Groin pain

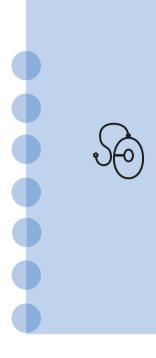
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Introduction

Groin injuries tax the diagnostic and therapeutic abilities of the clinician.^{1,2} Although they are considered to be common and the most frequent overuse syndromes in some athletic activities such as soccer,³ they are difficult to manage correctly.

First, groin lesions involve a complex regional anatomy and often produce unusual presentations. Second, the lesions are often described using inaccurate terminology. For example, *groin* is a confusing term and *groin injury* usually describes multiple clinical conditions without clearly defining location or cause. It can, as is usually the case, mean a thigh muscle strain; it may refer to the genitalia; it can indicate hip disorders; or it may mean a problem in the lower abdominal wall. Finally, lesions in the back, in the sacroiliac region and within the abdomen may cause pain referred to the region of the groin.



History

The clinician confronted with the prospect of evaluating a patient who complains of groin pain should first of all ask the patient to point to the pain and also establish whether it is localized or diffuse. The groin area is not only the crossing site of trunk and lower extremity muscles but is also a region of considerable dermatomical overlap which includes T11, T12, L1, L2, L3 and S4 (Fig. 1). Pain in the groin can also be of extrasegmental origin.

Once the localization and any radiation of the pain have been clarified, the examiner continues with the routine history which relates to problems in the back, sacroiliac region and the hip (see Ch. 36, 45, 61). Finally questions related to possible intra-abdominal disorders may be indicated. For example:

- Are fever, sweats or chills present (infection or neoplasm)?
- Has there been weight loss (neoplasm)?
- Are urinary symptoms such as dysuria, urgency, frequency or haematuria present?
- Are there bowel symptoms diarrhoea, mucus or blood in the stool?

Clinical examination

The physical examination of the groin region should proceed through several steps to search for various disorders. A start is always made with a routine examination of the lumbar spine, always followed with a similar procedure on the thoracic spine. A thorough examination of the hip follows. If the signs and symptoms warrant, a complete accessory examination of the sacroiliac joints must also be performed.

Finally, and if appropriate, an abdominal examination may be added: palpation for pain, rebound and guarding, pulses, nodes, hernia and masses such as an abdominal aortic aneurysm.

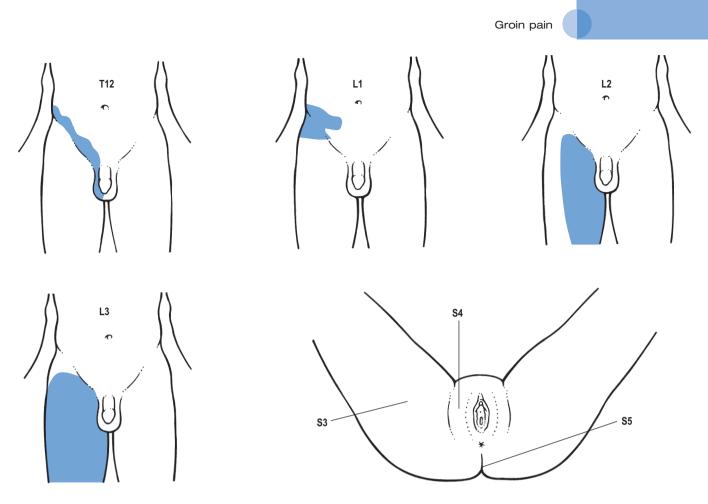


Fig 1 • The groin is a region of intense dermatomic overlap.

Interpretation

The causes that can result in groin pain are numerous and are summarized in Table 1. Differential diagnosis is not difficult if the guidelines and principles for a good functional examination of the lumbar spine and hip are followed. However, occasionally the results may be confusing. This is usually caused by the fact that resisted movements in and around the groin not only stress the activated contractile structures, but often also induce transmitted stress on inert structures (bones, ligaments). For example, resisted ad- and abduction movements of the hip may indirectly put stress on the sacroiliac or iliolumbar ligaments or on the pubic symphysis.

Most lesions have been discussed in the chapters on the hip and the thoracic spine. However, there remain some common sport lesions that cause groin pain and deserve particular attention.

Femoral neck stress fracture

This overuse injury occurs primarily in endurance athletes (often in thin women who are frequently amenorrhoeic). Risk factors include training errors, inadequate footwear, running on poor surfaces and coxa vara (angular deformity of the hip).

The fracture causes groin pain, sometimes radiating down the anterior part of the thigh. The pain (often merely an ache) increases with walking or running and is relieved on cessation of activity. Pain at night may be present in long-standing instances.

Examination reveals an antalgic gait. There is usually a discrepancy between the obvious gait and the rather subtle signs on clinical examination: a full range of motion with pain produced at the extremes of hip rotation and on axial compression.^{4,5}

Early radiographs may be negative and absence of a fracture line does not rule out a stress fracture. A bone scan should be positive 2–8 days after symptoms appear. Further imaging studies such as computed tomography (CT) or magnetic resonance imaging (MRI) should be undertaken early if clinical suspicion warrants it.⁶

Treatment is based on the type of fracture. If the bone scan is positive but there is no visible fracture on plain film, initial treatment will consist of modified bed rest. This leads on to non-weight bearing with crutches and then pain-free weight bearing.³ If there is visible fracture on the plain film, open reduction and internal fixation is the treatment of choice because of the high risk of displacement. An already displaced fracture is considered an orthopaedic emergency and requires open reduction and internal fixation.

Athletes must be told that stress fractures of the femoral neck are serious injuries that can compromise an athletic career. Even in a successful recovery, return to participation in the chosen sport may take as long as 4–5 months.

Table 1 Lesions that can cause groin pain

Referred pain Abdominal organs Abdominal wall Pelvis Hip Extrasegmental (dural) Bowel Rectus abdominis Sacroiliac strain Capsular lesions appendicitis tendinitis lliolumbar strain Loose body pain • diverticulitis T12 Inquinal hernia Pubic ramus fracture Avascular necrosis Aortic aneurism L1 'Groin disruption' Osteitis pubis Psoas bursitis L2 Genitalia llioinguinal neuralgia Femoral neck stress fracture ovarian cyst L3 ectopic pregnancy and other pelvic inflammation prostatitis S2 testicular torsion Avulsion fracture of anterior superior iliac spine S3 Urinary tract Avulsion fracture of lesser trochanter infection Adductor tendinitis Tendinitis of lithiasis • psoas sartorius rectus femoris

Acetabular labral tears

Recent arthroscopic studies suggest that most internal derangement in the hip may be the result of impingement of acetabular labral tears.⁷ The history is that of internal derangement: a feeling of giving way or a sharp 'twinge' in the groin that radiates into the anterior thigh, especially with a rotation of the hip while rising from a seated position. On examination, a noncapsular pattern of limitation is found, with limitation of lateral rotation (see p. 642).

Some authors report successful diagnosis of impingement lesions with the so-called Thomas test.³ This involves flexion and external rotation of the hip and then allowing the extremity to abduct. The hip is then moved into extension, internal rotation and adduction. A positive test result is indicated by a palpable or audible click and the production of typical pain. Arthrography, MRI and arthroscopy can be used to confirm the diagnosis.

Treatment consists of manipulation (p. 642), although arthroscopic or open operative excision may be necessary in recalcitrant cases.

Pubic ramus stress fracture

Stress fractures of the pubic ramus occur mostly in distance runners and joggers, with a higher incidence in females. Traction forces produced by the muscles attached to the pelvis have been implicated as possible aetiological factors. Pain in the inguinal, perineal or adductor region is the usual presenting symptom. On examination there is a considerable discrepancy between the marked signs on standing and walking (an antalgic gait with an inability to stand unsupported on the affected leg) and the full and painless passive range of hip motion in the supine-lying position. However, resisted movements of the hip (especially resisted adduction) do provoke the pain. Exquisite tenderness over the affected pubic ramus is also common.

Plain radiographs may not show a fracture until several weeks after the injury. Bone scan is necessary for early diagnosis.

Treatment consists of cessation of running activities. Most athletes will show complete union of bone at 3–5 months.³

Osteitis pubis

Although osteitis pubis is a well-known entity following surgery of the bladder or the prostate, 8 it has also been reported after athletic endeavours.

Osteitis pubis (an inflammatory lesion of the bone adjacent to the symphysis pubis) in athletes is thought to be the result of mechanical strain from trauma, excessive twisting and turning in sports such as soccer or repetitive shear stress from excessive side-to-side motion.⁹ It is quite common in icehockey players, soccer players and in long-distance runners. It is also frequent in women who exercise in the postpartum period because of the particular instability of the symphysis after birth.¹⁰

Complaints develop gradually and the patient cannot link the onset to any known injury. Pain is described as originating from the pubic region, with radiation into the lower abdomen, the groin and the adductor regions. The pain is linked to the athletic activity and gradually disappears upon resting. Coughing or sneezing may be painful.¹¹ In severe examples the athlete may develop an antalgic or waddling gait.

On examination there is a full range of passive movement of the hips with pain elicited by passive abduction and resisted adduction. The fact that the pain is reproduced during the examination of *both* lower extremities should help in the differentiation from a tendinitis of the adductor longus (p. 654). Palpation also causes pain along the pubic bones and the symphysis itself and not at the tendinous junction of the adductor muscles.

Bone scintigraphy, which typically shows increased uptake unilaterally or bilaterally at the pubic bones, is effective in making an early diagnosis. Radiographic changes may not be visible for 2–3 weeks but then show a symmetric resorption of the medial ends of the pubic bone, widening of the symphysis and rarefaction or sclerosis along the pubic rami. CT scan demonstrates early degenerative changes in the cortical bone, including erosions, cysts and osteophytic spurs at the symphysis.¹²

Treatment initially includes relative rest because the condition is usually considered as self-limiting within 8–12 weeks. One or two infiltrations with 20 mg triamcinolone into the symphysis may hasten healing.¹³

However, the condition may be chronic or recurrent. If symptoms persist, three infiltrations with sclerosant solution at weekly intervals usually give good results.

Groin hernia

Inguinal and femoral hernias are sufficiently common that every patient who suffers from groin pain should be examined specifically to eliminate this cause.

An inguinal hernia is located above and at the medial end of the inguinal ligament. A femoral hernia, more common in female patients, is below and lateral to the inguinal ligament (Fig. 2).

The more common type of inguinal hernia is *direct* which pushes out through the posterior wall of the inguinal canal lateral to the lateral border of the rectus abdominis muscle. It is usually the consequence of a weakness which has developed in the posterior wall of the inguinal canal (fascia of the transverse abdominal muscle). Most direct inguinal hernias are symptomless apart from the presence of a bulge.

An *indirect* inguinal hernia is congenital in origin and is caused by a failure of the processus vaginalis of the peritoneum soundly to close. It therefore originates at the internal inguinal ring, appears at the external ring and may extend into the scrotum. The relationship to injury is uncertain and, in contrast to the 'sports hernia' described below, many authorities consider that it develops from a weakness or tear of the posterior wall of the inguinal canal more lateral than that in a direct inguinal hernia in the presence of a potentially patent processus vaginalis.¹⁴

In most instances, activities that significantly increase intraabdominal pressure or may involve repeated Valsalva manœuvres, for example weight lifting, cause or exacerbate inguinal

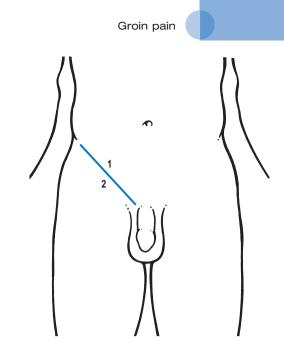


Fig 2 • Hernia localization: 1, inguinal hernia; 2, femoral hernia.

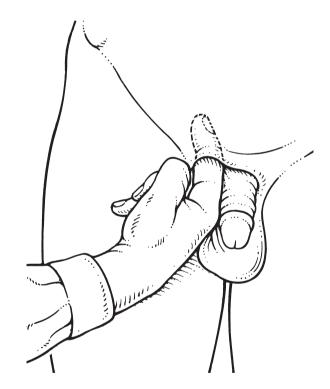


Fig 3 • Palpation of the inguinal canal via invagination of the scrotal skin.

hernia. While the pain might initially occur only after activity, it typically will increase in frequency to the point of occurring during activity and even with simple trunk and hip movements. In males the pain may radiate into the proximal thigh or the scrotum.

Examination for both types of inguinal hernia involves invaginating the scrotal skin along the spermatic cord using the index finger in males (Fig. 3) or direct palpation in females. A palpable mass may or may not be detected.

The Hip and Buttock

Manœuvres to increase intra-abdominal pressure, such as coughing or tensing the abdominal musculature, may produce a cough impulse (a sign of hernia), or may make a mass more prominent.

Treatment of inguinal hernias should be by surgical repair, not only to relieve pain and discomfort but also to prevent complications – incarceration, obstruction and strangulation with infarction of the bowel.

'Sports hernia' or 'groin disruption'

Athletes in fast-moving sports that involve twisting and turning – such as soccer, rugby and ice hockey – may be at particular risk of a tendinous disruption in the area of the inguinal canal.¹⁵ This injury, often called a 'sports hernia', usually involves the posterior wall of the inguinal canal and can appear as a tear of the transversus abdominis muscle or as a disruption to the conjoined tendon – the tendon of insertion of both the transversus abdominis and internal oblique muscles (Fig. 4).¹⁶ A sports hernia may, however, also involve a lesion of the external oblique aponeurosis and cause a dilatation of the external inguinal ring.¹⁷

A sports hernia should be differentiated from the more common inguinal hernia in that it does not involve a clinically detectable hernia (there is not a protrusion of any abdominal tissue through the walls of the abdominal cavity).¹⁸ The term 'disruption' is therefore more appropriate to describe this type of lesion.

A sports hernia typically produces unilateral groin pain during exercises. In chronic cases, however, the patient may have symptoms during activities of daily living. Onset of pain is usually insidious but may occur suddenly. It is typically localized to the conjoined tendon but can involve the inguinal canal more laterally. Sudden movements often exacerbate the pain.¹⁹

Examination for a sports hernia in men is generally done by inverting the scrotal skin with a finger and palpating the inguinal ring and canal. The uninvolved side should be examined first so that the examiner may put the patient at ease and also assess the normal structures. The examining finger is inserted into the scrotal sac just below its junction with the abdominal wall and carried superiorly over the pubis up to the external inguinal ring. The ring, conjoined tendon, pubic tubercle and midinguinal region are checked for size and the presence of abnormal tenderness.

Conventional imaging modalities such as bone scan, ultrasound, CT and MRI all fail to reveal the defect. Surgical exploration is currently the only method to confirm the diagnosis.

Treatment is generally surgical and involves restoration of the normal anatomy by repairing the conjoined tendon and/or the external oblique aponeurosis.

Ilioinguinal neuralgia²⁰

The ilioinguinal nerve originates from the Ll-L2 nerve roots. It passes between the ilium and psoas major to perforate the

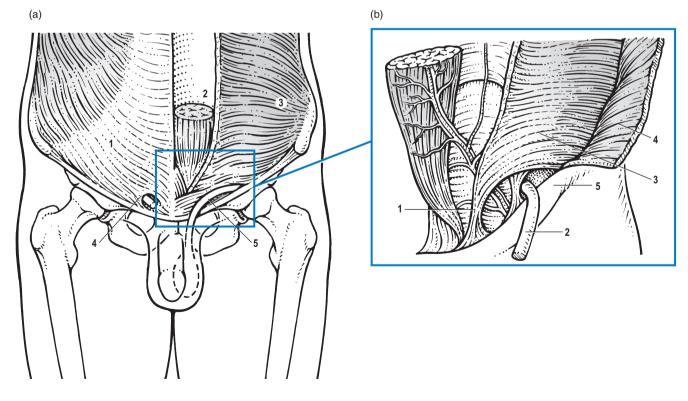


Fig 4 • Anatomy of the inguinal canal. A (overview): 1, external oblique muscle and aponeurosis; 2, rectus abdominis muscle; 3, transversus abdominis muscle; 4, external inguinal ring; 5, spermatic cord. B (insert): 1, falx inguinalis (conjoined tendon); 2, spermatic cord; 3, transversus abdominis muscle; 4, external oblique muscle; 5, inguinal ligament.

Ilioinguinal nerve entrapment is a well-established cause of chronic inguinal pain in patients who have had lower abdominal and inguinal hernia surgery (e.g. appendectomy or inguinal herniorrhaphy).²¹ Direct trauma, intense abdominal muscle training or inflammatory conditions can also lead to entrapment of this nerve as it passes through or close to the abdominal muscle layers.^{22,23}

Patients describe a burning or shooting pain in the distribution of the nerve. Light-touch sensation in the inguinal area may be altered and pain may be exacerbated by hyperextension of the hip. There is usually a well-circumscribed trigger point medial and below the anterior superior iliac spine where the ilioinguinal nerve pierces the fascia. Relief of pain by infiltration of a local anaesthetic confirms the diagnosis.

Treatment consists of three infiltrations at weekly intervals at the confirmed site with 5 ml procaine 0.5 to 1%.²⁴ In severe cases 20 mg triamcinolone may be added to the solution. Nerve ablation may be indicated if the lesion does not respond to infiltrations.

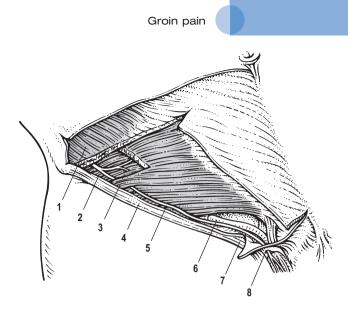


Fig 5 • Course of the ilioinguinal nerve: 1, anterior superior iliac spine; 2, transversus abdominis muscle; 3, external oblique muscle; 4, inguinal ligament; 5, ilioinguinal nerve; 6, spermatic cord; 7, pubic tubercle; 8, superficial inguinal ring.

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