



## Neuropathy of Lumbosacral and Pelvic, Radiofrequency Approach in Neurology

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### ABSTRACT

Radiofrequency Ablation (RFA) technology has been utilized to eliminate or modify noxious sources. For more than 50 years, radiofrequency (RF) has been used to treat a range of pain-producing components, albeit not all pain syndromes have yet been treated with it due to knowledge or technical limitations. This review paper will look at how RFA is being used for the first time in pain of lumbosacral and pelvic spines, how it's trending, and how it might be used in the future. They include Disc herniation and radiculitis, Intradiscal PRF for discogenic pain, Chronic lumbosacral radicular pain, Lumbosacral facet joint pain, Spinal stenosis, Degenerative spondylolisthesis, Breast cancer metastases in the SI joint, Post lumbar surgery syndrome, Coccygodynia, Ganglion impar. Osteoarthritis of the hip, Chronic post-arthroplasty hip pain, Persistent right hip pain after septic arthritis, and lumbosacral facet joint.

Keywords: Radiofrequency, Head and Neck, Neurology, Pain

### 1. Main text

**Introduction:** Radiofrequency Ablation (RFA) technology has been utilized to eliminate or modify noxious sources. For more than 50 years, radiofrequency (RF) has been used to treat a range of pain-producing components, albeit not all pain syndromes have yet been treated with it due to knowledge or technical limitations. This review paper will look at how RFA is being used for the first time in pain of lumbosacral and pelvic spines, how it's trending, and how it might be used in the future. (1).

A number of factors can cause lumbosacral plexopathy. Rarely does radiation cause lumbosacral plexopathy. However, past pelvic surgery and/or radiotherapy can make fibrosis difficult to distinguish from tumor. Often, patients are first scanned using CT or MRI (MRI). Understanding the neurologic presentation, tumor histology, and treatment time and kind helps interpret anatomical imaging. If these tests are normal or ambiguous, PET/CT should be investigated since recurrent disease may be seen in surgical scar tissue(2).

#### **Lumbar Spine and Sacroiliac Joint Pain Syndromes**

Approximately two-thirds of all adults will have some degree of low back pain during their lifetime. It is believed that disc annulus, posterior longitudinal ligaments, facet joints, spinal nerve roots and ganglia, and paravertebral muscles, are all responsible for lumbar spine discomfort. Each of these elements has the potential to be investigated therapeutically. Radiculitis and disc herniation can be treated with PRF. Several randomized studies have found that PRF significantly improves outcomes and reduces discomfort(3). Compared to corticosteroid injections, PRF is more effective in treating persistent lumbosacral radicular pain.(4)

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In numerous clinical trials, lumbosacral facet joint pain has been successfully treated with PRF stimulation.(5, 6). The lumbar medial branch nerves were relieved by CRF, but not by PRF, possibly due to short-term follow-up and small sample size. One study on lumbosacral pain found IA PRF stimulation and intra-facet joint CSI comparable(7).

A study of 80 spondylolisthesis patients found PRF to be analgesic on the lumbar medial branch. This effect outperformed the IA CSI.(8).

Degeneration, infection, malignancy, and trauma can all cause discomfort in the Sacroiliac Joint (SI Joint). In 2018, CT-guided IA CRF (80 °C, 180 seconds) (PRF were equally effective in treating SI joint pain in 64 individuals. Both groups saw a decrease in VAS at one week, six months, and a year, although the CRF group saw a higher decrease.(9).

PRF better provided pain alleviation and functional improvement.(10). The efficiency of CT-guided IA PRF and CRF was demonstrated in a clinical investigation on 64 patients with chronic sacroiliac joint pain. In both the early and late stages, the CRF outperformed the PRF(9).

PRF neuromodulation of the L4-S3 primary dorsal ram and lateral branches was employed in patients with buttock pain due to the SI joint's breast cancer metastases. Using a rotating curved needle approach, PRF minimized pain by 70%(11).

Lumbar disc pain can also be treated with RF. Disc herniation, disc disruption, disc degeneration, spinal stenosis, and post-lumbar surgical syndrome are all possible causes of chronic, persistent low back, lower extremities, and radicular pain.

Intradiscal PRF modulation in the treatment of disc herniation, spinal stenosis, and post-operative pain has shown promising outcomes(12).

Chronic facet joint pain: Pain in the spine's facet joints is a common occurrence. Lumbar chronic facet joint pain is specifically targeted at the facet joint, which is a genuine synovial joint and is innervated by two medial branches of the dorsal ramie. At least six months of pain alleviation with radiofrequency (RF) therapy of the lumbar medial branches was reported to be possible in these patients(13).Some rheumatological diseases can present them in different conditions, such as Ankylosing spondylitis (14).

**Post lumbar surgery syndrome:**Participants were given PRF stimulation in a research trial after failing two epidural steroid injections. Needles were inserted through the sacral hiatus into the epidural space (S2-3 IVC level). Even though only 32% of patients experienced pain reduction, these results are encouraging given the lack of response to earlier injections(15).

Coccygodynia: is characterized by discomfort and tenderness in the coccygeal area, and is almost often the result of some sort of trauma. It was found that Caudal epidural PRF was applied to coccygodynia patients, with 81 percent of patients responding well to treatment.(16).

PRF was used to treat coccygodynia as a new treatment, and the numeric pain rating scale decreased dramatically at intervals of three and six months. A ganglion impar block and pulsed RF treatments were offered to the patients. With long-term pain alleviation and reduced recurrence risk, chronic coccygodynia patients benefited from PRF neuromodulation.(17).

**Pulsed Radiofrequency Ablation of Pudendal Nerve (PN):** PN patients who have failed to respond to conservative treatment may benefit from transgluteal PRF ablation. It's possible that the MR neurography used in this case could help rule out other possible causes of pelvic pain, such as genitofemoral neuropathy, endometriosis, adenomyosis, or a pelvic mass lesion, in addition to helping confirm the diagnosis of PN. MR neurography can confirm a clinically suspected diagnosis of pudendal neuropathy, and transgluteal PRF ablation is a feasible therapy option for alleviating its symptoms(18).

**RF for Pelvic and Hip Pain**When used to treat chronic pelvic pain, PRF lowers VAS and reduces the need for analgesics.(19).A new anterior method to cooled RF hip denervation for chronic pelvic pain was introduced recently. This procedure prevented neurovascular femoral bundle and reached correct landmarks. These patients had easy needle access to the lateral articular branches of the femoral nerve, but putting the second trocar to the incisura acetabuli was more problematic. These findings support an anterior needle approach to the lateral articular branches of the femoral and obturator nerves, followed by RF denervation using a US-guide and fluoroscopy landmarks.(20).

Osteoarthritis of the hip: a prevalent and debilitating condition that requires joint replacement. RF denervation of the articular branches of the femoral and obturator nerves, the pelvic joint's nerves, is a new hip OA treatment approach. Some investigations employed continuous RF, which might cause neuritis and neuromas.Some orthopedic disorders can benefit from the use of radiofrequency energy. Some orthopedic conditions don't need surgery, so an alternative plan should be considered (21).

The effect of PRF on femoral articular branches and obturator nerves in chronic pelvic pain patients was studied. In a 6-month follow-up, 57 percent of patients reported less pain, and disability scores fell(22).

Chronic Post-arthroplasty Hip Pain: This syndrome can occur after complete hip replacement. In one study, cooled (60 ° C) RF lesioning of the articular branches of the femoral nerve effectively reduced chronic post-arthroplasty hip pain at 6-month and 24-month follow-up(23).

PRF can be utilized for chronic pelvic discomfort in patients who are not candidates for surgery. For example, in bilateral coxarthrosis, a 10 cm neurotherm needle at 42°C for 480 seconds alleviated his discomfort(24).

Both medial branch and IA stimulation can be utilized to treat lumbosacral facet joint discomfort. Stimulation of the posterior primary ramus medial branch can block pain signals from the facet joint to the brain.(25).

IA PRF stimulation is performed by placing the PRF catheter in the atlantooccipital or facet joints. Because the joint is tiny, PRF stimulation can significantly impact the whole joint.(26). The SI joint is one of the areas that has not yet been thoroughly investigated with a substantial number of samples to determine the efficiency of PRFs.

**Contraindications:** There are few contraindications to radiofrequency ablation. Patient refusal, elevated ICP, and local infection are all considered contraindications. Because many treatments entail using the spinal column, careful clinical judgment, and adherence to accepted standards of care are essential when dealing with anticoagulants or bleeding problems. It is normally carried out following ASRA regulations.

**Conclusion:** we will examine how RFA is being utilized in pain management for the first time in the lumbosacral and phrenic spines and how it is trending and how it might be employed in the future. They include Disc herniation and radiculitis, Intradiscal PRF for discogenic pain, Chronic lumbosacral radicular pain, Lumbosacral facet joint pain, Spinal stenosis, Degenerative spondylolisthesis, Breast cancer metastases in the SI joint, Post lumbar surgery syndrome, Coccygodynia, Ganglion impar. Osteoarthritis of the hip, Chronic post-arthroplasty hip pain, Persistent right hip pain after septic arthritis, and Lumbosacral facet joint(27).

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