

ILLUSTRATIVE ORIGINAL SURGICAL VIDEO

Microscissor DREZotomy for intractable brachial neuralgia

Sachin A. Borkar*, Rohit Bharti, Vivek Yadav, Het Sanjay Kumar and Kamaljeet Singh

Department of Neurosurgery and Gamma Knife, All India Institute of Medical Sciences (AIIMS) and Jai Prakash Narayan Apex Trauma Center, New Delhi, India

***Correspondence:**Sachin A. Borkar,
sachin.aiims@gmail.com**Received:** 04 August 2025; **Accepted:** 16 August 2025; **Published:** 29 September 2025

Dorsal Root Entry Zone lesioning (DREZotomy), also known as Lissauer tractotomy, was initially described in 1972 as an alternate treatment for intractable neuropathic pain. Microscissor DREZotomy is a cost effective and simple way to complete this procedure. Drezotomy help in relieving pain, thus improving patient's condition immediately. In this illustrative video and manuscript, we have discussed indication, technique and complications.

Keywords: DREZotomy, neuralgia, microscissor, brachial plexus injury, operative video

Introduction

DREZotomy, also known as Lissauer tractotomy, was initially described in 1972 as an alternate treatment for intractable neuropathic pain. This procedure involves lesioning the dorsal root entry zone (DREZ) (1) (**Figure 1**). This method, which had an effectiveness of over 80%, was employed to treat spasticity because it also caused hypotonia (2). The lesion of DREZ as a successful treatment for neuropathic pain and stiffness was originally reported by Sindou and Nashold in the 1970s. The authors have, however, established two distinct methods for DREZ lesioning. Both methods create a 2 mm deep incision; however, Sindou and Mertens (3) reported making an incision on the posterolateral sulcus at a 45° angle medially and ventrally, then using bipolar forceps to microcoagulate the incision.

The goal of DREZotomy is to kill the overactive nociceptive neurons located deep in the DH apex in order to treat pain with full deafferentation (4).

When using Nashold's approach, the radiofrequency (RF) electrode is placed on the intermediolateral sulcus at a 25° medial angle, causing lesions for 15 seconds after attaining a temperature of 75°C or a current of 35–40 mA (1, 3–9).

The purpose of "DREZotomy" is to preferentially cut off the nociceptive inputs in the DREZ lateral region (3, 10, 11).

Case

1. A/H/O Assault while driving a bike in 1999. Since then, patient is not able to move right upper limb. C/o severe pain in right upper limb for the past 3 years (more in the arm and forearm).
2. Left upper limb and both lower limb normal. O/E: Tone decreased in right upper limb, muscle wasting in right forearm and hand present. Power: Right upper limb 0/5 with no grip. Left upper limb power normal. Sensation: Right C5–C8 absent, T1 30% sensation present, plantar bilateral downgoing. Patient was diagnosed as a case of pan brachial plexus injury (Pan BPI) with neuropathic pain.

Management

The patient underwent a magnetic resonance imaging (MRI) of the cervical spine to look for the extent of the avulsions, root meningocele-root avulsion, and associated lesions of the spinal cord, mainly atrophy or loss of substance, as well as its eventual rotation as a result of arachnoiditis. This information can be useful for the identification of the dorsolateral sulcus when attempting DREZ surgery.

The patient lies prone during the procedure, which is carried out under general anesthesia. To access the dorsolateral and lateral spinal cisterns, the arachnoid must

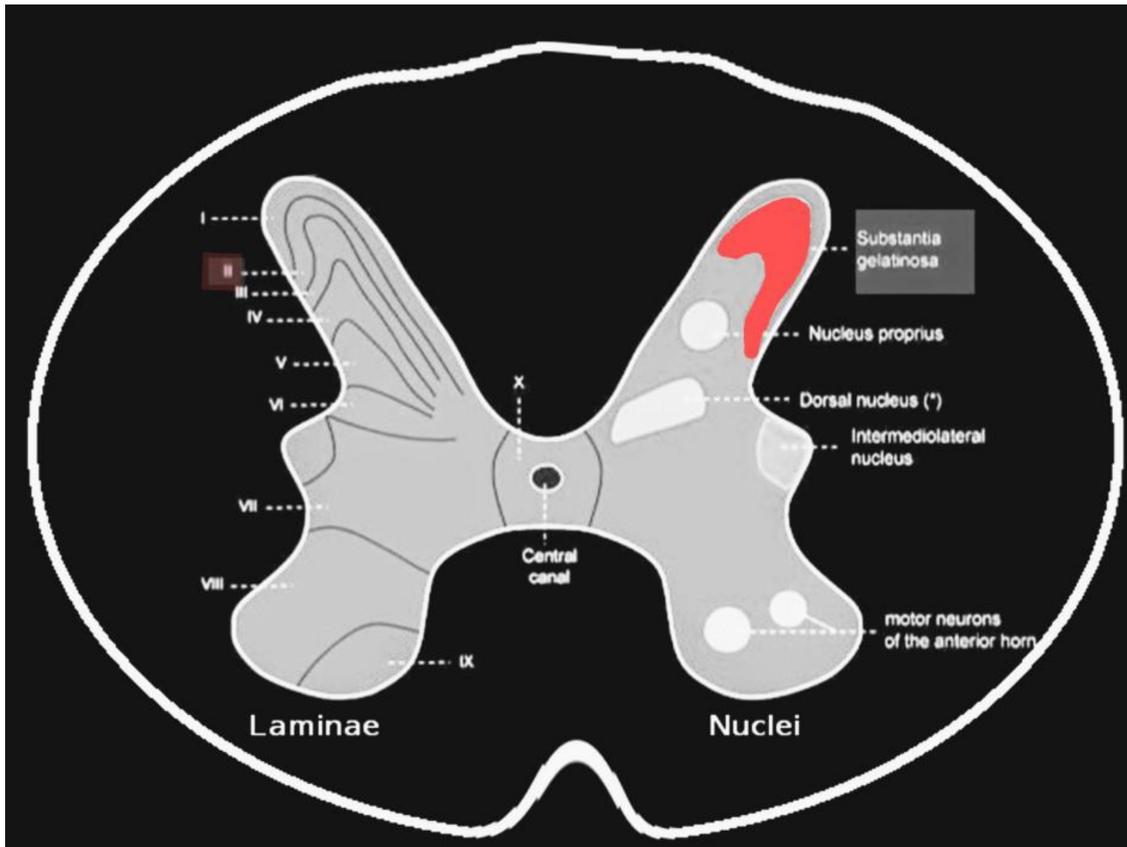


FIGURE 1 | Target for DREZotomy shown in red.

be extensively dissected once the dura mater has been opened (12). It could be challenging to locate the dorsolateral sulcus in brachial plexus avulsion (BPA) cases.

It can be recognized with the use of three anatomical features (Figure 2). First, by connecting the cranial and caudal normal rootlets, the remaining intact rootlets (above and below the avulsed segments) enable us to approximate the location of the dorsolateral sulcus. Second,

the dorsolateral sulcus is frequently defined by blood vessels that flow down the spinal cord. Thirdly, there are tiny holes where the rootlets used to pierce the cord, causing scarring along the sulcus.

Before starting drezotomy, microscissors, and bipolar forceps are marked at 3 mm (Figure 3).

DREZotomy is carried out from C5 to T1 with a sharp bipolar tool and a designated microscissor to enable accurate

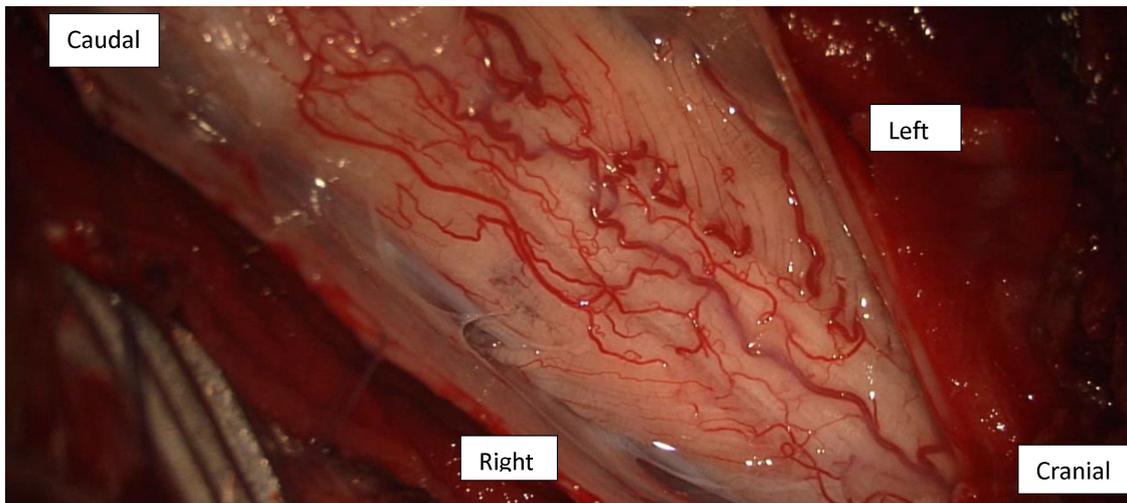


FIGURE 2 | Right root avulsed with visible dorsolateral sulcus.



FIGURE 3 | 3 mm being marked on scissor blade under microscope.

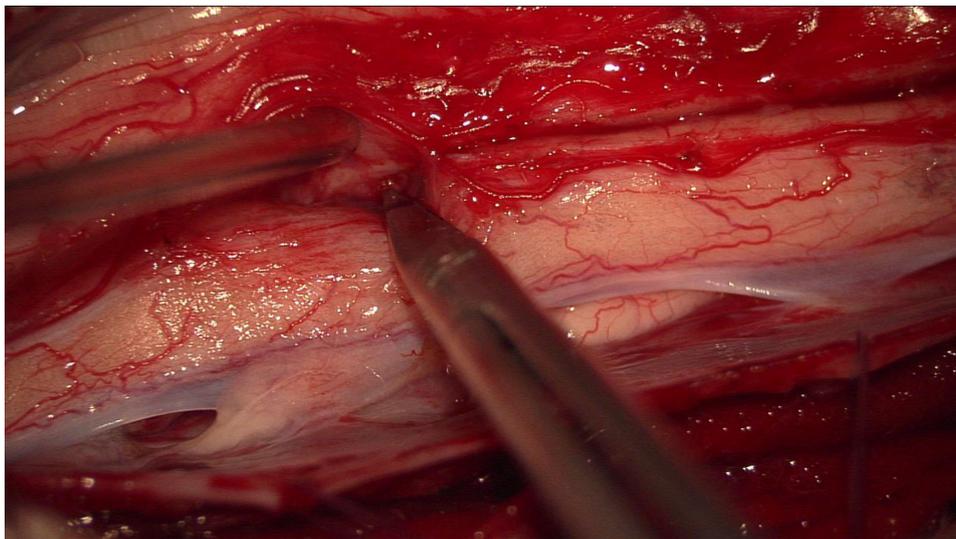


FIGURE 4 | DREZotomy being done using scissors (3 mm marking is visible).

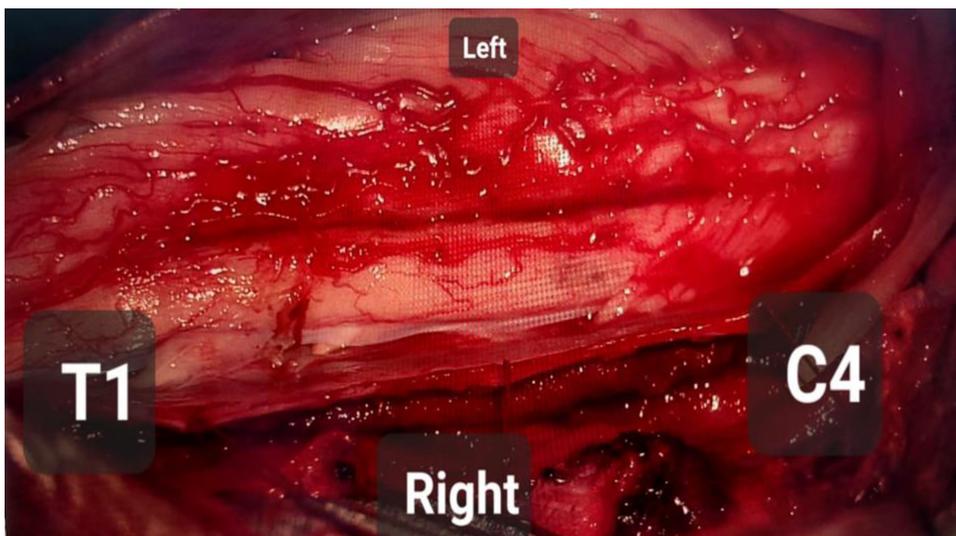


FIGURE 5 | Intact cranial C4 root visible after completion of DREZotomy from C5 to T1.

DH coagulation and microscissoring (Figures 4, 5). The surgeon benefits from preoperative surgical planning since it provides the angle between the median plane and the DH (13). Immediately following surgery, the patient reported that the neuropathic pain in his left upper limb had completely gone away (Video 1).

VIDEO 1 | Microscissor DREZotomy for intractable neuralgia post brachial plexus injury.
<https://youtu.be/EqbmMdraY5s>

Complication

Complications can happen if proper anatomy is not followed and may include damage to other tracts causing neurological abnormalities related to the posterior column (proprioception), spinocerebellar tract (ataxia), and corticospinal tract (hemiparesis). Severity and persistence of these complications can vary, with some improving over time while others may be permanent. Therefore, it may be advisable to use intraoperative multimodality neuromonitoring for this surgery.

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Conflict of Interest

The authors declare no financial or personal relationships with any organizations that could inappropriately influence the content of this article. The mention of specific brand names or products is solely for accurate identification

of the surgical instruments used and does not imply endorsement of one product over another.

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