

Background Information



Anatomy

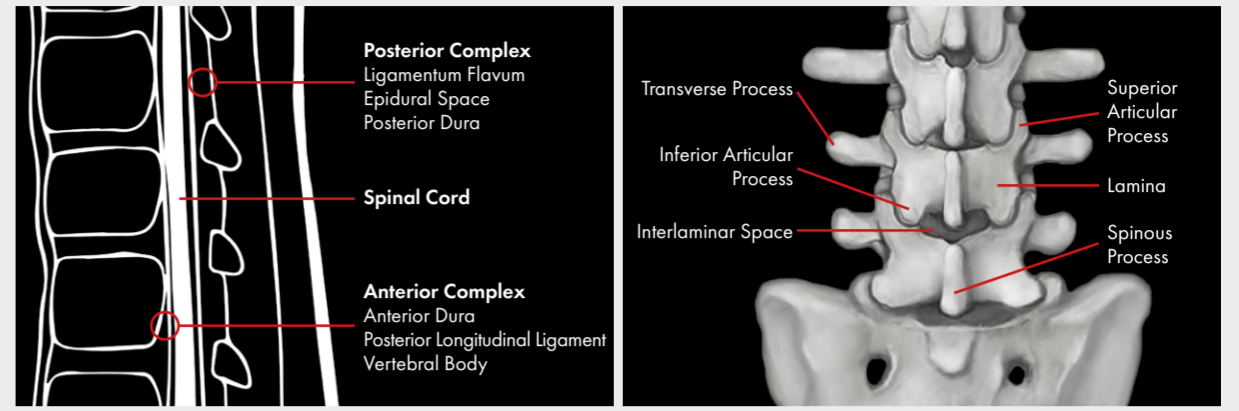
Pre-procedure neuraxial ultrasound scanning reduces multiple and failed attempts.

It is an ultrasound assisted technique where the target is identified and the skin marked prior to the performance of neuraxial anesthesia using standard methods. The same requirements for sterility apply.

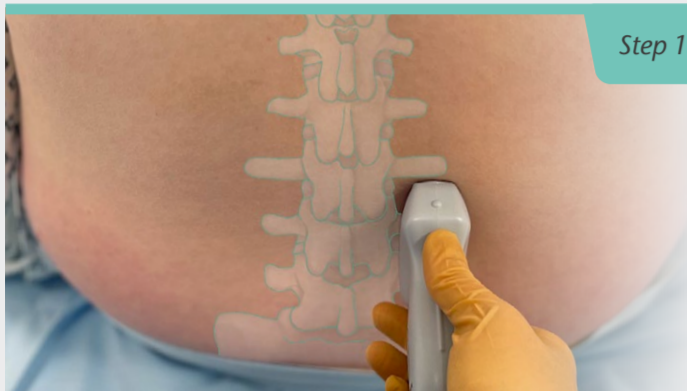
Prior to scanning the patient's position should be optimized (lateral decubitus / sitting). Once the skin is marked the patient's position should not be altered.

Tips: Avoid passing the spinal or epidural needle directly through the skin pen marks.

If time is limited and a paramedian approach is not required, steps 3 & 4 can be skipped.



Scanning Procedure



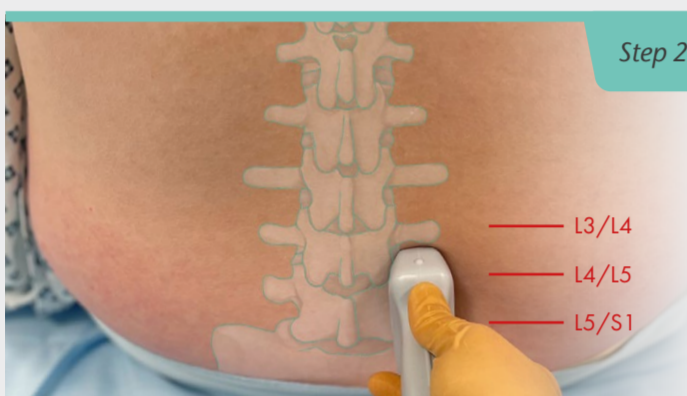
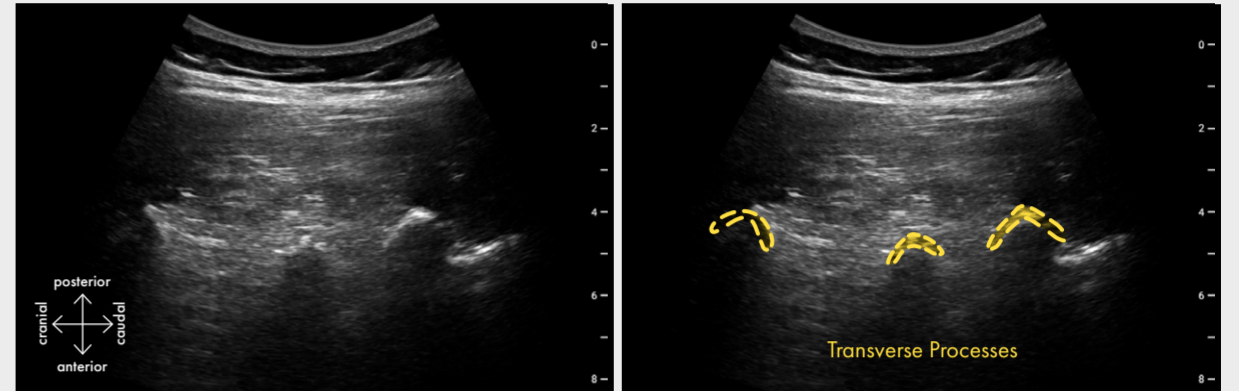
Step 1

Transverse Process View (Parasagittal)

Using a curved array probe (1-5Mhz) set the initial depth to 8-9cm. Adjust depth as needed thereafter.

First place the probe perpendicular and 2-3cm lateral to the midpoint of the lumbar spine and identify the transverse processes.

The transverse processes appear as hyperechoic structures with drop-out shadows beneath. These finger like projections are also described as the 'Trident Sign'.



Step 2

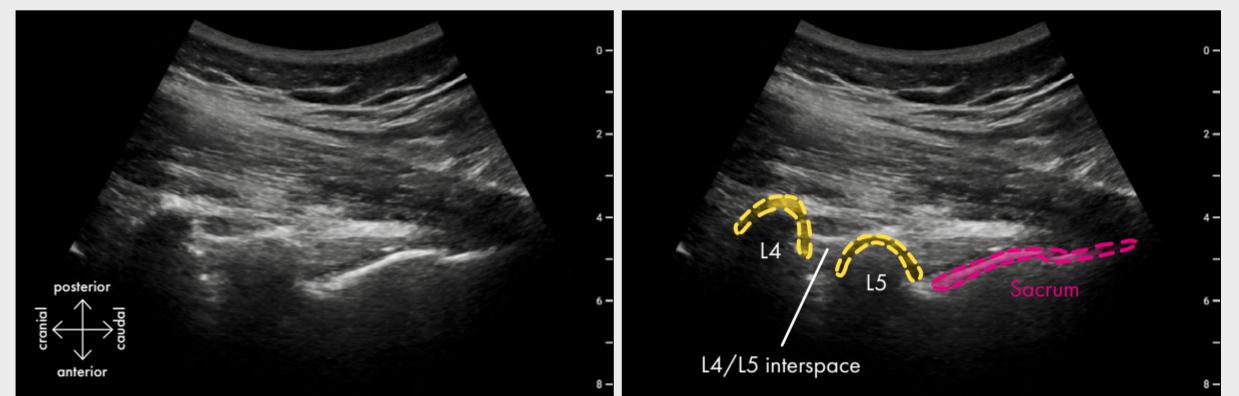
Identify Vertebral Level (Parasagittal)

Keeping the probe in the same orientation, move caudally until the flat sacral bone is identified.

The sacrum can now be used as a reference for identifying the different vertebral interspaces.

Slide the transducer cranially until all the relevant vertebral interspaces are identified, for example L5/S1, L4/5, L3/4.

Position each interspace in the middle of the probe and mark the level laterally on the skin (see red lines on image).



Step 3

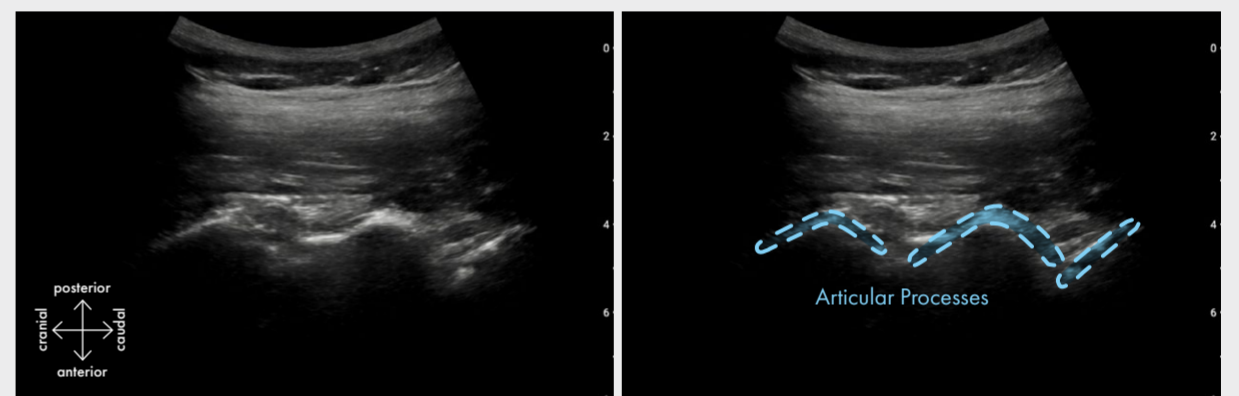
Articular Process View (Parasagittal)

At your selected level, keep the probe perpendicular but move it medially until a continuous hyperechoic line is seen, these are the articular processes.

These 'humps' in the hyperechoic line are also described as the 'camel hump sign'.

Vertebral contents are not often visible due to the bony structures being continuous at this location.

Tip: Only small, fine movements of the probe are needed to optimize the view. Use two hands to support the probe if necessary.



Step 4

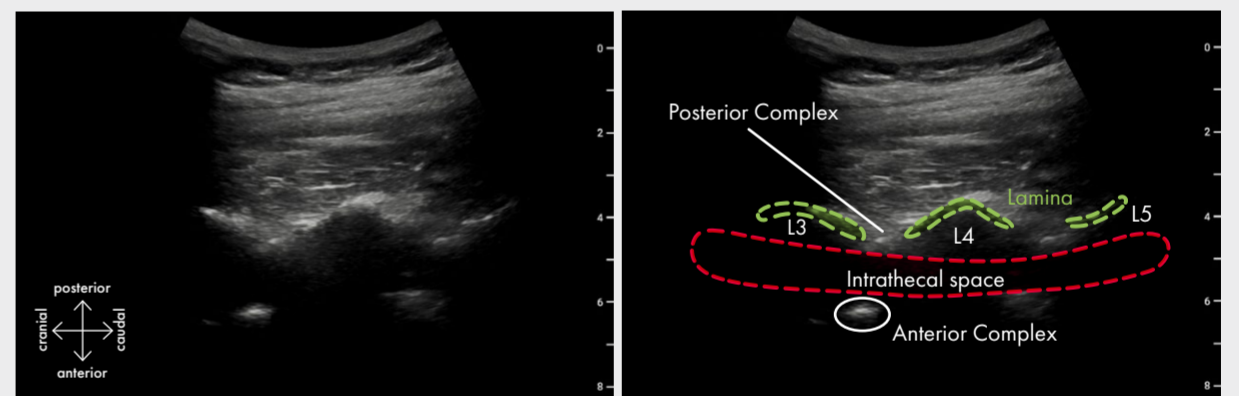
Oblique Interlaminar View (Parasagittal)

Tilt the probe medially. This brings the laminae into view with gaps where the vertebral contents can be seen, giving a 'sawtooth' appearance.

In this view you can see the **Posterior Complex** (ligamentum flavum, epidural space and posterior dura), the **intrathecal space** and **Anterior Complex** (anterior dura, posterior

longitudinal ligament and vertebral body). The anterior complex is often easier to see than the posterior complex.

This view is important if more accurate marking of interspace levels is required or a paramedian approach is to be used. Measurements of epidural depth can also be performed with this view.



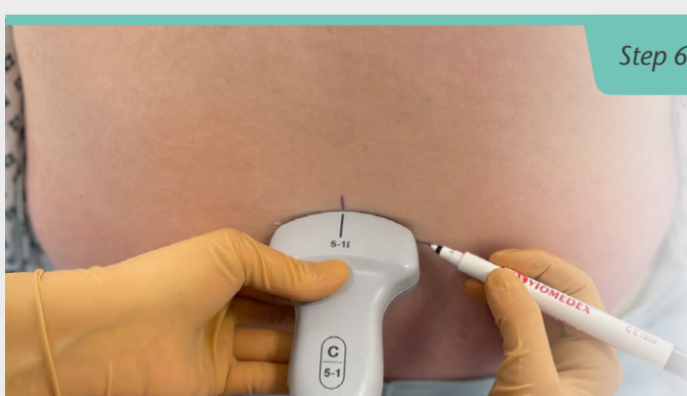
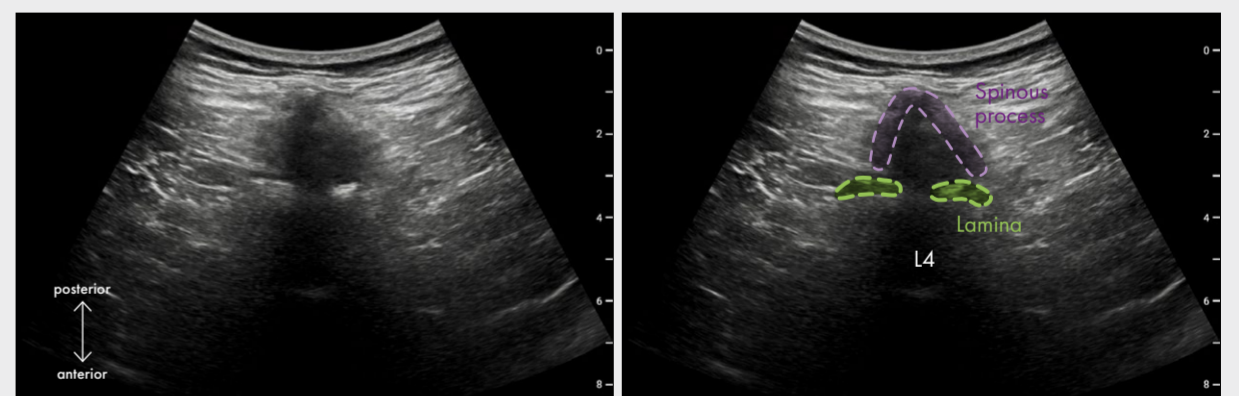
Step 5

Spinous Process View (Transverse)

With the desired interspace level positioned in the middle of the screen, rotate the probe 90 degrees from a longitudinal to transverse probe orientation.

You will see the drop-out shadow of the spinous process and lamina. Intervertebral contents will not be visible.

Tip: This view is particularly useful in obese patients to identify the midline when deep structures such as the anterior and posterior complexes may be poorly visible.



Step 6

Interspinous View (Transverse)

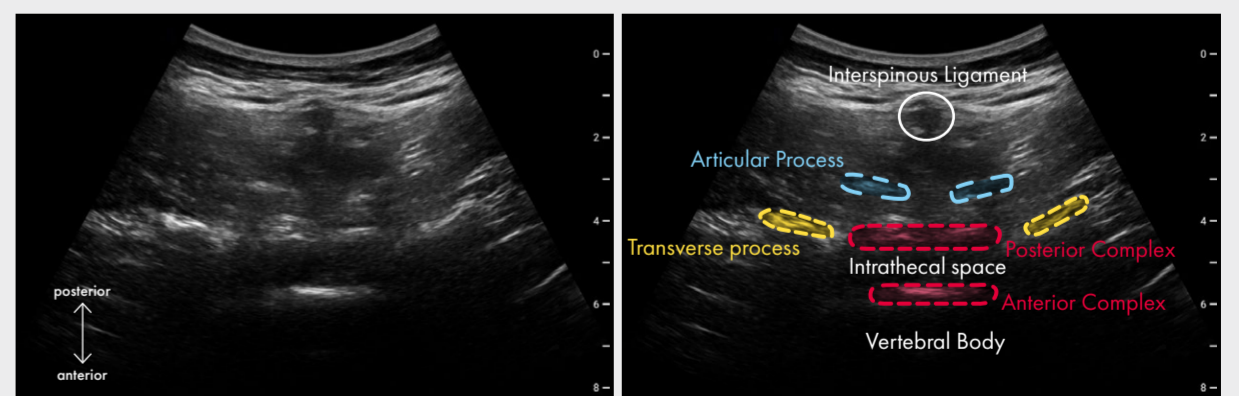
Use fine cranial and caudal movements with cranial tilt of the probe to optimize the view of the interspinous space.

The posterior and anterior complexes should be visible and measurements of depth can be taken. The intrathecal space is seen as the hypoechoic structure between the posterior and anterior complexes. When the optimum transverse interspinous view is obtained,

vertical and horizontal skin markings are performed.

Tips: Measurements of the depth of the intrathecal or epidural space can be useful when supervising those new to the technique.

Probe angulation can give an indication of needle trajectory.



Neuraxial Anesthesia

Neuraxial Anesthesia can now be performed after sterility of the patient's skin and equipment is undertaken. The epidural or spinal needle is inserted at the intersection of the skin markings, using the angle and depth information from step 6 for guidance. Ultrasound is not used during the actual needle insertion.

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