



# Interscalene Sonoanatomy : A Cadaver Study

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## Background

With the advent of high frequency ultrasound there has been increasing importance upon recognizing sonoanatomy. For sonoanatomy to have clinical significance there must be correlation to gross anatomy. Various experts in the field disagree upon key elements of the brachial plexus interscalene sonoanatomy. The debate is whether cervical nerve roots C5,C6,and C7 are visualized at the interscalene level or C5 root and a bifurcation of C6 root. The purpose of this study was to determine which cervical nerve roots are most likely visualized at the interscalene level using ultrasound.

## Methods

1 human cadaver was dissected. First a needle was placed under fluoroscopic guidance (figure 1) at the C6 vertebral level approximately where the C6 nerve root exits the vertebral foramen (figure 2). The brachial plexus was visualized with ultrasound at the interscalene level (figure 3) and three localization guide wires were placed through each of the three hypoechoic cervical nerve root structures in question (figure 4 - 6). After each placement the guidewires were labeled in series. The specimen was then dissected and examined with attention to location of guidewires and specific nerve roots intersected. The C6 nerve root was confirmed by dissecting proximally to the intersection point of the fluoroscopically placed needle. The C6 nerve root was then transected at the level of the guidewires and examined in cross section.

## Guidewire Placement

Figure 3



Figure 4



Figure 5

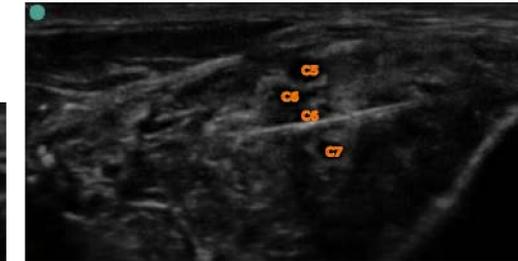


Figure 6



## C6 Nerve Cross Section

Figure 9



Figure 10



## Conclusions

This study demonstrates that the interscalene sonoanatomy visualized during peripheral nerve blocks is more likely the C5 nerve root and a C6 nerve root bifurcation. This finding is contrary to previous publications and beliefs that the cervical nerve roots visualized at this level were C5, C6, and C7.

### Clinical relevance

These findings have clinical significance as the improved understanding of interscalene sonoanatomy may help practitioners avoid intraneural or dural sheath injection. Additionally neurologists are using ultrasound for diagnosis. A more accurate description of nerve roots will aid direction of surgical staff in brachial plexus repair and resection surgeries. These findings may also improve placement of continuous peripheral nerve catheters for more appropriate dermatomal coverage during regional anesthesia.

## Dissection

After early dissection of the skin and subcutaneous adipose the sternocleidomastoid and anterior scalene were reflected (figure 7). Upon dissection and examination of the brachial plexus at the interscalene level it was found that both guidewire #1 and #2 intersected the C6 nerve root. Guidewire #3 intersected the C5 nerve root. None of the ultrasound placed guidewires intersected the C7 nerve root (figure 8). The transected C6 nerve root in cross section showed two discrete nerve structures with a common sheath, likely representing a common C6 nerve root bifurcation at this level (figure 9 & 10).

Figure 7

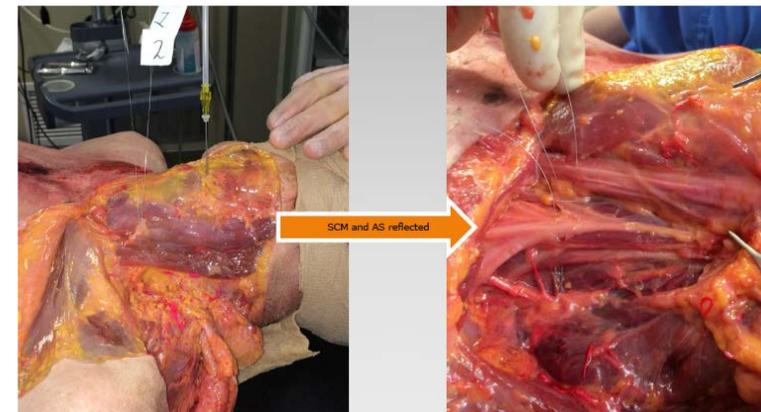


Figure 8

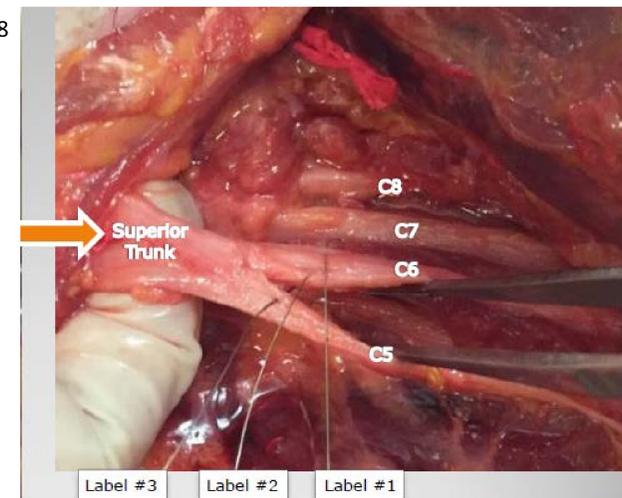


Figure 1



Figure 2



## References

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