

Doctor of Philosophy in Physical Medicine & Rehabilitation Program - PhD (PMR) USA

# "Current Perspectives on the Rehabilitation of Osteitis Pubis: A Literature Review"

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#### 1. Summary

Dynamic osteopathy of the pubis (PDO) and pubic symphysitis, also known as osteitis pubis, are conditions that affect the region of the pubic symphysis and share certain clinical characteristics, although they have particularities that differentiate them. Both conditions are characterized by inflammation of the pubic symphysis, manifesting with intense pelvic pain that can radiate to the groin, abdomen, or medial aspect of the thigh, which significantly limits daily and sports activities. In the case of ODP, a higher prevalence is observed in men, especially in athletes who practice disciplines with repetitive impacts, such as athletics, soccer, or rugby. On the other hand, osteitis pubis is usually associated with previous surgical interventions, although other etiologies such as infections, trauma, local vascular anomalies, and reflex-sympathetic dystrophy have also been suggested.

The differential diagnosis between the two conditions is essential due to the confusion that exists in the medical literature, where cases diagnosed as osteitis pubis have turned out to be osteomyelitis pubis. For an accurate diagnosis, especially in post-surgical patients, the use of biopsies and CT-guided arthrocentesis of the pubic symphysis is recommended. In terms of treatment, conservative strategies are prioritized, which have proven to be highly effective in most cases. These include rest, physical therapy, and the use of nonsteroidal anti-inflammatory drugs. In more complex or refractory cases, surgery may be considered.

The physiotherapeutic approach, especially in ODP, has evolved significantly with the introduction of new techniques such as shock waves, which are added to traditional therapies such as core strengthening, stretching, eccentric exercises and manual therapy. Although methods such as electrotherapy, ultrasound or laser were historically used, recent advances have improved the results, successfully resolving most cases through conservative treatments. Tools such as the Visual Analogue Scale (VAS) and detailed physiotherapy assessments provide valuable information on the patient's condition, allowing for more complete follow-up.

Despite advances in the management of these conditions, the scientific literature still has limitations, with few studies describing physiotherapy interventions in detail. This highlights the need for more clinical trials to optimize treatments and improve outcomes in patients with these pathologies. In addition, working on prevention, addressing specific risk factors, is essential to reduce the incidence and impact of these conditions, especially in vulnerable populations such as athletes.

# 2. Introduction

The pubic symphysis is a key anatomical structure that can be affected by various inflammatory and traumatic conditions, with dynamic osteopathy of the pubis (PDO) and pubic symphysitis (osteitis pubis) being two of the most relevant. Both pathologies share clinical characteristics such as intense pain in the pubic region, but present important differences in terms of their pathogenesis, diagnosis, and treatment.

ODP is an inflammatory and painful injury involving the pubic symphysis and its neighboring structures, such as the pubic branches, tendons, ligaments, and cartilage of the pelvis. It is mainly associated with overuse and repetitive trauma, being common in athletes who practice disciplines with high physical demand on the adductor and lower abdominal muscles, such as soccer, rugby, athletics, among others. Although its origin is idiopathic, it has been suggested that constant mechanical stress is the main trigger. Early detection of ODP is crucial to improve treatment efficacy and reduce recovery time, as late diagnosis can complicate clinical outcomes.

On the other hand, pubic symphysitis pubis, or osteitis pubis, is an inflammatory condition of the pubic symphysis that can lead to debilitating pain along with bone destruction of the articular surfaces of the pubis. Although traditionally considered a non-infectious disease, the medical literature has documented numerous cases in which initial diagnoses of osteitis pubis turned out to be pubic osteomyelitis, suggesting that infections could play a more significant role than previously thought. The pathogenesis of this condition remains controversial, and its proper diagnosis requires a clear differentiation between infectious and non-infectious causes, especially in post-surgical patients.

Both conditions require a meticulous diagnostic and therapeutic approach. In the case of ODP, conservative treatment is the first line of action and includes rest, physiotherapy based on core strengthening, eccentric exercises, manual therapy, and shock waves. These techniques have shown high effectiveness, although there is still limited scientific evidence on their effectiveness. On the other hand, pubic symphysitis may require more aggressive evaluation in patients with suspected infection, including biopsies and CT-guided arthrocentesis.

Terminological differentiation is also essential to avoid diagnostic confusion. While pubalgia refers to any pain in the pubic region without specifying its cause, ODP and osteitis pubis are well-defined clinical entities that can overlap with other pathologies, such as sports hernias, stress fractures, intra-articular hip injuries or genitourinary pathologies. This overlap underscores the importance of comprehensive evaluation and accurate diagnosis.

Despite decades of study, unresolved questions remain about the natural history and optimal treatment of these conditions. A greater amount of research and clinical trials are required to improve the understanding and management of these pathologies, optimizing both conservative treatments and surgical approaches where necessary.

#### 3. Anatomy and Biomechanics of the Pelvis.



The pelvis, a key structure in the support and movement of the human body, is composed of the iliac bones, the sacrum, and the coccyx. The iliac bones, in turn, are divided into three regions: ilium, ischium and pubis. The sacrum, located between the articular surfaces of the iliac bones, is made up of five fused vertebrae, while the coccyx, located below the sacrum, can contain between three and five vertebrae, depending on the anatomical variability.

In the region where the sacrum and iliac bones meet, the sacroiliac joint is formed, an amphiarthrosis with very limited mobility that confers structural stability to the pelvis. This joint, however, can experience an extension in its range of motion in exceptional situations, such as during childbirth, when the pelvic straits need to widen to allow the expulsion of the fetus.

The pubic symphysis, on the other hand, is located at the confluence of the two pubic bones and is separated by a fibrocartilaginous disc that allows it to absorb loads and maintain stability. This joint, also of the amphiarthrodial type, is stabilized by three main ligaments: the superior, the anterior and the arcuate or inferior, the latter being the main responsible for keeping the joint aligned. While the mobility of the pubic symphysis is minimal, it interacts biomechanically with the sacroiliac and hip joints, allowing small movements during specific activities. In pregnant women, the pubic symphysis experiences greater flexibility in the last months of gestation and during childbirth, facilitating the separation of the pubic bones.

From a functional point of view, the pelvis acts as a system of arches that transfers the weight of the trunk from the sacrum to the hips. This biomechanical interaction is essential for stability and body movement. In addition, the innervation of the pubic symphysis,

derived from the pudendal and genitofemoral nerves, explains the intensity of pain that can arise in cases of inflammation or injury. Its blood supply, provided by the pudendal arteries, inferior epigastric and midfemoral circumflex arteries, ensures the maintenance of joint structures and adjacent tissues. As for the musculature that inserts into the pubic symphysis, it includes the rectus abdominis, the gracilile, the pectineus and the adductors, both long and short.

Understanding the anatomy and biomechanics of the pelvis and pubic symphysis is crucial to address pathologies such as dynamic osteopathy of the pubis (PDO) and pubic symphysitis. These conditions are characterized by painful inflammatory processes that may be associated with overuse, trauma, or physiological changes, and require accurate evaluation to ensure appropriate therapeutic management.



The pelvis is a complex anatomical structure made up of multiple joints, ligaments, and muscle groups, which work in coordination to provide stability, mobility, and support to the human body. The following are the main joints of the pelvis and their ligament reinforcements:

#### **Pelvic joints**

#### 1. Sacroiliac joint

This joint connects the sacrum to the iliac bones and is reinforced by several ligaments that ensure its stability:

• Anterior sacroiliac ligament: Extends from the anterior aspect of S1 and S2 to the ilium.

- **Interosseous sacroiliac ligament**: It joins the tuberosity of the sacrum with the iliac tuberosity.
- **Posterior sacroiliac ligament**: Connects the iliac tuberosity to the lateral sacral crest and intermediate sacral crest.

# 2. Sacrococcygeal joint

Located between the sacrum and coccyx, this joint tends to ossify with age, reducing its mobility. It is reinforced by the following ligaments:

- **Anterior sacrococcygeal ligaments**: They connect the anterior aspect of the sacrum with that of the coccyx.
- **Posterior sacrococcygeal ligaments**: They extend between the posterior aspects of the sacrum and coccyx.
- Lateral sacrococcygeal ligaments: They link the lateral edges of the sacrum with those of the coccyx.

# 3. Symphysis pubis

This joint joins the anterior parts of the coxal bones by a fibrocartilaginous disc. It is amphiarthrodial type, allowing slight sliding movements between the hemipelvis. Its main ligament reinforcements are:

- Anterior ligaments: Transverse bands that connect both pubis, also serving as an insertion point for abdominal muscles.
- **Posterior ligaments**: They extend from the anterior aspect of one pubis to the posterior aspect of the other.
- **Superior ligament**: It joins the upper edges of both pubis.
- Inferior ligament: Links the lower edges of the pubic bones.



# Additional ligaments of the pelvis

There are other ligaments that provide greater stability to this region:

- **Sacrospinous ligament**: Triangular, it connects the sciatic spine with the lateral edges of the sacrum and coccyx.
- **Sacrotuberous ligament**: Joins the sacrum to the ischial tuberosity and some fibers extend into the iliac spines.

#### Muscles associated with the pelvis

1. Gluteal muscles

It is divided into three planes:

- **Superficial plane**: Gluteus maximus.
- Medium shot: Gluteus medius.
- Deep plane: Gluteus minimus and pelvitrochanteric muscles.

#### 2. Thigh muscles

- Posterior region:
  - Semitendinosus.
  - Semimembranous.
  - Biceps femoris.
  - Medial compartment:
    - Adductor magnus, short and long.
    - Pectineus.

• Graceful.

#### • Anterior compartment:

- Sartorius.
- Rectus femoris.



# 4. <u>Etiological factors and epidemiology of dynamic osteopathy of the pubis and pubic symphysitis</u>

Dynamic osteopathy of the pubis (PDO) and pubic symphysitis, also known as osteitis pubis, are pathologies that affect the pubic symphysis and share similar clinical characteristics, although they differ in their etiology and evolution. Various factors can contribute to its appearance, with sport being one of the most prominent. These conditions are more frequent in men, with a ratio of 5:1 compared to women, a difference attributed to the greater practice of high-impact physical activities in the male population.

#### Etiology and predisposing factors

Traditionally, pubic symphysitis has been considered a non-bacterial inflammatory process related to various conditions and procedures, such as urological and gynecological surgical interventions, pregnancy, childbirth, trauma, herniorrhaphia, and pyelonephritis. However, this view has been questioned due to the growing evidence of cases in which an infectious origin is observed. Many patients do not respond to conservative treatment, develop complications such as perineal fistulas, abscesses adjacent to the pubis or have positive blood cultures. Bone biopsies performed on these patients usually show changes consistent with osteomyelitis.

When an infectious origin is identified, the most isolated microorganisms are *Staphylococcus aureus*, *Pseudomonas aeruginosa* and polymicrobial infections. However, not all cases of good evolution after conservative treatment rule out the possibility of infection, since there are reports of pubic osteomyelitis that resolve spontaneously without the use of antibiotics.

As for ODP, it is mainly associated with the overuse of the pubic symphysis in high-impact sports activities that involve repetitive movements, such as running or sudden changes of direction. These activities generate inflammation in the pubic symphysis and surrounding structures due to prolonged mechanical stress.

#### Impact of sport and epidemiological studies

Sports with the highest incidence of these pathologies include football, long-distance runners, rugby, weightlifting, and cycling. According to a study by Renström, football accounts for 50% of reported cases, followed by runners and rugby players. Another study by Verrall documented that, between 1997 and 2012, an average of 10% of the players at each club suffered groin injuries, dynamic osteopathy of the pubis or hip injuries annually.

Radiological studies, such as that of Castelo Branco et al., show greater bone edema and alterations in soft tissues in athletes compared to sedentary people. In these cases, up to 31% of athletes have radiological signs of edema in the pubic bones, although they are not always accompanied by clinical symptoms.

#### Additional hypotheses about etiology

Over time, various theories have been proposed to explain the development of these pathologies. In 1941, Wheeler suggested that osteitis pubis could be caused by a sympathetic-reflex dystrophy of the pubis, while in 1980 thrombosis of the parapubic veins was proposed as a possible cause, hindering venous return, and proposing heparin as a treatment. However, these theories lack sufficient evidence to be widely accepted.

In the field of sports, to understand the factors that influence the origin and development of pubic symphysitis, it is essential to differentiate between two clinical forms of this disease:

Microtraumatic pubic osteoarthropathy (traumatic pubalgia)

This form arises because of a direct attack on the pubic symphysis and has two main possible causes:

• **Pubic shear**: It can occur after a fall on the feet in which the impact forces on the ground are unevenly distributed, causing one pubic branch to rise higher than the

other. This misalignment generates a shearing of the symphysis, accompanied by excessive stretching of the pubic ligaments.

• Sudden tension in the adductors: Sudden oppositional movements in the lower extremities or loss of ground support can cause acute strain on the adductor muscles. This places significant stress on the ligaments and muscle attachments of the pubis, which can lead to injury.

# Chronic pubalgia

Unlike traumatic pubalgia, in chronic pubalgia the origin of the pain does not lie directly in the pubis, but is a consequence of functional alterations in the body. This type of pubalgia is divided into two subcategories:

- **Upper pubalgia**: It is caused by an involvement of the anterior rectus abdominis muscle, whose insertion in the pubis is compromised.
- **Lower pubalgia**: This type is related to injuries to the adductor muscles, with the median adductor being the main responsible for the symptoms associated with pubic osteopathy.

# Triggers

Studies so far have identified several factors that contribute to these conditions, which are grouped into two main categories:

- Intrinsic factors: These include anatomical and biomechanical features such as:
  - Inequality in the length of the lower limbs.
  - Lumbar hyperlordosis.
  - Structural weaknesses in the abdominal wall and/or the inguinal tract.
- Extrinsic factors: Related to the environment and training conditions, such as:
  - The quality of the sports field.
  - Overload due to overtraining.
  - Execution of movements that involve a high risk of injury.

Despite advances in the knowledge of these conditions, both dynamic osteopathy of the pubis and pubic symphysitis require additional studies to clarify their etiology, diagnosis, and optimal treatment. Early identification and appropriate management are essential to minimize the functional impact and duration of these conditions, especially in athletes, who represent the population at greatest risk.

The etiology of this disease has not yet been fully clarified. In most cases, the main cause seems to be a decompensation between the lower abdominal muscles and the hip adductor muscles, the latter being significantly stronger. This imbalance generates continuous shearing in the pubic symphysis due to the traction exerted by the adductor tendons.

The anatomy of the pelvis shows significant differences between men and women. In men, increased muscle development creates insertion points subjected to more intense tensile

forces. These forces, combined with repeated impacts and co-contraction of the pelvic ring muscles, place additional stress on the pubic symphysis, contributing to the deterioration of this structure.

In women, a predisposing factor is pregnancy. The associated anatomical and physiological changes, such as modification of pelvic ring morphology and increased ligamentous laxity, can lead to diastasis pubis, especially after childbirth. Cases of post-traumatic pelvic diastasis have also been documented in other settings, presenting with insidious symptoms or post-trauma pain.

#### Risk factors

Several risk factors are identified that increase the probability of developing dynamic osteopathy of the pubis (PDO). These factors can be classified into two broad categories: extrinsic and intrinsic.

#### Extrinsic factors

External factors are related to conditions and activities that increase stress on the pubic symphysis:

- Previous trauma.
- Repetition of microtrauma.
- Specific and repetitive gestures associated with each sport.
- Muscle fatigue.
- Insufficiency in muscle strength levels.
- Conditions of the terrain where the physical activity is carried out.
- Practice of sports such as skiing, where the posture maintained subjects the adductor muscles to excessive stress.

#### Intrinsic factors

Internal factors refer to individual characteristics that predispose to pathology:

- Decreased range of motion (ROM) in the hip, especially in internal rotation.
- Previous anterior cruciate ligament (ACL) injuries.
- History of adductor injuries.
- Pregnancy, due to anatomical and hormonal changes that increase ligamentous laxity and alter pelvic stability.
- Dominance of the quadriceps muscle.
- Disparity in strength or dominance between the lower limbs, particularly in sports such as football, where the gesture of hitting the ball (kick) generates an imbalance.
- Weakness in the abdominal muscles.
- Imbalances between the abdominal muscles and the adductors.

In pregnant women, the predisposition is greater due to the changes in the morphology of the pelvic ring necessary to accommodate the fetus. These changes generate greater laxity in the ligaments and alter the joint coaptation of the pubic symphysis, increasing the risk of developing the pathology.

# 5. <u>Incidence</u>

The incidence of OP in the general population is not fully determined, but multiple studies have identified a strong association with various clinical situations, especially those related to pelvic organ surgeries. After procedures such as urinary incontinence surgery using the Marshall-Marchetti-Krantz technique, an incidence of osteitis publis is estimated to range between 2% and 3%.

Beyond its link with surgical interventions, this pathology has a marked occupational character, especially linked to sports practice. In a study conducted by Montes González in 2002, it was analyzed how various extrinsic risk factors related to physical activity, such as the quality of the terrain, overtraining, errors in training planning and the performance of dangerous movements, influence the incidence of the disease. The research included three subgroups of individuals:

- **Class 1**: People who train regularly, including strengthening the abdominal muscles and stretching the adductors.
- **Class 2**: People who train regularly, but with poor physical preparation, based on muscle strengthening exercises without adequate supervision.
- **Class 3**: People with little or no regularity in training (once a week or less).

The results showed that the **Class 2** group had the highest incidence of pathology, reaching 7.58%, while the **Class 3** group, composed of people with little regularity in training, presented the lowest risk, with only 1% incidence. Despite these differences, the study concluded that the overall incidence of the pathology in the three groups combined was low, less than 5%.

Another important finding of the study was the correlation between diagnosed cases and the months of greatest intensity in sports competitions. Overtraining and lack of adequate physical conditioning were identified as key factors for the development of the pathology. On the contrary, the implementation of preventive exercises, such as stretching the adductors and strengthening the abdominal and hamstring muscles, showed a significant protective effect, significantly reducing the risk of suffering from pubic osteopathy.

# 6. <u>Frequency and Classification of Pubic Symphysis Disorders</u>

The term **osteitis pubis** was introduced in 1924 by Beer, who used it to describe a postsurgical complication derived from suprapubic prostatectomy. This condition is characterized by severe pelvic pain, gait disturbances with an increased base of support, and bone damage at the margins of the pubic symphysis. Over the years, this pathology has generated a lot of controversy due to terminological confusions and imprecise definitions, which has complicated its understanding and classification. From a strictly medical perspective, pubic symphysitis is defined as an enthesopathy of the pubis, which involves painful inflammation in the areas of muscle attachment around the pubic branches. It is important to note that multiple terms have been used to describe this condition, including: pubalgia, pubitis, osteitis pubis, pelvic-arthritic syndrome, dynamic osteopathy of the pubis, sports pubalgia, lumbopubalgia, among others. This variety of names reflects the complexity and lack of consensus around their etiology and clinical presentation.

However, the term **pubic symphysitis** itself can be ambiguous, since the suffix "-itis" refers to an inflammatory process without specifying whether its origin is infectious, traumatic or of another nature. To clarify, pathologies that affect the pubic symphysis can be classified into the following categories:

#### 1. Congenital anomalies

Some conditions, such as bladder exstrophy, craniocaudal dysostosis, and Dyggve-Melchior-Clausen syndrome, can cause varying degrees of separation in the pubic bones, affecting functionality and leading to different levels of disability.

# 2. Infections

This category includes septic arthritis and pubic osteomyelitis. These conditions can be misdiagnosed as osteitis pubis, but they require specific attention due to their severity and the need for early interventions. Rapid identification of these infections is crucial to avoid serious complications, including the risk of mortality.

#### 3. Inflammatory diseases

**Osteitis pubis**, a sterile inflammation of the pubic symphysis, is the main condition of this type. Also, seronegative spondyloarthropathies can affect this joint, with progressive ossification of fibrous elements that can culminate in complete synostosis.

#### 4. Metabolic diseases

Pathologies such as renal osteodystrophy and hyperparathyroidism can lead to bone resorption. Likewise, conditions such as calcium pyrophosphate crystal arthropathy, ochronosis, and hemochromatosis can cause calcifications in the fibrocartilage and erosions in the subchondral bone.

#### 5. Degenerative diseases

From the age of 50, degenerative lesions begin to manifest in the pubic symphysis, initially characterized by sclerosis on the articular surfaces and the gradual development of marginal osteophytes.

#### 6. Neoplasms

Although the pubic symphysis is resistant to tumor invasion, it can be affected by malignant or benign tumors. In cases of metastatic carcinoma, multiple myeloma, or Hodgkin's disease, bilateral involvement of the pubic bones may be observed, although the joint usually remains intact. Benign lesions, such as desmoplastic fibroid, can cause unilateral damage to the bones, without directly compromising the symphysis.

#### 7. Post-traumatic diseases

Among traumatic injuries, four main patterns are identified:

- **Diastasis pubis**: The most common, accounting for 45% of cases.
- Displaced fractures.
- Intra-articular fractures with dislocation or overlap.
- Combinations of the above injuries.

#### Importance of Differential Diagnosis

Although most pathologies affecting the pubic symphysis are of non-infectious origin, it is essential to consider infectious etiologies such as septic arthritis in the differential diagnosis. Early detection of these conditions is vital to avoid severe complications, such as joint destruction, and to improve the patient's prognosis, reducing risks that could even compromise their life.

#### 7. <u>Clinical manifestations.</u>

#### Symptoms and Diagnosis of Dynamic Pubic Osteopathy (ODP)

Dynamic osteopathy of the pubis (ODP) is a complex pathology that presents with pain of variable intensity, which can be limited, chronic or fluctuating in duration. This pain is mainly located in the pubic symphysis, although it may radiate to the inguinal region, the medial aspect of the thigh, or the abdomen. In many cases, diagnosis is complicated due to the wide range of conditions that can cause pain in these areas.

The pain characteristic of ODP often intensifies during activities that put pressure on the pubic joint, such as walking, going up or down stairs, supporting weight on one leg, or making quick changes of direction. In addition, movements such as getting up from a chair, turning in bed, or walking on uneven surfaces can cause a click or worsen discomfort. Other symptoms include erythema, edema and increased local temperature, and in some cases fever, although this is not always present.

#### Main Pain Zone

The presence of suprapubic pain during walking is associated with torsional or compressive forces on an inflamed symphysis. The interosseous ligaments of the sacroiliac joints, which

limit joint motion to imperceptible levels (approximately 0.5 mm in men and 1.5 mm in non-pregnant women), can amplify these forces through the pubic branches, causing detectable displacements in the pubic symphysis.

# Clinical Classification of ODP

ODP can be classified according to the clinical course of the disease, using systems such as the classification of Rodríguez et al., which divides the pathology into four stages based on clinical findings, and the Wisbey-Roth system, which assesses lumbopelvic stability and its relationship with ODP:

Stadium	Clinical Findings
I	Unilateral pain in the adductor muscles, relief after warm-up, exacerbation of post-workout pain.
II	Bilateral pain in the adductor muscles, with aggravation after training sessions.
III	Bilateral pain affecting the adductor and abdominal muscles, pain when kicking, running, making changes in direction, and inability to continue sports activities.
IV	Groin pain affecting the adductors and abdominal muscles, radiation to the pelvic girdle and lumbar spine, discomfort when walking on uneven ground, during defecation or sneezing, and inability to perform daily activities.

# 8. Differential diagnosis

ODP shares clinical characteristics with other pathologies, which makes it difficult to diagnose. It is essential to differentiate between pubic symphysitis (sterile inflammation of the symphysis), pubic osteomyelitis, and septic arthritis of the pubic symphysis. The latter are particularly problematic, as they are often misdiagnosed as osteitis pubis, especially after urological surgeries.

A recent study highlighted that up to 71% of patients with osteitis pubis after urological intervention using the Marshall-Marchetti-Krantz technique had positive cultures in bone biopsies. This shows that some low-grade infections can resolve slowly thanks to the patient's immune response, like what happened in times prior to the development of antibiotics.

On the other hand, septic arthritis of the pubic symphysis can develop from pre-existing inflammation, facilitated by bacteremias caused by microorganisms such as *Staphylococcus aureus*. In a review by Ross and Hu, based on 100 cases recorded between 1973 and 2003, the main etiologic agents were identified: *S. aureus* (34%), *Pseudomonas aeruginosa* (24%), polymicrobial infections (19%), *Escherichia coli* and other gram-negative bacilli.

To make an accurate diagnosis of ODP, it is crucial to differentiate it from other pathologies that may manifest similar symptoms in the inguinal region. Conditions that should be considered in the differential diagnosis include:

- **1.** Initial injury to the adductor or abdominal musculature This includes tendinopathies or muscle tears, which can easily be confused with the early stages of ODP.
- 2. Pathology of the iliac psoas muscle Includes bursitis, tendinopathies or fibrillar ruptures. This type of injury usually presents as an acute condition, caused by sudden flexion of the hip, with deep pain in the groin region and positive results in functional tests.
- **3.** Non-specific groin pain Known as *groin pain, sports hernia* or "footballer's hernia", it is described as an incipient inguinal hernia characterized by pain under the pubic tubercle and discomfort in the pectineal region. It is sometimes associated with a weakening of the external inguinal ring.
- 4. Abdominal or inguinal hernias Hernias themselves that affect these areas.
- **5.** Sacroiliac dysfunction It can present as referred pain or functional alterations in the pelvic region.
- **6.** Stress fractures in the pelvis Although rare, these fractures can appear in the pubic branches. In adolescents, avulsion fractures may also occur.
- 7. Intra- or extracapsular hip problems include conditions such as joint effusions, soft tissue injuries, or bursitis.
- **8.** Nerve Entrapment Syndromes This includes entrapment of the obturator nerve (L2-L3) or femoral nerve (L3-L4), which can cause pain radiating into the groin region.
- **9.** Discogenic pain Referred pain from affected intervertebral discs between T12 and L5, which can be confused with groin discomfort.
- **10.** Hip pathologies include conditions such as *acetabular impingement* (femoroacetabular entrapment), osteochondritis, and other structural alterations that affect the biomechanics of the hip.

# 9. Physical Exam

Dynamic osteopathy of the pubis (ODP) is a common injury in athletes who perform activities with high physical demand, especially those that involve repetitive movements, changes of direction and explosive force. Despite its prevalence, ODP remains a diagnostic and therapeutic challenge, underscoring the importance of individualized protocols and multidisciplinary approaches to its treatment and rehabilitation. This analysis evaluates current management strategies, available clinical evidence, and areas of opportunity in the treatment of this pathology.

During clinical examination, palpation of the pubic symphysis usually triggers pain due to hypersensitivity, which is a key indicator for diagnosis. In addition, pain during active hip adduction movements reinforces the suspicion of ODP. Assessing the morphology and statics of the pelvis is critical, as alterations in these structures can exacerbate the impact of the pathology.

Pain can also manifest during the transition from sitting to standing, walking, or after physical activities. In addition, in women, this condition can occur after pregnancy or childbirth due to pelvic diastasis, as well as in cases of rheumatic disorders or trauma.

#### Evaluation and Diagnosis of Dynamic Pubic Osteopathy (ODP)

Not all groin injuries necessarily correspond to a PDO, so it is essential to take a detailed history and complete assessment to rule out other pathologies with similar symptoms. This ensures that the clinical approach focuses on treating the correct condition.

#### Classification of Assessment Tests

During the physical exam, tests can be divided into two main categories:

- Global testing.
- Specific tests.

Before applying the specific tests, it is crucial to observe the patient, evaluating their posture, gestures, and gait, which is part of the overall assessment.

#### Fundamental Valuations

In the early stages of PDO (I and II), it is important to also examine the contralateral side, as there may be limitations in this segment. For a comprehensive evaluation, it is recommended to carry out the following assessments:

- **Detect possible dysmetria:** Compare the limbs to identify differences in length or alignment.
- Assess hip movements: Examine adduction, abduction, flexion, and extension, both actively and passively, comparing both sides for significant differences.
- **Measure pain during palpation:** Explore the pubic symphysis and surrounding soft tissues, such as the rectus abdominis and adductor tendons, to locate the source of the pain.
- **Explain the maneuvers to the patient:** Ensure that the patient is relaxed and cooperative during the evaluation.
- **Evaluation of the adductor muscles:** Palpate from the proximal to the distal region, looking for points of tension or pain, always comparing with the opposite side.
- **Consider proximal limitations:** Recognize that restrictions in segments such as the pelvis, hip, or sacroiliac joint can impact distal segments due to the interaction between muscle chains.
- **Abdominal musculature examination:** Like the evaluation of the adductors, the insertion sites should be palpated with two or three fingers, comparing both sides to identify tensions.
- **Iliac psoas assessment:** With the patient in the supine position, the therapist should exert gentle pressure in the ventral direction. The muscle can be located by palpating the lateral limit of the rectus abdominis, asking the patient to slightly flex the hip if there is difficulty in identifying it. It is essential that the patient is relaxed, as deep palpation can be uncomfortable.

#### Local Tests for the Pubic Symphysis

In addition to general evaluations, there are specific local tests for the pubic symphysis that can help in clinical assessment. These tests are not exclusive to ODP, so a positive result could be related to other pathologies. These include:

- **Palpation of the pubic symphysis:** Press with one or two fingers in an anteroposterior direction to determine if there is pain or ligamentous instability in the joint.
- Lateral compression test: The patient is placed in lateral decubitus position, and the therapist applies caudal pressure on the iliac bone that is in a superior position. This procedure aims to evaluate the joint. A positive result may suggest the presence of an ODP or even a pelvic fracture.
- Adduction test
- **The functionality of the** hip adductor muscles is examined with the patient supine. During the test, the patient performs active resistance to hip adduction. If the test is positive, it could be indicative of ODP or an adductor muscle injury.
- **Abdominal muscle test** When these tests are positive, they may reflect an injury to the groin region, which could be related to an ODP. The muscles evaluated are:

#### a. Rectus abdominis:

The patient, with the hips flexed between 45° and 90° and the arms crossed over the chest, tries to perform a flexion of the trunk. This movement includes lifting your head and shoulder girdle off the stretcher. To prevent the patient from taking off their feet, the therapist stabilizes their knees with one hand, while with the other they generate resistance in the patient's chest to assess the strength of the rectus abdominis.

#### b. External and internal oblique:

The patient starts from the same initial position. During the test, you should try to bring one shoulder closer to the contralateral knee, simultaneously performing a flexion of the trunk combined with rotation and inclination. In this maneuver, the therapist stabilizes the patient's knees with the lower hand and uses the upper hand to offer resistance on the shoulder that is directed toward the opposite knee.

The clinical diagnosis of ODP requires a thorough history, supplemented by specific physical tests. Typical symptoms include pain in the pubic symphysis, irradiation to the adductors, the inguinal region, and, in advanced cases, the lumbar region. The most commonly used diagnostic tools include:

- 1. **Gap test**: Assesses pain in the symphysis during isometric contraction of the adductors in various hip positions.
- 2. **Faber test and Thomas test**: They help identify dysfunctions related to the hip or periarticular structures.
- 3. **Core Assessment**: Detects muscle imbalances between the lumbo-pelvic stabilizers and adductors.

# THOMAS TEST



"Thomas Test"



# Patrick Test (FABER)

- Patrick Test assist in diagnosis of pathologies at the hip, lumbar and sacroiliac joint. It is also known as the FABER sign (Flexion, ABduction, External Rotation) or figure of 4 test.
- The patient is supine with one leg extended and the other flexed at the knee. The lateral malleolus of the flexed leg lies across the other leg superior to the patella.
- The test may also be performed so that the foot of the flexed leg is in contact with the medial aspect of the knee of the contralateral leg. The flexed leg is then allowed to fall into abduction, and from this position the examiner increases the external rotation by increasingly pressing the patient's knee down toward the examining table with one hand.
- The examiner must immobilize the pelvis on the extended contralateral side to prevent it from moving during the test.

"FABER test or Patrick Test"

The use of scales such as the Visual Analogue Scale (VAS) and the LEFS scale makes it possible to quantify pain and functionality, providing objective parameters for patient follow-up.

# 10. Prevention and Rehabilitation in Dynamic Pubic Osteopathy (ODP)

In addition to addressing recovery from the injury, one of the fundamental pillars to avoid the appearance of ODP is to implement specific prevention programs. These programs are especially important in groups that have risk factors, either through muscle strengthening or by adjusting for extrinsic factors that affect the population at risk.

As mentioned above, ODP is prevalent in sports such as football, rugby, ice hockey, track and field, American football, tennis, basketball, karate, and gymnastics. These disciplines require explosive movements and repeated sprints, which puts a significant load on the lower limbs. Therefore, it is essential to work on the balanced strengthening of the leg muscles. However, overdevelopment of the anterior thigh muscles, such as the quadriceps, can increase the risk of ODP. This occurs because a muscle imbalance, where the knee flexors are not proportionally strengthened, generates biomechanical decompensations. These decompensations can lead to direct or indirect injuries, such as a previous anterior cruciate ligament (ACL) injury that later leads to ODP.

Recommendations and Exercises for Physical Reincorporation

Before resuming sports activity, it is crucial to follow specific guidelines that ensure a full recovery and minimize the risk of relapse. Recommendations include:

- **Hamstring strengthening:** Focusing on balancing strength between the knee flexor and extensor muscles.
- **Training the stabilizing muscles of the pelvis:** Improve pelvic stability to reduce unnecessary tensions in the pubic symphysis.
- **Stationary Bike:** Use this exercise as a form of low-impact cardio activity that contributes to progressive strengthening.
- **Treadmill walking:** Introduce controlled walking exercises to assess and improve lower limb functionality.
- **Correction of biomechanical patterns:** Identify and correct potentially harmful postures or movements, such as genu valgus, excessive pronation of the foot or external rotation of the hip.

# 11. Pubis Osteopathy: Need for a Differential Diagnosis and Effective Approach

Osteopathy pubis (ODP) is defined as an idiopathic inflammatory condition that affects the structures related to the pubic symphysis. However, it is essential to make a detailed differential diagnosis to rule out other pathologies that can also cause pain in the groin region, such as osteomyelitis, stress fractures, musculotendinous injuries, referred low back pain, adductor tendinopathies, among others.

Due to the complexity inherent in diagnosis in this context, it is not uncommon to find erroneous interventions that significantly delay the recovery process. The available scientific literature on this pathology reveals limited and inconclusive data in relation to the ideal treatment protocol, which reflects a great variability in the therapeutic approaches applied to patients with ODP. These methods, in many cases, fail to be completely effective.

In view of this situation, it is pertinent to carry out a narrative bibliographic review that allows analyzing the available scientific evidence on physiotherapy interventions in this pathology. This type of review can help identify evidence-based strategies that optimize the management of ODP and reduce disparities in clinical outcomes.

During clinical examination, the pubic symphysis usually presents tenderness, inflammation and a characteristic soft texture, a sign commonly known in English as "tenderness". This finding is essential to identify possible alterations in this region.

One of the diagnostic tests most recommended by various specialists is the "Gap Test" or "squeeze test". In this test, the patient is positioned lying down, with the hips and knees bent to 90°. The examiner places his fist between the patient's legs and asks him to perform an isometric contraction, exerting pressure against the fist. If the patient experiences pain during this maneuver, the result is considered positive, indicating possible involvement of the pubic symphysis.



The "Gap Test" or "squeeze test"



The "Gap Test" or "squeeze test"

In the clinical evaluation of dynamic osteopathy of the pubis (PDO), it is essential to analyze the condition of the muscle and tendon masses of the abdominal and adductor muscles, as well as to check if there are dilations in the inguinal rings that may be contributing to the patient's symptoms.

Rodríguez et al. (2001) proposed a clinical classification widely cited by various authors, which divides the evolution of ODP into four phases. This classification is commonly used to describe the different stages of pathology:

#### Phase I

In this initial stage, symptoms are usually unilateral, predominating in the dominant limb. The pain is in the inguinal region and mainly affects the adductor muscles. This pain has mechanical characteristics, decreasing after warming up before training, but reappearing after physical activity.

#### Phase II

In this phase, symptoms become bilateral. Pain persists in the groin region and along the adductor muscles, although it may begin to focus on the suprapubic area if treatment has been initiated, which improves adductor musculature-related symptoms. However, the pain intensifies after each training session.

#### Phase III

At this stage, bilateral pain spreads to the suprapubic and abdominal region. Patients experience pain during sports activities, particularly when kicking, performing sprints, spins, jumps, or any explosive movement. In many cases, pain prevents them from completing workouts, forcing them to drop out.

#### Phase IV

This is the most advanced stage, in which the pain generalizes and radiates to the lumbar region. The discomfort increases during basic activities such as walking or defecating. Patients often report significant limitations that make it difficult for them to perform even simple everyday tasks.

Imaging Tests for the Diagnosis and Evaluation of Dynamic Pubic Osteopathy (ODP)

To confirm the diagnosis of ODP and determine the stage of the disease at the time of evaluation, a variety of imaging tests are used to provide a detailed analysis of the affected structures. Among the most commonly used, the following stand out:

#### 1. Plain X-ray

An anteroposterior (AP) projection of the pelvis is performed, where it is possible to identify irregularities and sclerotic margins in the pubic rami and symphysis, specifically in the areas of insertion of the abdominal and adductor muscles. Also included is a unipodal load projection known as the "flamingo position". In this technique, a vertical displacement of more than 2 mm between the pubic branches is considered pathological, as is a horizontal separation greater than 7 mm.

#### 2. Technetium-99 Bone Scan

This test is highly sensitive and allows an early diagnosis by detecting capturing images in the pubic symphysis. It is especially useful for evaluating the bone phase, where an increase in bone metabolism or "turnover" is observed. Tracer uptake is classified into three degrees: mild, moderate, and severe, depending on the intensity of asymmetric hyperuptake in the pubic rami.

#### 3. Muscle-tendon ultrasound

Ultrasound completes the analysis of the other tests, as it allows the evaluation of the muscles involved, especially their insertions in the periosteum. In addition, it helps to rule out exclusively muscle-tendon pathologies. Ultrasound is also useful for exploring the inguinal canals, allowing inguinal hernias, such as the so-called "athlete's hernia", to be identified and ruled out.

#### 4. Magnetic Resonance Imaging (MRI)

Magnetic resonance imaging is widely considered the most appropriate test to confirm the diagnosis of ODP. Among the characteristic signs of the pathology are:

- Bone edema in one or both pubic branches.
- Presence of fluid in the pubic symphysis.
- Edema in the periarticular tissues.

Different authors have consistently pointed to these findings as indicative of ODP, including Albers (2001), Holmich (2004), Verrall (2005), and Cunningham (2007), reinforcing the consensus in the medical literature on their diagnostic utility. Zoga et al. (2008) reported that magnetic resonance imaging has a high sensitivity (98%) and specificity (90-100%) to make a differential diagnosis, especially when it comes to differentiating between enthesopathy of the rectus abdominis muscle and that of the adductor muscles. For his part, Cunningham proposes a key finding in MRI: the presence of a second "cleft" or "lip" at the insertion of the common tendon of the adductor medius and internal rectus muscles. This sign is essential to distinguish ODP from other insertional enthesopathy.

In advanced cases, MRI may also show additional features such as subchondral sclerosis, irregularities in bone margins, and osteophyte formation, indicating more severe structural damage.

# Clinical and Radiological Criteria

To diagnose ODP, it is necessary to meet both clinical and radiological criteria. In this context, the criteria proposed by Verrall et al. in 2007 serve as a standard reference and are widely used in clinical practice.

. History.

Unilateral or bilateral symptoms

- · Location: anterior groin pain, adductor region, lower central abdominal region
- Duration: at least 6 weeks

**Physical Examination** 

. "Soft" palpation of the pubic symphysis

 $\cdot$  Painful palpation of the pubic branches up to the insertion of the adductor (not the tendon)

 $\cdot$  Gap or squeeze provocation test: positive test

#### MRI

 $\cdot$  Extensive bone edema, in addition to the presence of a hyperintense line in the pubic symphysis.

# 12. Treatment of Dynamic Osteopathy of the Pubis (ODP)

The initial treatment of PDO should be conservative, considering both the bone characteristics and those of the athlete himself. These particularities could indicate, in certain cases, the need to consider early surgical treatment. As with any therapeutic approach, it is essential to individualize treatment for each patient.

When the initial symptoms of ODP are evident, the most important recommendations include sports rest, implementation of a basic rehabilitation program, and establishment of appropriate guidelines to improve lumbo-pelvic stabilization.

#### Duration of Sports Rest

The sports rest period is a controversial topic and varies according to different studies. This time can range from 3-4 weeks to 5-6 months, depending on factors such as the age of the athlete, the type of sport they practice, and the time of the season they are in.

#### Therapeutic Interventions

Although there are no conclusive studies that support a single rehabilitation protocol with scientific evidence, the most commonly used treatment includes a personalized combination of the following interventions:

- Nonsteroidal anti-inflammatory drugs (NSAIDs).
- Ultrasonography and electrostimulation.
- **Cryotherapy:** Applied to reduce inflammation and relieve pain.
- Massages: Useful for relaxing the affected muscles and reducing pain.
- **Lumbo-pelvic stabilization exercises:** They contribute to improving the strength and balance of this region.

#### Additional Interventions

In some cases, especially in athletes who cannot stop their competitive activity, corticosteroid injections have been used, obtaining good results. However, this treatment is only palliative and should not be considered definitive.

Other proposals include:

- Neoprene leggings: Designed to reduce discomfort in the groin region.
- Low-frequency pulsatile ultrasonography (< 0.1 W/cm<sup>2</sup>): Applied for 20 minutes in the area of the pubic symphysis and bony branches, this technique has shown some effectiveness in reducing symptoms.

#### Rehabilitation Protocol

The recommended protocol for the treatment of ODP follows the guidelines described by Wollin (2006) and Verrall (2007). This program is subdivided into phases, based on the clinical classification of Rodríguez et al., and includes specific strategies for phases I, II and III, as well as for phase IV.

#### Rehabilitation Protocol for Dynamic Public Osteopathy (ODP)

The treatment of ODP is divided into progressive modules designed to reduce pain, strengthen the structures involved and, finally, allow gradual sports reintegration. This protocol includes four specific phases:

#### 1st Module: Pain Reduction Phase

The main goal in this early stage is to relieve pain and control inflammation. Strategies include:

- **RICE:** Rest, immobilization, compression, and elevation of the affected region.
- **Pulsatile therapeutic ultrasonography:** Applied at low frequency to the pubic symphysis.
- **Magnetotherapy:** With frequencies of 20-25 Hz, intensity of 10-15 Gauss and tetrapolar interferential electrotherapy (50-100 Hz) around the pubic area. Although it has been proposed, its effectiveness is not fully proven.
- **Static isometric strengthening:** Focused on the pelvic floor and transverse abdominis muscles, guided by musculoskeletal ultrasound.
- **Isometric adductor exercises:** These include specific control of the abdominal muscles.
- Gentle and prolonged stretching: Always controlled to avoid pain.

This phase lasts approximately 3 to 6 weeks, depending on the case.

#### 2nd Module: Dynamic Early Phase

At this stage, dynamic exercises are introduced to strengthen the muscles and improve functionality:

- Increased resistance of exercises for the pelvic floor and transverse abdominis muscles.
- Initiation of specific work of the gluteal muscle.
- Use of elastic bands to work on flexion, extension, abduction, and adduction of the hip, paying special attention to the latter.
- Progressive introduction of the exercise bike, starting with 10 minutes a day and gradually increasing.

• Lumbo-pelvic stabilization exercises, increasing the intensity progressively. Repetitions and rest periods are adjusted according to tolerance, holding the poses for 6 to 12 seconds.

#### 3rd Module: Dynamic Phase Proper

The focus in this phase is the reintroduction of functional and sports movements:

- Lateral skating exercises: Start with distances of 1 meter and progressively increase to 3 sets of 10 repetitions of 30 seconds.
- Manual work assisted by a physical therapist: Includes the full range of motion (ROM) of eccentric and concentric exercises of the adductor muscles.
- Intensification of gluteal exercises and lumbo-pelvic stabilization.
- Increased resistance on the exercise bike.
- Gradual introduction of continuous running.

The duration of this phase is 4 to 6 weeks.

#### 4th Module: Advanced Phase

This stage is designed for athletes in more advanced stages of injury and those looking to return to their competitive activity:

- Stationary bike with interval protocols.
- **Prolonged initial rest:** For 12 weeks, avoiding any burden, walking as little as possible and refraining from running.
- Use of analgesic tools described in previous phases (RICE, ultrasonography, cryotherapy, etc.).
- Swimming with a float between the legs and an exercise bike, always avoiding activities that generate pain.
- **Reintroduction to the gym:** From the first month, weight work for the upper body is allowed.
- Continuous running increase with changes of direction and pace.
- Intensive exercises of eccentric-concentric ROM of the adductors.
- Introduction of advanced lumbo-pelvic stabilization exercises, adapted to the specific sporting gesture of the athlete.

#### Phase Transition

Progress from one phase to another depends on the patient's adaptation. If there is no pain, the functional tests are negative and the patient can perform stabilization exercises without imbalances, you can advance to the next module.

Post-Resting Progression

- At 6 weeks: Start step exercises, starting with 5 minutes a day and increasing by 1 minute daily if there is no pain.
- At 3 months: Reintroduction of continuous running, starting with 5 minutes a day and increasing 1 minute a day until 30 minutes are reached. Once achieved, the dynamic early phase module of stages I, II and III is passed.

#### Sports Reinstatement

- Progressive increase in speed with interval training and changes of pace.
- Gradual introduction of specific exercises to readapt the sports gesture.
- Compliance with module 4 of the advanced phase.

#### 13. Conclusions

ODP can be addressed through two main approaches: **conservative treatment** and **surgical treatment**. Most cases respond favorably to conservative treatment, which is usually the first recommended option. However, in those cases where this approach does not achieve satisfactory results, the possibility of surgical intervention is considered.

#### Conservative Treatment

Conservative treatment should be personalized and includes a combination of therapeutic strategies, such as:

- **Initial rest:** Reduction and control of the load on the affected region.
- Manual therapy: Applied to correct muscle imbalances.
- **Cryotherapy:** To reduce pain and inflammation.
- Electrotherapy: As a complement to manual techniques.
- Oral drugs: Including nonsteroidal anti-inflammatory drugs (NSAIDs).
- **Dextrose prolotherapy:** A technique that involves injecting stimulants that promote the production of growth factors to repair the affected tissue.
- **Corticosteroid injections:** Used as a palliative option in specific cases, such as athletes who cannot interrupt their competitive activity.

#### Surgical Treatment

When conservative treatment fails, several surgical options are considered, including:

- Arthroscopic procedures.
- Scrapings of the pubic symphysis.
- Wedge or total resections of the symphysis.
- Placement of polypropylene meshes.
- Joint fixations of the pubic symphysis.

In the case of elite athletes, surgical treatment is often used as an initial option to shorten recovery times and allow a rapid return to physical activity, with satisfactory results in pain relief. An accurate diagnosis is essential to differentiate ODP from other conditions such as osteomyelitis publis. Heguedus et al. proposed specific clinical trials to reproduce groin pain, including:

- Gap test.
- Adductor assessment test.
- Lasegue test.

While these tests are useful for detecting pain in the groin region, they are not definitive in ruling out other related pelvic pathologies, such as hip or sacroiliac joint dysfunctions. Physiotherapy intervention is key to correcting muscle imbalances that affect the pubic symphysis. Although there is no single defined cause for ODP, repetitive and impactful movements generate significant stress in the region. Factors such as hyperactivation of the adductors and inadequate synergy with the abdominal musculature can aggravate the condition. In addition, limitation in the internal rotation of the hip is associated with excessive stress on the pelvic ring and sacroiliac joint.

It is essential to explore key areas such as the rectus abdominis, adductors, external rotators, and hip flexors to identify possible muscle hypertonia that, if not treated in time, can lead to functional disability and premature sports withdrawals.

The ideal management of ODP requires the collaboration of a multidisciplinary team, including physicians, physiotherapists, and other health professionals. This approach allows for individualized treatment and monitoring of each stage of recovery.

The **classification of Rodríguez et al**. is a useful tool for staging the injury and determining recovery times. This classification includes four stages:

- 1. Stages I to III: Associated with shorter recovery times.
- 2. **Stage IV:** Identified as the one with the worst prognosis, with longer recovery times, according to studies such as Vijayakumar's.

The recovery period varies depending on the stage of the injury and the characteristics of the patient. Generally, the deadlines range from **2 to 12 months**, although recent studies have reported recoveries in as little as 7 weeks in some cases. Factors such as the patient's clinical condition, diagnostic imaging findings, and lumbo-pelvic stability, as assessed by the Wisbey-Roth classification, directly influence these timeframes. Correct staging of the injury before starting rehabilitation is critical to establishing an effective treatment plan. The differences in recovery times highlight the importance of adapting the therapeutic approach according to the stage of the injury, which ensures a better prognosis and a more efficient recovery. PDO mainly affects athletes, predominating in men, although it also occurs in women. Given the specific anatomy of the female pelvis compared to the male pelvis, it would be interesting to consider future studies focused exclusively on women to analyze whether recovery times and response to treatment differ between both sexes.

#### Conservative Treatment: The First Choice

Scientific evidence indicates that conservative treatment offers satisfactory results when there is good adherence to the protocol. This approach should always be the first choice and includes:

- Therapeutic exercise: Designed to strengthen and balance muscle structures.
- **Physiotherapy:** With specific techniques adapted to each stage of recovery.
- **Pharmacotherapy:** Indicated in acute phases to relieve pain and control inflammation.

Recovery time varies depending on the stage of the injury, the patient's individual evolution, the frequency of exercise and their commitment to treatment.

#### Focus on Physical Exercise

Therapeutic exercise focuses on working on strength, with an emphasis on:

- Abdominal girdle: To provide lumbo-pelvic stability.
- Adductor and abductor hip muscles: Keys to balancing biomechanical loads in the pubic symphysis.

A detailed evaluation of the abdominal and adductor musculature is essential, as imbalances in these areas can lead to unnecessary strain and aggravate the injury.

#### Importance of the Multidisciplinary Team

The treatment of PDO requires the collaboration of a multidisciplinary team made up of doctors, physiotherapists, and physical trainers. A comprehensive patient evaluation provides valuable information to design an effective recovery plan. During the initial phases, the physiotherapist plays a leading role, guiding the physical work and correcting muscle imbalances. As the patient approaches the return to physical activity, the physical trainer assumes a more relevant role, supervising the correct execution of the exercises, adjusting workloads, and ensuring a gradual and safe reintegration.

The key to success in the conservative treatment of PDO lies in the personalization of the therapeutic protocol, constant professional supervision, and the patient's adherence to the recovery plan. Interdisciplinary collaboration and a focused approach to physical exercise are essential to ensure optimal recovery and reduce the risk of relapse.

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