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MEDICAL IMPAIRMENT RATING REGISTRY

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Errors in
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In This Issue of AdMIRable Review

Volume 11, Spring 2022, Pages 11059 to 110



MEDICAL

[Common Errors in Spinal Impairment Ratings: AMA Guides, Sixth Edition, definitions of Radiculopathy vs Non-Verifiable Radicular Complaints](#)



MEDICAL

[Medical Abstracts of Interest Regarding Spinal Impairments and Radiculopathy](#)



LEGAL

[The Road Less Traveled: Can a Trial Court Adopt its Own Rating?](#)



OPPORTUNITIES

[Bureau Seeks Board-Certified Physicians Consider the CPP & MIR Registries](#)

Common Errors in Spinal Impairment Ratings: AMA Guides, Sixth Edition, definitions of Radiculopathy vs Non-Verifiable Radicular Complaints

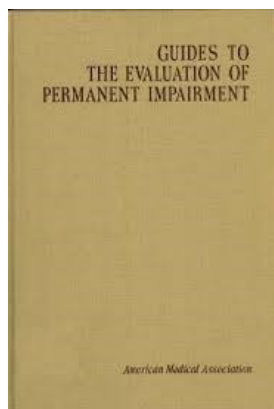
James B. Talmage, MD



In the Fall 2014 issue, the *AdMIRable Review* republished an article from the AMA Guides Newsletter on rating spinal impairments. Using the *AMA Guides, Sixth Edition*. A point of emphasis in that article was the distinction between limb pain or numbness that might be radicular, but with no objective verification that the symptoms were in fact true radiculopathy, and pain, numbness, or weakness that was clearly related to objective radiculopathy. This distinction determines what row in the spine tables is used to rate impairment and continues to be a source of frequent errors in spinal impairment rating. True radiculopathy is pain, numbness, and/or weakness from nerve root damage, most commonly from a disc herniation. It is instructive to review how the *AMA Guides* has dealt with the concept of radiculopathy through the years.

Historical Context

Historically, the 13 annual issues of the *Journal of the American Medical Association* (JAMA) that had been published on impairment ratings from 1958 to 1970 were compiled into a 1971 book. Each issue of JAMA was titled a “guide” to impairment rating of a different body system, so the collective “guides” were published as a single book but called by the plural title *Guides to the Evaluation of Permanent Impairment*. When a revision was published in 1984 as the *Second Edition*, the original 1971 book became known as the *First Edition*.



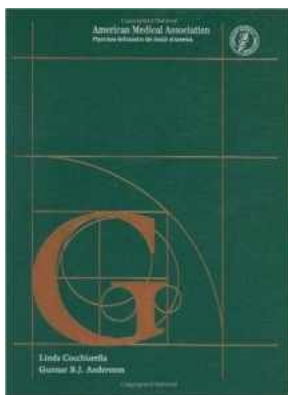
In the original, *First Edition*, range of motion was the primary method used to rate extremity impairment. The method of rating spinal impairment was also by spinal range of motion “guestimated” by use of a goniometer. If there was an intervertebral disc lesion without “residuals” (undefined term) there was no additional rating. If there were “residuals,” the instruction on page 47 was to combine the range-of-motion rating for whole person impairment (WPI) with 5% WPI for the residuals. If, in addition, there was also spinal nerve root injury/impairment, then additional impairment for that additional residual was rated from Chapter 2, Table 1, page 50. A range of potential upper extremity impairments for the cervical roots and lower extremity impairments for the lumbosacral roots was listed for “loss of function due to sensory deficit, pain, or discomfort” and for “loss of function due to loss of strength.”

This system was retained in the *Second* and *Third Editions* of the *Guides*. The listing of spinal diagnoses qualifying for diagnosis-based portion of ratings was expanded. The concept of determining a separate, additional rating for objective radiculopathy based on physical exam was retained. [*Third Edition*, Section 3.3 a. 7. D, page 74]

The *Fourth Edition* retained the concept of the earlier editions, calling it the “Range-of-Motion Model,” with the same potential additional impairment for evidence of nerve root impairment (*Fourth Edition*, page 130). The *Fourth Edition* introduced the alternative method to rate spinal impairment, the Diagnosis Related Estimate (DRE) Method. The DRE spinal impairment categories II in the cervical and the lumbar spine included non-verifiable radicular complaints, if “[t]here is no objective evidence of radiculopathy[.]” The word “radiculopathy” is not in the glossary. The DRE III text (*Fourth Edition*) pages 102 and 104 suggest that more than two centimeters of atrophy or loss of a relevant reflex qualifies as objective evidence and adds, for the first time, that electrodiagnostic studies may document radiculopathy even in the absence of these two stated physical exam criteria, with definitions provided for abnormal electrodiagnostic studies (Table 71, page 109).



The *Fifth Edition* retained both the DRE and the Range-of-Motion “methods” to rate spinal impairment. Box 15-1 (*Fourth Edition*, page 382) defines NON-verifiable radicular root pain as “in the distribution of a nerve root but has no identifiable origin; i.e., there are no objective physical, imaging, or electromyographic findings.”



Radiculopathy:

for the purposes of the Guides is defined as significant alteration in the function of a nerve root or nerve roots[.] The diagnosis requires a dermatomal distribution of pain, numbness, and/or paresthesias in a dermatomal distribution. The diagnosis of a 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.”

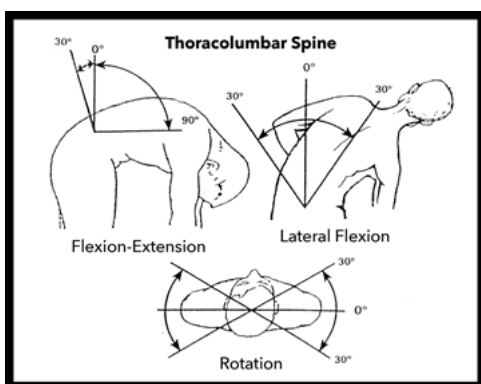
[Reflexes, loss of sensation, weakness, and atrophy are listed above this radiculopathy definition].

The text on page 383 continues this theme:

DRE ... III, radiculopathy with objective verification must be present. Since an individual is evaluated after having reached MMI, a previous history of objective findings may not define the current, ratable condition but is important in determining the course and whether MMI has been reached. The impairment rating is based on the condition once MMI is reached, not on prior symptoms or signs.

Table 15-3 adds that DRE III is still appropriate for “individuals who had surgery for radiculopathy but are now asymptomatic.” Table 15-5 varies slightly, assigning DRE III to those “with radiculopathy or with improvement of radiculopathy following surgery.”

In the *Sixth Edition* the Range of Motion Method does not appear. “Range of motion is no longer used as a basis for defining impairment, since current evidence does



not support this as a reliable indicator of specific pathology or permanent functional status (*Sixth Edition*, p.558).” The references at the end of Chapter 17 include eight references on spinal range of motion reliability and validity issues. With questions on reliability, and therefore validity, spinal range of motion was no longer used.

Part of the additional information confirming the decision to stop using spinal range of motion in impairment rating probably stems from the advances in spinal deformity surgery. Today we see patients with partial or fully surgically corrected major spinal deformities whose entire lumbar spine and the lower thoracic spine are solidly fused (no lower spinal motion possible) and as long as their hip motion is normal, they have no difficulty with ADLs, the theoretical basis for assigning impairment.

In addition, Bible (2010) reported that of the 15 Activities of Daily Living (ADLs) assessed, only two required greater than 50% of that person’s range of spinal motion, and only in Flexion/Extension (52% and 59%). All other ADLs assessed could be done normally by those using less than forty percent of their “normal” spinal motion. “The functional ROM required to complete all 15 ADLs included in this investigation was 3 to 49 degrees (median: 9 degrees) of flexion/extension, 2 to 11 degrees (6 degrees) of lateral bending, and 2 to 7 degrees (5 degrees) of rotation.”

Swinkels (2014) showed that normal neck motion decreases with age. Cobian (2013) confirmed that normal individuals use little of their lumbar and cervical motion in sixteen common ADLS.

Thus, the DRE method is the only method for rating spinal impairment in the *Sixth Edition*. The *Sixth Edition* continues the tradition of the other five editions by granting a higher impairment to those with objective signs of nerve root injury/impairment than to those with "Nonverifiable Radicular complaints," even if the non-verifiable complaints may be due to a disc extrusion or protrusion. All six editions of the *Guides* have the philosophy that those patients with clear objective motor weakness or sensory loss on physical exam, in general, have a greater impairment than patients with limb symptoms but a normal physical exam of nerve root function.

Sixth Edition, page 563 points out, "Common conditions related to degenerative changes in the spine, including abnormalities identified on imaging studies such as annular tears, facet arthropathy, and disk degeneration, do not correlate well with symptoms, clinical findings, or causation analysis and are not ratable according to the *Guides*."

This section goes on to explain how to use the first diagnostic condition row in the cervical, thoracic, and lumbar tables.

There is a category of patients who present with persistent pain and "no verifiable" radicular complaints (defined in greater detail in Section 17.3. Adjustment Grid: Physical Examination) that are documented repeatedly after an identifiable injury. These patients have no objective findings and therefore, are often given a diagnosis of "chronic sprain/strain" or "nonspecific back or neck pain. The current methodology allows these patients to be rated in impairment class 1 with a range of impairment ratings from 1 to 3% whole person impairment (WPI). The percentage impairment within that range depends on functional assessment, since there are no reliable physical examination or imaging findings in this group.

This is saying bluntly that there are, by definition, NO findings on physical exam or imaging that correlate with the patient's non-verifiable radicular pain complaints (sciatica or upper limb pain). This means the GMFH is



used but for the diagnoses in this row the GMPE & GMCS are not applicable (not used). The current term used today to describe most cases of low back pain or neck pain is “non-specific.” The recent Lancet multiauthor, multinational review of back pain points out that most cases of low back pain are nonspecific: “For nearly all people with low back pain, it is not possible to identify a specific nociceptive cause. Only a small proportion of people have a well understood pathological cause—e.g., a vertebral fracture, malignancy, or infection (Hartvigsen, 2018).” Thus, most workers’ compensation cases of neck or low back pain are expected to be “non-specific” if symptoms persist and are expected to be ratable as “non-specific” neck or low back pain from Tables 17-2 and 17-4.

Matsumoto (1997) published a series of 497 asymptomatic adult volunteers who had a 1.5 Tesla MRI. The prevalence of disc degeneration and disc space narrowing increased progressively with age in this asymptomatic population. Disc protrusions were noted in less than 10% of those under age 30, 15 to 20 percent of those in their forties, and up to 30% of those in their fifties and sixties. Surprisingly, spinal cord compression by a disc protrusion was not uncommon in these asymptomatic adults. These authors followed the volunteers and published 10-year (Okada, 2009) and 20-year (Daimon, 2018) follow-up studies. Degenerative changes of all types increased with age in 95% of the volunteers (“age happens”), but the only change over time that correlated with the development of symptoms was the development of bony foraminal stenosis compressing a nerve root, which correlated with upper limb pain. Thus, people with NO symptoms can have “ruptured” discs in the neck and have no symptoms and no consequences develop.

Similar Studies Have Been Reported in the Lumbar Spine

A systematic review of MRI changes in the lumbar spine, including asymptomatic pediatric patients], included seven published studies covering 2,373 children were retrieved (van den Heuvel et al, 2020). The ages of the children were between four and 19 years old.

Disc degeneration was found in 22% of asymptomatic non-athletic kids and 22% of asymptomatic athletic kids. **Disc herniations** were found in 1% of asymptomatic non-athletic children and 13% of asymptomatic athletic kids.

A systematic review of MRI changes in the asymptomatic adult lumbar spine found 33 articles covering 3,110 asymptomatic adults. Some of the data on the prevalence of abnormalities from this study are in the table below (Brinjiki et al, 2015):

Finding	Age 20s	Age 30s	Age 40s	Age 50s	Age 60s
Disc degeneration	37%	52%	68%	80%	88%
Disc bulge	30%	49%	50%	60%	69%
Disc protrusion	29%	31%	33%	36%	38%
Annular fissure	19%	20%	22%	23%	25%
Facet degeneration	4%	9%	18%	32%	50%

The above studies reviewed MRIs done with 1.5 Tesla magnets. As these MRI units reach their “service age” and are replaced, most health care centers are buying 3.0 Tesla magnet MRI units. Having a higher strength magnet is crudely analogous to having more pixels in your color TV, like the current 4K TV sets, and yields better images. The Italians published a series of asymptomatic 18 to 22-year-olds applying for admission to the Italian Air Force Academy hoping to become fighter pilots. Since ejection from a fighter jet plane puts incredible forces on the spine, the authors used 3.0 Tesla MRI to verify the applicants were medically acceptable. Of the 350 applicants, 270 had MRI findings (23% had a “normal” MRI). Disc bulging was present in 49%, and **18% had a disc protrusion, while 8% had a disc extrusion.**

The point of looking at these studies is that if a patient has both back and/or leg pain, and a disc protrusion on MRI, the disc protrusion may, or may not, be the source of the patient’s pain problem. The point of reviewing the history of the AMA *Guides* editions is that the *Guides* have historically always felt those patients with persisting objectively verifiable nerve root damage deserve a higher impairment rating than those patients with pain and imaging change, but no objective evidence of impairment of nerve root function.

How to Document the History and Physical Exam of spinal pain patients.

Modern pressures to maximize the number of patients seen in the office per day means pressure to minimize the time spent with each patient. There are a fixed number of hours per day.

Confirmation bias is one type of cognitive bias that occurs in orthopedic surgery assessments (Janssen, 2021). Confirmation bias means the doctor thinks he/she knows the diagnosis and does only the physical exam tests that would be abnormal if that diagnosis is correct. Omission of tests presumed to be normal may lead to erroneous diagnoses. In the *Guides, Sixth Edition*, Figure 17-3 shows a common pattern for cervical spine nerve roots to supply sensation to the upper limb, and the

left half of the figures shows the small area that frequently is predominantly supplied by a single nerve root. The equivalent figure showing lower limb nerve root sensory supply is Figure 17-4. Some doctors do a “15 second” sensory exam by touching only 1 place on the patient (one of the small “predominantly supplied by” areas of Figures 17-3 & 17-4) and asking, “Does it feel abnormal if I touch you here?” This phrasing is rhetorical and suggests to the patient that the correct answer is “Yes.” Patients believe doctors know what is wrong with them and want the doctor to be correct, so when asked a “leading question,” they frequently answer the way the question suggests. The doctor then records in the office note “light touch sensation abnormal in the ‘x’ dermatome.” This single sentence is not interpretable, as another doctor reading the office note has no idea how brief or how extensive the exam was, or where the sensory deficit is located. Confirmation bias has been confirmed by a study showing if the doctor has seen the MRI before the physical exam, he is more likely to find sensory deficit in the nerve root compressed on MRI, compared to if the doctor sees the MRI after the physical exam has been performed (Suri et al, 2010).

Radiculopathy vs Non-verifiable Radicular Complaints

The *Guides, Sixth Edition*, defines “Radiculopathy” and “Nonverifiable Radicular Complaints” on page 576. The definition of non-verifiable radicular complaints is:

Nonverifiable radicular complaints are defined as chronic persisting limb pain or numbness, which is consistently and repetitively recognized in medical records, in the distribution of a single nerve root that the examiner can name and with the following characteristics: preserved sharp vs. dull sensation and preserved muscle strength in the muscles it innervates, is not significantly compressed on imaging, and is not affected on electrodiagnostic studies (if performed). Although there are subjective complaints of a specific radicular nature, there are inadequate or no objective findings to support the diagnosis of radiculopathy.

There are several implications from this definition. First, of the four grades of sensory deficit severity in the upper limb (Tables 15-14 & 15-18) and in the lower limb (Table 16-11) Grade 3 Severity or loss of sharp vs dull discrimination should be present to “objectify” the sensory deficit as real. To do sharp vs dull testing properly, the patient should not be able to see the stimulus applied but be asked to verbally report sensations felt. The examiner would first demonstrate the sensation of sharp and dull sides of a sewing pin or safety pin on uninvolved normal skin. Then the examiner would ask the patient to “close your eyes, and each time you feel a

touch, say two words. You might feel the sharp side on the left limb, so you say, 'sharp, left,' or if you feel the dull side on the right limb, you say, 'dull, right'. That way I can know that you felt it." The inability to correctly distinguish sharp from dull is obvious. "I don't know but right limb" is a sufficient answer. "I don't know" is honest. If the patient is guessing, the responses should be correct about 50% of the time (like guessing "heads" or "tails" in a coin flip). If the answers are always wrong (sharp stimulus always called dull, and dull stimulus always called sharp) that pattern suggests normal conscious perception and intentionally answering incorrectly. Like getting consecutive coin flips always incorrect, six consecutive wrong answers would occur once in 64 trials by chance, seven consecutive wrong answers would occur once in 128 trials by chance, etc.

The doctor then must do the stimulus testing repetitively to map out the anatomic boundaries of the sensory deficit to see if it roughly corresponds to a dermatome pattern. This takes considerable time.

The *Guides, Sixth Edition*, requires that doctors distinguish between true radiculopathy and non-verifiable radicular complaints. The cervical, thoracic, and lumbar spine tables for rating impairment in the second diagnostic row list, "Intervertebral disk herniation and/or AOMSI^a" with a footnote "a." The footnote, or superscript *a*, in each table takes the reader to the bottom of Table 17-4, page 571, and states the following:

*Note: The following applies to the cervical, thoracic, and lumbar spine grids: 1) Intervertebral disk herniation **excludes** [emphasis added] annular bulge, annular tear and disk herniation on imaging without consistent **objective findings of radiculopathy** [emphasis added] at the appropriate level(s) when most symptomatic.*

The *Guides, Sixth Edition*, definition of non-verifiable radicular complaints includes the "distribution of a single nerve root that the examiner can name" [emphasis added]. Thus, the examiner is tasked with verifying objective findings that "fit with" a specific nerve root. Be aware any one individual may have a skin innervation pattern that differs from the textbook depiction of dermatomes. This has been established in the cervical spine (McAnany, 2016) and the lumbar spine (Hancock et al, 2011; Taylor et al, 2013).

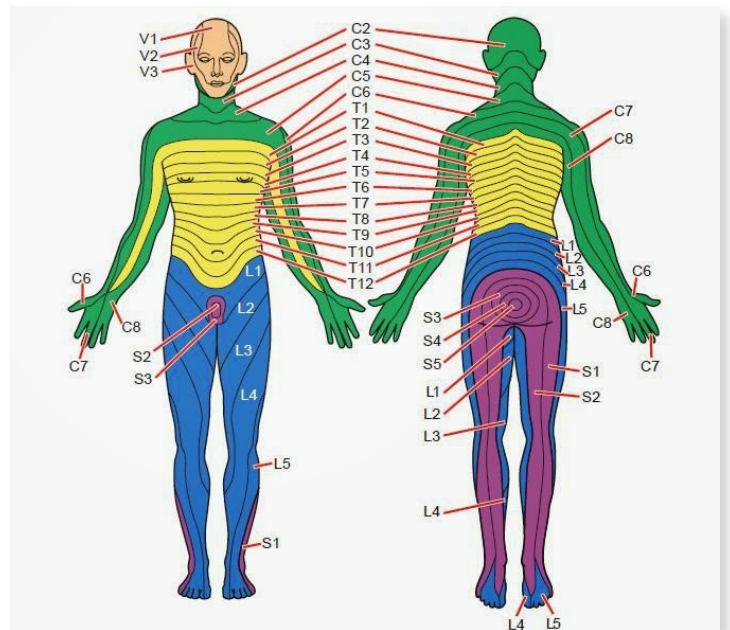
This leaves a conundrum in that the *Guides* seems to require conformity of the history and physical exam to the dermatomes and myotomes published by Netter and others, and yet people have frequent anatomic anomalies or variations such that a single individual may not have findings that fit with a textbook description of a

nerve root that is clearly compressed on the MRI. Thus, the sensory deficit should be potentially compatible with, and not necessarily an exact match to, textbook dermatomes. More weight should be assigned to the reproducibility (reliability) of the sensory deficit than to its exact match to a textbook dermatome.

Another caveat arises in assessing the *Guides, Sixth Edition*, that in non-verifiable radicular complaints the nerve root should not be significantly compressed. Many radiology reports don't use the recommended nomenclature to describe the appearance of discs on MRI (Fardon, 2014). While some radiologists and spine surgeons use the preferred terms "no contact with the nerve root," "nerve root touching," "nerve root displacing," and "nerve root compression," other radiologist and surgeons just use terms like "protrusion" and "extrusion," both of which are types of herniation. Published studies on the accuracy of MRI to detect nerve root compression can be compared to the clinical neurological examination, a pain drawing, electrodiagnostic testing (needle EMG), nerve root blockade by injection, CT myelography, and intra-operative findings. The "accuracy" of MRI in detecting nerve root compression depends upon what MRI is being compared to. Some patients with obviously compressed nerve roots are asymptomatic. Thus, there are multiple statements on the accuracy of assessment of nerve root compression in the literature (Tawa et al., 2016).

It is well known that many large lumbar disc herniations spontaneously disappear over time. The body does its own surgery (Chiu, 2015). Yet, surprisingly it is very rare to see an operation report state that preoperative imaging suggested nerve root compression, but there was no compression noted during surgery. The goal of caring for the patient with a herniated disc is to offer surgery to remove the nerve root compression in those not improving with time before permanent nerve root damage occurs. Thus, surgery is frequently performed appropriately BEFORE the patient has developed permanent nerve damage that meets objective criteria for radiculopathy.

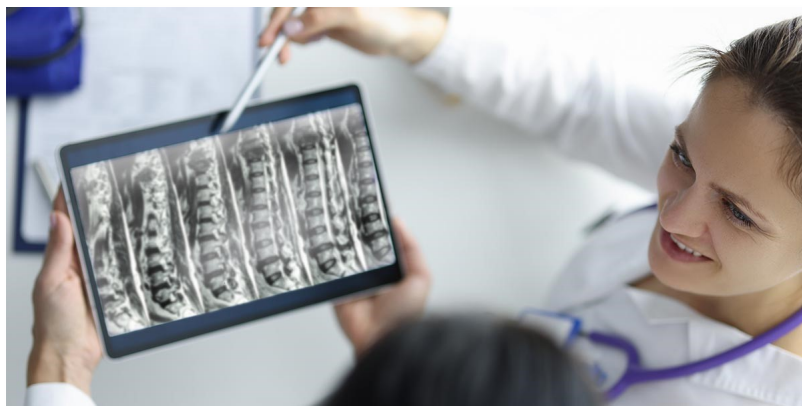
So, in summary, it is difficult, and clinical judgment is required to decide who has a nerve root in trouble and thus stands to benefit from surgical nerve root decom-



pression. It is similarly difficult to evaluate patients after time and treatment to decide if there is objective evidence of nerve root impairment that potentially correlates with an imaging change that they had (i.e. nerve root compression) either early after injury or at MMI.

The *Guides* assesses permanent impairment at MMI after recovery time has occurred. The *Guides, Sixth Edition*, still chooses in general to grant higher impairment awards to those with objective findings, or in this case specifically those with persistent objective evidence of nerve root impairment or dysfunction (i.e. radiculopathy). The *Guides, Sixth Edition*, defines appropriate objective evidence as reflex alteration, motor weakness, loss of the ability to tell sharp from dull stimuli, and needle EMG changes indicating motor axon death (fibrillations and positive waves acutely, and high amplitude polyphasic motor units chronically).

There may be some help with the medical distinction between these two groups of back or neck and limb pain patients. The International Association for the Study of Pain (IASP) first published a definition of neuropathic pain in 1996. Nociceptive pain is pain from injured or diseased tissue in which the nervous system functions normally, like in a sprained ankle, fracture, or arthritis. Neuropathic pain is pain felt when the nervous system itself has sustained an injury, like in a lacerated nerve or a spinal cord injury with paraplegia. The definition of neuropathic pain was slightly modified by IASP in 2016 (Finnerup et al., 2016). Their intent was to define neuropathic pain as “possible,” “probable,” and “definite” on a MEDICAL basis.



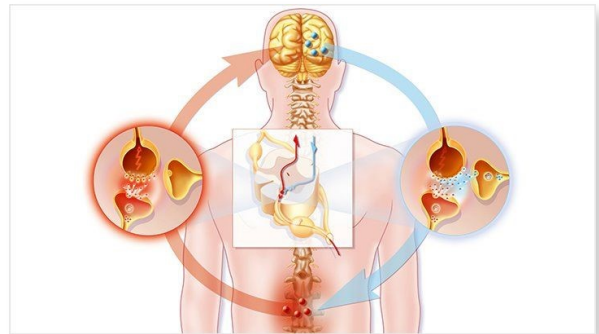
In deposition or testimony defending impairment ratings, doctors are frequently asked to answer in terms of reasonable medical probability. If the doctor asks the lawyer to define “reasonable medical probability,” the lawyer frequently says, “more likely than not” or “probable, not just possible,” or “>50% likely,” depending on the jurisdiction. Thus, the MEDICAL distinction between possible and probable as written by IASP appears to line up with the LEGAL concept for medical testimony. In 2016, the IASP defined pain as nociceptive or neuropathic.

Possible Neuropathic Pain

IASP indicates that words describing the pain in the patient history may be suggestive, and the more “neuropathic” words used the more suggestive the history is, but these descriptors alone are not sufficient to classify pain as neuropathic. Words like burning, hot, electric shocks, shooting, pins and needles are merely suggestive, as are the questionnaires that seek patient endorsement of these words.

There are two criteria for POSSIBLE neuropathic pain, and BOTH must be present. Note that “possible” would not likely conform to the legal “more likely than not” testimony standard.

1. The patient should have history of a relevant neurological lesion (injury or disease). The onset of pain is usually immediate but should be within a few weeks of the lesion or disease. Still some nerve diseases may have a slow insidious onset like diabetic neuropathy.
2. The pain should be in a “neuroanatomically plausible” distribution. The text explains the pain may be in a somewhat smaller or somewhat larger area than the anatomy textbook description, but should roughly conform to the distribution of a nerve root, a peripheral nerve, a known lesion of the central nervous system like stroke or spinal cord injury, or the pattern of known neuropathic pain disorders like peripheral neuropathy, phantom limb pain after amputation, etc.



Probable Neuropathic Pain

Probable neuropathic pain criteria include the two criteria of possible neuropathic pain and add the criterion that there must be supporting evidence from the physical examination. This should optimally be the presence of negative sensory signs, as in partial or complete loss of one or several sensory modalities that fit with the neuroanatomy of the disease or injury. IASP points out the negative sensory change (loss of the ability to sense stimuli) may also be seen in nociceptive pain, but in these cases the sensory loss lacks distinct neuroanatomic borders, and the area of loss is not reproducible between examiners or between exams on different days by the same examiner. Anatomy does not change, and if an anatomic portion of a nerve is permanently injured, that portion of the nerve will consistently display the

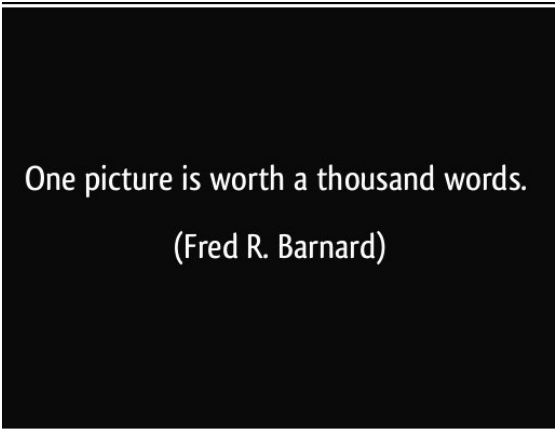
sensory loss. This means an examiner seeing a person will need to compare the current sensory loss on that day's exam to the loss in prior exams, which may be difficult as medical records rarely contain a description of the area of loss that is described well enough to permit comparison. The common comment "sensory change in the left L5 dermatome" cannot be evaluated for confirming reliability, and the reader has no idea what modality was tested, the size and location of the deficit area, and whether a negative sensory change (loss) was noted or a positive sensory change like allodynia or hyperalgesia is being described.

Bonezzi et al. (2020) suggest using "dry erase" markers to delineate the boundaries of the sensory loss by placing marks on the skin. The result can be, with patient permission, photographed and placed in the record as dermatologists and plastic surgeons do, or the resulting map can be used to shade in a "pain drawing" or human figure to enter into the patient record. The picture or drawing should be labeled to tell a reader the date, what modality was tested, and what was abnormal in that area. Absent this sort of documentation in the medical records it is very challenging to confirm that the borders of a sensory loss area are consistent over time (anatomically logical and reliable).

The alternative then for IME impairment assessments is to perform the sensory exam twice or three times during the physical exam, with multiple tests and perhaps conversations between sensory exams so the patient has time to forget the answers previously given. This is not only important for permanent impairment rating but also for treatment, as multiple reviews of chronic pain indicate nociceptive pain and neuropathic pain respond to different treatments.

IASP goes on to indicate that positive sensory signs like touch-evoked allodynia and thermal hyperalgesia carry less weight for the diagnosis of neuropathic pain as these are also seen in inflammatory state pain (nociceptive pain), anxiety, and sleep deprivation, stress and negative emotions. They do not mention opioid-induced hyperalgesia, but they should have, as opioid-induced hyperalgesia is real and common (see [AdMIRable Review, Spring 2021](#)) and produces allodynia and hyperalgesia in the absence of nerve injury and/sensory deficit.

Sensory loss or inability to perceive stimuli (not paresthesia, not allodynia, not hyperalgesia) is **the** necessary criterion for possible neuropathic pain to change to



One picture is worth a thousand words.

(Fred R. Barnard)

probable neuropathic pain. Thus, the *AMA Guides, Sixth Edition*, the criterion for radiculopathy (by definition nerve root injury or neuropathic pain) requiring loss of ability to tell sharp from dull is logical and reasonable. For a report on impairment rating by *Sixth Edition* criteria to be judged consistent with the *Guides* it should contain a sensory exam for sharp vs dull perception. Note that a patient response of “It feels funny or different when you touch me with the pin here versus other places” is paresthesia, or Grade 1 severity by Sixth Edition Table 16-11, and not the Grade 3 severity or loss of perception required to fulfill the criteria for radiculopathy unless there is clear motor weakness or needle EMG change. Neurologic weakness is usually accompanied by atrophy of the involved muscle, consistent with the historical use of atrophy in the early editions of the *Guides*, and *Sixth Edition* page 575: “Significant, long-standing weakness is usually accompanied by measurable atrophy.”



Conclusion

A review of the history of the *AMA Guides* spinal impairment rating shows the evolution from a range-of-motion-based rating to a diagnosis-based rating in line with evolving science. The *Sixth Edition* dropped the use of spinal motion and the incorrect term “spasm” from earlier editions. The *Sixth Edition* definition of true radiculopathy is consistent with the IASP 2016 conceptualization of neuropathic pain. True radiculopathy by *Guides, Sixth Edition*, definition, either at MMI or when most symptomatic, is **required** for the use of the herniated disc diagnosis to rate the persisting impairment. It is very challenging to determine for an individual patient whether the persisting pain is or is not probable neuropathic pain, as doctors are typically not following either the *Guides* or the IASP definitions for radiculopathy and neuropathic pain.

In future issues we will revisit “spasm” in terms of spinal impairment rating and treatment, and we will introduce the newly adopted concept of “nociplastic pain” now endorsed by IASP and ICD-11, as these may complicate the current process for revising the *AMA Guides* so that it stays current with evolving science.

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Medical Abstracts of Interest

Regarding Spine Impairments and Radiculopathy

Selected by James B. Talmage, MD

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J Bone Joint Surg Br. 1998 Jan;80(1):19-24.

MRI of cervical intervertebral discs in asymptomatic subjects

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PMID: 9460946 DOI: [10.1302/0301-620x.80b1.7929](https://doi.org/10.1302/0301-620x.80b1.7929)

Abstract

We studied degenerative changes in the cervical intervertebral discs of 497 asymptomatic subjects by MRI and evaluated disc degeneration by loss of signal intensity, posterior and anterior disc protrusion, narrowing of the disc space and foraminal stenosis. In each subject, five disc levels from C2-C3 to C6-C7 were evaluated. The frequency of all degenerative findings increased linearly with age. Disc degeneration was the most common observation, being present in 17% of discs of men and 12% of those of women in their twenties, and 86% and 89% of discs of both men and women over 60 years of age. We found significant differences in frequency between genders for posterior disc protrusion and foraminal stenosis. The former, with demonstrable compression of the spinal cord, was observed in 7.6% of subjects, mostly over 50 years of age. Our results should be taken into account when interpreting the MRI findings in patients with symptomatic disorders of the cervical spine.

Medical Abstracts of Interest

Regarding Spine Impairments and Radiculopathy

Selected by James B. Talmage, MD

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J. Bone Joint Surg Am. 2018 May 16; 100 (10): 843-849.

A 20-Year Prospective Longitudinal Study of Degeneration of the Cervical Spine in a Volunteer Cohort Assessed Using MRI: Follow-up of a Cross-Sectional Study

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PMID: 29762279 DOI: [10.2106/JBJS.17.01347](https://doi.org/10.2106/JBJS.17.01347)

Background

Few studies have addressed in detail long-term degenerative changes in the cervical spine. In this study, we evaluated the progression of degenerative changes of the cervical spine that occurred over a 20-year period in an originally healthy cohort. We also sought to clarify the relationship between the progression of cervical degenerative changes and the development of clinical symptoms.

Methods

For this prospective follow-up investigation, we recruited 193 subjects from an original cohort of 497 participants who had undergone magnetic resonance imaging (MRI) of the cervical spine between 1993 and 1996. The subjects were asked about the presence or absence of cervical spine-related symptoms. Degenerative changes of the cervical spine were assessed on MRI using an original numerical grading system. The relationship between the progression of degenerative changes and the onset of clinical symptoms was evaluated by logistic regression analysis.

Results

Degeneration in the cervical spine was found to have progressed in 95% of the sub-

jects during the 20-year period. The finding of a decrease in signal intensity of the intervertebral disc progressed in a relatively high proportion of the subjects in all age groups and occurred with similar frequency (around 60%) at all intervertebral disc levels. The rate of progression of other structural failures on MRI increased with age and was highest at C5-C6. The progression of foraminal stenosis was associated with the onset of upper-limb pain (odds ratio, 4.71 [95% confidence interval, 1.02 to 21.7]).

Conclusions

A progression of degenerative changes in the cervical spine on MRI over the 20-year period was detected in nearly all subjects. There was no relationship between the progression of degeneration on MRI and the development of clinical symptoms, with the exception of an association found between foraminal stenosis and upper-limb pain.

Level of evidence:

Prognostic Level III. See Instructions for Authors for a complete description of levels of evidence.

Medical Abstracts of Interest

Regarding Spine Impairments and Radiculopathy

Selected by James B. Talmage, MD

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Review AJNR Am J Neuroradiol. 2015 Apr; 36 811-6

Systematic literature review of imaging features of spinal degeneration in asymptomatic populations

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PMID: 25430861 PMCID: [PMC4464797](#) DOI: [10.3174/ajnr.A4173](#)

Abstract

Background and purpose

Degenerative changes are commonly found in spine imaging but often occur in pain-free individuals as well as those with back pain. We sought to estimate the prevalence, by age, of common degenerative spine conditions by performing a systematic review studying the prevalence of spine degeneration on imaging in asymptomatic individuals.

Materials and methods

We performed a systematic review of articles reporting the prevalence of imaging findings (CT or MR imaging) in asymptomatic individuals from published English literature through April 2014. Two reviewers evaluated each manuscript. We selected age groupings by decade (20, 30, 40, 50, 60, 70, 80 years), determining age-specific prevalence estimates. For each imaging finding, we fit a generalized linear mixed-effects model for the age-specific prevalence estimate clustering in the study, adjusting for the midpoint of the reported age interval.

Results

Thirty-three articles reporting imaging findings for 3110 asymptomatic individuals met our study inclusion criteria. The prevalence of disk degeneration in asymptomatic individuals increased from 37% of 20-year-old individuals to 96% of 80-year-

old individuals. Disk bulge prevalence increased from 30% of those 20 years of age to 84% of those 80 years of age. Disk protrusion prevalence increased from 29% of those 20 years of age to 43% of those 80 years of age. The prevalence of annular fissure increased from 19% of those 20 years of age to 29% of those 80 years of age.

Conclusions

Imaging findings of spine degeneration are present in high proportions of asymptomatic individuals, increasing with age. Many imaging-based degenerative features are likely part of normal aging and unassociated with pain. These imaging findings must be interpreted in the context of the patient's clinical condition.

Medical Abstracts of Interest

Regarding Spine Impairments and Radiculopathy

Selected by James B. Talmage, MD

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J Am Acad Orthop Surg. 2021 Jul 15;29 (14): 624-633

Cognitive Biases in Orthopaedic Surgery

[Stein J Janssen](#), [Teun Teunis](#), [David Ring](#), [Robert C Parisien](#)

PMID: 34234094 DOI: [10.5435/JAAOS-D-20-00620](https://doi.org/10.5435/JAAOS-D-20-00620)

Abstract

Introduction

Cognitive biases are known to affect all aspects of human decision-making and reasoning. Examples include misjudgment of probability, preferential attention to evidence that confirms one's beliefs, and preference for certainty. It is not known whether cognitive biases influence orthopaedic surgeon decision-making. This study measured the influence of a few cognitive biases on orthopaedic decision-making in hypothetical vignettes. The questions we addressed were as follows: Do orthopaedic surgeons display the cognitive biases of base rate neglect and confirmation bias in hypothetical vignettes? Can anchoring and framing biases be demonstrated?

Methods

One hundred ninety-six orthopaedic surgeons completed a survey consisting of three vignettes evaluating base rate neglect, five evaluating confirmation bias, and two separate vignettes each randomly exposing half of the group to different anchors and frames.

Results

For the three vignettes evaluating base rate neglect, 43% (84 of 196) chose answers consistent with base rate neglect in vignette 1, 88% (173 of 196) in vignette 2, and 35% (69 of 196) in vignette 3. Regarding confirmation bias, 51% (100 of 196) chose an answer consistent with confirmation bias for vignette 1, 11% (22 of 196) for vignette 2, 22% (43 of 196) for vignette 3, 22% (44 of 196) for vignette 4, and 29% (56 of 196) for vignette 5. There was a measurable anchoring heuristic (56% versus

34%; a difference of 22%) and framing effect (77% versus 61%; a difference of 16%).

Conclusion

The influence of cognitive biases can be documented in patient vignettes presented to orthopaedic surgeons. Strategies can anticipate cognitive bias and develop practice debiasing strategies to limit potential error.

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Medical Abstracts of Interest

Regarding Spine Impairments and Radiculopathy

Selected by James B. Talmage, MD

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Comparative Study BMC Musculoskelet Disord. 2010 Nov 30; 11;275

Bias in the physical examination of patients with lumbar radiculopathy

[Pradeep Suri](#), [David J Hunter](#), [Jeffrey N Katz](#), [Ling Li](#), [James Rainville](#)

PMID: 21118558

PMCID: [PMC3009628](#)

Abstract

Background

No prior studies have examined systematic bias in the musculoskeletal physical examination. The objective of this study was to assess the effects of bias due to prior knowledge of lumbar spine magnetic resonance imaging findings (MRI) on perceived diagnostic accuracy of the physical examination for lumbar radiculopathy.

Methods

This was a cross-sectional comparison of the performance characteristics of the physical examination with blinding to MRI results (the 'independent group') with performance in the situation where the physical examination was not blinded to MRI results (the 'non-independent group'). The reference standard was the final diagnostic impression of nerve root impingement by the examining physician. Subjects were recruited from a hospital-based outpatient specialty spine clinic. All adults age 18 and older presenting with lower extremity radiating pain of duration ≤ 12 weeks were evaluated for participation. 154 consecutively recruited subjects with lumbar disk herniation confirmed by lumbar spine MRI were included in this study. Sensitivities and specificities with 95% confidence intervals were calculated in the independent and non-independent groups for the four components of the radiculopathy examination: 1) provocative testing, 2) motor strength testing, 3) pinprick sensory testing, and 4) deep tendon reflex testing.

Results

The perceived sensitivity of sensory testing was higher with prior knowledge of MRI results (20% vs. 36%; $p = 0.05$). Sensitivities and specificities for exam components

otherwise showed no statistically significant differences between groups.

Conclusions

Prior knowledge of lumbar MRI results may introduce bias into the pinprick sensory testing component of the physical examination for lumbar radiculopathy. No statistically significant effect of bias was seen for other components of the physical examination. The effect of bias due to prior knowledge of lumbar MRI results should be considered when an isolated sensory deficit on examination is used in medical decision-making. Further studies of bias should include surgical clinic populations and other common diagnoses including shoulder, knee and hip pathology.

Medical Abstracts of Interest

Regarding Spine Impairments and Radiculopathy

Selected by James B. Talmage, MD

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Spin J. 2019 Jul; 19(7): 11137-1142. Epub 2018 Aug 16.

Observed patterns of cervical radiculopathy: how often do they differ from a standard, "Netter diagram" distribution?

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PMID: 30121324 DOI: [10.1016/j.spinee.2018.08.002](https://doi.org/10.1016/j.spinee.2018.08.002)

Background context:

Traditionally, cervical radiculopathy is thought to present with symptoms and signs in a standard, textbook, reproducible pattern as seen in a "Netter diagram." To date, no study has directly examined cervical radicular patterns attributable to single level pathology in patients undergoing ACDF.

Purpose

The purpose of this study is to examine cervical radiculopathy patterns in a surgical population and determine how often patients present with the standard textbook (ie, Netter diagram) versus nonstandard patterns.

Study design/setting

A retrospective study.

Patient sample

Patients who had single-level radiculopathy with at least 75% improvement of pre-operative symptoms following ACDF were included.

Outcome measures

Epidemiologic variables were collected including age, sex, weight, body mass index, laterality of symptoms, duration of symptoms prior to operative intervention, and the presence of diabetes mellitus. The observed pattern of radiculopathy at presen-

tation, including associated neck, shoulder, upper arm, forearm, and hand pain and/or numbness, was determined from chart review and patient-derived pain diagrams.

Methods

We identified all patients with single level cervical radiculopathy operated on between March 2011 and March 2016 by six surgeons. The observed pattern of radiculopathy was compared to a standard textbook pattern of radiculopathy that strictly adheres to a dermatomal map Fisher exact test was used to analyze categorical data and Student t test was used for continuous variables. A one-way ANOVA was used to determine differences in the observed versus expected radicular pattern. A logistic regression model assessed the effect of demographic variables on presentation with a nonstandard radicular pattern.

Results

Overall, 239 cervical levels were identified. The observed pattern of pain and numbness followed the standard pattern in only 54% (129 of 239; $p=.35$). When a nonstandard radicular pattern was present, it differed by 1.68 dermatomal levels from the standard ($p<.0001$). Neck pain on the radiculopathy side was the most prevalent symptom; it was found in 81% (193 of 239) of patients and did not differ by cervical level ($p=.72$). In a logistic regression model, none of the demographic variables of interest were found to significantly impact the likelihood of presenting with a nonstandard radicular pattern.

Conclusions

Observed patterns of cervical radiculopathy only followed the standard pattern in 54% of patients and did not differ by the cervical level involved. Cervical radiculopathy often presents with a nonstandard pattern. Surgeons should think broadly when identifying causative levels because they frequently may not adhere to textbook descriptions in actual clinical practice. We observed III level of evidence

Medical Abstracts of Interest

Regarding Spine Impairments and Radiculopathy

Selected by James B. Talmage, MD

Published verbatim from PubMed.gov, in the public domain.

Randomized Controlled Trial
Spine (Phila Pa 1976) 2011 May 15; 36 (11): E712-9

Diagnostic accuracy of the clinical examination in identifying the level of herniation in patients with sciatica

[Mark J Hancock](#) , [Bart Koes](#), [Raymond Ostelo](#), [Wilco Peul](#)

PMID: 21224761 DOI: [10.1097/BRS.0b013e3181ee7f78](https://doi.org/10.1097/BRS.0b013e3181ee7f78)

Study design

Cross sectional

Objective

To investigate the ability of the neurological examination to identify the specific level of a disc herniation in patients with sciatica and confirmed disc herniation.

Summary of background data

Tests included in a neurological examination theoretically provide accurate diagnostic information about the level of the herniated disc. However, there is currently very little evidence about the diagnostic accuracy of individual tests or combinations of tests.

Methods

The study included 283 patients with sciatica and confirmed disc herniation from a previous randomized controlled trial. The reference test for the current study was the MRI scan, reported for level of disc herniation. Index tests investigated were a neurologist's overall impression of the level of disc herniation, individual neurological tests (e.g., sensation testing) and multiple test findings (i.e., the number of positive tests). The index tests were performed blinded to the MRI results. The diagnostic accuracy of the index tests in predicting herniations at the lower three lumbar discs was investigated using area under the curve (AUC), sensitivity and specificity.

Results

None of the individual neurological tests from the clinical examination was highly accurate for identifying the level of disc herniation (AUC < 0.75). The outcome of multiple test findings was slightly more accurate but did not produce high sensitivity and specificity. The dermatomal pain location was generally the most informative individual neurological test. The overall suspected level of disc herniation rated by the neurologist after a full examination of the patient was more accurate than individual tests. At L4/5 and L5/S1 herniations the AUC for neurologist ratings was 0.79 and 0.80 respectively.

Conclusion

The current study did not find evidence to support the accuracy of individual tests from the neurological examination in identifying the level of disc herniation demonstrated on MRI. A neurologist's overall impression was moderately accurate in identifying the level of disc herniation.

Medical Abstracts of Interest

Regarding Spine Impairments and Radiculopathy

Selected by James B. Talmage, MD

Published verbatim from PubMed.gov, in the public domain.

Review

Pain. 2016 Aug; 157(8): 1599-1606.

Neuropathic pain: an updated grading system for research and clinical practice

[Nanna B Finnerup](#), [Simon Haroutounian](#), [Peter Kamerman](#), [Ralf Baron](#), [David L H Bennett](#), [Didier Bouhassira](#), [Giorgio Cruccu](#), [Roy Freeman](#), [Per Hansson](#), [Turo Nurmikko](#), [Srinivasa N Raja](#), [Andrew S C Rice](#), [Jordi Serra](#), [Blair H Smith](#), [Rolf-Detlef Treede](#), [Troels S Jensen](#)

PMID: 27115670

PMCID: [PMC4949003](#)

Abstract

The redefinition of neuropathic pain as "pain arising as a direct consequence of a lesion or disease affecting the somatosensory system," which was suggested by the International Association for the Study of Pain (IASP) Special Interest Group on Neuropathic Pain (NeuPSIG) in 2008, has been widely accepted. In contrast, the proposed grading system of possible, probable, and definite neuropathic pain from 2008 has been used to a lesser extent. Here, we report a citation analysis of the original NeuPSIG grading paper of 2008, followed by an analysis of its use by an expert panel and recommendations for an improved grading system. As of February, 2015, 608 eligible articles in Scopus cited the paper, 414 of which cited the neuropathic pain definition. Of 220 clinical studies citing the paper, 56 had used the grading system. The percentage using the grading system increased from 5% in 2009 to 30% in 2014. Obstacles to a wider use of the grading system were identified, including (1) questions about the relative significance of confirmatory tests, (2) the role of screening tools, and (3) uncertainties about what is considered a neuroanatomically plausible pain distribution. Here, we present a revised grading system with an adjusted order, better reflecting clinical practice, improvements in the specifications, and a word of caution that even the "definite" level of neuropathic pain does not always indicate causality. In addition, we add a table illustrating the area of pain and sensory abnormalities in common neuropathic pain conditions and propose areas for further research.

Medical Abstracts of Interest

Regarding Spine Impairments and Radiculopathy

Selected by James B. Talmage, MD

Published verbatim from PubMed.gov, in the public domain.

Meta-Analysis Spine (Phila Pa 1976). 2020 Sep 15:45 (18): E1185-1196.

The Prevalence of Abnormalities in the Pediatric Spine on MRI: A Systematic Review and Meta-Analysis

[Marleen M van den Heuvel¹](#), [Edwin H G Oei²](#), [Sita M A Bierma-Zeinstra¹](#), [Marienke van Middelkoop¹](#)

PMID: 32355138

DOI: [10.1097/BRS.0000000000003527](https://doi.org/10.1097/BRS.0000000000003527)

Study design

Systematic review and meta-analysis.

Objective

The aim of this study was to provide an overview of the prevalence of reported musculoskeletal abnormalities on magnetic resonance imaging (MRI) of the pediatric spine.

Summary of background data

Back pain is a common complaint and significant health issue, already in children. Several studies have investigated musculoskeletal abnormalities of the pediatric spine as possible cause of low back pain (LBP). However, it is not clear which abnormalities are the most prevalent among children.

Methods

A systematic literature search on the prevalence of musculoskeletal spinal abnormalities on MRI in children was conducted in the Embase, Medline Ovid, and Cochrane CENTRAL databases. Risk of bias (RoB) was assessed using a checklist based on the Downs and Black checklist. General information on study and patient characteristics and the prevalence of spinal abnormalities were extracted from the studies. Prevalence data were presented in three subgroups: nonathletes without LBP, participants with LBP, and athletes. Prevalence data of the most reported abnormalities were pooled using random-effects proportion meta-analysis. The study

protocol was prospectively registered in PROSPERO (CRD42017080543).

Results

The search resulted in 16,783 articles, of which 31 articles (2373 participants) were included in this systematic review. Two-thirds of the studies had a low RoB. The pooled prevalence in nonathletes without LBP, participants with LBP, and athletes without LBP was respectively 22%, 44%, and 22% for disc degeneration, 1%, 38%, and 13% for herniated discs, 5%, 22%, and 11% for endplate changes, and 0%, 30%, and 6% for pars fractures.

Conclusion

Disc degeneration, herniated discs, endplate changes, and spondylolysis are the most reported spinal abnormalities on MRI in children in literature. Spinal abnormalities seen in adults are already prevalent in children with LBP, with the highest prevalence for disc degeneration and herniated discs.

Level of evidence

2.

Medical Abstracts of Interest

Regarding Spine Impairments and Radiculopathy

*Selected by James B. Talmage, MD
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Active cervical and lumbar range of motion during performance of activities of daily living in healthy young adults

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Study design

Observational cohort design.

Objective

The purpose of this investigation was to characterize the maximum, cumulative, and average cervical and lumbar spine motion required to perform common activities of daily living (ADLs).

Summary of background data

Previous studies have measured the maximum cervical and lumbar excursions during ADLs, but none have used a motion capture system to allow for noninvasive continuous motion monitoring.

Methods

Ten healthy, young adults performed 16 ADLs while 3-dimensional kinematics were recorded. Cervical and lumbar rigid body kinematic models were created and scaled to each subject to calculate angular motion. Cervical and lumbar mean active range of motion (ROM) and total excursion for flexion-extension, lateral bending, and axial rotation were calculated.

Results

The majority of activities used 20% to 40% of maximum available cervical ROM and 40% to 60% of maximum available lumbar ROM. Activities that required concurrent

cervical and lumbar spine motion, such as washing in the shower, picking an object up from the floor, and clearing the table, had the greatest motion totals. These activities typically required rates of excursion greater than 10° per second.

Conclusion

This is the first investigation to report cumulative spine motion totals associated with the performance of common ADLs. These results provide a preliminary cervical and lumbar spine motion profile in healthy, young adults. The relationship between traditional end ROM measurements and function is not well defined. In agreement with previous research, this investigation concludes that only a small percentage of available ROM is used in performing most activities. Thus, determining the total wear related to common activities may help us to better understand and address spine-related impairments.

Level of evidence

N/A.

Medical Abstracts of Interest

Regarding Spine Impairments and Radiculopathy

Selected by James B. Talmage, MD

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What low back pain is and why we need to pay attention

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Abstract

Low back pain is a very common symptom. It occurs in high-income, middle-income, and low-income countries and all age groups from children to the elderly population. Globally, years lived with disability caused by low back pain increased by 54% between 1990 and 2015, mainly because of population increase and ageing, with the biggest increase seen in low-income and middle-income countries. Low back pain is now the leading cause of disability worldwide. For nearly all people with low back pain, it is not possible to identify a specific nociceptive cause. Only a small proportion of people have a well understood pathological cause-eg, a vertebral fracture, malignancy, or infection. People with physically demanding jobs, physical and mental comorbidities, smokers, and obese individuals are at greatest risk of reporting low back pain. Disabling low back pain is over-represented among people with low socioeconomic status. Most people with new episodes of low back pain recover quickly; however, recurrence is common and in a small proportion of people, low back pain becomes persistent and disabling. Initial high pain intensity, psychological distress, and accompanying pain at multiple body sites increases the risk of persistent disabling low back pain. Increasing evidence shows that central pain-modulating mechanisms and pain cognitions have important roles in the development of persistent disabling low back pain. Cost, health-care use, and disability from low back pain vary substantially between countries and are influenced by local culture and social systems, as well as by beliefs about cause and effect. Disability and costs attributed to low back pain are projected to increase in coming decades,

The Road Less Traveled: Can a Trial Court Adopt its Own Rating?

Jane Salem, Esquire



Medical science isn't exact. It's not like math, where two plus two is always four. Reasonable minds can differ.

This has always been true in workers' compensation concerning critical decisions such as medical causation, the medical necessity of proposed treatments, and a worker's degree of permanent impairment. It's why the Bureau has developed programs like Utilization Review and the Medical Impairment Rating Registry.

These programs are highly effective at resolving disputes. But they can't work in every case. Some issues must be litigated, placing the decision-making on judges—jurists with legal training and experience, who (hopefully) possess some familiarity with medicine and the *Guides*. But they're not doctors. Typically, judges consider the medical proof as expressed in terms understandable to a layperson, weigh it carefully, and then decide which expert got it right.

But in a 2020 appeal involving a pre-July date of injury, a state Chancery Court judge considered the expert proof and came up with *her own rating* for a lower-extremity impairment for injuries to the worker's hip and knee.

On appeal, a Tennessee Supreme Court Special Workers' Compensation Panel said the judge had that authority. So, the answer to the question in the title of the article is *yes*. But when the Panel looked at the evidence and the court's reasoning, the Panel modified the trial court's conclusion. The irony!

The appellate opinion suggests that when courts reject the experts' ratings and fashion their own rating, *judges should make detailed factual findings and express their rationale clearly.*



Facts

In *Perry v. Thyssenkrupp Elevator Corp.*, a 2020 opinion, a Hardeman County Chancery Court judge was presented with two different ratings for Frederick Perry's work-related torn labrum in his right hip and a torn meniscus

in his right knee from a fall at work. The treating orthopedic surgeon, Dr. Adam Smith, assigned impairment ratings of 3% for the hip and 3% for the knee, for a combined rating of 6% to the lower extremity, or 2% to the body as a whole. Dr. Samuel Chung, a physical medicine and rehab physician, performed an independent medical examination. He assigned impairment ratings of 15% for the knee and 22% for the hip, for a combined rating of 34% to the lower extremity, or 13% to the body as a whole. The trial court rejected these ratings and adopted its own modified ratings of 18% for the hip and 14% for the knee, for a combined 29% rating to the lower extremity, or 12% to the body as a whole. The trial court reasoned that the difference in the knee ratings was that Dr. Smith based his rating solely on the meniscus surgery and didn't consider that Perry's arthritis was aggravated by the fall. Dr. Chung based his rating of the knee on the arthritis that he found on an x-ray. Dr. Smith's opinion didn't fully account for Perry's injury. However, Dr. Chung based his rating on a standing x-ray that didn't show the patellofemoral area. Therefore, the Court adopted her own rating.

The opinion

Thyssenkrupp appealed, arguing that the trial judge improperly determined an anatomical impairment rating wholly independent of the ratings from the competing experts. It cited *Kirby v. Memphis Jewish Nursing Home*, a 2011 Panel decision. The Panel wrote:

Our review of *Kirby* leads us to conclude that what a trial court may not do is apply the *AMA Guides* to the physical findings and diagnostic studies of the testifying physicians in order to independently arrive at an anatomical impairment rating. A trial court, however, may properly adopt an anatomical impairment rating which is a modification of a rating assigned by a testifying physician, as long as the evidence in the record supports that modification.

That wasn't so here, the appellate court reasoned. The judges wrote that the trial court gave "no express explanation of how it arrived at its anatomical impairment ratings or how those ratings relate to the ratings assigned by either Dr. Smith or Dr. Chung. As a result, it is difficult to determine whether the court (a) independently applied the *AMA Guides* to the physical findings and diagnostic studies of one or the other of those physicians, or (b) modified the ratings assigned by one or the other of the physicians."

Thyssenkrupp questioned the trial court's reasoning about the aggravation of Perry's pre-existing arthritis in the hip. The Panel agreed.

The Workers' Compensation Law then (and now) gave a rebuttable presumption favoring the authorized treating physician's causation opinion, and the presumption applies to opinions regarding an aggravation, too. Thyssenkrupp pointed to Dr. Smith's testimony that only the labral repair to the hip was necessitated by the work incident, and that the remaining procedures he performed on the hip were the result of chronic arthritic conditions. The Panel concluded that the evidence was insufficient to rebut the presumption afforded to Dr. Smith's opinion on the absence of aggravation of arthritis. The judges wrote, "[W]e conclude that the trial court erred in rejecting Dr. Smith's anatomical impairment rating of 3% to the lower right extremity and instead adopting its own modified anatomical impairment rating of 18% to the lower right extremity for Employee's right hip injury."

Thyssenkrupp likewise contended that the record was devoid of medical evidence to support a finding of any aggravation of the pre-existing arthritis in Perry's knee, and the court's adoption of its own anatomical impairment rating on that basis. The Panel disagreed on this argument. Dr. Smith testified that the meniscal tear in Perry's knee was the result of a fall at work. But the remainder of his knee condition was the result of wear-and-tear arthritis. Dr. Smith said, "[T]o me it looked chronic." He conceded, however, that he didn't have pre- and post-fall x-rays to compare to determine whether there was, in fact, an aggravation of the pre-existing arthritis in the knee.

In contrast, Dr. Chung testified that the fall at work caused an aggravation of Perry's pre-existing arthritic condition in his knee. The Panel reasoned: "Employer is correct that Dr. Chung based his opinion as to aggravation of arthritis in Employee's right knee, in part, on an x-ray that apparently failed to visualize the relevant area and a measurement taken from that x-ray. The x-ray and resulting measurement, however, were not the only basis for Dr. Chung's finding of an aggravation of the pre-existing arthritis in Employee's right knee. Dr. Chung explained that in addition to the x-ray and resulting measurement, his finding of an aggravation of Employee's pre-existing arthritis in his right knee was based on 'the whole history and then the subsequent surgery itself as well. And then the clinical symptoms he developed even afterward with an extensive rehab.'"

Moreover, Perry testified that, before his fall, he had no problems with his knee, which Dr. Chung's history reflected. So, the Panel found the evidence sufficient to rebut the presumption afforded Dr. Smith's opinion about the aggravation of pre-

existing arthritis in Perry's knee. Therefore, the trial court correctly rejected Dr. Smith's rating and instead adopted its own modified rating for the knee.

The Panel affirmed in part and reversed in part, concluding that the correct ratings were 3% for the hip and 15% for the knee, which combined for an 18% rating that converted to a whole body impairment of 7%.

A final note

This case, although under circumstances before the 2013 Workers' Compensation Reform Act, effective for injuries on or after July 1, 2014, provides guidance for judges on the Court of Workers' Compensation Claims, as well as litigants who aren't convinced that the experts made the correct call. It bears repeating, though, that when arriving at an impairment rating different from the testifying physicians, a judge must thoroughly articulate the supporting rationale.

Bureau Seeks Board-Certified Physicians Consider the MIR Registry

Jay Blaisdell, MA

The Medical Impairment Rating (MIR) Registry is a Bureau-maintained listing of qualified and approved physicians who are specially trained to conduct impairment rating medical evaluations and who have applied to serve on the Registry. The program is designed to assist parties in settling a workers' compensation claim when the only item being disputed is the impairment rating.



How it Works

The program provides the names of physicians, listed on the Registry, who are specifically trained in the techniques of performing impairment rating evaluations on the body part(s) involved in the workers' compensation claim. The parties choose a physician from the list provided to perform an evaluation to determine an appropriate impairment rating. The rating produced is utilized to help determine any permanent disability benefits due in the matter. An MIR evaluation may be requested by either party. Regardless of which party requests it, the cost of the evaluation is borne by the employer. The report provided by the MIR physician will provide only the impairment rating. It will not address causation, apportionment, job restrictions or modifications, or the appropriateness of treatment.

Accurate, Objective, Impartial

Unlike some physicians who practice within the Tennessee workers' compensation system, MIR Physicians are formally trained to conduct impairment evaluations according to the *AMA Guides*. They are also required to cite the *AMA Guides* in their reports to show exactly how their impairment rating was obtained. Since the MIR Physician has no affiliation with either the employer or employee, and neither party may communicate with the MIR Physician prior to the evaluation, the whole process is designed to be objective and impartial. Once the MIR Report is completed, it is submitted to another independent physician for "peer review" to ensure *AMA Guides* methodology has been properly applied. Finally, and most importantly, MIR Reports are legally presumed to be accurate. Since a much higher standard of evidence must be used to refute an MIR Report, they usually supersede all other impairment rating opinions.

Approved AMA Guides Training

For appointments to the [Medical Impairment Rating \(MIR\) Registry](#) or the [Certified Physician Program \(CPP\) Registry](#), the Bureau requires training in the *AMA Guides™ to the Evaluation of Permanent Impairment*, Sixth Edition. Physicians seeking appointments to either the MIR or CPP Registries must provide proof of certification issued by an approved vendor. Approved impairment rating training vendors are:

6th Edition.com

[6thEdition.com](#) is a web-based annual subscription service. It is the only Bureau-approved training that is 100% online. The presentations are given by Christopher R. Brigham, MD, Senior Contributing Editor to the Sixth Edition. The subscription offers access to training, articles, calculators, forms and other resources to address the most commonly rated conditions.

IAIME

Founded in 1986, the [International Academy of Independent Medical Evaluators \(IAIME\)](#) offers period training conferences throughout the country in the *AMA Guides™ to the Evaluation of Permanent Impairment*, Sixth Edition. IAIME is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for physicians.

ABIME

Founded in 1993, the [American Board of Independent Evaluators \(ABIME\)](#) was created to establish and maintain standards of conduct and performance among independent medical examiners. ABIME periodically offers weekend training conferences throughout the country in the *AMA Guides™ to the Evaluation of Permanent Impairment*, Sixth Edition. Continuing medical education credits are available.

Apply for Appointment to the MIR Registry Today

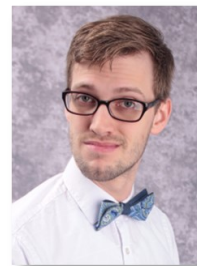
Interested physicians must request appointment by filling out the [Physician Application for Appointment to the Medical Impairment Rating Registry](#) and submitting it to the [Program Coordinator](#), along with the proof of medical licensure, board certification, approved *AMA Guides* training, and malpractice insurance. Meeting the minimum qualifications does not necessarily guarantee an appointment. The MIR Registry offers physicians an opportunity for public service, industry recognition as premier rating experts in Tennessee, publication of their names online, \$1500 per MIR referral and up to \$2000 for extraordinary cases. Apply for appointment today.



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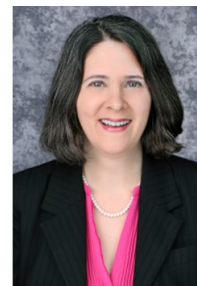
Kyle Jones

Kyle Jones is the Communications Coordinator for the Tennessee Bureau of Workers' Compensation. After receiving his bachelor's degree from MTSU, he began putting his skillset to work with Tennessee State Government. You will find Kyle's fingerprints on many digital and print publications from videos to brochures published by the Bureau. Kyle believes that visuals like motion graphics can help explain and break down complex concepts into something more digestible and bring awareness to the Bureau's multiple programs that are designed to help Tennesseans.



Sarah Byrne, Esquire

Sarah Byrne is a staff attorney for the Court of Workers' Compensation Claims. She has a bachelors' degree in journalism from Belmont University and a masters' degree in English from Simmons College in Boston. After working in religious publishing and then state government, she earned a law degree from Nashville School of Law in 2010. She first joined the Bureau of Workers' Compensation in 2010 as a mediator.



Jane Salem, Esquire

Jane Salem is a staff attorney with the Court of Workers' Compensation Claims in Nashville. She administers the Court's blog and is a former legal reporter and editor. She has run more than forty marathons.



Brian Holmes, MA

Brian Homes is the Director of Mediation Services and Ombudsman Services for the Tennessee Bureau of Workers' Compensation. In this role, he directs policy and leads twenty-three mediators and six ombudsmen as they educate the public about workers' compensation and help resolve benefit



disputes. He has had the privilege of helping thousands of injured workers, their employers, and insurance companies make informed decisions. A 17-year veteran of the Bureau, he has, of recent, created and implemented the Next Step Program, which assists unemployed workers' compensation claimants return to the workforce.

Robert B. Snyder, MD

Dr. Snyder was appointed Medical Director for the Bureau of Workers' Compensation in January, 2014 after 37 years of private practice in Orthopaedics. He graduated from Wayne State University School of Medicine in Detroit and completed two years of general surgery training at the University of Pittsburgh before he came to Nashville, completing his residency in Orthopaedics and Rehabilitation at Vanderbilt



University. Dr. Snyder has presented lectures for the American Academy of Orthopaedic Surgeons, Arthroscopy Society of Peru, the American Orthopaedic Society for Sports Medicine, the National Workers Compensation and Disability Conference, the National Association of Workers Compensation Judges, and in Tennessee: the Chiropractic Association, the Orthopaedic Society, the College of Occupational and Environmental Medicine, the Pain Society, the Neurosurgical Society, the Tennessee Medical Society, and Tennessee Attorney Memo. He has made numerous other presentations to attorneys, case managers, employers, adjusters and insurers. His activities with the Bureau have focused on Medical Treatment Guidelines, the Drug Formulary, Utilization Review, Case Management, Fee Schedules and physician/provider communications.

James B. Talmage, MD

Dr. Talmage is a graduate of the Ohio State University for both undergraduate school (1968) and medical school (1972). His orthopedic surgery training was in the United States Army. He has been Board Certified in Orthopaedic Surgery since 1979 and also was Board Certified in Emergency Medicine from 1987 - 2017. Since 2005 he been an Adjunct Associate Professor in the Division of Occupational Medicine,



Department of Family and Community Medicine at Meharry Medical College in Nashville. In 2013 he was Acting Medical Director for the State of Tennessee Division of Worker's Compensation. In 2014 he became Assistant Medical Director for the renamed Bureau of WC. He has been an author and co-editor of the AMA published books on Work Ability Assessment, and the second

edition of the Causation book. He was a contributor to the AMA Impairment Guides, 6th Edition, and he has served as co-editor of the AMA Guides Newsletter since 1996.

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