

Balancing Tremor Control and Device Safety: Lumbar Radiofrequency Ablation with Active DBS in Parkinson Disease

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Introduction

- Lumbar medial branch radiofrequency ablation (RFA) is an established treatment for facet-mediated axial pain.
- In patients with deep brain stimulation (DBS), radiofrequency energy raises theoretical concerns for electromagnetic interference, unintended current induction, device malfunction, and tissue heating.
- Published evidence is limited and consists mainly of case reports and expert guidance.

Clinical challenge

Routine DBS deactivation was not feasible: turning stimulation off provoked severe tremor and dyskinesia that could compromise safe positioning.

Case

71-year-old man	Parkinson disease	Bilateral STN DBS

- ≈2-year history of non-radiating axial low-back pain, aggravated by standing and increasingly limiting daily activity.
- Exam: pain with bilateral facet loading/palpation and lumbar extension with restricted range of motion.
- Failed >6 weeks of acetaminophen, celecoxib, physical therapy, and home exercise.
- Lumbar MRI could not be safely completed because MRI mode triggered disabling tremor/dyskinesia.

Working diagnosis

Facet-mediated axial low-back pain supported by examination and subsequent diagnostic medial branch blocks.

Evaluation & Treatment

1 Diagnostic block #1

Fluoroscopy-guided lumbar medial branch block

>80% pain relief + functional improvement

2 Diagnostic block #2

Repeat bilateral medial branch block

Again >80% relief + functional improvement

3 Procedural dilemma

DBS OFF → severe tremor / dyskinesia

DBS ON → theoretical device-interference risk

4 Multidisciplinary plan

Pain Medicine + Neurosurgery review

Proceed with bipolar RFA while DBS remained active

5 Bipolar thermal RFA

Bilateral L3–L5 medial branches

80°C × 90 s • non-pulsed • local anesthesia

Outcome

>80% PAIN RELIEF

- No perioperative complications
- No DBS dysfunction
- Improved standing and ambulation
- Durable benefit at 3-week follow-up

Discussion

- Radiofrequency energy may theoretically cause electromagnetic interference, induced currents, device malfunction, or lead/electrode heating.
- Risk depends on device configuration and current pathway; bipolar lesioning may confine the electromagnetic field. Evidence specific to spinal RFA in DBS patients remains limited.

What this case adds

Successful lumbar RFA was achieved when routine DBS deactivation itself compromised procedural safety. The case extends the limited literature by demonstrating a carefully planned, case-specific approach with active stimulation.

Case-specific risk-mitigation strategy

1. Multidisciplinary review
2. Bipolar lesioning
3. Local / minimal sedation
4. Post-procedure device assessment

TAKE-HOME MESSAGE

When DBS deactivation causes disabling motor symptoms, RFA planning should be individualized rather than reflexively abandoned. Multidisciplinary review and a device-conscious technique are essential.

Limitation

A single successful case does not establish general safety; larger prospective studies are needed, therefore an institutional guideline has been established.

Selected references

1. Osborne MD. Pain Med. 2009;10:1046–1049. 2. Ang SP, et al. Pain Med Case Rep. 2020;4:175–178. 3. Rahimpour S, et al. Clin Neurol Neurosurg. 2021;203:106577. 4. Friedrich J, et al. Pain Physician. 2020;23:E335–E342.