The 7th International Scientific Conference

EXERCISE FOR HEALTH AND REHABILITATION

The 3rd of December, 2021

Kaunas, Lithuania

BOOK OF ABSTRACTS

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The aim of the conference is to bring together physiotherapists, occupational therapists, adapted physical activity specialists, sports medicine doctors, physical medicine and rehabilitation physicians, trainers and other specialists who are interested in the health promotion and rehabilitation modalities.

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CONTENTS

DOES YOUNG AGE ADULTS WHO HAVE POOR FOOT POSTURE ALSO HAVE WORSE BODY BALANCE?

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Introduction. Body balance depends on a well-developed body structure, on the interaction of nervous, joint, ligament and muscular systems together. Therefore, failure of at least one system also impairs the stability of the body. It is believed that the balance of the body is greatly influenced by the height and flexibility of the foot and its arch (1, 2). The aim of this research - to evaluate correlation between foot posture and balance in young age adults who have poor foot posture before and after home exercise program.

Research methods and organization. The study was approved by the Lithuanian University of Health Sciences Bioethics Center. All participants signed informed consent forms. In this study participated 21 young age adults (11 females and 10 males) who had poor foot posture. The participants' age was 24 (20 – 37; 26.5) years. Inclusion criteria: 18 – 40 years old; poor foot posture. During this study foot posture was evaluated with Foot Posture Index (FPI-6), static body balance was assessed with Balance Error Scoring System (BESS) and dynamic body balance was evaluated with Functional Reach Test. Based on the results of the initial evaluation, specialised home exercise program was developed, which consisted of flexibility, strengthening and proprioception exercises for foot and ankle. The participants were asked to perform exercise program for 30 minutes. 3 times per week for six weeks till the second evaluation. Statistical data analysis was performed with SPSS (Statistical Package for Social Sciences) 27.0. Correlation was estimated using Spearman's correlation coefficient (r). Correlation when $|r| > 0.7$ was considered strong, $0.3 < |r| \leq 0.7$ – medium strength and $|r| \leq 0.3$ - weak. The correlation was considered significant when the significance level was $p < 0.05$.

Results. Analysing foot posture and static balance correlation before home exercise program, significant direct correlations were found strong correlation with the dominant foot ($r=0.702$, $p=0.001$), medium strength correlation with the non-dominant foot ($r=0.584$, $p=0.005$). Participants who had better foot posture also had better static balance. After the exercise program, the analysis of the relationship between the foot posture and the static balance showed a statistically significant medium strength direct correlations: with the dominant foot ($r=0.547$, $p=0.01$) and with the non-dominant foot ($r=0.533$, $p=0.013$). Analysis of the dominant foot posture and the dynamic balance relationship before home exercise program revealed statistically significant medium strength inverse correlation ($r=-0.485$, $p=0.026$). Participants who had better foot posture also had better dynamic balance. Meanwhile, no statistically significant correlation was observed with the non-dominant foot. After evaluating the correlations between the foot posture and the dynamic body balance after the exercise program, it was observed that there were a statistically significant inverse correlations of medium strength: with the dominant foot ($r=-0.505$, $p=0.02$) and with the non-dominant foot ($r=-0.482$, $p=0.027$).

Conclusions: Young age adults with a poor foot posture appeared to have a relationship between their feet posture and both static and dynamic balance. Participants who had better foot posture also had a better static balance both before and after the home exercise program. Moreover, participants with better foot posture showed greater dynamic balance before and after the home exercise program.

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EFFECTS OF VESTIBULAR PHYSIOTHERAPY AND UPPER BODY MOBILITY EXERCISES AT HOME ON QUALITY OF LIFE, DIZZINESS, BALANCE AND GAIT IN PATIENTS WITH VESTIBULAR NEURITIS

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Introduction: Imbalance and dizziness remain for up to several weeks after vestibular neuritis [1]. Considering the conclusions of other researchers that in the presence of damage to the vestibular system, tension in the neck and lumbar muscles emerges [2,3] and restricted movements of the upper body affects the static and dynamic balance [4-6], it was hypothesized that upper body mobility exercises improve quality of life, dizziness, balance and gait in patients after vestibular neuritis. In order to ensure continuous treatment of vestibular system, physiotherapy was performed at home. The aim of this study was to determine the effect of vestibular physiotherapy with upper body mobility exercises at home on quality of life, dizziness, balance and gait.
Research methods and organization. The research was approved by the Lithuanian University of Health Science Bioethics Center. The research was performed at LSMUL Kaunas Clinics and JSC "Ortopedijos paslaugų klinika". Eighteen patients – 7 men and 11 women (age = 43 (29-68; 46) years) were divided into two exposure groups: VP (n=9), VP-UBM (n=9) groups by a systematic selection method. On average, patients participated in the study after 25.5 (21-31; 25.94) days after acute vestibular neuritis. Selection criteria: the study included adults from 18 years old; patient had been diagnosed with acute vestibular neuritis (≤31 days before study); patient had imbalance and / or gait disorder (≤22 points according to Dynamic gait index; ≤40 points according to Berg scale); patient did not have any musculoskeletal disorders and / or did not use aids prior to illness; consent to participate in the study. Patients were examined before and after physiotherapy. Subjects performed vestibular physiotherapy five exercises for two weeks, five times a week, once per day at home. VP-UBM group performed additional ten upper body mobility exercises. During the first examination, patients were given a memory paper of the exercises and the performance of the exercises was explained. Methods: Dizziness Handicap Inventory (to assess quality of life); Motion Sensitivity Quotient (to assess dizziness); Berg balance scale (to assess balance); Dynamic gait index (to assess gait). Statistical analysis was performed with IBM SPSS. Mann-Whitney-Wilcoxon criterion was used for two independent samples and the Wilcoxon criterion was used for two dependent samples as a post-hoc analysis. ($p<0.05$ was considered statistically significant).
Research results. Before physiotherapy, VP and VP-UBM groups were homogeneous by gender, age, quality of life, dizziness, balance and by gait results ($p>0.05$). Analysing Dizziness Handicap results after physiotherapy, the quality of life was statistically significantly improved – VP ($Z=-2.687$; $p=0.007$), and VP-UBM ($Z=-2.670$; $p=0.008$) groups. However, comparing the quality of life between groups, the VP-UBM group had a bigger statistically significant improvement than VP group ($U=14.00$; $p=0.019$). Analysing Motion Sensitivity Quotient results, dizziness in VP group statistically significantly decreased after physiotherapy ($Z=-2.103$; $p=0.035$) as well as in the VP-UBM group (Z=-

2.549; p=0.011). However, comparing both groups, the VP-UBM group had a statistically significant greater decreasement of dizziness compared to VP (U=11.00; p=0.009). Analysing Berg balance scale results, patients balance improved after physiotherapy in both VP (Z=-2.524; p=0.012) and VP-UBM group (Z=-2.675; p=0.007). Comparing both groups, there was a greater statistically significant improvement in the VP-UBM group than VP (U=14.00; p=0.019). Analysing Dynamic gait index results, VP group patients gait results ware statistically significantly increased after physiotherapy (Z=-2.588; p=0.010), as well as in the VP-UBM group (Z=-2.692; p=0.007). Compared to VP group, there was a bigger statistically significant improvement in gait index results in the VP-UBM group (U=14.50; p=0.020).

Conclusions: After physiotherapy patients with vestibular neuritis quality of life, dizziness, balance and gait improved in both, vestibular physiotherapy and vestibular physiotherapy with upper body mobility, groups. After the vestibular physiotherapy and upper body mobility exercises patients quality of life, dizziness, balance and gait results were statistically significantly greater compared to patients who performed only vestibular physiotherapy.

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THE EFFECT OF DIFFERENT PHYSIOTHERAPY METHODS ON BALANCE, PROPRIOCEPTION, CORE MUSCLES ENDURANCE AND CORE STABILITY IN ADOLESCENTS WITH IDIOPATHIC SCOLIOSIS

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Introduction. 34-50 percent of children and adolescents have an abnormal posture [1]. By X-ray scan a doctor can determine whether the cause of the abnormal posture is a common pathology - adolescent idiopathic scoliosis [2]. This spinal deformity is observed in three planes and can cause problems with balance, proprioception [3] and core stability [4]. Two different physiotherapy methods are used to solve these problems - core stabilization exercises and aqua therapy, which are considered to be effective conservative methods in the treatment of scoliosis. The aim of a research is to evaluate the

effect of these methods on balance, proprioception, core muscles endurance and core stability in adolescents with idiopathic scoliosis.

Research methods and organization. The study was approved by the Lithuanian University of Health Science Bioethics center (BEC-SR(M)-118).The study was conducted from May 2021 to October 2021 at Vilnius city health care clinic "Medical diagnostic and treatment center". It included 20 (n=20) subjects aged 10-18 years with adolescent idiopathic scoliosis (Cobb's angle $<45^0$). All the subjects were girls and they were divided into two experimental groups: group I (n=10), aged 13,8±1,9 years, and group II (n=10), aged 13,9±2,0 years. Group I received aqua therapy while group II received core stabilization exercises. The subjects had 10 physiotherapy sessions twice a week for 30 minutes. Methods used in the study: Fukuda stepping test for measuring balance and proprioception, McGill test for measuring core muscles endurance and "Stabilizer" device for assessing core stability. Statistical analysis was performed by IBM SPSS Statistics 27 and Microsoft Excel software. Data is presented as median, minimum value, maximum value, and mean. The Wilcoxon signed-rank test was calculated to compare two dependent samples, Mann-Whitney U test to compare two independent samples. Data is considered statistically significant at $p<0.05$.

Results. After evaluation of the results of balance and proprioception, the angle of body rotation in group I decreased significantly from 15.5 (5-34; 17.6) to 14.5 (5-27; 14.3) degrees, (Z=-2.536; p=0.011), in group II from 13.5 (4-35; 16.8) to 11.0 (4-28; 14.0) degrees, (Z=-2.533; p=0.011). After comparing balance and proprioception tests results between experimental groups, no significant differences were found, p>0,05. After evaluation of muscles endurance results, significant differences were found: in group I results of flexor test increased from 56.6 (31-77; 56.5) to 76.0 (44-99; 76.6)s, (Z=-2,809; p=0,008), in group II from 57.5 (18-81; 51.0) to 68.5 (26-95; 65.0)s, (Z=-2,784; p=0,048). After measuring extensor endurance, in group I results increased from 111.0 (53-157; 110.0) to 121.5 (65-172; 123.3)s, (Z=-2,805; p=0,005), in group II from 115.5 (51-165; 110.8) to 128.0 (61-170; 119.5)s, (Z=-2,814; p=0,009). Right side-bridge endurance test results in group I increased from 50.5 (30-72; 49.2) to 64.5 (39-85; 61.2)s, (Z=-2,807; p=0,009), in group II from 54.5 (20-76; 54.0) to 72.0 (33-101; 72.3)s, (Z=-2,805; p=0,011). Left side-bridge endurance test results in group I increased from 50.0 (30-66; 45.7) to 55.5 (38-75; 54.7)s, (Z=-2,812; p=0,005), in group II from 50.5 (19-76; 50.5) to 65.5 (30-94; 66.4)s, (Z=-2,809; p=0,042). After comparing results between the groups, no significant differences were found, p>0,05. At the end of the research, core stability results improved significantly in both groups: flexion in group I from 46.0 (40-50; 45.9) to 49.5 (46-50; 49.0)mmHg, (Z=-2.226;p=0.026), in group II from 47.0 (38-50; 45.9) to 50.0 (46-50; 49.4)mmHg, (Z=-2.524;p=0.012), extension in group I from 29.5 (21-30; 27.5) to 30.0 (25-31; 29.4)mmHg, (Z=-2.041;p=0.041), in group II from 27.5 (20-32; 26.9) to 30,0 (29-30; 29,8)mmHg, (Z=-2.252;p=0.024). However, no significant differences were found in core stability results between groups, p>0,05.

Conclusions. 1.At the end of the study, balance and proprioception of adolescents with scoliosis improved significantly in aqua therapy and core stabilization groups.2.At the end of the study, core muscles endurance and core stability of adolescents with scoliosis improved significantly in aqua therapy and core stabilization groups.3.At the end of the study, there were no significant differences of the effect on balance, proprioception, core muscles endurance and core stability between aqua therapy and core stabilization exercises.

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CHANGES IN RESPIRATORY SYSTEM INDICES OF YOUNG SEDENTARY WORKERS WITH FORWARD HEAD POSTURE WHEN WORKSITE BASED EXERCISE PROGRAMME IS APPLIED

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Introduction. Abnormal head posture affects thoracic expansion, alveolar ventilation, and decreases lung volume and capacity, resulting in respiratory muscle weakness [1]. Forward head posture impairs the mobility and function of the diaphragm and causes inefficient contraction of abdominal muscles, decreasing lung capacity [1]. It is important to exercise in worksite because the time spent sitting for a long time in a static position cannot be compensated by more physically active leisure time [2]. Research aim - to evaluate the change of respiratory system‘s indicators of young people with forward head posture working sedentary work after exercises program performed during work.
Research methods and organization. The study was approved by the Lithuanian University of Health Sciences Bioethics Center. All participants signed informed consent forms. In this study participated 19 young adults with forward head posture (FHP) working in a sedentary job. Average participant’s age was 27 ± 4.7 years. Ten of them were women and nine of them – men. Inclusion criteria were young age (18 – 44 years), sedentary job, forward head posture. In this study, subjective and objective evaluations were performed to assess respiratory function. Objective evaluation indices were chest excursion (using a measuring tape), Hench and Stange tests (participants were asked to hold their breathing in different conditions and the time was assessed with chronometer) and breathing rate. Subjective evaluation was performed using Breathing self-assessment questionnaire (SEBQ), which allows both qualitative and quantitative assessment of the respiratory system and provides information about the subject's perceived discomfort. A score of 11 or over is indicative of breathing pattern disorder. After the evaluation, individuals were introduced with exercise program, consisting of stretching, strengthening, and mobility exercises for the cervical spine and shoulder region and were asked to perform it 10–15 min each day at their worksite, during their rest breaks. The study lasted for eight weeks, after which evaluation was repeated. Statistical data analysis was performed with SPSS (Statistical Package for Social Sciences) 29.0. Data in the text are presented as median (minimal and maximal values; average). Wilcoxon signed-rank test was used to compare two related samples. Correlation was estimated using Spearman's correlation coefficient (r). Correlation when $|r|>0.7$ was considered strong, $0.3<|r|\leq 0.7$ – medium and $|r|\leq 0.3$ - weak. Differences and correlations with $p<0.05$ were considered statistically significant.
Results. The median of breathing questionnaire was 15 (11 - 22; 15.21) points at the beginning of the research and it decreased to 11 (1 - 21; 10.16) points after the study. This change of SEBQ was statistically significant ($Z = -3.157$; $p = 0{,}002$) - respiratory function improved on the basis of subjective data. After evaluating the objective indices reflecting the respiratory system, it was found that the breathing rate decreased statistically significantly after the applied exercise program ($Z = -$

3.602; $p < 0.001$). At baseline, breathing rate was 25 (20 - 36; 26.60) breaths per minute, and it decreased to 15.50 (12 - 25; 16.80) breaths per minute. Moreover, statistically significant changes in the results of Hench ($Z = - 3.466$; $p < 0.001$) and Stange ($Z = - 3.594$; $p < 0.001$) tests were found, which indicates improved function of respiratory system. The median of Hench test results before the research was 10.50 (9 - 19; 12.10) seconds and it increased to 17.50 (9 - 38; 20.40) seconds after the study. The median of the Stange test at baseline was 19 (10 - 25; 18.32) seconds and after the study it increased to 35 (14 - 62; 35.47) seconds. The chest excursion of the participants after the exercise program increased statistically significantly ($Z = -3.066$; $p = 0.002$). Prior to the exercise program, the median was 7 (5 - 8.5; 7.18) cm, and eight weeks later, the median of the final assessment was 8 (6.5 - 9.5; 8.11) cm. This change indicates an improved breathing function. No statistically significant correlations were observed between objective and subjective respiratory system indices before the research ($p > 0.05$). But during follow up a statistically significant strong reverse relationship was found between SEBQ and these objective indices: the chest excursion ($r = - 0.757$; $p < 0.001$), the Hench test ($r = - 0.674$; $p = 0.002$) and the Stange test ($r = - 0.755$; $p < 0.001$). Also, a statistically significant strong direct relationship with breathing rate was found ($r = 0.724$; $p < 0.001$).

Conclusion. The respiratory system‘s function of young sedentary workers with forward head posture after eight weeks of exercise program performed during work changed: both subjective and objective evaluations indices improved. After exercise program those participants who subjectively evaluated individual respiratory system‘s function better also had better results of respiratory system’s objective parameters: chest excursion, breath holding time during Hench and Stange tests, breathing rate.

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THE DYNAMIC OF SUBJECTIVELY ASSESSED UPPER EXTREMITIES FUNCTIONAL STATE AFTER EXERCISE PROGRAM PERFORMED AT WORKPLACE IN YOUNG SEDENTARY JOB WORKERS

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Introduction. Although sedentary work is most commonly associated with lower back problems (muscle imbalance, low back pain), research has shown that 48% of young people have complained about upper extremity disorders (1). Many different methods and tools are used to assess hand function. Individuals tend to assess their functional status subjectively too well or too poorly, so it is always necessary to compare the results with an objective examination (2). It is emphasized that an exercise program can improve both the results of objective assessment and subjective assessment (3). The study aim - to evaluate the changes of upper extremities function’s subjective indicators after exercise program performed at workplace in young sedentary job workers.

Research methods and organization. The study was approved by the Lithuanian University of Health Sciences Bioethics center (BEC-SR (M) -121). Consent forms were signed before taking part in the study. 14 individuals participated in the study - 8 men and 6 women. The age of the participants was

24.8 ± 2.04 years. All subjects have been working sedentary job for at least one year and spent at least four hours at a computer/telephone. Only three participants indicated that they attend additional physical activities after work. For the evaluation of the upper extremity functional state, participants were asked to fill the WORQ-UP questionnaire before and after the exercise program. The questions in this questionnaire reflect four main groups of activities: strength, dexterity, use of tools and mobility. The questionnaire consists of 17 questions. Each question has 6 possible answer options, which are scored: 0 - not performed, 1 - no difficulties; 2 - slight difficulties; 3 - moderate difficulties; 4 - severe difficulties; 5 - very difficult or impossible. Not performed (NA) is indicated when the mentioned actions in the work were not performed. The overall score was averaged. The smaller it is, the better the functional condition of the upper extremity. Participants were asked to perform exercise program in their workplace for six weeks, every workday for 15 minutes. The program included stretching, muscle strengthening and relaxation exercises for the neck, upper extremities and thoracic spine regions, the intensity of program has been increased gradually over time. Data analysis was performed using the IBM SPSS Statistics 21 software package. Data are presented as median (minimal value, maximal value; mean). The Wilcoxon criterion was used to compare two dependent samples. A statistically significant difference was considered when $p<0.05$.

Results. Assessing how difficult it was for the participants to perform the activities listed in the questionnaire, we found out that none of the respondents stated that they found very difficult/impossible to perform the activities listed in the questionnaire; one participant pointed out that she experienced difficulties, and one - mild difficulties while performing tasks identified in the questionnaire. 83.3% of women indicated that they do not use hand-held devices, and there were no men who would have chosen NA (not performed). Analysis of specific questionnaire areas revealed that in strength area, only wheelchair pushing was pointed out by participants as difficult task. In dexterity area, only using hand exert force was pointed as difficult task. In tools and equipment area, working with power tools and devices that cause high vibrations was named as difficult task. In the mobility area only one women pointed out that driving could cause some small difficulties. Comparing the results of the WORQ-UP questionnaire before and after exercise program, a statistically significant difference was observed ($Z = -3{,}059$; $p=0.002$), functional state of upper extremities function has improved. The total score at the beginning was 1.28 (1 - 2.17; 1.33) points, and the total score after the exercise program was 1.03 (1 - 1.4; 1.08) points. Although a statistically significant difference was observed after the exercise program in the overall sample, only the men results changed ($Z=-2.251$; $p=0.012$). A change was observed in the female group, but it was not statistically significant. After the exercise program, the results of using the tools and equipment changed the most.

Conclusions: According to our results, young sedentary job workers are not experiencing a lot of difficulties performing daily tasks involving their upper extremities. Despite that, the subjective assessment of upper extremities functional state after exercise program performed at workplace revealed the improvement in functional state, but only in men.

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SHORT-TERM EFFECTS OF NEURODYNAMIC AND PROPRIOCEPION STIMULIATING EXERCISES FOR FUNCTIONAL INDICATORS OF LOWER EXTREMITIES IN YOUNG WOMEN WITH LOW PHYSICAL ACTIVITY LEVELS

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Introduction. Low physical activity lifestyle is a relevant issue of modern times. Insufficient physical activity can cause significant problems for mental and physical health, especially musculoskeletal system (1,2). Sedentary lifestyle can be the cause of decreasing muscle strength, range of motion and general soft tissue mobility restrictions and even decrease of proprioception function in the lower extremities (3,4,5). Because of frequent lack of time and motivation it is important to look for quick ways to maintain physical well-being. The aim of the study is to evaluate the short-term effects of neurodynamic and proprioception stimulating exercises for functional indicators of lower extremities in young females with low physical activity levels.
Research methods and organization: The study was approved by Bioethics Center of Lithuanian University of Health Sciences (BEC-SR(M)-122) and took place at the Department of Sports Medicine in Lithuanian University of Health Sciences and „ELi“ clinic of physical therapy. The study was carried out from March till October of 2021. The participants were young female adults with low physical activity levels depending on short version of the International Physical Activity Questionier. Subjects were assigned into two groups. One group (ND) of 13 participants, whose age median was 32 (22-44; 32.8) years, performed 7 repetitions of each neurodynamic sliding exercise for sciatic and femoral nerves of the dominant leg and the other group (PC) of 12 participants, whose age median was 32 (26-43; 33.5) years, performed same neurodynamic sliding exercises and additional proprioception stimulation for lower extremities – standing on both legs on unstable surface platform for one minute. Both groups were homogeneous by age, IPAQ score and all of the tests evaluations before intervention ($p>0.05$). The dominant leg was evaluated by the ball kick test. Dominant leg was chosen for the trial because the study did not evaluate the indicators of lower extremities between the different sides. Evaluation of lower extremity muscle strength was performed with Lafayette Manual Muscle Tester 01165. Lower extremity active range of motion measurements were evaluated with a goniometer. Y balance test was used to evaluate dynamic stability of the lower extremity. All evaluations were performed before intervention and immediately after. Statistical analysis was performed using the “IBM SPSS Statistics 27” software package. The nonparametric Man – Whitney Wilcoxon criteria (U) was applied to the two independent samples. The nonparametric Wilcoxon criteria (Z) was applied for the two dependent samples. Quantitative data of tests results are described by median (Xme), minimum value (Xmin), maximum value (Xmax) and arithmetic mean (m) - Xme (Xmin-Xmax; m). The difference was considered statistically significant when was $p<0.05$.
Results. Active range of motion medians in ND group before the intervention were: straight leg hip flexion 77 (60-88; 74.3)°, hip extension 12 (9-16; 12.1)°, hip external rotation 35 (25-44; 35)° and knee flexion 129 (120-137; 130.1)°. In PC group: straitght leg hip flexion 80 (67-87; 77.4)°, hip extension 12 (9-15; 12.2)°, hip external rotation 36.5 (24-44; 34.6)° and knee flexion 133 (125-140; 133.4)°. Immediately after the intervention active range of motion goniometry results in both groups shown statistically significant improvement in active straight leg hip flexion (ND group ($Z=-3.187$; $p=0.001$), PC group ($Z=-3.071$; $p=0.002$)), hip extension (ND group ($Z=-3.256$; $p=0.001$), PC group ($Z=-2.762$; $p=0.006$)), hip external rotation (ND group ($Z=-2.39$; $p=0.017$), PC group ($Z=-2.07$;

p=0.038)) and knee flexion (ND group (Z=-3.078; p=0.002), PC group (Z=-2.913; p=0.004)). However, there were no differences in active range of motion results between the groups after the intervention (p>0.05). After muscle strength evaluation, only hip extensors strength has improved immediately after intervention in ND group (Z=-2.521; p=0.012), before the intervention hip extensors strength in ND group was 16.7 (14-19.9; 16.8) kg. In PC group there was strength improvement of knee extensors (Z=-3.062; p=0.002) and hip adductors (Z=-2.752; p=0.006) without difference between groups (U=51.5; p=0.152) and hip extensors (Z=-3.063; p=0.002) with difference between groups (U=34.5; p=0.016) immediately after intervention. Before the intervention knee extensors strength of PC group was 24.5 (17.7-29.2; 24.1) kg, hip adductors 11.5 (9.3-13.6; 11.5) kg, and hip extensors 16.7 (14.5-21.2; 17.4) kg. Dynamic stability results before the intervention were 94.9 (81.2-120.3; 98.2) cm in ND group, and 103.2 (89-117.3; 103.2) cm in PC group. Dynamic stability results improved in the ND group (Z=-3.18; p=0.001) and in the PC group (Z=-2.936; p=0.003) without difference between groups (U=69; p=0.650).

Conclusion. Neurodynamic exercises with and without additional proprioception stimulation can improve lower extremities dynamic stability and active straight leg hip flexion, extension, external rotation and knee flexion range of motion. Additional proprioception stimulation can improve knee extensors and hip adductors strength and can be more effective in improving hip extensors strength than neurodynamic exercises alone immediately after intervention in young females with low physical activity levels.

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SCAPULAR DYSKINESIS, DYNAMIC STABILITY OF UPPER EXTREMITY AND GRIP STRENGTH EVALUATION IN MALE BASKETBALL PLAYERS ACCORDING TO AGE AND DOMINANT SIDE

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Introduction. Basketball is an intermittent team sport with frequent transitions between activities performed at different intensities (1). Impaired functions of athlete's kinematic chain lead to dysfunctions and increase the risk of injury (2). Scapula is important in shoulder complex while

throwing a ball as it transfers the force from lower extremities to arms. It is difficult to objectively evaluate scapula due to the position of the shoulder, surrounding muscles and complexity of movements (3). There is a lack of researches analyzing scapular function according age and dominant arm of the throwing athlete. Research aim: to evaluate scapular dyskinesis, dynamic stability and grip strength in male basketball players according to age and dominant side.

Research methods and organization: The study was approved by Lithuanian University of Health Sciences Bioethics Center (Nr BEC-SR(M)-146). All participants or their parents (for adolescent basketball players) signed the informed consent form before taking part in this study. Eleven athletes from national youth basketball team and twelve professional basketball players aged 15 to 30, without any upper extremity injuries in the past 1 year, which have not allowed them to train for 2 weeks, were enrolled to this study. The participants were divided into two groups: adolescent basketball players (n=11) aged 16.09 (±0.4) years and with 6.55 (±1.75) years of training period and adult basketball players (n=12) aged 22.17 (±4.11) and with 9.25 (±3.23) years of training period.

In order to determine arm dominance, the basketball players were asked to specify the preferred hand to throw a ball. Scapular dyskinesis was evaluated by test described by McClure et al. (2009) (4). The Closed Kinetic Chain Upper Extremity Stability Test (CKCUES) measurements were taken while performing the CKCUES test in order to evaluate upper extremity dynamic stability and proprioception. The grip strength was measured by "Camry " dynamometer in order to confirm whether grip strength is increasing with age. Data was analyzed by using the program SPSS 27.0 and Microsoft Excel for Windows. Non-parametric two independent values were compared with non-parametric Mann-Whitney test, contingency was compared with Fisher's exact test. The results are presented as median (xme), minimum (xmin), maximum (xmax) value and mean ($\bar{x}$) – xme (xmin – xmax; $\bar{x}$). The difference was considered statistically significant when $p < 0.05$.

Results. Scapular dyskinesis. Scapular dyskinesis in the dominant arm was detected in 6 adolescent basketball players (54.5 %) and in 3 adult basketball players (25%). Scapular dyskinesis in the non-dominant arm was detected in 9 adolescent basketball players (81.8%) and in 6 adult basketball players (50%). No significant differences in scapular dyskinesis display were found in the dominant (p=0.214) and non-dominant (p=0.193) sides between the groups. CKCUES test. The final score of the CKCUES test in adolescent basketball players group was 0.16 (0.13-0.17; 0.15) points, in the group of adult players – 0.18 (0.16-0.21; 0.18) points. Adult basketball players had better upper extremity dynamic stability and proprioception compared to adolescent basketball players (U=115.5, p=0.001). Grip strength. The grip strength of dominant hand in adolescent basketball players was 44.8 (36.5-57.1; 46.54) kg, in the group of adult basketball players – 56.45 (41.8-58.8; 54.1) kg. The grip strength of non-dominant hand in adolescent basketball players was – 44.1 (35.1-55; 45.03) kg, in adult basketball players – 52.2 (38.9-60.1; 51.7) kg. As expected, adult basketball players had greater muscle strength in both dominant (U=109, p=0.007) and non-dominant (U=106, p=0.013) sides than adolescent basketball players. Our findings confirmed that grip strength is increasing with age. There was no significant difference between adolescent and adult basketball players after measuring asymmetry of grip strength of dominant and non-dominant sides (U=57, p=0.608).

Conclusion. 1) Adolescent and adult basketball players had similar scapular dyskinesis display in both dominant and non-dominant sides. 2) Adult basketball players had better dynamic upper limb stability and proprioception than adolescent basketball players. 3) Adult basketball players had greater grip strength in both dominant and non-dominant sides than adolescent basketball players.

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CHANGES IN LOWER BACK AND PELVIC PAIN AND PSYCHOEMOTIONAL STATUS OF PREGNANT WOMEN USING WATER PHYSIOTHERAPY

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Introduction: Most studies state that 50 percent of women experience lower back pain [1], pelvic pain occurs in 20 percent of women during pregnancy [2] due to hormonal ligament loosening, changes in pelvic position and posture, as well as severe decrease in physical activity [3]. 10 to 30 percent of women experience depressive symptoms during pregnancy [4, 5]. Conventional physiotherapy often used during pregnancy, but there are advantages of water physiotherapy, which includes easier posture adjustment, reduction of the load on the spine, deep muscle training, and tissue relaxation. Aim of the study. To investigate the changes in the lower back, pelvic pain and psychoemotional state of pregnant women applying water physiotherapy.
Research methods and organization. The research was conducted in July-September 2021 at the Leisure and Wellness Center "Family Welfare Center" in Vilnius. The study included 23 pregnant women 20 to 30 weeks of gestation (at baseline) with lower back and / or pelvic pain. The average age of the subjects was 28 years. The minimum age was 22 years and the maximum was 36 years. The water physiotherapy program lasted for 8 weeks 2 times a week. The exercise began at the swimming pool, with a gradual warm-up that consisted of 8–10 min of walking at different intensities, static stretching of most muscle groups, and joint mobility exercises. Aerobic and strength training exercises were performed for 30 minutes, using an inventory of water exercises - foam weights, water noodles, rubber rings. Finally, 5 minutes for floating on the abdomen, relaxation. The Oswestry Low Back Pain Disability Questionnaire, The Pelvic Girdle Questionnaire, the SF-36 Questionnaire, and a general study of the physical condition using 5 functional tests were used for testing. Functional tests used: Thomas test (to determine flexural contracture of the hip joint), Ober test (to determine shortening of the tensor fasciae latae), quadriceps femoris test (to determine muscle shortening), hamstring test (to determine muscle shortening or tension) and Trendelenburg test (to assess middle gluteal muscle strength). Testing was performed 2 times before and after the water physiotherapy program. SPSS program version 24.0 was used for statistical analysis. The assumption of normality was verified using the Shapiro-Wilk test. Parametric tests were used for variables that met the normality assumption and non-parametric tests were used for those that did not. For the quantitative dependent variables, the parametric Student's paired t-test or the non-parametric Wilkoxon test was used. The McNemar

nonparametric test was also used to compare functional tests before and after physiotherapy. It was considered statistically significant when p <0.05.

Results. Pelvic pain was assessed using The Pelvic Girdle Questionnaire. The results revealed that the average pelvic pain of the subjects before the physiotherapy program was 34.72 ± 14.75 percent, after the program 24.12 ± 11.1 percent. Overall, the mean decrease was 10.61 ± 6.95 percent, which is a statistically significant difference since p <0.05 (t=7,539; df=22; p<0,001). Before the physiotherapy program, the mean Oswestry disability index was 28.26 ± 15.6 percent and after the program 17.13 ± 10.75 percent. Overall, the mean Oswestry disability index decreased by 11.13 ± 7.58 percent, a statistically significant difference of p <0.05 (t=7,046; df=22; p<0,001). Restriction of activity due to emotional disorders was 62.32 ± 38.01 points before physiotherapy, and 88.41 ± 19.09 points after physiotherapy. After physiotherapy, the result improved by 26.09 ± 38.87 points, which is a statistically significant difference, as p <0.05 (t=-3,219; df=22; p=0,004). It was found that before physiotherapy the general mental condition was evaluated with 70.96 ± 12.31 points and with 78.78 ± 11.66 points after. After physiotherapy, there was an improvement of 7.83 ± 9.68, which is a statistically significant difference, as p <0.05 (t=-3,876; df=22; p=0,001). Before the study Thomas test was positive in 8 subjects and only 4 after the study. A positive Ober test was found in 13 subjects before physiotherapy and in 7 subjects after the study. Shortening of the quadriceps muscle was observed in 4 subjects before physiotherapy and in 3 subjects after. Hamstring shortening was observed in 17 subjects before and in 13 subjects after the program. All of these changes were not statistically significant (p> 0.05). The Trendelenburg test was positive in 12 subjects before the study and only 4 after physiotherapy, and this difference is statistically significant (p <0.05). This indicates a statistically significant improvement in middle gluteal muscle strength using water physiotherapy.

Conclusions: The application of water physiotherapy in pregnancy significantly reduced pelvic pain and physical limitations related to it also the disability caused by back pain among the subjects. Exercise in water statistically significantly improved general psychoemotional state during pregnancy.

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PARENTS' ATTITUDES TOWARD THE FACTORS AFFECTING THE PARTICIPATION IN DAILY LIFE OF CHILDREN WITH AUTISM

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Introduction. Autism disorder affects about one in 1,000 children. (1) The main signs of autism are impaired social communication skills and language developmental problems, atypical behavior. (2) An earlier diagnosis can help the child by starting the early intervention, which will reflect in children's health. (3) Healthy children have higher participation in daily life, compared with children with an autism. (4) Participation in daily life is important part of children's life. Therapists should reveal the reasons, why the children's participation in the activities are limited and concentrate on the reasons reduction. The aim of the study: to research parental attitudes toward the factors affecting the participation in daily life of children with autism.

Research methods and organization. The study was approved by Research Ethics Committee (No BEC-SR(M)-209). The seven parents – mothers, which have a preschool-aged child with autism spectrum disorder have been selected for the research. The age of childrens' was presented as median (4.5), minimum (3.5), maximum (6.5) value, and mean 4.5(3.5 – 6.5; 4.5). All of the children were boys. The research participants were informed of the research aims and about the necessity of recording the interviews. There has been carried out qualitative research based on the phenomenological study. Each interview consisted of nine general questions followed by in-depth questions helping to better understand a situation. Recorded interviews were transcribed, the statements coded, divided into categories, and later - into subcategories.

The specific research questions that guide this research study are as follows:

1. What do your children enjoy most about doing at home?
2. What activities at home your child doesn't like?
3. How does your child get into unpleasant activities?
4. Does your child like to go to kindergarten?
5. What activities does your child like to do in kindergarten?
6. Are there activities your child does not like in kindergarten?
7. Where do you like to go in your free time with your child?
8. Do you visit any public institutions with your child? What do you like/dislike about them?
9. What difficulties do you present in public institutions? If so, which ones?

Results. Our analysis of parents generated three themes: child issues, parental attitudes, and sensory qualities of the environment. Child issues have been indicated as the broadest category having the biggest amount of statements. Parents were highlighted such problems as challenging behavior, attachment to routine, sensory integration disorder, attention disorder. The most usual challenging behavior was hyperactivity. Talking about parental attitudes, two main problems were incontinence, inner rules of kindergarten, for example, not giving an assistant for children, and exaggerated care. Sensory qualities of the environment theme were divided into environmental lightings, big, sharp noises, and people in the environment. Lightings in the environment usually were too faint and children were started to be scared and running outside. Big noises also were a problem and interfered children from participating in activities, for example, in the kindergarten. Some people sometimes can also interfere, because of their reactions at the local places. It is not motivating parents to take their children with autism disorder to public spaces. Within the categories, there have been discussed

various problems of the kindergarten, other people's reactions, and higher public education about autism spectrum disorder.

Insights. 1. Children's participation in activities at home is often hindered by attachment to routine, attention disorder, parental attitudes, challenging behavior, outbursts of anger. 2. Children's participation in activities at kindergarten is often hindered by sensory qualities, attention disorder, inner rules of kindergarten, challenging behavior. 3. Children's participation in activities at the community is often hindered by attaching to routine, parental attitudes, incontinence, challenging behavior.

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EFFECTS OF DIFFERENT PHYSIOTHERAPY METHODS ON PAIN INTENSITY AND NECK DISABILITY IN WOMEN WITH TENSION-TYPE HEADACHES

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Introduction. Tension-type headache (TTH) is the most prevalent type of primary headache in adults [1]. The pain is typically pressing or tightening in quality, of mild to moderate intensity and does not worsen with the routine physical activity [2]. TTH affects about one person in five worldwide. TTH is more common in women as compared to men (female-to-male 3 to 1) [3]. Physiotherapy or massage can produce a very quick and effective result, relieving tension in the cervical spine, headaches, relaxing the muscles in the event of excessive tension [4,5]. The aim of the study - to evaluate the effect of different physiotherapy methods on the change of pain intensity and neck disability in women experiencing tension-type headaches.

Research methods and organization. The research was approved by Lithuanian University of Health Sciences Bioethics Center (BEC-SR(M)-73). The study was conducted in 2021 May-August at Plungė district municipality hospital and consulting polyclinic. Twenty-one women (21-41 years old) experiencing tension-type headaches (3-8 points according to VAS) were included in this study. Headache intensity was measured by using Visual Analog Scale (VAS), Neck Disability Index (NDI) was used for measuring self-related disability. Subjects were divided into two experimental groups: neck stretching and isometric exercises (group I, n=11) and neck and shoulder strap stretching exercises with trigger point relaxation (group II, n=10). All subjects had 12 individual physiotherapy sessions, 3 times a week, once a day for 30 minutes. Statistical analysis was performed using SPSS 23 version. The Mann-Whitney test was used to compare two independent samples. The Wilcoxon criterion was used to compare the two dependent samples. Quantitative data were presented as median (Xme), the minimum value (Xmin), the maximum value (Xmax) and the mean (m) – Xme (Xmin-Xmax; m). The significance level was set to 0.05.

Results. Before physiotherapy headache intensity in group I was 6 (5-7; 6.0) points, after physiotherapy – 3 (2-4; 2.8) points. Neck stretching and isometric exercises reduced the intensity of pain in women with TTH from severe to mild (Z=-3.002; p=0.003). Before physiotherapy pain intensity in group II was 6 (5-8; 6.2) points, after physiotherapy – 3.5 (2-5; 3.4) points. Neck and shoulder strap stretching exercises with trigger point relaxation also reduced the intensity of pain in women experiencing TTH from severe to mild (Z=-2.842; p=0.004). After applying different physiotherapy methods, the change in headache intensity was the same in both groups (U=36.5; p=0.197). Before physiotherapy self-related disability in group I was 24 (18-27; 23.5) points, after physiotherapy – 14 (9-18; 13.9) points. Neck stretching and isometric exercises reduced self-related disability in women experiencing TTH from moderate to mild (Z=-2.938, p=0.003). Before physiotherapy self-related disability in group II was 19.4 (14-24; 19.6) points, after physiotherapy – 11 (6-11; 11.1) points. Neck and shoulder strap stretching exercises with trigger point relaxation also reduced self-related disability in women experiencing TTH from moderate to mild (Z=-2.812, p=0.005). However, self-related neck disability in group I and group II differed before the study (U=20; p=0.013), but did not differ after physiotherapy (U=27; p=0.051), i.e. self-related neck disability in group I was higher at the beginning of the study. After applying different physiotherapy methods the change in self-relates neck disability was the same in both study groups (U=36.5; p=0.197).

Conclusions: The study showed that both physiotherapy techniques, neck stretching and isometric exercise vs neck and shoulder strap stretching exercises with trigger point relaxation, had similar effects on tension-type headache intensity and neck disability.

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THE EFFECTS OF DIFFERENTIAL LEARNING ON INDIVIDUALS WHO HAVE UNDERGONE BRAIN TUMOR SURGERY AND THE ASSESSMENT OF PERSONAL MOTIVATION ON POSTURE MANAGEMENT

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Introduction. According to the Institute of Hygiene, 262 people died of brain tumor in Lithuania in 2020 [1]. The most common disorders are cognitive, balance, gait, vision impairments and fatigue.

Impaired balance increases the risk of falls causing psychological disorders [2]. Researchers are still trying to figure out new methods that would be more effective for patients which undergo brain tumor surgery. One of such methods could be differential learning, which is relatively new in rehabilitation, but proven to be effective in professional sports [3]. Aim. To evaluate the effects of differential learning and the changes in personal motivation for managing body position in individuals diagnosed with a brain tumor.

Research methods and organization. The study was carried out in the hospital of Lithuanian University of Health sciences "Kaunas Clinics". 30 patients diagnosed with brain tumor and undergone brain tumor surgery participated in the study, 16 women and 14 men. Selection criteria: 1. Age of subjects 40-74; 2. Diagnosed with brain tumor (malignant / benign / primary / secondary); 3. Able to walk without aids 4. Voluntary consent to participate in the study. Participants were assigned to three groups of 10 patients per group. First study group of 5 women and 5 men had physical therapy for 5 days based on differential learning. Second study group of 5 women and 5 men had the same exercise program for 5 days paired with music listening after exercise for 3min. Third study group of 6 women and 4 men had traditional physiotherapy on balance pad for 5 days paired with music listening after exercise for 3min. Assessment of age confirmed homogeneity between groups ($\chi 2$ =30; p=0.466). Methods of examination: 1. Timed up and go test; 2. Modified Clinical Test of Sensory Interaction in Balance; 3. Fullerton Advanced Balance Scale; 4. Recovery Locus of Control Scale. Statistical analysis was performed using IBM SPSS Statistics 27 software package. Chi-squared test was used to test homogeneity of variance, Kruskal-Wallis H test was used for three independent samples, Wilcoxon test was used to compare two dependent samples and Mann-Whitney U test was used for two independent samples as a post-hoc analysis. The result is statistically significant, by the standards of the study, when $p \leq 0.05$.

Results. First study group (differential learning) had a statistically significant improvement in balance (non-vestibular, vestibular) and functional mobility by assessing Timed up and go test (Z=-2.803; p=0.005), postural control, by assessing Modified Clinical Test of Sensory Interaction in Balance (Z=-2.201; p=0.028). Statistically significant improvement was also observed in balance (non-vestibular) by assessing Fullerton Advanced Balance Scale (Z=-2.675; p=0.007).

Second study group (differential learning and music) had a statistically significant improvement in balance (non-vestibular, vestibular) and functional mobility by assessing Timed up and go test (Z=-2.809; p=0.005) and improvement in balance (non-vestibular) was observed in Fullerton Advanced Balance Scale (Z=-22.546; p=0.011).

Third study group (traditional physiotherapy and music) had a statistically significant improvement in balance (non-vestibular, vestibular) and functional mobility by assessing Timed up and go test (Z=-2.803; p=0.005), postural control, by assessing Modified Clinical Test of Sensory Interaction in Balance (Z=-2.533; p=0.011). Statistically significant improvement was also observed in balance (non-vestibular) by assessing Fullerton Advanced Balance Scale (Z=-2.816; p=0.005).

Modified Clinical Test of Sensory Interaction in Balance results were significantly better in the differential learning group compared to the traditional physiotherapy and music group (U=-2.048; p=0.041). Improvements of Modified Clinical Test of Sensory Interaction in Balance were also significantly better in differential learning and music group compared to traditional physiotherapy and music (U=-2.133; p=0.033). No difference in Modified Clinical Test of Sensory Interaction in Balance were observed compared between differential learning and differential learning and music groups.

No difference in Recovery Locus of Control Scale in evaluation of motivation was observed between all study groups (H(2)=3.209; p=0.201).

Conclusions: Differential learning itself and differential learning paired with listening to music for 3 minutes after exercise, was more effective than traditional physiotherapy program paired with listening to music for 3 minutes after exercise on the recovery of postural control management function under various sensory conditions in patients after brain tumor surgery.

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THE EFFECT OF NEUROMUSCULAR TRAINING PROGRAM ON FUNCTIONAL CHARACTERISTICS OF UPPER EXTREMITY IN HANDBALL AND BASKETBALL PLAYERS

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Introduction. Basketball and handball are physically demanding team sports and are characterized by intense activities including running, sprinting, jumping, ball throwing, blocking and pushing between players (1,2). Interest in basketball and handball is growing annually, and injury rates are very high in comparison with other professional Olympic team sports (3). Neuromuscular training is a multi-intervention program with a combination of muscle strength, balance, plyometric, stability and sport-specific exercises to improve neuromuscular control and to reduce risk of injury (4). Research aim: To evaluate the effect of neuromuscular training program on functional characteristics of handball and basketball players.

Research methods and organization. The study was approved by Research Ethics Committee (Nr. BEC-SR (M)- 162). All participants signed the informed consent form before taking part in this study. Fifteen professional male basketball players and sixteen professional male handball players aged 20 – 35, without any upper extremity injuries in the past 1 year, without any musculoskeletal pain, and with a minimum of 10 years of training period, participated in the study. Neuromuscular training (NMT) was conducted 3 times a week with sessions lasting 30 minutes, for the period of one month. The program consisted of proprioception-enhancing exercises, plyometric exercises, rotator cuff muscle-strengthening exercises, scapular stabilization exercises, proprioceptive neuromuscular facilitation (PNF) D2 exercises for the upper extremities, and rhythmic stabilization exercises. The exercises were performed after a warm-up, before the main part of the training. Participants were evaluated before and after neuromuscular training program. Scapular dyskinesis was evaluated by tests, described by McClure et. al. (2009). For upper extremity dynamic stability measurement, The Closed Kinetic Chain Upper Extremity Stability Test (CKCUEST) was used. Upper extremity muscle strength was evaluated with Seated Medicine Ball Throw Test (SMBTT). Data was analyzed by using the program SPSS 27.0. Non-parametric dependent values were compared with Wilcoxon test. Two independent values were

compared with non-parametric Mann-Whitney test. Quantitative data results are presented as median (xme), minimum (xmin), maximum (xmax) value and mean ($\bar{x}$) – xme (xmin – xmax; $\bar{x}$). Qualitative data were compared by using McNemar's Chi-squared test, and the data were presented as percentages. The difference was considered statistically significant when $p < 0.05$.

Results. Scapular dyskinesis. Handball players: scapular dyskinesis display decreased in the dominant (χ^2=6,32; p=0,012) and in the non-dominant arm (χ^2=4,15; p=0,042) after NMT. Before NMT, scapular dyskinesis in the dominant arm was detected in 7 players (43.8%) and after NMT, in 5 players (31.3%). In the non-dominant arm before NMT, 7 players had scapular dyskinesis (43.8%), and after NMT, 4 players (25%). Basketball players: scapular dyskinesis display decreased in the dominant arm after NMT (χ^2=4,18; p=0,041), but not in the non-dominant arm (χ^2=0,744; p=0,388). Before NMT, scapular dyskinesis in the dominant arm was detected in 9 players (60%), and after NMT, in 6 players (40%). In the non-dominant arm, 13 players (86.7%) had scapular dyskinesis before NMT, compared to 8 players (53.3%) after NMT. No statistically significant differences were found in scapular dyskinesis display in the dominant arm between basketball players and handball players before and after NMT. Non-dominant arm scapular dyskinesis display among basketball players occurred more often than handball players before NMT (χ^2=4,495; p=0,034), but no statistically significant differences were found between groups after NMT. Closed kinetic chain upper extremity stability test. There were increases in handball players (Z=-3,559; p<0,001) and in basketball players (Z=-3,508; p<0,001) dynamic stability after NMT. No statistically significant differences between the groups were found before NMT, but after NMT handball players CKCUEST test score was higher than basketball players (U=61; p=0,019). Seated Medicine Ball Throw Test. Upper extremity strength increasement was found in both handball players (Z=-3,508; p=0,001) and basketball players (Z=-3,351; p=0,001) after NMT. Comparing results between the groups, basketball players SMBTT results were higher than handball players before (U=19; p<0,001) and after NMT (U=21; p<0,001).

Conclusions: 1) Neuromuscular training program decreased scapular dyskinesis display in handball players in both arms, and in basketball players, in the dominant arm. 2) Neuromuscular training program improved upper extremity dynamic stability and muscle strength in handball and basketball players. 3) Handball players had better upper extremity stability after the neuromuscular training program. 4) Muscle strength was higher in basketball players before and after neuromuscular training.

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EFFICIENCY OF DYNAMIC NEUROMUSCULAR STABILIZATION AND TRANSCUTANEOUS ELECTRICAL NERVE STIMULATION ON BACK PAIN AND TRUNK MUSCLE ENDURANCE IN MIDDLE-AGED AND OLDER ADULTS

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Introduction. Back pain is common named as a dysfunction, inherent in modern society. Back pain affects our population, most based on their age [1]. The treatment of back pain includes physiotherapy, which relieve pain, improve strength, and lastly improve functional status [2]. Back pain caused by intervertebral disc degeneration is suppressed in a variety of ways, including dynamic neuromuscular stabilization and transcutaneous electrical stimulation. Supposedly, that transcutaneous stimulation and dynamic stabilization affect intensity of the pain and muscles endurance. The purpose of this study was to determine the efficiency after 4- and 8-weeks of dynamic neuromuscular stabilization and transcutaneous electrical nerve stimulation on back pain and trunk muscle endurance in middle-aged and older adults.

Research methods and organization. The study was approved by research bioethics committee (Nr. MNL-KIN(M)-2020-310). All participants signed the informed consent form before taking part in this study. A total 40 participants, divided into two groups (middle-aged (n=22) and older (n=18) adults), participated in an 8-week dynamic neuromuscular stabilization and transcutaneous electrical nerve stimulation program. The I group consists of 13 females and 9 males (mean age 34,27±7,81; BMI - 23,88±2,29) and II group consists of 12 females and 6 males (mean age 55,28±5,86; BMI - 24,93±1,89) with intervertebral disc degeneration, Heart Rate Variability in the norm range, without neurological symptoms, comorbidities, or spinal surgeries. Participants in both groups performed the same program two or three times weekly. Pain intensity before the intervention, after 4 and 8 weeks was evaluated by using numerical rating scale (NRS). Tests of trunk muscle endurance evaluate the trunk extensors, flexors, and lateral musculature of the trunk. The assessment tests were performed before, after 4 and 8 weeks each of the phase. Dynamic stabilization and transcutaneous stimulation instructions were given before starting interventions. Data was analyzed by using the program SPSS 28.0 and Microsoft Excel 2012. Non-parametric dependent values were compared with Wilcoxon test, and two independent values were compared with non-parametric Mann-Whitney U test. The results are presented as average and standard deviation (SD). The difference was considered statistically significant when $p<0.05$.

Results. Pain intensity. There was significant decrease in I group after 4 ($Z=-3.169$) and 8 ($Z=-4.192$) weeks intervention ($p<0.05$). Results in II group statistically significantly decreased after 4 ($Z=-3.357$) and 8 ($Z=-3.810$) weeks intervention ($p<0.05$). There were significant differences pre ($U=-2.591$), after 4 ($U=-3.182$) and 8 ($U=-2.494$) weeks intervention in between groups ($p<0.05$). Trunk muscles endurance. The back muscles endurance statistically significant increase after 4 ($Z=-2.2360$ and 8 ($Z=-3.557$) weeks intervention in I group ($p<0.05$). Results in II group statistically significantly increased after 4 ($Z=-3.317$) and 8 ($Z=-4.025$) weeks intervention ($p<0.05$). There were significant differences pre ($U=-4.608$), after 4 ($U=-3.902$) and 8 ($U=-4.571$) weeks intervention in between groups ($p<0.05$). The abdominal muscles endurance statistically significant increase after 4 ($Z=-2.828$) and 8 ($Z=-4.123$) weeks intervention in I group ($p<0.05$). Results in II group statistically significantly increased after 4 ($Z=-2.449$) and 8 ($Z=-3.819$) weeks intervention ($p<0.05$). There were significant differences pre ($U=-$

2.449) and after 4 (U=-2.930) weeks intervention in between groups ($p<0.05$). The right-side bridge endurance statistically significant increase after 4 (Z=-3.000) and 8 (Z=-4.146) weeks intervention in I group ($p<0.05$). Results in II group statistically significantly increased after 4 (Z=-2.646) and 8 (Z=3.557) weeks intervention ($p<0.05$). There were significant differences pre (U=-3.357), after 4 (U=-3.685) and 8 (U=-3.767) weeks intervention in between groups ($p<0.05$). The left-side bridge endurance statistically significant increase after 4 (Z=-3.317) and 8 (Z=-3.900) weeks intervention in I group ($p<0.05$). Results in II group statistically significantly increased after 4 (Z=-2.828) and 8 (Z=-4.001) weeks intervention ($p<0.05$). There were significant differences pre (U=-4.243), after 4 (U=-4.234) and 8 (U=-3.574) weeks intervention in between groups ($p<0.05$).

Conclusions: 1) Dynamic stabilization and transcutaneous stimulation are effective in reducing pain and increasing trunk muscles endurance after 4-weeks intervention in middle-aged adults. 2) Dynamic stabilization and transcutaneous stimulation are effective in reducing pain and increasing trunk muscles endurance after 8-weeks intervention in older adults. 3) Dynamic stabilization and transcutaneous stimulation are more effective in reducing pain and increasing trunk muscles endurance in older adults.

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DOES PHYSICAL EXERCISES MAKE A DIFFERENCE FOR RISK OF FALLING AND INDEPENDENCE OF THE ELDERLY?

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Introduction. Human life expectancy has been increasing at a rapid rate [1]. Generally, increased life expectancy has further increased the risk of disease, falls and fall-related injuries [2,3]. Novel interventions such as differential learning method should therefore be tested looking at its potential to improve quality of life among elderly. Current evidence indicates that differential learning allow participant to find individual performance repertoire in order to perform and adapt its complex motor skills in everyday life [4]. Primary aim of current study was twofold - to evaluate physical exercises adjusted on classical and differential learning methods for risk of falls and compare intervention impact on independence of the elderly.

Research methods and organization. Ethical approval was obtained by the local bioethics center (No. BEC-SR(M) – 176). Study was performed during the period from 03/07/2021 to 28/08/2021. The study included 24 participants (age 68.83 ± 3.37 years). All participants that were involved in the study signed an informed consent. The main reason for meeting the inclusion criteria was being 60 – 75-year-old, Morse's fall risk scale over 25 points and, Mini mental state test up to 18 points. Participants were randomly divided into two groups – Regular exercises group ((RG), included 11 participants aged 68.36 ± 3.17 years) and differential learning group ((DG), included 13 participants aged 69.23 ± 3.61 years). RG group had individual regular physical exercises program, and DG group, had physical exercise program based on differential learning. Both groups, in total had 20 sessions (each being 25 –

35 minutes long), 5 times per week (excluding weekends), for 4 weeks. Before and after both programs risk of falling was evaluated through Berg balance, Fukuda stepping, stand-and-go, tandem tests while dynamics of independence were measured with functional independence test and instrumental daily activity questionnaire. The data were analysed using IBM SPSS Statistics (Armonk, NY: IBM Corp, USA), version 27. A non-parametric Wilcoxon test was used to compare the two dependent samples. The Mann-Whitney U test was run to compare the test scores of two independent samples. Data were presented as the median (me), the minimal value (min), maximal value (max) and the mean – me (min; max; mean). The significance level was set at $p < 0.05$.

Results. Results of Berg balance test. Before physical exercise program RG group results were 34 (32; 40; 34.27) points, after the regular program they were 42 (40; 45; 42.55) points. Therefore, there were a statistically significant difference before and after the program in RG group (Z=-2.969; p=0.003). Initial DG groups results were 34 (31; 40; 34) points, and after the program it reached 47 (44; 50; 46.61) points. Thus, DG groups results also showed a statistically significant difference (Z=-3.192; p=0.001). We found no statistically significant difference between the RG and DG groups results before the exercise programs (U=64.50; p=0.691). Although after the exercise programs there was a statistically significant difference between both groups (U=5.00; p=0.001). Fukuda stepping test results. Baseline results of RG group results were 46 (43; 49; 45.91) degrees. After intervention test results dropped till 34 (30; 36; 33.27) degrees and revealed statistically significant difference (Z=-2.937; p=0.003). DG test results at baseline were 44 (36; 51; 43.85) degrees and after the physical exercises program based on differential learning results decreased to 30 (26; 38; 30.62) degrees. DG results revealed statistically significant difference (Z=-3.186; p=0.001). Hence, there was no statistically significant difference among the RG and DG groups before the applied programs (U=50; p=0.228), but after the exercised programs among the RG and DG groups we found a statistically significant difference (U=30.50; p=0.010).

Conclusions: This study showed the differences between physical exercises adjusted on classical and differential learning methods proved to improve results for elderly people's risk of falling prevention. Among the groups, better results were seen in DG.

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THE IMPACT OF RED-S ON THE MENTAL AND PHYSICAL HEALTH OF ATHLETES

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Introduction. The International Olympic Committee expert working group introduces a broader, more comprehensive term for the condition previously known as 'Female Athlete Triad'. The term 'Relative Energy Deficiency in Sport' (RED-S), points to the complexity involved and the fact that male athletes are also affected (1). It is a syndrome of impaired physiological function of the reproductive, gastrointestinal, cardiovascular, metabolic, psychological, skeletal and immunological systems underpinned by low energy availability (2). Recent studies have investigated the prevalence of low energy availability in various sports. Prevalence ranges from 22% to 58% (3). Research aim – to evaluate the impact of RED-S on the mental and physical health of athletes.

Research methods and organization. The study was performed in Lithuanian Sports Center, Department of Sports Medicine and Kaunas Department of Sports Medicine. The examination included 10 young male athletes with RED-S syndrome. The age of the subjects ranged from 17 to 24 years. Inclusion criteria: athletes engaged in active physical activity. Body weight components were evaluated using Body Composition Analyser (IOI353). Daily energy balance of athletes was calculated using energy balance equation (energy balance = energy input – energy output). Muscle strength was evaluated with 01165 Lafayette Manual Muscle Tester. For mental health evaluation the International Olympic Committee Sport Mental Health Assessment Tool 1 (SMHAT-1) was used. Statistical data analysis was performed using SPSS (Statistical Package for Social Sciences) 27.0. The results are presented as median (xme), minimum (xmin), maximum (xmax) value and mean ($\bar{x}$) – xme (xmin – xmax; $\bar{x}$).The Spearman correlation coefficient (r) was calculated to determine the relationships between the quantitative variables. Differences with $p < 0.05$ were considered statistically significant.

Results. The median of recommended daily caloric intake for research participants with high energy output was 3355 (2751-3854; 3330) kcal. The results show that the body fat mass median of subjects was 14.5 (5.7-22; 15.25) %, The results of the survey on how many calories are consumed during different physical activities were: during purposeful physical activity for at least 2 hours a day, the median was 2300 (2000-2750; 2365) kcal. Without engaging in purposeful physical activity - 2425 (2000-3000; 2435) kcal. Using the energy balance equation, a daily caloric deficit - 975 (650-1351; 964.9) kcal was calculated. Analysing the results obtained by all respondents 60% (n = 6) of subjects have certain psychological disorders or symptoms. The remaining 40% (n = 4) did not show psychological disorders or symptoms and did not require further action. Assessing the anxiety felt by athletes, results show that out of 100% (n = 10) the questionnaire did not need to be filled in by 40% (n = 4) of participant, due to unexpressed psychological symptoms, 10% (n = 1) did not feel anxiety and minor anxiety was observed in 50% (n = 5) of subjects. There was a statistically significant strong positive relationship between sleep quality and other psychological factors: psychological disorders ($r = 0.913$; $p < 0.001$), anxiety ($r = 0.943$; $p < 0.001$) and symptoms of depression ($r = 0.913$; $p < 0.001$).

Conclusions: RED-S has a greater impact on athletes mental health than physical. Body fat mass norms were met by 30% of subjects and 70% did not comply with in the rate. 6 out of 10 participants experience certain psychological symptoms. The lower the quality of sleep, the more and faster psychological disorders and anxiety are felt, subjects are more likely to experience depressive symptoms.

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BALANCE, GAIT, RISK OF FALLS, UPPER EXTREMITIES TREMOR AND QUALITY OF LIFE CHANGES THROUGH DIFFERENT BALANCE AND GAIT PROGRAMS FOR PEOPLE WITH PARKINSON‘S DISEASE

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Introduction. Parkinson's disease is a progressive disorder that affects patients quality of life. Physiotherapy is an excellent component to pharmacological therapy (1) and many training progarms are possible for people with Parkinson‘s. So far balance and gait exercises are the most commonly observed. Single or dual-task gait exercises of varying difficulty can improve patients' physical performance, reduce the risk of falls, and improve their quality of life. Balance exercises both on a stable base and on unstable base could lead to Parkinson‘s disease progresion reduction (2, 3. 4, 5, 6). The aim of this study is to evaluate the effectiveness of different balance and gait programs for Patients with Parkinson‘s disease.
Research methods and organization. 20 people with diagnosed Parkinson's disease and also members of Kaunas Parkinson's Disease Society were included in this study. The research was approved by Lithuanian University of Health Science Bioethics Center (BEC-SR(M)-53). The study was performed during the period from 01/09/2021 to 01/11/2021. A total of 8 sessions were performed for each study group and physiotherapy procedures lasted 1 hour for each case. 6 males and 14 females were the subjects of this study and the age of participants were between 60 and 90 years (72.8±6.79). Cases were randomly divided into two groups of 10 subjects. Selection criteria: 1. People with Parkinson's disease who are at least 60 years old and not older than 90 years; 2. People who are able to control the torso, upper and lower limbs independently. Exclusion criteria: 1. People who refused to participate in the study; 2. Acute conditions/diseases; 3. Disease stage 4 and 5 (according to the Hoehn and Yahr scale). The first group of subjects performed balance exercises on a stable base and single task gait exercises on the special feets, and the second group did balance exercises on unstable planes and dual gait exercises on special feets. Before and after the procedures, all cases were assessed for balance and gait by the Tinetti test, the risk of falls was evaluated by the dynamic gait index and timed up and go test, the upper limbs tremor was assessed by a special mobile phone application, and the quality of life before and after the study was recorded with 39 Parkinson's disease questionnaire (part of the evaluation of mobility and daily activities). Statistical analysis was done using “IBM SPSS Statistics 27”. Differences were considered statistically significant at $p<0.05$. The study used statistical

methods, such as: 1. Wilcoxon criteria for two dependant samples; 2. Mann-Witney U test for two independant samples; 3. Spearman correlation coefficient was applied to search for correlations.
Results. First patient group included in the study had a statistically significant improvement of gait by evaluating results of Tinetti gait test (Z=-2.070; p=0.038). Also the second group of patients had statistically significant improvement of gait, using the same test (Z=-2.714; p=0.007). Statistically significant improvement of balance was observed by Tinetti balance test. After the test, first group of cases had statistically significant improvement on balance (Z=-2.449; p=0.014), also the second group of patients had statistical improvement of the same test (Z=-2.428; p=0.015). There were also statistically significant results on risk of falls: first group dynamic gait index results was (Z=-2.111; p=0.035) and the second group (Z=-2.309; p=0.021). First group of participants up and go test results (Z=-2.090; p=0.037) and the second (Z=-2.703; p=0.007). There were statistically significant results of right upper limb tremor strength. First (Z=-2.599; p=0.009) and the second (Z=-2.701; p=0.007) group results showed statistically significant change of right extremity tremor strength. After the study there were a statistically significant changes of right extremity tremor strength between the groups (U=22.000; p=0.035). Left upper extremity tremor strength outcomes after the procedures also shown statistically significant improvement. First (Z=-2.803; p=0.005) and the second (Z=-2.293; p=0.022) group of cases left extremity tremor strength results also revealed statistically significant changes.
Conclusions. The single task on a stable platform program and double task on unstable platform program improved patients gait and balance, reduced upper extremities tremor strength and risk of falls in both groups of Parkinson's disease patients. There were no significant improvement between the groups except right upper limb tremor strength.
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EVALUATION OF FUNCTIONAL MUSCLE STRENGTH, BALANCE AND MOTIVATION IN PATIENTS WITH PARKINSON'S DISEASE AFTER USING A LONG–TERM PHYSIOTHERAPY PROGRAM

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Introduction. Parkinson's disease is the second most common chronic neurodegenerative disease after Alzheimer's disease (1). In addition to pharmacotherapy and neurosurgical treatment, physiotherapy aims to improve a number of disorders associated with Parkinson's disease, including problems with physical capacity, functional muscle strength, balance and gait, increased risk of collapse, and lack of motivation (2). Studies confirm that regular exercise may lead to better function and quality of life and slower progression of the disease (3). The aim of the paper is to evaluate changes in functional muscle strength, balance, and motivation in patients with Parkinson's disease using a long-term physiotherapy program.

Research methods and organization. The reaserch was carried with Kaunas Parkinson's Disease Society patients at home-based from 2021.03.01 to 2021.09.01. The study included 16 subjects (11 – female, 5 – male), the mean age of the subjects was 72.62±7.04 years. Criteria for selection of subjects: adults diagnosed with Parkinson's disease; persons aged 55-90; stages I – III of Parkinson's disease were determined based on a modified Hoehn and Yahr Staging Scale. Exclusion criteria: people who refused to participate in the study; acute conditions/diseases; disease stage 4 and 5 (according to the Hoehn and Yahr scale). Physiotherapy was applied 2-3 times/week, the duration of one session was about 45 minutes. The patients were assessed using functional muscle strength which was determined by scores – assessment of neck extensor muscle strength, neck rotation muscle strength assessment, lumbar trunk muscle strength assessment and trunk muscle strength (concentric and eccentric muscle contraction), arm retraction and flexion, shoulder rotation force. The balance was assessed with the Functional reach test, Timed Up and Go test, Tinetti balance and walking test and Berg balance test. The motivation of patients recovery was assessed with the Recovery locus of control questionnaire. Statistical analysis of the data was performed using IBM SPSS (Armonk, NY: IBM Corp, USA) 27.0 software. The samples studied are small, so nonparametric criteria were used to compare dependent samples. Quantitative-dependent variables were subjected to a nonparametric paired Wilkoxon test and data were presented as median (Xme), minimum value (Xmin), maximum value (Xmax), and mean (x) Xme (Xmin; Xmax; x). A Spearman correlation coefficient was applied to search for correlations. There were statistically significant differences at $p<0.05$.

Results. The results of the neck extensor muscle strength was 3.00 (1; 4; 2.56) points, and after the physiotherapy program, the subjects evaluation score was 3.00 (2; 4; 3.12) points. After physiotherapy, the assessment of the strength of the neck muscles improved statistically significantly, $p<0.05$ ($Z=-3.00$; $p=0.003$). Analyzing the results of the neck rotating muscle strength, it was found that the result before the physiotherapy program was 2.5 (2; 3; 2.50) points, after the physiotherapy program the result was better 3.0 (2; 4; 3.00) points, ($Z=-2.82$; $p=0.005$). It was found that before the physiotherapy program, the result of Functional reach test among the subjects was 21.5 (9; 40; 22.87) cm, while the test results after physiotherapy improved statistically significantly to 27.5 (12; 40; 27.31) cm, ($Z=-3.18$; $p=0.001$). It was found that before the physiotherapy program, the results of the Timed Up and Go test was 13.5 (8; 19; 13.56) seconds, while after the physiotherapy, the test index improved statistically significantly to 9.0 (7; 12; 9.75) seconds, ($Z=-3.42$; $p=0.001$). The results of the Tinetti balance and walking test before physiotherapy was 23.5 (11; 27; 20.75) points, with a statistically significant improvement after the physiotherapy program, as the result was 24 (13; 28; 22.37) points, ($Z=-3.08$; $p=0.002$). The results of the Berg balance test before physiotherapy was 45.0 (24.0; 53.0; 42.5) points. After the physiotherapy program, the balance improved statistically significantly to 45.5 (26.0; 56.0; 45.75) points, ($Z=-3.32$; $p=0.001$). It was found that before the physiotherapy program the subjects were less motivated 26.0 (14; 31; 25.37) points, meanwhile, after the physiotherapy program, the motivation of the subjects improved statistically significantly to 33.0 (28; 35; 32.56) points, which showed a significant increase in the subjects motivation ($Z=-3.53$; $p=0.001$).

Conclusions. The long-term physiotherapy program improved functional muscle strength, balance and gait in patients with Parkinson's disease, also the physiotherapy program had a significant effect on increasing their motivation.

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CHANGES IN THE PHYSICAL CAPACITY, MOVEMENT FUNCTION OF PATIENTS WITH PARKINSON'S DISEASE BASED ON MINDFULNESS EXERCISES, DEPENDING ON THE TIME OF THE PROCEDURE

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Introduction. The rapid spread of Parkinson's disease around the world is constantly accompanied by a deterioration in the movement function [1] and physical capacity [2] of patients, and there is a growing need to treat the severe symptoms of the syndrome [3]. Mindfulness exercises are becoming one of the most popular methods that are applied to patients with Parkinson's disease [4]. It has been observed that the time of day is important for people with Parkinson's disease when physical activity is applied [5]. The study aim is to compare the changes of physical capacity, movement function in patients with Parkinson's disease based on Mindfulness disease, depending on the time of the procedure.

Research methods and organization. The study was conducted in the Kaunas County Parkinson's Society, Kaunas City, Lithuania. 23 patients participated in the study; 14 women (60,9%) and 9 men (39,1%). Patients were divided into two groups: the morning group (11 patients) and the afternoon group (12 patients). The mean age of the subjects in the morning group was 61,36 ± 8,59 years, and in the afternoon group 67,08 ± 2,39 years. Subjects were selected according to the following criteria: age of the subjects: 45–70 years; brief examination of the mental state, not identified or established mild cognition disorder; modified Hoehn and Yahr Parkinson's disease stage scale: stage 2-3; undocumented cases of gait stiffness; men and women voluntarily agreed to participate in the study. The patient's physical capacity was measured: Borg scale, visual fatigue test, orthostatic sample. The patient's movement function was measured: 6 min. walking test, Fullerton advanced balance scale, Tinetti gait and balance test. Also, before conducting a study, a questionnaire was provided for each subject, from which data on the age of the subject were collected, disease data, physical activity. The patients were performed before physiotherapy and after sixteen physiotherapy procedures. The data was analysed using SPSS for Windows software, version 27. The nonparametric Wilkokson test were used for quantitative dependent variables. Quantitative data are presented as median (xme), minimum value (xmin), maximum value x (xmax) and arithmetic mean (m) – xme(xmin; xmax; m) or as arithmetic mean (m) and standard deviation (SD) – m ± SD. Non-parametric Mann-Whitney test was

used to compare the two independent quantitative values. The Shapiro-Wilk test was used to check the normality of the data. A Spearman or Pearson correlation coefficient was used to determine the relationships. Differences with p<0,05 were considered statistically significant.

Results. In the morning group Borgo the score of the scale before and after improved significantly (Z=-2,236; p=0,025), afternoon group (Z=-2; p=0,046). No statistically significant differences were observed when comparing differences between groups (U=58; p=0,651). Visual fatigue scales before and after in the morning group the evaluation of the results improved significantly (Z=2,401; p=0,016), afternoon group (Z=-1,985; p=0,047). No statistically significant differences were observed when comparing differences between groups (U=60,5; p=0,74). Of the orthostatic sample in the morning group before and after was found to improve significantly (Z=-2,716; p=0,007), afternoon group (Z=-2,85; p=0,004). No statistically significant differences were observed when comparing differences between groups (U=64,5; p=0,928). Of the 6 min. walking test in the morning group before and after results didn't change statistically significantly (Z=-1,689; p=0,091), afternoon group (Z=-3,059; p=0,002). No statistically significant differences were observed when comparing differences between groups (U=42; p=0,151). Of the Fullerton balance test in the morning group before and after improved statistically significantly (Z=-2,754; p=0,006), afternoon group (Z=3,002; p=0,003). No differences were observed when comparing differences in change between groups (U=46,5; p=0,235). Of the Tinetti gait and balance test in the morning group before and after improved statistically significantly (Z=-2,754; p=0,006), afternoon group (Z=-2,565; p=0,01). No statistically significant differences were observed when comparing differences between groups (U=47,5; p=0,26). Morning and afternoon groups correlations between physical capacity and movement function indicators were performed in correlation analysis. In the morning: between orthostatic samples and 6 min. walking test (r=-0,746; p=0,008). In the afternoon: between orthostatic samples and Tinetti gait and balance test (r=-0,854; p<0,001).

Conclusions. We found that after the Mindfulness method, patients with Parkinson's disease improved movement function and physical capacity in the afternoon and morning groups. We observed that after the Mindfulness method, for afternoon and morning groups, results of movement function indicators are better, the results of physical capacity indicators are better. Also our study observed no difference between morning and afternoon groups movement function and physical capacity indicators.

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THE CORRELATION BETWEEN LOWER LIMB MUSCLE STRENGTH AND LENGTH, JOINT RANGE OF MOTION, BALANCE, FOOT POSTURE AND PAIN INTENSITY IN PATIENTS WITH NONSPECIFIC LOW BACK PAIN

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Introduction. Nonspecific low back pain is one of the major musculoskeletal disorders amongst adults causing disability and pain that leads to impairment of physical performance at work and in private life as well as placing a high financial burden on the health system (1). According to research, the greatest influence on the development of nonspecific low back pain is caused by disorders of the musculoskeletal system in the lower limb (2). The aim of this study is to determine and assess the correlation between lower limb muscle strength and length, active joint range of motion, balance, foot posture index and nonspecific low back pain.

Research methods and organization. The study was conducted at the department of physical medicine, Antakalnis` Clinic, Vilnius, Lithuania. This study was completed from April to June in 2021 after the approval of the Bioethics Centre of the Lithuanian University of Health Sciences. 23 participants, median age 57 (42-65) years old, males and females participated in the study. The inclusion criteria required that each participant be 40-65 years old, have a nonspecific low back pain for a duration longer than 12 weeks, be without radiating pain and experience pain no more than 8 on the Numeric Pain Rating Scale (1-7). Intensity of pain was evaluated using the Numeric Pain Rating Scale. Lower limb muscle strength was measured using Lovett technique. The length of hamstrings was measured using the 90/90 straight leg raising test, the length of hip flexors was measured using the Thomas test and the length of quadriceps was measured using the Kendall test. The active joint range of motion of the hip, knee and foot were measured using a goniometer. Dynamic balance was measured using a modified star excursion test. Foot posture index was measured using the FPI-6 which was used to assess the level of foot pronation and supination. All the results were calculated and assessed for any correlations with pain intensity. The data was analysed using SPSS for Windows software, version 27. Due to a small sample size the nonparametric tests were used for data analysis. Chi square test and Fishers Exact test were used to analyse relationships between the categorical data. Cramer`s V coefficient was used to measure association between two nominal variables. Spearman correlation was used to assess the relationship between two variables. Qualitative data is showed in percentages. Quantitative data is showed as median (xme) (minimum (xmin) - maximum (xmax)) value. The statistical significance level was established at $p<0.05$.

Results. The median score for the Numeric Pain Rating Scale was 5 (2-7) points. There was an association between pain intensity and right hip flexors muscle strength ($p=0,024$). We found statistically significant correlation between pain intensity and the muscle strength of the left hip flexors ($V=0,505$; $p=0,014$). There was a significant correlation between pain intensity and the length of the right ($r=0,486$; $p=0,019$) and left ($r=0,619$; $p=0,002$) hip flexors, right ($r=0,525$; $p=0,010$) and left ($r=0,570$; $p=0,005$) knee flexors, right ($r=-0,587$; $p=0,003$) and left ($r=-0,636$; $p<0,001$) knee extensors muscles. There were significant correlations between pain intensity and joint ranges of motion of left ($r=-0,417$; $p=0,048$) hip flexion, right ($r=-0,528$; $p=0,010$) and left ($r=-0,539$; $p=0,008$) hip extension, right ($r=-0,418$; $p=0,047$) knee flexion, left ($r=-0,478$; $p=0,021$) ankle plantarflexion. There were statistically significant correlations between pain intensity and right ($r=-0,769$; $p<0,001$) and left ($r=-0,742$; $p<0,001$) leg dynamic balance. We found an association between pain intensity and the left foot

posture (p=0,003). There was a statistically significant correlation between higher pain scores and left foot pronation (V=0,652; p=0,002).

Conclusions. We found that patients who experienced stronger nonspecific low back pain had reduced hip flexors` muscle strength, shortened hip flexor, knee flexors and extensors muscles, reduced joint range of motion of the hip, knee and foot. The higher pain scores were associated with lower dynamic balance scores of both legs. Left foot pronation was related to an increase in intensity of nonspecific low back pain.

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THE IMPACT OF THE TREE THEME METHOD ON THE QUALITY OF LIFE AND DAILY ACTIVITIES OF PEOPLE WITH MENTAL ILLNESS AND ANXIETY DISORDERS

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Introduction. Mental illnesses and disorders have a strong negative impact on individuals' daily activities and on their quality of life [1-6]. Now because of the global COVID-19 pandemic, people are increasingly concerned about their mental health. Some scientists believe that a new wave of mental illness will begin right after the pandemic, as the effects of the pandemic are already being felt globally [7-9]. The Tree Theme Method is an intervention based on creative activities and the telling and creation of one's life story which helps to cope with everyday life activities. Research aim was to evaluate the impact of the Tree Theme Method on the quality of life and daily activities of people with mental illness and anxiety disorders.

Research methods and organization. The head of the Psychiatry Department of LUHS Kaunas Hospital confirmed that there is no objection to conduct the research at LUHS Kaunas Hospital, Psychiatry Department. The research was conducted from 19th July 2021 to the 2nd August 2021. Only anonymous surveys and questionnaires such as The WHO Quality of Life Questionnaire (WHOQoL-BREF) and the Comprehensive Occupational Therapy Assessment Scale (COTE), and gender were collected during the study to ensure and maintain total anonymity. There were 20 patients in total who participated in the research. Subjects were selected to the following criteria: people diagnosed with mental illness; adult patients (> 18 years old); diagnosed with anxiety disorders; outpatient psychiatric services are provided. Exclusion criteria for patients were sedation states; minors (<18 years old); persons with symptoms of psychosis. After being picked out, 20 participants were randomly divided into 2 groups: study (n=10) and control groups (n=10). Study group contained 4 men and 6 women, control group – 2 men and 8 women. A quantitative study was performed. The control group received regular occupational therapy and problem solving in everyday situations, relaxation (breathing exercise 4-7-8). The study group received regular occupational therapy, relaxation (breathing exercise 4-7-8) and the Tree Theme Method. Data were processed and analyzed using the IBM SPSS Statistics 27 program. The following characteristics were calculated: normality tests,

medians, the level of significance chosen to test the statistical hypotheses was 0.05. The non-parametric Wilcoxon criteria was used to measure results before and after rehabilitation in groups, the Mann-Whitney U was used before and after interventions to compare between the groups.

Results. After analyzing the data of the research group, it was found that the overall quality of life changed statistically significantly (Z = -2.809; p=0.005) before the intervention based on Tree Theme Method (TTM), an improvement was observed for all members of the research group. Quality of life before the intervention was 68.5 (48-85; 70.6) points, after the TTM, the quality of life drastically improved to 82.5 (56-91; 78.80) points. After analyzing the data obtained by the control group, the results were slightly lower. The overall quality of life score before conventional occupational therapy was found to be 64 (55–86; 68.4). After conventional occupational therapy, the overall quality score rose to 65.5 points (55–90; 70.20). After evaluating the daily activities of the research group with the COTE scale before Tree Theme Method, it was observed that the daily activities were evaluated with statistically significant scores (Z = -2.814; p=0.005). Prior to TTM, daily activity was rated at 10.5 (8-22; 11.90) scores, with an improvement to 5.5 (1-20; 6.8) scores after intervention. Results of the control group differed statistically significantly from the beginning (Z = -2.501; p=0.012). Prior to conventional occupational therapy, COTE scores were 30 (7-73; 36), and after the intervention, the group mean improved to 28 (5-69; 33.8). There was no statistically significant difference in the quality of life between the study and control groups before (U = 43; p=0.631) or after (U = 28.5; p = 0.105) the interventions. Comparing the evaluations of daily activities before the interventions, a statistically significant difference was observed between the groups (U = 17; p=0.011), as well as between the groups after the interventions (U = 10; p=0.002). The control group performed better in the evaluation of overall daily activities than the study group even when both had shown improvements.

Conclusions: It was found that after using the Tree Theme Method positive impact on the daily activities and the quality of life were observed, although no statistically significant differences were observed between the study and control groups in the quality of life assessment.

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RESEARCH OF PARENTS AND REHABILITATION SPECIALISTS ATTITUDE TO THE APPLICATION OF TELEMEDICINE PRINCIPLES IN CHILDREN'S REHABILITATION

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Introduction. The term telemedicine usually means that doctors treat patients remotely (1). Telemedicine is a technology for patient care that allows to diagnose, treat, and act as a preventive measure that will help their long-term health. Over time, COVID–19 pandemic has also changed the field of children's rehabilitation where telemedicine has become an important technology for providing medical care to patients. Telemedicine can make children's healthcare more efficient, organized, and accessible around the world (2–4). The aim of the study is to evaluate the attitude of parents and rehabilitation specialists to the application of telemedicine principles in children's rehabilitation.
Research methods and organization. The study was approved by the Lithuanian University of Health Sciences Bioethics Center (BEC–SR(M)–212). A one–time survey of respondents was conducted from May till September 2021. Questionnaires were prepared by the author of the study, based on scientific articles and literature on telemedicine and its application in children's rehabilitation. Two questionnaires were prepared using Google Forms software and posted on social media networks and also sent by e-mail to rehabilitation specialists and medical institutions. They were completed once by parents and rehabilitation specialists. The first questionnaire was completed by 119 parents raising children with developmental and functional disabilities. The average age of parents was 34.13 ±6.207 years, the average age of children was 5.4±4.01 years. The first ten questions of the questionnaire were created to collect sociodemographic data. The other fifteen were about parents' attitudes towards telemedicine and the quality of the services. The second questionnaire was completed by 132 rehabilitation specialists working with developmentally and functionally impaired children. The average age of rehabilitation specialists was 31.39±7.82 years. The first five questions were to collect sociodemographic data. The other twenty questions were about rehabilitation specialists' attitudes towards telemedicine, the quality of telemedicine services, and personal experience. Statistical analysis was performed with IBM SPSS Statistics 27. Quantitative data are presented as an arithmetic mean (m) and standard deviation (SD) –m ± SD. Qualitative data are presented as percentages (%). The Chi-square ($\chi 2$) criteria were used to assess the homogeneity of the qualitative data. The reliability of the questionnaires was tested by Cronbach's alpha coefficient (α). Values of (α) above 0.7 indicate an excellent internal consistency. The differences with $p < 0.05$ were considered statistically significant.
Results. The study was approved by the Lithuanian University of Health Sciences Bioethics Center (BEC–SR(M)–212). A one–time survey of respondents was conducted from May till September 2021. Questionnaires were prepared by the author of the study, based on scientific articles and literature on telemedicine and its application in children's rehabilitation. Two questionnaires were prepared using Google Forms software and posted on social media networks and also sent by e-mail to rehabilitation specialists and medical institutions. They were completed once by parents and rehabilitation specialists. The first questionnaire was completed by 119 parents raising children with developmental and functional disabilities. The average age of parents was 34.13 ±6.207 years, the average age of children was 5.4±4.01 years. The first ten questions of the questionnaire were created to collect sociodemographic data. The other fifteen were about parents' attitudes towards telemedicine and the quality of the services. The second questionnaire was completed by 132 rehabilitation specialists working with developmentally and functionally impaired children. The average age of rehabilitation

specialists was 31.39±7.82 years. The first five questions were to collect sociodemographic data. The other twenty questions were about rehabilitation specialists' attitudes towards telemedicine, the quality of telemedicine services, and personal experience. Statistical analysis was performed with IBM SPSS Statistics 27. Quantitative data are presented as an arithmetic mean (m) and standard deviation (SD) – m ± SD. Qualitative data are presented as percentages (%). The Chi-square ($\chi 2$) criteria were used to assess the homogeneity of the qualitative data. The reliability of the questionnaires was tested by Cronbach's alpha coefficient (α). Values of (α) above 0.7 indicate an excellent internal consistency. The differences with $p < 0.05$ were considered statistically significant.

Conclusions: 1. The majority of the surveyed parents agreed that telemedicine is a step towards better medical services and it can reduce the cost and inconvenience of traveling. The results achieved through telemedicine satisfied most of the participated parents. 2. All surveyed rehabilitation specialists agreed that telemedicine reduces the travel costs and inconveniences of traveling. Half of the surveyed rehabilitation specialists rate telemedicine quality as excellent.

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THE RELATIONSHIP BETWEEN FUNCTIONAL STATE OF THIGH MUSCLES, LUMBOPELVIC MOVEMENT CONTROL, ERGONOMICS AND LOW BACK PAIN IN OFFICE WORKERS

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Introduction. Daily computer usage of more than 7 hours, sitting with no breaks and lack of ergonomics is associated with the risk of low back pain (LBP) (1). Prolonged sitting can cause muscle tightness and pain that may result in the loss of motor coordination and motor control (2,3). People who are inactive and sit for long periods have reduced passive hip extension and hip muscle stiffness (4). It has been shown in the literature that an ergonomic approach, the provision of a suitable and comfortable work environment is effective in correcting posture disorders and musculoskeletal problems (5). Research aim was to assess the relations among functional state of thigh muscles, lumbopelvic movement control, ergonomics and low back pain in office workers.

Research methods and organization. The research was approved by Lithuanian University of Health Sciences Bioethics Center (BEC-SR(M)-29). This study resulted in a total sample of 25 office workers (17 females and 8 males) with LBP. The median of the age of participants was 35 (30-55; 39.2) years. Individuals diagnosed with other lower back pathologies (disc herniation, radiculopathy, spinal stenosis, spondylolisthesis, osteoarthritis) were excluded. LBP intensity was measured using visual analogue scale (VAS). Tightness of hip flexors, adductors, hamstrings and tensor fasciae latae muscles was tested. The maximum isometric muscle strength was measured using hand-held dynamometer

(Lafayette). Lumbopelvic movement control was determined using movement control test. Ergonomic data were collected through the rapid office strain assessment (ROSA) method. A questionnaire was used to collect information about the gender, age, duration of sitting time, mobile phone or computer use and knowledge about ergonomics in workstation. Statistical analysis was performed with "Microsoft Office Excel 2010"and IBM SPSS Statistics 27. Correlation was determined by calculating Spearman's Rank correlation coefficient between two quantitative variables or Cramer's V between two nominal variables. Correlation was determined according to the obtained values of correlation coefficient (r or V): r(V)=0,00 – no correlation; r(V) = ± [0,01-0,19] – very weak correlation; r(V) = ± [0,20-0,39] – weak correlation; r(V) = ± [0,40-0,69] – moderate correlation; r(V) = ± [0,70-0,89] - strong correlation; r(V) = ± [0,90-0,99] – very strong correlation; r(V) = ±1 – linear correlation. The significance level was $p<0,05$.

Results. Statistically significant ($p<0,05$) moderate positive correlations were found between lumbopelvic movement control tests "Rocking forwards" and "Rocking backwards" in quadruped position and low back pain intensity (V = 0,46, V = 0,49); ROSA Monitor and peripherals score and low back pain intensity (r_s = 0,59). Statistically significant ($p<0,05$) strong positive correlations were found between lumbopelvic movement control test "Waiter's bow" and low back pain intensity (V = 0,721); ROSA scale section A, B, ROSA final score and low back pain intensity (r_s = 0,71; r_s = 0,73, r_s = 0,73). However, no significant correlations were found between functional state of thigh muscles and low back pain intensity ($p>0,05$).

Conclusions: Office workers with moderate or strong low back pain had poorer lumbopelvic movement control tests "Rocking forwards", "Rocking backwards" in quadruped position and "Waiter's bow" in standing position test as well. Participants with higher scores of Rapid Office Strain Assessment in section A (seat pan height, seat pan depth, armrest position and back support position), B (monitor and telephone), Monitor and peripherals and final result had more intensive low back pain. It means the poorer ergonomics, the higher was pain intensity. However, no significant correlations were found between functional state of thigh muscles and low back pain intensity.

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EFFECTS OF DIFFERENT PHYSIOTHERAPEUTIC MEASURES FOR A FUNCTIONAL CONDITION FOR PEOPLE WITH CHRONIC LOW BACK PAIN

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Introduction. The prevalence of chronic lower back pain is increasing, despite the increasing use of medical treatments [1]. Chronic low-back pain is a major contributor to social burden and years lived with disability. [2]. The purpose of this investigation is to identify the effects of different physiotherapeutic measures for chronic low back pain.

Research methods and organization. The research was approved by the Bioethics Center of the Lithuanian University of Health Sciences (No. BEC-SR (M) -108). The study included 19 subjects 38,58±11,047 years old. Criteria for inclusion: a) lower back pain over a period of 3 months; b) persons aged 25-60; c) consent to participate in the investigation. Subjects randomly divided into two groups: the different physiotherapeutic measures (n=9) and the control group, to which nothing was applied (n=10). The following physiotherapeutic measures were applied to the first group of subjects: TENS, lumbosacral massage, application of the McKenzie method, and physiotherapy exercises. The application of each measure was performed in 10 separate procedures, for a total of 40 procedures per person, the study lasted 8 weeks. TENS was applied for 30 minutes, lumbosacral massage was applied for 15 minutes, the McKenzie method was applied for 12 minutes with 10 repetitions performed twice a day, physiotherapy exercises were applied for 30 minutes in one procedure. The participants were tested before and after each physiotherapeutic measure, as well as a final evaluation conducted after the study. To assess the lower back muscle endurance of the participants, the following tests were conducted: static back extensor endurance test, isometric abdominal endurance test, internal/external abdominal obliques test. To assess lumbar spine mobility, the applied tests include: thoracolumbar flexion, thoracolumbar extension, thoracolumbar lateral flexion, and the Modified Schober Test. Microsoft Excel and SPSS 27.0 programs are used for statistical data analysis. The nonparametric Mann-Whitney-Wilkoxon test was chosen for comparison between the two independent samples, and the Wilkoxon test for the two dependent samples. Differences were considered statistically significant when $p < 0.05$.

Results. The data of the control group was not statistically significant to the functional condition. Statistically significant data for static back extensor muscle strength were obtained using massage (Z=-2.521; p=0.012), the McKenzie method (Z=-2.521; p=0.012), and physiotherapy (Z=-2.366; p=0.018). Isometric strength of abdominal muscles was increased by TENS (Z=-2.677; p=0.007), massage (Z=-2.558;p=0.011), the McKenzie method (Z=-2.670; p=0.008), and physiotherapy (Z=-2,666; p=0.008). Data did not differ between groups (U=27.5; p=0.278).The application of all measures was statistically significant for the static strength of the internal/external abdominal oblique muscles on the anatomically left side: TENS (Z=-2.047; p=0.41), massage (Z=-2.388; p=0.017), the McKenzie method (Z=-2.524; p=0.012), and physiotherapy (Z=-2.251; p=0.024). Data did not differ between groups (U=38; p=0.604). Statistically significant data for right-sided internal/external abdominal oblique muscles endurance was found using the McKenzie method (Z=-2.668; p=0.008) and physiotherapy (Z=-2.533; p=0.011). No statistically significant data was found between groups after the study (U=36; p=0.497).Statistically significant data for forward bending was obtained using the McKenzie method (Z=2.251; p=0.024) and physiotherapy (Z=-2.251; p=0.024). The thoracolumbar extension was statistically significant using the McKenzie method (Z=-2.232; p=0.016) and physiotherapy (Z=-2.070; p=0.038). Thoracolumbar lateral flexion to the left was statistically significant using only the McKenzie method (Z=-2.232; p=0.026). Statistically significant data for thoracolumbar lateral flexion to the right was obtained with the McKenzie method (Z=-2.271; p=0.023) and physiotherapy (Z=-2.333; p=0.020). Data did not differ after the study between groups on the left (U=21; p=0.053) or right (U=26; p= 0.133) sides. The application of different measures to the Modified Schober test differ just between groups (U=19,5;p=0,035).

Conclusions: 1. The least effective measure for the functional condition was transcutaneous electrical nerve stimulation, the most effective for the functional condition was the McKenzie method and physiotherapy. 2. The application of physiotherapeutic measures compared with the control group was found not effective for isometric abdominal muscles endurance, internal/external abdominal oblique muscles endurance, thoracolumbar lateral flexion to both sides.

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THE EFFECT OF CORRECTIVE EXERCISES ON THE FUNCTIONAL CONDITION OF THE UPPER LIMB OF SEDENTARY WORKERS

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Introduction. An increasing number of people spend more time in sedentary work, which affects musculoskeletal disorders, tension and shortening of muscles, decreased muscle strength and amplitude, increased intervertebral disc compression, deteriorating posture, neck and shoulder complex pain are the most common of sedentary musculoskeletal disorders (1). Physical activity is an effective intervention method in reducing the progression of most chronic diseases but also has positive effect on the muscles and composition of the human body, it also reduces development of the psycho-emotional conditions in humans (2). Research aim: To evaluate the effect of corrective exercises on the functional condition of the upper limb of sedentary workers.

Research methods and organization. The study research was approved by Lithuanian University of Health Science Bioethics Center (BEC-SR(M)-172). The study was initiated and conducted on 2021.07.19 – 2021.08.30 the home of the subjects. Participants of the study were gathered from different workplaces which involves sedentary job. All the participants signed the informed consent form before taking part in this study. A total of 21 participated in the study 9 men, 12 women. In this study involved people aged 40- 50 working in a sedentary job, who felt pain in the neck, shoulders, decreased muscle strength in upper extremities, amplitude, impaired functional movements. Age of all subjects was 46.62 ± 2.69 years. Age mean of the men was 46.33 ± 2.40 years, and the mean age of the women was 46.83± 2.98 years. Selection criteria: voluntary consent to participate in the study; feeling of discomfort in the shoulders or neck; decreased amplitude of movements of the joints of the upper extremities; persons spending at least 4 to 5 hours a day sedentary position. Exclusion criteria: pain intensity not exceeding 6 points; engaged in professional sports; with less than 2 years of job experience. SAS was used to evaluate pain intensity; DASH was used to determine the degree of shoulder pain and dysfunction. Statistical analysis was performed using “IMB SPSS Statistics 27.0” software package. A non-parametric Wilcoxon test was used to compare the two dependent samples. Data were presented as the median (me), minimal (min), maximal (max) and the mean– me (min; max; mean). The significance level was set at $p<0.05$.

Results. The median of the woman's pain intensity at the beginning of research was 3.5 (2– 6; 3.7) points, men's 4 (2– 6; 3.9) points. After physiotherapy, women's pain intensity was 2 (0– 3; 1.5) points, men's 2 (0– 3; 1.7). Examining the obtained data before and after physiotherapy statistically significant decrease intensity of pain was found in women (Z=–3.166; p=0.002) and men (Z=– 2.810, p= 0.005). Before physiotherapy, women's functional shoulder disability was evaluated – 12.9 (5– 18.3; 12.6) percent, men – 10 (6.7– 22.5; 11.6) percent. After physiotherapy, the functional shoulder disability of women was 7.1 (1.7– 11.7; 7.1) percent, and that of women was 6.7 (3.3– 13.3; 7.1) percent. Evaluating the obtained data before and after physiotherapy, a statistically significant decrease of functional shoulder disability was found in women (Z= – 3.064; p = 0.002) and men (Z= –2.675; p= 0.007).

Conclusions: This study showed that correctional exercise program for men and women working sedentary work reduced the pain intensity, improved functional state of the upper limb.

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POSSIBILITIES OF PROVIDING REHABILITATION SERVICES THROUGH TELEMEDICINE FOR CHILDREN WITH CEREBRAL PARALYSIS

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Introduction. Telemedicine is widely used for children with cerebral paralysis (CP). Pandemic restrictions made telemedicine as a good option for continuous patient treatment (1). Wide possibilities of telemedicine are growing fast bringing all benefits for patients who need non-interrupting care. Telemedicine can reduce this risk of the development of age-related diseases by providing continuous treatment when live contacts are restricted. Enhanced monitoring is crucial for younger children as devastating complications, such as hip dysplasia, could be minimized (2). The aim of our study was to evaluate possibilities, advantages and disadvantages of telemedicine for providing rehabilitation services for CP children.

Research methods and organization. The study was conducted by collecting data and information from medical staff and from parents of CP children. Separate validated questionnaires containing 11 different questions each were used for medical specialists and for parents. All participants of this study (medical professionals and parents) were using telemedicine methods for rehabilitation of CP children for at least 1.5 year. Medical professional participants of the study were further divided into 2 groups: physical therapy specialists and occupational therapy specialists. The bioethical permission was obtained prior the study (No.: BEC-SR(M)-216).

All respondents of the study were informed about the aim and tasks of this study and how collected information would be used for evaluation and further development of telemedicine for improved treatment of CP children. Confidentiality and anonymity was assured by encoding all collected data before analysis. Different questionnaires with different questions and different semi structured interview plans were prepared for medical staff and parents of CP children. Data was collected from the participants as written answers to questionnaires, recorded interviews and direct additional

questions and answers. All collected data was grouped into different groups and analyzed by various aspects evaluating and comparing positive and negative results: a) within each group separately; b) among all groups for the same question types. A total number of participants in the study was 14.

Results. All participants of the study confirmed that telemedicine is a very important alternative way of complimentary treatment for CP children. Due to pandemic restrictions of live meetings, alternative continuous treatment with the help of Telemedicine was the only possible way for some patients to stay in contact with specialists. When live meetings of doctors with patients were not interrupted, more intensive and continuous care using telemedicine could be provided in between. Regular usage of telemedicine in CP treatment had a number of advantages: 1) CP children could get the treatment at home, without going to the hospital; 2) parents could easily organize and choose the best possible time and duration for their children; 3) Physical and occupational therapy specialists had more flexibility for planning tele meetings with their patients; 4) Bi-directional communication of doctors and patients could be organized both: live online or at any convenient time for both sides by sending questions, videos or getting advices and suggestions from specialists relatively soon. Such a fast communication would not be possible having live meetings only. However, alternative treatment ways of telemedicine have some disadvantages. Both, physical and occupational therapy specialists emphasized difficulties of demonstrating and explaining some specific tasks and exercises. The manual assistance for a CP child performing some specific tasks was necessary. There was a higher risk that some tasks could be done incorrectly without live manual control. Some disadvantages were confirmed by the parents of CP children too: 1) some tasks were difficult to understand and to perform correctly without live manual control by the specialist; 2) CP children could not fully focus during designated hour for the treatment course online with the specialist; 3) family members at home as well as home atmosphere sometimes were inhibiting the willingness and active working during live online meeting.

Conclusions: Telemedicine is an important and complimentary way to provide continuous and uninterrupted complex treatment for CP children. Live visits and meetings with doctors are essential in the beginning stages of the treatment with additional tele medical courses between live meetings. In opposite, for advanced CP patient's alternative telemedicine can be used as the main method of the treatment, supported by short and irregular meetings which are necessary for live and manual control.

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ATTITUDE OF PARENTS RAISING CHILDREN WITH SERIOUS COMPLEX DISABILITIES ON ALTERNATIVE REHABILITATION METHODS

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Introduction. Alternative rehabilitation methods are described as medical care that is not standard medical practice but complements standard medical procedures (National Institutes of Health, 2015) (1). It is noticeable that there is not much research in Lithuania on the attitude of parents raising children with severe complex disabilities to alternative rehabilitation methods. Therefore, a study was

conducted is to reveal the attitudes of parents with severe complex disabilities towards alternative rehabilitation methods.

Research methods and organization. In order to determine the attitudes of parents with severe complex disabilities towards alternative rehabilitation methods, a qualitative study was conducted, and equilibrium structures selected for data collection were interviewed. The study was approved for bioethics under BEC approval no. BEC - SR (M) -201. Criteria selection was applied to the study contingent. The study was conducted from May to October. In the qualitative study, the price is 5 subjects who meet the selection criteria - parents raising a child with a severe complex disability older than 2 years; the child was subjected to 3 or more different alternative rehabilitation methods. Respondents in the study provided demographic data about their disabled child, as this made it easier to moderate the interview and plan the course of the interview. All study participants are women raising a child with a severe disability. The age of the two children was 3 years, the other children were 4, 5 and 6 years old difficult children have cerebral palsy with concomitant diseases such as microcephaly, mixed developmental disorders, vision problems, neurological disorders or heart disease and immediate incontinence. Many mothers learned the diagnosis from birth, and only one mother notes that when a child is 2 months old.

Results. The analysis of semi-structured interviews identified 3 main topics and 15 subtopics. All respondents were coded. The experience of all respondents with alternative medicine was only positive. Opinions have also emerged as to the situation in which traditional medicine cannot, and distrust of traditional medicine is emerging<...> I am not saying that our medicine does not help, but knowing how it is with it, <...> ”(A / 93),“ <...> I am not saying that I do not trust traditional medicine <...> but for some reason don't help, we're not getting stronger with her ... <(> D / 100) ".Concerns about the future of children have emerged “<...> What's next? Who will take care of her when I can’t? And the further away it becomes, the more terrible it is to live with such thoughts, for I perceive only one that it will always be only dependent on us ... ”(B / 210); "The thought that we will not live forever, and what will happen then?" (E / 150). Many respondents referred to the personal purchase of guilt for the quality of life of a child with a disability to assume that mothers would do more to develop the child's independence, improve their quality of life, improve physical and psychological pain and facilitate the family's daily routine. to hurt him less ... '(C / 230),' ... it is our desire as parents to do all we can ... '(D / 58). According to the respondents, alternative rehabilitation can have a positive psychological effect, a child with a severe complex disability can concentrate more easily, fix attention and ease communication and psychological problems. <...> ”(D / 112),“ <...> we have more and more emotions, more and more sounds, saliva has decreased <...> ”(E / 321),“ <....> to react to the environment, to us as parents, eye contact occurred ... ”(A / 65).

Conclusions: 1. There is a lack of professional alternative rehabilitation specialists in Lithuania and no modern alternative rehabilitation centers have been established. 2. Another problem that has emerged is the financial difficulties of families raising a separate child and the lack of state support, which means that many children cannot use alternative rehabilitation services. 3. Alternative rehabilitation provides a positive psychological effect.

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TEACHERS' ATTITUDE TOWARDS BEHAVIORAL ISSUES AND LACK OF INDEPENDENCE IN CHILDREN WITH AUTISM

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Introduction. In the last two decades, there has been a rapid increase in the number of school-children with autism who are enrolled in mainstream schools [1]. Children with autism often exhibit delayed speech, behavioral disturbances, lack of social responsiveness and daily living skills [2]. Researchers have found that teachers often lack knowledge about the specific characteristics and needs of school-children with autism and the practices that effectively support them in school [1]. A comprehensive approach is needed to improve outcomes for school-children with autism [1]. The aim of the study is to investigate teacher's attitude towards the problems of behavior and lack of independence of children with autism and the possibilities of their solution.

Research methods and organization. The study was performed with the permission of the Bioethics Center of Lithuanian University of Health Sciences No. BEC-SR(M)-217. The study was conducted from 2021 of September to 2021 of November. Fourteen teachers (3 men and 12 women; mean age 35.64±11.28 years, range 23-56) working with children with autism were interviewed using a semi-structured interview method. Teachers were selected on the basis of the selection criteria: voluntary consent to participate in the study, educators working in the field of pedagogy, working in an educational institution with a school-children with autism. Prior to the participation, teachers were informed about the research topic, the principles of confidentiality, and the ethics that guide the work. Before the survey, educators filled in a questionnaire of the characteristics of the subjects. The survey was conducted remotely using the Zoom platform. At the beginning of the interview, each teacher was informed that the interview will be recorded and used for scientific purposes only. The interview consisted of two research topics, on the behavior and independence of children with autism. Research questions were formulated for each research topic, and interview questions were formulated for these. Informants were asked about children behavior and independence problems, their causes, and solutions. The research data were transcribed and analyzed by the method of qualitative content analysis.

Results. The obtained data are transcribed from the recorded interviews into a Microsoft Word document after each meeting with the subject. Obtained data were coded to find meaningful units in the responses and to focus on the essentials. The most common behavioral problems identified by teachers was: aggression, self-aggression, refusal to act, and hyperactivity. The main reasons for the named behaviors were unsuitable environment, sensory problems, physiology, attention-seeking. The most effective behavioral solutions were identified as the use of alternative communication, structure application, environment adaptation. In order to change misbehavior, teachers use alternative communication, a structured agenda, elements of ABA and music therapy. Regarding the problems of children's lack of independence, the teachers mentioned that children often have problems with dressing, eating, personal hygiene, and toileting. The main reasons for the lack of independence were the children's lack of involvement in independent activities due to lack of understanding of the task, as well as the haste of those around them, and adult hyper-custody of the child. After identifying the reasons for the lack of independence, educators emphasized that the most effective ways to address independence are to allow children to perform activities independently and to provide clear sequences, and activity-based learning. Educators expressed a consensus on the most effective measure, which

was the performance scheme. School teachers expressed the need for training and seminars with more practical activities, as well as direct training of specialists to solve problems in the workplace.
Conclusions: Teachers face children's manifestations of misbehavior and lack of independence while working with school-children with autism. It is important to organize practical training that provides validated methodologies to help teachers to address children's behavioral and independence issues. Teachers expressed the need for teaching assistants and occupational therapists support in the educational institution in order to better address the emerging problems of behavior and independence of children.
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DAY-CARE CENTER SPECIALISTS' KNOWLEDGE AND ATTITUDES IN MANAGING THE BEHAVIORAL PROBLEMS IN CHILDREN WITH AUTISM

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Introduction. Children with autism often seem to be disobedient because they are reserved, irritable, misunderstood, antisocial (1). According to studies, a third of children with autism spectrum disorder (ASD) is diagnosed with emotional or behavioral disorders that can cause behavioral problems. If these children receive proper education and care they can integrate into society, learn to communicate with other individuals, and form relationships (2,3). Studies that assess the perspectives of day-care centers in managing the behavioral issues of children with ASD have not been conducted at a Lithuanian level. Aim of the study - to examine day-care center specialists' knowledge and attitudes in managing the behavioral problems in children with autism.
Research methods and organization. The quantitative research section - an instantaneous study using an anonymous questionnaire survey method. In the questionnaire, which was created by the author, respondents were asked 11 questions. The respondents were 79 day-care center specialists who work with children with autism. Descriptive statistics by using the frequencies of absolutes (n) and percentages (%) were used to assess the allocation of examined characteristics. Selection criteria: individuals who work with children on the autism spectrum in day-care centers; individuals who work with children who have autism and behavioral disorders; individuals who have worked in day-care centers for no less than one year; and individuals who answered all the compulsory questions in the questionnaire. In the qualitative part, a semi-structured interview was used, by interviewing 5 day-care center specialists. The data was analysed using thematic analysis. The survey was conducted in the year 2021, from May through September. The knowledge of the specialists of child day-care centers was assessed during the qualitative research. Knowledge was assessed by knowing the causes of the misbehavior, the adequacy of methods and measures to manage the misbehavior of children with autism.
Results. Specialists were asked to evaluate whether the listed reasons and statements are related to the behavioral problems of children with autism. All 79 respondents agreed that inappropriate behavior

associated with ASD is related to the child's inability to ask for help, express their needs. The statement about overly sensitive reactions to the surroundings was met with the approval of 60.8% of the respondents. The statements that have caused the most: misunderstanding language 48.1%, not understanding what is happening or why it is happening 43%, inability to make friends 62%, pain 48.1%. The statement about disliking being around other people was met with disapproval from 46.8% of the respondents while 31.6% were doubtful. Specialists were also asked to evaluate which measures and methods are the most effective in managing the behavioral problems of children with autism. Touching different textures, training the vestibular system with various tasks and exercises as well as adapting the surroundings were met with the approval of all the 79 respondents. Breaking down information into small steps and stages as well as daily enrichment of individual exercises were both met with a 91.1% approval. Daily routine images received approval from 87.3% of the respondents. Planning the number of sensory stimuli received the approval of 84.8%. Communicating through pictures and physical things received 83.5% of the respondents' approval. The statement about the change of surroundings, letting the child spend time alone, and calm down were met with 82.3% approval. The respondents also agreed with the statement about teaching the children various activities or skills through video material as well as teaching peers how to communicate with a child with ASD, the approval was 82.3%. Positive reinforcement by giving rewards for activities that were performed was met with 78.5% approval. Social narrative received 75.9% of the respondents' approval.

Conclusions: Day-care center specialists' knowledge of the reasons for behavioral problems is contrasting. The majority were doubtful or uninformed about communication, socialization issues, pain. The statement about communication issues received unanimous approval from all the participants. Specialists seemed to know the recommended behavior management methods well. Many respondents correctly identified 11 statements, which measures are the most effective in managing the unfit behavior of children with ASD.

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ASSESEMENT OF DIFFERENT PATIENT - REPORTED OUTCOME MEASURES IN PATIENTS WITH LOW BACK PAIN

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Introduction. Patient-reported outcome measures are essential in patient-centered care, especially in non-pharmacological interventions for low back pain (1). Although Oswestry Disability Index is 'golden standard' for functional disability evaluation, it has some disadvantages. It is most sensitive for persistent severe pain measurements, and it does not include questions about difficulty moving between positions such as sit to stand (2). The Spine Functional (SFI) is a tool to assess the impact of spinal problems, including pain on everyday activities (3). The aim of this research was to evaluate correlations and differences between various patient-reported outcome measures in adults with non-specific low back pain.

Research methods and organization. The study was approved by Kaunas Regional Biomedical Research Ethics Committee. It was a two-stage study. Stage one was performed by translating and cross-culturally adapting the SFI questionnaire to Lithuanian language. This process was performed using the guidelines recommended by the International Society for Pharmacoeconomics and Outcomes Research (4). During stage two volunteers with non-specific, chronic, or subacute low back pain were invited to participate. A total of 123 subjects participated in this study. Median age was 44.5(18-76) years, 70.7% of them were women. The inclusion criteria were age >18 years, symptoms duration–at least 6 weeks, native speakers of Lithuanian. Exclusion criteria were identified structural causes of back pain, infection, inflammatory disease, neurological disease, or any metabolic disorder that may affect low back area, pregnancy, use of analgesics or myorelaxants in the last 12 hours. All volunteers who agreed to participate were introduced to the study design and purpose. They completed two questionnaires: Lithuanian version of Oswestry Disability Index (ODI), Lithuanian version of the Spine Functional Index (SFI), evaluated their pain intensity using Numeric Rating Scale (NRS) and filled in a short form about their age, gender, and health status. The final ODI score is considered as a percentage of the patients' subjective disability, higher scores on the questionnaire indicate greater levels of perceived disability. On the contrary, higher SFI scores indicate better functional status, therefore in this research the final SFI results were flipped to equate it to ODI final score. Data analysis was performed using IBM SPSS 28.0.1.0 Software. With regards to the relationship between quantitative variables, Spearman's correlation coefficient was computed. The Wilcoxon test was applied for two dependent samples. Significance level $\alpha=0.05$. The results are presented as median (Md), minimum (min), maximum (max) values – Md(min-max).

Results. Only statistically significant correlations are presented in the results. A medium strength positive relationship was found between NRS score and ODI ($r=0.455$; $p<0.001$). Similar results were found between NRS score and SFI ($r=0.544$; $p<0.001$). The correlation between SFI and ODI final scores was very strong ($r=0,834$; $p<0.001$). Correlations between NRS and SFI items about changing positions were weak to medium strength. Correlations of NRS and SFI items "I change position frequently for comfort" ($r=0.312$; $p<0.001$), "I have difficulty moving in bed" ($r=0.304$; $p<0.001$) and "I have difficulty getting in and out of chairs"($r=0.282$; $p<0.001$) were weak. Medium strength correlation was found with item "I go upstairs slower or use a rail "($r=0.506$; $p<0.001$). The strength of the relationship between NRS and SFI items may be related to the fact, that NRS is not a functional status questionnaire but a scale that represents existing pain intensity. The relationships between SFI items about changing positions and ODI were medium to strong. Correlation between ODI and SFI item "I change position frequently for comfort" was ($r=0.510$; $p<0.001$), "I have difficulty moving in bed" was ($r=0.572$; $p<0.001$), "I have difficulty getting in and out of chairs" was ($r=0.573$; $p<0.001$). The strongest correlation was with the item "I go upstairs slower or use a rail" ($r=0.699$; $p<0.001$). It is important to note that the SFI flipped final score (26(2-84)% was statistically significantly higher than ODI final score(12(0-46)%);($z=-9.146$; $p<0.001$). We assume this happened because patients with non-specific, mostly mild to moderate low back pain participated in this study.

Conclusions: Higher scores in Numeric Rating Scale are associated with a poorer subjective functional status in adults with non-severe, non-specific low back pain. Questions about difficulty moving between postures are strongly associated with a final percentage of disability index. The Spine Functional Index shows higher disability than Oswestry Disability Index - it could be proposed as more suitable questionnaire for back pain status or treatment evaluation in patients with mild to moderate low back pain.

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EVALUATION OF POSTURE, RESPIRATORY SYSTEM FUNCTIONAL PARAMETERS, TRUNK STATIC ENDURANCE AND LUMBAR – PELVIC STABILITY IN YOUNG ADULTS WITH BODY TILT

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Introduction. : Lack of physical activity and a more sedentary lifestyle are currently increased, which is an integral part of skeletal muscle disorders (1,2). Long sitting causes structural changes in the body due to an inadequate load on the muscles that stabilize the spine, internal organs, and increased diaphragm pressure (3,4). The aim of our research was to evaluate the posture, the functional parameters of the respiratory system, the static endurance of the trunk, the stability of the lumbar-pelvic in young adult‘s with body tilt.
Research methods and organization. The study was approved by the Lithuanian University of Health Sciences Bioethics Center (BEC-SR(M)-107). The study involved 32 individuals, including 20 women and 12 men. Subjects were divided into two groups according to body tilt, which was determined by assessing posture in the sagittal plane. 1st group (30.06±5.2) years and BMI index was (22.9±3.5) kg/m2. In the 2nd group (28.07±7.2) years and BMI index was (22.3±3.2) kg/m2. There was no difference between groups by age, BMI index score and physical activity Baecke score. The study included young adults who were moderately physically active; had no diagnosed respiratory diseases; not experiencing acute back or joint pain; free of scoliosis. Tests were made at one particular time. To assess the posture we used the posture analysis grid, the APECS app. Using this app we assessed posture in the frontal and sagittal planes. In the frontal plane we put the markers (head; acromion; ASIS; knees; feet). And in the sagittal plane we assessed the deviation of the body from the midline (5). Respiratory functional parameters were determined by spirometry (FVC;FEV1;PEF;FER) as well as in Stange and Henche samples. Test of static endurance of the left and right sides trunk muscles, abdominal muscles, and back extensors muscles were performed. Lumbar - pelvic motion control assessment tests were chosen lumbar - pelvic stability. The body tilt of the 1st group ranged from 0 to 1.5 degrees, and that of the 2nd group ranged from 1.6 to 3.1 degrees. Statistical analysis was performed using SPSS 27.0 software. Due to the small sample size, the Mano-Whitney-Wilkoxon criterion (U) was used to compare the two independent samples, the Wilkoxon criterion (Z) was used for the dependent samples. Quantitative data are presented as median (xme), minimum value (xmin), maximum value (xmax) and arithmetic mean (m) as xme (xmin- xmax; m). Test results data are considered statistically significant when $p<0.05$.

Results. After analyzing the posture data in the frontal plane, the head position was 0.25(0-2.1; 0.49) degrees in the 1st group and 1.2(0.1-2.1; 1.12) degrees in the 2nd group (U=47.000; p=0.003). When comparing the position of the shoulders, the 1st group had 0.55(0.1 - 1.9; 0.75) degrees, and the 2nd group had 2.2(0.4-3.1; 2.1) degrees (U=23.500; p<0.001). After assessing the position of the knee, the 1st group had 0.1(0-0.6; 0.17) degrees, and the 2nd group had 0.85(0.1-2.1; 0.79) degrees. The difference between groups was statistically significant (U=33.500; p<0.001). According to the PEF (the maximum expiratory flow rate measured during forced expiration) parameter, in the 1st group 248.5(138-501; 267.17) l/s, and in the 2nd group 186(100-280; 197) l/s, the difference is statistically significant (U=74.000; p=0.048). No statistically significant difference was found between respiratory arrest tests, forced vital capacity, and forced expiratory volume. The static endurance of abdominal muscles were 64.5(35-99; 66.4) s in the 1st group and 38.5(20-97; 48.3) s in the 2nd group, the difference is statistically significant (U=71.000; p=0.037). The static endurance of the back extensor muscles, in the 1st group was 74(40-114; 72.1) s, in the 2nd – 45.5(10-98; 50.2) s, the difference is statistically significant (U=62.000; p=0.014). The static endurance of the lateral trunk muscles on the left side, in the 1st group was 38.5(16-68; 41.6) s and in the 2nd – 24(11-50; 27.7) s, the difference is statistically significant (U=59.500; p=0.011). A statistically significant difference (U=64,000; p=0.018) was also found when comparing the static endurance of the right side of both groups: first group – 41(20-65; 42.2) s and second group 25(9-57; 28) s. After evaluating the lumbar – pelvic stability, no statistically significant difference was found between the groups in the lumbar – pelvic movement control assessment tests.

Conclusions: Young adults with higher body tilt had poorer posture in the frontal plane also their static endurance of the lateral trunk muscles, abdominal muscles and back extensor muscles was poorer than young adult‘s with lower body tilt. Most respiratory function parameters results and lumbar – pelvic motion control assessment tests did not show any difference between young adult‘s with higher and lower body tilt.

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PARENTS AND SPECIALISTS APPROACH TO GOALS PHYSICAL THERAPY FOR CHILDREN WITH CEREBRAL PARALYSIS INVESTIGATION

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Introduction. Cerebral palsy (CP) is one of the most challenging diagnoses among kids. This set of disorders among children appears from non-progressive immature brain damage in prenatal or infancy [1]. Families with a child with a disability face anxiety, stress, psychological disorders, and specific needs of the child [2]. For the past years, there is a greater focus on goal-oriented therapy. The SMART goal system states that objectives should be specific, measurable achievable, relevant and time-bound. The main purpose of this research is to investigate parents and specialists approach to a physical therapy goals [3].

Research methods and organization. The study was approved by Research Ethics Committee (No. BEC-SR(M)-205). All participants signed the informed consent form before taking part in this study. The study was conducted in October-November 2021. It was written through systematic qualitative research and phenomenological design. The study involved 7 parents/guardians raising a child with CP and 2 physiotherapists working with these children. Children ranged in age from 2 to 6, with four boys and three girls. A semi-structured interview was used to obtain the most complete and targeted information. The questions in this interview were raised before the study for both the childs parents/guardians and the physiotherapists. A data collection questionnaire was used to find out the demographic and health information of the respondents and the children.

Results. The research is analyzed through topics and sub-themes. The first topic – the main goals of parents for a child with CP are analyzed in 4 sub-themes. Start of rehabilitation, the goal of parental rehabilitation, parents' attitudes towards the goal of physiotherapists rehabilitation and childs motivation. The subjects indicated that their goals and those of specialists coincide. After coding the answers of the respondents, we can notice that the main goal of physiotherapists is to strengthen the injured leg, control the injured arm and improve posture. Goals also include correct gait. According to the respondents' answers, it can be noticed that childrens motivation depends on fatigue or lunch time, if it is disturbed. Most indicated that children need incentives and different ways of engaging in order to be motivated to perform the indicated activities. The second topic - the main goals of specialists for a child with CP is analyzed in 3 sub-themes. The goal of physiotherapists' rehabilitation, physiotherapists attitudes towards parental physiotherapy goals and family expectations and benefits of physiotherapy for a child with CP. For children with hemiplegia, physiotherapists have identified the use of both hands or feet. In children with ataxic CP, physiotherapists indicated the use of compensatory measures and the prevention of deterioration as the main goal. Physiotherapists agree that goals coincide with parental goals and expectations. Often professionals have more goals for children, but parents agree with them and work together to achieve the desired result. According to physiotherapists, the benefits of physiotherapy for children with CP depend on the time spent attending the procedures. The more and the longer the rehabilitation, the more effective and visible results will be.

Conclusions: The study helped to reveal the attitudes of parents and professionals towards physiotherapy, its goals and benefits for kids with CP. The parents stated that their goals and those of specialists in physiotherapy coincide. However, physiotherapists place more emphasis on functional goals without fulfilling the entire SMART system. They do not specify the time taken to achieve the goal.

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THE EFFECT OF CORRECTIVE EXERCISES ON THE FUNCTIONAL STATE OF THE CERVICAL SPINE FOR WOMEN IN SEDENTARY WORK

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Introduction. In today's ever-evolving world, there has been a growing number of people who are doing sedentary work [1]. Individuals, who are working sedentary work for many hours, often face disorders of the upper body's musculoskeletal system, increased tension in muscles, changes in posture or reduced quality of life [2]. Neck pain is more prevalent in women, this may be attributed to reduced muscle strength [3]. According to Akram Mehri, muscle corrective exercise program is recommended to improve functional rates [4]. The aim of the research is to evaluate the effect of corrective exercises on functional state of the cervical spine in women performing sedentary work.
Research methods and organization. The study was approved by the Bioethics center (BEC-SR (M) -182). The study was initiated and completed on 2021.08.01 – 2021.10.01 in "Public Institution Regional Mazeikiai Hospital". All participants signed the informed consent form before taking part in this study. The study included 25 women devided into 2 groups: I - study group composed of 13 participants that were exposed to corrective exercises and II - control group had 12 participants. The total age of the subjects was 49.64 ± 3.81 years. All of them worked a sedentary job for at least 1 year and spent at least 8 hours at the sitting position at work. Individuals with other cervical spine conditions (acute and severe pain, inflammation, trauma and surgical interventions in the spine) were excluded. Functional state of the neck was evaluated by active ranges of motion of cervical spine using goniometer: neck flexion, right side rotation, left side rotation. W.W.K. Hoeger's visual scale was used for posture assessment. Both groups were homogeneous by all range of motion results and W.W.K. Hoeger's visual posture assessment scale scores before the trial ($p=>0.05$); questionnaire was used for information about age and duration of sedentary work. Women in study group performed an exercise program for 8 weeks, 5 days per week, in their workplace for 5-7 minutes. The program included cervical posture corrective exercises. Data analysis was performed using the IBM SPSS Statistics 27 software package. The Wilkoxon (Z) criterion - used to compare the two dependent samples. The nonparametric Mann-Whitney Wilcoxon (U) was applied to the two independent samples. A statistically significant difference was considered when $p<0.05$.
Results. After evaluation of active neck flexion range of motion, there was no statistically significant difference in study group after the exercise program ($Z=-1.342$; $p=0.18$). In control group there was also no coincidental improvement of active neck flexion range of motion ($Z=-1.414$; $p=0.157$). After comparing final neck flexion range of motion results, there was no difference between groups ($U=59.5$; $p=0.312$). Active neck right side rotation range of motion improved only in study group ($Z=-3.087$; $p=0.002$) with difference between groups after the trial ($U=40.5$; $p=0.037$). Active neck left side rotation improved in both study group ($Z=-2.419$; $p=0.004$) and control group ($Z=-2.0$; $p=0.046$). There was statistically significant difference between the groups after the trial ($U=34$; $p=0.016$). After the exercise program W.W.K. Hoeger`s visual posture assessment scale showed statistically significant difference in study group ($Z=3.340$; $p=0.001$), in control group ($Z=-1.0$; $p=0.317$). After comparing results between the groups there was no difference after the trial ($U=73.5$; $p=0.81$). To compare the

results of change in neck movement amplitudes and posture before and after the study, statistical differences were noticed in study group ($p>0.001$).

Conclusions: It was found that corrective neck exercise program, can help to improve neck flexion and active rotation range of motion and posture. According to our study, corrective exercises during work time was effective for functional neck state in women performing sedentary work.

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EVALUATION OF TRUNK MUSCLES ELECTRICAL ACTIVITY, LOAD OF EXERCISE AND SUBJECTIVE SENSATION USING OUTDOOR FITNESS EQUIPMENT FOR YOUNG ADULTS

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Introduction. According to the World Health Organization, physical inactivity is the fourth leading risk factor for global mortality (1). Outdoor fitness equipment (OFE) areas have become popular in public spaces, they potentially increase people's awareness and improve public health through increased physical activity (PA) (2)(3). Studies stated that OFE has a positive effect: it increases PA and attracts people with sedentary lifestyles to exercise (4). However, little is known about OFE usage, so electromyography was used to check how much OFE can affect core muscles during PA. Aim: To evaluate the electrical activity of trunk muscles, load of exercise and subjective sensation while performing exercises with outdoor fitness equipment for young adults.

Research methods and organization. The study was approved by Research Ethics Committee (Nr. BEC-SR(M)-132). The study involved 16 subjects with average age of 22.94 ± 1.61 years. Selection criteria: voluntary consent to participate; no diagnosed neurological and musculoskeletal disorders; no musculoskeletal injuries or pain in the lower back, knees, hips, shoulders and wrists in the last three months and subjects were non-professionals at any sport. Participants were in one exercise group, which included instructions of every exercise, warm-up (7 min.), seven different exercises using OFE (7 min.). Exercises were for different muscle groups and required correct posture. Workout began with sliding (SD) which included most muscle groups and was followed with exercises for different muscle groups. Every exercise of OFE was performed for 30s. with 30s. rest time for only one set during assessment. The electrical activity of the trunk muscles, measured by an electromyograph (Myotrace 400). Assessed muscles: musculus rectus abdominis (RA), musculus erector spinae (ES), musculus obliques abdominis internus (OI), musculus multifidus (MF). Rate of Perceived Exertion (RPE) scale was used to measure the load intensity of exercises. RPE it is a self-reported scale ranging from 1 – 10,

1 meaning very light activity and 10 – maximal effort activity. Subjective sensation was evaluated with original questionnaire created by the study author, which consisted of questions about pain, comfort, and control of the body and subjects told their sensations during every exercise. The analysis of the research data was performed by the means of mathematical statistical methods using IBM SPSS Statistics 27 software. The Fryman criterion was used to compare more than three dependent samples. Quantitative data are presented as median (m), minimum value (xmin), maximum value (xmax), and mean (x) - m (xmin - xmax; x). Qualitative data are given as a percentage. The difference was considered statistically significant when $p < 0.05$.

Results. After evaluating the electrical activity of the OI muscle during workout the highest electrical activity was seen during "hanging leg raises" (HLR) which reached 25.15 (10.70 – 110; 36.56) uV and lowest during exercise "seated leg press" (SLP) – 4.37 (2.68 – 13.60; 5.59) uV. Significant difference was found between exercises HLR and: (SD) ($Z = - 2.937$; $p = 0.003$), "lateral leg raises" (LLR) ($Z = - 2.687$; $p = 0.009$), SLP ($Z = - 5.375$; $p < 0.001$) and "cycling while squatted" (CWS) ($Z = 3.750$; $p < 0.001$). After evaluating the electrical activity of the RA muscle during workout the highest electrical activity was seen during HLR which reached 49.40 (3.72 – 258.00; 66.15) uV and lowest during exercise SLP – 7.92 (1.58 – 13.30; 8.03) uV. Significant difference was found between exercise HLR and: SD ($Z = - 4$; $p < 0.001$), LLR ($Z = - 4.156$; $p = 0.001$), SLP ($Z = - 4.594$; $p < 0.001$), CWS ($Z = 3.813$; $p < 0.001$). After evaluating the electrical activity of the MF muscle during training the highest electrical activity was seen during CWS which reached 22.70 (12.00 – 51.50; 24.56) uV and lowest during exercise "seated push up" (SPU) - 5,38 (1.97 – 47.90; 9.59) uV. Significant difference was found between exercise CWS and: SPU ($Z = - 3.500$; $p < 0.001$), "seated pull up" (SPUP) ($Z = -2.937$; $p = 0.003$). After evaluating the electrical activity of the ES muscle during training the highest electrical activity was seen during HLR, which reached 25.30 (5.95 – 87.70; 29.63) uV and lowest during exercise SPU 8.08 (3.28- 12.30; 8.07) uV. But in only two exercises significant difference was shown between HLR and: SPU ($Z = -4.334$; $p < 0.001$), LLR ($Z = - 2.531$; $p = 0.019$). According to subjects, exercises SD, SPUP, LLR, SLP and CWS were painless, comfortable, and easy to control. Exercises SPU and HLR were difficult to control and only HLR was uncomfortable and painful from all the exercises. RPE of whole workout was rated 4 (2 – 7; 4) points out of 10.

Conclusions: Abdominal muscles electrical activity peaked on hanging leg raise and lowered on seated leg press exercises. Electrical activity of multifidus muscle – highest on cycling while squatted, erector spinae muscle – on hanging leg raise exercise, but both were lowest on seated push-ups. Subjective sensation of most exercises is likely to be comfortable, not painful or difficult to control. Load intensity of exercising one set on outside fitness equipment for young adults was moderate activity.

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CORRECTIVE EXERCISES: ASSESSMENT OF DYNAMIC CHANGES IN ANKLE STABILITY AND PROPRIOCEPTION AMONG WOMEN ATTENDING DANCE WORKOUTS

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Introduction. Daily ankle injuries affect 1 in 10,000 persons [1]. Specifically, up to 69.8% of professional dancers and 42.1% of non-professional dancers suffer from ankle injuries [2]. Insufficient function recovery can lead to ankle joint chronic instability, that is mainly associated with components of the nerve and muscle junction. Consequently, those changes lead towards, impairments of sensory motor skills and contribute to stabilization loss [4]. As evidenced, around 20% of dancers with acute ankle sprain develop chronic ankle instability [3]. This research aims to evaluate the dynamical changes in the indicators of dancers' ankle stability and proprioception after the corrective exercises appliance.

Research methods and organization. Ethical approval for this study was obtained from Research Ethics Committee (No. BEC-SR(M)-37). All participants signed the informed consent form before taking part in this study. Seventeen cheerleading dancers aged 19 to 30 [5], with at least one year of dancing experience, without any ankle injuries in the past year, were enrolled. Prior to study initiation all dancers had to fill-in questionnaire about their age, weight, height, dance training attendance period, and intensity of pain in the ankle area. Ankle range of motion (ROM) was evaluated using goniometry. Neuromuscular control and ankle stability were evaluated through Single Leg Hop (SLH) test. Functional movement of the body was evaluated with functional movement screening (FMS) test. For dynamic balance, mobility and movement symmetry evaluation Y balance test was used. Based on the results of the initial evaluation, corrective exercise program was developed. Participants had to perform it 3 times per week before their typical workout for the next 6 weeks, in total 18 sessions. Once corrective program was ended, the second evaluation was performed. Statistical analysis was performed using SPSS 21.0 and Microsoft Excel for Windows. A non-parametric Wilcoxon test was used to compare the two dependent samples. We set the significance level at $p < 0.05$.

Results. There was increase in right ankle extension ROM after corrective exercise program (p=0,026; Z= -2.220), without changes in the left. No increase was present in both ankles flexion ROM after corrective exercise programme. We observed increase in right ankle eversion ROM after corrective exercise programme (p=0.007; Z= -2.719), without changes in left. Thus, increase in right ankle inversion ROM after exercise programme (p=0.027; Z= -2.212), with no changes in the left. There was increase in distance of right leg single leg hop test after corrective exercise programme (p=0.015; Z= -2.44), with no changes in the left. There was Z= -3.519) and (p=0.001; Z= -3.409), respectively. After corrective exercise programme there was incensement in left and right crossover single leg hop test (p=0.022; Z= -2.298) and (p=0.001; Z= -3.310), respectively. We observed changes in timed single leg hop after exercise programme in right (p=0.006; Z= -2.756), with no changes in the left. In FMS Hurdle step increase was present with right and left leg (p=0.002; Z= -3.162 and p=0.02; Z= -2.333), respectively. In Y-Balance test we observed distance augmentation in posterior direction with right and left leg (p=0,005; Z= -2.817 and p=0,006; Z= -2.769), respectively. There was incensement in posterolateral direction with right leg (p=0.001; Z= -3.385), without changes in left. Posteromedial direction augmented with right leg (p=0.005; Z= - 2.817), but not with left.

Conclusions: 1. Dancers' ankle range of motion improved after the corrective exercise programme. 2. Improvement of dancers' neuromuscular control of the ankle stabilizing muscles and ankle stability

was present after the intervention. 3. Improvement of dancers' dynamic balance was present after corrective exercise programme, however there was no improvement of dancers' movements symmetry and accuracy.

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EFFECTIVENESS OF FUNCTIONAL MAGNETIC STIMULATION ON PELVIC FLOOR MUSCLE FUNCTION, URINARY INCONTINENCE SYMPTOMS AND QUALITY OF LIFE FOR FEMALE WITH STRESS URINARY INCONTINENCE

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Introduction. Stress urinary incontinence (SUI) is one of the most common types of urinary incontinence, described as involuntary urination due to a weak pelvic floor muscles with a sudden increase in pressure in the abdominal cavity [1,2]. Studies show that SUI are not only experienced by older women, but also by women who have not given birth, and especially by young and middle-aged women who have given birth [3,4,5]. In the treatment of SUI, the applicability of functional magnetic stimulation is increasingly seen due to deeper tissues penetration, induce automatic muscle contraction [6]. Unlike before, pelvic floor muscle training with exercises is used [7]. Research aim: to evaluate the effects of functional magnetic stimulation in women with SUI.

Research methods and organization. The research was approved by the LSU Bioethics Center NR.MNL-KIN(M)-2021–404. The study was performed in the period of 07/21/2021-30/10/2021 in Vilnius. The study included 24 women 29-49 years old who have complained of SUI for at least 4 weeks, who gave birth and signed the consent form. Women with pregnancy, urinary tract infection, cancer, epilepsy or skin conditions with implanted pacemakers, metal implants were excluded from the study. Study participants were randomly divided into two groups: the I group (n=12, mean age 40.25±6.63), in which participants underwent functional magnetic stimulation and the II group (n=12, mean age 37.58±5.99) in which subjects took a pelvic floor muscle training (PFMT) program. Both procedures lasted up to 30 minutes. The intensity of the magnetic field was regulated up to the comfort level of the participant (2%-100%). PFMT program consists of breathing, pelvic floor muscle strength,

endurance exercises and thighs, glutes, deep back and abdominal muscle strengthening exercises. Intensity of exercises 2 sets 10 reps. Participants were evaluated before the intervention and repeated after 12 procedures. For both groups, the procedures were performed 2/3 times a week. Subjects responded to a general questionnaire before the intervention, and before and after the intervention, the International Consultation on Incontinence Questionnaire–Short Form (ICIQ-SF) and Incontinence Impact Questionnaire–Short Form (IIQ-7) were used to assess the symptoms of urinary incontinence and their impact on quality of life. Pelvic floor muscle strength and endurance were assessed with a "Pelvexiser" perineometer. Statistical analysis was performed by IBM SPSS Statistics 22.0 and Microsoft Excel software. Due to insufficient sample, the Wilcoxon criteria was applied to the two dependent samples. The nonparametric Mann – Whitney Wilcoxon criteria was applied to the two independent samples. Differences with $p<0.05$ were considered statistically significant.

Results. The results of I group urinary incontinence symptoms and their impact on quality of life (ICIQ-SF) comparing before and after the intervention decreased statistically significantly ($Z = -2.82$; $p<0.05$) in the same way as in II group ($Z = -2.75$; $p<0.05$). Assessing, the quality of life of women (IIQ-7) it was observed that the results in I group comparing before and after the intervention were statistically significantly improved ($Z = -2.82$; $p<0.05$) as in II group ($Z = -2.75$; $p<0.05$). The results of I group pelvic floor muscle strength parameters comparing before and after the intervention increased statistically significantly ($Z = -2.904$; $p<0.05$) as well as in II group ($Z = -2.904$; $p<0.05$). The results of I group pelvic floor endurance assessment comparing before and after the intervention increased statistically significantly ($Z = -2.945$; $p<0.05$) as in II group ($Z = -2.275$; $p <0.05$). Urinary incontinence symptoms and their impact on quality of life (ICIQ-SF) results after showed no significant difference between I and II groups ($U= 59.00$, $p = 0.44$). Quality of life (IIQ-7) results after showed no significant difference between I and II groups ($U= 58.00$, $p = 0.39$). Pelvic floor muscle strength results after did not differ statistically significantly between I and II group subjects ($U= 59.00$, $p = 0.45$). The results of pelvic floor muscle endurance after did not show a significant difference between I and II groups ($U= 57.00$, $p = 0.38$). In addition, no statistical significance was found when assessing the change in urinary incontinence symptoms and their impact on quality of life, the chance in pelvic floor muscle strength and endurance between the two groups ($p>0.05$).

Conclusions: Functional magnetic stimulation and pelvic floor muscle training program had significant positive effects on pelvic floor muscle function, urinary incontinence symptoms, and quality of life in women with stress urinary incontinence. Assessing pelvic floor muscle function, urinary incontinence symptoms, and quality of life no significant difference was found between functional magnetic stimulation and pelvic floor muscle training program treatments for women with stress urinary incontinence.

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