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Pain improvement, strength and mobility increase and quality of life enhancement through physical therapy in patients with simultaneous hip and knee osteoarthritis

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Abstract

Introduction. Osteoarthritis is the most common form of arthritis affecting the global population, representing 69.7% of all cases, with the knee being the third most affected joint by osteoarthritis. Hip osteoarthritis has a higher prevalence in the elderly, being a significant cause of disability. Studies estimate a 25% risk of developing hip osteoarthritis in individuals with a life expectancy of 85 years. Physical therapy is the primary treatment method for both knee and hip osteoarthritis. It is effective at every stage of the disease, but its effectiveness decreases with the worsening of the pathology.
Aim. This study aims to highlight the effectiveness of a physical therapy program in the rehabilitation of patients with hip and knee osteoarthritis.
*Material and Method***.** The study was conducted between 7.02.2022 - 19.05.2022 at the "Psiho Neuro Mag" Clinic in Oradea, on a group of 10 subjects with an average age of 58 ± 13.367 years, diagnosed with both hip osteoarthritis and knee osteoarthritis. The assessment of patients involved the evaluation of joint mobility (using a goniometer), muscle strength, and pain (VAS scale), conducted at the beginning and the end of the treatment. Additionally, patients' quality of life was assessed using the OAKHQOL questionnaire at the start of the research and the end of it, after 3 months. The treatment program consisted of combined physical therapy with electrotherapy and massage.
Results. Following the application of the physical therapy program, it was proven to be effective in increasing hip mobility in all planes and improving knee mobility in flexion, as well as enhancing the strength of flexors, extensors, abductors, and internal rotators of the hip in the subjects under study. Moreover, the applied physical therapy program effectively reduced pain intensity and improved the quality of life, with a positive but statistically insignificant correlation between pain intensity and quality of life, in the sense that as pain intensity decreases, the life quality assessment questionnaire score also decreases.

Key words**:** *osteoarthritis, improvement, effectiveness, autonomy, quality of life*

Rezumat

Introducere . Gonartroza este cea mai frecventă formă de artroză care afectează populația la nivel global, ea reprezentând 69,7% dintre artroze, genunchiul fiind a treia cea mai afectată articulație de artroză. Osteoartrita de șold are o prevalență crescută la bătrâni, aceasta fiind o cauză importantă de disabilitate. Studiile apreciază la 25% riscul de-a face osteoartrită de șold la persoanele care au o speranță de viață de 85 ani. Kinetoterapia este o metodă principală de tratament atât pentru gonartroză, cât și pentru coxartroză, fiind eficientă în fiecare etapă a bolii, dar eficiența ei scade odată cu agravarea patologiei.

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Scop. Lucrarea de faţă îşi propune să scoată în evidenţă eficienţa unui program kinetoterapeutic în recuperarea pacienţilor cu artroză de şold şi de genunchi.
Material şi metodă. Studiul s-a desfăşurat în perioada 7.02.2022 - 19.05.2022, la Clinica "Psiho Neuro Mag" din Oradea, pe un grup de 10 subiecţi, cu media de vârstă de 58 ± 13.367 ani, diagnosticaţi atât cu coxartroză, cât şi cu gonartroză (70% de sex feminin, 50% provenind din mediul urban şi 50% din mediul rural). Evaluarea pacienţilor a implicat evaluarea mobilităţii articulare (cu goniometrul), a forţei musculare şi a durerii (scala VAS) şi a fost efectuată la începutul tratamentului şi la finalul acestuia, Totodată, s-a efectuat şi evaluarea calităţii vieţii pacienţilor cu ajutorul chestionarului OAKHQOL, la începutul cercetării şi la final, după 3 luni. Programul de tratament a constat din kinetoterapie combinată cu electroterapie şi masaj.
Rezultate. În urma aplicării programului kinetoterapeutic s-a dovedit că acesta a fost eficient în privinţa creşterii mobilităţii şoldului în toate planurile şi în ceea ce priveşte creşterea mobilităţii genunchiului în flexie şi creşterea forţei flexorilor, extensorilor, abductorilor şi rotatorilor interni ai şoldului, la subiecţii luaţi în studiu. De asemenea, programul kinetoterapeutic aplicat a fost eficient în reducerea intensităţii durerii şi îmbunătăţirea calităţii vieţii existând o corelaţie pozitivă, dar nesemnificativă statistic, între intensitatea durerii şi calitatea vieţii, în sensul că, cu cât scade intensitatea durerii, scade şi scorul obţinut la chestionarul aplicat pentru evaluarea calităţii vieţii.
În *concluzie* pe parcursul cercetării, printr-o bună colaborare pacient-terapeut, cu un program complex şi adaptat patologiei artrozice simultane a şoldului şi genunchiului, am reuşit să recâştigăm în mare măsură autonomia subiecţilor, redându-le mobilitatea, forţa musculară şi totodată, îmbunătăţind calitatea vieţii acestora.

***Cuvinte cheie**:* osteoartrită, îmbunătăţire, eficient, autonomie, calitatea vieţii

Introduction

Osteoarthritis is the most common form of arthritis that affects the global population, representing 69.7% of all cases. Its prevalence increases with age, with 9% of the population affected by arthritis by the age of 30, of which 6% have knee osteoarthritis. By the age of 50, most cases occur in men, but beyond this age, women are more predisposed to this pathology. After the age of 65, the incidence of this condition reaches 70% (The Royal Australian College of General Practitioners, 2009; Zhang, W. et al., 2008).

Some studies indicate that out of all individuals affected by any form of arthritis, 60% are diagnosed with knee osteoarthritis and are professionally limited, confirming the impact of the pathology on the economy (The Royal Australian College of General Practitioners, 2009; Michael J.W.P., et al., 2010). The knee is the third most affected joint by osteoarthritis. Studies support that the chances of developing a form manifested by pain and other symptoms are 25.3%. Among men, the data show that 18.5% of them suffer from a painful form of arthritis, while women have an even higher percentage of 28.6% (Murphy L.B., et al., 2010).

Physical therapy is the primary treatment method for knee osteoarthritis. It is effective at every stage of the disease, but its effectiveness decreases with the worsening of the pathology. Studies show that physical exercise in controlled conditions helps combat painful syndromes and reduce joint mobility. Additionally, physical therapy aids in raising the patient's awareness of their condition, through understanding the arthritic pathology, which promotes long-term progress. The kinetic program aims to combat inflammation and helps increase mobility, tone muscles, and re-educate walking to achieve a correct kinematic chain without compensatory movements. (The Royal Australian College of General Practitioners, 2009).

In the rehabilitation of the arthritic knee, the strengthening of the hip represents an important factor. Studies have shown that stabilizing and toning the hip muscles will reduce the strain on the knees, resulting in improved walking and symptom relief (Schlenk E.A., et al., 2019).

Hip osteoarthritis has a higher prevalence in the elderly, being a significant cause of disability. Studies estimate a 25% risk of developing hip osteoarthritis in individuals with a life expectancy of 85 years (Murphy, L.B., et al., 2016).

Although hip and knee osteoarthritis have different etiopathogeneses, most therapeutic guidelines extrapolate the management of knee osteoarthritis to hip osteoarthritis (Murphy N.J., et al., 2016).

According to statistics, 25% of individuals aged over 55 suffer from some form of hip osteoarthritis (https://www.physiopedia.com/Hip_Osteoarthritis)

Objectives

This study aims to highlight the effectiveness of a physical therapy program in the rehabilitation of patients with hip and knee osteoarthritis. For this purpose, we started with the hypothesis that the daily application, for 10 days, of a program including electrotherapy, massage, and physical therapy, will relief the pain, increase mobility and muscle strength, improving the quality of life in patients suffering from both hip and knee osteoarthritis.

Material and Method

The study was conducted from February 7, 2022, to May 19, 2022, at the "Psiho Neuro Mag" Clinic in Oradea, on a group of 10 subjects with an average age of 58 ± 13.367 years (min. 35/max. 80 years). All subjects were diagnosed with both hip osteoarthritis and knee osteoarthritis. Among the participants, 70% were female, 50% came from urban areas, and 50% from rural areas; 70% of the subjects had primary hip osteoarthritis, and 30% had secondary hip osteoarthritis; 80% suffered from bilateral hip osteoarthritis, while 20% had right hip osteoarthritis; 50% of the subjects had bilateral knee osteoarthritis, 40% had right knee osteoarthritis, and 10% had left knee osteoarthritis. The patients' average body mass index (BMI) was 29.10 ± 6.506 kg/m2 (min. 21/max. 44 kg/m2). All subjects presented associated conditions, including cardiovascular and respiratory pathologies, obesity, osteoarthritis in joints other than the knee and hip, osteoporosis, diabetes mellitus, or carpal tunnel syndrome. The mental state of the patients during treatment varied due to a sedentary lifestyle (in most cases), pushing beyond their comfort zone, and the pain experienced during sessions and not only. Throughout the sessions, emphasis was placed on the physical treatment of patients and also on educating them about maintaining well-being in the

long term, the importance of being aware of their physical condition, and the level of motor deficiency, so they wouldn't create unrealistic expectations but also avoid underestimation.

Inclusion criteria for the study were: patients diagnosed with both hip and knee osteoarthritis; the patient's willingness to participate in the study; 80% rate of treatment attendance.

Exclusion criteria from the study were: patient refusal to participate in the study and less than 80% rate of treatment attendance. Table I presents the characteristics of the patient group.

Table I. Presentation of the Study Group

Subject characteristics n = 10	**Average ± SD**	**Min.**	**Max.**
Age	58 ± 13.367	35	80
BMI	29.10±6.506	21	44
		Percentage	
Gender	30% male	70% female	
Areas	50% urban	50% rural	
Primary/Secondary coxarthrosis	70% primary	30% secondary	
Bilateral coxarthrosis/right.	80% bilateral	20% right	
Bilateral gonarthrosis/ right/ left	50% bilateral	40% right	10% left
Associated disease	70%	HBP, Diabetes, Ischemic heart disease	
Medication	Yes		

Patient evaluation, involving the assessment of joint mobility (using a goniometer), muscle strength, and pain, was conducted at the beginning and the end of the treatment (Balint, T., et al, 2007). The assessment of patients' quality of life was performed using the OAKHQOL questionnaire at the first therapy session and after the completion of the rehabilitation program, at 3 months. Pain was evaluated using the VAS scale, and muscle strength through isometric strength assessment. The evaluation of hip mobility involved goniometric assessment of flexion, extension, abduction, adduction, internal and external rotation movements. Knee mobility assessment included goniometric evaluation of flexion and extension movements. Muscle strength measurement at the hip and knee joints was also conducted during these movements.

The VAS scale was used for pain evaluation. It consists of 6 steps, each representing a score. Step 1 is worth 0 points, step 2 is worth 2 points, step 3 is worth 4 points, step 4 is worth 6 points, step 5 is worth 8 points, and step 6 is worth 10 points. There is also an intermediate scoring represented by odd numbers, which can be used if the patient does not fit into the even scoring system. The evaluation is based solely on what the patient feels during the day, during daily tasks, and during treatment. Subjects were initially questioned at the first physical therapy session before the start of the rehabilitation program, and the final assessment took place on the last day of treatment, after completing the kinetic program.

Quality of life was assessed using the OAKHQOL questionnaire(https://oml.eular.org/sysModules/obxOML/docs/id_137/AMIQUAL_V2.4_VE.pdf; Rat, A.C., et al., 2005). The questionnaire aims to measure the impact of hip and knee osteoarthritis on the quality of life and on understanding the difficulties caused by it. Each subject completed the questionnaire on the first day of treatment and after completing the treatment, after 3 months. The initial assessment took place at the treatment base, represented by the private clinic "Psiho Neuro Mag," and the final assessment was conducted verbally over the phone. The patient had to check the box that best described his situation, numbered from 0 to 10, ranging from: not at all to very much; never to all the time; not at all to unbearable; not at all to strongly agree. Also, there are no wrong answers.

The objectives of the physiotherapy were: establishing the impact of simultaneous hip and knee osteoarthritis on the strength and joint mobility at this level; determining the impact of these pathologies on the quality of life of the subjects in the study; demonstrating the effectiveness of the physiotherapeutic intervention in improving the functional parameters and the quality of life in patients.

The treatment program consisted of physical therapy combined with electrotherapy and massage. Each procedure had its objectives, aiming to alleviate pain, reduce inflammation, enhance mobility, and improve the quality of life in patients. The subjects underwent five different procedures. The treatment included a 10-day course of combined

physiotherapy, physical therapy, and massage without subject hospitalization.

The primary objectives of the treatment program focused on: pain management; maintaining and increasing capsulo-ligamentous elasticity; enhancing muscle strength (for the middle gluteal, gluteus maximus, tensor fasciae latae, hamstrings, quadriceps, biceps femoris, gastrocnemius, soleus, tibialis anterior muscles); maintaining a correct posture of the hip and patellofemoral joints; gait re-education.

Secondary objectives aimed at: improving joint stiffness; reducing inflammation and lymphedema; increasing hip and knee stability; alleviating muscle contractures; facilitating blood and lymphatic circulation; reducing compensatory movements during walking; promoting relaxation.

Results

Data analysis was conducted using the SPSS 15.0.0 statistical program. Quantitative analysis revealed a normal distribution of the data. As the study group consisted of 10 subjects, the *non-parametric paired-sample z-test* was employed for inferential data analysis.

Table II. Comparative pre-test - post-test values of right/left hip mobility (95% confidence interval CI)

	Group A			Group A modification
	Pretest (average ± SD)	Posttest (average ± SD)	p	95% CI Max./Min.
RHFl	76.40 ± 15.834	104.70 ± 16.753	**0.000***	-36.937/ -19.663
LHFl	86.90 ± 21.408	105.90 ± 16.482	**0.000***	11.671/ 7.996
RHE	8.20 ± 3.615	14.70 ± 4.373	**0.001***	-7.687/ -3.940
LHE	10.30 ± 4.762	14.00 ± 5.249	**0.000***	2.963/ 2.277
RHIR	16.90 ± 4.846	22.80 ± 5.613	**0.001***	.734/ .366
LHIR	19.20 ± 6.197	23.70 ± 5.519	**0.001***	-1.781/ - .685
RHER	19.00 ± 4.163	23.60 ± 5.317	**0.000***	-1.901/ - .545
LHER	18.40 ± 4.300	22.50 ± 5.276	**0.001***	-5.970/ -3.630
RHAbd	18.40 ± 8.168	25.70 ± 9.452	**0.000***	-5.676/ -3.324
LHAbd	19.80 ± 7.208	25.20 ± 6.763	**0.000***	10.441/ 8.026

*Legend: RHFl = right hip flexion, LHFl = left hip flexion, RHE = right hip extension, LHE = left hip extension, RHIR = right hip internal rotation, LHIR = left hip internal rotation, RHER= right hip external rotation, LHER = left hip external rotation, RHAbd= right hip abduction, LHAbd = left hip abduction, Min = minimum, Max = maximum, *bolded numbers are statistically significant.*

Results indicate a significant difference in hip mobility in all planes before the start of the rehabilitation program and after the completion of the physiotherapeutic program, as follows: Right Knee Flexion=[z(9) = -2.803, p = .005 (CI -31.150/ -16.250)], Left Knee Flexion= [z(9) = -2.812, p = .005]. Thus, it can be concluded that the applied physiotherapeutic program was effective in increasing hip mobility in all planes in the subjects included in the study.

Table III - comparative pre-test – post-test values of right/left knee mobility (95% confidence interval)

	Group A			Group A modification
	Pretest (average ± SD)	Posttest (average ± SD)	p	95% CI Max./Min.
RKFl	79.80 ± 11.134	103.50 ± 8.947	**0.005***	-31.150/ -16.250
LKFl	86.70 ± 14.922	103.30 ± 13.606	**0.005***	-31.150/ -16.250

*Legend: RKFl = Right Knee Flexion, LKFl = Left Knee Flexion, Min = minimum, Max = maximum, *numbers in bold are statistically significant.*

Results indicate a significant difference in the mobility of both knees before the start of the recovery program and the mobility of the knees at the end of the physiotherapeutic program, as follows: *RKFl* =[z(9) = -2.803, p = .005 (CI -31.150/ -16.250)], *LKFl* = [z(9) = -2.812, p = .005]. Thus, we can conclude that the applied physiotherapeutic program was effective in increasing knee flexion mobility in the subjects included in the study.

Table IV. Comparative pre-test - post-test values of right/left hip muscle strength (95% confidence interval)

	Group A			Group A modification
	Pretest (medie ± SD)	Posttest (medie ± SD)	p	95% IC Min./Max.
RHFlM	1.90 ± .876	2.80 ± 1.003	**0.001***	-1.306/ - .494

LHFlM	2.20 ± 1.003	2.90 ± 1.287	**0.001***	-1.046/ - .354
RHEM	1.60 ± .966	2.60 ± .843	**0.001***	-1.477/ - .523
LHEM	2.20 ± .919	2.70 ± .949	0.015*	- .877/ - .123
RHIRM	1.20 ± .632	2.30 ± .675	**0.000***	-1.506/ - .694
LHIRM	1.70 ± 1.059	2.60 ± .843	**0.001***	-1.306/ - .575
RHERM	2.00 ± .667	2.30 ± .483	0.080*	- .646/ - .046
LHERM	2.20 ± .632	2.50 ± .527	0.081*	- .589/ - .041
RHAbdM	1.50 ± .850	2.40 ± .843	**0.001***	-1.307/ - .324
LHAbdM	2.00 ± .943	2.30 ± .949	0.081*	- .646/ - .046

*Legend: RHFlM = right hip flexor muscle, LHFlM = left hip flexor muscle, RHEM = right hip extensor muscle, LHEM = left hip extensor muscle, RHIRM = right hip internal rotator muscle, LHIRM = left hip internal rotator muscle, RHERM = right hip external rotator muscle, LHipERM = left hip external rotator muscle, RHAbdM = right hip abductor muscle, LHAbdM = left hip abductor muscle, Min = minimum, Max = maximum, *numbers in bold are statistically significant*

Results indicate a significant difference between the initial level of hip muscle strength and muscle strength at the end of the physiotherapeutic program for hip flexors, extensors, and internal rotators: RHFlM strength =[z(9) = -5.015, p = .001 (CI -1.306/ - .494)], LHFlM strength = [z(9) = -4.583, p = .001 (CI -1.046/ - .354)], RHEM strength = [z(9) = -4.743, p = .001 (CI -1.477/ - .523)], RHIRM strength = [z(9) = -5.014, p = .001 (CI -1.506/ - .694)], LHEM strength = [z(9) = -5.014, p = .001 (CI -1.306/ - .494)], RHAbdM strength = [z(9) = -5.014, p = .001 (CI -1.307/ - .324)]. There is no significant difference between the initial level of hip muscle strength and muscle strength at the end of the physiotherapeutic program for the right hip extensors, left hip abductors, and external rotators: LHEM strength = [t(9) = -3.000, p = .015 (CI -.877/ - .123)], LHAbdM strength = [t(9) = -6.021, p = .081 (CI - .646/ - .046)], RHERM strength = [t(9) = -1.964, p = .081 (CI - .646/ - .046)], LHERM strength = [t(9) = -1.964, p = .081]. Thus, it can be concluded that the applied physiotherapeutic program was effective in increasing the strength of hip flexors, extensors, abductors, and internal rotators in the subjects included in the study.

Table V. Comparative pre-test – post-test values of right/left knee muscle strength [95% confidence interval (CI)]

	Group A		**Group A modification**	
	Pretest (average ± SD)	Posttest (average ± SD)	p	95% CI Max./Min.
RKFlM	2.00 ± .667	3.00 ± 1.054	**0.004***	-1.584/ - .416
LKFlM	2.50 ± 1.178	3.20 ± 1.032	**0.001***	-1.045/ - .354 ?
RKEM	2.60 ± .516	3.30 ± .675	**0.001***	-1.046/ - .354 ?
LKEM	3.20 ± 1.032	3.52 ± .971	**0.081***	- .645/ .045

*Legend: RKFlM= right knee flexor muscle, LKFlM = left knee flexor muscle, RKEM = right knee extensor muscle, LKEM= left knee extensor muscle, Min = minimum, Max = maximum, *numbers in bold are statistically significant*

Results indicate a significant difference in the strength of both knees before the start of the recovery program and the mobility of the knees at the end of the physiotherapeutic program, as follows: *RKFlM strength* =[z(9) = -3.873, p = .004 (CI -1.584/ - .416)], *LKFlM strength* = [z(9) = -4.583, p = .001], *RKEM strength* = [z(9) = -5.235, p = .001 (CI -1.046/ - .354)]. There is no significant difference in the strength of the left knee extensors after the completion of the physiotherapy program *LKEM strength* = [z(9) = -1.964, p = .081 (CI - .645/ .045)]. Thus, it can be concluded that the applied physiotherapeutic program was effective in increasing knee muscle strength.

Table VI. Comparative pretest-posttest values of pain intensity and quality of life [95% confidence interval (CI)]

	Group A		**Group A modification**	
	Pretest (average ± SD)	Posttest (average ± SD)	p	95% CI Max/Min
VAS	7.60 ± .843	2.60 ± 0.516	**0.000***	5.584/ 4.416
QL	272.00 ± 52.445	160.90 ± 40.608	**0.000***	134.435/ 87.756

*Legend: VAS = pain intensity, QL = osteoarthritis knee and hip quality of life, Min = minimum, Max = maximum, *numbers in bold are statistically significant*

Results indicate a significant difference in pain intensity and quality of life before the start of the recovery program and hip mobility at the end of the

physiotherapeutic program, as follows: VAS=[z(9) =19.365, p= .000 (IC 5.584/ 4.416]., *CV*= [z(9) = 10.770., p= .000 (IC 134.435/ 87.756)]. Thus, it can be concluded that the applied physiotherapeutic program was effective in reducing pain intensity and improving the life quality of the subjects included in the study.

The "Spearman's rho" test was used to analyze the extent to which changes in pain intensity influence the improvement in quality of life. It was demonstrated that there is a positive but statistically nonsignificant correlation between pain intensity and quality of life s(9)= 1, p = .355, meaning that as pain intensity decreases, the score obtained on the quality of life assessment questionnaire also decreases. The lower the score on the quality of life assessment test, the higher the quality of life.

Table VII. Percentage values of mobility improvements obtained

	HFl (%)	HE (%)	HIR (%)	HER (%)	HAbd (%)	KFl (%)
Improved result	32,97	55,27	33,64	24	39,74	25,69

Legend: HFl= Hip flexion, HME = Hip extension, HMAbd = Hip abduction, HIR= Hip internal rotation, HMER= Hip external rotation, KFl= Knee flexion

Table VIII. Percentage values of strength and quality of life improvements obtained

	HSFl (%)	*HSE (%)*	*HSAbd (%)*	HSIR (%)	HSER (%)	KNFl (%)	KNE (%)	*QL (%)*
Improved result	48,75	55	49	85	123	47,08	20,42	40,81

Legend: HSFl= Hip flexion, HSE = Hip extension, HSAbd = Hip abduction, HSIR= Hip internal rotation, HSER= Hip external rotation, KSFl= Knee flexion, KSE = Knee extension, QL = osteoarthritis knee and hip quality of life

Discussions

Following physiotherapeutic treatment, an improvement in hip and knee mobility, along with an increase in muscle strength and quality of life in the study subjects, was observed. Considering the differences in age, associated pathologies, and the degree of mobility and strength deficit in each subject, the efficiency of the program was partial. Thus, subjects 9 and 10 showed minor progress compared to the rest of the group, related to their age. In the case of subject 9, who suffered from simultaneous knee and hip osteoarthritis for approximately 30 years, it was not just about installing a state of reduced mobility and strength due to the main local condition but also due to age. The performance of exercises was low due to pain and problems associated with advanced age (coordination issues, low patience, sedentary lifestyle, affected will).

In the case of subject 10, an irregularity in heart rate was observed on the first day of treatment. Following a medical consultation, antihypertensive medication was prescribed, revealing that the subject suffered from high blood pressure. Emotionally and psychologically affected, the subject did not cooperate as expected, and therefore, the results were not significant.

On the other hand, there were positive effects, as in the case of subject 3, with data indicating a considerable improvement in hip and knee mobility. Isometric force increased on both limbs, notably on the right knee flexion, from one second to three seconds of stress maintenance. The life quality score showed a major improvement, indicating the effectiveness of the therapeutic program in reducing pain, decreasing dependence on others, and revitalizing mentally.

The rest of the subjects regained their autonomy due to favorable progress, and cooperation was an essential factor in the recovery program, with kinesiotherapy sessions proceeding smoothly. Subjects were motivated by improved results over the treatment days, as reflected in the study's statistics.

Our data align with those from the literature. A study from 2016, conducted on 210 patients with hip osteoarthritis, confirmed that an appropriate kinetic plan, lasting 12 weeks, can reduce hip pain and increase mobility compared to individuals who do not follow any kinetic program or are subjected to a placebo treatment (Beselga C, et al., 2016).

In another study conducted in South Africa by Saw, M.M. et al., on patients with advanced-stage osteoarthritis scheduled for surgery, after a 6-week kinetic program and educational intervention, such good results were obtained that surgery could be postponed. This proved that a kinetic program tailored to the patient's needs can delay surgery (Saw, M.M. et al., 2016).

Conclusions

In conclusion, throughout the 10-day treatment period, through effective collaboration between the patient and therapist, with a comprehensive program tailored to the simultaneous arthritic conditions of the hip and knee, we successfully restored a significant degree of autonomy to the subjects, by restoring their mobility, muscle strength, and, simultaneously, improving their quality of life. The kinetic program, comprised of active and passive mobilizations, stretching, muscle toning exercises, and exercises on the ergometric bicycle, yielded a favorable effect, alleviating symptoms and aiding patients in resuming their daily activities. Consequently, we can conclude that the applied physiotherapeutic program is effective in: increasing hip mobility in all planes in the subjects under study, enhancing knee flexion mobility, increasing the strength of hip flexors, extensors, abductors, and internal rotators, augmenting knee muscle strength, reducing pain intensity, and improving the quality of life.

The study findings partially confirm the research hypothesis, namely, that the daily application, for 10 days, of a physiotherapeutic program encompassing electrotherapy, massage, and physical therapy, will lead to the alleviation of pain, increased hip and knee mobility and muscle strength, as well as an improvement in the quality of life for patients suffering from both hip and knee osteoarthritis.

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