

Topographical anatomy of the neck

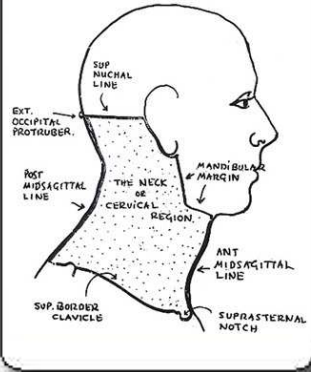
1. Neck – boundaries, palpation points, triangles and regions
2. Cervical fascia and interfascial spaces in the neck
3. Anterior cervical region:
 - ✓ submandibular triangle
 - ✓ carotid and muscular triangles
 - ✓ sternocleidomastoid region
4. Lateral cervical region
5. Viscera of the neck



Neck

Collum s.
Cervix

Neck boundaries

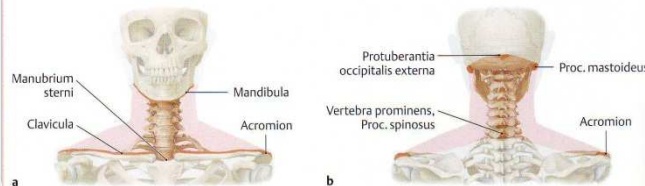


Boundaries of the neck

- cranial:
 - ✓ *basis mandibulae*
 - ✓ *proc. mastoideus*
 - ✓ *linea nuchalis superior*
 - ✓ *protuberantia occipitalis externa*
- caudal:
 - ✓ *incisura jugularis sterni*
 - ✓ *clavicula*
 - ✓ *acromion scapulae*
 - ✓ *proc. spinosus (C₇)*



© L-1.1 Begrenzungen des Halses

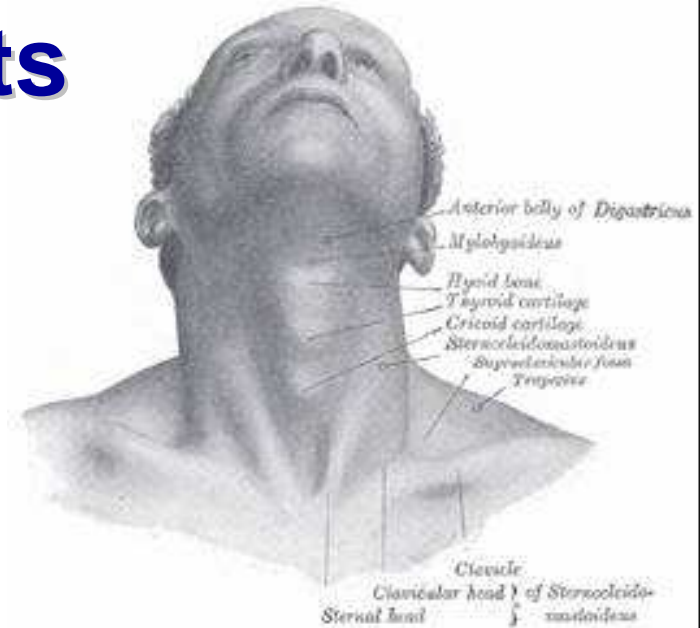


External points

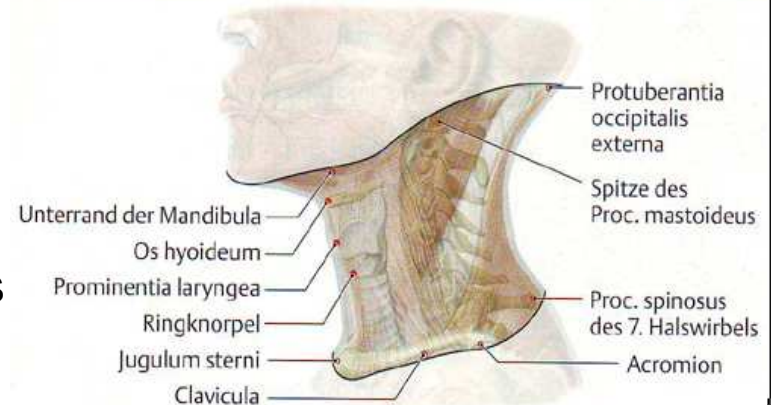


External palpation points

- anterior surface:
 - ✓ hyoid bone – C₃
 - ✓ superior thyroid notch
 - ✓ laryngeal prominence – C₄ (*Adam's apple*)
 - ✓ cricoid cartilage of the larynx – C₆
 - ✓ the isthmus of the thyroid gland:
II-IV tracheal cartilage
 - ✓ upper cartilaginous rings of the trachea



L-1.13 Konturgebende Strukturen am Hals

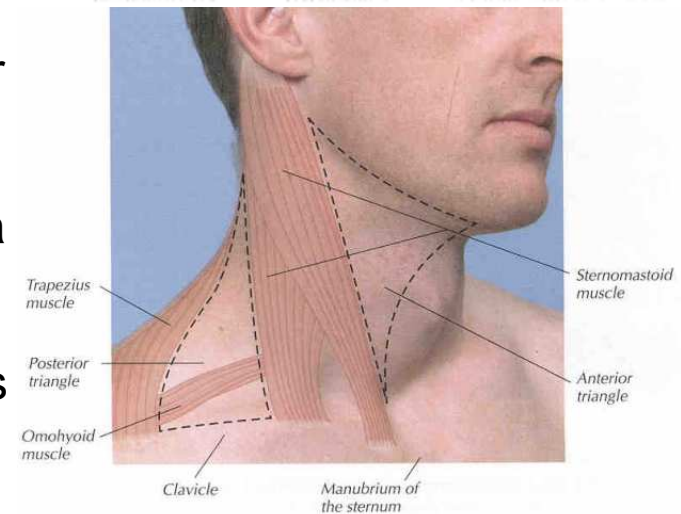


External points



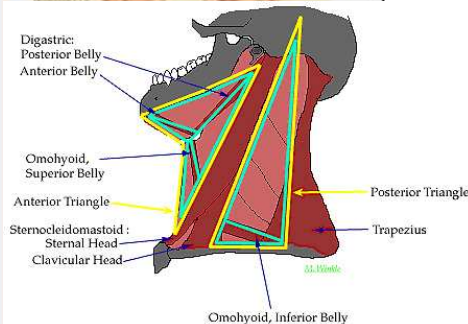
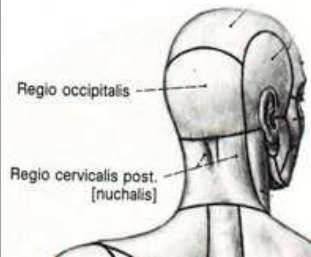
External palpation points

- lateral surface:
 - ✓ the anterior border of the trapezius
 - ✓ the contour of the sternocleidomastoid muscle
 - ✓ above the medial end of the clavicle – lesser supraclavicular fossa
 - ✓ between the posterior border of the sternocleidomastoid muscle and the clavicle – greater supraclavicular fossa (omoclavicular triangle): the brachial plexus trunks & subclavian arterial pulsations
 - ✓ along the anterior muscular border – carotid pulsations



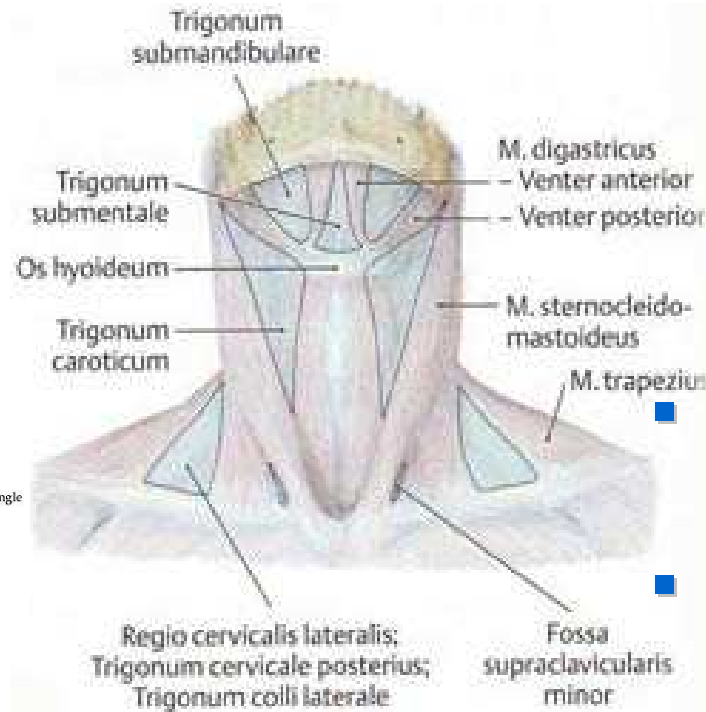
Regiones cervicales

Regio colli posterior



Cervical regions and triangles

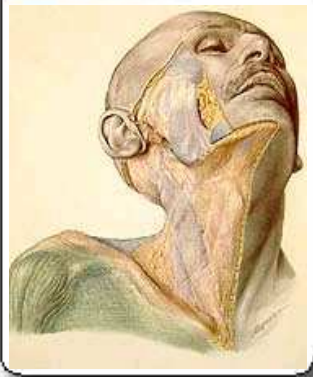
- ✓ anterior cervical region
- ✓ sternocleidomastoid region
- ✓ lateral cervical region
- ✓ posterior cervical region



- anterior triangle of neck:
 - ✓ submandibular triangle
 - ✓ carotid triangle
- lateral triangle of neck:
 - ✓ omotrpezoid triangle
 - ✓ omoclavicular triangle

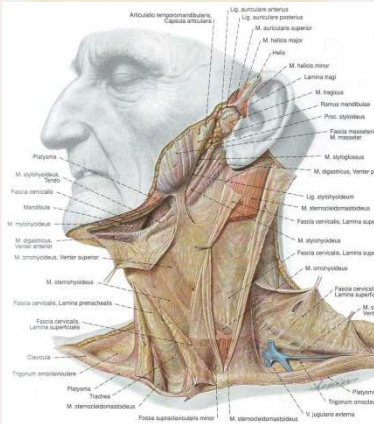
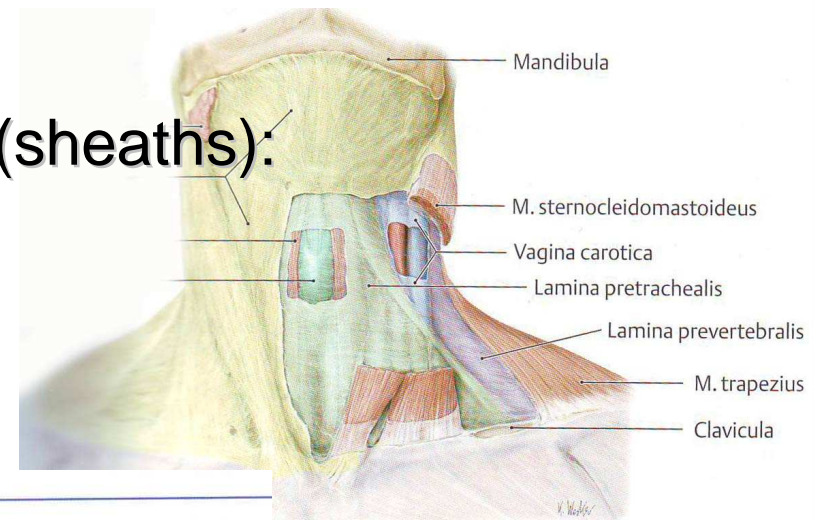
(Deep) cervical fascia, fascia cervicalis

Fascia cervicalis

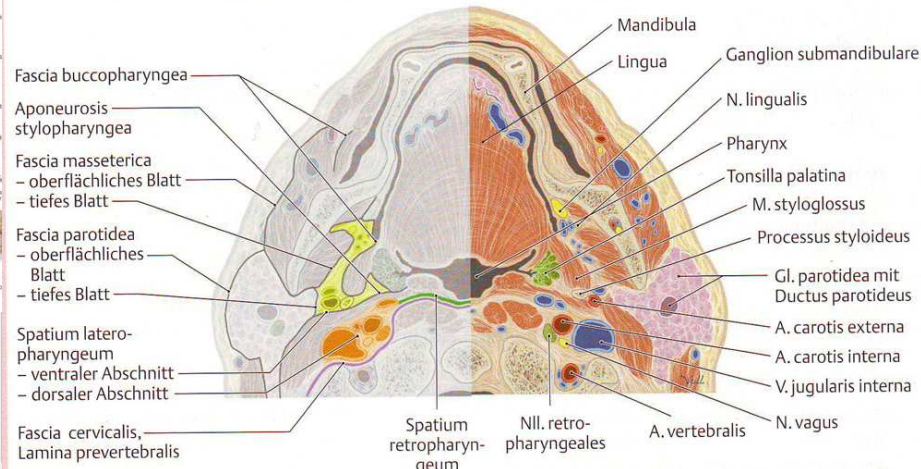


- three fascial layers (sheaths):

- ✓ investing layer
- ✓ pretracheal layer
- ✓ prevertebral layer



L-1.18 Spatium peripharyngeum

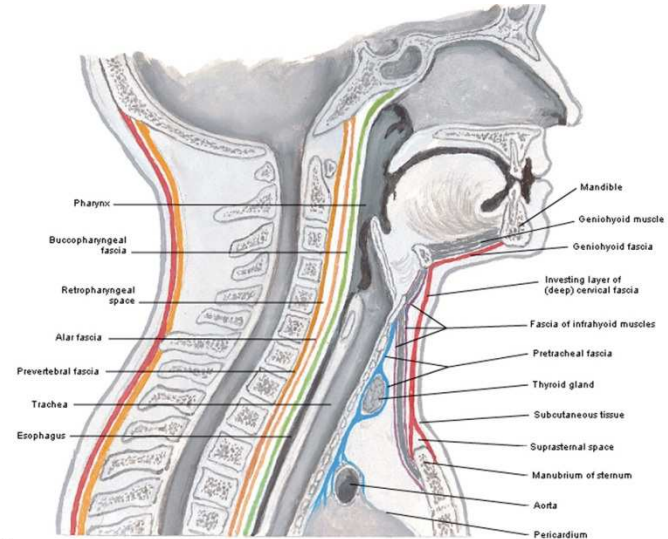
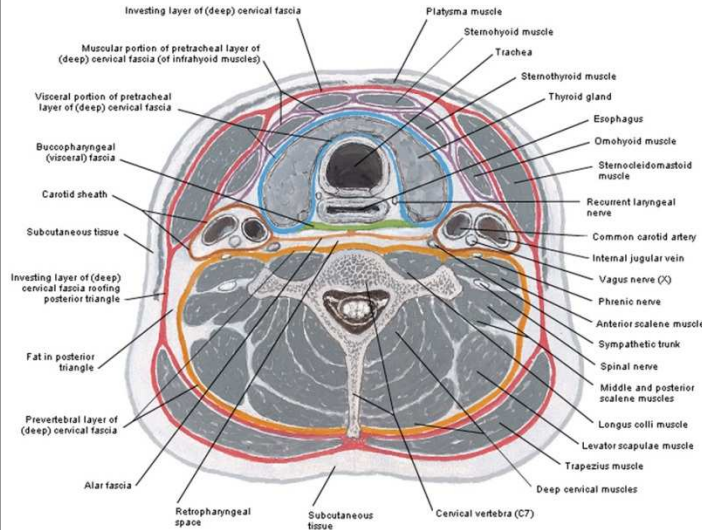
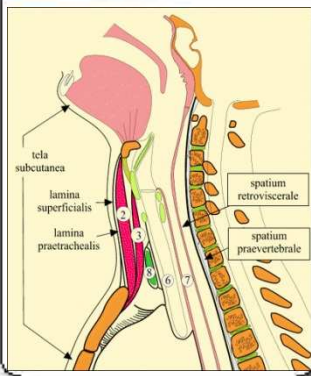


- suprasternal space
- peripharyngeal space

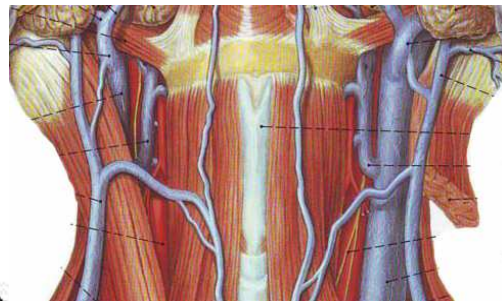
- ✓ lateropharyngeal space
- ✓ retropharyngeal space
⇒ posterior mediastinum

Cervical fascia, *fascia cervicalis*

Fascia cervicalis



- pretracheal space
- prevertebral space



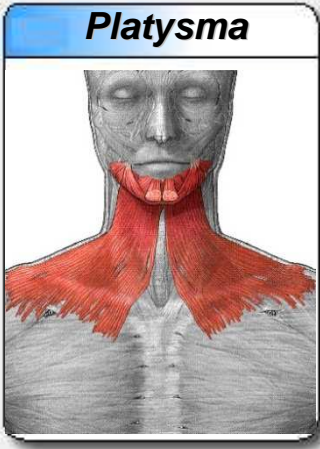
■ endocervical fascia:

- ✓ thin muscular part
- ✓ visceral part
- ✓ pretracheal space ⇒ anterior mediastinum
- ✓ parietal part ⇒ carotid sheath (*vagina carotica*)

■ cervical linea alba:

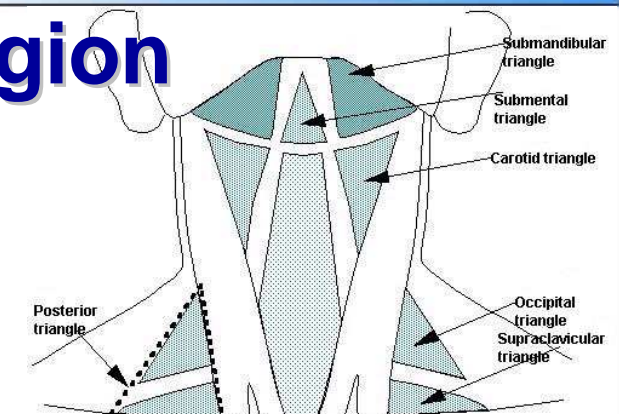
- ✓ accretion of pretracheal layer with investing layer
- ✓ extends to the manubrium of the sternum
- ⇒ bloodless surgical approach to the cervical viscera

parts
surface anatomy

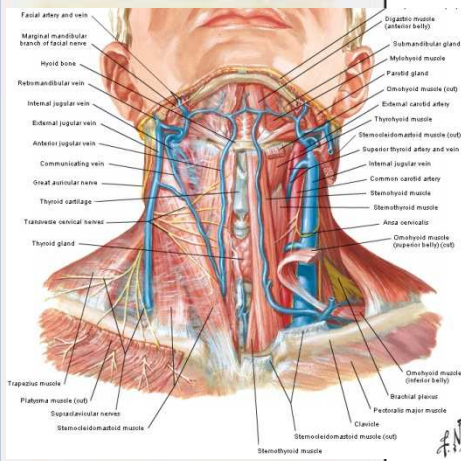


Anterior cervical region

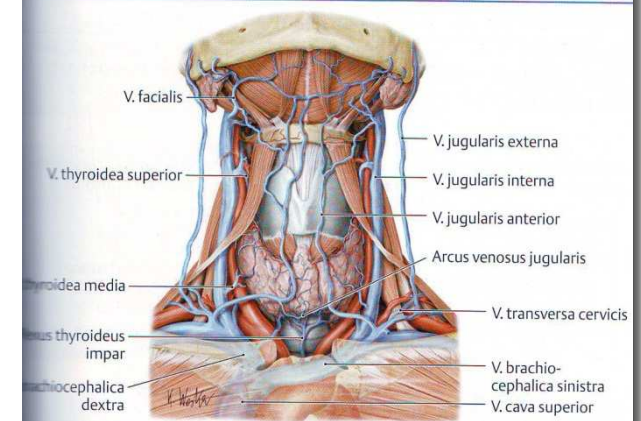
- parts:
 - ✓ suprahyoid (*regio suprahyoidea*):
 - submental region (submental triangle)
 - submandibular triangle ⇨ Pirogow triangle
 - ✓ infrahyoid (*regio infrahyoidea*):
 - carotid triangle
 - laryngotracheal eminence



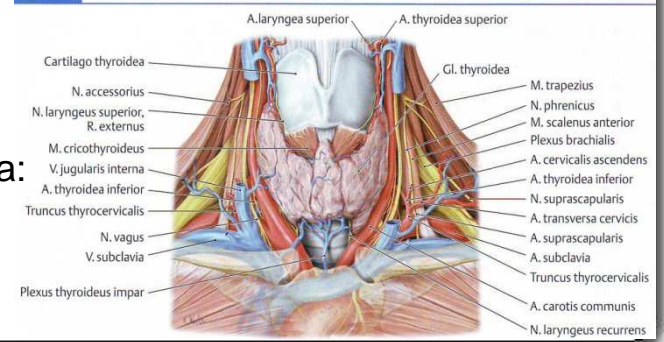
- surface anatomy:
 - ✓ skin – thin and pliable
 - ✓ superficial muscle layer:
 - *m. platysma*
 - *linea alba*
 - ✓ subcutaneous tissue – loose connective tissue:
 - *n. transversus colli* } *ansa cervicalis*
 - *r. colli n. facialis* } (*superficialis*)
 - superficial veins – *v. jugularis anterior*
 - superficial lymph nodes – submental and submandibular
 - ✓ investing layer of deep cervical fascia:
 - suprasternal space
 - ✓ pretracheal layer of deep cervical fascia:
 - sheath of inferior hyoid muscles – two laminae
 - ✓ visceral fascia
 - ✓ viscera of the neck



L-1.7 Venen im Halsbereich



L-1.15 Strukturen in der Tiefe der Regiones cervicalis anterior, sternocleidomastoidea und lateralis



topography

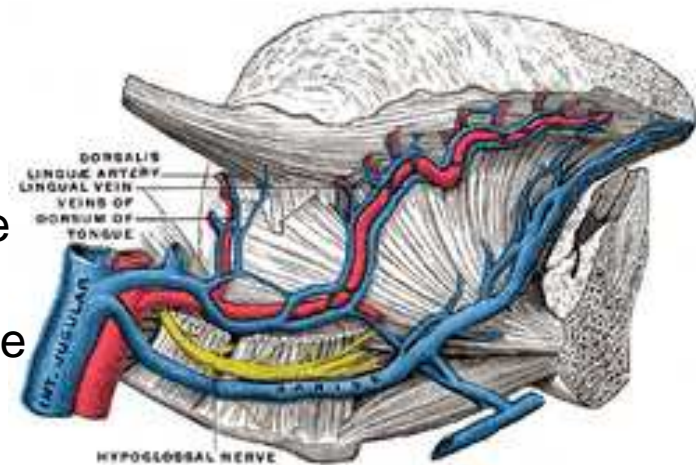
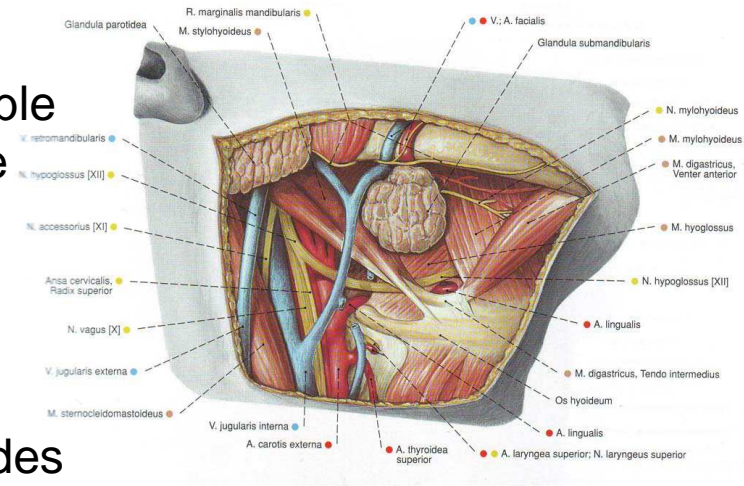
contents

N.I. Pirogow
(1810-1881)



Submandibular triangle

- boundaries:
 - ✓ superior – base of mandible
 - ✓ inferior – digastric muscle
- contents:
 - ✓ floor – mylohyoid muscle
 - ✓ submandibular gland
 - ✓ submandibular duct
 - ✓ submandibular lymph nodes
 - ✓ facial artery and vein
 - ✓ submental artery and vein, mylohyoid nerve
- Pirogow triangle:
 - ✓ anterior – mylohyoid muscle
 - ✓ inferior – digastric muscle
 - ✓ superior – hypoglossal nerve
 - ✓ floor – hyoglossus muscle
 - ✓ lingual vein
 - ✓ lingual artery – surgical approach

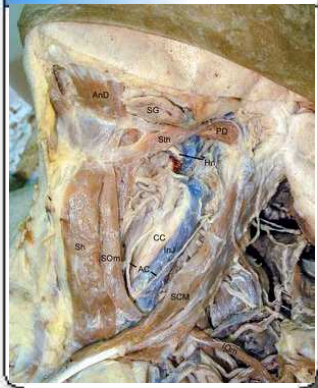


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topography

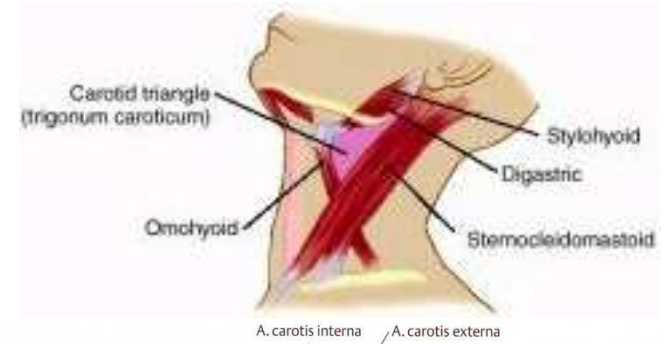
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Trigonum caroticum

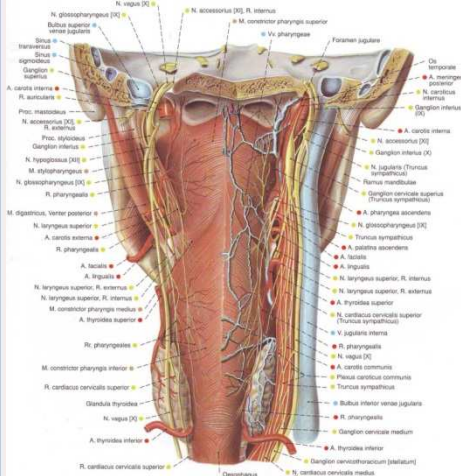
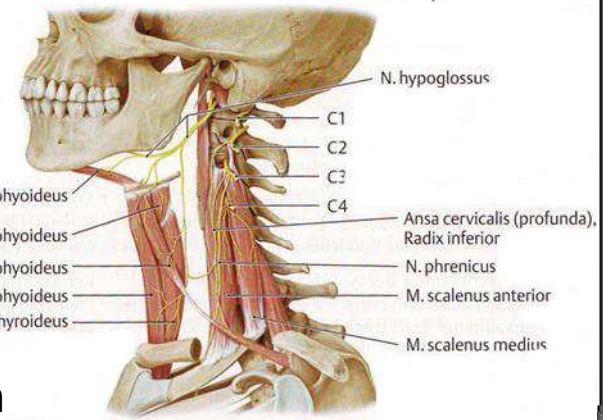
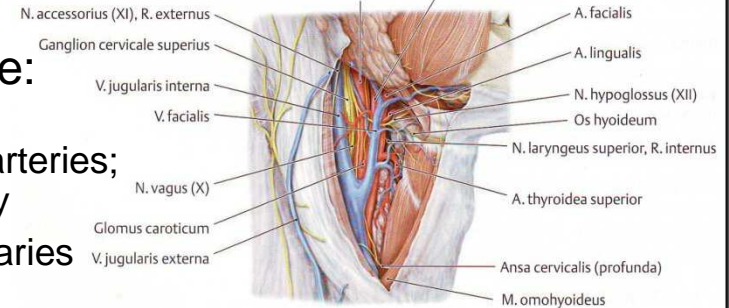


Carotid triangle

- boundaries:
 - ✓ anterior – superior belly of omohyoid muscle
 - ✓ posterior – anterior border of sternocleidomastoid muscle
 - ✓ superior – posterior belly of digastric muscle



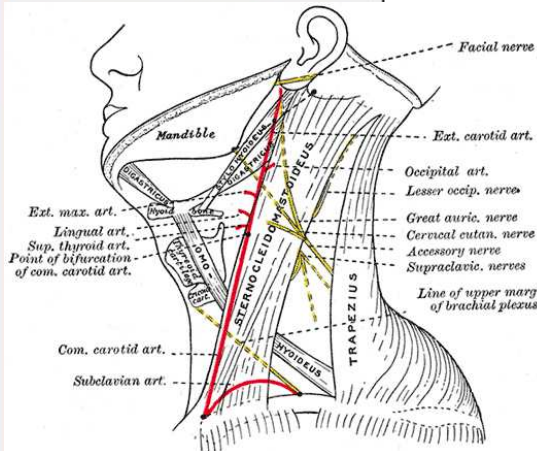
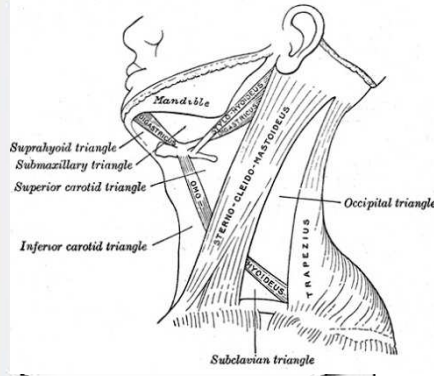
- contents:
 - ✓ major neurovascular bundle:
 - common carotid artery ⇒ internal and external carotid arteries; carotid sinus and carotid body
 - internal jugular vein – tributaries
 - vagus nerve – branches
 - ✓ carotid sheath (*vagina carotica*)
 - ✓ cervical plexus ⇒ *ansa cervicalis profunda*
 - ✓ cervical portion of the sympathetic trunk
 - ✓ vagus-sympathetic block after *Wischnewski*
 - ✓ cervicothoracic (stellate) ganglion



topography

contents

Trigonum musculare



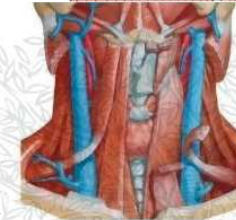
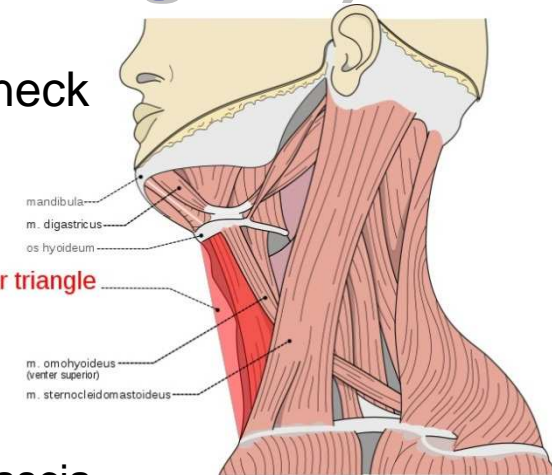
Muscular (omotracheal) triangle (inferior carotid trigone)

■ boundaries:

- ✓ anterior – median plane of the neck
- ✓ inferior-lateral – anterior border of sternocleidomastoid muscle
- ✓ superior-lateral – superior belly of omohyoid muscle

■ surface anatomy:

- ✓ skin – thin, movable and hairy
- ✓ subcutaneous tissue – sparse:
 - investing layer of the cervical fascia
 - platysma
 - transverse cervical nerve, anterior jugular vein
- ✓ muscle layer – pretracheal cervical layer
 - sternothyroid and sternohyoid muscles
- ✓ thyroid gland – blood vessels and nerves
- ✓ pretracheal space
 - inferior thyroid vein
 - unpaired thyroid venous plexus
- ✓ larynx and trachea
- ✓ pharynx and esophagus
- ✓ deep lymph nodes



location

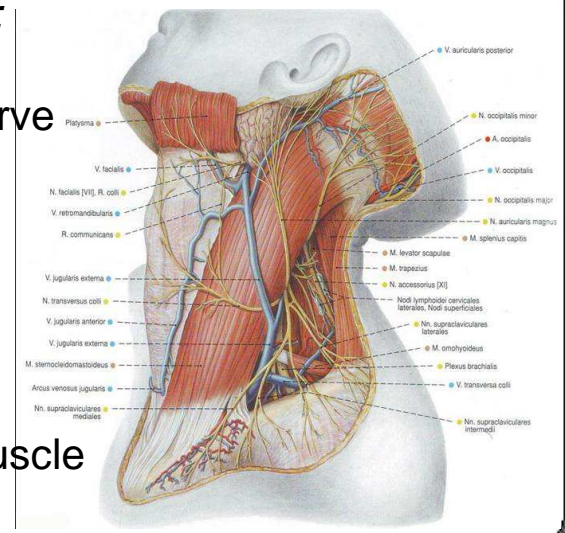
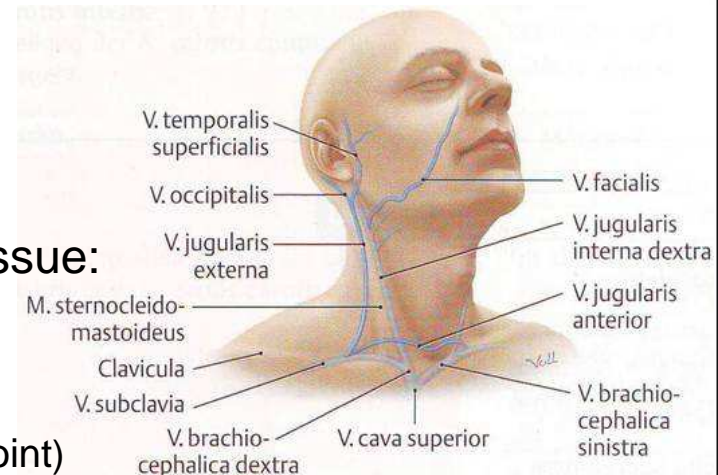
surface anatomy

Regio sternocleidomastoidea



Sternocleidomastoid region

- boundaries – boundaries of sternocleidomastoid muscle
- surface anatomy:
 - ✓ skin – thin and movable
 - ✓ subcutaneous tissue – fat tissue:
 - platysma bundles
 - external jugular vein
 - cervical plexus ⇒ *punctum nervosum* (Erb's point)
 - ✓ muscular sheet – two laminae (*lamina superficialis fasciae cervicalis*):
 - accessory nerve (external branch)
 - sternocleidomastoid artery and nerve
 - lymph nodes, jugular trunk
 - ✓ sternocleidomastoid muscle
 - ✓ cervical neurovascular bundle
 - ✓ omohyoid muscle – in lower part
 - ✓ sternothyroid muscle
 - ✓ phrenic nerve – on anterior scalene muscle
 - ✓ subclavian thyrocervical trunk



location

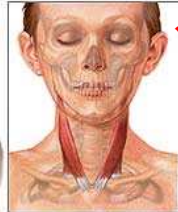
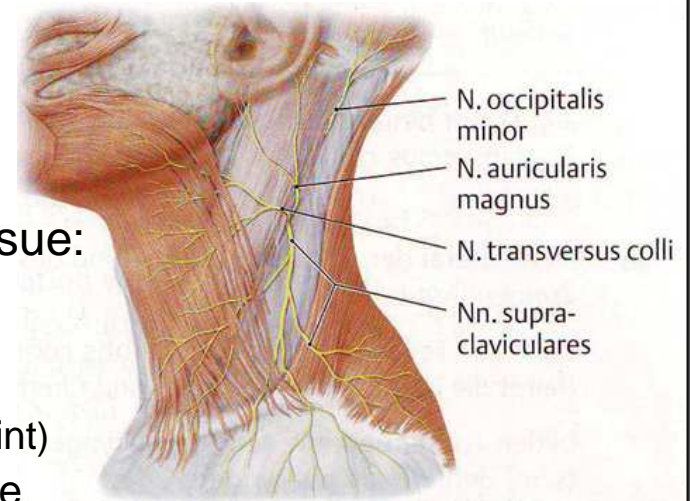
surface anatomy

Regio sternocleidomastoidea



Sternocleidomastoid region

- boundaries – boundaries of sternocleidomastoid muscle
- surface anatomy:
 - ✓ skin – thin and movable
 - ✓ subcutaneous tissue – fat tissue:
 - platysma bundles
 - external jugular vein
 - cervical plexus ⇒ *punctum nervosum* (Erb's point)



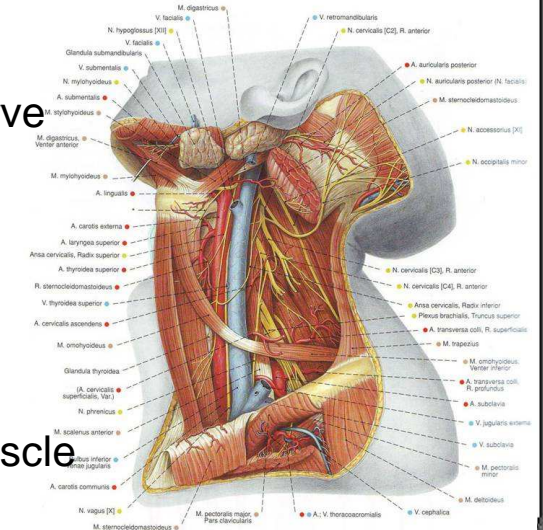
Sternocleidomastoid muscle stretches from the sternum to the skull behind the ear

"Wry neck"



muscular sheet – two laminae (*lamina superficialis fasciae cervicalis*):

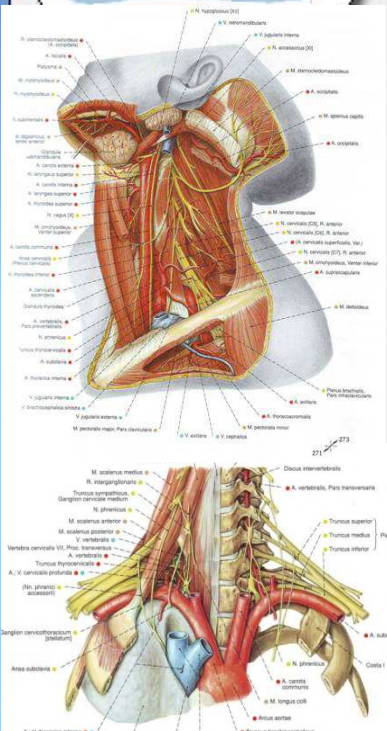
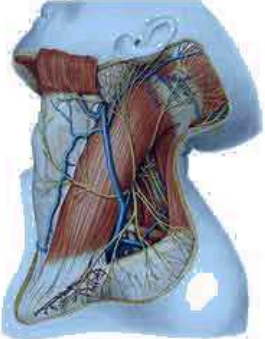
- accessory nerve (external branch)
- sternocleidomastoid artery and nerve
- lymph nodes, jugular trunk
- ✓ sternocleidomastoid muscle
- ✓ cervical neurovascular bundle
- ✓ omohyoid muscle – in lower part
- ✓ sternothyroid muscle
- ✓ phrenic nerve – on anterior scalene muscle
- ✓ subclavian thyrocervical trunk



location

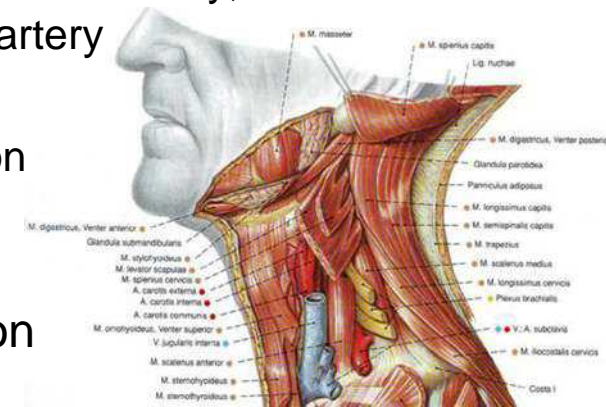
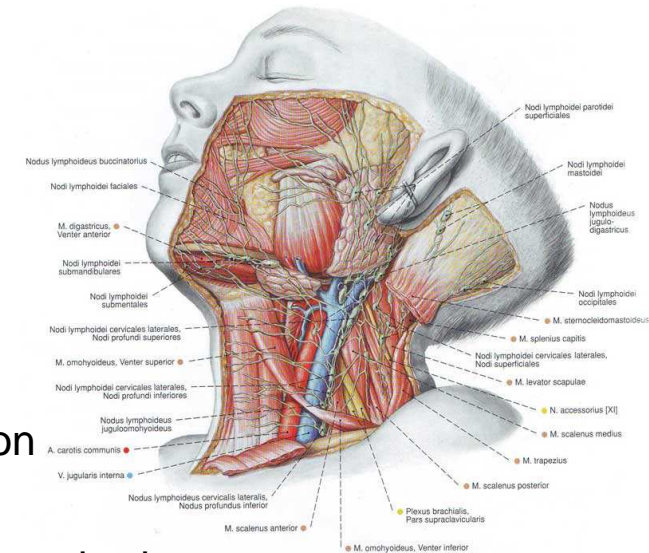
surface anatomy

Regio sternocleidomastoidea



Sternocleidomastoid region: topographic-anatomical items

- antescalene space:
 - ✓ venous angle ⇔ thoracic duct; right lymphatic duct
 - ✓ vagus nerve, common carotid artery, phrenic nerve
- interscalene space:
 - ✓ subclavian artery ⇔ costocervical trunk
 - ✓ brachial plexus – proximal portion
- scaleno-vertebral triangle:
 - ✓ subclavian artery and vein ⇔ vertebral artery, thyrocervical trunk, internal thoracic artery
 - ✓ vagus nerve and phrenic nerve
 - ✓ sympathetic trunk – inferior portion ⇔ surrounded by *ansa subclavia*
 - ✓ recurrent laryngeal nerve
 - ✓ cervicothoracic (stellate) ganglion – sympathetic blockade

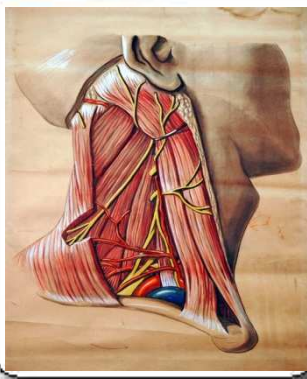


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location

surface anatomy

Regio colli lateralis



Lateral cervical region

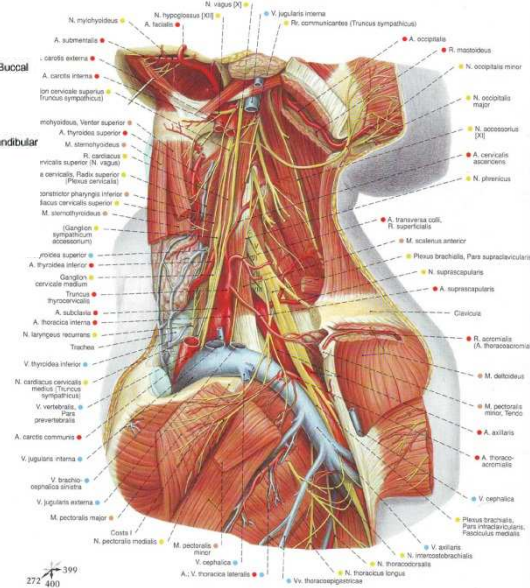
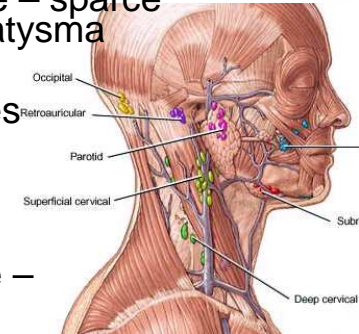
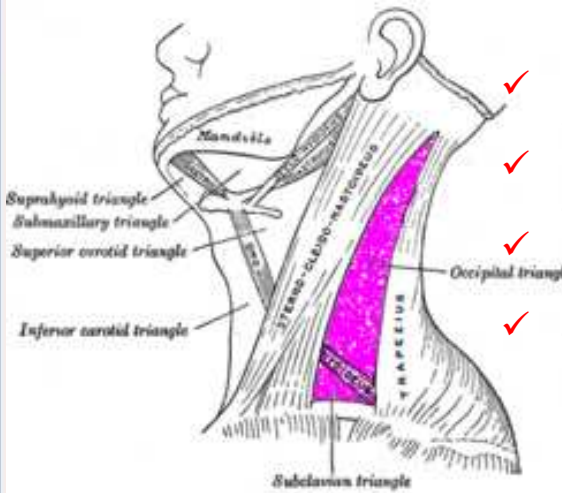
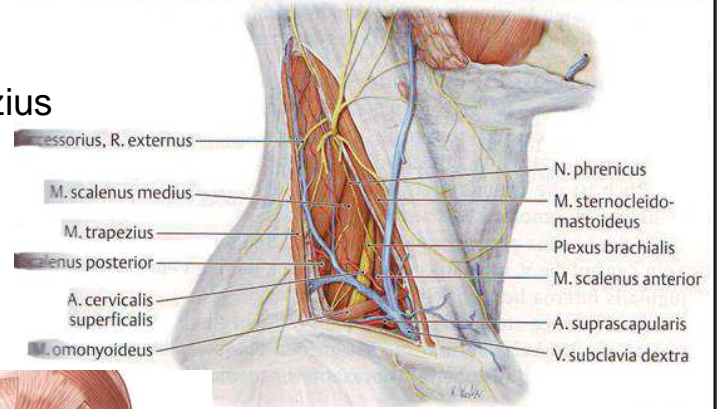
■ boundaries:

- ✓ anterior – posterior border of sternocleidomastoid muscle
- ✓ posterior – anterior border of trapezius
- ✓ inferior – clavicle
- ✓ greater supraclavicular fossa ⇒ omoclavicular triangle

■ surface anatomy:

- ✓ skin – thin and movable
- ✓ subcutaneous fat tissue – sparse
 - ⇒ posterior border of platysma
 - ⇒ external jugular vein
 - ⇒ supraclavicular nerves
 - ⇒ lymph nodes
- ✓ investing layer of the cervical fascia
- ✓ loose connective tissue – accessory nerve
- ✓ pretracheal layer of cervical fascia – only in omoclavicular trigone
- ✓ adipose and loose connective tissue:
 - ⇒ superficial cervical artery and vein
 - ⇒ suprascapular artery, vein and nerve
 - ⇒ major neurovascular bundle:
 - subclavian artery and vein – branches
 - brachial plexus – trunk part

L-1.16 Regio cervicalis lateralis



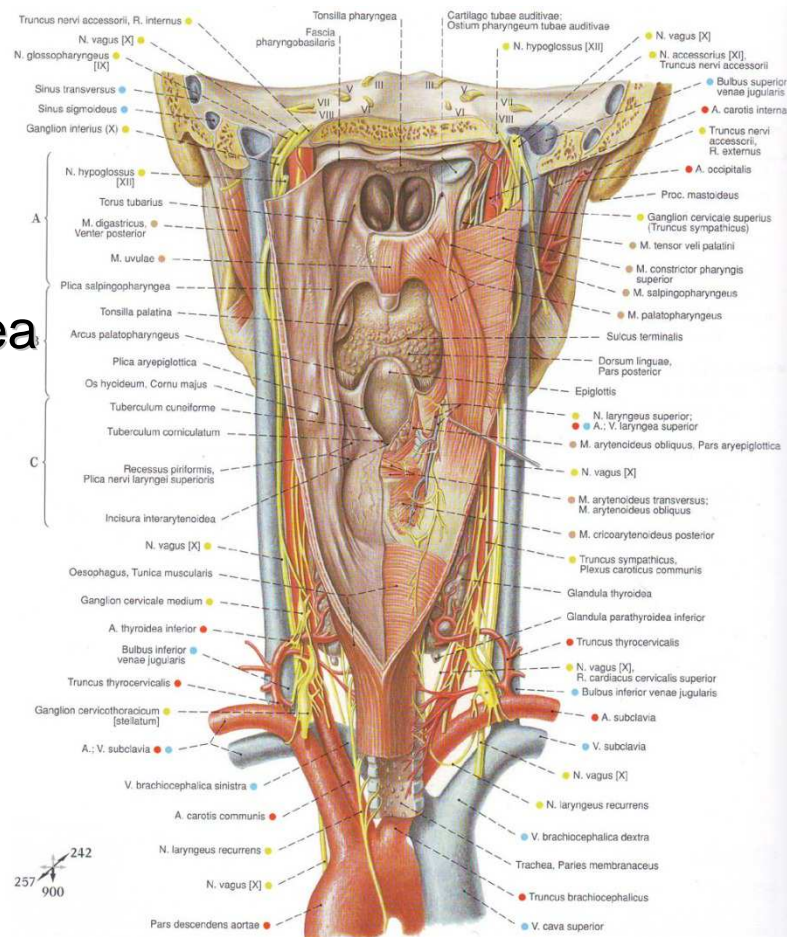
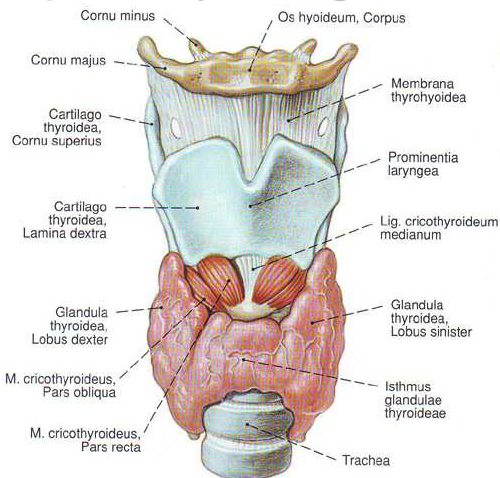
Viscera of the neck

Cervical viscera



■ Cervical viscera and glands:

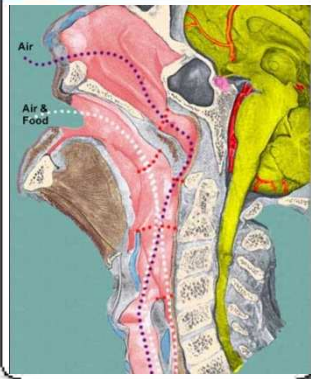
- ✓ submandibular gland
- ✓ pharynx
- ✓ cervical part of the esophagus
- ✓ larynx
- ✓ cervical part of trachea
- ✓ thyroid gland
- ✓ parathyroid glands



topography

structure

Pharynx

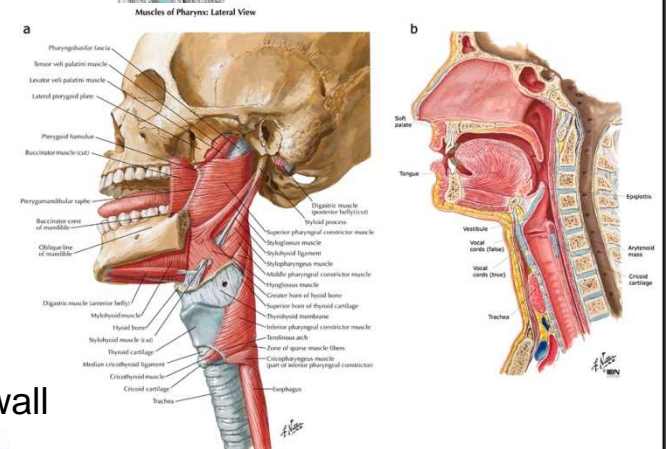
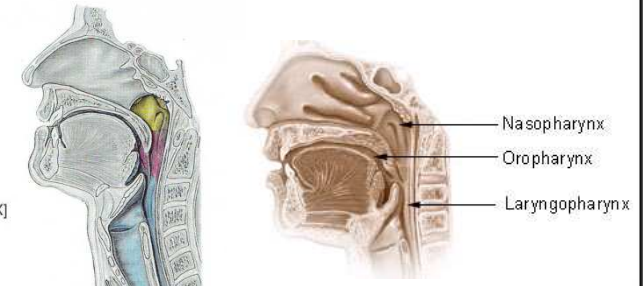


Pharynx

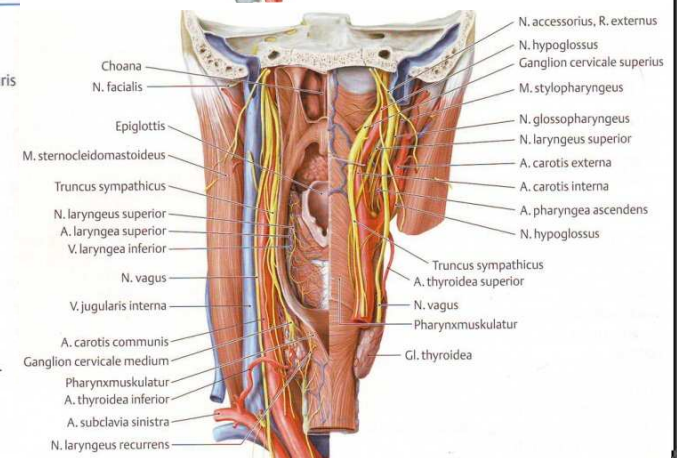
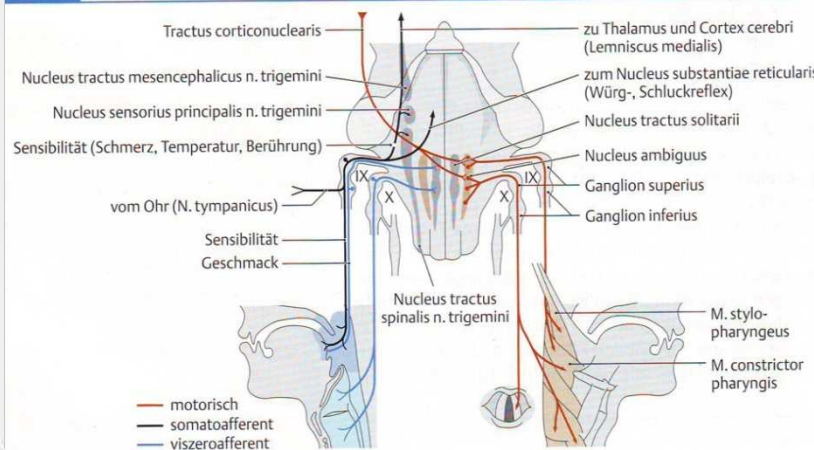
Sensory innervation

- N. maxillaris [V/2]
- N. glossopharyngeus [IX]
- N. vagus [X]

- upper border – base of the skull
- lower border – C₆ (cricoid cartilage)
 - ✓ retropharyngeal space ⇒ retropharyngeal lymph nodes ⇒ abscesses and phlegmones of tonsillar and/or otogenic origin
 - ✓ parapharyngeal space ⇒ cervical neurovascular bundle ⇒ internal carotid artery – most medially; at 1-1,5 cm lateral from the laryngeal wall



L-2.3 Motorische und sensible Innervation des Pharynx

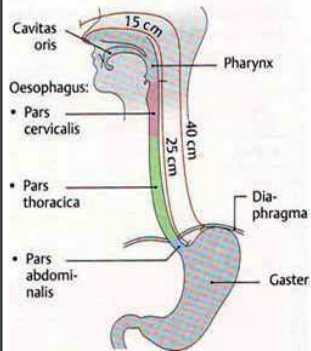


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topography

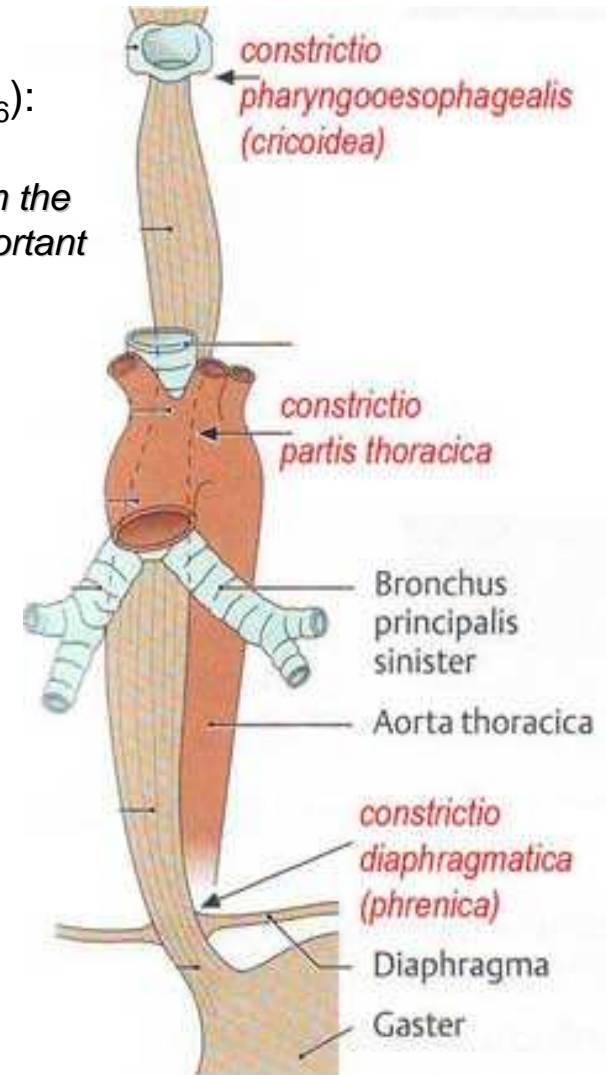
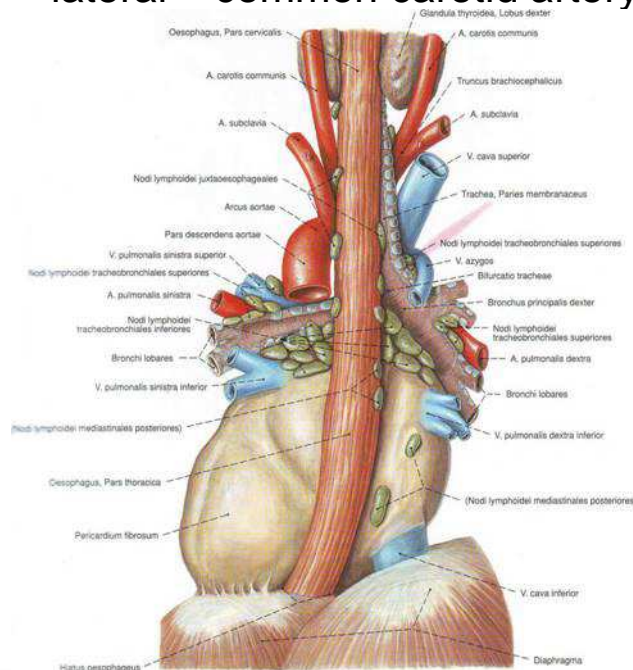
structure

Esophagus



Cervical part of the esophagus

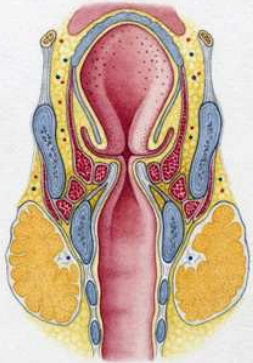
- cervical portion – 5-6 cm long:
 - ✓ upper border – cricoid cartilage (C₆):
 - pharyngeal constriction (*intortius esophagi*): at 15 cm from the upper incisor teeth – clinically important for endoscopy!
 - ✓ lower border – jugular notch (Th₂)
 - ✓ lateral – common carotid artery



topography

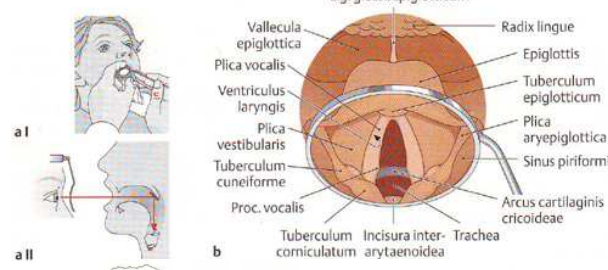
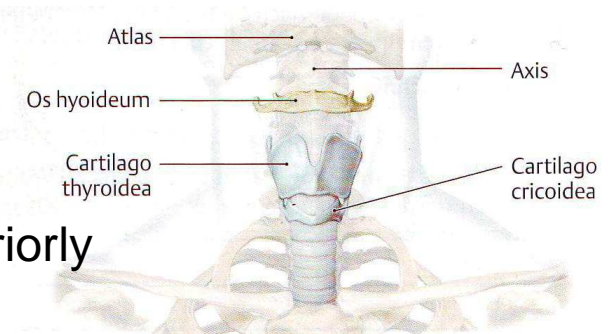
structure

Larynx

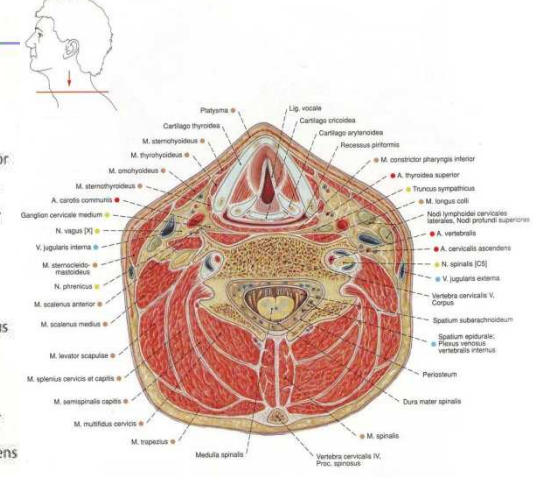
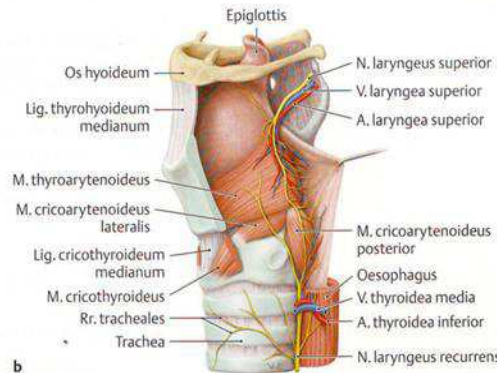
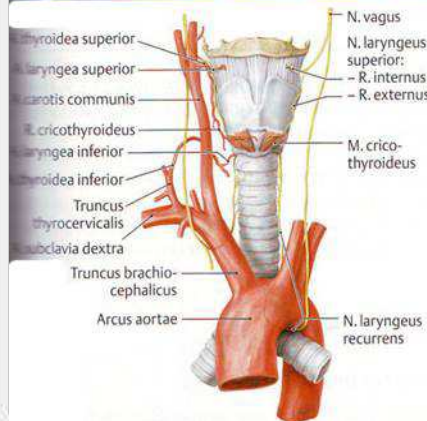


Larynx

- topography:
 - ✓ in men – C₃ (epiglottis)-C₆
 - ✓ in women and children – shorter and situated more superiorly
 - ✓ in infants – up to C₂-C₃
 - ✓ in elderly persons – C₄-C₆: *descensus laryngis*
 - ✓ vocal folds – C₅
 - ✓ anterior – previsceral space

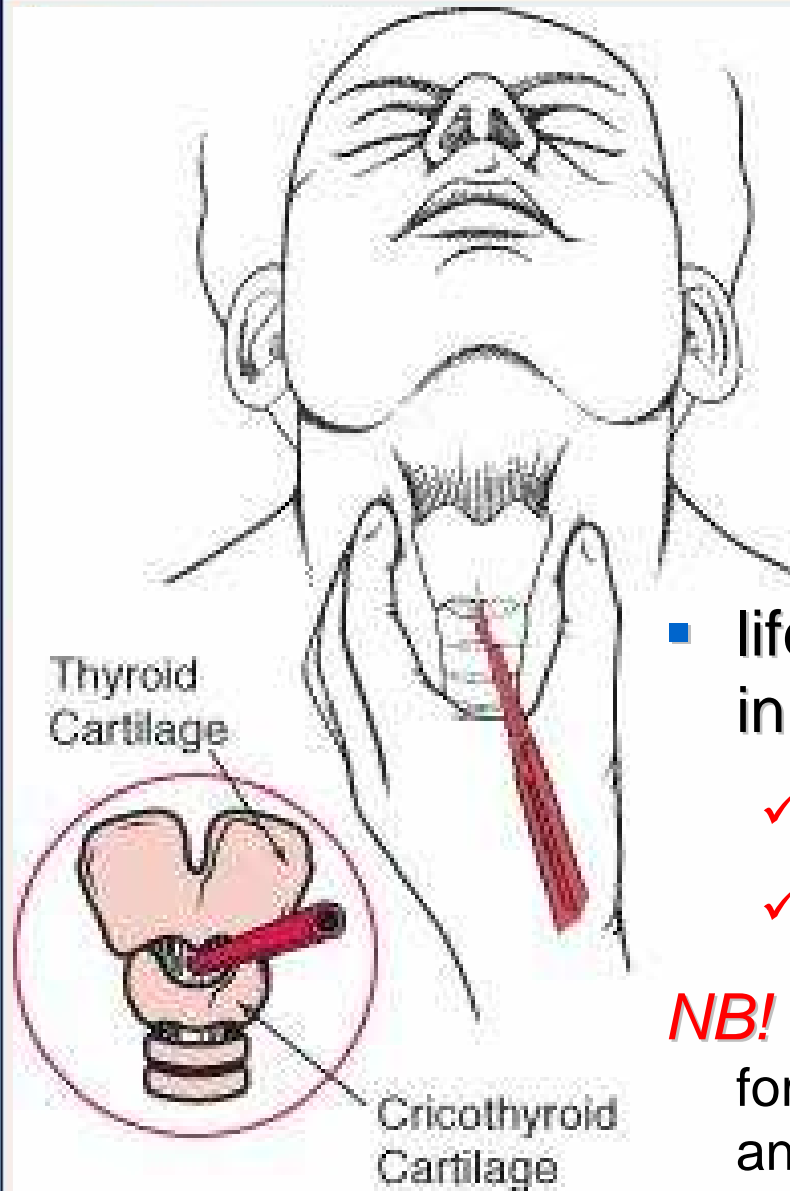


Arterielle Versorgung und Innervation des Kehlkopfs



проф. д-р Николай Лазаров

Cricothyrotomy (coniotomy)



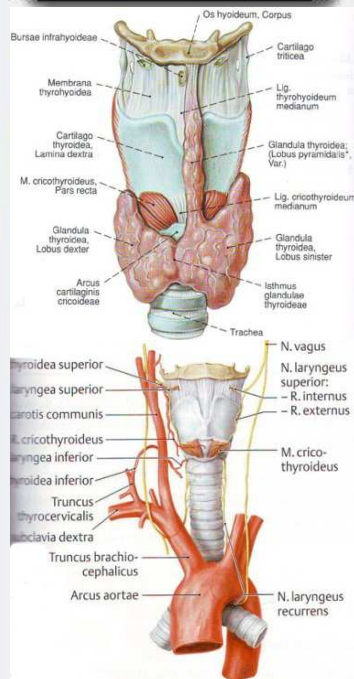
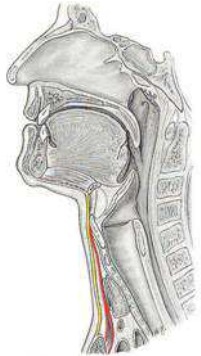
- life-saving procedure in extreme circumstances:
 - ✓ angioedema (*Quincke's edema*)
 - ✓ airway obstruction by a foreign body

NB! surgical cricothyrotomy is not recommended for infants or small children (age < 10) due to anatomical differences: close apposition of the vocal folds to the cricothyroid membrane

topography

structure

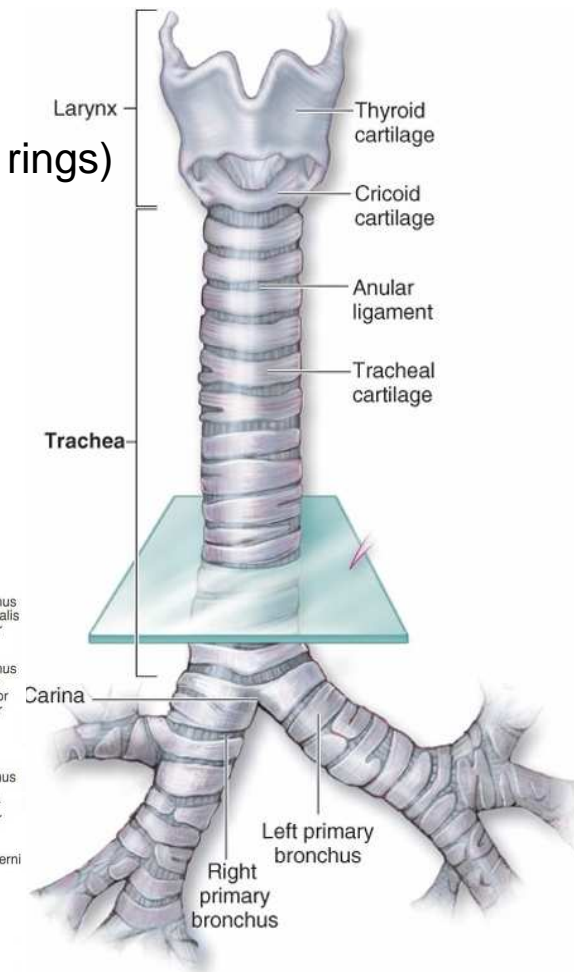
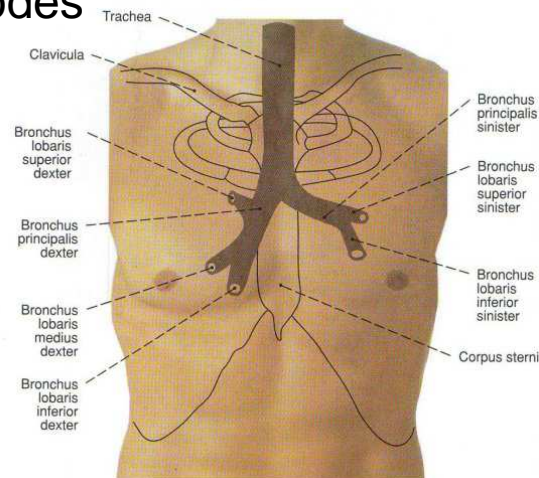
Trachea



Cervical part of the trachea

■ cervical portion – 4-5 tracheal cartilage rings:

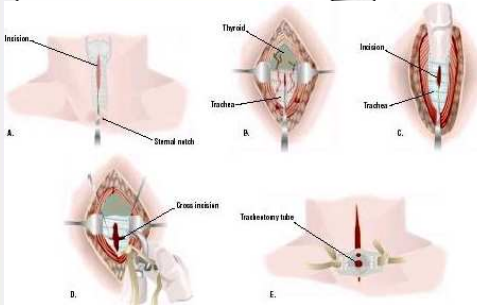
- ✓ upper end – cricoid cartilage (C₆)
- ✓ lower end – jugular notch (Th₂)
- ✓ isthmus of the thyroid gland (2-4th rings)
- ✓ recurrent laryngeal nerve
- ✓ unpaired thyroid venous plexus
- ✓ unpaired thyroid artery
- ✓ common carotid artery
- ✓ lymph nodes



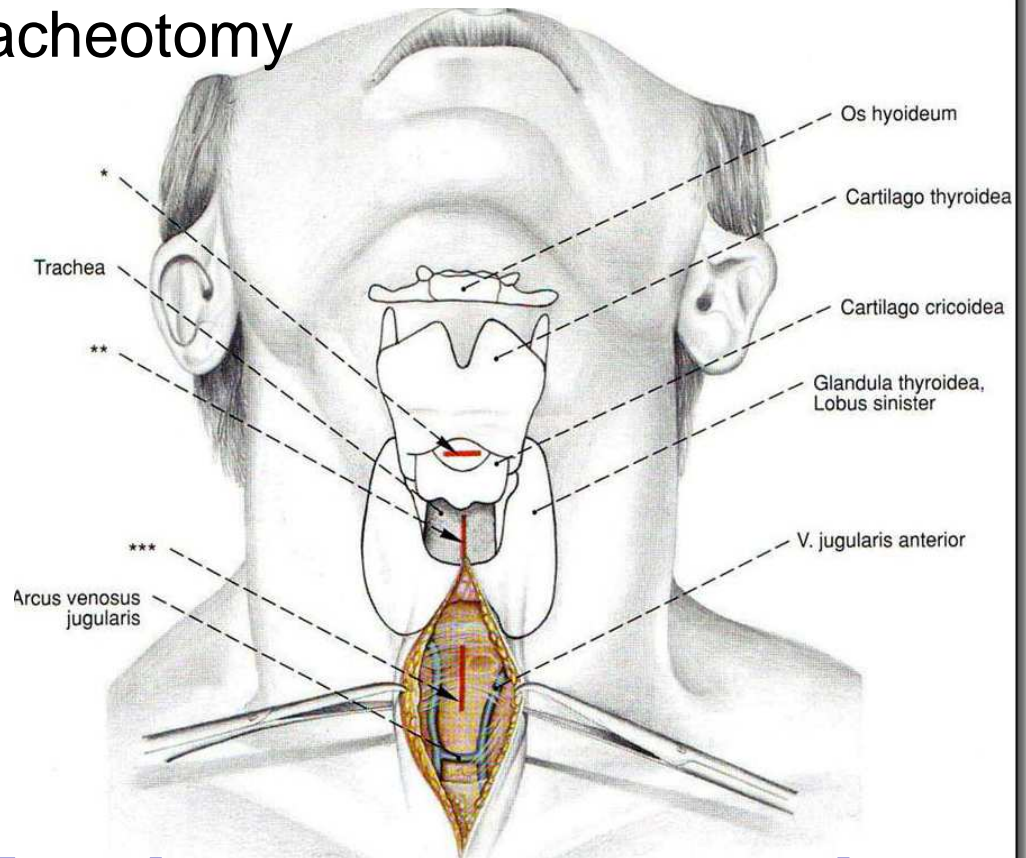
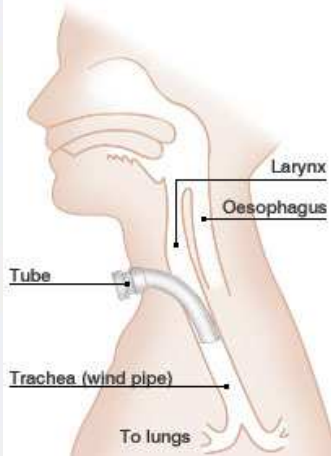


Tracheotomy vs. Tracheostomy

- ✓ superior (coniotomy)
- ✓ middle, and
- ✓ inferior tracheotomy



TRACHEOTOMY



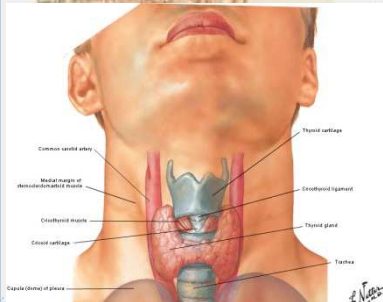
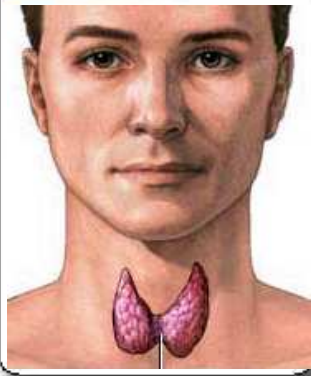
Tracheostomy procedure

проф. д-р Николай Лазаров

topography

structure

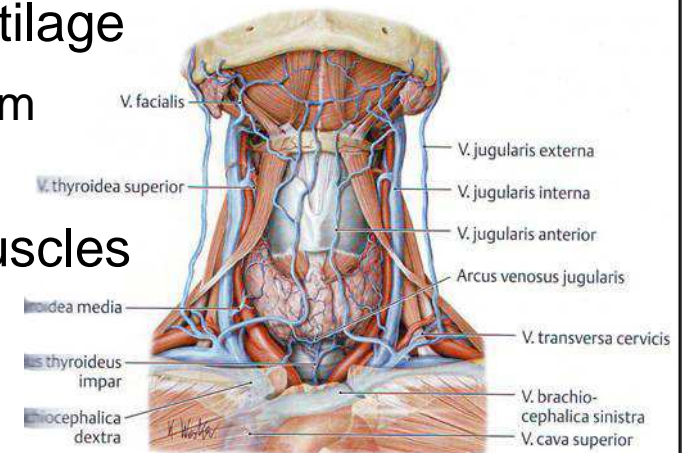
Glandula thyroidea



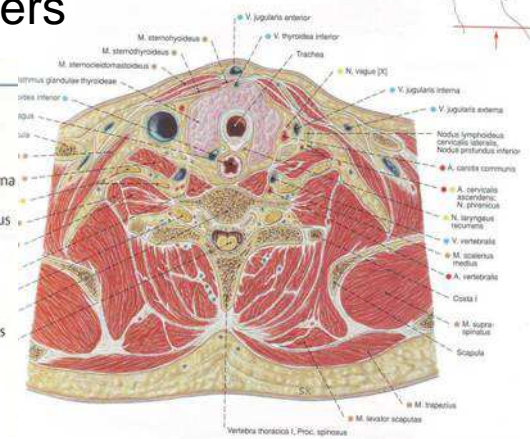
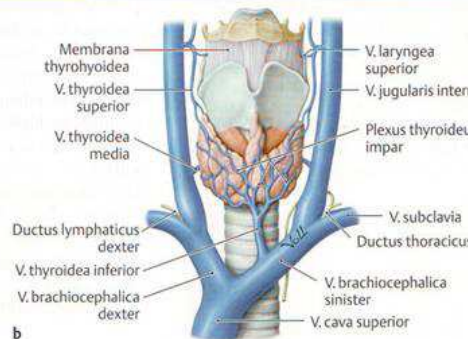
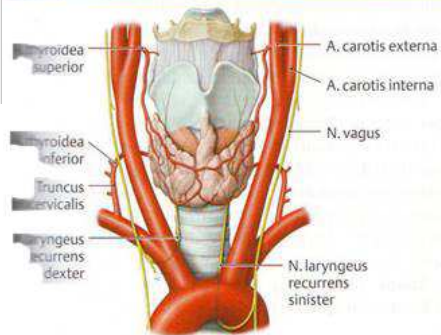
Thyroid gland, glandula thyroidea

■ topography:

- ✓ upper margin – thyroid cartilage
- ✓ lower margin – 1,5-2 cm from the jugular notch
- ✓ anterior – inferior hyoid muscles
- ✓ lateral:
 - common carotid artery
 - recurrent laryngeal nerve
 - esophagus – swallowing disorders



2.13 Blutgefäße und Nerven in der Schilddrüsenregion

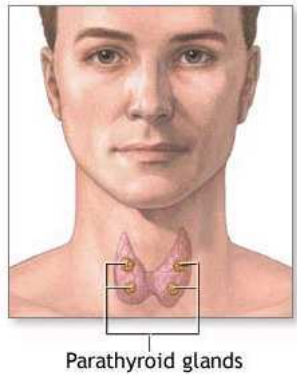


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topography

structure

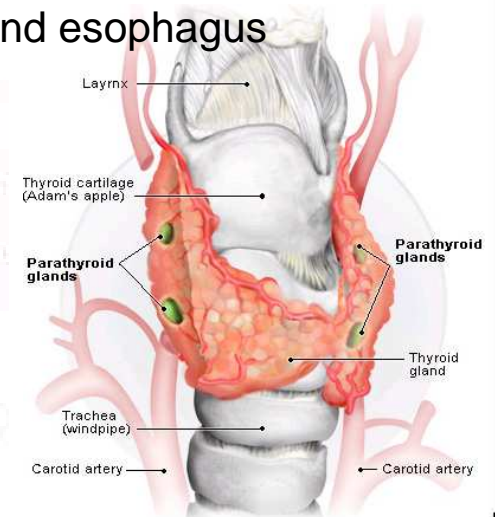
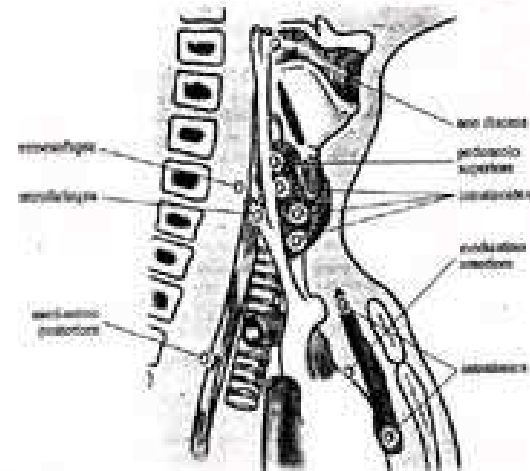
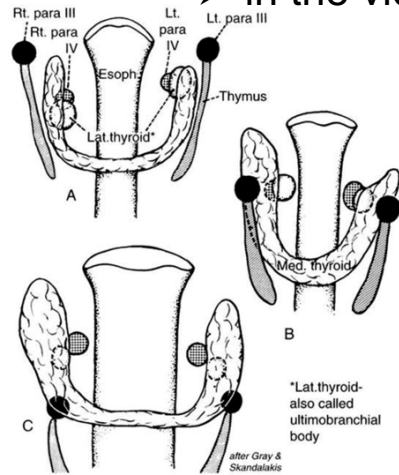
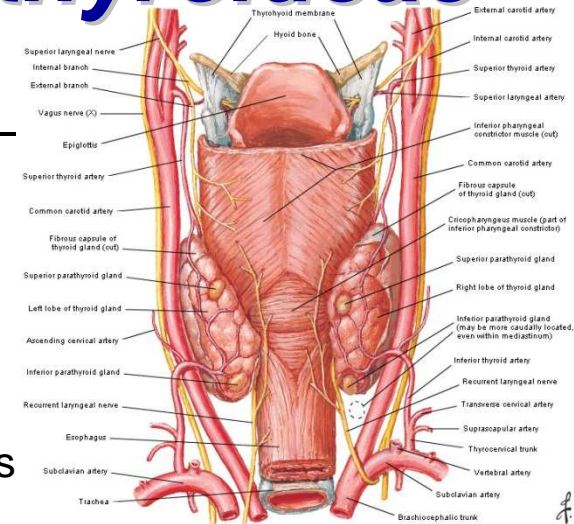
Glandulae parathyroideae



Parathyroid glands, *glandulae parathyroideae*

■ topography:

- ✓ superior parathyroid glands – inferior margin of thyroid cartilage
- ✓ inferior parathyroid glands – 2-4th tracheal rings
- ✓ ectopic glands:
 - in the thyroid gland
 - along the cervical migrating axis
 - in the mediastinum
 - in the vicinity of the thymus, trachea and esophagus



The Karen ethnic group "giraffe women"

Myanmar and Thailand Province Mae Hong Son



Thank you ...

проф. д-р Николай Лазаров