

Clinical examination of the sacroiliac joint

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Introduction

Sacroiliac arthritis, both rheumatic and septic, is a common cause of unilateral gluteal pain. The sacroiliac joint is a true synovial joint and therefore subject to the same inflammatory and infectious conditions that affect other synovial joints.^{1,2} However, the sacroiliac joint as a primary source of mechanical backache remains controversial and diagnoses such as 'sacroiliac dysfunction' or 'sacroiliac subluxation' are ill defined and difficult to substantiate.³⁻⁵ Much of the controversy is caused by lack of agreement on clinical criteria that justify the diagnosis of sacroiliac lesions. If the diagnosis is made only on the basis of pain localization or tenderness on palpation, sacroiliac lesions will be seen frequently. If the diagnosis is based on a thorough clinical examination of lumbar spine and pelvis, sacroiliac lesions will be rare. Unilateral pain and tenderness in the region of the sacroiliac joint is usually a manifestation of the confusing phenomena of referred pain and referred tenderness from a dura mater at a low lumbar level and not a reliable clinical proof of a sacroiliac disorder.⁶⁻⁹ Furthermore, mechanical testing of the sacroiliac joints – exerting tension on the sacroiliac ligaments *without* affecting the lumbar spine and the hip joint – is not easy. Most commonly used tests lack this requirement, which may explain the differences of opinion between examiners.^{10–12}

A discussion of the disorders affecting the joint requires definition of the following terms:

- *Sacroiliac strain/sprain* is overstretch or rupture of the capsuloligamentous structures as a result of abnormal joint movement.
- *Sacroiliac instability* is a condition of abnormal joint mobility caused by capsuloligamentous laxity.
- *Sacroiliac subluxation* is permanent displacement of the bony parts forming the joint.
- *Sacroiliac dysfunction* is a reversible decreased mobility of the joint, the result of articular causes.
- *Sacroiliac arthritis* is an inflammatory condition of the joint.

The concept of a 'sacroiliac sprain' as a common cause of backache and sciatica was introduced by Goldthwait and Osgood in 1905 and reinforced by others.^{13,14} It still persists. However, MacNab⁸ noticed that sacroiliac sprains only occur below the age of 45 and in circumstances creating considerable force on the joint, such as those generated by falls from a height or motor vehicle accidents. Cyriax⁷ (his p. 364) advised reserving the term for cases of pain arising from the sacroiliac ligaments in the absence of arthritis. However, difficulty arises in those examples of early sacroiliitis in which pain and clinical signs precede the appearance of radiographic sclerosis.

Diagnosis can also be suggested by negative findings. For example, absence of articular signs in the lumbar spine, full range on straight leg raising, a normal end-feel to the hip joint and the absence of neurological and arterial signs suggest possible involvement of the sacroiliac joint, when there is pain in the buttock, posterior thigh and calf. Clinical assessment does not differ from that described for the lumbar spine in low back pain disorders (see Ch. 36). When data from the history and functional examination suggest the possibility of a sacroiliac lesion, special tests can be performed and additional imaging studies requested.¹⁵

Referred pain

In sacroiliac joint lesions, pain may be either localized or referred to the buttock and leg. The distinction between pain referred *to* and *from* the joint is very important and should be the first consideration.

Pain referred to the region of the sacroiliac joint

Most instances are the result of lumbar disc protrusions with segmental (L1, L2, L3 and S1, S2) or multisegmental (lumbar dural) reference of pain. Arthritis of the hip joint is another possibility: pain may be felt in the inner and upper part of the buttock because of segmental reference of this joint in the third lumbar segment (see p. 11).

Pain referred from the sacroiliac joint¹⁶

The innervation of the sacroiliac joint and its ligaments is wide and complicated.¹⁷ Studies confirm that the anterior portion of the joint is innervated by the ventral rami of L5, S1 and S2, and the dorsal portions of the joint by the dorsal ramus of L5 and a plexus derived from the dorsal rami of the sacral nerves.^{18–20} The superior part of the joint and the iliolumbar ligaments have an L2 and L3 origin.

In sacroiliac strain or arthritis, pain is most often felt in the buttock, with radiation to the back of the thigh and the calf but never the foot. Often there is groin pain too.²¹ A typical distribution of pain is shown in Figure $41.1.^{22}$

History

History taking should cover preceding disease, trauma, pregnancy and delivery, occupation and working habits, as well as sports and recreational activities. Family and social history are of similar importance.²³ In pelvic peripartum instability, the pain often starts in the third month or within the first few weeks after delivery.

In sacroiliac lesions, a typical finding is that there is unilateral gluteal pain (often deep, dull and ill defined^{24–26}), perhaps together with reference to the S1–S2 dermatomes, chiefly the posterior thigh. Pain may alternate in the right and left buttocks which strongly suggests a manifestation of early ankylosing spondylitis, particularly when it is found in males aged between 15 and 35.

Coughing usually jars the buttock or posterior thigh as the result of the sudden increase in abdominal pressure which distracts the ilium from the sacrum. This sign may be interpreted as being of dural origin, based on the assumption that



Fig 41.1 • Pain referred from the sacroiliac joint. (a) Pain in the groin may refer from the superior part of the joint. (b) Typical pain referred from the posterior capsule and ligaments.

a disc lesion is present at a low lumbar level. However, if such a lesion is present, pain is normally felt in the lumbar area rather than the buttock.

Some authors describe the adoption of an antalgic gait in painful disorders of the sacroiliac joint^{27,28} and a tilt of the trunk, most frequently towards the painless side.²⁷ Some patients avoid sitting on the buttock of the affected side.²⁸

Neurological symptoms, such as paraesthesia, weakness or numbness, are absent.

Functional examination

Introduction

Clinical examination of the sacroiliac joint is not routinely undertaken in low back pain and sciatica, except for one test – sacroiliac distraction (see Fig. 41.3 below) – because this is the most sensitive test to detect inflammation in the joint.

Apart from the positive sacroiliac distraction test, attention may be drawn to the sacroiliac joint by some discrepancies between gross symptoms and slight signs during standing lumbar movements. For example, in acute sacroiliac arthritis,

Box 41.1

Indications for specific sacroiliac tests

- Positive sacroiliac distraction test during the routine lumbar examination
- Discrepancy between gross lumbopelvic pain and slight signs during routine lumbar examination
- Suggestive history for sacroiliac disorder and negative routine lumbar examination

full trunk flexion and side bending to the painful side may provoke pain, but the pain becomes much more severe as soon as the sacroiliac joints are directly tested. Movements of the hip joint may also prove painful, especially both rotations, as the result of an indirect strain on the sacroiliac joint at the end of the movement.

Routine clinical examination of the lumbar spine can be negative but some symptoms may point in the direction of possible sacroiliac involvement because of low back pain and/ or sciatica. In sacroiliac strain, the basic tests are usually not capable of evoking pain.^{29,30} It is only when movements really stretch the ligament and when this is prolonged that an injured ligament may react painfully. A diagnosis of ligamentous strain is thus based on the history, painful reactions after prolonged load, and the outcome of special sacroiliac tests (Box 41.1).

Sacroiliac tests

These tests can be divided into those that assess movement or position by palpation (palpation tests) and those that stress the structure to reproduce the patient's symptoms (pain provocation tests).

Palpation tests

The best-known palpation tests are the standing and sitting flexion palpation tests and the Gillett test.³¹ The Gillett test is performed as follows.

The patient stands with the back to the examiner (Fig. 41.2), who places one thumb just underneath the posterior superior iliac spine and the other on the second sacral spinous process or on the contralateral superior iliac spine. The patient is asked to lift one knee as high as possible, which rotates the ilium on that side posteriorly and therefore moves the posterior superior iliac spine inferiorly relative to the opposite side. Fixation of the sacroiliac joint prevents this movement or, paradoxically, even gives rise to elevation of the posterior superior iliac spine as the patient compensates by tilting the pelvis at the point of maximal hip flexion. This manœuvre is usually painful in symptomatic patients.

The test presupposes normal hip joint function; interpretation is difficult and even impossible in leg-length inequality, lumbar scoliosis and particularly in obese patients, in whom the bony landmarks are difficult to palpate.

To date, palpation tests have not demonstrated acceptable levels of reliability^{32–35} and therefore we do not use them.



Fig 41.2 • Gillett test to estimate rotation of the sacroiliac joints. The knee on the right-hand side is raised as high as possible. The ilium on that side rotates posteriorly, which can be established by palpation of the posterior superior iliac spine.

Pain provocation tests

Pain provocation tests aim to stress the structures in an attempt to reproduce the patient's symptoms. Studies that have examined these tests show good interexaminer agreement.³⁶⁻³⁹

The main tests are:

- Distraction test or anterior gapping test
- Compression test or posterior gapping test
- Sacral thrust or downward pressure test
- Cranial shear test
- Posterior shear or thigh trust test
- Pelvic torsion or Gaenslen's test
- Yeoman test
- Patrick's or 'faber' test.

Anterior gapping test (Fig. 41.3)

This test, always performed routinely in the basic functional examination of the lumbar spine, has a high sensitivity and an almost 100% specificity for sacroiliac arthritis.^{40,41}



Fig 41.3 • Anterior gapping test.



Fig 41.4 • Posterior gapping test.

The patient lies supine. The examiner applies increasing pressure to the anterior superior spines of the ilia in a downward and outward direction. The examiner crosses the arms to do this, in order to increase the strain on the ligaments. If the patient states that the test is painful, it must be ascertained whether pain is located unilaterally gluteal or posteriorly crural. All other outcomes, such as lumbar pain or tenderness at the anterior superior iliac spines, are not relevant. In gluteal or posterior crural pain, the test is repeated, with the lumbar



Fig 41.5 • Downward pressure on the sacrum.

region supported by the patient's forearm so as to stabilize the lumbar joints and also prevent compression of a tender part of the sacrum or ilium on the couch. If this does not alter the intensity of pain, it is almost certain that the anterior sacroiliac ligament is at fault.

Other tests to stretch the anterior sacroiliac ligament exist but are less specific because tension is also applied to other structures. Forced lateral rotation at the hip joint with the leg held in 90° flexion is one example and is a routine test in the basic functional examination of the lumbar spine.

Posterior gapping test (Fig. 41.4)

The patient lies on the painless side. The examiner stands behind the patient and exerts pressure on the uppermost iliac crest, directing it towards the opposite iliac crest. The test stretches the posterior sacroiliac ligaments and compresses the anterior part of the sacroiliac joint. This test has the advantage that the sacrum and the iliac spine are not in contact with the couch, excluding the possibility of pain being a result of pressure on a tender area.

Sacral thrust or downward pressure test (Fig. 41.5)

Pressure is applied directly to the sacrum while the patient lies prone. The heel of one hand, reinforced by the other hand, is



Fig 41.6 • Alternative test to stretch the posterior sacroiliac ligaments (thigh thrust test).

on the centre of the sacrum (S2), and the force is directed anteriorly against the ilia, which are fixed against the examining couch. In sacroiliac lesions, gluteal pain may be provoked on attempted extension by similar pressure on the lumbar spine but is much more severe when pressure is directed to the sacrum. In the *cranial shear test*, the hand is on the coccygeal end of the sacrum and the pressure is applied in a cranial direction.

The following set of sacroiliac pain provocation tests all use the femur as a lever. The results should therefore be interpreted cautiously.

Posterior shear or thigh thrust test (Fig. 41.6)

The patient lies supine and the examiner stands on the painful side. The hip is flexed and slightly adducted. The examiner applies a posterior shearing stress to the sacroiliac joint and ligaments through the femur. Excessive (to the end-feel) adduction of the hip is avoided and the stress should be in a longitudinal direction and not towards further adduction. Some authors believe that this test in particular puts strain on the iliolumbar ligaments and that, if the thigh is maximally flexed and adducted towards the opposite shoulder, axial pressure falls on the posterior sacroiliac ligaments; if the thigh is pushed towards the same shoulder, axial pressure is believed to tense the sacrotuberal ligament.³⁰

Pelvic torsion or Gaenslen's test (Fig. 41.7)

This test is performed with the patient in a supine-lying position.⁴² One hip is passively flexed and pushed to the chest. The opposing leg is extended passively, hanging over the edge of the couch. Overpressure is applied to force the sacroiliac joints to their end of range: nutation on one side and counternutation on the other. The test should be interpreted with care because it also stresses the psoas muscle, the hip joints and the femoral nerve.

Yeoman's test⁴³ (Fig. 41.8)

This test is performed with the patient lying prone. The examiner stands at the painful side and puts one hand on the sacrum.



Fig 41.7 • Gaenslen's test.

The other hand extends the hip and at maximum range forces the ilium into anterior rotation. A positive test produces pain over the sacroiliac joint. This test also stretches other structures – hip joint and psoas muscle – and via the latter also puts tension on the lumbar spine. For this reason, this test is not always reliable and should, at the very least, be compared with the results of hip extension with the ilium fixed (the stabilizing hand on the ilium instead of on the sacrum).

Patrick's test (Fig. 41.9)

This test *f*lexes, *a*bducts and *e*xternally *r*otates (*faber*) the femur at the hip joint. After reaching the end of the movement, the femur is fixed in relation to the pelvis. The examiner holds down the anterior superior iliac spine on the opposite side and increases the pressure at the medial side of the knee. This stresses the anterior sacroiliac ligaments, on the side of the abducted leg in particular.⁴⁴

It is good to recall that almost all routine functional tests of the hip indirectly put stress on the sacroiliac joints.



Fig 41.8 • Yeoman's test.

- Forced lateral rotation with the leg held in 90° of flexion and resisted adduction of the thigh exert a distraction force at the sacroiliac joints and indirectly stretch the anterior sacroiliac ligaments.
- Forced medial rotation at the hip joint with the hip and knee held in 90° of flexion and resisted abduction of the thigh pull the ilium away from the sacrum. In the absence of hip joint disease, pain experienced over the sacroiliac joint is highly suggestive of a sacroiliac lesion.⁸

Epidural local anaesthesia

Positive confirmation by local anaesthesia, normally so useful in difficult cases, is impracticable here because the anterior sacroiliac ligaments cannot be infiltrated and the posterior mass of ligaments is too large. Cyriax advises the induction of epidural local anaesthesia in patients with what appear to be genuine complaints, painful lumbar and sacroiliac tests and an uninformative radiograph.

Fig 41.9 • Patrick's test

Radiology

In sacroiliac strain, nothing is revealed by the radiograph. In arthritis, radiological assessment of the sacroiliac joints is of vital importance. However, clinical signs may precede the appearance of early sclerosis by months or years (Cyriax⁷: p. 360). Normal appearance of the sacroiliac joint therefore does not exclude a diagnosis of ankylosing spondylitis. During recent decades, magnetic resonance imaging (MRI) has become the most suitable method of detecting the early inflammation and structural damage associated with sacroiliac arthritis,⁴⁵ and has an estimated sensitivity and specificity of 90%.⁴⁶

Pelvic instability may be detected if the X-ray is taken while the patient is standing on one leg. A shift of the pubic bone on the non-weight-bearing side to a more caudal position implies an unstable symphysis pubis and sacroiliac joint.

Box 41.2

Sacroiliac pain provocation tests

Anterior ligaments

- Anterior gapping test
- Patrick's test

Posterior ligaments

Posterior gapping test

Anterior and posterior ligaments

- Sacral thrust test
- Cranial shear test
- Thigh thrust test
- Pelvic torsion test (Gaenslen's)
- Yeoman's test

Conclusion: the diagnosis of sacroiliac joint disorders should be established from the findings of a careful history and the outcome of physical examination.

Arthritis and strain are accepted conditions. If two or more specific tests to stress the joint prove to be positive, such a disorder is to be considered. However, these tests are only significant when the history and remaining physical findings rule out other syndromes. It is also important to remember that patients with sacroiliac joint lesions can have coexisting sources of pain: for example, lateral recess spinal stenosis or a herniated disc lesion.

Dysfunction and subluxation are difficult to prove, remain obscure and may not exist.

Access the complete reference list online at www.orthopaedicmedicineonline.com

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