MEDICAL EDUCATION RESOURCE

# Prevertebral and Paravertebral Regions

## Prevertebral and Paravertebral Regions

### Introduction

The prevertebral and paravertebral regions are located **anterior and lateral to the cervical vertebral column**. These regions contain important **muscles, arteries, veins, and nerves** that form part of the **deep structures of the neck** and are covered by the **prevertebral fascia**.

### Prevertebral Muscles

The **prevertebral muscles** lie directly in front of the cervical vertebrae and are responsible for **flexion of the head and neck**.

- **Longus Colli:** Flexes neck and rotates it to opposite side.
- **Longus Capitis:** Flexes head and neck forward.
- **Rectus Capitis Anterior:** Flexes head at the atlanto-occipital joint.
- **Rectus Capitis Lateralis:** Flexes head laterally.

All prevertebral muscles are supplied by **ventral rami of cervical spinal nerves**.

### Vertebral Artery

- **Origin:** Arises from the **first part of the subclavian artery**.
- **Course:**

    - **Cervical part:** Ascends through **foramina transversaria** of C6–C1 vertebrae.
    - **Atlantic part:** Winds around the atlas.
    - **Intracranial part:** Pierces dura and arachnoid, enters the **foramen magnum** to form the **basilar artery** with its fellow.
- **Relations:** Lies **posterior to carotid sheath**, accompanied by vertebral vein and sympathetic plexus.
- **Branches:**
    - Spinal branches
    - Muscular branches
    - Posterior meningeal branches
    - Medullary and cerebellar branches
- **Termination:** Unites with opposite vertebral artery at **lower border of pons** forming **basilar artery**.

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**Dissection**

Expose vertebral artery by reflecting the sternocleidomastoid and longus colli; identify the **foramen transversarium of C6** as entry point and note its relation with **cervical sympathetic chain** and **inferior thyroid artery**.

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**Scalenovertebral Triangle**

- **Boundaries:**

    - **Medial:** Longus colli muscle
    - **Lateral:** Scalenus anterior
    - **Base:** First part of subclavian artery
- **Contents:**
    - Vertebral artery and vein
    - Sympathetic trunk
    - Thoracic duct (on left side)
    - Inferior thyroid artery and vein

This small but clinically vital space is where **aneurysm or catheter insertion** complications may affect the vertebral artery or sympathetic chain.

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**Development of Vertebral Artery**

- Develops from **longitudinal anastomosis between cervical intersegmental arteries**.
- The **proximal part** arises from the **7th intersegmental artery** (as part of the subclavian artery).
- The **distal part** originates from the **cranial connections** of upper six intersegmental arteries that later regress.

**Clinical relevance:**

- Anomalies in this development may result in **asymmetry** or **duplication** of vertebral arteries.

- Vertebrobasilar insufficiency may result from kinking or compression of the artery in cervical spondylosis.

## Trachea

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### Introduction

- **Trachea** is a **fibrocartilaginous tube** that extends from the **cricoid cartilage (C6 vertebra)** to the **level of the sternal angle (T4–T5)**, where it divides into **right and left principal bronchi**.

- It acts as the **air passage between the larynx and bronchi**.

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### Relations in the Neck

- **Anteriorly:**
    - Isthmus of thyroid gland (2nd–4th tracheal rings)
    - Inferior thyroid veins
    - Jugular venous arch
    - Sternohyoid and sternothyroid muscles
    - Pretracheal fascia and skin
- **Posteriorly:**

- Oesophagus (close contact, allowing tracheoesophageal reflexes)

- **Laterally:**
  - Lobes of thyroid gland
  - Common carotid arteries

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**Structure**

- Composed of **15–20 C-shaped hyaline cartilaginous rings**, open posteriorly.
- The posterior gap is closed by **trachealis muscle** (smooth muscle).
- **Mucous membrane:** lined by **pseudostratified ciliated columnar epithelium with goblet cells**.
- Submucosa contains **seromucous glands**.

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**Blood Supply**

- **Arterial:** Inferior thyroid arteries
- **Venous:** Inferior thyroid veins
- **Lymphatic drainage:** Pretracheal and paratracheal nodes
- **Nerve supply:**
  - Parasympathetic: Recurrent laryngeal nerves
  - Sympathetic: Cervical sympathetic chain

## Clinical Anatomy of Trachea

- **Tracheostomy:** Surgical opening through 2nd–4th tracheal rings to establish airway.
- **Tracheitis:** Inflammation from infection or intubation.
- **Tracheal deviation:** Seen in lung collapse (toward affected side) or pleural effusion (away from affected side).
- **Foreign body entry:** More common into **right bronchus** due to its vertical alignment.
- **Compression symptoms:** Enlarged thyroid or retrosternal goiter can cause **dyspnoea and stridor** by pressing trachea.

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## Oesophagus

### Introduction

- A **muscular tube**, about **25 cm long**, extending from **cricoid cartilage (C6)** to **cardiac end of stomach (T11)**.
- The **cervical part (about 5 cm)** lies between the trachea and vertebral column.

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### Relations in the Neck

- **Anteriorly:** Trachea
- **Posteriorly:** Prevertebral fascia and longus colli

- **Laterally:**
  - Right recurrent laryngeal nerve (on right side)
  - Thoracic duct and left recurrent laryngeal nerve (on left side)
  - Lobes of thyroid gland

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**Structure**

- **Muscle:**
  - Upper 1/3 ? striated
  - Middle 1/3 ? mixed
  - Lower 1/3 ? smooth
- **Epithelium:** Non-keratinized stratified squamous
- **Constricted sites:**
  1. Cricoid (C6)
  2. Aortic arch level (T4)
  3. Left bronchus crossing (T5–T6)
  4. Diaphragmatic (T10)

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**Clinical Anatomy of Oesophagus**

- **Dysphagia:** Difficulty swallowing from stricture or carcinoma.
- **Oesophageal varices:** Portal hypertension leads to dilation of lower oesophageal veins.
- **Reflux oesophagitis (GERD):** Acid regurgitation due to defective lower sphincter.
- **Tracheo-oesophageal fistula:** Congenital defect due to incomplete separation of trachea and oesophagus.
- **Instrumentation hazard:** Cervical oesophagus can be injured during endoscopy due to its proximity to trachea.

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## Joints of the Neck

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### 1. Atlanto-Occipital Joints

- **Type:** Synovial, ellipsoid (biaxial).
- **Articulating surfaces:**
  - Condyles of occipital bone with superior articular facets of atlas (C1).
- **Ligaments:**
  - Anterior & posterior atlanto-occipital membranes.
- **Movements:**
  - Flexion and extension (nodding “yes”).
  - Lateral flexion (slight).

- **Nerve supply:** C1 spinal nerve via suboccipital nerve.

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### 2. Atlanto-Axial Joints

Three separate articulations between atlas (C1) and axis (C2):

- **Median joint:** Dens of axis with anterior arch of atlas (pivot type).
- **Two lateral joints:** Between articular facets (plane type).

**Ligaments:**

- Transverse ligament of atlas
- Alar ligaments
- Apical ligament of dens
- Cruciform ligament
- Tectorial membrane (continuation of posterior longitudinal ligament)

**Movements:**

- Rotation of head (“no” movement).
- Occurs around vertical axis through dens.

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### 3. Joints between Cervical Vertebrae

- **Type:** Plane synovial (between articular processes).

- **Intervertebral joints:** Secondary cartilaginous (between vertebral bodies).
- Allow flexion, extension, rotation, and lateral bending of neck.

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## Clinical Anatomy of Joints of the Neck

- **Atlanto-occipital dislocation:** Fatal due to medullary compression.
- **Atlanto-axial dislocation:** Seen in rheumatoid arthritis, trauma, or Down syndrome due to laxity of **transverse ligament**.
- **Whiplash injury:** Sudden hyperextension ? injury to ligaments and muscles.
- **Fracture of dens (odontoid process):** May compress spinal cord or medulla.
- **Degenerative changes:** Osteophytes in uncovertebral joints cause **cervical spondylosis**, leading to **radiculopathy**.

## Paravertebral Region

- Lies **lateral to the prevertebral region**, containing:
  - **Scalene muscles**
  - **Cervical plexus** and **phrenic nerve**
  - **Cervical pleura**

## Scalene Muscles

### Types

There are **three main scalene muscles**:

1. **Scalenus anterior**
2. **Scalenus medius**
3. **Scalenus posterior**

*(A small fourth muscle, scalenus minimus, may be present.)*

### Origins and Insertions

- **Scalenus anterior:**
  - *Origin:* Anterior tubercles of transverse processes of C3–C6
  - *Insertion:* Scalene tubercle on 1st rib (between subclavian artery and vein)
- **Scalenus medius:**
  - *Origin:* Posterior tubercles of transverse processes of C2–C7
  - *Insertion:* Upper surface of 1st rib, behind subclavian artery groove
- **Scalenus posterior:**
  - *Origin:* Posterior tubercles of transverse processes of C4–C6
  - *Insertion:* Outer surface of 2nd rib

- **Scalenus minimus (if present):**
    - *Origin:* Anterior border of C7 transverse process
    - *Insertion:* Inner border of 1st rib and dome of cervical pleura

**Nerve Supply**

- Ventral rami of **C3–C8 cervical nerves**

**Actions**

- **Elevate ribs** (1st and 2nd) during inspiration
- **Flex neck laterally** and **rotate to opposite side**
- **Stabilize neck** along with other cervical muscles

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### Dissection Points

- Scalenus anterior is a **key surgical landmark**.
- **Anterior relations:**
    - Phrenic nerve (covered by prevertebral fascia)
    - Internal jugular vein
    - Sternocleidomastoid muscle
    - Clavicle

- **Posterior relations:**
    - Brachial plexus
    - Subclavian artery
    - Scalenus medius
    - Cervical pleura (covered by suprapleural membrane)

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## Cervical Pleura

### Description

- Dome-shaped part of **parietal pleura** covering the **apex of the lung**.
- Projects into the root of the neck about **5 cm above the first costal cartilage** and **2.5 cm above the medial third of the clavicle**.
- Strengthened by **suprapleural membrane (Sibson's fascia)**, derived partly from **scalenus minimus**.

### Relations

- **Anterior:** Subclavian artery, scalenus anterior
- **Posterior:** Neck of 1st rib, sympathetic trunk, superior intercostal artery and vein, 1st thoracic nerve
- **Lateral:** Scalenus medius, lower trunk of brachial plexus

- **Medial:** Vertebral bodies, oesophagus, trachea, left recurrent laryngeal nerve, thoracic duct (on left), great vessels of neck

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## Cervical Plexus

### Formation

- Formed by **ventral rami of C1–C4 cervical nerves**.
- Each ramus divides into ascending and descending branches to form **three loops**.

### Position

- Lies deep to **sternocleidomastoid** and **prevertebral fascia**, on **levator scapulae** and **scalenus medius**.

### Branches

1. **Cutaneous Branches:**
    - Lesser occipital (C2)
    - Great auricular (C2, C3)
    - Transverse cervical (C2, C3)
    - Supraclavicular (C3, C4)
2. **Muscular Branches:**
    - To infrahyoid muscles (via ansa cervicalis)

- To prevertebral muscles
- To levator scapulae

3. **Phrenic Nerve:**
   - Chief branch, from **C3, C4, C5**

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> **Phrenic Nerve**

**Course**

- **Origin:** Mainly from C4 with contributions from C3 and C5.
- Descends **on scalenus anterior**, covered by prevertebral fascia.
- Enters thorax between **subclavian artery and vein**.
- **Right nerve:** Passes in front of root of right lung.
- **Left nerve:** Passes in front of root of left lung, crossing aortic arch.

**Branches**

- **Motor:** Diaphragm
- **Sensory:** Central diaphragm, mediastinal pleura, pericardium

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## Clinical Anatomy

- **Scalene syndrome:** Compression of **brachial plexus and subclavian artery** between scalenus anterior and medius ? pain and numbness in upper limb.
- **Pneumothorax (apical):** Penetrating neck injury may tear **cervical pleura**, collapsing the lung apex.
- **Phrenic nerve palsy:** Paralysis of diaphragm ? elevation of hemidiaphragm on X-ray.
- **Cervical plexus block:** Used for **regional anesthesia** in neck surgeries.

## Facts to Remember

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- The **scalene muscles** form an important landmark in the neck —
  - **Subclavian artery** passes **behind** the **scalenus anterior**.
  - **Subclavian vein** passes **in front** of the **scalenus anterior**.
  - **Brachial plexus** lies **between scalenus anterior and medius**.
- The **phrenic nerve** lies **on the anterior surface of scalenus anterior**, deep to prevertebral fascia.
  - On the **right**, it crosses the **subclavian artery**.
  - On the **left**, it crosses the **first part of the subclavian artery** and **aortic arch** in thorax.

- The **cervical pleura (cupula)** projects **2.5 cm above the medial third of the clavicle**.
    - It is strengthened by **Sibson's fascia (suprapleural membrane)** derived partly from **scalenus minimus** and **transverse process of C7**.
- The **cervical plexus** lies on **levator scapulae** and **scalenus medius**, beneath **sternocleidomastoid**.
    - Cutaneous branches emerge around the **midpoint of posterior border of sternocleidomastoid** ("nerve point of the neck").
- The **phrenic nerve** carries **motor fibers to the diaphragm** and **sensory fibers** from the **pericardium, pleura, and peritoneum (central part)**.
- A small muscular slip, **scalenus minimus**, may be present and is attached to the **1st rib and dome of pleura**.
- The **cervical plexus block** is given at the **nerve point of neck**, useful for anesthesia during neck and thyroid surgeries.

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## Clinicoanatomical Problems

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**1. A patient presents with pain and tingling in the arm, especially when lifting objects overhead. On examination, the radial pulse disappears when the arm is abducted. What is the likely cause?**

**Diagnosis:** *Scalene (Thoracic Outlet) Syndrome*

**Explanation:**

- Caused by **compression of the brachial plexus and subclavian artery** between **scalenus anterior and medius muscles**.

- Common causes include cervical rib, fibrous band, or hypertrophy of scalene muscles.
- Symptoms: numbness, paresthesia, and weakness of upper limb with absent pulse on arm elevation.

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**2. During a supraclavicular incision for brachial plexus block, the patient develops dyspnoea and elevated hemidiaphragm on X-ray. Which nerve was likely injured?**

**Answer:** *Phrenic nerve (C3, C4, C5)*

**Explanation:**

- Injury or block of the phrenic nerve causes **paralysis of the diaphragm** on the same side.
- On imaging, the affected hemidiaphragm appears **raised** due to loss of tone.

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**3. A stab wound just above the clavicle causes sudden respiratory distress and collapse of one lung. Explain the anatomical reason.**

**Diagnosis:** *Cervical (Apical) Pneumothorax*

**Explanation:**

- The **cervical pleura** and **apex of the lung** extend above the **clavicle**.
- Penetrating wounds or misplaced subclavian vein catheterization may rupture pleura ? air enters pleural cavity ? **lung collapse**.

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**4. A patient with carcinoma of thyroid presents with shoulder pain and paralysis of diaphragm. Which structure might have been involved?**

**Answer:** *Phrenic nerve*

**Explanation:**

- The phrenic nerve lies close to the **lateral lobe of thyroid** and may be compressed by tumor, inflammatory enlargement, or during thyroidectomy.
- This results in **referred pain to shoulder (C4 dermatome)** and **diaphragmatic paralysis**.

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**5. During neck surgery, the surgeon asks for identification of a nerve crossing the anterior scalene muscle. Which nerve is it?**

**Answer:** *Phrenic nerve.*

**Explanation:**

- The phrenic nerve descends **on the anterior surface of scalenus anterior**, deep to the prevertebral fascia and sternocleidomastoid.
- It serves as an important landmark in neck dissections.

## Frequently Asked Questions — Paravertebral Region

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**1. Name the muscles forming the scalene group.**

**Answer:** Scalenus anterior, scalenus medius, scalenus posterior, and sometimes **scalenus minimus** (accessory slip).

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**2. What are the actions of the scalene muscles?**

**Answer:**

- Elevate **first and second ribs** during inspiration.

- Flex the **neck laterally** and **rotate it** to the opposite side.
- Help stabilize the **cervical spine**.

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**3. Which important structures lie between the scalenus anterior and scalenus medius?**

**Answer:**

- **Brachial plexus (trunks)**
- **Subclavian artery**

This space is called the **interscalene (scalene) triangle**.

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**4. What structures lie in front of the scalenus anterior?**

**Answer:**

- Phrenic nerve (on its surface)
- Subclavian vein (in front of lower part)
- Transverse cervical and suprascapular veins
- Sternocleidomastoid muscle

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**5. What is the relation of the subclavian vessels to the scalenus anterior?**

**Answer:**

- **Subclavian artery** passes **behind** the muscle.
- **Subclavian vein** passes **in front** of it.

**6. What are the boundaries of the scalenovertebral triangle?**

**Answer:**

- **Medially:** Longus colli
- **Laterally:** Scalenus anterior
- **Base:** First part of subclavian artery

**Contents:** Vertebral artery and vein, thoracic duct (left side), sympathetic trunk, inferior thyroid artery.

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**7. What is the cervical pleura (cupula)?**

**Answer:**
The **dome-shaped parietal pleura** that covers the **apex of the lung** and projects into the root of the neck above the **first rib**.
It is reinforced by **Sibson's fascia (suprapleural membrane)**.

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**8. What is Sibson's fascia and what is its importance?**

**Answer:**
A **thickened layer of prevertebral fascia** covering the **cervical pleura**, derived partly from **scalenus minimus** and the **transverse process of C7**.
It **protects the lung apex** from injury in the root of the neck.

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**9. What is the cervical plexus?**

**Answer:**
Formed by **ventral rami of C1–C4 spinal nerves**, lying deep to sternocleidomastoid on levator scapulae and scalenus medius.
Provides **cutaneous and muscular branches** to the neck.

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**10. What is the “nerve point of the neck”?**

**Answer:**
The **midpoint of the posterior border of sternocleidomastoid**, where all **cutaneous branches of cervical plexus** emerge.
It is the site for **cervical plexus block** in anesthesia.

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**11. What is the origin and course of the phrenic nerve?**

**Answer:**

- **Origin:** Mainly from **C4**, with contributions from **C3 and C5**.
- **Course:** Descends **on scalenus anterior**, passes **between subclavian artery and vein**, and enters thorax to supply the **diaphragm**.

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**12. What are the branches of the phrenic nerve?**

**Answer:**

- **Motor:** To diaphragm
- **Sensory:** To pericardium, mediastinal pleura, and diaphragmatic peritoneum

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**13. What is the root value of the phrenic nerve?**

**Answer:** C3, C4, and C5 — *“C3, 4, 5 keeps the diaphragm alive.”*

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**14. What is the effect of injury to the phrenic nerve?**

**Answer:**

- **Paralysis of the diaphragm** on the same side

- **Elevation of hemidiaphragm** on chest X-ray
- **Dyspnoea** and referred pain to shoulder (C4 dermatome)

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**15. What is the clinical significance of the scalene muscles?**

**Answer:**

- Serve as **key landmarks** in neck dissections.
- **Scalene syndrome** may compress the **brachial plexus and subclavian artery**, producing pain, paresthesia, and loss of pulse on arm elevation.

## Multiple Choice Questions — Paravertebral Region

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**1. The scalenus anterior muscle is innervated by —**
A. Dorsal rami of cervical nerves
B. Ventral rami of cervical nerves
C. Accessory nerve
D. Phrenic nerve
? **Answer:** B. Ventral rami of cervical nerves
**Explanation:** All scalene muscles are supplied by ventral rami of **C3–C8**.

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**2. The subclavian artery passes —**
A. In front of scalenus anterior
B. Behind scalenus anterior
C. Between scalenus anterior and medius
D. In front of scalenus medius
? **Answer:** B. Behind scalenus anterior
**Explanation:** The subclavian artery lies **posterior** to scalenus anterior; the **vein lies anterior**.

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**3. The brachial plexus lies between which two muscles?**

A. Sternocleidomastoid and trapezius

B. Scalenus anterior and medius

C. Scalenus medius and posterior

D. Longus colli and scalenus anterior

? **Answer:** B. Scalenus anterior and medius

**Explanation:** The trunks of the brachial plexus occupy the **interscalene space**.

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**4. The phrenic nerve descends over which muscle in the neck?**

A. Longus colli

B. Scalenus anterior

C. Scalenus medius

D. Sternocleidomastoid

? **Answer:** B. Scalenus anterior

**Explanation:** The phrenic nerve runs **vertically on the anterior surface** of scalenus anterior.

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**5. The root value of the phrenic nerve is —**

A. C2, C3, C4

B. C3, C4, C5

C. C4, C5, C6

D. C2, C4, C6

? **Answer:** B. C3, C4, C5

**Mnemonic:** *“C3, 4, 5 keep the diaphragm alive.”*

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**6. The cervical pleura extends above the clavicle by —**

A. 1 cm

B. 2.5 cm

C. 5 cm

D. 7 cm

? **Answer:** B. 2.5 cm

**Explanation:** The cupula projects about **2.5 cm above the medial third of the clavicle**.

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**7. Sibson’s fascia (suprapleural membrane) is derived from —**

A. Pretracheal fascia

B. Prevertebral fascia

C. Investing layer of deep cervical fascia

D. Buccopharyngeal fascia

? **Answer:** B. Prevertebral fascia

**Explanation:** Sibson's fascia is a thickened extension of prevertebral fascia that strengthens the cervical pleura.

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**8. Which of the following statements about the phrenic nerve is true?**

A. Passes behind subclavian artery

B. Lies anterior to scalenus medius

C. Provides motor supply to diaphragm

D. Crosses behind root of the lung

? **Answer:** C. Provides motor supply to diaphragm

**Explanation:** The phrenic nerve runs in front of lung root and supplies **motor fibers to diaphragm**.

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**9. The cervical plexus is formed by ventral rami of —**

A. C1–C3

B. C1–C4

C. C2–C5

D. C3–C6

? **Answer:** B. C1–C4

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**10. The nerve point of the neck is located —**

A. At the posterior border of trapezius

B. At the midpoint of the posterior border of sternocleidomastoid

C. Behind the scalenus anterior

D. Above the clavicle

? **Answer:** B. Midpoint of posterior border of sternocleidomastoid

**Explanation:** All cutaneous branches of cervical plexus emerge from this point.

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**11. Injury to the phrenic nerve causes —**

A. Vocal cord paralysis

B. Drooping of shoulder

C. Elevation of diaphragm on same side

D. Constriction of pupil

? **Answer:** C. Elevation of diaphragm on same side

**Explanation:** Paralysis of the diaphragm due to loss of phrenic supply results in raised hemidiaphragm.

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**12. Which of the following muscles may reinforce the cervical pleura?**

A. Scalenus anterior

B. Scalenus medius

C. Scalenus minimus

D. Longus capitis

? **Answer:** C. Scalenus minimus

**Explanation:** When present, scalenus minimus gives fibers to the **suprapleural membrane (Sibson's fascia)**.

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**13. In scalene syndrome, which structures are compressed?**

A. Subclavian vein and thoracic duct

B. Subclavian artery and brachial plexus

C. Common carotid artery and vagus nerve

D. Internal jugular vein and phrenic nerve

? **Answer:** B. Subclavian artery and brachial plexus

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**14. Which nerve lies on the anterior surface of scalenus anterior?**

A. Vagus

B. Hypoglossal

C. Phrenic

D. Accessory

? **Answer:** C. Phrenic

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**15. The cervical plexus lies over which muscles?**

A. Longus capitis and longus colli

B. Levator scapulae and scalenus medius

C. Scalenus anterior and medius

D. Splenius capitis and semispinalis capitis

? **Answer:** B. Levator scapulae and

## Viva Voce — Paravertebral Region

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**Q1. What are the scalene muscles and where are they located?**
They are **three paired muscles** — scalenus anterior, medius, and posterior — situated **on the lateral aspect of the neck**, connecting cervical vertebrae to the first two ribs.

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**Q2. What is the action of the scalene muscles?**
They **flex the neck laterally**, **rotate it**, and assist in **inspiration** by elevating the first and second ribs.

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**Q3. What structures pass between the scalenus anterior and scalenus medius?**
The **subclavian artery** and **trunks of the brachial plexus**.

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**Q4. What structure passes in front of the scalenus anterior?**
The **subclavian vein**.

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**Q5. Which nerve runs on the surface of scalenus anterior?**
The **phrenic nerve**.

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**Q6. What is the root value of the phrenic nerve?**
**C3, C4, and C5** — *"C3, 4, 5 keeps the diaphragm alive."*

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**Q7. What is the motor and sensory distribution of the phrenic nerve?**

- **Motor:** Diaphragm
- **Sensory:** Central diaphragmatic pleura, pericardium, and diaphragmatic peritoneum

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**Q8. What happens when the phrenic nerve is injured?**

- **Diaphragmatic paralysis** on the same side
- **Elevation of the hemidiaphragm** on X-ray
- **Dyspnoea** (difficulty in breathing) and **referred pain** to the shoulder (C4 dermatome)

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**Q9. What is the cervical plexus and where is it situated?**
Formed by **ventral rami of C1–C4**, lying deep to **sternocleidomastoid** on **levator scapulae** and **scalenus medius**.

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**Q10. Name the cutaneous branches of the cervical plexus.**

- Lesser occipital (C2)
- Great auricular (C2, C3)
- Transverse cervical (C2, C3)
- Supraclavicular (C3, C4)

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**Q11. What is the "nerve point of the neck"?**
The **midpoint of the posterior border of sternocleidomastoid** where the **cutaneous branches of cervical plexus** emerge.

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**Q12. What is the cervical pleura?**
The **apical extension of parietal pleura** that rises **above the first rib** into the root of the neck. It covers the **apex of the lung**.

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**Q13. How is the cervical pleura strengthened?**
By the **suprapleural membrane (Sibson's fascia)** derived from **prevertebral fascia** and partly from **scalenus minimus**.

**Q14. What are the relations of cervical pleura?**

- **Anteriorly:** Subclavian artery
- **Posteriorly:** Neck of first rib and sympathetic chain
- **Medially:** Trachea, oesophagus, thoracic duct (on left)
- **Laterally:** Scalenus medius and lower trunk of brachial plexus

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**Q15. What is scalene (thoracic outlet) syndrome?**
Compression of the **brachial plexus and subclavian artery** between **scalenus anterior and medius**, leading to **pain, numbness, and weakness** of the upper limb, and loss of pulse when the arm is elevated.

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**Q16. Which muscle may give rise to Sibson's fascia?**
**Scalenus minimus** (when present).

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**Q17. What is the clinical importance of the nerve point of the neck?**
It is used for **cervical plexus block** in surgical anesthesia during thyroidectomy and other neck surgeries.

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**Q18. Which structure lies anterior to the cervical pleura and may be injured in subclavian vein puncture?**
**Subclavian vein.** Accidental injury may cause **pneumothorax** by puncturing the pleura.

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**Q19. Which side is the thoracic duct related to the cervical pleura?**
On the **left side**, the thoracic duct arches above the pleura to open into the **junction of left subclavian and internal jugular veins**.

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**Q20. What is the developmental origin of the diaphragm?**
From **septum transversum**, **pleuroperitoneal membranes**, **dorsal mesentery of oesophagus**, and **body wall mesoderm**.