A Patient's Guide to

Anterior Cervical Discectomy and Fusion



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Our goal is to help you be fully informed about your condition and how it affects your health. This section combined with our Patient Videos offers you a comprehensive overview of conditions and treatments.

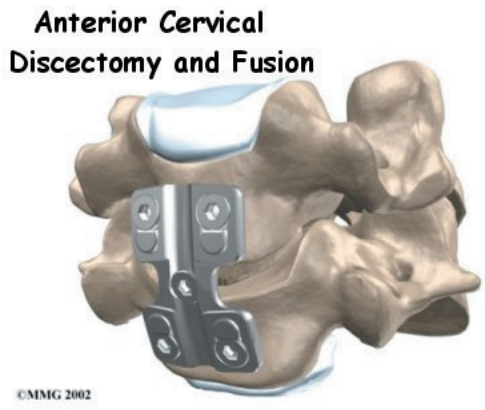
Please remember, making an appointment and learning about your specific condition is the only way to insure your health and rehabilitation. The information provided here is downloadable so you can study it and write down questions to ask during your appointment.

If you, or someone you know, need orthopedic help you are in the right place. Advanced Orthopedic Associates and Sports Medicine Institute sees hundreds of patients and only a small percentage ever require surgery.

Through education and understanding health can be restored to almost any condition and our Patient-Centered, Patient-Focused care is guaranteed to give you peace of mind throughout your treatment.

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Introduction

Anterior cervical discectomy and fusion (ACDF) is a procedure used to treat neck problems such as cervical radiculopathy, disc herniations, fractures, and spinal instability. In this procedure, the surgeon enters the neck from the front (the *anterior* region) and removes a spinal disc (*discectomy*). The vertebrae above and below the disc are then held in place with bone graft and sometimes metal hardware. The goal is to help the bones to grow together into one solid bone. This is known as *fusion*. The medical term for fusion is *arthrodesis*.

Operating on the back of the neck is more commonly used for neck fractures. That procedure is called *posterior cervical fusion.*

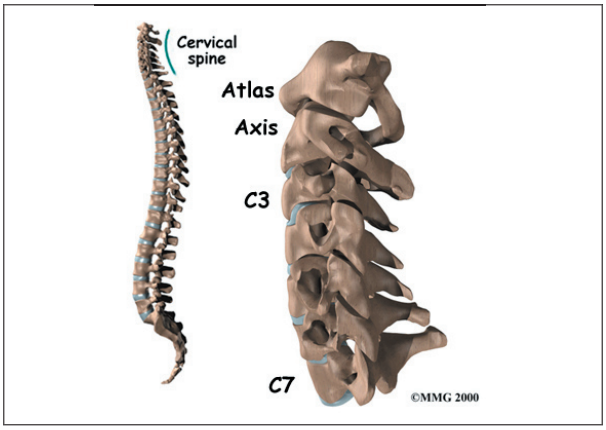
This guide will help you understand

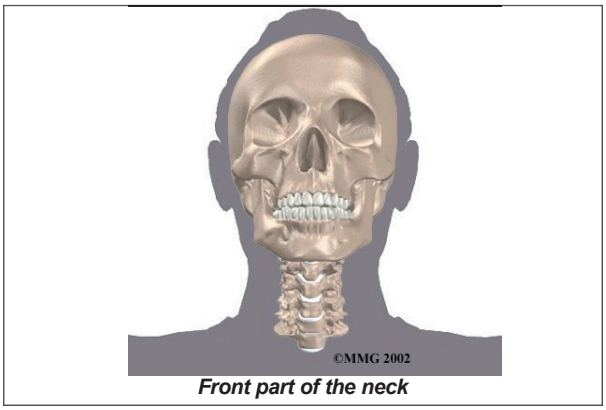
- **why the procedure becomes necessary**
- **what surgeons hope to achieve**
- **what to expect during your recovery**

Anatomy

What parts of the neck are involved?

Surgeons perform this surgery through the **front part of the neck**. Key structures include the ligaments and bones, intervertebral discs, the spinal cord and spinal nerves, and the neural foramina.



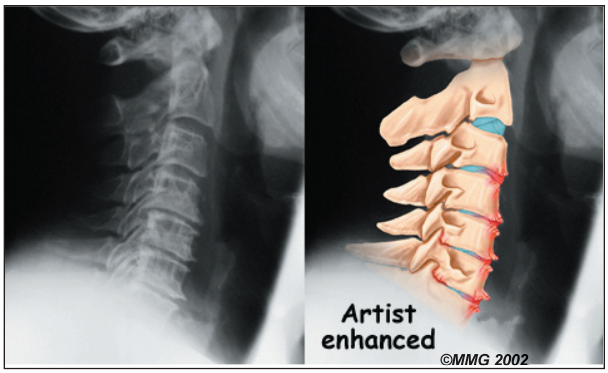


Front part of the neck

Rationale

What do surgeons hope to achieve?

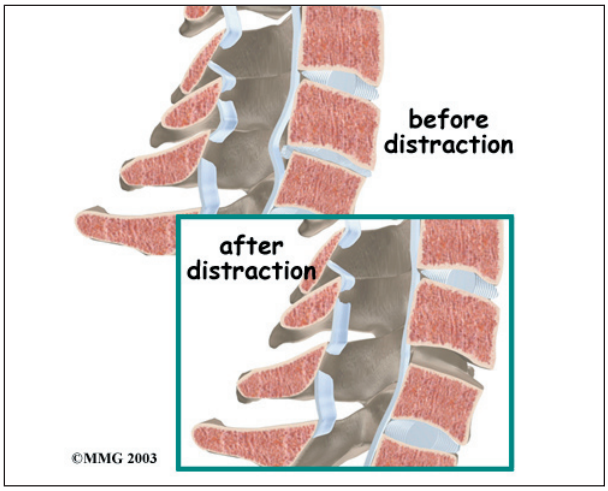
In most cases, ACDF is used to stop symptoms from cervical disc disease. Discs start to degenerate as a natural part of aging and also from stress and strain in the structures of the neck. Over time, the disc begins to collapse, and the space decreases between the vertebrae.



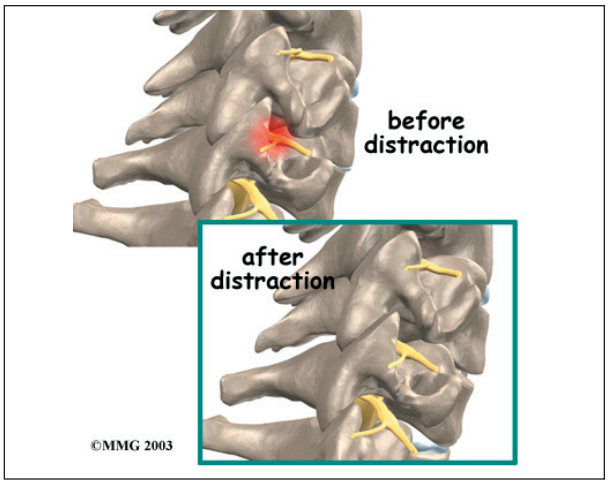
When this happens, the openings around the spinal nerves (the *neural foramina*) narrow and may begin to put pressure on the nerves. The long ligaments in the spine slacken. They

may even buckle and put pressure on the spinal cord. The outer rings of the disc, the *annulus*, weaken and develop small cracks. The *nucleus* in the center of the disc may press on the weakened annulus and actually squeeze out of the annulus. This is called a *herniated disc*. The herniated disc may press on ligaments, nerves, or even the spinal cord. Fragments of the disc that press against the outer annulus, spinal nerves, or spinal cord can be a source of pain, numbness, and weakness. Pressure on the spinal cord, called *myelopathy*, can also produce problems with the bowels and bladder, changes in the way you walk, and trouble with fine motor skills in the hands.

Discectomy is the removal of the disc (and any fragments) between the vertebrae that are to be fused. When symptoms are coming from the disc, it is hoped that this stops the symptoms.



Once the disc is removed, surgeons **spread the bones** of the spine apart slightly (*distraction*) to make room for the *bone graft*. This is bone material that can be taken from the top of the pelvis bone (*autograft*) or from a natural substitute (*allograft*). The bone graft separates and holds the vertebrae apart. Enlarging the space between the vertebrae widens the opening of the neural foramina, **taking pressure off** the spinal nerves that pass through them. Also, the ligaments inside the spinal canal are pulled taut so they don't buckle into the spinal canal.



No movement occurs between the bones that are fused together. By holding the sore part of the neck steady, the fusion helps relieve pain. And it prevents additional wear and tear on the structures inside the section that was fused. This keeps bone spurs from forming, and it has been shown that fusion causes existing bone spurs to shrink. By fusing the bones together, surgeons hope that patients won't have future pain and problems from cervical disc disease.

Preparations

How will I prepare for surgery?

The decision to proceed with surgery must be made jointly by you and your surgeon. You should understand as much about the procedure as possible. If you have concerns or questions, you should talk to your surgeon.

Once you decide on surgery, your surgeon may suggest a complete physical examination by your regular doctor. This exam helps ensure that you are in the best possible condition to undergo the operation.

On the day of your surgery, you will probably be admitted to the hospital early in the morning. You shouldn't eat or drink anything after midnight the night before.

Surgical Procedure

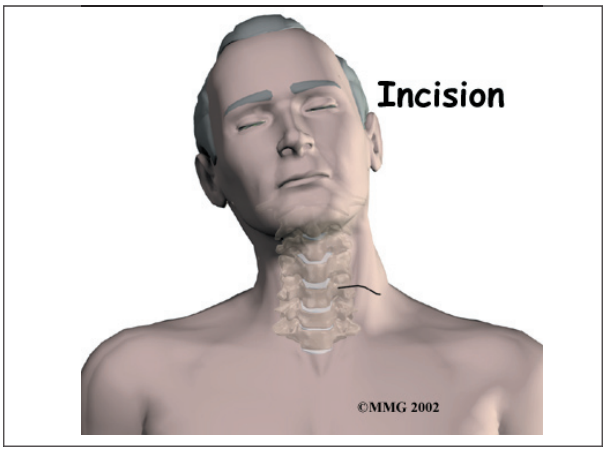
What happens during the operation?

Patients are given a general anesthesia to put them to sleep during most spine surgeries.

As you sleep, your breathing may be assisted with a *ventilator*. A ventilator is a device that controls and monitors the flow of air to the lungs.

The patient's neck is positioned facing the ceiling with the head bent back and slightly to the right. A two-inch **incision** is made two to three fingers' width above the collar bone across the left-hand side of the neck. Surgeons often choose the left side to avoid injuring the nerve going to the voice box. Retractors are used to gently separate and hold the neck muscles and soft tissues apart so the surgeon can work on the front of the spine.

A needle is inserted into the disc, and an X-ray is taken to identify the correct disc. A long strip of muscle and part of the long ligament that covers the front of the vertebral bodies are carefully pulled to the side. Forceps are used

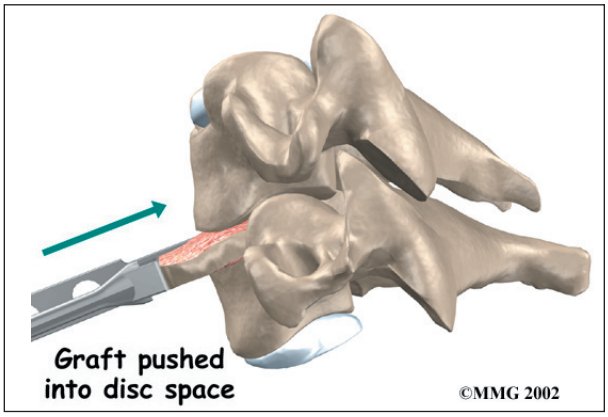


to take out the front half of the disc. Next, a tool is attached to the vertebrae to spread them apart. This makes it easier for the surgeon to see between the two vertebrae. A small rotary cutting tool (a *burr*) is used to carefully remove the back half of the disc. A special microscope is used to help the surgeon see and remove pieces of disc material and bone spurs near the spinal cord.

A layer of bone is shaved off the flat surfaces of the two vertebrae. This causes the surfaces to bleed. This is necessary to help the bone graft heal and join the bones together.

The surgeon measures the depth and height between the two vertebrae. A section of bone is grafted from the top part of the pelvis. It is measured to fit snugly in the space where the disc was taken out. The surgeon increases the traction pull to separate the two vertebrae, and the graft is tamped into place.

The traction pull is released. Then the surgeon tests the graft by bending and turning the neck to make sure it is in the right spot and is locked in place. Another X-ray may be taken to double check the location of the graft.



A drainage tube may be placed in the wound. The muscles and soft tissues are put back in place, and the skin is stitched together. The surgeon may place your neck in a rigid collar.

Complications

What might go wrong?

As with all major surgical procedures, complications can occur. Some of the most common complications following ACDF include

- anesthesia
- thrombophlebitis
- infection
- nerve damage
- problems with the graft
- nonunion
- ongoing pain

This is not intended to be a complete list of the possible complications, but these are the most common.

Problems with Anesthesia

Problems can arise when the anesthesia given during surgery causes a reaction with other drugs. Patients can also have problems with the anesthesia itself. In addition, anesthesia can affect lung function because the lungs don't expand as well while a person is under anesthesia. Be sure to discuss the risks and your concerns with your anesthesiologist.

Thrombophlebitis (Blood Clots)

Thrombophlebitis, sometimes called *deep venous thrombosis* (DVT), can occur after any operation. It occurs when the blood in the large veins of the leg forms blood clots. This may cause the leg to swell and become warm to the touch and painful. If the blood clots in the veins break apart, they can travel to the lung, where they lodge in the capillaries and cut off the blood supply to a portion of the lung. This is called a *pulmonary embolism*. (*Pulmonary* means lung, and *embolism* refers to a fragment of something traveling through the vascular system.) Most surgeons take preventing DVT very seriously. There are many ways to reduce the risk of DVT, but probably the most effective is getting you moving as soon as possible. Two other commonly used preventative measures include

- pressure stockings to keep the blood in the legs moving
- medications that thin the blood and prevent blood clots from forming

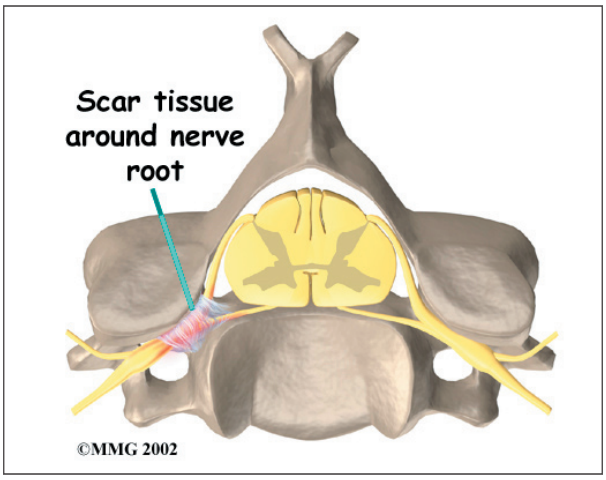
Infection

Infection following spine surgery is rare but can be a very serious complication. Some infections may show up early, even before you leave the hospital. Infections on the skin's surface usually go away with antibiotics. Deeper infections that spread into the bones and soft tissues of the spine are harder to treat and may require additional surgery to treat the infected portion of the spine.

Nerve Damage

Any surgery that is done near the spinal canal can potentially cause injury to the spinal cord or spinal nerves. Injury can occur from bumping or cutting the nerve tissue with a surgical instrument, from swelling around the nerve, or from the formation of **scar tissue**. An injury to these structures can cause muscle weakness and a loss of sensation to the areas supplied by the nerve.

The nerve to the voice box is sometimes injured during surgery on the front of the neck. Surgeons usually prefer to do surgery on the left side of the neck where the path



of the nerve is more predictable than on the right side. During surgery, the nerve may be stretched too far when retractors are used to hold the muscles and soft tissues apart. When this happens, patients may be hoarse for a few days or weeks after surgery. In rare cases in which the nerve is actually cut, patients may end up with ongoing minor problems of hoarseness, voice fatigue, or difficulty making high tones.

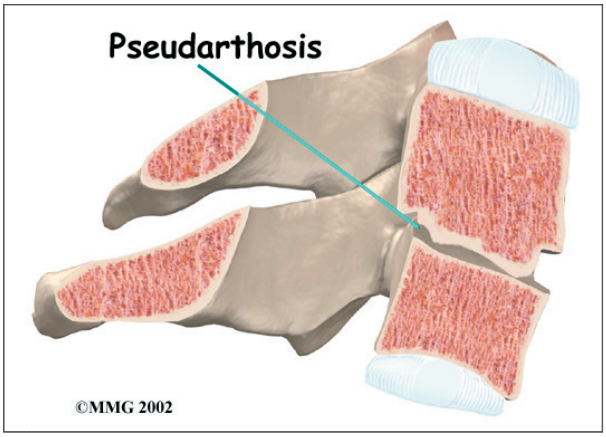
Problems with the Graft

Fusion surgery requires bone to be grafted into the spinal column. The graft is commonly taken from the top rim of the pelvis. There is a risk of having pain, infection, or weakness in the area where the graft is taken.

After the graft is placed, the surgeon checks the position of the graft before completing the surgery. However, the graft may shift slightly soon after surgery to the point it is no longer able to hold the spine stable. When the graft migrates out of position, it can cause injury to the nearby tissues. A second surgery may be needed to align the graft and to apply metal plates and screws to hold it firmly in place.

Nonunion

Sometimes the bones do not fuse as planned. This is called a *nonunion*, or ***pseudarthrosis***. (The term *pseudarthrosis* means false joint.) If the joint motion from a nonunion continues to cause pain, you may need a second operation.



In the second procedure, the surgeon usually adds more bone graft. Metal plates and screws may also be added to rigidly secure the bones so they will fuse together.

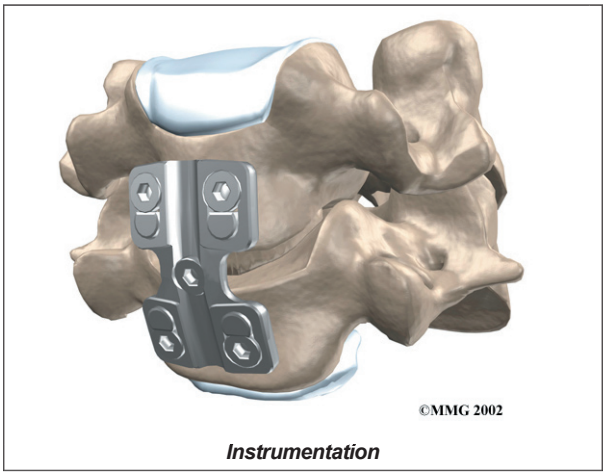
Ongoing Pain

ACDF is a complex surgery. Not all patients get complete pain relief with this procedure. As with any surgery, you should expect some pain afterward. If the pain continues or becomes unbearable, talk to your surgeon about treatments that can help control your pain.

After Surgery

What happens after surgery?

After ACDF, patients usually wear a special neck brace for several months. These neck braces are often bulky and restrictive. However, the bone graft needs time to heal in order for the fusion to succeed. This requires the neck to be held still.



Instrumentation

Recently, surgeons have begun using metal hardware, called ***instrumentation***, to lock the bones in place. This hardware includes metal plates and screws that are fastened to the neck bones. They hold the neck bones still so the graft can heal, replacing the need for a rigid neck brace.

Patients may stay in the hospital for one to two days after surgery. When the surgery is done on an outpatient basis, patients may even go home the same day of surgery. Patients can get out of bed as soon as they feel up to it. They are watched carefully when they begin eating to make sure they don't have problems swallowing. They usually drink liquids at first, and if they are not having problems, they can start eating solid food.

Patients are able to return home when their medical condition is stable. However, they are usually required to keep their activities to a minimum in order to give the graft time to heal.

Rehabilitation

What should I expect as I recover?

Rehabilitation after ACDF can be a slow process. You will probably need to attend

therapy sessions for two to three months, and you should expect full recovery to take up to eight months.

Many surgeons prescribe outpatient physical therapy beginning a minimum of four weeks after surgery. At first, treatments are used to help control pain and inflammation. Ice and electrical stimulation treatments are commonly used to help with these goals. Your therapist may also use massage and other hands-on treatments to ease muscle spasm and pain.



Active treatments are slowly added. These include exercises for improving heart and lung function. Walking and stationary cycling are ideal cardiovascular exercises. Therapists also teach specific exercises to help tone and control the muscles that stabilize the neck and upper back.

Your therapist also works with you on how to move and do activities. This form of treatment, called *body mechanics*, is used to help you develop new movement habits. This training helps you keep your neck in safe positions as you go about your work and daily activities. At first, this may be as simple as helping you learn how to move safely and easily in and out of bed, how to get dressed and undressed, and how to do some of your routine activities. Then you'll learn how to keep your neck safe while you lift and carry items and as you begin to do other heavier activities.

As your condition improves, your therapist will begin tailoring your program to help prepare you to go back to work. Some patients are not able to go back to a previous job that requires heavy and strenuous tasks. Your therapist may suggest changes in job tasks that enable you to go back to your previous job or to do alternate forms of work. You'll learn to do these tasks in ways that keep your neck safe and free of extra strain.

Before your therapy sessions end, your therapist will teach you ways to avoid future problems.

Notes