

ACDF: Anterior Cervical Discectomy and Fusion

A cervical disc herniation can be removed through an anterior approach (through the front of the neck) to relieve spinal cord or nerve root pressure and alleviate corresponding pain, weakness, numbness and tingling.

- This procedure is called an anterior cervical discectomy and allows the offending disc to be surgically removed. A discectomy is a form of surgical decompression, so the procedure may also be called an anterior cervical decompression.
- A fusion surgery is almost always done at the same time as the discectomy in order to stabilize the cervical segment.
- Together, the combined surgery is commonly referred to as an ACDF surgery, which stands for Anterior Cervical Discectomy and Fusion.

While this surgery is most commonly done to treat a symptomatic cervical herniated disc, it may also be done for cervical degenerative disc disease. It may also be done for more than one level of the cervical spine.

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Anterior Cervical Surgery Approach

The anterior approach of this surgery, which means that the surgery is done through the front of the neck as opposed to the back of the neck, has several typical advantages:

- Better access to the spine. The anterior approach can provide access to almost the entire cervical spine, from the C2 segment at the top of the neck down to the cervico-thoracic junction, which is where the cervical spine joins with the upper spine (thoracic spine).
- Less postoperative pain. Spine surgeons often prefer this approach because it provides good access to the spine through a relatively uncomplicated pathway. All things being equal, the patient tends to have less incisional pain from this approach than from a posterior operation.

After a skin incision is made in the front of the neck, only one thin vestigial muscle needs to be cut, after which anatomic planes can be followed right down to the spine.

The limited amount of muscle division or dissection helps to limit postoperative pain following the spine surgery.

While there are a number of potential risks and complications with ACDF surgery, the main postoperative problem most patients face is difficulty swallowing for 2 to 5 days due to retraction of the esophagus during the surgery.

ACDF Surgery Procedure

The general procedure for an anterior cervical discectomy and fusion - or ACDF - surgery includes the following steps:

1. Anterior surgical approach

- The skin incision is one to two inches and horizontal, and is made on the left or right hand side of the neck.
- The thin platysma muscle under the skin is then split in line with the skin incision, and the plane between the sternocleidomastoid muscle and the strap muscles is then entered.
- Next, a plane between the trachea/esophagus and the carotid sheath can be entered.
- A thin fascia (flat layers of fibrous tissue) covers the spine (pre-vertebral fascia), which is dissected away from the disc space.

2. Disc removal

- A needle is then inserted into the disc space, and an X-ray is done to confirm that the spine surgeon is at the correct level of the spine.
- After the correct disc space has been identified on X-ray, the appropriate portions of the disc are then removed by first cutting the outer annulus fibrosis (fibrous ring around the disc) and removing the nucleus pulposus (the soft inner core of the disc).
- With an anterior cervical discectomy, most of the disc (but not all) is usually removed.

3. Canal Decompression

- Dissection is carried out from the front to back of a ligament called the posterior longitudinal ligament.
- Often this ligament is gently removed to allow access to the spinal canal to remove any osteophytes (bone spurs) or disc material that may have extruded through the ligament.
- The dissection is often performed using an operating microscope or magnifying loupes to aid with visualization of the smaller anatomic structures.

4. Cervical Fusion

- An anterior cervical fusion is almost always done as part of a cervical discectomy. The insertion of a bone graft into the evacuated disc space serves to prevent disc space collapse and promote a growing together of the two vertebrae into a single unit, with this 'fusion' preventing local deformity (kyphosis) and serving to maintain adequate room for the nerve roots and spinal cord.

Patients typically go home the same day as the anterior cervical discectomy and fusion or after one night in the hospital. Most patients recover within about 4 to 6 weeks, although it may take up to 18 months for the fusion to fully set up. Patients should discuss relevant activity restrictions and rehabilitation with their surgeon.

Anterior Cervical Discectomy and Fusion Complications

As with any surgery, there are a number of possible risks and complications of anterior cervical discectomy surgery.

The rate of occurrence of potential risks and complications is highly variable and dependent mainly on a combination of:

1. The results of the individual surgeon with ACDF surgery (meaning that the frequency of complications varies between surgeons), and;
2. Individual patient risk factors, such as the condition of the disc, the patient's physical condition (bone strength, diabetes, etc.), whether or not the patient smokes, and other factors.

For an ACDF surgery, the main potential risks and complications that tend to occur include:

- Inadequate symptom relief after the surgery
- Failure of bone graft healing to create a fusion (a.k.a. non-union or pseudarthrosis)
- Persistent swallowing or speech disturbance
- Nerve root damage
- Damage to the spinal cord (about 1 in 10,000)
- Bleeding
- Infection
- Damage to the trachea/esophagus

Also, the small nerve that supplies innervation to the vocal cords (recurrent laryngeal nerve) will sometimes not function for several months after neck surgery because of retraction during the procedure. This complication can cause temporary hoarseness. Retraction of the esophagus can also produce difficulty with swallowing, which usually resolves within days but can last weeks to months. Rarely, it can result in permanent difficulty swallowing. There is little chance of a recurrent disc herniation because most of the disc is removed with this type of surgery. Patients are advised to discuss the potential risks and complications with their surgeon prior to having ACDF surgery.

A Spine-health.com Peer Reviewed Article Written by Peter F. Ullrich, Jr., MD

Disclaimer: This information is not intended as a substitute for medical or chiropractic professional help or advice, but is to be used only as an aide in understanding spinal and nerve issues.

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