

BASIVERTEBRAL NERVE ABLATION AT LUMBAR SEGMENTS PREVIOUSLY FUSED WITH PEDICLE SCREWS
TO TREAT AXIAL LOWER BACK PAIN

University of Massachusetts Chan Medical School
Yury Rabotnikov MD and William Pisano BS



INTRODUCTION

Post fusion adjacent segment degeneration is a common phenomenon and traditionally has no simple interventional solution. If neuraxial compromise is present, extension of the fusion is often warranted, but if no neurological symptoms are present, no surgical options exist. Patients often require a multi-modal approach to treat the residual axial pain. Basivertebral nerve ablation has been employed successfully for patients vertebrogenic pain, but there is very limited data in patients with previous fusion and adjacent segment disease.

This is a case report of a 77 year old male who presented to our practice with significant, recurring lower back pain after an initial L4-L5 fusion and extension to L3. His initial pain began a few years after his revision surgery, with the worst symptoms and most functional decline approximately 6 years post-op.

CASE REPORT

HPI: A 77-year-old male, burdened with multiple comorbidities, previously underwent posterior L4-L5 fusion with subsequent extension to L3. His initial post-operative course was unremarkable and endorsed relief from his radicular pain down his legs. Unfortunately, he subsequently, he developed axial lower back pain some years later that led to leg weakness and difficulty ascending/descending flights of stairs, which was mostly the result of deconditioning, rather than a re-emergence of his previous neurogenic claudication.

Relevant PMH: Uncontrolled T2DM, HTN, with a history of osteoarthritis and morbid obesity.

Findings on initial clinic visit: Neurological exam intact. Severe pain (8/10) in the lower back.

Imaging: Lower spine XR, CT, and MRI showing moderate to severe junctional degenerative disc disease at L2-L3 and L5-S1 with severe neuroforaminal narrowing.

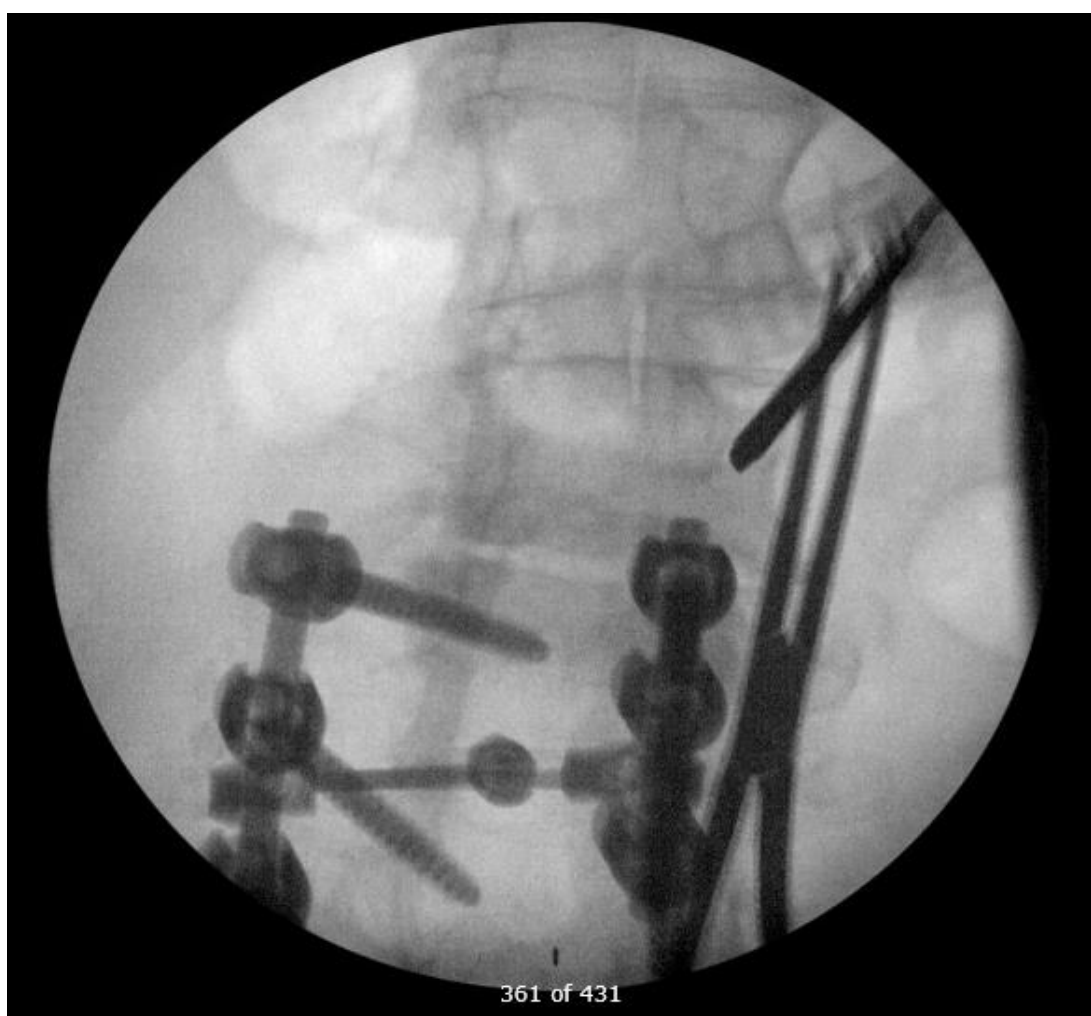
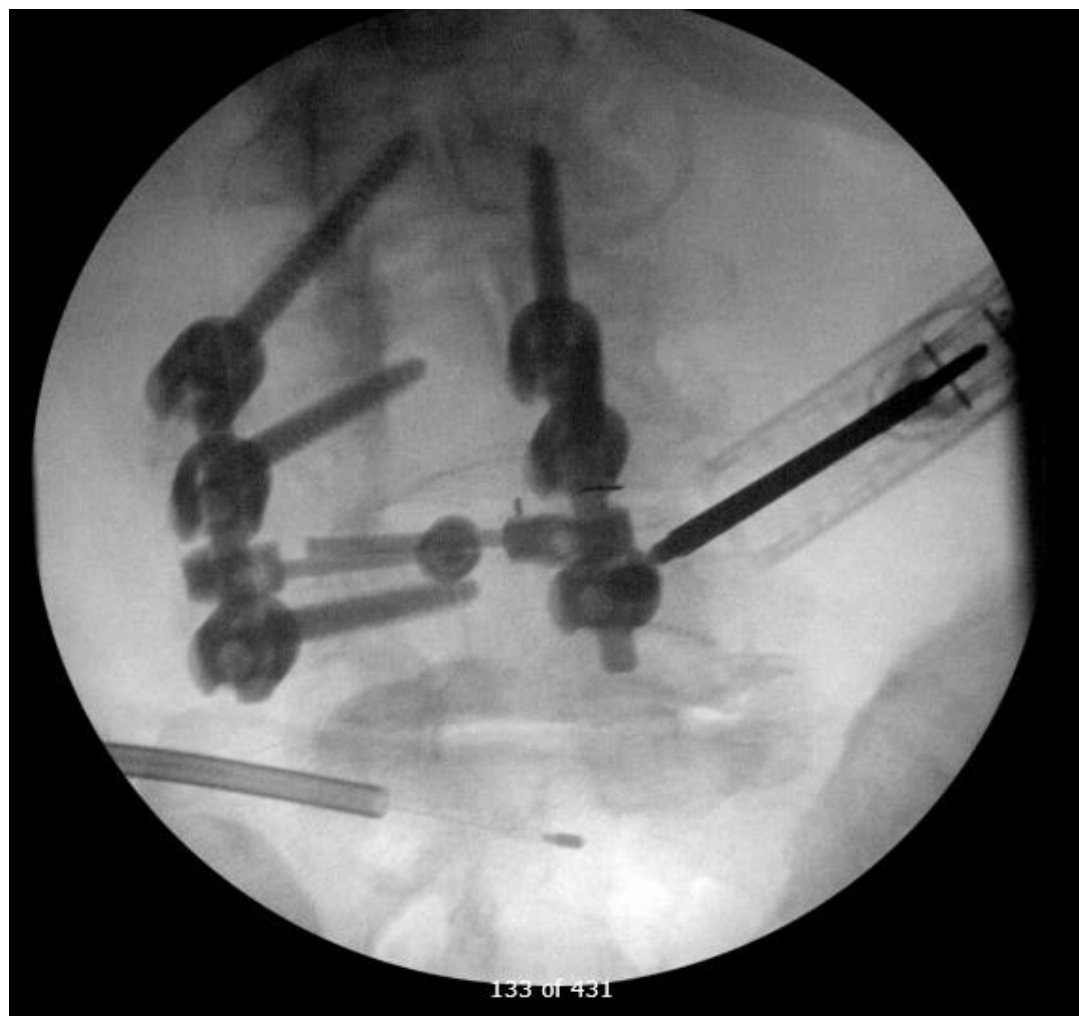
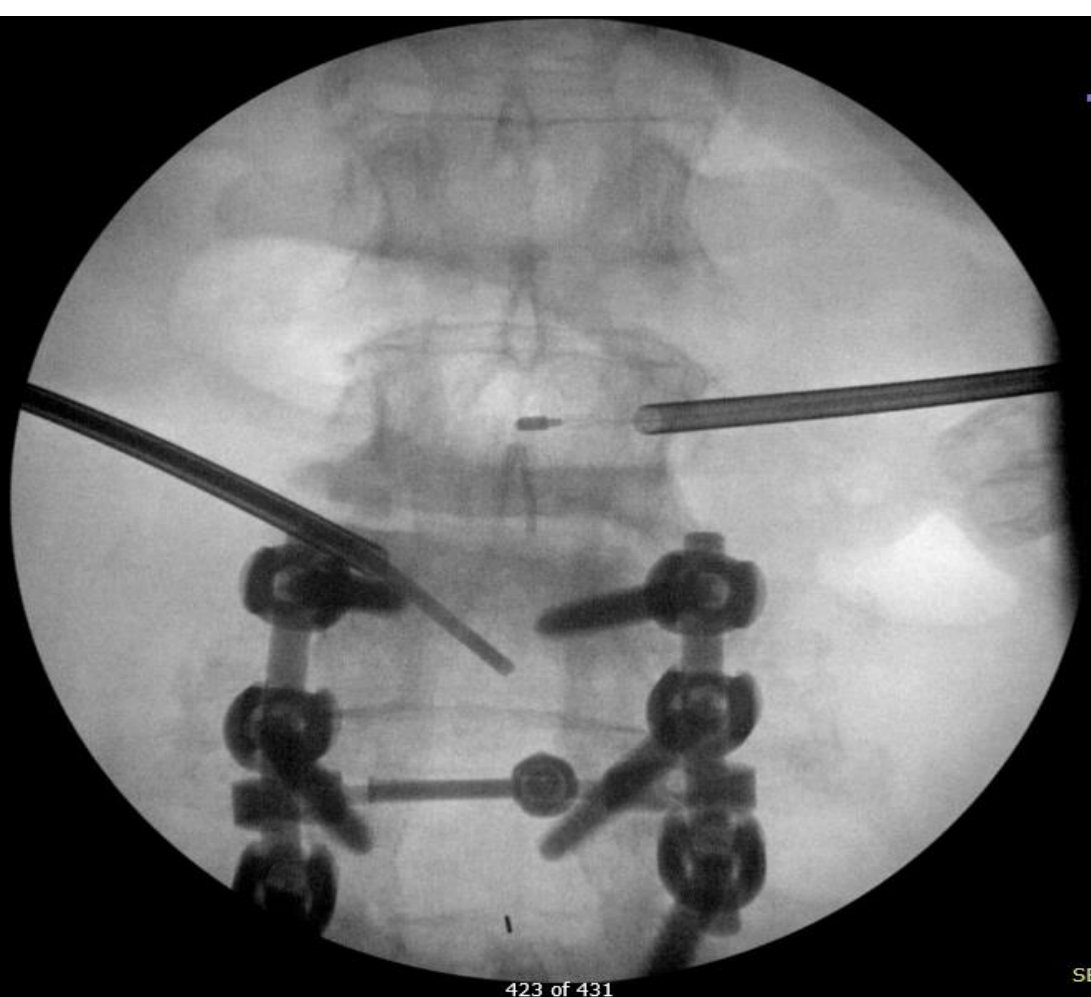
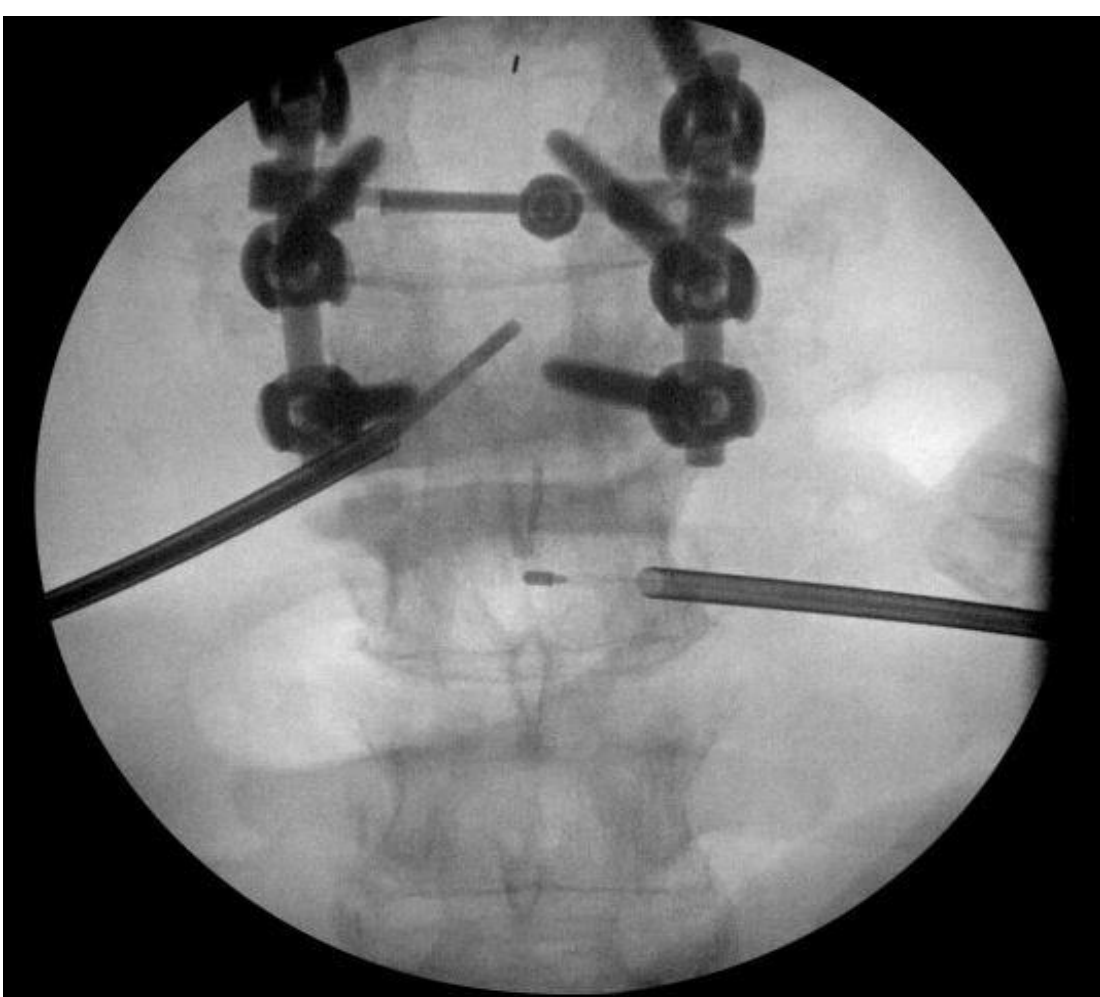
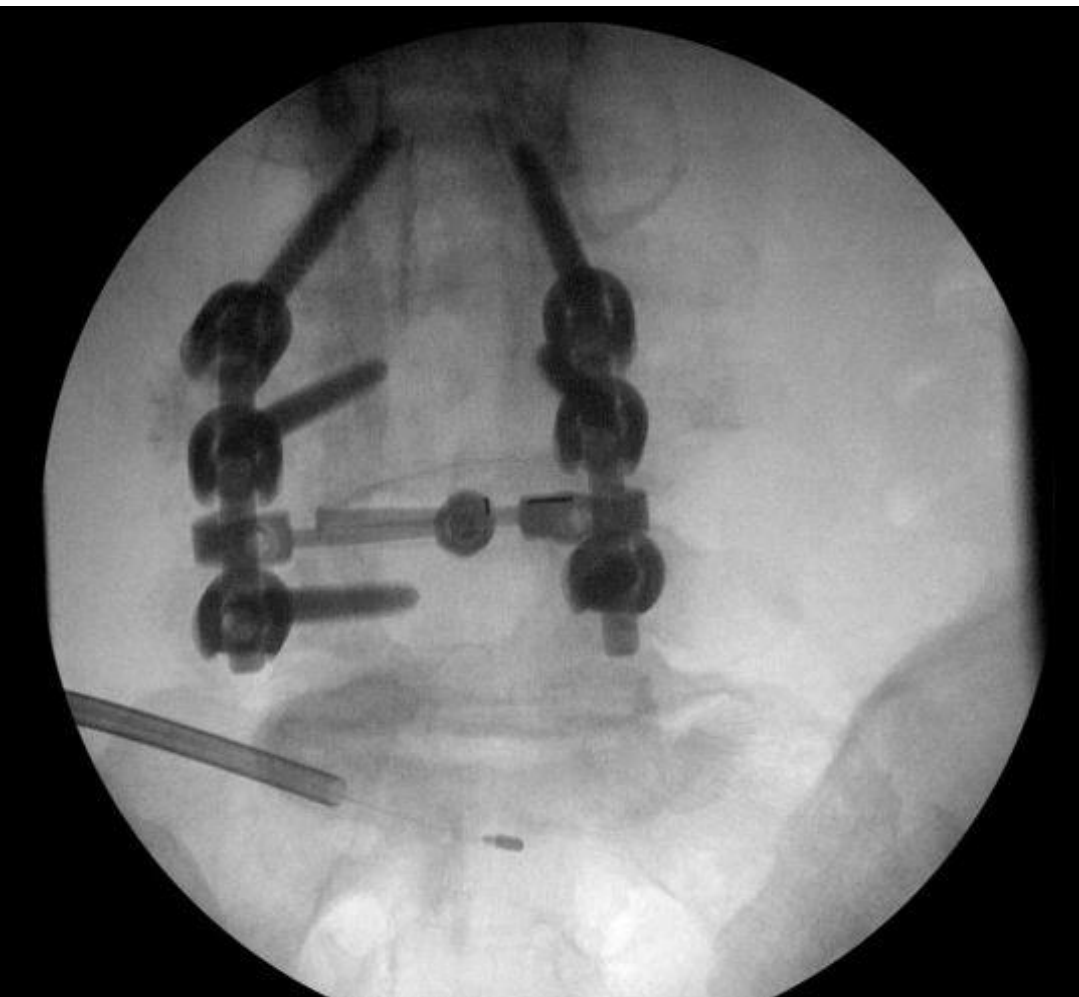
Conservative treatment: Initially, conservative management and physical therapy were pursued. However, despite these efforts, there was a progressive deterioration in the patient's condition, leading to continued deterioration.

Procedural interventions: Initial interventions included Bilateral L5-S1 Lumbar Medial Branch Blocks, Lumbar Spinal Epidural Injection of L2-L3 and L5-S1. The patient did not endorse any long-term significant relief of his axial pain from any of these interventions. After multi-disciplinary discussions, the patient underwent L2-L3 and L5-S1 intraosseous nerve ablation with fluoroscopic guidance

IMAGING



Post-Fusion Extension Degenerative Changes MRI and CT



Intraoperative XR

SURGICAL TECHNIQUE

Imaging: Portable C-arm for real-time visualization.
Equipment: Employed Relievant intracept device with RF probe, 8-gauge introducer cannula, along with a curved cannula assembly with the nitinol J-stylet for vertebral body access.
Anesthesia: General endotracheal anesthesia (GETA). Case duration: 2 hours. Estimated blood loss (EBL): 20 cc.
Procedures: Obtained access to the posterior aspect of the S1 vertebrae with 8-gauge introducer cannula. The position was checked in the AP and Lateral plane. Once the trocar was in proper place, the trocar was removed from the cannula and the curved cannula assembly with the nitinol J-stylet was inserted. The wingnut was rotated counterclockwise permitting excursion of the J-stylet. The curved cannula assembly was then advanced using a mallet in 1-2 mm increments. The J-stylet was observed to traverse the vertebral body in the midline in both the AP and lateral views. Target was reached when the tip of the stylet was noted to be approximately 50% forward of the posterior wall of the S1 in the lateral view, 40% inferior from the superior endplate and it crossed the midline of the S1 spinous process in the AP view. The stylet was then removed. The bipolar radiofrequency (RF) probe was removed from the previous vertebral body, cleaned and then inserted into the introducer cannula. The wingnut was rotated clockwise to retract the PEEK sleeve to expose the proximal electrode on the radiofrequency probe. The BVN nerve was then ablated at 85 degrees Celsius for 7 or 15 minutes using Relievant's RFG standard algorithm depending on the targeted vertebral body. A similar process was completed to ablate the intraosseous nerves in L5, L3 and L2.

OUTCOME

Immediate outcome : The procedure was uneventful and resulted in immediate pain relief, decrease from 10/10 to 3/10 VAS, and the patient was discharged home the same day.

Two-week follow-up: patient recovered completely in terms of back pain, he reported an 80% reduction in lower back pain with pain score of 2/10 and endorsed a significant improvement in his quality of life and ability to ambulate.

DISCUSSION

This case posed multiple challenges: pre-existing hardware obstructed the view in standard AP and lateral projections and made achieving the angle for the probe impossible at L3 and L5 from the right side requiring multiple changes to our planned approach. Success of this procedure signifies, not just the possibility of performing basivertebral nerve ablation at the level of the fusion, but also serves an important sign that the pain trigger at the fused segment could be the basivertebral nerve itself. The most difficult question in patients with multifactorial pain is identifying the source of the main pain generator. This case shows us that pain generator even at the fused segment could be still be the basivertebral nerve. The significance of this finding is that patients with adjacent segment degeneration do not necessarily need extension of their fusion, which is a very invasive procedure and contraindicated in patients with significant co-morbidities, but might be managed with fairly low risk intervention, such as basivertebral nerve ablation in an outpatient surgery setting.