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Sacroiliac Joint Syndrome

A Multidisciplinary Perspective on Diagnosis and Management

Sacroiliac joint (SIJ) syndrome is characterized by pain originating from the sacroiliac joint due to degeneration or altered mobility. The SIJ has been implicated as the main source of pain in 10 - 26% of cases with this suspected pathology. With proper recognition and management, the impact of this condition on patients' lives can be significantly alleviated.

ANATOMY AND FUNCTION

The sacroiliac joint is a unique, weight-bearing synovial kidney shaped joint connecting the sacrum to the pelvis. Its stability relies on a network of ligaments and surrounding muscles, including the gluteus maximus and piriformis. Its anterior aspect is lined by an articular capsule, whilst its posterior aspect is covered by the interosseous sacroiliac ligament. Over time, degenerative changes and mechanical stress can compromise this balance, leading to pain.

The posterior portion of the joint is innervated from the lateral branches of L4-S3 dorsal rami. The innervation of the anterior SIJ is unclear.

While the joint permits slight movement, its primary role is to transfer load between the spine and lower limbs. It also allows slight mobility between the sacrum and ilium. It rotates in all three axes, although in very small movements. SIJs may be affected by changes in the lumbar spine, hips and symphysis pubis. 40 different muscles may influence the joint, although no muscles specifically move the joint.

Figure 1. The sacroiliac joint.

Degenerative changes which occur with time improve the stability of the joint but reduce the mobility. Ligaments maintain the stability of the joint until puberty, after which interlocking bone irregularities begin to form. By the eighth decade of life, the SIJ is locked in place secondary to fibrous degeneration, resulting in no movement of the joint.

PATHOPHYSIOLOGY AND PREDISPOSING FACTORS

SIJ syndrome can result from intra-articular conditions such as arthritis or infection, and extra-articular conditions like ligamentous injuries or fractures. Pathologies which may cause pain in the SIJ also include inflammation, infection, degeneration, trauma, metabolic changes and tumours.

Stretching that exceeds the joint's capacity can cause injury to the bone structure and ligaments. This may be secondary to weight-bearing or twisting movements.

There are various predisposing conditions associated with SIJ syndrome. A few of which include pregnancy, repetitive trauma, or postural abnormalities, which may all exacerbate joint dysfunction. During pregnancy, for instance, hormone-induced ligament laxity coupled with weight and gait changes often overloads the SIJ, leading to discomfort.

Lumbar spine surgery may also lead to additional stress on the SIJs.

DIAGNOSIS

Accurate diagnosis is challenging due to the similarity of symptoms with other conditions, such as lumbar facet joint arthritis or hip pathologies. In view of the complex sensory innervation of the SIJs, pain referral patterns may be highly variable.

Common presenting factors include localized pain to the ipsilateral buttocks (94%) or lower back (72%), often worsened by prolonged sitting, standing, or stair climbing. Other pain patterns include lower extremity, groin, upper lumbar region and abdominal pain.

SIJ syndrome is usually reproducible on physical examination when the joint is stretched. These physical tests include the FABER (Flexion, Abduction, External Rotation) and Gaenslen's tests, which are useful diagnostic tools.

Figure 2. FABER test: Reproduction of buttock pain suggests SIJ involvement.

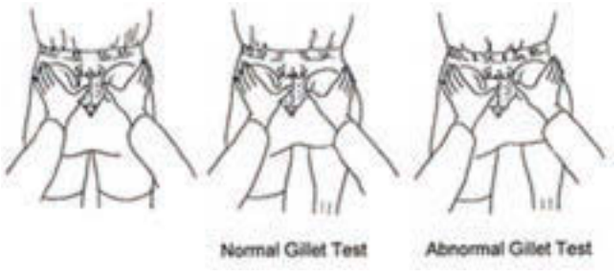
During the FABER test, pain is experienced in the buttock on the contralateral side of the flexed/ abducted limb if positive. On the other hand, back or ipsilateral groin pain a nonspecific sign which may indicate alternative pathology.

Figure 3. Gaenslen's test: Diagnostic manoeuvre stressing the SIJ.

In the Gaenslen's test, pain is felt in the affected SIJ (on the same side as the limb being passively extended) if positive.

Another diagnostic test which may be used is the Gillet test, during which the patient is asked to flex the affected limb at the knee.

Figure 4. Demonstration of the Gillet test.



During the Gillet test, the patient stands upright, bearing weight equally on both legs. The examiner places one thumb on the S2 spinous process and the other thumb on the posterior superior iliac spine. The patient then flexes the hip and knee of the tested leg, bringing the knee toward the chest. A positive test is demonstrated if the posterior superior iliac spine does not move downwards on the affected side. It suggests fixation of the SIJ on the tested side.

However, most of these diagnostic physical tests also cause stress on surrounding structures, which may be sources of pain. Therefore, do not isolate the SIJs.

No radiological features provide a definitive diagnosis, and around 25% of patients who are asymptomatic have positive radiological findings on X-Ray. Table 1 depicts the findings and the advantages and limitations present when using different modalities to help diagnose SIJ syndrome.

The gold standard remains a diagnostic injection of local anesthetic into the joint with alleviation of symptoms, although there is still a possibility of false positives (20%) or negatives.

Table 1. Radiological Modalities for Diagnosing Sacroiliac Joint Syndrome.

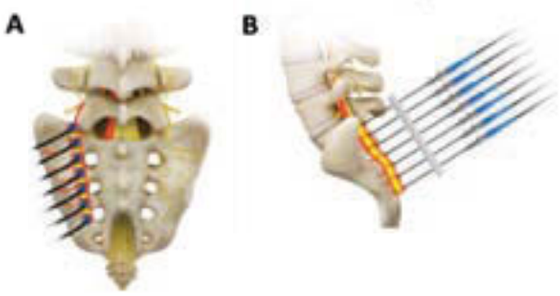
Radiological Modality	Findings	Advantages/Limitations
X-Ray	Used to assess fractures, joint space narrowing, or significant degenerative changes.	Lacks sensitivity for early inflammatory or subtle degenerative changes.
Computed Tomography (CT)	Provides detailed views of bony structures, detecting fractures, erosions, sclerosis, or ankylosis.	Superior resolution for bony details; does not visualize soft tissues or inflammation effectively.
Magnetic Resonance Imaging (MRI)	Preferred for detecting inflammation, soft tissue involvement, and edema. A STIR sequence is useful to highlight edema; a T1-weighted scan is useful to detect chronic anatomical changes.	Best for early inflammatory changes or soft tissue involvement, especially in spondyloarthropathies or infections.
Bone Scintigraphy (Bone Scan)	Detects increased metabolic activity, suggesting inflammation or pathological processes.	Useful for stress injuries or occult fractures; less commonly used.
Ultrasound	Evaluates soft tissues and guides injections.	Limited for SIJ visualization; non-invasive and real-time guidance.
Positron Emission Tomography (PET)	Detects increased metabolic activity in malignancies or infections.	Rarely used specifically for SIJ syndrome but helpful in complex cases.

The use of lumbar medial branch blocks and sacral lateral branch blocks has also been suggested for diagnostic use. However, in view of the variations in innervation and the possibility of local anaesthetic migration to other painful areas, this option is less attractive.

Injection into the SIJ may be challenging in itself. Extra-capsular spread is common. These infiltrations may be specifically challenging in the elderly in view of significant bony changes.

These infiltrations are performed under fluoroscopic or CT guidance. Blind injections have a poor success rate. It usually incorporates a steroid and a local anaesthetic as the treatment.

Figure 5. Schematic illustration of multiple needle placements and the location of the needles in both anteroposterior (A) and lateral views (B). The target nerves are L5 dorsal ramus and the lateral branches of the S1, S2, and S3 dorsal rami, which are the major innervating nerves of the posterior compartment of the sacroiliac joint.



MANAGEMENT STRATEGIES

Treatment begins with conservative approaches, including:

- **Physical Therapy:** An assessment should be carried out to identify clinically significant anatomical or functional abnormalities that may exacerbate SIJ dysfunction. While minor leg length discrepancies are common in the general population and usually asymptomatic, larger discrepancies (>1–2 cm) or functional imbalances may alter pelvic biomechanics and increase SIJ stress. Exercises to strengthen core and pelvic stabilizers can improve joint stability.
- **Pharmacotherapy**: Unless contraindicated, NSAIDs and adjunctive medications such as gabapentin, tricyclic antidepressants and SSRIs offer symptomatic relief.
- **Psychotherapy**
- **Support Devices:** Stabilization belts may reduce stress on hypermobile joints.

For refractory cases, **interventional techniques** are pivotal:

- **Intra-articular Injections**: A combination of local anaesthetics and steroids can provide diagnostic clarity and therapeutic benefit. These infiltrations have been proven to give short-term benefit. However, their long-term benefit has not been observed.
- **Radiofrequency Ablation (RFA):** This minimally invasive procedure targets the lateral branches of the dorsal sacral nerves, reducing pain by interrupting nerve signaling pathways. In a systematic review published in the journal *Current Pain and Headache Reports* in March 2024, findings indicated that RFA provides significant pain relief and functional improvement in patients with chronic SIJ pain.

The complicated and unpredictable anatomy of the innervation of the SIJ makes local anaesthetic and steroid infiltration a more attractive option.

Surgical intervention, such as SIJ fusion, is a last resort for severe cases unresponsive to other treatments.

CONCLUSION

SIJ syndrome underscores the complexity of chronic low back pain. By enhancing clinical awareness and adopting a multidisciplinary approach, healthcare providers can optimize patient outcomes, ensuring both relief from pain and restoration of function. As pain medicine evolves, integrating advanced diagnostics and therapies will further refine our capacity to address this prevalent condition.

This concise understanding of SIJ syndrome aims to aid practitioners in recognizing and managing this significant pain generator effectively.

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