

# Hip & Groin Pain

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## Diagnosis of Athletic Groin Pain

Acute or chronic athletic groin pain is extremely common, particularly in the football codes. It afflicts males significantly more commonly than females. Diagnosis of groin pain can be extremely challenging, despite the common use of advanced imaging techniques. This newsletter, based on Thorberg et al 2018 (see reference below) will list the possible structures that may be pain generators in both acute and chronic groin pain presentations. It will also discuss examination of this complex area.

## Possible Sources of Groin Pain

### Adolescent Athletes

#### *Acute injuries*

1. Muscular / tendon strain injuries. The most common muscles affected are the hip flexors, rectus femoris, and the adductors.
2. Apophyseal avulsion injuries. These injuries are quite common, resulting from intense loading activities such as kicking and sprinting. The most frequent areas affected are the anterior superior iliac spine (sartorius / tensor fascia lata) and the anterior inferior iliac spine (rectus femoris).

#### *Chronic Injuries*

1. Adductor related or pubic apophysitis. Apophysitis can occur at numerous muscular origins, including those listed above, and at the adductor origins. The pubic symphysis (along with the sternoclavicular joint) is the last area of the skeleton to mature. For this reason, pubic apophysitis can affect athletes into their early 20's.

2. Hip joint pathology. Femoroacetabular impingement (FAI) is being increasingly diagnosed in active adolescents. The CAM type impingement is the most common in male athletes. Risk of hip joint pathology is increased in those with a history of slipped capital femoral epiphyses, CDH, Perthes disease, or acetabular dysplasia (which is more common in females).

### Adult Athletes

#### *Acute injuries*

1. Muscular strains. These usually occur at the musculotendinous junction, where they will present as thigh pain. The most common sites are the adductor longus, rectus femoris and iliopsoas attachments. Strains at muscular origins (tenoperiosteal injury) can also occur and present as groin pain. Avulsions are also a possibility.
2. Stress fractures. These can present acutely, or as a progressive and ongoing condition. Stress fractures in and around the pelvic ring and femoral neck are more common in female athletes.

#### *Chronic Injuries*

1. Adductor tendinopathy. This is thought to be the most common cause of chronic groin pain. The adductor longus origin is the most common site, however any of the several tendon insertion sites along the pelvic/ischial ring could be affected.
2. FAI. This can be of the CAM or pincer type.
3. Acetabular labral tear.

4. Osteoarthritis. While uncommon in younger athletes, this is sometimes seen during the 3<sup>rd</sup> to 4<sup>th</sup> decade of life, particularly in those with a history of FAI or dysplasia.
5. Pain related to the inguinal canal. This may be due to posterior abdominal wall weakness that leads to bulging of abdominal structures, and pressure on the genitofemoral nerve. This can occur with or without true inguinal hernia.
6. Pubic symphysis disorder. This is thought to result from bony stress. However, symptomatic protrusions within the symphyseal disc may occur, and this structure is thought to behave in mechanical terms similarly to the intervertebral disc. Histologic analysis of this region has failed to identify an inflammatory process, so the term *osteitis pubis* is no longer favored.

3. Overuse injuries in adults are more likely to involve bone, or the bony enthesis (the point of tendon attachment).

### **Physical Examination:**

Below are described some of the physical examination procedures in common use for assessing various groin-related disorders.

#### *Apophysitis:*

The diagnosis should be based on age, location (pain at the adductor insertion or pubic bone), and increasing pain with adductor related activities (pivoting, resisted adduction etc).

#### *Stress fracture:*

The patella-pubic percussion test and fulcrum test have been described for the assessment of femoral neck fractures, and femoral shaft stress fractures. However, their reliability is poor to moderate. If stress fractures are suspected, MRI imaging is the gold standard. For long-standing, unexplained symptoms, further investigation is recommended to rule out red flags.

#### *Lumbar spine or SIJ referral:*

A lack of centralization or peripheralization of symptoms with repeated movement testing has been described for excluding discogenic pain. Lumbar flexion or extension are the main movements tested. Straight leg raise and slump testing are recommended when nerve root involvement is suspected.

For suspected facet joint referral, joint compression load testing is recommended - extension and rotation or side flexion in standing.

For the SIJ, the thigh thrust test has been found to have good clinical utility. Other tests include the sacral thrust, and sacral compression / distraction tests.

#### *Pain due to tendinopathy:*

Tenderness to palpation is important in diagnosis, particularly for adductor related, pubic, inguinal, or iliopsoas related pain. For tendon involvement, resisted testing is also useful, particularly for adductor related pain. For the hip flexors, palpation is a less reliable method of differentiation, and it can be difficult to separate pain due to iliopsoas from that due to rectus femoris. The Thomas test may add further information.

#### *Hip Joint related pain:*

For intra-articular pathology, the FADIR test (flexion, adduction, internal rotation in supine) is the most useful. Limited range of motion - flexion below

## **Differential Diagnosis**

### *Red Flags*

1. Abdominal or pelvic organ disorders referring pain to the groin.
2. Neoplasm. Cancers which frequently metastasise to the hip/groin, or cause direct pain in this region, include prostate cancer, breast cancer, and cancers affecting the reproductive organs.
3. Rheumatological disorders.
4. Serious bony pathologies including avascular necrosis, femoral neck fracture, or femoral shaft stress fracture. In adolescents, slipped capital femoral epiphysis (also known as epiphysiolysis of the femoral neck), occurs between the ages of 11 to 15, and is most common in overweight males.

### *Other causes*

1. Lumbar spine discogenic or facet joint referral.
2. Sacroiliac joint referral.

## **Examination**

While diagnosis in this region can be challenging, the history and age of the patient will help to guide the diagnosis. For instance, keep in mind that:

1. adolescents are more likely to suffer apophysitis, and possibly apophyseal avulsions during acute injuries.
2. Acute injuries in adults are more likely to involve the musculo-tendinous junction.

115° / internal rotation below 15°, or compared to the opposite side, in addition to reproduction of symptoms, will add to suspicion of articular involvement.

### **Imaging:**

Imaging needs to be performed as an adjunct to the clinical examination. For hip/groin related pain, false positive imaging findings are common, as morphology often does not relate to pathology.

In adolescents suffering an acute injury, plain x-ray may be indicated to rule out osseous avulsions, avascular necrosis & epiphysiolysis of the femoral neck.

#### *Pubic / adductor related pain:*

Abnormal imaging around the pubic symphysis is extremely common in athletes, both with and without symptoms. It is an indication that this area is subject to high stresses as part of normal athletic pursuits. Only higher grades of bony oedema or symphyseal disc protrusions, in symptomatic patients, should be considered clinically relevant.

#### *Acute adductor strains:*

Avulsion injuries are relatively common at the proximal adductor longus insertion. Imaging may be appropriate when this is suspected, with MRI the imaging of choice. For long-standing adductor related pain, ultrasound is the imaging of first choice.

#### *Inguinal related pain:*

Dynamic ultrasound can sometimes demonstrate weakness or bulging of the posterior abdominal wall. However, bulging alone is not associated with groin pain, and false positives are very common.

#### *Iliopsoas-related pain:*

This can be difficult to diagnose even with the use of MRI or ultrasound.

#### *Hip related pain:*

Radiological measures of CAM or pincer impingement, or acetabular dysplasia, can be demonstrated with standard plain x-ray views, including Dunn views for suspected FAI.

#### *Osteoarthritis:*

For older athletes, OA should be considered, particularly when there is loss of range (flexion below 115° / internal rotation below 15°). Positive findings include joint space narrowing or the presence of osteophytes.

For cartilage or acetabular labrum injury, 3.0T MRI imaging is recommended, keeping in mind that false positives are very common (up to 40% of asymptomatic adults have labral tears on imaging).

**Reference:** Thorberg, K et al (2018). Clinical examination, diagnostic imaging, and testing of athletes with groin pain: and evidence-based approach to effective management. JOSPT, 48, 4, 239-249.

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