

nerve root from the dorsal side (**Fig. 11.30**). Very rarely, hard sequestered fragments can perforate the ventral dura mater of the lumbar sac and present as an intradural or intrathecal fragment. Such cases have been reported by Roda et al. (1982), Lee (1983), Griss (1984), Kasch (1986), Yildizhan and Okten (1991), McCulloch (1998), and Postacchini (1999).

Grades of Dislocation

The classification of disk protrusions and prolapses by grade of dislocation (I–V) is shown in **Fig. 11.31**. The grade of dislocation, together with the clinical findings, determines the most advisable form of treatment; intradiscal therapy may still be possible, or an open operation may be necessary (**Figs. 11.32–11.37**).

Spontaneous Changes of Disk Prolapse

Once the disk tissue has left its usual environment in the intervertebral space and entered the epidural space, it is subject to new metabolic conditions. It was originally nourished by diffusion through the normal, pressure-related fluid shifts within the disk, but it now lies more or less suddenly in a space surrounded by connective tissue where it is exposed to lymphatic fluid.

When the disk tissue is no longer subject to intradiscal pressure, it takes up fluid, according to the relation

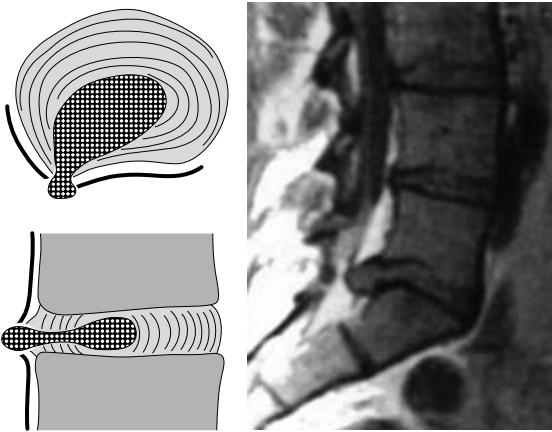


Fig. 11.33 Grade III dislocation. Covered prolapse at the discal level. The prolapsed tissue has completely perforated the annulus fibrosus and is only covered by a thin membrane (the ventral epidural membrane). This membrane can be bluntly perforated, e. g., with a 2 mm dissector. In general, the edge of the lamina will have to be resected for the prolapse to be reached.

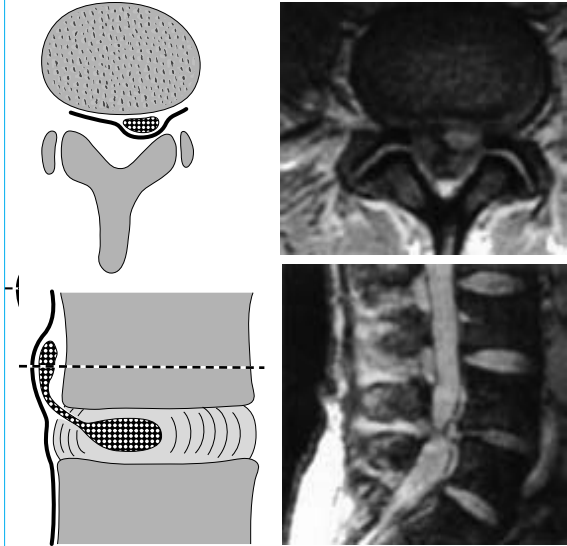


Fig. 11.34 Grade III dislocation. Covered prolapse at the supradiscal level. The dislocated disk tissue has emerged from the intervertebral space but is still covered by the ventral epidural membrane. The dislocated disk tissue can be reached only by opening the membrane with a blunt 2 mm dissector. In general, the lower edge of the lamina will have to be resected for the prolapse to be reached. A hemilaminectomy may be necessary.

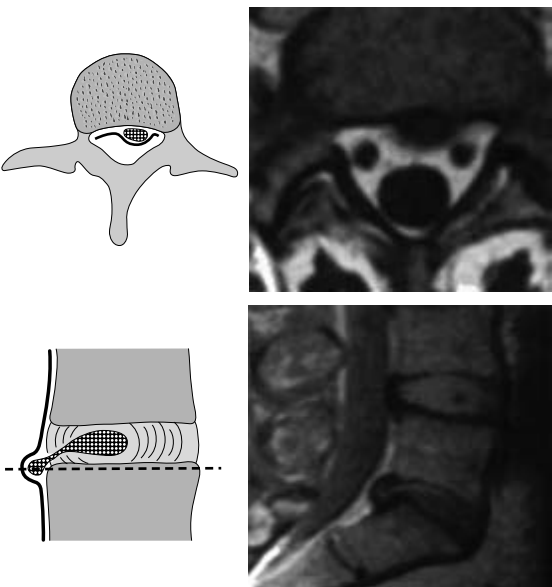


Fig. 11.35 Grade III dislocation. Covered prolapse at the infradiscal level. The prolapsed tissue is found under the ventral epidural membrane. After blunt opening of this membrane, e. g., with a dissector, the dislocated disk tissue is reached. The submembranous infradiscal prolapse can generally be reached by fenestration at L4/5 and L3/4. At the L5/S1 level, part of the sacral lamina may need to be resected.

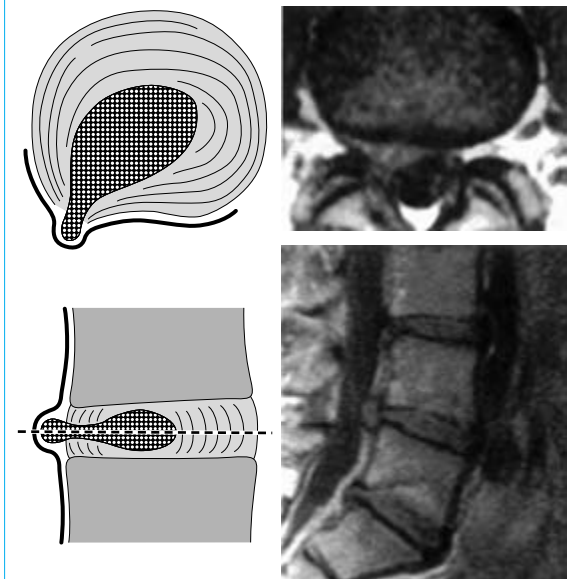


Fig. 11.36 Grade IV dislocation. The dislocated disk tissue is found partly inside and partly outside the disk. This situation generally obtains only at the discal level, when the ventral epidural membrane is also perforated at this level. Extensive removal of the dorsal portion of the disk is necessary to prevent recurrent disk herniation.