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The Lost Art of the Physical Examination



Case Law: The Role of the Physical Examination in Medical Evaluations

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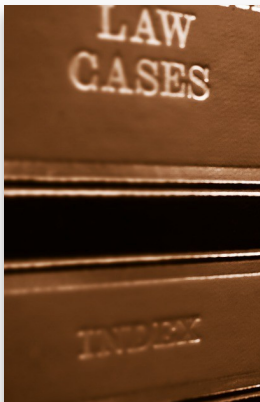
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The Lost Art of Physical Examination— Spine, Part 2

James B. Talmage, MD



In the Spring 2022 issue of the *AdMIRable Review*, we discussed spinal impairment rating using the *AMA Guides to the Evaluation of Permanent Impairment*, Sixth Edition, and the International Association for the Study of Pain (IASP) definitions of POSSIBLE neuropathic pain (i.e. non-verifiable radicular complaints) as opposed to PROBABLE neuropathic pain (radiculopathy verified by objective, or semi-objective, physical exam testing) that would correlate with the legal testimony criterion of “more likely than not,” or “within reasonable medical PROBABILITY,” or “primarily” – depending on what term is typically used in the applicable jurisdiction (Finnerup 2016).

As discussed in the last *AdMIRable Review* issue, lumbar and cervical disc herniations are common in MRIs done on asymptomatic volunteers. Thus, just finding a disc herniation on imaging in a person with back and/or leg pain does not permit a determination that the imaging change is the source of the person’s symptoms. The *AMA Guides*, Sixth Edition, solution to this conundrum is to grant higher impairment ratings for those with both a disc herniation on imaging and physical exam objective evidence of radiculopathy than to those with no physical exam evidence of true radiculopathy.

Not stated in the *AMA Guides*, but logical, is if a person with no physical exam evidence of true radiculopathy had surgery for a herniated disc on imaging without improvement in symptoms after surgery, the person may well have had surgery for an imaging finding that was not causing symptoms.

A person with a disc herniation and severe nerve root compression may keep symptoms from incomplete improvement after removal of the portion of the disc compressing the nerve. A person with no or minimal nerve compression with a disc herniation should recover. Decompressing a minimally compressed nerve should yield better outcomes than decompressing a severely compressed nerve with permanent nerve damage.

A similar situation is present in middle-aged adult workers with unilateral shoulder or knee complaints attributed to work, and imaging findings. A physical exam of both knees and both shoulders should be helpful in determining which imaging findings are present but are likely asymptomatic aging changes and which imaging findings likely correlate with the person’s symptoms. We will discuss physical exam of knees and shoulders in future issues to help understand these issues.

This issue will continue the discussion about the value of the physical exam in the spinal pain patient assessment for treatment, and for impairment rating. In the Spring 2022 issue, we discussed the sensory neurologic exam in detail.

In this issue, we will consider how to document motor weakness (decreased muscle strength), the erroneous finding of “spasm” on physical exam of chronic spinal pain cases, whether “spasm” causes a decrease in or loss of cervical spine lordosis (straightening), and the significance of tenderness in chronic spinal pain cases.

The objective is for the reader to understand that many patient-treatment records and even impairment rating reports contain non-scientifically verified physical findings. Realizing the limitations of these physical exam described findings may help the reader with assessing requests for treatment in utilization review and assessing permanent impairment reports.

Manual muscle testing is performed using the examiner’s upper limb strength to supply resistance when the patient attempts specific movements that are principally powered by specific muscles/nerve roots. In testing upper limb muscles, most physicians are strong enough to supply adequate resistance to patient movement. However, many of the patient’s lower limb muscles are big, and the physician’s upper limb muscles are by comparison small, so the physician may not be strong enough to adequately test lower limb muscles for weakness in cases of possible radiculopathy with neurologic deficit. Thus, medical records describing “normal” strength in the lower limbs in a back pain patient may be incorrect.

Most impairment rating exams for lumbar spine injury patients involve potential weakness in muscles supplied by the L3, L4, L5, & S1 nerve roots.

S1 nerve root:

The gastrocnemius/soleus muscle in the posterior calf can be tested by asking the patient to perform single leg heel raises (rise to the “tip toe” position by lifting the entire person’s body weight using a single leg’s gastrocnemius/soleus muscle) 10 times while provided a chair, or the examiner’s hand for balance [see illustration]. Normal strength is the ability to perform this 10 times quickly, with subtle but true weakness appearing as fatigue during this repetitive testing, causing the person to fail to raise the heel as high off the floor on later repetitions or being unable to complete this 10 times on the leg with S1 weakness (Bohannon 2022).

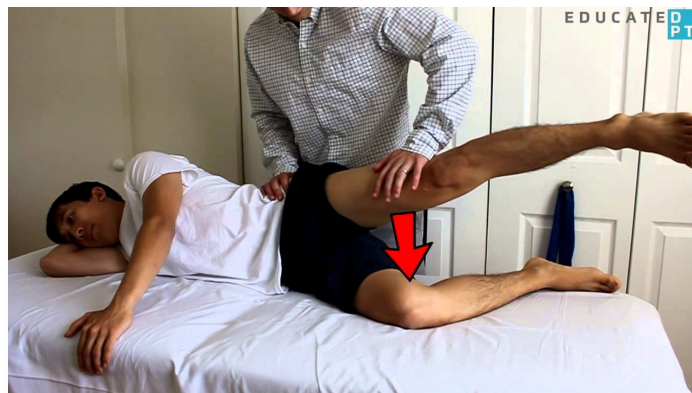


L5 nerve root:

Two muscles are commonly tested. The Extensor Hallucis Longus (EHL) is a very small muscle that lifts the big toe away from the floor when you are standing. It is easily tested with the physician's upper limb strength, as this is a small muscle that does not lift body weight. In most people, the L5 nerve root is the predominant nerve root serving this muscle. The anterior tibial muscle lifts the front portion (toe area) of the foot off the floor when you are standing. In gait, it functions to lift the foot out of the way when your weight is on the other foot and you are swinging the involved leg forward so it can be used for "heel strike" of the next step. It also functions when you begin stepping on a leg by having the heel touch down (heel strike). The anterior tibial muscles then allow the foot to slowly and smoothly descend to the floor in normal gait by slowing the descent of the foot. When this muscle is weak, the individual's foot "slaps" the floor

(Bohannon, 2022). Thus, watching the patient walk 50 feet may uncover subtle weakness, as with additional distance the slightly weak muscle fatigues, and the foot begins to slap the floor at heel strike, which is a change from the first several feet of walking. Since the L5 nerve root is also the principal nerve root supplying the hip abductor muscles (gluteus medius and minimus), a physical exam can confirm weakness in L5 nerve root muscles by manually testing the hip abductor muscles.

This hip weakness would not be expected in patients with peroneal nerve injury at the knee. In a case series, 4% of patients with peroneal nerve injury at the knee had hip abductor weakness, while 86% of L5 radiculopathy patients had hip abductor weakness in addition to the anterior tibialis weakness causing their foot drop (Jeon, 2013).



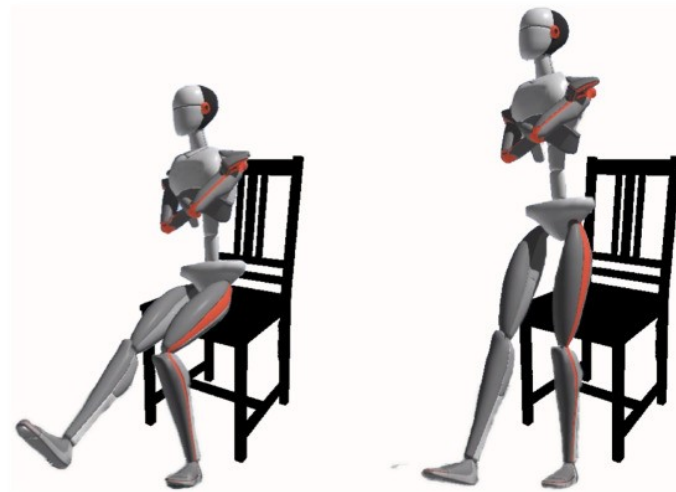
L2, L3, & L4 nerve roots:

The quadriceps muscle on the anterior thigh is principally supplied by the L3 and L4 nerve roots (with some contribution from L2). This is a big, powerful muscle, and most physicians are not strong enough with their hands to detect subtle weakness. Thus, the test recommended in the literature is the "single leg sit-to-stand" test. In this test, the person sits in a chair with the contralateral leg that is not being tested fully extended at the knee so that leg cannot help. The examiner provides support

for the person's hands for balance ONLY. The person then arises from sitting in the chair to standing, powering this with only the leg being tested.

In a case series of patients with upper lumbar nerve root compression on MRI (L2 nerve root = 2 patients, L3 root = 10 patients, and L4 root 13 patients) the "sit-to-stand" test uncovered quadriceps weakness in 12 patients (sensitivity = 0.48) and if weakness was present, the chance of an upper lumbar disc herniation was 90% (specificity) (Suri, 2011).

In medical records submitted to the BWC for Utilization Review Appeals and for MIRR cases, documentation of the above 3 tests is rare. What is most commonly seen is a statement that "there is no motor deficit." At times the medical record will give strength test outcomes for individual muscles based on the British Medical Research Council Manual Muscle Test grading system, but with no documentation of how testing was performed. Thus, a reviewing physician cannot be sure whether motor deficit was or was not present. Subtle but true weakness may have been present but missed by the examiner.



“Spasm”

Another issue is that chronic spinal pain patients are frequently reported as having “spasm” by palpation in the muscles posterior to the neck or lumbar spine. This is in the absence of upper motor neuron injury in the brain or spinal cord. This documentation on physical exam is apparently to legitimize the patient's suffering by finding a supposedly “objective” physical exam findings. Physicians apparently forget the absence of “spasm” in common low back pain/injury cases was clearly established in the 1950 to 1980 era, and no subsequent scientific publication documents true muscle spasm in common back pain scenarios.

What is REAL Spasm?

Muscle spasm should be defined as a sustained, isometric contraction of a muscle (the muscle is contracting but is not producing motion of the body part). The human nervous system has motor, or muscle movement pathways. The nerve cells (neurons) from the brain to the spinal cord are called “Upper Motor Neurons,” and the nerve cells (also neurons) from the spinal cord through the nerve roots in the

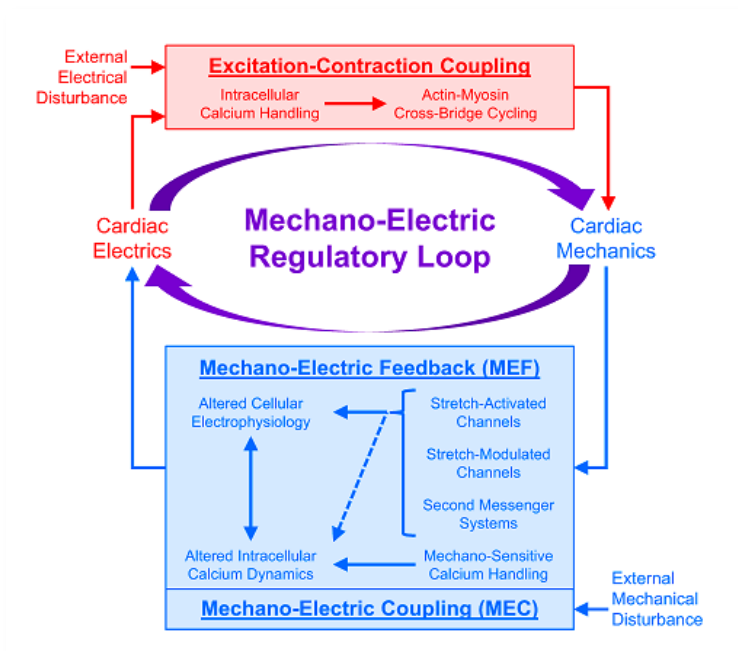
spine to the brachial or lumbosacral plexus to peripheral nerves to the individual muscle fibers are called “Lower Motor Neurons.”

Injuries to the brain or spinal cord that disrupt the Upper Motor Neurons remove the control of the brain from the Lower Motor Neuron circuit that activates muscle, and these Upper Motor Neuron diseases and injuries like stroke, multiple sclerosis, cerebral palsy, paraplegia, etc. “disinhibit” the Lower Motor Neuron Circuit and result in Hyperreflexia, abnormal reflexes (Hoffman, Babinski, etc.), and “Yes,” spastic contraction of skeletal muscle. In these upper motor neuron conditions limb spasticity, not spasticity in spinal muscles, is usually the most clinically dominant problem.

Diseases like disc herniation, spinal stenosis, spondylolisthesis with instability, cauda equina syndrome, etc. typically cause Radiculopathy, or Lower Motor Neuron injury **without** Upper Motor Neuron dysfunction (the brain to spinal cord circuit is intact). Thus, the typical finding on physical exam is flaccid weakness, areflexia or asymmetrically decreased muscle stretch reflexes, and NOT muscle “spasm,” despite the frequent physical exam finding in medical records of patients with mild back injury, disc herniation, etc.

Lower Motor Neuron diseases and injuries cause atrophy in the muscles whose nerve supply has been damaged. Upper Motor Neuron diseases and injuries that cause true spasm produce muscle hypertrophy or at least no atrophy, from the muscle continuously or frequently exercising. In patients with radiculopathy or non-specific back pain, paraspinal muscle **atrophy** and fatty infiltration are seen on T1 MRI images, consistent with the absence of true spasm.

Both cardiac muscle and skeletal muscle have electrical-mechanical coupling. For muscle contraction to occur, there MUST be first an electrical signal transmitted to the muscle cell by a “nerve” cell (neuron -or cardiac conduction system cell) that results in a change in the muscle cell’s electrical charge. These electrical charge changes in cardiac muscle are summated to become an “EKG,” or electrocardiogram. If an EKG



shows no electrical activity over time, this is called asystole, and confirms the heart muscle is NOT contracting. When the heart is not contracting, the patient is typically dead.

Similarly voluntary and involuntary contraction of skeletal muscle cells is always immediately preceded by an electrical change detectable by traditional needle EMG as summated muscle action potentials. If a muscle is not contracting, there is no electrical activity detected. Needle EMG reliably detects voluntary muscle contraction and involuntary muscle contraction (tremor, and true spasm in Upper Motor Neuron disorders). Note the absence of published studies showing needle EMG evidence of “spasm” in the common Lower Motor Neuron spinal injuries with true radiculopathy. Lower Motor Neuron spinal injuries do not produce “spasm” but may produce flaccid weakness – the exact opposite. This fact was determined in the 1950 to 1980 time period, and most current major textbooks on electrodiagnostic testing do not discuss muscle spasm with Lower Motor Neuron disease and injury, because it does not exist. Systematic Review and Meta-analysis articles have not reported on spasm by palpation, finding it too unreliable for analysis (May et al, 2006; Deyo et al, 1992).

While the concept of “spasm” in the common spinal injuries without quadriparesis or paraparesis was incorporated the *fourth and fifth editions*, it has been deleted from the *sixth edition* as an ***erroneous*** concept. Consider the *AMA Guides Newsletter* publications on “spasm.” Copied and pasted below are sections of this AMA publication showing the AMA has already adopted the scientific evidence on this “spasm” issue.

The AMA Guides, Newsletter Spasm and Asymmetric spinal motion

Jan/Feb 1997, page 6

“The muscle spasm that is very localized and is determined only by palpation is not considered significant for rating purposes.”

Sep/Oct 1999, page 9

“Spasm is often over-reported by physicians who are unaware of its definition (“sudden involuntary contraction of one or more muscle groups”) and

therefore mischaracterize normal or increased resting muscle tone or tenderness as spasm.”

Jan/Feb 2009, page 1

“[...]the unreliable findings of “spasm,” “guarding,” and motion loss referenced in the fourth and fifth editions no longer qualify as direct determinants of impairment.”

July/Aug 2010, page 1

“In clinical practice it may be difficult to validate one physician’s findings of muscle guarding and spasm at another examination, leading to controversy (dueling doctors) in rating those patients with questionable physical examination findings.”

Mar/Apr 2012, pages 4 and 5

“As implied, the medical literature shows spasm is not reliably detectable on physical examination. In addition, no published study has documented spasm by needle EMG in nonspecific low back pain patients. Furthermore, no one has published a neurologic theory of why “chronic spasm” should occur in painful spinal disorders, but not in painful disorders of the limbs.

Recent onset back pain may result in asymmetrical spasm of spinal muscles and cause a list (trunk deviation) and/or “sciatic scoliosis” visible in the standing patient. While cases have been documented photographically and radiographically, they are sufficiently infrequent that there are no published data on reliability. The acute and transient nature of these objective findings of spasm is confirmed by their absence during future re-examination.

Recall also the purpose of spasm is to immobilize a body part. Reports of neck or back spasm in a patient having more than 10 or 20 degrees of spinal motion in any direction should engender even more doubt regarding the validity of this finding.”

Mar/April 2014, page 6

“Subsequent science has found that physical examination findings such as muscle spasm, guarding and asymmetric loss of motion are not reliable differentiators in determining if someone is impaired.”

Nov/Dec 2014, page 6

“The *Fifth Edition* contains a contradiction regarding muscle spasm. While Box 15-1 permits an examiner using the DRE method to use spasm on the day of the exam as a ratable “objective finding,” in the ROM method “...if acute muscle spasm is present, this should be noted in the examiner’s report; however, the mobility measurements would not be valid for estimating permanent impairment. Because the *AMA Guides* only consider **permanent** impairment, rating should be deferred until after any acute exacerbation of the chronic condition has subsided...” (5th ed, 399). Taken together, these 2 sections suggest that if an examiner detects the rare true spasm on exam, the rating should be postponed to a day when spasm is not present.”

Nov/Dec 2015 – Cervical Lordosis article, pages 3 and 4

“At present, radiographs taken in an emergency department or at a health care provider’s office after a motor vehicle collision or other neck injury are often reported as showing “loss of the normal cervical lordosis.”

Concurrently, a provider may report finding “spasm” of cervical paraspinal muscles on palpation thereof during physical examination. The diminished lordosis is often then ascribed to “muscle spasm.”

Muscle spasm can occur after moderate to severe injury and is, in fact, a physiologic means to splint an injured body part. The strong muscular contraction immobilizes the traumatized region, protecting it from further damage. However, there is no known biomechanical explanation for how spasm, and the accompanying shortening, of the posterior cervical muscles could decrease cervical lordosis. An analogy, comparing a lordotic cervical spine and cervical paraspinal muscles to a bow and bowstring, respectively, may be illustrative. If the bowstring is shortened, the curvature of the bow increases. Likewise, paraspinal spasm would be expected to increase, not decrease, cervical lordosis (*curvature*). In fact, Helliwell et al reported no lordosis on lateral cervical spine X ray in 19% of acute neck pain emergency room cases, 26% of chronic neck pain cases, and 42% of normals from a previous

population survey. The significantly higher prevalence of lordosis in patients most likely to have cervical paraspinal spasm compared to normal lends some credence to the bowstring analogy.

Conversely, spasm of anterior cervical musculature would be expected to decrease or even reverse the normal lordotic curve. Yet [*physical exam*] reports of spasm isolated to anterior cervical musculature (longus colli, longus capitis, omohyoid, sternohyoid, scalenes, etc.) are rare. Spasm of anterolateral cervical musculature, primarily the sternocleidomastoid, with resultant torticollis, is more common but still infrequent. However, the cervical deformity in torticollis generally involves lateral bending with varying degrees of rotation (only 1 of the 2 muscles is typically involved), rather than decreased or reversed lordosis.

A literature search also failed to return citations of needle electromyogram (EMG)-documented muscle spasm (sustained contraction) in subacute or chronic spinal pain. Power lifters and bodybuilders use isometric exercise as a crucial part of their training program to increase strength and induce muscle hypertrophy. If the paracervical muscles in a chronic neck pain patient were usually or continually in spasm (sustained isometric contraction), MRI images would be expected to show hypertrophy thereof. Instead, atrophy and fatty infiltration of paraspinals on T1 images are usually seen, further negating the concept of chronic spasm. Hence, even if spasm did alter cervical alignment, the deformity would be expected to be temporary, not fixed.”

Jan/Feb 2018, page 6

“Muscle spasm is an objective finding that is not dependent on the report of or subject to modification of a patient. However, spasm is overreported, mistaking it for normal or increased muscle tone. Some patients characterize “spasm” as a sudden increase in pain, often prompting them to avoid moving the affected body part. This mischaracterization may be repeated by a provider and perhaps even treated with a muscle relaxant. True spasm is an involuntary, strong, and sustained contraction of a muscle or muscle group in response to an acute injury or other painful stimulus, designed to splint or immobilize the body part. Spasm may last for minutes or hours and even days but does not continue for weeks, months, or years. Reports of spasm at such temporally remote times, barring recurrent injury, should be met with skepticism.”

May/June 2018 – Reliability of Cervical Spine palpation

"A systematic literature review of 49 published studies raised concerns about the reliability (reproducibility) of cervical spine palpation due to poor inter-examiner reliability for all palpation tests (Seffinger et al, 2004). For spasm to be present, the sustained contraction of the paraspinal muscles must be present with the person supine (or prone as the paraspinal muscles are not easily palpated in the supine position). However, the presence of such "spasm" was refuted decades ago. Harrell et al (1950) reported on 42 patients with acute-onset low back pain and a list (acute deviation of the trunk to the left or to the right of midline). Since the paraspinal muscles are posture-stabilizing muscles, on needle electromyography, they found sustained electrical activity in the paraspinal muscles on the convex side (contralateral to the pain) and electrical silence (no mechanical contraction) on the side of the "supposedly painful contracted muscle." The normal electrical activity on the convex, non-painful side disappeared with the person prone, as the need for antigravity muscle activity was removed. Johnson (1989) duplicated these results in 50 additional patients. The *AMA Guides*, Fifth Edition, range-of-motion method for rating spinal impairment states that an examiner cannot find muscle spasm on exam and rate the individual's impairment on the same day, as by definition the individual is having an acute exacerbation of a chronic spinal disorder, and thus is not at MMI:

[. . .] for spinal "spasm" and "tension" (palpable firmness) found that the kappa values in published studies ranged from 0.06 to 0.73 for spasm and from -0.14 to 0.94 for tension, showing that neither is clearly a reliable finding that could consistently be reproduced by other examiners. :

Thus, despite acceptance by the *AMA Guides*, Fifth Edition, neither spasm nor guarding appears to be a reliable finding on palpation."

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Lumbar “Facet Pain”:

Pain originating from the lumbar facet joints is commonly postulated in chronic low back pain patients. The physical exam finding supposedly suggesting this is most typically tenderness or pain on palpation directly over the lumbar facets. However, in the typical adult, the lumbar facets are 4-8 cm below the skin surface and covered by muscle and subcutaneous fat. Claiming that tenderness over the facets can be determined on physical exam is like claiming to be able to palpate a pea underneath a mattress.

Framingham, Massachusetts, is famous for the ongoing heart disease risk studies, as adults in this city tend to stay and not move away. They publish on topics other than heart disease. A group of adults had CT scans for abdominal aorta atherosclerosis (cardiac disease risk factor), but the same images can be used to assess the lumbar facets for arthritic change.

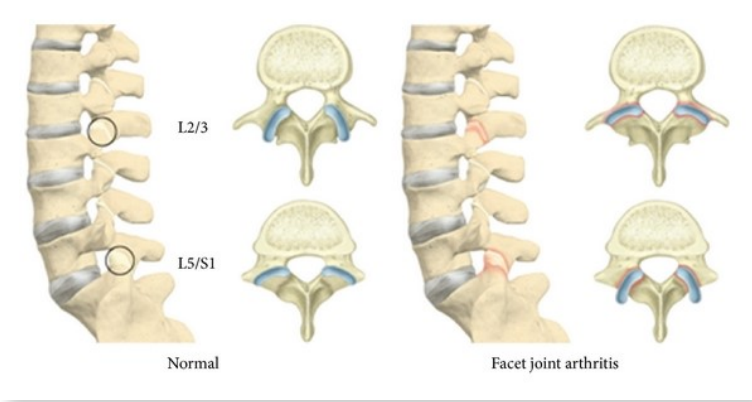


By decade, FJ OA [Facet Joint OsteoArthritis] was present in 24.0% of < 40-years-olds, 44.7% of 40- to 49-years-olds, 74.2% of 50- to 59-years-olds, 89.2% of 60- to 69-year-olds, and 69.2% of >70-years-olds. By spinal level the prevalence of FJ OA was: 15.1% at L2-L3, 30.6% at L3-L4, 45.1% at L4-L5, and 38.2% at L5-S1. In this community-based population, individuals with Facet Joint Osteoarthritis at any spinal level showed no association with LBP (Kalichman, 2008).

The most recent systematic review of published studies on History and Physical Exam recognition of facet-mediated pain concluded that 12 studies showed that patient history and physical exam could not prove or exclude facet joint-mediated pain, and injection of local anesthetic about the nerves to the facet joints looking

for pain relief would be needed to determine if facet joints were pain generating (Maas, 2017).

The largest and best methodology study of using facet joint nerve injection, sacroiliac joint nerve injection, or provocative discography was conducted in the Netherlands at 19 spinal pain centers. Patients with a suggestive history and physi-



cal exam were classified after nerve blocks or discography as “facet pain” (251 patients), “Sacro-iliac joint pain” (228 patients), or “combination pain” (202 patients – disc pain or multiple pain generators). The patients were randomized to radiofrequency ablation of the nerves to the facets, sacro-iliac joint, or disc. The primary outcome assessed was pain relief on a 0-10 pain intensity scale, with a 30% or 2 unit decrease in pain being considered the Minimal Clinically Important Difference or MCID (note: most studies consider 3 points, not 2 points on the pain score to be the MCID). At no point in time (3 weeks, 6 weeks, 3 months, 6 months, 9 months, or 12 months) did any of the nerve ablation patients’ average outcome exceed the conservative (PT and Meds ± psych referral) treatment group by 1 unit on the 0-10 pain intensity scale. The authors concluded they had not successfully identified treatable groups of low back pain patients, or that the nerve ablation procedures were ineffective.



In 2018 Lancet published a multi-authored international expert review of low back pain:

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 (Hartvigsen, 2018).

Thus, published literature is consistent with physical exam not being able to recognize “facet pain” or “spasm,” and unfortunately, in 2022 doctors are not able to tell most patients the reason they hurt (not able to name the pain-generating struc-

ture). This is consistent with the *AMA Guides*, Sixth Edition, page 563, indicating for the most common low back injuries in workers' compensation patients, the correct diagnosis is "non-specific low back pain" (the first diagnostic row in Table 17-4, page 570), and that "there are no reliable physical examination or imaging findings on this group."

Thus, physical exam can help differentiate symptomatic true radiculopathy from non-verifiable radicular complaints by careful neurological exam. This is the reason the only physical exam findings listed in Table 17-7 (Physical Examination Adjustment: Spine) are findings related to nerve root damage assessed by physical exam. "Spasm" and "Facet Pain" are not reliably recognized on physical examination.

The last sentence from the quote of Hartvigsen 2018, "Increasing evidence shows that central pain-modulating mechanisms and pain cognitions have important roles in the development of persistent disabling low back pain" hints at the newest category of pain to be formally recognized, that over time may explain much of the pain and disability conundrum – namely "Nociplastic Pain." We will explore this new concept of pain in a future issue of AdMIRable Review.

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Medical Abstracts of Interest

Regarding the Reliability and Validity of Spinal Diagnostic Methods

Selected by James B. Talmage, MD

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

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Reliability and validity of manual palpation for the assessment of patients with low back pain: a systematic and critical review

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PMID: 34446040

PMCID: [PMC8390263](#)

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Abstract

Background: Static or motion manual palpation of the low back is commonly used to assess pain location and reproduction in low back pain (LBP) patients. The purpose of this study is to review the reliability and validity of manual palpation used for the assessment of LBP in adults.

Method

We systematically searched five databases from 2000 to 2019. We critically appraised internal validity of studies using QAREL and QUADAS-2 instruments. We stratified results using best-evidence synthesis. Validity studies were classified according to Sackett and Haynes.

Results

We identified 2023 eligible articles, of which 14 were low risk of bias. Evidence suggests that reliability of soft tissue structures palpation is inconsistent, and reliability of bony structures and joint mobility palpation is poor. We found preliminary evidence that gluteal muscle palpation for tenderness may be valid in differentiating LBP patients with and without radiculopathy.

Conclusion

Reliability of manual palpation tests in the assessment of LBP patients varies greatly. This is problematic because these tests are commonly used by manual therapists and clinicians. Little is known about the validity of these tests; therefore, their clinical utility is uncertain. High quality validity studies are needed to inform the clinical use of manual palpation tests.

Medical Abstracts of Interest

Regarding the Reliability and Validity of Spinal Diagnostic Methods

Selected by James B. Talmage, MD
Published verbatim from PubMed.gov, in the public domain.

Spine (Phila Pa 1976) 2004 Oct 1;29(19):E413-25.
doi: 10.1097/01.brs.0000141178.98157.8e.

Reliability of spinal palpation for diagnosis of back and neck pain: a systematic review of the literature

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PMID: 15454722 DOI: [10.1097/01.brs.0000141178.98157.8e](https://doi.org/10.1097/01.brs.0000141178.98157.8e)

Study design

A systematic review.

Objectives

To determine the quality of the research and assess the interexaminer and intraexaminer reliability of spinal palpatory diagnostic procedures.

Summary of background data

Conflicting data have been reported over the past 35 years regarding the reliability of spinal palpatory tests.

Methods

The authors used 13 electronic databases and manually searched the literature from January 1, 1966 to October 1, 2001. Forty-nine (6%) of 797 primary research articles met the inclusion criteria. Two blinded, independent reviewers scored each article. Consensus or a content expert reconciled discrepancies.

Results

The quality scores ranged from 25 to 79/100. Subject description, study design, and presentation of results were the weakest areas. The 12 highest quality articles

found pain provocation, motion, and landmark location tests to have acceptable reliability ($K = 0.40$ or greater), but they were not always reproducible by other examiners under similar conditions. In those that used kappa statistics, a higher percentage of the pain provocation studies (64%) demonstrated acceptable reliability, followed by motion studies (58%), landmark (33%), and soft tissue studies (0%). Regional range of motion is more reliable than segmental range of motion, and intraexaminer reliability is better than interexaminer reliability. Overall, examiners' discipline, experience level, consensus on procedure used, training just before the study, or use of symptomatic subjects do not improve reliability.

Conclusion

The quality of the research on interreliability and intrareliability of spinal palpatory diagnostic procedures needs to be improved. Pain provocation tests are most reliable. Soft tissue paraspinal palpatory diagnostic tests are not reliable.

Medical Abstracts of Interest

Regarding the Reliability and Validity of Spinal Diagnostic Methods

*Selected by James B. Talmage, MD
Published verbatim from PubMed.gov, in the public domain.*

Spine (Phila Pa 1976) 2013 May 20;38(12):995-8.
doi: 10.1097/BRS.0b013e318286b7dd.

Do L5 and s1 nerve root compressions produce radicular pain in a dermatomal pattern?

Christopher S Taylor , Andrew J Coxon, Paul C Watson, Charles G Greenough
PMID: 23324941
DOI: [10.1097/BRS.0b013e318286b7dd](https://doi.org/10.1097/BRS.0b013e318286b7dd)

Study design

Observational case series.

Objective

To compare the pattern of distribution of radicular pain with published dermatome charts.

Summary of background data

Dermatomal charts vary and previous studies have demonstrated significant individual subject variation.

Methods

Patients with radiologically and surgically proven nerve root compression (NRC) caused by prolapsed intervertebral disc completed computerized diagrams of the distribution of pain and pins and needles. Ninety-eight patients had L5 compressions and 83 had S1 compressions.

Results

The distribution of pain and pins and needles did not correspond well with dermatomal patterns. Of those patients with L5 NRC, only 22 (22.4%) recorded any hits on the L5 dermatome on the front, and only 60 (61.2%) on the back with only 13

(13.3%) on both. Only 1 (1.0%) patient placed more than 50% of their hits within the L5 dermatome. Of those patients with S1 NRC, only 3 (3.6%) recorded any hits on the S1 dermatome on the front, and only 64 (77.1%) on the back with only 15 (18.1%) on both. No patients placed more than 50% of their hits within the S1 dermatome. Regarding pins and needles, 27 (29.7%) patients with L5 NRC recorded hits on the front alone, 27 (29.7%) on the back alone, and 14 (15.4%) on both. Nineteen (20.9%) recorded more than 50% of hits within the L5 dermatome. Three (3.6%) patients with S1 NRC recorded hits on the front alone, 44 (53.0%) on the back alone, and 18 (21.7%) on both. Twelve (14.5%) recorded more than 50% of hits within the S1 dermatome.

Conclusion

Patient report is an unreliable method of identifying the anatomical source of pain or paresthesia caused by nerve root compression.

Case Law: The Role of Physical Examinations in Medical Evaluations

Jane Salem, Esquire



When physicians are asked to give opinions about medical causation and/or permanent impairment in workers' compensation, in most cases, *the physical exam matters*.

That's because it's something that the trial judge must consider. In 1991, the Tennessee Supreme Court gave landmark guidance on how judges should analyze conflicting expert opinions. In *Orman v. Williams Sonoma, Inc.*, the justices said courts should consider, "among other things, ... the qualifications of the experts, *the circumstances of their examination*, the information available to them, and the evaluation of the importance of that information by other experts." (Emphasis added.)

The high court in *Orman* didn't say that any one of those factors is more important than the others. But the justices did write that "[i]t seems reasonable that the physicians having greater contact with the Plaintiff would have the advantage and opportunity to provide a more in-depth opinion, if not a more accurate one."

So "greater contact," i.e. a doctor-patient relationship, is significant. But that doesn't mean that a treating physician *always* gets the judge's nod. If that were true, parties would never ask a physician to solely review records or perform a one-time evaluation, for purposes of litigation.

Consider *Reece v. J.T. Walker Industries*, where the courts sided with a non-treating physician who performed the more thorough physical examination, and who showed greater familiarity with the AMA Guides, Fifth Edition (applicable at the time).

In *Reece*, the employee alleged bilateral carpal tunnel syndrome from assembling windows at work. Dr. David Hardin, an authorized physician, performed a right carpal tunnel release and later assigned no impairment. An authorized second-opinion physician, Dr. John Holbrook, diagnosed deQuervain's tendinitis on the right side, and he performed surgery to correct that condition. He later performed a left carpal tunnel release. Dr.



Holbrook also found no permanent impairment. Both physicians released the employee to full-duty.

The employee then sought an independent medical examination by Dr. William Kennedy. He assigned a nine-percent permanent impairment, which the trial court ultimately accepted and a Supreme Court Panel affirmed.

The Panel wrote that Dr. Hardin recorded a normal two-point discrimination test and had normal wrist strength when he released her. As for Dr. Holbrook, before releasing the employee from treatment, his assistant performed an in-office electromyography, or “EMG,” using a Nervepace Digital Electroneurometer. On cross-examination during Dr. Holbrook’s deposition, the employee’s attorney pointed out that medical literature characterized “NDEs” as “experimental” and “not effective substitutes for standard electrodiagnostic studies in clinical evaluation of patients with suspected CTS.”

The Panel wrote that Dr. Hardin administered “only” the two-point discrimination test, but did not administer Semmes-Weinstein monofilament testing or nerve conduction studies, as recommended in the Guides. Dr. Holbrook administered “only” a nerve conduction study with an “NDE.”



In contrast, Dr. Kennedy administered the two-point discrimination test, which showed normal sensation in all of her fingertips on both hands. Dr. Kennedy also administered the Tinel’s test and the median nerve compression test. The Tinel’s sign was positive on the right hand involving the thumb, index finger and middle finger. On the left hand, the Tinel’s sign was positive involving the middle and ring fingers. Dr. Kennedy additionally performed a Phalen’s test, which was positive on both the right and left sides, and the Finkelstein test was positive on the right and negative on the left.

According to the Panel, an “important point” Dr. Kennedy made was that “[i]t takes at least six months after the surgery for carpal tunnel release to be at maximum medical improvement.” Yet Dr. Hardin evaluated the employee 53 days after her surgery, and Dr. Holbrook evaluated her 121 days after her surgery.

“The other two doctors performed cursory examinations of Ms. Reece even before she reached her maximum medical improvement and opined she had no permanent partial disability,” the judges wrote. “The information gleaned by Dr. Kennedy could have been found by Dr. Hardin and Dr. Holbrook had they performed the tests of anatomical impairment required by the ‘A.M.A. Guides.’”

The Panel modified the judgment but on other grounds. *Reece* is a 2007 memorandum opinion, meaning it bears persuasive value only for other judges. Yet it has been cited twice since then by two other appellate panels and is considered good law.

The Panel’s language, “cursory examinations,” had to sting a bit to those physicians, and it should induce other physicians to err on the side of thoroughness.

That said, a physical exam isn’t always necessary.

In *Hollars v. United Parcel Service, Inc.*, the employee alleged a permanent impairment as a result of heat exhaustion while delivering packages in the summer months. The case pitted two experts, neither of whom treated *or even examined* the employee, but their differing qualifications played a significant role.

The employee hired Dr. Richard Fishbein, an orthopedic surgeon, who, according to the Panel, “professed familiarity with the subject of heat exhaustion, but conceded that the condition was more likely to be treated by physicians in other specialties.”

The employer relied on Dr. Jonas Kalnas, who had “received specific training concerning heat exposure in the workplace, both in medical school and in graduate programs.” The Panel wrote that he had studied and addressed the subject in his roles as medical director for a petrochemical company and for the occupational health agency of a Canadian province, and he had published articles on the prevention of heat exposure workplace injuries. Dr. Kalnas also showed greater familiarity with the Guides, Sixth Edition, the Panel reasoned. (Remember, this was important in *Reece*, too.)

The Panel accepted Dr. Kalnas’s opinion, despite him never laying hands on the employee. It just wasn’t necessary considering the condition at issue and his expertise.

In sum, the physical exam isn’t always what a case will turn on, but frequently it is. And when it is, the more thorough the exam, the better.

Bureau Seeks Board-Certified Physicians Consider the MIR Registry

Jay Blaisdell, MPA, 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.



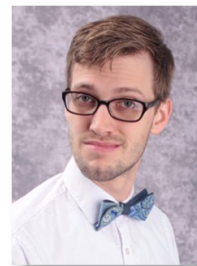
Apply for Appointment to the MIR Registry Today

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 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.



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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.

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AdMIRable Review accepts electronic submission for articles related to Tennessee Workers' Compensation. Manuscripts prepared in accordance with the American Psychological Association (APA) guidelines are preferred. Submission of a manuscript implies permission and commitment to publish in *AdMIRable Review*. Authors submitting manuscript to *AdMIRable Review* should not simultaneously submit them to another public-administration journal. Submission and inquires should be directed to *AdMIRable Review*, Editorial Staff, at Jay.Blaisdell@tn.gov.

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