

# A Novel Method of Ultrasound-guided Modified Thoracolumbar Interfascial Plane Block for Perioperative Pain Control in Lumbar Spine Fusion Surgery: Experience based on Two Cases

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## ABSTRACT

Thoracolumbar Interfascial Plane Blocks (TLIP) is commonly used for pain management after spine surgeries. It involves blocking the dorsal rami of the thoracolumbar nerves in the fascial plane between the multifidus and longissimus muscles. The clinical efficacy of the conventional TLIP block is well documented in the postoperative pain management for lumbar spinal surgeries. The novel ultrasound-guided modified TLIP block described here is relatively safe and easier to perform by the trainee Anaesthesiologists. Besides, the relevant sonoanatomic landmarks of the novel technique and its perioperative analgesic efficacy in patients undergoing lumbar spine fusion surgery are described here. Further ultrasound-anatomy correlation studies are required to investigate this novel approach TLIP block.

**Keywords:** Anaesthesiologists, Lumbar spinous processes, Partha's technique, Postoperative analgesia

## CASE DETAILS

### Case 1

A 39-year-old male American Society of Anaesthesiologist (ASA) grade I patient with low back pain diagnosed as having L3-L4 disc herniation, underwent posterior Transforaminal Lumbar Interbody Fusion surgery (TLIF). His preoperative assessment findings were unremarkable. General anaesthesia was induced with a titrated dose of Thiopentone (up to 5 mg/kg) and fentanyl 2 µg/kg. Oral endotracheal intubation was performed after achieving muscle relaxation with vecuronium (1 mg/kg). Further maintenance of anaesthesia was done using isoflurane and nitrous oxide in oxygen. The bilateral modified Thoracolumbar Interfascial Plane Blocks (TLIP) block was given after general anaesthesia in the prone position. The block was performed using a high-frequency linear probe (Sonosite X-Porte, USA). The transducer was placed longitudinally with a parasagittal orientation at the L3 and L4 spinous processes level and moved laterally to identify the fascial plane between the longissimus and iliocostalis muscles at the level of L3 transverse processes [Table/Fig-1]. Using the in-plane technique (craniocaudal direction), 20 mL of 0.25% bupivacaine was

injected in the fascial plane on each side. The intraoperative period was uneventful without further requirement of any analgesics and extubated normally. The postoperative period was uneventful, and the first analgesic demand was made after 9 hours of surgery. The further postoperative pain was managed with intravenous paracetamol 1 g every 8<sup>th</sup> hourly and oral tramadol. There were no local side effects.

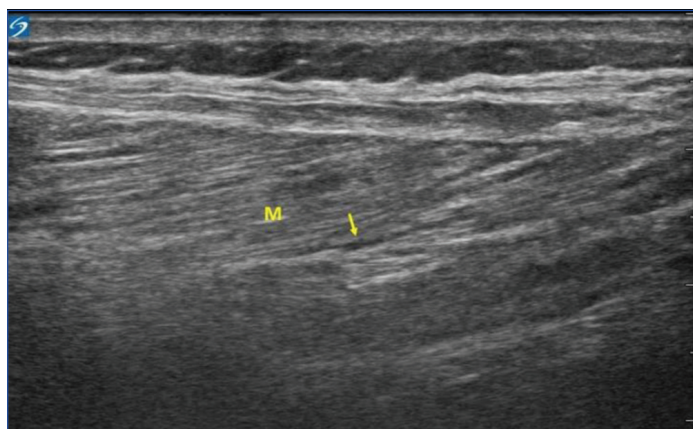
### Case 2

A 55-year-old female patient of ASA II status (controlled systemic hypertension) diagnosed with L3-L4 spondylolisthesis underwent posterior TLIF surgery (TLIF). The bilateral modified TLIP block was given using the same ultrasound after general anaesthesia in the prone position (as described in case 1). The intraoperative and postoperative course was uneventful. The first analgesic demand was made 7 hours after the surgery.

## DISCUSSION

This case reports describe the novel method of TLIP block (Partha's technique) that could potentially be a technique of choice for providing postoperative pain relief following lumbar spine surgery. TLIP was first described by Hand WR et al., [1]. It involves blocking the dorsal rami of the thoracolumbar nerves in the fascial plane between the multifidus and longissimus muscles [1]. So far, there are two approaches described for TLIP block. The original description of TLIP block involves injecting the local anaesthetic in the fascial plane between the multifidus and longissimus muscles, with the ultrasound probe in the transverse plane. The other approach involves the injection of the local anaesthetic in the fascial plane between longissimus and iliocostalis muscles, with the advancing of block needle from medial to lateral direction (lateral technique). This modified technique was designed for a better sonographic visualisation of the muscles and avoid accidental neuraxial injury [2]. The analgesic efficacy of TLIP and modified TLIP block was already established in several studies [1,3-6].

The novel method described here involves the modification in the orientation of the ultrasound probe to identify the fascial plane.



**[Table/Fig-1]:** Ultrasound section in the lumbar paravertebral area.  
M: Longissimus muscle; Arrow mark showing the fascial plane

In this technique, the linear ultrasound probe (HFL 15-6 MHz) is placed in a parasagittal orientation 3-4 cm lateral to the midline in the lumbar area with the ultrasound depth setting at 7-8 cm. This modification is aimed to ease the performance of TLIP block by the trainee Anaesthesiologists. The ultrasound section obtained by this technique identifies the transverse processes of successive lumbar vertebrae as hyperechoic curvilinear structures with 'finger-like projections (trident sign) [7]. At this level, the depth setting is readjusted at 3-4 cm to visualise the superficial muscle plane [Table/Fig-2].



**[Table/Fig-2]:** Anatomical section in the lumbar paravertebral area.  
M: Longissimus muscle; TP: Transverse process

Although the fascial plane obtained is inconclusive of the muscle group, the findings demonstrate the analgesic efficacy of the method as the lumbar fusion surgeries involve posterior approach TLIF, which is associated with more pain after surgery. Furthermore, this technique involves local anaesthetic deposition in the muscular plane, which may be easier and safer to perform than other

paravertebral and neuraxial blocks. Ergonomically, this method is more advantageous.

The identification of the muscle plane in sonography is not conclusive. Therefore, to identify the plane of local anaesthetic spread, the anatomical sections (sagittal section at the level of lumbar spinous processes) were made in a cadaver similar to the ultrasound cross-section (limitations of this series). This finding suggested that the local anaesthetic deposition was made in the fascial plane in the longissimus muscle. However, the anatomic details were limited due to the non availability of advanced techniques and logistic reasons.

## CONCLUSION(S)

In conclusion, the novel ultrasound method of TLIP block has provided adequate intraoperative and postoperative pain relief for the two patients requiring lumbar spine fusion surgery. Future studies are required to correlate the gross anatomy and ultrasound section to investigate the mechanism and spread of local anaesthesia.

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