

A Novel Multisite Peripheral Nerve Stimulation Approach for Chronic Hip Pain in Avascular Necrosis: A Case Report

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Introduction

Avascular necrosis (AVN) is a progressive disease, commonly leading to femoroacetabular joint collapse and severe pain (1). While early-stage AVN may be managed non-operatively, advanced cases often require total hip arthroplasty (1). For patients not eligible for surgery, peripheral nerve stimulation (PNS) can be a viable option for pain relief by targeting nerves innervating the hip, proximally at the lumbar plexus and distally at the articular branches of the femoral nerve, providing broad pain coverage.

Materials and Methods

A retrospective chart review was conducted to evaluate clinical course and outcomes of a patient with chronic bilateral hip pain secondary to AVN. The patient was treated at an academic pain management clinic with all data including medical history, imaging, prior interventions, procedural details, and follow up outcomes extracted from electronic medical records. Patient informed consent was obtained for submission of a case report.

Figures

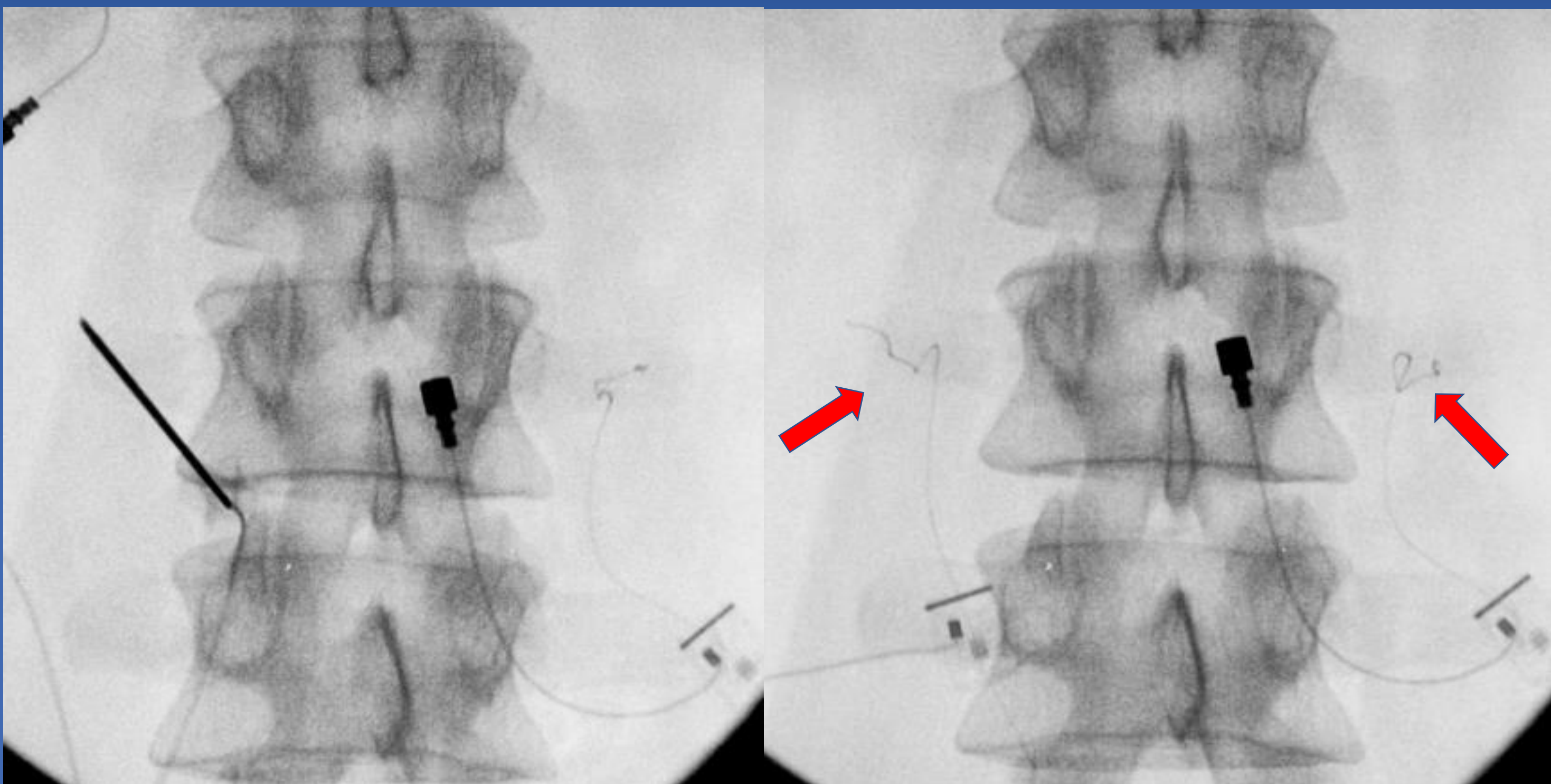
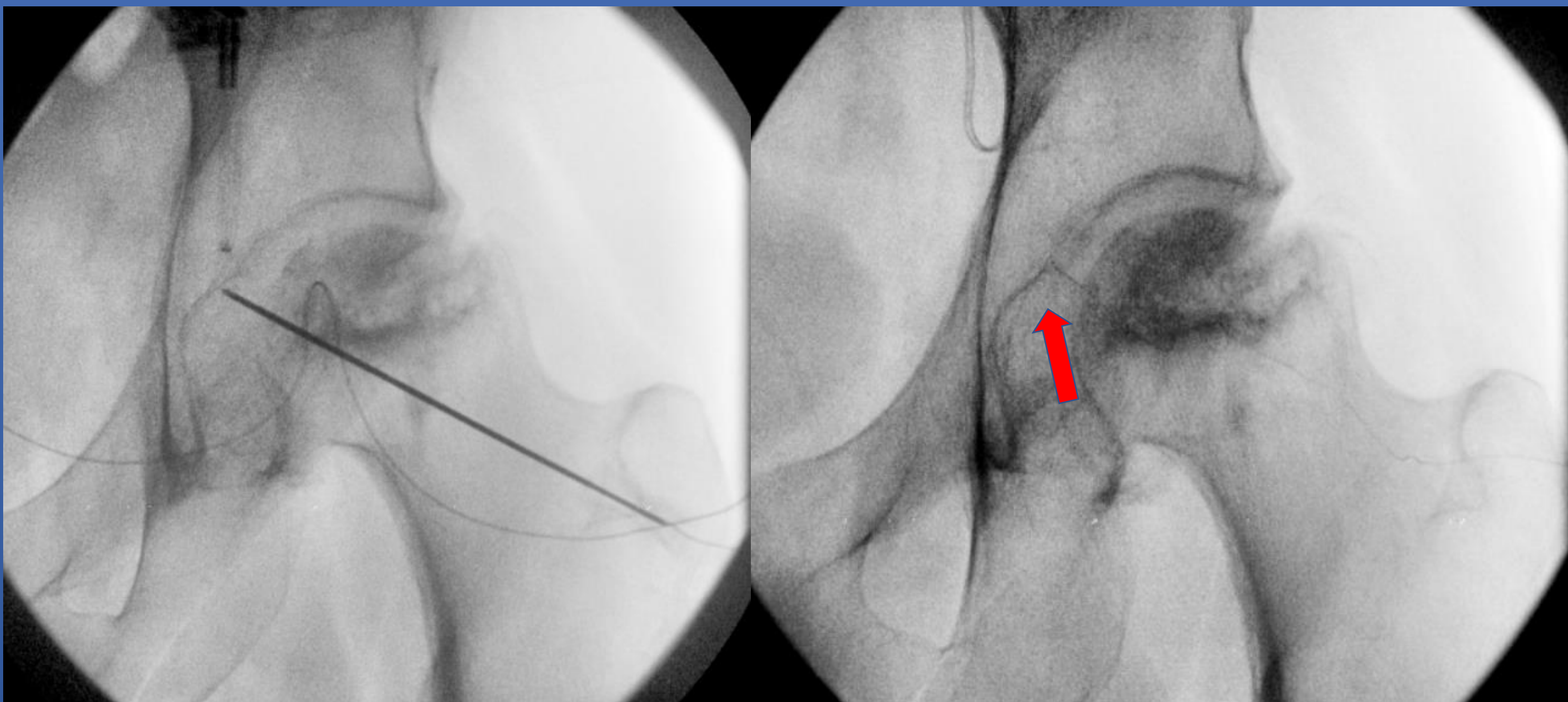


Figure 1.
Fluoroscopic guided SPRINT peripheral nerve stimulator placement (arrows) at the bilateral lumbar plexus (L2 region).

Figure 2.
Fluoroscopic guided SPRINT peripheral nerve stimulator placement (arrow) at the left anterior femoral nerve.



Case Presentation

A 32-year-old male with a history of bilateral hip pain due to AVN received PNS bilaterally to the lumbar plexus at the level of L2 and articular branches of the femoral nerve. He had previously failed conservative management, including bilateral radiofrequency ablation (RFA) of the femoral and obturator articular branches, and was not a candidate for hip arthroplasty due to significant medical comorbidities. Following lumbar plexus PNS, the patient reported greater than 90% relief of bilateral posterolateral hip pain. However, he continued to experience persistent anterior groin pain. Subsequently, PNS was applied directly to the articular branches of the femoral nerves bilaterally, resulting in a 75% overall reduction in bilateral hip pain.

Discussion

Hip sensation is primarily mediated by articular branches of the lumbar plexus, with the femoral/obturator nerves innervating the anteromedial capsule – areas rich in nociceptive receptors – thus making them key pain generators of the hip and common targets for RFA (2, 3). Alternatively, PNS has been an emerging therapy for refractory chronic neuropathic pain, particularly when conservative or less-invasive interventions have failed. PNS is thought to modulate peripheral nerve activity resulting in improved interplay between Aβ fibers and C fibers leading to decreased central sensitization and local nociceptive signaling (4). Current guidelines from the American Society of Pain and Neuroscience (ASPN) support PNS to the femoral, obturator, and sciatic nerves (Level I Evidence, Grade B) for anterior and posterior hip pain (5). Despite limited clinical evidence, PNS targeting the lumbar plexus and articular branches innervating the hip joint is a promising, novel treatment for chronic hip pain in patients with AVN who have failed conservative management and are not surgical candidates. It offers benefits in pain relief, function, and daily activity participation, particularly for diffuse or poorly localized hip pain. When lumbar plexus PNS alone is insufficient, additional targeted stimulation to the femoral and/or obturator nerves may enhance coverage and improve outcomes. Given limited existing data, further investigation and comparative studies with targeted PNS would prove beneficial to determine a potential role for lumbar plexus neuromodulation in managing chronic hip pain.

References

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