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A Novel Technique to Selective Nerve Root Cannulation in the Treatment of Chronic Pain

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Purpose: The conventional approach to the epidural space involves cannulation in a cranial direction with insertion at the appropriate level. In this approach, the needle is placed inferior to the interlaminar space, advanced craniad and parallel to the angle of the lamina, and can be performed without fluoroscopy. However, this approach does not allow access to individual nerve roots or the lumbosacral plexus, because the anatomical branching off of the nerve roots is in a caudal direction. We investigated the possibility of performing selective nerve root cannulations using a novel percutaneous approach. In this approach a Tuohy type needle is inserted superior to the interlaminar space rather than inferior, and advanced in a caudal direction rather than a cranial direction while using fluoroscopic guidance.

Methods: Since 1995 we have performed selective nerve root cannulations at the cervical, lumbar and sacral nerve root levels in patients. Recently, in 36 human cadavers, we studied the placement of selective nerve root stimulator electrodes at the lumbar and sacral levels. We tested various needles, catheters, electrodes, epiduroscopes, and guide wires. We collected radiographic images of the essential steps involved in this technique.

Results: Successful placement was obtained in 67% of the cervical nerve root placements, 83% of the lumbar nerve root placements, and 89% of sacral nerve root placements.

Conclusions: In human cadavers, a retrograde approach was successful in the selective cannulation of the, lumbar and sacral nerve roots. Clinical trials using temporary catheters are in progress, and safety in chronic cannulations is to be evaluated.