Peripheral Nerve Stimulation for the Treatment of Superior Cluneal Neuralgia: Revised Novel Technique for Lead Placement

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BACKGROUND

- Cluneal nerve pathologies are a heavily underdiagnosed cause of chronic lower back pain
- Clunealgias result from nerve entrapment (trauma or myofibrosis), causing pain in the buttocks, pelvis, lower back, or extremities
- Superior cluneal nerves (SCN) are frequent culprits, entrapped as they traverse the thoracolumbar fascia and iliac crest (an osteo-fibrous tunnel)
- Diagnostic and treatment efforts for clunealgias have grown in recent years
- Peripheral nerve stimulators (PNS) have grown a treatment modality with a growing number of case reports since 2020
- **Objective:** Describe a revised fluoroscopic angle for PNS lead placement along the SCN

ANATOMY AND PATHOLOGY

Anatomy

- Cluneal nerves: superior, middle, and inferior divisions from dorsal rami of ~T11–L3
- SCN crosses the iliac crest through an osteofibrous tunnel (thoracolumbar fascia + crest), the suspected site of entrapment
- Supplies sensation to the superior/medial gluteal region

Pathology & Diagnosis

- Causes: mechanical compression (surgical, such as fusion or bone harvest; non-surgical, such as spasm, stenosis, or Parkinson's rigidity)
- Presents as low back pain, buttock pain, or pseudosciatica
- Clinical diagnosis (SCN is 1–3 mm, too thin for CT/MRI): trigger point over the iliac crest, Tinel sign, pain aggravated by movement
- Relief with SCN block is the gold standard

TREATMENT OPTIONS AND PRIOR ANGLE

- Conservative therapy: first-line, but limited by side effects and variable efficacy
- Nerve block (local anesthetic ± steroid): relief ranged from <28% to 68%
- Surgical release, neurolysis (phenol/radiofrequency), or PNS for refractory cases
- PNS data for clunealgia are limited to case series; 5/6 patients had >50% improvement at 60 days
- Cadaveric bone marrow aspiration (BMA) study: 30° contralateral oblique, posterior superior iliac spine (PSIS) → anterior inferior iliac spine (AIIS) was safer than 15° or 0°, avoiding the greater sciatic notch
- Designed for deep osseous access, not for tracking the superficial SCN

IMAGES

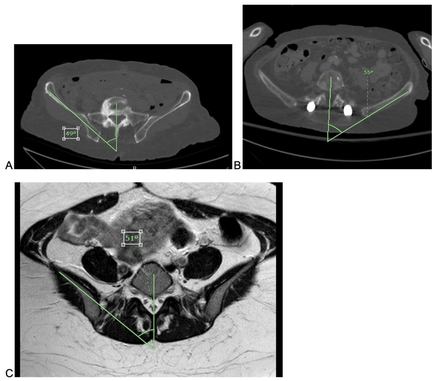


Figure one: Radiographic measurements of the angle of the top of the iliac crest from the patient's midline. A: Patient 1, a CT scan. B: Patient 2, a CT scan. C: Patient 3, an MRI.

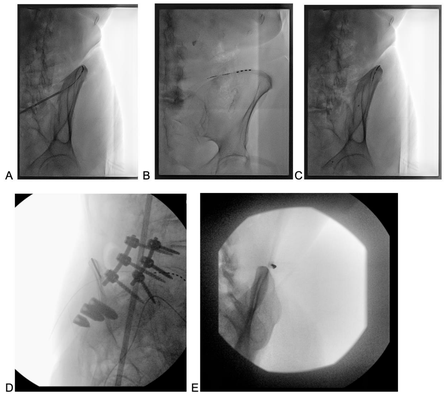


Figure two: Intraoperative fluoroscopic placement of superior cluneal nerve PNS lead in a series of patients. A: Patient 1. B: Patient 1. C: Patient 1. D: Patient 2 fluoroscopy demonstrating contralateral oblique image with approximately 55 degrees angle, with introducer needle in plane. E: Patient 3.

NOVEL TECHNIQUE: ~50° CONTRALATERAL OBLIQUE

1. Position patient prone on a radiolucent table
2. Obtain an AP view to identify the posterior iliac crest. Map out its angle from the spine (Fig. 1)
3. Rotate the C-arm to ~50° contralateral oblique, so the beam aligns with the cephalad crest (Fig. 2)
4. Confirm the crest appears as a continuous line
5. Place a finder needle to confirm superficial depth and trajectory over the crest
6. Advance the introducer parallel to the crest, cephalad
7. Place the PNS lead along the superior crest, spanning the medial, intermediate, and lateral SCN branches
8. Confirm fluoroscopically (Fig. 2) and secure per manufacturer specifications

CONCLUSIONS

- A ~50° contralateral oblique view aligns fluoroscopy with the cephalad iliac crest, the course of the SCN
- Angles designed for deep BMA access (30°) are not optimized for superficial lead placement
- This small adjustment may improve lead–nerve proximity and PNS outcomes; prospective study needed

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