



Sacroiliac Joint Pain after Spinal Fusion Surgery

Tarek Elhewala¹, Amr Mohamed El-Adawy¹, Akram Abdullallah Ahmed Alfaghi², and Mohammed Hassan Abd Ellatif¹

¹Orthopedic Surgery Department, Faculty of Medicine, Zagazig University, Egypt

² Orthopedic Surgery Department, Faculty of Medicine, Gharian University- Libya

Corresponding author*

Akram Abdullallah Ahmed Alfaghi

E-Mail: orthoakram@gmail.com

Submit Date 05-01-2024

Revise Date 14-01-2024

Accept Date 28-01-2024



ABSTRACT

Background: The sacroiliac joint (SIJ) has drawn more attention lately as a potential cause of chronic or acute discomfort following lumbar/lumbosacral fusion. Misdiagnosis of SIJ syndrome, iliac crest bone grafting, or increased mechanical strain could be the underlying pathophysiology of SIJ pain. Patients with lumbar/lumbosacral fusion exhibit more frequent degeneration of the SIJ compared to those without such fusion, according to imaging studies. Injection studies have demonstrated that in a significant majority of patients following fusion surgery, lingering symptoms are brought on by SIJ pain. A large proportion of patients who underwent prior lumbar/lumbosacral fusion or surgery are included in recent articles discussing the surgical results of SIJ fusion. **Aim:** The aim of this study is to assess sacroiliac joint pain after lumbosacral fusion. **Conclusion:** well-controlled clinical trials are required to evaluate the effectiveness of surgical treatment. In light of these findings, patients with failed back surgery syndrome following lumbar/lumbosacral fusion should be evaluated for the possibility that their SIJ is the cause of their discomfort.

Keywords: Sacroiliac joint pain, Lumbosacral fixation, Spine surgery, Sacroiliac joint degeneration

INTRODUCTION

There are numerous explanations for low back pain (LBP) that develops after lumbosacral fusion. A number of researchers have suggested that people who have had lumbar fusion surgery may suffer postoperative discomfort related to the SIJ. After lumbar and lumbosacral fusions, the prevalence and features of SIJ discomfort are yet unknown[1,2].

A number of studies have estimated that 10–38% of low back pain cases are caused by the

SIJ; this type of pain is characterized by aching without tingling or numbness. In the L5-S1 fusion, pain is felt below the belt line and may occasionally radiate below the knee in the ipsilateral groin, buttock, and lower extremities. A physical examination and provocative maneuvers can help narrow down the evaluation of low back pain in order to rule out sacroiliac joint pain [3].

It may be inferred that SIJ pain is a primary cause of mechanical lower limb pain (MLBP) in patients of all ages, as evidenced by the bimodal distribution of its prevalence rates,

which are highest in younger athletes and the elderly [2].

Aim of The Work

The aim of the work is to assess sacroiliac joint pain after lumbosacral fusion.

Diagnosis For Sacroiliac Joint Pain

History and Physical examination:

The best way to distinguish SIJ issues from other types of low back pain is to use a variety of diagnostic techniques, such as getting a thorough medical history and performing a physical examination [4].

Usually, unilateral or bilateral agonizing pain below the L5 level without numbness is the initial symptom of SIJ discomfort. Patients usually describe extended sitting, leaning forward, and getting up from a low chair or toilet, as well as transferring out of bed, as making their low back discomfort worse. For certain people, weight-bearing exercises like bending, twisting, climbing stairs or even long walks may make their pain worse. While there isn't a single physical exam maneuver that may diagnose SIJ issues, a mix of particular findings and thought-provoking

tests can be crucial. For SIJ dysfunction, specific physical evaluations and thought-provoking tests consist of [4]:

FABER Test (Patrick's Test)

On the examination table, the patient lays supine while undergoing the FABER test (**Figure 1**). The examiner places the hip joint in the FABER position on the side of the patient with SIJ pain that is ipsilateral. (**Flexion, Abduction, and External Rotation**) With the ipsilateral foot resting on the contralateral knee, the hip is externally rotated and the ipsilateral knee is flexed to a 90° angle. The examiner next applies pressure to the opposing anterior superior iliac spine (ASIS) and descends the flexed knee toward the table. If the patient experiences pain in the SIJ on the side where the knee was flexed, the test is deemed successful. At this time, pain in the groin area may imply hip disease, whereas pain in the buttocks is suggestive of SIJ pain. Out of the five provocative movements, the FABER test has one of the highest sensitivities[5].



Figure (1): FABER test [4]

Thigh Thrust Test (Posterior Shear Test)

The patient lays supine during the Thigh Thrust Test (**Figure 2**), and the examiner flexes the tested-side hip joint and knee to

about 90 degrees. Through the femur's axis, a shear stress from anterior to posterior is imparted to the SIJ. A positive test result is indicated by discomfort at the ipsilateral SIJ [4].



Figure (2): Thigh Thrust Test (Posterior Shear Test)[4]

Gaenslen Test

The patient is positioned supine at the side of the table; with the leg to be examined dangling over the edge and the other hip and knee flexed to the chest, in order to complete the Gaenslen Test **Figure (3)**. The flexed

knee is subjected to firm pressure by the examiner, while the hanging leg's knee experiences counterpressure. Next, the process is carried out again on the other side. Bilateral SIJ is stressed as a result. If the patient has low back discomfort in SIJ while being tested, the test is deemed successful [4].



Figure (3): Gaenslen Test [4]

Compression Test

The patient rests in the lateral decubitus position, facing away from the examiner, with the affected side up, during the Compression

Test **Figure (4)**. The examiner applies downward pressure to the anterior superior iliac spine (ASIS) and ipsilateral iliac crest. If the patient has pain on the ipsilateral side of the SIJ, the test is deemed positive [2].



Figure (4): Compression Test[3]

Distraction Test

The patient is positioned supine on the table for the Distraction Test (**Figure 5**). The examiner crosses the patient's forearms and

slowly and steadily presses outward on the left and right ASIS to spread or divert them. If the patient experiences pain in the SIJ region, the test is deemed successful [3].



Figure (5): Distraction Test[6]

Yeoman Test

The patient lays in a prone posture with the ipsilateral knee flexed to 90 degrees for completing the Yeoman Test **Figure (6)**. The examiner next lifts the leg off the table and

extends the hip in a passive manner. While anterior thigh paresthesia may suggest a femoral nerve stretch or tight anterior thigh muscle, pain replicated to the sacroiliac joint implies disease in the anterior sacroiliac ligament[6].



Figure (6): Yeoman Test[7]

Imaging

Imaging of the SIJ is necessary to rule out warning signs such as a fracture, cancer, or infection, even though it is not conclusive in diagnosing a pain generator. An X-ray of the pelvis and back with anterior/posterior, oblique, and lateral views should be part of the initial imaging. These images can be used to rule out conditions such as hip osteoarthritis, lumbosacral spondylosis, and spondylolisthesis that may be confused for SIJ discomfort as additional causes of low back pain. Depending on the patient's presentation and the existence of any "red flag" symptoms, the imaging schedule varies substantially [6].

Pain that hasn't been there for more than six weeks usually doesn't require imaging. Imaging should be taken into consideration if discomfort persists for more than six weeks. In addition, plain films have to be obtained before injection if interventional therapy is planned. To rule out neural compression, particularly of the L5 nerve root, lumbar spine MRI may be beneficial. On radiographs, the

SIJ can be challenging to profile, and there may or may not be obvious signs of structural diseases affecting the joint. Due to its high sensitivity and capacity to see SIJ edema and bone marrow, magnetic resonance imaging (MRI) is frequently advised for the diagnosis of SIJ pain associated with HLA-B27 seronegative spondyloarthropathies (Psoriasis arthritis, Ankylosing spondylitis, Inflammatory bowel disease with associated arthritis, and Reactive arthritis). Non-inflammatory arthropathy-related SIJ discomfort usually shows nothing on advanced imaging, but it can reveal joint space constriction, osteophytes, and sclerosis. SIJ dysfunction has been diagnosed with single-photon emission computed tomography (SPECT/CT). It has been demonstrated that there is a strong correlation between SPECT/CT results and intra-articular steroid injection results. As a result, SPECT/CT may be helpful in addition to intra-articular steroid injections for diagnostic purposes [8].

Diagnostic intra-articular injection

Although there isn't a real

"gold standard" for treating SI joint-mediated pain, because imaging guided intra-articular block with local anesthetic is target specific, it's often used by doctors to rule out or confirm clinically suspected SI joint symptomatology. Ultrasonography, CT, MRI, and fluoroscopy can all be used to carry out the injections. It is not advised to perform "blind" sacroiliac joint injections without imaging guidance because only 22% of these individuals experienced intra-articular joint injection [9].

Differential Diagnosis

Many causes other than SIJ pain should be taken into consideration when patients report posterior hip or low back pain below the level L5 or the beltline. These include proximal hamstring tendinopathy, piriformis syndrome, posterior femoro-acetabular pathology, seronegative spondyloarthropathies, stress fractures of the sacrum, and referred pain from lumbar spinal pathology, including proximal L5 radiculopathy and lumbosacral facet mediated pain [10].

Treatment of Sacroiliac Joint Pain

Non-surgical treatment

Conventional medical management

Initially, sacroiliac joint discomfort is usually treated with a short time of rest. It could be suggested to take one or two days off. It is not advised to rest for more than a few days at a time as this could exacerbate stiffness and discomfort. Additionally, using heat or ice can be beneficial. Ice applied to the pelvis and low back helps lessen pain and suffering by reducing inflammation. Applying heat around the joint might help ease discomfort by easing tense or spastic muscles. For mild to moderate pain management, over-the-counter pain medicines like paracetamol and nonsteroidal

anti-inflammatory drugs (NSAIDs), such as ibuprofen or naproxen, may be advised. During instances of intense, acute pain, medications like muscle relaxants or narcotic medicines may be administered. Because these drugs have serious negative effects and are highly addictive, care must be taken when using them [11].

Physical therapy

In order to relieve SI joint pain, exercise therapy entails a series of guided stretching and strengthening exercises that work to relax the surrounding muscles and strengthen the ligaments to better support the joint while also restoring natural motion within the joint. Exercises focus on a number of lower limb and abdominal muscle groups. Therapeutic interventions such as physical massage, ultrasound, transcutaneous electrical nerve stimulation, and others may help lessen pain, discomfort, and inflammation [12].

Therapeutic Injections

In order to treat SI joint discomfort, a local anesthetic and corticosteroid medicine are used together. There are two types of therapeutic SI joint injections: intraarticular and periarticular. More and more evidence points to the superiority of intraarticular therapeutic injections over periarticular injections [13].

Rhizotomy

After non-operative care fails and the patient responds well to the SIJ injection, radiofrequency denervation, also known as rhizotomy a minimally invasive technique that disables a sensory nerve is frequently the next line of treatment. Radiofrequency waves can be used to pulse, heat, or freeze the nerve in order to do this. In order to stop pain signals from reaching the brain, a sacroiliac

joint rhizotomy inhibits the numerous sensory nerves (L5-S4) that supply the sacroiliac joint [14].

Surgical treatment of Sacroiliac joint pain

When a patient fails at least six months of rigorous non-operative care, has persistent moderate to severe pain, and functional impairment, surgical stabilization and/or fusion of the sacroiliac joint might be explored. Two techniques can be used for surgical stabilization and/or fusion: the lateral approach and/or the posterior and posterior oblique approach. Sacroiliac joint minimally invasive surgery therapy can reduce discomfort and enhance function [15-17].

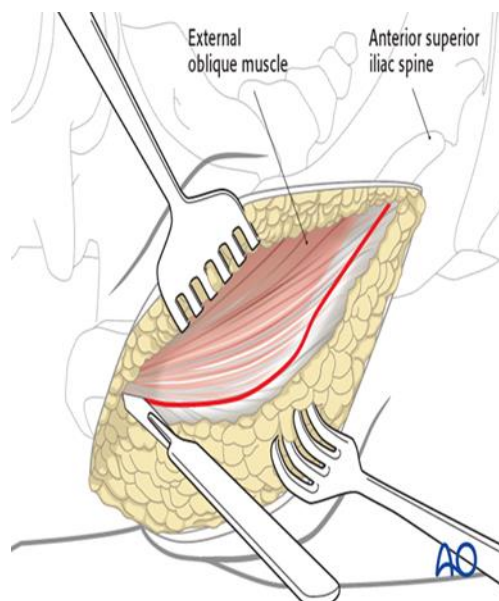
Surgical techniques

Open approaches

The Smith-Petersen-described lateral transiliac route is the most widely utilized open method for sacroiliac joint access. Over the posterior two-thirds of the iliac crest, a curving incision is made. The lateral surface of the ilium is exposed by a subperiosteal incision. The sacroiliac joint's projected area is covered by a rectangular window. The

cancellous bone is seen when the cartilaginous surface of the sacrum is shaved away. After being first cut out to make a window, the bone block is reinserted so that its cancellous surface is in line with the sacral cancellous bone. The plates and screws hold the joint in place. Next, the flap is restored and layers of sutures are made [18].

Anterior access is another method of fusing the sacroiliac joint. This method involves making an incision across the iliac crest, extending to the subcutaneous tissue, and then identifying the external oblique muscle fascia. After that, the external oblique muscle is raised subperiosteally from the iliac crest and the gluteus medius muscle is detached. The same sub-periosteal plane is used to raise the iliacus muscle. Dissection is done medially till the location of the sacroiliac joint is determined. Curettes and rongeurs are tools for removing cartilage from joints. Fusion can be achieved by using plates and screws to secure the joint and implanting a bone graft (figure 7).[18].



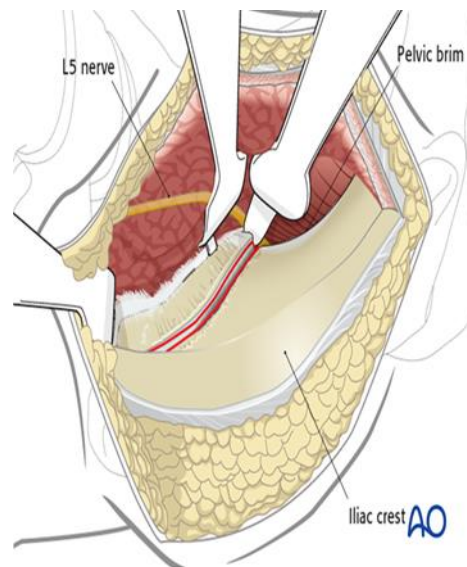


Figure 7: Anterior approach to the sacroiliac joint [19]

Minimally Invasive Surgery Approach

Thanks to advancements in imaging technology, surgeons can now access the sacroiliac joint with a lower rate of morbidity associated with approaches. There are two categories for MIS approaches: transiliac and posterior. The former can be carried out with or without bone grafting and joint decortication. To stabilize the joint, joint-spanning transiliac implants are utilised. In the latter case, an interference cage may be employed to distract the joint. This is usually an intra-articular method involving joint decortication and bone grafting[1].

Whether using 3D image-guided navigation or 2D fluoroscopy, intraoperative imaging is critical to MIS. The majority of MIS systems for SIJ fusion use a Kirschner wire (K-wire) and are cannulated. Notably, advancement of the Kwire into areas other than the bony sacrum, like the sacral foramen, pelvis, or spinal canal, has the potential to cause damage to the sacral nerve roots, rectum, or pelvic arteries. Surgeons should therefore exercise extreme caution to prevent unintentional advancement of K-wires [20].

Important anatomical landmarks must be identifiable to surgeons. Inadequate intraoperative image analysis is frequently caused by large patients or low-resolution imaging technology. An alternative method ought to be taken into consideration if the anatomic landmarks cannot be sufficiently distinguished. Following the manufacturer's recommended approach, implants are inserted after optimal imaging has been obtained [21]. Since it entails direct visualization of the joint but does so in a less disruptive manner than the standard open technique, posterior access to the sacroiliac joint and the use of an interference screw can be referred to as a mini-open operation. (Disclosure: The writers do not personally employ this strategy.) To put it briefly, the incision extends laterally to the posterior superior iliac spine and down to the thoracolumbar fascia. The soft tissues and ligaments surrounding the joint are cut away. A distraction device is positioned between the sacrum and ilium, and the sacroiliac joint is treated. The diversion is sustained by the interference screw. To fill in the hole in the recess, a bone graft is placed both within and

outside of the screw [22].

CONCLUSION

The sacroiliac joint is a possible source of persistent or new-onset low back pain after a lumbosacral fusion. SIJ pain can result from a variety of causes after lumbosacral fusion, and therefore clinical diagnosis, imaging studies, and treatment may be difficult. Therefore, it is recommended for the surgeon to consider the degeneration and pain of SIJ before and after lumbosacral fusion surgery, and monitoring the patients over time.

RECOMMENDATION

High-quality clinical trials, also metanalysis studies are still required to identify risk factors, determine the best course of treatment, and assess the efficacy and safety of surgical therapy concerning the different stages of sacroiliac joint pain.

Declaration of interest

The authors report no conflicts of interest. The authors along are responsible for the content and writing of the paper.

Funding information

None declared

REFERENCES

1. Martin CT, Haase L, Lender PA, Polly DW. Minimally invasive sacroiliac joint fusion: the current evidence. *Int. J. Spine Surg.*, 2020; 14(s1), S20-S29.
2. Cohen SP, Chen Y, Neufeld NJ. Sacroiliac joint pain: a comprehensive review of epidemiology, diagnosis and treatment. *Expert Rev Neurother.* 2013; 13(1):99-116.
3. Thawrani DP, Agabegi SS, Asghar F. Diagnosing Sacroiliac Joint Pain. *J Am Acad Orthop Surg.* 2019; 27(3), 85-93.
4. Buchanan P, Vodapally S, Lee DW, Hagedorn JM, Bovinet C, Strand N, et al. Successful diagnosis of sacroiliac joint dysfunction. *J. Pain Res.*, 2021:3135-43.
5. Dreyfuss P, Michaelsen M, Pauza K, McLarty J, Bogduk N. The value of medical history and physical examination in diagnosing sacroiliac joint pain. *Spine.* 1996; 21(22): p. 2594-2602.
6. Rashbaum RF, Ohnmeiss DD, Lindley EM, Kitchel SH, Patel VV. Sacroiliac joint pain and its treatment. *J. Spinal Disord.*, 2016; 29(2), 42-48.
7. van Leeuwen R, Szadek K, de Vet H, Zuurmond W, Perez R. Pain pressure threshold in the region of the sacroiliac joint in patients diagnosed with sacroiliac joint pain. *Pain physician*, 2016; 19(3), 147.
8. de Winter J, de Hooge M, van de Sande M, de Jong H, van Hooft L, de Koning A, et al. Magnetic resonance imaging of the sacroiliac joints indicating sacroiliitis according to the Assessment of SpondyloArthritis international Society definition in healthy individuals, runners, and women with postpartum back pain. *A&R*, 2018; 70(7), 1042-1048.
9. Noori SA, Rasheed A, Aiyer R, Jung B, Bansal N, Chang KV, et al. Therapeutic ultrasound for pain management in chronic low back pain and chronic neck pain: a systematic review. *Pain Med.*, 2020;21(7):1482-93.
10. Falowski S, Sayed D, Pope J, Patterson D, Fishman M, Gupta M, et al. A review and algorithm in the diagnosis and treatment of sacroiliac joint pain. *J Pain Res.*, 2020:3337-48.
11. Choi KL, Verbeek JH, Wai-San Tam W, Jiang JY. Exercises for prevention of recurrences of low-back pain. *CDSR.*, 2010; (1).
12. Chou R, Shekelle P. Will this patient develop persistent disabling low back pain? *Jama.* 2010;303(13):1295-302.
13. Farahbakhsh F, Rostami M, Noormohammadpour P, Mehraki Zade A, Hassanmirazaei B, Faghieh Jouibari M, et al. Prevalence of low back pain among athletes: A systematic review. *J Back Musculoskelet Rehabil.*, 2018;31(5):901-16.
14. Roberts A, Stewart C, Freeman R. Gait analysis to guide a selective dorsal rhizotomy program. *Gait*

- & Posture. 2015;42(1):16-22.
15. Dengler J, Kools D, Pflugmacher R, Gasbarrini A, Prestamburgo D, Gaetani P, et al. 1-year results of a randomized controlled trial of conservative management vs. minimally invasive surgical treatment for sacroiliac joint pain. *Pain Physician*. 2017;20(6):537.
 16. Dengler J, Kools D, Pflugmacher R, Gasbarrini A, Prestamburgo D, Gaetani P, et al. Randomized trial of sacroiliac joint arthrodesis compared with conservative management for chronic low back pain attributed to the sacroiliac joint. *J Bone Joint Surg Am.*, 2019;101(5):400.
 17. Dengler J, Duhon B, Whang P, Frank C, Glaser J, Stureson B, et al. Predictors of outcome in conservative and minimally invasive surgical management of pain originating from the sacroiliac joint: a pooled analysis. *Spine*. 2017;42(21):1664.
 18. Smith AG, Capobianco R, Cher D, Rudolf L, Sachs D, Gundanna M, et al. Open versus minimally invasive sacroiliac joint fusion: a multi-center comparison of perioperative measures and clinical outcomes. *Ann Surg Innov Res*, 2013; 7(1), 1-12.
 19. Riouallon G, Chanteux L, Upex P, Zaraa M, Jouffroy P. Anterior approach to the sacroiliac joint for pelvic ring fractures. *Orthop Traumatol Surg Res*, 2020; 106(5), 845-847.
 20. Yson SC, Sembrano JN, Polly DW. Sacroiliac joint fusion: approaches and recent outcomes. *PM&R*, 2019; 11, S114-S117.
 21. Heiney J, Capobianco R, Cher D. A systematic review of minimally invasive sacroiliac joint fusion utilizing a lateral transarticular technique. *Int. J. Spine Surg.*, 2015; 9.
 22. Martin CT, Haase L, Lender PA, Polly DW. Minimally invasive sacroiliac joint fusion: the current evidence. *Int. J. Spine Surg.*, 2020; 14(s1), S20-S29.

Citation:

Elhewala, T., El-Adawy, A., Ahmed Alfaghi, A., Abdellatif, M. Sacroiliac joint pain after spinal fusion surgery. *Zagazig University Medical Journal*, 2024; (4047-4056): -. doi: 10.21608/zumj.2024.260807.3092