MEDICAL EDUCATION RESOURCE

Anterior Triangle of the Neck

Anterior Triangle of the Neck

Introduction

- The **anterior triangle** is one of the two large triangles of the neck (the other being posterior).
- It is situated **in front of the sternocleidomastoid (SCM)**.
- Important because it contains **major vessels, nerves, glands, and viscera** of the neck.

Surface Landmarks

- **Hyoid bone**: palpable at the level of **C3 vertebra**.
- **Thyroid cartilage**: Adam's apple; lies opposite **C4–C5 vertebrae**.
- **Cricoid cartilage**: corresponds to **C6 level**.
- **Jugular notch**: between sternal ends of clavicles and upper sternum.
- **Sternocleidomastoid muscle**: divides neck into anterior and posterior triangles.

Structures in the Anterior Median Region of the Neck

- Lies between the **two anterior borders of SCM**.

- Extends from **chin (mentum)** to **sternal notch**.
- Contains:
    - **Subcutaneous tissue and platysma**
    - **Investing layer of deep cervical fascia**
    - **Infrahyoid (strap) muscles**:
        - Sternohyoid
        - Sternothyroid
        - Thyrohyoid
        - Omohyoid (superior belly)
    - **Viscera of the neck**:
        - Thyroid gland
        - Parathyroid glands
        - Trachea
        - Oesophagus
        - Larynx and pharynx
    - **Vessels and nerves**: Ansa cervicalis, superior and inferior thyroid arteries.

Dissection

- Make a midline incision from the **chin to the sternum**.
- Reflect skin laterally to expose **platysma**.
- Identify:
    - **Anterior jugular veins** in the superficial fascia.
    - **Deep cervical fascia layers**: investing, pretracheal, and carotid sheath.
- Separate and identify **infrahyoid muscles** and **thyroid gland**.
- Note the **relations of trachea and larynx**, and **location of carotid sheath**.

Clinical Anatomy

- **Goitre:** Enlargement of thyroid gland — may compress trachea, oesophagus, or recurrent laryngeal nerves.
- **Tracheostomy:** Performed in the lower part of anterior triangle, below isthmus of thyroid gland.
- **Cricoid cartilage (C6):** Surgical landmark for tracheostomy and start of oesophagus.
- **Laryngeal prominence:** More prominent in males due to acute angle between laminae of thyroid cartilage.
- **Cricothyrotomy:** Emergency airway through **cricothyroid membrane** between thyroid and cricoid cartilages.
- **Injury to anterior jugular vein:** May cause bleeding or air embolism.

Anterior Triangle — Boundaries

- **Medially:** Anterior median line of the neck
- **Laterally:** Anterior border of sternocleidomastoid (SCM)
- **Superiorly (base):** Lower border of mandible and a line joining its angle to mastoid process
- **Apex:** Suprasternal notch
- **Roof:** Skin, superficial fascia (with platysma, cutaneous nerves, veins), and investing layer of deep cervical fascia
- **Floor:** Pretracheal fascia covering pharynx, larynx, and thyroid gland

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Subdivisions of Anterior Triangle

Divided by **digastric muscle** and **superior belly of omohyoid** into:

1. **Submental triangle**
2. **Digastric (submandibular) triangle**
3. **Carotid triangle**
4. **Muscular triangle**

Submental Triangle

- **Type:** Median triangle
- **Boundaries:**
  - **On each side:** Anterior belly of digastric
  - **Base:** Body of hyoid bone
  - **Apex:** Chin
  - **Floor:** Right and left mylohyoid muscles with median raphe
- **Contents:**
  1. 2–4 submental lymph nodes (drain chin, central lower lip, gums, anterior floor of mouth, tip of tongue)
  2. Submental veins ? form anterior jugular vein
- **Clinical relevance:**
  - **Enlarged submental lymph nodes** ? infection of lower lip or tip of tongue.
  - **Sublingual dermoid cysts** may cause swelling both below chin and inside mouth.

Digastric (Submandibular) Triangle

- **Boundaries:**

- **Anteroinferior:** Anterior belly of digastric
- **Posteroinferior:** Posterior belly of digastric + stylohyoid
- **Superior (base):** Mandible and a line joining angle of mandible to mastoid process

- **Roof:**
  - Skin, superficial fascia (platysma, cervical branch of facial nerve), and deep fascia (splitting around submandibular gland)

- **Floor:**
  - Mylohyoid (anteriorly), hyoglossus (posteriorly), and part of middle constrictor of pharynx

- **Contents (superficial to deep):**
  1. **Submandibular gland (superficial part)**
  2. **Facial vein** and **submandibular lymph nodes** (superficial)
  3. **Facial artery** (deep to gland)
  4. **Submental artery**
  5. **Mylohyoid nerve and vessels**
  6. **Hypoglossal nerve (XII)**

- **Clinical importance:**
  - Common site for **submandibular sialadenitis**.

- Facial artery can be palpated at the **lower border of mandible** (anteroinferior angle).

Dissection Steps

1. Remove deep fascia from anterior bellies of digastric to expose both mylohyoids.
2. Identify submental lymph nodes between them.
3. Reflect deep fascia from mandible downward ? expose submandibular gland.
4. Identify **anterior and posterior bellies of digastric** and **stylohyoid**.
5. Locate **intermediate tendon of digastric**, **facial artery and vein**, and **hypoglossal nerve**.

Carotid Triangle

- **Boundaries:**
  - **Anterosuperiorly:** Posterior belly of digastric and stylohyoid
  - **Anteroinferiorly:** Superior belly of omohyoid
  - **Posteriorly:** Anterior border of sternocleidomastoid
- **Floor:**
  - Middle and inferior constrictors of pharynx, thyrohyoid membrane

- **Roof:**
    - Skin, platysma, and investing layer of deep fascia
- **Contents:**
    - **Arteries:** Common carotid (bifurcation), internal and external carotid with branches
    - **Veins:** Internal jugular vein and tributaries
    - **Nerves:**
        - Hypoglossal (XII)
        - Vagus (X)
        - Accessory (XI)
        - Glossopharyngeal (IX)
        - Superior root of ansa cervicalis
    - **Other structures:** Deep cervical lymph nodes, carotid sinus, and carotid body

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Dissection (Carotid Triangle)

- Clean region between **posterior belly of digastric** and **superior belly of omohyoid**.
- Expose **common, internal, and external carotid arteries** with **internal jugular vein**.
- Identify **cranial nerves IX–XII** and **ansa cervicalis**.

- Note **floor muscles**: middle and inferior constrictors and thyrohyoid membrane.

Muscular Triangle – Boundaries

- **Anteromedial:** Midline of neck from hyoid to sternum.
- **Superolateral:** Superior belly of omohyoid.
- **Inferolateral:** Anterior border of sternocleidomastoid.
- **Roof:** Skin, superficial fascia (with platysma and anterior jugular vein), and investing layer of deep cervical fascia.
- **Floor:** Pretracheal fascia covering strap muscles (sternohyoid and sternothyroid) and underlying viscera of neck (thyroid gland, larynx, trachea, and oesophagus).

Contents

- **Infrahyoid strap muscles:** Sternohyoid and sternothyroid (mainly), occasionally superior belly of omohyoid along upper part.
- **Viscera of neck:** Thyroid and parathyroid glands, larynx, trachea, and oesophagus (upper portion).
- **Vessels:** Superior thyroid artery and vein, anterior jugular vein.
- **Nerves:** Ansa cervicalis branches to strap muscles, and nerve to thyrohyoid (from C1 via hypoglossal).

Dissection Steps

1. Incise the deep fascia between the midline and sternocleidomastoid.
2. Reflect platysma and identify superior belly of omohyoid.
3. Clean and trace sternohyoid and sternothyroid muscles to their attachments.
4. Reflect sternohyoid to expose sternothyroid and thyroid gland deep to it.
5. Identify anterior jugular vein and superior thyroid vessels.

Ansa Cervicalis (Ansa Hypoglossi)

- **Definition:** A nerve loop lying superficially on carotid sheath, supplying infrahyoid strap muscles.
- **Roots:**
    - **Superior root:** Fibres from C1 through hypoglossal nerve.
    - **Inferior root:** Fibres from C2 and C3 of cervical plexus.
- **Formation:** Superior and inferior roots join to form a loop (anterior to internal jugular vein and carotid artery).
- **Branches to:** Sternohyoid, sternothyroid, and both bellies of omohyoid.
- **Clinical note:** Injury to ansa ? weakness of infrahyoid muscles and impaired swallowing movements.

Common Carotid Artery

- **Origin:**

- **Right:** From brachiocephalic trunk behind sternoclavicular joint.
- **Left:** From arch of aorta in thorax.

- **Course:** Ascends within carotid sheath with internal jugular vein (lateral) and vagus nerve (posterior).
- **Level of bifurcation:** Upper border of thyroid cartilage (C3–C4) ? internal and external carotid arteries.
- **Relations (Anterior):** Skin, platysma, fasciae, and sternocleidomastoid.
- **Posterior relations:** Prevertebral muscles, sympathetic trunk.
- **Medial relations:** Viscera of neck (pharynx, larynx, trachea, oesophagus).
- **Lateral relations:** Internal jugular vein.
- **Carotid Sheath contents:** Common carotid artery, internal jugular vein, vagus nerve.
- **Surface marking:** A line from sternoclavicular joint to mid-point of thyroid cartilage upper border.
- **Clinical importance:**
  - Site for carotid pulse palpation.
  - Carotid endarterectomy to remove atheromatous plaque.
  - Carotid sinus reflex may cause bradycardia or syncope on pressure.

Clinical Anatomy

- **Goitre:** Diffuse or nodular enlargement of thyroid produces neck swelling within muscular triangle.
- **Thyroidectomy:** Caution to preserve recurrent laryngeal nerve and parathyroids.
- **Carotid sinus hypersensitivity:** Leads to fainting or cardiac inhibition.
- **Ansa cervicalis block:** Used in surgical procedures to relax infrahyoid muscles.

External Carotid Artery

Introduction

- One of the two **terminal branches of the common carotid artery**.
- Lies **anterior to the internal carotid artery** in the neck.
- Principal artery supplying **structures of the face, scalp, and neck**.

Origin

- Begins **in the carotid triangle** at the level of the **upper border of the thyroid cartilage (C3–C4)**.

Course

- Runs **upward and slightly backward and laterally**.
- **Ends** behind the neck of the mandible within the **parotid gland**, dividing into:

- **Superficial temporal artery**
- **Maxillary artery**

Relations

- **In the carotid triangle:**
  - *Superficial relations:* Sternocleidomastoid, platysma, hypoglossal nerve, facial veins.
  - *Deep relations:* Pharyngeal wall and superior laryngeal nerve.
- **In the parotid gland:** Lies deep to facial nerve and retromandibular vein.
- Crossed superficially by **hypoglossal nerve**, **facial vein**, and **lingual vein**.

Branches of External Carotid Artery

There are **eight branches**, grouped as **anterior, posterior, medial, and terminal**.

1. Anterior branches

- **Superior thyroid artery:**
  Supplies thyroid gland, infrahyoid muscles, and larynx.
- **Lingual artery:**
  Supplies tongue, floor of mouth, and sublingual gland.
- **Facial artery:**
  Supplies face and submandibular region; tortuous to allow free movement.

2. Posterior branches

- **Occipital artery:**
  Runs backward to supply posterior scalp.

- **Posterior auricular artery:**
  Small; supplies scalp behind ear and auricle.

3. Medial branch

- **Ascending pharyngeal artery:**
  Smallest branch; supplies pharyngeal wall and prevertebral muscles.

4. Terminal branches

- **Maxillary artery:**
  Larger terminal branch; passes into infratemporal fossa to supply deep facial structures.

- **Superficial temporal artery:**
  Smaller terminal branch; supplies scalp and temple; palpable above zygoma.

Mnemonic for Branches

“Some Anatomists Like Freaking Out Poor Medical Students”
S – *Superior thyroid*
A – *Ascending pharyngeal*
L – *Lingual*
F – *Facial*
O – *Occipital*
P – *Posterior auricular*
M – *Maxillary*
S – *Superficial temporal*

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Potential Tissue Spaces in Head and Neck

1. Submental Space

- Lies below the **inferior border of mandible**.
- Corresponds to **submental triangle**.
- Communicates with **submandibular spaces** on both sides.

Clinical Note:
Infections here cause **midline swelling below chin** (e.g., cellulitis of lower incisors).

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2. Submandibular Space

- Between **anterior and posterior bellies of digastric** and the **inferior border of mandible**.
- Communicates with **sublingual** and **submental spaces**.

Clinical Note:
Infection ? *Ludwig's angina* (bilateral submandibular cellulitis).

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3. Parotid Space

- Around **parotid gland**, **behind the ramus of mandible**.
- Communicates with **retropharyngeal space** and may extend to **mediastinum**.

Clinical Note:
Parotid abscess can track down into **parapharyngeal or retropharyngeal spaces**.

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4. Parapharyngeal Space

- In **suprahyoid region**, **lateral to pharynx**.
- Continuous with **retropharyngeal space**.

Clinical Note:
Infection may spread from **tonsillar or dental origin**.

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5. Retropharyngeal Space

- Between **buccopharyngeal fascia (anteriorly)** and **prevertebral fascia (posteriorly)**.
- Communicates with **peritonsillar**, **submental**, and **mediastinal spaces**.

Clinical Note:
Infection can spread into the **posterior mediastinum** ? life-threatening **mediastinitis**.

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6. Peritonsillar Space

- Between **capsule of palatine tonsil** and **superior constrictor muscle**.
- Communicates with **sublingual space**.

Clinical Note:
Site of **peritonsillar abscess (quinsy)** following tonsillitis.

Mnemonics

Branches of External Carotid Artery

Mnemonic: **“Some Anatomists Like Freaking Out Poor Medical Students”**

- **S** ? Superior thyroid artery
- **A** ? Ascending pharyngeal artery
- **L** ? Lingual artery
- **F** ? Facial artery
- **O** ? Occipital artery
- **P** ? Posterior auricular artery
- **M** ? Maxillary artery
- **S** ? Superficial temporal artery

Tip for memory:
The first six branches arise in the neck (within or near carotid triangle), and the last two are terminal within the parotid gland.

Facts to Remember

1. **Apex of triangles:**
    - Apex of the **anterior triangle** lies near the **sternum**.
    - Apex of the **posterior triangle** lies near the **mastoid process**.
2. **Submental triangle:**
    - Lies **half on each side** of the midline.

- Contains **submental lymph nodes** draining the tip of the tongue and lower lip.

3. **Vascular richness:**
   - **Carotid triangle** contains the **maximum number of major vessels** in the neck.
4. **Superficial temporal artery:**
   - Pulsation can be felt **in front of the ear**, just above the **zygomatic arch** (preauricular point).
5. **Carotid sinus reflex:**
   - Compression of the **carotid sinus** can **slow the heart rate** (vagal effect).
   - Hypersensitivity leads to **carotid sinus syndrome** (syncope on head turning).
6. **Safety of tight clothing:**
   - Tight **neckties or collars** may compress the **carotid arteries**, reducing blood flow to the brain.
7. **Clinical palpation:**
   - The **common carotid artery** pulse is felt at the **anterior border of the SCM**.
   - The **facial artery** pulse is felt **at the lower border of mandible**, anterior to the masseter.
8. **Fascial layers:**
   - Deep cervical fascia prevents **spread of infection**, but defines **potential spaces** that allow deep infections to descend into **mediastinum**.

9. **Ansa cervicalis:**
    - Located **superficial to the carotid sheath**; supplies **strap muscles** (except thyrohyoid, which gets C1 via hypoglossal).
10. **Level landmarks:**
    - **Hyoid bone ? C3**
    - **Thyroid cartilage ? C4–C5**
    - **Cricoid cartilage ? C6** (level where larynx joins trachea and pharynx joins oesophagus).

Clinicoanatomical Problems

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1. A patient presents with a midline swelling in the neck that moves upward during swallowing and tongue protrusion. What is the likely diagnosis?

Explanation:

- Midline swelling that moves with **swallowing and tongue protrusion** = **Thyroglossal cyst**.
- It develops from persistence of a **part of the thyroglossal duct** connecting the thyroid gland to the foramen cecum of the tongue.
- Located usually **below the hyoid bone**, but can occur anywhere along the thyroglossal tract.
- **Movement:**

- Upward on swallowing ? attached to larynx via pretracheal fascia.
- Upward on tongue protrusion ? connected to foramen cecum.

Treatment:

- **Sistrunk's operation** — excision of cyst along with central part of hyoid bone and tract up to foramen cecum.

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2. A pulsating swelling appears in the carotid triangle. What could it be?

Explanation:

- The **common carotid artery** and its **bifurcation** lie within the carotid triangle.
- A **pulsatile swelling** here may be a **carotid artery aneurysm**.
- **Differentiation:**
  - Swelling **expands with systole** and **does not move with deglutition** (unlike thyroid).
- **Complications:** May compress nearby cranial nerves (IX, X, XI, XII) ? dysphagia, hoarseness, or tongue deviation.

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3. After radical neck dissection, a patient develops drooping of shoulder. Which nerve is likely injured?

Explanation:

- **Spinal accessory nerve (cranial XI)** passes through the **posterior part of the carotid triangle** before entering the **posterior triangle**.

- Injury ? paralysis of **trapezius** ? shoulder droop and difficulty raising arm above horizontal.

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4. A patient develops sudden bradycardia when the neck is massaged near the angle of mandible. Explain.

Explanation:

- Pressure near the **angle of mandible** stimulates the **carotid sinus (baroreceptor zone)** at the **bifurcation of the common carotid artery**.
- Afferents via **glossopharyngeal nerve (IX)** ? medulla ? vagal efferents ? **reflex bradycardia and hypotension**.
- Seen in **carotid sinus hypersensitivity**.

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5. A large swelling in the anterior triangle causes hoarseness of voice. What structures are involved?

Explanation:

- Swelling could be due to **goitre** (thyroid enlargement).
- **Recurrent laryngeal nerves**, which run in the **tracheoesophageal groove**, may be **compressed**, leading to **paralysis of intrinsic laryngeal muscles** ? hoarseness.
- **Dyspnoea** may occur due to tracheal compression.

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6. A dentist notices that infection in the lower molar spreads to the floor of the mouth and below the mandible. How does this occur?

Explanation:

- Infection may involve **submandibular and submental spaces**, which communicate freely around the mylohyoid muscle.
- The result is **Ludwig's angina** — a rapidly spreading cellulitis involving both submandibular spaces and floor of mouth.
- May cause **airway obstruction** if untreated.

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7. A midline incision made during tracheostomy produces brisk venous bleeding. Why?

Explanation:

- The **anterior jugular veins** run just deep to platysma in the **midline of neck**, interconnected by a **jugular venous arch**.
- Injury to this arch leads to severe bleeding; careful dissection and ligation required.

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8. A patient presents with severe pain radiating to ear after tonsillectomy. Which nerve is involved?

Explanation:

- The **glossopharyngeal nerve (IX)** supplies both the **palatine tonsil** and **middle ear (via tympanic branch)**.
- Postoperative irritation ? **referred otalgia** (pain in ear).

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9. A surgeon performing carotid endarterectomy observes sudden cardiac inhibition. Why?

Explanation:

- Pressure on **carotid sinus** during surgery stimulates baroreceptors ? reflex via **glossopharyngeal (afferent)** and **vagus (efferent)** ? **cardiac slowing or arrest**.
- Controlled by local **infiltration anesthesia** to carotid sinus before dissection.

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10. Why does Ludwig's angina spread rapidly?

Explanation:

- Due to **absence of fascial barriers** between **submental, submandibular, and parapharyngeal spaces**.
- Infection spreads across midline and downward to **mediastinum**, producing airway compromise.

Frequently Asked Questions

1. What are the main subdivisions of the anterior triangle of the neck?

- **Submental triangle**
- **Digastric (Submandibular) triangle**
- **Carotid triangle**
- **Muscular triangle**

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2. What are the boundaries of the anterior triangle?

- **Anteriorly:** Median line of the neck

- **Posteriorly:** Anterior border of sternocleidomastoid
- **Superiorly:** Base of mandible and a line from the angle of mandible to mastoid process
- **Apex:** Suprasternal notch
- **Roof:** Skin, superficial fascia, and platysma
- **Floor:** Pretracheal fascia and muscles (e.g., mylohyoid, hyoglossus, thyrohyoid)

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3. What are the contents of the carotid triangle?

- **Arteries:** Common carotid artery and its bifurcation into internal and external carotid arteries
- **Veins:** Internal jugular vein and its tributaries
- **Nerves:** Vagus, hypoglossal, spinal accessory, and branches of cervical sympathetic chain
- **Lymph nodes:** Deep cervical nodes

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4. What are the infrahyoid (strap) muscles and their nerve supply?

- **Sternohyoid**, **Sternothyroid**, **Thyrohyoid**, **Omohyoid (superior belly)**
- Supplied by **ansa cervicalis (C1–C3)**, except **thyrohyoid**, which receives **C1 fibers via hypoglossal nerve**.

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5. What structures are found within the carotid sheath?

- **Medial:** Common or internal carotid artery
- **Lateral:** Internal jugular vein
- **Posterior:** Vagus nerve
- **Ansa cervicalis** lies on its **anterior wall**, embedded in fascia.

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6. What is the surface marking of the common carotid artery?

- From the **sternoclavicular joint** to a point midway between **mastoid process** and **angle of mandible**.

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7. At what level does the common carotid artery bifurcate?

- At the level of the **upper border of thyroid cartilage (C3–C4)**.

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8. What is the significance of the carotid sinus and carotid body?

- **Carotid sinus:** Baroreceptor regulating blood pressure.
- **Carotid body:** Chemoreceptor sensitive to blood O?, CO?, and pH.
- Both are supplied by **glossopharyngeal (IX) and vagus (X) nerves**.

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9. What are the clinical landmarks in the anterior triangle?

- **Hyoid bone (C3)** ? Level of tongue base.
- **Thyroid cartilage (C4–C5)** ? Laryngeal prominence.

- **Cricoid cartilage (C6)** ? Junction of larynx and trachea.

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10. What are the boundaries and contents of the muscular triangle?

- **Boundaries:**
  - Anterior ? Midline of neck
  - Posterior ? Superior belly of omohyoid and anterior border of SCM
  - Superior ? Hyoid bone
- **Contents:**
  - Infrahyoid muscles
  - Thyroid and parathyroid glands
  - Trachea, oesophagus, and larynx

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11. What is the clinical importance of the retropharyngeal space?

- It allows **movement of pharynx during swallowing**, but also acts as a **pathway for infection** from throat or teeth to spread into the **posterior mediastinum**.

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12. Why is Ludwig's angina dangerous?

- It is a **rapidly spreading cellulitis** involving **submental, submandibular, and sublingual spaces**.

- May cause **airway obstruction** if untreated due to elevation of the tongue and edema of the floor of the mouth.

Multiple Choice Questions

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1. The boundaries of the anterior triangle of the neck include all, EXCEPT:

A. Anterior border of sternocleidomastoid
B. Midline of the neck
C. Superior border of the clavicle
D. Base of the mandible

Answer: C
Explanation: The superior border of the clavicle forms the base of the **posterior triangle**, not the anterior.

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2. Which of the following is NOT a subdivision of the anterior triangle?

A. Carotid triangle
B. Submental triangle
C. Occipital triangle
D. Muscular triangle

Answer: C
Explanation: The **occipital triangle** lies in the **posterior** part of the neck.

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3. The submental triangle contains which of the following structures?

A. Submandibular gland
B. Submental lymph nodes
C. Internal jugular vein
D. Hypoglossal nerve

Answer: B

Explanation: The **submental lymph nodes** lie between the anterior bellies of digastric and drain the **tip of tongue and chin**.

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4. The carotid triangle is an important surgical area because it contains:

A. External carotid artery and its branches
B. Subclavian artery
C. Thoracic duct
D. Vertebral artery

Answer: A

Explanation: The **carotid triangle** contains the **carotid bifurcation**, **internal jugular vein**, and **vagus nerve**.

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5. The muscular triangle contains all of the following, EXCEPT:

A. Infrahyoid muscles
B. Thyroid gland
C. Trachea
D. Submandibular gland

Answer: D

Explanation: The **submandibular gland** lies in the **digastric (submandibular) triangle**.

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6. The ansa cervicalis supplies all of the following muscles, EXCEPT:

A. Sternohyoid
B. Sternothyroid
C. Thyrohyoid
D. Omohyoid

Answer: C

Explanation: Thyrohyoid is supplied by **C1 fibers via the hypoglossal nerve**, not by ansa cervicalis.

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7. Carotid sinus acts as a:

A. Chemoreceptor
B. Baroreceptor
C. Mechanoreceptor
D. Proprioceptor

Answer: B
Explanation: The **carotid sinus** monitors **arterial blood pressure** and sends signals via the **glossopharyngeal nerve (IX)**.

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8. The carotid body acts as a:

A. Baroreceptor
B. Thermoreceptor
C. Chemoreceptor
D. Mechanoreceptor

Answer: C
Explanation: The **carotid body** detects changes in **blood oxygen, CO?, and pH** levels.

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9. Which structure lies within the carotid sheath?

A. Internal carotid artery
B. Internal jugular vein
C. Vagus nerve
D. All of the above

Answer: D
Explanation: The **carotid sheath** encloses all three — **internal carotid artery (medial)**, **internal jugular vein (lateral)**, and **vagus nerve (posterior)**.

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10. The pulsation of the facial artery can be felt at:

A. Midline of the neck
B. Angle of mandible
C. Lower border of mandible anterior to masseter

D. Mastoid process

Answer: C
Explanation: The **facial artery** crosses the **lower border of mandible just anterior to the masseter**, where its pulse can be felt.

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11. The carotid artery bifurcates at the level of:

A. Hyoid bone
B. Cricoid cartilage
C. Upper border of thyroid cartilage
D. C6 vertebra

Answer: C
Explanation: The **common carotid artery** divides into internal and external carotids at the **upper border of thyroid cartilage (C3–C4)**.

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12. Infection from the face can spread to the brain through:

A. Facial vein
B. Retromandibular vein
C. Pterygoid venous plexus
D. Both A and C

Answer: D
Explanation: Facial vein communicates with **cavernous sinus** via **angular vein** and **pterygoid plexus**, providing a dangerous route for infection.

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13. Ludwig's angina involves which spaces of the neck?

A. Submandibular and submental
B. Carotid
C. Retropharyngeal
D. Parapharyngeal

Answer: A
Explanation: Ludwig's angina is a rapidly spreading cellulitis involving **submandibular and**

submental spaces, causing airway obstruction.

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14. The apex of the anterior triangle lies at:

A. Mastoid process
B. Suprasternal notch
C. Hyoid bone
D. Clavicle

Answer: B
Explanation: The **apex** of the **anterior triangle** lies inferiorly at the **suprasternal notch**.

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15. The posterior wall of the carotid sheath is formed by:

A. Pretracheal fascia
B. Prevertebral fascia
C. Investing layer of deep cervical fascia
D. Buccopharyngeal fascia

Answer: B
Explanation: The **prevertebral fascia** forms the **posterior boundary** of the carotid sheath.

Viva Voce Questions

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1. What are the boundaries of the anterior triangle of the neck?

- **Anterior:** Median line of neck.
- **Posterior:** Anterior border of sternocleidomastoid.
- **Superior:** Base of mandible and a line joining angle of mandible to mastoid process.

- **Apex:** Suprasternal notch.
- **Roof:** Skin, superficial fascia (with platysma), and investing fascia.
- **Floor:** Pretracheal fascia covering pharynx, larynx, and thyroid gland.

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2. What are the main subdivisions of the anterior triangle?

- **Submental triangle**
- **Digastric (submandibular) triangle**
- **Carotid triangle**
- **Muscular triangle**

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3. What are the boundaries and contents of the submental triangle?

- **Boundaries:**
  - Lateral ? Anterior bellies of digastric.
  - Base ? Hyoid bone.
  - Apex ? Chin.
  - Floor ? Mylohyoid muscles.
- **Contents:**
  - Submental lymph nodes.

- Submental veins forming the anterior jugular vein.

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4. What are the boundaries of the digastric (submandibular) triangle?

- **Superior:** Base of mandible.
- **Anteroinferior:** Anterior belly of digastric.
- **Posteroinferior:** Posterior belly of digastric and stylohyoid.

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5. What structures are contained in the digastric triangle?

- Submandibular gland.
- Facial artery and vein.
- Hypoglossal nerve (XII).
- Submandibular lymph nodes.
- Mylohyoid nerve and vessels.

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6. What are the boundaries and contents of the carotid triangle?

- **Boundaries:**
  - Anterosuperior ? Posterior belly of digastric and stylohyoid.
  - Anteroinferior ? Superior belly of omohyoid.
  - Posterior ? Anterior border of SCM.

- **Contents:**
    - Common carotid artery (and its bifurcation).
    - Internal jugular vein.
    - Vagus, accessory, hypoglossal nerves.
    - Ansa cervicalis.
    - Deep cervical lymph nodes.

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7. What are the boundaries and contents of the muscular triangle?

- **Boundaries:**
    - Anterior ? Median line of neck.
    - Posterior ? Superior belly of omohyoid and anterior border of SCM.
    - Superior ? Hyoid bone.
- **Contents:**
    - Infrahyoid muscles.
    - Thyroid gland and parathyroids.
    - Trachea and oesophagus.

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8. What structures are enclosed within the carotid sheath?

- **Medial:** Common/internal carotid artery.
- **Lateral:** Internal jugular vein.
- **Posterior:** Vagus nerve.
- **Anterior wall:** Ansa cervicalis.

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9. What is the level of bifurcation of the common carotid artery?

At the **upper border of the thyroid cartilage** — opposite **C3–C4 vertebrae**.

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10. What are the branches of the external carotid artery?

Mnemonic: *Some Anatomists Like Freaking Out Poor Medical Students*
? Superior thyroid, Ascending pharyngeal, Lingual, Facial, Occipital, Posterior auricular, Maxillary, and Superficial temporal arteries.

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11. What is the function of the carotid sinus and carotid body?

- **Carotid sinus:** Baroreceptor (blood pressure regulation).
- **Carotid body:** Chemoreceptor (detects O?, CO?, and pH).

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12. What is the nerve supply of the infrahyoid (strap) muscles?

- Supplied by **ansa cervicalis (C1–C3)** except **thyrohyoid**, which gets **C1 via hypoglossal nerve**.

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13. What is the clinical significance of the carotid triangle?

- Site for **carotid pulse palpation**.
- **Carotid endarterectomy** for removing plaques.
- Location of **carotid sinus** and **carotid body** for reflex studies.

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14. Why is Ludwig's angina potentially fatal?

- It is a **bilateral infection of submandibular and submental spaces**.
- Rapidly spreads, causing **tongue elevation** and **airway obstruction**.

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15. Which structure marks the level of transition between the pharynx and oesophagus?

- **Cricoid cartilage (C6 level)**.

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16. What fascia encloses the thyroid gland?

- **Pretracheal fascia**, part of deep cervical fascia.

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17. Why does a thyroglossal cyst move with tongue protrusion?

Because it remains connected to the **foramen cecum** of the tongue through a fibrous tract derived from the **thyroglossal duct**.

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18. Which nerve crosses both the external and internal carotid arteries?

- **Hypoglossal nerve (XII)**.

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19. What is the course of the hypoglossal nerve in the neck?

- Appears deep to posterior belly of digastric.
- Crosses both carotid arteries.
- Passes deep to mylohyoid to supply the tongue muscles.

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20. What is the surgical importance of the muscular triangle?

- **Thyroid gland** and **trachea** lie within it.
- Surgical procedures like **tracheostomy** and **thyroidectomy** are performed here.