

Nerve Root Disorders

(Radiculopathies)

By **Michael Rubin, MDCM**

Nerve root disorders result in segmental radicular deficits (eg, pain or paresthesias in a dermatomal distribution, weakness of muscles innervated by the root). Diagnosis may require neuroimaging, electrodiagnostic testing, and systemic testing for underlying disorders. Treatment depends on the cause but includes symptomatic relief with NSAIDs, other analgesics, and corticosteroids.

Nerve root disorders (radiculopathies) are precipitated by acute or chronic pressure on a root in or adjacent to the spinal column. The most common cause is

- A herniated intervertebral disk

Bone changes due to RA or osteoarthritis, especially in the cervical and lumbar areas, may also compress isolated nerve roots.

Less commonly, carcinomatous meningitis causes patchy multiple root dysfunction. Rarely, spinal mass lesions (eg, epidural abscesses and tumors, spinal meningiomas, neurofibromas) may manifest with radicular symptoms instead of the usual symptoms of spinal cord dysfunction (see [Overview of Spinal Cord Disorders : Symptoms and Signs](#)). Diabetes can

cause a painful thoracic or extremity radiculopathy by causing ischemia of the nerve root. Infectious disorders, such as those due to mycobacteria (eg, TB), fungi (eg, histoplasmosis), or spirochetes (eg, Lyme disease, syphilis), sometimes affect nerve roots. Herpes zoster infection usually causes a painful radiculopathy with dermatomal sensory loss and characteristic rash, but it may cause a motor radiculopathy with segmental weakness and reflex loss. Cytomegalovirus-induced polyradiculitis is a complication of AIDS.

Symptoms and Signs

Radiculopathies tend to cause characteristic radicular syndromes of pain and segmental neurologic deficits based on the cord level of the affected root (see Table: [Symptoms of Common Radiculopathies by Cord Level](#)). Muscles innervated by the affected motor root become weak and atrophy; they also may be flaccid with fasciculations. Sensory root involvement causes sensory impairment in a dermatomal distribution. Corresponding segmental deep tendon reflexes may be diminished or absent. Electric shock-like pains may radiate along the affected nerve root's distribution.

Symptoms of Common Radiculopathies by Cord Level

Level	Symptoms
C6	Pain in the trapezius ridge and tip of the shoulder, often radiating to the thumb, with paresthesias and sensory impairment in the same areas Weakness of biceps Decreased biceps brachii and brachioradialis reflexes
C7	Pain in the shoulder blade and axilla, radiating to the middle finger Weakness of triceps Decreased triceps brachii reflex

Level	Symptoms
T (any)	Bandlike dysesthesias around the thorax
L5	Pain in the buttock, posterior lateral thigh, calf, and foot Footdrop with weakness of the anterior tibial, posterior tibial, and peroneal muscles Sensory loss over the shin and dorsal foot
S1	Pain along the posterior aspect of the leg and buttock Weakness of the medial gastrocnemius muscle with impaired ankle plantar flexion Loss of ankle jerk Sensory loss over the lateral calf and foot

Pain may be exacerbated by movements that transmit pressure to the nerve root through the subarachnoid space (eg, moving the spine, coughing, sneezing, doing the Valsalva maneuver). Lesions of the cauda equina, which affect multiple lumbar and sacral roots, cause radicular symptoms in both legs and may impair sphincter and sexual function.

Findings indicating spinal cord compression include the following:

- A sensory level (an abrupt change in sensation below a horizontal line across the spine)
- Flaccid paraparesis or quadriparesis
- Reflex abnormalities below the site of compression
- Early-onset hyporeflexia followed later by hyperreflexia
- Sphincter dysfunction

Diagnosis

- Neuroimaging
- Sometimes electrodiagnostic tests

Radicular symptoms require MRI or CT of the affected area. Myelography is needed only if MRI is contraindicated (eg, because of an implanted pacemaker or presence of other metal) and CT is inconclusive. The area imaged depends on symptoms and signs; if the level is unclear, electrodiagnostic tests should be done to localize the affected root, but they cannot identify the cause.

If imaging does not detect an anatomic abnormality, CSF analysis is done to check for infectious or inflammatory causes, and fasting plasma glucose is measured to check for diabetes.

Treatment

- Treatment of the cause and of pain

Specific causes are treated.

Acute pain requires appropriate analgesics (eg, acetaminophen, NSAIDs, sometimes opioids). NSAIDs are particularly useful for disorders that involve inflammation. Muscle relaxants, sedatives, and topical treatments rarely provide additional benefit. If symptoms are not relieved with nonopioid analgesics, corticosteroids can be given systemically or as an epidural injection; however, analgesia tends to be modest and temporary. Methylprednisolone may be given, tapered over 6 days, starting with 24 mg po daily and decreased by 4 mg a day.

Chronic pain can be difficult to manage (see [Geriatrics Essentials : Treatment](#)); acetaminophen and NSAIDs are often only partly effective, and chronic use of NSAIDs has substantial risks. Opioids have a high risk of addiction. Tricyclic antidepressants and anticonvulsants may be effective, as may physical therapy and consultation with a mental health practitioner. For a few patients, alternative medical treatments (eg, transdermal electrical nerve stimulation, spinal manipulation, acupuncture, medicinal herbs) may be tried if all other treatments are ineffective.

Key Points

- Suspect a nerve root disorder in patients who have segmental deficits such as sensory abnormalities in a dermatomal distribution (eg, pain, paresthesias) and/or motor abnormalities (eg, weakness, atrophy, fasciculations, hyporeflexia) at a nerve root level.
- If patients have a sensory level, bilateral flaccid weakness, and/or sphincter dysfunction, suspect spinal cord compression.
- If clinical findings suggest radiculopathy, do MRI or CT.
- Use analgesics and sometimes corticosteroids for acute pain, and consider other drugs and other treatments, as well as analgesics, for chronic pain.

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