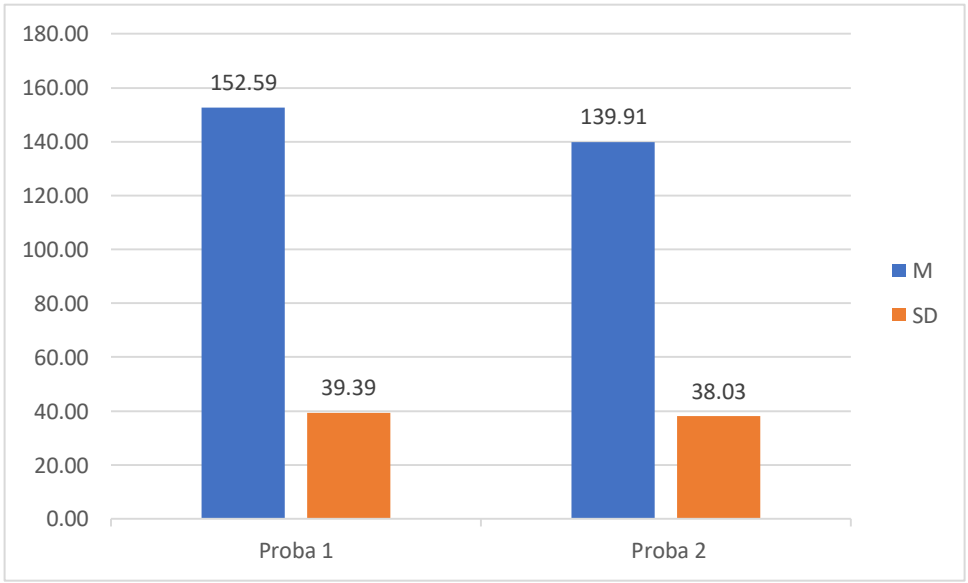

Fig. 2. Group 2 results, reported with M and SD.

In contrast to group 1, group 2 shows a more significant decrease in the average length of the jump, of 12.68 cm or 8.30% with a decrease in the standard deviation of 1.36 points or 3.42%

so a difference of 11.32 cm or 161.25% in the average length of the jump and a difference of 0.66 points or 64.07% in the value of the standard deviation.

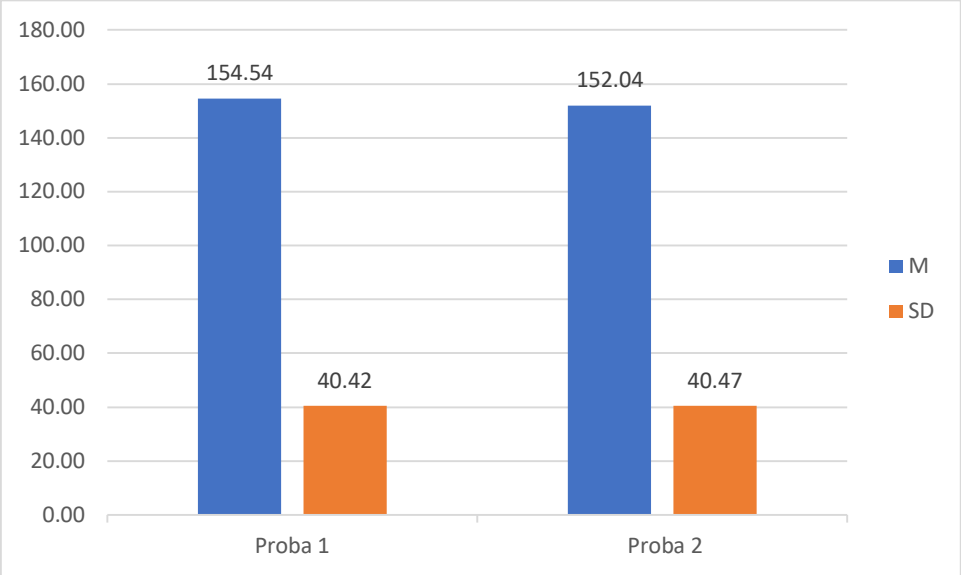

Fig.3. The results of boys in group 1, reported with M and SD.

From fig.3. a 2.5 cm decrease or 1.61% decrease, on average, in jump length is observed after the online training period. An increase in the standard deviation of 0.04 points or 0.12% is also observed. Results consistent with the group 1 trend, i.e. little change in mean jump length and standard deviation.

From the analysis of the experimental data it is observed that:

1. Regarding the results of group 2 compared to group 1 following test 2, we observe a large difference in the decrease in performance 161.25% in the average length of the jump, in favor of group 1 .

2. The same situation for group 2 of boys compared to group 1 of boys after test 2, i.e. a difference of 143.88% between the two groups of boys after the online training period, in favor of group 1 .

3. For group 2 of girls compared to group 1 of girls after test 2 we observe a difference of 193.59% in favor of group 1 .

4. Also group 1 of girls is the only one that shows an increase,

although insignificant, of performance, from M=121.27 cm to M=121.36

Final conclusions

1. Re-evaluating and improving the framework methodology for organizing didactic activity through the Internet in the field of physical education and sports in such a way as to cover the Physical and Sports Education curriculum and adapt it to the new learning environment; the curriculum should be adapted in such a way as to achieve as many of the learning objectives as possible but without requiring too much specific equipment.
2. Since, following the analysis of the results obtained by the subjects in both tests, no correlation was discovered between the attendance at the classes and the slowing down of the performance decline in the standing long jump test, we propose the following:

- Organizing a new experiment with a larger base of subjects to verify the validity of the results of the experiment described in this paper;
- Determining, through the new experiment, the variable that influenced the maintenance of performance in group 1 or its loss in group 2.

In cases where it is absolutely necessary for the sports activity in person to be interrupted for a longer period of time, it is recommended to use any methods of training in physical activity, by training using the means of education with the help of the Internet or by other methods, to prevent or at least slowing performance loss

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Biological Bases of an Injury: Applications to Resistance Training

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Abstract

Understanding the biological factors of an injury is beyond the aspects that caused this condition in the athlete. Thus, the aim of this study is to develop a solid understanding of the biology associated with the development of an injury derived from the practice of physical exercise and its related aspects. It is verified that the harmful processes affect countless strength training practitioners throughout their periodizations. These injuries lead to departures from the training routine and delays in the development of the practitioners' goals. Lesions mainly affect joint structures, with synovial joints being among the most affected. Reduced muscle strength and impaired mobility are among the factors that contribute to the development of joint damage. Bone injuries are also among the most present in the population practicing physical training, and these are caused by microfractures derived from shear loads common in contact sports. Muscle strengthening, including training variables and biomechanical techniques, help to reduce the incidence of injuries and in their treatment when they are already installed in the physical

exercise practitioner.

Keywords: biomechanical phenomena, morphology, exercise, strength training.

Introduction

The knowledge that a physical trainer or Physical Education professional must have in assisting their students in environments such as gyms and sports centers must be firmly structured in recent research and already consolidated literary support. In this sense, the use of techniques, sometimes more innovative, sometimes more traditional, becomes an excellent tool in the development of works in favor of the physical, psychological and social improvement of the student (Belozo et al., 2020).

One of the characteristics that most stands out in the context of resistance training is the execution of a certain movement in a harmonic way and within the practitioner's joint limits. In addition, a well-produced movement against resistance is associated with benefits to several organ systems, in addition to the muscular, skeletal and joint systems (Mendonça et al., 2020).

However, on the contrary, movements executed in a wrong way, with excessive speed or too slowness, reduced or exaggerated amplitude of the gesture, innovations in the execution of traditional exercises, which are more similar to the performing arts implemented in the movement, leading to overload of structures anatomical features and making the exercise less functional , also attract the attention of passers-by to gyms, bodybuilders, professionals working in the context and digital influencers (Fernandes et al., 2021).

The fact that well-executed movements strike us for the beauty of the gesture, while poorly executed movements awaken in us fun, astonishment and the questioning of how much a human being is capable of withstanding, is not restricted to aesthetic aspects, but also to the potentially harmful factors that the second example can provide to the resistance training practitioner.

As it is already common sense and widely disseminated in scientific circles, physical training, be it resistance, aerobic, aquatic or in any other way, brings countless benefits to the individual who performs it. However, in association with this, the large number of people who are frequently injured practicing sports, fights, dancing and physical exercise in general are also known (Pelegrina et al., 2021).

In this sense, the personal trainer, Physical Education professional or physical trainer must

be aware of the peculiarities that involve and derive from a sports injury, as well as prevent it from being developed in their student, athlete or client. For this, a basic understanding of cellular and molecular biology, as well as histological and anatomical characteristics, in addition to extensive knowledge in kinesiology and biomechanics are necessary.

Therefore, the aim of this study was to present the biological bases of the harmful process in resistance training practitioners, based on an integrative literature review.

Method

The present work is an integrative literature review study, exploratory and basic in nature, aiming at the development of future hypotheses for clinical trials and experimental protocols on the subject, as well as a reflection on the topic addressed. For this study, the descriptors *"training", ''physical training'',''injuries'', ''analysis of human movement'', ''biomechanical phenomena''* were used. Standardized descriptors and associated by the search platform used.

For the elaboration of this review, the Pubmed (Medline), DOAJ and Scielo databases were accessed and used, which include original and revision manuscripts, as well as case reports and meta-analyses, in addition to scientific books in English and published in journals of high technical-scientific impact (with an impact factor of 0.7 or higher).

Regardless of, only articles published in the English language were accepted for the preparation of the results of this article. Associated with this, only randomized clinical trials, meta-analyses, systematic reviews and clinical trials were accepted. Classic literature and outside the temporal cutoff, in which ten years were applied (January 2011 to February 2021), were accepted with exclusively conceptual purposes . Integrative review articles and letters to the editor were not considered.

Results and Discussion

The results obtained from the search criteria and the reading of the articles, as well as from the analyses, were synthesized and they are discussed below.

Cellular and molecular aspects related to an injury

Usually, the cells of a human body are in adequate physiological conditions for maintaining homeostasis and recovering it if it is altered. In this way, it is common to identify in

cells the cell nuclei positioned in regions that are characteristic, in addition to genetic material internalized in its nucleus with the appropriate constitution and condensation consistent with the moment of the cell cycle. In the cytoplasm of healthy cells, the protein synthesis machinery is normally in full swing. Always synthesizing new proteins, a process that involves the secretory biosynthetic pathway, and recycling old and already used ones, a procedure carried out by organelles such as proteasomes that, in normal cells, act in a manner dependent on biomolecular markers such as ubequitin (Camargo et al., 2020).

Still, in healthy cells, the cytoplasm is organized and contained by means of a cytoplasmic membrane with an organized bilayer with phospholipids, fatty acids and proteins always adequate to the work and activity of each specialized cell. The mitochondria, which are responsible for cellular respiration and the synthesis of adenosine triphosphate, which provides chemical energy for cellular reactions, are working normally, always with their matrix and outer membrane organized, thus avoiding apoptotic processes related to numerous protein cascades (Cunha et al., 2021).

As can be seen, in a normal cell the functioning of molecules and organelles is adequate, all in a natural condition. However, if any degenerating harmful agent affects this order and condition of cell functioning, it may undergo processes that alter its physiology and morphology, and may even lead to death (Cunha et al., 2021; Camargo et al., 2020; Fernandes et al., 2020).

Normally a sports injury occurs in a way that the agent practicing the sport loses control of his body, or is surprised by an object or opponent. However, there are cases in which peripheral or central fatigue is installed, and even with such wear and tear, the athlete remains active, also leading to highly harmful processes. However, the frequent use of a structure for a given activity, for example the anterior surface of the tibia used for kicking punching bags, can also cause microfractures which, after a period of poor recovery and excessive physical and psychological stress, lead to injuries and fractures in this region (Image 01) (Santos et al, 2021).

Image 01: Professional MuayThai athlete executing a side kick at the height of the upper region of the punching bag. Check that the area that comes into contact with the object is distal to the leg, precisely the ankle and end of the tibia. The frequency of loads in a single area can lead to microfractures in the region, which can progressively generate a larger and debilitating fracture (Source: personal files of Prof. Doc. Victor Fernandes and Prof. Filipe Lucas)

A cell subjected to a harmful process modifies its physiological activity in a complementary way. Therefore, biochemical markers expressed in the blood plasma are observed, which indicate the deficient state of a certain tissue or organ. This occurs because the genetic material, deoxyribonucleic acid (DNA), which contains numerous genes that encode numerous other proteins, is stimulated to produce mechanisms of responses to harmful agents and to delay the progression of the lesion. Thus, many proteins are synthesized in an attempt to signal a local injury and prevent a worsening of the condition. For example, it is known that high levels of the creatine kinase enzyme metabolite are associated with muscle tissue stress, often observed in athletes and practitioners of vigorous physical exercise. However, it is observed that altered levels of sodium in the bloodstream are also associated with cellular impairments of various types (Cunha et al., 2021; Fernandes et al., 2020).

This stimulation of genetic material can be caused by the presence of microorganisms foreign to the individual, such as bacteria and viruses, for example, or, as is more frequent in

sports injuries, by excessive load or sudden imbalance of the practitioner during movement. In gym environments and resistance training sports centers, injuries can occur due to inadequacy of loads, that is, a poorly designed training sheet that focuses on high intensities daily with little recovery time or a poor diet. In addition to an inadequate anatomical structure, caused by muscle imbalances of practitioners (Gonçalves et al., 2021).

The second case, muscle imbalances, are very common in gym environments. This occurs because the proper adjustment of loads and the frequency with which a given body region is exercised does not always match the limits or needs of the practitioner, and it is up to the coach or professional to make these adjustments (Mendonça et al., 2021; Gonçalves et al., 2021).

An anatomical perspective

It is known that, from an anatomical perspective, the locomotor system consists of three essential systems for promoting movement, namely, the skeletal system, the muscular system and the joint system.

The skeletal system is so named due to the fact that its main constituents are the bones of the human body. Embryologically, the skeletal system derives from the mesoderm, one of the embryonic layers that arise during the gastrulation phase[1]. Skeletal tissue is made up of four basic cell types: osteoclasts, osteoblasts, osteocytes, and bone lining cells. Osteoclasts are cells specialized in reabsorbing bone tissue, thus helping to maintain and remove unused or inadequate bone matrix from the tissue. Osteoblasts, in turn, synthesize bone matrix and mineralize the tissue, that is, they produce new bone tissue on top of the old bone. Osteocytes are mature bone cells, precisely osteoblasts that have become enveloped by bone matrix and begin to help maintain tissue in a paracrine and local manner. Bone lining cells line the tissue (Cunha et al., 2021).

Bone tissue is often exposed to different types of loads that can cause different effects on the bone. In addition, as is already widely known, bones vary according to their type and geometric characteristics, therefore, the loads imposed on bones behave differently according to different types of bones (Cunha et al., 2021; Fernandes et al., 2021).

[1]Essential process in the development of the animal embryo, which in the case of this content, the human being. This is a stage that derives from the blastula, in which the cells that undergo intense mitotic activity position themselves in a more adequate way for their respective functions and, in this way, become specialized. In this phase, the body starts to have axes and anatomical planes.

The so-called long bones, because they have a length greater than the width and thickness[2], are more adapted to undergo axial loads, such as compression loads (Image 02). The short bones[3], as well as the long ones, too. This occurs because the distribution of the load imposed on the tissue takes place over a larger surface, thus avoiding an accumulation of energy in an exclusive region of the tissue (Silva et al., 2020; Dangelo & Fattine, 2007).

Image 02: Long bones of the lower limb. The first bone (at the far left) is the femur. Note that between the fibula (right end) is the tibia, a typical long bone that frequently receives compression loads because it supports a large amount of body weight. (Source: personal archive of Prof. Doc. Victor Fernandes)

[2]Femur, humerus, tibia, radius, ulna and fibula are examples of long bones.
[3]Carpal bones are examples of short bones.

However, flat[4], pneumatic, sensamoid and irregular bones support compressive loads, each to its own capacity. For example, if you observe a vertebral column, you will verify that the irregular bones that constitute it, the vertebrae, support a great load of body weight being imposed on them during most of the day. But, if you look carefully, you will see that as the vertebral column moves caudally, the body of the vertebrae gains more and more volume, area and perimeter, a fact that allows the vertebrae of the lumbar and sacral regions, for example, to , support the body weight of the trunk, upper limbs, head and neck (Image 03) (Silva et al., 2020; Dangelo & Fattine, 2007).

Imagem 03: Lumbar, sacral and coccygeal region of the spine, pelvic girdle being evidenced by the relationship of the (fused) sacral vertebrae to the hip bones (ilium, ischium and pubis). Note that the vertebral body is progressively larger as we view the vertebrae caudally. This is to help support the compressive load exerted by the body. (Source: archive of personal images of Prof. Doc. Victor Fernandes).

The patella, a typical sesamoid bone, has a low capacity to withstand compressive loads, but its ability to handle tensile loads is exemplary. It is, therefore, an axis for leveraging the extension of the lower limb, a fact that the quadriceps uses its passage anteriorly to the patella, going to fix itself on the tibial tuberosity, to promote a moment of very efficient driving force in

[4]Scapula and ilium (hip bone), for example.

the traction of the individual's leg (Image 04) (Silva et al., 2020; Dangelo & Fattine, 2007).

Image 04: Patella located between the femoral condyles, precisely on the patellar surface. Note that the patella acts as the pivot on the lever that is needed to move the tibia and fibula (leg). (Source: personal files of Prof. Doc. Victor Fernandes).

Shear load (also called sliding or tangential) is one of the load examples that are most associated with fractures and serious injuries during sports movements or in daily activities. This occurs because, typically, this load is accompanied by opposing vector forces, that is, the force of a blow contrary to the movement you want to perform. Furthermore, these forces are of the same magnitude, as the third Newtonian law explains (Fernandes et al., 2020; Dangelo & Fattine, 2007).

In combat sports, such as Muay Thai, for example, the presence of this type of load on bone structures present in the region of the lower limbs is commonplace. A very illustrative example is the injury that the professional athlete Anderson Silva suffered in his tibia, due to a great shear load that was imposed on him (Cunha et al., 2021; Dangelo & Fattine, 2007).

Usually an injury is accompanied by symptoms that indicate the presence of tissue abnormalities at the site. Of these symptoms, the most common are local pain, limitation of movement at this location, the area has a high temperature and is red, in addition to accumulation of fluid (blood and lymphatic) in the subcutaneous tissue, characterizing edema (Gonçalves et al., 2021).

These symptoms, in addition to being associated with discomfort in the practitioner of physical exercises, are also the cardinal points or main characteristics of local tissue

inflammation. It is worth mentioning that an inflammatory process can be initiated by several causative agents, such as the presence of foreign microorganisms and cellular disruption with extravasation of cellular material, the latter being one of the most common in resistance training environments (Gonçalves et al., 2021; Mendonaça et al., 2021; Silva et al., 2020).

During the movement performed in conditions against resistance, whether a typical bodybuilding exercise or Olympic weight lifting, even Yoga and Pilates exercises in which resistance is usually a body region, there is the possibility of observing the movement in three different conditions , concentric, eccentric and isometric movement. Concentric movement is characterized by the shortening of skeletal muscle fibers so that the angle of the joint at which that muscle is in action is decreased, reducing the distance between the bones that attach the muscle. If you take the biceps brachii and the brachialis muscle as an example, both have their distal attachments[5] on the tuberosity radius and ulna, respectively. Its origins are in the superior margin of the glenoid cavity of the scapula and in the coracoid process and in the medial region of the anterior face of the humerus, also respectively. Note that during the elbow flexion movement, the bones in question come together, together with the shortening of these muscles,

thus characterizing a concentric movement (Image 06). (GONÇALVES, et al. 2021).

Image 06: Note that the sequence of images shows a progressive change in the angle (in yellow) of the elbow joint, during the execution of the movement. The amplitude is reduced and this evidences the concentric movement. Amplitude increases and exposes eccentric movement. (Source: personal files of Prof. Doc. Victor Fernandes and Prof. Ney Lucio).

The eccentric movement, in turn, is an increase in the angle of the joint, distancing one bone from the other, which can be, within its pedagogical limitations, compared to the opposite movement of the concentric. However, eccentric movement is not basically about allowing the

[5]Distal attachments may also be called insertions.

limb to return to its original state after a concentric movement. But rather resisting the return, given that, as studies have already indicated, the eccentric movement is capable of promoting microfiber breakage, which in a tissue recovery process encourages muscle hypertrophy (Fernandes et al., 2021; Fernandes et al.; 2020; Silva et al., 2020).

The isometric movement, however, is characterized as a contraction of the myofibrils, without, however, there is a movement of decrease or increase in the angle of the joint of the muscle involved. In this sense, if a simplified analogy of the isometric movement were made, we would understand that this consists of a movement in which there is muscle contraction, without the movement of the limb. This might sound a little strange to the first-time reader, but try the following experiment. Finish off your body and position yourself to do a push-up. After that, start the movement by descending your torso and flexing your elbow, if you are trained, sustain your torso in the lowest position for a while, without touching the ground. At this precise moment, your pectoralis major and anterior portion of the deltoids, in addition to your triceps brachii and serratus anterior will be in isometric movement, sometimes with greater activation of a certain muscle, sometimes with less of another (Hall, 2012).

This relationship between types of movements and sports injuries has aroused great interest in the scientific and professional community for years. It is already known that the eccentric movement produces greater cellular damage to the muscle fibers, since the rupture of the crossed bridges during the return of the movement, even more increased with high loads, makes the overload principle effective, thus stimulating the muscular hypertrophy. But recent studies have also identified that eccentric training is associated with morphological improvement in muscle tissue, such as increased cross-sectional area, fiber type, improved fibrillar contraction (per unit) and pennation angle. However, it was observed in these studies that eccentric exercise modifies motor neuron activity in a positive way, facilitating its stimulation and direction, since during this phase of the exercise, Rewshal cells would receive stimuli more slowly. Furthermore, eccentric training also promotes greater brain activation, influencing the corticospinal pathway, allowing motor neuron stimulation, as previously mentioned, more adequate (Gonçalves et al., 2021).

Another important aspect in the theme of injuries and sports training are the joint structures and the components responsible for maintaining joint stabilization. A joint, as mentioned earlier in this content, can be classified, from anatomical perspectives, as fibrous,

cartilaginous or synovial. This last type of joint has great mobility when compared to other joints in the human body. Your joint structures are properly developed so that the support and movement of these joints is efficient and lasting. (Mendonça et al., 2021).

One of the components of a synovial joint is the articular cartilage present at the ends of the bones that make up the joint. This cartilage is made up of hyaline connective tissue capable of absorbing impacts and adapting the load homogeneously throughout the surface on which it is located. In addition, the articular cartilage is formed by chondrocytes, cells specialized in the production of collagen and cartilaginous tissue (Dangelo & Fattine, 2007; Fernandes et al., 2018).

Injuries to the hyaline cartilage are among the most common in elderly individuals. Such conditions are installed due to microlesions that, coincidentally, are added to larger lesions in this region, until the development of diseases, such as arthrosis, becomes propitious (Riesberg et al., 2016). Associated with this advance, there is the fact that the articular cartilage does not have the ability to regenerate in the elderly population. This occurs due to a decrease in cellular mitotic activity, in addition to the low vascularization of this bone tissue site (Gonçalves et al., 2021).

Another structure that forms part of a synovial joint and is of great importance in maintaining joint stability is the joint capsule. Consisting of two membranes, one fibrous (external) and the other serous (internal), the joint capsule has the function of acting as a cuff containing the structures of the synovial joint. In addition, due to its formation in two distinct membranes, it assumes varied functions that also influence joint dynamism. The outer or fibrous membrane of the joint capsule is made up of connective tissue with greater capacity to withstand traction, given that many tendons and ligaments are inserted in this area. The inner membrane of the joint capsule, in turn, is made up of cells called chondroblasts and chondrocytes, which synthesize the synovial fluid that serves as an important agent for distributing the loads that act on the joint, in addition to lubricating and nourishing all the structures present. in the synovial joints (Dangelo & Fattine, 2007).

The connective tissue that connects the bones that make up the synovial joints, are also characterized as important elements in this context. Tendons and ligaments are, in themselves, structures with important differences that are frequently cited and mistakenly observed. Tendons belong to muscle tissue despite being part of the connective tissue of a synovial joint as it connects a muscle to the bone it attaches to. A ligament, however, is a structure also made up of connective tissue, but it connects two bones and not a muscle and a bone, as the tendon does

(Dangelo & Fattine, 2007; Silva et al., 2020).

Synovial articulations also have menisci or discs that give them many mechanical benefits. The menisci are crescent-shaped structures that are located between two pieces of bone and have the function of more adequately distributing the loads that one piece of bone offers the other, better adaptation of the surface and fitting. The disks have similar functions, what differs between them is their shape, the latter being mentioned in an ellipse format (Dangelo & Fattine, 2007).

Ligamentous and musculotendinous injuries: A constant in the field of training

The connection between bones takes place through ligaments specialized in limiting the displacement between these connecting parts. One can easily observe injuries in which the limit of the ligament is exceeded, causing it to tear. In addition, there are ligaments that are located intracapsularly and others that are extracapsular, that is, the first are inside the joint capsule of the synovial joint, while the second are located outside, often attached to the fibrous membrane of the capsule (Dangelo & Fattine, 2007, Fernandes et al., 2021).

The tissue that makes up ligaments is called fibrous connective tissue. Its constitution is rich in typical cells of this type of tissue, the fibroblasts, with great synthesis of collagen and elastin. Its elasticity is reduced, with no possibility of contraction of this type of tissue (Dangelo & Fattine, 2007).

Since the elasticity of the fibrous connective tissue that make up ligaments in general is already physiologically reduced, excess overloads in their constitution easily result in ruptures and injuries (Dangelo & Fattine, 2007; Silva et al., 2020; Gonçalves et al., 2021).

Some exercises can lead to this damage suddenly or gradually. For example, the bench press is a typical movement performed by strength training practitioners. The amplitude of the eccentric phase of the exercise may influence the health of some shoulder ligaments, even more so under the conditions of overload that this exercise provides (Image 07). The shoulder is made up of muscles that form the cuff and extrinsic muscles related to movement of the humerus. The rotator cuff is made up of the supraspinatus, infraspinatus, subscapularis, and teres minor muscles. The tendons that make up the aforementioned muscles are similar in material and morphology to ligaments (Image 08). During an excessive eccentric phase of the bench press, the humerus ends up exceeding the limit of its joint axis, invading the space of the supraspinatus

muscle, which is consequently pushed against the scapular accident called acromion. The long-term result will be progressive tearing of the supraspinatus muscle tendon (Dangelo & Fattine, 2007; Silva et al., 2020; Fernandes et al., 2021; Mendonça et al., 2021).

Image 07: Analysis of the eccentric movement of the pectoralis major muscle during the execution of the bench press exercise. (Source: personal files of Prof. Doc. Victor Fernandes).

However, sudden injuries can also affect tendons and ligaments. Imagine the following situation: a soccer player dominates the ball close to the center of the lawn. Your first decision is to move to a colleague on the same team, making the game more dynamic. However, he sees that everyone on his team is being well marked and, in order not to lose the ball in the position he is in, he decides to carry it with his feet forward. At that moment, an opponent observes the athlete's decision making and makes a stealthy attempt to recover the ball. Due to a slight delay on his body, he ends up missing the ball and hitting the athlete's ankle, who is immediately thrown to the ground in severe pain (Dangelo & Fattine, 2007; Fernandes et al., 2021; Mendonça et al., 2021).

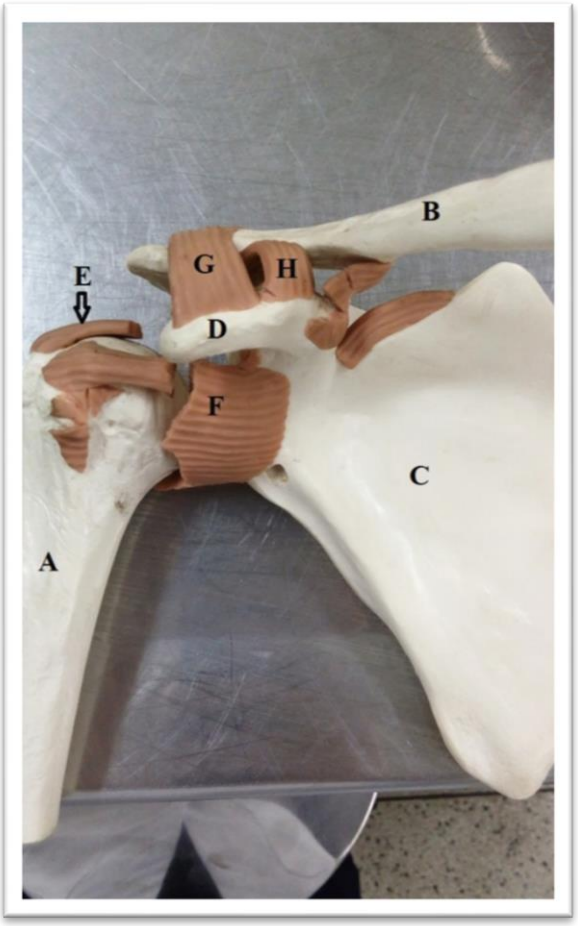

Image 08: Region of the rotator cuff, showing the scapula (anterior view), clavicle and humerus. The letter A indicates the humerus bone (intertubercular groove). The letter B indicates the clavicle. The letter C shows the subscapula fossa of the scapula (place of origin of the subscapularis muscle). The letter D indicates the coracoid process of the scapula. The letter E, being indicated by the arrow, presents the tendon of the supraspinatus muscle. The letter F stands for the subscapularis muscle. The letter G and H indicate the coracoclavicular ligament (trapezoid ligament H, conoid ligament G). (Source: personal archive of Prof. Doc. Victor Fernandes).

In addition to the fact that the tissue that makes up the ligaments is of low extensibility, other aspects also contribute to musculotendinous and ligament injuries, among them the characteristics of the joint. If you look closely at two synovial joints, you will see that both have their bones with articular cartilage surrounding the region that is internalized in the joint capsule, you will also see that this capsule has its membranes (both fibrous and serous) well organized and

with its functions, which have already been presented in this text, well defined. However, some joints have higher injury rates than others. If you haven't noticed yet, search your memory for the number of students or clients they have who complain of shoulder pain. Now compare with the number of customers complaining of hip pain. Substantially lower the number of hip pains, isn't it? Well, of course, this may not be an absolute truth, given that the number of injuries to the lower limbs has been growing, mainly due to overweight (Dangelo & Fattine, 2007; Silva et al., 2020; Fernandes et al., 2021; Mendonça et al., 2021).

Shoulder: A synovial joint that must be remembered. In view of the importance that this diarthrosic joint assumes in the practice of physical exercises, mainly in the context of this material, resisted. It will be discussed and extensively studied in the following pages. It is recommended that you always make use of an anatomy atlas to accompany your reading, since you will be able to verify the structures mentioned in loco, even if some images have been developed for this purpose.

The shoulder joint is of great importance in sports and sports movements, since through it the connection between the axial and appendicular skeleton takes place. The shoulder is a constitution of structures of the upper limb, precisely the arm, and the scapular girdle. In this way, the bone relationships of the shoulder must be understood, so that the progression to the other structures can be made (Image 08).

The bones that make up the shoulder girdle are two, the clavicle and the scapula. The first of these connects to the sternum, at the level of the manubrium, precisely at the clavicular notch, thus establishing proximal-medial contact with the axial skeleton and distal-lateral contact with the scapula. Morphologically, these bones can be classified as laminar, for the scapula, and long, for the clavicle. This classification is due to the geometric aspects that these bones have, in addition to large faces for muscle attachment, in the case of the scapula (Dangelo & Fattine, 2007; Mendonça et al., 2021).

The topographic anatomy of the clavicle shows us a proximal region, which maintains contact with the steno bone, called the sternal end, and diametrically opposite to this, the acromial end can be seen (Dangelo & Fattine, 2007). The superior and inferior surfaces of the clavicle can be seen, both of which allow the fixation of important muscles, namely:

- ✓ Superior face (anterior region of the bone): deltoid muscle (near the acromial extremity); pectoralis major muscle (clavicular head of this muscle, close to the sternal end); sternocleidomastoid muscle (also close to the sternal end, just above the attachment of origin of the pectoralis major muscle);
- ✓ Upper face (posterior region): trapezius muscle (distal attachment or insertion);
- ✓ Lower face (anterior region): the continuity of the origin of the deltoid muscle is verified, as mentioned in the upper face, anterior region and the pectoralis major muscle. Pay attention to the fact that both muscles cover almost the entire perimeter of the upper and lower faces of the clavicle, in its anterior region, each close to its aforementioned extremity;
- ✓ Inferior face (posterior region): trapezoid and conoid ligament, at the acromial end. These ligaments form the coracoclavicular ligament, which is of great importance in stabilizing the clavicle in this area. In association with this, at the sternal extremity, there is the costoclavicular ligament (also on the inferior face and in the posterior region of the latter) (which connects the clavicle to the first rib).

The scapula, in turn, has more accidents and anatomical characteristics that will be mentioned below. The following regions of the scapula can be distinguished: superior margin, inferior angle, medial margin and lateral margin. Furthermore, two faces can be seen on the scapula, the anterior and posterior (Dangelo & Fattine, 2007; Silva et al., 2020).

On the superior border of the scapula, in a frontal view, that is, on the anterior surface. Two very important bone accidents can be seen, the scapular notch and the coracoid process. The scapular notch is connected to the coracoid process by the superior transverse ligament of the scapula, stabilizing this area in relation to the movement that the scapular girdle promotes. In a transitional area between the upper border and the notch of the scapula is the site of origin of the omohyoid muscle. This muscle originates on the scapula and inserts on the hyoid bone, located anteriorly in the neck (Dangelo & Fattine, 2007; Silva et al., 2020; Fernandes et al., 2021; Mendonça et al., 2021).

In the coracoid process of the scapula, the origin of the muscles coracobrachialis and the short head of the biceps brachii, both flexors of the elbow and located in the anterior compartment of the arm, is verified. Also located in the coracoid process is the insertion of the

pectoralis minor muscle, which is very important in attaching the scapula to the thoracic cage (Fernandes et al., 2021; Mendonça et al., 2021).

Most of the anterior surface of the scapula is made up of the subscapular fossa, the site of origin of the subscapularis muscle (which forms part of the rotator cuff). In addition, the serratus anterior muscle fills the entire medial margin of the scapula, an important muscle involved in maintaining posture and adjusting the scapulae during many movements. The lateral border of the scapula has the glenoid cavity, the site of relationship with the humerus (arm bone) and very frequently injured in shoulder exercises. Also, on the lateral margin (anterior view), is the origin of the triceps brachii muscle (its long head) (Dangelo & Fattine, 2007).

In posterior view, the scapula shows some other formations and accidents. Passing obliquely in a superolateral direction, one can see the spine of the scapula, a site of important anatomical demarcation and attachment of muscles such as the trapezius and deltoid. At the end of the spine of the scapula is the acromion. This important reference point used in anthropometric assessments connects through the acroclavicular ligament with the clavicle and, through the coracoacromial ligament, with the coracoid process of the scapula itself (Dangelo & Fattine, 2007).

The region below the spine of the scapula is the site of origin for the infraspinatus muscle. In the region superior to this accident, the supraspinatus muscle originates in the supraspinatus fossa. Close to the inferior angle of the scapula, the teres major and latissimus dorsi muscles originate, while at the medial and lateral margins, the rhomboid minor, levator scapulae, rhomboid major, and triceps brachii (long head) muscles, respectively (Dangelo & Fattine, 2007).

The connection with the humerus, arm bone, is through the glenoid cavity of the scapula, which is located on the lateral margin of the laminar bone. This cavity has some structures of its own, which must be well understood.

Located in the center of the glenoid cavity is the articular cartilage of the scapula for constituting the synovial joint in conjunction with the humerus. Around this cartilage is the glenoid labrum, which in living beings is covered by the synovial membrane, the serous portion of the joint capsule. The function of the glenoid labrum, in a sense, is to contain movement of the humeral head within the glenoid cavity. However, injuries affect this structure (glenoid labrum) with great frequency. One of the most common injuries is tearing of the glenoid labrum, which derives from excessive local loads or repetitive movements, such as swimming, tennis or sports

that involve a lot of shoulder movement. This injury can progress to local osteoarthritis, with greater damage to adjacent structures, such as the articular cartilage of the bones that make up this joint.

In an anterior view, still in the glenoid cavity, the subscapular bursa can be seen, located inferiorly to the apex of the coracoid process, in an area of transition between the glenoid cavity and the humerus. This structure, the subscapular bursa, assists in the mechanics of the shoulder, facilitating the fitting and movement of this joint. It is worth noting that it is still in front of the capsular ligaments.

As for the musculature present in the shoulder, the muscles with abduction and flexion functions stand out, with the deltoid active in both conditions, supraspinatus in abduction (mainly in the initial 15º of the movement) and the pectoralis major assisting in flexion. The deltoid and pectoralis major muscles are more superficial, while the supraspinatus is part of the muscle group that makes up the rotator cuff (Dangelo & Fattine, 2007).

The rotator cuff is characterized by the function of fixing the humeral head in the glenoid cavity, maintaining the integrity of the shoulder girdle. This structure includes the infraspinatus muscles (located in the infraspinatus fossa, inferior to the spine of the scapula), the subscapularis, located in the subscapular fossa, on the anterior face of the scapula, the teres minor muscle, which originates on the lateral margin of the scapula and it inserts below the greater tubercle of the humerus, and the supraspinatus, already mentioned above (Mendonça et al., 2021).

Rotator cuff injuries are very common in resistance training environments, this is due to the overload imposed on them, as well as the lack of prescribed exercises directed to this set of muscles. One of the most common is the tendonitis of the supra-spinal muscle. As image 09 can be seen that the supra-speech muscle has its origin in the supraspinal fossa in the portion above the spine of the scapula. Its insertion, however, occurs in the upper area of the larger tuber of the humerus. The supra-spinal is found under the acroMio, a process that clides the scapula's spine and maintains contact with the clavicle. In exercises such as the lateral elevation above the shoulder line, or bench press with exarcebated eccentric phase seeking to touch the bar in the sternum, in addition to the typical posterior handle, the supraspinal ends up scraping the acromion, precisely its tendon. Therefore, due to the friction caused by the bone in the fibrous connective tissue that inserts the muscle to the humerus, a tendonitis that can be classified at different stress levels develops. Level one The student has pain in the area, as well as annoying

for abduction movements. Level two is already breaking some fibrous fiber fibers of the tendon and severe mobility lose. Level three, the most severe, the student lacks medical and possibly surgical intervention (Mendonça et al., 2021; Gonçalves et al., 2021).

Image 09: Side view of the left arm. Note that the letter A stands for the supraspinatus muscle. The origin of this muscle is in the supraspinatus fossa of the scapula. Its insertion, not seen in this image, occurs on the greater tubercle of the humerus. The letter B stands for the deltoid muscle. The letter C is the infraspinatus muscle. The letter D indicates the triceps brachii (lateral head), the letter E indicates the brachialis muscle (powerful elbow flexor). The letter F indicates the biceps brachii and the letters G and H indicate the brachioradialis and extensor carpi longus muscles. Source: personal files of Prof. Doc. Victor Fernandes.

Some exercises, as mentioned above, can induce this condition. Particular emphasis is placed on the posterior puller, which is often prescribed in gyms and sports centers and can potentiate the musculotendinous injury that affects the supraspinatus muscle (Fernandes et al., 2021).

Other muscles help move the shoulder. These muscles are classified as

thoracoappendicular, given that they allow movement of the limbs so that they originate in the axial region, mainly in the thoracic area. In this way, the anterior thoracoappendicular muscles (image 10) and posterior are observed, the former being found in frontal view, while the latter in dorsal view (Dangelo & Fattine, 2007).

The anterior thoracoappendicular muscles are the pectoralis major, pectoralis minor, serratus anterior, and subclavius. It is noteworthy that the pectoralis major has double innervation, with the lateral and middle pectoral nerves being innervated. This condition characterizes a differentiated muscle activity to the pectoralis major depending on the angle at which the shoulder is. Therefore, in conditions where the shoulder is positioned at 90º, as in the image exercise, the most active region of the pectoralis major will be the sternocostal region. However, when the shoulder is at 60º, the clavicular area of the pectoralis major will be recruited more (Dangelo & Fattine, 2007).

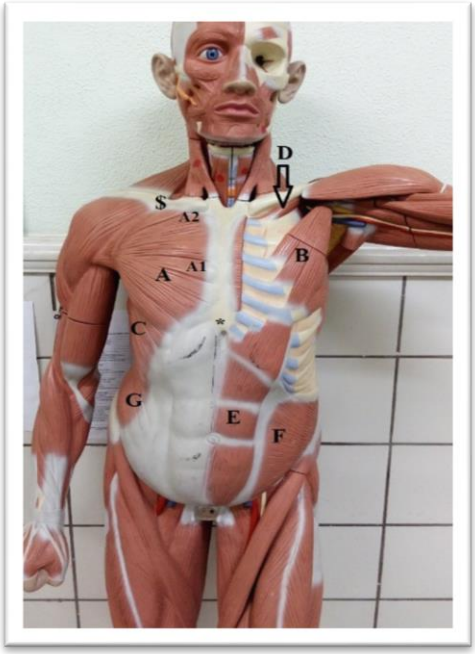

Image 10: Anterior view of the axial region showing the most prominent muscles and bone regions. The letter A indicates the muscle belly of the pectoralis major, while A1 indicates the sternocostal area and A2 the clavicular area. B indicates the pectoralis minor muscle and C, serratus anterior. The letter D is being pointed towards the subclavius muscle. The specimen was used to identify the rectus abdominis (E), internal oblique (F) and external (G) muscles. The * sign shows the xiphoid process of the sternum. The $ symbol shows the clavicle. Source: personal archives of Prof. Doc. Victor Fernandes.

Often in sports training environments, these variations are unconscious to the beginner practitioner or to the inexperienced professional without extensive knowledge of anatomy. However, attention to the movement must be well applied, considering that the movement with shoulders at 90º can cause muscle discomfort in the anterior region of the shoulder, due to overload of the muscles of the rotator cuff, precisely supraspinatus (Dangelo & Fattine, 2007).

Final considerations

Based on the analyzes and reflections carried out regarding the topic addressed, it is identified that the Physical Education professional lacks solid knowledge in the biological bases for an adequate prescription of training. However, the highest rate of injuries in the glenohumeral joint derives a lot from the wrong periodization of training, which advocates consecutive days that stimulate this body region. Injuries have a progressive association with microtraumas that can cause events of great proportions that must be taken into account, since they keep athletes and physical activity practitioners away for long periods.

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Consolidation of lateral Danilova in female artistic gymnastic

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Abstract

Introduction. Artistic gymnastics is one of the most beautiful sports disciplines, offering a show of great virtuosity, mastery and art. She helped to get to know our country, taking the fame of this discipline to the farthest corners of the world, raising Romanian sport to the highest heights of glory.

The goal. The purpose of the paper is to promote the application of the algorithmic program, which I have created, in order to learn and perfect the acrobatic element of the lateral jump, lateral Danilova in female artistic gymnastics.

The hypothesis. Using the methods and means proposed by me in this work, I believe that this can lead to a faster, correct and effective acquisition of the lateral jump, lateral Danilova.

Work methodology. The study was carried out during the 2022-2023 school year, between September and February, including female athletes who practice artistic gymnastics from the 3rd grade. We applied the experiment on the group of children who participated in artistic gymnastics training nine times a week.

Results. From the analysis indicators statistically looking performances experimental when **scoring the technical execution of the technical element - lateral Danilova, lateral jump** (with marks from 1-10)**,** the conclusion can be formulated that been stabilized arithmetic mean, for TEST initially it was 3.71**,** and for the final test of **6.21**. When scoring the technical execution **-** Danilova lateral, lateral jump from the point of view of the **amplitude (height) of the jump** (with marks from 1-10) **,** the conclusion can be formulated that been stabilized **arithmetic mean**,

for test initially it was 2.71**,** and for the final test of **6**. From the analysis indicators statistically looking PERFORMANCE experimental when **scoring the technical execution**-lateral Danilova, lateral jump from an artistic point of view **(with marks from 1-10),** it is possible form the conclusion that been stabilized **arithmetic mean**, for test initially it was 2.92**,** and for the final test of **5.71**.

Conclusions. The work approached can be considered up-to-date due to the methodical line approached, which capitalizes on the experience of the gymnasts who are part of the Olympic team.

Keywords: consolidation , elements technical , training , preparation physics , program.

Introduction.

Currently, performance gymnastics has a special dynamic that offers the audience spectacularity and elegance, developing both in the degree of difficulty of the elements that hold the audience in their hearts, but also in the complexity of the movements and the composition of the exercises, registering a remarkable progress over time (Grigore V., 1998).

In artistic gymnastics, a diversification of the training of gymnasts is required, due to the fact that the tests require an alternation of efforts and the execution of certain movements specific to the apparatus, so that the jumps, the beam and the floor engage in effort the lower train, while the parallels more on the upper one (Grigore V., 2001).

A requirement of the current artistic gymnastics is the originality of the movements, elements, connections and composition within an exercise, the elegance and skill of the gymnast with which they highlight the superior qualitative presentation of the entire exercise, posture and expressiveness (Hahn,E., 1996).

The variety of the technical content of an exercise is also given by the scoring code, which changes from 4 to 4 years (even more often), the gymnast having to learn new elements, connections and constantly improve her technique from year to year.

Due to the development of the difficulty and complexity of the elements, it forces trainers to pay more attention to the creation of new, more original and more difficult elements, but also a good mastery of the correct techniques.

Coordinative abilities generically designate a complex of predominantly psychomotor qualities that assume the ability to quickly learn new movements, quick and efficient adaptation to varied conditions, specific to different types of activities, by restructuring the existing motor fund (A. Dragnea, A. Bota, 2006) .

According to (Manno R., 1996) the component elements of the coordinative capacity are:

• the ability to orient and coordinate movements, which also includes segmental coordination;

• the capacity for spatial-temporal orientation;

• kinesthetic differentiation capacity;

• balance capacity;

• motor reaction capacity;

• the ability to transform movement;

• sense of rhythm.

The coordination capacity depends on the genetic endowment of each individual athlete, it being an innate quality (Emilia Florina Grosu, 2009). This ability must be given special importance from the early period, because analyzing the gymnastics polyathlon for both girls and boys, it is requested in all competition apparatuses, gymnastics being a complex sport from all points of view (Mihai Epuran, 2002).

In artistic gymnastics, the psychomotricity components are (Horghidan V., 2000):

• body diagram;

• dynamic coordination;

• static coordination – balancing;

• perceptual-motor coordination;

• speed of movements;

• ideomotricity;

Articular mobility is a basic quality in the practice of artistic gymnastics, it represents the human ability to perform large-amplitude movements, by own forces or under the influence of external forces, (Weineck , J., 1992).

Some authors such as (Macovei , S., Vasile, L., 2009) prefer to use the term "flexibility" (musculo-ligamentary, neuro-muscular and joint flexibility) for this quality.

To determine the correct execution of the element lateral jump - lateral Danilova , it was decomposed into the following structures of moments, phases and positions (Vieru **N.,** 1997):

Initial position, which includes: the preparatory phase, the directing-loading phase, the detachment moment, lift-flight-rotation phase, the landing phase (Dina L., 2006).

The final position comprising: preparatory phase, directing-loading phase, detachment phase, flight-rotation phase, the landing phase (Dina L., Niculescu G., 1999).

The goal.

The purpose of the paper is to promote the application of the algorithmic program, which I have created, in order to learn and perfect the acrobatic element of the lateral jump, lateral Danilova in female artistic gymnastics.

The tasks of the work consist of:

• performing a synthesis of the data from the specialized literature regarding the topic addressed;

• establishing, according to the coordinates of the element, the muscle groups involved in the execution of the element;

• selection of the most effective means for the 3 series of exercises within the algorithmic program for learning the lateral jump, lateral Danilova;

• formulating conclusions and proposals.

The hypothesis.

Using the methods and means proposed by me in this work, I believe that this can lead to a faster, correct and effective acquisition of the lateral jump, lateral Danilova.

Work methodology.

I carried out the study and research for the preparation of the work at the "Cetate Deva" High School with a sports program, which has special conditions for artistic gymnastics activities, with two gymnasiums and several spaces intended for specific training for the four apparatuses from female artistic gymnastics, as well as for conducting choreography classes.

The study was carried out during the 2022-2023 school year, between September and February, including female athletes who practice artistic gymnastics from the 3rd grade. We applied the experiment on the group of children who participated in artistic gymnastics training nine times a week.

The subjects are between 9-10 years old. The initial measurements were carried out in September 2022, and the final tests took place in February 2023.

After carrying out the initinal testing, the athletes included in the research activity carried out a physical and technical training program in order to strengthen the technical element "Danilova laterala", lateral jump, according to the exercises presented in tables no. 1 and 2.
This program was carried out weekly at six training sessions (of 9/week) from September 2022 to February 2023. I administered two tests, an initial test in September and a final test in February. In these tests we evaluated the following (giving marks from 1-10):

- technical execution - lateral Danilova, lateral jump;
- the amplitude (height) of the lateral Danilova jump, lateral jump;
- technical execution - lateral Danilova, lateral jump from an artistic point of view.

Research methods use in the development Job.

In the development the work I used next methods (Tudor V., 2000):

a) The study bibliographic;

b) Method experimental;

c) Method statistical - mathematical data processing (Stefan Tudos, 2000). Indicators which I used in the This one research are: arithmetic mean, amplitude, standard deviation, coefficient of variability (Epuran M., 2005);

d) Method graphics.

Results.

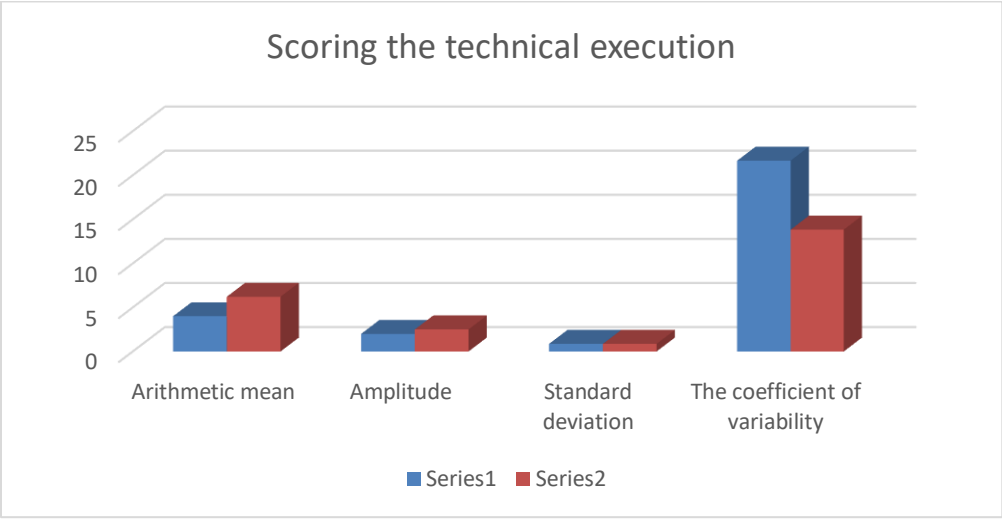
From the analysis indicators statistically looking performances experimental when **scoring the technical execution of the technical element-Danilova lateral,** (with marks from 1-10)**,** the following can be formulated conclusions:

- been stabilized arithmetic mean, for test initially it was 3.71**,** and for the final test of **6.21**;
- important extremely small variation amplitudes (2-2.5) reflect a field limited by data variation primary, what what the satisfy on full the condition of homogeneity;
- standard deviation of one variables random is a measure of dispersion important it's in the around one considered average, how much this one it is may small, that's all the degree of dispersion of the values feature studied it is may reduced (**0.86** - **0.85**);

- considered important obtained through prisma of the coefficient of variation is observed that all dates primary they come from the crowds homogeneous both for sample experimental How and for control sample results in the follow speed running being included in the interval: **21.65 - 13.82**;

Table no. 1 - Scoring the technical execution - **Danilova lateral**

Scoring the technical execution - Danilova lateral (with marks from 1-10)		
Subjects	Initial testing	Final testing
1	3	5
2	4.5	6.5
3	5	7.5
4	4	6
5	3.5	5.5
6	3	6
7	5	7
Arithmetic mean	3.71	6.21
Amplitude	2	2.5
Standard deviation	0.86	0.85
The coefficient of variability	21.65	13.82



Graph no. 1 - Evolution indicators statistics from the point of view of **technical execution - lateral Danilova**

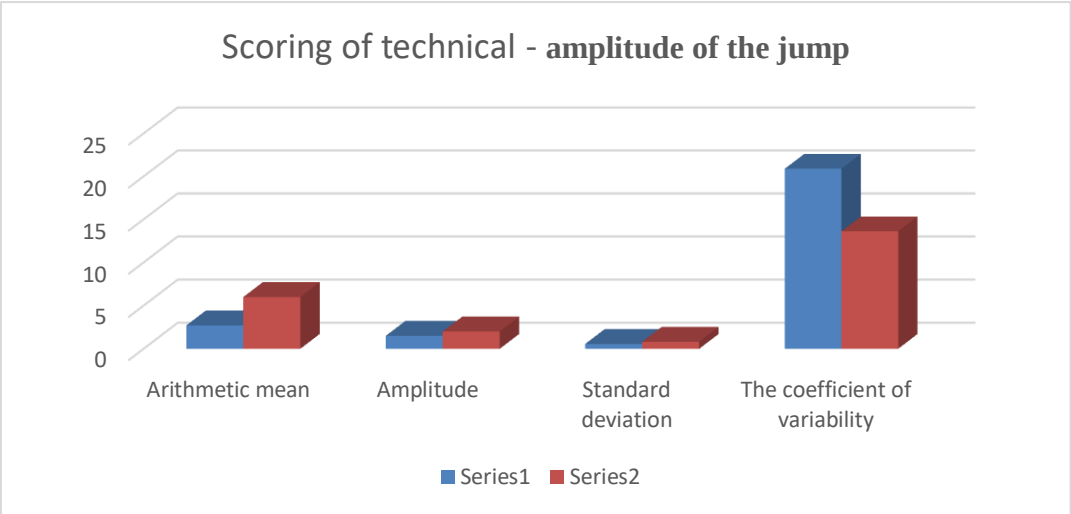
From the analysis indicators statistically looking performances experimental when scoring the technical execution - lateral Danilova, lateral jump from the point of view of the

amplitude (height) of the jump (with marks from 1-10) **,** the following can be formulated conclusions :

- been stabilized **arithmetic mean**, for test initially it was 2.71**,** and for the final test of **6**;
- important extremely small **variation** amplitudes (1.5-2) reflect a field limited by data variation primary, what what the satisfy on full the condition of homogeneity;
- **standard deviation** of one variables random is a measure of dispersion important it's in the around one considered average, how much This one it is may small, that's all the degree of dispersion of the values feature studied it is may reduced (**0.57** - **0.82**);
- considered important obtained through prisma **of the coefficient of variation** is observed that all dates primary they come from the crowds homogeneous both for sample experimental how and for control sample results in the follow speed running being included in the interval: **20.88** - **13.60**;

Table no. 2 - Marking of the technical execution - Danilova lateral, **amplitude of the jump**

Scoring of technical execution - lateral Danilova, AMPLITUDE of the jump (with marks from 1-10)		
Subjects	Initial testing	Final testing
1	2.5	5
2	3	6
3	3.5	7
4	2	6
5	3	5
6	2	6
7	3	7
Arithmetic mean	2.71	6
Amplitude	1.5	2
Standard deviation	0.57	0.82
The coefficient of variability	20.88	13.60



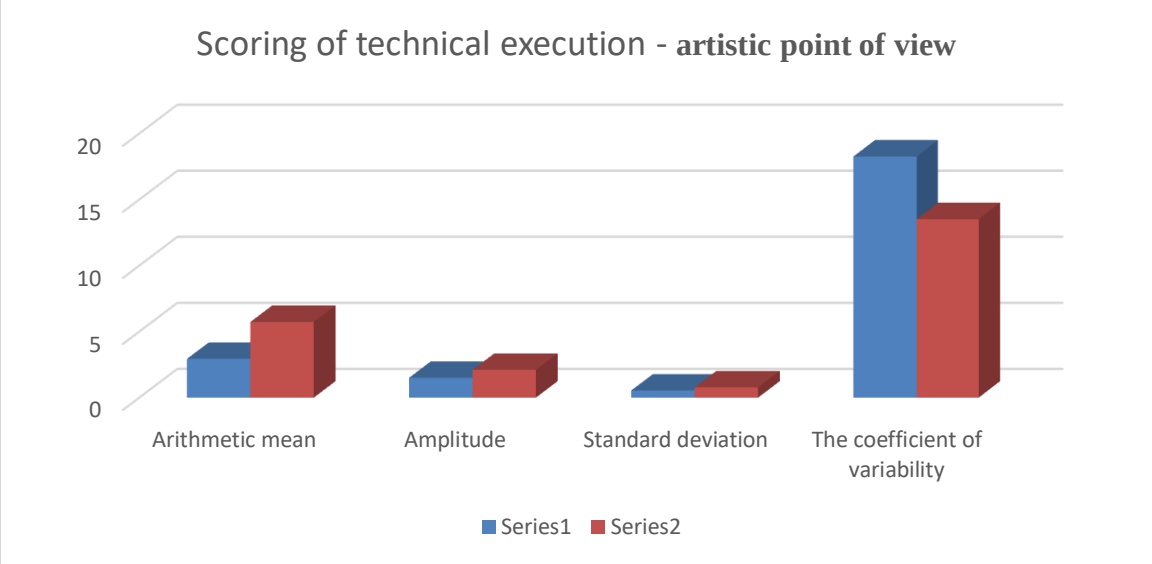
Ggraph no . 2 - Evolution indicators statistics from the point of view of technical execution - lateral Danilova - from the point of view of the **amplitude (height) of the jump**

From the analysis indicators statistically looking performance experimental when **scoring the technical execution** - lateral Danilova, lateral jump from an artistic point of view **(with marks from 1-10),** the following can be formulated conclusions :

- been stabilized **arithmetic mean**, for test initially it was 2.92**,** and for the final test of **5.71**;
- important extremely small variation **amplitudes** (1.5-2.1) reflect a domain limited by data variation primary, what what the satisfy on full the condition of homogeneity;
- **standard deviation** of one variables random is a measure of dispersion important its in the around one considered average, how much this one it is may small, that's all the degree of dispersion of the values feature studied It is May reduced (**0.53 - 0.77**);
- considered important obtained through prisma **of the coefficient of variation** is observed that all dates primary they come from the crowds homogeneous both for sample experimental how and for control sample results in the follow speed running being included in the interval: **18.25 - 13.51**;

Table no. 3 - Scoring the technical execution - Danilova lateral, from an **artistic point of view**

Scoring of technical execution - lateral Danilova ARTISTIC point of view (with marks from 1-10)		
Subjects	Initial testing	Final testing
1	3	4.5
2	2	5.5
3	3	6.5
4	3.5	6
5	3	5
6	3.5	6
7	2.5	6.5
Arithmetic mean	2.92	5.71
amplitude	1.5	2.1
Standard deviation	0.53	0.77
The coefficient of variability	18.25	13.51



Graph no. 3 - Evolution indicators statistics from the point of view of technical execution - lateral Danilova - from the **artistic point of view**

Conclusions.

According to the requirements of the FIG scoring code, the combination of the side jump (lateral danilova) with other elements offers the possibility of obtaining additional tenths in the final mark. The tools used were structured on three series of exercises, thus representing the methodical requirements of the algorithmic programming for learning the lateral jump (Danilova lateral). The tools used in the algorithmic program were verified and perfected during personal training at the level of the Olympic female artistic gymnastics team. The work approached can be considered up-to-date due to the methodical line approached, which capitalizes on the experience of the gymnasts who are part of the Olympic team. Considering the logical ordering of the means used in the training of gymnasts in accordance with the principles of learning, we propose:

- generalized application of algorithmic programs for learning technical elements, at all performance levels in female artistic gymnastics;
- using the work to constitute a methodical support in learning this element;
- the development of a methodical material for learning the lateral jump (Danilova lateral) , which can be used by coaches in the training of gymnasts.

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Likert scale as a tool to assess awareness in children

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Abstract

Introduction: In the sports field, the use of proprioceptive training is an effective method in optimizing athletes' performances. For this reason, we thought also to try this method also in the field of physical education, namely in the physical education lesson in a public school. Our intention was to organize an intervention through a physical exercise program that would stimulate the proprioceptors in order to improve the sensory-motor function of children. We wanted to observe and highlight whether students can express what they feel when they do exercise. Before starting to practice, the students were instructed by the physical education teacher to focus on the signals received from the external and internal environment of the body, e.g., proprioceptive, or tactile information in the absence of visual information. **Purpose:** The purpose of this study was to highlight the level of awareness in children during physical exercise in order to evaluate and compare it with other children. **Methods:** bibliographic study; observation method; the Likert scale tool; the method of comparing the results; data collection; graphing and data analysis and interpretation. **Results:** The subjects of this research were a total of 74 students, of which 48 children from the 4th grade and 26 children from the 7th grade, enrolled in a public school in Bucharest. We created a chart, which we have distributed to the students, and measured their level of awareness immediately after they finished their exercise. **Conclusions:** There are large differences between the 4th grade and the 7th grade students in terms of the results obtained. Thus, the 4th grade children aged 10 were much more aware of what they were feeling than the 7th grade children aged 13.

Keywords: awareness, children, Likert scale, *physical education*, *proprioceptors*,

Introduction

At the level of primary education, there is a school curriculum grouped by years of study from the preparatory grade, the 1st and the 2nd grades, respectively for the 3rd and 4th grades. But what is still not understood by children, their families, as well as colleagues who teach other subjects in school, is the fact that physical education subject is not sports subject at all. Although they may have the same meaning to all non-specialists, the terms physical education, sport and physical activity are not synonymous because they do not have the same purpose or objectives. This misunderstanding of the terms could mislead students about the content of our subject, as well as what it can do for them through the multitude of specific skills that children should achieve at the end of the academic school year.

The term kinesthesia is used, according to Konczak et al. (2009), to refer to 'the conscious perception of limb and body movement' (Konczak et al., 2009) and the term proprioception is used to refer to 'the unconscious processing of proprioceptive signals used for reflexive motor and postural control, while recognizing that proprioceptive information also forms the basis of kinesthesia' (Konczak et al., 2009). According to the same author, kinesthesia is commonly defined as the conscious awareness of body or limb position and movement in space. It relies on sensory information derived from receptors in muscles, tendons, and joint capsules. These receptors provide information about muscle length, contractile speed, muscle tension, and joint position, information that is also called proprioception or muscle sense. According to Goldscheider's (1898) classic definition cited by Konczak et al. (2009), the four properties of muscle sense are (a) sense of passive movement, (b) sense of active movement, (c) sense of limb position, and (d) sense of weight (Konczak et al., 2009). Also, for all these aspects to function in optimal parameters, health and well-being is very important in the commitment to achieve important objectives in physical education class (Ardelean et al. 2022). In other words, exploring children's cognitive ability, how much they like to learn, their ability to concentrate in school, and their school skills and performance are very important as well.

It is known that, according to Aman et al. (2015) citing Sherrington (1907)[6], 'the function of proprioception has an unconscious component where the information provided by the proprioceptors is used for reflexive control of muscle tone and posture control'. To make a distinction between conscious and unconscious processing of proprioceptive information, 'it has been suggested to refer to the sense of movement as the conscious perception of the position and movement of the limbs and body, and to reserve the term proprioception to refer to the unconscious processing of proprioceptive information' (Aman et al., 2015 citing Konczak et al., 2009).

Another point of view shows that the motor behavior it is controlled by perception, in the conditions where visual perception serves the behavior (Gibson, 2015, p.213). This confirms what Nadin (1986) stated in his study of perception that indeed perception or 'analysis of sensory data' (Nadin, 2003) involves global information, while emission, as an effect of information processing in the brain, is directed, structured, essential.

According to Epuran (2011, p.75), 'the multitude and variety of exteroceptive, proprioceptive and interoceptive information are analyzed, interpreted and organized in the cerebral cortex system [...] on the basis of which responses, both stereotypical, can be generated for ordinary situations, as well as unique, creative, for new situations'.

As Ifrim & Niculescu (1988, p.147) state, ‘the nervous system transforms stimuli from the environment into either defense or adaptation movements, depending on their nature and intensity, creating engrams[7], memorizing them, and learning and their education’.

Other authors state in their books that the child's physical development depends mainly on 'hereditary baggage and environmental conditions, especially economic and social' (Gurău, 1994, p.230), so physical exercise favors an average growth and a harmonious development that they practice accordingly. Natural factors such as air, sun, and water 'strengthen the organism and increase its power of adaptation to environmental conditions and resistance to their sudden changes' (Ionescu, 1994, p.52).

[6] In 1907, Sherrington stated that Lewandowski considered the cerebellum to be the central organ of muscle sense, as well as the assumption that this organ is the main coordinating center of the proprioceptor reflex system.
[7] neural imprints from the action of stimuli

According to Aagten-Murphy et al. (2019, p.8) and Davidenko & Hopalle & Bridgeman (2018), potential mechanisms of visual perception (Brenton & Müller, 2018) are generated by eye saccades during object pursuit. The authors state that 'the perceptual system will anticipate that the visual landmark would be after the correctly executed eye movement being used to calibrate the visual space and the auditory space in the eye movements'.

The main purpose of the elaborate processing and storage of information that takes place in the brain is to enable us to interact with our environment both internally and externally. This is important, because several authors (Wagman & Blau, 2020, p.140, Hutt & Redding, 2014; Evangelos et al., 2012; Kostopoulos et al., 2012; Raibert, 1977, p.761; Wolpert & Pearson & Ghez, 2013, p.743) argue that through stimulating the function of proprioception, new information about the sensations felt by the body is transmitted to the central nervous system.

According to Gagea (1994, p.357), muscle contraction changes the initial positions of body segments, moving according to all the classical rules of levers and according to the principles of conservation of momentum, power, and energy.

Children's choices about whether and how an object is accessible, as well as what kind of motor skills should be used, e.g., whether the object is grasped with one or two hands or with sports equipment, are 'sized according to the anthropometric properties of the person' (Wagman & Blau, 2020, p.140).

In physical education lessons with physical presence at school compared to video cameras permanently closed by students in the online teaching system, a real help in increasing attention and developing motor skills in children is also the tracking and correction of exercises demonstrated by physical education teachers. A new word has been invented, *'covibesity'* (Khan & Moverley, 2020), which requires rapid, efficient, and comprehensive management involving multiple stakeholders. This phenomenon refers to the rapid weight gain that occurred in some people during the SARS-CoV-2 pandemic (Camenidis & Băițel, 2021).

What is known from the practice of teaching in students' lessons is that the motor skills of children are similar, while the level of assimilation and the peaks reached in motor learning are different among children in the same class. Through the creativity of didactic strategies, the physical education teacher tries to take into account children's reaction to effort, their motivation

level, native or acquired family habits and attitudes, so that individual motor skills are improved during school lessons.

The use of movement games by children, both during and outside of school lessons, but also during school holidays, develops their capacity for effort. Children will improve their skills and motor skills during the game. Mentally, they will develop a robust, balanced, mobile nervous system, outstanding ability to focus attention and resistance to stress and mental fatigue, operative, concrete thinking, as well as good visual-motor coordination, speed, and efficiency in the analysis of unforeseen situations and in decision-making, anticipatory spirit (Camenidis et al., 2020). Also, all these factors of child development (physical, technical, tactical, theoretical) could also have an appreciable psychological load because any intervention on the motor skills development is aimed at the person and leads to its improvement.

Materials & Methods

The hypothesis of the research was the following: there are differences in kinesthesia between the ages of 10 and 13 when we apply a program to develop the sense of movement by stimulating proprioceptors.

The main research methods used were the following: bibliographic study; measurement on the Likert scale; the method of comparing the results; data collection; graphic representation; method of data analysis and interpretation.

A total of 74 subjects (N=74 students, 48 children from the 4^{th} grade and 26 children from the 7^{th} grade) were included in this study.

The children followed an exercise program with their eyes closed, and after completing it, the students opened their eyes, took one blank model each (fig.1.1) and colored one arc of a circle corresponding to the level of individual awareness of what they felt.

To measure the level of awareness, we applied an evaluation tool, namely the Likert scale[8] for validating the answers given by the children, as follows: 1 = not at all; 2 = little; 3 = moderate; 4 = a lot; 5 = very much (Vrasti, 2018, p.18).

We explained 8 exercises to the children, and where they did not understand what they had to do, we offered the following explanations:

- *Exercise no. 1*: Recognize and name what you feel. *For example:* You have done this exercise before with your eyes open. Do you recognize it now when you work with your eyes closed? Can you say what you feel now that you've practiced with your eyes closed?
- *Exercise no. 2:* How do you feel the effect of the exercise in your body. *For example:* when we are afraid that the other children around us will laugh at us or even at ourselves, we may not want to do the exercise anymore. Or we work without feeling like it/we don't pay attention/we don't hear what we need to practice. Or if we don't care what those around us say, then we may be impatient to practice/pay attention.
- *Exercise no. 3:* The influence of the effect on individual practice. *For example:* Do you feel more confident after completing the exercise than at the beginning? Notice how the effect of the exercise influences your motor behavior. How does your motor behavior affect your current state?
- *Exercise no. 4:* What do you think about when you practice. *For example:* Words or sentences (positive/negative) such as: I can't do that; I will never succeed; I'm not good; I'm weak or the opposite.
- *Exercise no. 5:* The cause of this state/sensation come from inside or outside of you or both. *For example:* Is a child laughing at you, telling you that you won't make it (external cause) or having an internal dialogue (talking to yourself – internal cause)? Or there's noise around you and you can't focus. Or it's quiet and you feel safe.
- *Exercise no. 6:* I accept what I feel when I practice. *For example:* Try to tell yourself what you feel even if the movement is not correct, without arguing/judging yourself or the other children around you.

[8] Rensis Likert created the method in 1932 as a personal contribution to his doctoral thesis to identify by scaling the extent of a person's attitudes and feelings towards international affairs. The Likert scale is used in surveying, with applications in business-related fields such as marketing or customer satisfaction, social sciences, and attitudinal research projects (https://en.wikipedia.org/wiki/Rensis_Likert)

➢ *Exercise no. 7:* Be present in your exercise. *For example:* I understand what I have to do, I learned how I feel, to say what I feel, what thoughts I have, I learned to identify the cause of my thoughts. What can you do next? Replace negative words with positive ones, both about yourself and others. Pay attention to your motor behavior when you practice.

➢ *Exercise no. 8:* Be active and aware of what you are doing. *For example:* You can also decide how to approach this physical exercise in a personal practice. Choose to participate in the lesson instead of staying away.

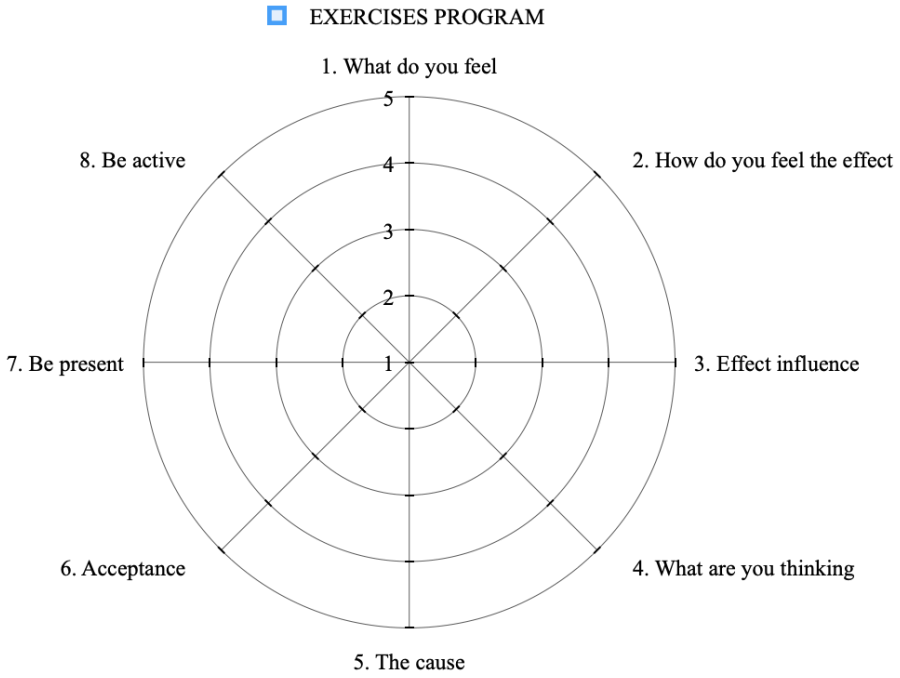

Fig. 1.1. Awareness assessment

(Source: figure arising from the original research activity)

Results

The obtained values are presented in the following tables:

Table 1.1. Awareness exercise program data from 4th grade

(Source: original data resulting from research activity*)*

No.	Item	Not at all	Little	Moderate	A lot	Very much	n	Mean	Standard deviation	C.V. %
1	What do you feel		5	7	15	21	48	12	7,39	61,61
2	How do you feel the effect	2	7	6	11	22	48	9,6	7,64	79,54
3	Effect influence	3	5	10	13	17	48	9,6	5,73	59,66
4	What are you thinking	3	6	6	14	19	48	9,6	6,66	69,33
5	The cause	2	8	5	10	23	48	9,6	8,08	84,18
6	Acceptance	1		3	13	31	48	12	13,71	114,26
7	Be present		1	2	12	33	48	12	14,85	123,79
8	Be active		2	8	16	22	48	12	8,79	73,28

Table 1.2. Awareness exercise program data from 7th grade

(Source: original data resulting from research activity*)*

No.	Item	Not at all	Little	Moderate	A lot	Very much	n	Mean	Standard deviation	C.V. %
1	What do you feel		5	14	5	2	26	6,5	5,20	79,94
2	How do you feel the effect		7	4	13	2	26	6,5	4,80	73,78
3	Effect influence		6	8	7	5	26	6,5	1,29	19,86
4	What are you thinking		8	5	7	6	26	6,5	1,29	19,86
5	The cause		5	10	7	4	26	6,5	2,65	40,70
6	Acceptance		3	8	5	10	26	6,5	3,11	47,83
7	Be present	1	1	6	9	9	26	5,2	4,02	77,40
8	Be active		2	7	9	8	26	6,5	3,11	47,83

Our intention in carrying out an exercise program was to organize an intervention aimed at stimulating proprioceptors. This intervention focused on using signals received from the external and internal environment, such as proprioceptive or tactile information in the absence of visual information to improve sensorimotor function in primary school children.

This led us to turn our attention, and scientifically discover, to what children feel when they exercise.

We wanted to analyze a comparison between the level of awareness of 4th grade vs. 7th grade children.

At the beginning, physical exercises were practiced with eyes open to familiarize with information from the external environment, e.g., demonstration of exercises by the teacher,

structure of sports materials, space-time dimensions, safety of space, distance between colleagues, then with eyes closed.

Discussions

The results obtained from the tests are presented in graphical form in Fig. 1.2. and Fig. 1.3.

Before completing the radar chart, all children completed the same exercise program. The results of the data processing that we obtained, we presented in the form of tables and statistical graphs with the aim of highlighting scientific differences between the variables of the children of the 4th grade and those of the 7th grade.

We have chosen to gather the data obtained as follows:

- in the first column, we have written the names of the 8 exercises (items).
- in the following 5 columns we have centralized the frequencies of the answers received from the children (Likert rating scale).
- in the last 3 columns we applied the statistical indicators from the Excel program 'SUM' (the sum of the data on each row), 'AVERAGE' (the arithmetic mean for each row), 'STDEV.S' (the standard deviation based on a sample) and the coefficient of variation (C.V.%) evaluation of the standard deviation in relation to the arithmetic mean, in order to observe if the groups are homogeneous or heterogeneous (CV < 10% = homogeneous population; 10% < CV < 20% = relatively homogeneous population; 20% < CV < 30% = relatively heterogeneous population; CV > 30% = heterogeneous population).

Analyzing the coefficient of variation (C.V.%) from the two tables, which we used to compare the degree of variation of different characteristics (not at all, little, moderate, much and very much), we can state that the percentage values for each exercise /item if they are closer to zero, the smaller the variation, this fact could mean that that category/population is more homogeneous (7th grade - 19.86%), and the average of 6.5 has a high grade of representativeness for the 7th grade.

In the case of the coefficient of variation with a value of over 30%, heterogeneous groups predominate in the 4th and 7th grades, and the average is considered to be no longer representative and, therefore, it is necessary to separate the data into groups according to by the variation of another grouping characteristic.

We created the frequency graph (fig.1.2) to observe the data distribution for each item and year of study.

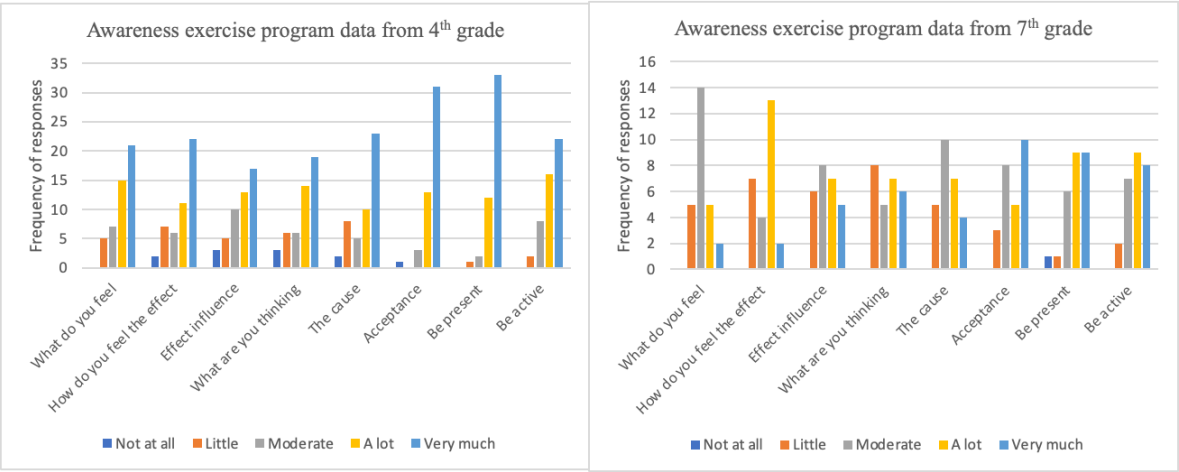

Fig. 1.2. Frequency responses graph

(Source: figure arising from the original research activity)

In the Excel program we selected the collected data and created the radar graph (fig.1.3) to observe if there are similarities or differences between the ages of the children from the 4th and 7th grade (10 years, respectively 13 years).

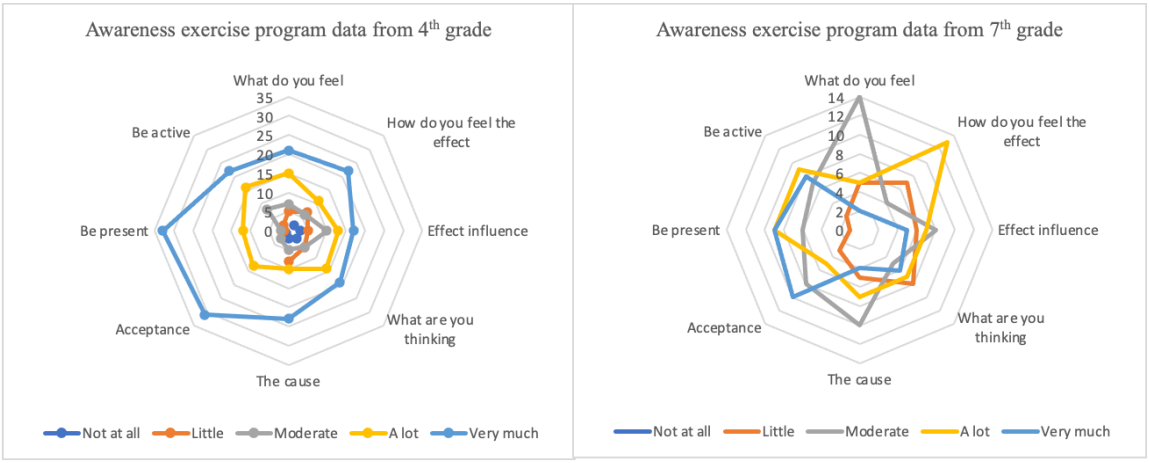

Fig. 1.3. Comparative radar chart

(Source: figure arising from the original research activity)

By means of the radar graph we were able to have a clear and comparative picture of the values of the 5 variables of the Likert scale associated with the 8 exercises, both for the 4th grade and the 7th grade.

At the *exercise no. 1*, saying what you feel, children from the 4th grade had high values *'very much'* (n=48, 12±7.39) for the level of awareness compared to *'moderate'* (n=26, 6.5±5.20) in the 7th grade.

At the exercise no. 2, how do you feel the effect, children from the 4th grade had high values *'very much'* (n=48, 9.6±7.64) for the level of awareness compared to *'a lot'* (n=26, 6.5 ±4.80) in the 7th grade.

At the *exercise no. 3*, the influence of the effect, children from the 4th grade had high values *'very much'* (n=48, 9.6±5.73) for the level of awareness compared to *'moderate'* (n=26, 6.5± 1.29) in the 7th grade.

At the *exercise no. 4*, what do you think, children from the 4th grade had high values *'very much'* (n=48, 9.6±6.66) for the level of awareness compared to *'a little'* (n=26, 6.5±1.29) in the 7th grade.

At the *exercise no. 5*, identification of the cause, children from the 4th grade had high values *'very much'* (n=48, 9.6±8.08) for the level of awareness compared to *'moderate'* (n=26, 6.5± 2.65) in the 7th grade.

At the *exercise no. 6*, accepting that you feel, children from the 4th grade had high values *'very much'* (n=48, 12±13.71) for the level of awareness compared to *'very much'* (n=26, 6.5±3.11) in the 7th grade.

At the *exercise no. 7*, paying attention to practice, children from the 4th grade had high values *'very much'* (n=48, 12±14.85) for the level of awareness compared to *'very much'* (n= 26, 5.2±4.02) in the 7th grade.

At the *exercise no. 8*, being aware of what you are doing, children from the 4th grade had high values *'very much'* (n=48, 12±8.79) for the level of awareness compared to *'moderate'* (n= 26, 6.5±3.11) in the 7th grade.

Conclusions

Even if in school the Physical Education subject is mandatory for all students, regardless of the level of motor skills and abilities, of the physical activities carried out in kindergarten or in their free time, or of their previous experiences in sports, students are different from the point of view of their psycho- neuro-motor, and the pace of motor learning may be different.

The coordination is an important component of voluntary movement because through specific exercises of certain postural muscles could provide the stable support needed for further actions.

But even so, from the age of 10 children can be aware, and even learn to become aware, of what they feel, how exercise affects the body, improving their proprioception function and the quality of motor control.

We believe that the constant and conscious practice of physical exercise is the main argument for improving and sustaining physical activity to maximize the beneficial effects on the human body.

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The Impact of Physical Exercise on Motor Education to Pupils

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Abstract

Introduction: Physical exercise, as an application of body exercises, is an adapted process, which during the application of movement activities causes changes in human abilities, from the initial ones to the desired ones. Physical exercise is an adapted, thought-out and organized process with the application of certain exercises and methods, which cause changes in the exerciser's physical condition. **The purpose of this paper** review is to analyze the literature and understand every movement or every physical activity that in a correct and harmonious manner with legalities, is carried out for the achievement of concrete actions of physical education. In fact, it has an important impact on physical exercise is: - creation of certain skills and habits; - development and improvement of movement and functional skills; - satisfaction of personality needs (creative, recreational and human needs, entertainment needs). **Methodology:** In order to fulfill this review are using methods of literature analysis, and is made combination and comparison of data from various works of authors varied. To successfully realize this review paper we studied and analyzed the contemporary scientific literature. The methods used are: literature analysis, physical activity and recommendations. **Recommendations:** In the literature used, one can clearly see the importance of understanding that, the higher quality level of pupil movement culture, the higher level of mastery of teaching tasks and the higher level of movement skills education.

Keywords: motor skills, movement, recreational needs, pupils, amplitude.

Introduction

CONCEPT ON PHYSICAL EXERCISE

There are many definitions that clarify the concept of physical exercise. In the following, we are presenting some of them, with the aim that pupils and teachers act in an operative manner. Physical exercise (physical exercise) is the thought and guided movement activity, with the aim of positive transformation of human abilities, from concrete ones to desired ones. Physical exercise is the basic tool and method of physical education of pupils, a special chosen movement activity, which is first of all is:

a- Optimum achievement of the level of motor skills (biological purpose);

b- Achieving motor training through the formation of the perfection of movement skills and habits (pedagogical goal) *(Adriana G et al., 2020).*

By physical exercise we mean any movement or any physical activity, which is performed correctly and in harmony with the laws, to achieve the concrete goals of physical education. Physical exercise is a motor form, movement and system of movements, with the application of which, at a given time, the process of physical exercise is formed. Physical exercise is an adapted process, which is achieved through systematic repetitions of exercises.

The basic purpose of physical exercise can be:

- Creation of certain skills and habits;
- Development and improvement of motor and functional skills;
- Satisfaction of personality needs (creative, recreational and human needs, entertainment needs) *(Arem H et al., 2015).*

Physical exercise as an application of body exercises, is an adapted process, with which during the application of movement activities (or through systematic ways of repetitions and physical exercises) cause changes in human abilities, from the initial ones to the desired ones. Physical training exercise is an adapted, thought-out and organized process with the application of certain exercises and methods, which cause changes from the current state to the desired one *(Hearing M et al., 2016).*

The process of physical exercise can be shown in this way:

So + V. D = S1 Where,

So-indicates the current state (growth, health, motor skills, exercise results, motivation, creative abilities, etc.);

V - indicates suitable operators and physical exercises;

D - indicates dosage (number of repetitions, intensity and duration);

S1-indicates the product of the exercises or the achievement of the specific goal *(Schuch B et al., 2016).*

Every movement activity is composed of certain number of movements, but not every movement is considered physical exercise. In physical education, in sports and recreation, by exercises we understand only the selected movements, with which consciousness is regulated.

The selected (desired) movements have the following characteristics:

- Appear as a result of knowledge;
- Continue as a result of the learning experience;
- Learning movements is a function of human desires *(Guthold R et al., 2019).*

The impact of physical exercises is intentional and never accidental, as happens in certain movement actions, where the impact of physical exercises is more or less pronounced. Thus, the force of cutting wood in the forest is a consequence of natural work, with which material existence is created. Some work activities can have a positive impact on the psycho-somatic status of the individual, but even that impact is slow. On the other hand, lifting weights in physical education is a chosen activity, with which it is desired to improve the strength of the muscles, to form their beautiful appearance, to achieve the desired results of the exercises, etc.

Physical exercise in physical education performs two basic tasks:

1- By repeating the exercises, to perfect or strengthen the movement technique (form of movement);

2- To have an impact on organs and functional systems of the organism, in order to obtain certain changes *(Wen X., 2015).*

Kinematic structure of physical exercises

Physical exercise has spatial, temporal and spatial-temporal characteristics. The spatial characteristics of the exercise include: - the position of the body of the exerciser and the amplitude of the movements (direction, shape and volume of the amplitude).

Body position - certain relations of the body and its parts with external objects. Before executing any exercise, where the body and its parts are transferred, it must be taken into

account beforehand that each movement begins and ends with apparent precision (initial and final position or stance).

The initial position or stance is important, because in most cases it plays a decisive role in the development and efficiency of the movement. The initial position or stance affects the direction, speed and force of the movement. The starting position or stance is an integral part of the movement technique (low start, rope pulling stance, etc.). The initial position or stance is not only seen as a form, but also as a special psychological activity of the person performing the movement. In it, first of all, concentration, attention and mobilization of skills are present, which are quite important for performing movements.

The positions of the exerciser are also very important in movement (cycling, skiing, swimming), where with their help, greater efficiency is possible, as a result of reducing the resistance of air, snow, water. In some sports (jumping, figure skating, dancing, rhythmic gymnastics), the starting position has its great role in the aesthetic side.

The final position or stance has a great role, because it gives us the information about what dimensions and parameters, with what measures the motor form and the tasks were carried out. Based on the final position, impressions can be created and new instructions can be given for the correct execution of movements in future exercises. In teaching physical education, it is important to ask the exerciser to emphasize the final position himself, as this directly and efficiently affects the learning of the movement *(Nizhnikovski T et al., 2013).*

The path of movement is characterized by direction, distance and shape.

Direction is the orientation of the movement (determination of movement) of the body or its parts in space. Executions of lifts and bends of the head are possible, if there is a transfer of momentum from the lower extremities of the body, before opening at a certain angle, in relation to the support. Throwing the sphere is efficient, if it is performed after a movement from a certain angle. At the start for swimming, the bending of the body and breaking away from the certain angle affect successful swimming and the feeling of the depth in the water and the start of swimming, etc.

Each movement, depending on the anatomical-mechanical possibilities of the movement itself in the joints, can be performed in many directions. From the direction of the movement of the foot before the shot, it depends on what level the contact with the ball will be and therefore,

what level the speed of the ball movement and precision will be *(Potop VA & Grad R & Boloban V N., 2013).*

The volume, the size or rather the amplitude of the beginning of the movement, indicates the extent or limit of displacement of the body and its parts from one position to the last position. We can determine the volume of movement through the degree of countermovement, by measuring distance or height (jumps, momentum distance, step length, etc.) *(Sadovski E et al., 2012).*

The amplitude of the movement depends on the mobility of the joints, on the quality of the muscles and their connections, on the harmonization of the work of the agonistic and antagonistic muscles, on the cooperation of the synergistic muscles, on the structure of the exercises and on the tasks to be achieved.

According to its path, the movement can be *rectilinear* and arc. Rectilinear movements in humans are almost non-existent (although running and swimming are considered so-called rectilinear movements), and even short rectilinear movements (kicks in karate or boxing) occur in arcs. The sequence of movement is determined by neuromuscular coordination as well as by the mass of the moving body *(Garnacho M V et al., 2015).*

Regarding its extension, the movement is defined as the time distance between the initial position and the final one of the exercise, between the beginning and the end of the movement. The duration of the exercise is related to the time of movement of the body or its parts from the place. We can talk about the existence of several phases of movements, especially cyclical movements. Knowing the duration of the exercise is very important for determining the exercise load as well as for planning the exercises during the physical education and training class.

The rhythm of the exercise is a time characteristic, by which we must understand the frequency of movements in a given time. In physical education and sports, care is always taken in the rhythm of running, walking, swimming, in the execution and combination of gymnastic exercises, etc.

The tempo of the exercise is very significant. The end, the result of the exercise depends on the tempo, but also the level of the load in the training *(Venturelli F & Schena & Richardson R S., 2012).*

Spatial and temporal characteristics of physical exercise can be highlighted through the analysis of movement speed. Speed is the distance traveled in a given time. If the speed of a

movement from one point to another, in the entire path of movement, does not change, we say that we are dealing with uniform movement. If the speed of the movement changes during the movement, we say that we are dealing with non-uniform movement. The speed of individual movements and that of the whole body, the speed of displacement of the body in space and that of the movement of separate parts of the body, are often different. Movements can be at maximum speed, fast, medium speed, slow and very slow.

The speed of all movements is related to concrete movements or concrete exercises. In training, it is important to distinguish between maximum and optimal speed. In some sports disciplines and physical exercises, it is required to perform movements at maximum speed (sprinting, punching in boxing, momentum in the long jump, etc.); there are other disciplines, in which movements are required to be performed at optimal speed (rhythmic gymnastics, artistic gymnastics, figure skating-skating, momentum in high jump, etc.) *(Sánchez L et al., 2014).*

The dynamic structure of physical exercises

The technique, the kinematic structure of physical exercises are determined by their dynamic characteristics, which are conditioned by the action of muscular forces. Every physical exercise is performed by activating the muscles that produce muscular strength, but external forces also affect the movement. All forces that have an impact on movement are divided into *internal forces and external forces.*

Internal forces include:

- Active muscle forces;
- Passive joint forces (elasticity of ligaments and tendons);
- Reactive forces, which influence the harmonization of body movements with the movements of individual parts (moving with acceleration).

External forces include:

- Body weight;
- Reactive forces of supports and hangers;
- Physical forces of external bodies (objects) (adversary, weight of tools and equipment, inertial forces of tools, the body on which the person relies, etc.) and the environment.

External forces in most cases are load forces. In addition to muscular forces, inertial forces or any other external force can be used to perform work and to overcome any load, which significantly consumes reserve energy forces. Man is forced to perfect the movements and in them to reduce the participation of active muscle forces, as a result of increasing the action of external forces *(Keller K & Engelhardt M., 2013).*

The rhythmic structure of physical exercises

In complex movements, rhythmic data also play an important role. The rhythm of the movement is about the periodic execution of the movements. In contrast to the tempo, the rhythm of the movement varies in:

- The presentation or non-presentation of the part of the movement or the movement in totality;
- Submission to certain standards of time intervals.

Emphasized parts of the movement occur under the influence of the active force of the muscles, in order to then follow (cause) the movement according to inertia, for the unaccented part of the movement. The economy and efficiency of movement depends to a certain extent on the rhythm of movement. For physical exercises, apart from the kinematic, dynamic and rhythmic characteristics, it is necessary to take into account the quality characteristics of the movement *(Donnelly J E et al., 2016).*

Quality characteristics of physical exercises

The qualitative characteristics of physical exercises are indicators of the way of performing the movements, which show to what extent the technique of the movements, for their identity with the requirements and the required form. Qualitative characteristics are also indicative of the level of temporal and spatial parameters of movements. Movements can be:

- Correct;
- Economic;
- Energetic;
- Harmonic;
- Elastic.

The accuracy of the movements has to do with their intentional harmonization (shooting at the goal, rolling the ball, etc.) or with giving the shape of the movements in advance (jumping in the water, artistic sliding, etc.).

The economization of movements can be achieved by coordinating the participating actions, in which there should be no unnecessary load or excessive actions, which means that energy is spent in the required amount.

Harmonic movements are about performing them in a fluid manner, where the load and release of the muscles, the acceleration and deceleration of the movements are aligned directly and harmoniously (movements in rhythmic gymnastics, acrobatics, skating, etc.).

The elasticity and mobility of the movements can be seen in the cases where their amortization is done in the different phases (falls on the floor, meeting the ground in jumps, jumps, jumps roll, catching and stopping the ball, etc.).

The aforementioned characteristics of physical exercises speak for the quality of execution, for the level of acquisition of the exercise technique. The quality of technique is a matter of learning and practicing, including sports competitions. The quality characteristics of physical exercises are influenced by the nature of the exercise itself, but also by the individual qualities of the exerciser *(Pesce C., 2012).*

Systems of physical exercises

Various physical exercises are used in physical education, sports and recreation. In order to be used with clear orientations and goals, completing their number, but also the learning process of students, children, youth, people and specialists in the field of physical education and sports, it is extremely important that physical exercises are organized according to certain criteria. Their classification into groups is done according to some common criteria.

According to the anatomical criteria, physical exercises are divided into exercises for the neck, arms, trunk, legs and exercises for the whole body.

According to the use of tools, physical exercises are divided into exercises on tools, exercises with tools and exercises without tools. Physical exercises can be with or without the use of assistive devices.

In general relation to keeping or not keeping the pose, standing position, physical exercises are divided into exercises in place and exercises in movement.

Such and similar divisions of physical exercises are numerous, since the criterion of their systematization does not come from the essence of the character, but from other superficial data *(Best J R., 2010).*

Based on the form of movement, physical exercises are divided into four main groups:

- Exercises without tools and without the help and resistance of others;
- Exercises on tools and with their help;
- Joint exercises;
- Combat exercises, which overcome the resistance of external forces.

Based on pedagogical principles, physical exercises have been systematized, dividing them into three groups:

- Exercises that affect discipline and education, in a general sense (exercises for keeping the body straight, etc.);
- Systematic exercises for the formation of muscles and joints (corrective exercises),
- Exercises for the development of mobility and motor coordination (balance exercises, exercises that develop strength, endurance and determination, such as: walking, running, jumping, mobility exercises, games and sports) *(Daci J et al., 2016).*

With the development of science on physical exercises and sports training, other systems have been made, based on physiological, biomechanical and psychological principles. Considering them not only as movement actions, but also as a method, based on these principles, physical exercises are divided into:

- Strength exercises;
- Speed exercises;
- Endurance exercises;
- Flexibility exercises;
- Skill exercises *(Brand R Ekkekakis P., 2018).*

Subashi G., 2006 divided physical exercises as follows:

- Auxiliary exercises (formation exercises), which are presented as mobility with analytical-isolating and relative-standard actions;

- Basic or elementary exercises (throws, lifts, pulls and catches) and locomotor exercises (running, swimming, jumping, etc.).
- Exercises of technical use or adapted exercises, which are characterized by movement elements that are technically selected and motivated. Dance exercises, as artistic forms of movements, which we can frame in this group, are characterized by the difficulty of expressing the emotional state of the exerciser himself and the state of others in a certain rhythm *(Subashi G., 2006).*

Pesce C. et al., based on their use in sports, made a systematization of physical exercises, as follows:

- Exercises for general physical preparation (used for the general functional development of the athlete);
- Auxiliary exercises (used in order to create the bases and later the perfect bases for sports disciplines.
- Exercises for special preparation, which have a central place especially in sports training and include movement actions, which in themselves contain elements or, according to the superficial character of functional actions, are similar to competition activities;
- Competition exercises (movement actions, which make up the structure and content of sports specialization) *(Pesce C et al., 2019).*

Wilson M. & Bengoechea E., have classified the movements, relying on the physiological criteria. Based on authors, we divide the physical exercises:

According to the basic stance in which the participating movements are performed:

- Exercises that are performed in the frontal or dorsal position (swimming-shooting);
- Exercises that are performed in a sitting position (horse riding, cycling, motorcycling, rowing);
- Exercises performed while standing with open legs (shooting, weightlifting, combat sports);
- Exercises performed while standing with legs together (standing upright, standing still);

- Exercises performed while standing with the feet in a line (exercises on the balance beam, on the gymnastic bench or on other limited surfaces).
- Exercises performed while standing on one leg on tiptoes (artistic gymnastics, rhythmic gymnastics, aerobic gymnastics, rhythmic dance, etc.);
- Exercises performed while standing on skates (figure skating);
- Exercises that are performed in support or hanging (grabs, hanging, support on the forearm, support on the hands, support on one hand, on the head and hands, etc.) *(Wilson M & Bengoechea E., 2010)*.

Participatory and characteristic movement actions of physical exercises can be:

- Stereotyped motor actions (standardized);
- Situational motor actions (not standardized).

Stereotyped movement actions, starting from the forms and ways of performing them, are measured quantitatively (cm, m, km, sec, min, hour, etc.) and with qualitative values (point, grade). According to the intensity, the movement actions (whether cyclic or acyclic), are: movement actions with maximal, submaximal, average, sub average and low intensity. Movement actions are also divided according to the links participating in them. Thus, in many of them, the participation of the legs is essential (walking, running, sliding, pedaling a bicycle), while in many others, the participation of the hands is essential (swimming, sailing, exercises with and on tools, etc.).

Stereotyped motor actions can be: fast and strong (jumps, powerful throws), weight lifting and precision (shooting, passing in sports games, target shooting).

Stereotyped movement actions that have qualitative values in execution, are divided according to types of sport and according to movement characteristics. According to the type of sport, they are: gymnastic movements, acrobatic movements, artistic slides, water jumps, ski jumps, etc.

According to movement characteristics, we mention: artistic gymnastics, acrobatics (requiring strength, speed, coordination, orientation in space and differentiation in time), figure skating, water jumps, ski jumping (requiring balance, flexibility, expressiveness).

Situational (non-standard) movement actions include: combat sports (wrestling, boxing, karate, judo, etc.), sports games (badminton, tennis, volleyball, handball, basketball, football,

field hockey, ice hockey, etc.)), cross-country (running, cross-country skiing, downhill, motocross, cross-country cycling, etc.) *(Mitchell J H et al., 1994).*

Purpose of the paper

Review is to analyze the literature and understand every movement or every physical activity that in a correct and harmonious manner with legalities, is carried out for the achievement of concrete actions of physical education. In fact, it has an important impact on physical exercise is: - creation of certain skills and habits; - development and improvement of movement and functional skills; - satisfaction of personality needs (creative, recreational and human needs, entertainment needs).

Methodology

In order to fulfill this review are using methods of literature analysis, and is made combination and comparison of data from various works of authors varied. To successfully realize this review paper we studied and analyzed the contemporary scientific literature. The methods used are: literature analysis, physical activity and recommendations.

Recommendations

The research in this paper brings the following recommendations:

- The process of physical education is at the same time a process of recognizing the variety of movement actions and physical exercises, with which children, students and young people can exercise with their choice and determination and based on the skills they possess. Knowing their types allows teachers and specialists of physical education and sports a successful creativity *(Mooses K et al., 2017).*
- The defining role in the education of pupils with motor skills and habits is played by the teacher, who must know at a high level the meaning and content of the movement phenomenon.
- Disciplines such as gymnastics, athletics, movement games and dance play an even greater role in the education of movement habits.

- The implementation of the physical education program requires the increase of the mobility baggage of the pupils and together with the characteristics and their executive features make up the meaning of mobility culture.
- The higher the quality level of the movement culture of the pupils, the higher the level of mastery of teaching tasks in the education of movement skills and the higher the level of predispositions for any sports discipline desired by them.
- The physical education teacher plays the essential role for an organic connection of the phenomena of movement culture in function of each other.
- In order for the teaching process in the subject of physical education to have an even greater impact on the quality education of physical movement habits, must be reviewed the planning processes of the programming of this subject, as well as the teaching methods.

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The study movement games in physical education class with primary school students

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Abstract

Movement games used both with technical elements from handball in physical education lessons with primary school children will manage to optimize the instructional-educational process and consequently will favor the faster and quality acquisition of skills and motor skills, the development of morpho- functional and basic motor skills of students. The purpose of the research it is the optimization of the physical education teaching process by using movement games with technical handball elements in physical education lessons with primary school students. The objective is to argue and experimentally verify the effectiveness of the methodology regarding the use of movement games with technical handball elements within physical education lessons with primary school students. The basic direction of the research was the learning of some elements and procedures from the game of handball through movement games, adapted to the psychomotor peculiarities of the age of students from the 4th grade (10-11 years). The independent variable, used in the experimental group, was the introduction, within the thematic planning, of handball elements in the form of movement games.

Keywords :Motor activity, physical education, height, weight

Introduction

Within the contemporary theory devoted to the problem of human activity, games, as a primary factor of socialization, is given a special importance. This is a specific action loaded with meanings and tensions, always carried out according to voluntarily accepted rules and outside the sphere of utility or material necessity, accompanied by feelings of elevation and tension, of joy and relaxation (Dragnea A., 2000) .

A major importance in the physical education of students, and especially of primary school students, belongs to movement games with handball elements, which, through their specific content of individual competitive analytical influence, have the potential to train them in socio-psychomotor skills and self-affirmation attitudes , self-evaluation and the value orientation of the personality. (Cârstea,2000)

The insufficient approach to the problem of the game as a pedagogical system of school physical education, in the formation of the student's integrative activities, but also the lack of theoretical-methodical elaborations regarding the practice of movement games with handball elements, which possess the psycho-motor potential appropriate to the particularities of the age of children in primary classes , became the main factor of updating this research.(Mitra,1980)

In the context of the given positions, the hypothesis, the object and the subject, the purpose and the objectives, the methodological and organizational concept of the research were formulated.(Ilica,2007)

The theory and methodology of physical education, as an object of study, aims at the somatic and motor development of man, through the systematic practice of physical exercises, regardless of the socio-economic and political formation in which it is carried out.(Cârstea,2000)

The considerations for which the theory and methodology of physical education is a scientific discipline, which has its own field of research are:

- own, adapted, scientific research methods of the field of study;
- fairly well specified and unanimously accepted concepts;
- independently established research hypotheses, intended to continuously prospect and optimize the efficiency of practice in the field;
- a collection of theoretical and practical data that is constantly growing; classified and quantified with its own categories of problems.

Through a correctly applied technology, the objectives of general education can also be achieved, where physical education contributes to the development and improvement of the child in terms of motor skills; stimulation of intellectual activity and affective processes; the development of group relations; dynamization of some mental processes; the formation of skills and qualities in the work process; the improvement of the body's organs, functions, devices; the improvement of some particular notes that appear in the activity of some organs, process devices,

as an effect of practicing physical exercise: the sense of the ball, the sense of rhythm, of sliding, peripheral vision, tactical thinking, motor memory, kinesthetic sensations, etc.;(Epuran,1992)
Gh. Cârstea defines physical exercise as a systematic and conscious repetition of an action for the purpose of training or perfecting some skills or habits(Dragnea,2001). The content of the exercise depends on the intention or purpose in which the respective physical exercise is practiced.(Colibaba,1998)

The elements that represent the essence of the content of the physical exercise are: the physical effort requested by the respective motor act or the respective motor action; the movements of the body or its segments, the physical effort required to perform the respective acts or motor actions, the form of the exercise is the particular way in which the component movements of each exercise follow, as well as the links established between them during the performance of the motor action in question.(Dragnea,1996)
The characteristics of physical exercises are:

- spatial ones that define positions, directions, amplitude, distance, etc.;
- temporal refers to rhythm, tempo, duration;
- spatiotemporal that are determined by the speeds with which they are performed;
- dynamics that are determined by the internal and external forces that influence the execution.

The fact that movement games are practiced in the physical education lesson at school, in the child's view, acquires different meanings, although the child lives and is more active within the game than in reality, the environment still exerts one of the strongest influences on children's play . The game is also an exercise that prepares the child for life, it is the mirror of the environment in which the child lives and develops.(Paraschiv1992) Placing games within action-based methods I. Cerghit considers them "simulation methods in which very varied situations are imitated, for example from the life and current activity of adults". Some authors look for its essence in the human tendency to dominate, to surpass others, others consider it a means of counteracting some harmful beginnings or as a necessary filler in an activity that is too unilaterally oriented or as the fulfillment of desires that cannot be satisfied in reality.(Lecea,2007)

Materials and working methods

The pedagogical experiment requires the creation of a new situation, by introducing a change in the development of the educational action with the aim of verifying the hypothesis that triggered these innovations. For this purpose, we formed an experimental group of 4th grade students, equally divided into an experimental group (boys+girls) and a control group (boys+girls). The experiment took place during three school years, 2008-2011, and was divided into a pedagogical observational experiment and a basic pedagogical experiment. Both in the observational pedagogical experiment and in the basic experiment, groups of fourth-grade students from the "Mihai Eminescu" Theoretical High School in Arad, Arad county, were included.

The measurement in standard conditions, of the sample established by us, with the help of some test batteries, had the purpose of ascertaining and then highlighting the evolution of essential anthropometric, motor, physiological parameters in primary school children, under a practical ratio. Anthropometrically, waist, weight and chest elasticity were measured (the difference between the perimeter of the chest during deep inspiration and forced expiration).

Results and discussion

Physical education and school sports are aimed at maintaining an optimal state of health, ensuring harmonious physical development, forming a broad system of basic, utilitarian-applicative motor skills and skills specific to certain branches of sport, developing basic motor qualities, such as and those specific to some sports, the development of intellectual qualities as well as moral-volitional traits.

Handball, practiced since primary school, broadens children's motor skills, contributes to the acquisition and consolidation of various motor skills and harmoniously develops children's physical qualities.

One of the basic objectives of the research was to assess the level of somatic development, motor and functional training of primary school students in comparison with the respective scales in the country. The predictive (initial) evaluation consisted of practical tests applied at the beginning of the pedagogical experiment. The measurement under standard conditions of the researched samples highlights the development of the main somatic and motor parameters in the fourth grade students under a practical ratio.

The samples used are presented in detail in chapter II of the paper. Next, we present the results obtained by the students included in the pedagogical experiment in the practical tests, which we have classified into tests for somatic development, tests regarding physical training.

Waist - In the group of girls, the average waist is 143.98 cm. Comparing the results of the girls' groups with the average for the country (138.8 cm) from the work "Comparative Study of the Biomotric Potential of Students from Grades I-IV", we [9]notice that the average of the girls' group is more than 5 cm higher than the average on the country. The same trend is observed in the case of boys, they have an average of 143.67 cm. Comparing the results of the experimental group of boys with the average for the country: 139.0 cm assures us that also in the case of the group of boys the average is superior by 4.67 cm . Thus, a trend of waist growth is observed in both girls and boys, which is in good agreement with the acceleration process of the parameters in question.

Weight - The experimental group of girls has an arithmetic mean of 37.96 kg. Comparing the statistical indices of the experimental group with the statistical indicators from the work "Biomotric potential of students from classes I-IV" (1992), we notice that the average weight of the girls is close to the average for the country (30.89 kg) the experimental group has an average higher than the national average by 7 kg. The average of the group of boys is 38.04 kg. Analyzing the group of boys with the average for the country, we notice that the average value is higher than the average for the country (32.0 kg) by 6 kg. This process is growing as well as the previous indicator, being caused by several factors.

Table. 1 The results of testing the indices of somatic development of primary school students aged 10-11 years

Control samples	Guys	Average for the country	girls	Average for the country
Waist (cm)	143.67	139.00	143.98	138.8
Weight (kg)	38.04	32.05	37.96	30.89
Chest circumference in inspiration (cm)	69.38	70.9	67,28	69.3
Exhalation chest circumference (cm	64.70	65.3	63.43	63.9

Thoracic circumference in inspiration

The average result of the group of girls is 67.28 cm, reporting the result obtained by the group of girls we notice that for this indicator of physical development the average is 2 cm lower than the average for the country (69.3 cm). The homogeneity of the researched community is high, the CV is 9.77%, and the EM is 0.86. The average of the boys' group (69.38cm) is slightly lower than the national average (70.9cm), by 1cm; homogeneity is high, CV is 8.26%. The EM value is 0.73.

Chest circumference in exhalation

The group of girls has an average of 63.43 cm. Comparing the data obtained with the average for the country, we notice that the group of girls is 0.5 cm less than the average for the country: 63.9 cm, the homogeneity of the groups is average, CV= 10.72%, so a less homogeneous group. The average error is 0.89, which ensures a good representativeness of the average. In the boys' groups, the arithmetic mean is 64.70 cm, which is 0.6 cm lower than the national average: 65.30 cm; in the group of boys we have a good homogeneity, even if the CV value is 9.24%, this proves that this parameter has a good development rate in this age group. EM is worth 0.18.

The weight of the children in the studied group is higher than the national average for girls and boys. The chest circumferences have values close to the national average, but the groups are less homogeneous. The very small differences between the averages allow us to appreciate that the group of children studied shows a good physical development, with a normal development rate, specific to this age period.

The results of predictive testing of the level of motor training

Speed

Speed development was evaluated by the 30 m sprint test with a standing start. The group of girls averages 6'85. Analyzing the data from the 30m speed run test, we notice that in the group of girls the movement speed is 4.37 m/s

Table . 2 The results of predictive testing of the level of motor training of primary school students

Control samples	Guys	Average for the country	girls	Average for the country
Sprint 30 m (s)	6.28	6.1	6.58	6.4
Travel speed (m/s)	4.48	4.92	4.37	4.69
Long jump (cm)	141.05	138.5	128.97	130.7
Throwing the sheep ball (m)	20.53	21.5	12.86	13.7
Trunk Extensions (Rep No.)	27.76	20.70	23.17	18.1
Trunk Raises (Rep No.)	20.79	44.00	15,26	35.2
Throwing at a vertical target (no. of successes)	1.77	1	1.43	1
Running Duration (s)	1741.35	1842.25	960.97	1124.03

Comparing the data with the averages for the country, we notice that the average of the group of girls is lower than the average for the country: 4.69 m/s for travel speed, due to the fact that in the case of the studied sample we have a small number of cases with very good results, and most of the cases are located around the mean. The group of boys has an average of 6"28. We notice that the movement speed of boys is 4.48 m/s, and if we compare the movement speed of boys with the average movement speed in the country: 4.92 m/s, we have a superiority of 0.44 m/s in in favor of the research carried out in 1992 in this age category.

Conclusions

The children of the studied group are taller than the previous generations. Both in the group of girls and in the group of boys, we note the superiority of the arithmetic mean of the experimental group compared to the control group

The analysis of the results from the preliminary experiment confirmed the fact that both the experimental groups and the control groups in terms of the level of motor training, physical and functional development are in the vast majority of cases below the scales of the National Evaluation System.

The selection and elaboration of means of action is a fundamental condition for the teacher to be able to clearly shape the content of the activity of the instructive-educational

process. Thus, the importance of designing and planning the didactic process comes logically from the respective model. Specifying the lesson topics is the next step. Depending on the themes, the basic actions of the lesson will be established (the didactic means, methods and procedures, the forms of organization of the exercise, the dynamics of the effort, the necessary materials and the other didactic measures that are imposed for the organization and carrying out of the didactic process).

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Development of motor skills through movement games

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Abstract

Introduction. The new requirements and conditions formulated by the development of society impose on the didactic process of physical education its enrollment in the idea of modernizing the activity, imposing a richer content and a complex methodology based on a deep knowledge of the level of development and growth of the organism at a given moment. **The goal.** In the paper, I set out to investigate whether the effort made in systematic and correctly dosed physical education lessons has the role of optimizing and perfecting the development process (physical, motor and mental) of the students' bodies, as well as to find out whether the consistent practice of games of movement in the school activity (class and optional lessons) and independent activity contribute to strengthening the spirit of discipline and organization, to the easy practice of physical exercises performed with a greater effort in the lesson, as well as to the faster development of qualities motor skills (speed, skill, endurance, strength and mobility). **The hypothesis.** By using movement games in a rhythmic way within physical education lessons, after a judiciously elaborated planning, I believe that they will contribute essentially to the faster development of motor qualities (speed, skill, resistance, strength and mobility), to strengthening the spirit of discipline and organization, to a faster adaptation to the effort in the physical education lesson. **Work methodology.** The subjects are between 7-8 years old. The research took place over a period of 6 months, using two experimental and control groups. The initial measurements were carried out in the first semester (September 2022), and the final tests took place in February 2023. During the experiment, we used movement games, which gave a pleasant character to the physical education lessons. **Results .** Through the use movement games, lessons have become

may pleasure and efficient, increasing the interest manifested by children in the the process instructive-educational. **Conclusions.** The movement games used in the physical education activity had a positive influence in obtaining the results of the experiment.

Keywords: movement games, qualities motor, development physics harmonious, measurements, analysis.

Introduction.

The current stage of society's development places physical education with particularly great responsibilities in relation to the contribution it can bring to improving health and increasing the capacity for effort and, implicitly, to the harmonious development and personality formation of children (Colibaba , D.E. , Bota , I., 1998). During the development of the body, the different body elements show a generally uniform development accelerating towards the end of the period (Bota , C. 2000).

That is why the task, the obligation that falls in principle to the teacher and then to the physical education teacher, but also to those who take care of the health and training of the young generation, is to make direct contact with reality, to get to know the collective as well as possible, because each student represents a unique community of which he is a part (Dragnea A., 2001). In the didactic strategy, the forms of organization of the physical education activity occupy an important place. They create the methodical-organizational framework for achieving the objectives of the school physical education system (Tudor, Bompa ., 2002)

In a class of students there are as many individualities as there are children (G. Raţă , BC Raţă, 2006). Thus, the direct knowledge of schoolchildren helps to distinguish the healthy and well-developed ones from those with problems in physical development, to check the stage of development of motor skills according to age, to the efficiency of the means used in the physical education activity to achieve the above-mentioned objectives (Emilia Florina Grosu, 2009).

The new requirements and conditions formulated by the development of society impose on the didactic process of physical education its enrollment in the idea of modernizing the activity, imposing a richer content and a complex methodology based on a deep knowledge of the level of development and growth of the organism at a given moment (Epuran Mihai, 2005).

That's why I stopped on this topic in order to penetrate and know its secrets better and to know how to act according to the pluses and minuses obtained so that I can adapt in the future activity to the content, strategies and differentiated forms that determine increasing the efficiency of the didactic process (Tudor, V., 1999).

Considerations for which I chose this work are also related to the need to have the greatest possible efficiency in teaching physical education in grades I - IV, from the desire to clarify some aspects regarding the development of motor skills at the level of 7-11 year old students and to establish effectiveness (Bitang, Viorel, 2009), the place and duration in the structure of the lesson of the most significant movement games for the above-mentioned purpose, the development of motor skills and the education of young schoolchildren (Horghidan, Valentina, 1997).

The goal the work.

In the paper I set out to investigate whether:

- the effort made in physical education lessons, systematically and correctly dosed, has the role of optimizing and perfecting the development process (physical, motor and mental) of the students bodies;

- the consistent practice of movement games in the school activity (class and optional lessons) and independent activity contributes to:

- strengthening the spirit of discipline and organization;
- facilitating the introduction of greater effort into the lesson;
- faster development of motor skills (speed, skill, resistance, strength and mobility);
- increasing the conscious effort in the direction of obtaining educational effects, having a beneficial influence on all sides of the personality.

For this work we have established the following tasks:

- studying the theme in specialized literature;
- testing the level of physical development and the level of development of motor qualities;
- the choice of exercise structures and movement games used in physical education lessons;
- making measurements and final tests;
- data processing and their interpretation.

The hypothesis of the work.

By using movement games in a rhythmic way within physical education lessons, after a judiciously elaborated planning, I believe that they will contribute essentially to the faster development of motor qualities (speed, skill, resistance, strength and mobility), to strengthening the spirit of discipline and organization, to a faster adaptation to the effort in the physical education lesson.

Work methodology.

I did the study and personal research for the preparation of the paper at the College National "Vasile Goldiș"Arad,_which has a properly equipped physical education room and a sports field.

The study was carried out during the 2022-2023 school year, between September and February, including second grade students. Children who participated in three physical education lessons per week (2 from the common core + 1 optional) were co-opted in the experimental group with a number of 11 students, of which 6 are boys and 5 are girls **.** The students in **the control group** did not participate in the optional lesson, but only in the 2 hours of the common core. Its staff is 11 students, 7 boys and 4 girls. The subjects are between 7-8 years old. The initial measurements were carried out in the first semester (September 2022), and the final tests took place in February 2023. During the experiment, we used movement games, which include the following: "Go the ball", "Treadmill", "Traction in the stick", "Hit the ball", "The ball on the tower", "The race with three legs" (Septimiu Florian Todea, 2002). These games were used during the experiment in physical education lessons.

Anthropometric measurements were performed**:** height, body weight, chest circumference. To assess the general physical development, the degree of development, the motor qualities, we used the following tests and norms (Tudor, Bompa, 2003):

a) Speed running over a distance of 20 meters;

b) Throwing the ball away from the spot;

c) Running for the duration at a uniform moderate tempo (as much as everyone can);

d) Vertical clearance;

e) Application course (a combined test for testing general skills).

Research methods use in the development job

In the development the work I used next methods (Gagea A., 2010):

e) Bibliographic study;

f) The experimental method;

g) The statistical-mathematical method of data processing (Stefan Tudos, 2000)**.** The indicators we used in this research are: arithmetic mean, amplitude, standard deviation, coefficient of variability;

h) Graphical method.

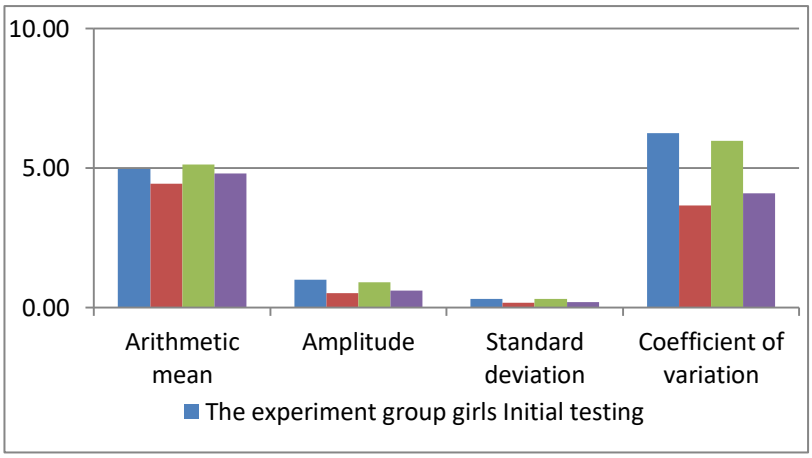
Results.

From the analysis indicators statistically looking performances experimental at speed running (experimental group/control group), the following can be formulated conclusions:

- been stabilized arithmetic mean, in the experimental group - speed run 20 m, for test originally it was 4.96 again for final test of 4.43, and for control group in the test initial the value average was 5.12 again for final test value being 4.81.

Table no . 1 - Dynamics performances experiment obtained in the **20 m speed run test**

Arithmetic mean	4.96	4.43	5.12	4.81
amplitude	1	0.5	0.9	0.6
Standard deviation	0.31	0.16	0.31	0.20
Coefficient of variation (CV)	6.26	3.65	5.98	4.10

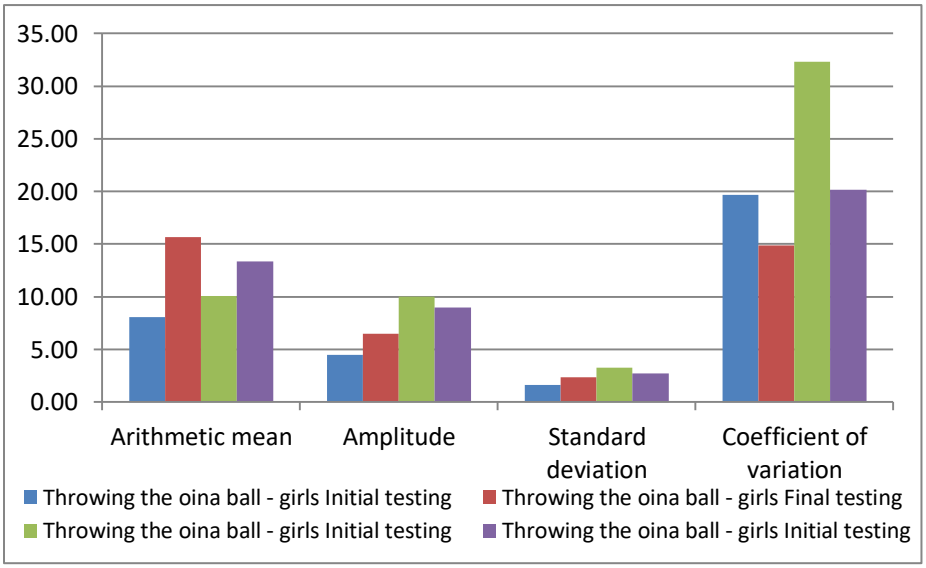


Graph no . 1 - Evolution indicators statistically in the speed **run test on the distance of 20m**

The arithmetic mean value, in the experimental group - throwing mutton balls, for test originally it was 8.09 again for final test of 15.69; and for control group in the test initial the value average was 10.09 again for final test value being 13.36.

Table no . 2 – Dynamics performances experiment obtained in the sample of **throwing the oina ball**

Arithmetic mean	8.09	15.69	10.09	13.36
amplitude	4.50	6.50	10.00	9.00
Standard deviation	1.59	2.33	3.26	2.69
Coefficient of variation (CV)	19.70	14.85	32.33	20.15

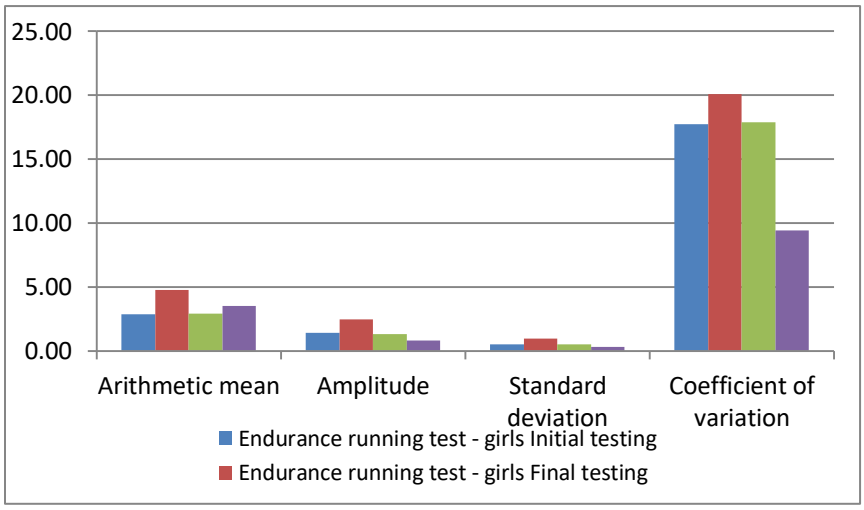


Ggraph no . 2 – Evolution indicators statistically in the **the oina ball** throwing test

The arithmetic mean value, in the experimental group – long run, for test initially it was 2.86 again for final test of 4.75; and for control group in the test initial the value average was 2.89 again for final test value being 3.50.

Table no . 3 - Dynamics performances experiment obtained in the **endurance** running test

Arithmetic mean	2.86	4.75	2.89	3.50
amplitude	1.40	2.45	1.30	0.80
Standard deviation	0.51	0.95	0.52	0.33
Coefficient of variation (CV)	17.72	20.08	17.91	9.43



Graph no . 3 – Evolution indicators statistically in the **endurance** running test

The arithmetic mean value, in the experimental group - relaxation, for test initially it was 15.36 again for final test of 17.92, and for control group in the test initial the value average was 14.88 again for final test value being 16.13.

Table no . 4 – Dynamics performances experiment obtained in the sample of **vertical detachment**

Arithmetic mean	15.36	17.92	14.88	16.13
amplitude	2.50	2.50	4.80	4.50
Standard deviation	0.78	0.99	1.51	1.40
Coefficient of variation (CV)	5.06	5.54	10.17	8.69

The arithmetic mean value, in the experimental group - sample path application, for test initially it was 15.36 again for final test of 17.92, and for control group in the test initial the value average was 20.62 again for final test value being 19.80.

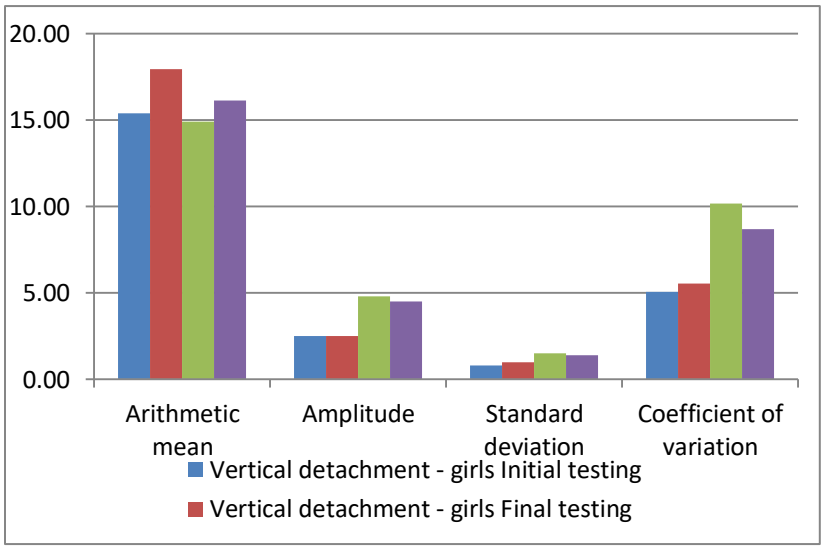
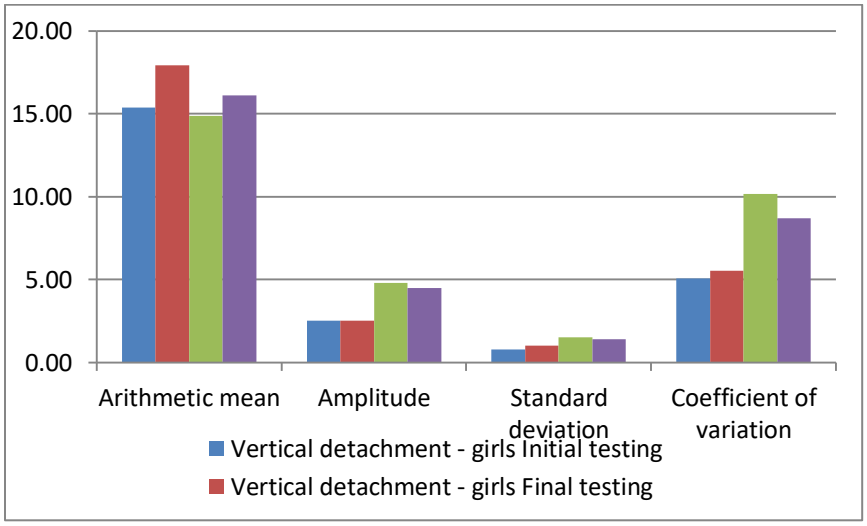


Table no . 5 - Dynamics performances experiment obtained in the **the test of the application course**

Arithmetic mean	15.36	17.92	20.62	19.80
amplitude	2.50	2.50	12.40	6.00 am
Standard deviation	0.78	0.99	3.34	1.70
Coefficient of variation (CV)	5.06	5.54	16.18	8.59



Graph no . 4 – Evolution indicators statistically in the **the test of the application course**

Conclusions.

The most important measure for the teacher or physical education teacher at the beginning of each school year is the performance of the main anthropometric measurements, particularly necessary for an efficient activity. Based on these, teachers and professors can form an image of the degree of development of the students, giving the possibility of the correct dosing of the effort depending on the morpho-functional particularities of each student.

The antepubertal period presents special particularities in terms of growth and physical development. The progress recorded from one test to another is also explained by the development and growth process they went through.

Contributing to physical and motor development, movement games also exert a beneficial influence on all aspects of personality, especially on intellectual development. The educational power of games consists in their contribution to the intellectual education of students, the development of knowledge processes, the formation of beliefs, skills and habits of moral conduct, the education of a positive attitude towards work.

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Study on the improvements of body composition indices in adult women by means of aerobic gymnastics

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Abstract

Introduction: Fitness in relation to health is a contemporary topic, which is topical due to the diversity of methods and programmes to support and improve health and is increasingly being addressed by the sports and medical scientific community. Regular physical activity and exercise are the actuators of our whole body's well-being, both somatic, functional, and cognitive. **Purpose:** Through this article, we wish to highlight the use of a personalized aerobic fitness program conducted collectively that can generate significant results based on transforming the perception of how participants look and feel good in their own bodies. **Materials & Methods:** The research sample consisted of nineteen young adult female subjects (N=19, age = 35,4 ± 5,02 years, Weight($_i$) 66,7 ± 12,61 kg, Height= 166 ± 6,69 cm) clients of a fitness center. They trained following a personalized program of an aerobic fitness class for 4 weeks, with a frequency of 2 workouts per week. **The results** indicate a significant improvement in the somatic parameters of the research participants, but in order to maintain the results obtained, physical activity should be continued after the end of the research. **Conlusions:** Within the limits of our study, we conclude that significant changes in body composition indices can be produced in adult women by performing an exercise routine under systematic and continuous conditions.

Keywords: fitness, aerobic gymnastics, adult women, physical activity, wellbeing

Introduction

Due to the evolution of human consciousness and as a consequence, of technology, numerous methods of assessing human body composition are available. The methods range from numerous simple techniques that can be applied by the researcher in the field or outside the laboratory, such as: weight, standing height, anthropometry (skinfold thickness and body circumferences) and bioelectrical impedance analysis (Lukaski, 2017, p. 14; Potteiger, 2021, p. 320) to more complex methods that are limited to the controlled environment of a laboratory precisely because they require sophisticated equipment and skilled personnel in providing technical assistance, and according to Heymsfield et al. (1997) some of the methods can be: isotopic dilution, densitometry, whole body plethysmography or even radiological methods.

The assessment of human body composition is a useful tool in various fields including medicine, nutrition, and sports science (Ackland et al. 2012). People who participate in regular physical activity whether recreational, competitive or occupational, are interested in body composition (e.g., lean or fat-free mass, muscle mass and fat) which can be associated with performance or simply health (Lukaski, 2017, p. 13; Ackland, et al. 2012).

Today's global situation forces each of us to be more responsible, to increase the care for the health of the body and the mind, for a better functionality and interaction with the environment but also with ourselves. Total or partial lack of physical activity can affect women's quality of life. According to a report by the World Health Organization (WHO), physical inactivity has become a global public health problem worldwide, predominantly affecting women and responsible for an estimated 3.2 million deaths each year (World Health Organization, 2014). Let's not forget that the world's population has been going through a very socially restrictive experience for two years due to the COVID-19 pandemic. A new word, "covibesity" (Khan & Moverley, 2020), has even been coined, associated with the lack of movement during the pandemic. This phenomenon refers to the rapid weight gain that occurred in some individuals during the SARS-CoV-2 pandemic (Camenidis & Băițel, 2021).

In contrast to the above, women's consistent participation in physical activities, has been identified as a keyway to promote fitness and well-being (D'abundo, 2007). It is not news that women like aerobic exercise programs. If you go to any gym/fitness center with aerobic fitness classes, you will find most females enrolled in these classes. One reason may be the beneficial effects that aerobic exercise programmes have on the dynamics of human morphological and cognitive functions and thus on health.

Physical activity in relation to health, or physical fitness (Stodden, Sacko & Nesbitt, 2015), as recognized by specialists in the field, is an important attribute in the proper interaction and functioning of contemporary humans with their environment, regardless of the gender of the individual. From a technical

perspective, physical activity in relation to health can be viewed as a measure of strength, endurance, and flexibility of the body (President's Council on Physical Fitness, 1980, p. 5).

On the other hand, from a general perspective, due to the fast-paced lifestyle, both for the young population and for the young adult population regardless of gender, constant participation in exercise programmes is a necessity to increase and maintain health, motor capacity and implicitly, improve moral qualities or moral values. Garber et al. (2011) state that during the last decade, attention has been focused on routines in which an active and healthy lifestyle based on physical training (e.g., resistance training, high intensity interval training, endurance training, stretching/flexibility training) predominates to prevent premature aging possible or due to lack of movement. Most often, ageing is accompanied by a progressive decline in skeletal muscle mass and strength, the consequences of which are reduced functional capacity and decreased ability to perform daily activities (Kraemer, 1997; Volpi, Nazemi & Fujita, 2012).

Despite numerous campaigns promoting regular exercise and physical activity, physical inactivity, and its negative effects, is developing at a rapid pace, and is already a known problem in modern life and worldwide (U.S Department of Health and Human Services, 1996; Guthold et al., 2008; Blair, 2009; Courel-Ibáñez et al. 2018). Lack of physical activity begins with a decline as early as adolescence, and is transient into adulthood (Kim et al., 2002). Advancing age, produces a concomitant decline in health and fitness, a major consequence supported, being the lack of regular exercise (Evans & Meredith, 1989; Nakamura et al., 2007). Evidence includes as early as adolescence as factors that may contribute to physical inactivity social support, or lack of inner motivation (Conroy et al., 2010; Power et al., 2011; Litt, Iannotti & Wang, 2011; Teixeira et al., 2012; Beauchamp, Puterman & Lubans, 2018). One more aspect we can say of concern is the way in which the present-day lifestyle of modern society has reduced the time and intensity of leisure-time physical activity among the adult population (35-65 years) (Church et al., 2011; Macías et al., 2014). For example, Macías et al. (2014) conducted a study in Spain based on 1330 adults of which 51% were women, reporting a 76.3% sedentary leisure time lifestyle, mainly in women (83.0%) and in participants aged 41-50 years (80.2%). These figures should be viewed with concern knowing that around us, we observe children, again more girls than boys, from an early age, with health problems due to sedentarism.

Therefore, without doubt, maintaining a healthy lifestyle from the age of school entry (within the anthropometric and motor, nutritional and medical limits appropriate to the age group) to adulthood is closely linked to maintaining optimal physical condition (fitness), i.e. muscular strength, muscular endurance, cardiorespiratory endurance, flexibility, body composition (Davis, 2008, p. 2; Howley & Thompson, 2022, p. 182; Gibson, Wagner & Heyward, 2019, p. 153) and physical activity (Nakamura, 2007; Stodden, Langendorfer & Roberton, 2009; Zaharia & Duck, 2014).

The focus of our research is around female subjects. We have chosen this category because in everyday life, we observe more and more women who due to their busy lifestyle, forget that regular sport, together with proper rest combined with optimal nutrition can keep them in good physical shape.

Through aerobic gymnastics "gymnastic structures are exploited for multi-objective purposes but with emphasis on body shaping-building" (Popescu, A. & Popescu, G., 2012, p. 20).

Also, in this study we tried to use the means of contemporary aerobic gymnastics translated into a personalized group program to achieve the set goals. Aerobic gymnastics is a component of fitness, and moreover, a sport rich in dynamic movements and exercises, the consequences of which are felt in the improvement of the indices and major functions of the human body (cardiovascular function, respiratory function, digestive function, nervous system function), at the somatic and motor level (improvement of the body scheme, maintenance of an optimal weight, development of motor qualities such as endurance strength, coordinative abilities) and cognitive (mental relaxation, improvement of memory, capacity for self-awareness).

In other words, by the nature of the complexity of the movements in aerobic gymnastics, practitioners can get the most out of the benefits it offers. The rewards of aerobic exercise are multiple and refer to the functional improvement of auditory, visual, kinesthetic analyzers, improvement of self-control mechanisms, modification of skin quality, protection against osteoporosis and other diseases, stress relief, psychological relaxation, improvement of self-image and self-confidence, artistic education, aesthetics (Popescu, A. & Popescu, G., 2012, pp. 25-26).

This sport is suitable for people who regardless of age or gender, go to a gym/fitness center/ to develop a systematic and continuous activity, regardless of whether the goal is to have a good physical condition, or just leisure physical activity (Leuciuc & Sobon, 2012).

Materials & Methods

Subjects and experimental design

The study was initiated to obtain a conclusion as to whether Limitless aerobic training in female subjects can produce significant changes in selected somatic parameters: weight (W), body mass index (BMI), body fat (FM), visceral fat (VAT), metabolic age (Metage), as well as body perimeters such as waist (Waist), arm (Arm), thigh (Thigh), and hip (Gluteal).

However, we consider that in the training routine, due to the dynamics and complexity of the exercises, the other muscle groups were not neglected, although they were not mentioned. Each subject was tested before and after the research period of the training routine. The research subjects are clients of a gym in Brasov County who enrolled in an aerobic program, called Limitless. The gym had the necessary

conditions to conduct the study. A total of 19 female subjects (N=19, age = 35.4 ± 5.02 years, Weight(s) 66.7 ± 12.61 kg, Height= 166 ± 6.69 cm) were included in this research.

Materials & Methods

Measurements of the somatic parameters were made using a Tanita DC-360P professional bioimpedance scale and a tape measure was used for body perimeters. In both cases, an initial assessment was carried out before starting the experiment and a final one after the weeks of training. For the assessment of somatic parameters, before stepping on the Tanita bioimpedance scale subjects were required to fill in some basic information (e.g., sex, age, height) which was integrated into the scale profile. After stepping on the scale, they had to wait for 15 seconds until the body composition analysis result was delivered on the LCD screen of the scale. To measure the targeted body perimeters, the technique involves placing a flexible measuring tape, made of cloth, over an area of the body and measuring the circumferences (Schoenfeld, 2021, pp. 69-70). Also, according to Schoenfeld, (2021, pp. 69-70) usually metric tape measurements are taken at the midpoint of the body area, but any place along the muscle can be measured. The reliability of body circumference assessments, however, is much more relevant than that reported for skinfold testing (Atherton, Phillips & Wilkinson, 2015).

Training program

Limitless aerobic training program was used in this research. Although its foundations have been laid since 2011, so far no one has bothered at least on a national level to scientifically communicate the results it can provide although according to the evaluation files of people who have gone through the Limitless program, the success rate is 93% (Limitless Romania, n.d.).

The Limitless training programme includes both exercises from classical aerobics and exercises from yoga classes, with isometric maintenance, exercises from the fit box performed on the punching bag, exercises specific to TRX training (toning exercises performed in conditions of balance maintenance, the TRX ropes not being stable) and cardio exercises performed on the rebound (trampoline) or exercises borrowed from the fit ball course, performed with the ball.

During the 4 weeks of training, the routine of the subjects involved in the study was two intense workouts per week. Each training session was preceded by a general preparation of the body for the effort through warm-up exercises.

The workout routines were monitored by the researchers and the gym staff responsible for implementing the Limitless workouts. What differentiates the Limitless programme from other aerobics programmes is that the workouts are conducted with two instructors. One of the instructors explains and

performs the exercises simultaneously with the subjects, and the second instructor corrects the subject's body position during execution.

Each training programme is different. In one workout, 2 exercises are worked 30 seconds each with a 10 second pause, 2 repetitions, and then the exercises are changed in another workout, 2 exercises are worked 20 seconds each with a 10 second pause between exercises, these are repeated 4 times. Another workout variant with 2 exercises each working for 40 seconds and 20 seconds break between them, repeating 2 times. Generally, the last workout contains 7-8 exercises of 45 seconds each and 15 seconds rest between exercises, performed 4 times.

In the workout you work with low weights and your own body weight. Also, in the workout there is emphasis on both the toning part of the muscle groups and the cardio exercises, which are combined with each other.

Importance is attached to the correct execution of the movement. In this respect it should be mentioned that before the start of the Limitless programme, participants have a biomechanics session, where movements are explained and demonstrated.

In conjunction with the training programme, participants also receive a personalized diet plan. This includes 3 main meals and 2 snacks per day. On training days, the quantities are higher.

A workout from the Limitless routine has been attached in Table 1.

Table 1. Example of training set A from the Limitless program.

Coach 1:
A: Squats (3-4 seconds/repetition)
B: From neutral bipedal position into Chair Pose (3-4 seconds/repetition)
Coach 2:
A: Left tree yoga with arms at sides, palms facing the ceiling
B: Tree yoga straight with arms at side, palms facing the ceiling
Coach 1:
A: Knee push-ups
B: Camel yoga
Coach 2:
A: Backbends with left leg in isometric position and arms up – warrior 1 yoga
B: Backbend with right leg in isometric position and arms up – warrior 1 yoga
* The first workout (A) is a combination of exercises involving the whole-body musculature and yoga to improve stability and physical effort.

Workout description:

Set an interval of 30 seconds by 10 seconds
Duration of each exercise: 30 seconds
Pause between exercises: 30 seconds
Breaks between workouts: 40 seconds
Structure of a set: A B, A B

Results

Table 2. Data presented with Mean and SD.

Variable	Initial ($_i$)	Final($_f$)
Age (y)	35,4 ± 5,02	
Height (cm)	166,1 ± 6,69	
Weight (kg)	66,7 ± 12,61	64,9 ± 12,04
BMI (kg/m^2)	24,1 ± 4,17	23,5 ± 3,98
Fat Mass (%)	29,4 ± 8,92	27,2 ± 8,01
Metabolic Age	32,2 ± 11,88	29,9 ± 11,46
VAT	3,8 ± 2,51	2,9 ± 1,82
Waist (cm)	89,6 ± 10,42	87,2 ± 10,15
Arm (cm)	27,8 ± 3,46	26,9 ± 3,08
Thigh (cm)	56,4 ± 4,59	54,8 ± 4,59
Gluteal (cm)	102,6 ± 10,35	100,6 ± 10,01

Legend: Initial ($_i$) – Initial assessment; Final ($_f$) – Final assessment.

After completion of the 4 weeks of intense training, the analysis of body index measurements using electrical bioimpedance and anthropometric measurements indicates a progress in body composition dynamics. The association between the improvement of the targeted variables and the working method is shown by the change in the means and standard deviation of the variables (Weight($_i$) 66,7 ± 12,61, Weight ($_f$) 64,9 ± 12,04; FM($_i$) 29,4 ± 8,92, FM($_f$) 27,2 ± 8,01; BMI($_i$) 24,1 ± 4,17, BMI($_f$) 23,5 ± 3,98; Metage($_i$) 32,2 ± 11,88, Metage($_f$) 29,9 ± 11,46; VAT($_i$) 3,8 ± 2,51VAT($_f$) 2,9 ± 1,82; Waist($_i$) 89,6 ± 10,42, Waist($_f$) 87,2 ± 10,15; Arm($_i$) 27,8 ± 3,46, Arm($_f$) 26,9 ± 3,08; Thigh($_i$) 56,4 ± 4,59, Thigh($_f$) 54,8 ± 4,59; Gluteal($_i$) 102,6 ± 10,35, Gluteal($_f$) 100,6 ± 10,01).

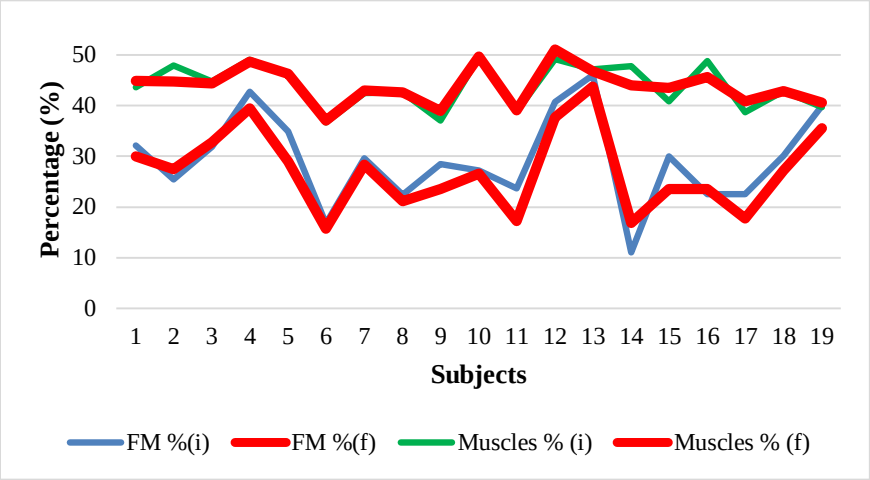

Fig. 1. Fat mass (FM) and muscle percentage of subjects before and after the experimental session.

According to Fig. 1, the dynamics of body fat (FM) and muscle mass percentage (Muscle) for each subject can be observed. The whole sample showed significant changes. A reduced percentage of FM helps to increase metabolism. Due to the intensity of the training and most possibly the diet, the subjects also lost muscle mass. Complementarily, significant results were also recorded in the body perimeters selected for the experiment which can be seen in Table 2 but also in Fig. 2.

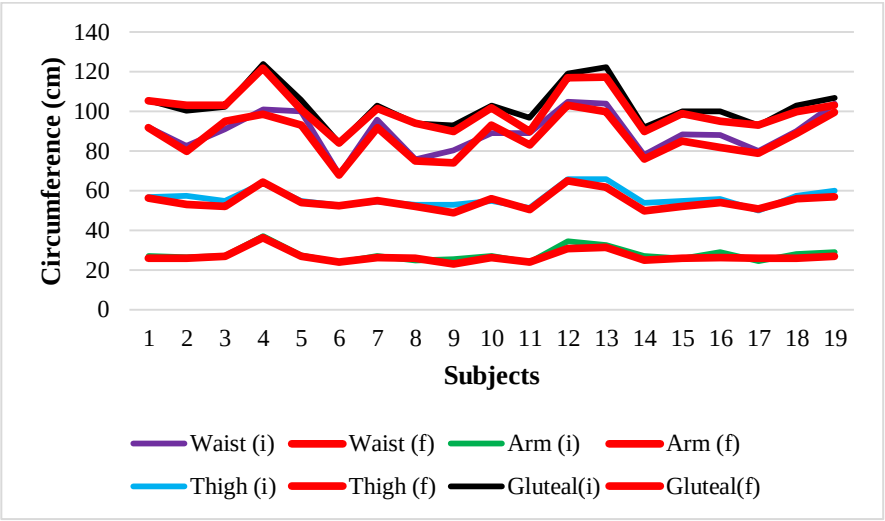

Fig. 2. The dynamics of the anthropometric measurements in initial and final stage of the research at selected body zones.

According to fig. 3, the research subjects had a BMI of 24.1 at baseline, close to the limit of 25, which indicates a moderate but not necessarily worrying weight, and at the final assessment the mean of the variable reached 23.5, which is still a small health risk.

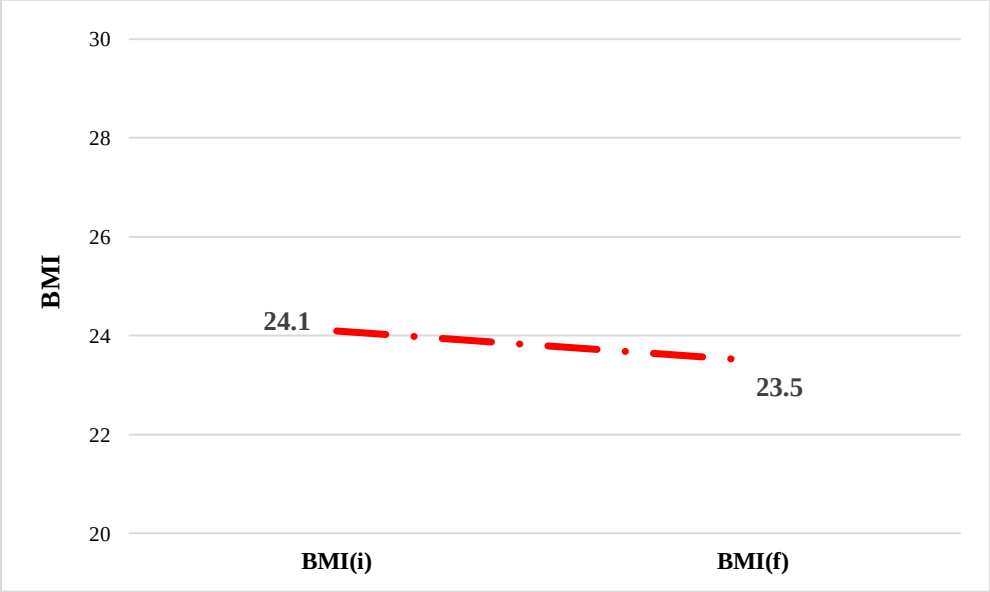

Fig. 3. Mean change in BMI at initial assessment ($_i$) and final assessment ($_f$).

Discussions

Evidence of improved cognitive function through fitness programs is provided by the study of Colcombe & Kraemer (2003) who subjected their subjects to fitness training, and at the end of the research period, subjects showed superior cognitive function in several areas, including executive function, controlled processes, spatial temporal processing and motor speed, compared to a group that did not undergo an exercise program.

Even the beneficial effects of simple responses, such as upper limb extension, can be produced by different neuromuscular patterns when task was altered (Camenidis et al., 2020).

According to Kalaska & Rizzolatti (2013, p.862), the motor cortex, although it plays an essential role in the control of voluntary movements, its neurons do not function as spinal motor neurons whose unique role is to encode patterns of muscle activity. Instead, the motor cortex contains a heterogeneous population of neurons that contribute to several operations required to convert a plan of action into motor controls that execute the movement pattern. The new evolutionary development in primates of a direct

monosynaptic projection onto spinal motor neurons allows the primary motor cortex to control hand and finger movements in a uniquely skilled manner. This feature was essential in the acquisition of dexterous hand movements that only higher primates and especially humans possess.

During the weeks of training through the Limitless program we first noticed in the subjects a significant improvement in well-being. The same was found in other studies on male subjects this time when weight training (Geanta & Herlo, 2020; Geanta & Ardelean, 2021a; Geanta, 2021b) circuit methods (Geanta & Ardelean, 2022), or via a method using electrostimulation (Ardelean, Geanta & Nicoară, 2022) were used. It is very easy to draw a first conclusion regarding the fact that physical exercise, regardless of the methods used, if there is systematization and continuity behind it, can generate beneficial cognitive effects.

Effects that also depend on the variety of exteroceptive, proprioceptive and interoceptive information, which are "analyzed, interpreted and organized in the cerebral cortex system [...] on the basis of which responses, both stereotypical. can be generated for habitual situations and unique, creative responses for new situations" (Epuran, 2011, p. 75).

Of course, the aim of this study is focused on improving body composition indices, but we felt it necessary to intervene at the beginning of the section on the complex benefits that repeated systematic and continuous exercise offers to the human body. Following the Limitless training programme and adherence to the diet plan, a favorable outcome in terms of weight and cm loss at selected body perimeters and an improvement in BMI can be observed. More and more adults can be more physically active. Due to the alarming statistics on the lack of fitness and therefore physical activity among the adult population concurrent with the evidence of the numerous health benefits of physical activity, several reports and campaigns have been published in an attempt to increase physical activity (Davies, 2008, p. 5).

As Schmidt (2019, p. 526) states, the way a person focuses attention influences performance and motor learning, thereby also improving somatic-functional indicators. The refinement of feedback through awareness of movement and how the motor actions to be performed are perceived can be achieved based on the evolution of somatic-functional indices and from "individual resources in sensory/perceptual systems, cognitive systems, and action systems" (Chui, 2020, pp. 41-43). And Pickenhain analyzing complex motor behavior states that "perception and action must be taken together as a binding entity because no brain function can be understood if we consider them as distinct. Perception and action are common constitutive elements of the organism's behavior which are related to the behavioral function of the organism as a whole" (Pickenhain, 1988, pp. 464-469).

Conclusions

Body composition assessment can provide the researcher with useful information about a competitive athlete, or a simple exerciser. Without a doubt, there is no single or combined method that can

be considered an absolutely accurate measure of a variable in this context (e.g. muscle mass, body fat). The nature of scientific research forces us to work with numbers, and the result obtained is only an approximation of the absolute.

Professional trainers in the fitness industry need to be an inspirational role model for their clients. When the presence and concomitant behaviors of a professional trainer demonstrate a healthy lifestyle, this generates added value to their words and programs (Howley & Thompson, 2012, p. 406).

Nonetheless, the Limitless program despite the short implementation period and low frequency of workouts, generated significant results, with our study achieving its objective while also being an encouragement to exercise among females.

However, there were variables that could not be directly monitored and controlled (e.g. proper nutrition, rest, extra sport life), precisely for this reason the results varied from subject to subject.

Clearly, if they continue the routines, the subjects will be able to progress in terms of training level concurrently with a much healthier lifestyle, getting out of sedentarism at least for a while.

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General physical training at Judoka from rural areas

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Abstract

Introduction. Physical training plays a decisive role in forming a solid base for high performance in judo. In the first year of preparation of the Judokans, there is a special emphasis on the development of the basic motor qualities: strength, speed, resistance, skill and mobility. The physical training of the judokan is a continuous process, a relatively long period of achievement at a high level is required. With children aged 6-10 years, no emphasis will be placed on strength and resistance, the activity being oriented on the development of speed and skill. The planning of the process of improving the motor qualities for a long period is imposed by the uneven development of the motor qualities of the Judokans. Also, age particularities must be taken into account. For the development of motor qualities, general and specific exercises are used. General physical exercises are selected from complementary sports, being adapted to the specific judo.

The purpose of the preliminary research is to identify the suspicious appeals of optimization and operationalization in the national programs of the FRJ "Judo in schools" and "Judo in villages" in order to develop an efficient implementation strategy and to evaluate their effects or a mix- Judo in schools in rural areas.

Hypothesis. In this paper I started from the premise that the implementation of training and training programs of children between the ages of 6-10 must take into account the level of general physical training. This will lead to the crystallization of a national judo strategy in rural areas from a technical and tactical point of view.

Working methodology. In order to carry out the investigation I developed a questionnaire with 10 items that I distributed to the 14 specialists involved in the national program "Judo La Sate", considering that they best know the aspects that a program to promote the judo in schools from the rural area.

Results. From the analysis of the answers to those questioned, we have detached the fact that at the level of the local communities there is openness and support for the successful organization and implementation of the "Judo La Village" program. The support comes from the parents but also from the schools, and the coaches are supported by the local councils.

Conclusions. The final conclusion is that the training program applied by us was effective, beneficial for creating the premises of the future performances of the little judoka in the village (rural) environment.

Keywords: physical training, questionnaire, judo, tests, measurements

Introduction.

The interest in Judo sports discipline increases, especially among parents, because it is a sport that educates. He not only helps in obtaining a harmonious physical, and ensures the possibility to defend yourself, not to be able to have physical incidents (Hantu, I., 2000).

In children, the fall school is very important, a judokan, even if it does not hit, so parents are increasingly interested in this sport and because this sport is a sum of principles, a code of honor, which Everyone respects him. The physical training of the judokan is a continuous process, being the period corresponding to the realization of the sports performances (Simion, Gh., Stănculescu, G., Mihăilă, I., 2011).

With children aged 6-10 years, no emphasis will be placed on strength and resistance, the activity being oriented on the development of speed and skill (Zlate, M., 1999). The planning of the process of improving the combined and coordinating motor qualities over a long period is imposed by their uneven development. Also, the age and individual features of the practitioners (Ungureanu, A., 2003) must be taken into account.

Getting great results in judo requires the development and improvement of all the components of motor training, because the improper development of a motor quality has negative effects on the others, and by diminishing the performances (Utiu, I., Almășan, D., 1993).

For the development of the dominant motor qualities in the performance judo, general and specific means are used. These are usually selected from complementary sports, being adapted to the specificity of the judge (Weineck, J., 1992). The means used in the training of the Judokans taken from other sports complement those especially in the development of motor qualities.

General physical exercises are selected from complementary sports, being adapted to the specific judo. General physical exercises complete the special ones in the development of the motor qualities of a judoka (Alexe, N., 1999).

Each training and branch of sports requires special requirements in terms of force - component of physical training. It will be taken into account the relations of force with the resistance and speed in both cyclical and acyclic movements (Bompa, T., 2001)).

(Dragnea, A., 2002, p. 356) argues that the definitions of the specialists do not differ between them, only through the terminology used. Essentially, the strength of the human body consists in the ability to make efforts of defeating, maintaining or transferring in relation to external or internal resistance, by contraction of one or more muscle groups.

In the final performance in any sports activity with a continuous duration of 60 seconds or higher, the resistance has an important contribution. In order to thoroughly prepare the athletes, the factors that influence the development of this motor quality, as well as the psychic and will of the athletes, must be studied and observed.

(Bompa, T., 2006, p. 364) refers to resistance as: "the time required for an individual to perform a thing of a certain intensity". (BUGLE, S.C., 2003)) refers primarily to fatigue, for the purpose of correctly defining resistance. They consider fatigue "the temporary decrease in working capacity, caused by the work done". As a result of this definition, the resistance is: "the ability to oppose fatigue in some activity."

Another clear and complex definition of resistance offers us (Bota, A., 2007), namely: "The body's ability to perform a mechanical thing of a certain intensity, a longer time, without decreasing the efficiency of the activity submitted, under the conditions repression of the state of fatigue ”.

All sports programs must include the fundamental factors of sports training, respectively: physical, technical, tactical, physiological and theoretical. These are an essential part of any training program, regardless of the age of the athlete, the individual potential, the level or the preparation phase. However, the focus on each factor varies depending on these features and the characteristics of the sport or the test. (Bompa, Tudor, 2001, p. 47.).

Psychological training in aerobic gymnastics occupies an important place among training factors. Without this and without manifesting a solid self -confidence, the athlete practically destroys his chances of performing (Epuran, M., 1990).

The goal

The purpose of the preliminary research is to identify the suspicious appeals of optimization and operationalization in the national programs of the FRJ "Judo in schools" and "Judo in villages" in order to develop an efficient implementation strategy and to evaluate their effects or a mix- Judo in schools in rural areas.

In order to achieve the purpose, we have proposed two objectives of preliminary research:

- Establishing the content elements of the national programs "Judo in schools" and "Judo in villages" that can be operationalized in a didactic strategy that combines the two programs that determine the initiation of a pedagogical experiment "Judo in schools/ in the environment rural".

- elaboration of the didactic strategy for the implementation of the pilot program "Judo in school in villages/ in the rural area" and for evaluating its effects.

Hypothesis.

In this paper I started from the premise that the implementation of training and training programs of children between the ages of 6-10 must take into account the level of general physical training. This will lead to the crystallization of a national judo strategy in rural areas from a technical and tactical point of view. Also knowing the level of general physical training can be established national strategies for implementing the judo in the rural area.

Working methodology.

The preliminary research took into account the protocol concluded between the Romanian Judo Federation and the Association of Communes in Romania (through which a national program for the development of the judo in the rural area was established. This program was enjoying the support of the local rural communities. For the investigation we developed a questionnaire With 10 items that I distributed to the 14 specialists involved in the national program "Judo La villages", considering that they best know the aspects involved in a program to promote the judo in rural schools.

Stage of the research

The research included two distinct stages: a preliminary stage in which data on the phenomenon of the judge in the rural area were collected, which was carried out between February 2018-September 2018 and a stage of scientific research between October 2020-March 2022.

Research subjects

The experimental research included athletes from the rural Aradan.

Place of research

Experimental research took place within the S club

The tasks of the preliminary research

In order to achieve the objectives of the research and its purpose, we have set the following activities associated with the objectives/tasks of the research:

- Analysis of the national programs of the FRJ "Judo in schools" and "Judo in villages" and identifying their content elements for their optimization to increase the efficiency of their implementation.
- elaboration and application of a questionnaire, addressed to the specialists of the field to identify their opinion on the opportunity, content, purpose of these national programs.
- Analysis and interpretation of the results of the investigation and the formulation of the conclusions that will be the basis for choosing the teaching strategy for the operationalization of a mixed program "Judo in school in villages".
- establishing the elements of the teaching strategy for operationalizing a mixed program.
- establishing the system of evaluating the efficiency of the application in practice of the "Judo in school" program in the personal development of the students included in this project.

Research methods used in the elaboration of the work (Epuran, M., 1996), (Epuran, M., 1996):

In the elaboration of the work I used the following methods (Gagea A., 2010):

a) the method of studying the specialized and interdisciplinary literature;

b) the method of pedagogical observation;

c) the method of the sociological investigation;

d) method of control tests and tests;

e) the method of the pedagogical (experimental) experiment;

f) the statistical-mathematical method. The indicators I used in this research are: the arithmetic mean, the standard deviation, the coefficient of variability;

g) the graphic and table method.

Results.

The analysis and interpretation of the opinion of the specialists regarding the elaboration of specialized programs for the practice of judo in schools and the rural environment.

Item 1 - What is the desire to practice judo in your community?

Tabel nr.1- The graphic interpretation of the answers obtained at the question no. 1

No. item	The answer variants	The share of the answers on variants (%)
1.	very important	86 %
	important	14%
	little important	0%
	unimportant	0%

From the analysis of the responses of the 14 respondents we find that 86% consider it very important, and 14% consider it important. From here it is clear that the theme of the present PhD theme is strict and acute.

ITEM 2 - What is the number of children who want to practice judo?

Table no. 2 - The graphic interpretation of the answers obtained at the question no. **2**

2.	The answer variants	The share of the answers on variants (%)
	bigger than 100	72%
	smaller than 100;	14%
	smaller than 75	14%

The data of the above graph associated with those regarding the subjects of the investigation subjected to the questionnaire shows that the desire to practice judge animates 72% of them. A new confirmation of the actuality of this thesis.

Item 3 - What financial support do you have from the local community?

Table no. 3 - Graphic interpretation of answers obtained to question 3

	The answer variants	The share of the answers on variants (%)
3.	Payment of coach	46%
	The space for carrying out the activity	47%
	Supporting a training calendar	7%

Unfortunately, the answers recorded and processed are disappointing. I believe that the insurance by the local community (these are localities that have a considerable financial potential pre - Tinca, Cornu, Brănești, Bradu, Păuliș, Ghioroc) only 46% of the coach's payment and 47% for the maintenance of the space for the activity is inexplicable . And that only 7% intended by the subsidiary community for supporting a training calendar (incusiv training internships, cantonments) is at least hilarious.

Item 4 - What support for sports activity from local structures?

Table no. 4 - Graphic interpretation of answers obtained to question 4

4.	The answer variants	The share of the answers on variants (%)
	school	100%
	The local community	100%

To this question the answers were unanimous. The respective schools, the 14 targets give 100%support. The identical percentage is also the support of the local community to support the sports activity.

Item 5 - which would be in your opinion the percentage of physical training in judoka training for beginners.

Table no. 5 - Graphic interpretation of answers obtained to question 5

5.	The answer variants	The share of the answers on variants (%)
	>50%	72%
	40%	14%
	30%	14%
	<25%	0%

At the question no. 5 of the statistical distribution analysis of the answers we note that:

- 10 of the respondents (72%) believes that the share of physical training in the judoka training (in this year's case) must be over 50%.

- 2 of the resumption of the investigation (14%) considers that the percentage weight of physical training at this level must be about 40%.

- The other 2 repondents (14%) believe that this (physical training has to be 30%.

Item 6 - What would be your opinion on the new methodical line on weight categories and techniques admitted in 2020?

Table no. 6 - Graphic interpretation of answers obtained to question 6

6.	The answer variants	The share of the answers on variants (%)
	Very good	86%
	Good	14%
	Unsatisfactory	0%

Item 7 - What would be your opinion on the percentage of physical training in relation to technical training?

Table no. 7 - Graphic interpretation of answers obtained to question 7

7.	The answer variants	The share of the answers on variants (%)
	50/50	79%
	60/40	11%
	70/30	0%

Item 8 - Which PLIOMETRIC EXERCISES Do you consider to be more effective in physical preparation for improving the vitesis capacity at U12?

Table no. 8 - Graphic interpretation of answers obtained to question 8

8.	The answer variants	The share of the answers on variants (%)
	Simple plyometric exercises	100%
	Pliometric exercises with low load	100%

Item 9 - Who do you think is the optimal age for judoka training?

Table no. 9 - Graphic interpretation of answers obtained to question 9

	The answer variants	The share of the answers on variants (%)
9.	7-10	100%
	10-12	0%
	12-14	0%
	bigger	0%

To this question we conclude from the analysis of the answers obtained from the 14 reponditioners, that 10 of them considers the age of children between 7-10 years (the target sample of the study of this PhD thesis), 2 out of 3 considers the optimum age between 10 and 12 years, another 2 considers the optimal age 12-14 years to start practicing the judge.

Item 10 - What is the percentage weight of the preparation components (physical and technical component) in your opinion in sports training in the judo beginner groups.

Table no. 10 - Graphic interpretation of answers obtained to question 10

	The answer variants	The share of the answers on variants (%)
10.	Physical training - technical preparation	30/70%
	Physical training	40/60%
		50/50%
		60/40%

Regarding the percentage distribution of the preparation components (physical and technical factory) in sports training at the beginner groups at Judo (target group 6-10 years) we conclude from the analysis of the answers obtained from the 14 respondents that for physical training in relation to that Technique, the data have the following distribution: 30/70% - 1 respondent; 40/% - 6 repandants; 50/50% - 5 repondents; 60/40% - 2 repondents.

In order to improve the capacity for general physical training to the judo practitioners in the rural area, specialized training programs have been elaborated and systematized for increasing muscle strength (arms, trunk, lower limbs), execution speed, supplementation and joint mobility,

skill as well as endurance, as well as anaerobic alactacid effort. In this regard I used the following evaluation tools:

- lifts of trunk from the dorsal bed (maximum number of repetitions in 30 seconds)
- floats (maximum number of repetitions)
- knee (maximum number of repetitions in 20 seconds)
- Jump in length (in meters)
- Holded by Kimono in the counter

Table no. 11 - Evolution of statistical indicators in the trunk lift sample

UP trunk	Arithmetic mean	Standard deviation	Coefficient of variability (%)	Dispersion
	19,16	0,0362	18,90	bună

The determined arithmetic mean is 19.16. The appropriate standard deviation is 0.0362. And here the coefficient of variability calculated (0.1890) characterizes a good dispersion.

Table no. 12 - Evolution of statistical indicators in floating sample

Float	Arithmetic mean	Standard deviation	Coefficient of variability (%)	Dispersion
	19,14	0,0382	19,97	bună

The calculated arithmetic mean is 19.14, and the standard deviation of 0.0382. The coefficient of variability calculated is 0.1997, ie 19.97% which characterizes a good dispersion of the results, is right to the lower mathematical limit.

Table no. 13 - The evolution of the statistical indicators in the knee flexions sample

Genuflections	Arithmetic mean	Standard deviation	Coefficient of variability (%)	Dispersion
	16,77	0,032	19,11	bună

And here the arithmetic mean of 16.77 is under the existing possibilities. The calculated standard deviation is 0.032. The coefficient of variability calculated of 19.11% (0.1911) characterizes the same good dispersion at the lower limit of the mathematical threshold.

Table no. 14 - Evolution of statistical indicators in length jumping test

Long jump	Arithmetic mean	Standard deviation	Coefficient of variability (%)	Dispersion
	1,602	0,031	19,92	bună

The arithmetic mean is 1.602, a rather modest one. The resulting standard deviation is 0.031. The coefficient of variability resulting from the algebraic calculation is 0.1992 ie = with 19.92%. This modest dispersion is the mathematical result of the aforementioned arithmetic mean.

Table no. 15 - The evolution of the statistical indicators in the test hung by Kimono

Hanging by Kimono	Arithmetic mean	Standard deviation	Coefficient of variability (%)	Dispersion
	12,96	0,0248	19,21	bună

And here we see an average of 12.96, quite small. By determining the standard deviation of 0.0248 and the calculation of the coefficient of variability which is 19.21% confirm the statement related to the arithmetic mean.

Conclusions.

The conclusions resulting from our scientific approach bring to the foreground the hypotheses formulated and which have been confirmed by the results obtained in all categories of tests and evaluations by their statistical interpretation.

From the analysis of the answers to those questioned, we have detached the fact that at the level of the local communities there is openness and support for the successful organization and implementation of the "Judo La Village" program. The support comes from the parents but also from the schools, and the coaches are supported by the local councils.

I am edifying in this regard I find the result of the questionnaire regarding the practice of judo in rural communities: 86% of the number of those questioned considers very important the practice of judo in the rural (village) and 14% argue to be important. In the current conditions in

Romania I consider the capital that the coaches are supported by the local communities, both financially and with the training spaces, in maximum percentage.

In the context of the general demographic regression in Romania, we consider that the primary human resource can be ensured for the practice of performance judo.

The coaching teachers involved in the judo program in villages are specialized in the judo discipline who know the new guidelines on national and international judo. They participated in the training courses organized by F.R.J.

Analyzing the responses of the 14 respondents (especially on the technical side) we notice that they have a rich baggage of knowledge that prove to assimilate the requirements necessary for the preparation of Judoka athletes in the village environment.

Thus we consider that practicing the performance judge in the rural area, can ensure the "raw material" for future champions.

The final conclusion is that the training program applied by us was effective, beneficial for creating the premises of the future performances of the little judoka in the village (rural) environment.

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