Keyhole foraminotomy

The desired level is localized with intra-op fluoroscopy before making the skin incision, a 2–3 cm midline incision is adequate. A unilateral exposure suffices. Periosteal elevators are used to dissect muscles off the lamina and facet joint in the subperiosteal plane. A Kocher clamp may be placed on the spinous process to permit confirmation of the correct level on intraoperative X-ray. A Scoville retractor or equivalent is employed. A high-speed drill (e.g. with diamond burr) is used to make an opening in the medial one-third to one-half of the inferior facet of the vertebra above the desired disc space, extending slightly medially into the junction with the lamina. Once the inferior facet is penetrated, the superior facet of the inferior vertebral level will be visualized. This is also thinned with the drill (it is critical to remove the bone of the superior facet of the level below caudally to where it meets the pedicle). A small Kerrison rongeur may be used to slightly enlarge the laminectomy. An opening is made in the ligamentum flavum overlying the lateral aspect of the spinal cord dura. The nerve root can be identified as it exits from the thecal sac, and can be followed as it travels between the pedicles of the vertebrae above and below. Soft tissues (including ligamentum flavum) form fibrous bands across the dorsum of the nerve, and are removed to further expose the dura of the nerve root. The venous plexus around the nerve root is coagulated with bipolar cautery and then divided to mobilize the nerve. The nerve may then be gently moved a few millimeters rostrally using a micro nerve hook. The dura overlying the spinal cord should not be manipulated, and the disc space need not be entered. Inspection for free disc fragments should begin in the nerve root axilla using a probe (e.g. blunt nerve hook). Next, the space anterior to the root (the region of the disc) may be palpated. Any disc fragments that are dislodged are removed with a small pituitary rongeur. If the disc fragment is contained anterior to the posterior longitudinal ligament (PLL), the PLL may be incised in the region of the nerve root axilla with a #11 scalpel blade in a motion that is directed downward and laterally, away from the nerve root and spinal cord. The foraminotomy may be extended slightly laterally if the foramen still feels tight when probed. Small osteophytes can potentially be reduced using a small reversed-angled curette, although some surgeons believe that the need for this is obviated by the decompression provided by the keyhole opening. In some cases, simple posterior decompression of the nerve root (without removing a disc fragment) may be adequate to relieve compression. Spinal stability is usually preserved if less than half the facet joint is removed.