Neck

- Extent
- Compartments
  - Visceral
  - Vertebral
  - Neurovascular
- Fascial spaces
  - Pretracheal
  - Retropharyngeal
Deep dissection of neck- Muscles

- **Suprahyoid muscles**
  1. Stylohyoid
  2. Digastric
  3. Mylohyoid
  4. Geniohyoid

- **Infrahyoid muscles**
  1. Sternohyoid
  2. Omohyoid
  3. Thyrohyoid
  4. Sternothyroid
Infrahyoid and Suprahyoid Muscles and their Action

Schema
Scaleni Muscles

- Scalenus anterior
  Origin: Anterior tubercles of transverse processes of 3rd to 6th cervical vertebrae
  Insertion: Scalene tubercle on 1st rib
  Relations: Lies between subclavian vein and artery; anteriorly crossed by IJV and phrenic nerve; posteriorly separated by scalenus medius by subclavian artery and roots of brachial plexus; medially thyrocervical trunk, pleura, supracleural membrane; superiorly vertebral artery
Scalenus medius and posterior

- **Origin:** Posterior tubercles of all cervical transverse processes
- **Insertion:** Superior surface of 1\textsuperscript{st} rib
- **Relations:** anterior to it are roots of cervical and brachial plexus, subclavian artery; post. to it is levator scapulae; pierced by dorsal scapular and two roots of long thoracic nerve; inferiorly cervical pleura.
- **Scalenus posterior**
  Actually a part of scalenus medius but inserted to external surface of 2\textsuperscript{nd} rib.
Deep dissection of neck- Arteries

• CAROTID SYSTEM
  Common carotid
  Internal carotid
  External carotid

• SUBCLAVIAN ARTERY
Nerves of Larynx
Anterior View

- Right vagus nerve (X)
- Anomalous right inferior laryngeal nerve (not recurrent)
- Left vagus nerve (X)
- Left common carotid artery
- Left inferior laryngeal nerve
- Left recurrent laryngeal nerve
- Right common carotid artery
- Anomalous (penroseophagial) right subclavian artery originating from left side of aortic arch
- Arch of aorta
- Left subclavian artery
- Left recurrent laryngeal nerve
External carotid artery

- Superior thyroid
- Ascending pharyngeal
- Lingual
- Facial
- Occipital
- Posterior auricular
- Superficial temporal
- Maxillary
External Carotid Artery and Branches

- Superficial temporal artery
- Transverse facial artery
- Posterior auricular artery
- Macular artery
- Digastric muscle (phantom)
- Facial artery
- Lingual artery
- Occipital artery with sternocleidomastoid and descending branches
- External carotid artery
- Superior thyroid artery and superior laryngeal branch
- Internal carotid artery
- Omohyoid muscle (phantom)
- Thyrocervical trunk
- Common carotid artery
- Ascending pharyngeal artery
Subclavian Artery

- **Origin:**
  - Right: from brachiocephalic
  - Left: from arch of aorta
- **Extent:** From sternoclavicular joint to outer border of first rib
- **Branches**
  - **First part**
    - Vertebral
    - Internal thoracic
    - Thyrocervical
    - Inf. Thyroid
    - Transverse cervical
    - Suprascapular
  - **Second part**
    - Costocervical
    - Deep cervical
    - Highest intercostal
  - **Third part**
    - Dorsal scapular?
Subclavian artery

• Relations

• Anterior: Phrenic nerve, vagus nerve, ansa subclavia, Thoracic duct, CCA, IJV, ant. Jugular vein
  SCM, sternohyoid, sternothyroid, scalenous anterior

• Posterior: Lung, cervical pleura, suprapleural membrane, ansa subclavia, lower trunk of brachial plexus
Deep dissection of neck- Veins

- **Anterior jugular**: Paired venous channels draining anterior aspect of neck, forms jugular venous arch, drains into subclavian vein
- **External jugular**: forms by joining post. Auricular and retromandibular (post division) post to the angle of mandible, drains into subclavian vein
  
  tributaries: transverse cervical, suprascapular

- **Internal jugular**
- **Subclavian vein**
- **Brachiocephalic**
Internal Jugular Vein

- Starts as a continuation of sigmoid sinus
- Exits the skull through jugular foramen
- Enters carotid sheath, lateral to CCA, anterior to vagus
- Joins subclavian veins to form brachiocephalic veins
- Tributaries
  - Inferior petrosal sinus
  - Facial
  - Lingual
  - Pharyngeal
  - Occipital
  - Superior thyroid
  - Middle thyroid
Veins of Oral and Pharyngeal Regions

- Supraorbital vein
- Supraorbital vein communicating with cavernous sinus
- Angular vein
- External nasal vein
- Inferior alveolar vein
- Palatine vein
- Deep facial vein
- Superior labial vein
- Maxillary vein
- Inferior labial vein
- Mental vein
- Facial vein and artery
- Submental vein
- Submandibular gland
- Veins omotemporal to lower deep lingual vein
- Lingual vein
- Communication to anterior jugular vein (cut)
- Superior thyroid vein
- Thyroid gland
- Middle thyroid vein
- Interior thyroid vein
- Left brachiocephalic vein
- Termination of anterior jugular vein (cut)
- Subclavian vein
- Subclavian artery
- Transverse cervical vein (cut)
- Transverse carotid muscle
- Anterior scalene muscle
- Middle scalene muscle
- Vagus nerve (X) and sympathetic trunk
- Common carotid artery
- Superior thyroid artery
- Submental gland
- External carotid artery
- Occipital vein and artery
- Hypoglossal nerve (XII)
- Common trunk for facial, venous mandibular and lingual veins
- Internal jugular vein
- External carotid artery
- Facial vein
- Posterior auricular vein
- Pterygoid plexus
- Superficial temporal vein and artery
- Transverse facial vein (cut)
- Posterior auricular vein
- Retromandibular vein
- Occipital vein and artery
- Occipital vein and artery
- Common trunk for facial, venous mandibular and lingual veins
- Internal jugular vein
- External carotid artery
- Facial vein
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- Occipital vein and artery
- Occipital vein and artery
- Common trunk for facial, venous mandibular and lingual veins
- Internal jugular vein
- External carotid artery
Veins (contd.)

- **Subclavian veins**
  Begins as a continuation of axillary vein at the outer border of 1st rib. Runs antero-inferior to the artery, separated by scalenous anterior muscle.
  Tributaries: External jugular, dorsal scapular

- **Brachiocephalic veins**
  Begins by junction of internal jugular and subclavian veins between cervical pleura and medial end of clavicle.
  The two veins join to form superior vena cava behind right 1st costal cartilage.
  Tributaries: vertebral, highest intercostal, inferior thyroid; left sup. intercostal vein (in to left)
  Thoracic duct drains at the junction of lt. Subclavian and lt.internal jugular veins
Deep dissection of neck- Nerves

- Cranial nerves
  - Facial
  - Glossopharyngeal
  - Vagus
  - Accessory
  - Hypoglossal

- Cervical plexus
- Brachial plexus
- Phrenic nerve
- Ansa cervicalis
- Transverse cervical nerve
- Cervical sympathetic chain
IXth Nerve

• Leaves cranial cavity through jugular foramen
• Passes forwards and laterally between IJV and ICA, deep to styloid apparatus.
• Descends, passes forwards between ICA ^ ECA, curves around stylopharyngeus
• Continues anteriorly, deep to hyoglossus to reach base of tongue
• Sends branches to pharynx, carotid sinus, stylopharyngems muscle and to post 1/3 of tongue
Vagus (Xth) Nerve

- Leaves cranial cavity through jugular foramen between IX and XI curves
- Enters carotid sheath behind IJA & CCA and then ICA
- In the neck, gives branches to pharynx, carotid 50 dig, superior laryngeal nerve and a cardiac branch and right recurrent laryngeal nerve
Hypoglossal (XII) nerve

- Leaves cranial cavity through hypoglossal canal, medial to IJV and ICA.
- Descends forwards and medially, deep to anterior belly of diagastric and stylohyoid
- Disappears medial to hyoglossus muscle
Ansa Cervicalis

- Loop of nerve fibres from cervical nerves C1-C3.
- Begins as branches from the C join XIIth nerve soon after it leaves the skull
- These nerve fibres leave the hypoglosssal nerve after some distance and form the *superior root*
- These innervate the superior belly of omohyoid, geniohyoid and thycohyoid
- Loop is completed by a direct branch from the C2 and C3 forming *inferior root*
- Branches from this loop are to inferior belly of omohyoid, sternohyoid and sterno thyroid muscles.
Phrenic Nerve

- From out rami of C3-C5 spinal nerves
- Passes around upper lateral border of scalenus anterior, continues out to it with in prevertebral layer of cervical fascia
- Leaving S. anterior, it passes between subcalvian vein and artery to enter thorax and continue to diaphragm
Lymphatics

• **Superficial lymph nodes**
  – Occipital
  – Mastoid/retro auricular/post auricular
  – Parotid
  – Submandibular
  – Submental

• **Superficial cervical lymph nodes**
  – Collection of Lymph nodes along external
  – Jugular vein, superficial to SCM

• **Deep cervical lymph nodes**
  – Group of Lymph nodes that form a chain along IJV divided into upper and lower groups
  – Juguloduagastric
  – Jugulo-omohyoid

• They receive all lymph from other groups. Lymph vessels form right and left jugular trunks which empty in to right lymphatic duct or thoracic duct.
Lymph Vessels and Nodes of Oral and Pharyngeal Regions

- Superficial parotid nodes (deep parotid nodes deep to parotid gland)
- Mastoid nodes
- Occipital nodes
- Sternocleidomastoid nodes
- External jugular node (lateral superficial cervical node)
- Jugulodigastric node
- Deep lateral nodes (spinal accessory nodes)
- Transverse cervical chain of nodes
- Internal jugular chain of nodes (deep lateral cervical nodes)
- Internal jugular (scalene) node
- Transverse cervical chain of nodes
- Jugular trunk
- Jugulocommissural node
- Suprasternal nodes
- Subclavian trunk and node of subclavian chain
- Subclavian trunk and node of subclavian chain
- Anterior superficial cervical nodes (anterior jugular nodes)
- Anterior deep cervical (pretracheal and thyroid) nodes (deep to strap muscles)
- Submental nodes
- Suprahyoid node
- Superior thyroid nodes
- Mandibular and submandibular nodes
- Submandibular nodes
- Facial nodes (buccal nodes)
- Subparotid node
- Thoracic duct
Deep dissection of neck-Viscera

- Thyroid gland
- Parathyroid gland
- Larynx and Trachea
- Pharynx and Oesophagus
Thyroid Gland

• Lies in the visceral compartment of neck along with pharynx and oesophagus and is surrounded by the pretracheal layer of fascia.

• Arises as a median outgrowth from the floor of pharynx and foramen caecum of tongue and migrates downwards along the thyroglossal duct.

• Persistence of thyroglossal duct may be in the form of lingual thyroid/aberrant thyroid/pyramidal lobe.
Thryoid gland

- Dimensions: 5x2.5 x 2.5 cms. (Each lobe)
- Weight: 25 gms
- Location: Lies in front of lower part of larynx and upper part of trachea
  C5, 6, 7, 8 vertebral level
  From the oblique line of thyroid cartilage up to upper 5-6 tracheal rings
- Coverings: Two
  True capsule: Condensation of connective tissue around the gland
  False capsule: covering of the pretracheal fascia along with other viscera of neck
  Pretracheal fascia is attached to oblique line on thyroid cartilage and to arch of cricoid cartilage. This ensures the movement of thyroid with the larynx
Thyroid gland

• Composed of two pyramidal lobes joined by a narrow isthmus across the median plane

• Isthmus:
  – Lies on 2-4\textsuperscript{th} tracheal rings near the lower end of the lobes
  – Pyramidal lobe
  – Levator glandulae thyroidae
Thyroid gland

• Lobes: Three surfaces
  – Superficial/lateral: covered by sternohyoid, sternothyroid, omohyoid, SCM
  – Medial: related to trachea and oesophagus
    Cricoid and thyroid cartilages.
    Superior and recurrent laryngeal nerves.
    Cricothyroid and inferior constrictor muscles
  – Posterior: lies on prevertebral fascia anterior to longus colli.
    Overlaps carotid sheath medially
    parathyroid glands
Thyroid gland

- Blood supply
- Arterial - Superior thyroid
  Anterior branch
  Posterior branch
  Inferior thyroid
  Inferior branch
  Ascending branch

Thyroidea Ima?

- Venous
  Superior thyroid
  Middle thyroid in to IJV
  Inferior thyroid in to branchiocephalic
Thyroid gland

- Nerve supply
  - Cervical sympathetic ganglia
  - Cardiac and laryngeal branches of vagus

- Lymphatic drainage
  - Pretracheal lymph nodes
  - Deep cervical lymph nodes
Parathyroid glands

- Two pairs of glands
- Lie adjacent to thyroid
- Each gland is roughly oval and weighs 50 mg
- Superior:
  - relatively constant
  - Lies near posterior border of thyroid
  - Blood supply from anastomotic branch
- Inferior:
  - Lies near the lower end of posterior border
  - Variable position
  - Blood supply from inferior thyroid artery
Parathyroid Glands
Right Lateral View

- External carotid artery
- Internal branch of superior laryngeal nerve
- Superior thyroid artery (cut)
- Superior laryngeal artery
- Superior parathyroid gland
- Thyroid gland (right lobe) (reflected)
- Internal jugular vein
- Common carotid artery
- Internal parathyroid gland
- Recurrent laryngeal nerve
- Esophagus
- Inferior parathyroid gland
- Inferior thyroid artery
- Internal pharyngeal constrictor muscle
Applied Anatomy

- Thyroidectomy
- Thyroglossal duct cysts
- Ectopic thyroid gland
- Accessory thyroid gland
- Injury to recurrent laryngeal nerve
- Injury to external laryngeal nerve
- Inadvertent removal of parathyroid glands (Tetany)
- Multinodular goiter
- Hypothyroidism (Myxedema)