



How to better evaluate and negotiate a neck and back injury case

AN ANATOMICAL REVIEW OF THE SPINE AND HOW TO USE THAT KNOWLEDGE EFFECTIVELY IN NEGOTIATION

Whether you're a plaintiff or defense attorney your knowledge of the anatomy and physiology of the spine is critical in evaluating a neck/back injury. This general overview of the spine will assist you as you negotiate settlement with an adjuster or defense attorney.

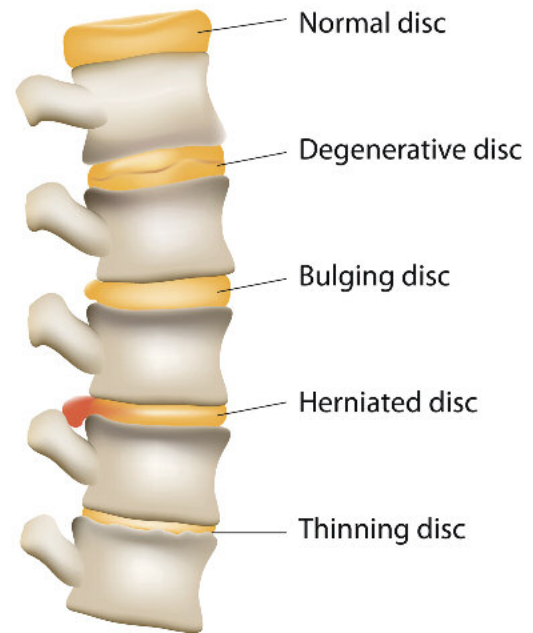
Spinal anatomy overview

The spinal vertebral column includes five sections: 7 cervical vertebrae; 12 thoracic vertebrae; 5 lumbar vertebrae; 5 fused sacral vertebrae and 4 fused vertebrae in the coccyx. The 33 vertebral bodies serve as a support system for the muscles and ligaments. Separating the vertebrae are 23 discs (also *disks*), 6 in the cervical spine, 12 in the thoracic region and 5 in the lumbar region. The discs are made up of three basic structures: the *nucleus pulposus*, the *annulus fibrosus* and the *vertebral end-plate*, and with the exception of the nucleus pulposus, the foregoing structures are innervated with nerve fibers. The discs lie in between every vertebra. Spinal nerves emerge from a small opening (foramen) between every two vertebrae and travel to the periphery upper and lower limbs to innervate the skin and muscles. The often-referred-to *sciatica nerve* is formed with the pelvis by branches from the last three lumbar spinal nerves. It is often this "giant" nerve that causes so much trouble in chronic back-pain sufferers.

Spinal cord anatomy

The spinal cord is the life-line of sensory and motor neurons (nerves). The spinal cord is a tube-like structure located vertically within a bony corridor running down the center of all the vertebrae of the spine. This corridor is called the *central canal*. The function of the sensory and motor neurons is to carry sensory information (perception of touch, temperature, position and pain) and motor functions to the periphery. The spinal cord contains three protective layers of tough connective tissue called the meninges. The outer layer is the *dura* (aka thecal sac), the middle layer is the *arachnoid* and the *pia mater* is the inner layer.

The internal structure of the spinal cord consists of "gray matter" shaped like the letter "H" surrounded by white matter. The lumbar nerves increase in size from above downward, while the lumbar intervertebral foramen (aka neural foramina) decrease in diameter. The foramina, or openings, are present between every pair of vertebrae in these areas. The root of each spinal nerve passes through the foramen. The foramen can be occluded or narrowed by arthritic degenerative changes and space-occupying lesions such as tumors and spinal disc herniations that put pressure on the nerve, causing pain.



DISC PATHOLOGY

The *spinal cord* actually stops somewhere between the L1 and L2 vertebrae. The tip of the spinal cord is called the *conus medullaris*. In simplistic terms, below the *conus medullaris* the spinal cord becomes the *cauda equina* (Latin for "horse's tail") which is a bundle of spinal nerves and spinal nerve roots, consisting of the 2nd through the 5th lumbar nerve pairs, the 1st through 5th sacral nerve pairs, and the coccygeal nerve. The nerves that compose the *cauda equina* innervate the pelvic organs and the lower limbs. The *cauda equina* is surrounded by the thecal sac containing cerebrospinal fluid and terminates at the S2 level in most cases. The nerve roots of L2 through S5 (which collectively hang in the thecal sac that make up the *cauda equina*) are more vulnerable to compression and chemical irritation within the thecal sac as opposed to the cervical and thoracic areas. The L5 nerve root is the thickest and transverses the narrowest foramen; thus, it is not surprising why the L5 level has an increased chance of compression by pathology compromising the foramen.

Epidural space

The *epidural space* is the area between the *dura mater* (a membrane) and the vertebral wall, containing fat and small blood vessels. The space is located just outside the dural sac which surrounds the nerve roots and is filled with cerebrospinal fluid. It is in this space where epidural injections are administered.

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Dermatomes

Dermatomes are specific areas of the skin whose sensory nerves all come from a single spinal nerve root. This is often referred to as a “dermatomal pattern.” Sensory nerves carry information about such things as touch, pain, temperature and vibration from the skin to the spinal cord. Sensory information from a specific dermatome is carried by sensory nerve fibers to the spinal nerve root of a specific vertebrae. For example, sensory information from a strip of skin along the back of the thigh is carried by sensory nerve fibers to the 2nd sacral vertebrae (S2) nerve root.

Disc anatomy: Nucleus pulposus, Annulus fibrosus and Endplates

The *nucleus pulposus* is the water-rich gelatinous center of the disc, which is under very high pressure when the spine is upright — especially in the seated or flexed position. It has two main functions: to bear or carry the downward weight of the human body and to act as “pivot point” from which all movement of the lower trunk occurs. A third function is to act as a ligament and bind the vertebrae together. These disks lie in between every vertebrae.

Annulus fibrosis

The *annulus fibrosus* is more fibrous (tougher) than the nucleus. It has a much higher collagen content and lower water content compared to the nucleus. The annulus’ main job is to corral or hold in place the highly pressurized nucleus. The annulus is made up of 15 to 25 concentric sheets of collagen (lamellae). The lamellae are arranged in a special configuration that makes them extremely strong, which assists in its job to contain the nucleus pulposus.

The discs assist in spinal flexibility, facilitate movement and dissipate energy as a shock absorber. During the human developmental process discs have some vascular supply to the cartilage end-plates and the annulus fibrosus. In healthy adults there is no direct blood supply to the disks. For

this reason, the end-plates serve a vital role in keeping the avascular disc nourished.

End-plates

The *vertebral end-plates* are located both on the top and bottom of each vertebral body. The end-plate is a thin three-fourths millimeter of a cartilaginous pad. The biochemical morphology of the end-plates is similar to that of the disc, each sharing the same properties of water, proteoglycans, collagen and cartilage cells. Whether they are attached to the vertebral body or the disc is subject to debate. However, there is a strong argument the end-plate is strongly interwoven into the annulus of the disc due to the strong morphological similarities between the disc and the end-plates.

The end-plates serve as the transporter of nutrients and blood supply from the vertebral body to the avascular discs. The similar biochemical makeup between the disc and end-plates helps the diffusion of the much needed nutrients between the subchondral bone of the vertebrae and the depths of the disc. The outer rim of the vertebrae is not covered by the end-plate, which leaves a ring of exposed bone on the periphery of the top and bottom of each vertebra. This exposed peripheral area is called the “*ring apophysis*” and is often the site for the development of spur formation associated with the degeneration process. A damaged end-plate may lead to the leaking of disc material into the adjacent vertebral body (Schmorl’s node).

Schmorl’s node

A *Schmorl’s node* is an extrusion of disc material found in the vertebral body through a damaged end-plate by way of narrow aperture in the end plate. How this occurs is not entirely clear: possible trauma, tumors or congenital.

The normal healthy disc is a closed hydraulic system that serves to withstand pressure. By analogy the disc is similar to a tire of a car, except that instead of air in the center, the disc has the nucleus pulposus in the center and the rubber radials surrounding the car tire is akin to

the annulus fibrosus of the disc, which like a car tire, may be susceptible to punctures or lacerations called annular tears or fissures in the disc and may have painful consequences.

Disc pathology

There are many terms used to describe spinal disc pathology and associated pain, such as “*herniated disc*,” “*pinched nerve*,” and “*bulging disc*,” and all are used differently and, at times, interchangeably. Health-care professionals do not agree on a precise definition of any of these terms, and patients may be frustrated when they hear their diagnosis referred to in different terms. The unusually wide range of additional terms used to describe spinal disc problems (such as ruptured disc, torn disc, slipped disc, collapsed disc, disc protrusion, disc disease, and black disc) can add to the confusion.

Common spinal diagnoses

In your review of the medical records you will come across many terms describing conditions of the spine. Here are some of the most common terms:

- **Spinal osteoarthritis** – Also referred to as degenerative spinal arthritis, this condition involves the breakdown of cartilage located on the spinal facet joints. When osteoarthritis occurs, cartilage wears away, allowing bone-on-bone contact to occur within the joint. This can cause inflammation, the formation of bone spurs and nerve irritation.
- **Degenerative disc disease** – A condition that describes the breakdown of intervertebral discs. As we grow older, the intervertebral discs dehydrate and the proteins that keep them healthy break down. As the discs deteriorate, they become less effective at supporting the vertebrae. This can cause the vertebrae to become slightly displaced and put pressure on the nerve roots that travel in between the vertebrae, or press on the spinal cord itself.
- **Bulging discs** – A bulging disc refers to an intervertebral disc that has swelled beyond its normal parameters between

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adjacent vertebral bodies. The enlarged disc remains structurally intact but, due to increased pressure, has expanded into the spinal column. A bulging disc is not inherently symptomatic, but when the disc wall comes in contact with the spinal cord or any nearby nerve infrastructure, painful symptoms can develop.

• **Herniated discs** – A herniated disc refers to an intervertebral disc that has ruptured, allowing the inner gel-like disc material of the nucleus pulposus to seep into the spinal canal through a tear in the disc wall. This condition can be painful if the nerves that innervate the disc become irritated as a result of the rupture or if the extruded disc material irritates the spinal nerves. Herniated discs might develop as a result of an injury, but can also be caused by disc weakening that comes with age.

Some refer to this condition as a “slipped,” “ruptured,” or “blown” disc. Most of the time it is not known what caused the disc to herniate, but it is thought to occur from repetitive stress due to occupation, poor spinal posture, and/or natural processes of aging and/or trauma.

Herniated discs may take the form of protrusion or extrusion based on the shape of the displaced or herniated material. If you have a herniation, the disc material can press on the nerve roots or central nerves running through the central canal where the spinal cord lives. This can produce serious neck or back pain and radiating pain as well as numbness and tingling.

• **Spondylolisthesis** – Spondylolisthesis is a condition indicated by the presence of vertebral misalignment. In an otherwise healthy spine, the spinal column has a natural S-curve that evenly distributes weight along its length. With spondylolisthesis, one of the vertebral bodies in the spinal column slides out of its normal position. This condition is described in degrees of severity, with Grade 1 spondylolisthesis representing 0 to 25 percent slippage and Grade IV spondylolisthesis indicating 75 to 100 percent vertebral slippage.

• **Bone spurs** – Bone spurs are smooth protrusions of excess bone that frequently

accompany arthritic deterioration. While these growths of bone are asymptomatic in and of themselves, the excess material can become problematic if it comes in contact with a nearby nerve. Bone spurs also often form in the aftermath of an injury.

• **Spinal stenosis** – Spinal stenosis describes the narrowing of the spinal canal. This isn’t necessarily problematic by itself, but when the canal space becomes constricted, the spinal cord and other nerve structures can be irritated. Common causes of spinal stenosis include the presence of herniated disc material, bone spurs and other tissue. Spinal stenosis occurs most often in the lower back and neck. In later stages of spinal degeneration, bone spurs from the degeneration process can cause pressure on the nerve roots, causing numbness, tingling, or pain in the arms, hands and legs. In the neck the condition is often called cervical myelopathy.

• **Foraminal stenosis** – Foraminal stenosis describes the narrowing of the passageways through which nerve roots enter and exit the spinal canal. Like spinal stenosis, this condition isn’t symptomatic by itself, but if the space becomes so narrowed that the nerves are irritated, a variety of painful symptoms may develop. Often, this condition causes discomfort to travel the length of the affected nerve, potentially causing pain to develop in areas seemingly unrelated to the spine.

• **Pinched nerves** – A pinched spinal nerve is a common condition that most people will experience on occasion as they grow older. When the symptoms of a pinched nerve don’t abate on their own over several days, they could be the byproduct of one of the aforementioned degenerative spine conditions.

Alleviating the symptoms is contingent on identifying and addressing the cause of the nerve constriction.

• **Paresthesia** – this is a term for abnormal sensations such as tingling, numbness, weakness or “pins and needles.” These symptoms may be the result of a herniated disc and may be experienced in the same regions as painful sensations.

• **Sciatica** – Sciatica is a term that is frequently used as a catch-all to describe the

symptoms that arise from the inflammation and irritation of the sciatic nerve. This nerve originates at the base of the spinal cord and extends downward through the lower body before ending near the feet. Most commonly, sciatica is associated with chronic lower back and leg pain.

• **Broad-based disc bulge** – By strict definition, a broad-based herniation involves between 25 and 50 percent of the disc circumference. A focal herniation involves less than 25 percent of the disc circumference.

• **Disc desiccation** – Disc desiccation is an extremely common degenerative change of intervertebral discs. The incidence climbs with age, and to a large degree, a gradual desiccation is a ‘normal’ part of disc aging. It results from a loss of water content, or in technical terms, it’s a replacement of the hydrophilic glycosaminoglycans within the nucleus pulposus with fibrocartilage.

• **Facet joint pain** – Between each of the vertebral bodies there are small faced facet joints to assist the discs in movement such as flexion, extension and twisting of the spine. Because the spinal cord also runs behind and through the spinal vertebrae, it is important to make sure the spine doesn’t twist or bend too far—this is the job of the facet joints. The facet joint bones are covered in cartilage to help protect them during movement. There is also fluid between the bones for lubrication, and a thin sac, or capsule, surrounding the joint and keeping the fluid in place. When this cartilage wears down, or degenerates, or the capsule is over-stretched, facet pain can be caused.

• **Facet joint injections** – This is the most important step in arriving at a definitive facet joint syndrome diagnosis. If pain is significantly decreased following injections, then it can be reasonably concluded that the facet joint is a cause of, or major contributor to, the pain being experienced. If the pain does not change following injections, then facet joint syndrome is ruled out.

• **Epidural injections** – An *epidural steroid injection* (ESI) is a minimally invasive procedure that can help relieve neck, arm, back, and leg pain caused by inflamed

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spinal nerves. ESI may be performed to relieve pain caused by spinal stenosis, spondylolysis, or disc herniation.

Negotiating tips using your anatomy and physiology knowledge: dos and don'ts

• *Causation*

Pre-existing conditions, prior pain, previous treatment and prior surgeries present heated discussions on whether or not the “accident” or “trauma” forming the basis of your client’s claim is related or a “substantial factor” relating to your client’s complaints of pain and treatment rendered. Prior asymptomatic conditions of cervical/lumbar disc pathology are common. The aging process alone coupled with daily activities of constant movement of the spinal vertebrae and surrounding structures is arguably the strongest explanation for the post-trauma diagnosis of the spinal diagnoses discussed above.

- When opposing counsel sends out subpoenas for records, you should obtain copies as well so you have everything your opponent has. This will eliminate surprise and potential impeachment on any undiscovered prior condition issues.
- Do identify all relevant pre-existing spinal pathology.
- Do familiarize yourself with all the relevant medical terms and conditions as they relate to your client’s injury. Be prepared to discuss the spinal pathology as it relates to the traumatic injury. This is crucial as the “degenerative process” will always be used to deflate your “traumatic injury” argument. Depending on the nature and extent of any pre-existing pathology, you may have to consider relying on a post-accident “symptomatic condition superimposed on the asymptomatic pre-existing degenerative condition” position.

Pitfalls to avoid when negotiating

- Stay away from going “overboard” when asserting your “position” on your opponent. (i.e., “my client was injured by the negligence of your insured and now my client has pain that wasn’t there

before and you should pay my demand.” This passionate delivery to the insurance adjuster or defense attorney is rarely effective. Have some finesse. The better approach is to state your position through a series of questions; here are some examples:

“I trust you have reviewed all the records and film reports?”

“Have you considered that my client was asymptomatic prior to the accident?”

“Are you aware the medical history does not support any prior complaints of pain or any treatment at the affected levels of the spine?”

“Do you have any evidence that my client’s complaints of pain will be questioned by the jury?”

“I understand the films reveal spinal age-related degeneration at several levels, however, given the symptoms of sciatica which was non-existent prior to the accident, wouldn’t it make sense that we have an exacerbation of a preexisting spinal condition?”

If it’s an epidural injection issue, try this, “the films suggest pathology in the spine such as bulging, calcification, desiccation, etc., and you would agree with me on that point?”

“Medical findings of compression or indentation on the dura coupled with radicular pain –that would be consistent with the dermatomal pattern my client describes, wouldn’t it?”

“Is your doctor going to suggest that an injection (epidural/facet joint) at the location where the pain generator appears to be is not reasonable?”

- The point is not asserting a “position,” but rather using your knowledge of the anatomy and the medical condition at issue to “move” your opponent to consider your position in a different light through a series of questions.

- Don’t rely solely on the “egg shell” condition of your client. Although your client’s prior condition is an important factor, you still have to prove causation, necessity of treatment and reasonable bills.

- Don’t assume “big” medical bills/liens always equate to the defense putting “big” money on the case. The defense attorneys spend the time and resources

in contesting “big” bills and liens and have been successful recently in convincing the trier of fact through their own medical and billing experts that medical bills and liens should be reduced substantially.

- Don’t use the “your defense IME doctor is a ‘hack’” defense to a less than favorable IME/DME report. The insurance industry spends a lot of money to seek expert opinions. They use the doctors that have given them good results in the past and who have testified well in front of a jury. Don’t insult their decision on who they choose to examine your client. Instead, point out the flaws and shortcomings in the manner the defense exam was conducted and the “findings” in the report.

- Don’t overuse the “how nice my client will come across” or “the jury will love my client” argument. If that is true, the defense will find that out on their own during discovery.

- Don’t argue with the opposing attorney/insurance adjuster. Be professional but firm. Remember you’re dealing with differences in personalities, different levels of knowledge of the anatomy and physiology of the claimed spinal area, and differences in outlooks on the case. Impress them with your knowledge of the spine.

- Don’t threaten or brag about how you get the big verdicts in similar cases. Rest assured they know who will try cases and who the formidable opponents are. Creating a trust relationship is a big plus as chances are you will work with your opponent again in the future.

- Be careful using ultimatums when talking settlement with the defense. Caution should be exercised here. If you communicate a “best and last demand” be prepared to stick with it and not “cave.” Otherwise your subsequent lower demands won’t be taken seriously. Ultimatums effectively place you and your opponent in a corner with no escape hatch. You risk a communication breakdown using this approach. There may be a time and place to exercise this option, but the better part of prudence may be to have a professional mediator

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assist you in the timing of such an approach.

Effective approaches to move the adjuster into your corner

- Be polite and ask the adjuster whether there is anything else they need to fully evaluate the claim.
- Educate the defense on the specific anatomical areas that are more likely the pain generators and how it has resulted in the pain and need for treatment.
- Discuss causation using the medical records as your sword. Be prepared to compare and contrast the prior medicals (if any) with the post-accident records and all anatomical changes to suggest exacerbation or a new injury.
- Know your *Howell* bills. If you're in a mediation setting, know what lien reductions you can rely on.
- Be firm on the strengths of your case but don't be afraid to acknowledge your obvious weaknesses. This shows you know your case well and have considered your potential weaknesses. This shows preparedness and confidence.

- Be realistic in your demand. Remember, as the plaintiff's attorney you have the right and luxury of demanding any number you desire. However, there is a cost for that luxury, that being you will have to make bigger leaps downward in your demands than the defense moving upward in their offers. Generally, the higher your demand, the bigger your moves downward will be.
- If you contend future treatment is needed (i.e., surgery), be prepared to discuss the reasonable cost of the reasonable and necessary care that your client is *reasonably certain* to need in the future. (See CACI jury instruction 3903A).
- Follow-up is a good approach to keep your communication open for discussion. If your client has additional treatment/medical records or incurred additional bills, immediately send the documents to the defense. This shows you're in control of your case, you're not playing "hide the pea" and your efforts show a continued display of professionalism and class.

The mediator's role

As a mediator I serve as a conduit

between the parties to facilitate movement to reach a settlement at a figure both sides can live with. In a neck or back injury case involving neurological components of the spinal cord I am always impressed with those attorneys (plaintiff and defense) who are familiar with the anatomy and physiology of the spine and its relevance to the injuries being claimed. Your knowledge and understanding of the areas discussed in this article will significantly increase your chances of a more meaningful negotiated resolution.

Scott Dickinson is a full time mediator with ADR Services, Inc. with offices in Los Angeles, Century City and Irvine, California. He earned his Master's degree in Physiology from California State University, Fullerton and received his Law degree from Western State University College of Law. He spent 20 years as a trial attorney representing both plaintiffs and the insurance industry. He has mediated over 3000 cases and has been recognized by the Daily Journal as a "Top 50 Neutral in California for the years 2010-2013."