

weeks following surgery.

### What happens after surgery?

After surgery you are likely to experience pain at the incision site (incisional pain) that can be managed through the administration of oral analgesics or narcotics. If you have a sore throat or hoarseness, throat lozenges may assist in soothing this condition. Sometimes you may stay in the hospital overnight, but some patients prefer to go home the same day after operation.

Walk as early as possible after your surgery. This can help prevent blood clots from forming in your legs and pneumonia by helping your lungs expand. Usually you will be given a small breathing device called an "incentive spirometer" (Figure 7) which you can use to expand your lungs while in bed.

Over time, normal healing progresses and the pain subsides. Incisional pain accompanied by swelling, redness, discoloration, numbness or flu-like symptoms (e.g. fever/chills) should be reported to your physician immediately.

A cast must be worn at all times, unless specified by your doctor. You may be given permission to shower, but you must stay in an upright position, no turning or bending must be done.

Dissolving stitches, sutures or staples are commonly used to close incisions. Surgical dressings that cover the incision may be removed prior to discharge from the hospital. Some incisions are held closed with Steri-Strips. These are small adhesive strips that are made to peel and fall on their own as the incision site heals.

Normal wound care during the post-operative period requires keeping the incision dry. You usually are able to shower, but should avoid "soaking the wound" such as in baths, or swimming until you are seen by your physician at the follow up appointment. Your first follow-up appointment is usually scheduled at 2 weeks.

Eat healthy foods, especially those high in protein unless indicated otherwise.

### What are the possible complications?\*

- Infection (post-op infection is rare but can become a serious complication if left untreated)
- Bleeding
- Complications from anesthesia (the anesthesiologist will discuss this with you)
- Continued pain
- Fusion may not occur (higher incidence of non-fusion in patients who smoke)
- Hardware (i.e. screws, plates or cages) may break or come loose

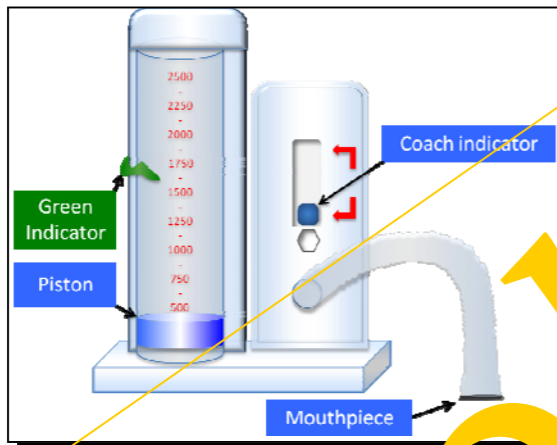


Figure 7. Use by breathing-in deeply and measuring the volume of air your lungs can hold. Repeat this slowly, 10 times every hour.

- Numbness
- Nerve damage- surgery that is done near the spinal canal can potentially cause injury to the spinal cord or spinal nerves
- Weakness
- Thrombophlebitis (a condition in which the blood in the large veins of the leg forms blood clots)
- Death

\*This is not intended to be a complete list of all possible complications.

### What is the recovery period?

Recovery time is different for every patient, however, most patients are up and walking within 24 hours for the first day after surgery. Most patients can expect to stay in the hospital for 1-2 days depending on their condition. Once released from the hospital, patients who have undergone surgery may be given a prescription for pain medications to be taken as needed, as well as a detailed post-operative activity, physical therapy/exercise plan to help with the recovery and return to a healthy life.

Patients can generally resume normal activities in about 6-8 weeks after surgery, but this should be discussed with your physician. If you require outpatient physical therapy, you will probably need to attend therapy sessions for 2-4 weeks. You should expect the recovery to take up to 3 months.

I have read and understood the content presented in this brochure. All my questions regarding this surgical procedure have been answered satisfactorily.

PATIENT'S SIGNATURE \_\_\_\_\_ DATE \_\_\_\_\_  
Disclaimer: The content presented in this brochure may vary slightly from the actual surgical procedure.

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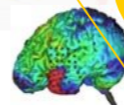
Colen Publishing L.L.C.

#### Authors:

Chaim B. Colen, M.D., PhD.  
Roxanne E. Colen, PA-C

#### Illustrations:

Chaim B. Colen, M.D., PhD.



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#### Editor:

Setti S. Rengarajan, M.D.

#### Editorial Formatting:

Kathryn Schwartz  
Chelsea M. Smialek  
Katherine Van de Putte

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# Anterior Cervical Discectomy and Fusion

## Colen Surgical Medi-Card

### What is an Anterior Cervical Discectomy and Fusion (ACDF)?

Anterior Cervical Discectomy and Fusion, also known as ACDF, is a surgical procedure performed through the front (anterior region) of the neck in which two or more cervical vertebrae are joined or fused together. It is commonly performed to treat cervical herniated discs or instability caused by tumors, infection or trauma. During this procedure the disc in between two vertebral bodies is removed and a bone graft or synthetic spacer is inserted in its place. The goal of the procedure is to stimulate the vertebrae to grow together into one solid bone (known as fusion (Figures 1 and 2).

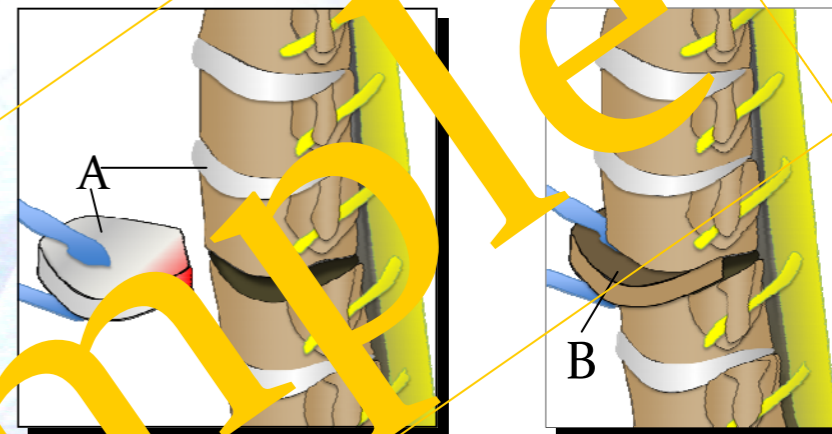


Figure 1: Cervical bony structures. The disc (labeled A) is removed and replaced with a spacer between two vertebral bodies. This synthetic spacer is known as an interbody biomechanical device (labeled B).

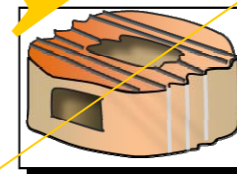
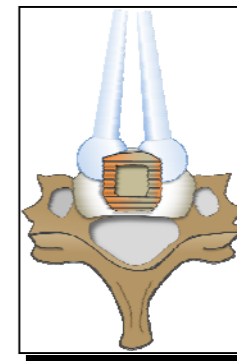


Figure 2: Interbody biomechanical spacer. Many types of biomechanical spacers are available on the market; this is an example of one that your physician may use.

There are 2 types of bony grafts that may be used in this procedure, one is an autograft (bone is taken from the patient's own pelvic bone) or an allograft (bone obtained from another donor). Once the appropriate graft is chosen, it is then packed between the two vertebrae



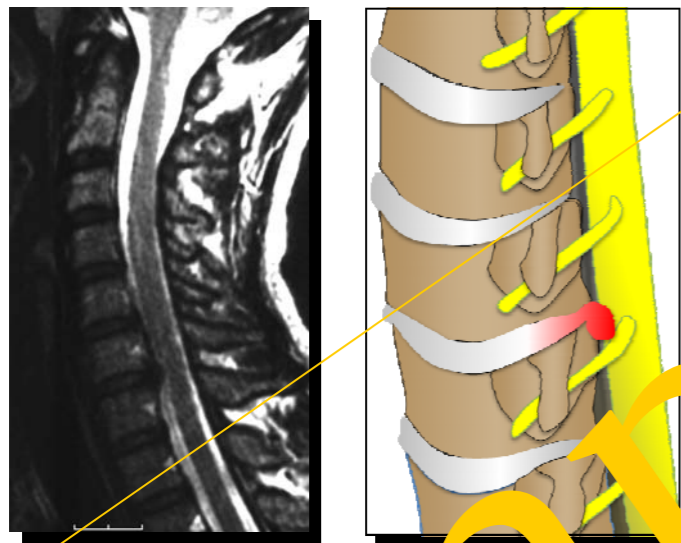


Figure 3: A herniated disc impinges on the spinal nerve, causing radiating neck pain.

in order to “fuse” them together, providing increased spinal stability. This bone graft, or the biomechanical spacer implant, will take the place of the intervertebral disc, which is entirely removed in the process.

### What are the indications? When is it used?

Spinal fusion surgery such as ACDF is commonly indicated for patients with chronic neck or arm pain, numbness, tingling or weakness. Indications include degenerative disc disease, herniated cervical disc and deformity of the spine causing spinal instability (Figure 3). Pain NOT relieved with conservative therapies (e.g. physical therapy, medication) might require surgery. Surgery is done to relieve the pressure on the nerve roots, stabilize and strengthen the spine, and to alleviate chronic neck and/or arm pain. A cervical herniated disc will typically cause pain patterns and neurological deficits as shown in (Figure 4).

C4 - C5 (C5 nerve root) – Associated with weakness in the deltoid muscle in the upper arm, resulting in shoulder pain. This level of herniation does not usually cause numbness or tingling.  
 C5 - C6 (C6 nerve root) – Associated with weakness in the biceps (muscles in the front of the upper arms) and the extensor muscles. Numbness and tingling along

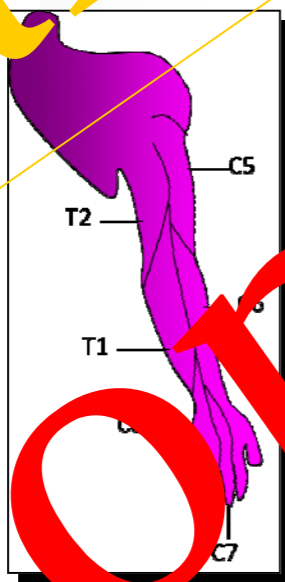


Figure 4: Pain from nerve root has a typical radiating pattern, known as a dermatome pattern.

with pain can radiate to the thumb side of the hand. C5-C6 is one of the most common levels for a cervical disc herniation to occur.

C6 - C7 (C7 nerve root) – Associated with weakness in the triceps (muscles in the back of the upper arm and extending to the forearm) and the finger extensor muscles. Numbness and tingling along with pain can radiate down the triceps and into the middle finger. This is also one of the most common levels for a cervical disc herniation.

C7 - T1 (C8 nerve root) – Associated with weakness with handgrip. Numbness and tingling and pain can radiate down the arm to the little finger side of hand. In cases where there is not a lot of instability, an anterior fusion (ACDF) alone can be sufficient. Usually, this is true in cases of one level degenerative disease where there is single disc space collapse or disc herniation. If however, films (plain x-rays) of the cervical spine indicate abnormal movement of the spine suggesting instability (e.g. severe unstable kyphotic deformity), an anterior approach to spine fusion may be accompanied with posterior (from the back) fusion to provide additional support to the fused level of the spine.

### What are the benefits?

ACDF is done to decompress the spinal nerves, to stabilize and strengthen the spine and to alleviate the symptoms of severe chronic neck pain, arm pain or weakness. If weakness is present prior to surgery, this may or may not improve; however, symptoms should remain stable.

### 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 before undergoing the operation. Once you decide on surgery, most surgeons will have you undergo a complete physical examination by your regular doctor. This exam helps evaluate whether you are physically fit to tolerate the upcoming operation.

Before surgery you should **avoid using antiplatelet agents** (such as aspirin, Plavix) or **blood thinners** (such as coumadin, heparin) since these can increase bleeding during the operation. **Smoking** is frowned upon since it retards wound healing and should be **stopped at least 2 weeks** prior to 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 your surgery.** If you take any medications, discuss this fact with your doctor.

### What happens during surgery?

Patients are given a general anesthesia to put them to sleep during the surgery. A breathing tube (endotracheal tube) is placed and the patient breathes with the assistance of a ventilator. A ventilator is a device that controls and monitors the flow of air into the lungs. Preoperative intravenous antibiotics are given. The patient is positioned on their back on the operating room table with the neck kept in its usual position. The surgical region (neck area) is cleansed with a special cleaning solution. Sterile drapes are placed, and the surgical team wears sterile surgical attire such as gowns and gloves to maintain a bacteria-free environment.

An incision is made on either the right or left side of the neck according to the surgeon's preference. Often this incision may be made in three places, giving no increase to minimize its visibility after surgery (Figure 5).

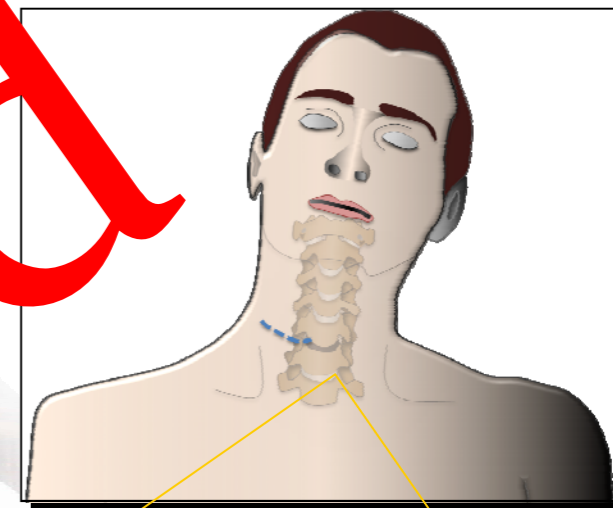


Figure 5: Typical location of the incision on the neck.

The trachea and esophagus are protected midline, and the carotid artery and jugular vein are protected toward the side using metal retractors. These retractors occasionally cause a sore throat or hoarseness for a short time after surgery. At this point, the operating microscope might be used for better vision throughout the remainder of the surgery.

The disc is cut and excised using special cutting and gouging instruments (rongeurs and curettes). If there are bone spurs or other bony irregularities, a drill may be used to shave down these areas. The height of the disc space is then measured, and a bone spacer (metal or plastic spacers may also be used) is carefully placed in the disc space. Fluoroscopic x-rays are taken to confirm that the spacer is in the correct position. Once in place, these spacers are held between the two vertebral bodies and will eventually form a secure fusion.

When cadaveric bone is used as the spacer, it is tested and sterilized before use, but in some instances, it is preferred by the surgeon, or by the patient's request, that the patient's own bone is used. If this is the case, the bone is usually taken from the hip.

During the procedure, certain substances (e.g. bone morphogenetic protein; BMP) may be used to promote bony fusion, or, depending on the surgeon, a titanium plate may be screwed to the upper and lower vertebral bodies to reinforce the bone graft, providing extra stability until the cadaveric bone causes a fusion (Figure 6).

The retractors are then removed and the incision is closed with stitches. The patient may be asked to wear a neck collar for several

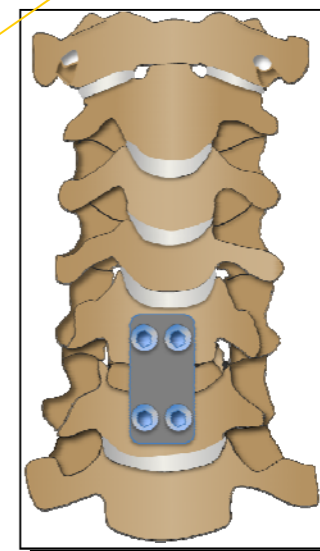


Figure 6: Titanium plate and screws reinforcing interbody graft.