



## Advanced Sports Medicine Concepts and Controversies

# Diagnosis and Treatment of Hip Girdle Pain in the Athlete

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**Abstract**

Evaluation of an athlete's report of "hip pain" is challenging. Many conditions involving the pelvic girdle can present with overlapping pain distributions, and athletes often may have coexisting disorders. Appropriate evaluation requires thorough, systematic consideration of intra-articular hip disease, extra-articular local causes of hip pain, and referred pain from other musculoskeletal or even visceral sources. Although our understanding of intra-articular hip disorders has been greatly enhanced in recent decades through advances in hip arthroscopy, gaps still exist in our understanding of appropriate treatment, including effective nonsurgical protocols and when to consider surgical intervention. For instance, we have a better understanding of hip dysfunction related to structural changes that occur prior to the onset of arthritis, but we are also learning that correction of the structural changes does not always guarantee a correction of dysfunction and pain. Furthermore, athletes need instruction and guidance in retraining appropriate movement patterns after a surgical intervention. Risk stratification regarding which athletes need surgical intervention and what their needs are after specific surgical procedures remain undefined. In this review we will describe the differential diagnosis of hip and pelvic girdle pain in the athlete and then discuss how to use a history, physical examination, and appropriate imaging and diagnostic injections to arrive at a proper diagnosis. Lastly, a brief discussion is included of key concepts and controversies involved in treating some of the most common hip disorders experienced by athletes.

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**Introduction**

Hip girdle pain is experienced by athletes of all ages and activity levels. Cutting and other movements requiring frequent and forceful acceleration and deceleration put athletes at particularly high risk of sustaining hip and other pelvic girdle injuries.

The complex anatomy and biomechanics of the hip create diagnostic challenges when evaluating an athlete with hip pain. Often the first step in diagnosing the cause of hip pain is to determine whether the athlete has an intra-articular versus an extra-articular disorder or a combination of both. Intra-articular disorders affect structures inside the joint capsule such as the articular cartilage, acetabular labrum, acetabulum, and proximal femur, whereas extra-articular disorders involve bone and soft tissue structures outside the hip joint capsule. The differential diagnosis of hip pain also includes referred sources such as the lumbar spine, pelvic girdle, and visceral conditions of the abdomen and pelvis. Not only do the pain distributions of many of these conditions overlap, but multiple conditions frequently coexist because of force transmission across the hip, pelvic girdle, and spine during movement [1,2].

Even after identifying the cause of a patient's hip pain, large knowledge gaps still exist regarding optimal management for many intra-articular hip disorders. For example, nonoperative treatment protocols for conditions such as femoroacetabular impingement (FAI) and developmental dysplasia of the hip (DDH) with or without acetabular labral tears continue to evolve. The purpose of this review is to identify the challenges involved in establishing the cause of hip pain, summarize local and referred causes of pelvic girdle pain, provide a clinical approach to the athlete with hip pain, and discuss controversies and nonsurgical treatment options for common local hip disorders.

For this descriptive review, we selected literature pertaining to 3 different categories:

1. History and physical examination of the hip
2. Treatment options for athletes with hip pain
3. Discussion of effectiveness of surgical and nonsurgical treatment options

We have experience in the review of such literature, including prospective, descriptive, and peer-reviewed publications regarding clinical presentations of athletes,

asymptomatic control subjects, and symptomatic persons with hip disorders. The senior author (HP) also has been involved in national and international multidisciplinary research cooperatives organized to promote the study of people with prearthritic hip disorders. The literature presented here is descriptive and based on these experiences.

### Challenges of Evaluating Hip Pain

Historically, the distribution of pain related to intra-articular hip disorders was thought to be isolated to the groin and anterior thigh. Whereas the groin is indeed the most common location of pain, multiple studies have described intra-articular hip pain as including distributions to the lateral thigh, posterior pelvis, low back, knee, and lower leg. In patients with symptomatic femoroacetabular impingement requiring surgical intervention, Clohisy and colleagues [3] reported that 88% had groin pain, 67% had lateral hip pain, 35% had anterior thigh pain, 29% had buttock pain, 27% had knee pain, and 23% had low back pain. Patients requiring surgery for symptomatic developmental hip dysplasia presented with a similar prevalence of these pain distributions [4]. Patients with painful acetabular labral tears with and without hip deformity have been described as presenting with a "C" sign in which the patient wraps his/her index finger over the anterior hip and thumb over the posterior trochanteric area to indicate the multiple painful regions [5]. In one study, 47% of patients undergoing surgery for hip osteoarthritis (OA) experienced anterior shin pain and 29% experienced calf pain thought to be related to saphenous nerve referred pain [6].

Because of the variety of pain referral patterns from intra-articular hip conditions, it is not surprising that pain arising from the hip joint has overlapping distributions with pain arising from other structures such as the lumbar spine and extra-articular pelvic girdle. Low back pain with radiculopathy, facet-mediated pain, and sacroiliac (SI) joint pain commonly present as posterior pelvis pain with radiation, in some cases, into the lateral hip and/or groin [7,8]. Intervertebral disk disorders can produce pain in the buttocks, groin, hip, and lower extremities [9], and noxious stimulation of the interspinous ligament and paravertebral muscles can refer pain to the posterior pelvis and lower extremity [10,11]. Piriformis syndrome and greater trochanteric pain syndrome can also present with pain in the posterior pelvis, lateral hip, and thigh [12]. This significant overlap in pain distributions for so many disorders is likely related to the overlap in innervations of these structures. The anterior hip joint capsule is innervated by the obturator and femoral nerves (L2-L4), and the posterior capsule is innervated by the sciatic and superior gluteal nerves (L4-S1) [13]. The nerve roots involved in hip innervation also provide sensation to

essentially all lumbar spine structures, the SI joint, and the lower extremity.

Because the variety of pain presentations from intra-articular hip disease overlaps with pain patterns attributed to so many other conditions, the clinician must be careful to consider hip conditions in the differential diagnosis for an athlete experiencing almost any pattern of lower body pain, especially if the athlete is not improving as expected with traditional management of the initial diagnosis.

### Differential Diagnosis of Hip Pain

The differential diagnosis for hip pain in an athlete is extensive and spans multiple medical specialties. Potential causes include intra-articular sources directly from the hip joint, extra-articular structures of the hip girdle, and referred sources from both the lumbopelvic region and from visceral structures of the abdomen and pelvis. To accurately diagnose the cause of an athlete's hip pain, the clinician must first be aware of all the possible causes. An extensive differential diagnosis is provided in Table 1, and in this section we review some of the more common causes of hip pain observed in athletes.

#### *Intra-Articular Sources*

Intra-articular hip disease affects structures inside the joint capsule, including the articular cartilage, acetabular labrum, ligamentum teres, synovium, acetabulum, and femoral head and neck. Disorders can be caused by congenital, chronic overuse, acute traumatic, inflammatory, infectious, or malignant disease, either in isolation or in combination with each other. Prearthritic hip disorders are common intra-articular sources of pain in athletes and include hip deformities (FAI and DDH) with and without acetabular labral tears. These conditions need to be identified because without proper management, patients have an increased risk of the development of chronic pain syndromes and early articular cartilage degeneration.

#### *Disorders of Skeletally Immature Patients*

Two notable conditions that occur exclusively in skeletally immature patients are Legg-Calvé-Perthes disease (LCPD) and slipped capital femoral epiphysis (SCFE). LCPD is osteonecrosis of the femoral head epiphysis and occurs in children and young adolescents. LCPD usually occurs in children aged 4-10 years. The cause is thought to be from repetitive microvascular trauma to the femoral head [14]. The condition is more common in boys [15,16] and in hyperactive children [14]. In contrast, SCFE is displacement of the femur at the femoral head epiphysis. SCFE is most common in the adolescent period (ie, in boys aged 10-16 years and in girls aged 12-14 years). Males have

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