

Cervical Spine Sonoanatomy



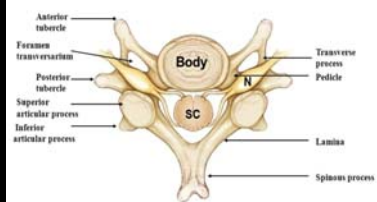
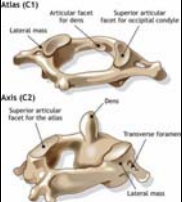
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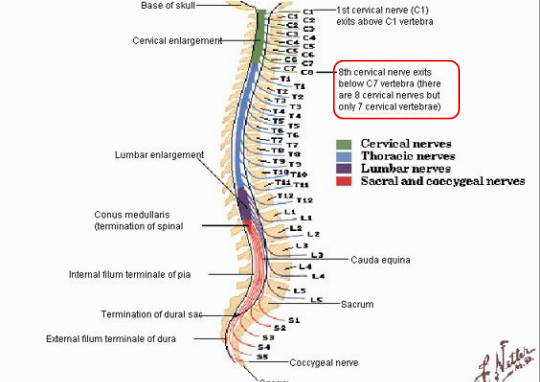
Anatomy

- Special:
 - C1 (atlas): no/rudimentary SP, prominent TP
 - C2 (axis) : bifid SP
 - C7: prominent SP, no ant. tubercle of TP
- C3-C6: ant./post. tubercle of TP

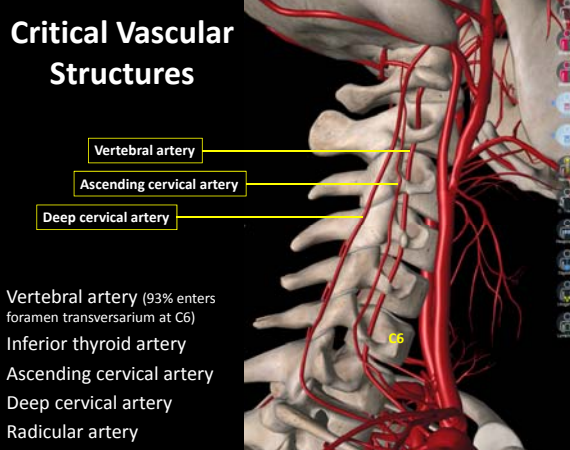



SP: spinous process; TP: transverse process

Relation of Spinal Nerve Roots to Vertebrae



Critical Vascular Structures



- Vertebral artery (93% enters foramen transversarium at C6)
- Inferior thyroid artery
- Ascending cervical artery
- Deep cervical artery
- Radicular artery

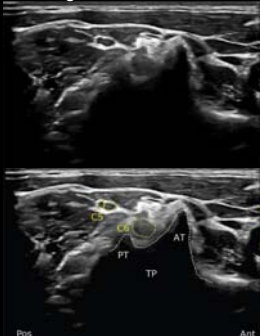
Cervical Spine Level Identification

- C6, C7 transverse process approach**
 - Cervical nerve root and stellate ganglion injection
 - Not primary choice for other cervical injection
- Occiput, C1, C2 approach**
 - For upper cervical, facet, medial branch, GON, 3rd occipital nerve injection
- Mastoid process, C1, C2 approach**
 - For unilateral upper cervical, facet, medial branch injection

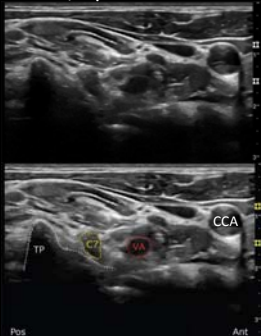
Journal of Ultrasound in Medicine. 2013 Nov;32(11):1885-96

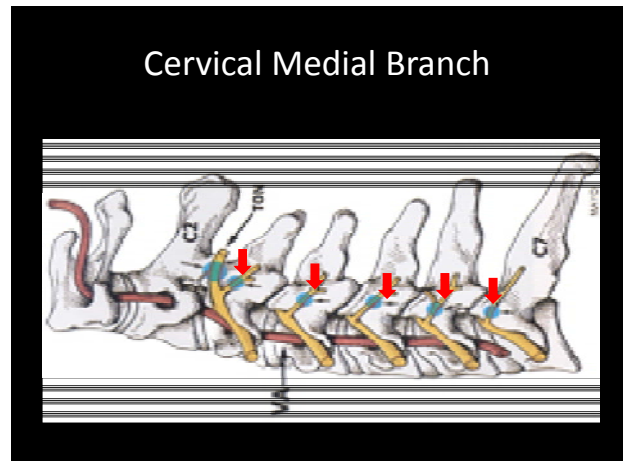
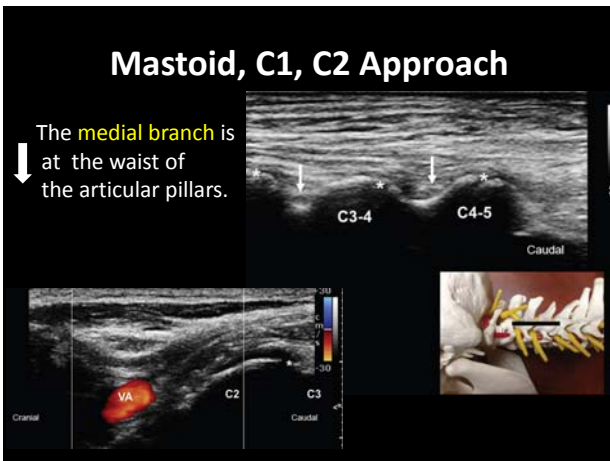
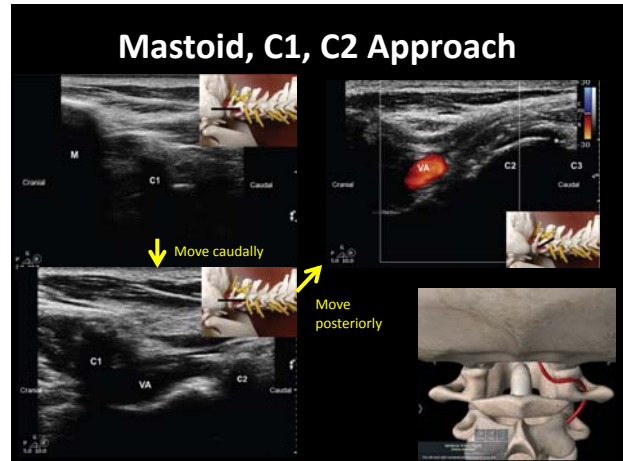
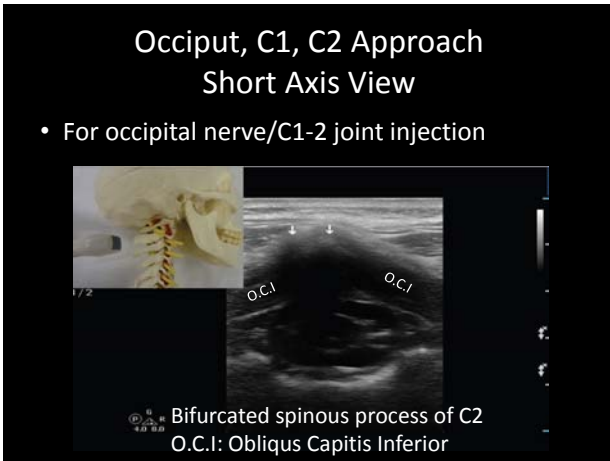
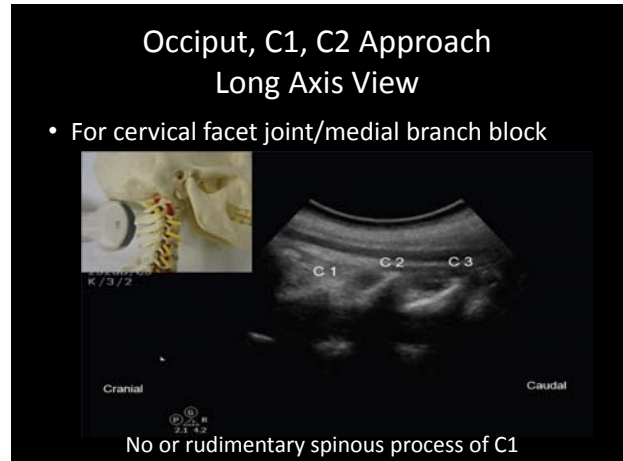
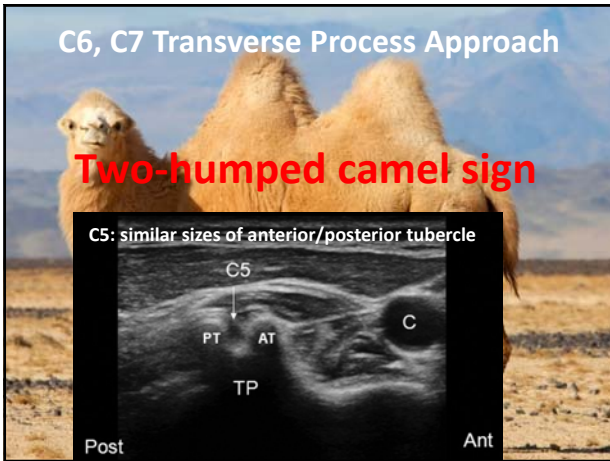
C6, C7 Transverse Process Approach

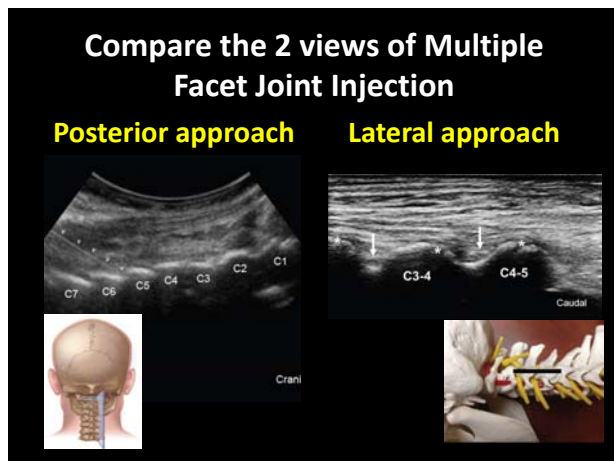
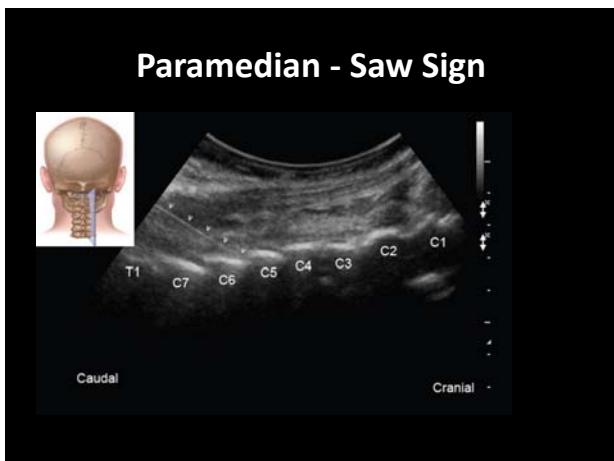
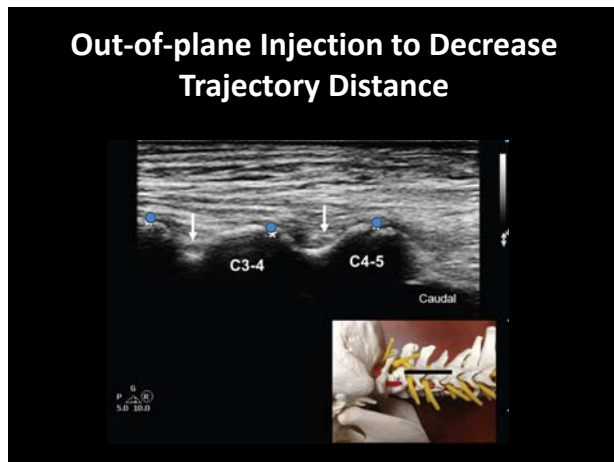
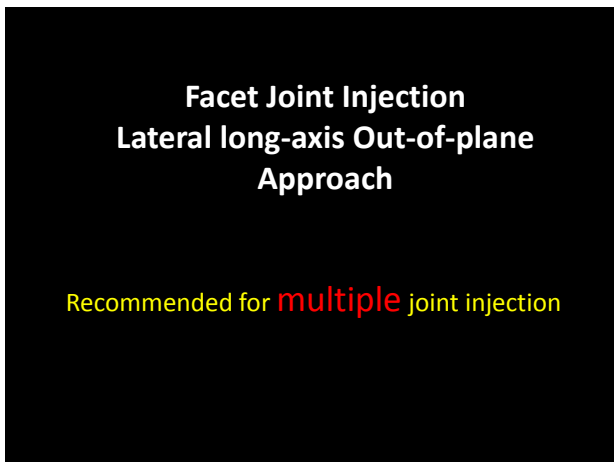
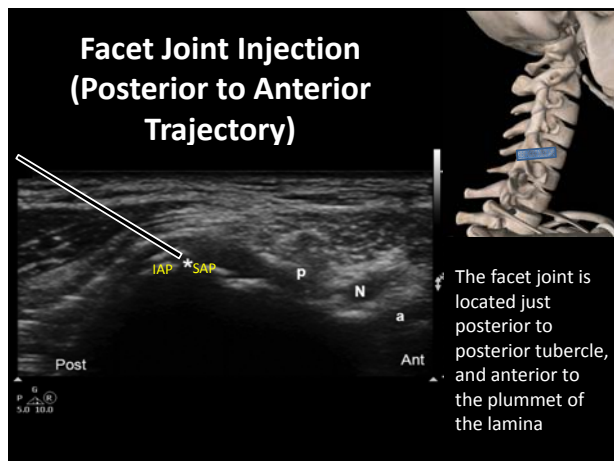
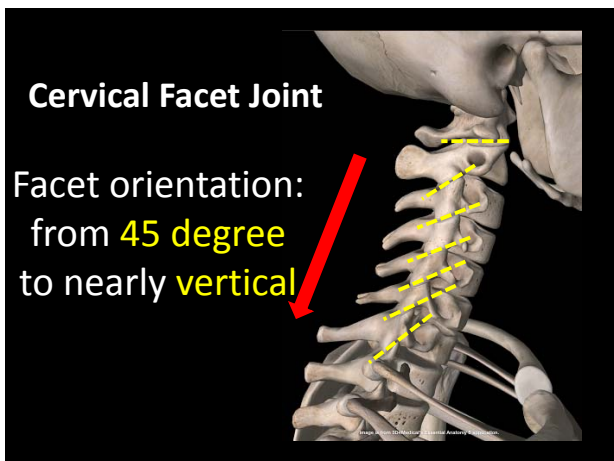
C6: sharp anterior tubercle, Chassaignac tubercle



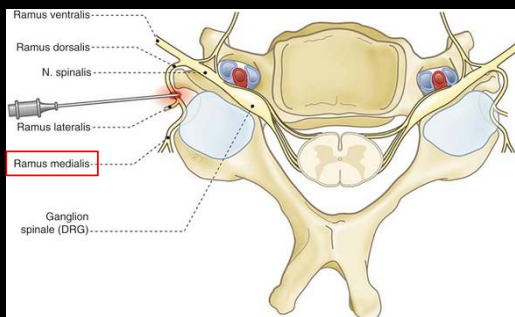
C7: absent or rudimentary anterior tubercle, unprotected vertebral artery







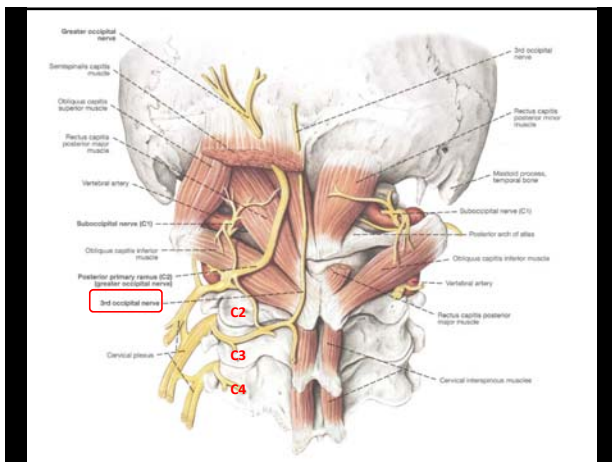
Cervical Medial Branch



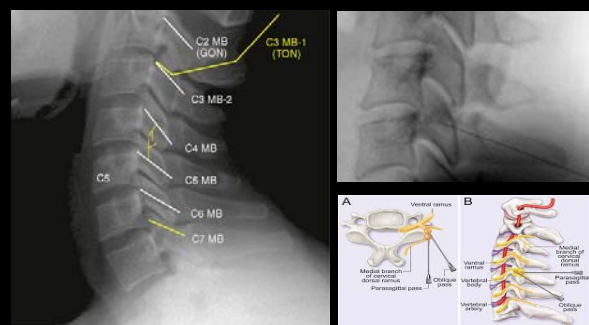
Yong-Chul Kim, MD, PhD

Medial Branch Block

- C2-3
 - **single innervation** by TON (third occipital nerve)
 - The **superficial medial branch** of C3 dorsal ramus
 - TON, the largest cervical medial branch (1.5 mm)
- The **deep branch** of C3 dorsal ramus → C3 medial branch → join the C4 medial branch to innervate C3-4 facet joint (**dual innervation**)



Cervical Medial Branch



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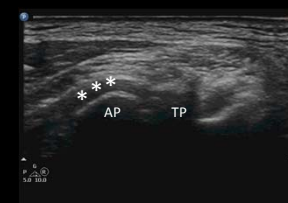
Which View to Choose?

- The short-axis view offers better visualization of **blood vessels** (from articular processes to neuroforamens)
- The long-axis view better identifies the **nerve** as a oval shape structure

Cervical Medial Branch Block

Short axis, in-plane

Single injection



Long axis, out-of-plane

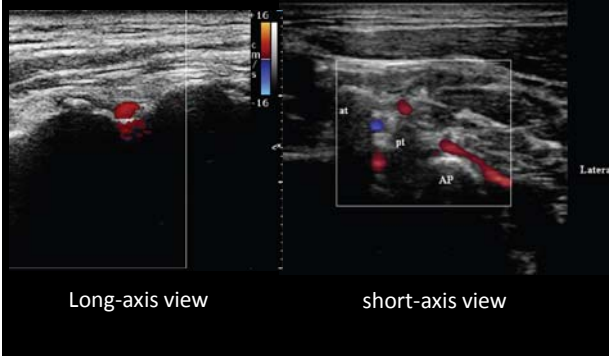
Multiple injection



- Use Doppler to identify any small vessels first
- Injection to the articular pillar (AP) to the correct level

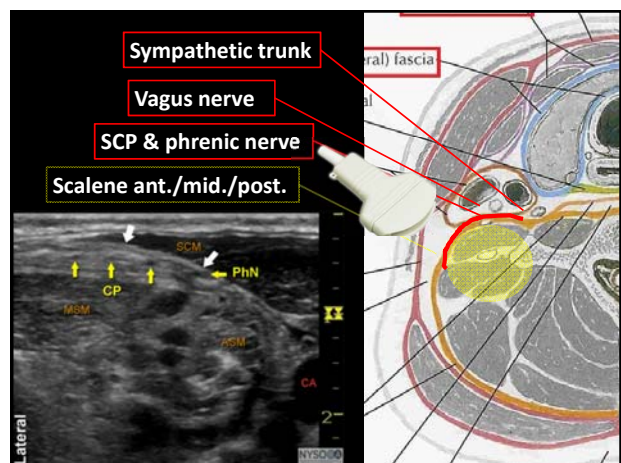
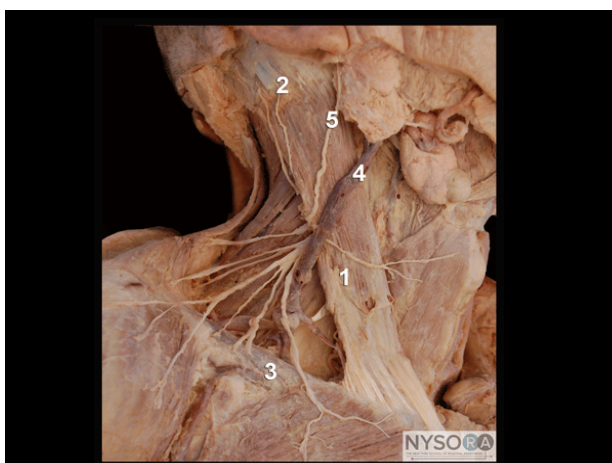
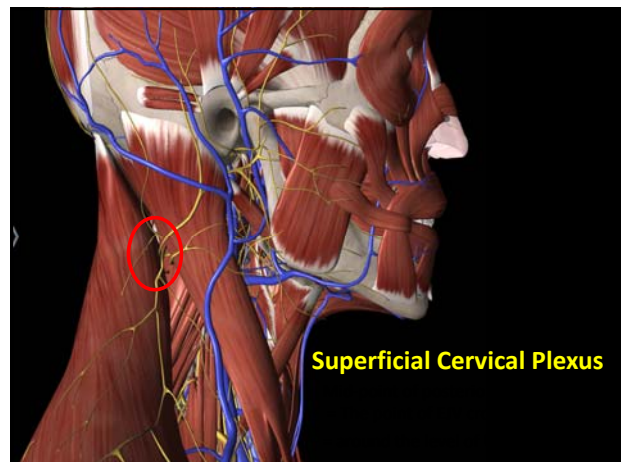
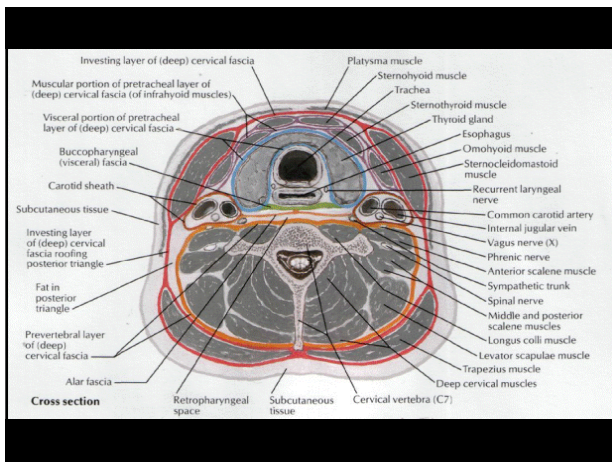
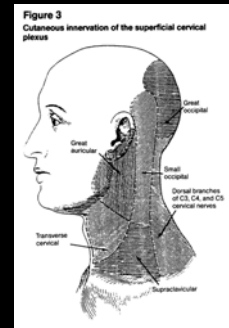
- Shift to the longitudinal view to visualize the nerve better and adjust the needle to be closer to the nerve

Avoid Critical Arteries



Superficial Cervical Plexus

- Lesser occipital nerve, C2
- Greater auricular nerve, C2-3
- Transverse cervical nerve, C2-3
- Supraclavicular nerve (medial, lateral, intermediate), C3-4



Great Auricular Nerve

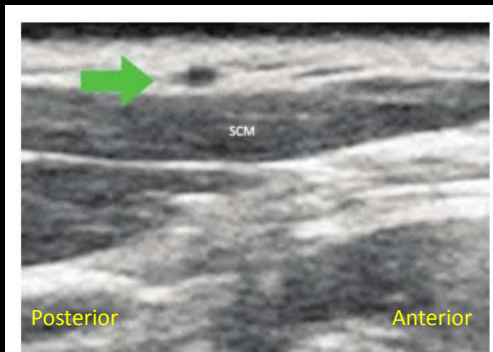
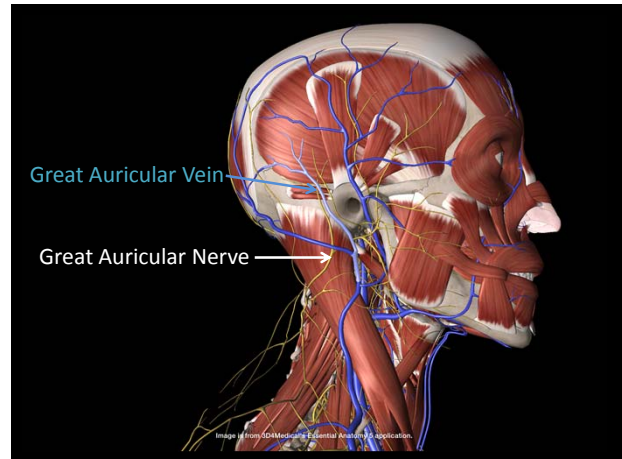
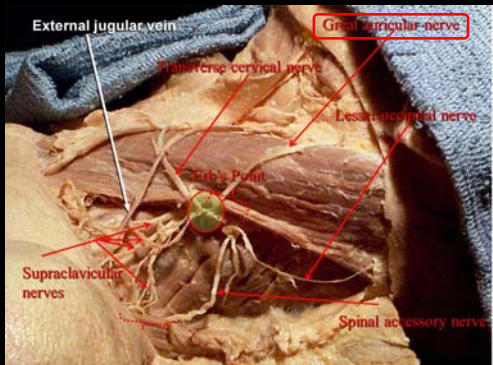
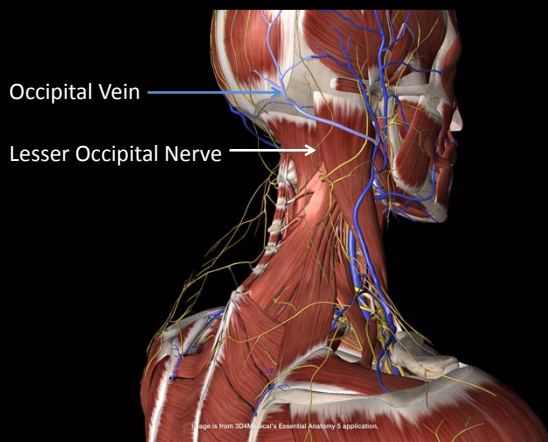
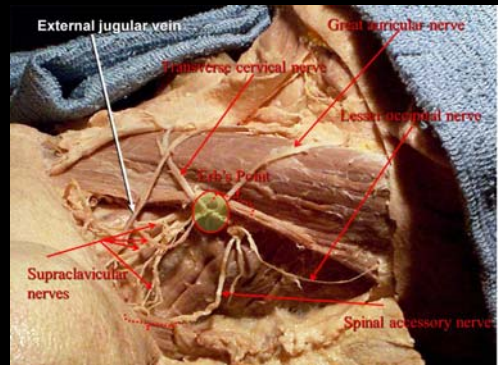
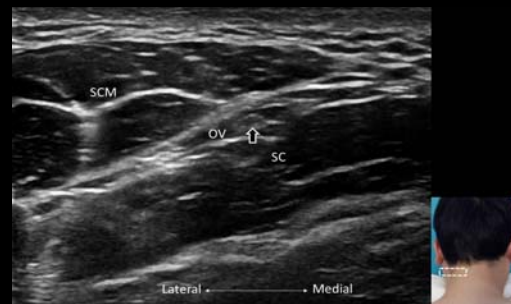


Figure 1. Great auricular nerve on ultrasound. The great auricular nerve (arrow) above the sternocleidomastoid muscle (SCM).

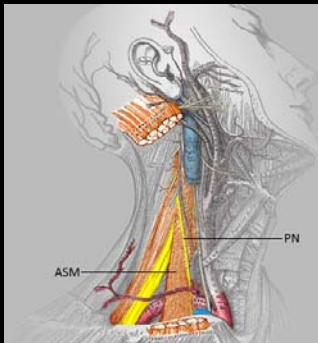
Lesser Occipital Nerve



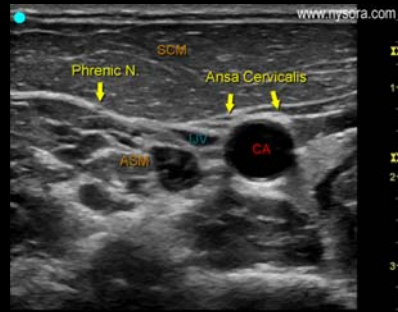
Lesser Occipital Nerve



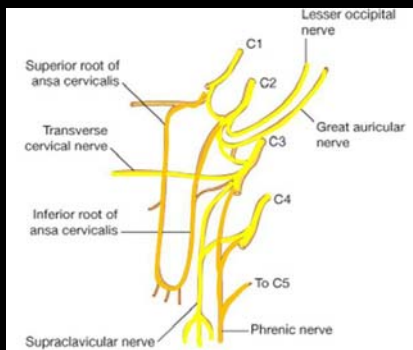
Phrenic nerve



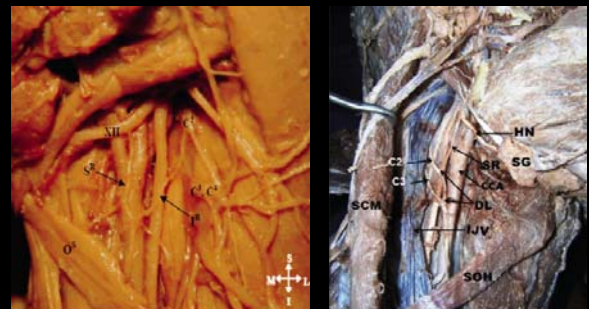
Phrenic nerve



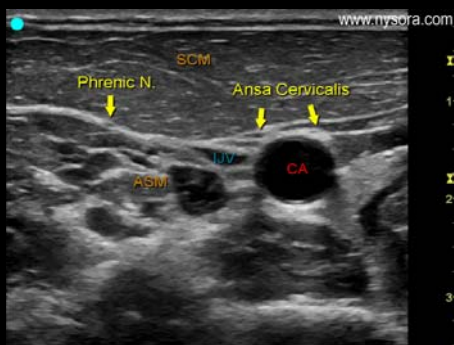
Ansa Cervicalis



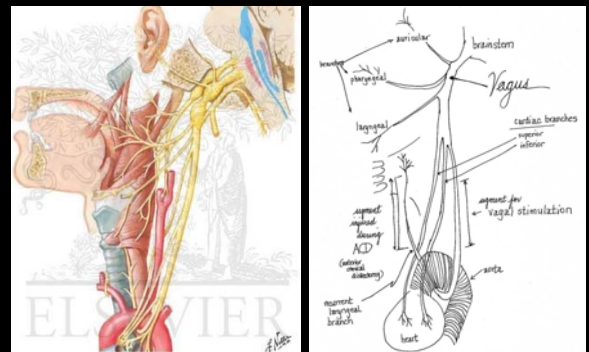
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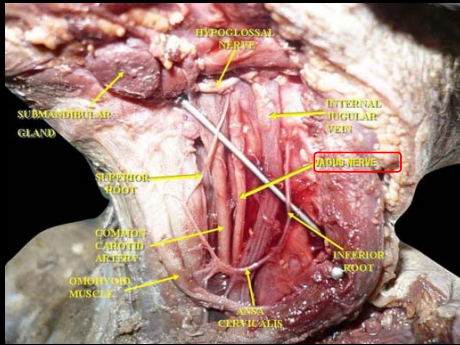
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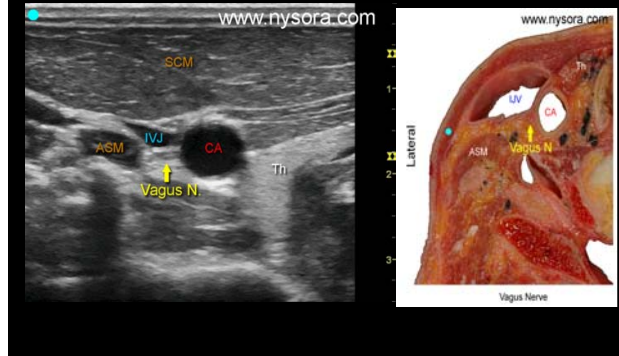
Vagus Nerve



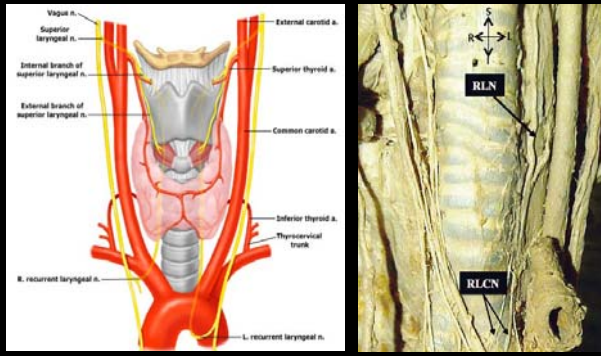
Vagus Nerve



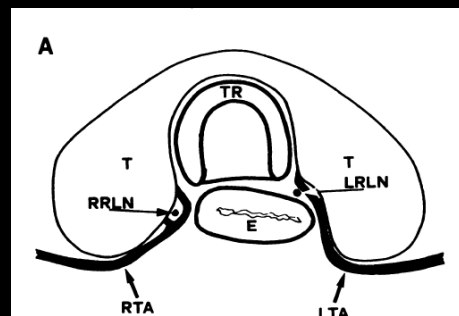
Vagus Nerve



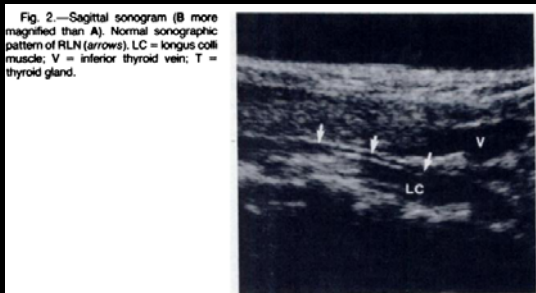
Recurrent Laryngeal Nerve



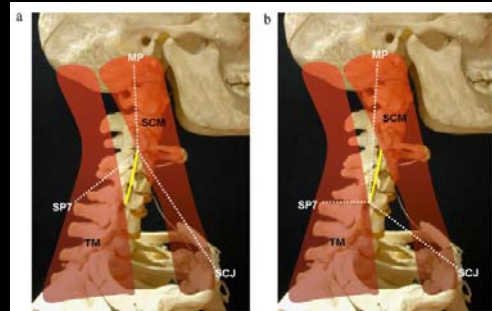
Recurrent Laryngeal Nerve



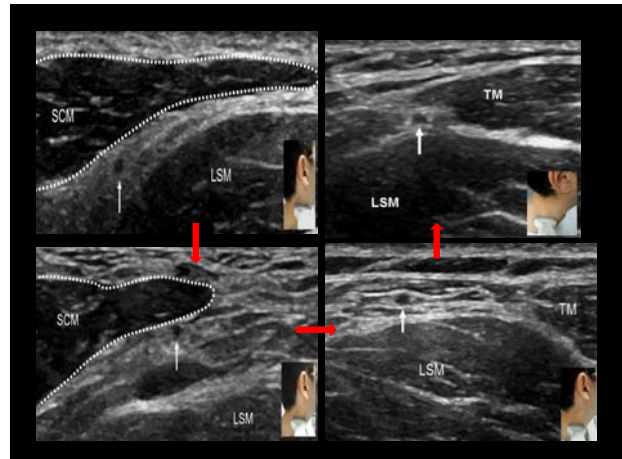
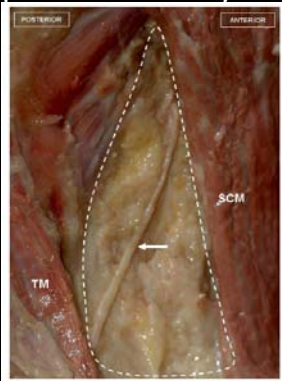
Recurrent Laryngeal Nerve



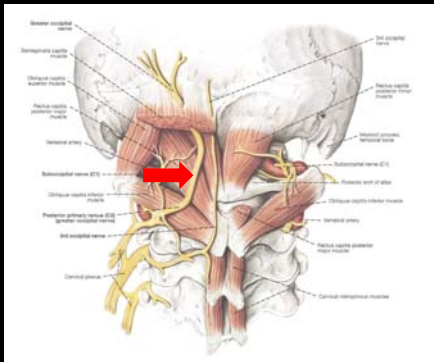
Spinal Accessory Nerve



Spinal Accessory Nerve



Greater Occipital Nerve

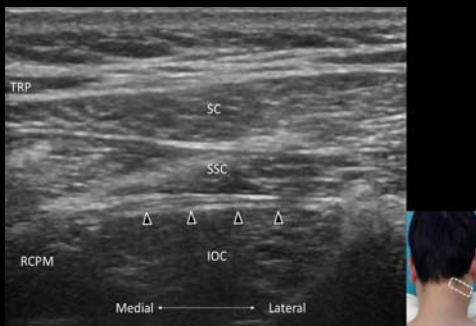


Great Occipital Nerve (Short-axis View)



Cho JC et al. JCU 2010.

Great Occipital Nerve (Long-axis View)



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