

Revision (Salvage) Spine Surgery

Revision spine surgery becomes complicated by altered or distorted previously normal anatomy, especially by obliterated tissue planes with scar tissue formation and/or epidural fibrosis. The surgeon must safely establish a plane between the neural tissue, the dura, and the scar tissue. It is safer and easier to work from normal, unscarred area to the abnormal, scarred area. The normal, unscarred area in the spine is characteristically defined by the surrounding bone, which should be carefully exposed. Usually, a midline incision is made. Dissection is carried through the scar tissue, or by excising the old scar, or bypassing it. The exposure is carried down to a safe 3-5 mm distance from the dura as determined by the exposure of adjacent structures such as the lamina. Exposure is then made laterally at the safe level, leaving the scar tissue overlying the dural sac (Figure 1).

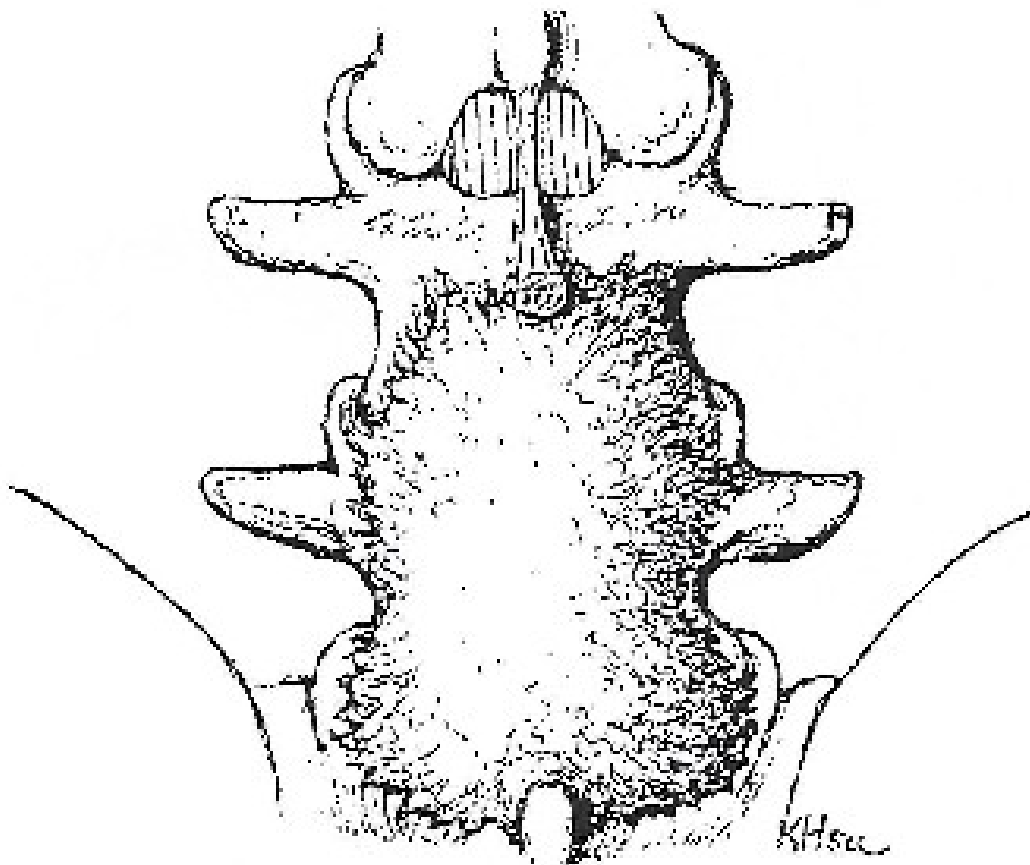


Fig. 1 Scar tissue overlying dura at previous laminectomy site.

The soft tissue is removed from the facets, and if necessary, exposure carried to the transverse process (Figure 2).

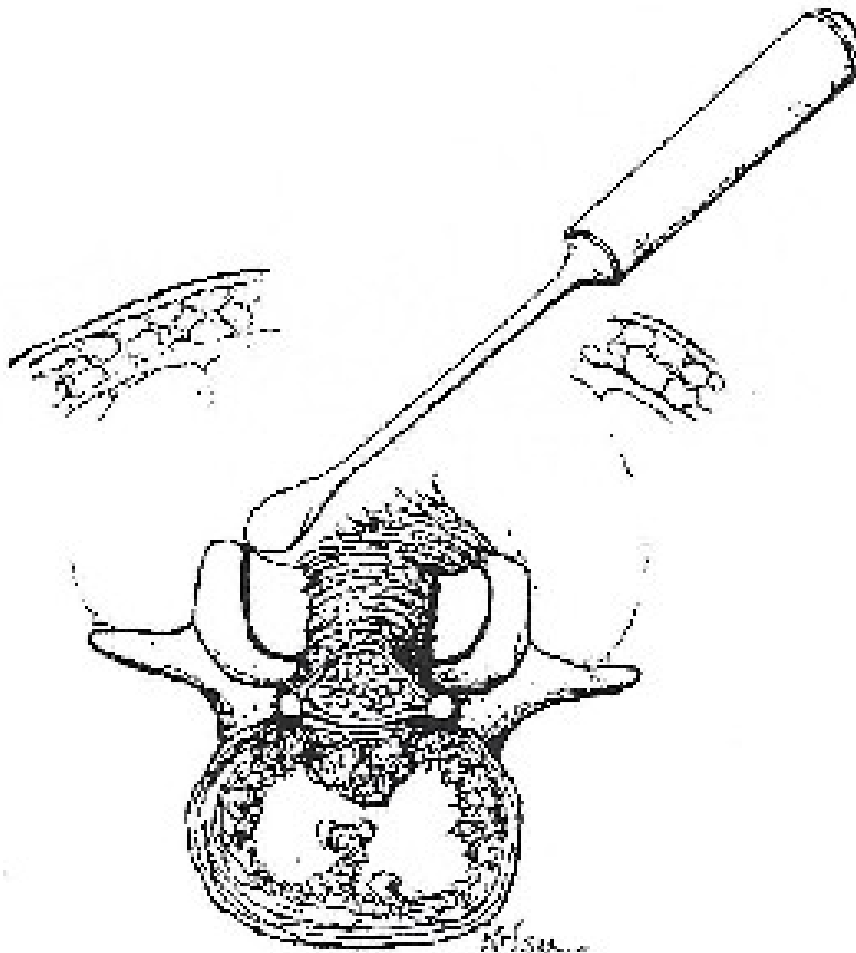


Fig. 2 Scar tissue removed from facet joints and transverse processes with periosteal elevator.

The scar tissue often encroaches on the laminectomy site and intervertebral foramen, making surgical dissection difficult and risking dural tear or nerve injury (Figure 3).

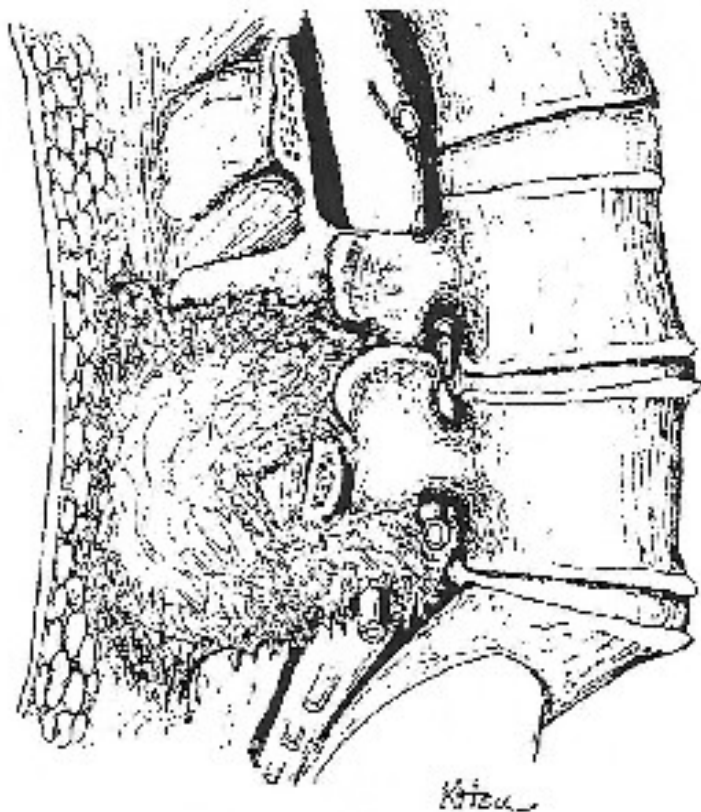


Fig. 3 Epidural scar encroaching laminectomy site and intervertebral foramen.

A sharp curette can be used to develop the plane between the soft scar tissue and facet (Figure 4).

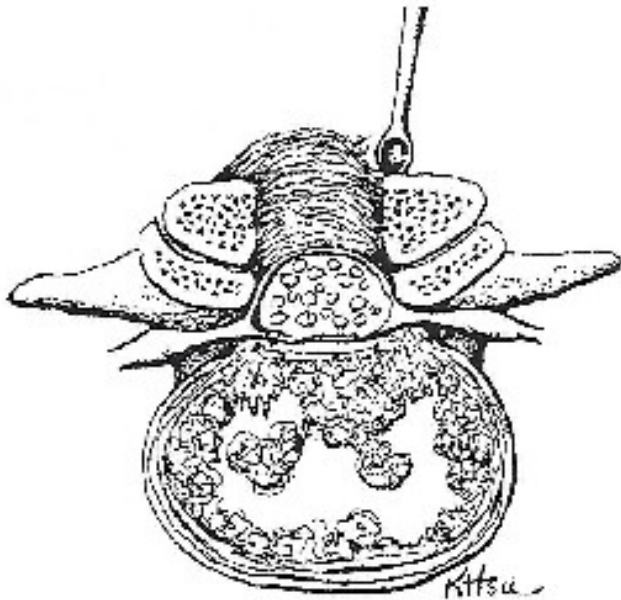


Fig. 4 Developing plane between scar tissue and facet with sharp curette.

Blunt dissection of the plane is then made between the dura and facet with great care (Figure 5).

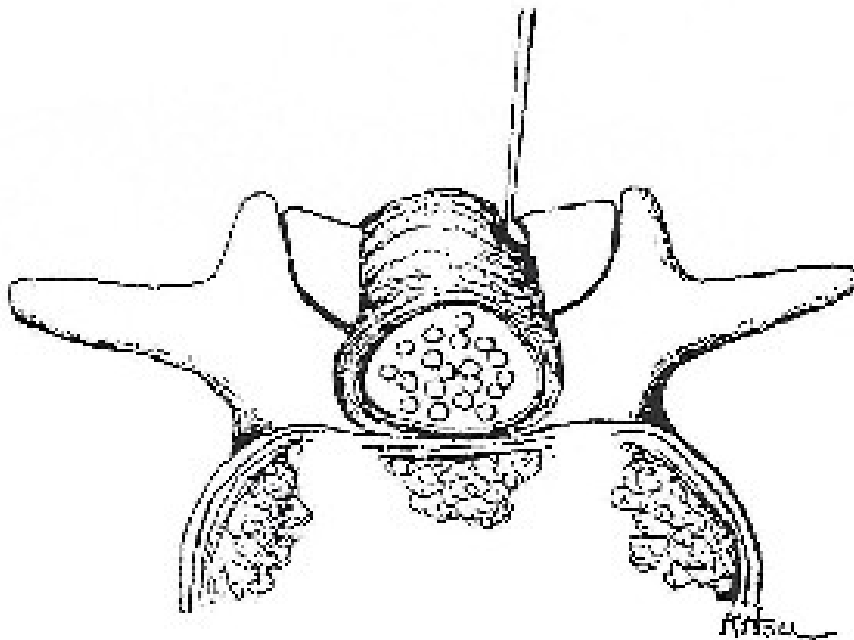


Fig. 5 Blunt dissection of plane between dura and facet.

The area of bone to be removed should be carefully defined around the previous laminectomy site (Figure 6).

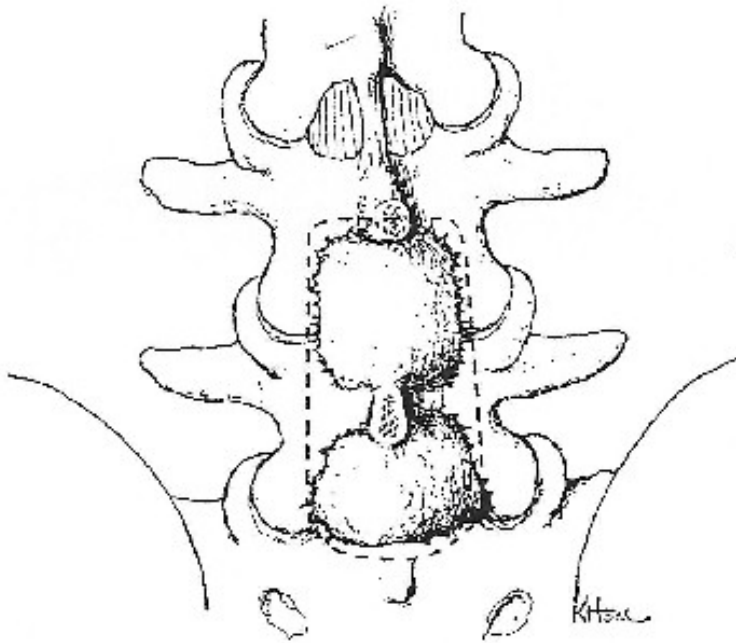


Fig.6 Area of bone to be removed around previous laminectomy sites.

This can be performed with a chisel to remove laterally 3-10 mm of what is left of the lamina, facet joint, or pars interarticularis (Figure 7).

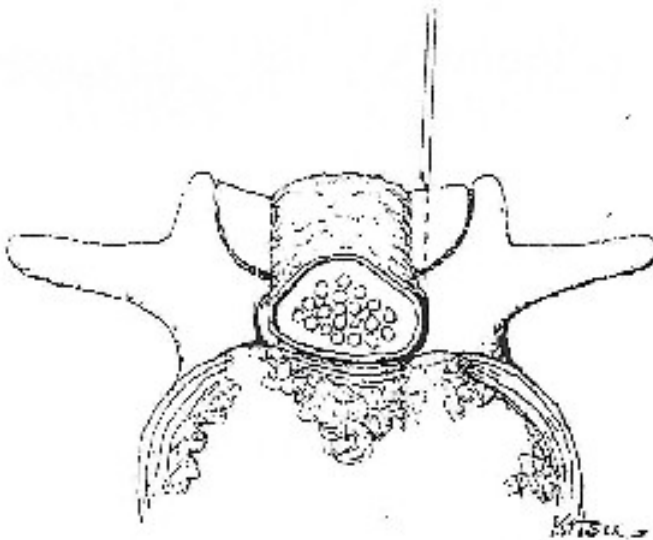


Fig. 7 Chisel being used to create new plane laterally to scar tissue.

A new plane of dissection is bluntly developed as the dura is gently retracted away (Figure 8).

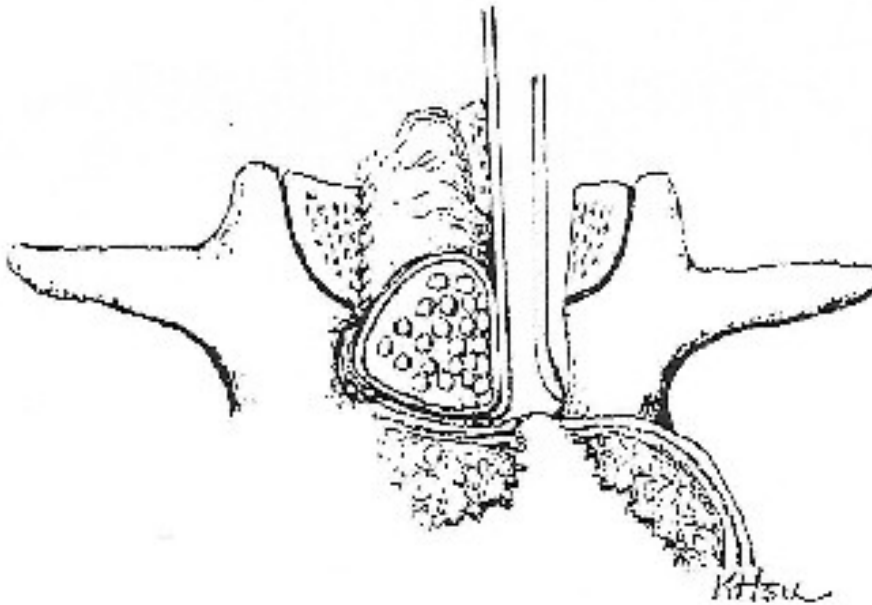


Fig. 8 New plane of dissection bluntly developed as dura is retracted.

Adherent bone fragment to the scar tissue can be used for traction as a new plane is developed (Figure 9).

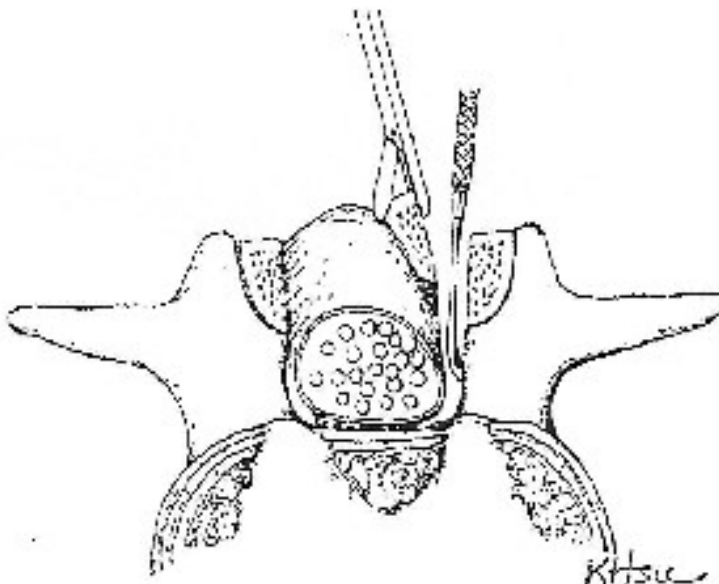


Fig. 9 Adherent bone fragment used for traction as new plane is bluntly developed.

Under the removed bone, the surgeon can find a nerve root with normal tissue plane. Then, the lateral recess and neural foramen can be enlarged and probed (Figure 10).

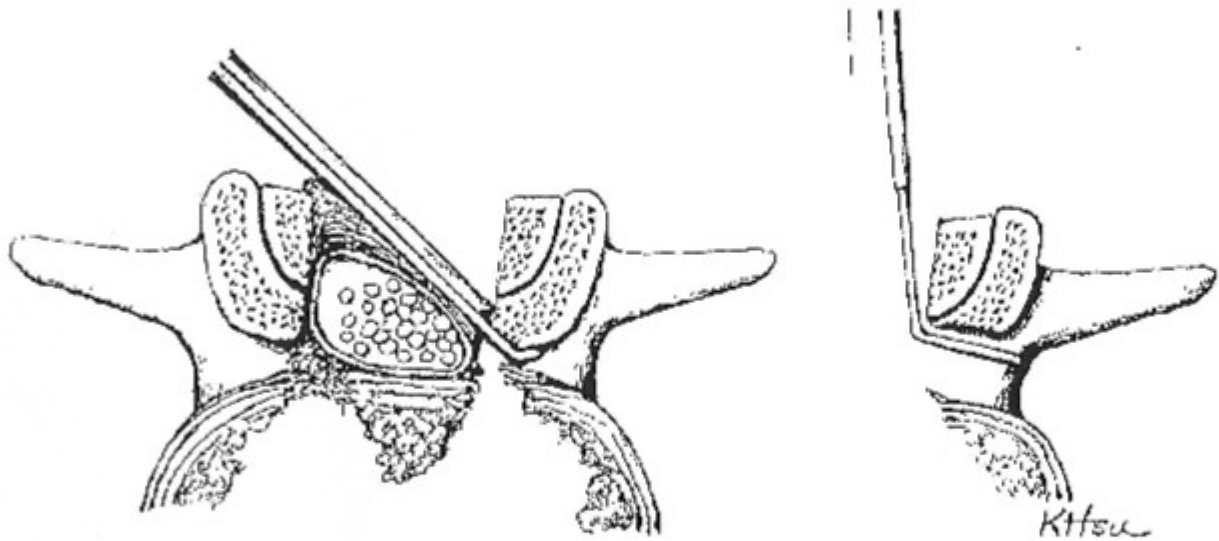


Fig. 10 Lateral recess and intervertebral foramen enlarged and probed.

In recurrent disc herniation, the spinal nerve is often adherent to the underlying disc material and scar tissue. It is usually very difficult to retract the nerve from this dense scar. Care should be exercised to minimize trauma to the nerve root, and no further attempt should be made to create a plane. In this case, the disc is entered more laterally to the nerve, and the disc material is removed from under the nerve from inside the disc (Figure 11).

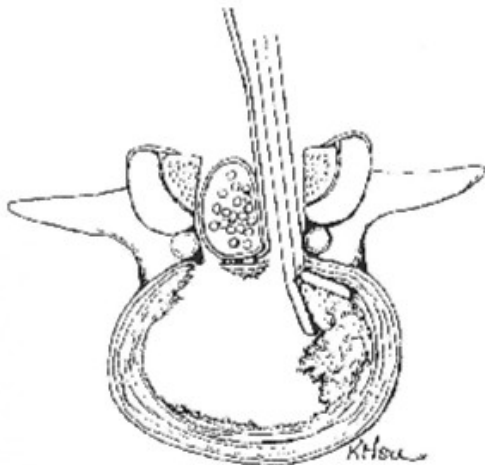


Fig. 11 Disc material removed with pituitary rongeur.

Down-going curette can be used for this purpose (Figure 12).

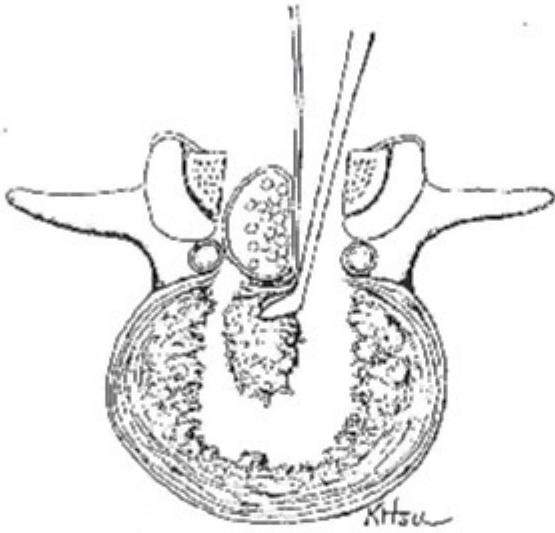


Fig. 12 Down-facing curette used to free fragments for removal.

The same procedure can be done from the opposite side, which was not surgically entered before. The surgeon must make sure that all involved nerves are free from compression from disc, scar tissue, or bone. Any symptom-causing abnormality found should be corrected. All available information from patient history, physical examination, preoperative imaging studies, and electrodiagnostic studies should be used to make this decision.

Sometimes, excessive bones are removed, such as the facet joint or pars interarticularis, to cause instability. If there is instability, fusion should be considered. The decision regarding the type of fusion—posterior, posterolateral, anterior, or lateral—as well as use of internal fixation such as pedicle screw fixation, should be made.