

## Interscalene block

In the interscalene groove the roots and trunks of the brachial plexus descend between scalenus anterior and scalenus medius tending laterally.

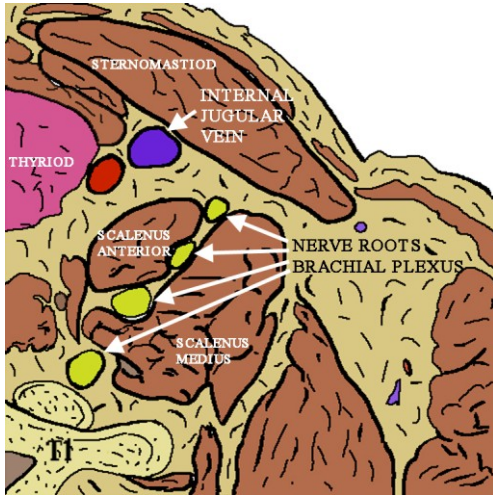


Fig 2.1 Diagram of an oblique section through the neck perpendicular to the interscalene groove

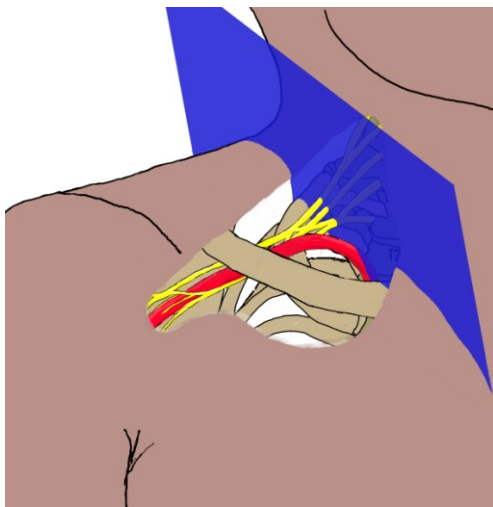


Fig 2.2 plane of ultrasound for interscalene block

Sonographically the nerve roots and trunks have a bright rim with a black (echolucent) core. If the probe is angulated or moved up and down the groove, the trunks can be seen to become more superficial further inferiorly.

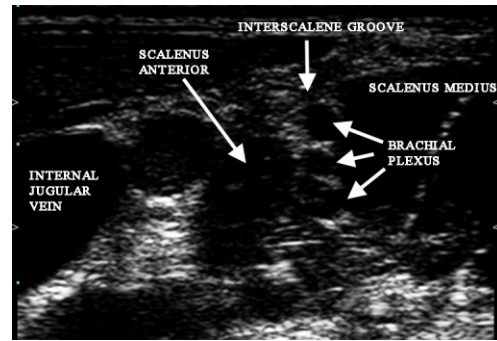


Fig 2.3 Sonogram of mid level interscalene groove prior to block

The key to the block is identifying the groove. The ultrasound probe is held transversely on the base of the neck over sternomastoid and angled medially, inferiorly and posteriorly (towards the contralateral scapula).

First identify the internal jugular vein in short axis. It may be partly collapsed and is distinguished from the carotid artery by a more irregular shape and compressibility. Scalenus anterior is the first muscle found postero-laterally and at roughly the same depth as the internal jugular vein. The interscalene groove is less well defined the higher in the neck it is imaged.

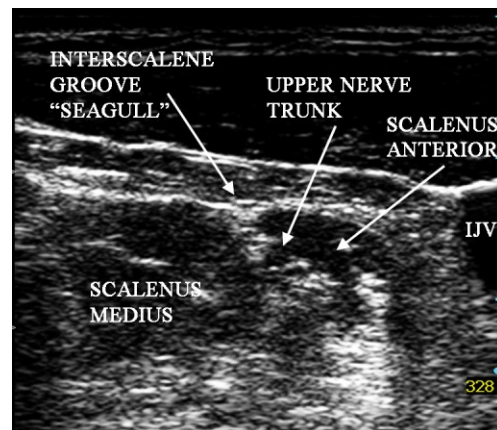


Fig 2.4 Sonogram of the interscalene groove high in the neck

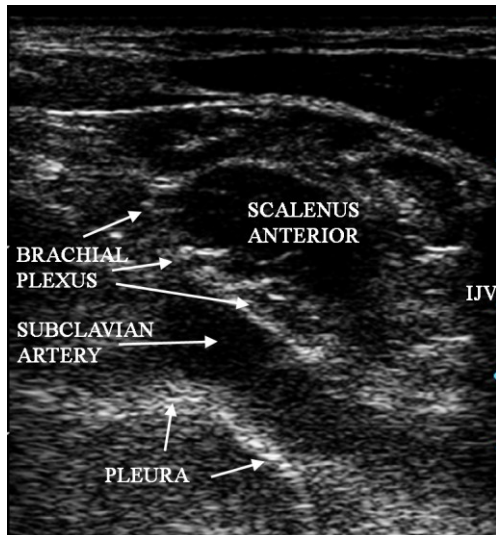


Fig 2.5 Sonogram of the interscalene groove low in the neck.

If the location of the groove is followed inferiorly the subclavian artery is seen in oblique section with the origin of the anterior scalene muscle superficial to the artery. Colour Doppler may be useful to help identify the artery. Scalene anterior may then be followed superiorly to find the groove.

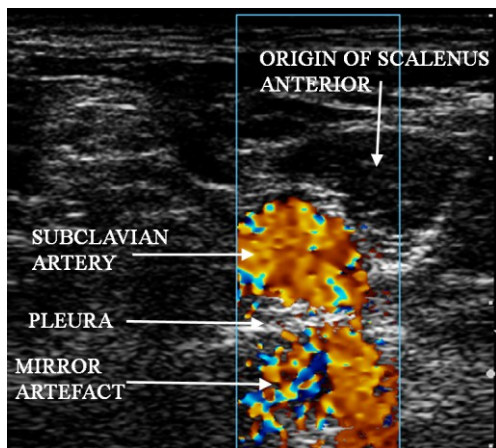


Fig 2.6 Sonogram of the origine of scalenus anterior identified by the position of the subclavian artery. Note the mirror artefact caused by the strongly reflecting pleura.

At the level of the block the fascial layer superficially investing the scalene muscles is often visible and makes a “seagull” shape over the groove. The “wings” extend over the two scalene muscles and the body

is in the groove. If the patient is asked to sniff or the ultrasound probe is gently pushed into the neck the independent movement of the scalene muscles and the nerve roots may also help identify the groove. The phrenic nerve position is variable and not always able to be identified. It may be imaged passing across the superficial aspect of scalenus anterior although it is sometimes located in the muscle or even in the interscalene groove. Frequent anatomical variants are seen in the interscalene area. The two of most interest to the regional anaesthetist are the bifid interscalene groove split by a slip of scalenus anterior and the transverse cervical artery. The scalene muscles are multipennate and there may be two interscalene grooves, one more superficial to the other. Individual nerve roots or trunks may also be found within the substance of scalene muscles.

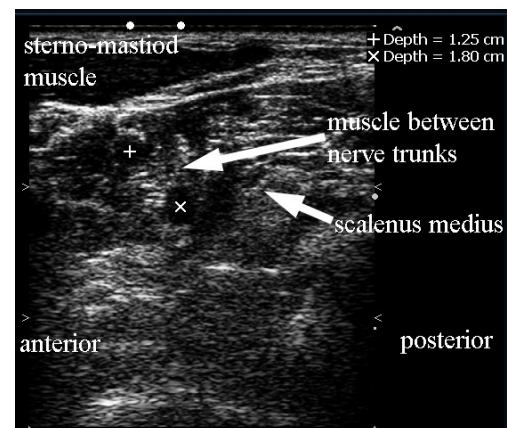


Fig 2.7 Muscle belly separating two nerve trunks (marked + and x) in the interscalene groove

The transverse cervical artery is a variant sometimes passing through the brachial plexus in the interscalene groove. It may sometimes resemble a nerve trunk if seen in short axis however it is more usually seen in long axis passing between the nerve trunks.

The plexus may be approached either in or across the plane of the ultrasound beam. The nerves are very superficial and if the

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insertion depth is limited to 1 to 2 cm absolute visualisation of the needle tip is less critical than many blocks. In plane approaches may be used from both posterior and anterior (taking care to avoid the internal jugular vein and the phrenic nerve) depending on access and individual preference. A perpendicular in plane approach is illustrated with an anterior insertion point approximately 20 to 30mm from the probe and using a 50mm 22g needle. The probe may be slid towards the needle until it is identified. The needle is then guided towards the interscalene groove to enter between the nerve trunks.

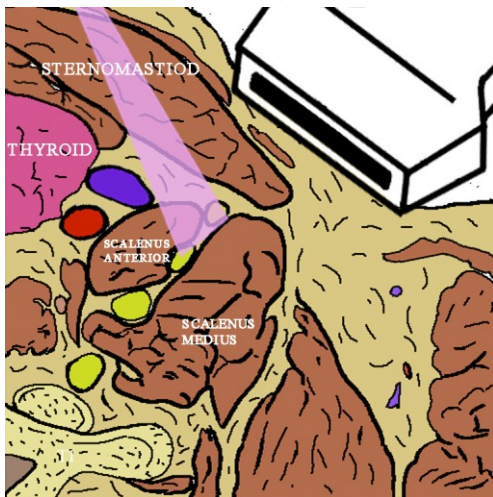


Fig 2.8 Diagram showing anterior, in plane perpendicular approach. Needle path in purple

There is often a “pop” felt and seen on the ultrasound as the needle enters the groove. The local anaesthetic solution should be seen distending the groove immediately the injection is started. If distension is not seen the injection should be stopped and needle tip position checked. Imaging is continued during the injection checking that local anaesthetic spreads around all the visible nerve trunks. 20 to 25 ml of ropivacaine 0.75 to 1% or lignocaine 2% with adrenaline is effective.

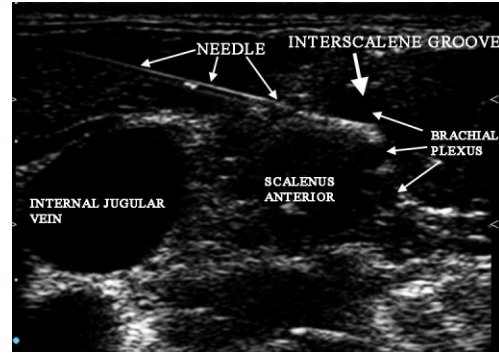


Fig 2.9 Sonogram of interscalene brachial plexus block prior to injection. Needle tip is seen between upper and middle trunks in interscalene groove. Anterior in plane approach



Fig 2.10 Position of needle and probe for interscalene block, anterior in plane approach.

In describing this ultrasound guided procedure it has been assumed that attention has been paid to appropriate location, personnel, sterility, preparation, doses and technique necessary for the safe conduct of major nerve blocks and other procedures. These medical procedures should not be attempted without suitable qualifications

### Acknowledgements

Thanks go to the Ecole Polytechnique Federale de Lausanne for the excellent anatomical slices that can be obtained from the data set of the Visible Human Project via their website at

<http://visiblehuman.epfl.ch/>