
DRE Spinal Impairment

Non-Verifiable Radicular Root Pain vs. Verifiable Radicular Complaints

- **If the medical evaluator provides a miscalculation of impairment and the medical report includes objective clinical findings that would support a higher or lower impairment, the AMA Guides allows any knowledgeable observer to adjust the reported impairment accordingly. - AMA Guides 5th Ed, Ch.2, pg. 17**
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Before estimating the extent of any impairment, the AMA Guides requires that physicians establish an accurate diagnosis. The primary requirement is the confirmation of the presence or absence of specific pathology and/or loss of organ function.

A diagnosis provides information on the nature of impairments that might be expected, the anticipated clinical course, the overall prognosis and the availability of treatments or cures. **Neurodiagnostic testing is often essential as an adjunct to the clinical examination in order to determine the diagnosis on which the impairment is based.**

Physicians assess nerve function through sensory discrimination, reflexes and motor strength. Common tests for sensory function are pinprick and light touch done over a specific dermatome to attribute loss of sensory function to a specific nerve. The examination helps assess dermatome-related sensory deficits and myotome related motor deficits. **In order to be considered valid, the sensory findings must be in an anatomic distribution (i.e., follow dermatomal patterns).**

- **Dermatomal Pattern: Location on the skin where pain, abnormal sensation or numbness is experienced, depending on the nerve that is impaired.**

The AMA Guides provides appropriate tables and figures to help identify common dermatome maps. Nervous system disorders can present with generalized or focal symptoms. Many of these symptoms describe the functional impairment experienced by the individual. **The neurologic evaluation and ancillary clinical testing determine the origin of these symptoms.**

The dermatomes depicted in Figures 15-1 and Figure 15-2 (5th Ed., p. 377) are accurate for most individuals. Motor function is assessed through strength and reflex testing. Other specialized maneuvers in the physical exam, such as straight leg raising (SLR) test, also help determine if a nerve root is involved. (Master the AMA Guides 5th Ed., p. 185 - AMA 5th Ed, pg. 375)

Nonverifiable Radicular Root Pain

Non-verifiable radicular complaints are subjective complaints not supported by objective findings. Although there are subjective complaints of a specific radicular nature, no objective findings exist to support the diagnosis of radiculopathy. The complaints of pain or sensory features that follow an anatomical pathway cannot be verified by objective imaging or clinical studies. That is why they are described as 'non-verifiable' radicular complaints.

Non-verifiable radicular complaints are symptoms (e.g. shooting pain, burning sensation, tingling) that must follow the distribution of a specific nerve root, but there are no objective clinical findings (signs) of dysfunction of the nerve root (e.g. loss or diminished sensation, loss or diminished power, loss or diminished reflexes. (AMA 4th Ed)

- **Box 15-1, AMA 5th Ed, p. 382:** *Nonverifiable Radicular Root Pain is pain that is in the distribution of a nerve root but has no identifiable origin; i.e., there are no objective physical, imaging or electromyographic findings. For dermatomal distributions, see Figures 15-1 and 15-2, pg. 377*

Nonverifiable radicular complaints are defined as limb pain or numbness which is consistently and repetitively recognized in medical records, in the distribution of a nerve root that the examiner can name and can have the following characteristics: (AMA 6th Ed)

- **preserved sharp vs. dull sensation**
- **preserved muscle strength in the muscles it innervates,**
- **is not significantly compressed on imaging studies, and,**
- **Is not affected on electrodiagnostic studies (if performed).**

Injured workers with radiculopathy have easily documented motor, sensory and reflex abnormalities. When the clinical picture has a confusing clinical pattern of diffuse numbness or weakness, testing is necessary to differentiate the presence or absence of radiculopathy.

In other words, a diagnosis of nonverifiable radicular root pain exists when the diagnosis of radiculopathy cannot be clinically documented (verified). But even then, non-verifiable radicular complaints must follow known dermatomal pattern(s).

Radiculopathy / Verifiable Radicular Complaints

When an individual has the classic description of radicular pain, confirmed clinically by objective demonstration, with sensory loss over the individual dermatomes, and motor weakness confined to the muscles innervated by the involved roots, a diagnosis of Radiculopathy is objectively supported.

Radicular Pain has three characteristics which are helpful in distinguishing it from other pain: (a) radiation from the involved spinal region along the involved individual sensory dermatome (b) aggravation of pain by any maneuver which increases the intraspinal pressure and (c) aggravation of pain by a maneuver which stretches the involved nerve root.

The physician needs to integrate the clinical assessment of sensory, motor and reflex findings, identify any nerve tension signs and reconcile these findings with the relevant imaging studies to determine whether radiculopathy is present. The *AMA Guides* defines radiculopathy as a significant alteration in the function of a nerve root or nerve roots and is usually caused by pressure on one or several nerve roots.

Alterations of sensation or muscle weakness may be a sign of radiculopathy but the findings must be reproducible in an anatomical distribution, following nerve root paths. Unilateral whole leg or arm or glove-like (hand) or stocking-like distribution (foot) is not indicative of a radiculopathy, rather it is a “non-physiologic” finding suggestive of symptom magnification.

• **Box 15-1, AMA 5th ED, p. 382:** *“Radiculopathy for the purposes of the Guides is defined as significant alteration in the function of a nerve root or nerve roots and is usually caused by pressure on one or several nerve roots. The diagnosis requires a dermatomal distribution of pain, numbness, and/or paresthesias in a dermatomal distribution. A root tension sign is usually positive. The diagnosis of herniated disk must be substantiated by an appropriate finding on an imaging study. The presence of findings on an imaging study in and of itself does not make the diagnosis of radiculopathy. There must also be clinical evidence as described above.”*

Tension Signs

Tension signs, such as straight leg raising are usually present... To be significant, straight leg raising should be reproducible at the same angle, and should be present in both the sitting and supine positions. The pain elicited by the maneuver should be in the leg, not the back and especially should be in the distribution of a nerve root. (AMA 5th Ed, pg. 375)

In the supine position (flat on one’s back), with the knee extended and the hip flexed to the point that pain is elicited, external rotation of the hip and plantar flexion of the ankle should relieve the pain and internal rotation of the hip and dorsiflexion of the ankle should aggravate the pain. These findings may not be present but the opposite response would raise the question of symptom magnification.

Weakness and Loss of Sensation

“To be valid, the sensory findings must be in a strict anatomic distribution, i.e., follow dermatomal patterns (see Figures 151 and 152). Motor findings should also be consistent with the affected nerve structure(s). Significant, longstanding weakness is usually accompanied by atrophy.” (AMA 5th ed., pg. 382)

Radiculopathy / Verifiable Radicular Complaints (cont.)

Atrophy

“Atrophy is measured with a tape measure at identical levels on both limbs. For reasons of reproducibility, the difference in circumference should be 2 cm or greater in the thigh and 1 cm or greater in the arm, forearm, or leg. The evaluator can address asymmetry due to extremity dominance in the report.” (AMA 5th ed., p, 382)

Atrophy may be present after a patient has sustained significant nerve root pressure. The parameters are different from the Fourth Edition where the threshold was 2 cm. These thresholds are also different than those used in assessing lower extremity impairment, e.g. the values provided in Table 17-6 Impairment Due to Unilateral Leg Muscle Atrophy (AMA 5th ed., p, 530).

Reflexes

“Reflexes may be normal, increased, reduced, or absent. For reflex abnormalities to be considered valid, the involved and normal limb should show marked asymmetry between arms or legs on repeated testing. Once lost (because of previous radiculopathy) a reflex rarely returns. Abnormal reflexes such as Babinski signs or clonus may be signs of corticospinal tract involvement.” (AMA 5th ed., 382)

Loss of knee or ankle reflexes in the lower extremity or biceps, triceps or brachioradialis in the upper extremity suggests radiculopathy. Since once a reflex is lost it rarely returns, it is a less significant finding in recurrent back pain.

Electrodiagnostic Verification of Radiculopathy

Unequivocal electrodiagnostic evidence of acute radiculopathy includes the presence of multiple positive sharp waves or fibrillation potentials in muscles innervated in one nerve root. **However the credentials of the person performing the study are critical.**

The interpretation of EMG is subjective. The study should be performed by a licensed physician and one trained in interpreting EMGs. EMGs that are done by technicians and interpreted by a physician in a remote location are highly suspect. EMGs are not required to make a diagnosis of radiculopathy, but if an EMG demonstrates the findings described above, then the diagnosis of radiculopathy is made by definition. Occasionally, EMGs will demonstrate radiculopathy that is not caused by compression of a nerve root or the compression is not evident on imaging studies. (AMA 5th ed., p. 382)

Normal electrodiagnostic tests fail to meet the definitions necessary to permit a diagnosis of focal nerve compromise for the purpose of impairment rating.

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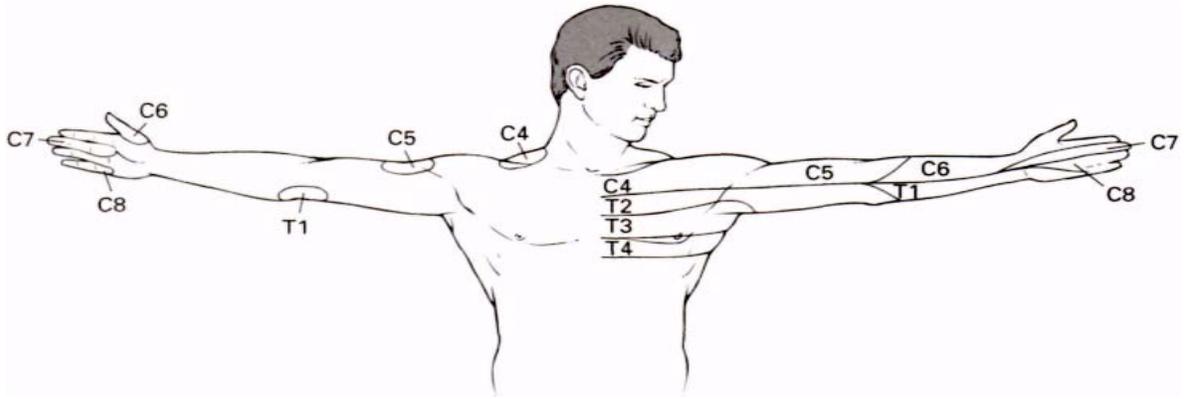
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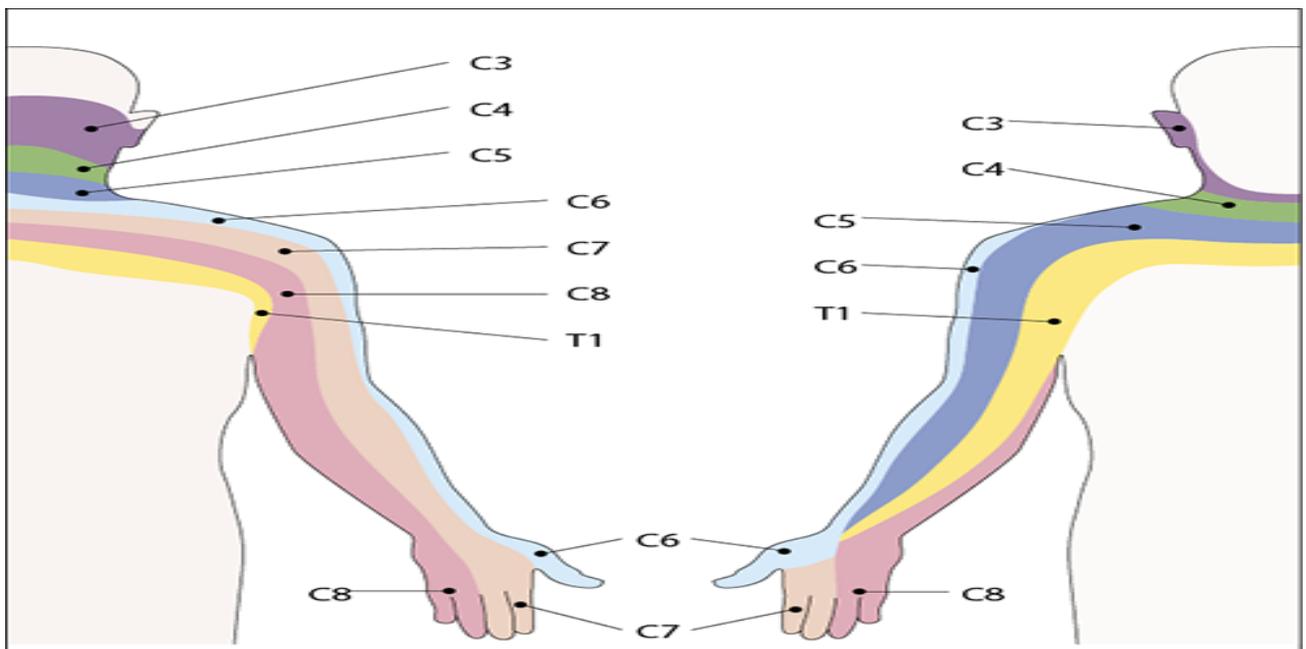
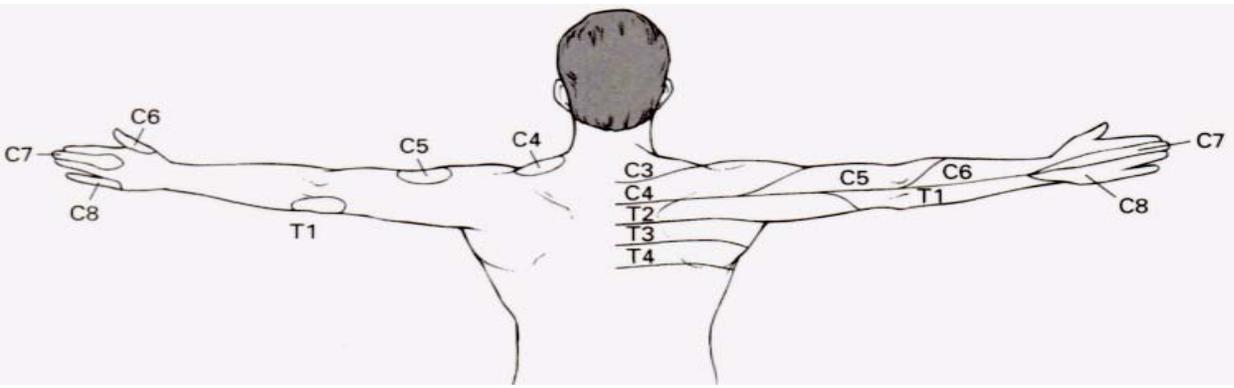
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Impairment Verification Figures, Tables & Charts

AMA 5th Ed, Figure 15-2 (p.377)
Skin Area Innervated by the Cervical & Thoracic Nerve Roots Showing Autonomous Zones



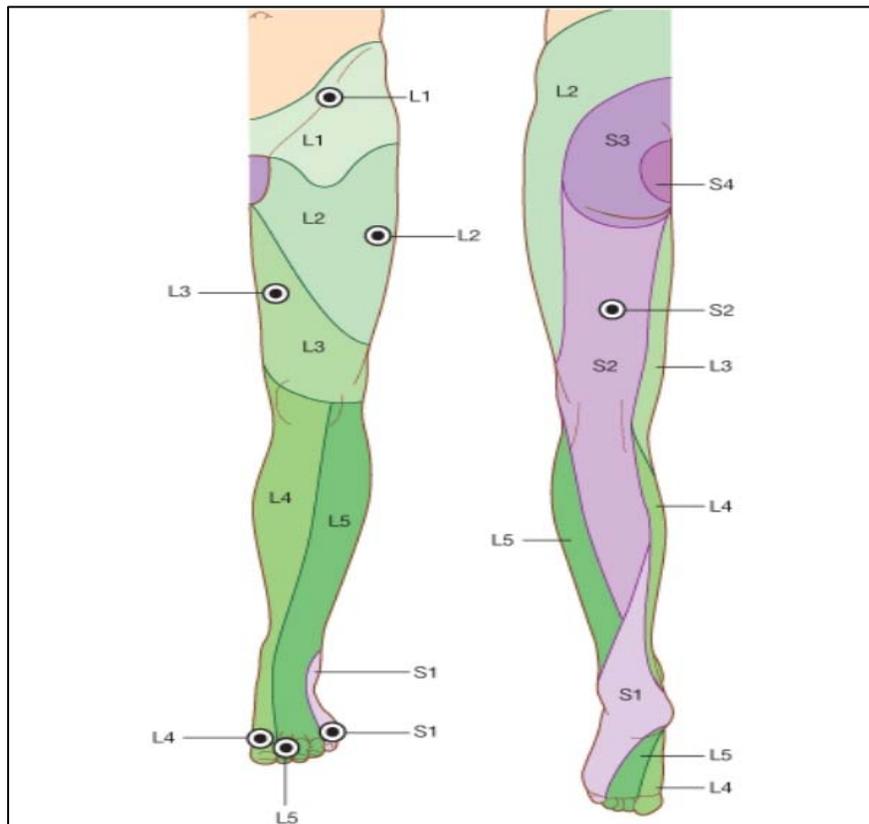
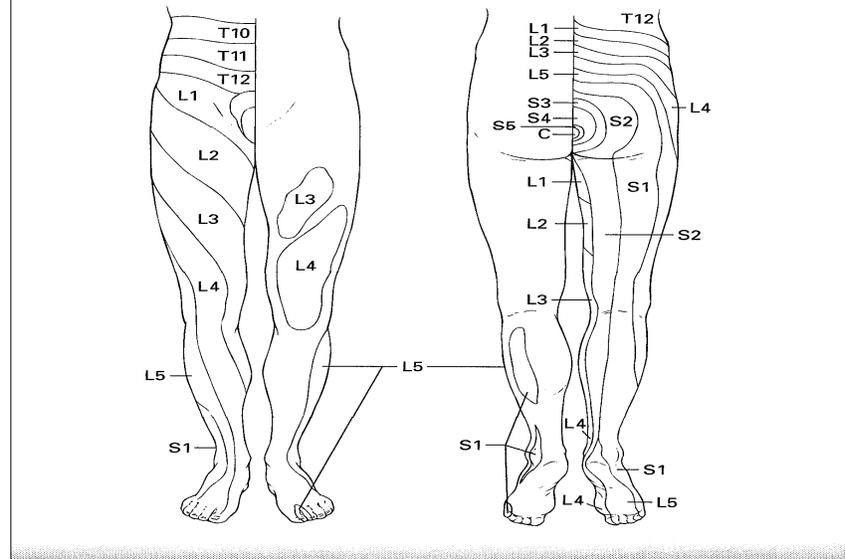
AMA 5th Ed, Figure 15-2 (p.377)
Skin Area Innervated by the Cervical & Thoracic Nerve Roots Showing Autonomous Zones



Impairment Verification Figures, Tables & Charts

AMA 5th Ed, Figure 15-1 (p.377)

Figure 15-1 Skin Areas Innervated by the Thoracic and Lumbosacral Nerve Roots and Showing Autonomous Zones



Impairment Verification Figures, Tables & Charts

Distribution of Cervical Radiculopathy				
Disk	Root	Motor Weakness	Reflex	Sensation
C4-C5	C5	Deltoid, Supraspinatus, Infraspinatus	Biceps	Lateral Arm
C5-C6	C6	Biceps Wrist extensors	Biceps, Brachioradialis	Radial Forearm, Thumb, Index Finger
C6-C7	C7	Triceps Wrist flexors Finger extensors	Triceps	Middle Finger
C7-T1	C8	Finger Flexors	None	Fourth & Fifth Finger
T1-T2	T1	Finger Abductors	None	Ulnar Forearm

**AMA Guides 5th Edition pg. 376, Table 15-2:
Cervical Spine - Common Radicular Syndromes (Expanded) ¹**

Damage or irritation of C1, C2, and C3 does not result in reflex or motor deficits but can result in pain in the back of the neck extending along the back of the head. Because the distal-most innervation of C4 is to the top of the shoulder, compression of the C4 nerve root does not produce symptoms below the level of the shoulder, and usually there is no demonstrable muscle weakness or any reflex abnormalities. The cervical nerve roots C5, C6 and C7 are the most commonly involved and result in characteristic signs and symptoms in the upper extremities. Pain from neck sources other than cervical nerve roots does not result in sensory, motor or reflex deficits and the pain patterns are not as well defined. Pain reproduction studies have investigated patients with neck pain but without evidence of specific nerve root involvement.

Disk	Root	Motor Weakness	Reflex	Sensation	Pain Distribution
C4-C5*	C5	Deltoid Biceps	Biceps	<i>Anterolateral Shoulder and Arm (Outer Shoulder/Upper Arm)</i>	Neck Pain radiating down to anterior arm (above elbow)
C5-C6*	C6	Biceps Wrist extensors ‡	Brachioradialis Pronator Teres	<i>Lateral forearm and hand Thumb (Thumb Side of Hand) C6 sensation: lateral forearm, thumb, index finger and 1/2 of the middle finger.</i>	Neck Pain radiating along arm and dorsum of forearm to thumb.
C6-C7	C7	Triceps Wrist flexors Finger extensors §	Triceps	C7 Sensation, middle finger.	Neck pain radiating along lateral arm and dorsum of forearm to middle finger
C7-T1	C8	Finger flexors Hand intrinsic	None	<i>Medial forearm, hand, ring and little fingers. (Down Arm to little finger side of hand)</i>	Neck Pain radiating along ulnar side of arm and forearm to ring and little finger
T1-T2	T1	Hand intrinsic	None	Medial forearm Med. Brach. Cutaneous nerve	

* Most common levels of herniation

† Deltoid, rhomboid, supra and infraspinatus muscles

‡ Extensor carpi radialis longus & brevis

§ Triceps, flexor carpi radialis, extensor digitorum longus

|| Flexor digitorum muscles

¹ Stanley Hopenfeld, Orthopaedic Neurology, A Diagnostic Guide to Neurologic Levels, JP Lippincott (1977)

Distribution of Lumbar Radiculopathy

Disk	Root	Motor Weakness	Reflex	Sensation
L3-L4	L4	Quadriceps	Patellar	Anterior/Medial Upper Thigh
L4-L5	L5	Big Toe/Foot Extensor Weakness	Medial Hamstrings	Lateral Thigh. Anterolateral Leg / Midtarsal Foot
L5-S1	S1	Ankle Plantar Flexors	Achilles	Posterior Leg / Lateral Foot

AMA Guides 5 th Edition pg. 376, Table 15-2: Lumbar Spine - Understanding Herniated Lumbar Discs (Expanded) ¹					
Disc	Root	Motor Weakness	Reflex	Sensation	Pain
L2-L3	L3 Rare	Quadriceps (Knee Extensors) Thigh Adduction	(None)	(Frontal Thighs)	(Across Thigh) Anterolateral thigh
L3-L4	L4	Tibialis anterior (Foot bending /Knee stretching) Leg Extension at the Knee (Inversion of Foot)	Knee Patellar	Anterolateral thigh Anterior Knee Medial leg & Foot (Front Portion of the Leg)	Posterolateral thigh, anterior tibial area and lower leg (above ankle)
L4-L5	L5	Extensor hallucis longus † (Ankle Bending-dorsiflexion. Big toe/ foot extensor weakness Foot Drop)	Medial Hamstrings	Lateral Thigh Anterolateral Leg Middorsal foot (Top of foot.)	Pain in Dorsum of Foot
L5-S1 *	S1	Perineum Longus & Brevis ‡ (peroneals) (Calf / Toe Walking/Ankle plantar flexors/Knee flexor)	<u>Ankle Jerk</u> Achilles	Heel - Posterior Leg Lateral foot (Calf area as well.)	Lateral Aspect of Foot

* Most common level of herniation / † Extensor digitorum longus and brevis, medial hamstring, gluteus medius muscles
‡ Flexor hallucis longus, gastrocnemius, lateral hamstring, gluteus maximus muscles

¹ Stanley Hoppenfeld, *Orthopaedic Neurology, A Diagnostic Guide to Neurologic Levels*, JP Lippincott (1977)

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