

## GONARTHROSIS - REHABILITATION THROUGH KINETOTHERAPY

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**Abstract:** Gonarthrosis is a degenerative disorder consists of hyaline cartilage destruction present in the joint and bones, it manifests itself through great pain, which often does not respond to drug therapy and require surgery. The onset of the illness is slow, with an installation period of between a few months and a few years, which can lead to a delay in starting treatment. Medical rehabilitation in patients with gonarthrosis is extremely important, because if this is not achieved in time, forms of disability are created which can lead to the person from working and living a normal life. At the first manifestations of the disease, treatment should be started, combining the procedures of kinetotherapy with the medical treatment. The physical exercises associated with massage have the effect of knee rehabilitation and joint protection. The goal of this research is to demonstrate the efficiency of physical therapy during the medical treatment for gonarthrosis and to compare the state of pain and mobility before and after the treatment. The program was according to evolution stage of the disease. Between 01.03.2018 - 31.05. 2018 we conducted a study on a group of 24 adults with gonarthrosis in one or both knees. Progress at the end of treatment was favourable, even if the physical treatment cannot get healing. Applying early rehabilitation treatment leads to shortened recovery period. Weight loss is necessary to prevent excessive joint stress.

**Keywords:** *knee, gonarthrosis, pain, rehabilitation.*

### Introduction

Gonarthrosis is one of the most frequent chronic diseases and the most common musculoskeletal disorder [1].

By age 35, about 50 % of the population has arthritic lesions, and after age 55, over 80 % of the population. A common assessment of the frequency of gonarthrosis is difficult to do because there are asymptomatic gonarthrosis, and only a small proportion of patients with gonarthrosis seek medical attention because of arthritic diseases [2].

A more genuine give epidemiological studies have shown that currently more than 80% of people aged over 60 have osteoarthritic changes in one or more joints and 60% of patients are arthritic rheumatism, suffering and have limited capacity for work, which showing the importance of social - economic development of arthrosis [3].

The knee joint is the largest and most complex joint of the human body. Because the joint is not protected by the musculature is most exposed to trauma, cold and moisture. [4]. Gonarthrosis of the knee is the most common form of rheumatic pain caused by worn articular cartilage, especially femoral-patellar and femoral-tibial joint [5].

Gonarthrosis of the knee is a disease with insidious onset, slow onset with a period of between a few months and 3-5 years. Detailed medical history patient reports symptoms and

possible injury, underlying conditions that might explain pain [1].

Physical examination. Therapist makes movements of flexion, extension, rotation and pressure on knee purpose to locate pain and determine the degree of limitation of movement [6].

The main symptom of gonarthrosis is pain localized to the knee or thigh, pain radiates in muscles with deep character that appears at the joint mobilization after a period of rest. The pain is moderate at first, during the day and responds to treatment with anti-inflammatory and pain relievers. The pain is described as a burning sensation or stabbing local. Can be present only to mobilization or at rest. The patient may accuse: knee swelling, functional impotence [1].

Radiography is the investigation of choice for diagnosing gonarthrosis. On it highlights the signs like: joint space narrowing, osteophytes marginal and posterior bone cysts, shaft deflection with biomechanical limb or genu valgum-genuvarum, bone sclerosis [7].

The aim of this study was rehabilitation knee function by kinetotherapy for patients diagnosed with gonarthrosis. Rehabilitation program has been differentiated, depending on evolution stage of the disease.

Physical treatment objectives were:

- a) reduction of pain;
- b) achieve stability, which is actually the main function of the knee;
- c) improving mobility;

d) coordination of leg movements.

**Material and Methods**

We set up a study group of 24 subjects diagnosed with gonarthrosis (clinical and radiological diagnosis), 20 women and 4 men, aged between 31 and 70 years. The group was followed during the period 01.03.2018 - 31.05.2018, in rehabilitation department of Dr.Tr. Severin hospital.

Massage, with sedative techniques on peri-articular structures and exciting-toning techniques on the adjacent muscles, has been used in preparation of physical therapy sessions.

The electrotherapy techniques used have been aimed at achieving antialgic effects or stimulation of the atrophy risk (quadriceps).

Patients followed individual rehabilitation program for three weeks.

In the rehabilitation program the patients had 15 minute daily massage session, after the exercises program.

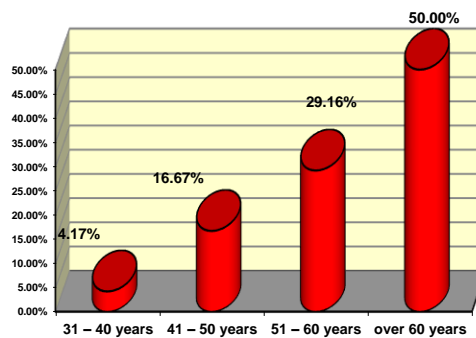
The rehabilitation program performed by the subjects consisted in knee exercises 40-50 minutes, 5 days a week, for 3 weeks. Patients were trained to repeat at home exercises for 30 minutes daily.

For assessment were used: goniometry for assessment amplitude of knee movements, manual muscle testing for muscle strength, VAS for pain intensity, Lysholm scale for functional performance.

The distribution of patients by age group studied is presented in Table 1. and Fig. 1.

**Table 1. The distribution by age**

Age groups	Number of cases	Frequency [%]
31 – 40 years	1	4,17
41 – 50 years	4	16,67
51 – 60 years	7	29,16
over 60 years	12	50
Total	24	100



■ The distribution by age group

**Fig. 1. The prevalence of gonarthrosis by age**

From the study of figure 1 and table 1 we note increasing the number of patients with increasing patient age. In the study group, gonarthrosis morbidity is highest in patients over 60 years old, 50% of cases. Percentage in patients between 51 - 60 years age was 29.6% and patients between 41 - 50 years age represented 16.67%.

The distribution by sex of the cases studied indicated the prevalence of female sex.

**Table 2. Study group distribution according to sex**

Sex	Number of cases	Frequency [%]
Female	20	83.33
Male	4	16.67
Total	24	100

The data in figure 2 and table 2 highlight the fact that gonarthrosis appears more frequently in women (83.33%), then in men (16.67%).

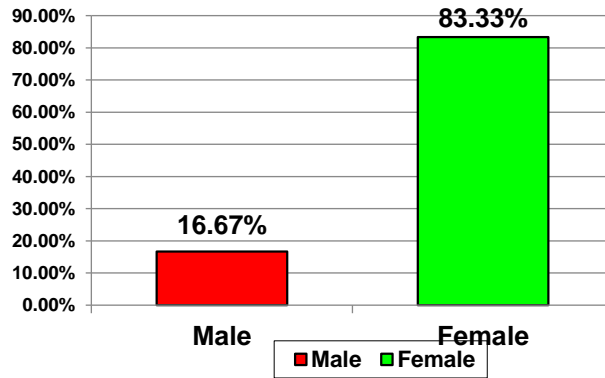


Fig. 2. Group distribution according to sex

The visual analogue scale (VAS) used to assess pain intensity, comprises 100 mm scale with two markers (0 for painless and 100 for the most existing pain). Assessment was made on passive mobilization and on active movement, at the beginning of therapy and at the end of it.

Applying VAS scale for pain to passive mobilization of knee joint, we obtained an initial mean value of 52.2 mm. The assessment at the end of the 3 weeks of treatment showed that a significant decrease pain intensity of 28.7 mm was achieved; the final average value was 26.7 mm.

For pain on active movement VAS scale shows an initial mean value of 49.3 mm. After treatment, the intensity was reduced with 24.6 mm, final mean value was 24.7 mm (table 3, fig. 3).

Table 3. Results of pain assessment with VAS

Parameters	Initial assessment	Final assessment	Difference
Pain in passive movements (VAS ) mm	52.2	25.5	26.7
Pain in active movements (VAS ) mm	49.3	24.7	24.6

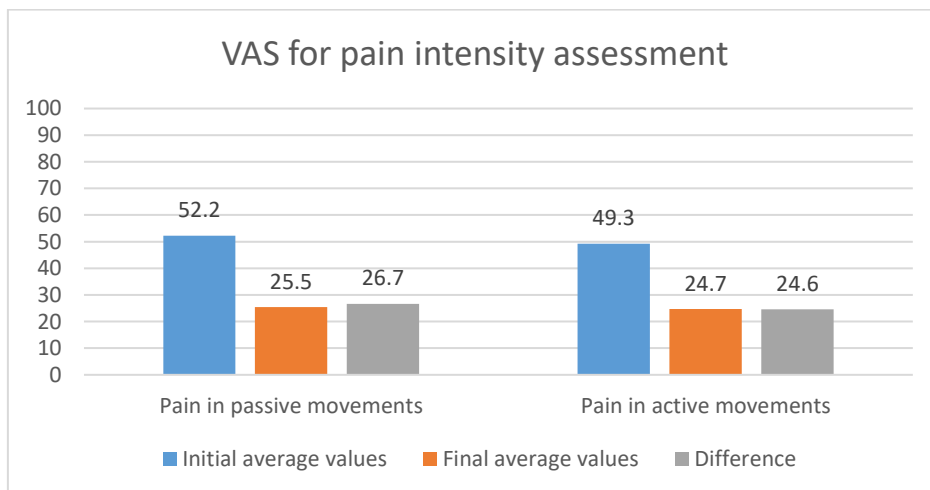


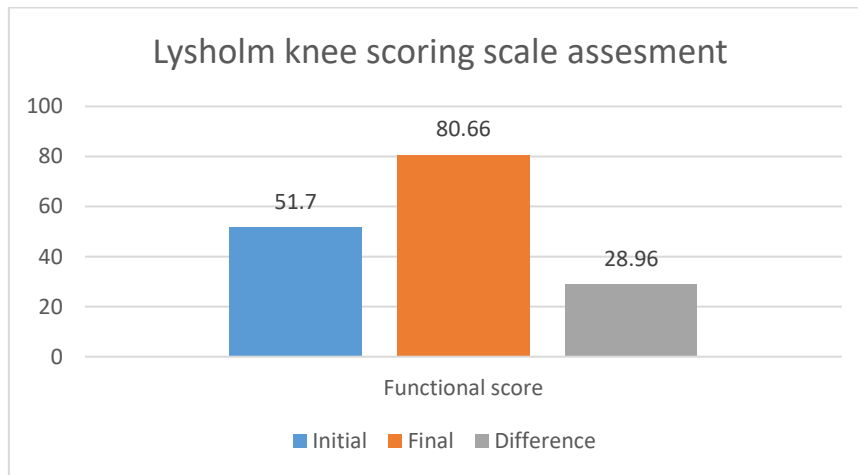
Fig. 3. Evolution of pain intensity

Results of kinetotherapeutic treatment on functional knee balance were evaluated using the Lysholm scale. The Lysholm scale is one of the tools used to assess the functional performance of the knee in everyday activities and includes 8 items (Limp, Support, Locking, Stairs, Instability, Pain, Swelling, Squatting).

**Table 4 Lysholm knee scoring scale assesment**

No	Parameters	Initial assessment	Final assessment	Difference
1	Limp	96	110	14
2	Support	93	114	21
3	Locking	173	269	96
4	Stairs	111	162	51
5	Instability	329	480	151
6	Pain	205	490	285
7	Swelling	170	208	38
8	Squatting	64	103	39
<b>Average values</b>		<b>51.70</b>	<b>80.66</b>	<b>28.96</b>

Analysis the eight items Lysholm scale highlighted positive evolution of functional score, starting from an average initial value of 51.70 points (low functional level), at the end of study was growing at 80.66 points (satisfactory functional level), the functional score difference being 28.96 points (table 4, fig. 4).

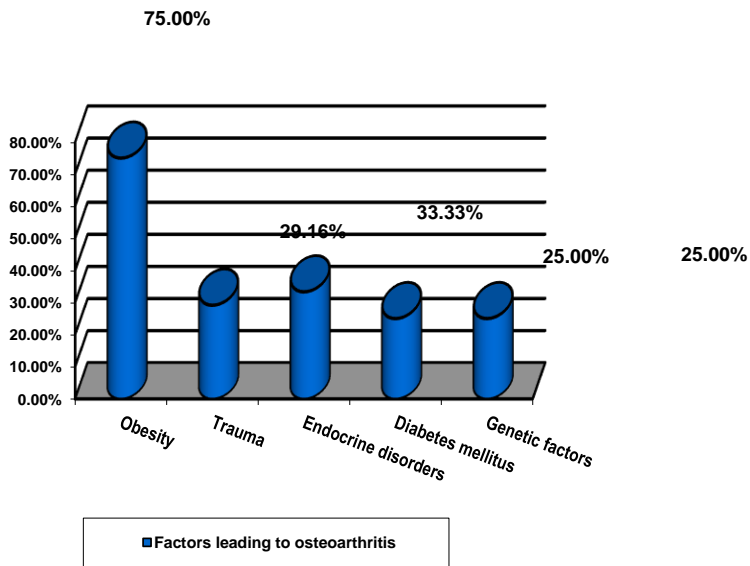


**Fig. 4 Assessment functional score Lysholm scale**

The following factors favoring gonarthrosis result from the history of the patients:

**Tabel 5. The main causes of gonarthrosis in the study group**

Factors predisposing	Number of cases	Frequency [%]
Metabolic disorders (obesity)	18	75.00
Endocrine disorders	8	33.33
Trauma	7	29.16
Metabolic diseases (diabetes mellitus )	6	25.00
Genetic factors	6	25.00



**Fig. 4. The main causes of gonarthrosis in the study group**

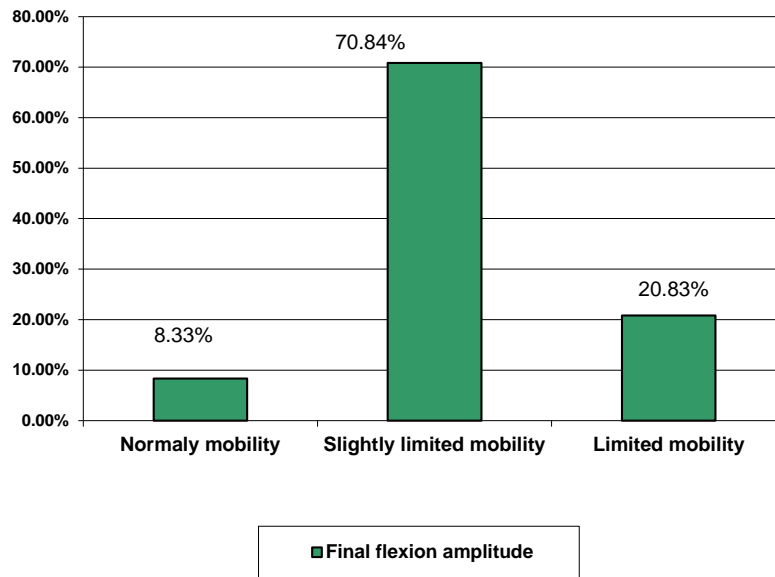
Obesity is one of the most important risk factors for gonarthrosis. Obesity greatly increases the risk that gonarthrosis progress faster and severely. For this reason, weight loss is the first recommendation when a person is diagnosed with gonarthrosis. At the start of study, 16 women and 2 men were overweight or obese. Gonarthrosis typically occurs in people over 50 years age and affects women more frequently. Association age and gender as risk factors in gonarthrosis led development endocrine-metabolic theory. The genetic factor is questionable in cases where gonarthrosis occurs less than 40 years. Inherited genes can determine the quality of collagen fibers. Collagen fibers are important component of cartilage and this is the structure that degenerates and then propagate pathological changes whole knee joint [8]. This can be possible influence of the genetic factor on 6 patients: a patient was 34 years old and 3 patients said disease started before 40 years.

**1. Results and Discussions**

After the rehabilitation program a significant improvement in the amplitude of flexion movement of the knee affected by gonarthrosis has been recorded for all patients. Analyzing the knee mobility parameter in flexion movement (maximum amplitude = 135° after several authors among them Ch. Rocher, T. Sbenghe, D. Magee) patients were grouped at the end of the study in 3 categories: normal mobility, slight limited mobility and limited mobility (table 6, fig.6).

**Table 6 Results obtained**

Mobility assessment	Final flexion amplitude	Cases	%
Normal mobility	130° – 135°	2	8.33
Slight limited mobility	90° – 130°	17	70.84
Limited mobility	Under 90°	5	20.83
		<b>24</b>	<b>100</b>



**Fig.6. Knee mobility in flexion movement at the end of the treatment**

It's noticed a significant improvement in the knee flexion movement (table no.), 2 patients returning to normal values and 17 patients were able to make flexion movements with amplitudes between  $90^\circ$  and  $130^\circ$ . 5 patients had limited flexion, with value under  $90^\circ$ .

The obtained results demonstrate the effectiveness of kinetotherapy applied to the rehabilitation of the knee affected by gonarthrosis.

The contribution of kinetotherapy to the rehabilitation of patients with gonarthrosis is also supported by the achievement of the objectives proposed in this research.

In the rehabilitation program, patients with gonarthrosis performed a physical exercise program, and obese patients also had a normoproteic, hypolipidic and hypoglycid diet, reducing calories around 1200 - 1500 calories a day.

Articular mobilization is the main objective of rehabilitation of the knee arthritis. The primary role of articular mobilization was the development of the ability to move. Articular mobilization was achieved through active and passive movements [9].

Stability has been achieved by toning muscles. To improve muscle strength were carried out isometric exercises, exercising the extension. Good results have had autopasive and active exercises with weights or even with the weight of their own body. [10].

During the second part of the rehabilitation program, the extension member's lifting exercises or short lifting exercises were performed. Gradually, small ankle weights were added to increase strength. Extensions of the member and

the weights contributed to the maintenance of the muscular force.

Another recommended exercise was to contract the quadriceps muscle so that the knee is flat, straight and fully extended. Raises the entire member above the bed or floor plan.

The right knee was held down to about 45 degrees, a pause of a few seconds, and then the leg slightly lowered.

With the knee bent on a rolled towel or blanket, short elevations were made so that the knee was fully extended. Keep the knee locked in the extension for 5 seconds, and then slowly lower.

Standing straight with his back touching the wall, place the legs 30 cm apart from one another and 10 cm away from the wall. Bends the knee and slips along the wall until the knees are flexed at 45 degrees. Keep this position for 5 seconds and then return to the starting position.

The usual weight bearing exercises have had positive effects on functional re-education of the knee, especially walking, climbing and lowering stairs [11].

Medical rehabilitation sessions were followed by massage. Massage aimed to obtain muscle relaxation in the affected area, improve blood circulation in the area. The patient lying face up, legs uncovered, began massaging the opposite side with smooth, starting from the upper third of the leg to the lower third of the thigh with both hands making an accommodation of our hands skin of the patient, but at the same while making a heating muscles acting on the knee joint (which is the calf and thigh muscles). After smoothing slight unrest followed with one hand, two and contremps on the same lines.

The most important maneuver was friction, which insisted more and to do the following: leg slightly flexed on the thigh, then made smooth by placing the four fingers of the hands in popliteal space and thumb from the top of the kneecap with cubital smoothing their share slipping to the bottom of the kneecap after which we returned, the external femoral condyle bypassing the popliteal space [12].

Patients with gonarthrosis were given the following recommendations:

- conduct further exercises to improve muscle atrophy and increase muscle mass;
- protecting knee by using orthotics;
- the return to previous activity should be done gradually;
- avoiding running;
- monitoring of weight.

### Conclusions

Normal activity and exercise do not increase the risk of degenerative arthropathy of the knee. For this reason, gonarthrosis is no longer considered a process in normal aging.

Very intense and repetitive physical activity, physically demanding occupations greatly increase the risk of gonarthrosis. Recurrent traumas suffered at the knee often lead, over the years, to gonarthrosis.

Gonarthrosis is one of the most common degenerative forms of rheumatism. Applying early rehabilitation treatment leads to shortened restoration period. Weight loss is necessary to prevent excessive joint stress.

Treatment of gonarthrosis has the following objectives: removal of pain increased joint mobility suffering, preventing disease progression (muscle atrophy, joint deformity).

In patients with gonarthrosis, a thorough training should be done with regard to continue at home the exercises. With regard to daily activities, patients need to know and respect the rules of knee orthopedic hygiene:

- maintaining or weight loss;
- avoid standing for long time and long walks;
- avoiding maximum flexion position of the knee;
- avoiding rough terrain;
- using a walking stick, if necessary
- avoiding spending time in a humid and cold climate.

Prophylactic treatment is very important and is based on knowledge and predisposing risk factors.

The highest incidence of the disease is in patients over 60 years, is approx. 4 times more common in females than in males.

In the group studied, obesity as a contributing factor, is in the first place (75%). Increased mechanical stress has a very strong connection with knee arthritis. Studies have shown that the increased body mass index can lead to premature aging knee joint.

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