Disclaimer

This movie is an educational resource only and should not be used to manage orthopaedic health. All decisions about the management of orthopaedic conditions must be made in conjunction with your Physician or a licensed healthcare provider.
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INTRODUCTION

Anterior Cervical Discectomy and Fusion (ACDF) is a surgical procedure of the spine performed to remove a herniated or degenerative disc from the spinal canal in the neck region. It is referred to as “anterior” because your surgeon accesses the spinal canal through the anterior or front of the neck. Spinal fusion surgery joins (fuses) two or more vertebrae together with bone grafts to eventually form one solid piece of bone.

To learn more about ACDF, it is important to learn about normal spine anatomy.
Normal Spine Anatomy

The spine, also called the back bone, is designed to give us stability, smooth movement, as well as providing a corridor of protection for the delicate spinal cord. It is made up of bony segments called vertebrae and fibrous tissue called intervertebral discs.

(Refer fig. 1)

The vertebrae and discs form a column from your head to your pelvis providing symmetry and support to the body. The spine can be divided into 4 parts. The uppermost is the cervical region, consisting of 7 small vertebrae that form the neck.

As we move down the body, the next 12 vertebrae make up the thoracic region or mid back from which the ribs are hinged.

The 5 lumbar vertebrae are the largest of the mobile vertebrae and supports 2/3 of the body’s weight. The lowest region of the spine is the sacrum and coccyx. The sacrum is a triangular plate made up of 5 fused vertebral segments while the 4 coccyxes terminate the bony spine.

Cervical

(Refer fig. 2)

Thoracic

(Refer fig. 3)
A single vertebra is made up of two parts; the front portion is called the body, cylindrical in shape, and is strong and stable. The back portion of the vertebra is referred to as the vertebral or neural arch and is made up of many parts. The strong pedicles join the vertebral arch to the front body.

The laminae form the arch itself while the transverse process spread out from the side of the pedicles like wings to help anchor the vertebral arch to surrounding muscle. The spinous process forms a steeple at the apex of the laminae, and is the part of our spine that is felt directly under the skin.

(Refer fig. 7)
Laminae
The laminae of the vertebra can be described as a pair of flat arched bones that form a component of the vertebral arch.

Spinal Canal
This canal is formed by the placement of single vertebral foramina, one on top of the other, to form a canal. The purpose of the canal is to create a bony casing from the head to the lower back through which the spinal cord passes.

Pars Inter Articularis
Known as the Pars, it is the part of the vertebral arch where the pedicle, transverse process, and articular process transect.
Intervertebral Disc
The intervertebral disc sits between the weight bearing vertebral bodies, servicing the spine as shock absorbers.

The disc has fibrous outer rings called the annulus fibrosus with a watery jelly filled nucleus called the Nucleus Pulposis.

(Refer fig. 11)

Spinal Cord
The spinal cord is the means by which the nervous system communicates the electrical signals between the brain and the body. It begins at the brain stem and is held within the spinal canal until it reaches the beginning of the lumbar vertebrae.

At L1 the spinal cord resolves down to a grouping of nerves that supply the lower body.

(Refer fig. 12)

Facet Joint
Facet joints are the paired articular processes of the vertebral arch.

These synovial joints give the spine it’s flexibility by sliding on the articular processes of the vertebrae below.

(Refer fig. 13)
Diagnosis
Evaluating the source of neck pain is critical in determining your options for relief of the pain and the location of where to perform surgery.

Your surgeon will perform the following:

- Medical History
- Physical Examination

MRI
Magnetic and radio waves are used to create a computer image of soft tissue such as nerves and ligaments.

(Refer fig. 14)

CT Scan with myelogram
CT Scan with myelogram a type of medical imaging which is done by injecting contrast medium into the affected area of the spine followed by CT scan of the area that creates 3D images from multiple x-rays

(Refer fig. 15 & 16)
X-rays

X-rays a form of electromagnetic radiation that is used to take pictures of bones.

(Refer fig. 17)

Indications

Indications for Anterior Cervical Discectomy with Fusion surgery include

ACDF is performed to relieve pressure on neural structures caused by abnormal bony growths or herniated discs. Your surgeon may recommend this surgery if the following conditions exist:

- Diagnostic testing shows the presence of a herniated cervical disc, a condition caused by a tear in the disc causing the disc contents to bulge out placing pressure on nerve roots or the spinal cord.
- Diagnostic testing shows the presence of a degenerative cervical disc, a condition caused by accumulated “wear and tear” leading to osteoarthritis causing neck pain and neurological deficits.
- Patient is experiencing radiculopathy, neurological deficits such as arm or finger weakness, numbness or pain.
- Conservative treatment options such as medication, physical therapy, or injections have failed to improve the patient’s condition.
Anterior Cervical Discectomy and Fusion Surgery

Surgical Overview

Anterior Cervical Discectomy and Fusion is a surgical procedure to alleviate severe pain and disability resulting from the compression of spinal nerves in the neck area from a herniated disc.

ACDF surgery is usually recommended for patients whose symptoms have not been relieved by other treatments such as rest, medication, physical therapy, and pain blocking injections. The surgery involves the placement of a bone graft between the two vertebrae where the disc is removed to fuse (join) the two vertebrae together.

Bone grafts can be obtained from the following sources:

- **Allograft**: This is bone from a bone bank that has been donated.
- **Autograft**: This is bone taken from the patient’s hip requiring another incision to the body.
- Combination of both allograft and autograft
- **Bone graft substitute**

The fusion process varies in each patient and can take anywhere from 6-9 months or longer.

The goal of Anterior Cervical Discectomy and Fusion surgery is to:

- Relieve radiculopathy: pain, numbness, tingling and weakness
- Restore nerve function
- Stop or prevent abnormal motion in the spine

Surgical Procedure

Anterior Cervical Discectomy and Fusion Surgery is performed by an experienced Spine or Neuro surgeon. The surgery is performed under sterile conditions in the operating room with the patient under general anesthesia and lying on their back. Your surgeon will make a horizontal incision to the front of the throat area.

*(Refer fig. 18 to 30)*
Surgical Procedure

The neck muscles are separated and the esophagus and trachea are retracted (moved aside) so the surgeon can access the vertebrae and herniated disc.

Once the disc is located and confirmed on x-ray, the surgeon then inserts a spreader to separate the vertebrae above and below the affected disc. The disc is removed with assistance from fluoroscopic x-ray and a microscope to ensure complete removal of all contents.

(Refer fig. 18 to 30)
Surgical Procedure

Next, the ligament which covers the spinal nerves is removed to ensure no disc contents are pressing on the nerve. Any bone spurs present will also be removed.

A foraminotomy is then performed. This involves widening the opening through which the spinal nerves pass to give more room and prevent nerve compression.

Next, the vertebral bone is prepared to receive the bone graft and the graft is inserted between the two vertebrae.

(Refer fig. 18 to 30)
Surgical Procedure

Depending on your surgeon’s preference, a metal plate is screwed into the vertebrae above and below the graft to provide stability.

Your surgeon then removes the spreaders and retractors and sutures the tissue layers closed. The external incision is closed with dissolvable sutures or biologic glue.

(Refer fig. 18 to 30)
Postoperative Care

After surgery your surgeon will give you guidelines to follow depending on the type of surgery performed and the surgeon's preference. Common post operative guidelines following include the Following:

- You will be taught how to use proper body mechanics to turn in bed, stand up, sit, and walk while the incision is healing to prevent strain on the surgical area.
- You will usually be discharged from the hospital after 1 or 2 days depending on your circumstances.
- You will be given IV pain medications the first day, then oral pain medications for the discomfort. It is very important NOT to take NSAID’s, non-steroidal anti-inflammatory drugs, such as aspirin, ibuprofen or naproxen sodium for 6 months. NSAID’s can interfere with healing and cause bleeding.
- You will be given specific instructions regarding bathing and care of your incision.
- You will be encouraged to walk as much as tolerated and avoid prolonged sitting.
- DO NOT SMOKE. This is very important to follow as smoking slows down the healing, increases the risk of complications, and interferes with the bone graft process.
- No driving, usually for about 2-4 weeks, depending on your surgeon's preference.
- Avoid pulling, pushing, or lifting. Do not bend your head forward or backward.
- A postoperative rehabilitation program may be prescribed by your doctor.
- You may be given a neck brace to wear to support the neck muscles during the healing process.
- Keep the incision area clean and dry and report any signs or symptoms of infection to your surgeon such as redness, swelling, increased pain, excess drainage, odorous drainage, fever, or chills.
- Eating a healthy diet and not smoking will promote healing.

Risks and Complications

As with any major surgery there are potential risks involved. The decision to proceed with the surgery is made because the advantages of surgery outweigh the potential disadvantages. It is important that you are informed of these risks before the surgery takes place.

Complications can be medical (general) or specific to spinal surgery. Medical complications include those of the anesthetic and your general well being.
Risks and Complications

Almost any medical condition can occur so this list is not complete. Complications are rare but can include:

(Refer fig. 31)

- Allergic reaction to medications
- Blood loss requiring transfusion with its low risk of disease transmission
- Heart attack, strokes, kidney failure, pneumonia, bladder infections
- Complications from nerve blocks such as infection or nerve damage
- Serious medical problems can lead to ongoing health concerns, prolonged hospitalization, or rarely death.

Complications are rare after ACDF surgery, but unexpected events can follow any operation. Your surgeon feels you should be aware of complications that may take place so that your decision to proceed with this operation is taken with all relevant information available to you.

Specific complications of Anterior Cervical Discectomy and Fusion Surgery can include:

- Swallowing difficulties
- Transient neck pain
- Failure of vertebrae to fuse
- Adjacent-segment degenerative disease
- Spinal instability
- Nerve root injury/damage
- Failure to improve
Risks and Complications

- Skin infection at the incision line
- Bone graft migration
- Bone graft migration

Risk factors that can negatively affect adequate healing after surgery include:

- Poor nutrition
- Smoking
- Alcoholism
- Chronic Illness
- Steroid Use
- Age (over 60)
Disclaimer

Although every effort is made to educate you on Anterior Cervical Discectomy and Fusion surgery and take control, there will be specific information that will not be discussed. Talk to your doctor or health care provider about any concerns you have about ACDF surgery.

You must not proceed until you are confident that you understand this procedure, particularly, the complications.
YOUR SURGERY DATE

READ YOUR BOOK AND MATERIAL

VIEW YOUR VIDEO / CD / DVD / WEBSITE

PRE - HABILITATION

ARRANGE FOR BLOOD

MEDICAL CHECK UP

ADVANCE MEDICAL DIRECTIVE

PRE - ADMISSION TESTING

FAMILY SUPPORT REVIEW

Physician's Name: ____________________     Patient's Name: ____________________

Physician's Signature: ____________________     Patient's Signature: ____________________

Date: ______________     Date: ______________