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KINETIC RECOVERY IN SECONDARY GONARTHROSIS

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Abstract

Aim. This case study aims to highlight the important role of physical therapy in the treatment of secondary gonarthrosis by applying an individualized physical therapy program for the six patients diagnosed with secondary gonarthrosis, with the aim of optimizing the recovery process by reducing the time required and increasing its efficiency, which will lead to improved joint mobility, muscle strength, and pain reduction.

Methods. Observation and intervention in the study took place over a period of three months. The initial assessment included the patients' medical history, evaluation of joint mobility using a goniometer, evaluation of lower limb muscle strength using the manual method, and evaluation of pain in the morning, during physical exercise, and during the night using a visual analog pain scale.

The hydrokinesotherapy, kinesiotherapy, and massage program was practiced by patients over a period of three months, three times a week, with each session lasting approximately 40-60 minutes. It combined recovery exercises from hydrokinesotherapy, kinesiotherapy, and massage techniques, exercises to improve mobility, muscle strength, and pain reduction.

Results. Initial and final tests were conducted, and following the final tests, it was found that the exercise program designed and adapted for secondary gonarthrosis led to a significant improvement and recovery of joint mobility and muscle strength, as well as a reduction in pain.

Conclusions. Through the selected methods and immediate application of the kinetic recovery program, the dysfunction of the femorotibial joint improved, giving it the necessary strength, ensuring static and dynamic balance to the body, and enabling the patient to return to his social and professional life.

Massage using sedative techniques on the periarticular structures and toning/stimulating techniques on the lower limb muscles is very important in preparation for physical therapy and hydrokinesiotherapy sessions.

Keywords: hydrokinesiotherapy, kinesiotherapy, recovery, massage techniques.

Introduction

Gonarthrosis is one of the most common conditions for which patients seek specialist medical advice. This joint problem affects both sexes, with a higher incidence in women than in men. It is defined by the presence of chronic degenerative rheumatism in the knee joint, which mainly affects the articular cartilage.

Knee osteoarthritis is common and can involve all three compartments: medial tibiofemoral (most commonly causing symptoms), lateral tibiofemoral, and patellofemoral. Clinical and/or radiological findings are necessary for diagnosis (Radu, Bucur & Mărcuț, 2006).

Lower limb and knee pain still represent a pathology of great interest to specialists in the field of medical recovery, who seek to achieve the most thorough and rapid recovery possible.

Medical statistics show that every day more and more people, regardless of gender, suffer from degenerative joint cartilage disorders. Among the most common joints to be treated is the femorotibial patellar joint. The lower limb is a very important segment of the musculoskeletal system that helps integrate the body into the environment and ensures the intervention needs of human beings in various fields of activity. Damage to the lower limb due to gonarthrosis or any other condition leads to major harm and suffering for any individual, which is why physical therapy is very useful in the prevention, treatment, and recovery of conditions affecting this segment.

Internationally, approximately 528 million people worldwide suffered from osteoarthritis, an increase of 113% since 1990.

Approximately 73% of people with osteoarthritis are over 55 years of age, and 60% are women. With a prevalence of 365 million, the knee is the most commonly affected joint, followed by the hip and hand.

Gonarthrosis is a pathology with an increased incidence (3 times more frequent than coxarthrosis), affecting between 2-5% of the adult population aged 45-70, reaching 17% over the age of 70.

Women are more affected than men, with an overall prevalence of 6.00% compared to 3.78% in men. (<https://www.who.int/news-room/fact-sheets/detail/osteoarthritis/>).

Gonarthrosis is described and presented as aging of the articular cartilage, aggravated and influenced by trauma and static loading. Primary gonarthrosis generally occurs between the ages of 40 and 50, especially in menopausal women

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who are obese and have varicose veins in the lower limbs. Secondary cases start earlier, are usually one-sided, and often need surgery to fix and recover.

Through this case study, we aim to highlight and emphasize the importance of kinetic recovery in secondary gonarthrosis in slowing down the process of joint cartilage degradation and improving patients' lives.

Objectives

The main objective is to optimize the recovery process by reducing its duration and increasing the effectiveness of therapeutic interventions.

Remarks

Patients diagnosed with secondary gonarthrosis were affected by intra- and extra-articular problems.

Patients began kinetic recovery and adherence to a recovery program later than would have been recommended and indicated.

Case Presentation

The patient group consisted of six professionally active individuals from urban areas, aged between 45 and 62.

Table 1. Patient group

Name	Age	Gen	Blood pressure	Heart Rate	Weight (Kg)	Height (cm)	Diagnosis
C.M.	45	F	140/80	70	78	165	Secondary gonarthrosis on the left side, following tibial plateau fracture.
S.P.	50	F	130/80	72	75	160	Secondary bilateral gonarthrosis, decompensated algic and functional on the right side.
L.I.	62	M	130/60	60	80	170	Secondary gonarthrosis, left, post-traumatic.
A.T.	54	F	140/80	80	70	158	Secondary bilateral gonarthrosis, genu valgum.
R.P.	60	M	140/60	75	84	175	Grade I secondary gonarthrosis on the left side.
V.D.	52	F	120/60	60	80	169	Secondary gonarthrosis on the right, post-comminuted fracture of the patella.

Methods

Intervention protocol

The kinetic recovery program that was assigned based on a plan consisted of initial and final assessments along with recovery exercises and massage sessions.

During the recovery sessions, we integrated special recovery exercises tailored to each subject's abilities, as well as massage techniques. The role of the physical therapist is crucial in alleviating pain after diagnosis and reducing the fears and stress associated with the condition.

The initial assessment included the patients' medical history and tests to evaluate joint mobility, muscle strength, and pain. Initial observations revealed moderate to severe deficiencies in the affected limb.

The therapeutic program was tailored to the specific needs of each patient and focused on achieving the following main objectives (Mircea, 2004):

- Correction of secondary, compensatory deficiencies;
- Restoration of general mobility;
- Return to normal function of the knee affected by the deficiency;
- Forming correct body attitudes;
- Correcting posture and body alignment;
- Increasing joint mobility in the knee;
- Increasing muscle strength and endurance in the lower limb;
- Re-educating coordination and balance.

As a general principle, applicable to the entire lower limb, the primary goal will be to gain and maintain joint mobility, immediately followed by gaining strength, dexterity, and stability.

Painful exercises (dynamic exercises) should never be performed during acute phases. Physical therapy sessions should be preceded, as appropriate, by cryotherapy, thermotherapy, or electrotherapy, massage, or other physical procedures suitable for combating pain, activating blood circulation, and increasing muscle elasticity.

General information about the recovery program:

- Frequency of sessions: (2-3 per week);
- Duration of session: (40-60 minutes);

The total duration of the program is eight weeks with periodic reassessment and possible continuation for maintenance.

Recovery exercises

Patients followed a program consisting of nineteen exercises, structured over twelve weeks, assigned according to a schedule.

Patients performed six hydrokinesitherapy exercises, thirteen kinesitherapy exercises, and also received massage therapy.

Results

Results of the recovery protocol involving hydrokinesitherapy, kinesitherapy, and massage

For joint mobility, the values obtained using the goniometer indicate the following:

Table 2. Results for joint mobility in flexion movement

Name	Age	Gen	Left knee flexion		Right kneeflexion		Difference		% Final	
			T. inițial	T. final	T. initial	T. final	L.K.	R.K.	L.K.	R.K.
C.M.	45	F	110 °	125 °	120 °	130 °	15 °	10 °	13,60%	8,30%
S.P.	50	F	80 °	110 °	50 °	100 °	30 °	50 °	37,50%	100%
L.I.	62	M	30 °	100 °	110 °	125 °	70 °	15 °	233%	13,60%
A.T.	54	F	120 °	130 °	120 °	130 °	10 °	10 °	8,30%	8,30%
R.P.	60	M	115 °	125 °	120 °	130 °	10 °	10 °	8,70%	8,30%
V.D.	52	F	120 °	135 °	100 °	115 °	15 °	15 °	12,50%	15%

*L. K. – Left Knee; R. K. – Right Knee; T. final- final testing; T. initial – initial Testing

Table 3. Results for joint mobility in extension movement

Name	Age	Gen	Left knee extension		Right knee extension		Difference		% Final	
			T. inițial	T. final	T. initial	T. final	K.L	K.R	K.L	K.R
C.M.	45	F	-15 °	-5 °	-10 °	0 °	10 °	10 °	-66,67	-100%
S.P.	50	F	-10 °	0 °	-15 °	-5 °	10 °	10 °	-100%	-66,67%
L.I.	62	M	-15 °	-5 °	-10 °	-5 °	10 °	5 °	- 66,67 %	-50%
A.T.	54	F	-15 °	0 °	-15 °	0 °	15 °	15 °	-100%	-100%
R.P.	60	M	-10 °	0 °	-5 °	0 °	10 °	5 °	-100%	-100%
V.D.	52	F	-10 °	0 °	-10 °	-5 °	10 °	5 °	-100%	50%

For the strength assessment, the values obtained indicate the following:

Table 4. Results in strength assessment in the extension movement

Name	Age	Gen	Left knee extension		Right knee extension		Difference		% Final	
			T. inițial	T. final	T. initial	T. final	G.S	G.D	G.S	G.D
C.M.	45	F	F 4	F 5	F 5	F 5	+1	0	20%	0%
S.P.	50	F	F 4	F 5	F 3	F 5	+1	+2	20%	40%
L.I.	62	M	F 3	F 4	F 5	F 5	+1	0	20%	0%
A.T.	54	F	F 4	F 5	F 4	F 5	+1	+1	20%	20%
R.P.	60	M	F 4	F 5	F 5	F 5	+1	0	20%	0%
V.D.	52	F	F 5	F 5	F 3	F 4	0	+1	0%	20%

Table 5. Results in strength assessment in flexion movement

Name	Age	Gen	Left knee flexion		Right knee flexion		Difference		% Final	
			T. inițial	T. final	T. initial	T. final	G.S	G.D	G.S	G.D
C.M.	45	F	F 4	F 5	F 5	F 5	+1	0	20%	0%
S.P.	50	F	F 4	F 5	F 3	F 4	+1	+1	20%	20%
L.I	62	M	F 4	F 5	F 5	F 5	+1	0	20%	0%
A.T.	54	F	F 4	F 5	F 4	F 5	+1	+1	20%	20%
R.P.	60	M	F 4	F 5	F 5	F 5	+1	0	20%	0%
V.D.	52	F	F 5	F 5	F 4	F 5	0	+1	0%	20%

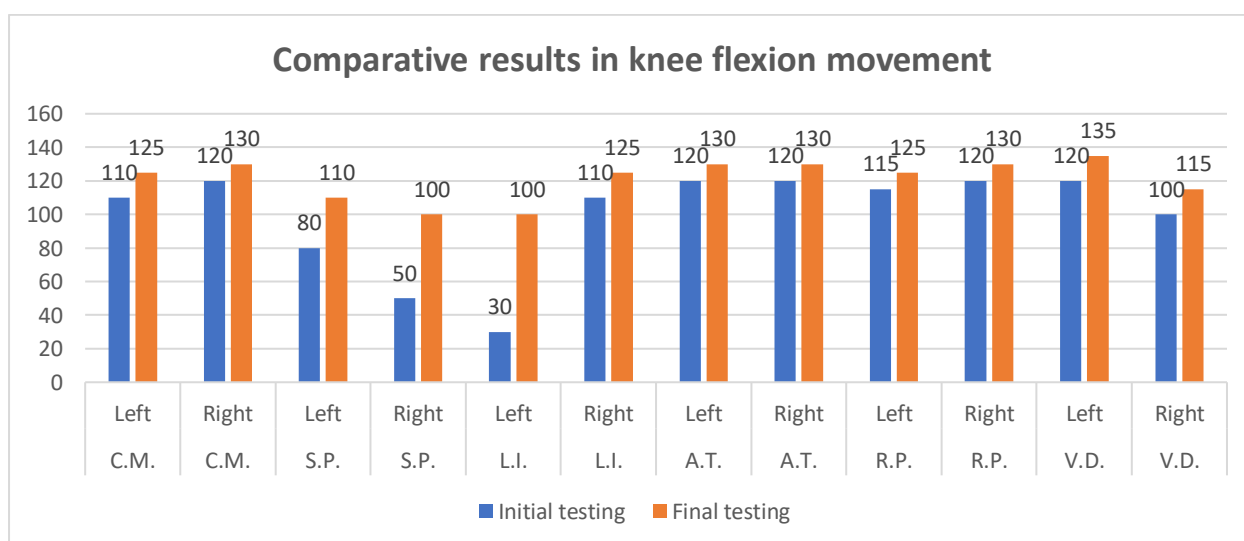
For pain assessment, the values obtained indicate the following:

Table 6. Results in pain assessment

Name	Morning pain		Pain during exercise		Pain during the night		Difference			% Final		
	T. inițial	T. final	T. inițial	T. final	T. inițial	T. final	M	Ex.	N.	M.	Ex.	N.
C.M.	6	3	4	2	5	3	-3	-2	-2	-50%	-50%	-40%
S.P.	5	2	3	2	4	3	-3	-1	-1	-60%	-33,33%	-25%
L.I	5	3	3	2	5	3	-2	-1	-2	-40%	-33,33%	-40%
A.T.	4	2	3	1	3	2	-2	-2	-1	-50%	-33,33%	-50%
R.P.	6	2	4	2	6	3	-4	-2	-3	-66%	-50%	-25%
V.D.	4	1	3	1	5	2	-3	-2	-3	-75%	-66,67%	-60%

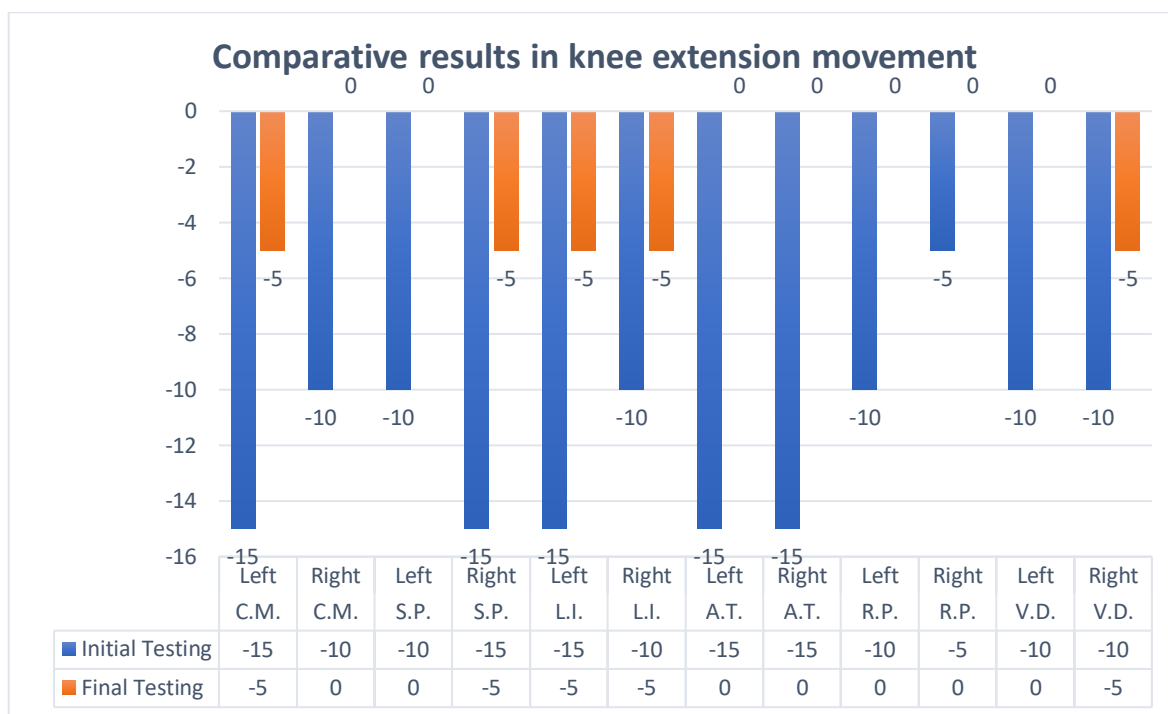
Key observations

For flexion, gains in joint mobility were high, with one patient gaining 70° more flexion than in the initial test, with the highest percentage gain of 233% (patient L.I.). The smallest gain was achieved by patient A.T., with an 8.30% gain for the affected leg. The kinetic recovery program was a success for all patients, as all values improved significantly at the end of the recovery.



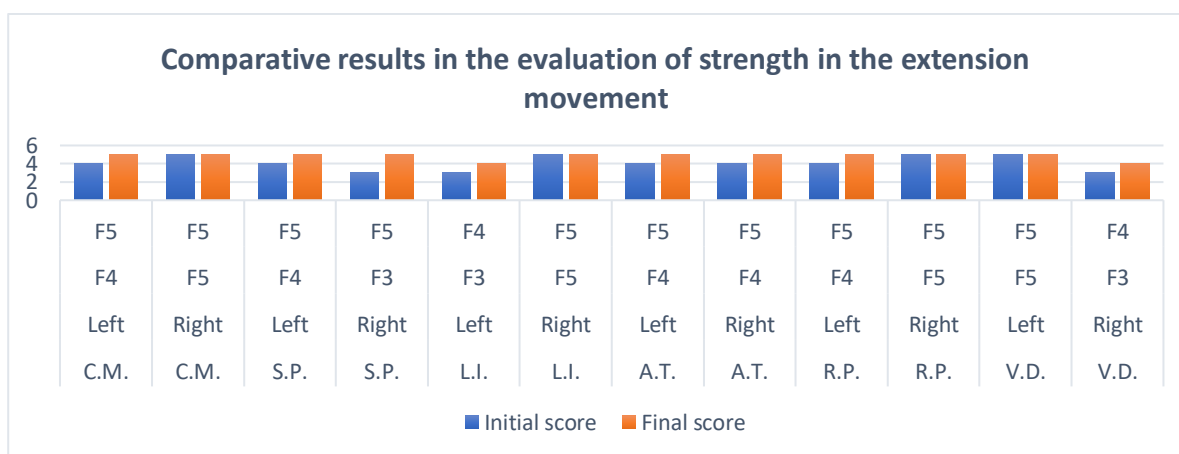
Graph 1. Comparative results in knee flexion movement

For extension, the values were quite similar, with most patients achieving a 100% gain. The lowest gain for the affected knee was achieved by patient V.D., with a percentage of 50%.



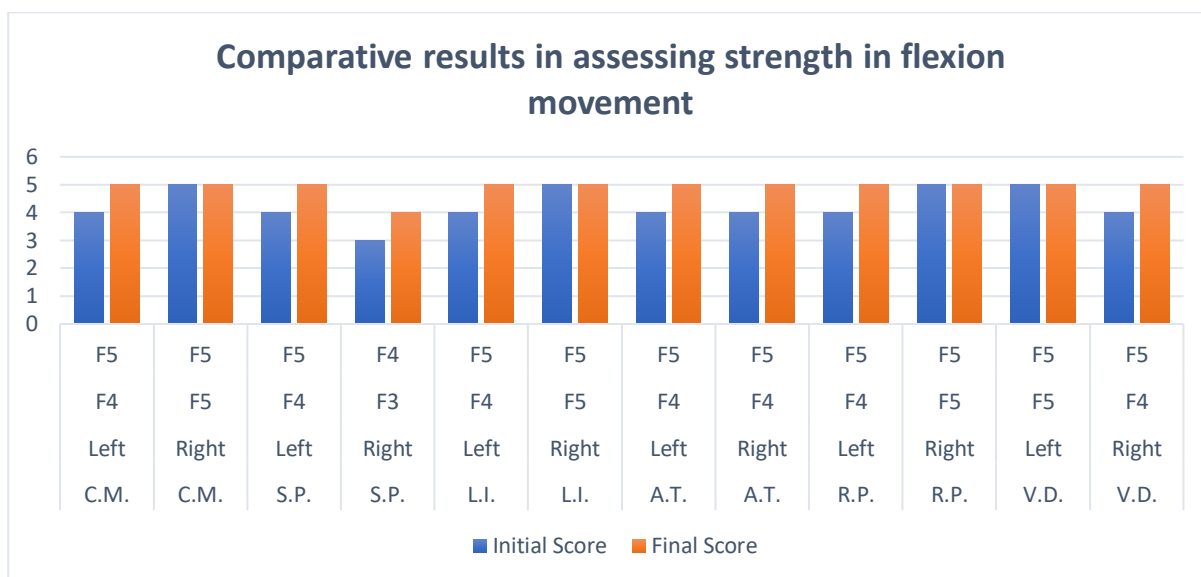
Graph 2. Comparative results in knee extension movement

For the knee extensor muscles, the values were improved, with patient S.P. showing the greatest gain after the final test, obtaining 2 additional points, or 40%.



Graph 3. Comparative results in assessing strength in the extension movement

For the knee flexor muscles, the values were similar and the gains were comparable, with all patients ultimately enjoying improvements and normal strength values, except for patient S.P., who only managed to reach F4, rather than F5 like all the other patients.

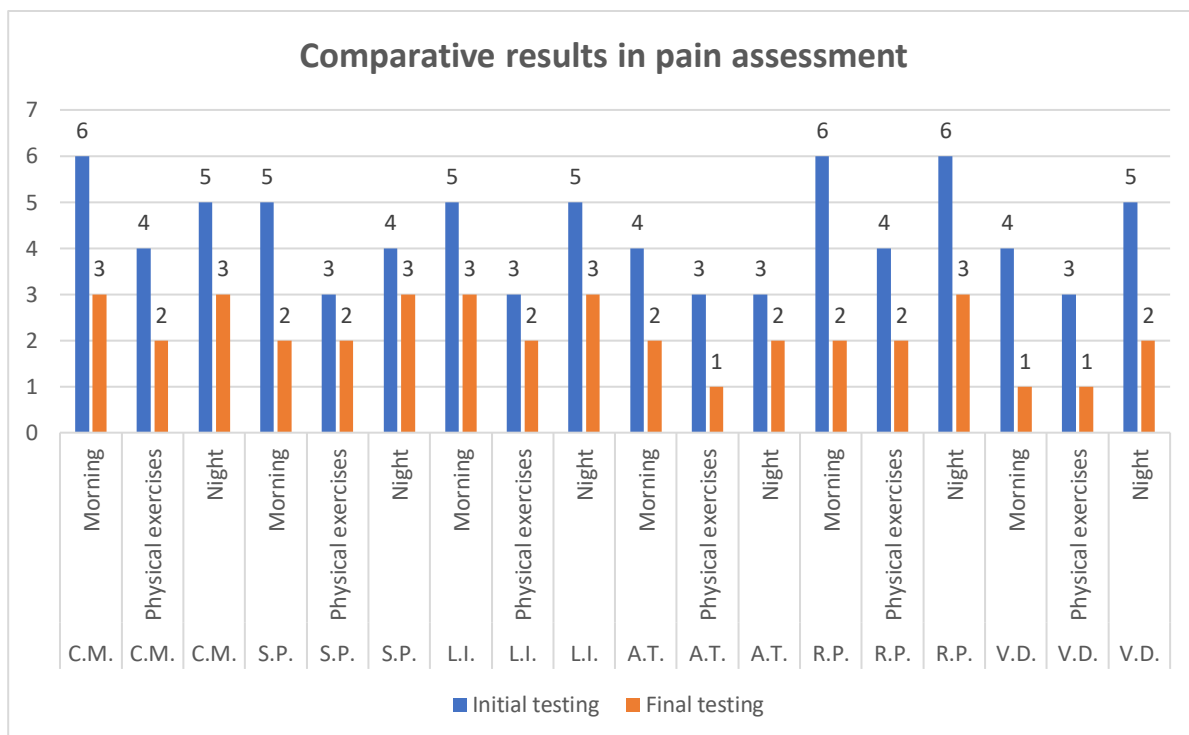


Graph 4. Comparative results in assessing strength in flexion movement

Pain after waking up and during the first part of the day was highest for patients C.M. and R.P., and for R.P., also during the last part of the day, before bedtime. Both had moderate to severe pain, represented by a score of 6 on the VAS scale. All three reached a final score of 3 and 2, respectively, a 50% and 66% reduction in pain.

Pain during exercise was minimal, with two patients initially experiencing mild to moderate pain, rated as 4 on the VAS scale, and the other four patients experiencing mild pain, rated as 3. At the end, two of the patients, A.T. and V.D., experienced very mild pain, represented by a score of 1, and the other four also experienced mild pain, represented by a score of 2 on the VAS scale.

Pain during the night was higher compared to pain during exercise, but similar to pain in the morning, with patients reporting values between 3 and 6, ranging from mild to severe pain. All patients achieved improvements, reducing pain by up to 60%, with the highest percentage for V.D., the lowest percentage of 25% for S.P. and R.P., and the others having a percentage of 40% - 50%.



Graph 5. Comparative results in pain assessment

Discussions

The results confirm that the kinetic recovery program was a success for all patients, as all values improved significantly at the end of the recovery program.

As in another similar study conducted in 2024 (Olteanu, 2024), flexion and muscle strength improved following the recovery program. In our case study, patients also had extension deficits, which were also remedied and improved.

Conclusions

The kinetic program led to increased joint mobility, increased muscle strength and endurance, restored stability and controlled movement, and, last but not least, reduced pain.

The results obtained from the kinetic program applied in this research demonstrate that kinesitherapy cannot be eliminated from this extensive recovery process, proving its particular importance in secondary gonarthrosis.

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Author's contribution

All authors contributed equally to this study.

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