

What happens after surgery?

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

Walk as early as possible after your surgery. This can help to prevent blood clots from forming in your legs and pneumonia by assisting your lungs to 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.

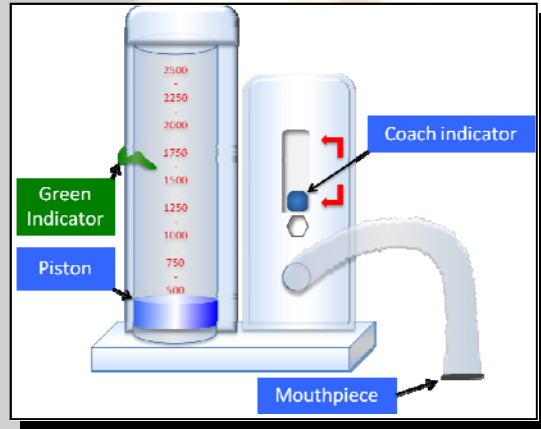


Figure 7. Use by breathing-in deeply and measuring the volume of air your lungs can hold. Repeat this slowly, 10 times every hour.

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

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

Dissolving stitches, sutures or staples are commonly used to close incision. 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 when the incision site heals.

Normal wound care during the post-operative period includes keeping the incisions dry. You usually are able to shower, but should avoid swimming and hot tubs as in baths, or swimming until you are seen by your physician at the next appointment. Your first follow-up appointment is usually within 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 may be 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
- **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 by the end of the first day after surgery. Most patients can expect to stay in the hospital or 1-2 days depending on their condition. Once released from the hospital, patients who have undergone surgery are may be given a prescription for pain medications to be taken if needed, as well as a detailed post-operative plan, physical therapy/exercise plan to help ease recovery and return to a healthy lifestyle. Patients can generally resume normal activities about a week after surgery, but this should be discussed with your physician. If you are an outpatient, physical therapy, you will probably need to attend many sessions over two to four weeks. You should expect full recovery to take up to three months.

Anterior Cervical Discectomy and Fusion (ACDF)

Colen Surgical Medi-Card

What is 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 three 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 the procedure the disc in between two vertebral bodies is removed and a bony 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.

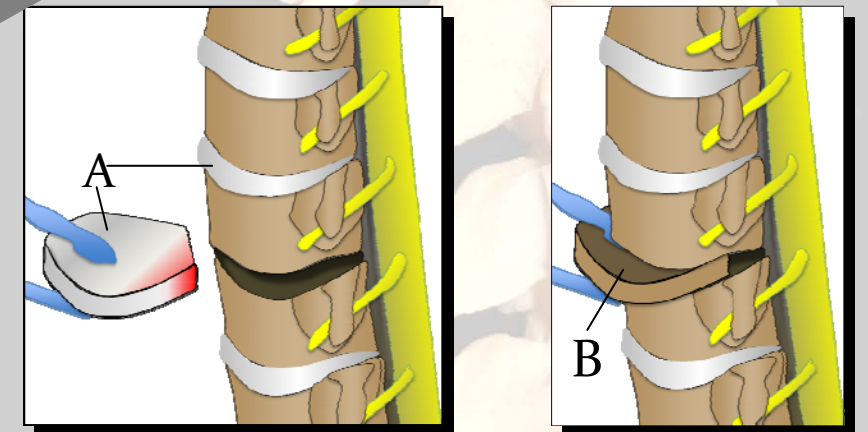


Figure 1: Cervical bony structures. The disc (labeled A) is removed and replaced with a spacer in between both vertebral bodies. This synthetic spacer is known as an *interbody biomechanical device* (labeled B).

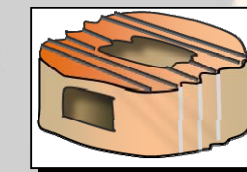
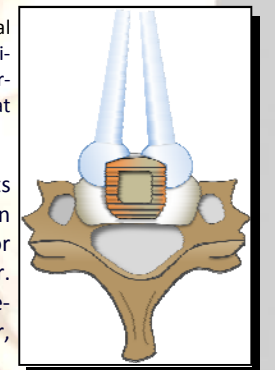


Figure 2: Interbody biomechanical spacer. Many types of biomechanical spacers are available on the market; this is an example of one that your physician may use.



There are 2 types of bony grafts that may be used in this procedure, one is an (autograft) in which bone is taken from the patient's own pelvic bone, or an (allograft) which is a bone obtained from another donor. Once the appropriate graft is chosen it is then packed between the two vertebrae in order to "fuse" them together, hence providing increased spinal stability. This bone graft,

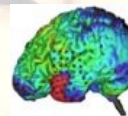
I read and understand the content presented in this brochure. All my questions regarding this surgical procedure have been answered satisfactorily.

PATIENT'S SIGNATURE

Disclaimer: The content presented in this brochure may vary slightly from the actual surgical procedure.

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or the biomechanical spacer implant, will take the place of the intervertebral disc, which is entirely removed in the process.

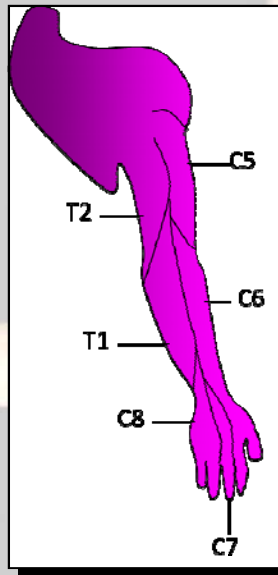


Figure 3: A herniated disc impinges on the spinal nerve, causing radiating neck pain.

What are the indications? When is it used?

Spinal fusion surgery such as ACDF is most commonly indicated for patients suffering with chronic neck and/or arm pain, numbness, tingling or weakness secondary to degenerative disc disease, spine instability, and deformities in the curve of the spine causing spinal instability; NOT relieved with conservative therapies (e.g. physical therapy, pain medication). Fusion surgery is done to relieve the pressure on the nerve roots, stabilize and strengthen the spine, and to alleviate severe, 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 front of the upper arms) and wrist extensors. Numbness, tingling along 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.
 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.

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

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. Generally, this is true in cases of one level degenerative disc disease where there is a lot of disc space collapse or a single disc herniation. If however, x-ray films (prior to surgery) of the cervical spine indicated abnormal movement of the spine suggesting instability (e.g. severe unstable kyphotic deformity), an anterior approach to spine fusion may be accompanied with a 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 relieve the symptoms of severe, chronic neck, arm pain, numbness, weakness. If weakness is present prior to surgery, this may or may not improve; however, symptoms should remain constant.

How will I prepare for surgery?

The decision to proceed with surgery is made jointly by you and your surgeon. You should understand as much as possible about the procedure. If you have any questions, you should ask 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 general anesthesia to help them to sleep during the surgery. A breathing tube (tracheal tube) is placed in the mouth and the patient breathes through the assistance of a ventilator. A ventilator is a device that pushes air into the lungs and allows the flow of air to be controlled. Preoperatively, the patient is given antibiotics to prevent infection. The patient is positioned on their back in the operating room. The neck is shaved and kept in its usual position. The surgical region (neck area) is prepared with a special cleaning solution. Sterile drapes are placed around the neck and the surgical team wears sterile protective attire such as gowns and gloves to maintain a bacteria-free environment. The decision is made on either the right or left side of the neck according to the surgeon's preference. One of the incisions may be made to preexisting neck scars to increase to minimize its visibility after surgery, figure 5.

The trachea and esophagus are protected midline, and the carotid artery and jugular vein are protected toward the side using metal retractors. These retractors can occasionally cause a sore throat or hoarseness for a short time after surgery.

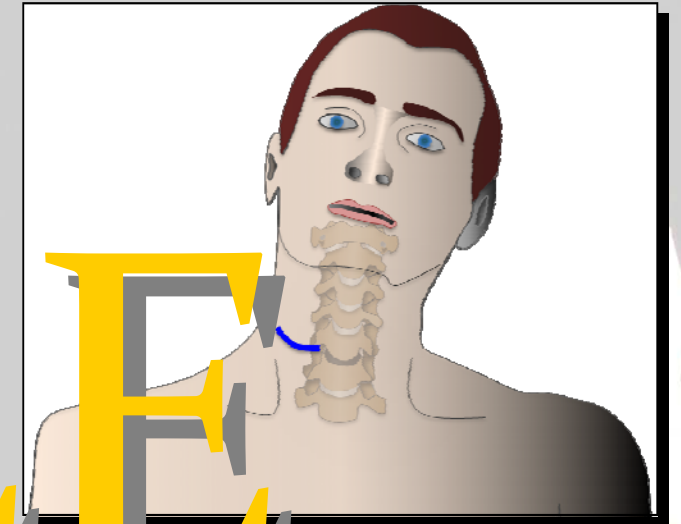


Figure 5: Location of the incision on the neck.

At this point, the operating microscope might be used for better vision throughout the remainder of the surgery. The disc is then cut and excised using special biting and grasping instruments (such as a pituitary rongeur, Kerrison rongeur, and curettes). If there are bone spurs or other bony irregularities, a drill may be used to shave down these protrusions.

The height of the disc space is then measured, and a bone spacer (metal or plastic spacers may also be used) is then carefully placed in the disc space. These spacers are left between the two vertebral bodies, which will eventually form a secure fusion. Fluoroscopic x-rays are taken to confirm that the spacer is in the correct position.

When cadaveric bone is used as the spacer, it is tested and sterilized before use, and in some instances, patients are requested that their own bone be used. If the case, the bone is usually taken from the patient. There are also some instances in which it is possible to use the patient's own bone. In addition, certain substances (e.g. bone morphogen protein; BMP) may be used to promote bony fusion. Finally, depending on the surgeon, titanium may be used to the intervertebral discs to reinforce the bone graft in between and provide some extra stability until the cadaveric bone causes a fusion, Figure 6.

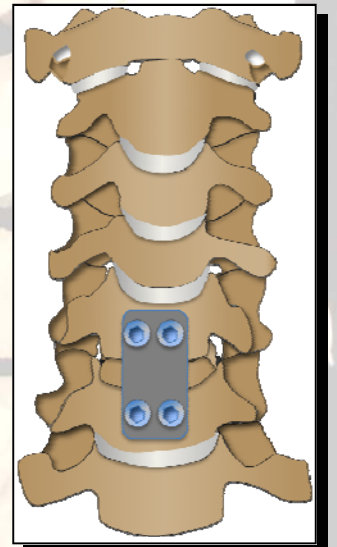


Figure 6: Titanium plate and screws reinforcing interbody graft.

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