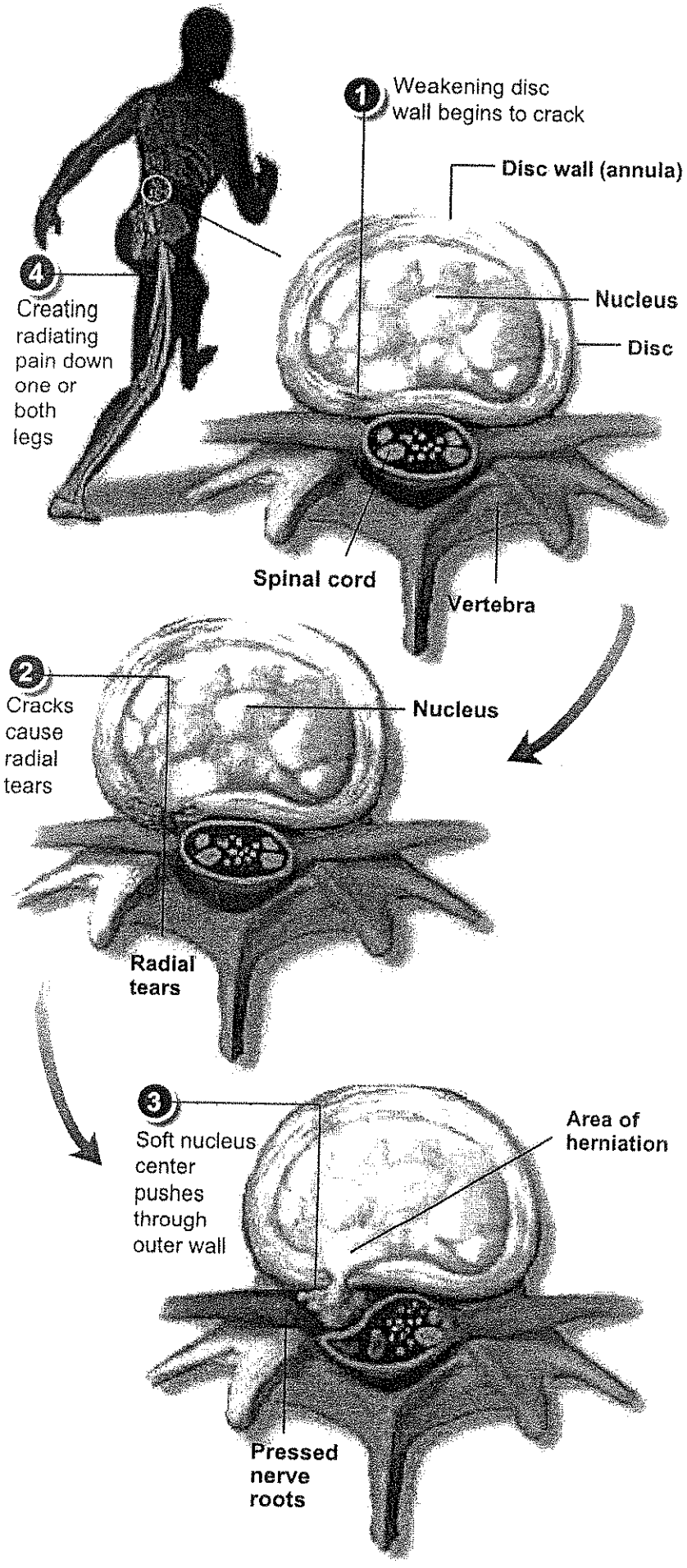


Where back pain begins

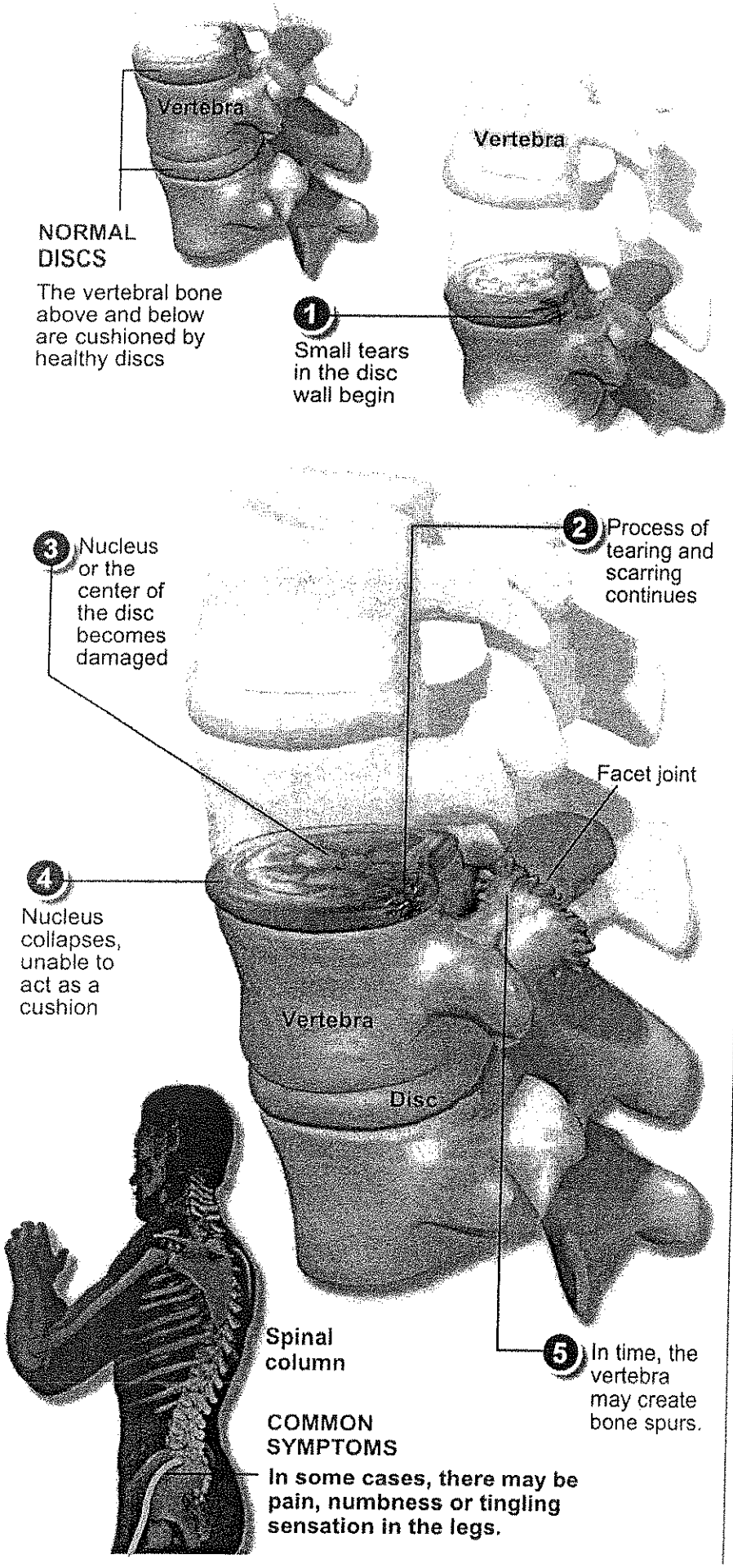
How herniated discs cause pain.

STEP 1
The fibers in the disc wall or annula begin to crack and weaken.

STEP 2
The cracks cause radial tears in and around sensitive nerve fibers in the disc wall.

STEP 3
The soft nucleus center of the disc pushes through to the outer wall of the annula along the tear. This causes local back pain at the disc level.

STEP 4
As the herniated disc pushes through the disc wall, it presses on the large nerve roots creating radiating pain down one or both legs.



Degenerative Disc Disease

OVERVIEW

While disc degeneration is a natural part of the aging process, it may also result from continued injury to the back. These injuries generally develop over a long period of time from activities that push the disc space together.

STEP 1

Degenerative disc disease generally begins with an injury to a cushioning disc in the spine. Small tears appear in the disc wall, or annulus.

STEP 2

The tears heal, creating scar tissue that is not as strong as the original disc wall. The process of tearing and scarring may continue, weakening the disc wall.

STEP 3

After some time, the nucleus center of the disc becomes damaged and loses some of its water content. This center is called the pulposus, and its water content is needed to keep it functioning as a shock absorber for the spine.

STEP 4

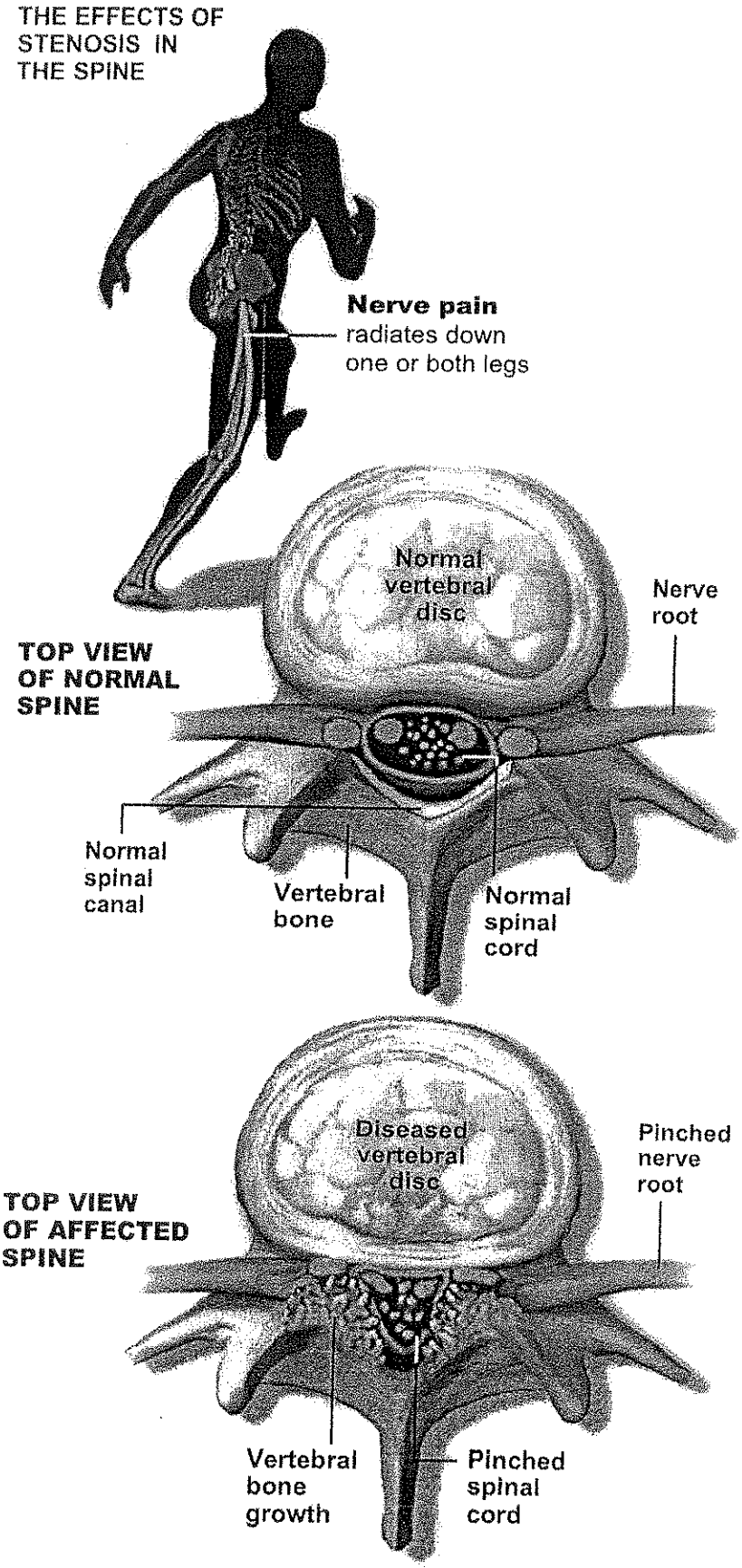
Unable to act as a cushion, the nucleus collapses. The vertebral bone above and below this damaged disc come closer together. This unnaturally twists an area called the facet joints.

STEP 5

In time, this awkward positioning of the vertebra may create bone spurs. If these spurs grow into the spinal canal, they may pinch the spinal cord and nerves (a condition called spinal stenosis).

COMMON SYMPTOMS

Pain may be felt in the back around the site of injury. Strong pain tends to come and go. Bending, twisting and sitting may make the pain worse. Lying down relieves pressure on the spine.



About Spinal Stenosis

Spinal stenosis results from new bone and soft tissue growth on the vertebra, which reduces the space in the spinal canal. When the nerve roots are pinched, a pain, burning, tingling and/or a numbing sensation is felt from the lower back area, down the legs, and sometimes all the way to the feet.

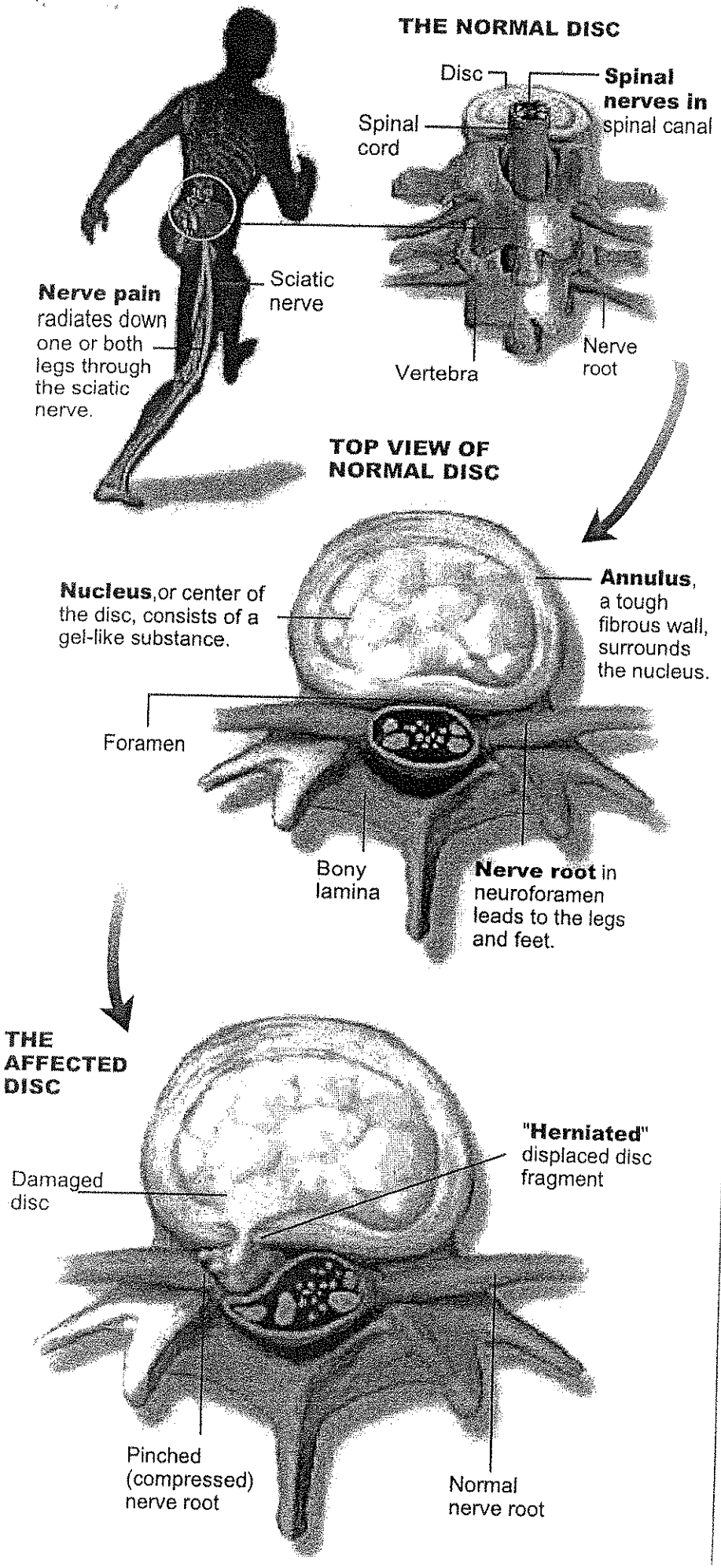
Nerve pain radiates down one or both legs through the sciatic nerve.
To understand stenosis, let's look at a normal canal.

THE NORMAL SPINE

The spinal canal has a rounded triangular shape that holds the spinal cord without pinching. Nerve roots leave the spinal canal through openings called nerve root canals which are also free of obstruction.

THE AFFECTED SPINE

New bone growth within the spinal canal causes compression of the nerve roots, which leads to the pain of spinal stenosis.



Herniated Discs

OVERVIEW

The nerves leaving the lumbar region join together and travel through the hip as the sciatic nerve. When this nerve is pinched by a herniated disc, a pain, burning, tingling and/or a numbing sensation is felt from the low back area to the foot.

THE NORMAL DISC

To understand a disc herniation, let's first look at a normal disc. The bony vertebrae of your spinal column are separated from one another by pads of tough cartilage called intervertebral discs. The discs act like shock absorbers, and allow for normal pain-free motion of the spine.

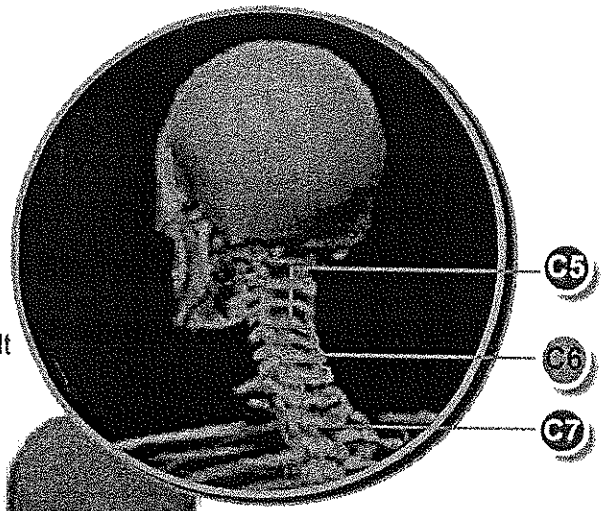
Structurally, the disc is composed of two main parts. The inner nucleus (nucleus pulposis) and outer wall (annulus fibrosis).

THE AFFECTED DISC

The wear of normal aging and/or trauma can cause injury to the disc. The soft nucleus hardens and breaks apart. The annulus weakens and forms small tears. A disc herniates when damaged pieces of nucleus rupture through a tear in the annulus. The herniated disc often pinches (compresses) a local nerve root.

Symptoms

The nerve roots leaving the neck area serve the arms. When a cervical nerve root is injured, pain, weakness, numbness or tingling may be felt in the shoulder, arm or hand.

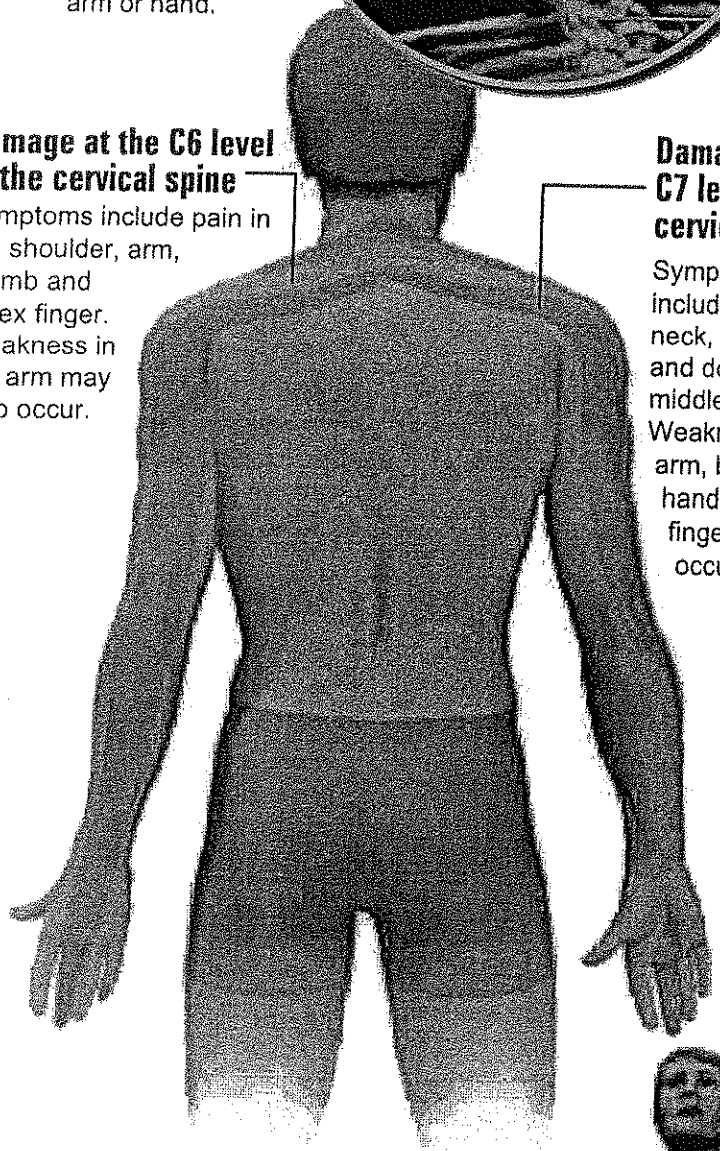


Damage at the C6 level of the cervical spine

Symptoms include pain in the shoulder, arm, thumb and index finger. Weakness in the arm may also occur.

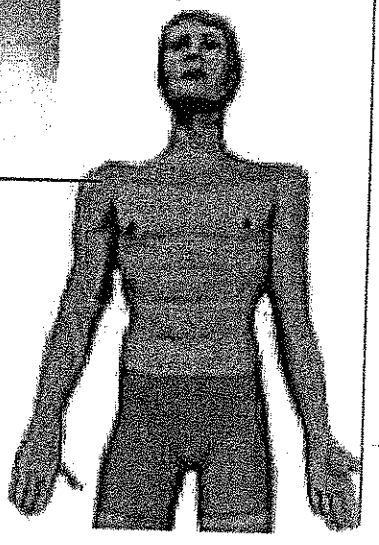
Damage at the C7 level of the cervical spine

Symptoms include pain in the neck, shoulder and down the middle finger. Weakness in the arm, back of the hand and middle finger may also occur.



Damage at the C5 level of the cervical spine

Symptoms include pain in the shoulder and upper arm. Weakness in the upper arm and shoulder may also occur.



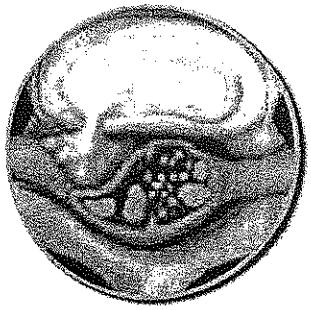
Cervical Radiculopathy

The spinal cord branches out to all parts of the body. The part of a nerve that connects to the spinal cord is called a nerve root. If one of these roots is injured or pinched, pain, weakness, numbness or tingling may be felt in the part of the body served by that nerve.

MOST COMMON CAUSES OF NERVE ROOT INJURY

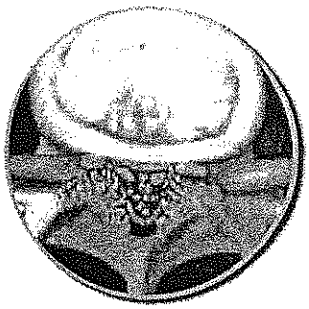
Herniated Disc

When a spinal disc ruptures, it may press on a nerve root.



Spinal Stenosis

The bones creating the spinal canal may grow inward, pinching a nerve root.

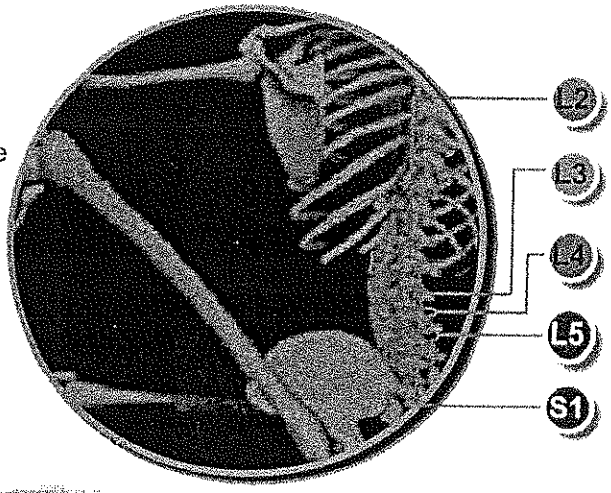


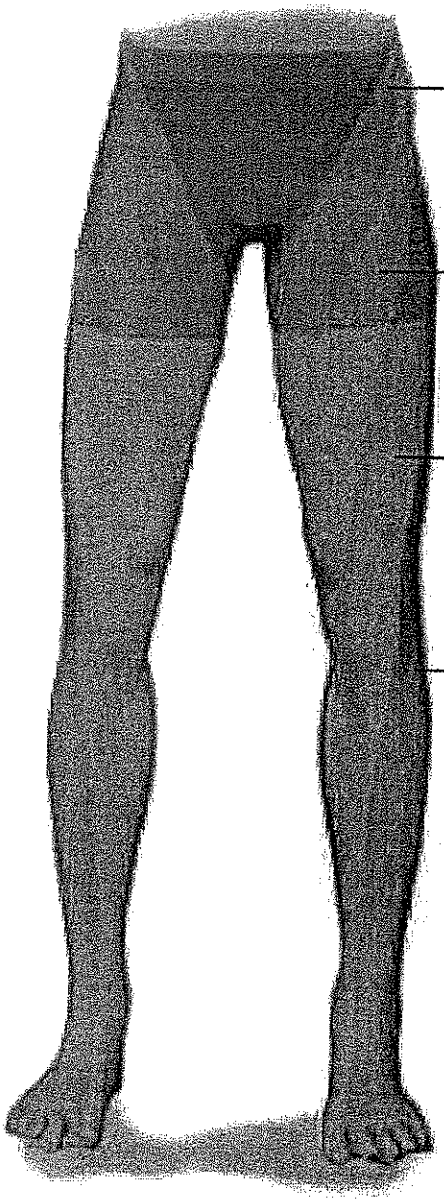
Degenerative Disc Disease

If a spinal disc weakens, vertebral bones above and below may touch, pinching nearby nerve roots. Bony spurs also may press on the nerves.

Symptoms

The nerve roots leaving the back serve the legs. When a lumbar root is injured, pain, weakness, numbness or tingling may be felt in the buttocks, leg or foot. This pain is usually called sciatica.





Damage at the L2 level of the lumbar

Pain in the thigh. Weakness in the hip.

Damage at the L3 level of the lumbar

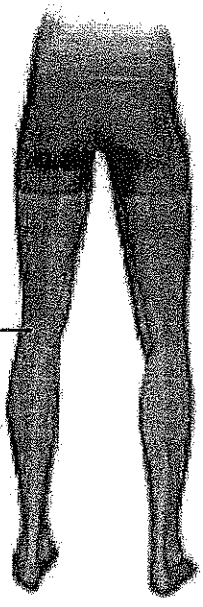
Pain in the thigh. Weakness in the knee and thigh.

Damage at the L4 level of the lumbar

Pain in the lower back down to the knee and foot. Weakness in the foot.

Damage at the L5 level of the lumbar

Pain on the outside of the leg to the top of the foot and big toe. Weakness in the foot.



Damage at the S1 level of the spine

Pain in the back of the calf to the outside of the foot and little toe. Weakness in the foot.

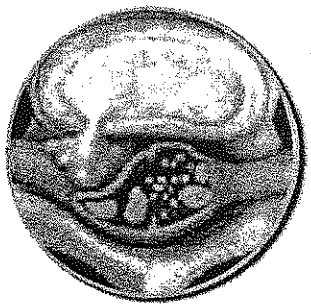
Lumbar Radiculopathy

The spinal cord branches out to all parts of the body. The part of a nerve that connects to the spinal cord is called a nerve root. If one of these roots is injured or pinched, pain, weakness, numbness or tingling may be felt in the part of the body served by that nerve.

MOST COMMON CAUSES OF NERVE ROOT INJURY

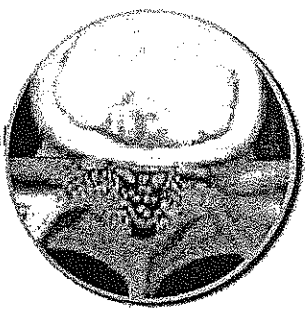
Herniated Disc

When a spinal disc ruptures, it may press on a nerve root.



Spinal Stenosis

The bones creating the spinal canal may grow inward, pinching a nerve root.



Degenerative Disc Disease

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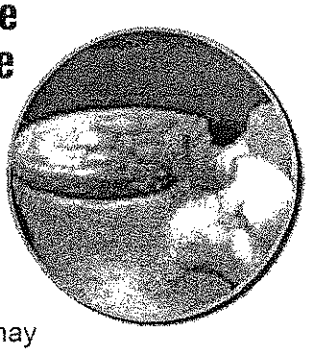
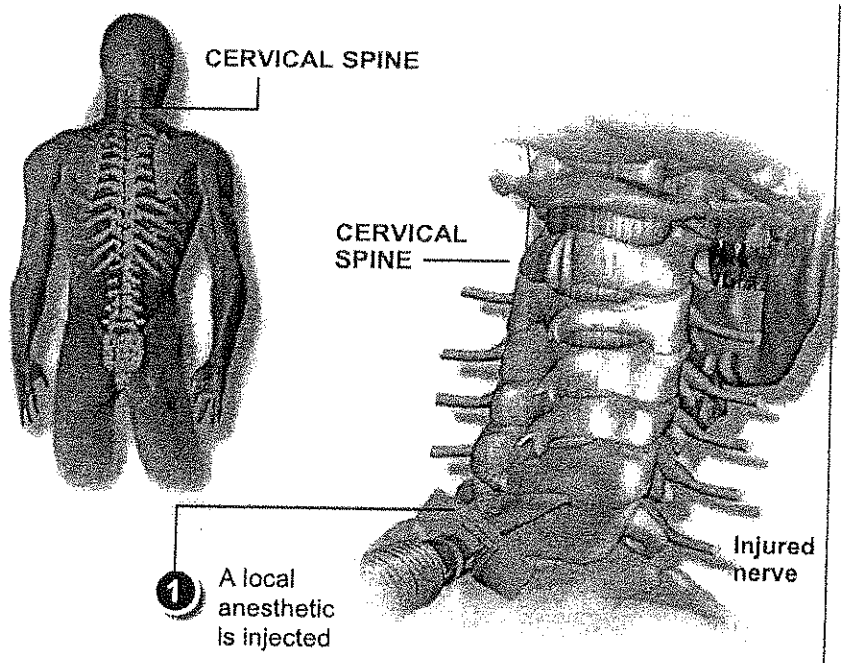
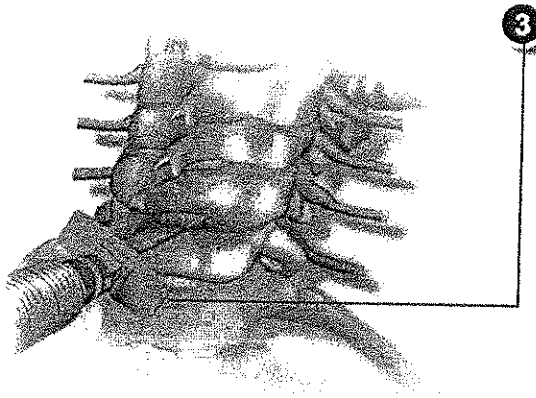
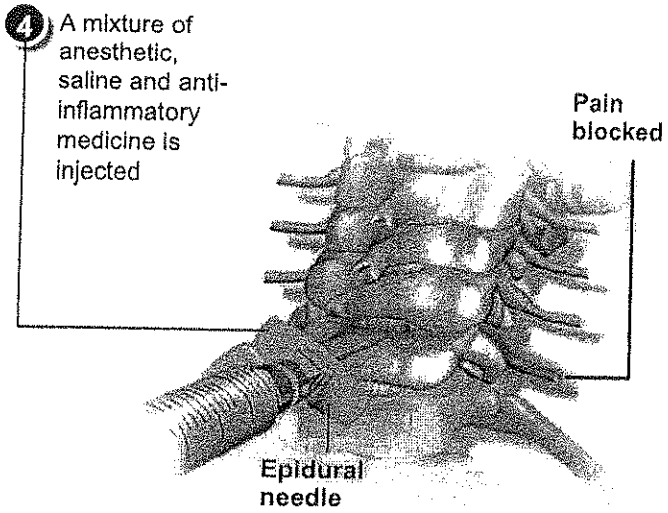








Cervical Epidural Steroid Injection

This injection is administered to relieve pain in the neck, shoulders, and arms caused by pinched nerve(s) in the cervical spine. Conditions such as herniated discs, spinal stenosis, or radiculopathy can compress nerves, causing inflammation and pain. The medication injected helps decrease swelling of the affected nerve(s). Some patients may need only one injection, but it usually takes two or three injections, given two weeks apart, to provide significant pain relief.

STEP 1

This procedure is performed with the patient lying down. Intravenous sedation may be given, and an area of neck skin and tissues is numbed with a local anesthetic delivered through a small needle.

STEP 2

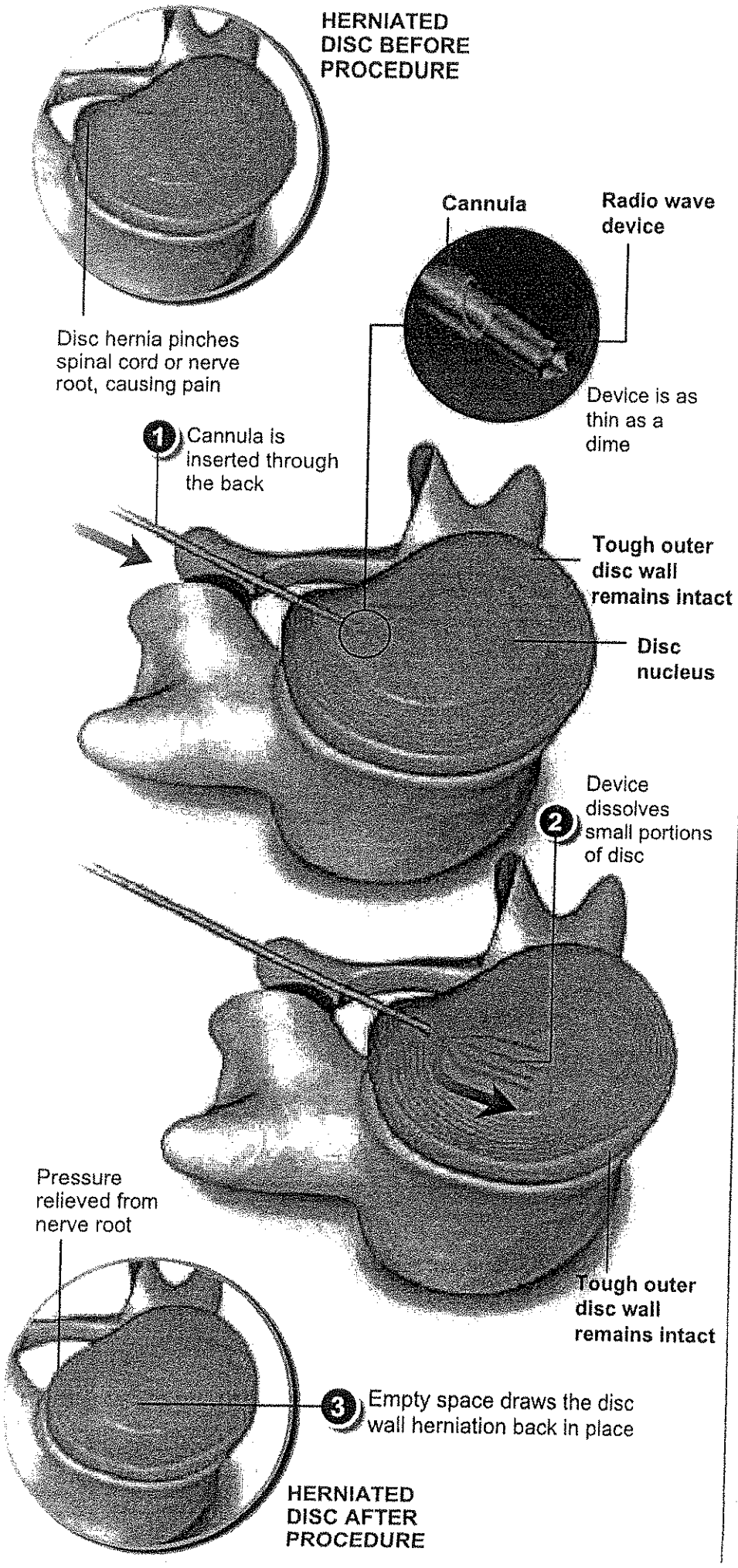
Using x-ray guidance (fluoroscopy), the physician guides a larger needle to the painful area of the neck. The needle is inserted into the epidural space, the region through which spinal nerves travel.

STEP 3

Contrast dye is injected into the space to make sure the needle is properly positioned near the area of the irritated nerve(s).

STEP 4

A combination of an anesthetic and cortisone steroid solution is injected into the epidural space. The steroid is an anti-inflammatory medication that is absorbed by the inflamed nerves to decrease swelling and relieve pressure.



Percutaneous Disc Nucleoplasty

OVERVIEW

This minimally-invasive procedure uses a small needle and advanced radiofrequency technology to reduce a herniated disc, quickly relieving pain in most patients. The procedure may be done using a gentle relaxing medicine and local anesthetic on an outpatient basis.

Step 1

After some anesthetic is injected to numb the area, a thin needle called a cannula is inserted through the back and into the herniated disc. The surgeon uses x-ray images to guide the placement of the cannula.

STEP 2

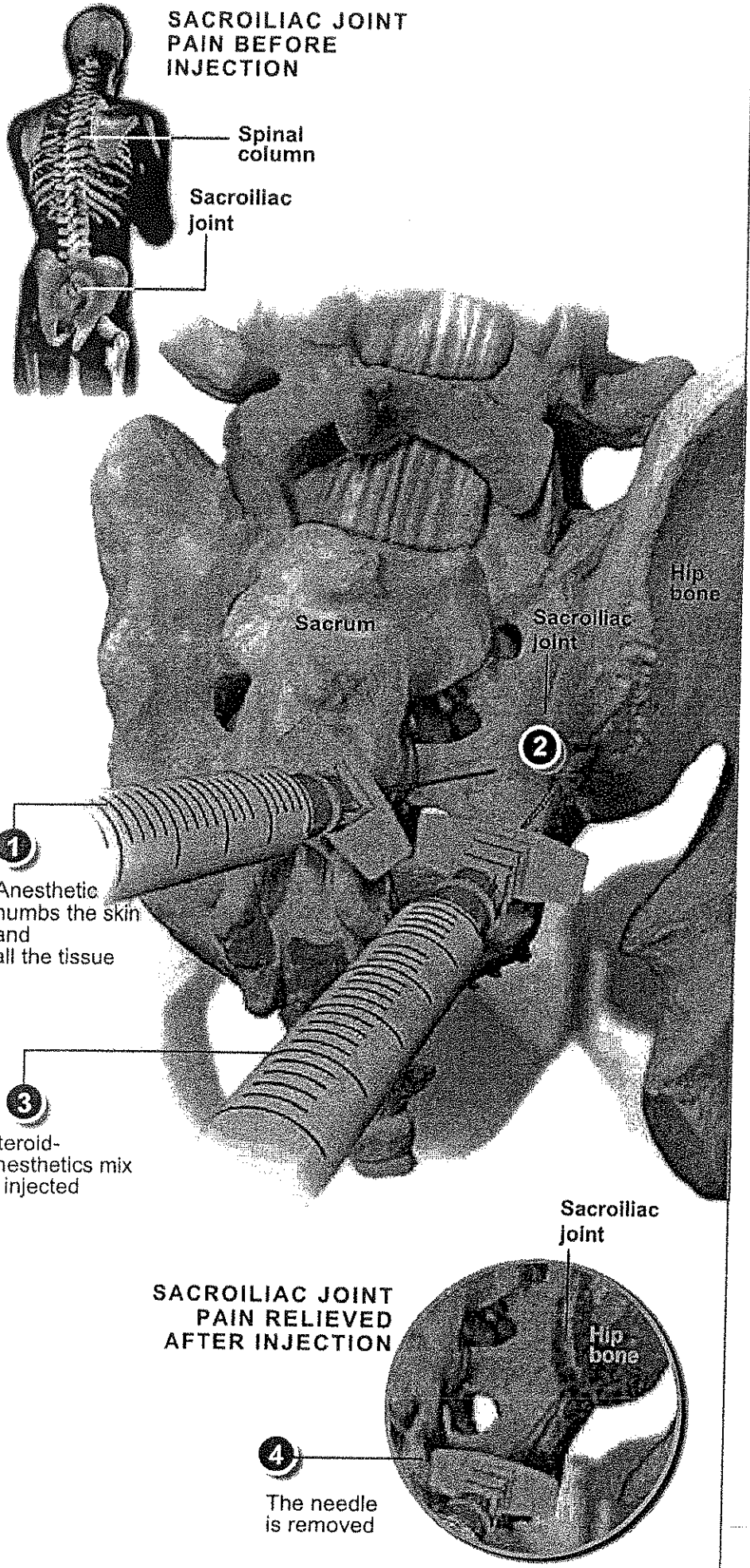
A small catheter-like device is inserted into the disc.The device sends pulses of radio waves to dissolve small portions of the disc nucleus. Because only enough of the disc is vaporized to reduce pressure inside the disc, the spine remains stable.

STEP 3

The empty space left behind draws the disc wall herniation back in place.

END OF PROCEDURE

The device and needle are removed, and the insertion area in the skin is covered with a small bandage. Because no muscles or bone are cut during the procedure, recovery is fast and scarring is minimized. The patient may need a day of bed rest after the procedure, as well as physical therapy. Most may return to normal activity within one to six weeks.



Sacroiliac Joint Steroid Injection

This injection procedure is performed to relieve pain caused by arthritis in the sacroiliac joint where the spine and hip bone meet. The steroid medication can reduce the swelling and inflammation.

Positioning the patient

In this procedure, the patient lays face down. A cushion is placed under the stomach area for comfort and to arch the back. The physician uses touch and a fluoroscope to find the sacroiliac joint.

Step 1

A local anesthetic numbs the skin and all the tissue down to the surface of the sacroiliac joint.

Step 2

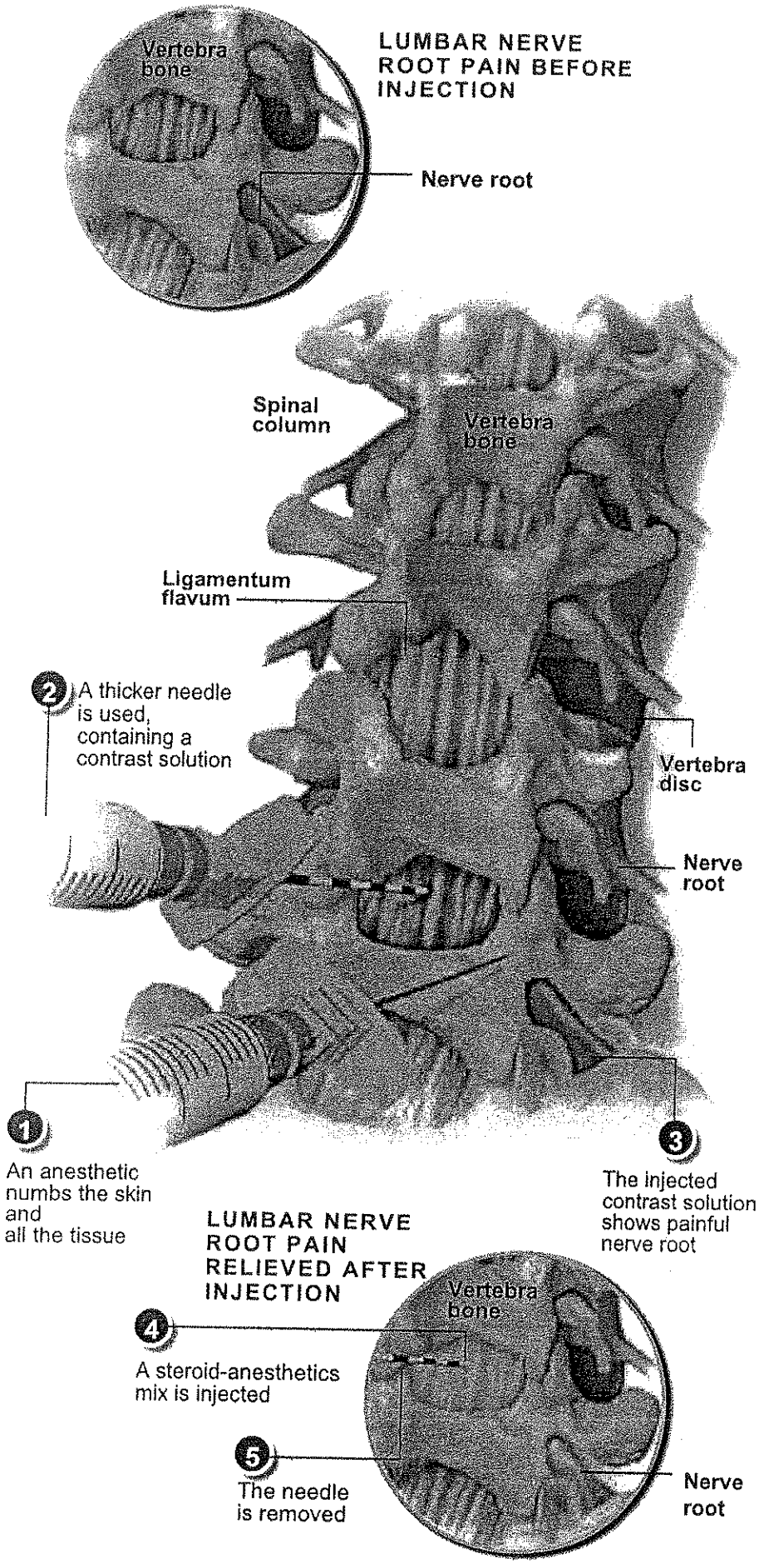
The physician advances the needle through the anesthetized track and into the sacroiliac joint.

Step 3

A steroid-anesthetics mix is injected into the sacroiliac joint, bathing the painful area in medication.

Step 4

The needle is removed, and a small bandage is used to cover the tiny surface wound.



Lumbar epidural steroid injection

This injection procedure is performed to relieve low back and radiating leg pain. The steroid medication can reduce the swelling and inflammation caused by spinal conditions, such as spinal stenosis, radiculopathy, sciatica and herniated discs. In some cases it may be necessary to repeat the procedure as many as three times to get the full benefit of the medication. However many patients get significant relief from only one or two injections.

Positioning the patient

In this procedure, the patient lays face down. A cushion under the stomach area provides comfort and flexes the back. In this position the spine will open allowing for easier access to the epidural space. A fluoroscope assists the physician in locating the appropriate lumbar vertebra and nerve root.

Step 1

A local anesthetic numbs the skin and all the tissue, down to the surface of the lamina portion of the lumbar vertebra bone.

Step 2

Using a thicker needle the physician then slides the needle through the anesthetized track. Under fluoroscope to see, the physician guides the needle toward the epidural space between the L-4 and L-5 vertebral space.

Step 3

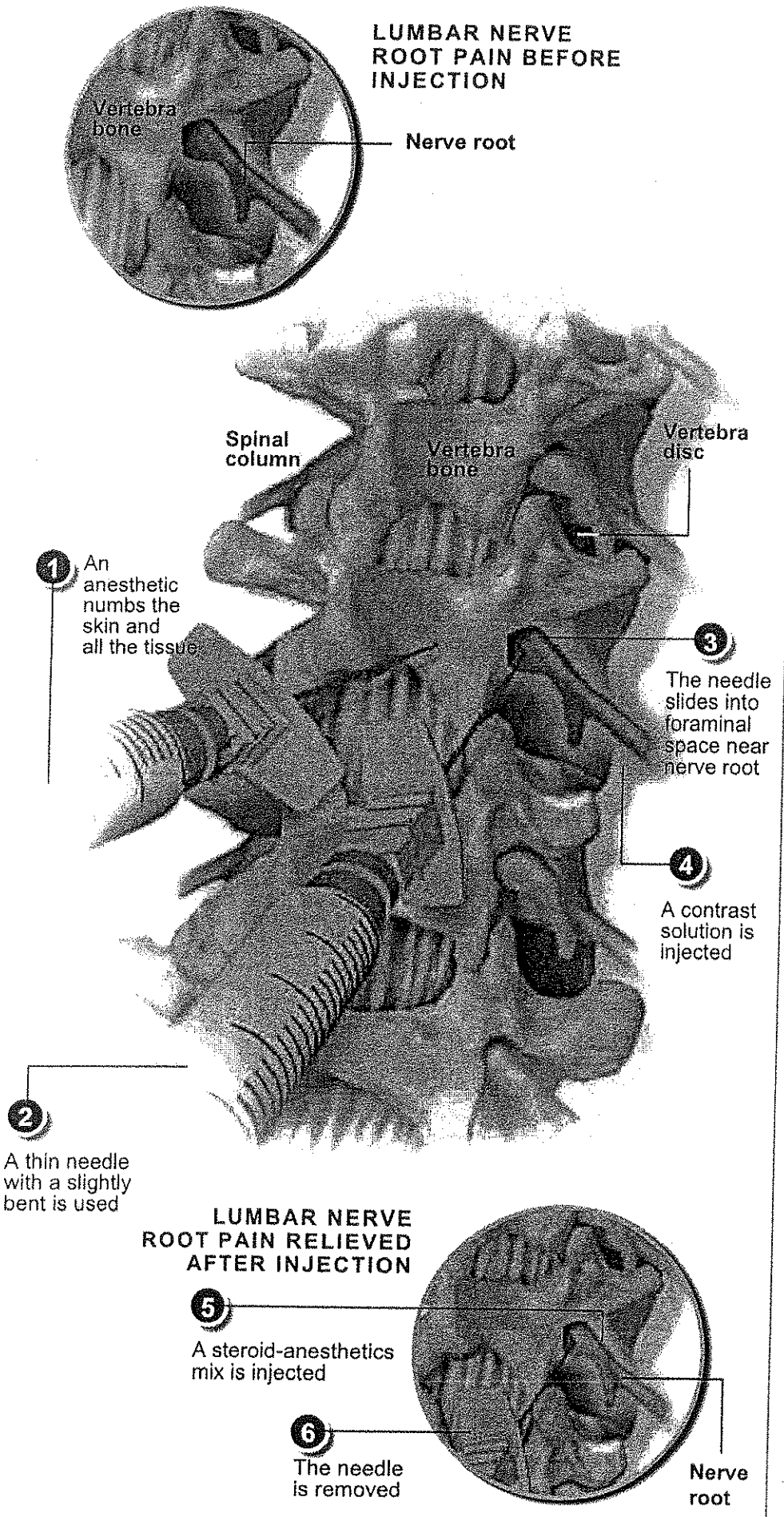
A contrast solution is injected so the physician can use the fluoroscope to see the painful areas and to confirm the correct location of the needle tip.

Step 4

A steroid-anesthetics mix is injected into the foraminal epidural space, bathing the painful nerve root with soothing medication.

Step 5

The needle is removed, and a small band-aid will be used to cover the tiny needle surface wound.



Transforaminal epidural steroid injection

This procedure is performed to relieve low back and radiating leg pain. The steroid medication can reduce the swelling and inflammation caused by spinal conditions, such as spinal stenosis, radiculopathy, sciatica and herniated discs. In some cases it may be necessary to repeat the procedure. However many patients get significant relief from only one or two injections.

Positioning the patient

Laying face down, a cushion under the stomach provides comfort and flexes the back. A fluoroscope is used to locate the appropriate lumbar vertebra and nerve root, and a local anesthetic numbs the skin.

Step 1

All the tissue down to the surface of the vertebral transverse process is anesthetized.

Step 2

The physician then slides a thin needle with a slightly bent point through the anesthetized track.

Step 3

Using the fluoroscope to see, the physician guides the needle carefully into the foraminal space near the nerve root.

Step 4

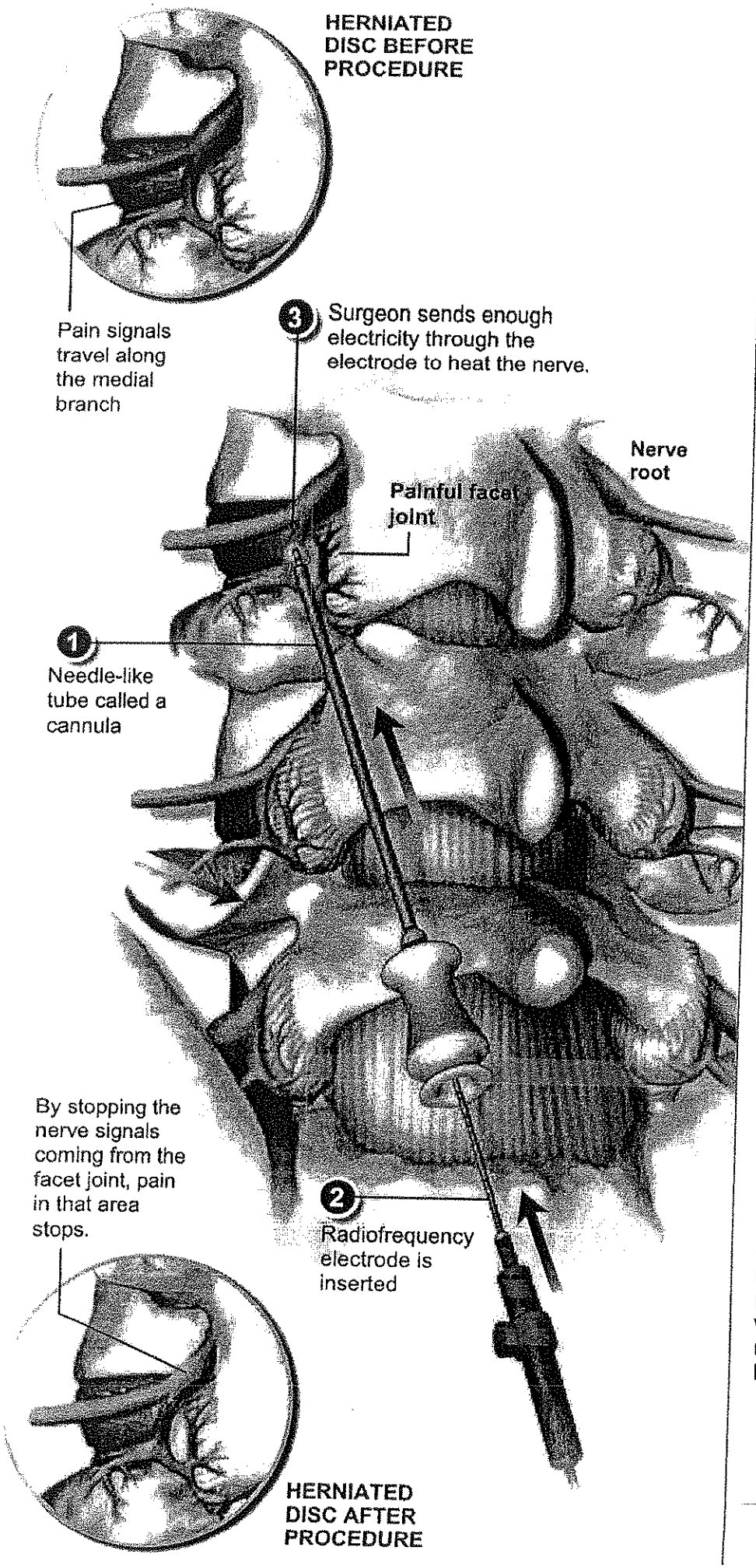
A contrast solution is injected so the physician can use the fluoroscope to see the painful areas and to confirm the correct location of the needle tip.

Step 5

A steroid-anesthetics mix is injected into the foraminal epidural space, bathing the painful nerve root with soothing medication.

Step 6

The needle is removed, and a small band-aid is used to cover the tiny needle surface wound.



Lumbar Radiofrequency Neurotomy

OVERVIEW

Also called radiofrequency (RF) rhizotomy, this procedure is done to reduce or stop pain in the spinal facets. A slight electric current is used to cut the nerves serving the painful facet joints. This short, minimally invasive procedure is done with local anesthetic.

Step 1

A needle-like tube called a cannula is inserted and positioned near the targeted medial branch. An x-ray or fluoroscope is used to help position the cannula properly.

STEP 2

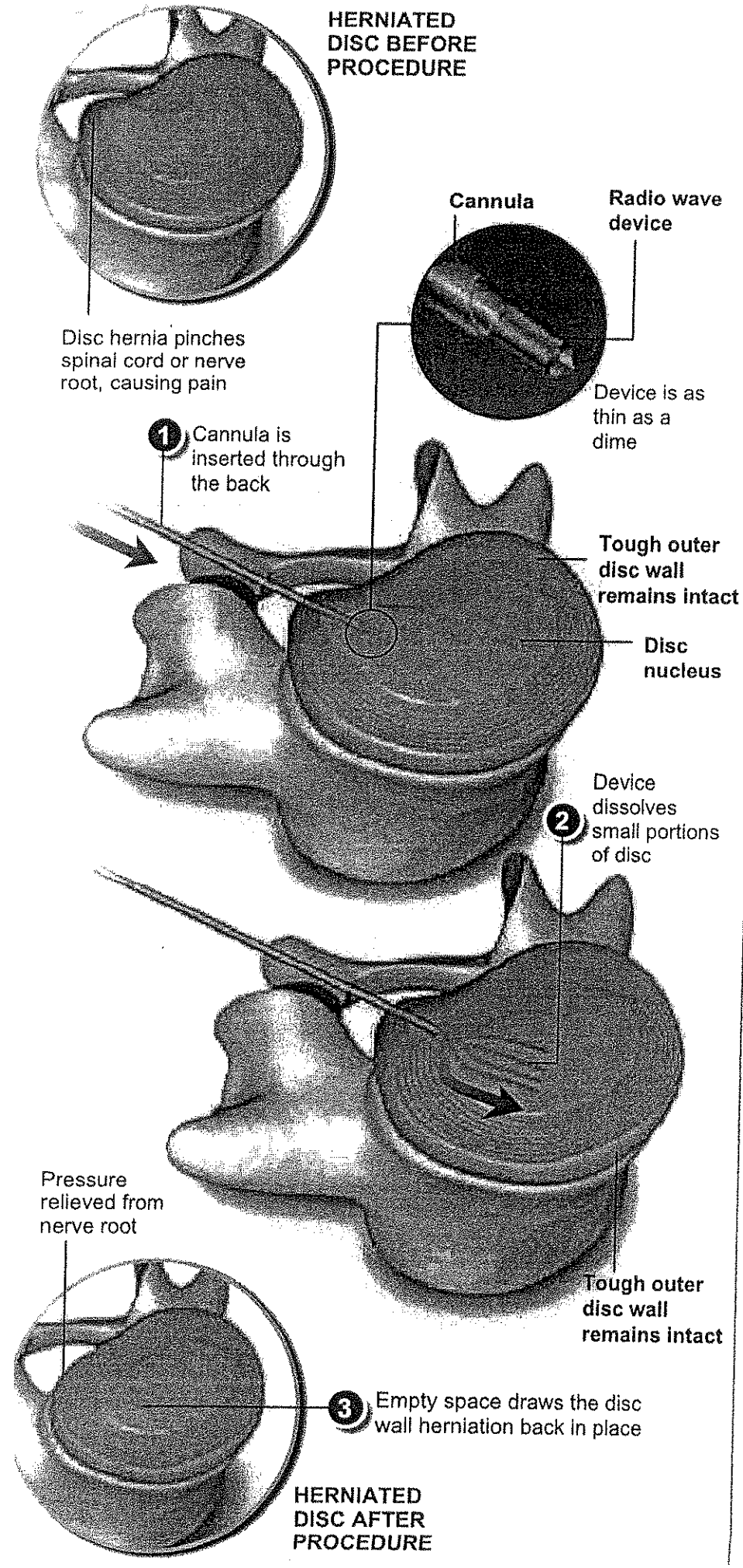
A radiofrequency electrode is inserted down the cannula. To make sure it is in the right location, a small amount of electricity stimulates the area. If the stimulation recreates the pain without any other muscular effects, the electrode is in the right place.

STEP 3

To cut the nerve, the surgeon sends enough electricity through the electrode to heat the nerve. Once one neurotomy is done, the surgeon may do the same procedure on one or more nerves.

END OF PROCEDURE

After the procedure, the electrode and cannula are removed. An increase in pain may occur for about a week after the procedure, with full relief from pain seen within a month. Successful RF neurotomies can last longer than steroid block injections.



Percutaneous Disc Nucleoplasty

OVERVIEW

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Step 1

After some anesthetic is injected to numb the area, a thin needle called a cannula is inserted through the back and into the herniated disc. The surgeon uses x-ray images to guide the placement of the cannula.

STEP 2

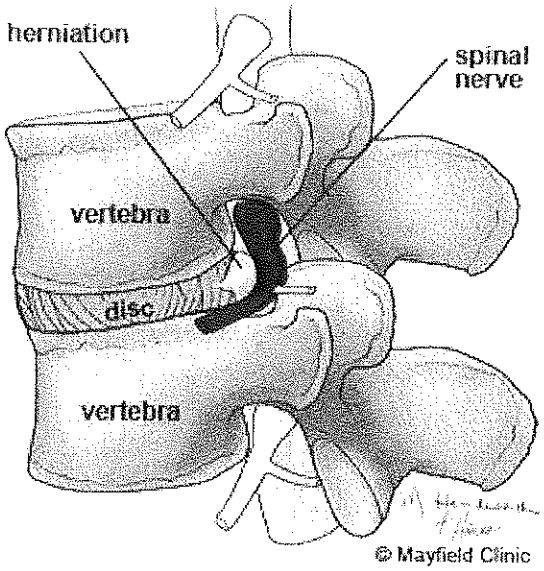
A small catheter-like device is inserted into the disc.The device sends pulses of radio waves to dissolve small portions of the disc nucleus. Because only enough of the disc is vaporized to reduce pressure inside the disc, the spine remains stable.

STEP 3

The empty space left behind draws the disc wall herniation back in place.

END OF PROCEDURE

The device and needle are removed, and the insertion area in the skin is covered with a small bandage. Because no muscles or bone are cut during the procedure, recovery is fast and scarring is minimized. The patient may need a day of bed rest after the procedure, as well as physical therapy. Most may return to normal activity within one to six weeks.


herniation
spinal nerve
vertebra
disc
vertebra
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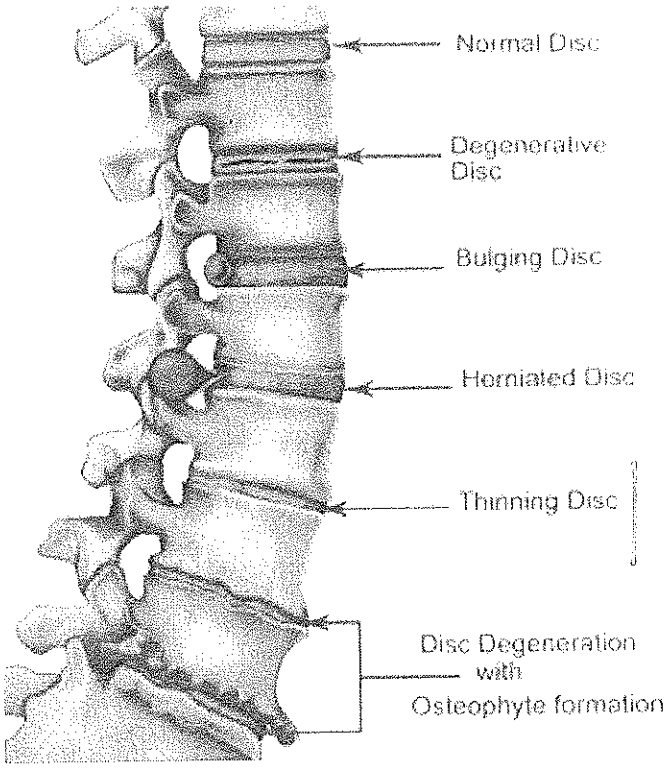
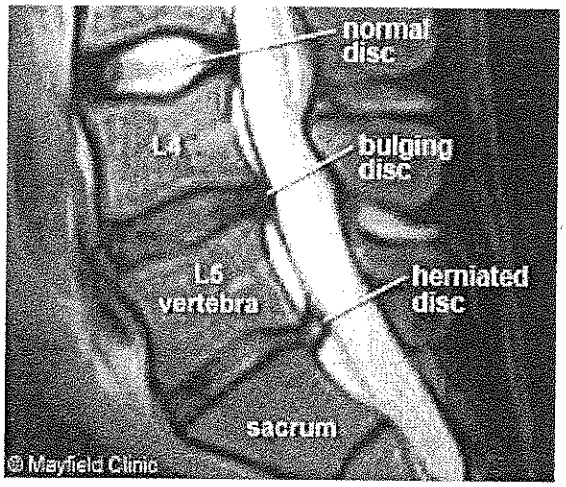
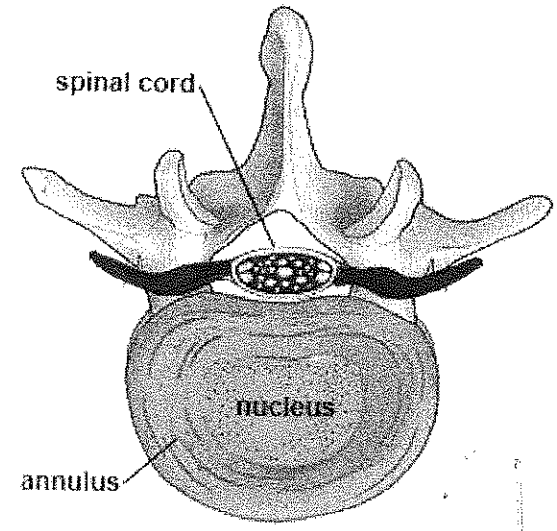
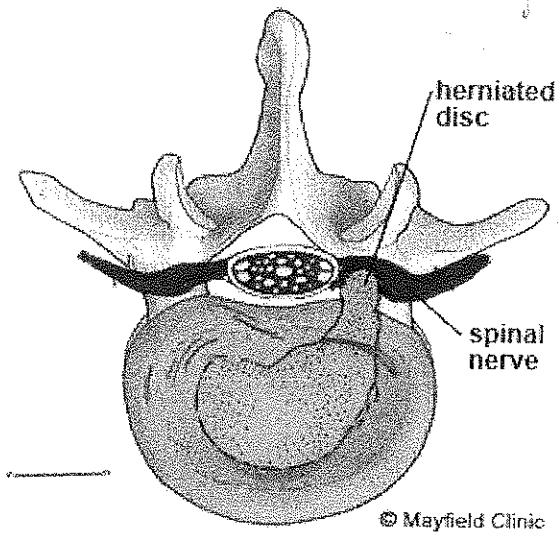

Normal Disc
Degenerative Disc
Bulging Disc
Herniated Disc
Thinning Disc
Disc Degeneration with Osteophyte formation


normal disc
L4
bulging disc
L5 vertebra
herniated disc
sacrum
© Mayfield Clinic


spinal cord
nucleus
annulus


herniated disc
spinal nerve
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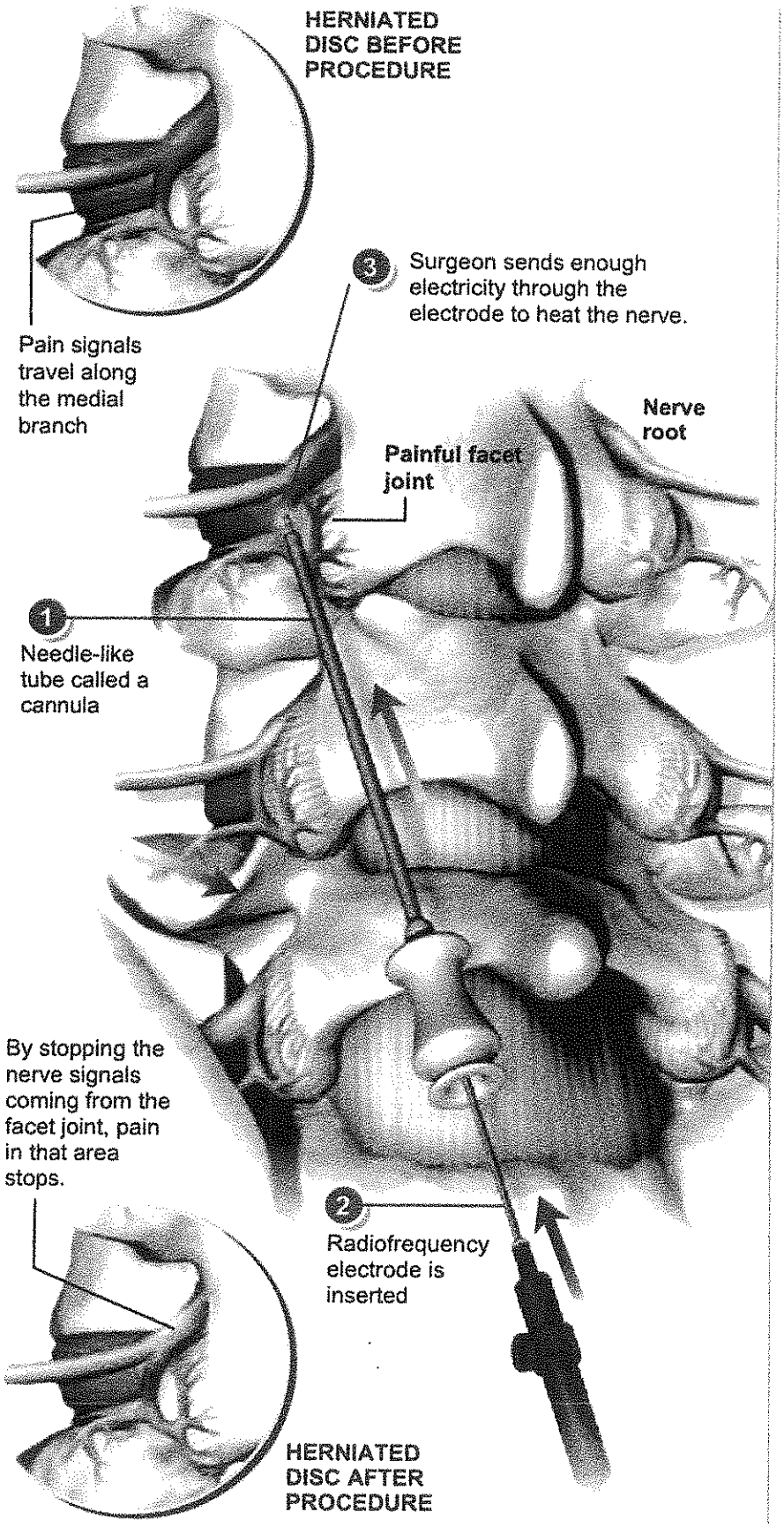

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To cut the nerve, the surgeon sends enough electricity through the electrode to heat the nerve. Once one neurotomy is done, the surgeon may do the same procedure on one or more nerves.

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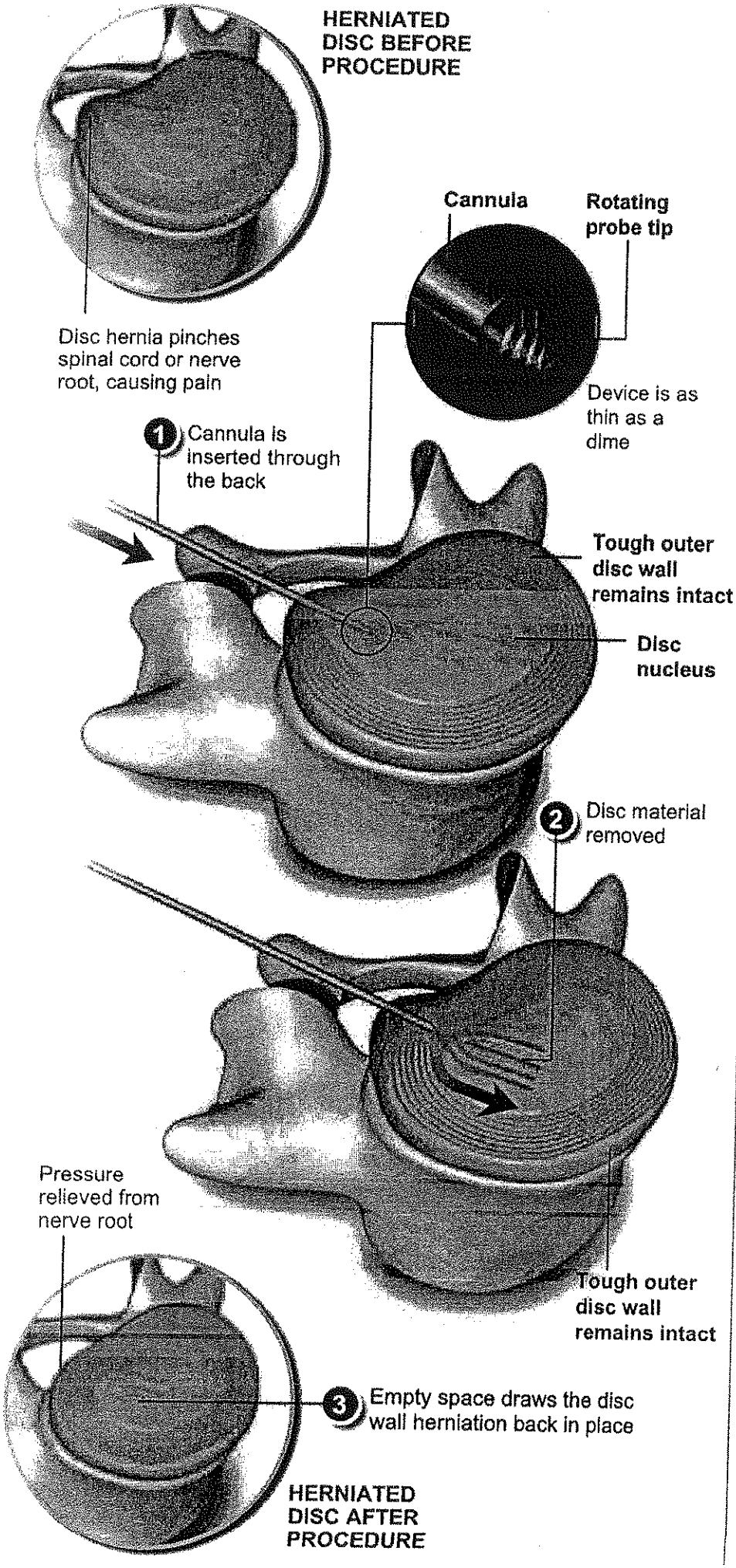


Dekompressor Discectomy

OVERVIEW

This minimally-invasive procedure uses a small needle and an advanced probe device to reduce a herniated disc, quickly relieving pain in most patients. The procedure may be done using a gentle relaxing medicine and local anesthetic on an outpatient basis.

Step 1

After some anesthetic is injected to numb After some anesthetic is injected to numb the area, a thin needle called a cannula is inserted through the back and into the herniated disc. The surgeon uses x-ray images to guide the placement of the cannula.

STEP 2

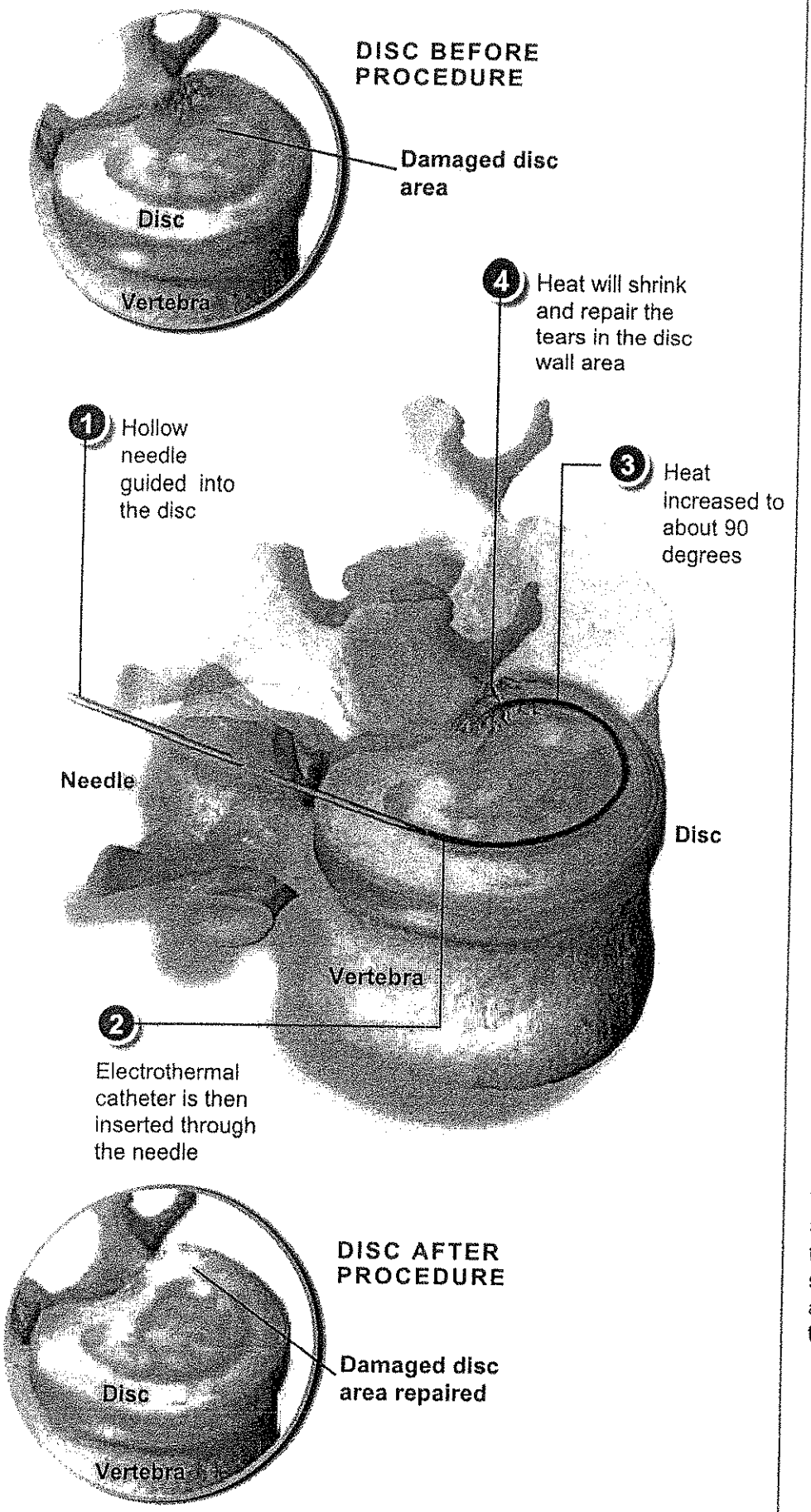
The small probe is carefully inserted through the cannula and into the disc. When the probe is turned on, its rotating tip removes small portions of the disc nucleus. Because only enough of the disc is removed to reduce pressure inside the disc, the spine remains stable.

STEP 3

The empty space left behind draws the disc wall herniation back in place.

END OF PROCEDURE

The probe and needle are removed, and the insertion area in the skin is covered with a small bandage. Because no muscles or bone are cut during the procedure, recovery is fast and scarring is minimized. The patient may need a day of bed rest after the procedure, as well as physical therapy. Most may return to normal activity within one to six weeks.



Intradiscal Electrothermal Therapy (IDET)

This minimally invasive procedure is performed to alleviate the effects of low back pain caused by diseased or small herniations of discs. The IDET procedure is usually performed on a outpatient basis. The patient is awake during the hour-long procedure that uses local anesthesia and a mild sedative to reduce discomfort.

STEP 1

After the affected disc level is located, the surgeon uses live x-ray imaging to guide a hollow needle into the disc.

STEP 2

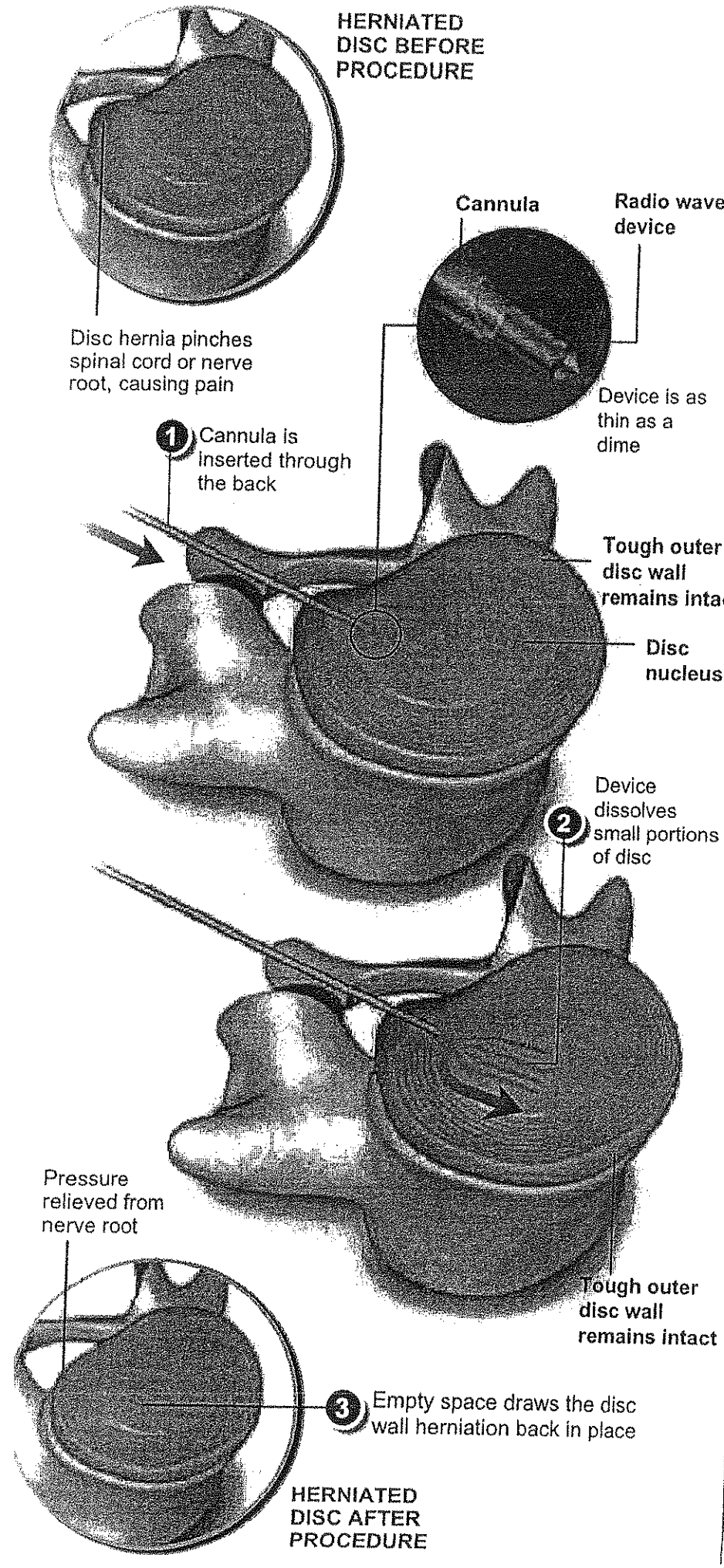
An electrothermal catheter, or heating wire, is then inserted through the needle and maneuvered to find the diseased position of the disc.

STEP 3

The temperature of the heating catheter is slowly increased to about 90 degrees Celsius, raising the temperature of the disc wall.

STEP 4

The heat will shrink and repair the tears in the disc wall area. Small nerve endings are also cauterized, or burned, to make them less sensitive. The patient may feel some pain during the procedure, which is an indication that the heat is being applied to the appropriate area.



Percutaneous Disc Nucleoplasty

OVERVIEW

This minimally-invasive procedure uses a small needle and advanced radiofrequency technology to reduce a herniated disc, quickly relieving pain in most patients. The procedure may be done using a gentle relaxing medicine and local anesthetic on an outpatient basis.

Step 1

After some anesthetic is injected to numb the area, a thin needle called a cannula is inserted through the back and into the herniated disc. The surgeon uses x-ray images to guide the placement of the cannula.

STEP 2

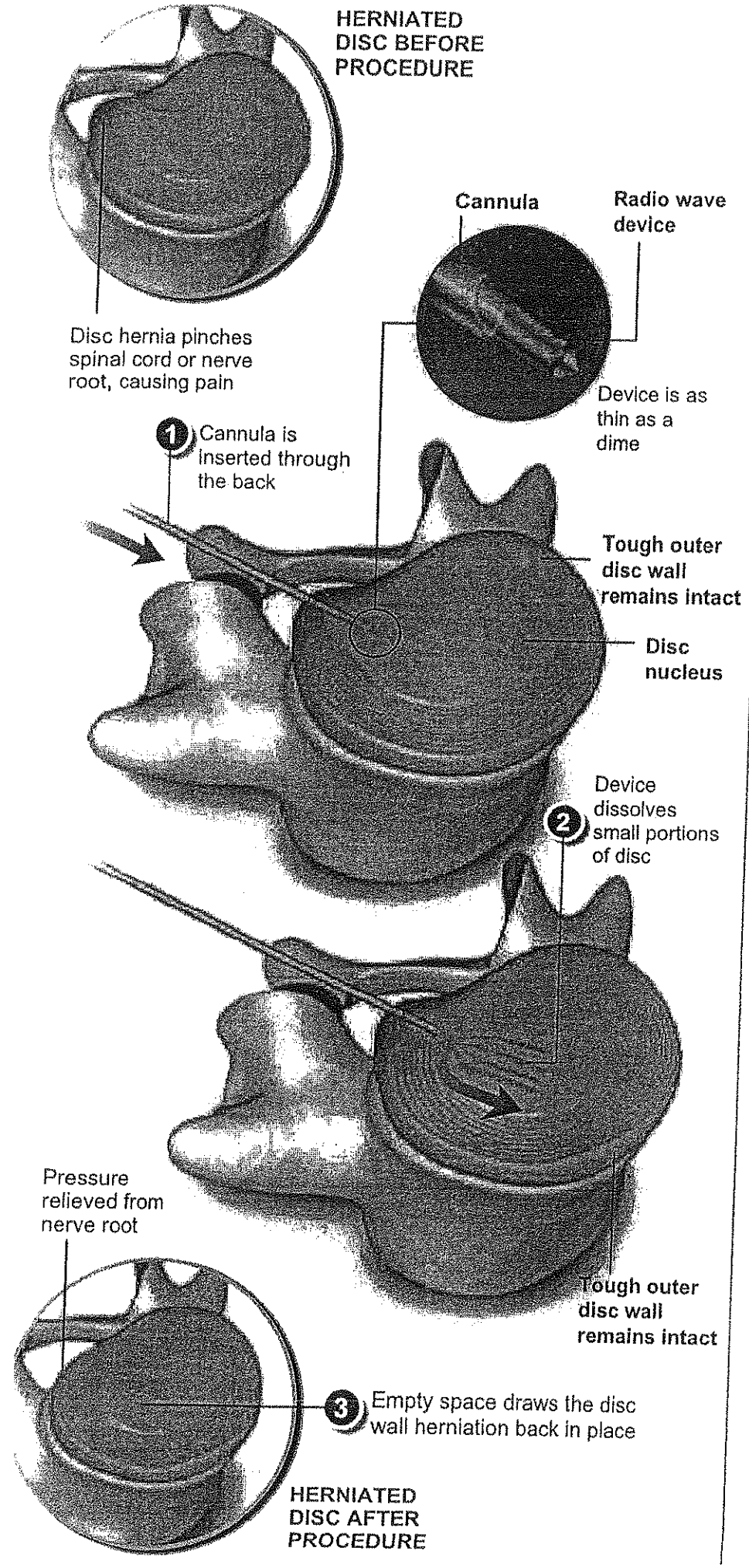
A small catheter-like device is inserted into the disc.The device sends pulses of radio waves to dissolve small portions of the disc nucleus. Because only enough of the disc is vaporized to reduce pressure inside the disc, the spine remains stable.

STEP 3

The empty space left behind draws the disc wall herniation back in place.

END OF PROCEDURE

The device and needle are removed, and the insertion area in the skin is covered with a small bandage. Because no muscles or bone are cut during the procedure, recovery is fast and scarring is minimized. The patient may need a day of bed rest after the procedure, as well as physical therapy. Most may return to normal activity within one to six weeks.



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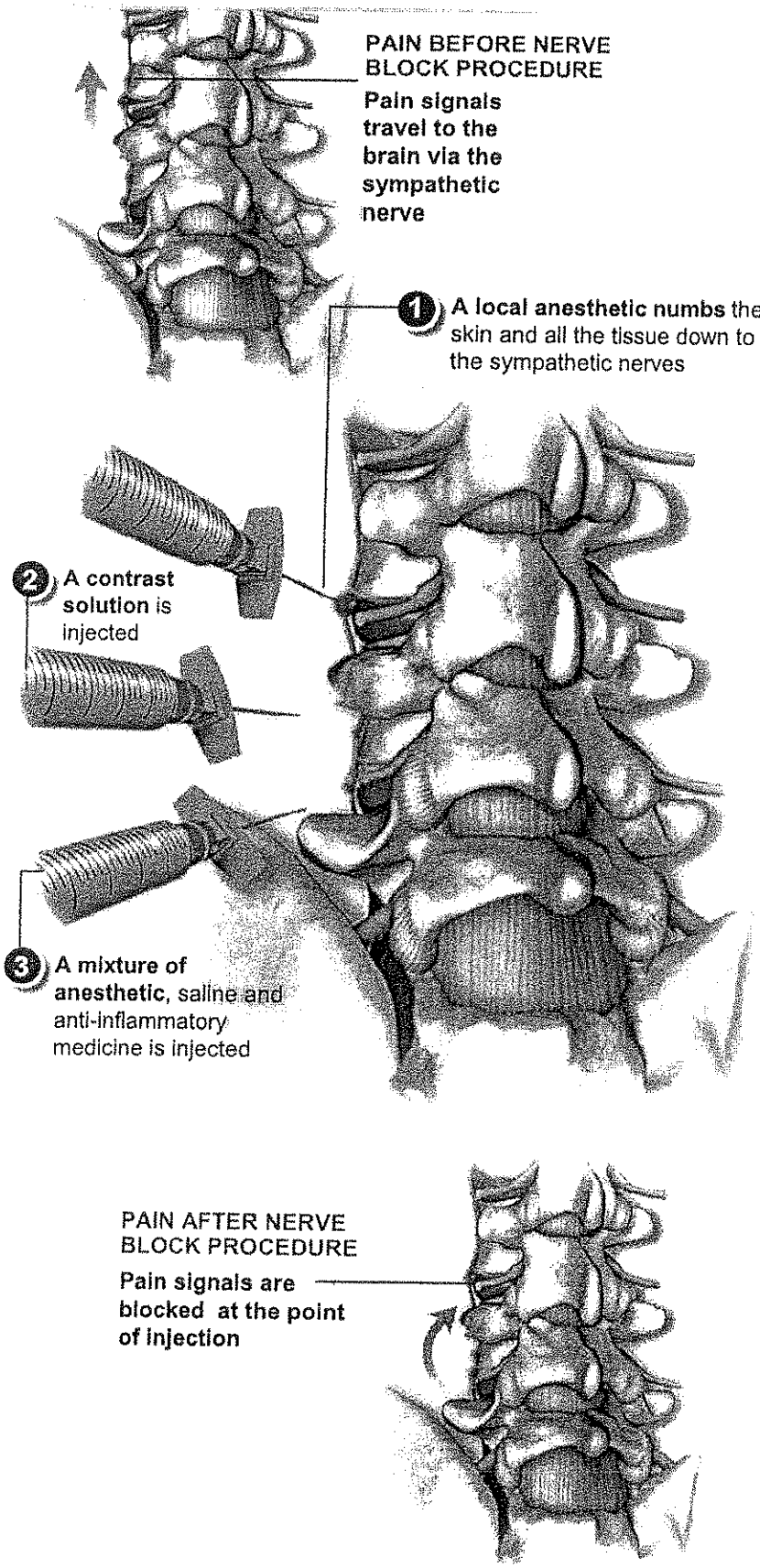


Lumbar Sympathetic Block

This procedure is done to relieve leg pain from Complex Regional Pain Syndromes, which may appear after an injury to a joint or limb. Usually a series of these injections is needed to treat the problem.

STEP 1

Patients lie either on their side or stomach on a table equipped with a special x-ray (fluoroscopic) unit, and an intravenous (IV) line is started to administer medication that relaxes the patient. A local anesthetic numbs the skin and all the tissue down to the sympathetic nerves.

STEP 2

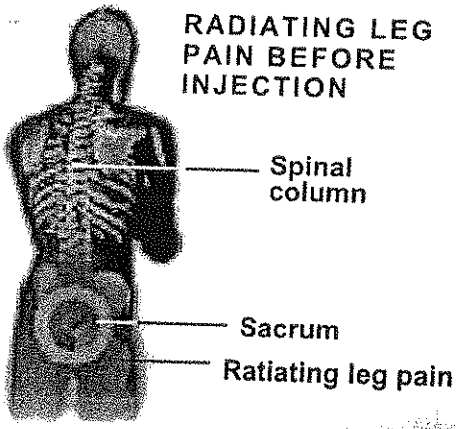
The physician slides a needle through the anesthetized track. A contrast solution is injected so the physician can use an x-ray (fluoroscope) to see the painful areas and to confirm the correct location of the needle tip.

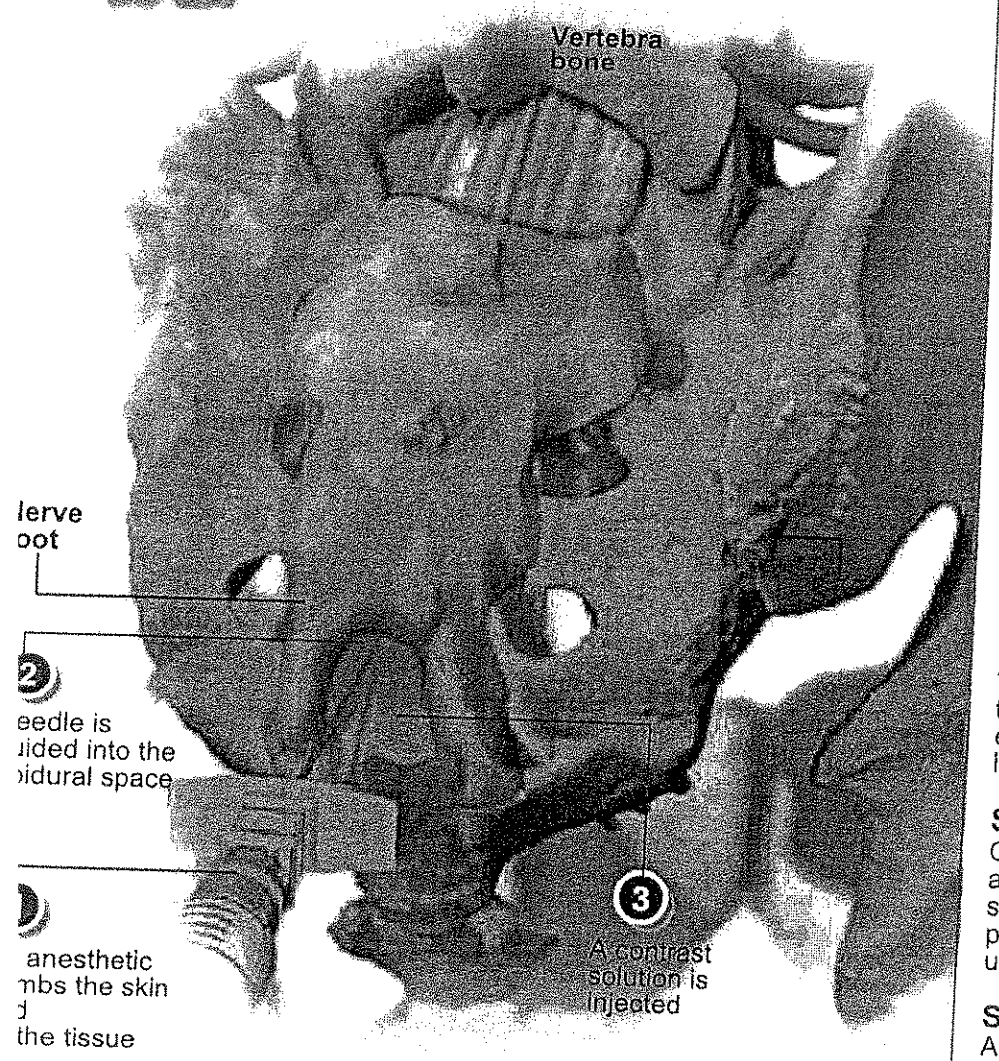
STEP 3

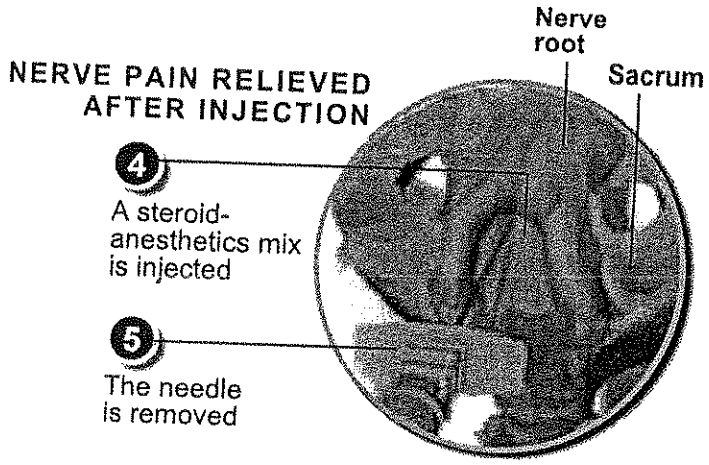
Next, a mixture of anesthetic, saline and anti-inflammatory medicine is injected around the sympathetic nerves to block pain signals from reaching the brain.

END OF PROCEDURE

The legs may feel weak or numb for a few hours after the procedure. Then, pain from the legs should improve. More blocks may be repeated about once a week until the pain subsides. Patients who are on blood thinning medications or who have an infection near the injection site should not receive the block.







Caudal steroid injection

This injection procedure is performed to relieve low back and radiating leg pain. The steroid medication can reduce the swelling and inflammation caused by spinal conditions, such as spinal stenosis, radiculopathy, sciatica and herniated discs.

Positioning the patient

In this procedure, the patient lays face down. A cushion is placed under the stomach area for comfort and to arch the back. The physician uses a fluoroscope to find the small opening at the base of the sacrum called the sacral hiatus.

Step 1

A local anesthetic numbs the skin and all the tissue down to the surface of the sacral hiatus.

Step 2

The physician then guides the needle through the anesthetized track and into the epidural space through the sacrococcygeal ligament about one to two centimeters.

Step 3

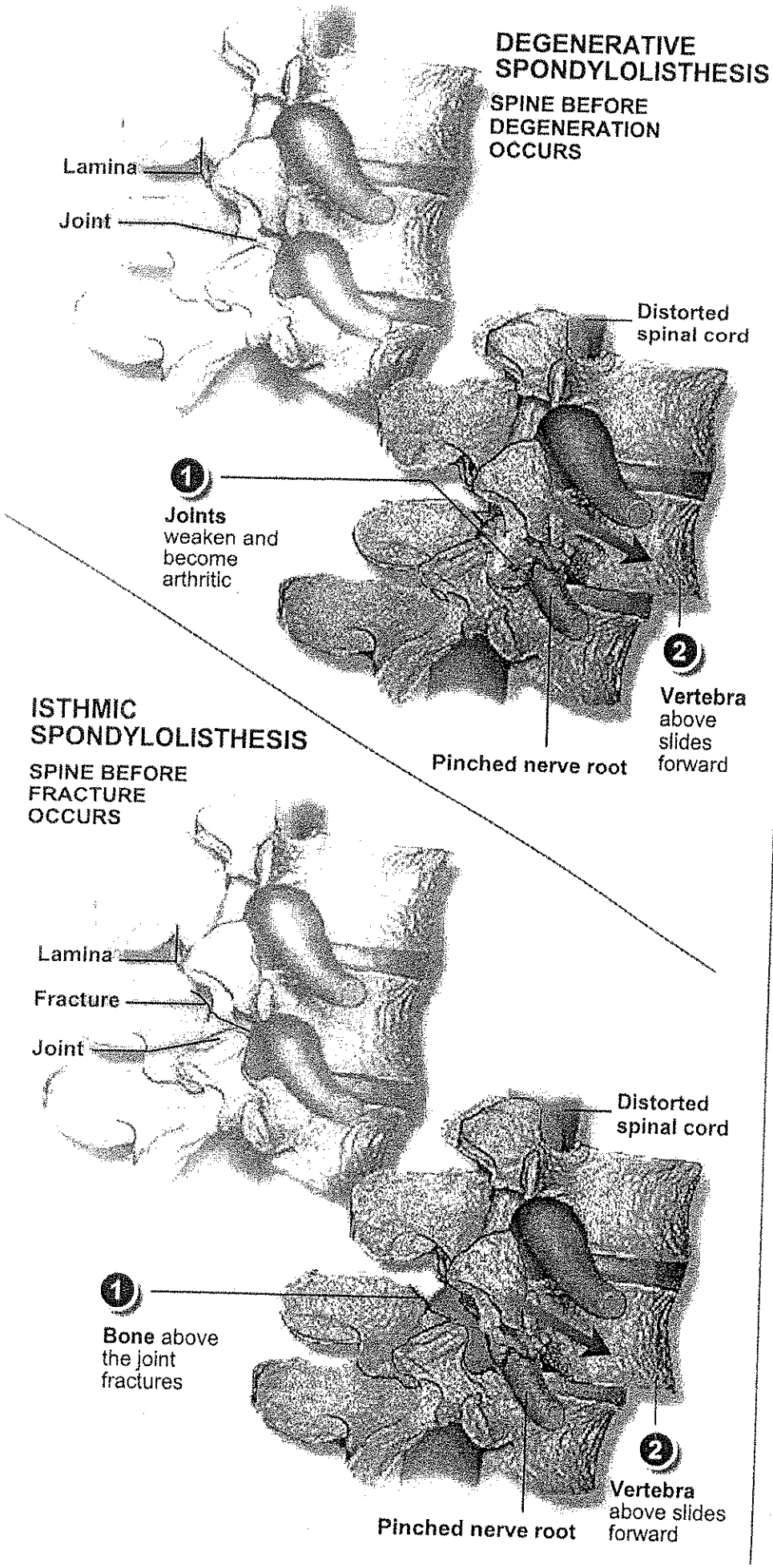
Once inside the sacral hiatus space, a contrast or non-allogeneic iodine base solution is injected. This solution helps the physician see the diseased and painful areas using a fluoroscope.

Step 4

A steroid-anesthetics mix is injected into the epidural space, bathing the painful area in medication.

Step 5

The needle is removed and a small bandage is used to cover the tiny surface wound. In some cases it may be necessary to repeat the procedure as many as three times to get the full benefit of the medication. However, many patients get significant relief from only one or two injections.



Understanding Spondylolisthesis

OVERVIEW

Here is a look at the two types of spondylolisthesis conditions known as degenerative and isthmic.

DEGENERATIVE

STEP 1

In this condition, the joints weaken and become arthritic allowing the vertebra to slip forward.

STEP 2

As the vertebra above slides forward the spinal cord becomes distorted, pinching the nerve root causing pain.

Symptoms

Pain may be felt in the back around the site of injury. Pain can also be felt radiating down to legs and feet.

ISTHMIC

STEP 1

In this condition, bone above the joint fractures, allowing the vertebra to slip forward.

STEP 2

As the vertebra above slides forward the spinal cord becomes distorted, pinching the nerve root causing pain.

Symptoms

Pain may be felt in the back around the site of injury. Pain can also be felt radiating down to legs and feet.

Radiofrequency neurotomy for facet and sacroiliac joint pain

A radiofrequency neurotomy is a type of injection procedure in which a heat lesion is created on certain nerves with the goal of interrupting the pain signals to the brain, thus eliminating pain.

A *medial branch neurotomy* affects the nerves carrying pain from the facet joints, and a *lateral branch neurotomy* affects nerves that carry pain from the sacroiliac joints. These medial or lateral branch nerves do not control any muscles or sensation in the arms or legs so there is no danger of negatively affecting those areas. The medial branch nerves do control small muscles in the neck and mid or low back, but loss of these nerves has not proved harmful.

Before this procedure is undertaken, the joints and branch nerves will have already been proven to be painful by a diagnostic form of spinal injection, and will not have responded to other treatment methods. If effective, the neurotomy should provide pain relief lasting at least nine to fourteen months and sometimes much longer. After this period of time, however, the nerve will regenerate and the pain may return.

Success rates vary, but typically about 30% to 50% of patients undergoing this procedure will experience significant pain relief for as much as two years. Of the remaining patients, about 50% will get some pain relief for a shorter period. Some patients do not experience any relief from pain as a result of this procedure.

Anatomy of facet joints and sacroiliac joints

Facet joints are pairs of small joints that are situated at each vertebral level of the spine. Each facet joint is connected to two medial nerves that carry signals (including pain signals) away from the spine to the rest of the body. The sacroiliac joints are located at the lowest part of the spine, between the sacrum and ilium in the pelvis, and are also connected to nerves that carry signals to other parts of the body.

Radiofrequency neurotomy procedure

As with many spinal injections, radiofrequency neurotomy is best performed under fluoroscopy (live x-ray) for guidance in properly targeting and placing the needle (and for avoiding nerve injury or other injury). On the day of the injection, patients are advised to avoid driving and avoid doing any strenuous activities. Patients may continue to take any normal medications except aspirin or any other blood-thinning medications, such as Coumadin.

The neurotomy procedure includes the following steps:

- An IV line will be started so that adequate relaxation medicine can be given, as needed.
- The patient lies face down on an x-ray table and the skin over the neck, mid-back, or low back is well cleaned.
- The physician numbs a small area of skin with numbing medicine (anesthetic), which may sting for a few seconds.
- The physician uses x-ray guidance (fluoroscopy) to direct a special (radiofrequency) needle alongside the medial or lateral branch nerves.
- A small amount of electrical current will then be carefully passed through the needle to assure it is next to the target nerve. This should briefly recreate the usual pain and cause a muscle twitch in the neck or back.
- The nerves will then be numbed to minimize pain while the lesion is being created. This process will be repeated for 1 to 5 additional nerves.

The entire procedure usually takes between 30 and 90 minutes.

Radiofrequency neurotomy results and follow-up

On the day after the procedure, the patient may cautiously return to regular activities. The neck or back will usually be very sore during the next one to four days. This pain is usually caused by muscle spasms and irritability while the targeted nerves are dying from the heat lesion over the next seven to fourteen days. The physician may give medicine to the patient to treat the expected soreness, and the physician may also instruct the patient on how to apply ice (or heat or warm towels) to the sore area to alleviate discomfort. Patients usually will want to rest for several days before returning to normal activities.

If pain relief is going to occur, full pain relief will typically not be experienced until about two to three weeks after the procedure when the nerves have completely died. On occasion, the back or neck may feel odd or slightly weak for several weeks after the procedure.

The nerves will eventually grow back (regenerate), but the patient's pain may or may not recur. If the pain does recur, a second neurotomy can be performed, and similar results will usually be achieved. Some patients will not have a recurrence of pain.

Common concerns about radiofrequency neurotomy

Patients are frequently concerned that, without the ability to feel sensation through these nerves, they may cause an injury to either the joints or the back. There is no scientific evidence to support this happening. In the many years that neurotomies have been performed, this has not been found to occur. Another concern is that by damaging nerves, pain will be caused rather than relieved. There is a small chance (less than 5%) that the pain will worsen after the procedure. This is believed to be from increased irritation of a nerve that was only partially damaged, not completely destroyed. This can be treated with medication and usually goes away in several months. It is less common in the mid and low back than in the neck, and is most common at higher levels of the neck.

Potential complications of radiofrequency neurotomy

As with all medical procedures, there are certain risks and potential complications associate with a radiofrequency neurotomy. Complications are rare with this procedure, but can occur, and include:

- Pain or discomfort around the injection site
- Numbness of skin covering the injection site
- Worsened pain due to muscle spasm in the area of the injection
- Permanent nerve pain
- Allergies or reactions to medications used
- Infection

By: Ray Baker, MD

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