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THE IMPACT OF PHYSICAL ACTIVITY FOR SENIOR FALL PREVENTION USING NORTHERN WALKING

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Abstract: *Falling is one of the main problems in the lives of older people. Falls experienced affect the further life of seniors and limit their physical activity. Nordic walking can be used as a means of preventing repeated falls and promoting physical activity. Nordic walking in Lithuania is still a new and completely unexplored methodology, the full benefits of walking have not yet been proven, and little research has been done. Aim of the research was to investigate the improvement of physical activity and fall prevention in the elderly using Nordic walking. Methods of the research: Desmond Fall Risk Questionnaire; Berg Balance Scale and balance samples of Schmitz; The quality of life Questionnaire (SF-36). Results: After 7 weeks of exercises, the risk of fall decreased for all subjects. Physical activity increased statistically after doing Nordic walking, the average physical activity of the study group increased. Control groups results also improved. Conclusions: Physical activity improved statistically significantly ($p < 0.05$) The frequency of falls decreased statistically significantly ($p < 0.05$). The static and dynamic balance of the elderly improved statistically significantly ($p < 0.05$). The risk of falling after NW was statistically significantly reduced ($p < 0.05$).*

Key words: *Trauma, Elderly, Physical Therapy., Rehabilitation.*

INTRODUCTION

Aging is a natural process common to all living nature and human. Aging is an inevitable stage of life, which can be called the process of change of biological, social and cognitive functions (Garlauskaitė A., et al., 2015). Physiological changes cause psychological difficulties, increase the fear of falling, people become more closed, afraid to perform their daily activities (Lim E., 2016). Loss of muscle mass and strength can be caused by malnutrition, too many calories can lead to obesity or overweight, which affects physical activity. Hormonal changes also affect the human body. Altered blood testosterone levels, vascular thrombosis, changes in muscle strength and mass (Rocha S.V., et al., 2016). Successful aging is a life long process that requires physical activity, disease prevention, and health (Martin P., et al., 2014). Collapses and related injuries are a serious global health problem experienced by individual over 65 (Frieson C.W., et al., 2018). Falling is not only associated with morbidity or mortality but also up to 60% of injuries sustained during a fall can have long-term effects on a person's independence, which can later lead to major daily activity limitations and active access to long-term health care (Prometti P., et al., 2016). The problem of aging is often addressed, but the problem of the risk of collapse is not addressed and collapse prevention is not applied. Collapses in adulthood can lead to loss of independence, disability, or even death (Ishigaki E., et al., 2014). To prevent recurrences and reduce the number of falls, multifactorial interventions include the analysis of the home environment and the elimination of causes of falls, vision testing and evaluation, review and adjustment of medications, and targeted exercise programs (Ishigaki E., et al., 2014). However, collapse is most of ten determined by a combination of several factors (Abreu D. R., et al., 2016). Disorders of coordination, balance, and gait characterized by emotional, mental, and neurological factors (Cifu D. X., et al., 2018). Physiotherapy and its methodologies help to avoid the risk of collapse in the elderly and the elderly (Prata M.G., et al., 2015). Regular physical activity reduces the fear of falling, increases self-confidence, strengthens all muscle groups, and improves quality of life (Royset B., et al., 2019). Nordic walking is a great way to improve your quality of life. Nordic walking is a form of physical activity suitable for

older people to improve their health and reduce the risk of falling. The International Nordic Walking Association states that the basic principle of Nordic walking is natural and graceful movements (Tschentscher M., et al., 2013). NW (Nordic Walking) is a fast-learning, simple, safe, inexpensive, stability-promoting, health-promoting form of physical activity that can be practiced by people of all ages. During physical activity, all the muscles of the body are activated, 90% of the muscles of the whole body work during walking. The use of special sticks forces the muscles of the shoulders, arms and torso to work (Hagner - Derengowska M., et al., 2015). There is also a decrease in body weight, blood cholesterol, and torso volumes (Fischer M.J., et al., 2015). NW can help increase the amplitude of movements and promote the emergence of decreased functions (Fischer M.J., et al., 2015). Nordic walking is one of the forms of physical education or applied physical activity that can be practiced for rehabilitation or recreation purposes: recovery of physical skills, improvement of psychological state and social perception. The benefits of Nordic walking for people with various health conditions are proven by many studies. HR can help increase the amplitude of movements and promote the recovery of decreased functions. The study found that in women with breast cancer, HRT reduces pain sensitivity, improves lymph flow, and is a safe form of physical activity (Fischer M.J., et al., 2015).

RESEARCH PARTICIPANTS AND METHODS

Research Bioethics The research protocol was formally approved by the Bio Ethics Committee of Klaipeda University, in September 2019 and carried out according to the Helsinki Declaration. Respondents participated in the quantitative study voluntarily; all submitted questionnaires and questionnaires were anonymous and did not require them to write either their name or surname, they filled in everything independently without the help of the researcher. All participants signed the informed consent form to ensure that the information they provided was correct. The research was carried out in accordance with the ethical aspects of the research: the principles of anonymity, respect, confidentiality. The anonymity of the subjects is guaranteed that their personal data will not be mentioned anywhere, the data obtained during the study will be used only in a general form. The principle of voluntariness,

where individuals participate in a study voluntarily, may at any time refuse to participate in the study and terminate their participation. The principle of respect, when the subjects are introduced to the purpose of the research, to acquaint with how the research will be carried out, is shown by filling in sample questionnaires. All subjects were third-age students (seniors) of Klaipeda University. The study included n = 16 patients, n=3 were aged 50 to 60 years, n= 9 were aged 61 to 70 years, and n=4 patients were aged 71 to 80 years. The mean age of the subjects was (68 ±5, 8) years. The groups are homogeneous. The participants in the study had to meet the following criteria: The gender distribution of the subjects is formed, everything will depend on the existing people and the desire to participate in the study; Age 60 - 78 years; Having balance, coordination disorders; Signed consent to participate in the study. Without diseases or disorders significantly restricting the function of movement. Participants who did not meet criteria's were excluded from the research: Participants under: 60 years of age; did not sign consent to participate in the study; Inability to move independently; Suffering from severe heart disease.

Research instruments: Desmond Fall Risk Questionnaire (Desmond A. L., 2000). Designed to identify factors influencing the risk of collapse. The questionnaire consisted of 15 questions. Each question can be positive or negative. A positive answer indicates the factors influencing the risk of collapse. A negative answer negates the potential risk of falling that increases that person's fall.

Berg Balance Scale (Berg K., et al., 1992); Designed to assess static and dynamic body balance. The scale consists of 14 tasks that performed while sitting and standing. It is a reliable and valid assessment method for examining the risk of falls in the elderly. The test assesses the patient's ability to maintain a position with a smaller support area when sitting, standing with both feet on one side. The patient's ability to change position is also determined. All tasks are evaluated with points from 0 to 4. The highest score of 4 evaluates the patient's ability to perform movements freely and independently, to maintain a certain body position for the required period of time. 0 points fail to complete the given task. The maximum score on the whole scale is 56 points. A score of 41-56 indicates a low probability of collapse, 21-40 a moderate

probability of collapse, and a score of 20 or less indicates that the patient has severe imbalance and coordination and this has a high probability of collapse.

SF - 36 quality of life questionnaire (Ware J.E., et al., 1992). Consisting of 36 questions covering eight areas of life: activity, activity limitation due to physical ailments, activity limitation due to emotional disorders, social connections, emotional state, vitality, general health, and pain. The questionnaire assesses the well-being of four weeks. Points score the answers to the questions. Each category and area is rated from 0 to 100 using a calculation algorithm. The higher the score, the better the quality of life (100 points indicates the best rating). The questions of the physical activity category are evaluated from 1 to 3 points, the maximum number of points is 100. The "SF - 36" questionnaire is standardized, i. y. all respondents answer the same questions by choosing the answer that suits them best from the presented answer variants.

Balance samples of Schmitz(Arnold B.L., and Schmitz R.J., 1998) To assess functional skills related to body balance and its control. The test consists of 14 tasks, 7 of which assess static equilibrium, the other seven assess dynamic equilibrium. Throughout the test, the patient's ability to maintain a normal position with their feet shoulder-width apart, compressed, or standing on one leg is assessed. The patient's ability to maintain an unexpectedly disturbed balance when the investigator pushes the patient forward, backward, or sideways is also assessed. Assessing the dynamic balance, the patient must go foot to foot, go to the sides, change the direction of walking according to commands, go in a circle on the toes on the heels. Test for evaluations 5-point system: maximum score 4 when a person maintains a normal static and dynamic balance during the task. 3 points - more difficult to perform movements or maintained position, inaccuracies occur during the movement. 2 points - difficult to maintain body position, movements are rhythmic and become even more inaccurate with increasing speed of performance. 1 point - very difficult to maintain body position, movements are arrhythmic, inaccurate, tremors occur, side movements. A minimum of 0 points for not performing the requested movements did not maintain either static or dynamic equilibrium. The duration of the whole test is 10 - 15 minutes. The maximum score of the test is 56 points.

Research progress The research was performed in Klaipeda seaside forest-park from 04.11.2019 to 20.12.2019. For both groups, the Nordic walk lasted 7 weeks. Classes were held in the forest on established routes. One session lasted 90 minutes. Nordic walking technique was applied. Respondents in the study were given two methods to reduce the risk of falling: Nordic walking and balance exercises. Warm-up and stretching exercises were performed before each walk. After studying, the factors influencing the risk of falls and assessing the static and dynamic balance and physical activity of both groups, Nordic walking activities were started. Subjects were divided into two groups: 8 women in the control group and 8 in the study group. Classes were held three times a week for the study group and twice a week for the control group. The study group used Nordic walking and balance exercises, while the control group used only Nordic walking. Participants of Nordic walking were taught. All research participants were tested twice. The first test was performed before the start of the sessions, the second time after the end of all sessions after seven weeks. Statistical data analysis was performed using Microsoft Office Excel 2016 software package, Microsoft Office Word 2007 and SPSS 17.0 software. The characteristics of the results were reviewed by calculating the arithmetic mean, standard deviation, sampling error. The reliability of the results was determined by using a significance level α (p) <0.05 (95% reliability).

RESULTS

Desmond fall risk questionnaire data. The questionnaire identifies potential collapse risk factors. The table presents data on risk factors for human falls. To the first question, "Have you collapsed or stumbled this year?" Half of the group, i.e. 50 percent answered in the affirmative. In the control group, 37.5 percent answered positively subjects. The research group to the second question, "Are you afraid of falling and this limits your activity?" 62.5 percent. responded with a positive control of 37.5 percent. 25% experience dizziness or a feeling of dizziness when lowering or flipping their head in bed. research and 50 percent. control groups. When walking in the dark or between store stalls, both groups also feel constrained by 50 percent each. If Question 3, 4 or 5 is answered in the affirmative, a vestibular disorder can be

judged, in which case patients are more likely to be guided by vision while maintaining body position while walking or performing certain activities. When asked whether the feet or toes were freezing or numb, both groups also answered 62.5 percent. Only 12.5 percent of the study group answered the question whether you wear glasses. Those who lose balance or feel weakness and dizziness on standing up are named by 37.5 percent. subjects and 50 percent. control groups. Those taking medication for depression or to improve sleep said 50 percent. research and 12.5 percent. control group individuals. Those taking more than four prescription drugs per day in both the study and control groups reported 12.5 percent. Leg stiffness was not mentioned by any group. 50 percent the study groups indicate that they cannot go in a straight line, pull to one side or the other, and the control groups of the study groups indicate 37.5 percent. Regular physical activity for more than 6 months was reported by the study group at 50%. control 62.5 percent. Proper physical activity and motivation and active participation are essential to prevent falls and improve fall prevention. The last question about improving balance and mobility was mentioned by 87.5% of the study group and 100% by the control group.

Table 1 Desmond collapse risk data

Question	Researchgroup		Controlgroup		Difference between groups
	Taip	Ne	Taip	Ne	
1. Have you fallen or stumbled this year?	50%	50%	37.5%	62.5%	p>0,05
2. Are you afraid of falling and does this limit your activity?	62.5%	37.5%	37.5%	62.5%	p<0,05
3. Do you experience dizziness or a tingling sensation when you lie down, lower your head, or turn over in bed?	25%	75%	50%	50%	p>0,05
4. Do you feel unsteady or constrained while walking between queues in a store	37.5%	62.5%	12.5%	87.5%	p<0,05

or places where there are a lot of other people?				%	
5. Do you have difficulty walking in the dark or on uneven surfaces such as gravel roads or sloping sidewalks	50%	50%	50%	50%	p>0,05
6. Do you feel frequent colds or heating, numbness, or itching of your feet or toes?	62.5%	37.5%	62.5%	37.5%	p<0,05
7. Do you wear bifocal or trifocal glasses or is your vision noticeably better in one eye?	12.5%	87.5%	----	100%	p<0,05
8. Do you lose your balance or feel weak or dizzy when you stand up?	37.5%	62.5%	50%	50%	p<0,05
9. Are you taking medication for depression, anxiety, nervousness, pain, or sleep?	50%	50%	12.5%	87.5%	p<0,05
10. Do you take more than 4 prescription medications per day?	12.5%	87.5%	12.5%	87.5%	p>0,05
11. Do you feel like your feet aren't going where you want to go?	-----	100%	-----	100%	p<0,05
12. Do you feel like you can't walk in a straight line or pull in one direction?	50%	50%	37.5%	62.5%	p<0,05
13. Do you exercise regularly for more than 6 months?	50%	50%	62.5%	37.5%	p<0,05
14. Do you think that no one really understands how strongly dizziness and balance problems affect your quality of	----	100%	25%	75%	p<0,05

life?					
15. Are you interested in improving your balance and mobility?	87.5%	12.5%	100%	----	p<0,05

Berg Balance Scale. Figure 1 shows the scores of the Berg equilibrium scale of the experimental and control groups during testing I and II. The average of the results of the balance test of the experimental group during the first test was 46.75 ± 4.17 points, after the application of balance training exercises and Nordic walking the balance increased statistically significantly to 51.87 ± 3.30 points ($p < 0.05$). In the study group, the highest score on the Berg Body Balance Scale in Test I was 54 points and the lowest was 42 points. During the second test, the highest was 56 and the lowest was 47 points. The mean of the Berg equilibrium scale of the control group in Test I was 48.75 ± 4.01 points, and in Test II the control group treated with Nordic walking only did not increase statistically significantly by 51.37 ± 3.29 ($p > 0.05$) points. In Test I, the highest scale score was 52 and the lowest was 40. In Test II, the highest score was 54 and the lowest was 45 points. The equilibrium results of the study group improved by 5,126 points after 7 weeks, while the control group increased by 2,625 points. The change after 7 weeks between the study and control groups was statistically significant ($p < 0.05$).

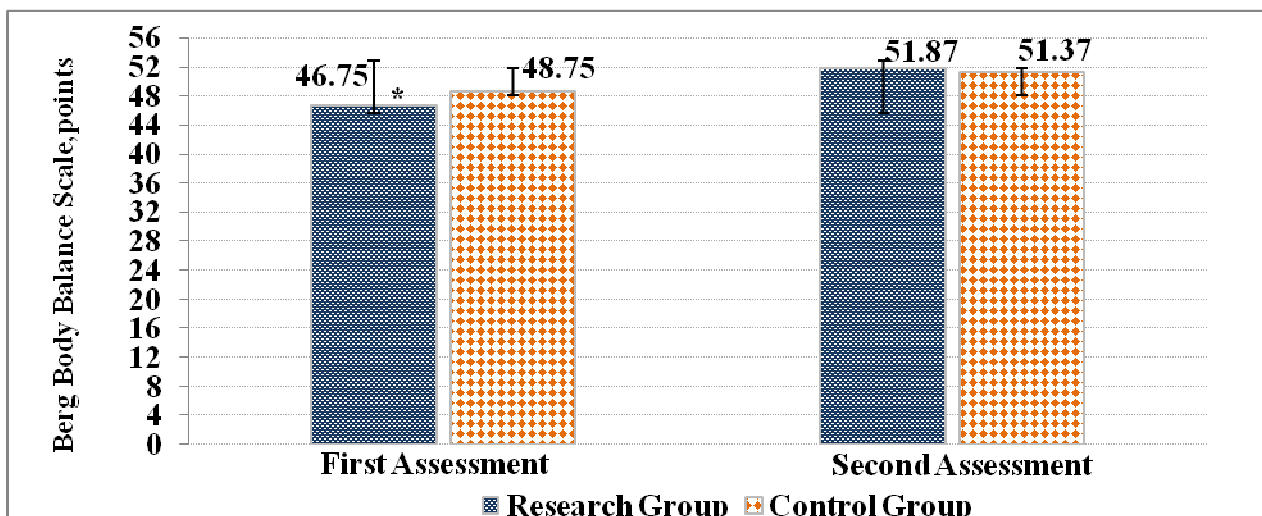


Fig. 1 The mean of the Berg body balance scale of the research and control groups during tests I and II * $p < 0.05$, comparing the results of tests I and II. SF-36 (part of physical activity) results.

SF-36.Quality of Life Fig. 2 shows the physical activity indices of the experimental and control groups in points I and II during testing. The average of the results of the physical activity test of the experimental group during the first test was 70.625 ± 14.83 points, after the activities in the final test the physical activity increased statistically to 88 ± 8.62 points ($p < 0.05$). The highest assessment of physical activity in the study group during testing I was 100 points, the lowest - 45 points. During testing II, the maximum is 100 points, the minimum is 75 points. The mean of the physical activity test of the control group in the first test was 79.375 ± 13.25 points, and the mean of the repeated test in the second test increased statistically significantly by 91.25 ± 5.12 ($p < 0.05$) points. During the first test, the highest score was 95 points and the lowest was 60 points. During the second test, the highest score was 100 points and the lowest was 75 points.

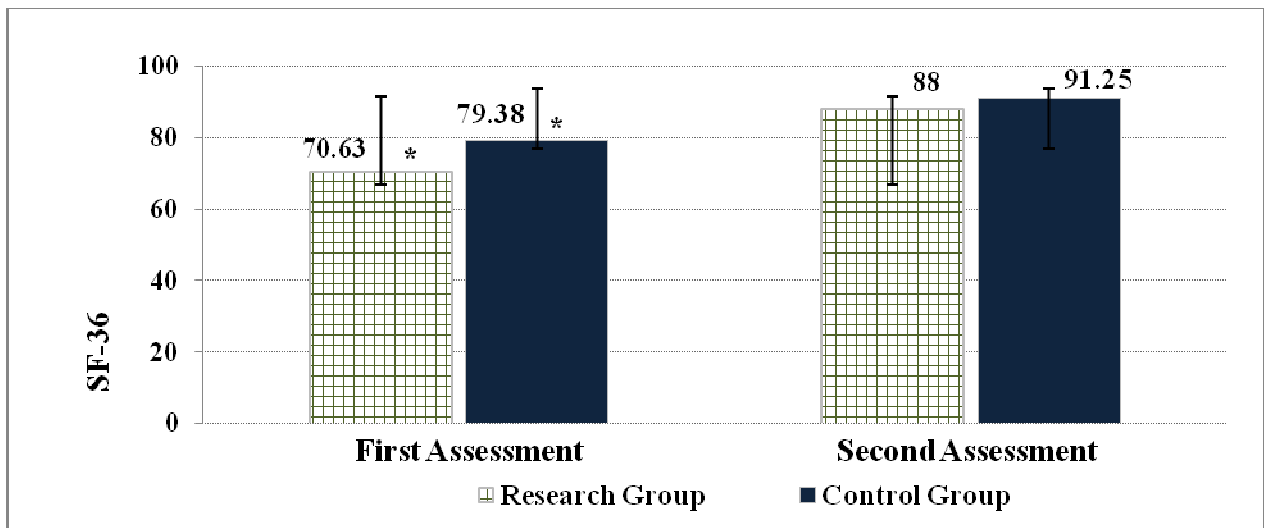


Fig. 2 Mean scale of physical activity scales of experimental and control groups during tests I and II * $p < 0.05$, comparing the results of tests I and II Results of equilibrium samples.

Balance samples of Schmitz. Assessment results shows at Fig. 3 the scores of the equilibrium samples of the experimental and control groups during the first and second tests. The mean of the equilibrium test results of the study group during the first test was 48.125 ± 2.61 points, after seven weeks of Nordic walking after the second test the equilibrium test result statistically increased to 51.75 ± 1.91 points ($p < 0.05$). From the research group, the highest score was 51 and the lowest was 44 during the first evaluation. In the second test, the highest score was 54 and the lowest was 49 points. The mean of the first test of the equilibrium samples of the control group increased by 49 ± 2.72 points, and the mean of the retest increased statistically to 51.875 ± 1.98 ($p < 0.05$) points. During the first test, a maximum of 52 points, a minimum of 43 points. During retesting, the highest was 54 points, the lowest was 47.

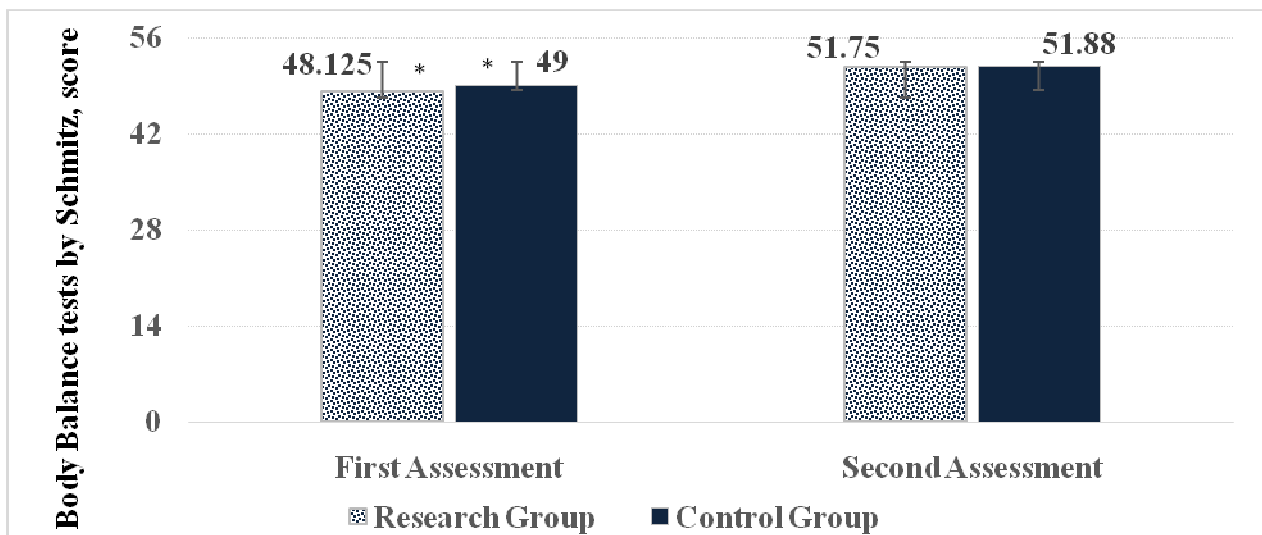


Fig. 3 Equilibrium samples of experimental and control groups during tests I and II * $p < 0.05$, comparing the results of tests I and II

Discussion. One aspect of aging is muscle loss otherwise still sarcopenia. As muscle mass decreases, so does muscle strength, which is associated with loss of function and disability. All of these factors complicate the functional movement of people. It becomes difficult for a person to get up from a sitting position, take care of personal hygiene and perform routine household chores (Papa E.V., et al., 2017). Loss of muscle mass increases the likelihood of collapse risk and the onset of independence (Santilli

V., et al., 2014). Reducing the number of falls requires continuous preventive physical activity programs that have a positive effect on fall prevention, improve balance, and increase muscle strength (Ishigaki E., et al., 2014). According Royset B., et al., during falls, there are bruises, fractures, which in the fairy tale deteriorates the quality of life, after injuries there is a fear of walking, and the risk of falling again increases. In the study, the authors argue that balance training and muscle strength exercises are very important in preventing collapse. Constant maintenance of physical activity and fall prevention reduces the fear of falling, encourages self-movement, and increases self-confidence (Royset B., et al., 2019). In most studies, gender is very often singled out as a risk of collapse. White and co-authors in their study tried to investigate the reasons why women are more likely to experience falls than men. It has been found that overweight women have a faster deterioration in balance and gait changes. Women are more likely to develop chronic diseases and experience fatigue more quickly than men (White A.M., et al., 2018). Only older women with balance problems were included in the study. Some patients experienced at least one collapse per year. Almost all subjects who experienced collapses also experienced the consequences of collapses such as bruises, dips, or fractures. The aging process determines social, economic and health problems that complicate the lives of older people and affect their quality of life. As external environmental conditions change, the body's system changes, so external environmental factors can be used as health-promoting factors. Active physical exercise belongs to the group of external factors (Dunn S., et al., 2013). Nordic walking was used as a methodology in the study. Nordic walking is a form of physical activity that uses special sticks designed for this purpose; they are used for hand resistance. Nordic walking increases gait speed and cardiovascular metabolism (Takeshima N., et al., 2013). Nordic walking is a great way to improve your quality of life. The International Nordic Walking Association states that the basic principle of Nordic walking is natural and graceful movements (Tschentscher M., et al., 2013). Nordic walking is one of the forms of physical education of applied physical activity that can be used for rehabilitation or recreational purposes: recovery of physical skills, improvement of psychological state and social perception. The benefits of Nordic walking for people with various health conditions are proven by

many studies. HR can help increase the amplitude of movements and promote the recovery of decreased functions (Fischer M.J., et al., 2015). Nordic walking can be an engagement in the physical activity of all people because it is a safe physical activity that is easily accessible and has a positive impact on people's physical, mental, and social health (Tschentscher M., et al., 2013).

Physical activity reduces the risk of falls and the fear of falling. After analyzing the data of the study, statistically significant correlations were observed between the subjects' fear of collapse and physical activity ($p < 0.05$). People with low physical activity are statistically more likely to experience falls than people with moderate physical activity. Statistically significant correlations between falls and physical activity were also observed ($p < 0.05$). All subjects with low physical activity were more likely to experience falls than those with moderate to high physical activity ($p < 0.05$). In a study conducted with co-authors, A. Harnish points out that in order to reduce the risk of falls in the elderly, it is very important to pay attention to the duration of the program, the variety of exercises, the choice of appropriate workload (Harnish A., et al., 2016).

One way to increase physical activity is Nordic walking. During Nordic walking, more upper body muscles are involved in the work, which is involved without direct human perception. After seven weeks of Nordic walking exercises, there was a statistically significant improvement in the physical activity of all subjects ($p < 0.05$). With the improvement of physical activity, the risk of falls also decreased statistically significantly ($p < 0.05$). In the balance samples, the most difficult for the subjects was to go in a straight line leg to foot, not to swing 360 degrees around its axis, easily losing balance when suddenly pushed. In the Berg equilibrium samples, the most difficult for the subjects was to pick up the object from the ground without falling sideways, forward or backward. It was also difficult to stand on one leg or walk abruptly to change direction. Some patients had difficulty climbing the stairs, climbing only the introductory step, and climbing only to the second floor holding behind the handrails. After the applied balance exercises and Nordic walking, the balance of all subjects improved statistically significantly ($p < 0.05$). The change in equilibrium in the study group was statistically significant than in the control group. Nordic walking

and balance exercises three times a week were more beneficial for the study group and a greater change was found than for the control group, which was treated twice a week. According to the questions answered by the SF - 36 life questionnaire before and after the Nordic walk, it can be stated that the increase in physical activity, improved balance and coordination, and the decrease in falls resulted in a statistically significant improvement in the quality of life of the subjects ($p < 0.05$). In summary, properly identified risk factors for falls, accurately assessed motor skills and appropriate physical activity, intensity, duration and frequency can have a positive effect on balance and coordination, reduce the risk and fear of falls, improve quality of life.

Conclusions

Physical activity improved statistically significantly ($p < 0.05$) after evaluating physical activity before the study and after the Nordic walking methodology. Improved physical activity reduces the risk of falling and improves the quality of life. Increased physical activity has a positive effect on fall prevention. The higher the physical activity, the lower the risk of falling. As the frequency of physical activity increased, the frequency of falls decreased statistically significantly ($p < 0.05$). After seven weeks of Nordic walking sessions, the static and dynamic balance of the elderly improved statistically significantly ($p < 0.05$). Improved static and dynamic balance improved patient and coordination. As physical activity increases, the risk of falling decreases, people's quality of life improves, people become motivated, more active, discover the fullness of life, reveal themselves. The risk of collapse after CT was statistically significantly reduced ($p < 0.05$).

Practical recommendations: Nordic walking originated in 1997. In Finland and quickly became popular not only in Finland, in Germany, Norway, Sweden, France. Nordic walking to Lithuania came about 2007, and the first courses took place in that year. The abundance of research papers only tentatively helps to select appropriate forms of physical activity. Researching, using and integrating new methods will always remain an issue. In order to improve the physical and mental health of people

of different ages, integrated rehabilitation methods are needed, especially after the COVID-19 pandemic. So Nordic walking is a very effective tool that can be easily transported, easily adapted to different weather and geographical conditions to a different population groups.

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ASPECTS OF THE IMPORTANCE OF FIRST METATARSOPHALANGEAL JOINT IN THE PROCESS OF GAIT RECOVERY

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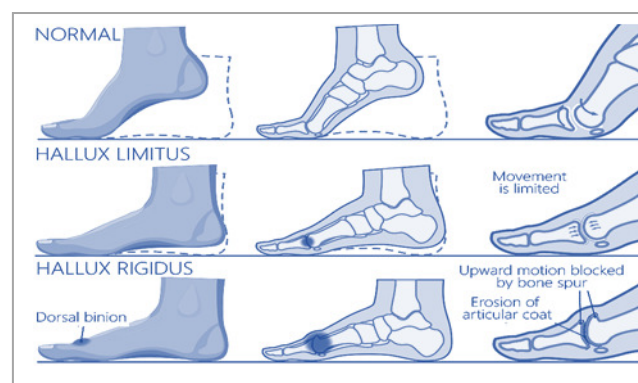
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Murgoci Nicolae

Abstract

The purpose of the present scientific research is to take into consideration the importance of rehabilitation of the first metatarsophalangeal joint in the process of physio cycling in order to recover the gait. Hypothesis: patients over 55 age has hallux rigidus that determine the vicious angulation of the ankle by reduction of the normal range of motion. The aim of this research is to analyses the possibility of applying kinetic programs for the first metatarsophalangeal joint too, in the process of horizontal cycling. Recovering the independence of gait in order to improve the quality of life it is a crucial factor of rehabilitation. Materials and Methods: 19 patients over 55 years age, period November 2020- March 2021 diagnosed with different pathologies (excluding amputation) that affects lower limbs and with indication for physiotherapy and Visual Analog Scale maxim 4. Determination of active dorsiflexion and active plantarflexion of the first metatarsophalangeal joint was proceed according to American Medical Association scale of grading. Pearson correlation between right and left foot of the first metatarsophalangeal joint are strong. The most common grade is 3 both for left and right foot on dorsiflexion and plantarflexion, approximately equal distribution on gender. Kinetic program can be used only for the first 3 grades according AMA and hallux rigidus severity grades 0-2. In the process of gait recovery may be possible physiotherapy for 12 patients for the 1st MTF joint among the other programs for kinetic chain.

Keywords: hallux limitus-rigidus, metatarsophalangeal joint, range of motion, activ goniometry



1. Introduction;

The difference between performance and recovery using physio cycling is to use the movement of total ROM of MTP and ankle. Performance cycling blocks ROM of MTP joint in order to use total force of quadriceps and Gluteus maximus, Semimembranosus. Muscles involved in cycling are as in figure 1. For the measurement of the 1st MTP joint motion was based on goniometry according to American Medical Association (AMA) standards:

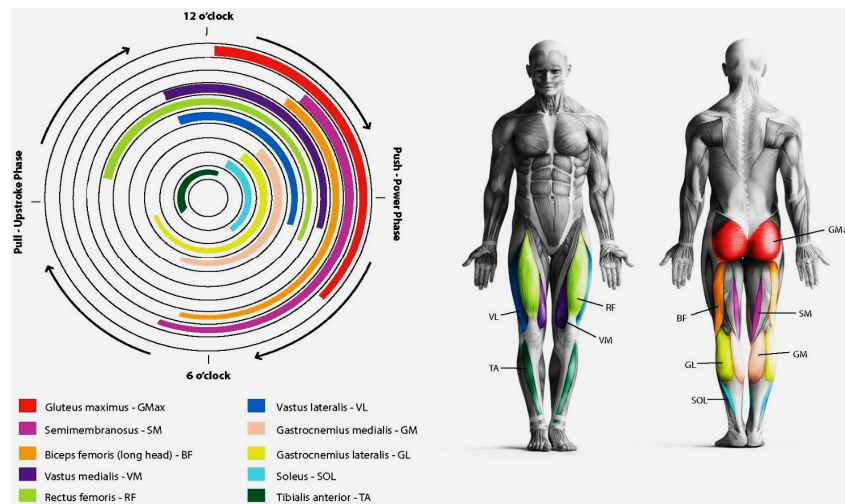


Figure 1 Stress-Strain relation – Muscles involved in cycling after “The Secret of Cycling”(13)

In this respect it was considered the possibility of improvement of the 1st MTF joint to recover an correct gait using a physio-bike. First metatarsophalangeal joint integrity influences the kinetic chain of the lower limbs so it is crucial to have a good function of it by improving structure components and revers. Wolff's Law states that bones will adapt to the degree of mechanical loading, based on the stress or demands placed on them or stress-strain relation. (10). The process bases on the core principle that function determines the structure and an appropriate structure maintains the function. Examination before articular testing of the subjects of the 1st metatarsal-phalangeal joint involved: inspection-looking for Celsus signs: rubor- redness, calor -heat, tumor - tumefaction, dolor - pain and functional impotence, callus pattern or obvious deformity;palpation of the joint for areas that cause pain, percussion and auscultation – crackments; measurements - the range of motion of the joint was tested according AMA standards.

If the MTP joint has a reduced ROM during the test, it is a tell-tale sign of a condition called functional hallux limitus or hallux rigidus classification. (11) The movement is limited during gait due to the blockage of this function - commonly known as "jamming up". (2) in phases 3



Figure 2. Three phases of gait: contact, midstance, propulsion after (6)

One of the most important targets of physiotherapy is the recover the gait, the independence of Activities of Daily Living (ADL) and well-being state.

American Medical Association provide values for MTP joint of the first toe. In general, flexion and extension of the first toe is greater than flexion and extension of the lesser toes. It was considered the MTP joint to be at 0 degrees when the metacarpal and proximal phalanx are in a straight line. (1,4). Measurements of the MTP joint varied as to whether the goniometer was aligned on the dorsal or medial aspect. (4,5)

Hallux limitus refers to the stiffness of big toe joint - a condition that is characterized by a decreased range of motion and pain at first metatarsophalangeal joint. Hallux Rigidus (or Hallux Limitus) is a degenerative condition leading to reduced range of motion in the first metatarsophalangeal (MTP) joint of the big toe or great toe which can impair normal gait function, during the propulsive phase. Physiotherapeutic exercise for joint amplitude- the maximum possible length can be used, not the force (8)


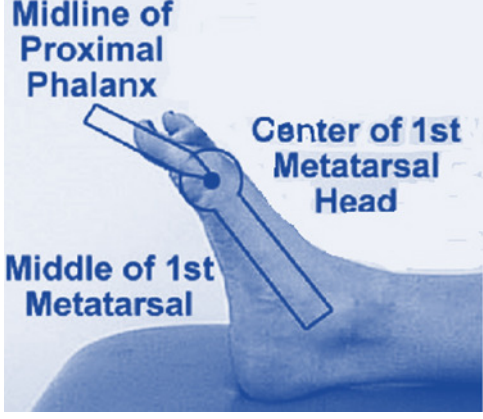
2. Materials and methods

Subject: 19 patients over 55 years age from own portfolio from period November 2020- March 2021 diagnosed with different pathologies (excluding amputation) that affects lower limbs and with indication for physiotherapy. Determination of active dorsiflexion and active plantarflexion of the first metatarsophalangeal joint was proceed according to American Medical Association scale of grading.

Procedures: Goniometry - Axis – medial to center of metatarsal head; Stationary arm – aligned metatarsal, Moving arm – aligned with proximal phalange.

In the present study, I considered medial goniometry and subject in supine position.

Tabel 1 Goniometry normal values after (12)

Metatarsophalangeal Joint Dorsiflexion	Metatarsophalangeal Joint Plantarflexion
 <p>Source (9) Goniometry, Dr. Benjamin Saviet</p>	 <p>Source (9) Goniometry, Dr. Benjamin Saviet</p>
<p>Normal degrees (9) 65° to 75°</p>	<p>Normal degrees (9) >30°</p>

All subjects evaluated in according to AMA standards and interpretation of the results considered as in table 2.

Tabel 2 AMA standards versus grading hallux rigidus severity

1stMTP Grade	Plantar Flexion (AMA)o	Dorsal Flexion (AMA)o	Grading hallux rigidus severity (3)	Clinical findings (3)	Treatment (except medication)
1	50	30	0	No pain; only stiffness and loss of motion on examination	physiotherapy
2	40	30	1	Mild or occasional pain and stiffness; pain at extremes of dorsiflexion and/or plantarflexion on examination	physiotherapy

3	30	20	2	Moderate-to-severe pain and stiffness constant; pain occurs just before maximum dorsiflexion and maximum plantar flexion on examination	physiotherapy
4	20	10	3	constant pain; substantial stiffness at extremes of ROM but not at midrange	surgery
5	10	10	4	3 +definite pain at midrange of passive motion	surgery

Microsoft Excel used for general data and IBM SPSS Statistics software, Version 25 was used to calculate correlations, means, and deviations from standards, frequency, and domination.

3. Results

Demographic variables: Age: four groups of patients: 55-60 years, 61-65 years, 66-70 years – 26.32%, over 70 years – 21.05% . Fisher test $\chi^2 > 7.81$, $\phi > 0.4$, ratio Cohen >0.4 shows strong relation between 1st MFP joint reduced ROM and all groups of age.

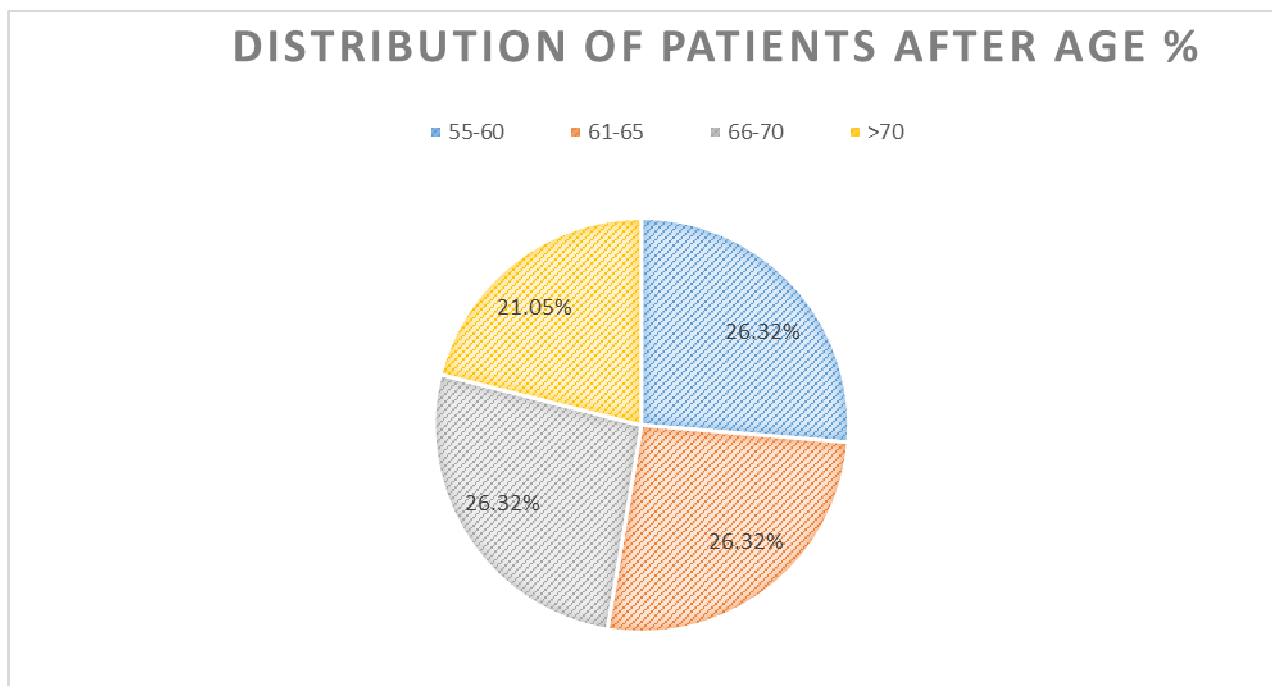
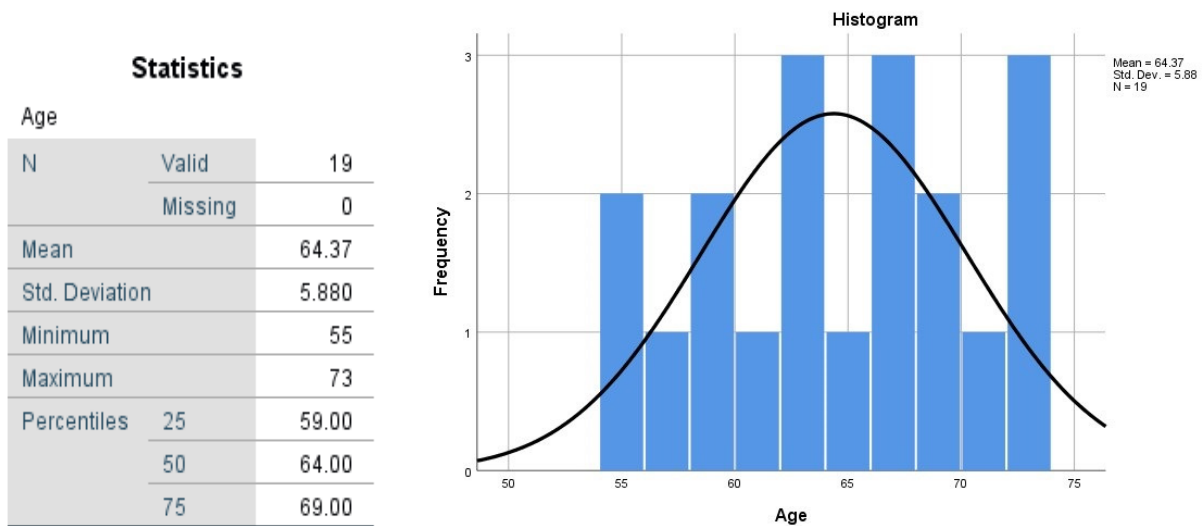


Figure 3 Distribution of patients after age (%)

Mean age = 64.37 ± 5.880 ; Std. Deviation; Min= 55, Max = 73; notable difference between 55-60 years and >70 years.

Tabel 3 Mean/Std. Deviation Age/Frequency



Gender: From 19 patients there are 9 women and 10 men. Men are 60% in age groups: 66-70 years and 55-60 years, statistical significant ($\alpha > 0.05$).

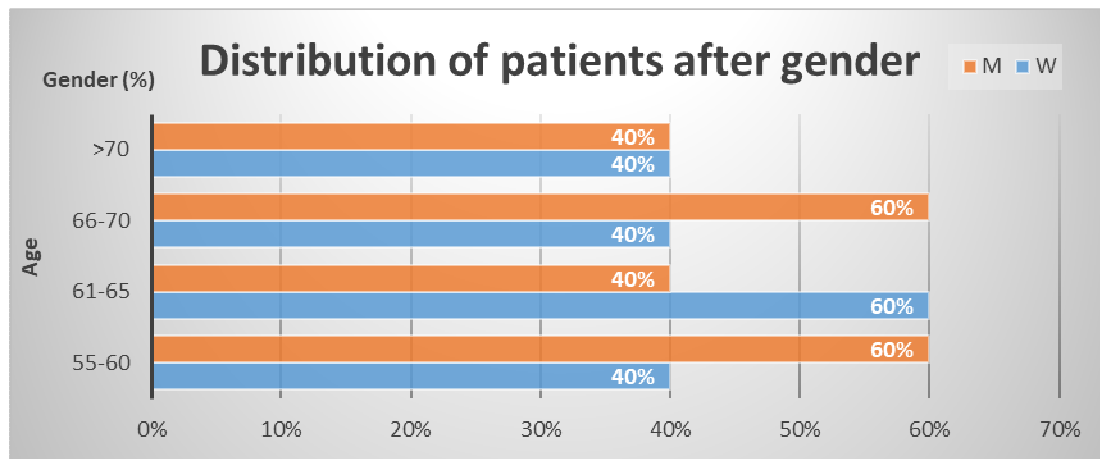


Figure 4 Distribution of patients after gender (%)

Clinical variables.

VAS: all patients have a VAS of pain < 4 points, with an average of 3.75 for patients over 70 years. (significant correlation with age Fisher test $\chi^2 > 7.81$, $\phi > 0.4$, ratio Cohen > 0.4 strong relation between 1st MFP joint reduced ROM and gender, $\alpha > 0.05$)

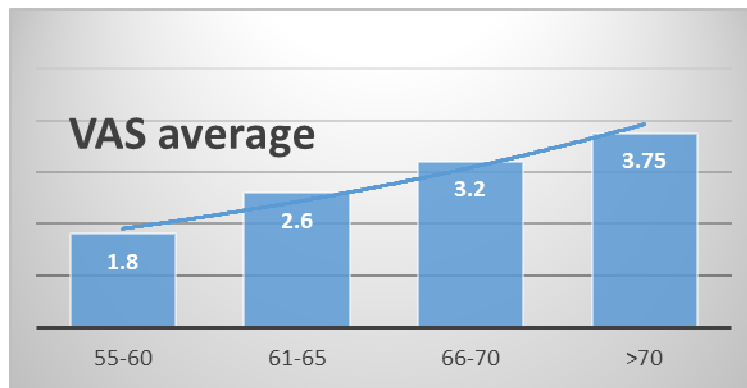


Figure 5 Distribution of patients after VAS average

Goniometry of 1st MTP joint for right and left foot according AMA

Table 4 Goniometry of 1st MTP joint for right and left foot according AMA

Age	Total	W	M	W	M	55-60	W	M	61-65	W	M	66-70	W	M	>70
Count	19	9	10	2	2	5	3	2	5	2	3	5	2	2	4
DF 1MTP R1	1	1	0	1		1									
DF 1MTP R2	7	3	4	1	2	3	1	1	2		1	1	1		1
DF 1MTP R3	9	4	5		1	1	2	1	3	2	2	4		1	1
DF 1MTP R4	2	1	1											1	1
DF 1MTP L1	0	0	0												
DF 1MTP L2	5	1	4	1	2	3					1	1		1	1
DF 1MTP L3	8	3	5	1	1	2	1	2	3		1	1	1	1	2
DF 1MTP L4	5	4	1				2		2	2	1	3			

DF 1MTP L5	1	1	0										1		1
PF 1MTP R1	3	1	2	1	1	2		1	1						
PF 1MTP R2	4	3	1	1		1	1		1		1	1	1		1
PF 1MTP R3	11	4	7		2	2	2	1	3	2	2	4		2	2
PF 1MTP R4	1	1	0										1		1
PF 1MTP L1	0	0	0												
PF 1MTP L2	4	1	3	1	1	2		1	1					1	1
PF 1MTP L3	14	7	7	1	2	3	3	1	4	2	3	5	1	1	2
PF 1MTP L4	1	1	0										1		1

DF – dorsal flexion, PL – plantar flexion, R – right, L - left

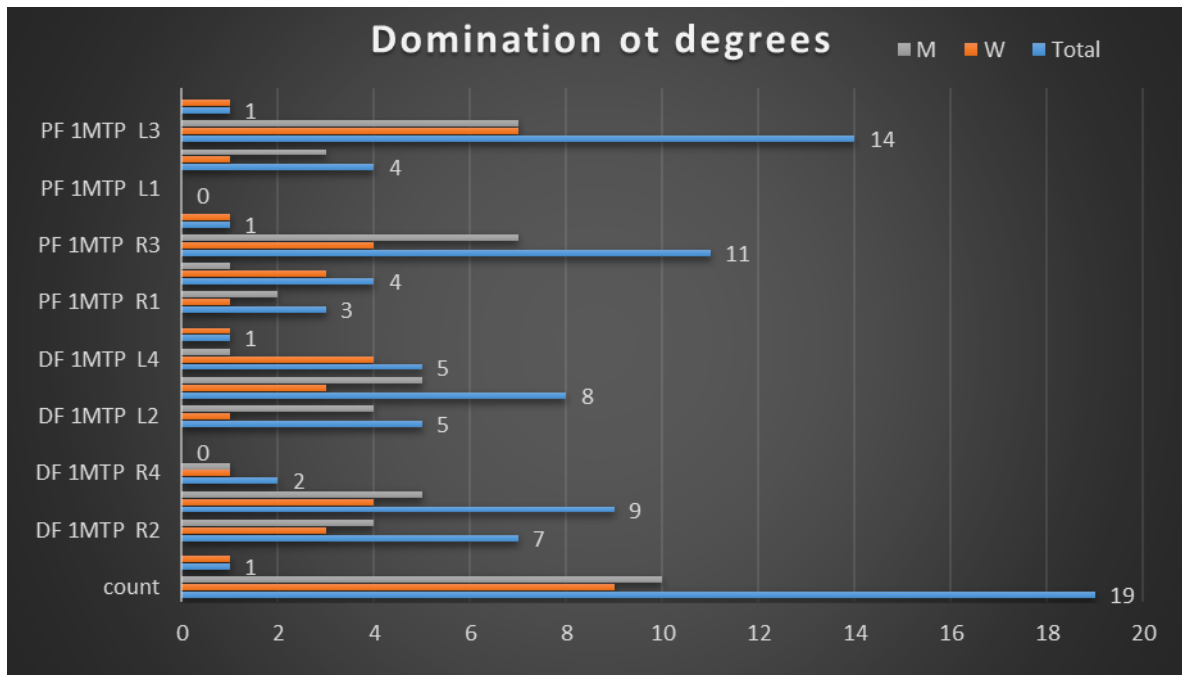


Figure 6 Domination of degrees

From 19 patients: 14 items have **grade 3 for left foot – plantar flexion**, 11 items **grade 3 for right foot – plantar flexion** followed by 9 items grade 3 for dorsal flexion, 8 items grade 3 for dorsal flexion and 7 items grade 2 dorsal flexion with statistical significance ($\alpha > 0.05$, Fisher test χ^2)

Tabel 5 Mean. Sd. Deviation according AMA

Descriptive Statistics			
	Mean	Std. Deviation	N
DF 1MTP R1	1.00	.	1
DF 1MTP R2	1.75	.957	4
DF 1MTP R3	2.25	1.500	4
DF 1MTP R4	2.00	.	1
DF 1MTP L1	.	.	0
DF 1MTP L2	1.67	1.155	3
DF 1MTP L3	2.00	.816	4
DF 1MTP L4	2.50	.707	2
DF 1MTP L5	1.00	.	1
PF 1MTP R1	1.50	.707	2
PF 1MTP R2	1.00	.000	4
PF 1MTP R3	2.75	.957	4
PF 1MTP R4	1.00	.	1
PF 1MTP L1	.	.	0
PF 1MTP L2	1.33	.577	3
PF 1MTP L3	3.50	1.291	4
PF 1MTP L4	1.00	.	1

It is noticed that the highest values are: 3.50 for **PF L3**, 2.75 for **DF R3**.

Pearson correlation between right and left foot are strong between: **DF R3-PF L3**, $r = 0.947$ [CI = 95%]

This means that a patients who has affected the 1st MTP joint of the left foot PF – grade 3 will have probably the right foot affected on DF – grade 3, that is important to gait recovery.

Regarding the distribution on genders the mean has no differences W/M but the standard deviation on men is variated reported to age groups. Pearson Correlation $r = 0.705$ means a strong corellation for both men and women, age over 55 years and redused ROM of the 1st MTP joint.

Tabel 6 Mean/ Std. Deviation after gender of 1st MTF/Pearson Corellation

Descriptive Statistics				Correlations			
	Mean	Std. Deviation	N			W	M
W	2.40	1.805	15	W	Pearson Correlation	1	.705**
M	2.67	2.526	15		Sig. (2-tailed)		.003
					N	15	15
				M	Pearson Correlation	.705**	1
					Sig. (2-tailed)	.003	
					N	15	15

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

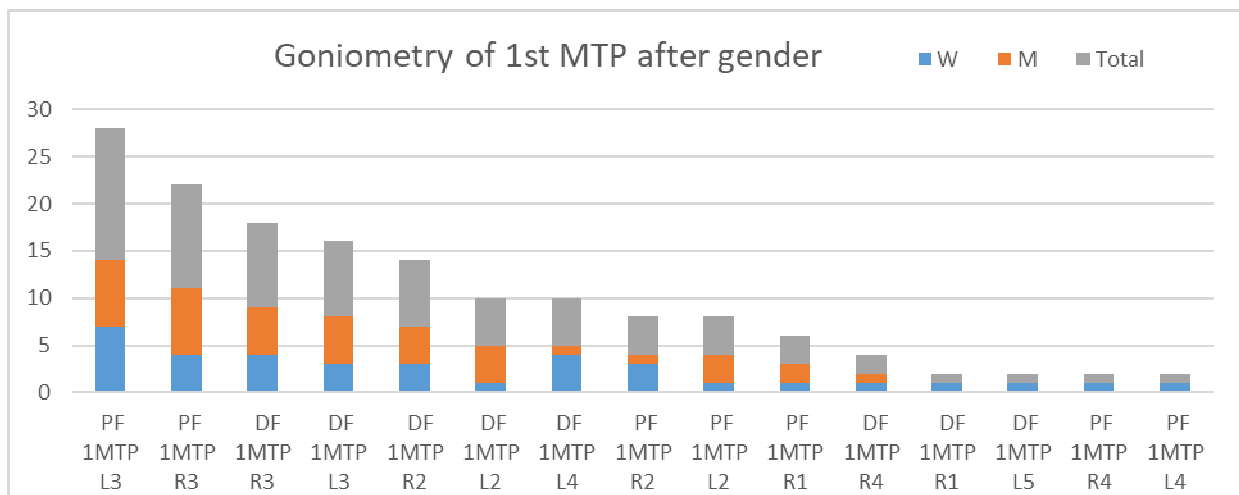


Figure 7 Goniometry of 1st MTF after gender

The most common grade is 3 both for left and right foot on DF and PF, approximately equal distribution on gender.

4. Discussion

Findings according different studies: MTP extension ROM of the first toe was greater when measured medially than dorsally, decreasing with age for MTP extension (dorsiflexion) and less of a difference for flexion (plantarflexion), women have greater ROM in plantarflexion than men and males have greater active and passive dorsiflexion ROM than females.(7)The decrease in extensibility of the plantarflexor muscle–tendon unit was due to connective tissue changes associated with the aging process.Both males and females showed a consistent trend toward decreasing ROM with increasing age, but females had a larger decrease than males.(14,15)

5. Perspective

Tabel 7 Perspectives of gait recovery

Goniometry	Total	Hallux rigidus grades	Perspectives
PF 1MTP L3	14	2	Phsioterapy
PF 1MTP R3	11	2	Phsioterapy
DF 1MTP R3	9	2	Phsioterapy
DF 1MTP L3	8	2	Phsioterapy
DF 1MTP R2	7	1	Phsioterapy
DF 1MTP L2	5	1	Phsioterapy
DF 1MTP L4	5	3	Phsioterapy after Surgery
PF 1MTP R2	4	1	Phsioterapy
PF 1MTP L2	4	1	Phsioterapy
PF 1MTP R1	3	0	Phsioterapy
DF 1MTP R4	2	3	Phsioterapy

DF 1MTP R1	1	0	Phsioterapy
DF 1MTP L5	1	4	Phsioterapy after Surgery
PF 1MTP R4	1	3	Phsioterapy after Surgery
PF 1MTP L4	1	3	Phsioterapy after Surgery

6. Conclusions

1. The groups of age under comparison were homogeneous as number. Fisher test $\chi^2 > 7.81$, $\phi > 0.4$, ratio Cohen >0.4 shows strong relation between 1st MFP joint redused ROM and all groups of age.

2. Mean age = 64.37 ± 5.880 ; Std. Deviation; Min= 55, Max = 73; notable difference between 55-60 years and >70 years.

3. From 19 patients there are 9 women and 10 men. Men are 60% in age groups: 66-70 years and 55-60 years, statistical significant ($\alpha >0.05$).

4. All patients have a VAS of pain < 4 points, with an average of 3.75 for patients over 70 years.

Significant correlation with age: Fisher test $\chi^2 > 7.81$, $\phi > 0.4$, ratio Cohen >0.4 strong relation between 1st MFP joint redused ROM and gender, $\alpha >0.05$.

5. From 19 patients: 14 items have **grade 3 for left foot – plantar flexion**, 11 items **grade 3 for right foot – plantar flexion** followed by 9 items grade 3 for dorsal flexion, 8 items grade 3 for dorsal flexion and 7 items grade 2 dorsal flexion (AMA standards) with statistical significance at Fisher test χ^2 ($\alpha >0.05$).

6. Pearson correlation between right and left foot are strong between **DF R3-PF L3 = 0.947**, AMA standards.[CI = 95%].

7. Pearson Correlation $r = 0.705$ means a strong corellation for both men and women, age over 55 years and redused ROM of the 1st MTP joint

8. The most common grade is 3 both for left and right foot on DF and PF, approximately equal distribution on gender.

9. Kinetic program can be used only for the first 3 grades according AMA and **hallux rigidus severity grades 0-2**.

10. In the process of gait recovery may be possible physiotherapy for 12 patients for the 1st MTF joint among the other programs for kinetic chain.

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RELEVANCE OF USING LOCOMOTOR MOVEMENT SKILLS IN PREPARING PUPILS FOR REAL LIFE

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Abstract

The spectacular evolution of communications systems, accessibility, has increased in the last year due to the restrictions caused by pandemic. We see the tendency of young people to give up any physical activity that requires physical exertion. This study is based on the answers of the 75 subjects, teachers of physical education, 35 students and master students from the last years of study, who were previously informed on the subject around which the questionnaire was addressed. The questions were formulated together with a group of Methodist teachers, physical education teachers. We found that 54.3% of school principals agree to the placement of a center to develop school mobility skills, and 22.2% agree with it only after the vote in the school board. For the opportunity to collaborate with military school teachers in organizing the exercise skills course, 96% of physical education teachers and school leaders responded favorably. We consider that a constructive proposal is the creation of new opportunities for collaboration between schools and especially high schools, with military schools, which can realize partnerships generating value and benefits for students.

Keywords: observation, realism, engagement, adaptation.

Introduction

Physical claims for a student in 2021 are an important factor and not a few difficult challenge, all the more in most current cases in which students are not involved in sports activities under the coordination of a specialist. The reflex of young people to give up without even a little attempt to any activity that involves effort of any kind, produces long-term serious effects in several areas of activity. Before reaching the end of a stage, each of us thinks about what we are going to do, what decisions to take, what are the consequences of these decisions, and especially, what are the implications and what we need to take for each of the viable options. An unrealistic approach or, equally, an overestimation of its own possibilities, invariably leads to failure. In another alternative, lack of information and a low confidence in

their own abilities do not open new horizons and are not sources necessary for spectacular developments. The realistic and objective approach, in assessing with the situations that we face and the ability to accept reality as it is, is the only way we can act and make accurate decisions, with great chances to achieve the proposed goal. James Bond Stockdale (December 23, 1923 - 5 July 2005), formerly Viceamiral and Aviator in the Navy of the United States, received the Medal of Honor, for the period in which he was a prisoner of war in the Vietnam War for more than seven years. Stockdale discovered that the optimism of some comrades or pessimism of others did not help them, as they had the lowest chances of survival. Those who have been able to focus on the ultimate goal, with a balanced and realistic attitude, have gone through this calvary and have been able to survive having always the ability to take into account all aspects, both unfavorable and favorable. In this way, we have the opportunity to correlate optimism with reality. In this spirit, young people, students must be guided when they look at the whole complex context that they are facing before a decision should be taken. The evolution of means of communication, increasing the speed of data transmission and the number of applications used, has produced an evolution in communication, but obviously produced a real problem in psycho-motor development of young people. Increasing the body mass index, BMI, and a motor experiences in continuous decline, consequence of a long period of isolation, a situation produced by the measures taken against the spread of SarsCov2 virus infection, they generated the complex period we are going through, they brought a number of important needs for pupils and students and many tasks for teachers, especially for physical education teachers. The projection that the young people do when they begin the construction of a future plan is clearly correlated with the level of development and the volume of accumulation of theoretical knowledge. Lack or low level of physical training often discourages candidates for a place in higher education institutions. Medium-level physical possibilities, limits their options, although their intellectual possibilities, good working capacity and progress potential would bring value to the higher education system, regardless of the profile. Each of us went through this stage several times in our lives, trying to imagine how we cross a narrow bridge, how we will try to make a turn by bike or ski. Each time I had a picture of the

proposed future actions, some encouraging, some less encouraging, this exercise being assimilated to ideomotor training, a means of training in performance sports, of course in a more evolved form. Ideomotor training is a mental training way through the mental interpretation of a planned activity. In any type of human activity, there is a possibility to predict the succession of operations and their results. No activity involving stress, voltage, danger, does not take place in optimal conditions, if the subject is not brought in a suitable working condition. At the beginning of the specific tasks, the athlete must be concerned, focused on the issue to be resolved. If the motor experiences of the future candidate also include locomotor movement skills in a consolidated or refined form, the hesitation of young people in various activities, the fear of failure will no longer be present and the various physical challenges, tests and verifications will not be an insurmountable obstacle. The wish of any educational institution consists in the formation of a well-defined and attractive professional horizon, aimed at creating the prerequisites for the realization of the young specialist's future plans. The mission of initial training aims at defining the general cultural heritage that constitutes the "substrate for professional culture, not only by the amount of useful knowledge, which it implies, but especially through the qualities of the spirit it develops and which is everywhere. (*Hubert, R., 1965*)

In the situation of any young man, it is absolutely necessary to raise the importance of control over the following events with which it is about to face. The need for control refers to the desire to have control over any situation, because only in this way can we be sure that nothing bad will happen, that things are well done and that we will be able to achieve what we have set out to achieve. This need is closely linked to the lack of confidence in their own skills, which is caused by the meeting of new situations that can be avoided by completing school curricula. Eliminating this unfavorable factor is a not very complicated path that can positively influence the increase in the motor level of young people. These school program adaptations will eliminate the fear of the unknown and will produce a positioning in the comfort zone of those who, without specific experience and training, have been confronted with the fear of the unknown. Many of us, when we are forced to choose between a comfort zone and an interesting but total new activity, avoid attractive activity, often choosing to do what we are

accustomed to doing and not exposing our risks or unknown. Perhaps too often we observe young people who do not seek to do new things, do not develop skills, do not accumulate baggage of new motor experiences that they can use in various stimulating situations, reaching the unknown situations as a danger. The above-mentioned situations generate the fear of the unknown (*USACI, 2008*). Another study published in the journal "Pediatric Journal" brings to the attention of the public another worrying statistics. Globally, now more than ever, a third of children spend time with sedentary recreational activities (playing on the computer or watching TV shows), not outdoors, playing sports. At the end of 2020, the situation became more serious due to the restrictions generated by the pandemic. As long as we do not have an educational system in which sport has an important place, no matter how much it is in, the situation will not change too much. I think that, in our country, sport has reached the situation where, through the skills it currently develops, graduates do not contribute to their insertion on the labour market. It is unanimously accepted that the level of motor skills development is of great importance. It is considered that the whole variety of motor actions performed by the individual in daily activity or in sports, is performed correctly or less correctly, in direct relation to the degree of development of motor skills. Through his persuasive approach, the teacher tries to strengthen and improve the utilitarian skills applied, emphasizing the motivation of the target group and the aspect given by the competition. In gymnasium and high school programs, the applied utility skills have a very small share (*Ashmarin, 1978*). An important argument is that in each school, even with a low material base, it is only necessary for the initiative and the concern of the physical education teacher for the arrangement of a space for the proper conduct of the activity and updating of the school programs, in line with the current needs of the school population. The presented paper brings to the attention of the specialists the importance and results of the use of the locomotor movement skills. Teachers who have this approach, seek to identify arguments and motivational ways to convince a number of pupils to practice sports. In the physical education lesson not only one or two skills are developed, but a wide range of qualities that work together in the motor development of students. An important fact is observed after going through and engaging in sports competitions, namely the increase in self-confidence,

the desire to compete and the elimination of barriers that students considered insurmountable. Students always act consciously, stimulated by the diversity of content and forms of organization of lesson (*Eurydice Education, 2020*). Good provision caused by the race makes the activity attractive. During competitions, students mobilize all neuromuscular resources, being animated by the desire to get victory. Upgrading school programs can make an important contribution to solving the complex problems that the physical education teacher has to solve. Thus, a constructive proposal is represented by the possibility of materializing new collaboration opportunities between schools and especially military high schools, which can achieve partnerships generating scientific added and developmental value at institutional level, respectively to promote the image of the military school institution, so drawn in Military education The best high school graduates or gymnasium and preparing young people for any activity in their future adults, no matter what field they will activate.

Through this study, we have proposed to properly appreciate the importance of teacher training, regardless of the discipline they teach, to aware of the importance of accumulating a baggage of motor experiences and skills. It is also necessary to introduce in high school and gymnasium programs similar contents to those in tests and admission exams in military education forms. Utility-applicative means are used in mass education in order to form utility applicative performance (*Banăţan, 1983*). Using of these knowledge more than in physical education hours, aims to prepare young people as well as the familiarity of future pupils or students with types of physical activities and tactical movements they will use in various ways in civil life and not just there. Physical training of young people makes effective use of these pathways, making an essential contribution to understanding the importance of teamwork, assessing and self-assessing their ability to adapt quickly and solve problems. Physical and classical military preparation that uses applied utility means involves obstacles that participants have to go through. They have to climb, crawl, balance, hang, jump, carry weights. Most of the time the specialized courses are made to focus on specific needs, correlated with the requirements, such as movements in various fields, fast movement, mastery of emotions and concentration of attention.

Military routes may also include climbing walls and rappelling walls. In mainstream education, the applications present in the school curriculum in the primary cycle are complex structures consisting of basic motor skills (walking, running, jumping, throwing, catching) motor skills applied utility (climbing, climbing, balance, crawling, lifting) and transport of weights, traction, pushing) and technical elements from the sports branches, ensuring a high motor density in lessons, regardless of the existing material conditions. The organization of the application paths involves the use of devices, installations, objects with which you can organize and develop them. When organizing physical education lessons in which children develop locomotor movement skills, measures must be provided to sanitize playgrounds and to check the materials included in the course. Emotional preparation and a clear description of the requirements are an important factor in achieving the results expected by the teacher. The difficulty, the length of the route, the materials used and the speed must be correlated with the degree of preparation and the baggage of motor experiences that the students have at that moment. The impermissibly large difference between the physical abilities that students currently have and those that a future active adult must demonstrate, which is identified by physical education teachers, makes us sound a serious alarm signal regarding the assumption, responsibilities and fulfilling real-life tasks. Updating programs for physical education will raise students' level of training in basic and special the utilitarian skills, thus preparing a much larger number of students for admission to higher education where a level of physical training is required optimum. Physical education lessons are organized with appropriate means, in any material or climatic conditions, both in the gym and outdoors. An effective process of methodical organization is when we have a single formation and the students move one after the other on the route. Preparing students for real life by using locomotor movement skills in the physical education lesson, which brings an important contribution to emotional development, courage, but also self-confidence, ability to react quickly in extreme conditions, self-discipline, self-control, while the control is maintained and the presence of attention.

Methodology

In the study we aimed to familiarize students, future adults with any form of locomotor movement skills, through contributions to their completion and a more consistent presence in the curriculum, the form of intervention that is an attractive and accepted way of to connect them with the most important aspects, information, ideas and values specifics to the sports, recreational activities, military and more. This study was conducted on a sample of 75 subjects, pre-university professors, 35 first and second year students aged between 19 and 25 years and master students from the last year of study, who were previously informed about to the content of the questionnaire. The answers provided by the participants whose professional and personal experiences had the possibility to significantly influence the result of our research were statistically eliminated from the analysis. Also, students who participated in military training courses were excluded from the calculation base. The questions were sent via an application to the target group. The form in which the questionnaire was completed was based on the products in the questionnaire provided by the mentimeter. In this form, the subjects received a link, which they accessed by instantly receiving the question and all possible answers. The subjects chose a single answer, the centralization of all the answers and the provision of a graphic illustration being done by the mentimeter application. Physical education teachers, school principals, but also students, people involved in the implementation of school curricula, provided us with quality information on how the use of means for locomotor movement skills, means of intervention used and in is perceived military education, what are the main obstacles that future candidates identify and what are the ways in which we can make an important contribution to overcoming them and preparing all students for real life. It was very important to keep in touch with the subjects who answered the questions, always bringing clarifications, so that the options of the questionnaire participants fully and objectively reflect their visions regarding the completion of school curricula and the usefulness of the application paths.

Results

The team of specialist who worked on the design of this study and the formulation of questions, was composed of Methodist teachers, physical education teachers.

Question number one, "Do you consider that a larger number of lessons for the development of locomotor movement skills in middle and high school education are useful for students?", "Fig. 1", a percentage of 47% of the respondents consider that it is -very useful- to increase the share of hours in which locomotor movement skills are present.

The group of those who consider that the routes that include motor skills are useful, but are conditioned by the use of materials and sports facilities that the school does not have, is 24%. Together, the two groups that promote motor skills in physical education, represent 71% of the total. 11% consider it useless to continue in high school, to work with motor skills. 29% of respondents are not in favor of introducing in the physical education lesson to a greater extent the utilitarian routes. The need for a greater number of hours of physical education for the teacher, in which there is the necessary time to meet all objectives is absolutely obvious. The causes of deficiencies and gaps in the development of future adults come from the primary cycle, where we must accept that not all teachers follow the program, do not do physical education classes according to the provisions of the curriculum, do not follow all methodical instructions and present themselves, to the group of students, incorrectly equipped for physical education class.

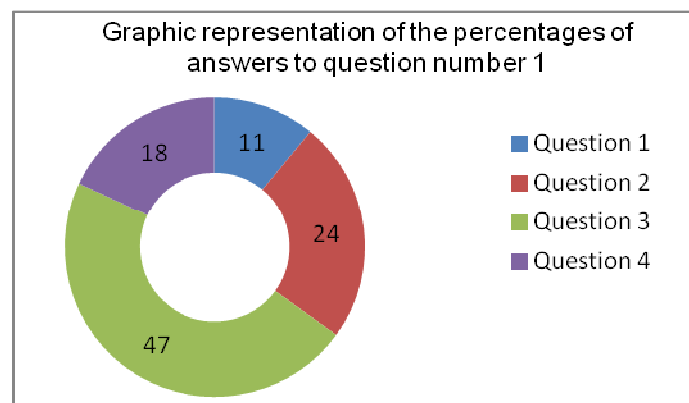


Figure 1. Answer to questions number 1

This together with the pandemic situation of the last year, have generated an alarming gap between the real level of accumulations and the one that all future adults must acquire. A higher number of hours in middle school and high school, where motor skills must be worked on, is necessary not only for consolidation and improvement, but mainly for learning basic motor skills. From this current level, to the fulfillment of the requirements for the entrance exams in the educational institutions in which these enterprises are required, among which the military schools, is a rather difficult path for a student with very good school results, but with a level modest of motor qualities (*Pelmuș, 2020*).

To question number two "Do you consider it possible that at the end of your university studies you will participate in the courses of a military educational institution?", "Fig. 2", which was addressed to the students from years II and III, from "Ovidius" University of Constanța, the analyzed results offered asome what expected surprise. A percentage of 53%, composed of two favorable response variants, consider such a variant to be attractive. Thus, for the answer option -very possible- they opted 35% and for-I want, but I am not ready- 18%. on the other hand, we have a total of 47%, composed of -impossible- present in our poll with a percentage of 31% and -probably- the variant that we assimilated with the previous one and for which 16% voted.

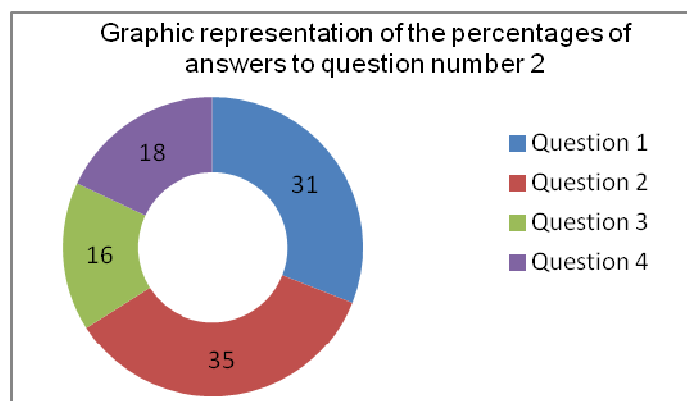


Figure 2. Answer to questions number 2

The third question, asked after two weeks, about students who took routes in which they had identical requirements to those required for admission tests in military schools, completes and explains the result obtained in the previous question, "Do you think that after familiarization and consolidation all of the utilitarian skills applied, are you still interested in military education?", "Fig. 3". This brings new arguments in support of our approach. The explanations given by the physical education teachers and the presentation of the admission conditions in some educational institutions and the improvement of the locomotor movement skills, can help the candidate to meet the requirements - a percentage of 38%, was registered by the group that opted for the answer - yes, I'm interested - which proves the lack of confidence in their own skills, is caused by a poor level of training.

Those who are not interested are present in our survey with a percentage of 35%. The sum of the percentages of those who have a favorable position towards the forms of education for the locomotor movement skills is required, is 65% and is composed of the first answer with 38% presented and the last - I'm interested, but I can't - which has a percentage of 27%.

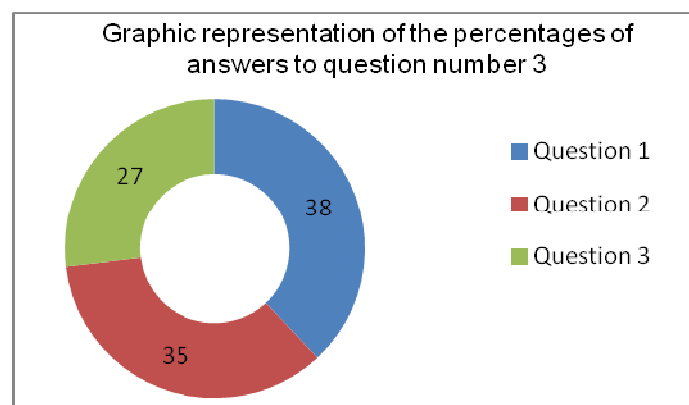


Figure 3. Answer to questions number 3

In the case of question no. 4, "How do you consider the organization of locomotor movement skills application courses for the students in your school, by the representatives of the military schools?", "Fig. 4", the number of those who answered was the highest. thus, we obtained the opinion of 96% of teachers and school principals in Constanța County. The percentage with the highest representativeness

was recorded in the answer variant - useful and attractive for children - 72%. This percentage was generated by specialists in the field, which proves that the observation led to the support of activities that students consider attractive and useful.

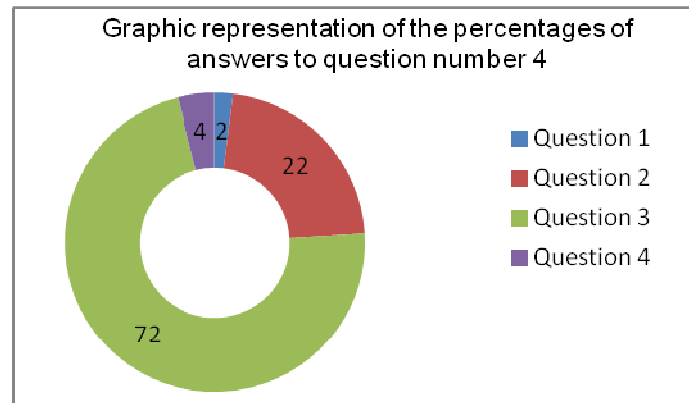


Figure 4. Answer to questions number 4

22% think it is interesting to organize such an event through which students get in touch with these challenging exercises. The share of those who do not consider this approach useful is 6% and represents the sum of those who are not interested, 2% and those who think it is too difficult for the students in the school where they work, in a percentage of 4%. This result encourages us to continue this approach which statistically supports the need to increase the importance of strengthening and improving motor skills in all educational cycles, including academia. The last question of the questionnaire was addressed to school managers: "Do you agree to place a utility route in the school yard, without affecting your school budget?", "Fig. 5", - 54% of respondents said agreement for the location of a route application utility and related facilities, assuming this without hesitation. The difference between those who found it useful for students to organize a route - which was 74% and those who assume permanent installation is generated by the level of decision of each respondent, the procedures and, of course, the necessary authorizations for such facilities. on the whole, we note that for the answer option - after the vote of the Management Board - the option that obtained 21% of the total votes cast, to which is added that of those who opted for - yes, I agree - 54%, get a sum of 75%, a percentage even higher than

the one registered in question number 4 - useful and attractive for students - 72%. An 18% percentage was added by those who chose the answer option - no, it's dangerous. For those who did not give their consent motivating the lack of space, a percentage of 7% is registered. We recognize that this 7% percentage is largely relevant and well-founded, as we know the situations in schools centrally located in cities and municipalities, whose courtyards and outdoor spaces are obviously much smaller compared to other schools with much smaller ground the report of use.

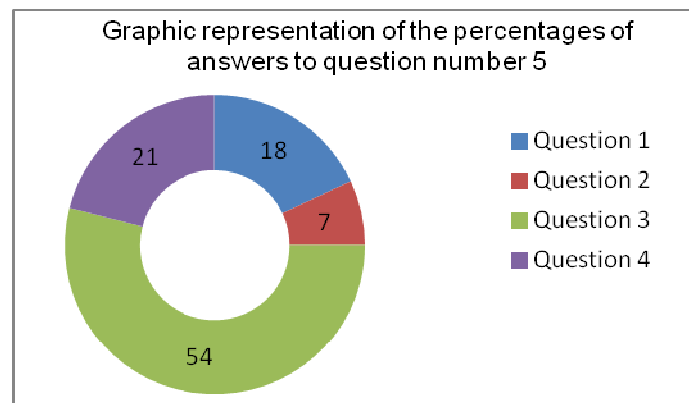


Figure 5. Answer to questions number 5

Motions

Physical training through the use of lessons with utilitarian motor skills during mainstream education in the middle and high school cycle can make a decisive contribution to increasing the level of attractiveness compared to the forms of higher education in which access is conditioned by them skills, or military schools. The training of a corps of physical education teachers of military or police officers, who can work in the field, begins in high school and represents the ability to adapt to new transformations imposed by new challenges and contemporary requirements. We propose to modify the physical education and sports programs for middle school and high school, with the aim of training as many young people as possible for these professions, the main objective being the continuous increase of the selection base, among high school and high school graduates but also those with higher education, from all parts of the country. The proposal to complete the educational offer also a few several secondary objectives, among which the improvement of the perception that the

candidates have regarding the admission method and the requirements that a candidate who intends to enter a competition must meet entrance exam, by familiarizing and preparing the students with these specific tests. Elaboration of effective working tools in the promotion activity (printed leaflets, films made with students and specialists in the field of military and physical education), which can then remain at the schools, at the disposal of teachers and inspectors within the School Inspectorates County is required.

It is important to attract as many physical education teachers or young students, future teachers, to introduce the elements of motor utility skills in their planning with the motivation to continuously improve the teaching process, disseminating positive experiences. It is desirable that the effects of such an approach be reflected in the high school curriculum. Also, through the means of mass dissemination of information and electronic data transmission networks, the possibility of institutional intervention between ministries can be made by promoting the educational offer and the image of military faculties or schools, especially at the way of admission and the physical tests that those in the segment of the young population who have potential, qualities and meet the conditions to be able to apply for the admission competition, should not perceive as difficult.

Conclusions

Use by the teacher of locomotor movement skills in physical education classes, keeping within the themes, offers the possibility to increase the dynamism, but also the volume and intensity of effort, which are generally reduced. This is possible by organizing a short application course, parallel to the learning, or towards the end of the fundamental part of the lesson, thus preparing students during high school and gymnasium for any physical admission test in a form of military education. It is necessary to strengthen the scientific collaboration partnerships between schools and specialized higher education institutions with those in the military area, in order to increase the participation of students with very good school results in competitions for admission to physical education faculties or military education.

The close collaboration of the higher education institutions that organize an admission contest with the County School Inspectorate, can ensure the continuous and efficient promotion of all educational offers. In the complex process of development and preparation for the future of students for real life, we meet the concept that the development of motor skills in all educational cycles can be achieved through specific methods and means, but also through games, steps, leading applications, these contributing to the general and implicit purpose proposed in this study.

The development of motor skills, regardless of their type, is learned, consolidated and perfected in stages, being one of the main purposes of the scientific and didactic approach in school sports, theoretically, but practically this approach stops at the end of the primary cycle. If the teacher is aware of the importance of skills and is interested, he can make a methodical route even in a school with a small material base. It takes the initiative and the concern of the physical education teacher to arrange a conducive space for carrying out the activity in good conditions. The process of developing locomotor movement skills of students must become a permanent activity, attractive by combining movement games, ways of application with specific means of developing motor skills.

We believe that informing parents associations in regular schools and including them in the marketing plan of military schools brings an additional volume of information and contributes to the formation of a correct and complex image, absolutely necessary in the process of counselling and guidance. Representatives of the faculties of physical education and other interested institutions must also participate to this activities.

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THE CORRELATION BETWEEN STRAIGHT NECK, IMPROVING OF THE HEART RATE AND RAISING OF THE OXYGEN SATURATION

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Abstract

In this article i have exposed the correlation between the correction of the posture and the improvement of the oxygen saturation and of the heart rate. This thing was possible by using two treatment methods: the trigger points therapy and the global postural rehabilitation. The postural improvement was applied to a woman, aged 37 who works at the desk daily for 8 to 10 hours. Her prolonged incorrect posture was the main cause for developing straight neck. Beside the postural deficiency she has vertigo, increased heart rate and suffers from chronic stress. The process of the posture improvement was made for 6 treatment sessions. The objective of these session was to rebalance the muscular tone of the anterior and posterior neck muscles.

Key words *straight neck, trigger points, global postural rehabilitation*

Introduction

Office work causes a lot of problems in the long term at the postural level, especially when ergonomic rules are not followed to ensure a relaxed working position, such as adjusting the height or distance at which the monitor or chair is located. Spinal deficiencies are caused primarily by the muscular effort to keep the head in a different position from the neutral one for a few hours a day. The average mass of an adult's skull is 5.4 Kg (the equivalent of a bowling ball) and at an inclination of 45 degrees, the body feels a weight of 23 kg which overloads the upper muscles of the body. This pressure is felt in the muscles of the neck, shoulders, vertebral joints, directly influencing the psycho-emotional state^[1].

Sagittal spine problems are encountered in most of the population, they have different severity depending on the particularities of each individual. An accentuated anteriorization of the head implies a significant reduction of the mobility of the cervical spine, especially in the case of rotational and flexion movements of the neck.

[ⁱⁱ] , [ⁱⁱⁱ]. Moreover, cervical stiffness negatively influences static balance among asymptomatic adults [^{iv}].

Cervical pain affects a large part of the population, having a significant impact on health insurance systems, businesses, communities and individual well-being. These pains can be associated, in addition to the flawed posture, with serious health problems such as neoplasms, neurological disorders or infections. Favored factors include repetitive movements in the neck, maintaining the neck flexion, prolonged use of smartphone and laptop [^v].

Over time, studies have shown that incorrect postures maintained for long periods of time create microtraumas in muscle fibers following repetitive stress on the required muscles. The association of sustained effort with a low level of physical activity and a deficiency of vitamins and minerals determines the appearance of trigger points [^{vi}].

In the case of cervical rectitude, there is a muscular imbalance, characterized by shortening of the suboccipital muscles, levator scapulae, pectoralis minor and elongation of the retractor muscles of the scapula, erector spinae and deep cervical flexors [^{vii}].

It is important that the anteriority of the head be diagnosed and treated early because, over time, it produces additional pressure on the joints and tissues associated with the cervical spine. Studies have shown that symptoms such as temporomandibular pain, migraines and musculoskeletal dysfunction are associated with head anteriority [^{viii}].

Respiration is also affected due to the biomechanical imbalance produced by the scalene, SCM and trapezius muscles, which actively participate in respiration [^{ix}].

Thus, the strength of the muscles involved in the breathing process is reduced in people suffering from neck pain and the dynamics of the rib cage is negatively influenced, practically reducing its range of motion [^x].

Heart rate can also be influenced by factors such as: age, body mass, level of physical activity, physical condition, ambient temperature, breathing rate, emotions, cholesterol level, cardiovascular disease or medication. [^{xi}]

For most adults, at rest when the heart is pumping a minimal amount of blood, a normal heart rate is between 60-100 beats per minute [^{xii}].

In the case of athletes, values of about 40 beats per minute can also be recorded at rest [xiii]. A specialist consultation is required when the pulse is constantly below 60 (bradycardia) or above 100 (tachycardia), especially if dizziness, fainting or shortness of breath occurs. [xiv].

Tachycardia has various causes such as: anxiety, stress, fatigue, excessive caffeine consumption, fever, alcohol consumption, intense physical activity, smoking, drug use or electrolyte imbalance [xv].

The context of the COVID-19 pandemic

The current context of the pandemic has had an unfavorable impact on human health and the global economy [xvi], causing a radical change in the way people carry out their professional activity.. With this change, thousands of people lost their jobs, the most affected being women [xvii].

For most who had the opportunity to work from home, most of them in the category of "white collars", the home became both a place of work and relaxation. Most companies prefer employees to work online, precisely to limit physical contact and the risk of spreading the SARS-CoV2 virus. [xviii].

At European level, in 2017, Italy had the lowest number of employees working online [xix] . During the pandemic, their percentage increased to 69%, and globally it is estimated that 81% of the total workforce was affected by the radical changes caused by the pandemic. [xx].

Working from home produces anxiety, isolation, well-being, productivity and work-life balance are affected. [xxi]. Moreover, physical distancing and isolation from co-workers increased the level of irritability, as people could not share their problems, thus being forced to find solutions on their own. [xxii].

However, teleworking allows employees to spend more time with relatives and take care of them when they need to, but eliminates the time that can be allocated to oneself. [xxiii].

In addition to the psychological and social problems that arose with the sudden change of lifestyle, maintaining a relatively fixed and often incorrect posture, led to problems with the spine.

Costs allocated to the treatment of cervical and lumbar problems

For the treatment of low back and neck pain, the amounts allocated are very large. According to the JAMA Journal, between 1996 and 2006 the costs of the American health system are estimated at 3.1 trillion dollars [^{xxiv}].

Costs for treating low back and neck pain have reached \$ 77 billion in private insurers, \$ 45 billion in public health services and \$ 12 billion received directly from patients. In comparison, Americans spent \$ 111 billion and \$ 89 billion on ischemic heart disease in 2016 to treat diabetes [^{xxv}]

The experiment

During the 6 treatment sessions, the global postural reeducation procedures were combined with those of trigger points therapy.

The reason for choosing the two treatment methods is that, in clinical practice, we observed the benefits of each method applied separately but also together. Although the principles on which it is based are different, the objectives are the same: increase the range of motion at the joint level, reduce muscle inflammation, reduce stress levels and speed up the healing process.

Basically, the trigger points method starts from the idea that due to direct trauma, muscle fiber overload or a deficiency of micronutrients, the muscle shortens due to the accumulation of metabolic products, which causes inflammation and reduced joint mobility.

Global postural reeducation, on the other hand, groups the muscles of the human body into two chains (anterior and posterior) and aims, through the use of postures and the reverse myotatic reflex, to regain biomechanical balance. In this case, we are dealing with an anterior predominance characterized by anteriority of the head, leading forward of the shoulders and anteversion of the pelvis.

During the postural re-education processes, two positions specific to this method were used: the "ground frog" (solo wound) useful for balancing the anterior muscle chain, implicitly the orthostatism and the posture on the wall (Control il muro) addressed to the muscles and joints. lower limbs. Global postural rehabilitation procedures are not

recommended to be performed more than twice a week because the positions used involve intense physical exertion, characterized by the simultaneous isometric contraction of several muscle groups, which would cause an excessive accumulation of metabolic products.

In the first two sessions, in the "ground frog" position, it was necessary to use 4 rectangular lifts with a thickness of 5 mm to improve the craniocervical angle and to eliminate the vertigo sensation that appeared in supine position due to the contraction of the suboccipital muscles. With the relaxation of the suboccipital muscles, the lifts were gradually removed, in order to maintain the correct posture of the skull and in orthostatism. This problem was eliminated after the second session, we still needed the lifts in the subsequent sessions.

Moreover, in the first 3 sessions, a shortening was observed in the adductor muscles and iliopsoas, which caused both dorsal decubitus and orthostatism, an involuntary anteversion of the pelvis, which causes pain in the lumbar and sometimes even along the sciatic nerve. , on the back of the thigh.

After performing the two positions, the patient was placed each time on the ventral massage bed, then dorsal to identify and deactivate the remaining trigger points. The permanent goal was to lengthen the muscle fiber to specific anatomical dimensions and regain biomechanical balance.

In dorsal decubitus, the aim was to deactivate the trigger points of the scalenes, SCM, brachial biceps, anterior bundle of the deltoid, quadriceps, iliopsoas and adductors. Ventral trigger points in the lumbar quadrant, long back muscle, suboccipital and dorsal muscles of the cervical region were deactivated.

The acute pain gradually limited the area where they were felt, thus becoming isolated painful points that were subsequently observed only after maintaining the office posture and local pressure. At the fifth session, the pain completely disappeared, and this aspect was also observed in the sixth session.

The research subject

The subject of the study is a 37-year-old woman, working between 8 and 10 hours a day in the office. Drink coffee daily. At a first examination, the resting pulse was 133 and the oxygen saturation was 96%.

At the initial examination, he complained of episodes of vertigo and pain in the cervical region and paravertebral muscles that were activated at the time of breathing, the pain being felt even at the intercostal level. The person also complains of lumbar pain radiating along the lower left limb, which is caused by pelvic anteversion.

Usually, the person sleeps 8-10 hours but despite this aspect, she always wakes up tired, the main cause being the consumption of glycogen reserves during the night.

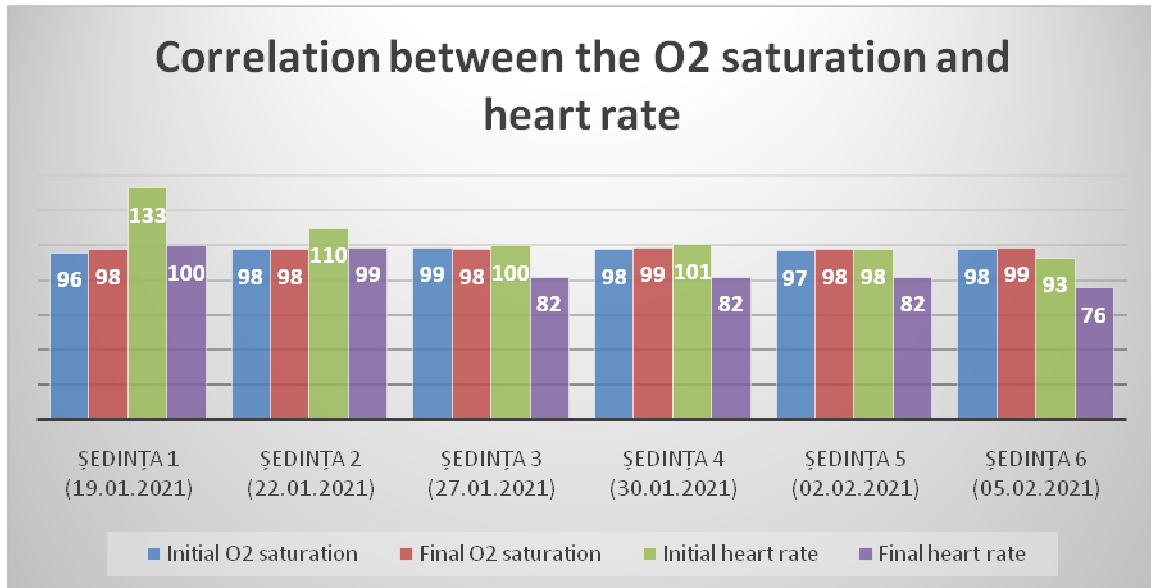
The aim of the study is to show that re-education of posture can significantly improve these parameters without the need to change diet or rest.

The subject of the study was chosen due to the physiological peculiarities determined by the demanding lifestyle, which it presents along with musculoskeletal disorders. In order to determine the connection between the adopted posture and the modification of the targeted physiological parameters, it was necessary to evaluate the anatomical angles specific to the cervical rectitude.

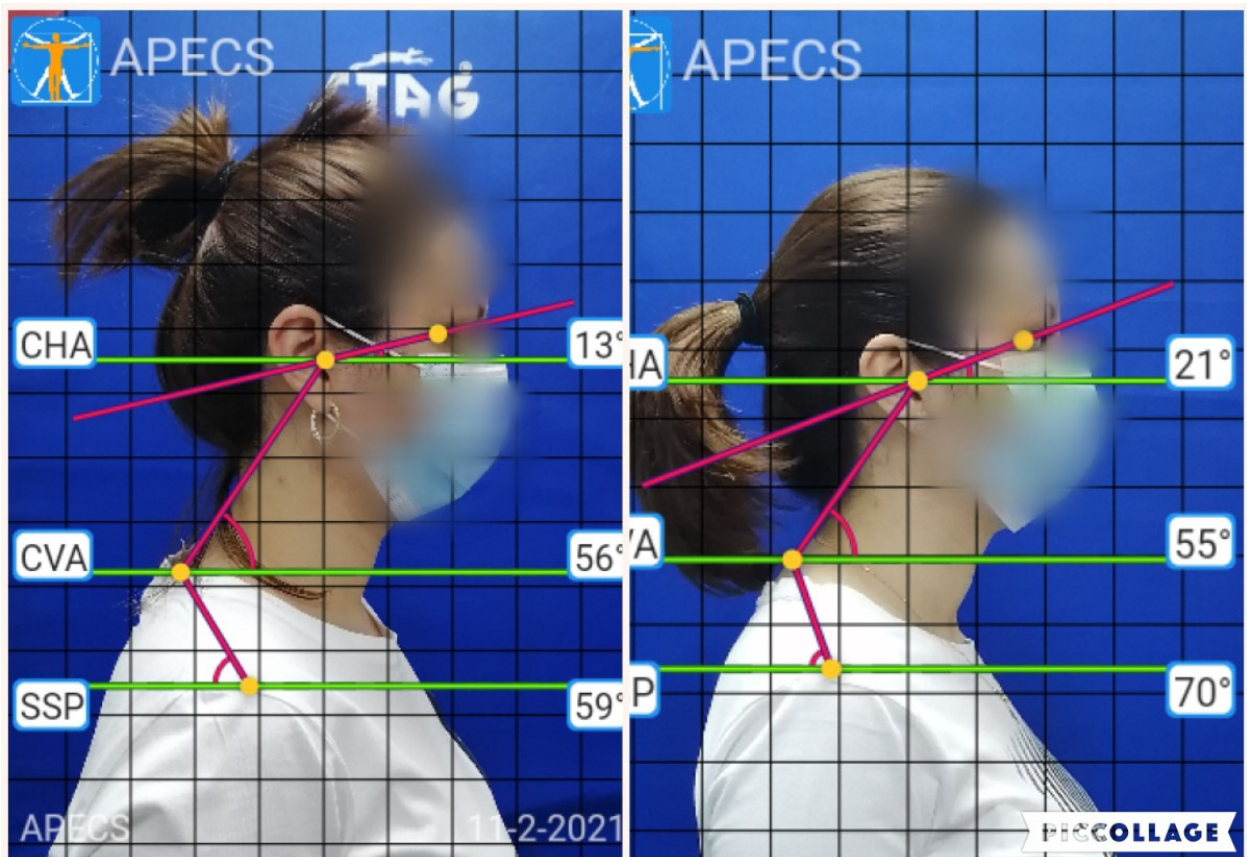
Results

	Date of the session	Initial heart rate	Final heart rate	Initial O2 saturation (%)	Final O2 saturation (%)
1	19.01.2021	133	100	96	98
2	22.01.2021	110	99	98	98
3	27.01.2021	100	82	99	98
4	30.01.2021	101	83	98	99
5	02.02.2021	98	82	97	98
6	05.02.2021	93	76	98	99

[Table 1 ,Correlation between the O2 saturation and heart rate]



[Chart 1 - Correlation between the O2 saturation and heart rate]



[Image 1 –Comparing the results obtained in the first and final session]

No. Session	Date	CHA	CVA	SSP
1	19.01.2021	13	56	59
2	22.01.2021	17	55	76
3	27.01.2021	16	55	73
4	30.01.2021	18	55	65
5	02.02.2021	14	53	71
6	05.02.2021	21	55	70

[Tabel 2 The evolution of the angles between the anatomical marks during the sessions]

Age	Heart rate, 50-85% effort intensity	Heart rate, 100% effort intensity
20 years	100-170 beats per minute (bpm)	200 bpm
30 years	95-162 bpm	190 bpm
35 years	93-157 bpm	185 bpm
40 years	90-153 bpm	180 bpm
45 years	88-149 bpm	175 bpm
50 years	85-145 bpm	170 bpm
55 years	83-140 bpm	165 bpm
60 years	80-136 bpm	160 bpm
65 years	78-132 bpm	155 bpm
70 years	75-128 bpm	150 bpm

[Tabel 3 - Ritmul cardiac specific vârstei și nivelului de efort]^{xxvi, xxvii}

Conclusions

Following the treatment sessions, a correlation was observed between the improvement of the targeted anatomical angles, the improvement of the respiratory amplitude, the decrease of the heart rate and the increase of the oxygen saturation. The

posture being improved, the subject stated that the pain initially charged in the cervical, thoracic (paravertebral and intercostal) and lumbar area disappeared, and while the stress level decreased.

The decrease in stress levels occurred as a result of the elimination of the inflammatory response caused by the shortening of muscle fibers caused by trigger points resulting from vicious postures maintained over time.

Thus, it can be stated that the combination of the two treatment methods (global postural reeducation and trigger point therapy), can contribute to obtaining a correct posture that positively influences a person's physiological parameters, without the need to change other aspects of lifestyle. .

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