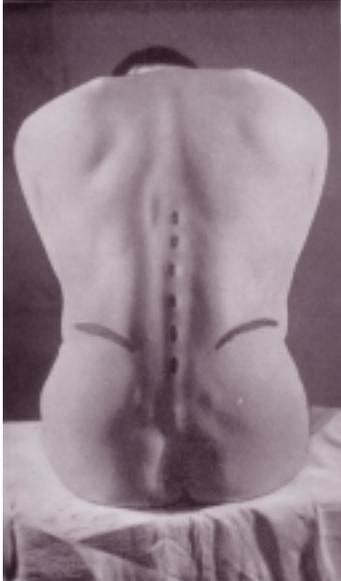
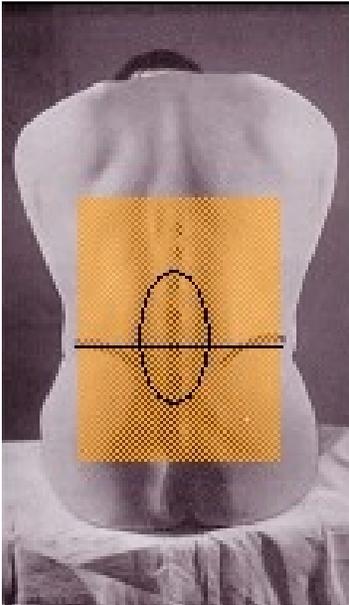


## Doing an Epidural or Spinal



Look at this anatomy. Is there any need to feel this back to figure out where you are going to do the lumbar puncture or epidural? No!

The spines of T12 and L1 – L5 are marked.

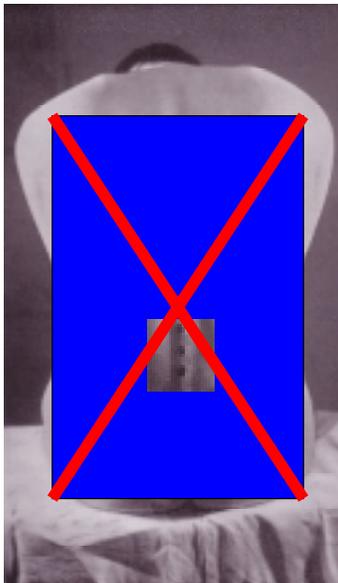


The imaginary horizontal line drawn from iliac crest to iliac crest is Tuffier's line and usually passes through the L4 spinous process.

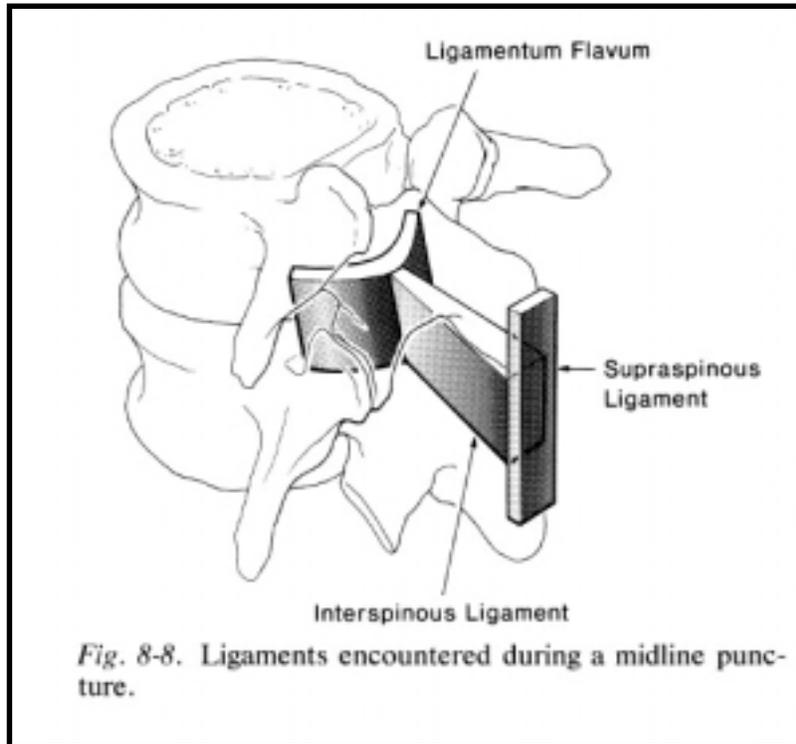
We perform the epidural or lumbar puncture anywhere in the oval area (L2 – L5). There is no need to do a lot of feeling of the back. Just pick the interspace that you think you will have the best chance of being successful.

Paint a large area of the back with betadine. Wipe the betadine off. Keep the wiping towel or sponge on the betadine. Do not to contaminate the prep by placing the clean wipe on the un-prepped skin and then dragging the wipe onto the betadine.

**KEEP YOU GLOVED HANDS ON THE BETADINE AREA AT ALL TIMES. BE COGNIZANT OF WHERE YOUR HANDS ARE AND DO NOT TOUCH THE UN-PREPPED SKIN.**

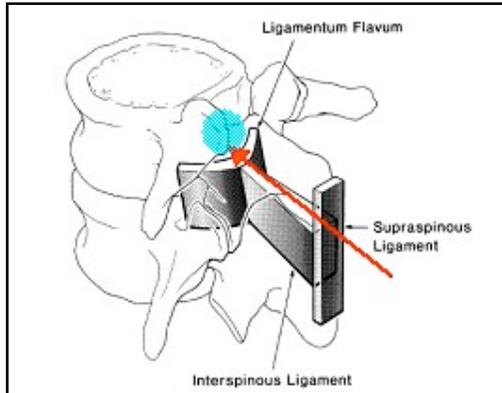


Don't use a drape. It covers up all of the useful anatomy that you need to see to be successful.

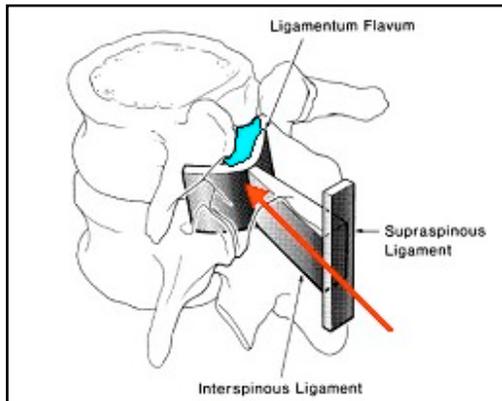


**Please memorize this image. When you are performing an epidural or spinal puncture use the image of the ligaments as a guide to imagine where the needle tip is at all times.**

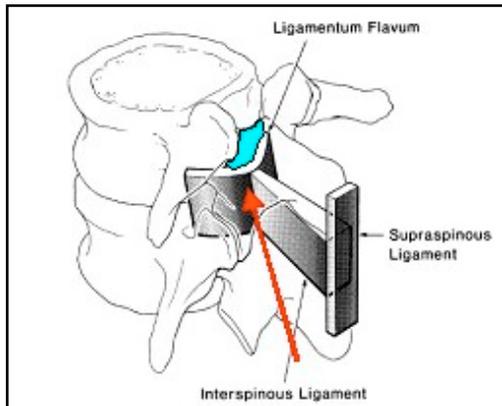
## APPROACHES TO THE EPIDURAL SPACE



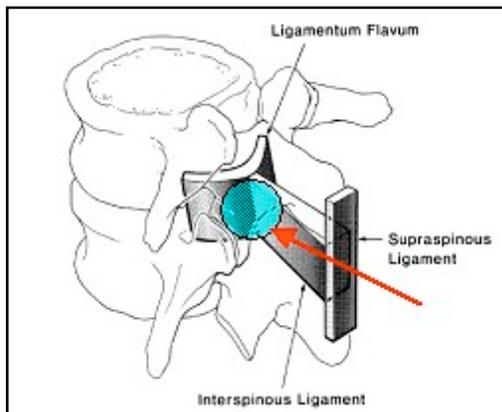
The classic midline approach to the epidural space. Needle penetrates the supraspinous ligament, interspinous ligament and finally the ligamentum flavum.



Slight paramedian approach. Needle starts out off of the midline and avoids the supraspinous and interspinous ligaments. Resistance to injection of fluid or air is not encountered until the ligamentum flavum is engaged.

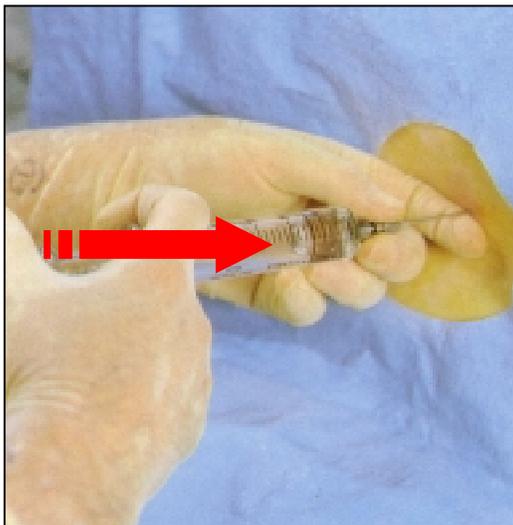
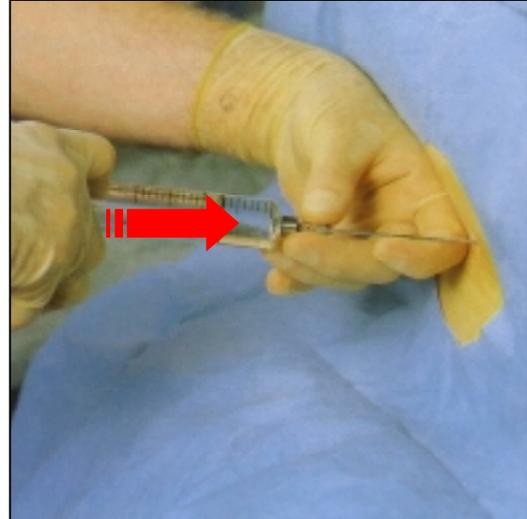
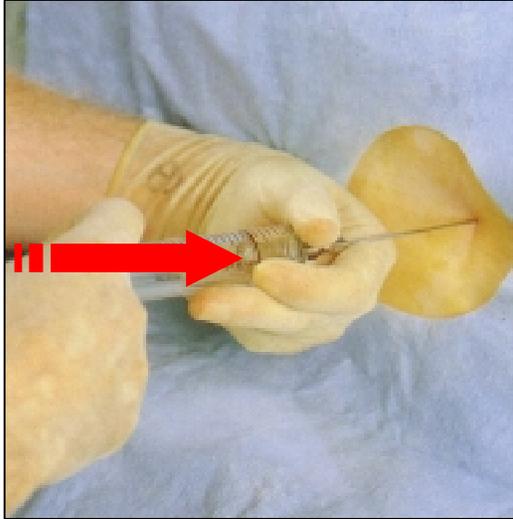


Lateral approach. Needle starts out well off of the midline (1 to 1.5 cm) and avoids the supraspinous and interspinous ligaments. Resistance to injection of fluid or air is not encountered until the ligamentum flavum is engaged.



False loss of resistance. Here the needle starts out in the midline and in the supraspinous and interspinous ligaments but wanders off of the midline and leaves the interspinous ligament before encountering the ligamentum flavum. The solution is injected dorsal to the ligamentum flavum.

## Loss of Resistance with Saline



If at any time you think the plunger is stuck, **STOP**. Remove the syringe and check that the plunger moves freely.

Pay attention to what you are **FEELING** as the needle advances. If you feel as though the ligamentum flavum has been penetrated but there has been no LOR to injection, **STOP**. Reassess plunger action and resistance to injection.

Pay attention to **DEPTH** as the needle advances. If you feel as though you should have penetrated the ligamentum flavum by now but there has been no LOR to injection, **STOP**. Reassess plunger action and resistance to injection.

Shown here are three different ways to hold the needle for the loss of resistance with saline method.

The way the needle is held is unimportant. What is important is that you have control of the needle and that the needle is INSERTED AND MOVED **SLOWLY** AND DELIBERATELY.

Please note the following:

1. The syringe is filled with saline and there is **NO AIR** in the syringe.
2. The syringes shown here are not filled enough to start with. Put 4 – 5 ml of saline in the syringe.
3. Do not inject all of the saline before you have engaged the needle in the interspinous ligament or the ligamentum flavum.
4. Once engaged in a ligament it is impossible to inject the saline
5. Once there is resistance to injection, keep **CONSTANT UNREMITTING THUMB PRESSURE ON THE PLUNGER WHILE SLOWLY ADVANCING THE NEEDLE** until there is no resistance to injection.

## **Spinals and Epidurals**

**(Please do not share this information with other attending physicians. This is how I do it. I have been doing it this way for a long time. I don't want to have to justify why I do it this way nor do I want to waste time discussing it. Please do not say to another attending, "That's not the way Dr. Lambert does it." Other attendings have their way of doing things and I have mind. And that's okay.)**

### **Spinals for cesarean section:**

1. I have been giving patients 50 – 75 ug of fentanyl IV (depending on level of anxiety or labor pain) prior to placing the spinal. I sometimes give 30 mg of propofol if necessary.
1. All patients receive 1.5 ml of 0.75% hyperbaric bupivacaine with 100 ug of morphine.
2. Once the baby is born, sedate the patient with fentanyl as necessary (no midazolam except in unusual circumstances) and the morphine left over from the intrathecal morphine vial. It is my opinion that all patients require some sedation.
3. Oxytocin infusion. If the running IV has >100 ml of solution left in it after the cord is clamped, add 40 units of oxytocin to it and run it wide open. Add 20 units of oxytocin to the next bag. If there is <100 ml of solution left in the IV bag, add 20 units of oxytocin and then add 40 units to the next bag.

### **Spinals for shorter duration operations (e.g., tubal ligation):**

1. These patients can be sedated with midazolam and fentanyl as we would do in the main OR prior to inducing spinal anesthesia.
2. All patients receive 3% chloroprocaine (the solution that we use for epidurals).
3. Add 2ml of NaHCO<sub>3</sub> to 20 ml of the 3% chloroprocaine.
4. Dilute 1.5 ml (45 mg) of the pH adjusted 3% solution to 3 ml with saline and give all 3 ml (45 mg) intrathecally.

### **Epidurals for cesarean section (epidural catheter in place and patient receiving labor analgesia):**

1. All patients get 20 ml of 3% chloroprocaine (no need to add NaHCO<sub>3</sub>) on the way to the OR.
2. 30 minutes after the chloroprocaine was given, start giving 0.5% bupivacaine in increments total of 20 ml over a half-hour or so.
3. After delivery give 3 mg of morphine epidurally. Ask me about using hydromorphone instead of morphine.
4. Once the baby is born, sedate the patient with fentanyl as necessary (no midazolam except in unusual circumstances) and the morphine left over from the epidural morphine vial. It is my opinion that all patients require some sedation.
4. Oxytocin infusion. If the running IV has >100 ml of solution left in it after the cord is clamped, add 40 units of oxytocin to it and run it wide open. Add 20 units of oxytocin to the next bag. If there is <100 ml of solution left in the IV bag, add 20 units of oxytocin and then add 40 units to the next bag.

### **Placing the epidural for labor analgesia:**

1. I have been giving patients 50 – 75 ug of fentanyl IV (depending on level of anxiety or labor pain) prior to placing the epidural. Can I do an epidural without the fentanyl. Sure. But why torture the patient and yourself? You can inject the remaining 25 -- 50 ug epidurally once the epidural is in. That way you don't have to find someone to waste it with.

2. Please, no wasting time with rituals like wetting the barrel of the syringe, etc.
3. When setting up the tray, draw up the entire 5 ml of the 1.5% lidocaine with epinephrine in the 20 ml syringe.
4. Don't drape.
5. Don't get too involved with patient position until you are ready to insert the epidural needle. Very few patients will stay still when you infiltrate the skin and all precise positioning prior to that is a waste of time. After you have infiltrated the skin, you can ask for better positioning. Don't waste your time up to that point because positioning is not critical to doing the skin wheal.
6. Please use the 25 gauge needle for the skin wheal. Make sure it is a good intradermal wheal. There is no need to infiltrate any deeper than the skin. The ligaments and soft tissue contain no pain receptors.
7. Do the epidural the way you like to do it but MOVE THE NEEDLE SLOWLY AND DELIBERATELY. Please, no rapid movements of the epidural needle. Go especially slowly when you are "in tiger country," that is close to penetrating the ligamentum flavum.
8. Once loss of resistance is obtained, inject the 5 ml of 1.5% lidocaine with epinephrine through the epidural needle SLOWLY. If the needle is in the epidural space then analgesia will develop in within the time for the next one to two contractions. The patient will quickly begin to get comfortable, which is what she paying us for.
9. Insert the catheter 3-5 cm.
10. All patients 5 feet and taller get 10 ml per hour. Under 5 foot, give 8 ml per hour.
11. Place a tegaderm over the catheter at the insertion site. Tape over the tegaderm with 2 inch tape. It is not necessary to be able to see the catheter through the tegaderm.

### **Combined spinal-epidural:**

1. Once the epidural has been located, insert the 27 gauge Whitacre needle and insure that it is engaged in firmly into the hub of the epidural needle.
2. Inject 1 ml of 0.25% bupivacaine to which 10 – 20 ug of fentanyl have been added.
3. Don't try to aspirate CSF. Just inject and then remove the Whitacre needle.
4. Insert the epidural catheter 3 -- 5 cm, tape it in place, and start the epidural infusion at your leisure (within an hour) at 10 ml per hour.

### **Boluses for pain:**

1. If the patient is in mild pain, then a bolus of 5 ml via the pump and increasing the infusion rate by 2 ml per hour should be adequate.
2. If the patient is in a lot of pain, make sure the catheter is working and make her comfortable quickly.
3. Give 5 ml of 2% lidocaine or 5 –10 ml of 1% lidocaine or 5 – 10 ml of 3% chloroprocaine.
4. Increase the infusion rate by 2 ml. If we are not getting good analgesia with a 14 ml infusion rate then the catheter is likely not working and will need replacing.

### **The only true test that an epidural is working appropriately is that the patient has**

**no pain.** Pinprick analgesia, insensibility to cold, and motor block are not measures of epidural effectiveness. If the patient is in pain we have to do something differently and alleviate the pain. If we can not relieve her pain, then we have failed. That does happen, but it is rare.

Consult with me as necessary and at any time (and there is no reason to say, "Sorry to bother you."). You will not be bothering me. It is my job to help you with your education and the patient with her anesthetic. I will be bothered much more if you don't call me and the patient has a less than optimal anesthetic.

All patients with labor epidurals deserve to be seen every two hours while we are up and around. The nurses will not call you if everything is going well, but that does not mean the patient shouldn't be seen. And, sometimes the nurses won't call you if it is late and the epidural is not working as well as it could. In these cases don't assume that no call from the nurse means that everything is good. If it is a marginal epidural, stop by every couple of hours even if it is late to see if there isn't something that can be done to make the patient more comfortable. I don't expect you to set your alarm clock and get up at 2 AM, if the epidural is working well just to write down the blood pressures, heart rates and "FHR OK" in the record.

For those epidurals that are not working well, call me for my advice on how to make it better.

If you go into the patient's room for any reason, take a few minutes to write something in the chart that will indicate that you were on the scene at that time. Just a note of the blood pressures and heart rates and FHR OK is adequate. Of course note any interventions that you make so that those who come after you will know what you did and when. It is a shame to go into a patient's room and not get credit for being there because you didn't write something in the record that would indicate that you were there.