

# When Groin Pain Is More Than 'Just a Strain'

Navigating a Broad Differential

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## In brief

**Most groin pain results from musculotendinous injuries, but not all groin pain signifies simply a pulled muscle. The pain can stem from one or more musculoskeletal or nonmusculoskeletal origins, such as avulsion fracture, osteitis pubis, or hernia. While acute causes are often readily identified, chronic groin pain can present a diagnostic challenge. Paying close attention to the history can help identify acute causes such as strains and avulsion fractures; determining the location and nature of the pain can also help with diagnosis. Conservative treatment is often effective for treatment of acute injuries such as strains and avulsion fractures.**

**W**hile the most common cause of groin pain in active patients may be a garden-variety muscle strain, less common causes add up to a wide differential. Broadly considered, the pain can be thought of in terms of onset and chronicity (acute vs chronic), and in terms of its musculoskeletal or nonmusculoskeletal origin (table 1).

Acute groin pain is a common result of musculoskeletal injuries that can occur with the  
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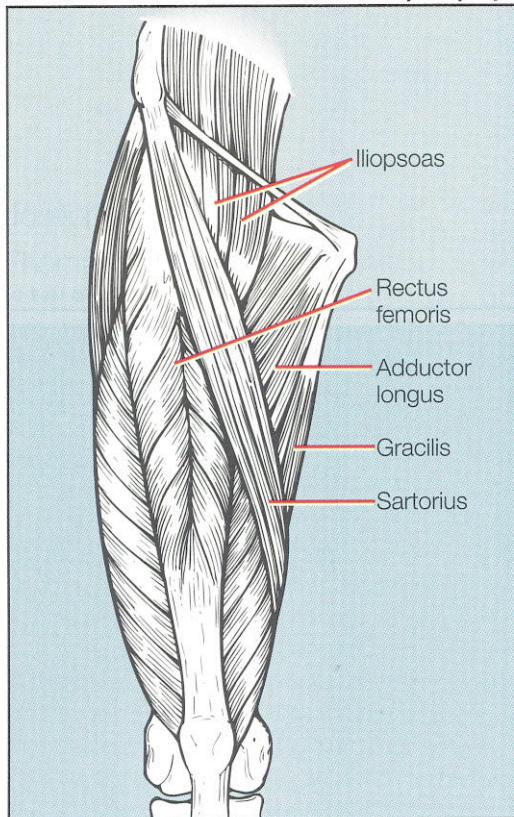


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Illustrations: Mary Albury-Noyes



**Figure 1. Anterior view of muscles that, when injured, can produce groin pain. Musculo-tendinous injuries in this region most often involve the adductor longus muscle but can also include the iliopsoas, rectus femoris, sartorius, or gracilis muscles.**

sharp, cutting movements of kicking and running sports. These injuries are especially common in soccer but are also seen in racket sports, basketball, hockey, volleyball, football, and other sports.

Chronic groin pain, in contrast, may suggest nonmusculoskeletal causes such as hernias, lymphadenopathy, infections, sexually transmitted diseases, or even cancer.

### Directions for Diagnosis

As in all medicine, the diagnosis of groin pain begins with a good history. Paying close attention to subtle clues in the patient's history often leads to the correct diagnosis. With a sudden change of direction while running, a forceful ec-

centric contraction of a muscle can occur instead of the intended concentric contraction, causing the most common groin injury—a muscle strain. Overstretching a muscle can also induce a strain.<sup>1,2</sup> A forceful muscle contraction in an adult might strain the muscle unit, while in an adolescent the same action can cause an avulsion fracture.<sup>3</sup> Symptoms that occur with a change of training regimen suggest a stress fracture. A detailed history of injury or trauma to the area can lead you to the source of pain (see “Case Study: A Surprising Cause of Groin Pain in a Female Runner,” page 87).

Determining the site of pain will further assist in the diagnosis. Is it localized—such as in the medial thigh, over the pubis, over an apophysis, or in the testes—or is it diffuse? Is there a referral pattern such as into the scrotum, into the knee, or along a specific dermatomal area; or is the pain nonradiating? Movements that reproduce or intensify the pain should also be sought.

Perhaps the most important task in diagnosis is delineating whether the injury is acute or chronic. While acute causes are often readily identified, chronic groin pain may suggest myriad diagnoses, many with vague and overlapping signs and symptoms.

For chronic groin pain, the physician needs to inquire about urinary symptoms, night pain, rheumatologic components, or systemic symptoms. Chronic, insidious groin pain can indicate a nonmusculoskeletal cause and requires a more complex diagnostic approach.

If groin pain persists despite treatment, other diagnoses must be entertained. A multidisciplinary strategy may be required, and secondary diagnoses are not uncommon.<sup>4,6</sup>

Following are musculoskeletal and nonmusculoskeletal causes of groin pain, with clinical features and treatments described.

### Primary Musculoskeletal Causes

Active people who incur an acute injury with a sharp, cutting motion usually experience pain in the proximal medial thigh and, possibly, swelling. Such patients usually have only minor discomfort with walking, but their pain increases with running or cutting. Musculotendinous injuries most

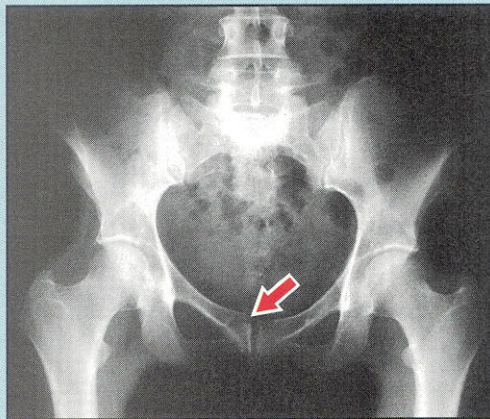
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## Case Study: A Surprising Cause of Groin Pain in a Female Runner

A 33-year-old woman presented with right groin pain. Three weeks earlier she had had a dirt bike accident but did not recall any significant impact to the pelvic region. She was an avid runner and was having difficulty returning to her sport. She was treating her "bad groin pull" with heat and over-the-counter analgesics. She also had right-side sacroiliac pain, and discomfort in the right anterior thigh with running.

Clinical examination revealed tenderness and spasm of the proximal adductor mass on the right, with significant tenderness at the insertion. There was pain and weakness with activation of that adductor muscle group. The right sacroiliac joint was tender, with tenderness extending a few centimeters into the sacrum.

An anteroposterior pelvis radiograph was obtained (figure A), mostly to inspect the sacrum and sacroiliac joint. A minimally displaced transverse fracture of the right superior pubic ramus was discovered, which likely re-



**Figure A.** An anteroposterior radiograph of the pelvis of a 33-year-old woman who had groin pain reveals a healing fracture of the pubic ramus (arrow).

sulted from the trauma at the time of the dirt bike accident. As the patient had already been ambulatory for 3 weeks, treatment consisted of continued protected weight bearing. At 8 weeks postinjury she was pain free with ambulation, and she gradually returned to running with no further incident.

often involve the adductor longus muscle but can also include the iliopsoas, rectus femoris, sartorius, or gracilis muscle (figure 1).<sup>1,2,4,7</sup>

Most groin injuries in active people are musculotendinous.<sup>5</sup>

**Strains.** The most common musculoskeletal cause of groin pain is a muscle strain, which occurs when a muscle is stretched beyond its normal capability or encounters an unexpected opposing force. Signs and symptoms include acute pain over the proximal muscles of the medial thigh, swelling, and, occasionally, bruising. Also present will be the classic musculotendinous injury triad: tenderness to palpation, pain with resistance, and pain with passive stretching.

Imaging procedures are usually unnecessary in simple muscle strains. If obtained, they are usually done to rule out concomitant or more

severe injuries.<sup>8</sup> Ultrasound should be used with caution because it can promote bleeding in the acute injury and mutagenesis, and the treatment area is often close to reproductive organs.

The treatment of muscle strains consists of rest from aggravating activities for the first 1 to 2 weeks.<sup>7</sup> Ice is used initially, and heat can be used after the first 48 hours. Compression shorts can provide symptomatic relief and expedite return to play. If compression shorts are not available, a hip spica wrap can provide both warmth and support. We like to use nonsteroidal anti-inflammatory drugs (NSAIDs) for the first 7 to 10 days to limit inflammation and control pain in order to facilitate rehabilitation.

When inflammation subsides, patients can start a stretching program. During the stretching phase of rehabilitation, patients are encouraged

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**Table 1. Differential Diagnosis of Groin Pain: Key Features and Treatments**

Musculoskeletal Causes	Key Features	Treatment Options
Abdominal muscle tear	Localized tenderness to palpation; pain with activation of rectus abdominis	Relative rest, analgesics
Adductor tendinitis	Tenderness over involved tendon, pain with resisted adduction of lower extremity	NSAIDs, rest, physical therapy
Avascular necrosis of the femoral head	Inguinal pain with internal rotation of hip; decreased hip range of motion	Mild: conservative measures; severe: total hip replacement
Avulsion fracture	Pain on palpation of injury site; pain with stretch of involved muscle	Relative rest; ice; NSAIDs; possibly crutches
Bursitis	Pain over site of bursa	Injection of cortisone, anesthetic, or both
Conjoined tendon dehiscence	Pain with Valsalva's maneuver	Surgical referral
Herniated nucleus pulposus	Positive dural or sciatic tension signs	Physical therapy or appropriate referral
Muscle strain	Acute pain over proximal muscles of medial thigh region; swelling; occasionally, bruising	Rest; avoidance of aggravating activities; initial ice, with heat after 48 hours; hip spica wrap; NSAIDs for 7 to 10 days
Myositis ossificans	Pain and decreased range of motion in involved muscle; palpable mass within substance of muscle	Moderately aggressive active or passive range-of-motion exercises; wrap thigh with knee in maximum flexion for first 24 hours; NSAIDs used sparingly for 2 days after trauma
Nerve entrapment	Burning or shooting pain in distribution of nerve; altered light touch sensation in medial groin; pain exacerbated by hyperextension at hip joint, possibly radiating; tenderness near superior iliac spine	Infiltration of site with local anesthetic; topical cream (eg, capsaicin)
Osteitis pubis	Pain around abdomen, groin, hip, or thigh, increased by resisted adduction of thigh	Relative rest; initial ice and NSAIDs; possibly crutches; later, stretching exercises
Osteoarthritis	Inguinal pain with hip motion, especially internal rotation	Nonnarcotic analgesics or NSAIDs; hip replacement for intractable pain
Pubic instability	Excess motion at pubic symphysis; pain in pubis, groin, or lower abdomen	Physical therapy, NSAIDs, compression shorts
Referred pain from knee or spine	Hip range of motion and palpation response normal	Identify true source
Seronegative spondyloarthropathy	Signs of systemic illness, other joint involvement	Refer to rheumatologist
Slipped capital femoral epiphysis	Inguinal pain with hip movement; insidious development in ages 8 to 15; walking with limp, holding leg in external rotation	Discontinue athletic activity; refer to orthopedic surgeon

NSAIDs = nonsteroidal anti-inflammatory drugs

<b>Musculoskeletal Causes</b>	<b>Key Features</b>	<b>Treatment Options</b>
Stress fracture		
Pubic ramus	Chronic ache or pain in the groin, buttock, and thighs	Relative rest; avoid aggravating activities
Femoral neck	Chronic ache or pain in the groin, buttock, and thighs, or pain with decreased hip range of motion (internal rotation in flexion)	Refer to orthopedist if radiographs show lesion; for nonoperative fractures, strict non-weight bearing until pain free, with gradual return to activity

<b>Nonmusculoskeletal Causes</b>	<b>Key Features</b>	<b>Treatment Options</b>
Genital swelling or inflammation		
Epididymitis	Tenderness over superior aspect of testes	Antibiotics if appropriate, or refer to urologist
Hydrocele	Pain in lower spermatic cord region	Refer to urologist
Varicocele	Rubbery, elongated mass around spermatic cord	Refer to urologist
Hernia	Recurrent episodes of pain; palpable mass made more prominent with coughing or straining; discomfort elicited by abdominal wall tension	Refer for surgical treatment
Lymphadenopathy	Palpable lymph nodes just below inguinal ligaments; fever, chills, discharge	Antibiotics
Ovarian cyst	Groin or perineal pain	Refer to gynecologist
Pelvic inflammatory disease	Fever, chills, purulent discharge	Refer to gynecologist
Postpartum symphysis separation	Recent vaginal delivery with no prior history of groin pain	Physical therapy, relative rest, analgesics
Prostatitis	Dysuria, purulent discharge	Antibiotics, NSAIDs
Renal lithiasis	Intense pain that radiates to scrotum	Pain control, increased fluids until stone passes; hospitalization sometimes necessary
Testicular neoplasm	Hard mass palpated on the testicle; may not be tender	Refer to urologist
Testicular torsion or rupture	Severe pain in the scrotum; nausea, vomiting; testes hard on palpation or not palpable	Refer immediately to urologist
Urinary tract infection	Burning with urination; itching; frequent urination	Short course of antibiotics

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