



## Concord Orthopaedics, P.A.

### PART IV: HOW IS THE INJECTION DONE?

#### **Why Inject?**

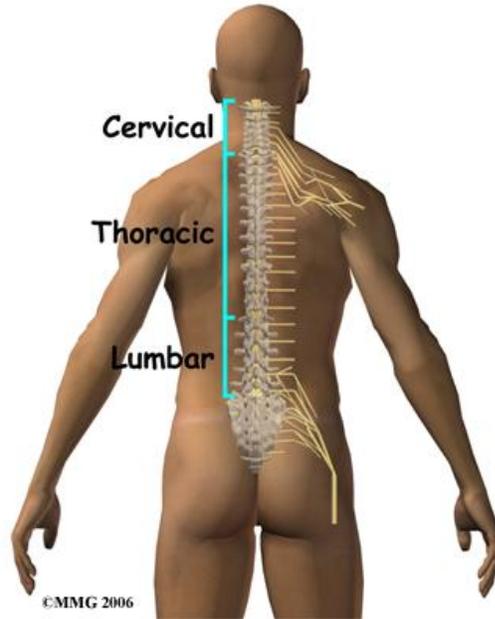
An injection is intended to:

- To decrease pain
- To improve function
- To eliminate or reduce the need for pain medication
- To diagnose

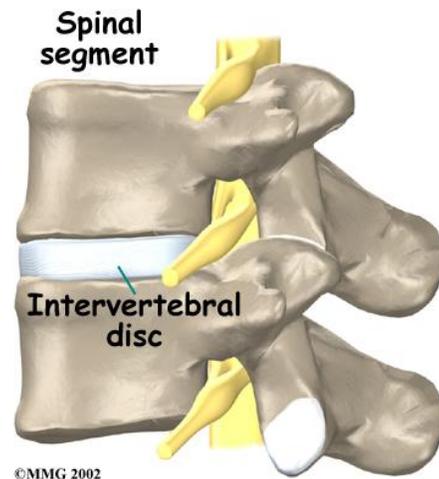
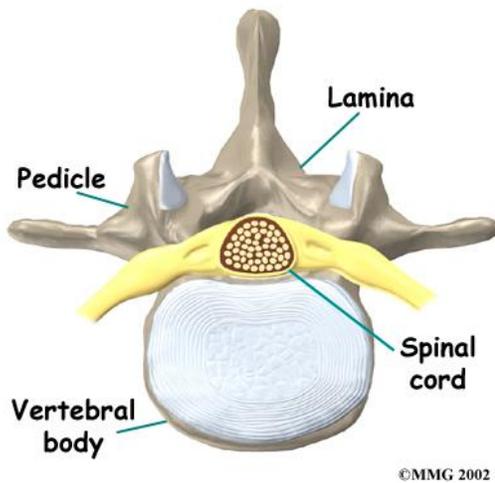
Some believe response to a guided and specific spinal injection can be diagnostic of a specific spine problem. It is not at all clear that is true. Some experts believe specific injection can differentiate between disc pain, facet pain, sacro-iliac pain, etc. I am not sure I agree. I am not even convinced that specific injection can differentiate between pain of spinal origin and pain of peripheral origin, i.e. neck vs. shoulder or back vs. hip or knee. With that said, it is my impression that there is more diagnostic value in spinal injection when trying to differentiate between spine and peripheral pain than there is when trying to differentiate between pain of different spine structures.

#### **What part(s) of the spine do we inject?**

- The spine is a complicated structure. It must serve a dual role of supporting our body while allowing it to move. Therefore, it needs to be strong, yet flexible. It must also protect our spinal cord. To accomplish this, it is composed of a tube within a tube.
  - The inner tube is a sac, called the *dura*, which is filled with spinal fluid. In the upper part of the spine, the sac also contains the spinal cord. In the lumbar spine, in adults, the sac contains spinal nerves but not the spinal cord.
  - In this arrangement, the outer, structural, boney tube serves to protect the spinal cord and spinal nerves.
  - The outer tube is composed of a stack of bones called **vertebrae**. The vertebrae are connected in the front by **intervertebral discs** and in the back by a pair of **facet joints**. The vertebrae vary in size and shape depending on their location. The spine is divided into the cervical spine (neck) with 7 vertebrae, the thoracic spine (chest) with 12 vertebrae which attach to ribs, the lumbar spine (low back) with 5 vertebrae, the sacrum with 5 vertebrae which connects to the pelvis through the sacro-iliac joint, and the coccyx, or tail bone, with 5 vertebrae.
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- Vertebrae are lettered by the type of vertebrae and numbered from top to bottom based again on top. For example, the 5<sup>th</sup> thoracic vertebrae from the top is referred to as T-5.

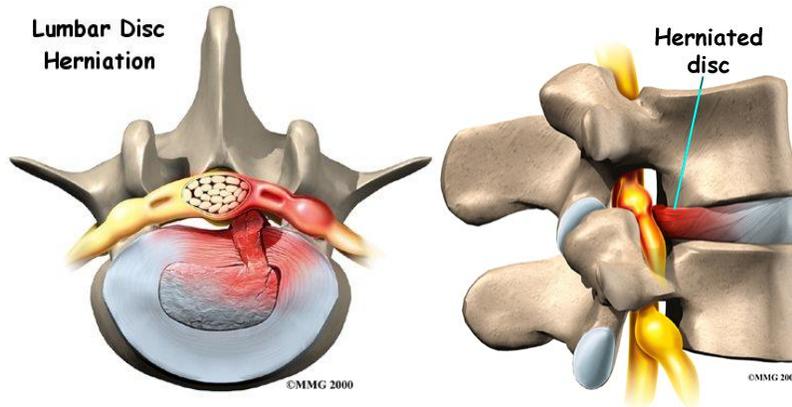


- The intervertebral discs are cables which hold the bones together. The outer portion is referred to as the annulus, which functions to hold the bones together, and the inner portion, which is referred to as the nucleus, serves to dampen shock to the spine. Discs are numbered based on the two vertebrae they connect. For example, the disc which connects C5 to C6 is called the C5-6 disc.

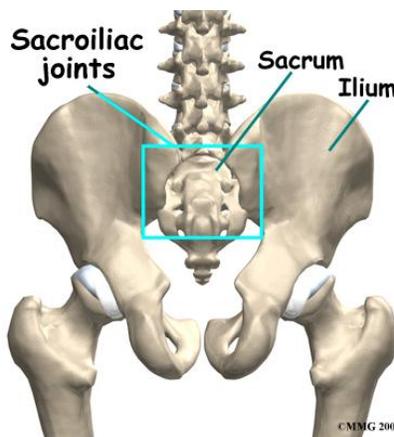


- Discs are injured when the outer annulus is torn. This is referred to as an **annular tear**. Most often, such injuries are painless. When enough tears accumulate in an area, this causes the disc to bulge. Again, this is most often painless. If enough tears occur to allow the nucleus to migrate towards the

outside of the annulus, this is called a **protrusion** or **herniation**. If the disc leaks totally out of the confines of the annulus, this is called an **extrusion**.



- Interestingly, most protrusions and extrusions are also painless. Why these problems become painful in some individuals remains a mystery.
- When disc degeneration occurs, it becomes less effective at its twin tasks of holding vertebrae together and absorbing shock. When this happens, load is transferred to the vertebrae, supporting ligaments, and facet joints. In response, they thicken. As they thicken, they have the capacity to narrow the spinal canal producing **stenosis**. If this happens in the middle of the spine, this is referred to as **central stenosis**. If this happens on the side, it is referred to as **lateral stenosis**. Again, stenosis is usually painless. Again, why stenosis becomes painful in some people is a mystery. The progression of degeneration is referred to as the **degenerative cascade**.
- Where the spine connects to the pelvis is referred to as the sacro-iliac joint. The sacrum is a part of the lower spine. This portion of the spine is a solid bone with no discs or facet joints.



- Each of these structures, disc, facet, spinal nerve, and sacroiliac joint can become injured and inflamed. When injury does not respond to routine treatment, these structures can be injected with corticosteroids.

### **How do we inject?**

- Any joint in the body can be treated with cortisone injection. Most injections are done blindly. This means the physician identifies the spot to be injected by visual inspection and by feel. For most injections, this is accurate. For the spine and the hip, though, that is not true.
- All spinal injections are typically done under fluoroscopy or x-ray guidance. This is more to promote accuracy than to promote safety, as most spinal injections can be done safely, though not accurately, without x-ray.
- Because of the need to use x-ray guidance, the procedure must be done in a facility that is x-ray compatible. In our facility, it is done in an operating room.
- **Please note: the procedure is a cortisone injection. It is not an operation!**

### **Preparing for the injection.**

- Attend your consultation
- Have any pain medication issues resolved with your referring provider
- Notify me if you are on blood thinners (Plavix or Coumadin). These must be discontinued several days before the procedure. They can be resumed immediately after the procedure.
- This is a clean procedure. Therefore, patients with artificial joints, artificial heart valves, or other heart valve issues do not need to take prophylactic antibiotics.
- Notify me if you are allergic to latex, band-aids, betadine, lidocaine, cortisone, or x-ray dyes.
- Notify me if you are an insulin dependent diabetic
- Do not plan any physical activity which involves forceful bending or twisting or heavy lifting for 3-4 days after the procedure. If you need a note for reduced activity from work during this period of time only, I can provide this.
- Make sure you have a ride if needed. Of note, we do allow some people to drive themselves home after the injection. This must be approved in advance. You cannot drive yourself if you live more than 25 miles away or have taken a sedative.
- If you are very nervous about the procedure, make arrangements in advance with me to receive an oral sedative. We do not provide intravenous sedation (conscious or unconscious).
- Notify us if you are or may be pregnant.
- Notify us if you have a history of passing out with exposure to needles or other medical procedures.
- Notify us if you have an acute infection of any type.

### **The day of the procedure**

- Eat as you normally would
- Take your medications as you normally would (except for Coumadin and Plavix)
- Arrive at the time you were notified by the OSC staff. Please note, this time is 30 minutes before the injection is planned to begin.

Page 4 of 10

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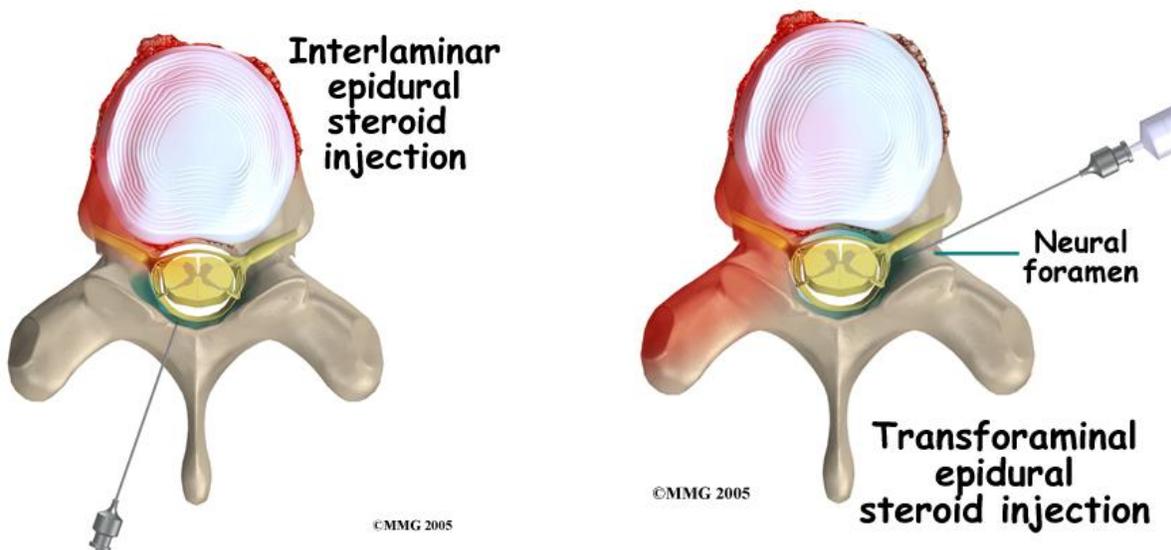
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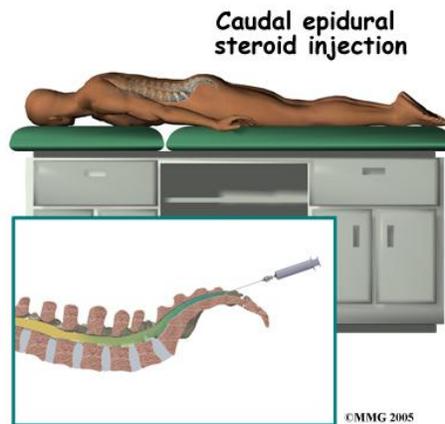
- Wear loose fitting clothing.

**The procedure**

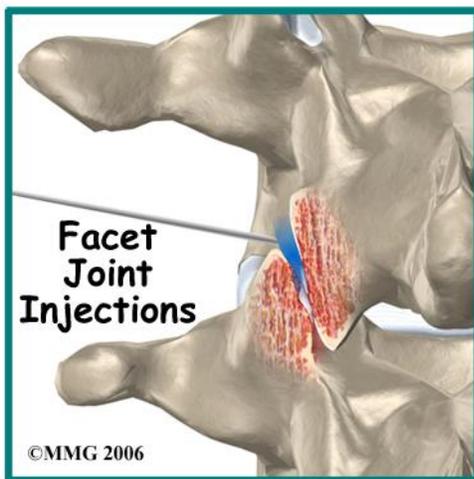
- The nurse will bring you back to the pre-operative room.
- I will meet with you and go over any changes since our meeting or since our last injection.
- You will walk into the procedural room.
- You will lie on your belly on the procedural table. We position pillows under your waist, chest, and lower legs to round your back and keep you comfortable. If you are not, we will do what we can to make you comfortable.
- An x-ray machine will be placed over you. It is small enough that many people do not notice it. There is a viewing screen. You are welcome to watch if you wish.
- I will begin by cleaning your skin with betadine or other antiseptic if you are allergic to betadine
- I will then numb your skin and muscles with lidocaine. You will feel this part.
- We will then put a needle in place. At this point, you should only feel pressure. If any part of the procedure is uncomfortable after your skin has been numbed, please let me know! We will take steps to make you more comfortable.
  - For facet, coccyx, and sacro-iliac injections, the needle is placed directly in the joint as depicted in the diagrams below. Most people do feel some pain when the needle enters the joint. Often, if the joint is the cause of your pain (pain generator), you will feel a reproduction of your pain. This is normal.
  - For epidural injections, the needle is placed in the epidural space which is the space between the bone and the dural sac as outlined in the diagram below.



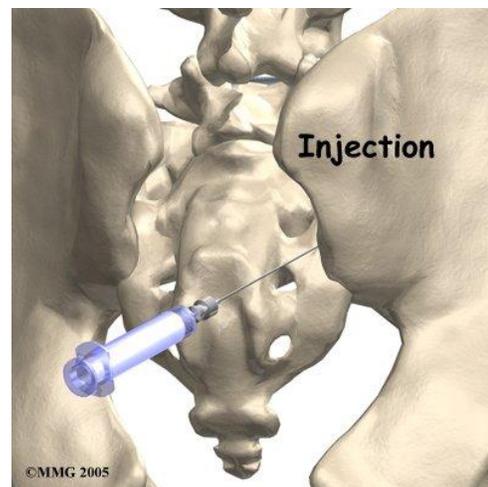
**Translaminar and Transforaminal Epidural injection**



**Caudal Epidural Injection**



**Lumbar Facet Injection**



**Sacroiliac Joint Injection**

- ✓ The spinal canal can be entered through the midline (trans-laminar epidural), on the side where the nerve exits (transforaminal) or at the bottom of the sacrum (caudal).
- ✓ Most often, we use the trans-laminar approach. In certain circumstances, we will use the other approaches. Each approach has its unique pros and cons, and I will discuss that with you beforehand.
- ✓ All lumbar and thoracic injections are done from the level **below** the problem with a few exceptions.
- ✓ All cervical injections are done at C7-T1. The epidural space at this level is large and consistent from patient to patient. As one moves up the neck, the space shrinks or

- becomes non-existent, and it is not safe to go higher. I do not do trans-foraminal injections above the lumbar spine as I do not believe potential benefits outweigh the risks.
- ✓ Depending on other factors, such as severe stenosis or post-operative changes, I may need to modify the approach. I will discuss any such changes thoroughly with you in advance.
  - Once the needle is in place, I will confirm accuracy by injecting some %ray contrast+or %bye.+ In doing this, we wish to make sure of the following:
    - the needle is in the joint for facet, coccygeal, or %SI+injections
    - the needle in the epidural space for epidural injection.
    - We want to make sure that the needle is not in a vein. There are many epidural veins, and it is common to hit one or be in one. Hitting one is not the problem. The only problem with injecting in a vein is that the medicine will travel systemically, not to the area we wish to address.
    - The needle is not in the dural sac/spinal fluid. This is referred to as a %spinal.+ This approach is used for myelograms, spinal anesthesia, and diagnostic spinal taps. It is not clear if injection of cortisone into the spinal fluid (intrathecal space) is therapeutically helpful, therefore, we need to be aware of such positioning. A potential complication is a spinal headache (see below).
    - If the needle is not in proper position, I will adjust its position until I am satisfied it is in place.
  - Once the needle position is satisfactory, I will inject the medicine.
    - Typically, the injectate is a mixture of lidocaine and depo-medrol. At times, I will use other agents.
    - In cervical epidurals, the two agents are not mixed, and are injected separately.
    - Please note, you will probably feel something when we inject. Usually, the sensation is a pressure sensation. In cervical injections, you may feel a wave of coolness or warmth over your chest or back. Sometimes, you will feel pain. Usually this is a reproduction of your typical pain, although it may be different. The severity of the pain is directly related to the rate of increase in pressure caused by placing fluid in the tight epidural space. It can be controlled by the rate of injection. We encourage you to tell us if you are uncomfortable so I can make adjustments in the rate at which I inject.

***Immediately after the procedure***

- You will be taken to the post-operative area.
- While there, you will be monitored to be sure your vital signs are stable and that you have not developed a spinal, epidural, or peripheral nerve block. This would mean you would be experiencing numbness and/or weakness below the site of injection. These are not complications. In fact, this effect is intended when epidurals are used for anesthesia. It is our observation that roughly 1 in 200 patients will develop this. The effect will wear off usually in 1 to 4 hours. We will have you stay until we feel you can ambulate safely.
- You will be given an instruction sheet with the following:
  - What to do and what not to do
  - What problems may arise, and what to do if they arise.

- Where to call if problems arise.
- Your next appointment with me or your referring provider

**What to Expect after the Procedure**

- What is normal
  - Most people do not feel better immediately. 20% feel better immediately, 20% feel worse for a few days. 60% will feel better after a few days or a few weeks.
  - It is unusual to have a long term improvement with the first injection. Most people require 2 to 3 injections to get the peak effect.
  - It is not unusual to see no response to the first injection, yet still do well with the series. If the first injection does not help, do not despair. We strongly encourage you to do the second.
  - If you notice no response to both of the first 2 injections, your likelihood of success diminishes substantially. Some still do well. With that in mind, if you get no relief from the first two injections, I leave it up to you if you wish to proceed.
  - A low grade temperature within 24 hours after the procedure.
  - Bruising or swelling or local discomfort at the injection site
  - A slight elevation in blood pressure for a few days
  - A persistent ~~hot~~ flash in post-menopausal women lasting several days
- What is not normal
  - An increase in pain for more than 7 days after the procedure.
  - A severe increase in pain immediately after the procedure
  - An increased temperature more than 24 hours after
  - Any change in sensation, strength, or bowel or bladder function
  - A severe frontal headache beginning within 24 hours of the procedure
  - An increase in blood sugar in diabetics over 300 mg/dl. If this happens, please contact the doctor who manages your diabetes.

There is no need to call for any of the ~~normal~~ events. For the ~~not normal~~ events please contact us immediately. For any issues not related to the injection, please contact your referring doctor.

**Activities after the Procedure**

- Cortisone can mask your pain sensitivity for a few days after the procedure, so it is important to limit your activities for 3-4 days.
- You can:
  - Drive
  - Walk
  - Ride bike over even terrain
  - Do stretching exercises
- You shouldn't:
  - Do any activities which involve any forceful bending or twisting such as raking, shoveling, vacuuming, golf, etc.
  - Avoid heavy lifting.
  - Avoid any activities which adversely affected you pain before the injection
  - Avoid trying any new, physically strenuous activities
- After 4 days, you can challenge yourself. If you have questions about your activity, please ask.
- Plan on staying on your pre-procedural pain medications for at least 7 days post-procedure.

## **Risks**

- Common, self limited
  - Increased pain for a few days
  - Localized bleeding
  - Localized swelling
  - Low grade temperature
  - Reactions to cortisone: anxiety, increased appetite, swelling in ankles
  
- Uncommon
  - Severe headache (spinal headache). This usually abates after 2-3 days and is treated with bed rest and fluids. If it persists, it responds 95% of the time to an epidural blood patch.+ This involves introducing 10 . 15 cc (3 tsp) of your blood into the epidural space.
  - Severe pain lasting more than a few days. It is my experience this usually abates within a week, but may require oral corticosteroids.
  - Nerve injury. This usually results from using the transforaminal epidural approach in patients with severe stenosis, lateral disc herniation at the level injected, or previous surgery at the level injected. The pain is typically within the distribution of the nerve injured, and usually abates within a few weeks. This is avoided by not injecting in the areas described.
  - Vaso-vagal reaction (faint). This is self limited and easily treated
  - Numbness or weakness. This is typically due to nerve or epidural block and abates within a few hours. Rarely may it last a few days. We have not seen this effect last more than a few days.
  
- Rare
  - Infection. As of the writing of this monogram, we have had one infection in over 20,000 injections. This infection responded to antibiotics.
  - Paralysis: we have not seen this happen, nor have I heard of it happening in an in-out+epidural. There are reports of paralysis occurring from in-dwelling epidural catheters which become infected, or from cervical epidurals where the needle is placed in a stenotic area where there is effectively no epidural space. The problem is avoided by not placing the needle in such areas.
  - Stroke. This complication has been reported with the use of particulate steroids in trans-foraminal cervical epidurals when the needle has entered the vertebral artery. It is because of this risk that I do not use this approach to cervical epidurals
  - Persistent pain

## **Outcomes**

- Unfortunately, the literature on both long and short term outcomes with spinal injection is sparse and contradictory. Most of the literature focuses on the treatment of herniated lumbar discs. There is virtually no data on outcomes for cervical or thoracic injection, or for stenosis in any part of the spine. There is also no useful data on outcomes for coccygeal or sacroiliac injection. There is evidence to suggest that facet injection is only useful as a prognostic indicator for medial-branch radio-frequency ablation.
- With that said, it is generally felt that 60% of patients with spine pain associated with limb pain will do well with epidural injection for a period of time and can avoid surgery. It is common for us to see patients do well for several years
- It is our observation that patients with spinal stenosis, especially associated with limb pain, do better than those with herniated discs.
- It is our observation that Sacroiliac injection typically only provides weeks to months of relief, at best.

Page 9 of 10

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The unfortunate reality is that there are no predictive variables for who will do well and who won't with epidural injection. The cost/benefit ratio favors using epidural injection before spine surgery as a treatment modality when other conservative measures have failed, when there is a significant limitation of function due to pain, and when there is no progressive neurologic deficit.