



Non-Surgical Management of Chronic Knee Pain: Evaluating the Role of Advanced Knee Rehabilitation and Decompression Treatment in Early Osteoarthritis

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Abstract

Chronic knee pain is a leading contributor to global disability, significantly affecting mobility, independence, and quality of life. Osteoarthritis (OA), a degenerative joint disease, is the most common cause of chronic knee pain, particularly among ageing populations. Conventional treatment strategies, including long-term pharmacological therapy and surgical interventions such as total knee replacement, are associated with various limitations, including adverse effects, high costs, and prolonged recovery periods. These challenges have prompted growing interest in non-surgical, multimodal rehabilitation approaches.

This article provides a comprehensive review of the etiology, clinical presentation, and diagnostic evaluation of chronic knee pain, with a particular focus on osteoarthritis. It critically examines the limitations of traditional treatments and introduces an advanced, structured rehabilitation approach that integrates physiotherapy with knee decompression treatment. The mechanisms, workflow, and clinical outcomes associated with this approach are discussed in detail. Furthermore, the importance of patient compliance, physiotherapy protocols, and continuous monitoring is highlighted. The role of specialized clinical infrastructure in delivering standardized, non-invasive care is also explored. Evidence suggests that early intervention through such programs may significantly improve functional outcomes and delay or avoid surgical intervention.

Keywords: Chronic Knee Pain; Osteoarthritis; Knee Decompression; Physiotherapy; Non-surgical Treatment; Rehabilitation

Abbreviations

NSAIDs: Non-steroidal Anti-Inflammatory Drugs; ANSSI: American Non-Surgical Spine Institute

Chronic knee pain: A global issue

Chronic knee pain is a widespread musculoskeletal condition defined as persistent or recurrent pain lasting more than three months. It represents a major public health concern due to its high prevalence, chronic nature, and impact on functional independence. Globally, musculoskeletal disorders are among the leading causes of disability-adjusted life years (DALYs), with knee pain being a significant contributor.



Figure 1: Chronic knee pain is a widespread musculoskeletal condition that represents a major public health concern.

The prevalence of knee pain has increased over the past few decades, driven by factors such as population aging, sedentary lifestyles, obesity, and increased participation in physically demanding activities. Epidemiological studies estimate that about 13% of women and 10% of men aged 60 years and older have symptomatic knee osteoarthritis, with higher prevalence observed in women and overweight populations.

Chronic knee pain not only limits physical activity but also contributes to psychological distress, reduced work productivity, and increased healthcare expenditure. The socioeconomic burden associated with this condition underscores the need for effective, sustainable, and accessible treatment strategies. In recent years, there has been a shift toward non-surgical approaches that focus on restoring function and improving quality of life without the risks associated with invasive procedures.

Etiology of chronic knee pain with emphasis on osteoarthritis

Chronic knee pain is a multifactorial condition arising from structural, mechanical, and inflammatory processes within the joint. Common causes include ligament injuries, meniscal tears, patellofemoral disorders, muscle imbalances, and degenerative joint diseases.

Osteoarthritis (OA) is the most prevalent cause and is characterized by progressive degeneration of articular cartilage, subchondral bone remodeling, osteophyte formation, and synovial inflammation. The knee joint, being a major weight-bearing joint, is particularly susceptible to degenerative changes.

In osteoarthritis, the protective cartilage covering the ends of bones gradually wears away, leading to increased friction between the femur and tibia. This results in joint space narrowing, mechanical stress, and pain. Over time, these changes may lead to joint deformity, reduced mobility, and functional impairment.

Several risk factors contribute to the development and progression of knee osteoarthritis:

- **Age:** Degenerative changes increase with age due to cumulative wear and reduced regenerative capacity.
- **Obesity:** Excess body weight increases mechanical load on the knee joint, accelerating cartilage degeneration.

- **Repetitive Stress:** Occupational or athletic activities involving repetitive knee loading contribute to joint wear.
- **Hormonal Factors:** Post-menopausal women are at higher risk due to hormonal changes affecting bone and cartilage health.
- **Previous Injuries:** Ligament tears and meniscal injuries predispose individuals to early-onset osteoarthritis.

Understanding these etiological factors is critical for designing targeted interventions aimed at slowing disease progression and improving joint function.

Clinical presentation and symptoms

The clinical presentation of chronic knee pain varies depending on the underlying pathology and severity of the condition. However, several common symptoms are frequently observed in patients with osteoarthritis and related disorders.

Pain is the most prominent symptom and is typically exacerbated by weight-bearing activities such as walking, climbing stairs, or standing for prolonged periods. In the early stages, pain may be intermittent, but it often becomes persistent as the condition progresses.

Other common symptoms include:

- **Joint stiffness:** Particularly noticeable after periods of inactivity or in the morning.
- **Swelling:** Due to inflammation or fluid accumulation within the joint.
- **Reduced range of motion:** Limiting the ability to fully bend or straighten the knee.
- **Mechanical symptoms:** Such as locking, clicking, or crepitus during movement.
- **Instability:** A sensation of the knee "giving way," especially in advanced cases.

These symptoms significantly affect daily activities, including walking, sitting, standing, and performing occupational tasks. As the condition progresses, patients may experience reduced independence and quality of life.

Diagnostic evaluation

Accurate diagnosis of chronic knee pain is essential for effective management. A comprehensive diagnostic approach includes both clinical assessment and imaging studies.

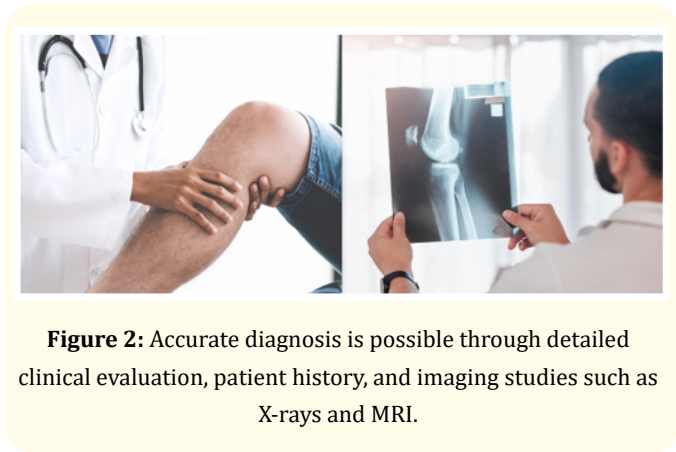


Figure 2: Accurate diagnosis is possible through detailed clinical evaluation, patient history, and imaging studies such as X-rays and MRI.

Clinical assessment

The clinical evaluation begins with a detailed patient history, including onset, duration, and characteristics of pain.

Physical examination focuses on:

- Range of motion (ROM).
- Joint stability.
- Gait analysis.
- Palpation for tenderness, swelling, and warmth.
- Functional tests to assess mobility and strength.

These assessments help identify the underlying cause and severity of the condition.

Imaging studies

Imaging plays a crucial role in confirming diagnosis and assessing structural changes:

- **X-rays:** Commonly used to detect joint space narrowing, osteophyte formation, and bone alignment.
- **Magnetic resonance imaging (MRI):** Provides detailed visualization of cartilage, ligaments, menisci, and other soft tissues.

Early diagnosis through appropriate imaging allows timely intervention, which is critical for preventing disease progression.

Limitations of conventional treatments

Traditional management of chronic knee pain includes pharmacological therapy and surgical interventions. While these approaches can provide symptom relief, they are associated with several limitations.

Pharmacological therapy

Non-steroidal anti-inflammatory drugs (NSAIDs) and analgesics are commonly prescribed to manage pain and inflammation. However, long-term use is associated with adverse effects such as:

- Gastrointestinal complications (ulcers, bleeding).
- Cardiovascular risks.
- Renal impairment.

Additionally, medications primarily address symptoms rather than the underlying cause of the condition.

Surgical interventions

Surgical procedures, including arthroscopy and total knee replacement, are often recommended for advanced osteoarthritis. While effective in certain cases, surgery carries inherent risks such as:

- Infection.
- Blood clots.
- Implant failure or complications.
- Prolonged recovery and rehabilitation.

Furthermore, surgical interventions involve high financial costs and may not be suitable for all patients, particularly those with comorbidities.

These limitations highlight the need for safer, cost-effective, and non-invasive treatment alternatives.

Advanced knee rehabilitation program at ANSSI Wellness

ANSSI Wellness's Advanced Knee Rehabilitation Program represents a structured, non-surgical approach to managing chronic knee pain, particularly in early to moderate stages of

osteoarthritis (Grade 1 and Grade 2). This program integrates multiple therapeutic modalities to address both symptoms and underlying biomechanical dysfunction.

The primary objectives include:

- Reduction of pain and inflammation.
- Improvement in joint mobility and flexibility.
- Strengthening of supporting musculature.
- Restoration of functional movement patterns.
- Delay or prevention of surgical intervention.

This program is particularly beneficial for patients seeking long-term relief without the risks associated with surgery or prolonged medication use.

Knee decompression treatment

Knee decompression treatment is an innovative component of the advanced rehabilitation program. It is a non-invasive technique that applies controlled mechanical forces to the knee joint.

Mechanism of action

The treatment involves gentle separation of the femur and tibia with the help of specialized equipment, which:

- Reduces compressive forces within the joint.
- Decreases friction between articulating surfaces.
- Enhances blood circulation.
- Facilitates nutrient exchange in joint tissues.

This process helps create a more favorable environment for tissue recovery and pain reduction.

Clinical relevance

Unlike conventional physiotherapy, which primarily focuses on muscle strengthening, decompression treatment directly targets joint mechanics. This makes it particularly useful in conditions where joint compression plays a significant role in pain generation.

Rehabilitation protocol and workflow

The advanced knee rehabilitation program follows a systematic and phased approach that includes:

- **Initial assessment:** Comprehensive evaluation of patient's condition.
- **Preparatory phase:** Warm therapy and gentle exercises to improve mobility.
- **Core intervention:** Knee decompression treatment combined with supporting modalities such as taping and dry needling.
- **Strengthening phase:** Progressive resistance training and functional exercises.

The program is typically conducted over multiple sessions spanning several weeks, allowing gradual adaptation and recovery.

Role of physiotherapy and patient compliance

Physiotherapy is a critical component of knee rehabilitation. It includes:

- **Stretching exercises:** Targeting muscles such as hamstrings, quadriceps, and calves to improve flexibility.
- **Strengthening exercises:** Focusing on quadriceps, hamstrings, and hip stabilizers to enhance joint stability.
- **Patient guidelines:**
 - **Do's:** Adherence to exercise routines, maintaining proper posture.
 - **Don'ts:** Avoiding high-impact activities and excessive joint loading.

Patient compliance plays a crucial role in achieving optimal outcomes.

Knee taping and dry needling

As a part of the recovery process, physiotherapists use knee taping to help stabilize the knee joint, improve alignment, reduce strain on surrounding tissues, and support pain-free movement during rehabilitation. Dry needling is also applied to target tight muscles and trigger points, relieving muscle tension, improving blood circulation, and reducing pain and stiffness associated with chronic knee pain, thereby enhancing mobility and functional recovery.

Patient outcomes and early effects

Patients undergoing the structured rehabilitation program often report significant improvements, including:



Figure 3: Physiotherapy and knee decompression, along with taping and dry needling, help improve joint stability.

- Reduction in pain intensity.
- Increased joint mobility.
- Enhanced functional performance.

Early effects may include reduced stiffness, improved circulation, and increased confidence in movement. Evidence suggests that early-stage intervention yields better outcomes and may delay disease progression.

Monitoring and progress evaluation

Continuous monitoring by trained physiotherapists ensures effective treatment.

Parameters assessed include:

- Pain levels.
- Range of motion.
- Muscle strength.
- Functional performance.

Regular evaluations allow for personalized adjustments to the treatment plan, improving overall effectiveness.

Clinical infrastructure and expertise

The successful implementation of the advanced rehabilitation program requires:

- Multidisciplinary teams of orthopedic specialists and physiotherapists.

- Standardized treatment protocols.
- Access to specialized equipment.

ANSSI Wellness offers such a program in multiple centers that focus on delivering consistent, patient-centered care.

Conclusion

Chronic knee pain, particularly due to osteoarthritis, remains a significant global health challenge. While conventional treatments provide relief, their limitations necessitate alternative approaches.

The Advanced Knee Rehabilitation Program at ANSSI Wellness, incorporating physiotherapy and knee decompression treatment, offers a promising non-surgical solution. By addressing both mechanical and functional aspects of knee pathology, this program can improve outcomes, enhance quality of life, and reduce the need for surgical intervention.

Further research is required to establish long-term efficacy and standardize treatment protocols. However, current evidence supports the growing role of non-invasive rehabilitation in modern musculoskeletal care [1-10].

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