Head and Neck Pain

Over many years, our necks are subjected to repeated stress and minor injury. These injuries may not cause pain at the time of injury. However, repeated injuries add up, and can eventually result in degeneration of the cervical spine, causing neck pain. Most neck pain is due to degenerative changes that occur in the neck. The overall condition of the cervical spine usually determines how fast you recover from an injury, and whether your neck pain will become a chronic problem.

For chronic neck pain, there may not be a quick fix or complete cure. You will need to work with your health care team to try to improve the problem causing pain and to slow down the degenerative process. The physician's role in the treatment of neck pain is to find the main causes that need treatment right away. He or she will also try to keep your neck pain from becoming a chronic condition by teaching you how to slow down the degenerative process and prevent further injury.

The purpose of this information is to help you understand:

- The causes of neck pain
- The normal anatomy of the spine and neck
- The signs and symptoms of degenerative changes in the neck
- The treatments available to you now and later
- What you can expect from those treatments
- What you can expect long-term if you have a problem with neck pain

In order to understand your symptoms and treatment choices, you must start with some understanding of the general anatomy of your spine and neck. This includes becoming familiar with the various parts that make up the neck. You should have a general understanding of the function of these parts, that is, how they work together. The more you know, the more you will be able to talk with your doctors and health care team in words that will help them better understand your specific problem. It will also help you understand what they are telling you about your particular problem.

The Parts of the Cervical Spine and How They Work

In general, the neck includes the cervical spine (the upper most part of the spine) and the soft tissues that surround the cervical spine. These soft tissues include: nerves, muscles, ligaments, tendons, and blood vessels. The cervical spine is made up of the first seven vertebrae in the spine. Your doctor will usually refer to these bones as C1 through C7. The cervical spine starts just below the skull and ends just above the thoracic spine. The spine has two main functions:

- To protect and support the spinal cord
- To give structure and support to our body allowing us to stand up straight

The vertebrae are the 24 bones that are linked together to make up the spinal column. Just as the bones of the skull protect our brain, the bones of the spine protect the spinal cord. The spinal cord is the large collection of nerves that connects the brain to the rest of the body.

In the center of each vertebra is a large hole. Because the vertebrae are all linked together, these holes line up to form a “bony tube”, called the spinal canal, through which the spinal cord passes. This bony tube makes up the spinal canal, which provides protection and support for the spinal cord.

As the spinal cord leaves the brain, it travels down the spinal canal to the tailbone. Along the way, it gives off smaller nerves that leave the spine between each vertebra through an opening called the foramen. The nerves that leave the spine in the upper area, or the cervical spine, travel into the arms to the hands. The nerves that leave the spine in the chest area, or thoracic spine, mostly go into the chest and belly area. The nerves that leave the spinal canal in the lower spine, or the lumbar spine, travel into the legs and feet.

To better understand how the parts of the spine work together, let’s look at a spinal segment. A spinal segment is made up of: two vertebrae, the intervertebral disc between the vertebrae, and the two nerve roots, one from each side that “branch off of ” the spine. The cervical vertebrae are the smallest vertebrae in the spine because they do not have the weight-bearing function of the vertebrae in the back. One pair of spinal nerves exits through the gap between the vertebrae in each segment. One common cause of pain comes from pressure on the nerve roots, sometimes causing pain and numbness in the neck or in the lower body.

The space between two vertebrae contains a large round disc of connective tissue, called an intervertebral disc. By looking at the intervertebral disc from above, we can see an outer ring, called the annulus, and a soft spongy center, called the nucleus pulposus. The annulus is the strongest part of the disc and helps keep the spongy center inside the disc. The nucleus pulposus acts as a shock absorber to cushion the bones from pressure during twisting, jumping, and weight bearing.

A joint is formed where two or more bones meet. Bony knobs, called facets, extend from each vertebra and overlap each other to form a facet joint. Facet joints link the vertebrae together like a chain, and provide a mobile connection between each vertebra. The facet joints are important because they allow the neck to bend and turn. Each vertebra can move only a little, but the chain of small movements combined makes the spine very flexible.

The Most Common Causes of Neck Pain

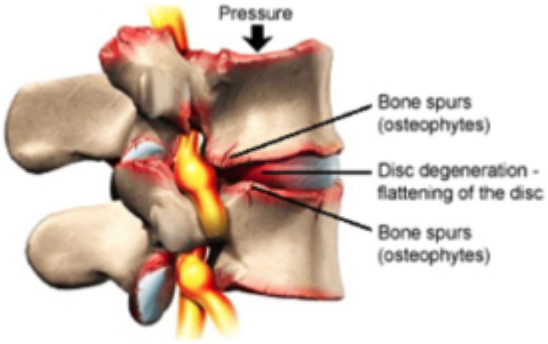
The disc is made up of connective tissue, which wears normally as we age. However, many of the problems that cause neck pain are from abnormal wear and tear. This process is called degeneration of the intervertebral disc. Degeneration often results from small injuries that may not cause pain at the time the injuries actually occur. Over time, these injuries add up and the abnormal wear and tear can weaken the connective tissue that makes up the disc. Once the connective tissue is weak, sudden stress, such as a whiplash type movement, may injure the disc more easily. The entire process of disc degeneration is sometimes referred to as spondylolysis. You may hear your doctor refer to your neck problem as spondylolysis of the cervical spine.

To really understand neck pain, you need an understanding of the wear and tear process, called disc degeneration. This will also help you later understand what can happen to the neck when a sudden injury can cause immediate pain and dysfunction. The next section will explain both the process of degeneration and the most common causes of pain in the neck.

Spinal Conditions

Degeneration of the disc and spinal segment can result in several different spinal conditions that cause problems. These include: mechanical neck pain, cervical radiculopathy, and spinal stenosis. Sometimes we may injure our neck with a relatively minor injury. These minor injuries may cause pain for a few days and then go away. This is commonly referred to as a neck, or muscle strain. Actually, we may never fully understand what has been injured in one of these episodes. In the next section, we will try to explain each condition and how they differ.

Degenerative Disc Disease



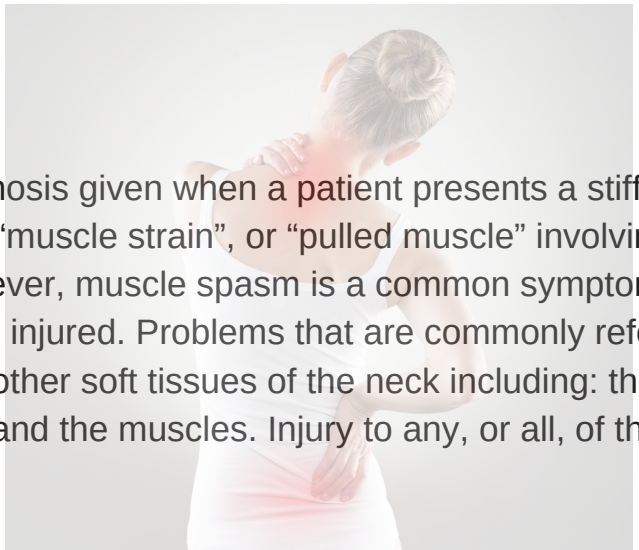
To help you understand disc degeneration, compare a spinal segment to two vanilla wafers (the “vertebrae”) and a marshmallow (the “disc”). Imagine a fresh marshmallow between the two wafers. When you press the wafers close together, the marshmallow gives or “squishes out”. Suppose you leave the marshmallow out for a week and it starts to dry out. When you press it between the wafers, it is not quite as spongy. If you press hard enough, the outside of the marshmallow may even tear or split. Suppose you left the marshmallow out for a month. It would probably be so dried out it would be hard and very thin and would not have any “shock absorbing” ability.

As we age, the disc loses some of its water content and, as a result, some of its shock absorbing ability. Like the marshmallow, the first changes that occur in the disc are tears in the outer ring of the disc, called the annulus. Tears in the annulus may occur without symptoms. Therefore, you may not notice when they occur or what caused them. These tears heal by forming scar tissue. Scar tissue is weaker than normal tissue. Repeated injuries and tears cause more wear and tear to the disc. As the disc wears, it loses more of its water content. It becomes less and less “spongy”, eventually no longer able to act as a shock absorber.

As the disc continues to wear, it begins to collapse. The space between each vertebra becomes smaller. The collapse also affects the way that the facet joints in the back of the spine “line up”. Like any other joint in the body, the change in the way the bones fit together causes abnormal pressure on the articular cartilage. Articular cartilage is the smooth shiny material that covers the end of the bones in any joint. Over time, this abnormal pressure causes wear and tear arthritis (osteoarthritis) of the facet joints.

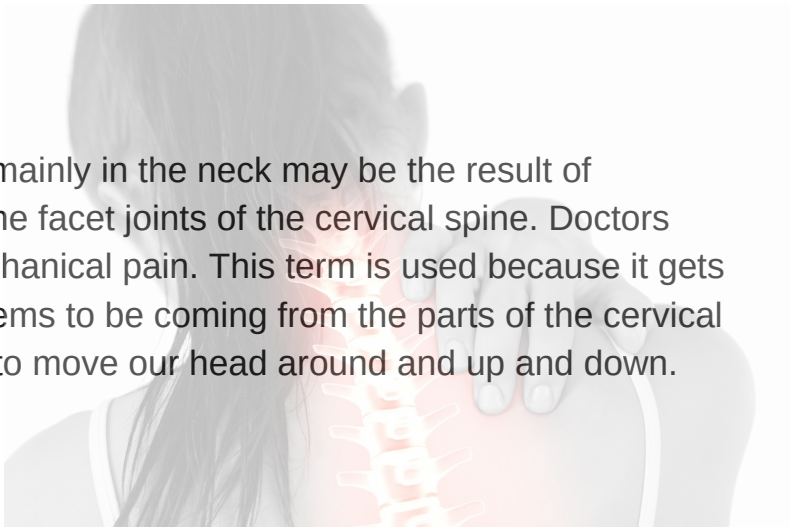
Bone spurs may form around the disc and facet joints. It is thought that too much motion in a spinal segment causes the bone spurs to form. Eventually, bone spurs can form around the nerves of the spine, causing a condition called spinal stenosis.

Muscle Strains



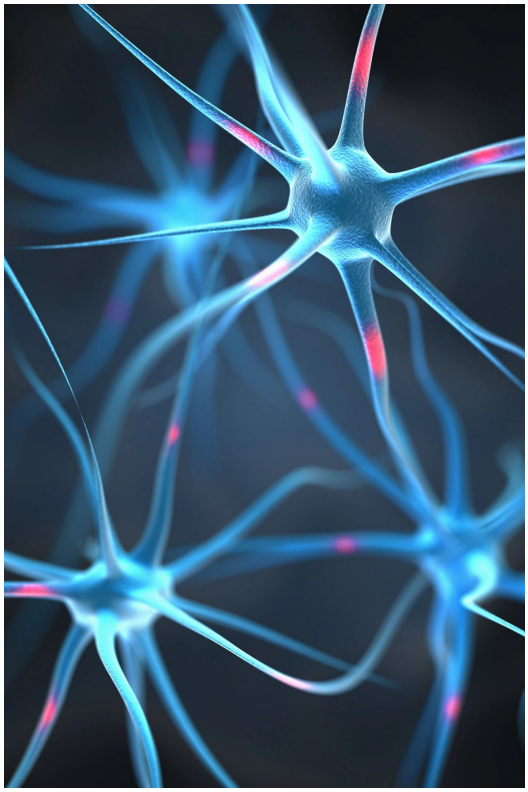
A “muscle strain” of the neck is a common diagnosis given when a patient presents a stiff neck. In some cases, this may represent a true “muscle strain”, or “pulled muscle” involving the muscles around the spine of the neck. However, muscle spasm is a common symptom that can result when other areas of the neck are injured. Problems that are commonly referred to as a muscle strain may also involve injury of other soft tissues of the neck including: the disc, the ligaments around the spinal segment, and the muscles. Injury to any, or all, of these structures may cause similar symptoms.

Mechanical Neck Pain



A chronic neck ache where the pain stays mainly in the neck may be the result of degenerative disc disease and arthritis of the facet joints of the cervical spine. Doctors sometimes refer to this type of pain as mechanical pain. This term is used because it gets worse when we use our neck more and seems to be coming from the parts of the cervical spine – the mechanical parts that allow us to move our head around and up and down.

Cervical Radiculopathy (Pinched Nerve)



When a nerve root leaves the spinal cord and the cervical spine, it travels down into the arm. Along the way, each nerve supplies sensation (feeling) to a part of the skin of the shoulder and arm and supplies electrical signals to certain muscles to move part of the arm or hand. When a nerve is irritated or pinched – by either a bone spur or part of the intervertebral disc – it causes the nerve not work properly. This shows up as: weakness in the muscles the nerve goes to, numbness in the skin where the nerve goes, or pain in the area where the nerve travels. This condition is called cervical radiculopathy. Let's look at the different causes of cervical radiculopathy.

Pinched Nerve from Degeneration and Bone Spurs

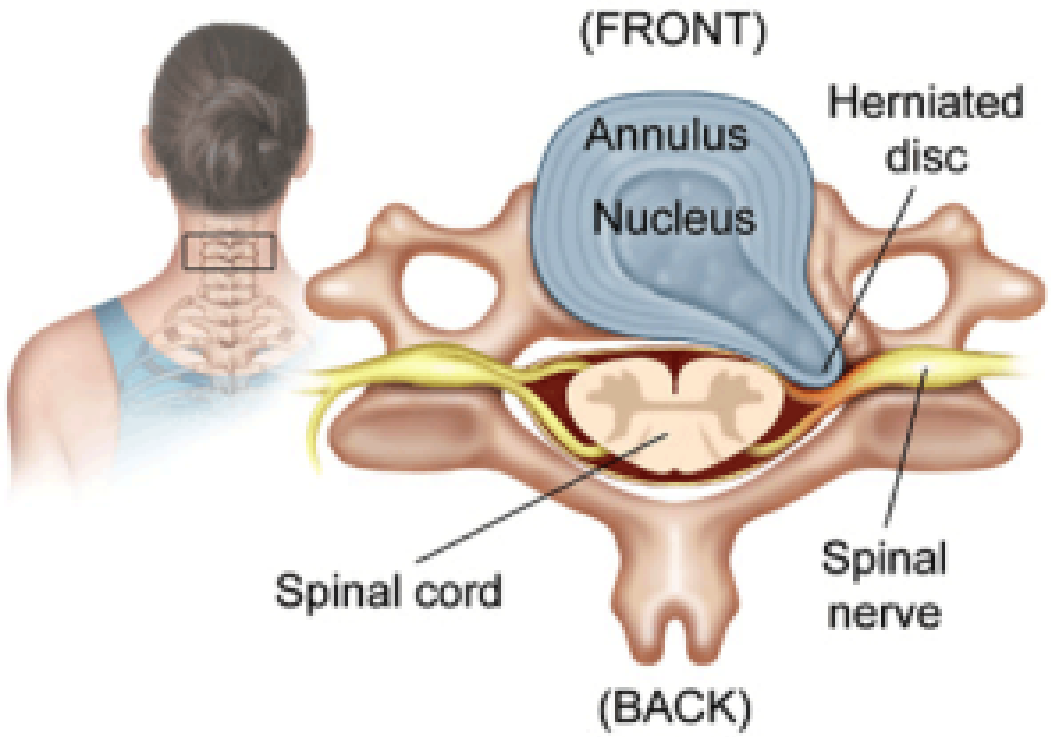
In middle-aged and older people, the degenerative disc disease can cause bone spurs to form around the nerve roots. This usually occurs inside the foramen – the opening in the cervical spine where the nerve root leaves the spine to travel into the arm. If these bone spurs get large enough, they may begin to rub on the nerve root and irritate it. This causes the same symptoms as a herniated disc. The irritation causes: pain to run down the arm, numbness to occur in the areas to which the nerve provides sensation, and weakness in the muscles that the nerve supplies.

Pinched Nerve from a Herniated Disc

Bending the neck forward and backward, and twisting left and right, places many kinds of pressure on the vertebrae and disc. The disc responds to the pressure from the vertebrae by acting as a shock absorber. Bending the neck forward compresses the disc between the vertebrae. This increased pressure on the disc may cause the disc to bulge toward the spinal canal and the nerve roots. Remember the vanilla wafers and marshmallow; pressing the wafers together on one side would cause the marshmallow to bulge out on the opposite side.

Injury to the disc may occur when neck motion puts too much pressure on the disc. One of the most painful injuries that can occur is a herniated disc. In this injury, the tear in the annulus is so bad that part of the nucleus pulposus squeezes out of the center of the disc. The annulus can tear or rupture anywhere around the disc. If it tears on the side next to the spinal canal, then when the nucleus pulposus squeezes out, it can press against the spinal nerves. Pressure on the nerve root from a herniated disc can cause pain, numbness, and weakness along the nerve. There is also evidence that the chemicals released from the ruptured disc may irritate the nerve root, leading to some of the symptoms of a herniated disc – especially pain.

Herniated discs are more common in early, middle-aged adults. This condition may occur when too much force is exerted on an otherwise healthy intervertebral disc. An example would be a car accident where your head hit the windshield. The force on the neck is simply too much for even a healthy disc to absorb and injury is the result. A herniated disc may also occur in a disc that has been weakened by the degenerative process. Once weakened, less force is needed to cause the disc to tear or rupture. However, not everyone with a ruptured disc has degenerative disc disease. Likewise, not everyone with degenerative disc disease will suffer a ruptured disc.



Spinal Stenosis

Perhaps the most serious of the problems caused by degeneration of the spinal segment in the cervical spine is the condition of spinal stenosis. In the late stages of spinal degeneration, bone spurs from the degenerative process can cause a condition known as spinal stenosis. As the bone spurs form, the size of the spinal canal becomes smaller. The bone spurs begin to press on the spinal cord or the nerve roots. Pressure on the nerves in the spinal cord can cause numbness, tingling, or pain in the arms, hands, and legs. This condition is sometimes called cervical myelopathy and is different from the simpler problem where only one nerve root is being pinched by a herniated disc or a bone spur.

When there is narrowing of the spinal canal (the bony tube where the spinal cord runs), the whole spinal cord may be affected. This is different than when the bone spurs only narrow one of the foramen (the openings where the nerve roots exit). The symptoms are much different. A pinched nerve from either a herniated disc or a bone spur rarely affects the legs. Cervical myelopathy can affect both the arms and the legs.

Symptoms are how the cause of your pain affects you. Common symptoms include:

- Pain in your neck
- Headaches
- Pain in your shoulder, arm, or hand
- Reduced range of motion in your neck
- Numbness, weakness, and slower reflexes in your arms, hands,legs, or feet
- Problems walking including a “spastic gait”
- Muscle weakness in your legsAdd a little bit of body text

Diagnosis

Finding the Cause of your Neck Pain

Finding the cause of neck pain begins with a complete history and physical examination. After the history and physical exam, your physical therapist will have a good idea of the cause of your pain. To make sure of the exact cause of your neck pain, your doctor and physical therapist will work together to determine the exact structures involved, the underlying cause of your pain and why so they know what the best approach will be.

Physical Therapy

The physical therapists at Cutting Edge Physical Therapy are trained in treating spinal conditions, determining the exact structures that are involved, what the underlying cause of the problem is and why. Many times there may be an accident that causes your neck pain but many times you will not know why or where it came from. We will use manual therapy techniques to do hands on treatment to decrease the muscle spasms that the pain is causing. We will also work at increasing your range of motion and restoring normal movement and function to your neck. We will work on an exercise program developed just for you and will teach you ways to prevent further injury to your neck.