

surgery

internal medicine

emergency & critical care

dermatology

radiology, ultrasound & CT scan

# Spine • Intervertebral Disc Herniation

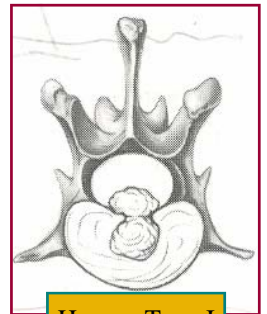
Myelography is a primary diagnostic tool used to identify spinal cord compression due to disc herniation. A needle is carefully placed into a ~1 mm envelope that surrounds the spinal cord and contrast material is injected.



Lumbar puncture for injection of contrast material.



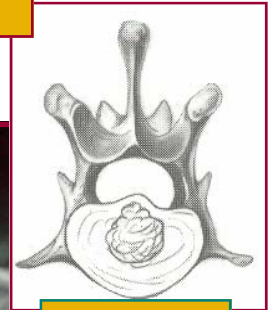
Ruptured disc (Hansen Type I) The nucleus pulposus ruptures through the dorsal annulus fibrosus causing pressure on the spinal cord and attenuation of the myelogram contrast column. This case depicts an acute rupture @ T13-L1 (red arrow) with severe cord compression and contrast column attenuation dorsally and ventrally.



Hansen Type I  
Ruptured disc

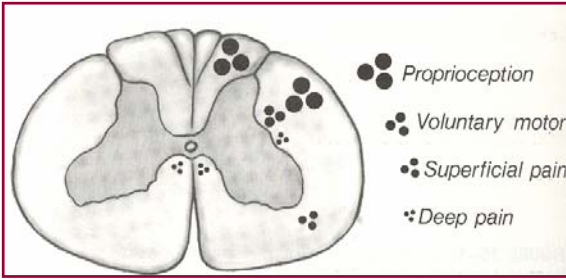


Ruptured disc (Hansen Type I) This case depicts a more chronic but severe rupture @L2-3 (red) with mainly ventral cord compression and contrast column attenuation. Notice chronic and complete collapse of the L1-2 (yellow) intervertebral space with ventral spondylosis and less severe cord compression.



Hansen Type II  
Bulging disc

Bulging disc (Hansen Type II) The nucleus pulposus bulges up (yellow arrow) but does not rupture through the dorsal annulus fibrosus. The bulging disc and displaced ligamentous tissue cause slow but significant pressure on the ventral aspect of the cord. These cases tend to be more chronic in nature and duration. Chronic cord compression in these cases often results in demyelination of spinal cord long tracts resulting in delayed recovery or permanent deficits despite successful surgical intervention.



**Upper Motor Neurons (UMNs):** arise from cell bodies located in the brain - their axons form descending pathways of the spinal cord and terminate on interneurons that in turn synapse with LMNs.

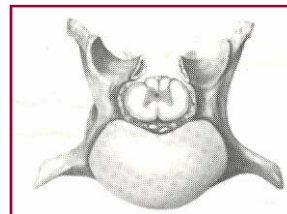
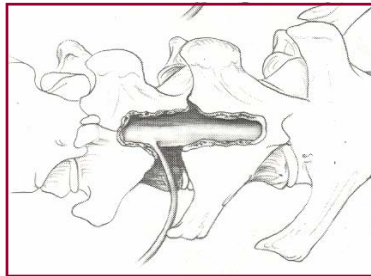
**Lower Motor Neurons (LMNs):** arise from cell bodies in the spinal cord gray matter - their axons leave the spinal cord via the ventral nerve root to become part of a peripheral nerve.

Neurologic deficits following any type of disc protrusion are dependent upon the degree and duration of spinal cord compression. Different neurologic functions are lost in a predictable manner according to the degree of myelination and diameter of the fibers that mediate a given type of function. Large, heavily myelinated fibers mediating conscious proprioception are the first to be affected. Intermediate-sized fibers mediating voluntary motor function and slightly smaller fibers mediating superficial pain are affected next. Small fibers mediating deep pain appreciation are affected last. During recovery from successful decompressive surgery or medical treatment, functions return in the reverse order. Deep pain perception returns first and conscious proprioception last\*.

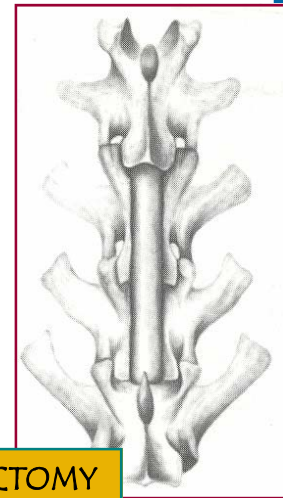
\* adapted from Slatter, *Textbook of Small Animal Surgery*, 2nd edition.



HEMILAMINECTOMY



DORSAL LAMINECTOMY



Thoracolumbar disc herniations are treated with hemilaminectomy or dorsal laminectomy decompressive techniques. These procedures allow direct visualization of the spinal cord and removal of disc protrusions or ruptures in the thoracolumbar spine and occasionally in the cervical spine. Length of decompression is dependent upon degree of disc herniation and cord compression but is usually limited to removal of the lateral or dorsal lamina of two consecutive vertebral bodies and associated articular facets. **Hemilaminectomy** is the preferred decompressive procedure due to the tendency for most thoracolumbar disc herniations to be somewhat lateralized and the overall lower morbidity associated with this procedure.

## Spinal Neurosurgical Expertise:

The surgeons at WRVS have extensive experience and expertise in this field with over 30 years of combined experience in neurosurgical diagnosis and treatment of spinal cord disease in dogs and cats. Specific areas of expertise include spinal cord disc disease, lumbo-sacral instability, spinal cord trauma, spinal cord neoplasia, and congenital spinal malformations.

### WHEAT RIDGE OFFICE

3695 Kipling St., Wheat Ridge, CO 80033  
Tel 303-940-1239 • Fax 303-420-8360

### WESTMINSTER OFFICE

945 W 124th Av, Westminster, CO 80234  
Tel 303-350-4733 • Fax 303-350-4734

### BOULDER OFFICE

1658 30<sup>th</sup> ST, Boulder, CO 80301  
Tel 720-974-5802 • Fax 303-440-0649