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Physical exercise in the rehabilitation of elderly patients with knee osteoarthritis

Exercițiul fizic în reabilitarea pacientului vârstnic cu gonartroză

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Abstract

Background. The risk for disability attributable to knee osteoarthritis (KOA) is as great as that attributable to cardiovascular disease and greater than that due to other medical conditions in the elderly.

Aims. We aim to highlight the role of physical exercise in the recovery of the clinical and functional status of elderly patients with KOA.

Methods. We performed a randomized controlled trial between two groups of elderly patients, each consisting of 35 patients. Healthcare was complex. The kinetic program was applied only to the study group. Evaluation of patients was carried out in three stages - initial (T1), after 2 weeks (T2) and after a further 10 weeks (T3) in an outpatient setting. Between T2-T3, patients in group 1 followed a home-training program (components learned during hospitalization).

Results. Regarding the quadriceps muscle, improvement of muscle strength was significant for each of the two groups, with no statistical difference between groups when comparing values. The mean scores of VAS and WOMAC scales improved, at times T2 and T3. The only values that were statistically significantly correlated were the averages of the pain parameter (VAS scale score) and the WOMAC functionality scale score, in the study group, at times T3 and T2.

Conclusions. Osteoarthritis of the knee, one common and crippling site of osteoarthritis, requires complex and individualized medical care. Regular aerobic exercise, with judiciously chosen parameters is one of the most recommended non-pharmacological, non-surgical measures in healthcare for elderly patients with osteoarthritis.

Keywords: elderly patient, knee osteoarthritis, physical exercise.

Rezumat

Premize. La pacientul vârstnic, boala artrozică cu localizare la nivelul genunchiului generează dizabilitate semnificativă, comparabilă cu cea determinată de suferința cardiovasculară și chiar mai importantă decât cele datorate altor afecțiuni.

Obiective. Demonstrarea rolului important al exercițiului fizic în refacerea statusului clinic și funcțional la pacientul vârstnic cu gonartroză.

Metode. Am derulat un studiu randomizat controlat între două loturi de câte 35 pacienți vârstnici, complet evaluați. Programul kinetic a fost performat doar de către pacienții din lotul de studiu. Subiecții au fost evaluați în trei timpi: inițial (T1), după 2 săptămâni (T2) și după alte 10 săptămâni (T3). Între momentele T2 și T3, pacienții din lotul de studiu au derulat un program de home-training.

Rezultate. Forța mușchiului cvadriceps s-a ameliorat la toți pacienții, fără o diferență semnificativă între cele două loturi. Valorile medii ale scorurilor scalelor VAS și WOMAC s-au îmbunătățit în momentele T2 și T3 de evaluare. Singurele corelații semnificative statistic au fost stabilite între valorile medii ale scalelor VAS și WOMAC pentru lotul de studiu, în momentele T2 și T3.

Concluzii. Gonartroza, una dintre cele mai frecvente localizări ale bolii artrozice, necesită asistență medicală complexă și individualizată. Exercițiul fizic regulat, aerobic, cu parametri judicios aleși, reprezintă cea mai recomandată și eficientă metodă non-farmacologică și non-chirurgicală în asistența medicală a pacientului vârstnic cu gonartroză.

Cuvinte cheie: pacient vârstnic, gonartroză, exercițiu fizic.

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Introduction

Osteoarthritis is the most common musculoskeletal affliction, representing a significant health problem worldwide (Murphy et al., 2008). Statistical data worldwide mention that over 100 million people are diagnosed with OA, which is one of the most common causes of disability (Hinman et al., 2010; Heiden et al., 2009). The global incidence of this disorder is high, more than 50% of the world's population (>65 years, 9% of men and 18% of women) have X-ray evidence of OA in one of the joints (Bathia et al., 2013).

Osteoarthritis, a chronic disease with debilitating potential, is a progressive disorder affecting the joint cartilage, subchondral bone, joint capsule and synovia (Weiss & Jurmain, 2007). It has a multifactorial etiology and is characterized by a disrupted state of physical and mental wellbeing of the patient. Its clinical and functional expression is all the more important as the affected joint - knee - is one of the pivots of the lower driveline with human specific purpose – orthostatic posture and walking. The knee joint (the largest joint in the human body is intensely stressed in both locomotion and repose, with the rapid deterioration of its elements) is one of the most common sites of osteoarthritis (even the most frequent in some studies), with major dysfunctional impact on the body (Hinman et al., 2010; Heiden et al., 2009; Bathia et al., 2013).

Presently, knee osteoarthritis is a major social and health problem and a cause of disability among the aging population, generating an increasingly heavy financial burden on health care systems in modern societies (Liikavainio et al., 2008). Osteoarthritis of the knee is one of the five leading causes of physical disability in non-institutionalized elderly men and women. Knee osteoarthritis significantly contributes to functional limitations and disability in the elderly, affecting the ability to walk and climb the stairs more than any other disease. The risk for disability attributable to knee OA is as great as that attributable to cardiovascular disease and greater than that due to other medical conditions in the elderly. The incidence of symptomatic knee osteoarthritis is 1% per year, with a radiographic incidence of 2% per year (Choudhary & Kishor, 2013). Medical care of patients with osteoarthritis is provided by a multidisciplinary team because of the variety of methods used to obtain a pain free knee, stable and mobile, i.e. a knee with optimum functionality.

The available literature data (Table I) mention an apparent paradox regarding the use of exercise in patients with osteoarthritis: on the one hand, physical exercise should be avoided and on the other hand, the idea of exercise that facilitates both the functional status of the knee and the general condition of the body is promoted (Grainger & Cicuttini, 2004; Parmet et al., 2003). Both immobilization and intense physical exercise can contribute to degeneration of the joint and increase the risk of developing the most severe form of OA, which requires arthroplasty, osteotomy or arthroscopy. OA leads to difficulties in performing daily activities and lack of physical activity, as a result of pain (de Almeida Carvalho et al., 2010).

Table I

The effects of physical activity in patients with osteoarthritis.

Determined by its absence in healthcare	1. Encourages increase in body weight, with additional joint strain 2. Lowers overall body strength 3. Decreases parameters for quadriceps muscle (and other muscles)
Determined by constant inclusion in healthcare	1. Reduces pain 2. Increases the range of movement, prevents joint stiffness 3. Normalizes parameters of periarticular muscle groups and entire leg 4. Decreases the harm caused by knee osteoarthritis 5. Increases overall strength, wellbeing and the quality of life

Hypothesis

In the present study, we aim to highlight the role of physical exercise in the recovery of the clinical and functional status of elderly patients with osteoarthritis. Probably, the judiciously chosen parameters of physical exercise will permit to perform the kinetic program in healthcare for this type of patients.

Material and methods

We mention that we obtained the approval of the Ethics Committee of the University of Medicine and Pharmacy of Craiova No 97/12.12.2014 and a signed informed consent from all the subjects participating in our study. Our research was performed on 44 elderly patients, all diagnosed with knee osteoarthritis.

Research protocol

Period and place of the research

We conducted our study during the period December 2014 - July 2015 in the Rehabilitation Department of the "Filantropia" Hospital Craiova.

Subjects and groups

The study was a randomized controlled trial including two groups of elderly patients, homogeneous in terms of biographical and rheumatic disease features, each consisting of 35 patients (Table II).

Table II

Patient biographical data and mean values of the studied scales.

Group	Group 1 (study)			Group 2 (control)		
Sex	20 F/15 M			24 F/11 M		
Age (years) limits	68.83 ± 3.005 (65-75)			68.71 ± 3.214 (65-75)		
Urban/rural	17 urban/18 rural			16 urban/19 rural		
Smoking	13 smokers/22 non-smokers			11 smokers/24 non-smokers		
Evaluated parameters	**T1**	**T2**	**T3**	**T1**	**T2**	**T3**
VAS Scale (Mean value ± SD)	6.4*±1.24	4.06*±0.90	3.46*±0.74	6.89*±0.96	4.94*±0.99	4.66*±0.83
WOMAC Scale (Mean value ± SD)	52.37±3.63	49.03*±3.35	48.49±3.65	52.23*±3.45	49.11*±2.64	49.74*±2.82

* Correlation (p) is significant at the 0.01 level (2-tailed). Pearson correlation;
SD = standard deviation; F = female; M = male; U = urban; R = rural.

The inclusion criteria taken into account when designing the groups were:

- patients older than 65 years diagnosed with primitive osteoarthritis according to the American College of Rheumatology, criteria also accepted in our country;
- at least 10 years of disease progression;
- painful knee for a period of 48 hours after physical activity;
- absence of knee injuries at least 6 months before;
- absence of major disturbances in the frontal plane alignment of the knee;
- patients with stable cardiovascular and respiratory function, with normal blood pressure;
- compliance with physical exercise during the healthcare program.

Tests applied

We completed an initial etiopathogenic, clinical, laboratory (laboratory screening, imaging examination - radiography and ultrasound) and functional assessment. All tests applied are mentioned below.

The *etiopathogenic* and *clinical assessment* included:

- careful patient history to determine pain parameters, accompanying symptoms;
- general physical examination (system examination including sensory evaluation);
- musculoskeletal examination – somatoscopic exam, assessment of the range of motion and manual muscle testing of the leg muscles, especially the knee muscles, patellar shock assessment;
- exam in loaded bipodal, unipodal and sitting position;
- examination of gait, pace and dynamics, analysis of pain during walking (on flat ground and stairs).

During the examination, we conducted *laboratory* and *radiological examination* of the knee and also *ultrasound* to evidence clinical changes at this level. For the ultrasound examination, we used the Esaote AU5 ultrasound machine, with the 7.5 MHz probe. To assess the strength of the quadriceps muscle (most important stabilizing muscle) in the studied patients, an ultrasound examination was performed in the lower third of the thigh and in the suprapatellar area with the patient in dorsal decubitus with the knee extended. This was done bilaterally during both relaxation and isometric contraction at moments T1 and T3. All patients examined were ranked 1 if there was not a clear change in muscle size during isometric contraction and 2 if the change was obvious (Figure 1a and 1b).

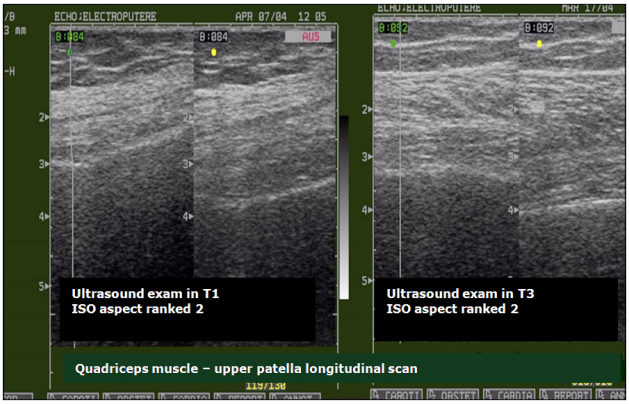

Fig. 1a **Fig. 1b**

Fig. 1 – Ultrasound exam of the quadriceps muscle (longitudinal scan).

For a *functional assessment,* we used the VAS - Visual Analogue Scale (from 0 to 10, 0 = absence of pain and 10 = maximum pain score, other values between 0 and 10 are directly proportional to the intensity of pain, depending on the individual pain threshold), scales for pain and the WOMAC scale to assess the impact of osteoarthritis on lower limbs in performing activities of daily living (total score = 0 = maximum functional status and functional status 96 = minimum, with maximum disruption of daily activities).

Evaluation of patients was carried out in three stages - initial (T1), after 2 weeks (T2) - during which an in-hospital program of rehabilitation was conducted, and after a further 10 weeks (T3) in an outpatient setting. Between T2-T3, patients in group 1 followed a home-training program (components learned during hospitalization).

The healthcare objectives were:

- painful status control;
- controlling the inflammatory process;
- regaining stability and mobility of the knee, muscle and ligament balance, restoring balance to the muscle groups serving the entire "knee" complex;
- correcting the abnormal walking scheme, with recovery of normal walking;
- keeping the knee functional in the biomechanical structure of the limb;
- regaining motor control, optimal knee function.

Healthcare was complex, based on non-surgical measures in both groups of patients, and included:

- non-pharmacological measures - educational, dietary and hygienic, posture, physical (thermotherapy - paraffin and electrotherapy - magnetodiaflux, TENS, ultrasound), massage and kinetic measures;
- pharmacological measures - analgesics, chondroprotective medicine, anti-inflammatory drugs.

The kinetic program was applied only to patients complying with the idea of physical exercise (Table III), who formed the study group. This program was intended for upgrading the periarticular muscle groups. The principles underlying the kinetic program were:

- individualized, depending on the severity of pain, knee stability and patient resources;
- structured - posture, active exercise without load (passive mobilization and active stretching), isometric exercises, isotonic exercises with a progressive load, exercises in open and closed kinematic succession (pedaling on a cycloergometer with a high saddle), exercises for gait coordination;
- complete, with tactics for increasing patient compliance - setting realistic objectives, explanations to the patient, gradual initiation and slow advancement, planning exercises at the optimum time, group physical therapy.

At discharge, patients were recommended a set of exercises to perform at home (home-training program).

In Table 3, three main types of exercises are included, which consist of physical therapy sessions and home-training for the study group.

Statistical processing

Data were statistically analyzed using SPSS 12.0 for Windows (Statistical Package for Social Sciences). If $p < 0.05$, comparisons or correlations (Pearson correlation and regression curves) had statistical significance.

Results

All patients in the two groups, diagnosed with primitive bilateral knee arthritis with painful and functional decompensation, attended a recovery program and were evaluated at 2 months' intervals after inclusion in the study groups.

Regarding the quadriceps muscle, improvement of muscle strength assessed by manual muscle testing and supported by ultrasound examination was significant for each of the two groups, with no statistical difference between the groups when comparing values.

The recovery program resulted in a favorable trend of relieving pain and improving functional status. The mean scores of the VAS and WOMAC scales improved, at times T2 and T3, with no statistically significant difference when comparing the averages for the two groups. For the study group, the pain parameter improvement was 25% at T1 and 47% at T2, while the WOMAC scale score improved by 6% and 7% at T1 and T2, respectively. The percentages of the mean values for the control group improved by 28% at T1 and 32% at T2 for VAS and were 5% at T1 and 4% at T2 when analyzing WOMAC. Synchronicity of the favorable evolution was maintained for the average values of the subgroups of patients depending on the environment of origin and sex, in both groups.

The only values that were statistically significantly correlated were the averages of the pain parameter (VAS scale score) and the WOMAC functionality scale score, in the study group, at times T3 and T2, a result that suggests the importance of a kinetic program applied to elderly patients with knee arthritis (Table IV).

The same results were obtained with statistical significance, by studying the regression equations for the mean values of the two scale scores for each of the groups (Table 4). The higher the R values are, the better the average values expressing the beneficial effect of the nursing programs correlate. In the same table we included the R square values over 0.5. A value higher than 0.5 R^2 expresses that half of those cases follow a regression model equation, supported by ANOVA analysis, where the sum of

Table III

Components of the kinetic program applied to the studied patients with knee OA.

Objective	Exercises	
	Example exercises	Exercise parameters
Flexibility (ROM)	Passive movement of lower limbs Stretching of calf muscles, hamstrings and quadriceps	Daily, 5 sets for each of the lower limb joints, from distal to proximal Daily, 5 sets of 6 seconds for each muscle group
Muscle strength	Isometric contraction of vastus medialis oblique of the quadriceps muscle and gluteus maximus	Daily, 3 sets, 5 repetitions/set, 6 seconds for isometric contraction, 1 minute rest between contractions
	Isotonic contraction of leg flexor and leg extensor, quadriceps muscle, calf muscles	Daily, in antigravity position for each muscle, 2 sets, 10 repetitions/ set, 2 minutes rest between sets. Intensity equal to maximal voluntary contraction
Endurance	Cycling, walking, housework	Daily, 30-40 minutes. Intensity equal to submaximal voluntary contraction
Control of movement and gait coordination	Frenkel exercises for lower limbs Exercises on the balance board Front and back cross over stepping Tandem walking Walking with eyes closed (supervised!)	3 per week
ADL (functional activities)	Sitting to standing in chair, bed, other places Stair climbing Getting in and out of car	Daily

Every session was preceded by Cyriax kinetic massage of the knee.
For relative repose, the patient was asked to comply with the correct posture, alternating the position (with knees slightly flexed) with functional position (with knees in extension).
During the walking scheme, with slight variants, we used a cane for weight unloading.
Learning and respecting the orthopedic hygiene of the knee completed the program

Table IV

Correlations between the studied parameters.

Correlation between mean values		Study group			Control group		
Correlation ISO1 – ISO3		ISO1 – ISO3 R = 0.523; R square = 0.489 *			ISO1 – ISO3 R = 0.510; R square = 0.262		
VAS Scale		VAS1	VAS2	VAS3	VAS1	VAS2	VAS3
VAS1	Pearson correl.	1	.706	.499	1	687	.269
	Sig. (2-tailed)	.	.000	.002	.	.076	.107
VAS2	Pearson correl.	.706	1	.623	.687	1	.280
	Sig. (2-tailed)	.000	.	.000	.076	.	.093
Correlation VAS1 – VAS2		R = 0.70; R square = 0.499 *			R = 0.499; R square = 0.249		
Correlation VAS1 – VAS3		R = 0.598; R square = 0.557 *			R = 0.520; R square = 0.270		
WOMAC Scale (W)		W1	W2	W3	W1	W2	W3
W1	Pearson correl.	1	.825	.707	1	.741	.590
	Sig. (2-tailed)	.	.000	.000	.	.008	.001
W2	Pearson correl.	.825	1	.856	.741	1	.712
	Sig. (2-tailed)	.000	.	.000	.008	,	.001
Correlation W1 – W2		R = 0.835; R square = 0.688 *			R = 0.741; R square = 0.549		
Correlation W1 – W3		R = 0.702; R square = 0.593 *			R = 0.590; R square = 0.348		

ISO = alternation during ultrasound exam when performing an isometric contraction;
Pearson correlation is significant at the 0.01 level (2-tailed);
* Anova analysis, having statistical significance Sig. = .000.

the sum of square values is about equal between values obeying the equation and residual ones, and the frequency graph is relatively close to the ideal curve; namely, R square expresses predictivity in obtaining those results in a group of patients similar to those examined when performing therapeutic rehabilitation measures.

The graph frequencies for muscle parameters, VAS and WOMAC, are expressed by curves in Figures 2, 3a and 3b, 4a and 4b. Taking this into account, how to structure and implement a recovery program has a real chance of success.

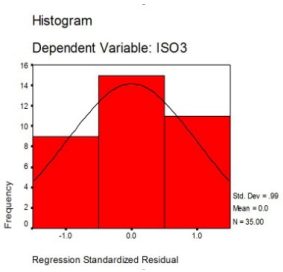

Fig. 2 – The graph frequencies for the muscle ultrasound parameter (study group).

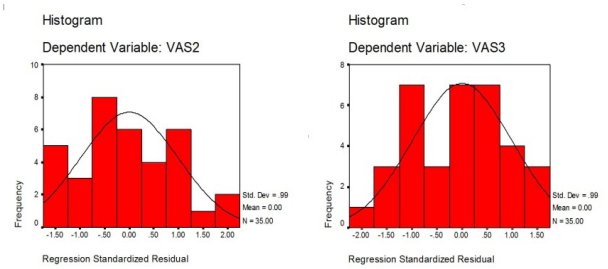

Fig. 3a **Fig. 3b**

Fig. 3 – The graph frequencies for VAS scores at T2 (VAS2) and T3 (VAS3) (study group).

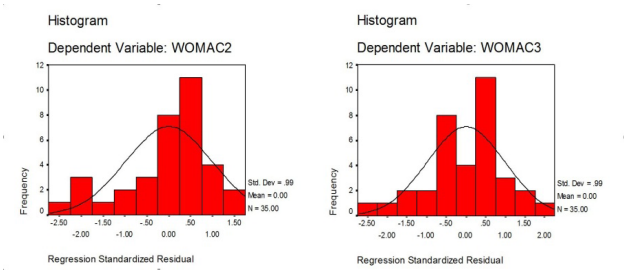

Fig. 4a **Fig. 4b**

Fig. 4 – The graph frequencies for WOMAC scores at T2 (WOMAC2) and T3 (WOMAC3) (study group).

Discussions

Reviewing the literature shows that there are numerous clinical benefits of the regular practice of physical therapy exercises in patients with osteoarthritis of the knee(s) in a program with appropriate guidance. The regular practice of exercises in patients with knee OA, in this type of program (intervention through appropriate guidance), can help prevent the loss of muscle strength and restrictions in day-to-day activities. A real and straightforward kinetic program enables elderly patients with knee OA to achieve a significant improvement in pain, ROM knee flexion, muscle strength and functional capacity.

Our results reflect the data found in the medical literature, according to which, when applying an individualized kinetic program based on the severity of the disease, age, gender, and the individual's functional status, pain relief and functional improvement are achieved in patients with OA of the knee (Esser & Bailey, 2011; Bhatia et al., 2013).

The duration of the kinetic program in most previous studies is approximately 8 weeks, with the inclusion of muscle strengthening, proprioception, and flexibility exercises; knee bracing; and patient education (Miller & Block, 2014).

In our study, we recommended that patients compliant with the kinetic program continue home exercises and orthopedic hygiene rules of the knee for a period of 10 weeks, the reason being that subjects should get accustomed to this program for the more distant future, in order to lead a normal life and to preserve the functional gain achieved during the study.

Patients did not have abnormal alignment of the knee, which would raise the risk of negative impact that increased muscle strength of the quadriceps, especially the vastus lateralis and the medial muscles, may have on frontal biomechanics in the femoral-tibial compartment (Brandt, 2003).

Improvement in a higher percentage of the pain parameters compared to the percentage for the functional WOMAC scale is explained by conditioning of the complex functional status, especially in elderly patients. Moreover, the WOMAC scale score was a global one, taking into account all functional aspects. This explains the difference between our study and other studies, where WOMAC subscale scores are referred to (Miller & Block, 2014; Davis, 2012).

Our program for improving muscle strength was effective, controlling pain, maintaining the range of movement in the knee joint, and reducing functional incapacity.

To obtain these results, the choice of parameters for each exercise (intensity, duration, frequency) was very judicious for the studied patients aged over 65 years, and the cardiovascular and neuro-myo-arthro-kinetic status was balanced for the age groups concerned. We used submaximal loading exercise and in the case of aerobic exercise for restoring the effort capacity, the target heart rate was set between 50% and 70% for a minimum of 30 minutes, three times a week (Bhatia et al., 2013; Roddy et al., 2005).

During each kinetic session over the 2 weeks of hospitalization, and then during the home-training program, we observed each patient closely in order to achieve a balance between rest and exercise. For this kind of elderly population, we cannot consider a kinetic program with good compliance without alternating physical exercise with appropriate resting sessions. Also, the interval between sessions for regaining exercise capacity followed the guidelines in the literature (Wang et al., 2011). Only in this way, we could make elderly patients with knee OA feel better, help reduce the joint pain, and make it easier for them to perform daily tasks (McQuade & de Oliveira,

2011).

During the program, we used several categories of kinetic exercises (stretching, strengthening, and aerobic exercise) and performed the exercises for the entire kinematic chain of the lower limb muscle groups, conferring a greater importance to biarticular muscle groups (hip - knee). There are few studies in knee arthrosis where the kinetic program also involves the hip muscle groups. Because the two hip - knee joints are closely biomechanically related, and ensure functionality of the lower limb along with the foot complex, we recommended global exercises involving the hip-knee-ankle-foot for our patients (Sled et al., 2010).

Stretching exercises were included in the program with the aim of maintaining or improving kinetic ROM. Joint mobility should be maintained or improved in patients with OA because the loss of ROM causes shortening and contraction of the muscles and capsular structures, and it can impair functionality (Deyle et al., 2005).

We did not perform any global isometric exercises because in elderly patients, this type of contraction may cause increased heart rate and blood pressure, which could be a severe contraindication. In patients with high compliance and no significant previous cardiovascular history, we performed isometric contractions for the vastus medialis oblique muscle, the most important component of the quadriceps muscle for active knee stability.

The need for the inclusion of a permanent recovery program based on exercise for elderly patients with osteoarthritis is justified by the benefit of this complex exercise, as outlined in many randomized trials and systematic reviews (Hicks-Little et al., 2008; Jamtvedt et al., 2008):

- articular cartilage degeneration may regress, more exactly, arthrogenic muscle inhibition of the knee muscles (especially quadriceps) decreases
- correction of muscle weakness that plays an important role in the development of OA;
- increase of muscle endurance and improvement of proprioceptive acuity;
- reduction of pain and improvement of muscle strength, functional ability, and psychological well-being.

Since we did not have the necessary equipment available for the assessment and coordination of the walking/gait scheme, we could not make judgments on these issues. However, the literature is not encouraging in this regard. Exercise interventions for strength, flexibility and endurance have resulted in only modest improvements in motor control of walking (Brach et al., 2015). So, we included in our physical program special exercises for joint proprioception in all lower limb joints, especially for the knee. Better knee joint proprioception means better functional ability, greater improvement of symptoms and lower fall risk (Choudhary et al., 2013).

Weakness of the quadriceps muscle is considered one of the most important risks in the progression of the OA of the knee. The strength of this muscle naturally decreases with age, leading to functional limitation (Mikesky et al., 2006). Strength-building exercises designed for the flexor muscles of the knee are just as important for the quadriceps in the rehabilitation of knee OA because of the dynamic stability of this joint.

We performed ultrasound examination of quadriceps muscles for assessing the direct impact that the exercise program had on knee muscles. Clinical studies mention the fact that patients with knee OA have impaired physical function and muscle strength and QFM composition compared with healthy controls. Also, the effect of quadriceps strength on physical function is recognized (Liikavainio et al., 2008). The echogenic pattern of knee muscle directly depends on the muscle composition. In knee OA patients, impaired physical function is associated with muscle hypotrophy and atrophy, which can be proved through ultrasound exam (increased echogenicity and decreased muscle thickness). The ultrasound examination of the quadriceps muscle and the results obtained by statistical processing of data certify kinesiology data according to which functional muscle hypotrophy is not always accompanied by a decrease in muscle mass and the relatively rapid improvement of the parameter is proof of the neural recovery factor conditioning the muscle strength (Appell, 1990; ***, 2005). Musculoskeletal ultrasound of patients with osteoarthritis highlights other elements of the inflammatory process of osteoarthritis at this level - joint effusion, synovial reaction, allowing to follow their dynamics (Filippucci & Iagnocco, 2006).

The kinetic program applied during hospitalization should be adjusted accordingly on discharge, to be applied at home; continuity is one of the "secrets" of success, in order to obtain an improvement of the quality of life. Even when this program is followed at home without constant supervision, the use of the printed manual for orientation on the performance of exercises for osteoarthritis of the knee is beneficial. Correct exercise ensures optimum functionality of the periarticular muscle groups, which help the knee during various daily movements without causing pain; it is considered that the muscles act as a shock absorber at the joint, having a protective role. The magnitude of improving the two parameters conditions adherence and compliance of the patients in continuing exercises in a secondary kinetic program for painful arthritic decompensations.

For patients in the early stage of the disease with minimal or no painful experience, it is particularly useful to perform physical exercise (***, 2000).

Articular repose during evolutionary flares helps managing the pain, but prolonged rest accentuates stiffness, osteoporosis and hypotrophy/atrophy of muscle. Therefore, it is recommended to rest in the functional position.

The patient will become familiar with the rules of energy conservation in various daily activities, as well as with how to optimally use the functional sector of all joints. Instructions on how to sit, lift, carry heavy objects and walk correctly are important and useful in the treatment of OA.

Conclusions

1. Osteoarthritis of the knee, one common and crippling site of osteoarthritis, requires complex and individualized medical care.

2. Regular aerobic exercise, with judiciously chosen parameters is one of the most recommended non-pharmacological, non-surgical measures in healthcare for elderly patients with osteoarthritis.

3. Isometric exercises, necessary but insufficient in the kinetic program for the control of the algo-dysfunctional status of the knee with osteoarthritis, can be applied to elderly patients, with cardiovascular precautions.

4. Physiotherapy continues to be the best "drug" for patients with osteoarthritis, which obviously contributes to the control of a slow, progressive and irreversible evolution of osteoarthritis, with a favorable impact on the whole body and wellbeing.

Conflicts of interests

There are no conflicts of interest.

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