

1: Cervical Spine Anatomy (Neck) - Vertebrae and Cervical Spinal Nerves

Neck anatomy is a well-engineered structure of bones, nerves, muscles, ligaments and tendons. The cervical spine (neck) is delicate—housing the spinal cord that sends messages from the brain to control all aspects of the body—while also remarkably strong and flexible, allowing movement in all directions.

Print Overview Neck pain is a common complaint. Osteoarthritis also is a common cause of neck pain. Rarely, neck pain can be a symptom of a more serious problem. Seek medical care if your neck pain is accompanied by numbness or loss of strength in your arms or hands or if you have shooting pain into your shoulder or down your arm. Symptoms Signs and symptoms include: If not, see your doctor. Seek immediate care if severe neck pain results from an injury, such as a motor vehicle accident, diving accident or fall. Contact a doctor if your neck pain: Is severe Persists for several days without relief Spreads down arms or legs Is accompanied by headache, numbness, weakness or tingling Request an Appointment at Mayo Clinic Causes Your neck is flexible and supports the weight of your head, so it can be vulnerable to injuries and conditions that cause pain and restrict motion. Neck pain causes include: Overuse, such as too many hours hunched over your computer or smartphone, often triggers muscle strains. Even minor things, such as reading in bed or gritting your teeth, can strain neck muscles. Just like the other joints in your body, your neck joints tend to wear down with age. Osteoarthritis causes the cushions cartilage between your bones vertebrae to deteriorate. Your body then forms bone spurs that affect joint motion and cause pain. Herniated disks or bone spurs in the vertebrae of your neck can press on the nerves branching out from the spinal cord. Rear-end auto collisions often result in whiplash injury, which occurs when the head is jerked backward and then forward, straining the soft tissues of the neck. Certain diseases, such as rheumatoid arthritis, meningitis or cancer, can cause neck pain. Prevention Most neck pain is associated with poor posture combined with age-related wear and tear. To help prevent neck pain, keep your head centered over your spine. Some simple changes in your daily routine may help. When standing and sitting, be sure your shoulders are in a straight line over your hips and your ears are directly over your shoulders. If you travel long distances or work long hours at your computer, get up, move around and stretch your neck and shoulders. Adjust your desk, chair and computer so that the monitor is at eye level. Knees should be slightly lower than hips. Avoid tucking the phone between your ear and shoulder when you talk. Use a headset or speakerphone instead. If you smoke, quit. Smoking can put you at higher risk of developing neck pain. Avoid carrying heavy bags with straps over your shoulder. The weight can strain your neck. Sleep in a good position. Your head and neck should be aligned with your body. Use a small pillow under your neck. Try sleeping on your back with your thighs elevated on pillows, which will flatten your spinal muscles.

2: Cervical Spondylosis | Neck Pain | Symptoms & Treatment | Patient

Cervical disc disease goes beyond just a pain in the neck, though. A degenerative process can cause radiating pain, as well as numbness and weakness in your shoulders, arm, and hand.

Been Told You Need Surgery? Cervicalgia Symptoms and Treatment Every year, millions of people visit their doctors for a common problem: Neck pain is often diagnosed as cervicalgia. Although a pain in the neck sounds simple, cervicalgia can have many causes. Diagnosing cervicalgia, therefore, can be easy compared to treating it. One cause of cervicalgia is gravity: Keeping your head erect for nearly every waking moment puts enormous stress on your neck muscles. The strain alone can cause muscle fatigue. Cervicalgia Symptoms Cervicalgia causes localized pain, so it rarely radiates outward. The pain often goes away when you relax. Other times, you may feel it every time you turn your head or bend your neck. The discomfort may be merely a sense of tightness in your neck that can extend into your upper back. Your neck and back may be tender to the touch, making massaging very painful. These symptoms are characteristic of classic cervicalgia. Other symptoms include headaches and general neck stiffness, as well as a burning and aching sensation in your upper back and neck. These symptoms sometimes can point to a more serious illness than cervicalgia. When in doubt, seek a medical exam. The most obvious cause of cervicalgia is injury. An examination can rule out other, more serious conditions than cervicalgia. Whiplash or neck strain: Microscopic tears in your neck muscles, from sports injuries or accidents, can cause muscles to tighten and swell. Most tears occur in the trapezius muscle covering the back of your neck, shoulders and thorax or the levator scapulae muscle covering the back and side of your neck. Stress is a very common cause of neck pain. Many people hold their stress in the neck and shoulders, unconsciously clenching those muscles whenever they find themselves in a stressful situation. Over time, this leads to exhausted, overworked muscles. How and how long you sit at in a chair at your desk can also cause cervicalgia. Without an ergonomically proper setup, you easily can develop neck and back pain. This condition, also known as cervical posture syndrome, affects such athletes as cyclists, baseball catchers, and bodybuilders. Typically, kyphosis sufferers stand with their shoulders rounded forward and their chins poking forward. Their shoulder blades poke out away from their spines. Kyphosis is caused either by a repetitive movement that promotes this posture, as in the case of cyclists and catchers, or by an uneven bodybuilding regimen that makes chest muscles stronger than back muscles, pulling the body forward. Tight muscles in your neck and upper back prohibit necessary blood circulation. This condition can be caused by kyphosis, poor ergonomics in the workplace, scoliosis, and bad posture. Poor or incomplete stretching after training sessions also can be a factor. Once your muscles have loosened up from working out, you have to stretch them properly to cool them off or they will tighten up. Cervicalgia Treatment Treatment for cervicalgia varies according to the symptoms and suspected cause. Initial treatment could involve prescription-strength anti-inflammatories and painkillers. You also may be advised to wear a temporary cervical collar to support your head. Wearing the collar gives your neck muscles a chance to rest and heal. In such a case, you can take measures at home to ease your pain. First, take an over-the-counter anti-inflammatory drug, such as ibuprofen, to reduce swelling. These medications also help your muscles to relax, which also reduces your pain. Applying a heating pad will help, too. If you spend a lot of time at your desk at work or at home, you can take precautions to prevent cervicalgia. Make sure your chair supports your lower back. Your feet should rest flat on the floor, with your knees bent at a right angle. Adjust the armrests of your chair so that your elbows and forearms rest on the chair. Rest your forearms on the desktop if your keyboard is on top of the desk. If your desk is too high, you may need a footrest to sit comfortably and safely. If you have kyphosis, massage and stretching help to relax the muscles in your upper chest and neck. Strengthening the muscles in your upper back can help re-balance your body. The pain caused by kyphosis often seems to get worse if you stand or sit in the same position for a long time, but the pain usually goes away once you start moving around. Regardless of the cause, your cervicalgia can be ongoing and persistent. If your discomfort does not disappear with rest, anti-inflammatory medication, and alternating hot and cold packs, you need to see a doctor. Contact us to learn more about the condition and treatment of your cervicalgia. Our accreditations mean you will receive the best

NECK AND CERVICAL SPINE pdf

possible spinal care. Click on the corresponding logo below to learn more.

3: Neck Injuries | Neck Disorders | MedlinePlus

The cervical spine (sometimes abbreviated as c-spine in the medical world) begins at the base of the skull. Seven vertebrae make up the cervical spine with eight pairs of cervical nerves. The individual cervical vertebrae are abbreviated C1, C2, C3, C4, C5, C6, and C7.

Anatomy uses a set of Latin based terms that are used to describe all the structures in our body. Coronal “ a plane dividing the body into anterior and posterior portions Sagittal “ a plane dividing the body into right and left portions Transverse “ a plane dividing the body into superior and inferior portions Basic Anatomy: It serves as a pathway for nervous impulses to and from the brain and is a center for executing and coordinating many reflex actions independent of the brain. Tendon “ the fibrous band of tissue that connects muscle to bone, mainly composed of collagen Spinal Curvatures The human spine has natural curvatures. When you look at a back from behind, the spine should be straight and centered over the pelvis. However, when you look at the spine from the side, the curves are designed to maintain balance as the spine is behind organs in the chest and abdomen. In the neck and low back there is normally an inward curvature or sway back known as lordosis. In the thoracic spine and sacrum there is an outward curvature known as kyphosis or hunchback. These curves normally balance out each other so that when the patient stands they are well balanced with their head straight above their hips when viewed from the side. Standing in this position minimizes the effect of gravity and allows the patient to stand with the best posture and use the least energy when moving or walking. There are seven cervical C vertebrae, twelve thoracic T vertebrae, and typically five lumbar L vertebrae. View of the spine from the side, back and front Vertebrae The spine is made of a column of bones. A round bone called a vertebral body forms each bone. The body is located in the front of the spine. A bony ring attaches to the back of the vertebral body, forming a canal for the spinal cord and nerves. This bony ring is formed by two sets of bones. One set called the pedicle bone attaches to the back of each vertebral body to the side, transverse processes. Processes are outgrowths of bone and then subsequently named for where the outgrowth occurs. A lamina Latin for plate bone connects to the other end of the pedicle, one on the left and one on the right to connect the transverse process with the spinous process. When the vertebra bones are stacked on top of each other, the canal forms a long tube that surrounds and protects the spinal cord as it passes through the spine. Joints A joint is a connection between two bones. Our spine is made up of multiple joints at each level and many of these joints in the spine are synovial joints. The skull is connected to the cervical spine at C1 by synovial joints called the occipital-cervical joint. Each spinal motion segment of the spine has a pair of facet joints that provide the posterior support for the spine. A pivot joint is found at the very top of the spine, called the atlanto-axial joint. This joint is between the very first and second cervical vertebrae which are very specialized to the spine to allow for rotational movement. This tripod creates great stability, supports all your weight above each level and provides support for you to move in all directions. Vertebrae are stacked one on top of another and are separated by intervertebral discs, which act as an elastic cushions or shock absorbers. The first two cervical vertebrae are an exception and do not have discs. The interbody space is the disc space that is located between the vertebral body bones. Cervical Vertebrae There are seven cervical vertebrae, named C1-C7, designed for flexibility and movement. The first two cervical vertebrae are very specialized to allow us to turn our head from side to side. This bone is formed like a ring that sits upon the second cervical vertebra C2. The C1 vertebra connects the skull to the cervical spine. These two vertebrae have different anatomy than the rest of the spine. The C1 vertebra is formed like a ring that sits on top of C2. The C2 vertebra has a bony knob that fits into the front portion of the ring of the C1 vertebra. This bony knob is called the odontoid process or dens. It is held in place by a special ligament that holds it tightly to the front of the ring of the C1 vertebra. While the cervical spine is very flexible, it is also at greatest risk for injury from strong sudden movements, as there is less muscular support. A cervical vertebrae Thoracic Vertebrae There are twelve thoracic vertebrae, named T1-T12, specialized for stability. The thoracic spine aids in keeping the body upright, protects vital chest organs and articulates with each rib to form the rib cage. Each rib is firmly connected to each level of the thoracic spine. Lumbar Vertebrae There are usually five lumbar vertebrae,

named L1-L5, designed for weight bearing loads and movement. In some people, they may have developed four or six lumbar vertebrae. In some cases one of the bones of the sacrum, the base of the spine, forms as a vertebra instead of the sacrum. This is called a transitional or sixth vertebra and is simply a bony anomaly. The vertebrae in the lumbar spine are the largest of the entire spine, designed to hold increasing forces of weight. The lumbar spinal canal is also the largest, allowing for more space for the nerves.

Sacrum and Coccyx The sacrum is made of five fused vertebrae that form a single bone. The sacrum is shaped like an inverted triangle with the base at the top. It acts as a wedge between the two iliac pelvic bones. On both sides of the pelvis, the sacrum articulates with the ilium through the sacroiliac joints. The coccyx is formed by the fusion of four to five rudimentary vertebrae, commonly referred to as the tailbone.

Sacroiliac Joint The sacroiliac SI joint is a strong weight bearing joint in the pelvis that connects the sacrum and pelvis. There are two joints, one on each side of the sacrum. This joint is reinforced by strong surrounding ligaments as shown in the image. Both joints move together as single unit to transmit upper body forces and provide shock absorption for the spine. A series of ridges and valleys in the joint fit together like a lock and key, much like if you put your knuckles together. There is a small amount of movement in this joint to allow for a walking gait pattern in normal human locomotion. Just like other joints in the body, this joint can become inflamed, unstable and dysfunctional.

Intervertebral disc An intervertebral disc is a strong ligament that connects one vertebral bone to the next. The discs are the shock-absorbing cushions between each vertebra of the spine. The disc is made up of three basic structures: All three disc structures are made of different percent compositions of proteoglycan proteins that bind water, collagen the main protein in connective tissue and water. The varying compositions create different functions. All these properties make the disc unique and highly specialized. Discs in the spine increase in size from the neck to the low back as there are increasing needs for shock absorption due to weight and gravity. These specific disc ligaments function just like knee ligaments and shoulder ligaments do. They allow the spine to move so we can bend forward, backward and sideways. The intervertebral disc is essential for providing spinal stability and proper alignment, withstanding compressive shock forces, and allowing for movement between vertebral bones. The intervertebral disc is an avascular tissue, meaning it does not naturally have a blood supply. Capillaries from the surface of the vertebral bodies supply the disc with nutrients. Thus, the disc is dependent on the blood supply to the vertebral bones. Each disc has a strong outer ring of fibers, called the annulus fibrosus. The annulus is comprised of specialized sheets of connective tissue, called lamellae, which are layered for strength. The annulus has a higher amount of collagen that makes the outer layer extremely stiff. The nucleus pulposus is the soft, jelly-like center. It serves as the main shock absorber and is held in place by the outer annulus. The nucleus consists of a gel like matrix that provides maximum hydration. It functions to distribute pressures in all directions within each disc under compressive forces.

Spinal Cord and Nerves The spinal cord connects the nervous system from the brain to the rest of the body. The spinal cord leaves the brain through a hole in the base of the skull called the foramen magnum. The spinal cord and nerves travel from the cervical spine down to the lowest point of the spine, the sacrum. Spinal nerves exit the spinal canal between the vertebrae at each level. Two nerves exit each level, one on the left and one on the right. These nerves exit through openings called foramen. The nerves leave the spinal cord and travel to specific destinations in the body. The nerves leaving the neck travel to both arms and those from the low back to each leg. The specific pattern each nerve innervates is called a dermatome pattern.

4: Cervicalgia Symptoms and Treatment | Southeastern Spine Institute

The anatomy of the neck and specifically the cervical spine is extremely important to understand. The cervical spine sits upon the top of the spinal column. It is comprised of seven cervical vertebrae, C1-C7, which enclose the spinal cord and meninges.

The neck is part of a long flexible column, known as the spinal column or backbone, which extends through most of the body. The cervical spine neck region consists of seven bones C1-C7 vertebrae, which are separated from one another by intervertebral discs. These discs allow the spine to move freely and act as shock absorbers during activity. Attached to the back of each vertebral body is an arch of bone that forms a continuous hollow longitudinal space, which runs the whole length of the back. This space, called the spinal canal, is the area through which the spinal cord and nerve bundles pass. The spinal cord is bathed in cerebrospinal fluid CSF and surrounded by three protective layers called the meninges dura, arachnoid, and pia mater. At each vertebral level, a pair of spinal nerves exit through small openings called foraminae one to the left and one to the right. These nerves serve the muscles, skin and tissues of the body and thus provide sensation and movement to all parts of the body. The delicate spinal cord and nerves are further supported by strong muscles and ligaments that are attached to the vertebrae. Neck pain may be caused by disc degeneration, narrowing of the spinal canal, arthritis, and, in rare cases, cancer or meningitis. For serious neck problems, a primary care physician and often a specialist, such as a neurosurgeon, should be consulted to make an accurate diagnosis and prescribe treatment. Sudden severe injury to the neck may also contribute to disc herniation, whiplash, blood vessel destruction, vertebral bone or ligament injury and, in extreme cases, permanent paralysis. Herniated discs or bone spurs may cause a narrowing of the spinal canal or the small openings through which spinal nerve roots exit. Pressure on the spinal cord in the cervical region can be a very serious problem because virtually all of the nerves to the rest of the body have to pass through the neck to reach their final destination arms, chest, abdomen, legs. This can potentially compromise the function of many important organs. Cervical stenosis Cervical stenosis occurs when the spinal canal narrows and compresses the spinal cord, and is most frequently caused by aging. The discs in the spine that separate and cushion vertebrae may dry out. As a result, the space between the vertebrae shrinks, and the discs lose their ability to act as shock absorbers. At the same time, the bones and ligaments that make up the spine become less pliable and thicken. These changes result in a narrowing of the spinal canal. In addition, the degenerative changes associated with cervical stenosis can affect the vertebrae by contributing to the growth of bone spurs that compress the nerve roots. Mild stenosis can be treated conservatively for extended periods of time as long as the symptoms are restricted to neck pain. Severe stenosis requires referral to a neurosurgeon. Symptoms Numbness and weakness in both hands Unsteady gait when walking Muscle spasms in the legs Loss of coordination Diagnosis Diagnosis is made by a neurosurgeon based on history, symptoms, a physical examination and results of tests, including the following: A diagnostic image created after a computer reads and combines a multitude of thin-cut X-rays; can show the shape and size of the spinal canal, its contents and the structures around it, especially bones. These tests measure the electrical impulse along nerve roots, peripheral nerves and muscle tissue. This will indicate whether there is ongoing nerve damage, if the nerves are in a state of healing from a past injury or whether there is another site of nerve compression. Magnetic resonance imaging MRI: A diagnostic test that produces images of body structures using powerful magnets and computer technology; can show the spinal cord, nerve roots and surrounding areas, as well as enlargement, degeneration and tumors. An X-ray of the spinal canal following injection of a contrast material into the surrounding cerebrospinal fluid spaces; can show pressure on the spinal cord or nerves due to herniated discs, bone spurs or tumors. Application of radiation to produce a film or picture of a part of the body can show the structure of the vertebrae and the outline of the joints. Treatment Nonsurgical treatment is the first approach in patients with common neck pain not involving trauma. For example, many patients with cervical disc herniations improve with conservative treatment and time and do not require surgery. Conservative treatment includes time, medication, brief bed rest, reduction of physical activity and physical

therapy. A doctor may prescribe medications to reduce the pain or inflammation and muscle relaxants to allow time for healing to occur. An injection of corticosteroids may be used to temporarily relieve pain. In a small percentage of patients, spinal instability may require that spinal fusion be performed, a decision that is generally determined prior to surgery. Spinal fusion is an operation that creates a solid union between two or more vertebrae. Various devices like screws or plates may be used to enhance fusion and support unstable areas of the cervical spine. This procedure may assist in strengthening and stabilizing the spine and may thereby help to alleviate severe and chronic neck pain.

Anterior Cervical Discectomy This operation is performed on the neck to relieve pressure on one or more nerve roots or on the spinal cord. The cervical spine is reached through a small incision in the anterior front of the neck. If only one disc is to be removed, it will typically be a small horizontal incision in the crease of the skin. If the operation is more extensive, it may require a slanted or longer incision. After the soft tissues of the neck are separated, the intervertebral disc and bone spurs are removed. The space left between the vertebrae may be left open or filled with a small piece of bone or device through spinal fusion. In time, the vertebrae may fuse or join together.

Anterior Cervical Corpectomy This operation is performed in conjunction with the anterior cervical discectomy. The corpectomy is often done for multi-level cervical stenosis with spinal cord compression caused by bone spur formations. In this procedure, the neurosurgeon removes a part of the vertebral body to relieve pressure on the spinal cord. One or more vertebral bodies may be removed including the adjoining discs. The incision is generally larger. The space between the vertebrae is filled using a small piece of bone or device through spinal fusion. Because more bone is removed, the recovery process for the fusion to heal and the neck to become stable is generally longer than with anterior cervical discectomy. The surgeon may select to use a metal plate that is screwed into the front of the vertebra to help the healing process.

Posterior Microdiscectomy This procedure is performed through a vertical incision in the posterior back of your neck, generally in the middle. This approach may be considered for a large soft disc herniation that is located on the side of the spinal cord. A high speed burr is used to remove some of the facet joint, and the nerve root is identified under the facet joint. The nerve root needs to be gently moved aside to free up and remove the disc herniation.

Posterior Cervical Laminectomy This procedure requires a small incision in the middle of the neck to remove the lamina the back bony part of the vertebrae. The foramen, the passageway in the vertebrae through which the spinal nerve roots travel, may also be enlarged, to allow the nerves to pass through.

Risks and Outcome Although complications are fairly rare, as with any surgery, the following risks may be associated with cervical spine surgery: Infection Excessive bleeding, which may require blood transfusion An adverse reaction to anesthesia Chronic neck or arm pain Inadequate symptom relief Damage to the nerves and nerve roots Damage to the spinal cord about 1 in 10, resulting in paralysis Spinal instability Damage to the esophagus, trachea or vocal cords Injury to the carotid or vertebral arteries, which could result in stroke Fusion that does not Persistent swallowing or speech disturbance Leakage of cerebral spinal fluid

The benefits of surgery should always be weighed carefully against its risks. Although a large percentage of cervical spine patients report significant pain relief after surgery, there is no guarantee that surgery will help every individual.

Post-surgery The doctor will give specific instructions postsurgery and usually prescribe pain medication. The doctor will help determine when the patient can resume normal activities such as returning to work, driving and exercising. Some patients may benefit from supervised rehabilitation or physical therapy after surgery. Discomfort is expected while the patient gradually returns to normal activity, but pain is a warning signal that he or she might need to slow down. The AANS does not endorse any treatments, procedures, products or physicians referenced in these patient fact sheets. This information is provided as an educational service and is not intended to serve as medical advice.

5: Spine Anatomy | Cervical Spine Anatomy

12 Neck and cervical spine. The commonest orthopaedic cause of neck disorders is degeneration of a cervical intervertebral disc. This may lead to protrusion of part of the disc contents (prolapsed cervical disc) or, more often, it may give rise to secondary osteoarthritic changes in the intervertebral joints (cervical spondylosis).

If you have had an accident that started your neck pain or if you have pain, numbness, tingling or weakness in your arm that is worsening, you should see your physician before starting any exercises. The Importance of Exercise for the Neck Spine experts agree that physical activity is important for people with neck pain. This brochure will show you how to stay active without making your pain worse. You can even reduce your pain by being active. Activity can also then protect you against your neck pain returning in the future. So how do you stay physically active without making your pain worse? Many people are surprised that carefully selected exercises can actually reduce pain. The exercises described in this brochure can often provide quick and significant relief, speed your recovery as well as keep your pain from returning. Once pain lessens or disappears, other exercises can help restore neck movement and muscle strength. These exercises will help you gain optimal recovery and help protect you against future episodes. If it is difficult to reduce your pain, many doctors believe returning to your activities is worthwhile. Even if pain increases, as long as that increase ceases as soon as the activity stops, that temporary additional pain is acceptable. So try to stay active.

Selecting Exercises to Relieve Pain It is important to choose exercises carefully to avoid making your neck pain worse. One way to know if your neck problem is getting worse is if your symptoms spread away from the neck itself and into your shoulder or down your arm. This can happen during certain exercises or common activities such as driving, reading or using a computer for a prolonged period of time. The good news is that the opposite is also true! Symptoms can move out of your arm or shoulder so they are felt closer to the center or midline of your neck called symptom "centralization". When this happens, you are improving and moving toward recovery! You may be able to identify exercises and positions that can intentionally make that happen. When that is the case, once all symptoms have returned to the center of your neck, they will often decrease and disappear with continued exercise. Or if you only have pain in your neck, these same exercises will often eliminate that pain. Numbness or tingling usually recovers as well, but sometimes more slowly than the pain. Four simple exercises often help centralize and reduce neck-related symptoms. When doing these exercises, as well as any other activities, monitor your pain and any numbness and tingling. Make sure they are moving toward the middle of your neck centralizing, becoming less intense, or at least remaining the same. If they are moving further away from your neck, stop the exercise. Continue with those that help your pain the most; abandon those that aggravate your pain.

Walking erectly with "neutral" head position Figure 1: Make an effort to "walk tall" chest up, shoulders back and with your head positioned in "neutral. Allowing your head to fall into a forward position is a bad habit worth breaking because it so often contributes to neck pain and prolongs recovery. It initially requires an effort to consistently draw your head backward but, over time, this neutral position will become your new habit.

Supine neutral head position Figure 2: This exercise enables you to establish and maintain the "neutral" head position with very little effort, while resting. By lying on your back with as thin a pillow as is comfortable, or ideally with no pillow, let your head fall backward so your ears move toward being aligned with your shoulders and hips as much as you comfortably can. Spending minutes in this position, perhaps every couple hours if necessary, often decreases or helps eliminate neck pain and allows your head to move further and further into that ideal alignment.

Supine neutral head position **Supine retraction** Figure 3: While lying on your back with your head in neutral position, place your fingers on your chin and push downward so your chin tucks and your head is pushed downward into its resting surface. Be sure to feel a stretch in the back of your neck and a sense of "crowding" in the front of your neck. Repeat that stretch times while monitoring your pain for either improvement or worsening. Stop the exercise if your pain is worsens as a result.

Supine retraction **Sitting or standing neck retraction** Figure 4: This exercise often reduces or eliminates pain by taking your head as far backward as possible, often well past the "neutral" position Figure 1. Place your fingers on the front of your chin to help push your head backward as

far as it will go, but maintain your face in a forward-direction. You will again feel a stretch in the back of your neck and a sense of "crowding" your throat in front. Hold that "retracted" stretching position for seconds and then release, allowing your head to return to neutral. Repeat that movement times and perform such sessions each day, especially if you are finding it is reducing your pain. Often, as pain reduces, your head will retract further and further backward, making the exercise even more beneficial. Even after your pain is eliminated, continue this exercise times daily for another two weeks to help prevent your pain from returning, or return to it any time your pain does begin again. Most of us have a habit of slouching and letting our head protrude forward Figure 5. A forward head position, especially when maintained for an extended period of time, commonly produces and aggravates painful neck conditions. To your painful lower neck, it is the equivalent of forward bending at the waist that so commonly aggravates a painful low back. Forward head position Good neck posture means placing and maintaining your head in a "neutral" position so, looking from the side, your ears are aligned directly over your shoulders Figure 6. When you are unaccustomed to this position, it initially can feel awkward, like a chin-tucking position. But this new position places the weight of your head directly over your supporting spine, like a golf ball nicely sitting on a small golf tee. That minimizes the stresses on the discs and supporting ligaments in your neck. It is helpful to sit with the same hollow in our lower back that we have with standing and walking Figure 6. The use of a lumbar roll or support for that hollow can make sitting erectly much easier, especially if the buttocks are positioned against the back of an upright chair. Avoiding deep soft chairs also assists in sitting erectly. Neutral head position while sitting It also helps at first to approach this new erect sitting posture as an exercise. That helps you practice finding this new head position as well as build the necessary stamina to hold this posture for longer and longer periods of time. Many also find pain relief by creating that same neutral head position by lying on their back using as thin a pillow as possible, or even no pillow at all. Establishing and maintaining the neutral head position is challenging at first, but can be a key to both recovery and preventing the return of your pain. You can determine the usefulness of these posture modifications by monitoring your own pain: If no exercise, movement or posture is found that will cause your pain to centralize, you may need further evaluation to determine your other treatment options.

Exercising Once Pain Has Lessened In many cases, it may take only one or two days to control or eliminate symptoms. Continue as long as your symptoms do not return, get worse, or move away from the center of the back. Establishing that habit of sitting more erectly with your head in a neutral position, thus avoiding the protruded head position, is often necessary and valuable to establish long-term comfort.

Strengthening Exercises Many people with neck pain also have weak muscles in the neck, upper back and core. By strengthening and stretching those muscles, more blood flow comes to the area to help repair injury. Your ability to function in your daily activities also improves. Stronger muscles provide greater stability to the neck and trunk to help establish and maintain good posture and enhance all body movements. Increasing strength helps protect you from future problems. Moderate strength training is one of the most valuable things you can do for your overall health and is especially important if you have neck pain. Continue exercises as long as your symptoms do not return, get worse, or move away from the center of the back. Special equipment and gyms can be helpful, but there are good, low-tech, inexpensive ways to strengthen neck muscles at home. Five simple exercises can help strengthen the muscles in your neck and upper back:

Strengthening Can Help

Isometric strengthening: Sit in a chair with your back supported and your head in the neutral position Figure 6. Place your hand across your forehead. Push your head and neck forward as hard as you are able while firmly resisting any movement of your head with your hand Figure 7. Push for 10 seconds, then relax, and repeat three times. Similarly, place your hand against the back of your head as you try to push your head backward Figure 8 against the resistance of your hand. Push as hard as you are able for 10 seconds, relax, and repeat three times. Do the same by bending your neck to either side, again pushing as hard as you can against the resistance of your hand that is placed against the side of your head Figure 9. Push for 10 seconds, relax, and repeat three times. Forward isometric strengthening Figure 8. Backward isometric strengthening Figure 9. Sideward isometric strengthening Perform one set of each of these exercises twice a day. As you repeat them over time, you can vary the position of your head and neck as your hand resists your movement, bending slightly forward, backward, or to each side. These exercises will increase your neck strength in all directions

of motion. Prone Head Lifts Figure Lying face down on a firm surface, raise your chest, shoulders and head up by resting on your elbows. Let your head hang fully downward so your chin is on or near your chest. Lift your head upward to the head-neutral position, being sure to retract your head tuck your chin as you move Figure 6. Then continue lifting your head upward and backward as far as it will go in an attempt to look skyward. Hold that position for 5 seconds before slowly returning through that head-neutral position to the original downward head-hanging position. Repeat that exercise 5 times, twice a day. Prone head lift Supine Head Lifts Figure

6: Cervical Spine – Anatomy, Diseases and Treatments

A regular routine of exercises for the cervical spine can help reduce pain and increase strength, range of motion and mobility of your neck. Training helps to maintain the proper posture of the cervical spine, which is a reversed "C" form.

An anatomy lesson is a good place to start. This article will help you understand key anatomical structures in the skull and spine, with the goal of helping you better understand your condition. The CVJ is one of the unique and complex areas of your body, as this is where your brain transitions to your spine. The CVJ is composed of the occipital bone, atlas C1, and axis C2, along with a network of complex nerve and vascular structures. The occipital bone, atlas, and axis. The Bone that Rests on Top of Your Spine The occipital bone is a bone that covers the back of your head; an area called the occiput. The occipital bone is the only bone in your head that connects with your cervical spine neck. The occipital bone surrounds a large opening known as the foramen magnum. The foramen magnum allows key nerves and vascular structures passage between the brain and spine. Namely, it is what the spinal cord passes through to enter the skull. The brainstem also passes through this opening. The foramen magnum also allows 2 key blood vessels traversing through the cervical spine, called the vertebral arteries, to enter the inner skull and supply blood to the brain. The atlas is named after the Greek God Atlas, who held up the world on his shoulders. A pair of synovial joints, known as the atlanto-occipital joint connect the atlas and your skull. The atlas is also known as C1, and while other bones in your spine are numbered in such a way eg, the first bone in your lumbar spine is known as L1, this vertebra is much different in shape and function compared to the rest of your vertebrae. The atlas is ring-shaped and has the important task of supporting the head. It serves as a pivot, and it allows your head to move forward and backward. Like the atlas, the axis is distinct in appearance and function from the rest of your vertebrae. Between C1 and C2, there two synovial joints called the atlanto-axial joint. These joints facilitate rotation at this level. The axis has a superior extension upward, which is a peg-like bone called the dens. The intersection of the base of your skull and top of your spine is chock-full of essential neurological and vascular activity. This will help you have informed and productive conversations with your doctor, and enable you to be an engaged participant in your treatment decisions. Anatomy and biomechanics of the craniocervical junction. Virginia Spine Institute Web site. Accessed August 3, Rheumatoid Arthritis of the Cervical Spine. DePuy Synthes Spine Web site. Skull Base [Cranio-cervical] Anatomy. Ligaments of the craniocervical junction.

7: Medical Devices of the Neck and Spine: an imaging guide

The neck is part of a long flexible column, known as the spinal column or backbone, which extends through most of the body. The cervical spine (neck region) consists of seven bones (C1-C7 vertebrae), which are separated from one another by intervertebral discs.

Muscle weakness makes it hard to lift the arms or grasp objects firmly. Other common signs include: These symptoms warrant immediate medical attention. When to see a doctor If you have the sudden onset of numbness or tingling in the shoulder, arms, or legs, or if you lose bowel or bladder control, talk to your doctor and seek medical attention as soon as possible. This is a medical emergency. If your pain and discomfort start to interfere with your daily activities, you may wish to make an appointment with your doctor. Although the condition is often the result of aging, there are treatments available that can reduce pain and stiffness. Testing for and diagnosing the condition Making a diagnosis of cervical spondylosis involves ruling out other potential conditions, such as fibromyalgia. Making a diagnosis also involves testing for movement and determining the affected nerves, bones, and muscles. Your doctor may treat your condition or refer you to an orthopedic specialist, neurologist, or neurosurgeon for further testing. Physical exam Your doctor will start by asking you several questions regarding your symptoms. Typical exams include testing your reflexes, checking for muscle weakness or sensory deficits, and testing the range of motion of your neck. Your doctor might also want to watch how you walk. All of this helps your doctor determine if your nerves and spinal cord are under too much pressure. Imaging tests X-rays can be used to check for bone spurs and other abnormalities. A CT scan can provide more detailed images of your neck. An MRI scan, which produces images using radio waves and a magnetic field, helps your doctor locate pinched nerves. In a myelogram, a dye injection is used to highlight certain areas of your spine. CT scans or X-rays are then used to provide more detailed images of these areas. An electromyogram EMG is used to check that your nerves are functioning normally when sending signals to your muscles. A nerve conduction study checks the speed and strength of the signals a nerve sends. This is done by placing electrodes on your skin where the nerve is located. Treatments for cervical spondylosis focus on providing pain relief, lowering the risk of permanent damage, and helping you lead a normal life. Nonsurgical methods are usually very effective. Physical therapy Your doctor might send you to a physical therapist for treatment. Physical therapy helps you stretch your neck and shoulder muscles. This makes them stronger and ultimately helps to relieve pain. You might also have neck traction. This involves using weights to increase the space between the cervical joints and relieve the pressure on the cervical discs and nerve roots. This can involve removing bone spurs, parts of your neck bones, or herniated discs to give your spinal cord and nerves more room. Surgery is rarely necessary for cervical spondylosis. Home treatment options If your condition is mild, you can try a few things at home to treat it: Use a heating pad or a cold pack on your neck to provide pain relief for sore muscles. Exercise regularly to help you recover faster. Wear a soft neck brace or soft collar to get temporary relief. Outlook for cervical spondylosis Cervical spondylosis is a common, and often age-related, condition that can cause stiffness, discomfort, and headaches related to neck pain. Your doctor may not be able to reverse the condition, but they can often recommend conservative treatments to help you overcome the discomfort and pain. Healthline and our partners may receive a portion of revenues if you make a purchase using a link above.

8: Cervical Exercise: The Backbone of Spine Treatment

Cervical Laminectomy, Laminoplasty and Posterior Cervical Fusion Posterior Cervical Decompression and Posterior Cervical Foramenotomy Myths of Laser Spine Surgery Cervical.

Together, the vertebrae support the skull, move the spine, and protect the spinal cord, a bundle of nerves connected to the brain. All seven cervical vertebrae are numbered. The C1, the first vertebra in the column closest to the skull, is also known as the atlas. The C2, the vertebra below it, is also known as the axis. These ligaments also prevent excessive movement that could damage the spinal column. Each vertebra has a protrusion on its backside called the spinous process. It extends backward and slightly downward. This is where ligaments and muscles attach to the vertebra. Several muscles support the vertebrae of the spine. The spinalis moves the spine and helps maintain correct posture. It is divided into three parts: This muscle begins in the middle region of the spine and travel up to the axis. It may begin at the lower cervical vertebrae or the upper thoracic vertebrae the section of the spinal column just below the cervical spine. It helps extend the neck. This muscle begins at the upper thoracic vertebrae and extends down to the lower back. This muscle begins at the upper and middle thoracic spine and lower cervical spine. It extends up to the occipital bone, near the base of the skull. This muscle is inseparably connected with another muscle in the neck, the semispinalis capitis. The longus colli muscle begins at the spinous process of the atlas and extends past the cervical spine to the third thoracic vertebra. This muscle is broad in the middle but narrow where it connects to vertebrae. It helps move and stabilize the neck. The longus colli is the most commonly injured muscle in rear-end car accidents when whiplash – the sudden jerking of the head at impact – occurs.

9: Neck and cervical spine | Clinical Gate

Cervical spondylosis is a common, age-related condition that affects the joints and discs in your cervical spine, which is in your neck. It's also known as cervical osteoarthritis or neck arthritis.

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