

## Lumbar Puncture Simulator Instructions



### Set includes;

- 1 Lumbar model
- 2 Puncture block
- 1 Skin sheet
- 1 Syringe
- 1 Irrigator stand
- 1 Irrigator bag
- 1 Lumbar spine model
- 1 Supporter

### Set up

- 1) Make sure the clamp is closed on the irrigator bag tubing.
- 2) Fill the irrigator bag with ~200 cc water and hang from irrigator stand.
- 3) Connect irrigator tubing to the top of the puncture block.
  - a. Blocks are labelled as follows: N=normal, O=obese, S=senior, SO=senior obese
- 4) Open clamp.
- 5) Connect syringe to bottom of puncture block and withdraw a couple cc of fluid. Disconnect syringe.
- 6) Place torso on either the supine or seated supporter.
- 7) Place puncture block in torso with the tubing end at the top.
- 8) Replace skin.
- 9) Place irrigator stand on a shelf or on several books so the base is above the level of the torso—fluid will not flow otherwise.

### Using the model to teach

- 1) You should demonstrate how to find the appropriate intervertebral space by palpating the top of the iliac crests. A figure illustrating the anatomy will be kept with the simulator and there is a lumbar spine model to demonstrate the proper angle of needle insertion. The vertebrae numbers on puncture blocks and lumbar spine model are L2-L5.
- 2) We will keep an LP kit with the simulator. You should refer to it when discussing how to prep the area, numb the skin, and set up the manometer and collection tubes. Please have the students practice connecting the manometer, measuring CSF pressure, and collecting fluid into tubes, but **do not use betadine or lidocaine on the model**.
- 3) The needle should be inserted about halfway to reach the subarachnoid space in this model. (Make sure students realize this is not always the case in real life.)
- 4) You will note that the resistance to needle insertion through the subcutaneous tissue, the “pop,” and the flow of CSF are realistic, but the skin density is not. Also, there is a design flaw with this model in that posterior to the spinal canal/subarachnoid space is spongy material as opposed to bone.

### Troubleshooting

If you are convinced you have hit the subarachnoid space but no fluid is flowing:

- 1) Lift a corner of the skin to see the needle angle and whether the needle has entered the appropriate space.
- 2) Make sure the clamp on the irrigator bag is open.
- 3) Make sure the irrigator bag and catheter are above the level of the torso.
- 4) Try another intervertebral space.

### In order to extend the life of the model and replacement parts, please

- 1) Clean the skin with soap and water only.
- 2) DO NOT use betadine or lidocaine on the skin.
- 3) DO NOT use a needle that is larger than 20-23 gauge.
- 4) Insert the needle into the puncture block only as many times as is necessary. Each vertebral space is intended to be punctured up to 30 times. In my experience with the demo model, the puncture block tore after ~30 punctures but this did not appear to affect performance. We will continue to use the puncture blocks and skin until wear-and-tear is affecting performance. **Please let me know when you think it is time to replace a puncture block or the skin** ([zazulia@wustl.edu](mailto:zazulia@wustl.edu)).