SpineFAQs

Neck Pain Diagnosis & Treatment

Neck pain is a common reason people visit their doctor. Neck pain typically doesn't start from a single injury. Instead, the problem usually develops over time from the stress and strain of daily activities. Eventually, the parts of the spine begin to degenerate. The degeneration can become a source of neck pain.

Why do I have neck pain?

There are many causes of neck pain. Doctors are not always able to pinpoint the source of a patient's pain. Your doctor will make every effort to ensure that your symptoms are not from a serious medical cause, such as cancer or a spinal infection. Below is a brief overview of some of the most common causes of neck pain.

Spondylosis - Most neck problems happen after years of wear and tear on the parts of the cervical spine. At first, these small injuries are not painful. But over time they can add up. Eventually they begin to cause neck pain. Doctors sometimes call these degenerative changes in the spine *spondylosis*. Spondylosis can affect the bones and soft tissues of the spine. However, it is important to know that most problems with spondylosis are a normal part of aging.

Degenerative Disc Disease - The normal aging process involves changes within the intervertebral discs. Repeated stresses and strains weaken the connective tissues that make up a disc. Over time, the nucleus in the center of the disc dries out. When this happens, it loses some of its ability to absorb shock. The annulus also weakens and develops

small cracks and tears. Often these changes are not painful. But larger tears that reach to the outer edge of the annulus can cause neck pain. The body tries to heal the cracks with scar tissue. But scar tissue is not as strong as the tissue it replaces. At some point the disc may finally lose its ability to absorb shock for the spine. Then forces from gravity and daily activities can take even more of a toll on the disc and other structures of the spine.

As the disc continues to degenerate, the space between the vertebrae becomes smaller. This compresses the facet joints along the back of the spinal column. As these joints are forced together, extra pressure builds on the articular cartilage on the surface of the facet joints. This extra pressure can damage the facet joints. Over time, this may lead to arthritis in the facet joints.

These *degenerative changes* in the disc, facet joints, and ligaments cause the spinal segment to become loose and unstable. The extra movement causes even more wear and tear on the spine. As a result, more and larger tears occur in the annulus. The nucleus may push through the weakened and torn annulus and into the spinal canal. This is called a *herniated* or *ruptured disc*. The disc material that squeezes out can press against the spinal nerves. The disc also emits enzymes and chemicals that produce inflammation. The combination of pressure on the nerves and inflammation caused by the chemicals released from the disc cause pain.

As the degeneration continues, *bone spurs* develop around the facet joints and around the disc. No one knows exactly why these bone spurs develop. Most doctors think that bone spurs are the body's attempt to stop the extra motion between the spinal segment. These bone spurs can cause problems by pressing on the nerves of the spine where they

pass through the neural foramina. This pressure around the irritated nerve roots can cause pain, numbness, and weakness in the neck, arms, and hands.

Muscle Strain - People with minor neck pain or stiffness are often told they have a muscle strain. However, unless there was a severe injury to the neck, the muscles probably haven't been pulled or injured. Instead, the problem may be coming from irritation or injury in other spine tissues, such as the disc or ligaments. When this happens, the neck muscles may go into spasm to help support and protect the sore area.

Tell me more. What could it be?

As stated before, neck pain can come from many sources. Below are more detailed descriptions of reasons for neck pain.

Mechanical Neck Pain - *Mechanical neck pain* is caused by wear and tear on the parts of the neck. It is similar in nature to a machine that begins to wear out. Mechanical pain usually starts from degenerative changes in the disc. As the disc starts to collapse, the space between the vertebrae narrows, and the facet joints may become inflamed. The pain is usually *chronic*. (Chronic pain builds over time and is long-lasting.) The pain is typically felt in the neck, but it may spread from the neck into the upper back or to the outside of the shoulder. Mechanical neck pain usually doesn't cause weakness or numbness in the arm or hand, because the problem is not from pressure on the spinal nerves.

Radiculopathy (Pinched Nerve) - Pressure or irritation in the nerves of the cervical spine can affect the nerves' electrical signals. The pressure or irritation can be felt as numbness on the skin, weakness in the muscles, or pain along the path of the nerve. Most people think of these symptoms as indications of a

pinched nerve. Health care providers call this condition *cervical radiculopathy*. Several conditions can cause radiculopathy. The most common are degeneration, disc herniation, and spinal instability.

Degeneration: As the spine ages, several changes occur in the bones and soft tissues. The disc loses its water content and begins to collapse, causing the space between the vertebrae to narrow. The added pressure may irritate and inflame the facet joints, causing them to become enlarged. When this happens, the enlarged joints can press against the nerves going to the arm as they squeeze through the neural foramina. Degeneration can also cause bone spurs to develop. Bone spurs may put pressure on nerves and produce symptoms of cervical radiculopathy.

Herniated Disc: Heavy, repetitive bending, twisting, and lifting can place extra pressure on the shock-absorbing nucleus of the disc. If great enough, this increased pressure can injure the *annulus* (the tough, outer ring of the disc). If the annulus ruptures or tears, the material in the nucleus can squeeze out of the disc. This is called a herniation. Although daily activities may cause the nucleus to press against the annulus, the body is normally able to withstand these pressures. However, as the annulus ages, it tends to crack and tear. It
is repaired with scar tissue. Over time, the annulus becomes weakened, and the disc can more easily herniate through the damaged annulus.

If the herniated disc material presses against a nerve root it can cause pain, numbness, and weakness in the area the nerve supplies. This condition is called cervical radiculopathy (mentioned earlier). And any time the herniated nucleus contacts tissues outside the damaged

annulus, it releases chemicals that cause inflammation and pain. If the nucleus herniates completely through the annulus, it may squeeze against the spinal cord. This causes a condition that is even more serious because it affects all the nerves of the spinal cord. This condition is called *cervical myelopathy*.

Spinal Instability: *Spinal instability* means there is extra movement among the bones of the spine. Instability in the cervical spine can develop if the supporting ligaments have been stretched or torn from a severe injury to the head or neck. People with diseases that loosen their connective tissue may also have spinal instability. Spinal instability also includes conditions in which a vertebral body slips over the one just below it. When the vertebral body slips too far forward, the condition is called *spondylolisthesis*. Whatever the cause, extra movement in the bones of the spine can irritate or put pressure on the nerves of the neck, causing symptoms.

Spinal Stenosis (Cervical Myelopathy) - *Stenosis* means closed in. *Spinal stenosis* refers to a condition in which the spinal cord is closed in, or compressed, inside the tube of the spinal canal. Spinal stenosis may be caused by degenerative changes, such as bone spurs pushing against the spinal cord within the spinal canal. However, stenosis can also develop when a person of any age has a disc herniation that pushes against the spinal canal. When the spinal cord is squeezed in the neck, doctors call the condition *cervical myelopathy*. This is an alarming condition that demands medical attention. Cervical myelopathy can cause problems with the bowels and bladder, change the way you walk, and affect your ability to use your fingers and hand.

How will you find out what is causing my problem?

The diagnosis of neck problems begins with a thorough history of your condition. You will be asked to fill out a questionnaire describing your neck

problems. Then I will ask you questions to find out when you first started having problems, what makes your symptoms worse or better, and how the symptoms affect your daily activity. Your answers will help guide the physical examination.

I will then physically examine the muscles and joints of your neck. It is important that I see how your neck is aligned, how it moves, and exactly where it hurts. I will do some simple tests to check the function of the nerves. These tests measure your arm and hand strength, check your reflexes, and help determine whether you have numbness in your arms, hands, or fingers. The information from your medical history and physical examination will help me decide which tests to run. The tests give different types of information.

Radiological imaging tests help me see the anatomy of your spine. There are several kinds of imaging tests.

> **X-rays -** X-rays show problems with bones, such as infection, bone tumors, or fractures. X-rays of the spine also can give your doctor information about how much degeneration has occurred in the spine, by showing the amount of space in the neural foramina and between the discs. X-rays are usually the first test ordered before any of the more specialized tests. Special X-rays called *flexion* and *extension X-rays* may help to determine if there is instability between vertebrae. These X-rays are taken from the side as

you lean as far forward and then as far backward as you can. Comparing the two X-rays allows the doctor to see how much motion occurs between each spinal segment.

MRI - The *magnetic resonance imaging* (MRI) scan uses magnetic waves to create pictures of the cervical spine in slices. The MRI scan shows the cervical spine bones, as well as the soft tissue structures such as the discs, joints, and nerves. MRI scans are painless and don't

require needles or dye. The MRI scan has become the most common test to look at the cervical spine after X-rays have been taken.

CT scan - The *computed tomography* (CT) scan is a special type of X-ray that lets doctors see *slices* of bone tissue. The machine uses a

computer and X-rays to create these slices. It is used primarily when problems are suspected in the bones.

Myelogram - The *myelogram* is a special kind of X-ray test where a special dye is injected into the spinal sac. The dye shows up on an X-ray. It helps a doctor see if there is a herniated disc, pressure on the spinal cord or spinal nerves, or a spinal tumor. Before the CT scan and the MRI scan were developed, the myelogram was the only test that doctors had to look for a herniated disc. The myelogram is still used today but not nearly as often. The myelogram is usually combined with CT scan to give more detail.

What kind of treatment is available?

Whenever possible, I prefer to use treatments other than surgery. The first goal of these nonsurgical treatments is to ease your pain

and other symptoms. I will work with you to improve your neck movement and strength. I will also encourage healthy body alignment and posture. These steps are designed to slow the degeneration process and enable you to get back to your normal activities.

Medications - Many different types of medications are typically prescribed to help gain control of the symptoms of neck pain. There is no medication that will cure neck pain. I may prescribe medications to ease pain, fight inflammation, and to help you get a better night's sleep.

Soft Neck Collar - If your pain is severe, I may recommend a soft neck collar to keep your neck still for short periods of time. Resting the muscles and joints can help calm pain, inflammation, and muscle spasm.

Ice and Heat Applications - You might also be advised to place a cold pack on your neck for 10 to 15 minutes at a time, or you may be shown how to do a contrast treatment. Contrast treatments involve switching between a cold pack and a hot pack.

Physical Therapy – I often ask my patients to work with a physical therapist. Therapy treatments focus on relieving pain, improving neck movement, and fostering healthy posture. A therapist can design a rehabilitation program to address your particular condition and to help you prevent future problems.

Injections - Spinal injections are used for both treatment and diagnostic purposes. There are several different types of spinal injections that your doctor may suggest. These

injections usually use a mixture of an *anesthetic* and some type of *cortisone* preparation. The anesthetic is a medication that numbs the area where it is injected. If the injection takes away your pain immediately, this gives me important information suggesting that the injected area is indeed the source of your pain. The cortisone decreases inflammation and can reduce the pain from an inflamed nerve or joint for a prolonged period of time. Some injections are more difficult to perform and require the use of a *fluoroscope*. A fluoroscope is a special type of X-ray that allows the doctor to see an X-ray picture continuously on a TV screen. The fluoroscope is used to guide the needle into the correct place before the injection is given. I have one of my associates known as a Physiatrist do these types of injections.

Epidural Steroid Injection: Neck pain or pain that spreads down the arm may require treatment with an *epidural steroid injection* (ESI). In an ESI, the medication mixture is injected into the epidural space around the nerve roots. Generally, an ESI is given only when other non-operative treatments aren't working. ESIs are not always successful in relieving pain. If they do work, they may only provide temporary relief.

Selective Nerve Root Injection: Another type of injection to place steroid medication around a specific inflamed nerve root is called a *selective nerve root injection*. The fluoroscope is used to guide a needle directly to the painful spinal nerve.

The nerve root is then bathed with the medication. I believe this procedure gets more medication to the painful spot. In difficult cases, the selective nerve

root injection can also help me decide which nerve root is causing the problem before surgery is planned.

Facet Joint Injection: When the problem is thought to be in the facet joints, an injection into one or more facet joints can help determine which joints are causing the problem and ease

the pain as well. The fluoroscope is used to guide a needle directly into the facet joint. The facet joint is then filled with medication mixture. If the injection immediately eases the pain, it helps confirm that the facet joint is a source of pain. The steroid medication will reduce the inflammation in the joint over a period of days and may reduce or eliminate your neck pain.

Trigger Point Injections: Injections of anesthetic medications mixed with a cortisone medication are sometimes given in the muscles, ligaments, or other soft tissues near the spine. These injections are called *trigger point injections*. These injections can help relieve neck pain and ease muscle spasm and tender points in the neck muscles.

Will surgery help me?

Only rarely is cervical spine surgery scheduled immediately. I may suggest immediate surgery if there are signs of pressure developing on the spinal cord or if your muscles are becoming weaker very rapidly. For other conditions, I prefer to try non-surgical treatments for a minimum of three months before considering surgical options. Most people with neck pain tend to get better, not worse. Even people who have degenerative spine changes tend to gradually improve with time.

Surgery may be suggested when severe pain is not improving.

There are many different operations for neck pain. The goal of nearly all spine operations is to remove pressure from the nerves of the spine, to stop excessive motion between two or more vertebrae, or both. The type of surgery that is best depends on the patient's conditions and symptoms.

Foraminotomy – A foraminotomy is done to open up the neural foramen and relieve pressure on a spinal nerve root. A foraminotomy may be done because of bone spurs or inflammation.

Cervical Laminectomy - The *lamina* is the covering layer of the bony ring of the spinal canal. It forms a roof-like structure over the back of the spinal cord. When the nerves in the spinal canal are being squeezed by a herniated disc or from bone spurs pushing into the canal, a laminectomy removes part or all of the lamina to release pressure on the spinal cord.

Cervical Discectomy - In a discectomy, the surgeon removes a problem disc. Surgeons usually do this surgery from the front of the neck. This procedure is called *anterior cervical discectomy*. In most patients, discectomy is done together with a procedure called an *anterior cervical fusion*.

Cervical Fusion- A *fusion* surgery joins two or more bones into one solid bone. The purpose for doing spinal fusion is to increase the space between the vertebrae and to keep the sore joint from moving. This is usually done by placing a small block of bone graft in the space where a disc was removed. The bone graft needs time to heal in order for the fusion to succeed. This requires the neck to be held still. After cervical fusion surgery, patients usually have to wear a special neck brace for several months. These neck braces are often bulky and restrictive. Opening up more space

enlarges the neural foramen, takes pressure off the nerve roots, and eases tension on the facet joints. Cervical fusion is used to treat neck problems such as cervical radiculopathy, disc herniations, fractures, and spinal instability. There are two main types of fusion for neck problems.

Anterior Cervical Discectomy and Fusion: *Anterior discectomy and fusion* is done through the front of the neck. After taking out the disc (discectomy), the disc space is filled with a small graft of bone. I most often also add a metal plate and screws to the bones to stiffen the spine. The bone is allowed to heal, fusing the two vertebrae into one solid bone.

Posterior Cervical Fusion: In *posterior fusion*, I lay small grafts of bone over the back of the spine. When these bones heal together, they fuse the two vertebrae into one solid bone. Posterior fusions in the cervical spine are primarily used to treat fractures of the neck. Screws and rods or wires are usually added to increase stability.

Corpectomy and Strut Graft Fusion – A corpectomy relieves pressure over a large part of the spinal cord, at several level. In this procedure, I take off the front part of the spinal column and remove several vertebral bodies. The spaces are then filled with bone graft material. Metal plates and screws are generally used to hold the spine in place while it heals. A corpectomy is used in cases of severe spinal stenosis and myelopathy.

Rehabilitation after surgery is much more complex than that therapy in non-surgical treatment. Some patients leave the

hospital shortly after surgery, but some surgeries require patients to stay in the hospital for a few days. Patients who stay in the hospital may visit with a physical therapist in the hospital room soon after surgery. The treatment sessions help patients learn to move and do routine activities without putting extra strain on the neck. Many surgical patients need physical therapy outside of the hospital as well. They often see a therapist for one to three months, depending on the type of surgery. Therapy treatments are designed to calm pain and muscle spasm, teach patients to move safely, and help patients develop strength and mobility. As the therapy sessions come to an end, the therapist may help the patient get back to work. The therapist can do a work assessment to ensure the patient can do his or her job safely. Some patients may need to modify their work or other activities to avoid future problems.