

## C. SPINAL PAIN, SECTION 1: SPINAL AND RADICULAR PAIN SYNDROMES

### Note on Arrangements

In this section, both spinal pain and radicular pain are considered. Definitions of spinal pain and related phenomena are offered first, followed by principles related to spinal pain and a comment on radicular pain and radiculopathy. Next there follows a detailed schedule of classifications of spinal pain affecting the cervical and thoracic regions. This schedule is intended to be comprehensive and includes numerous categories and coded items that are not described. Other elements, the more common and chronic with respect to pain, are described in detail later in the body of the text according to the usual pattern.

The coding system and schedules provide categories for both spinal pain and radicular pain when they are associated with each other or when they occur separately. A diagnosis for each should be made as required with the suffix S or R as appropriate, and C when both occur.

Subsequent to the schedule of classifications for the cervical and thoracic regions a more detailed description of radicular pain and radiculopathy is provided.

The schedule of classifications relating to lumbar, sacral, and coccygeal, spinal, and radicular pains is presented later in the text, after the incorporation of material dealing with other syndromes in the upper limbs, thorax, abdomen, and perineum.

### Definitions of Spinal Pain and Related Phenomena

#### SPINAL PAIN

Spinal pain is pain perceived as arising from the vertebral column or its adnexa. The location of the pain can be described in terms similar to those used to describe the five regions of the vertebral column, i.e., cervical, thoracic, lumbar, sacral, and coccygeal. However, this relates only to the perceived location of the pain and, in the first instance, does not imply a direct relationship between the location of the pain and the location of its source. The following descriptions therefore apply only to the description of symptoms and not to their cause.

Wherever a pain is specified as coming from a particular region, it should be understood that this means that it is “perceived substantially” within that region. Thus a cervical pain which extended to a small portion of the upper arm may simply be regarded as a cervical pain. Similarly a lumbar pain which extended to the sacrum or a sacral pain which extended to a minor portion of the lower limb above the knee would be adequately qualified by the principal area in which it is felt. If two areas are substantially involved, then both areas are required to be identified and diagnoses listed for both areas.

**Cervical Spinal Pain:** Pain perceived as arising from anywhere within the region bounded superiorly by the superior nuchal line, inferiorly by an imaginary transverse line through the tip of the first thoracic spinous process, and laterally by sagittal planes tangential to the lateral borders of the neck.

Cervical pain may be subdivided into *upper cervical pain* and *lower cervical pain* by subdividing the above region into two equal halves by an imaginary transverse plane. Additionally, pain located between the superior nuchal line and an imaginary transverse line through the tip of the second cervical spinous process can be qualified as *suboccipital pain*.

**Thoracic Spinal Pain:** Pain perceived as arising from anywhere within the region bounded superiorly by an imaginary transverse line through the tip of first thoracic spinous process, inferiorly by an imaginary transverse line through the tip of the last thoracic spinous process, and laterally by vertical lines tangential to the most lateral margins of the erector spinae muscles.

Pain located over the posterior chest wall but lateral to the above region is best described as *posterior chest wall pain* to distinguish it from thoracic spinal pain.

If required, thoracic spinal pain can be further qualified by dividing the above region into thirds from the top down, to establish regions of *upper thoracic*, *mid thoracic*, and *lower thoracic* spinal pain.

**Lumbar Spinal Pain:** Pain perceived as arising from anywhere within a region bounded superiorly by an imaginary transverse line through the tip of the last thoracic spinous process, inferiorly by an imaginary transverse line through the tip of the first sacral spinous process, and laterally by vertical lines tangential to the lateral borders of the lumbar erectors spinae.

Pain located over the posterior region of the trunk but lateral to the erectors spinae is best described as *loin pain* to distinguish it from lumbar spinal pain.

If required, lumbar spinal pain can be divided into *upper lumbar* spinal pain and *lower lumbar* spinal pain by subdividing the above region into equal halves by an imaginary transverse line.

**Sacral Spinal Pain:** Pain perceived as arising from anywhere within a region bounded superiorly by an imaginary transverse line through the tip of the first sacral spinous process, inferiorly by an imaginary transverse line through the posterior sacrococcygeal joints, and laterally by imaginary lines passing through the posterior superior and posterior inferior iliac spines.

**Coccygeal Pain:** Pain perceived as arising from the region defined by the location of the coccyx.

**Cervico-Occipital Pain:** Pain perceived as arising in the cervical region and extending over the occipital region of the skull.

**Cervico-Thoracic Pain:** Pain perceived as arising from a region encompassing or centered over the lower quarter of the cervical region as defined above and the upper quarter of the thoracic region as defined above.

**Thoraco-Lumbar Pain:** Pain perceived as arising from a region encompassing or centered over the lower quarter of the thoracic region as described above and the upper third of the lumbar region as described above.

**Lumbosacral Pain:** Pain perceived as arising from a region encompassing or centered over the lower third of the lumbar region as described above and the upper third of the sacral region as described above.

**Combined States:** Spinal pain not satisfying either the primary or conjunctive descriptors defined above but otherwise encompassing more than one spinal region should be described in composite forms, e.g., lumbar and thoracic spinal pain.

## REFERRED PAIN

In clinical terms, referred pain may be defined as pain perceived as occurring in a region of the body topographically distinct from the region in which the actual source of pain is located. This definition, however, becomes ambiguous in situations where it is unclear where one region of the body ends and an adjacent region begins. Consequently, without detracting from the intent of the above definition, referred pain can be defined more strictly in neurological terms as pain perceived as arising or occurring in a region of the body innervated by nerves or branches of nerves other than those that innervate the actual source of pain. Referred pain may thus occur in a region that is either remote from or directly contiguous with the source of pain, but the two locations are distinguishable on the basis of their different nerve supply.

In the context of spinal pain, referred pain may occur in the head (Campbell and Parsons 1944; Feinstein et al. 1954; Ehni and Benner 1984; Bogduk and Marsland 1986, 1988; Dwyer et al. 1990), the upper limb girdle and upper limb (Kellgren 1938, 1939; Feinstein et al. 1954; Cloward 1959; Bogduk and Marsland 1988; Dwyer et al. 1990), the posterior or anterior chest wall (Kellgren 1938, 1939; Feinstein et al. 1954; Hockaday and Whitty 1967; Booth and Rothman 1976), the abdominal wall (Kellgren 1938, 1939; Feinstein et al. 1954; Hockaday and Whitty 1967), the lower limb girdle and the lower limb (Kellgren 1938, 1939; Feinstein et al. 1954; Mooney and Robertson 1976; McCall et al. 1979).

The distribution of referred pain in the **head** can be described in terms of the region encompassed based on the underlying bones of the skull or regions of the skull, viz., occipital, parietal, frontal, temporal, orbital, auricular, maxillary, and mandibular.

Referred pain to the **upper limb girdle** may encompass all or only part of the girdle. The following descriptors apply to various patterns that may occur.

**Scapular Pain:** Pain perceived as arising substantially within the area encompassed by the borders of the scapula.

**Upper Scapular Pain:** Pain perceived as arising substantially within a region bounded medially by an imaginary line in a parasagittal plane coincident with the medial border of the scapula, laterally by the glenohumeral joint, superiorly by the upper border of trapezius, and inferiorly by the spine of the scapula.

**Lower Scapular Pain:** Pain perceived as arising substantially within the area encompassed by the borders of the scapula but below its spine.

**Shoulder Pain:** Pain focused over the top of the glenohumeral joint, centered over the lateral margin of the acromion.

**Anterior Shoulder Pain:** Pain focused over the anterior fibers of the deltoid muscle.

**Posterior Shoulder Pain:** Pain focused over the posterior fibers of the deltoid muscle.

Referred pain in the **upper limb** can be qualified according to the topographic segment encompassed using standard anatomical definitions, viz., arm, forearm, hand, digits I-V, medial, lateral, anterior, posterior, ulnar, radial, etc.

Referred pain to the **thoracic wall** may be focused over the anterior, lateral, or posterior chest wall and should be described in such terms. Its exact topographic location can be specified by enunciating the ribs that it spans.

Referred pain to the **abdominal wall** can be qualified using established terminology describing the regions of the abdomen, viz., hypochondrial, epigastric, lumbar, umbilical, and suprapubic.

Referred pain located between the thighs may be described as **perineal** pain, unless it is perceived more specifically as occurring in the penis, scrotum, or testis, in which case those descriptions should apply. **Scrotal pain** and **testicular pain** should be distinguished on the basis that the former is perceived principally as being superficial and in the skin of the scrotum while the latter is perceived as being deep and related to the contents of the scrotum.

Referred pain over the **lower limb girdle** posteriorly may be described as **gluteal** pain. For this purpose the gluteal region may be defined as a sector central on the greater trochanter and spanning from the posterior inferior iliac spine to the anterior superior iliac spine. Referred pain immediately below this region posteriorly should be qualified as **posterior hip** pain; pain immediately below this region anteriorly should be qualified as **anterior hip** pain. Pain focused over the inguinal ligament may be qualified as groin pain.

Referred pain in the lower **limb** may be qualified using standard anatomical terms that describe its topographic location, viz., thigh, leg, foot, digits I-V, anterior, posterior, medial, lateral, dorsal, plantar. Descriptors based on the course or distribution of nerves, such as “sciatica” and “anterior sciatica” should not be used because they convey an unjustified implication of the involvement of the said nerve. The term “calf” can substitute for “posterior leg.”

Usage: In describing a patient simultaneously suffering from spinal pain and referred pain, the distribution of both pains should be explicitly stated, e.g., “lower cervical spinal pain and referred pain to the shoulder,” or “lumbosacral pain with referred pain to the gluteal region and posterior thigh,” with the side to which the pain is referred being stated. This precision avoids the ambiguity of terms such as “upper cervical syndrome and headache,” “typical cervical syndrome,” “brachialgia,” “sciatica,” and “low-back syndrome.”

**Physiology:** The anatomical basis for spinal referred pain appears to be convergence. Afferent fibers from the vertebral column synapse in the spinal cord with second-order neurons that happen also to receive afferents from other nerves. In the absence of any further localizing information, the brain is unable to determine whether the information it receives from the second-order neuron was initiated by the vertebral afferent or the other convergent fibers, and so attributes its origin to both.

Convergence is typically segmental in nature, in that referred pain is perceived as arising from those

regions innervated by fibers of the anterior primary nerves of the spinal nerve that also innervates the spinal source of pain. However, convergence may also occur between consecutive spinal cord segments, resulting in more disparate patterns of referred and local pain. For example, convergence between afferents of the trigeminal nerve from the forehead and orbit with vertebral afferents in the third cervical spine nerve may result in upper cervical pain being referred to the forehead.

The essential feature of spinal referred pain that distinguishes it from neurogenic and radicular pain (see below) is that it is nociceptive in nature: the pain is initiated by stimulation of nerve endings of afferent fibers that innervate the vertebral column and its adnexa. Afferent fibers from the region of referred pain are not stimulated by the causative lesion.

### **RADICULAR PAIN (see also Radicular Pain and Radiculopathy, below)**

Radicular pain is distinguished from nociception by the axons being stimulated along their course; their peripheral terminals are not the site of stimulation. Ectopic activation may occur as a result of mechanical deformation of a dorsal root ganglion, mechanical stimulation of previously damaged nerve roots, inflammation of a dorsal root ganglion, and possibly by ischemic damage to dorsal root ganglia (Howe et al. 1977; Murphy 1977; Howe 1979).

Ectopic activation results in pain being perceived as arising in the territory supplied by the affected axons. Radicular pain differs from referred pain in several respects.

The disease processes that cause radicular pain are indiscriminate and inescapably also affect nonnociceptive afferents (Howe et al. 1977; Howe 1979), resulting in a sensation that is more than pure nociception. Consequently, radicular pain differs in quality from referred pain. The latter is felt deeply and is aching in quality; although its central region is recognizable and constant, its margins are hard to define (Kellgren 1938, 1939; Feinstein et al. 1954). In contrast, radicular pain is usually lancinating in quality and may be perceived along narrow bands reminiscent of but not identical to the bands of dermatomes (Norlen 1944; Smyth and Wright 1959; McCulloch and Waddell 1980). While also perceived deeply, radicular pain nevertheless has a cutaneous quality in proportion to the number of cutaneous afferent fibers being ectopically activated, i.e., it is perceived in the skin as well as deeply. Referred pain lacks any cutaneous quality.

**Sciatica:** This term is an anachronism and should be abandoned. It stems from an era when the mechanisms of referred pain and radicular pain were poorly understood. It was used to describe pain that appeared to travel along the course of the sciatic nerve. The unfortunate legacy of this term is that it has been applied erroneously to any or all pain of spinal origin perceived in the lower limb. Furthermore, because nerve root compression has been believed to be the cause of sciatica, many forms of referred pain in the lower limb have been erroneously ascribed to this cause.

Clinical experiments have shown that the only type of pain that is evoked by stimulating nerve roots is radicular pain as described above (Norlen 1944; Smyth and Wright 1959; McCulloch and Waddell 1980). Consequently, at the most, sciatica and radicular pain can be considered as synonymous. However, there is no justification on physiological grounds for equating sciatica and referred pain. The two are distinct in mechanism and quality.

Pain in the lower limb should be described specifically as either referred pain or radicular pain. In cases of doubt no implication should be made and the pain should be described as pain in the lower limb.

### **QUALITY OR DESCRIPTION OF PAIN**

In this section, individual descriptions of the quality of pain have not been presented throughout the descriptions of syndromes. This is because pain in the back tends not to discriminate much among the different diagnostic groups. The following general characteristics may be noted.

Acute back pain is often cramping or knifelike, but may be merely dull or aching. It is worse with movement. Chronic back pain without a radicular component is generally aching, dull, or burning or any combination of these three features. It also tends to be made worse by movement.

Radicular pain is often stabbing or shooting with paresthesias, and tingling or lancinating elements, but may well occur against a background of more dull aching pain.

## REFERENCES

- Bogduk N, Marsland A. On the concept of third occipital headache. *J Neurol Neurosurg Psychiatry* 1986;49:775–80.
- Bogduk N, Marsland A. The cervical zygapophyseal joints as a source of neck pain. *Spine* 1988;13:610–7.
- Booth RE, Rothman RH. Cervical angina. *Spine* 1976;1:28–32.
- Campbell DG, Parsons CM. Referred head pain and its concomitants. *J Nerv Ment Dis* 1944;99:544–51.
- Cloward RB. Cervical diskography: a contribution to the aetiology and mechanism of neck, shoulder and arm pain. *Ann Surg* 1959;130:1052–64.
- Dwyer A, Aprill C, Bogduk N. Cervical zygapophyseal joint pain patterns I: a study in normal volunteers. *Spine* 1990;15:453–7.
- Ehni G, Benner B. Occipital neuralgia and the C1-2 arthrosis syndrome. *J Neurosurg* 1984;61:961–5.
- Feinstein B, Langton JBK, Jameson RM, Schiller F. Experiments on referred pain from deep somatic tissues. *J Bone Joint Surg* 1954;36A:981–97.
- Hockaday JM, Whitty CWM. Patterns of referred pain in the normal subject. *Brain* 1967;90:481–96.
- Howe JF. A neurophysiological basis for the radicular pain of nerve root compression. In: Bonica JJ, Liebeskind JC, Albe-Fessard DG, editors. *Proceedings of the Second World Congress on Pain. Advances in Pain Research and Therapy, Vol. 3.* New York: Raven Press; 1979. p. 647–57.
- Howe JF, Loeser JD, Calvin WH. Mechanosensitivity of dorsal root ganglia and chronically injured axons: a physiological basis for the radicular pain of nerve root compression. *Pain* 1977;3:25–41.
- Kellgren JH. Observations on referred pain arising from muscle. *Clin Sci* 1938;3:175–90.
- Kellgren JH. On the distribution of referred pain arising from deep somatic structures with charts of segmental pain areas. *Clin Sci* 1939;4:35–46.
- McCall IW, Park WM, O'Brien JP. Induced pain referral from posterior lumbar elements in normal subjects. *Spine (Phila Pa 1976)* 1979;4:441–6.
- McCulloch JA, Waddell G. Variation of the lumbosacral myotomes with bony segmental anomalies. *J Bone Joint Surg* 1980;62B:475–80.
- Mooney V, Robertson J. The facet syndrome. *Clin Orthop* 1976;115:149–56.
- Murphy RW. Nerve roots and spinal nerves in degenerative disk disease. *Clin Orthop* 1977;129:46–60.
- Norlen G. On the value of the neurological symptoms in sciatica for the localisation of a lumbar disk herniation. *Acta Chir Scand* 1944;Suppl 95:1–96.
- Smyth MJ, Wright V. Sciatica and the intervertebral disc: an experimental study. *J Bone Joint Surg* 1959;40A:1401–18.

## Principles

The symptom of spinal pain should be described in terms of its location and nature using the definitions supplied on pages 11 and 12; these descriptions, however, do not establish a diagnosis.

As far as possible, the actual diagnosis of spinal pain should be expressed simultaneously along two axes: an anatomic axis specifying the structure that is the *source* of pain, including its regional or segmental location, and a pathologic axis specifying the pathological basis for the *cause* of pain, e.g., “septic arthritis of the left T5-6 zygapophysial joint.”

In patients with spinal pain and referred pain or radicular pain, attention should be paid to diagnosing both parts of their pain. In some cases both forms of pain may stem from the one lesion and a single diagnosis can be formulated, e.g., “cervical spinal pain with right upper scapular referred pain due to osteomyelitis of the C6 vertebral body.”

In other cases the two forms of pain may have separate but related causes; both should be enunciated, e.g., “lumbar spinal pain due to internal disruption of the L4-5 intervertebral disk and radicular pain in the right posterior thigh and calf due to stenosis of the L4-5 intervertebral foramen.”

It is acknowledged that given the limitations of reliability and validity of currently available clinical techniques and special investigations, it may not always be possible to formulate a diagnosis complete in both anatomic and pathologic terms. Accordingly, this taxonomy provides for three types of diagnoses.

The schedule of classifications provides for:

1. Conditions that are associated with spinal pain whose cause can reasonably be attributed to a demonstrable lesion or otherwise recognizable diathesis;
2. Conditions that may be recognized clinically and for which there is no dispute about their definition but for which a specific diagnosis in anatomic or pathologic terms is either not available or is not justifiable; and
3. Conditions that in some circles are considered controversial or unproven, but which in other circles are staunchly endorsed.

Conditions in which the spinal pain can reasonably be attributed to a demonstrable lesion would be more appropriately coded in terms of the primary diagnosis. There is no special need to elaborate a diagnosis and classification system based on the pain they cause when these conditions are otherwise already classifiable. For example, tumors may cause spinal pain, but once the diagnosis is established, the condition should be classified as “tumor,” followed by the pathologic nature of the tumor and the region of the spine that it affects. However, these entities have been included in the schedule for completeness.

For conditions that are considered still controversial or unproven, the Committee has formulated criteria that should be fully satisfied before the diagnosis is ascribed. The Committee also accepts the use of such diagnoses on a presumptive basis without the criteria being satisfied. In adopting this stance, the Committee seeks to mediate contemporary controversies by on the one hand acknowledging novel or controversial entities while on the other hand outlining criteria that if satisfied should assuage skepticism about the validity of the diagnosis. In this regard, the Committee hopes to facilitate the evolution of knowledge in this field by outlining contemporary standards of scientific thought.

In this way, the following taxonomy is designed not to be limiting or prescriptive but to provide options reflecting the diversity of current approaches and attitudes to the problem of spinal pain.

The next section below incorporates definitions of radicular pain and radiculopathy. Technically, radicular pain is not a spinal pain, for it is not perceived in any region of the vertebral column; it is perceived in the limbs or around a segment of the body wall. However, it is mentioned in the context of spinal pain for not uncommonly radicular pain is associated with spinal pain, and in some instances but not always, both forms of pain may have the same cause. It is, however, illegitimate to diagnose or classify any form of spinal pain as radicular pain or in terms relating to radicular pain. Radicular pain in isolation is strictly a pain problem of the affected limb or body wall segment. When associated with spinal pain, the spinal pain warrants an independent classification to which the classification of the radicular pain may then be appended.

Similarly, radiculopathy may occur in conjunction with spinal pain, but radiculopathy involves loss of conduction in sensory or motor axons, or both, in a nerve root, and there is no evidence that such conduction loss can be a cause of spinal pain. Consequently, it is illegitimate to classify spinal pain in terms of any radiculopathy that may be associated with it. As with radicular pain, the spinal pain should be classified independently, supplemented if required by a classification of the radiculopathy.

In classifying spinal pain, it is immaterial whether or not the spinal pain is associated with referred pain; the extent or distribution of referred pain has no bearing on the underlying cause of the spinal pain. Both the spinal pain and the referred pain are caused by the same lesion (unless one believes the patient is suffering from two independent pain problems), and identifying the location or extent of any referred pain has little bearing on formulating a diagnosis. Consequently, in this taxonomy spinal pain problems are classified according to their location but without deference to the presence or distribution of any referred pain.

In compiling a taxonomy based on anatomical and pathological axes, the Committee has endeavored to provide a workable system of diagnostic criteria which may help to order the primary phenomena. The complete *assessment* of a patient requires attention beyond the anatomical diagnosis to consider the psychological, social, and vocational context and consequences of pain and their significance.

# **Radicular Pain and Radiculopathy**

## **RADICULAR PAIN: GENERAL FEATURES**

**Definition:** Pain perceived as arising in a limb or the trunk wall caused by ectopic activation of nociceptive afferent fibers in a spinal nerve or its roots or other neuropathic mechanisms.

**Clinical Features:** The pain is lancinating in quality and travels along a narrow band. It may be episodic, recurrent, or paroxysmal according to the causative lesion or any superimposed aggravating factors.

**Pathology:** Lesions that directly compromise the dorsal root ganglion mechanically or indirectly compromise the spinal nerve and its roots by causing ischemia or inflammation of the axons. Specific entities include:

1. Foraminal stenosis due to vertical subluxation of the intervertebral joint, osteophytes stemming from the zygapophysial joint or intervertebral disk, buckling of the ligamentum flavum, or a combination of any of the above.
2. Foraminal stenosis due to miscellaneous disorders of the zygapophysial joint such as articular fractures, slipped epiphysis, ganglion, joint effusion, and synovitis.
3. Prolapsed intervertebral disk acting mechanically as a space-occupying lesion that compromises axons.
4. Prolapsed intervertebral disk material that elicits an inflammatory reaction in the vertebral canal that secondarily produces inflammation of adjacent neural elements.
5. Radiculitis caused by inflammatory exudates leaking from an intervertebral disk in the absence of frank prolapse.
6. Radiculitis caused by exudates from a zygapophysial joint.
7. Radiculitis caused by viral infection or postviral inflammation of a dorsal root ganglion, e.g., herpes zoster and postherpetic neuralgia.
8. Radiculitis due to arteritis.
9. Tabes dorsalis.

**Diagnosis:** The diagnosis can be ascribed on clinical grounds alone if the appropriate clinical features are present. Where possible the segmental level of the affected spinal nerve should be specified. The cause and segmental level of the affected nerve can be specified if an appropriate lesion is demonstrated by imaging techniques such as myelography, CT, or MRI. The affected nerve but not the causative lesion can be specified if in the presence of the appropriate clinical features, a selective spinal nerve block abolishes the pain.

**Remarks:** Radicular pain must be distinguished from referred pain (see above).

Radicular pain must, by definition, involve a region beyond the spine. There is no evidence that the mechanism underlying radicular pain can cause spinal pain alone.

Radicular pain may occur alone, in the absence of spinal pain, whereupon it should be classified as limb pain or trunk pain according to its perceived distribution. When present in conjunction with spinal pain, the two should in the first instance be defined and diagnosed separately, for there is no prima facie reason to maintain that both pains will have exactly the same cause.

## **RADICULOPATHY: GENERAL FEATURES**

**Definition:** Objective loss of sensory and/or motor function as a result of conduction block in axons of a spinal nerve or its roots.

**Clinical Features:** Subjective sensations of numbness and weakness, confirmed objectively by neurological examination and/or by electrodiagnostic means, occurring in the distribution of a spinal nerve. Radiculopathy may occur in isolation or in association with radicular pain, referred pain, or spinal pain.

Paresthesias in a dermatomal distribution can be caused by ischemia of a spinal nerve or its roots, and may be regarded as a feature of incipient conduction block and therefore a feature of radiculopathy.

**Pathology:** Any lesion that causes conduction block in axons of a spinal nerve or its roots either directly by mechanical compression of the axons or indirectly by compromising their blood supply and nutrition. Specific entities include:

1. Foraminal stenosis due to vertical subluxation of the intervertebral joint, osteophytes stemming from the zygapophysial joint or intervertebral disk, buckling of the ligamentum flavum, or a combination of any of these.
2. Foraminal stenosis due to miscellaneous disorders of the zygapophysial joint such as articular fractures, slipped epiphysis, ganglion, joint effusion, and synovitis.
3. Prolapsed intervertebral disk acting mechanically as a space-occupying lesion that compromises axons.
4. Chronic inflammation of the nerve root complex and its meningeal investments.

**Remarks:** Radiculopathy and radicular pain are not synonymous. The former relates to objective neurological signs due to conduction block. The latter is a symptom caused by ectopic impulse generation. The two conditions may nonetheless coexist and may be caused by the same lesion; or radiculopathy may follow radicular pain in the course of a disease process.

However, radiculopathy and radicular pain are both distinct from referred pain. There is no physiological or clinical evidence that referred pain can be caused by the same processes that underlie radiculopathy. Similarly, radiculopathy is not a cause of spinal pain.

Referred pain and spinal pain associated with radiculopathy consequently warrant a separate and additional diagnosis.