

COMPLEX EXPLORATION OF BILATERAL PATELLOFEMORAL INSTABILITY AND INTEGRATED MANAGEMENT IN THE CONTEXT OF GRADE 2 KNEE GONARTHROSIS

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Abstract: *This article delves into the intricate realm of bilateral patellofemoral instability and its correlation with Grade 2 Knee Gonarthrosis. Bilateral patellofemoral instability, characterized by dysfunctions in the rotational movements of the patella in relation to the femur, is often intertwined with the degenerative processes of knee Gonarthrosis. Examining this association, the article scrutinizes the impact of bilateral patellofemoral instability on the progression of knee gonarthrosis and vice versa. It emphasizes the significance of early diagnosis and accurate assessment of patellofemoral instability, considering its substantial implications on knee joint function and longevity. Based on these investigations, the article advocates for an integrated approach in managing patients with bilateral patellofemoral instability and Grade 2 Knee Gonarthrosis. In conclusion, the article underscores the need for a multidisciplinary approach to efficiently address patients with bilateral patellofemoral instability associated with Grade 2 Knee Gonarthrosis. By comprehending the complexities of these conditions, healthcare professionals can offer tailored solutions and enhance the quality of life for patients.*

Key words *Bilateral patellofemoral instability, physical therapy, rehabilitation program, progression of gonarthrosis.*

1. Introduction

The common etiology of knee pain and knee damage is patellofemoral instability and how it interacts with Grade 2 Gonarthrosis. Patellofemoral instability

can be defined in various ways. One way is when the patient has suffered a traumatic dislocation of the patella. It may also describe a clinical sign on physical examination and muscle balance that signifies the ability of the patella to be

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translated from the trochlear groove of the femur in a passive manner. Moreover, patellofemoral instability can be a symptom, when the patient feels that the knee "to yield" to a certain load or performance and some daily activities. This clinical picture occurs when the patella slips out of the trochlear groove. The relationships between symptoms, injuries and diseases of the patellofemoral joint (grade 2 gonarthrosis) are often confusing for the physiotherapist [1, 2], [8].

The clinical presentation of patients is represented by anterior knee pain and episodes of biomechanical and physical instability [2]. The pain can be aggravated by activities such as going up and down stairs, sports that involve running, jumping and changing running direction. On functional assessment the patient may have difficulty controlling the patella and the knee as a whole, resulting in the patella pulling away from the midline, therefore to assess this we need to observe what happens to the patella during static and dynamic movements and it occurs during the performance of physiotherapist control exercises.

Bilateral patellofemoral instability associated with grade 2 gonarthrosis is a major concern in the field of orthopedics and physical therapy. This complex combination of joint conditions presents healthcare professionals with significant challenges in diagnosis, assessment and management. In light of this concern, this scientific article aims to explore in depth the interdisciplinary interactions between bilateral patellofemoral instability and the progression of gonarthrosis in patients with grade 2 of this condition.

Examining the underlying mechanisms of bilateral patellofemoral instability, we will analyze how it can contribute to the

acceleration of joint degradation associated with gonarthrosis if not intervened in time through physical therapy techniques and methods. Thus, in this article I propose a comprehensive perspective on how bilateral patellofemoral instability can amplify pain, functionally limit movement and damage the knee joint in patients with grade 2 gonarthrosis.

We will also explore advanced integrated management strategies, bringing together personalized and carefully planned physical therapy programs. The main goal of this study is to identify the most effective methods to approach this complex combination of conditions, thus contributing to increasing the quality of life and the functionality of affected patients [3], [13, 14].

2. The Research

2.1. Purpose:

The goal of the physical therapy program in bilateral patellofemoral instability associated with grade 2 gonarthrosis is to improve functionality, reduce pain, and slow the progression of knee joint damage in affected patients through the integrated and personalized approach of physical therapy to regain control over mobility and quality of life.

2.2. Objectives

1. Stabilizing the Knee joint and improving Joint mobility by strengthening the quadriceps.
2. Pain relief and optimization of body posture and biomechanics.
3. Training the patient in Self-management, continuous monitoring and evaluation.

4. Preventing secondary complications and promoting the adoption of an active lifestyle.

2.3. Methods

On the research problem, theories, conceptions, theoretical approaches focused on research and scientific documentation were taken into account. From the physiotherapist point of view, the goniometric method and the patient's muscle balance were used, as well as the scales:

- Anterior Knee Pain Scale
- Lower Extremity Functional Scale
- Pain Assessment Scales
- Numeric Pain Rating Scale

3. Results and Discussions

Patellofemoral (PF) disorders are a very special entity in knee practice, and

although they are very common to encounter, very often their treatment is cumbersome and time-consuming for both the patient and the surgeon. The cornerstone of most PF pathology is the abnormal tracking of the patella over the trochlea, which may extend from obvious patellar dislocation to insidious abnormal patellar tracking [4–7], [9], [11].

To elucidate the bilateral patellofemoral instability associated with grade 2 gonarthrosis in a case study carried out at CRM "KINETICA," Chisinau, RM, at the physiotherapist's consultation, Patient X.P. 40 years old, who presents in the lower limbs 2nd degree gonarthrosis more accentuated at the sting, presence of pain (Figure 1), lack of muscle strength - F2, limitation of movements -120° (Goniometry) sting, VAS scale 7-10, Physical inactivity - did not practice sports (Table 1).

Physical therapy program

Table 1

X.P.	left lower limb	Right lower limb
VAS scale, 10p.	8	6
muscle strength F 0-5	2	3
Goniometry °	120°	Flexion, 135° degrees (limited by buttock heel contact) 160°(Sbenghe)
Apley Test	Ligament pain	-
Physical therapy program		
Physiotherapy sessions	25	
5 +5	Physioprocedures – interference currents, VMS, Joint mobilisations, physical exercises: finger pulling with knee extension. Eversion/extension knee extension from DD with a roll under the knee.	
10	exercises: Ergometric bike -15 min., Performing knee extension from DD with weights of 0.5 kg, isometric knee flexion, half knee flexions.	
5	proprioception, going down the stairs (40 stairs).	
muscle strength F 0-5	F4/F5	

Physical therapy is the most useful for strengthening the muscles of the lower limbs and stabilizing the joint by default; exercise programs (avoiding overloading) of the joint are recommended; passive, passive-active mobilizations, exercises performed on the ground, pedaling can be

successfully used, but in no case squats with exaggerated weight in the case of an advanced degree of gonarthrosis.

Following the completion of the 25 physiotherapy sessions, the patient's general condition improved considerably.

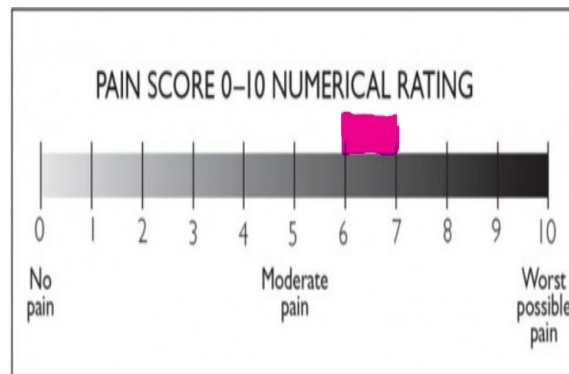


Fig. 1. Pain score 0-10 (VAS)

The patient reported a significant decrease in knee and patellofemoral pain intensity. This was observed during and after physical activities, indicating an improvement in overall comfort. Through specific exercises to increase the stability of the knee joint, the patient demonstrated a significant improvement in movement control and a reduction in the feeling of instability.

Periodic assessments indicated an increase in muscle strength in the lower limb area, focusing particularly on the muscles involved in supporting the knee and patellofemoral joint. The patient showed a significant increase in the range of motion in the knee joint, which facilitated the performance of daily

activities without discomfort or significant restrictions (Figure 2). Quality of life assessment showed significant improvements in aspects such as sleep, participation in recreational activities, and the ability to perform daily tasks without significant difficulty [1], [10], [12], [15, 16].

Additional observations:

- The patient became more aware of his posture and learned techniques to maintain correct body alignment, thus reducing stress on the knee joint.
- Active participation in physical therapy exercises and educational discussions indicated an increase in patient motivation and commitment to improving their health.

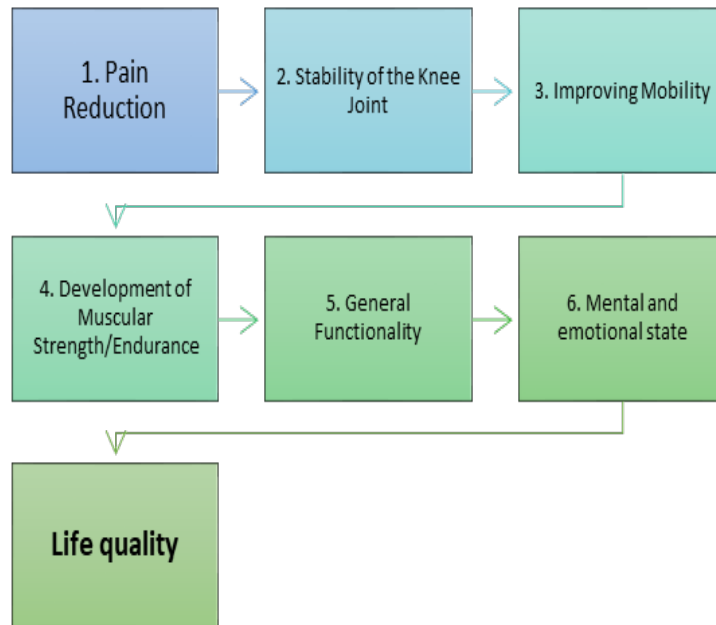


Fig. 2. Progress after 25 physical therapy sessions

The Physical therapy program included a variety of exercises and techniques tailored to the patient's individual needs. These included:

1. **STABILIZATION EXERCISES:** Focused on strengthening the muscles around the knee joint, with an emphasis on quadriceps and femoral muscles.
2. **MOBILIZATION EXERCISES:** To improve flexibility and mobility in the knee joint, reducing the stiffness associated with gonarthrosis.
3. **MOTOR CONTROL TECHNIQUES:** Aimed at improving movement control, especially in cases of patellofemoral instability, to minimize the risk of subluxations.
4. **POSTURE AND ALIGNMENT TRAINING:** Education on correct posture and techniques to minimize stress on the knee joint in daily activities.
5. **HOME CARE PROGRAM:** The patient received instructions regarding exercises and Physical therapy

techniques that could be continued at home.

Bilateral patellofemoral instability combined with grade 2 knee gonarthrosis presents a challenging clinical case due to the simultaneous occurrence of joint misalignment and cartilage degeneration. Effective management requires a multidisciplinary approach combining orthopedic, physiotherapeutic, and sometimes surgical interventions.

4. Exploration and Diagnosis:

Patellofemoral instability occurs when the patella (kneecap) does not track properly in the femoral groove, leading to pain, discomfort, and recurrent dislocations. In a bilateral context, this condition affects both knees, causing significant functional limitations. Diagnosis often includes imaging techniques like MRI to assess the soft tissues and cartilage and X-rays to analyze the alignment of the

bones involved. Gonarthrosis, especially of grade 2, involves moderate cartilage degradation, which exacerbates pain and limits movement.

Management:

For patients with both conditions, an integrated management plan must address both the instability and the degenerative changes in the knee. Conservative management often begins with physiotherapy to strengthen the quadriceps, hip muscles, and core to provide better stability for the patella. Neuromuscular training, especially using techniques like proprioceptive neuromuscular facilitation (PNF), is effective in improving joint stability and controlling patellar movement. Additionally, taping or bracing might be used to provide external support for the patella.

Surgical Interventions:

If conservative treatments are insufficient, surgery may be necessary. Procedures like medial patellofemoral ligament (MPFL) reconstruction or tibial tubercle transfer can help realign the patella. For patients with gonarthrosis, additional procedures to manage cartilage wear, such as viscosupplementation or cartilage repair techniques, may be considered.

Outcomes:

The integration of these treatments, along with personalized exercise regimens, helps reduce pain and prevent the progression of degenerative changes. Post-surgery, rehabilitation focuses on regaining full function, strength, and joint mobility, while reducing the recurrence of instability.

Progress and Results:

Throughout the 25 sessions, the patient showed significant improvement in multiple aspects:

1. Pain Intensity Reduction: Subjective and objective assessments indicated a significant reduction in pain during movements and daily activities.
2. Improved Stability: The patient demonstrated increased confidence in movement control and a reduced sense of patellofemoral instability.
3. Muscular Strength Increase: Muscle assessments showed a significant increase in strength in relevant muscle groups, contributing to knee joint support.
4. Range of Motion Extension: Knee joint mobility improved significantly, facilitating daily activities.

Perspectives:

This patient case study illustrates the effectiveness of a personalized Physical therapy program in addressing the complex issue of bilateral patellofemoral instability associated with grade 2 gonarthrosis. The results highlight the importance of a multidisciplinary and individualized approach to managing this complex clinical condition. The study indicates that in this patient's case, Physical therapy significantly contributed to improving the quality of life and overall functionality.

5. Conclusions

Based on the investigative results we can formulate the following general conclusions:

1. After 25 physical therapy sessions, the patient with bilateral patellofemoral instability associated

with grade 2 gonarthrosis made significant progress in reducing pain, improving stability and general functionality, reaching F4-F5. These results underline the effectiveness of the physical therapy program specifically adapted to the individual needs of the patient.

2. Following a tailored and comprehensive therapeutic journey, the patient diagnosed with bilateral patellofemoral instability associated with grade 2 gonarthrosis has experienced notable improvements in their overall health. Particularly significant has been the progression in terms of muscle strength, reaching a level of F4 according to Physical therapy program assessments.

This enhancement in muscle strength indicates the effectiveness of the applied treatment, focusing on specifically tailored strengthening exercises to meet the patient's needs. The transition from the initial level of muscle strength to F4 not only suggests remarkable functional recovery but also an increased capacity to support and control knee joint movements. It is crucial to emphasize that this progress not only alleviates symptoms associated with patellofemoral instability and grade 2 gonarthrosis but also contributes to enhancing the patient's overall quality of life. This underscores the importance of an integrated approach in addressing complex musculoskeletal conditions, where Physical therapy intervention plays a pivotal role in restoring function and physical capabilities.

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