# Ultrasound-guided sacral multifidus plane block for sacral spine surgery: A case report


**ABSTRACT**

Sacral surgeries are a relatively rare type of spine surgery associated with a significant amount of perioperative pain. The paraspinal interfascial or erector spinae plane block is currently being practiced with promising results in cervical, thoracic, and lumbar spine surgeries. It provides not only effective analgesia but also helps in reducing perioperative opioid consumption. Sacral multifidus plane block is one such variant of paraspinal blocks, which may have an equianalgesic profile. This case report describes a novel application of this block for providing perioperative analgesia in sacral spine surgery.



**Key words:** Acute pain management, regional analgesia, sacral multifidus plane block, sacral spine surgery


## Introduction

Interfascial plane blocks have revolutionized the perioperative pain management of truncal surgeries. The inclusion of regional analgesia techniques in the multimodal analgesia regimen of spine surgeries improves the quality of analgesia, offers intraoperative hemodynamic stability, decreases perioperative opioids, and enhances recovery. The paraspinal interfascial plane block, such as erector spinae plane block (ESPB), has been used at cervical, thoracic, and lumbar levels to provide perioperative analgesia for spine instrumentation surgery.[1-3]

Sacral vertebral surgeries, such as neural decompression and fixation of sacral fractures or degenerative spondylolisthesis with lumbarization sacral vertebrae, are rare.[4,5] However, these are associated with a significant amount of perioperative pain. Following the first description of the paraspinal interfascial plane block at the sacral level by Tulgar *et al.*,[6] the sacral retrolaminar or sacral multifidus plane block (SMPB) has been used for various indications in adults as well as pediatric patients.[7-10] We present another novel application of SMPB for analgesia in sacral spine surgery to the ever-increasing range of its indications. The patient provided written consent for the procedures and the publication of this case report.

## Case Report

A 55-year-old man (weight: 62 kg, height: 170 cm, body mass index: 21.45 kg/m$^2$) with the American Society of Anesthesiologist physical status II presented with lower back pain and lower limb radiculopathy for 20 days without


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a history of trauma. He was on medications for hypertension and diabetes mellitus. His neuromuscular examination was normal. Other systemic examinations and laboratory investigations were also within normal limits. Radiographs revealed S1–S2 lytic anterolisthesis (Meyerding's grade 1), reduced intervertebral disc height, and lumbarization of S1 [Figure 1a and 1b]. He was scheduled for S1-S2 decompression and posterior transforaminal interbody fusion [Figure 1c].

Inside the operating room, an intravenous cannula was placed, and the standard monitors were connected. General anesthesia was administered using intravenous propofol 2 mg/kg, fentanyl 2 μg/kg, and rocuronium 0.6 mg/kg. Following intubation, the patient was positioned prone on padded bolsters. After cleansing the lower back area, the surgeon marked S1 and S2 spinous processes with C-arm guidance. Following that, a low-frequency curvilinear transducer (Sonosite rC60xi/5–2 MHz; Fujifilm SonoSite Inc., Bothell, WA, USA) was placed longitudinally in the midline just above the median sacral crest [Figure 2a]. After identifying the hyperechoic median sacral crest with the overlying hypoechoic latissimus dorsi muscle [Figure 2b], the probe was moved laterally to identify the intermediate crest, the dorsal sacral foramina (DSF), longissimus thoracic muscle, and multifidus muscle (MFM) [Figure 2c-e]. After optimizing the image at the S2 level [Figure 2e], a 21G 80 mm block needle was advanced in an out-of-plane approach hitting the underlying bone. After negative aspiration, 20 mL of local anesthetic (LA) solution (0.2% ropivacaine + 4 mg dexamethasone) was administered in the plane under the MFM and over the hyperechoic bony area (between the median and intermediate sacral crests). The craniocaudal spread of the LA with the separation of MFM from the underlying bone was noted during the injection. The same procedure was repeated on the opposite side.

Intraoperative anesthesia was maintained with nitrous oxide:oxygen (1:1) mixture and titrated desflurane with controlled ventilation. Intravenous paracetamol 15 mg/kg, ketorolac 0.5 mg/kg, and 40 mg/kg magnesium sulfate were administered. The patient was hemodynamically stable and extubated uneventfully after 2 h of surgery.

Postoperatively, intravenous paracetamol 15 mg/kg 6th hourly and oral pregabalin 75 mg once daily were continued. The patient remained comfortable with pain scores of 0–3 on the numeric rating scale for 24 h following the surgery without requiring additional analgesics.

## Discussion

SMPB is technically similar but anatomically different from ESPB performed at cervical, thoracic, and lumbar regions. It targets the retrolaminar area instead of the transverse process. The dorsal surface of the sacrum is irregular and possesses three bony crests [Figure 3a]. The median, intermediate, and lateral sacral crests are just the fusion of the spinous, articular, and transverse processes of sacral vertebrae, respectively. In the lateral part of the sacral canal, the ventral and dorsal roots of the sacral spinal nerves (S1–S4) unite to form spinal ganglia, from which dorsal and ventral rami arise. After exiting through the dorsal sacral foramina, the small dorsal rami innervate the skin and the muscles in

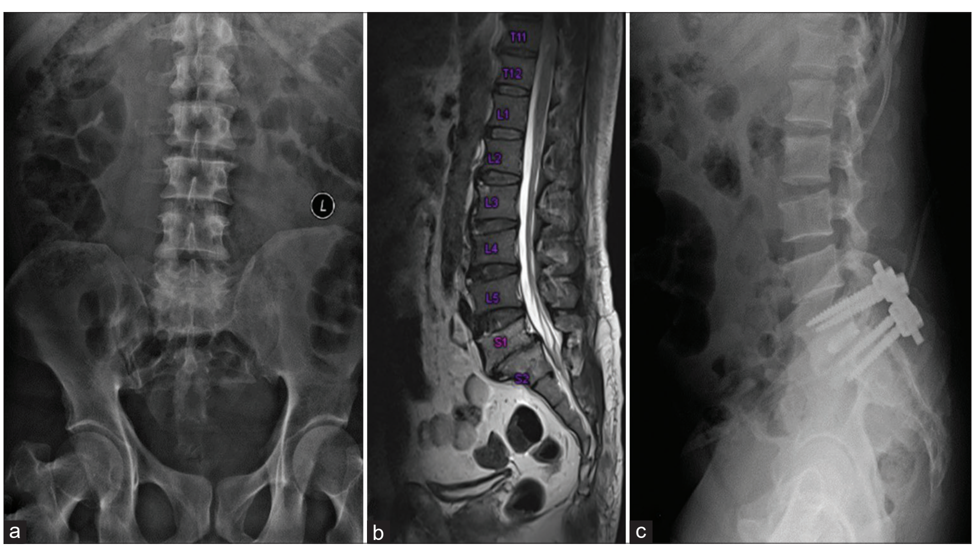


**Figure 1: (a) Anteroposterior radiograph of the lumbosacral spine; (b) Magnetic resonance imaging showing Grade 1 spondylolisthesis at S1–S2; (c) Postoperative radiograph—lateral view**

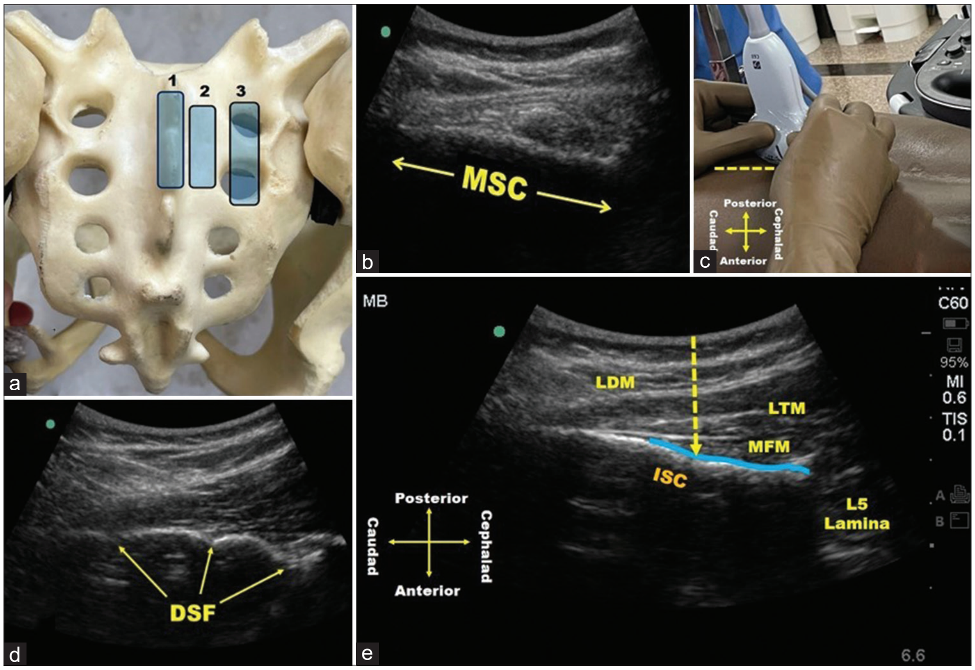


**Figure 2: (a) Ultrasound probe position 1) over the median sacral crest (MSC), 2) medial to intermediate sacral crest (ISC), 3) over the dorsal sacral foramina (DSF). (b) Sonoanatomy at MSC. (c) Patient and transducer position for performing sacral multifidus plane block at S2. (d) Sonoanatomy at DSF. (e) Performance of SMPB and spread of local anesthetic, LDM, Latissimus dorsi muscle; blue line, local anesthetic; yellow dashed arrow, needle trajectory in out-of-plane approach**

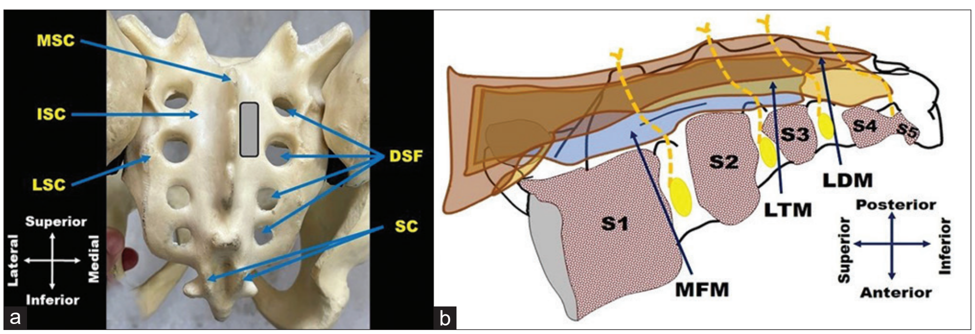


**Figure 3: (a) Anatomical bony landmarks related to SMPB. SC, sacral cornua; LSC, lateral sacral crest; gray rectangle, ultrasound probe position for sacral multifidus plane block. (b) Schematic diagram representing the sagittal section through DSF, showing the relationship between the sacrum, muscles, and dorsal sacral rami**

the adjacent region [Figure 3b].[11] The upper three dorsal rami pierce the MFM and divide into medial and lateral branches. The lateral branches form the medial cluneal nerves (S1–S3) that innervate the skin overlying the posteromedial area of the buttock close to the midline.

The possible mechanism of action of SMPB includes blocking the dorsal rami and medial cluneal nerves directly by LA deposition and ventral rami by anterior LA spread through dorsal and ventral sacral foramina. The SMPB may also block the pudendal nerve (S2–S4), lumbosacral plexus, and sciatic nerve via the anterior and cranial LA spread.[8,12] Postoperatively, we observed selective sensory loss in the L4-S3 dermatome without motor weakness. Our findings correlate well with those of Kilicaslan *et al*.[13] However, our observations cannot be generalized based on a single case report. It requires a proper investigation exploring every nook and corner of the SMPB, especially in sacral spine surgeries.

To conclude, SMPB as a component of MMA can potentially provide effective perioperative analgesia in sacral spine surgery. However, further cadaveric, clinical, and radiological studies are warranted for a better understanding of the mechanism of SMPB.

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### Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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### Conflicts of interest

There are no conflicts of interest.

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