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## **Surgical Anatomy of Lumbar Dorsal Ramus and Its Significance in Nondiscogenic Axial Back Pain and Dorsal Endoscopic Rhizotomy**

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**Introduction:** Lumbar facet originated nondiscogenic axial back pain is responsible for up to 40% of common debilitating backache. Radiofrequency has been extensively used for lesioning the medial branch of dorsal ramus in treating facet joint pain. Most patients, however, only benefitted from short-term relief of pain, due to assumed reinnervation by re-grown nerves. To accurately locate the medial branch is essential for ablation of the nerve to reach maximal pain relief. The purpose of this anatomic study in fresh cadavers was to report the dissection findings of the lumbar dorsal ramus, particularly the facet innervation and their significance comparing traditional radiofrequency neurotomy versus dorsal endoscopic rhizotomy.

**Materials and method:** The first part of study was dissection of lumbar dorsal rami at L1-5 lumbar levels, and the second part was to find the ideal portal via the YESS endoscope to visualize the medial, intermediate, and lateral branches for ablation.

Fresh cadavers were used for anatomic dissection. Two Wiltse surgical exposures were performed in the lumbar spine bilaterally, then dissecting the longitudinal plane between the multifidus and longissimus muscles. The medial branch, intermediate branch and lateral branches were found to vary in location and numbers.

### **Results:**

**L1 to L4 Dorsal Rami.** The Medial branch (MB) passes dorsally and caudally across the transverse process (TP) and enters a groove at the base of the superior articular process (SAP). Here the nerve is either bound to the periosteum by a layer of connective tissue, or it is just as easily found unprotected. The MB sends off branches to innervate the both cephalad and caudal facet joints. Findings revealed anatomic variations that were not as consistent as that cited by Bogduk's study.

The intermediate branch (IMB) runs caudally over the TP distributing to the lateral soft tissues and the longissimus thoracis muscle. The lateral branch (LB) may consist of two or multiple branches found at each level. L3-4 was found to have more branches than any other level.

**L5 Dorsal Ramus.** It courses the superior border of the ala of the sacrum, lying in the groove formed by the ala and the SAP of the sacrum. It divides into medial and intermediate branches, lacking a lateral branch.

Following dissection, a cannula and endoscope radiofrequency probe were placed over the TP to look for the branches of the dorsal ramus. While the endoscope was docked in location of the medial branch at the junction of the lateral facet and TP, the branch was easily missed. Using the blunt obturator to develop the longitudinal plane between the multifidus and longissimus muscles and to produce a window via cannula to apply a flexible bipolar radiofrequency probe to target the intermediate and lateral branches in addition to ablating the medial branch.

**Conclusions:** Our findings revealed many anatomic variation exists when targeting the branches of the dorsal ramus. This may account for the result inconsistencies from traditional fluoroscopic placement of thermal electrodes. The posterior endoscopic approach provides visualization and surgical targeting off the nerves innervating the facet joints and adjacent muscles with very little surgical morbidity, and therefore more effective than traditional techniques of medial branch rhizotomy.