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Groin Injuries

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Contributors

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Overview

Groin injuries in athletes are commonly associated with sports requiring repetitive hip flexion or kicking. Individual characteristics, such as biomechanical abnormalities or muscle imbalances, and sport-specific movements which place abnormal load on muscle groups, can predispose to either acute or chronic injury.[1] Groin injuries can be classified according to their anatomical origin and region of tenderness on examination which may be adductor-related, iliopsoas-related, inguinal-related or pubic-related.[1] Causes of groin injury can be difficult to distinguish, often have diffuse or uncharacteristic symptoms, and in many individuals there may be more than one pathology present. Therefore, it is important to maintain a broad differential diagnosis when evaluating groin pain, including medical and surgical pathologies.

Case Study

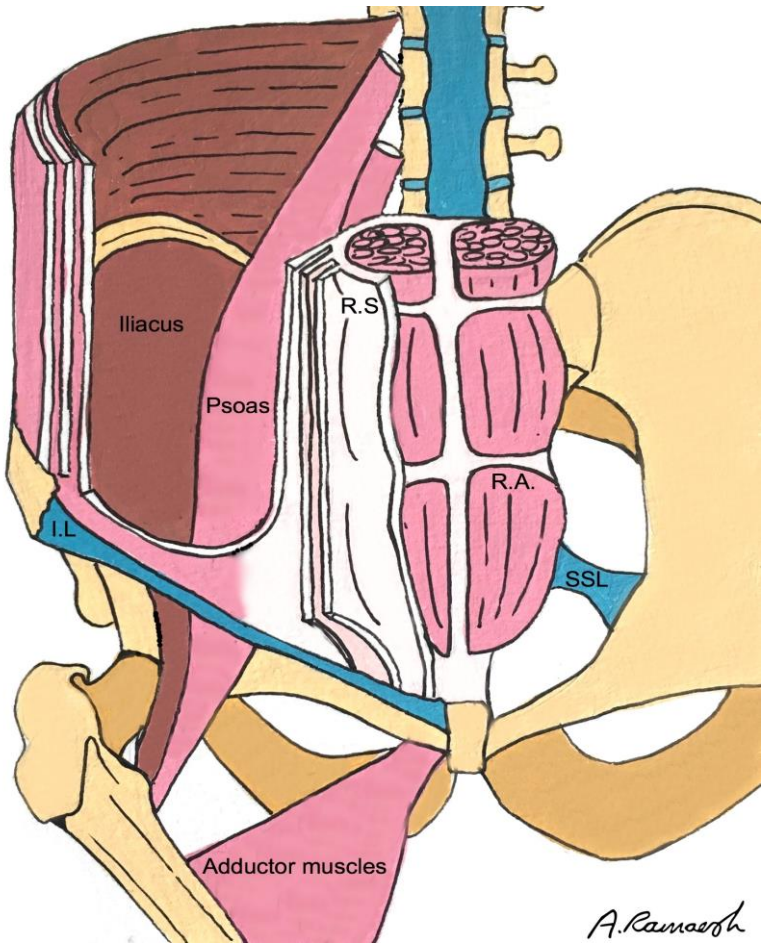
A 25-year-old female recreational athlete had begun training for a triathlon two weeks previously. The training involved long-distance running, cycling and swimming approximately four times per week. She developed gradual onset right-sided deep groin pain which was poorly localised and occasionally radiated to the anterior thigh. There was a history of similar pain one year previously which had developed after a number of weeks of running every day, which had subsided on rest. Now on return to training the pain was more severe, worsened with repeated activity, and was relieved by rest. On examination there was pain on deep palpation over the musculotendinous junction of the iliopsoas. A diagnosis of iliopsoas tendonitis was made and referral to a physiotherapist resulted in a phased return to full activity over a period of eight weeks. This involved a short period of total rest (approximately two weeks) followed by a phased increase in range of movement (ROM) exercises and hip and buttock strengthening exercises. Following this period, full training was resumed alongside maintenance physiotherapy for the prevention of future injury.

Case Study

The groin region is complex and consists of ligaments, tendons, muscles and fascia, many of which attach to the pubic symphysis. The pubic symphysis is a cartilaginous joint connecting the left and right superior pubic rami of the pubic bones and is central to withstanding the extreme forces of weight-bearing activity. Insertion of the rectus abdominis and oblique muscles into the pubic symphysis anchors the torso, whilst attachment of the adductor muscles and ligaments of the inguinal region into the pubic symphysis anchors the thigh.[1]

The adductor muscles include the adductor longus, magnus and brevis and originate at the ischium of the pelvis and connect to the femur. This primarily allows adduction of the thigh but also aids flexion and rotation of the hip. The iliopsoas is a strong hip flexor formed from the psoas major and iliacus muscles which originate from T12-L3 vertebral bodies and the iliac fossa respectively.

The inguinal region connects the abdomen to the lower limb and can be anatomically divided into a series of canals connecting structures from the abdomen and pelvis to the genitalia and lower limb. The inguinal canal runs superior and parallel to the inguinal ligament, arising at its midpoint. The inguinal ligament arises from the aponeurosis of the external oblique muscle which extends from the anterior superior iliac spine (ASIS) to the pubic tubercle. The inguinal canal is a passage in the abdominal wall through which structures pass into the external genitalia and represents a weak point in the abdominal wall.[1] Stress-induced 'sports hernias' have often been shown on MRI to result from subtle aponeurotic or other soft tissue (e.g. adductor muscle tendon) injury in the inguinal canal region. Finally, the femoral and obturator canals contain nerves and vessels connecting the abdomen to the upper thigh. Rarer causes of groin pain include nerve injury and entrapment related to the narrow canals in the inguinal region.[1]



Anatomy of the groin.
I.L: inguinal ligament R.A: rectus abdominis R.S: rectus sheath SSL: sacrospinous ligament

Aetiology

Groin injuries comprise up to 5% of all sports injuries and are responsible for an even greater proportion of time lost from training and competition in athletes because the onset of injury is often insidious and symptoms may be chronic.[1] Groin injuries are more common in males when comparing the incidence in football players.[1] Up to 30% of athletes with groin pathology have an unclear diagnosis.[2] The most common causes of musculoskeletal groin pain in athletes are adductor strains and osteitis pubis. Activities involving hip flexion and kicking such as football, ice hockey, hurdling and jumping sports are more likely to lead to groin injury.[1-3]

Clinical Features

The differences between some of the commonest groin injuries are outlined in the table below.

Injury	Adductor strain[1]	Iliopsoas strain, tendonitis and bursitis[2,8]	Sports hernia/groin disruption[1,2] (posterior abdominal wall disruption)	Osteitis pubis (inflammation of the pubic symphysis)[2]
Symptoms	Localised adductor pain. Onset may be insidious. Radiates to medial thigh/rectus abdominis. Symptoms may briefly improve with exercise but then worsen with increasing intensity/activity.	Injury due to repeated hip flexion (tendinopathy, bursitis) or forceful flexion against resistance (strain). Deep groin pain; may be poorly localised. Radiates to anterior hip/thigh. Snapping sensation.	Deep, often chronic, groin pain. Onset may be insidious. Radiation along inguinal ligament, perineum and rectus muscles. Exacerbated by Valsalva manoeuvres (hernia) or resisted hip adduction (disruption).	Injury due to overload or overtraining, e.g. running on hard surfaces. Pain in lower abdomen/medial thighs. Often chronic pain. Onset may be insidious. Worse with repeated activity.
Signs	Pain on palpation. Pain on resisted adduction.	Pain on deep palpation over the musculotendinous junction of the iliopsoas over femoral triangle. Pain on resisted hip flexion or hyperextension Limp (if severe).	Pain on palpation above pubis. Examination may be normal (as only the posterior abdominal wall is affected).	Pubic symphysis pain and tenderness. Pain on active adduction or sit ups.

Important differential diagnoses to consider: nerve pathology (e.g. ilio-inguinal nerve entrapment due to abdominal muscle overtraining[8]), stress fracture (e.g. pubic ramus due to overuse, commonly in young female runners), avulsion of internal oblique, tumours; intra-abdominal, urological or gynaecological pathology.

Investigations

Due to its non-invasive nature and low cost, ultrasound scanning (USS) is being used to diagnose both soft tissue and bony injuries.[1] One example of its use is to identify the location and extent of groin tendon injuries and muscular tears. There is some evidence to suggest that USS can also be used in the diagnosis of sports hernias, which in other cases may only be identified at the time of surgical exploration and repair.[1] Disadvantages of USS are that it may not be able to identify muscle strains as there may only be microscopic damage to fibres, and its use is also operator-dependent which results in variable sensitivity.[2]

X-ray imaging can be used to exclude avulsion fractures in soft tissue injuries such as muscle strains.[2] Regarding pubic-related groin pathology, x-rays are likely to be normal in early or mild osteitis pubis but may show widening of the symphysis or irregularity of the articular surfaces in more advanced disease. Likewise, stress fractures are unlikely to manifest any visible changes on plain x-ray imaging.

Computerised tomography (CT) scan is useful in the detection of bone-related pathology such as bony erosions.[10] It is used to confirm or further characterise conditions such as osteitis pubis or stress fractures with a greater sensitivity than x-ray. Magnetic Resonance Imaging (MRI) can specifically categorise muscular and tendinous pathology with a greater sensitivity than CT. MRI can also identify effusions and bone marrow oedema which may be present in iliopsoas strains and osteitis pubis/pubic ramus stress fractures respectively.[9]

Management Options

Most acute soft tissue injuries such as adductor muscle strains are managed with relative rest, avoidance of the activity and ice therapy in the acute phase of injury (48-72 hours) to reduce inflammation, alongside short-term use of non-steroidal anti-inflammatory medication.[9]

In the later stages of recovery (weeks to months), tailored physiotherapy is advised to restore ROM, prevent muscle atrophy and to identify and correct any biomechanical abnormalities which may be contributing to an increased risk of further injury. As a general rule, when athletes have regained at least 70% strength and full ROM without pain they can begin a structured phased return to sport.[2] Following an acute muscle injury this process takes between 4-8 weeks.

In chronic or long-standing soft tissue injury there is moderate evidence to suggest that active training rather than passive physical therapy results in a greater percentage of athletes returning to sport, and that manual manipulation such as sports massage is also effective for a faster return to sport.[1] In some injuries such as iliopsoas strain, there is limited evidence for the use of corticosteroid injections (ideally performed under ultrasound guidance), but only in severe cases.[9] Surgical management (hernia repair) is usually required for sports hernias and has a 95% success rate.[2]

For pubic-related causes of groin pain such as osteitis pubis or pubic ramus stress fractures, the healing time for conservative management (i.e. avoidance of the aggravating activity and stepwise physiotherapy) can be much longer due to bony involvement. The average healing time for osteitis pubis is 9.6 months.[2]

Prevention

Structured and progressive training programmes should be undertaken to prevent the onset of injury as there is evidence to suggest that deconditioning may contribute to an increased risk of injury and that strength training programs may be preventative.[9] The following progression of exercise has been recommended to build strength over time and prevent injury.[8]

1. Isometric exercises without external resistance;
2. Dynamic training without load;
3. Dynamic training with increasing load;
4. Stretching to maintain mobility and flexibility (can be carried out throughout each stage), and;
5. Specialised training (specific to the activity being undertaken).

As with any activity, the onset of pain which is unrelated or disproportionate to the activity being undertaken should result in avoidance of the offending activity for a period of time until an appropriate diagnosis and management plan has been established.

References

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