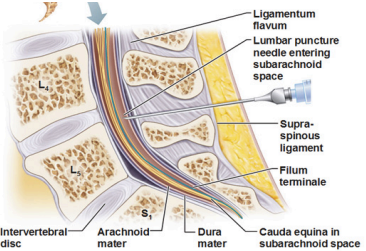
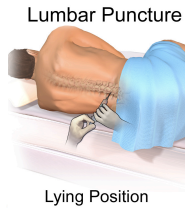

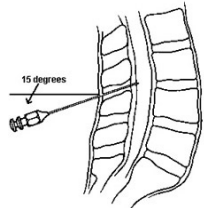
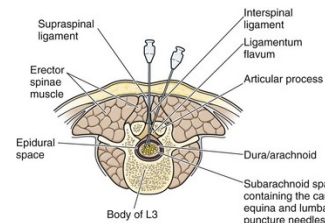
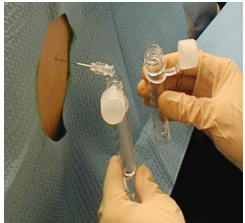
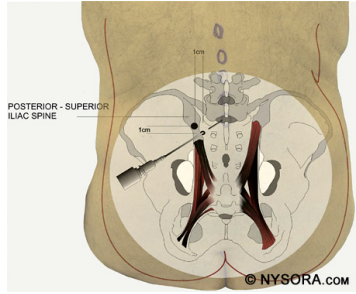



# LUMBAR PUNCTURE

Indications	Midline Procedure Technique	Other Techniques	Complications
<ul style="list-style-type: none"> <li>- <b>Suspected CNS infection</b> (meningitis)</li> <li>- <b>Suspected Subarachnoid Hemorrhage (SAH)</b></li> <li>- Diagnosis of Guillain-Barre or MS, acute demyelinating disorders</li> <li>- Spinal analgesia</li> <li>- Unexplained neurologic disorders if CT is negative</li> <li>- Intrathecal antibiotics or chemotherapy</li> </ul>	<p><b>Note:</b> if meningitis is suspected, initiate antibiotics immediately while waiting for CT scan results before lumbar puncture</p>    <ol style="list-style-type: none"> <li>1. <b>Positioning.</b> Position the patient near the end of bed in lateral decubitus or sitting position. If patient is lying have them curl up into a ball. If they're sitting flex the neck anteriorly.</li> <li>2. <b>Identify Landmarks.</b> Identify L3-L4 interspace by using the iliac crests as landmarks (L2-L3 and L4-L5 can be used also).</li> <li>3. Open your tray and <b>assemble your equipment</b> (manometer, open and label test tubes).</li> <li>4. <b>Clean the skin</b> with antiseptic solution including above and below the interspace by one level.</li> <li>5. <b>Anesthetize the area.</b> Draw 3mL of Lidocaine into 20 to 23-Gauge needle. First anesthetize the skin by raising a wheal over the L3-L4 interspace with a skin needle. Then, perform deep anesthesia in the trajectory of the needle.</li> <li>6. <b>Needle insertion.</b> Insert 20 to 22-Gauge spinal needle through the skin in the midline, angling the needle 15 degrees cephalad and aiming toward the umbilicus with the bevel parallel to the longitudinal axis of the spine. A "pop" should be felt as the needle enters the dura.</li> </ol>    <ol style="list-style-type: none"> <li>- Note: If bone is encountered, withdraw the needle slightly and angle the needle more cephalad.</li> <li>7. Push the needle in 1-2mm more, and <b>remove the stylus.</b></li> <li>8. Once fluid is obtained, <b>anchor the needle</b> hub by firmly holding between thumb and index finger.</li> <li>9. <b>Manometry.</b> Place the stopcock with the manometer on the hub to determine the pressure. Note the color of CSF, and record pressure. <ul style="list-style-type: none"> <li>- Note: If the fluid appears bloody, and does not clear after first few drops, replace the stylus, remove the needle and try a different interspace</li> <li>- In SAH, the blood does not clot and will appear xanthochromic (slightly yellow)</li> </ul> </li> <li>10. <b>CSF collection.</b> Turn the stopcock to allow CSF to flow into the test tubes. Collect 2-3mL in each tube.</li> <li>11. <b>Removal.</b> Replace the stylus and withdraw the needle.</li> <li>12. Cover the site with a sterile dressing.</li> </ol> <p><b>Note:</b> Consider US guidance for obese patients if you are unable to locate landmarks (ex. obese)</p>	<p><b>Lateral Approach:</b></p>  <p>Used in elderly patients with calcified supraspinous and infraspinal ligaments.</p> <ol style="list-style-type: none"> <li>1. Position patient in lateral recumbent.</li> <li>2. Prepare the same as previously.</li> <li>3. Anesthetize 1.5-2cm lateral of midline on either side of patient.</li> <li>4. Spinal needle should be injected approximately 15 degrees cephalad, and 20 degrees to midline (bypassing supraspinous and infraspinal ligaments, penetrating erector spinae and paraspinal muscles)</li> </ol> <p>Considerations for Pediatric Patients:</p> <ul style="list-style-type: none"> <li>- Infant should be seated with head only slightly flexed (avoid blocking airway)</li> </ul>  <ul style="list-style-type: none"> <li>- Provide supplemental pre-oxygenation before procedure to prevent hypoxemia (2-5 min)</li> <li>- Spinal needle is directly slightly cephalad "pop" sensation may not be felt</li> <li>- Use a 20 to 22-Gauge 1½" needle in infants and 3½" in children</li> </ul>	<ul style="list-style-type: none"> <li>- <b>Post-LP headache:</b> 10-25% of patients within 48 hours, usually self-limited. This may improve with oral caffeine or epidural blood patch.</li> <li>- <b>Epidermoid tumors</b> (if performed on a neonate)</li> <li>- <b>Seizures</b> (small percent)</li> <li>- <b>Traumatic or bloody tap:</b> inadvertent puncture of venous plexous, usually self-limiting but may lead to spinal hematoma</li> <li>- <b>Brain herniation:</b> from supratentorial mass or increased ICP</li> <li>- <b>Intracranial subdural hematoma:</b> (rare) downward displacement of brain due to tugging of meninges causes shearing of the vessels</li> <li>- <b>Spinal epidural or subdural hematoma</b></li> <li>- <b>Paraplegia</b></li> <li>- <b>Weakness</b></li> <li>- <b>Paresthesias:</b> common, usually transient</li> <li>- <b>Local pain:</b> due to minor injury to tissue</li> <li>- <b>Disk herniation:</b> (rare) due to needle entering the annulus fibrosis during procedure</li> <li>- <b>Cranial nerve neuropathy:</b> usually transient</li> <li>- <b>Meningitis:</b> highly unlikely, but bacteria can be introduced</li> </ul>