



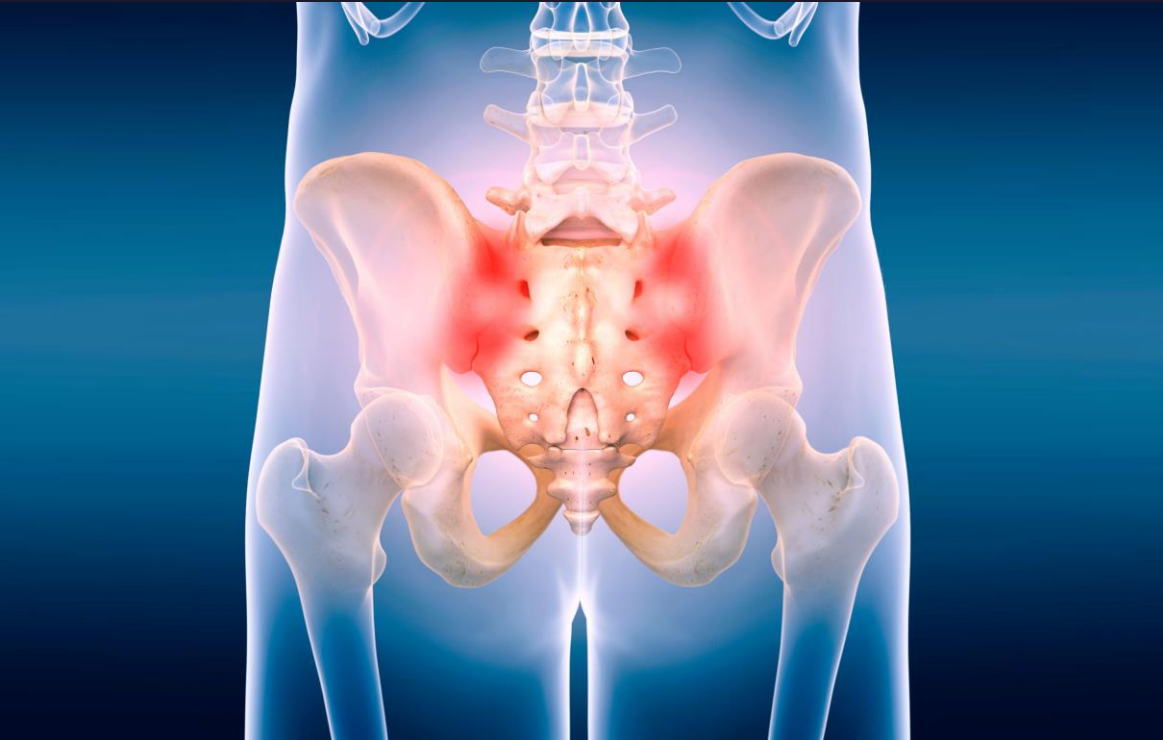
Interventions for Sacroiliac Dysfunction

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Disclosures

- No disclosures
- Former Chairman and Program Director Department of Anesthesia at Texas Tech (1999-2005) and LSU New Orleans (2005-2019); Former Provost, Vice Chancellor of Academic Affairs, and Chief Academic Officer, at LSUHSC (2019-2023); Interventional Pain Program Director at LSUHSC (2020-Present)
- Thank you to Dr. Allen Dennis, MD, for the use of some of the slides presented today.

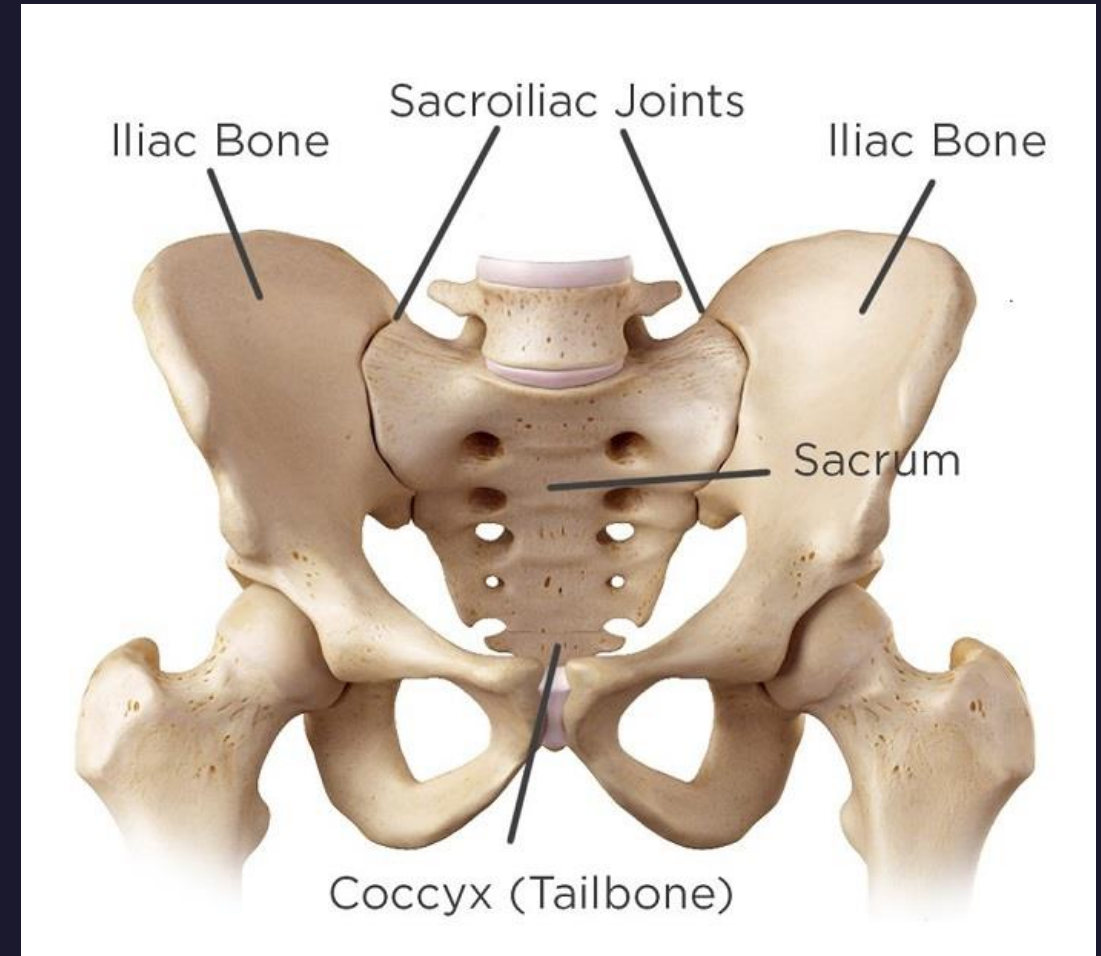


- **Anatomy**
- **Presentation**
- **Differential Diagnosis**
- **Physical Exam**
- **Imaging**
- **Diagnosis**
- **Treatment**



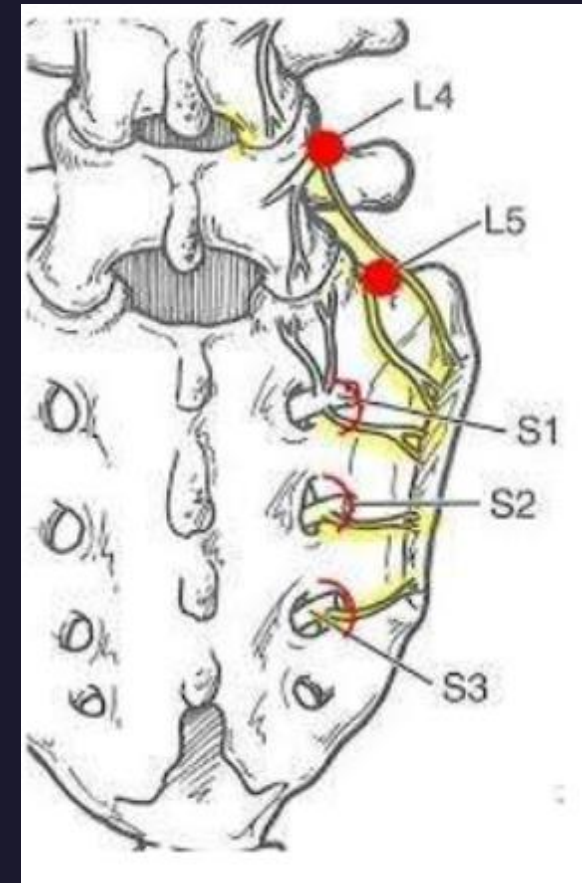
Anatomy

- **Articulating surface between sacrum and iliac bones.**
 - Connects spine to lower extremities
- **Diarthroidial** joint
 - Opposing articular surfaces with synovial space and fibrous capsule
 - Large joint surface area
 - Little mobility due to complementary, multi-faceted joint interface.



Anatomy

- Innervation
 - Complex and variable – Can present with referred pain.
 - Posterior
 - Dorsal ramus L5, lateral branches of dorsal rami S1-S3
 - +/- L4 medial branch and S4 lateral branch.
 - Anterior
 - Ventral rami of L5-S2.
 - +/- L4



Presentation

- 15-30% of patients with axial low back pain.

- Variable presentation of pain:

- Buttock pain
- Lower lumbar
- Lower extremity
- Radiation to knee/foot (12%)

*Not all back pain with radiation to foot is lumbar radiculopathy

- **Causes:**

- Traumatic event (44%) – falls, MVC, pregnancy (up to 25%)
- Repetitive injury (21%) – repetitive lifting, running, altered gait, OCD cleaners
- Idiopathic (35%)
- Post-surgical
- Rheumatologic – systemic inflammatory process

Differential Diagnosis

- Discogenic pain
- Lumbosacral radiculitis
- Myofascial pain
- Piriformis syndrome
- Sacroiliac joint pathology
- Lumbar facet arthropathy
- Rheumatologic



Seronegative Spondyloarthropathies

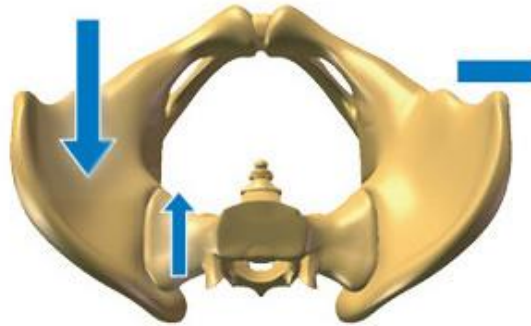
- **Ankylosing spondylitis, enteropathic arthritis, psoriatic arthritis, reactive arthritis, idiopathic.**
- Inflammatory process
 - Dull pain
 - Morning stiffness, improves with movement, worse with rest.
 - Earlier onset (adolescence, young adults).
 - HLA B27
 - Family history

SI joint pain causes and risk factors

Risk factor	Description
Gait issues	Leg length discrepancy or scoliosis can exert unequal pressure on one side of the pelvis, resulting in wear and tear on the SI joint and an increased risk of discomfort
Pregnancy or recent childbirth	Sacroiliac joint discomfort is frequently experienced by women as a result of weight gain, hormonal changes that lead ligaments in the SI joint to loosen (hypermobility), and pelvic changes associated with delivery. Ligaments may remain loose in certain women following delivery, resulting in continued SI joint discomfort and instability
Prior lower back surgery	SI discomfort can be more prevalent following fusion surgery than following discectomy. Furthermore, multi-level surgery can be more likely than single-level surgery to result in SI joint discomfort. SI joint discomfort has also been observed following hip joint replacement surgery and iliac bone grafts (the pelvic “wings”)
Activities that place repeated stress on the joint	Contact sports, regular heavy lifting, or labor-intensive work are all examples of labor-intensive jobs. Stress from extended sitting or standing may also lead to SI joint discomfort if pelvic and/or low back muscles are unconditioned
Traumatic injury	A abrupt impact, such as a collision with another car or a fall, can cause injury to SI joints
Arthritis	SI joints can develop wear-and-tear arthritis (osteoarthritis), and ankylosing spondylitis—a kind of inflammatory arthritis that affects the spine
Infection	The SI joint can get infected in rare instances

Novel Interventional Techniques for Chronic Pain with Minimally Invasive Arthrodesis of the Sacroiliac Joint: (INSITE, iFuse, Tricor, Rialto, and others) Alan D. Kaye , et al., *Rheumatol Ther* 2021, <https://doi.org/10.1007/s40744-021-00350-8>.

Physical Exam

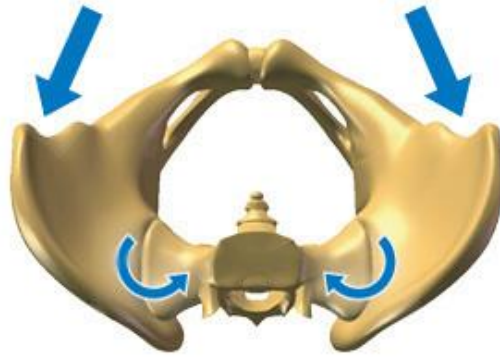


Thigh Thrust: patient supine with knee and hip of affected side flexed to 90 deg. Dorsal pressure applied along femur.

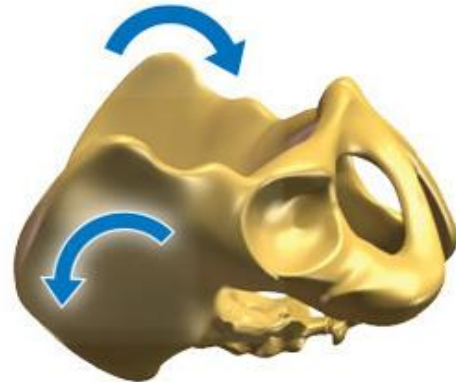


Compression Test: lateral with affected side up, pillow between knees, medial pressure applied to lateral ilium.

Physical Exam



Distraction: supine, pillow under knees, arm under lumbar spine. Apply dorso-lateral pressure to ASIS.



Gaenslen's: supine at edge of bed with affected side leg hanging down, contralateral leg in flexion at hip. Apply dorsal torsional force to knees.

Physical Exam

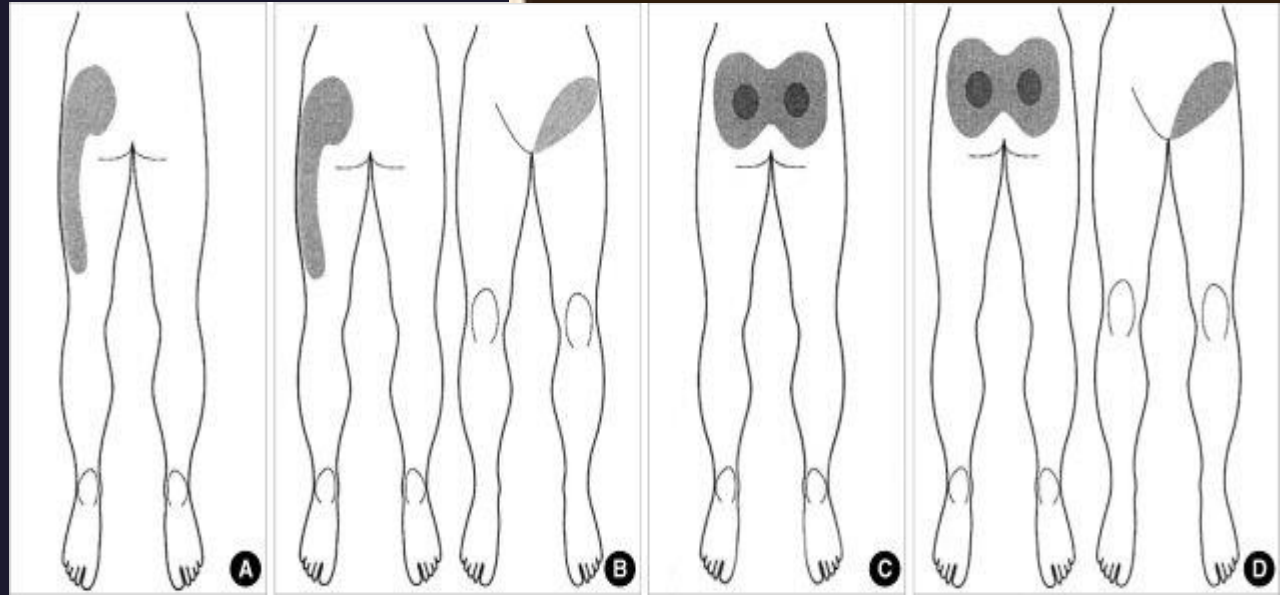


FABER (Patrick) Test: supine, affected leg flexed, abducted and externally rotated. Foot placed on contralateral knee. Dorsal pressure applied to flexed knee.

SI Pain Presentation

- 15-30% of Low back pain
- 40-60% have originating injury
- Unilateral or Bilateral
- Can radiate into the hip, thigh and even calf
- Pain with prolonged sitting, rising to stand, standing one leg, bending forward and walking up stairs

• Fortin Finger Sign



Exam

Three Exam Findings
confirms pain from a
Sacroiliac origin

Distraction



Thigh Thrust



Compression



FABER



Gaenslen

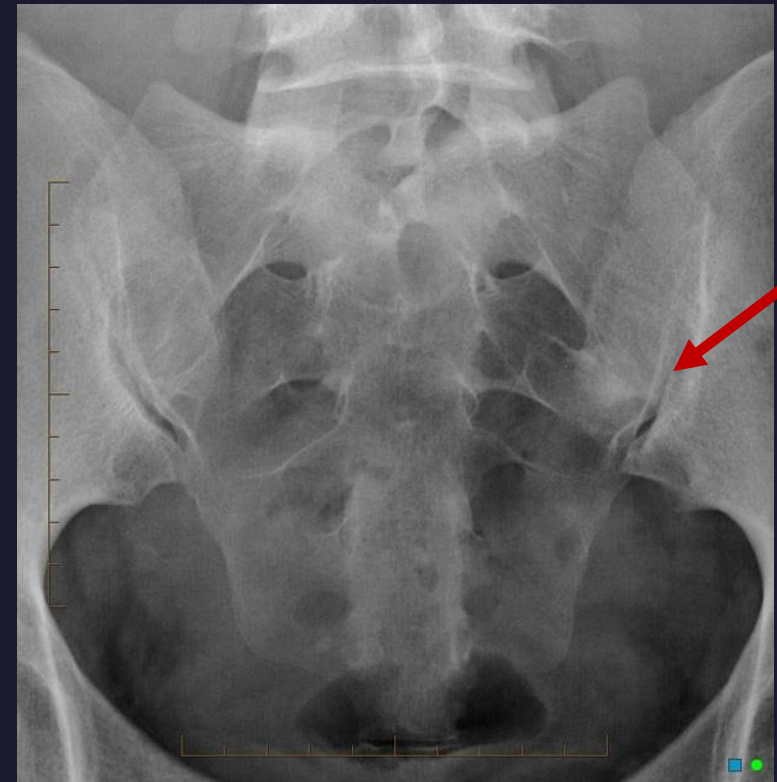


To Image or
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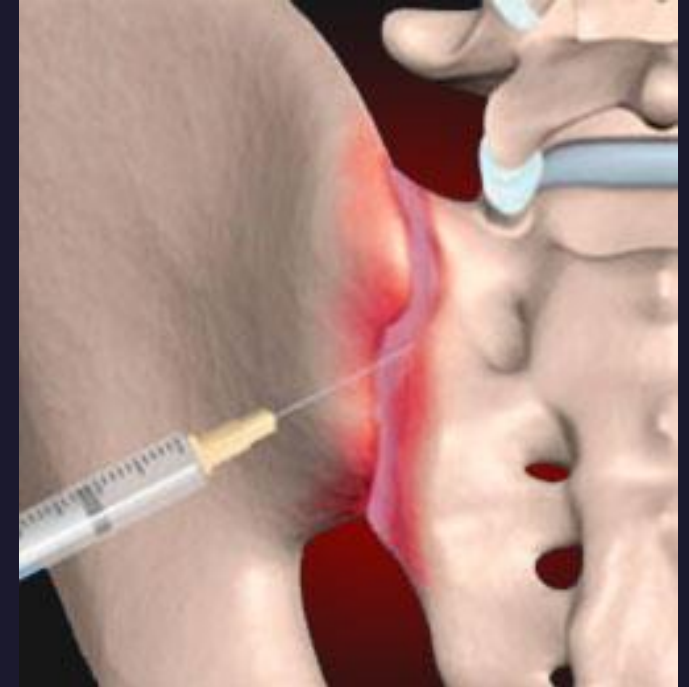
Imaging

- **Limited value in diagnosis.**
 - More useful to rule out other causes of LBP.
- Computed Tomography (CT) - 57.5% sen., 69% spec.
- Radionucleotide Bone Scan – 100% sen., 12.9% spec.
- MRI – more useful for spondyloarthropathies.



Diagnosis

- History & PE – 3 or more positive provocation tests have 85% sensitivity, 79% specificity
 - NOT definitive for diagnosis but has high PPV (77%) and NPV (87%).
- **Gold Standard**
 - **Positive response to SI Joint injection with Local Anesthesia**
- Double Block Paradigm
 - Improvement with 2 separate blocks.
 - Avoids single false-positive response.
 - Can be complicated by procedure variability.



Treatment

- **Conservative Management**

- Lidocaine patches
- NSAIDS, we utilize **Meloxicam**, which is COX-2 inhibitor, safer for GI tract
- TENS (transcutaneous electrical nerve stimulation)
- Physical Therapy
- SI Joint Belt
- Orthotics and shoe lifts
- Adjuvant drugs
 - Duloxetine (Cymbalta)
 - Pregabalin (Lyrica)



Interventions

Manual Therapy

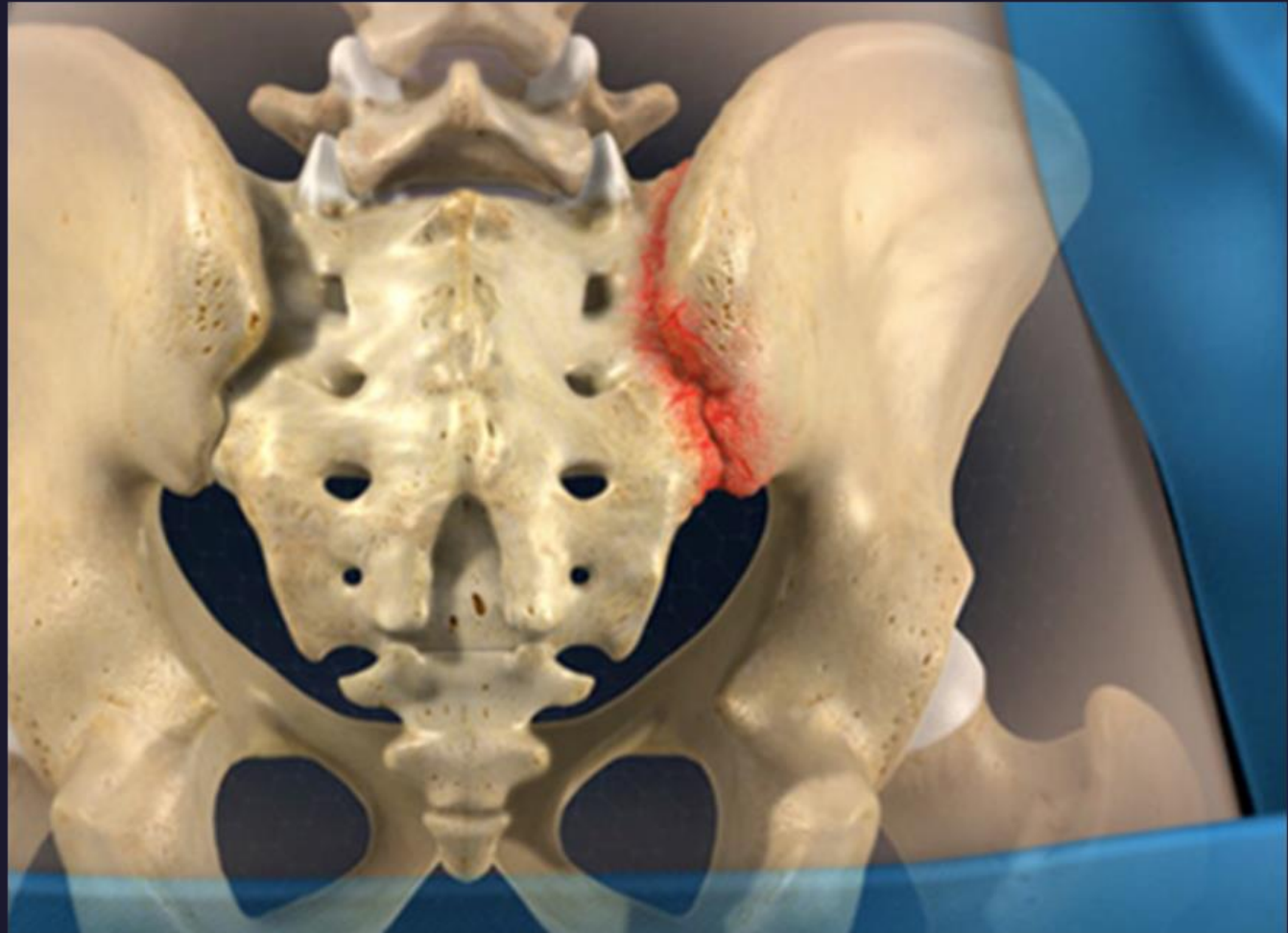
Sacroiliac Injection

Regenerative Medicine PRP/Stem Cells

Sacral Lateral Branch Block/Ablation

Sacroiliac Fusion

Peripheral Stimulation



Sacroiliac Interventions



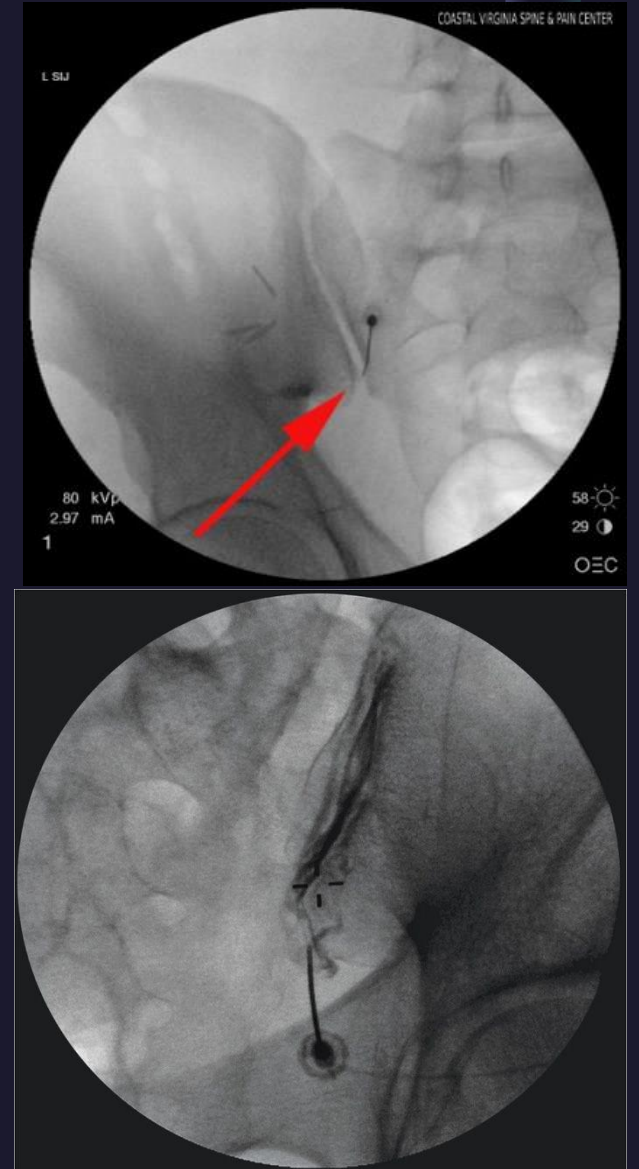
- Sacroiliac pain presentation
- Exam findings
- **Sacroiliac Joint Injection**
- Sacral Lateral Branch Block and Ablation
- Sacroiliac Fusion
 - Lateral Approach
 - Percutaneous Posterior Approach
- Peripheral Stimulation

Sacroiliac Joint Injection

- Recent review of 15 studies for sacroiliac joint injections
 - 468 injections in 268 patients
 - Two small controlled studies showed significant results over placebo
 - Ten open studies showed 80% response rate with mean duration of improvement for 8 months

Typical clinic goal of 50-70% relief for greater than 3 months

Wendling D. Local sacroiliac injections in the treatment of spondyloarthritis. What is the evidence? Joint Bone Spine. 2020 May; 87(3):209-213.

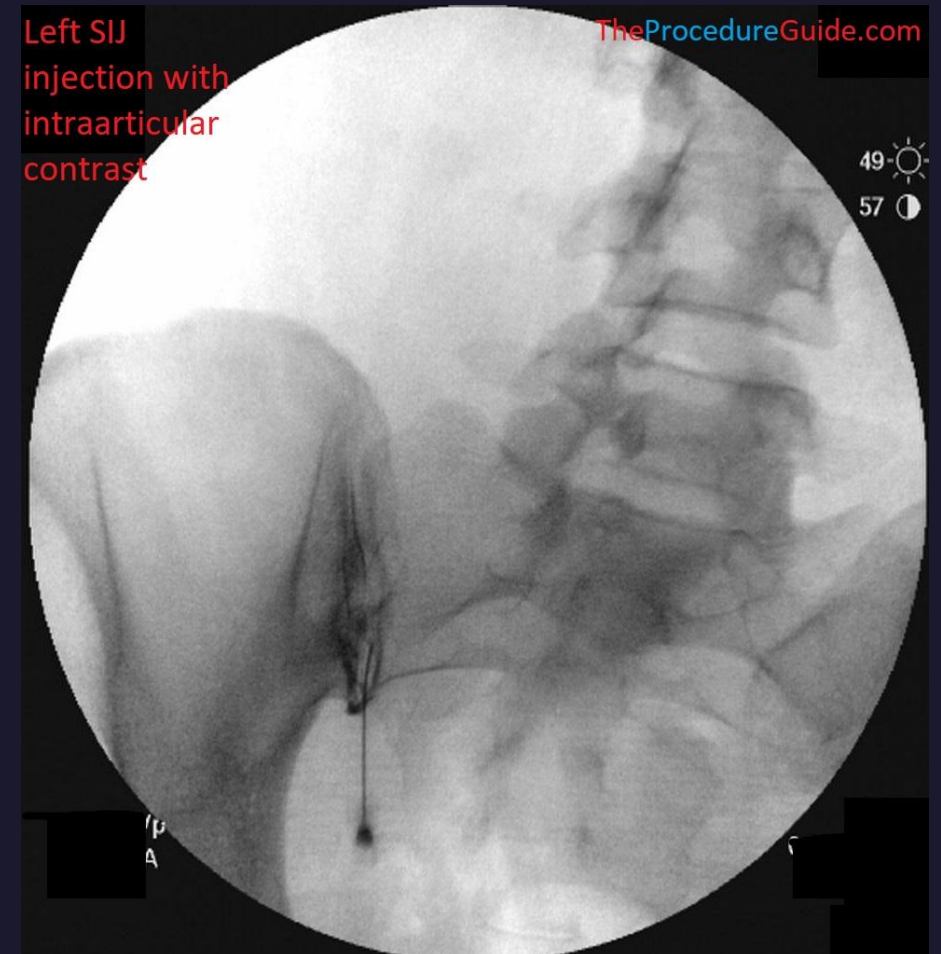


Treatment

- Interventional Pain Procedure
 - **Sacroiliac Joint injection**
 - Fluoroscopic guidance for needle placement
 - Needle advanced into the intra-articular space.
 - Contrast given for confirmation.
 - 2-4mL of local anesthetic/steroid delivered.

*Pain can be associated with **intra and extra-articular structures** as both are innervated.

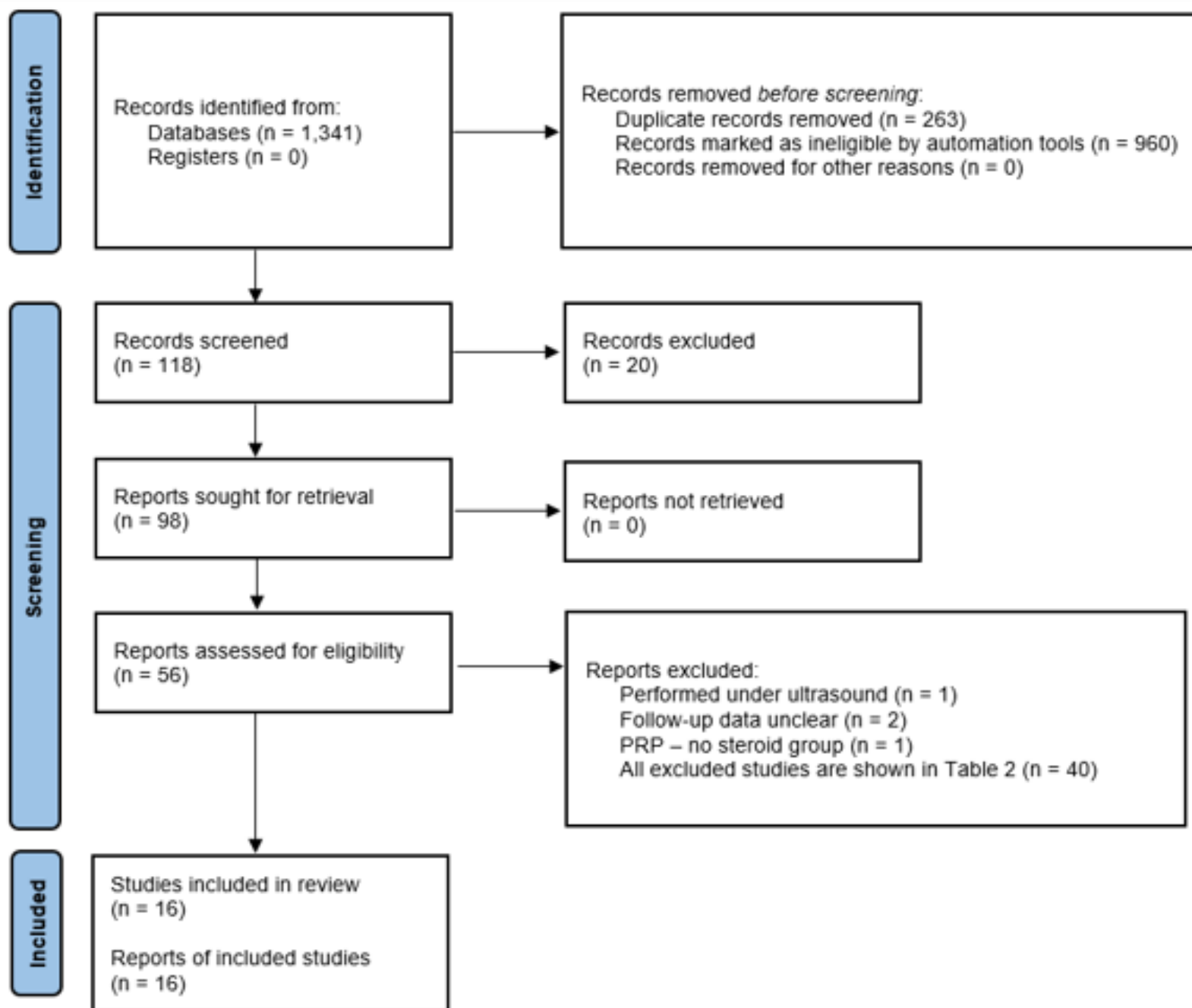
*SI Joint pain is a **spectrum of disorders** encompassing injury to joint, capsule, and/or associated ligaments.



SYSTEMATIC REVIEW AND META-ANALYSIS OF EFFECTIVENESS OF THERAPEUTIC SACROILIAC JOINT INJECTIONS

Rajesh Naidu Janapala, Emilija Knezevic, **Nebojsa Nick Knezevic**, Mahendra R. Sanapati, **Alan D. Kaye**, Vidyasagar Pampati, **Laxmaiah Manchikanti**

“The present systematic review and meta-analysis of sacroiliac joint injections for low back pain originating from the sacroiliac joints showed Level III or fair evidence based on **16** relevant moderate and high quality RCTs and relevant observational studies.”



Qualitative modified approach to grading of evidence of therapeutic effectiveness studies.

Level I	Strong	Evidence obtained from multiple relevant high-quality randomized controlled trials
Level II	Moderate	Evidence obtained from at least one relevant high-quality randomized controlled trial or multiple relevant moderate or low-quality randomized controlled trials
Level III	Fair	Evidence obtained from at least one relevant moderate or low-quality randomized trial or Evidence obtained from at least one relevant high-quality non-randomized trial or observational study with multiple moderate or low-quality observational studies
Level IV	Limited	Evidence obtained from multiple moderate or low-quality relevant observational studies
Level V	Consensus based	Opinion or consensus of large group of clinicians and/or scientists

Treatment Options

- **Long-term Treatment**

- Some patients respond well to SI Joint injection with prolonged relief.
- Regenerative Medicine has shown efficacy
- If pain relief is temporary, Radio Frequency Ablation (RFA) can provide long-term improvement.

- **Radio Frequency Ablation**

- Targets lateral branches of S1-3 dorsal rami and L4 medial branch/L5 lateral dorsal ramus.
- RFA needle localized to target nerve and heat applied to create a lesion that denervates the surrounding structure.
- Provides long term relief – nerves eventually regrow.

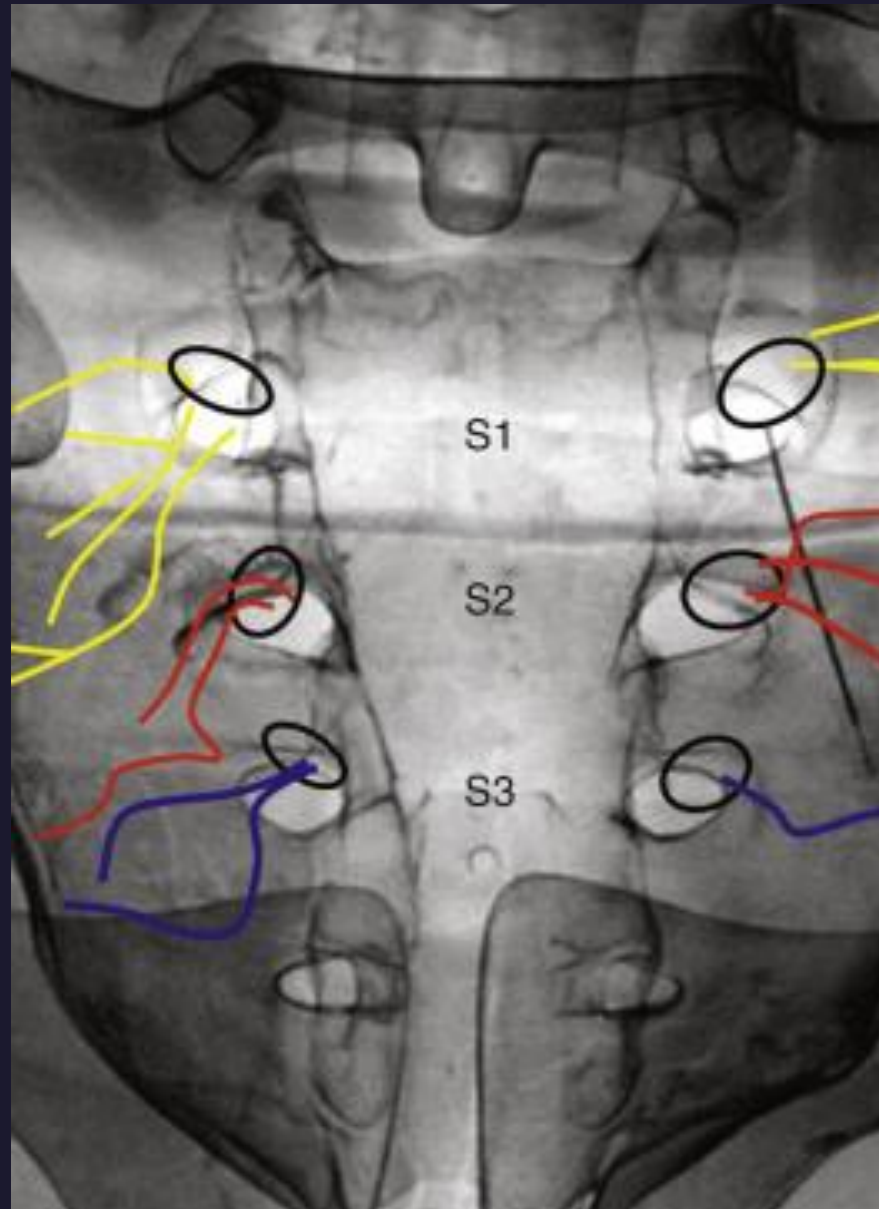
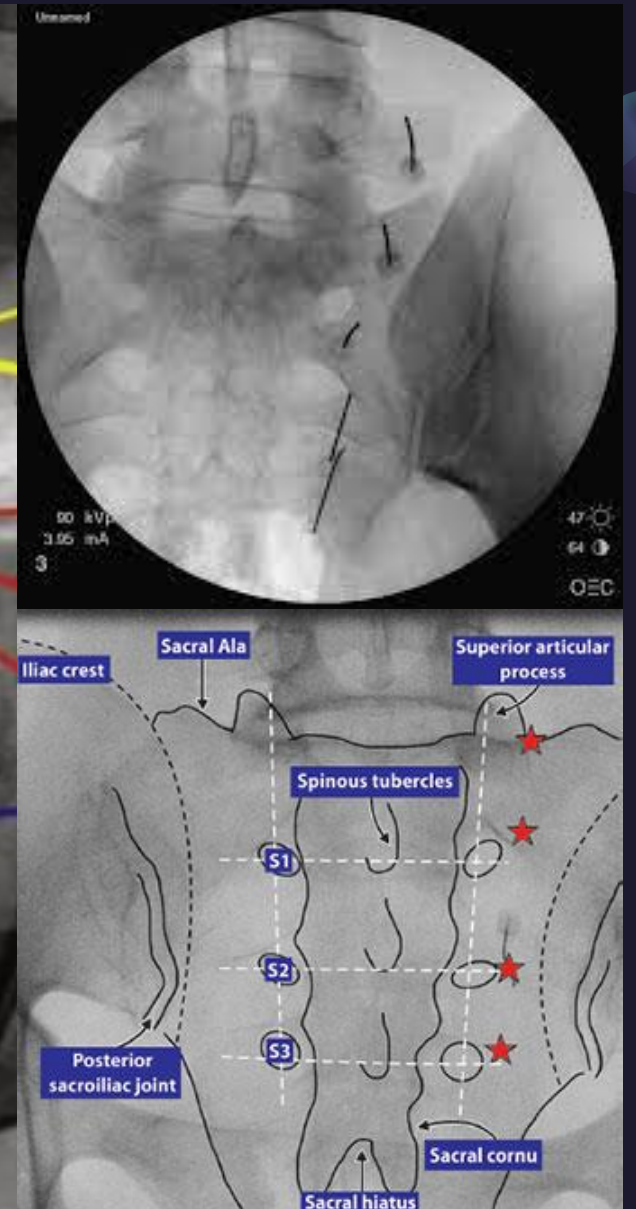
- **Various RFA technology**

- **tRFA, cRFA, bRFA, pulsed RFA.**



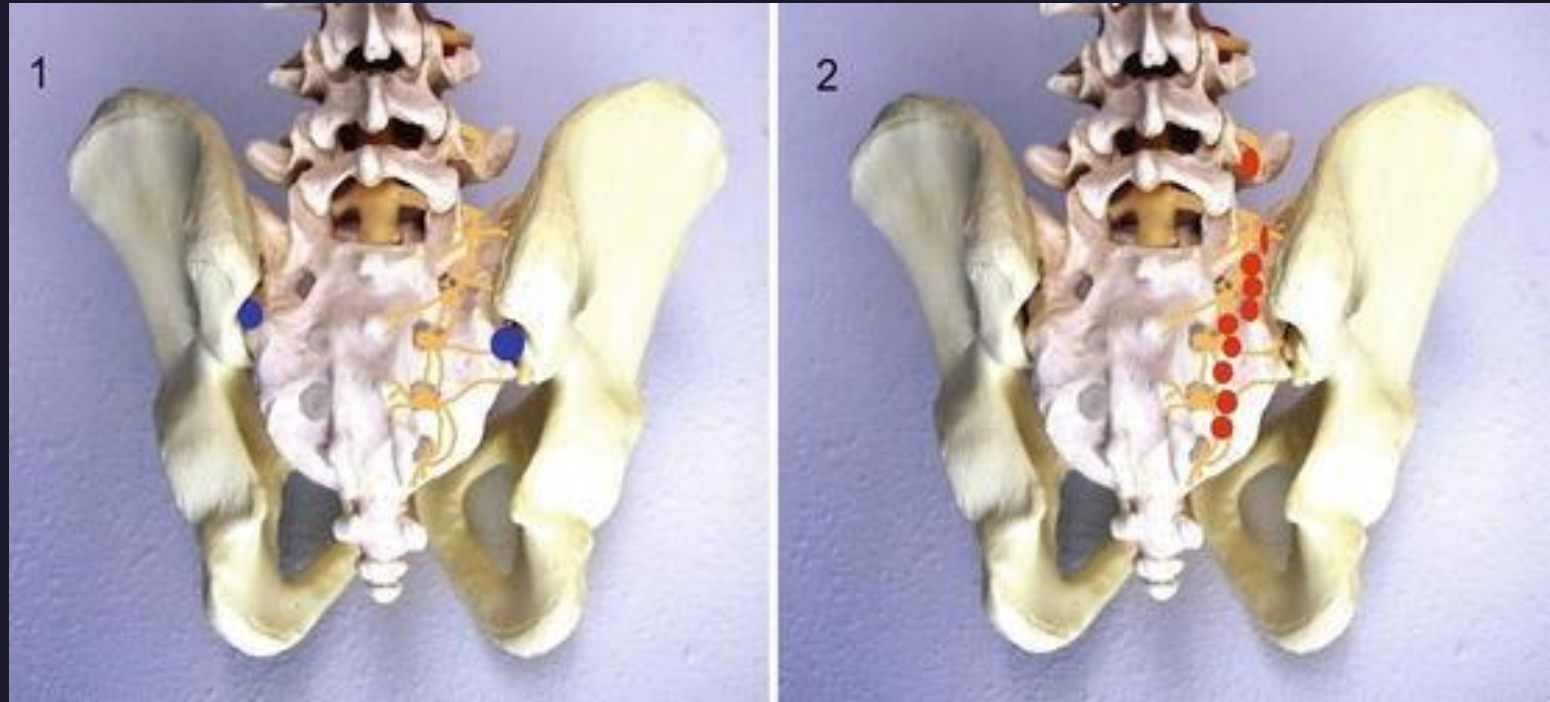
Sacral Lateral Branch Block

- Sacroiliac innervation reported from L5 primary dorsal rami and S1-3 lateral branches
- Varied anatomic location lateral to the sacral foramen
- **Lateral Branch Block is primarily used as a diagnostic block in work up for ablation**



Sacral Lateral Branch Ablation

- Multiple studies reporting sustained relief for at least 6 months in over 60% of patients
- Can be difficult to capture all the innervating branches



- Falowski, Steven et al. A Review and Algorithm in the Diagnosis and Treatment of Sacroiliac Joint Pain. J Pain Res. 2020 Dec 8;13:3337-3348.

Systematic Review and Meta-Analysis of the Effectiveness of Radiofrequency Ablation of the Sacroiliac Joint

Rajesh N. Janapala, Emilija Knezevic, **Nebojsa N. Knezevic**, Rachana Pasupuleti, Mahendra R. Sanapati, **Alan D. Kaye**, Vidyasagar Pampati, **Laxmaiah Manchikanti**

- Despite methodological disparities, the evidence from this review, supported by changes in pain scores and functional improvement, suggests **Level III evidence with fair recommendation** for radiofrequency neurotomy as a treatment option.
- Of these **8 RCT trials**, **2 trials were negative**, whereas the remaining **6 trials were positive**.
- In addition, we also analyzed **12 observational studies** which were **all shown to be positive**.

SI joint and PRP/Stem Cells-Level IV Evidence

- Role of intra-articular platelet-rich plasma in sacroiliac joint pain. **Navani A**, Gupta D. Techniques in Regional Anesthesia and Pain Medicine 2015 (19): 54-59.
- Case series of ultrasound-guided platelet-rich plasma injections for sacroiliac joint dysfunction. Ko GD, Mindra S, Lawson GE, Whitmore S, Arseneau L. J Back Musculoskelet Rehabil. 2017;30(2):363-370.
- Steroid vs. Platelet-Rich Plasma in Ultrasound-Guided Sacroiliac Joint Injection for Chronic Low Back Pain. Singla V, Batra YK, Bharti N, Goni VG, Marwaha N. Pain Pract. 2017 Jul;17(6):782-791.

SI Injection Based on **1 high-quality RCT, 1 moderate-quality observational study, and 1 low-quality case report**, the qualitative evidence has been assessed as **Level IV** (on a scale of Level I through V) using a qualitative modified approach to the grading of evidence based on best evidence synthesis (*Safe, and Effective Use of Biologics in the Management of Low Back Pain: American Society of Interventional Pain Physicians (ASIPP) Guidelines. Pain Physician. 2019 Jan;22(1S):S1-S74*).

Fusion Techniques: Lateral versus Posterior

- Recent advances in the treatment of SI joint pain have led to the creation of SI joint fusion devices. These fusion devices seek to stabilize joints so that they are immobile and, in theory, can no longer be a source of pain.
- -- **Lateral or posterolateral approach** transfix SIJ to fuse ilium and upperpart of sacrum via placement of the device through the ilium in direction of the sacrum via SIJ. More than 20 devices are currently approved by the FDA.
- -- **Posterior approach** the allograft bone products and/or devices are implanted into the ligamentous portion of the SIJ using a small incision to the skin and soft tissue and dissecting through muscle. A portion of the interosseous SI joint ligament is also typically removed. Most of the devices used for this procedure are unclassified allograft bone products originating from human cells and tissues. This approach is less invasive, requiring less surgical dissection and surgical time, and has less bony destruction. Numerous devices are currently approved by the FDA.



Lateral Fusion

- **Level 1** two-year randomized control study comparing MIS lateral SI fusion to conservative therapy
 - 55.4 point improvement in ODI compared with 12.2 in conservative arm
 - 100 VAS scale reduction of 55.4 points compared to 12.2 in conservative arm
- MIS SI fusion has a reported **11.1% complication rate**
 - Increased pain, Hematoma, Wound Infection , and Sacral Nerve Root Impingement
- Prolonged recovery
 - **Six weeks of ambulation with a walker**

Falowski, Steven et al. A Review and Algorithm in the Diagnosis and Treatment of Sacroiliac Joint Pain. J Pain Res. 2020 Dec 8;13:3337-3348.

Polly DW, et al. Two-year outcomes from a randomized controlled trial of minimally invasive sacroiliac joint fusion vs non-surgical management for sacroiliac joint dysfunction. Int J Spine Surg. 2016;10:28.



Examples of Lateral SI Fusion Equipment

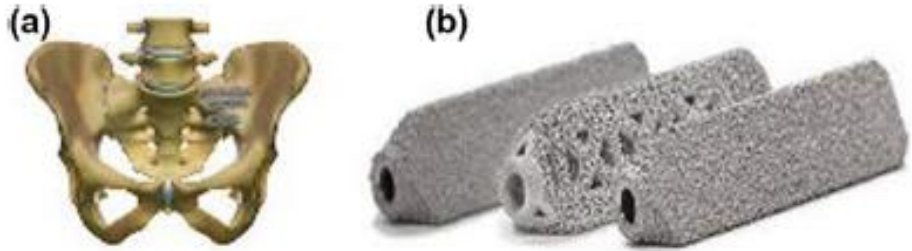


Fig. 1 a Three iFuse implants inserted in the sacroiliac (SI) joint using the lateral approach. b iFuse titanium porous implants. (Source: iFuse Implant System; SI-Bone, Santa Clara, CA, USA)

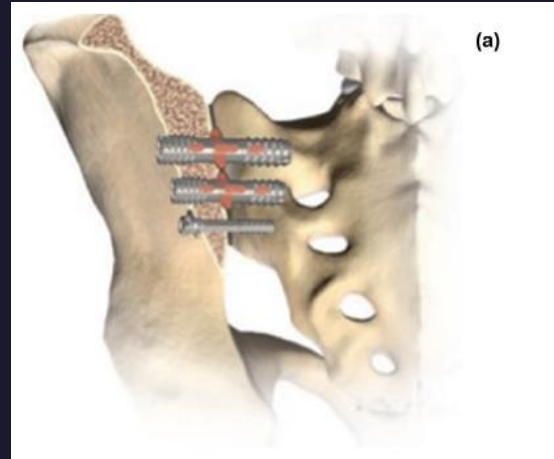


Fig. 2 a The TriCor Sacroiliac Joint Fusion System in place. b This system consists of 3 cylindrical, partially threaded, cannulated titanium-plated screw implants. The two superiorly placed screws are fenestrated to allow for bone graft filling to promote fusion. The most caudal screw serves as a locking implant with an optional 13.5-mm washer that lies on the posterior surface of the pelvis.



Fig. 3 a The ComerLoc™ Allograft-based SI Stabilization System in place. b This system consists of 2 biologic implants composed of demineralized bone matrix that are positioned orthogonally to prevent migration and improve the strength of fusion. Surgical access for implantation is obtained via a posterior approach [4]

Examples of Posterior SI Fusion Equipment

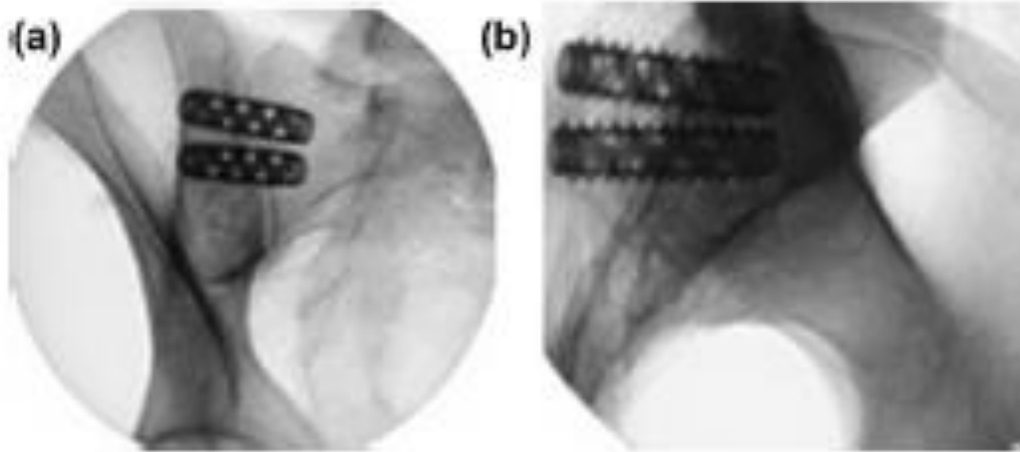


Fig. 4 a, b Rialto™ anteroposterior (a) and lateral fluoroscopic (b) views of Medtronic Rialto cylindrical implants. (Source: Medtronic plc; Dublin, Ireland)

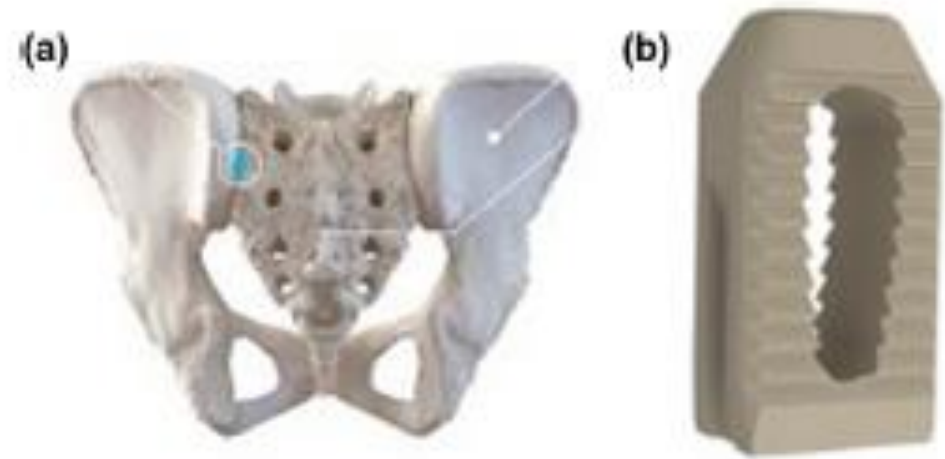


Fig. 5 a PainTEQ LinQ™ device in place. **b** This device is implanted by a minimally invasive technique. Implant contains a window in the center which is filled with the bone allograft. (Source: PainTEQ; Tampa, FL, USA)

Table 2 Table of novel devices available for minimally invasive sacroiliac arthrodesis

SI fusion device	Description	Number of implants	Surgical approach	Clinical studies	Distributor (year available)
iFuse	Titanium construction, porous surface allows bony growth/ingrowth	3	Lateral	One post-marketing surveillance [32], multiple clinical trials [33, 34, 35, 36, 37]	SI-BONE (2009)
TriCor™	Titanium alloy, screws titanium-plated, cylindrical, cannulated, partially threaded	3	Lateral	None found Case report [3]	Zimmer Biomet Spine, Inc (2014)
CornerLoc™	Biologic, allograft demineralized bone matrix, rectangular cuboid-shaped, cannulated, partially threaded	2	Posterior	1 open-label ($n = 120$) to be complete Sept 2022 [5]	Foundation Fusion Solutions (2017)
Rialto™	Cylindrical threaded devices, Bone graft can be delivered within the device	1–3	Posterior	One retrospective case series [19]	Medtronic (2016)
PainTEQ LinQ device	Biologic allograft implant	1	Posterior	No RCT available. A Single Arm, Multicenter, Prospective, Clinical Study is currently underway. Expected study completion date 03/21/2022 [38]	PainTEQ (2020)

Only the Pain TEQ study has been completed to date!!!

Safety, Efficacy, and Durability of Outcomes: Results from SECURE: A Single Arm, Multicenter, Prospective, Clinical Study on a Minimally Invasive Posterior Sacroiliac Fusion Allograft Implant (LinQ Implant-Pain TEQ)

Results: 159 participants across 16 sites in the US between January 2020 and March 2022. 122 participants were implanted. At the 1-month follow-up, 82 participants satisfied all criteria for the composite responder endpoint, representing 73.2% of the study cohort. These results stayed consistent across the remaining study timepoints with 66.0%, 74.4%, and 73.5% of participants classified as responders at the 3-, 6- and 12-month follow-up visits, respectively. **VAS scores were significantly reduced ($p < 0.0001$) and ODI scores were significantly improved ($p < 0.0001$). All domains of the PROMIS- 29 were also significantly improved (all p 's < 0.0001).** Only 1 procedure-related serious AE was identified.

Conclusion: These results suggest that the posterior approach LinQ Implant System is a safe and effective treatment for SI dysfunction at 12 months, with results that are favorable compared to outcomes reported for an FDA-cleared lateral approach.

Calodney A, Azeem N, Buchanan P, Skaribas I, Antony A, Kim C, Girardi G, Vu C, Bovinet C, Vogel R, Li S, Jassal N, Josephson Y, Lubenow T, Lam CM, Deer TR. Safety, Efficacy, and Durability of Outcomes: Results from SECURE: A Single Arm, Multicenter, Prospective, Clinical Study on a Minimally Invasive Posterior Sacroiliac Fusion Allograft Implant. J Pain Res. 2024 Mar 20;17:1209-1222.

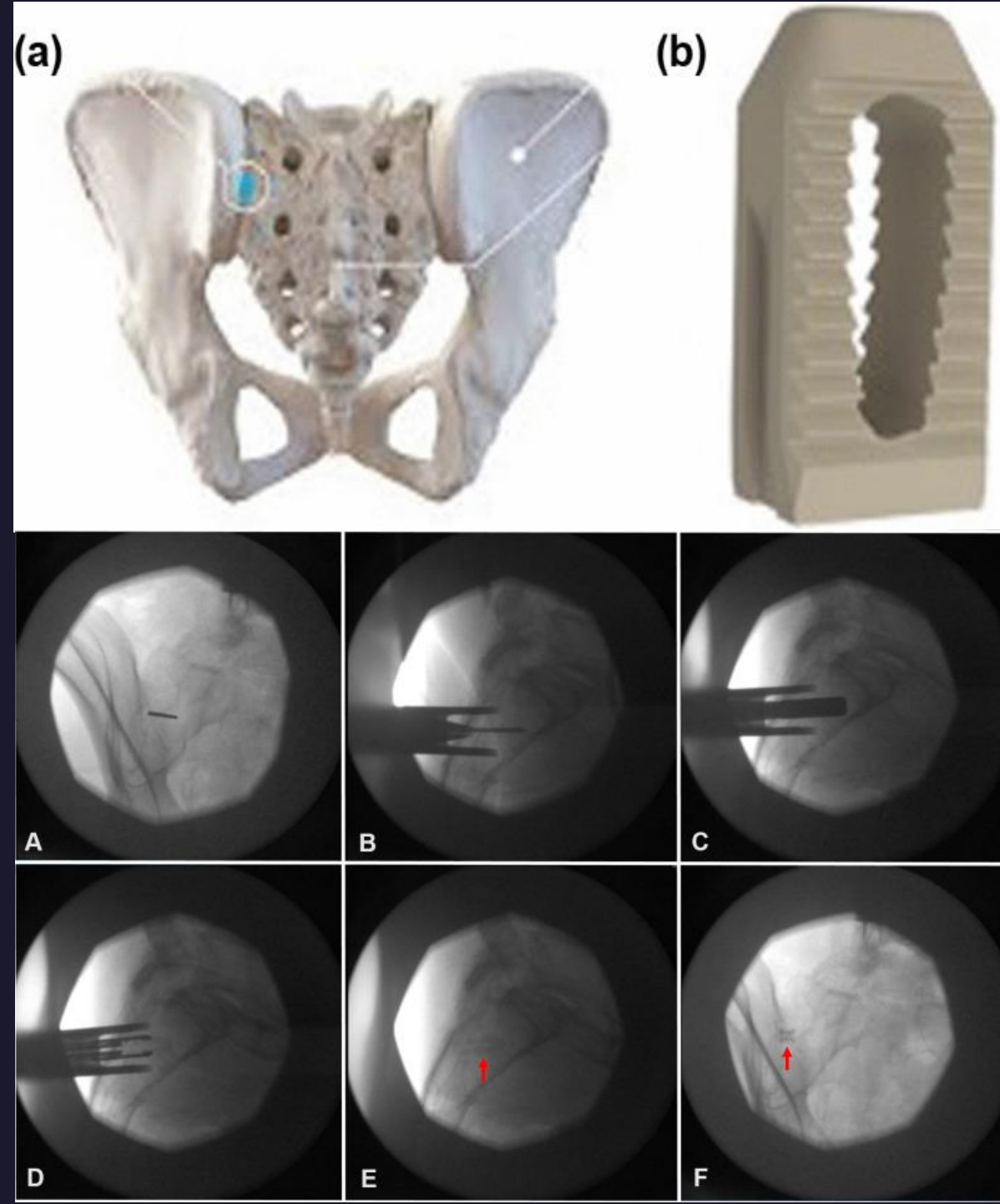
Posterior SI Fusion Studies:

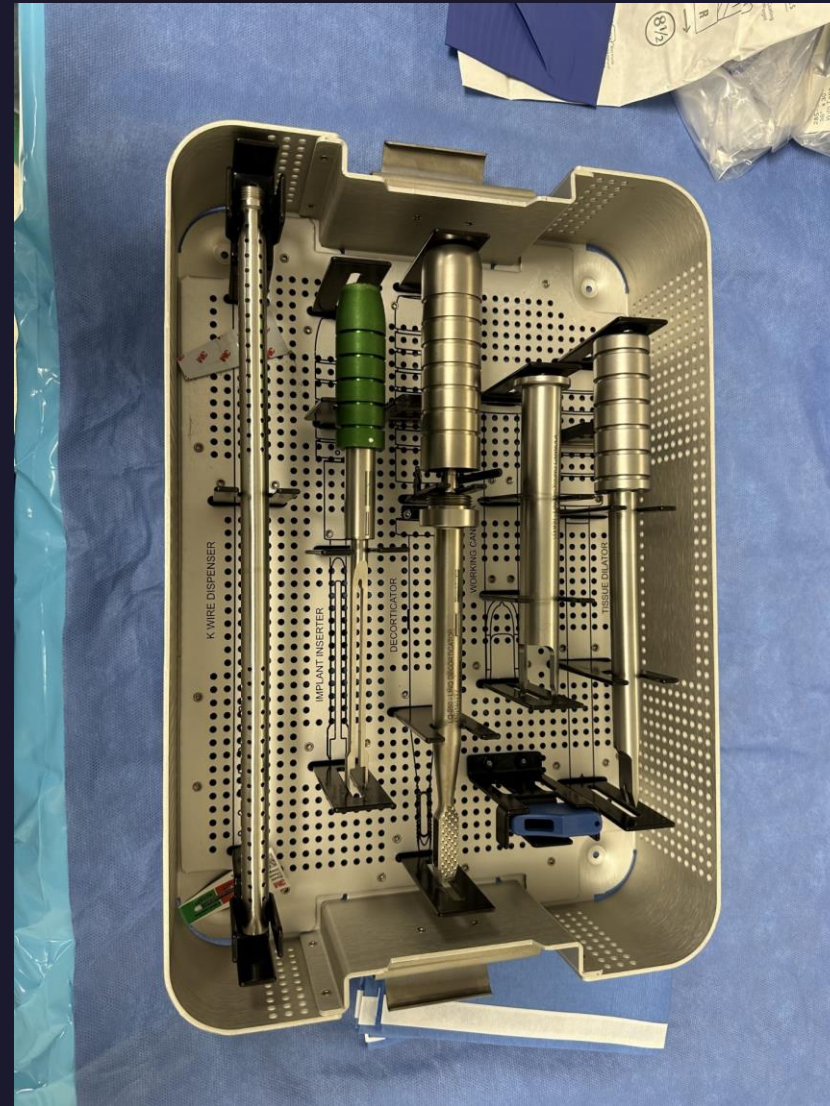
- Sayed et al., published a study of 50 patients followed for 613 days showed **NRS reduction from 6.85 to 2.86 with no major reported adverse events**

Sayed D, Balter K, Pyles S, Lam CM. A Multicenter Retrospective Analysis of the Long-Term Efficacy and Safety of a Novel Posterior Sacroiliac Fusion Device. J Pain Res. 2021 Oct 14;14:3251-3258.

- Randers, et al., published a sham operation double blind study of 63 patients showed **NRS reduction of -2.6 control vs. -1.7 in the sham group with no major reported adverse events.**

Randers EM, Gerdhem P, Stuge B, Diarbakerli E, Nordsletten L, Röhrli SM, Kibsgård TJ. The effect of minimally invasive sacroiliac joint fusion compared to sham operation: a double-blind randomized placebo-controlled trial. EClinicalMedicine. 2024 Feb 1;68:102438.

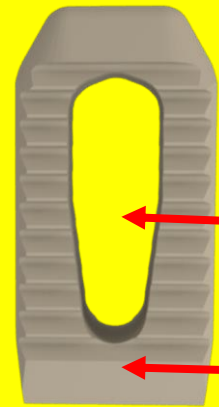




The LSU Shreveport experience-101 SI fusions since 2000 using Pain Teq and Omnia, submission of results next month

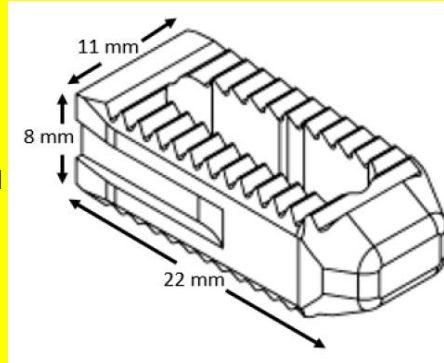
The single implant helps patients immediately regain joint stability – and with its large graft window, the SI Joint Stabilization System helps create an ideal environment for long-term fusion

Implant



Demineralized Bone Matrix (DBM) filled window is Osteoinductive

Cortical Cage is Osteoconductive



- implant is made from cortical bone harvested from either the femur or tibia of cadavers
- provides joint stability but also integrates proven principles that promote an optimal fusion environment
- ~1/3 of the implant surface area is composed of DBM
 - Graft window accommodates 0.5cc of DBM
- The DBM filled graft window facilitates a relatively quick fusion through the window locking the cage into place
 - DBM being osteoinductive will stimulate the host body to actively create an environment that promotes fusion
- Anti-migration technology should allow the implant to withstand higher stress and trauma than solid cortical implants

Single-Use Instrumentation



- 1 Glide Pin**
 - Full round tip helps prevent “false-positive” placement
- 2 Cannula**
 - Indicates orientation/prevents misalignment
- 3 Decorticator**
 - Distal tip is rounded and tapered, allowing for a tissue-sparing shallow incision
- 4 Decorticator**
 - First of its kind lever action removal system
- 5 Inserter**
 - Easy deployment of implant and removal



Sterile: Single-use kits reduce the risk of infection



Sharp: Every instrument arrives brand new, never dull



Ready: No cleaning, sterilization, or tray logistics required



Sleek: Designed by physicians; every function is user-input driven



Environmentally Responsible: Overall carbon footprint for single-use instruments is lower than reusable instruments

Step 1 Access

- Oblique the c-arm to align the anterior and posterior joint.
- Advance the Glide Pin into the middle of the joint.



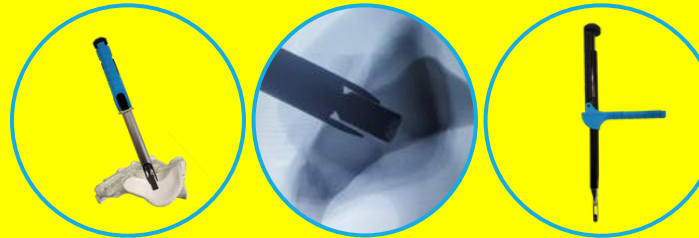
Step 2 Dilate

- Advance the Dilator with the Cannula over the pin until fully seated in the joint.
- Remove the Dilator and the Glide Pin from the Cannula.



Step 3 Decorticate

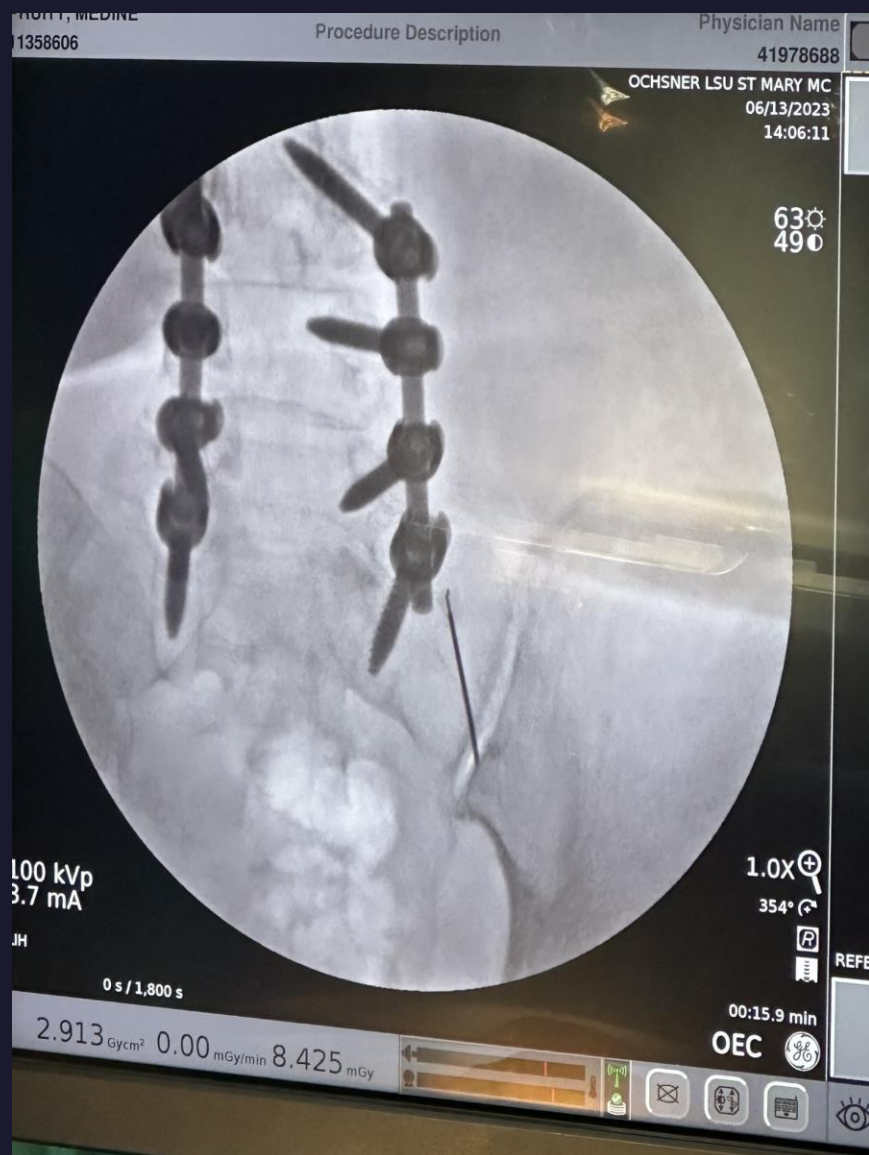
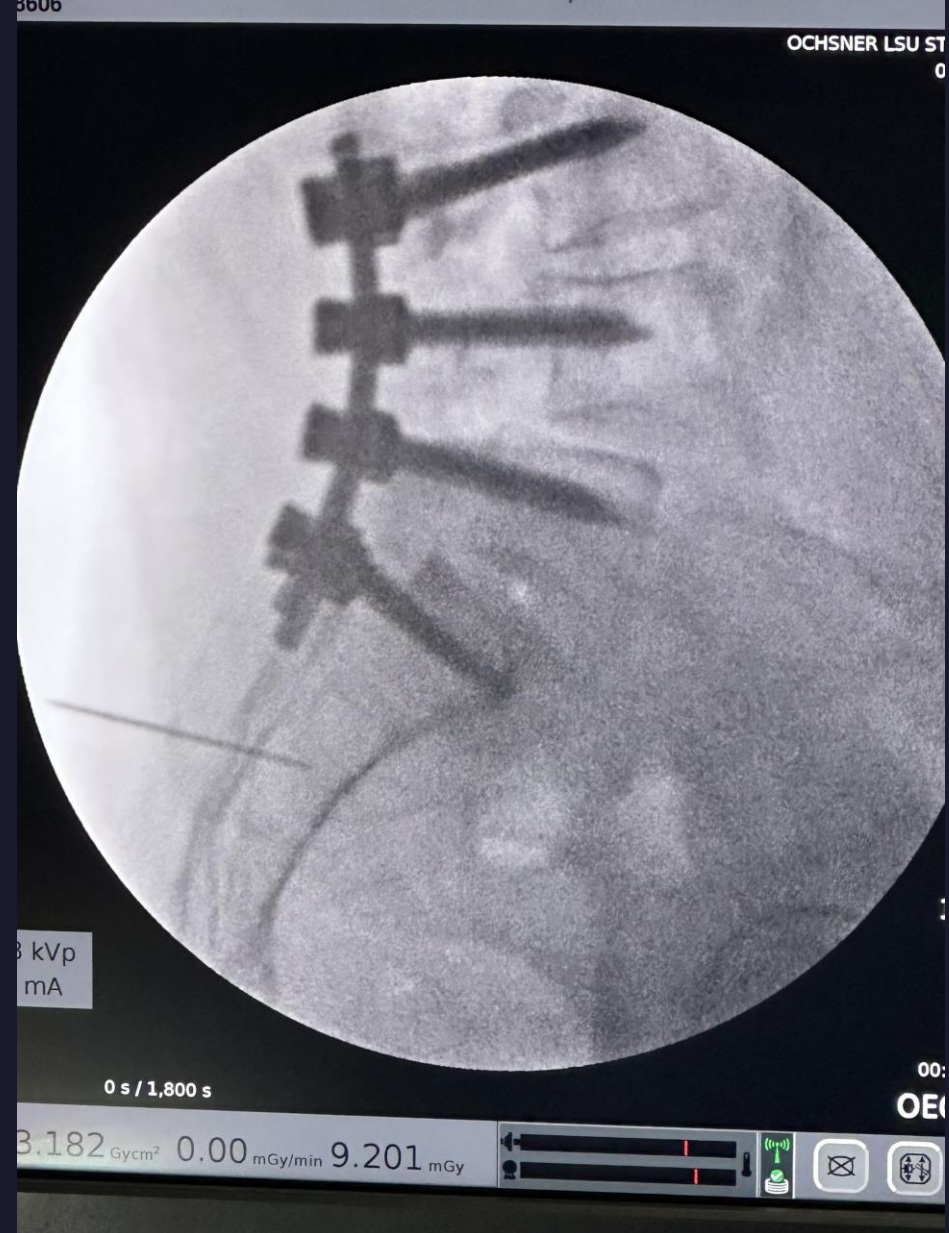
- Insert the Decorticator and tap with a mallet until fully seated.
- Remove the Decorticator by actuating the cam handle.

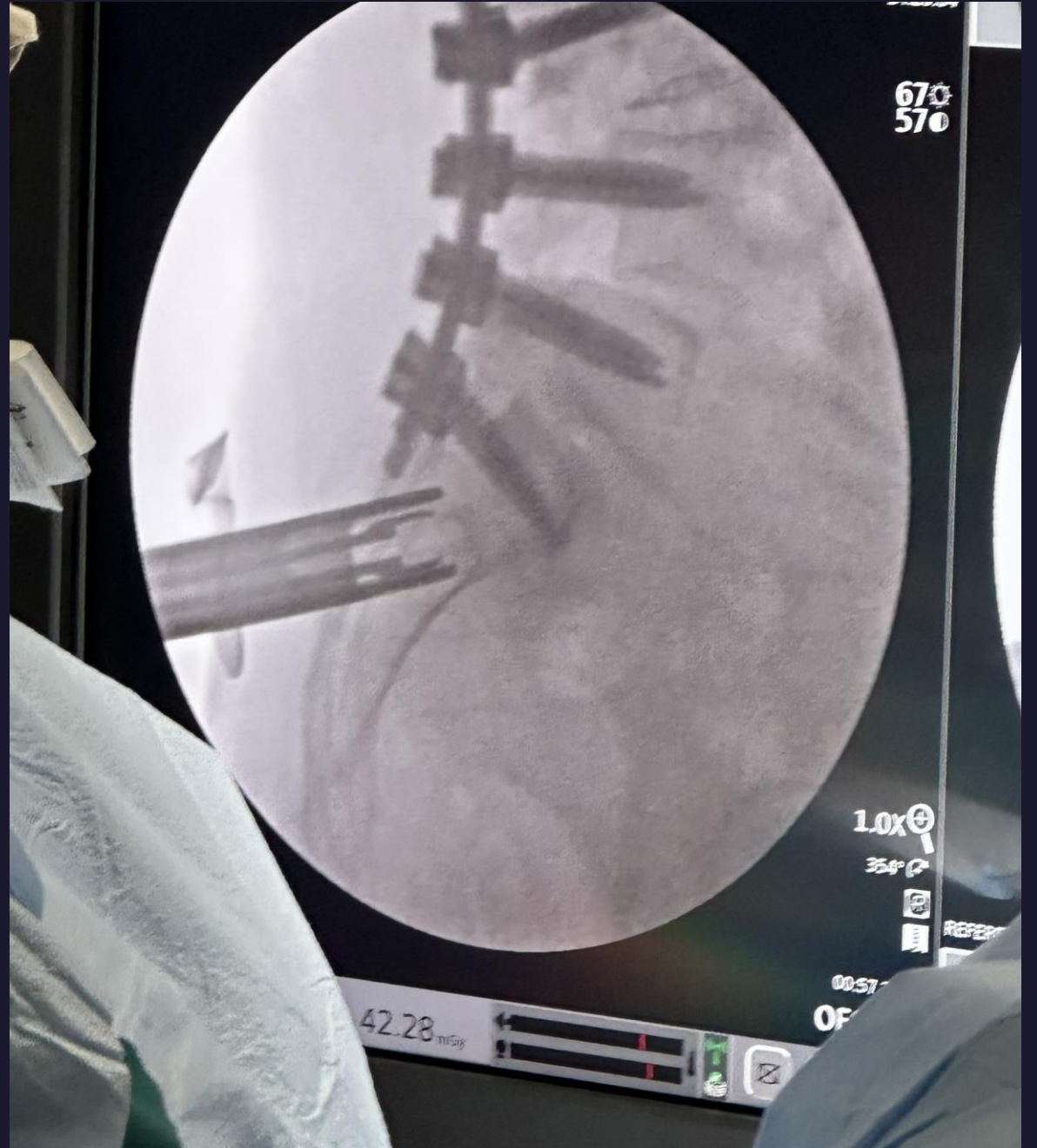


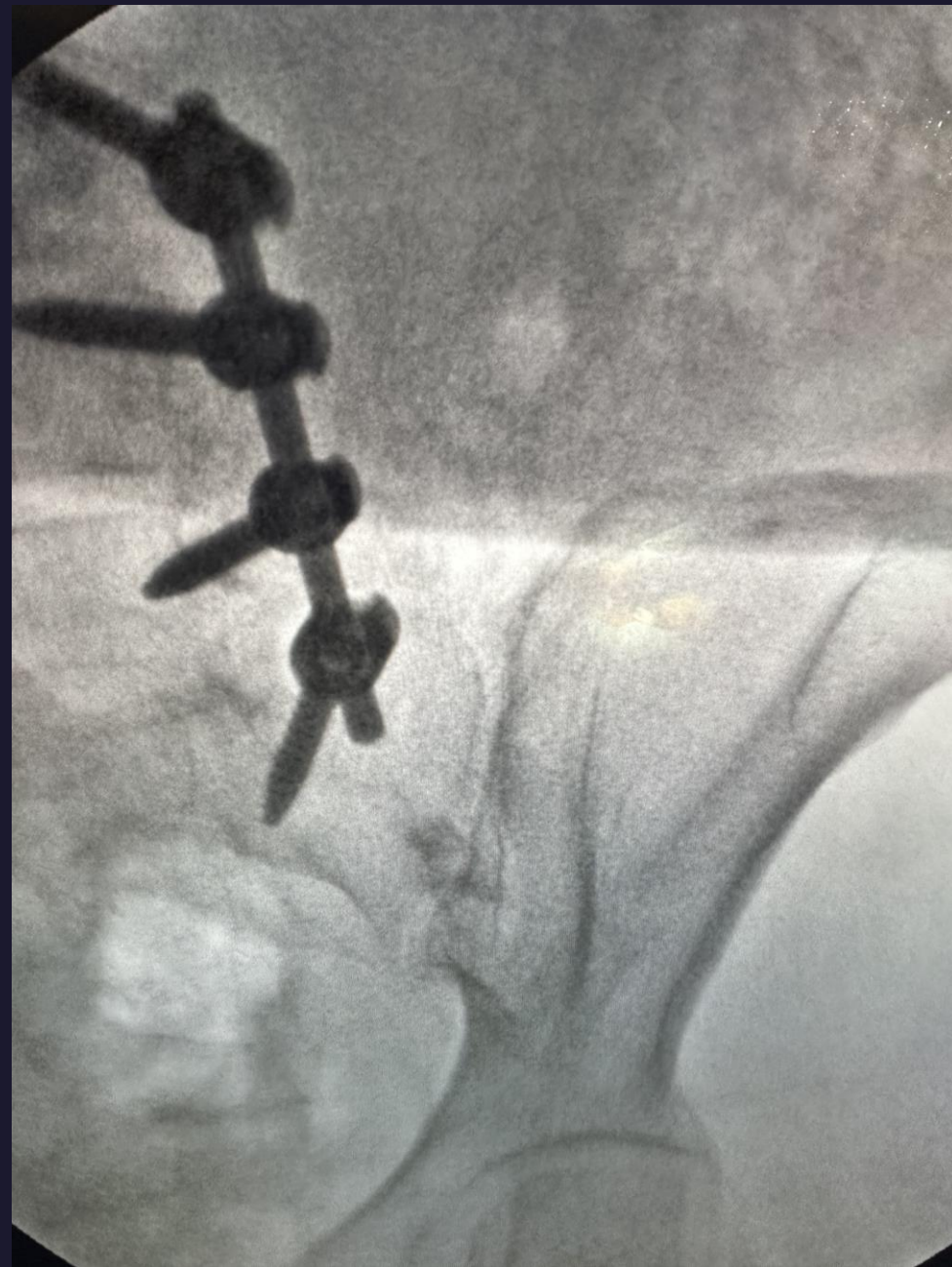
Step 4 Deliver

- Place the allograft implant on the Inserter and fill with included DBM.
- Deliver the LinQ allograft by gently tapping with a mallet until the Inserter is fully seated.









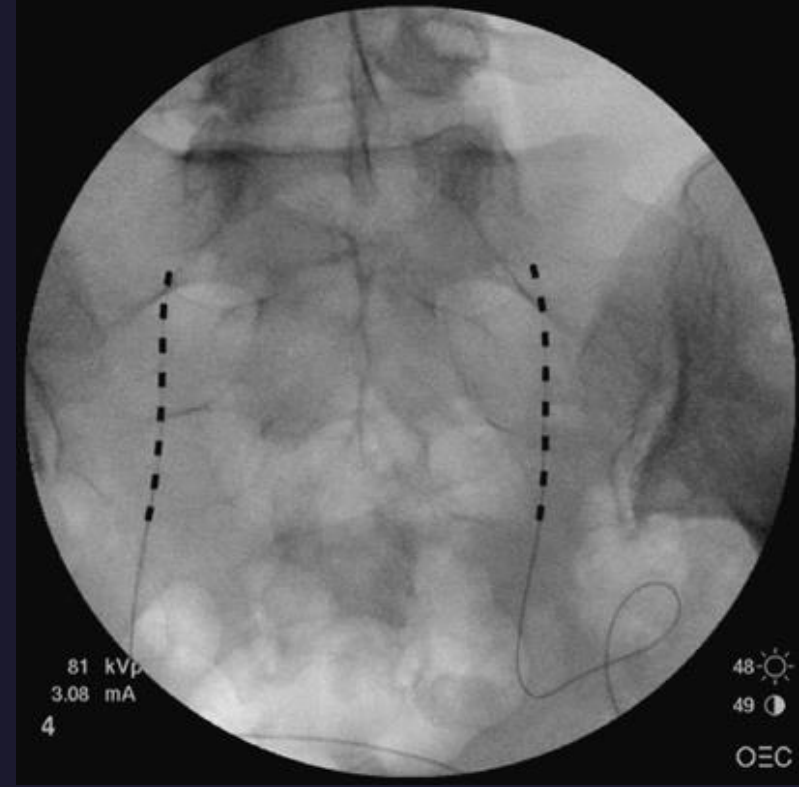
Peripheral Nerve Stimulation

- Promising results from small sized studies
 - 10 patients followed for 2 years after implantation
 - 9 patients reported PNS to be successful at 24 months
 - **Average pain score reduction from 9 to 1.9**

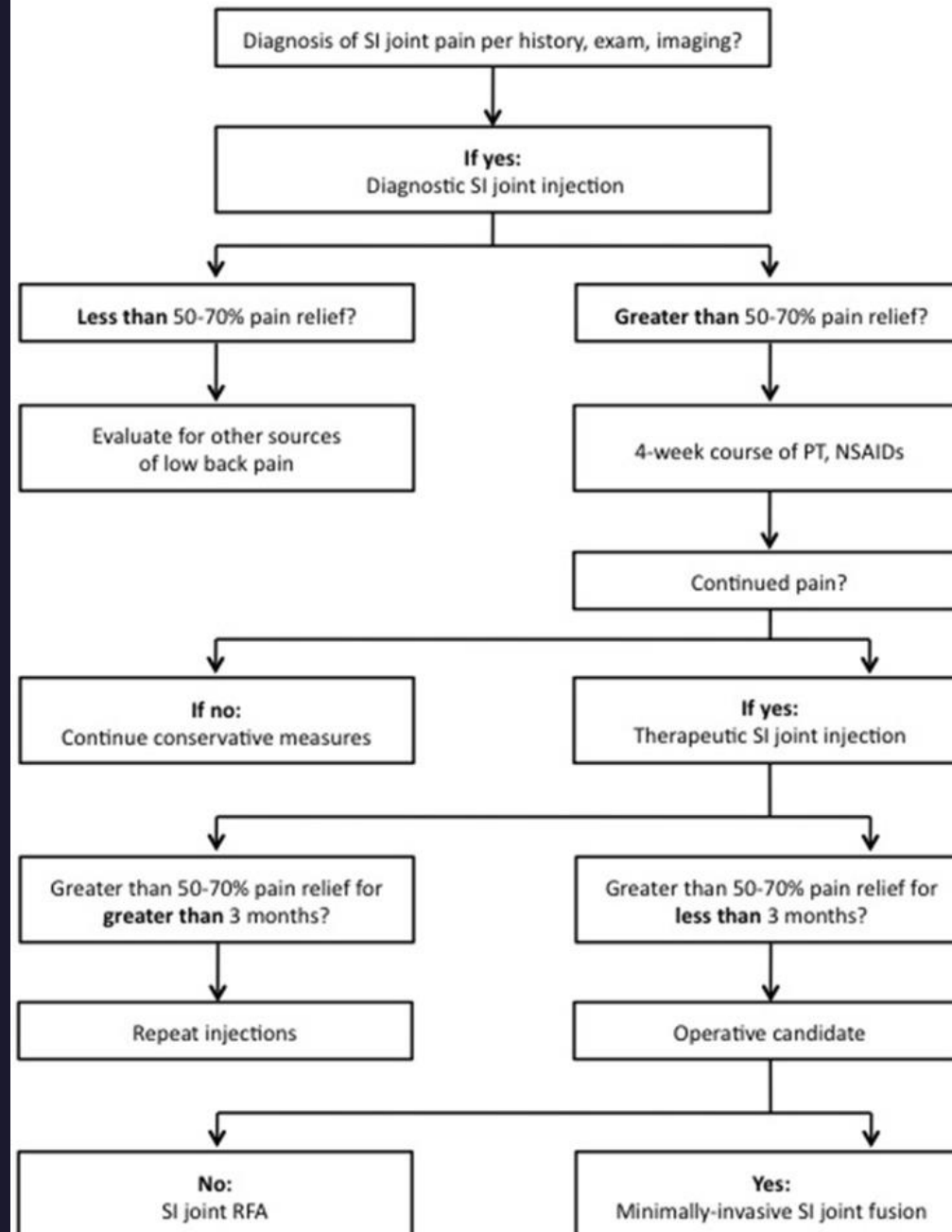
Guentchev M, Preuss C, Rink R, Peter L, Sailer MHM, Tuettenberg J. Long-Term Reduction of Sacroiliac Joint Pain With Peripheral Nerve Stimulation. Oper Neurosurg (Hagerstown). 2017 Oct 1;13(5):634-639

- **Successful Use of Subcutaneous Stimulation for Bilateral SI Joint Pain**
 - **90% pain relief case report**

Shah T, Khosla A. Successful Use of Subcutaneous Stimulation for Bilateral SI Joint Pain. Cureus. 2022 Nov 14;14(11):e31495.

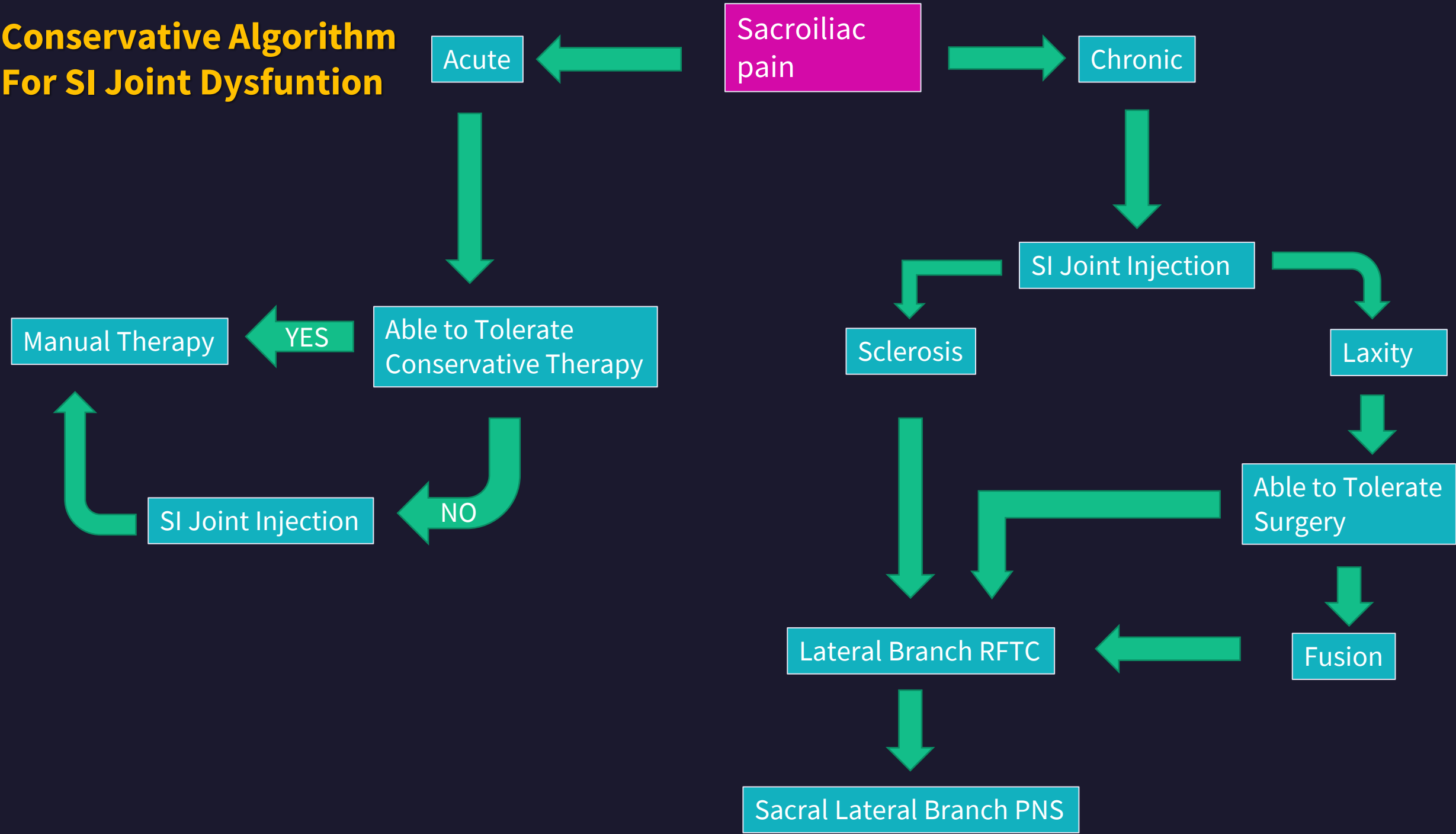


SACROILIAC JOINT DYSFUNCTION ALGORITHM FOR THE INTERVENTIONALIST



**Falowski, Steven et al.
A Review and
Algorithm in the
Diagnosis and
Treatment of Sacroiliac
Joint Pain. J Pain Res.
2020 Dec 8;13:3337-
3348.**

**Conservative Algorithm
For SI Joint Dysfunction**



Peripheral Nerve Stimulation for Sacroiliac Related Pain

Patient Identification – Medial/Middle Cluneal



- SI Joint Fusion
- SI Joint Stabilization
- Lumbar Fusions

Pain Pattern & Patient Identification

- SI Joint pain – pain when sitting, transition movements
- Leg symptoms mimic neuropathy
- Medial Cluneal neuralgia
- Buttock/gluteal pain
- Mononeuritis
- Low back pain - pseudo sciatica
- Post SIJ fusion with residual chronic pain
- CRPS
- Patients who aren't open to fusion
- Post-surgical lumbar fusions with residual pain
- Pre/Post SI Joint Fusion
- Patients with hardware



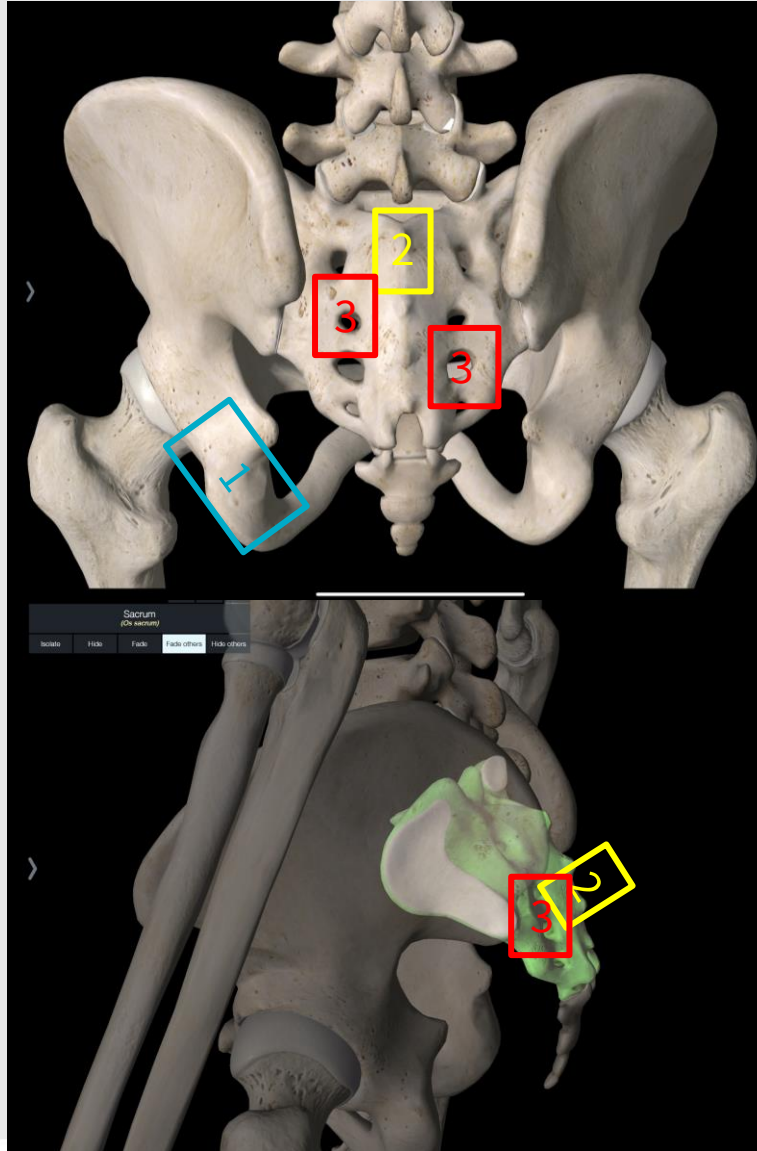
Lower Pelvis & Sacrum (Middle Cluneal): Medial/Middle Cluneal Nerves [at SI]

- Sensory branches of the dorsal roots of S1-S3 emerge through foramen – travel below the PSIS to form MCN
- Clinical Presentation: primarily buttock pain with leg pain aggravated by standing and walking
- May be diagnosed/treated as SI-Joint pain

1. Ischium

2. Sacrum/Sacral Spine

3. Sacral Foramen



Landmarks:

Lateral view is key to know we achieved placement along foramen and curve of sacrum

Entry Point:

Normally could use same entry point for medial & superior if doing joint case

Enter above sacrum (L5 transverse process) on side of placement – May need to make a slight curve in the introducer/needle *****tip: use coude needle***** to accommodate for sacral curvature (Lordosis) – Identify trajectory of introducer: lateral to foramen, medial to joint – Follow curve of sacrum

Target Point:

Touch bone around S1 – Confirm trajectory and angle in lateral view – Final placement is to lay leads lateral-caudal from S1-S2 foramen

FREEDOM FROM CHRONIC PAIN

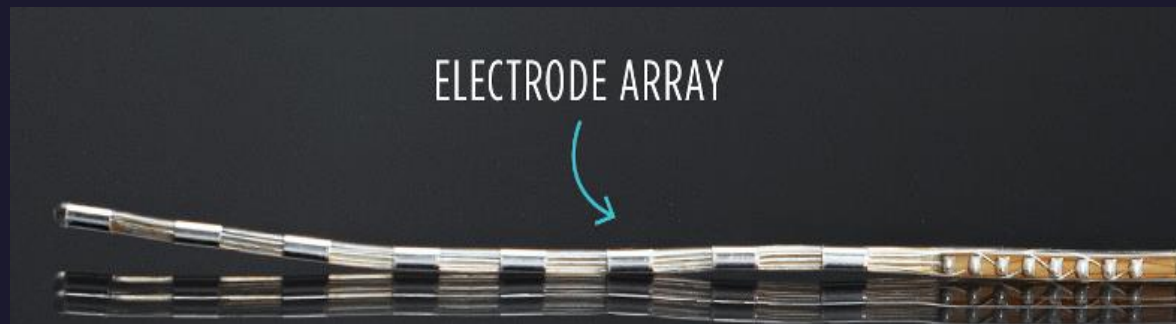
PNS PRODUCTS



FULL LEAD LENGTH: 45 cm

Freedom 4A/ STQ4

- 4 contact electrode array
- Non-tined for Trial
- Tined for Permanent
- Measurements:
 - ♦ Tip → Channel Marker = 13cm
 - ♦ Tip → Receiver Marker = 23cm



Freedom 8A

- 8 contact electrode array
- Non-tined for Trial & Permanent
- Measurements:
 - ♦ Tip → Channel Marker = 17cm
 - ♦ Tip → Receiver Marker = 27cm

Channel marker bands in each lead differentiate channel:
Channel A: 1 band, Channel B: 2 bands

E. 30 cm

- A. Introducer 6 in.
- B. 2 receivers (pink hubs)
- C. Preloaded electrode array
 - with steering stylet (blue hub
 - this stylet has a small 30° bent tip)
- D. Green straight stylet
- E. 30 cm Guidewire



Freedom System

The Freedom PNS System is designed to treat chronic peripheral nerve pain.

Transmitter Assembly

Antenna

Transmitter

Electrode Array

Receiver

ELECTRODE ARRAY & SEPARATE RECEIVER PLACEMENT

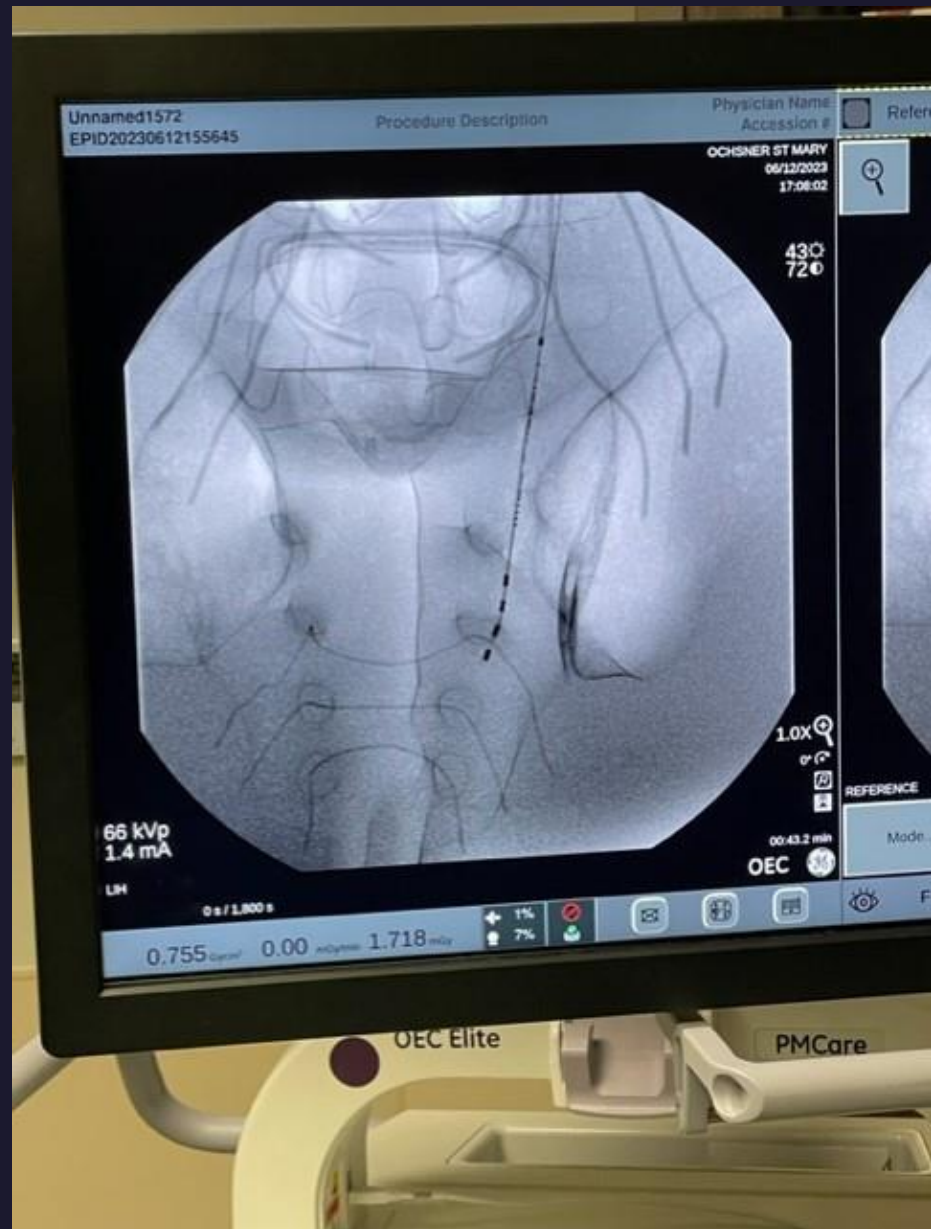
ELECTRODE ARRAY PLACEMENT FOR TARGETED NERVE

1st INCISION NEAR FIRST MARKER BAND

TUNNEL FROM 1ST TO 2ND INCISION

KNOT THE SEPARATE RECEIVER TO ELECTRODE ARRAY

2nd INCISION FOR SUBCUTANEOUS POCKET & RECEIVER COIL ANCHORING





**Target just lateral
to the S2 foramen**

Patient Identification – Medial/Middle Cluneal



- SI Joint Fusion
- SI Joint Stabilization
- Lumbar Fusions

PNS COIL GUIDE



Summary

The SI joint is a frequent source of low back pain, both acute and chronic. Recent advancements in the treatment of SI joint pain have resulted in the creation of a diverse range of SI joint fusion devices. **SI injections and RFA carry a LEVEL 3 or Fair evidence rating.**

SI fusion devices seek to immobilize the joints so that they can no longer be a source of pain and are designed to alleviate chronic pain without requiring patients to undergo lengthy surgery or take medications, including opioids that carry the risk of addiction and abuse. SI fusion can be performed minimally invasively via a **lateral** approach (i.e., iFuse, Tricor) or a **posterior** approach (i.e., CornerLoc, LinQ, Omnia, Rialto). Recent literature demonstrates efficacy with minimal complications.

Regenerative medicine and PNS are also evolving therapeutic techniques offering new hope for chronic lower back pain associated with the SI joint.



Thank you!!!

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