CABANG
BANTEN

TRACHEOSTOMY

A PART OF UPPER AIRWAY MANAGEMENT

KODI ONKOLOGI
BEDAH KEPALA LEHER

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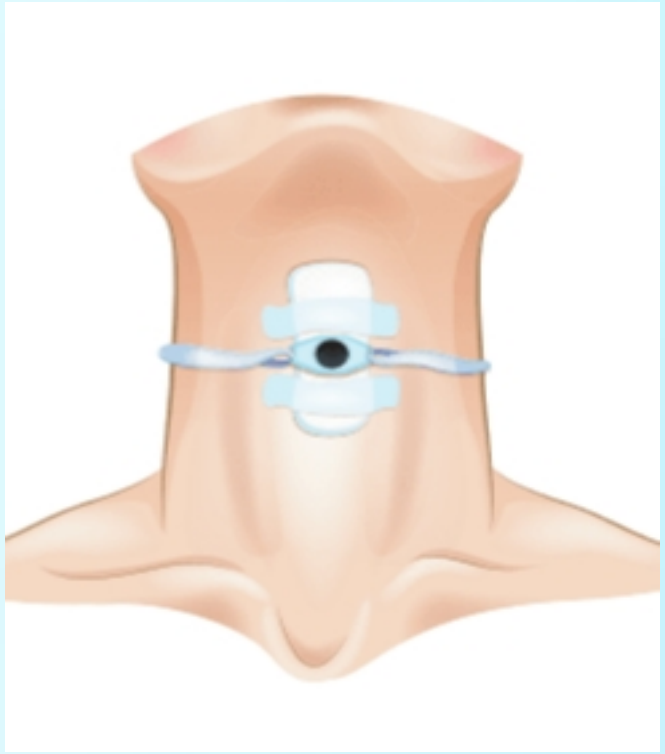
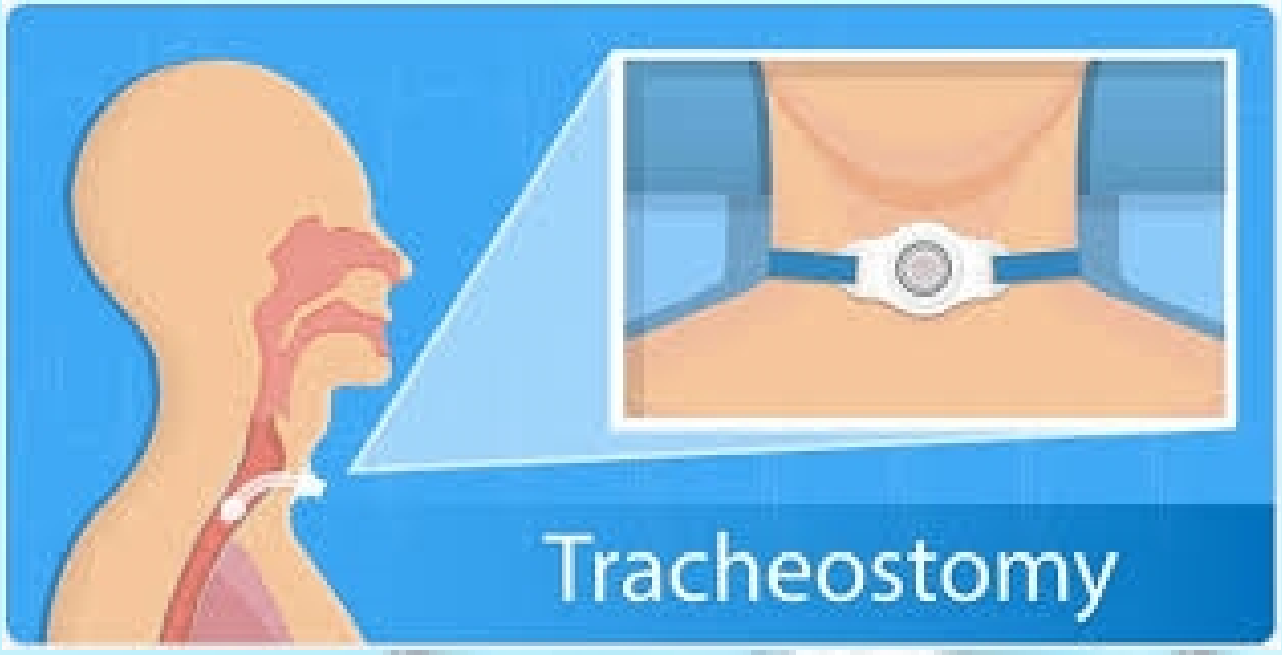
Tracheostomy

- Merupakan suatu prosedur tindakan operasi pembuatan lubang melalui insisi kulit pada bagian depan leher yang bertujuan menghubungkan trakea dengan bagian luar.



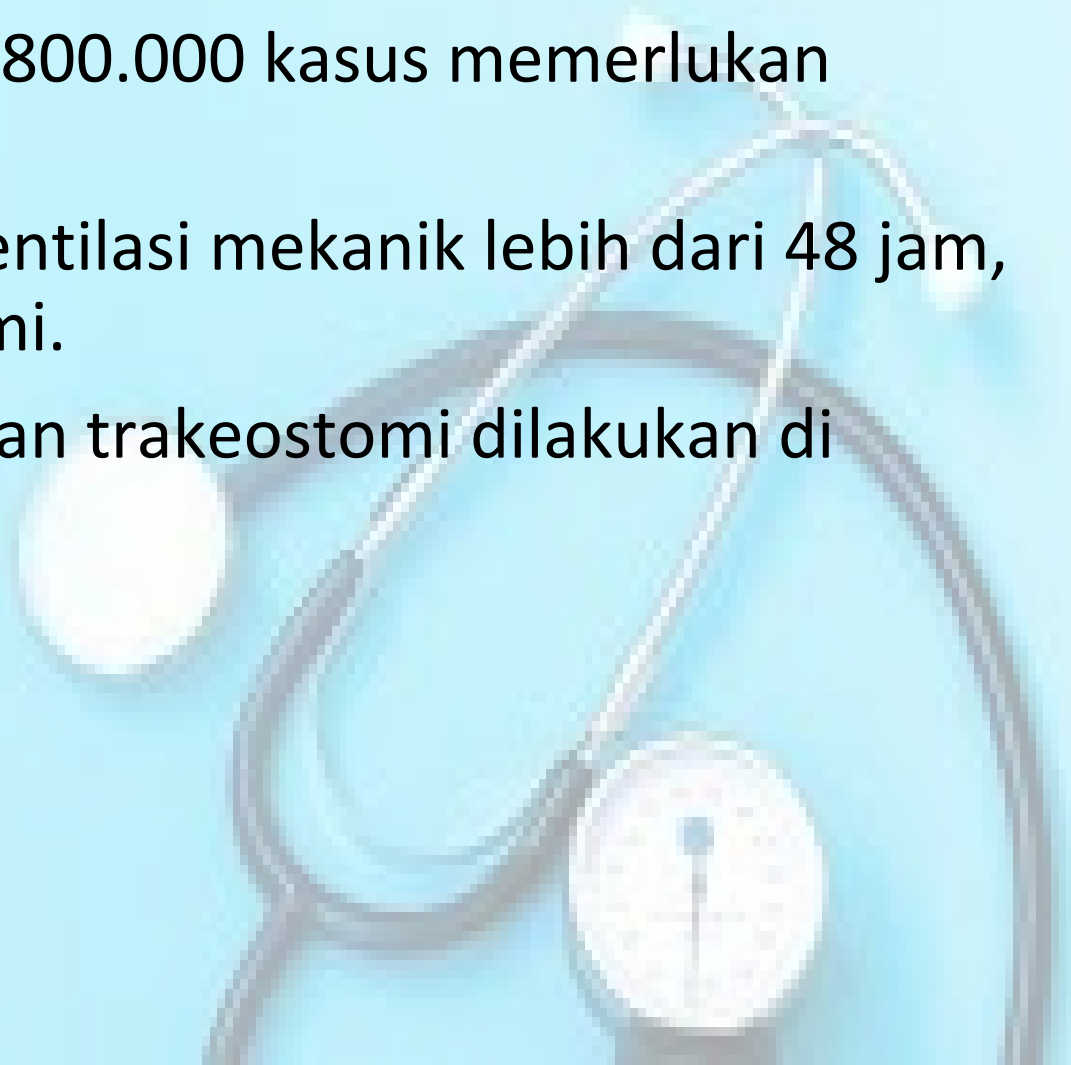


SEJARAH

- 3600 BC, Alexander Agung menggunakan pedangnya melakukan pembebasan jalan nafas pada tentara yang mengalami tersedak tulang di tenggorok.
- 100 BC, Asklepiades dokter Yunani.
- 1546, Antonio Musa Brasalova melakukan pembebasan jalan nafas karena obstruksi yang disebabkan pembesaran tonsil.
- 1546-1833, hanya 28 tracheostomy yang berhasil menurut catatan.
- Abad 20, Chevalier Jackson memperkenalkan teknik modern, banyak dilakukan pada era wabah difteri.

EPIDEMIOLOGI

- DI Amerika setiap tahun terdapat 800.000 kasus memerlukan Ventilasi mekanik.
- 34% pasien yang menggunakan ventilasi mekanik lebih dari 48 jam, memerlukan Tindakan Trakeostomi.
- Secara rata-rata > 100.000 Tindakan trakeostomi dilakukan di Amerika dalam 1 tahun.



INDIKASI

1. Intubasi lama *(prologed intubation)*
2. Ventilator weaning
3. Efisiensi pembersihan paru
4. Obstruksi jalan nafas atas
   - Stridor, air hunger, retraksi
   - OSA dengan desaturasi O2
   - Parese Pita suara bilateral
5. Gagal intubasi
6. Berkaitan dengan op HN/Trauma management
7. Proteksi airway (penyakit neurologis/traumatic brain injury)

EARLY VS LATE TRACHEOSTOMY

Terdapat 2 hal yang harus dipertimbangkan :

1. Kita harus memutuskan apakah pasien akan membutuhkan *prolonged intubation.*
2. Kita harus memutuskan kapan waktu yang tepat untuk melakukan Tindakan trakeostomi.

Definisi : Early : Hari ke 3-10 mekanikal ventilator

Late : Hari ke 7-14, 14-28, > 28

WAKTU

- Konsensus internasional terhadap pasien yang menerima artificial airway dan mekanikal ventilator merekomendasikan :

"The appropriate duration of translaryngeal intubation cannot be defined at present. Clinical consideration or complications may dictate changing the artificial airway to another route. How- ever, no data exist that give adequate direction as to when it is routinely advisable to change from a translaryngeal intubation to a tracheostomy."

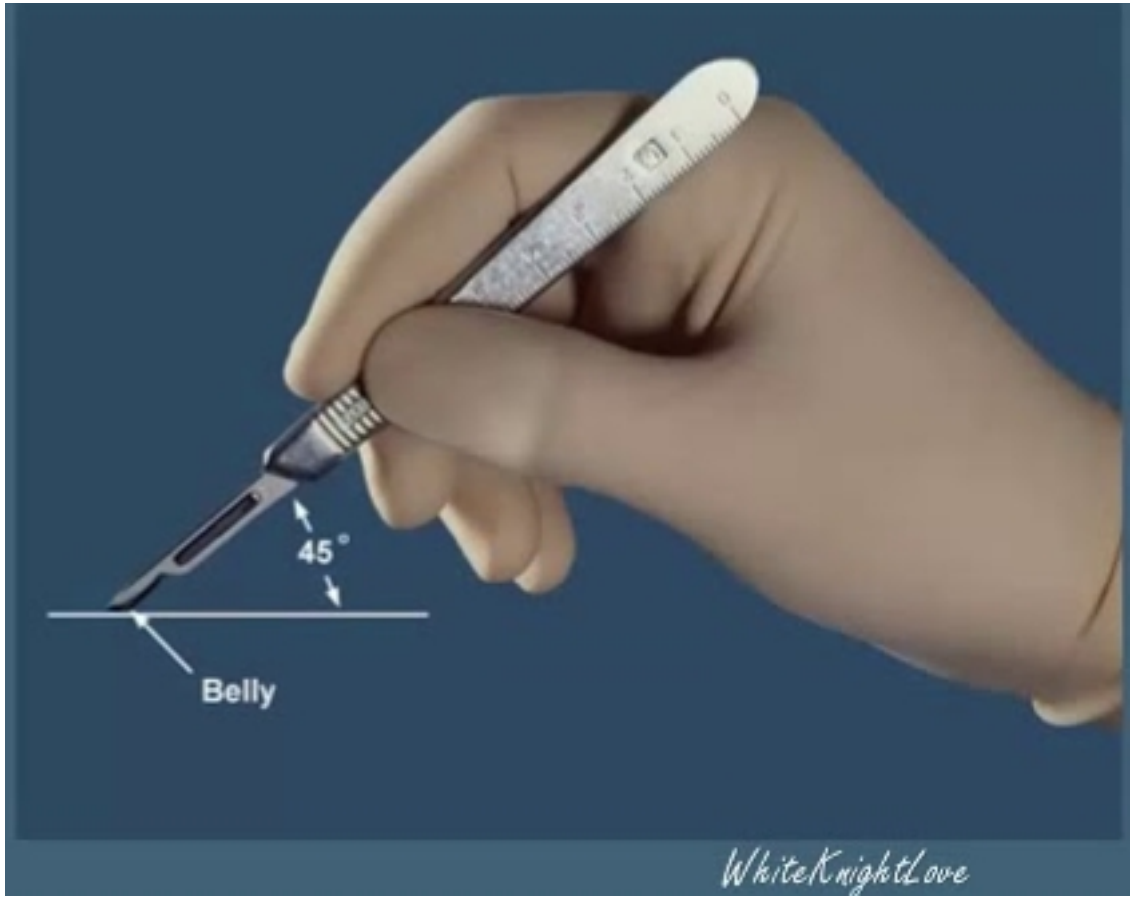
EARLY VS LATE TRACHEOSTOMY

- Retrospective study 531 pasien dengan ventilator di ICU : early tracheostomy memperpendek penggunaan ventilator dan lama perawatan ICU, namun tidak berkorelasi dengan mortalitas pasien.

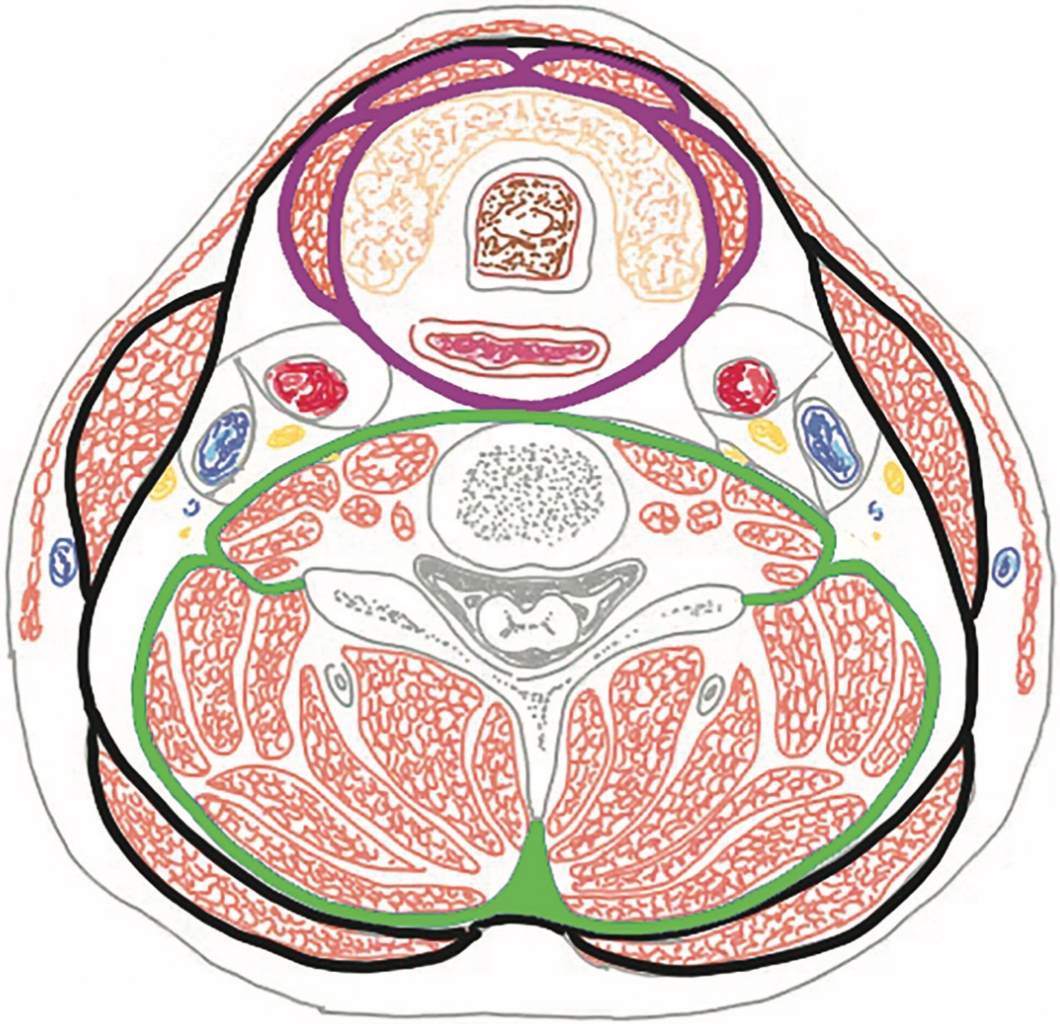
- Sebuah penelitian lain membandingkan tracheostomy hari ke 5 dengan > hari ke 5, mendapatkan early tracheostomy memperpendek penggunaan ventilator dan perawatan ICU, namun tidak berkaitan dengan angka kematian pasien.

HOW DEEP IN YOUR INCISION ??

- Aman/Safety
- Terukur/Precise



ANATOMI



- POTONGAN MELINTANG LEHER

Terdapat 3 lapis fasia pada leher

1. Superfisial (Investing) layer
2. Middle atau Viseral layer
3. Deep atau Vertebral layer

ANATOMI, Layer by layer

- M.Platysma

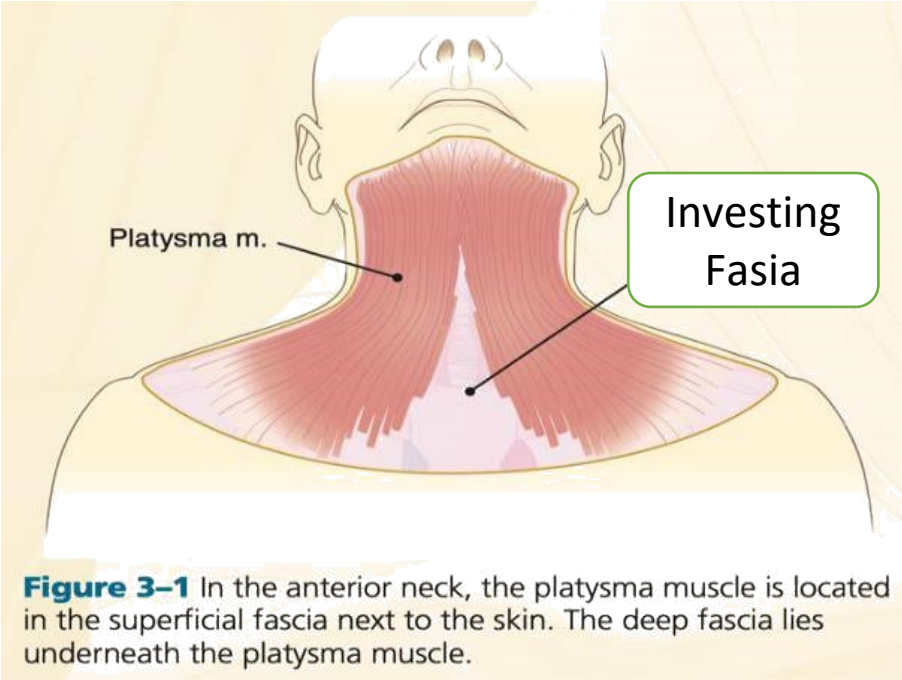
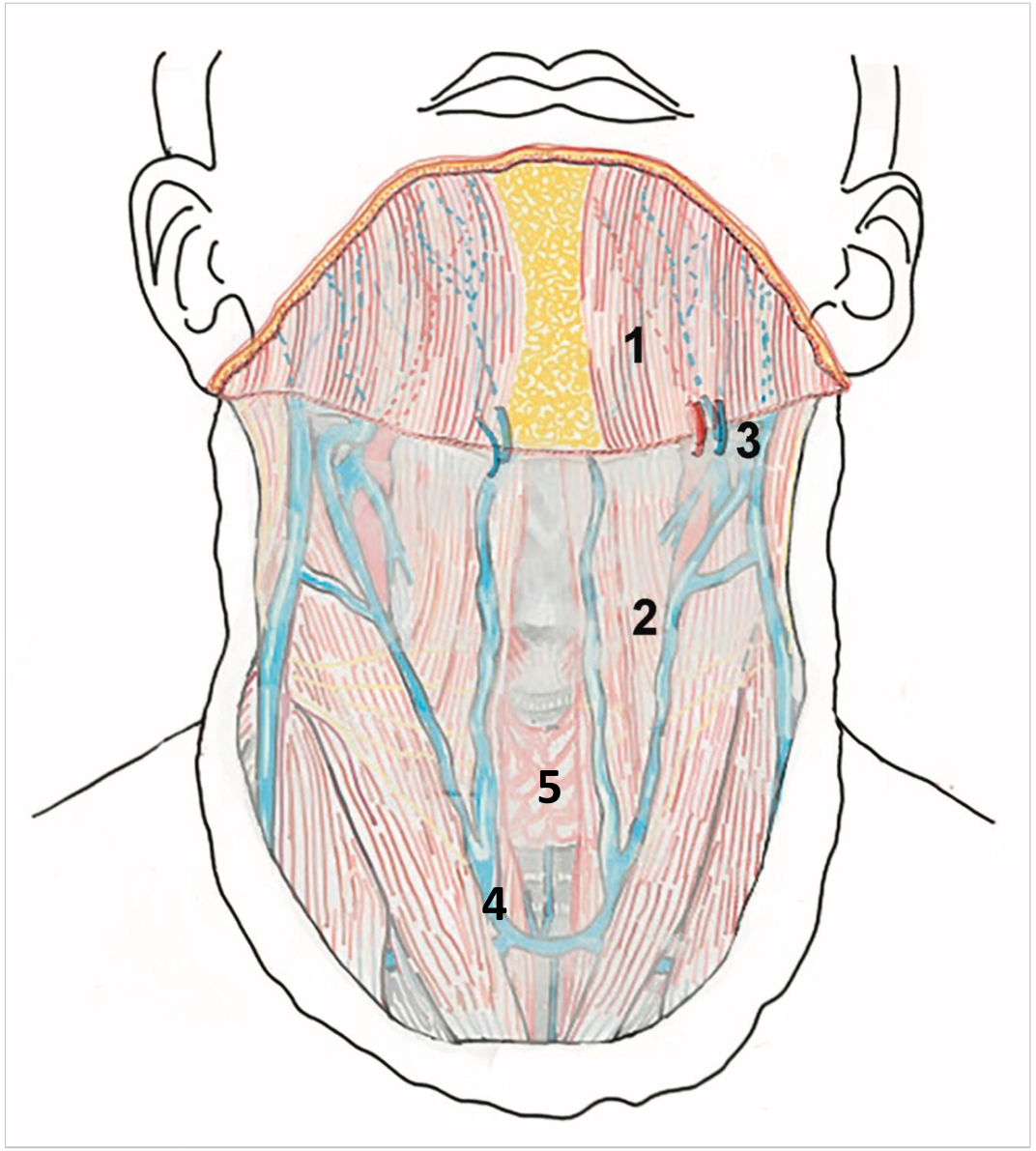


Figure 3–1 In the anterior neck, the platysma muscle is located in the superficial fascia next to the skin. The deep fascia lies underneath the platysma muscle.

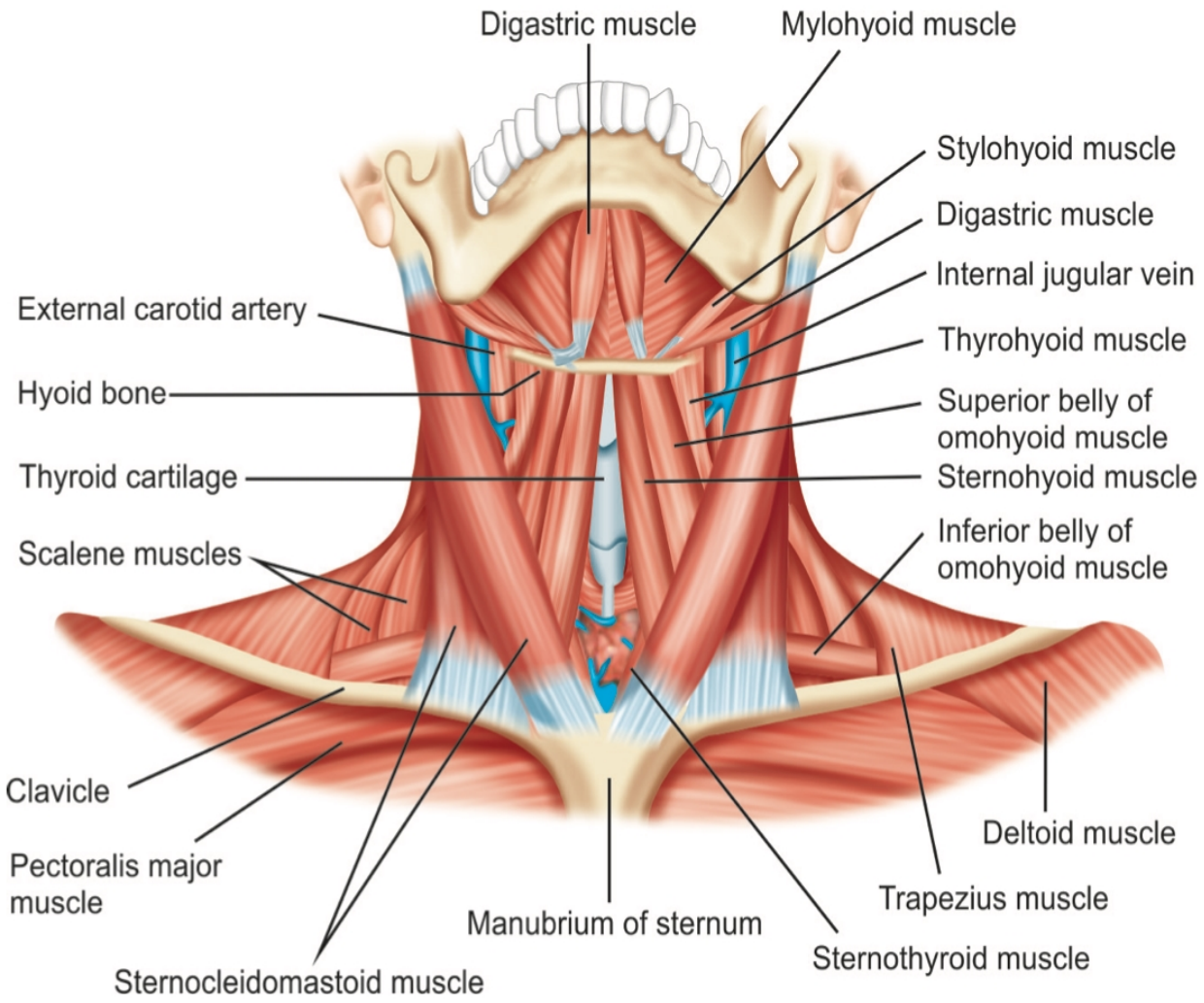
ANATOMI

- Memahami struktur anatomi area leher lapis demi lapis (layer by layer)

1. Skin Flap, insisi sedalam M. Platysma hingga tampak Investing fasia.
2. Investing fasia
3. Anastomosis
4. Anterior jugular Vein
5. Thyroid



Otot Anterior



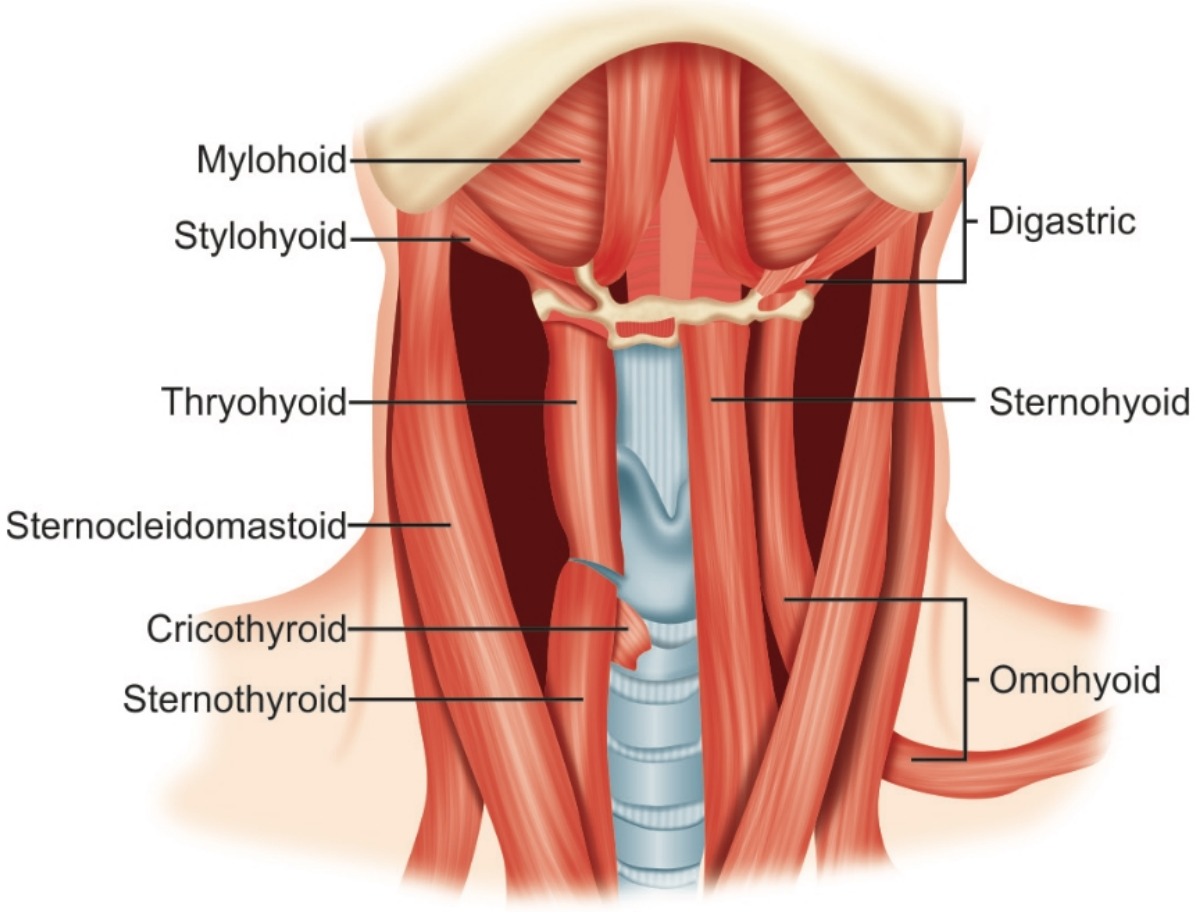
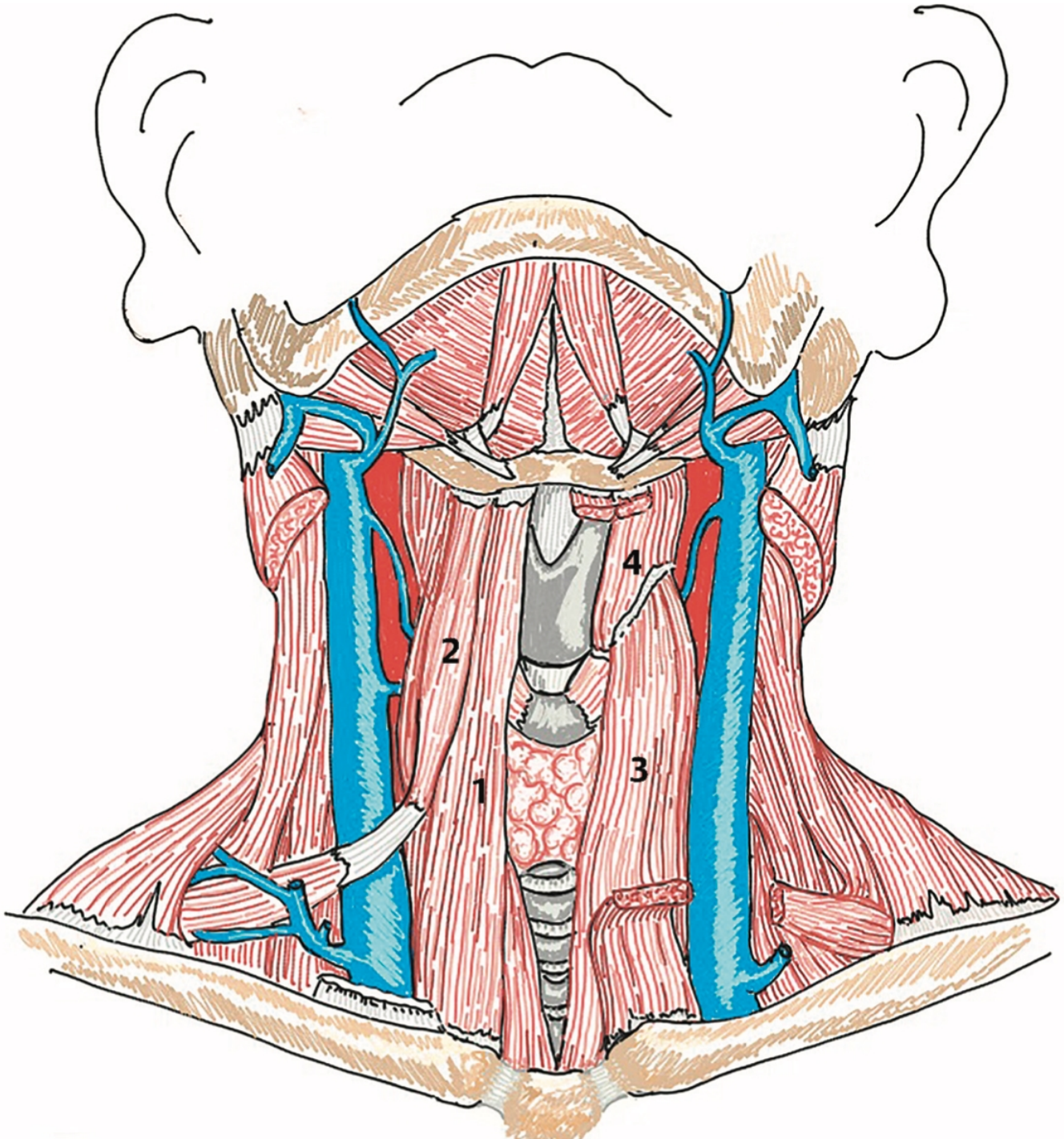


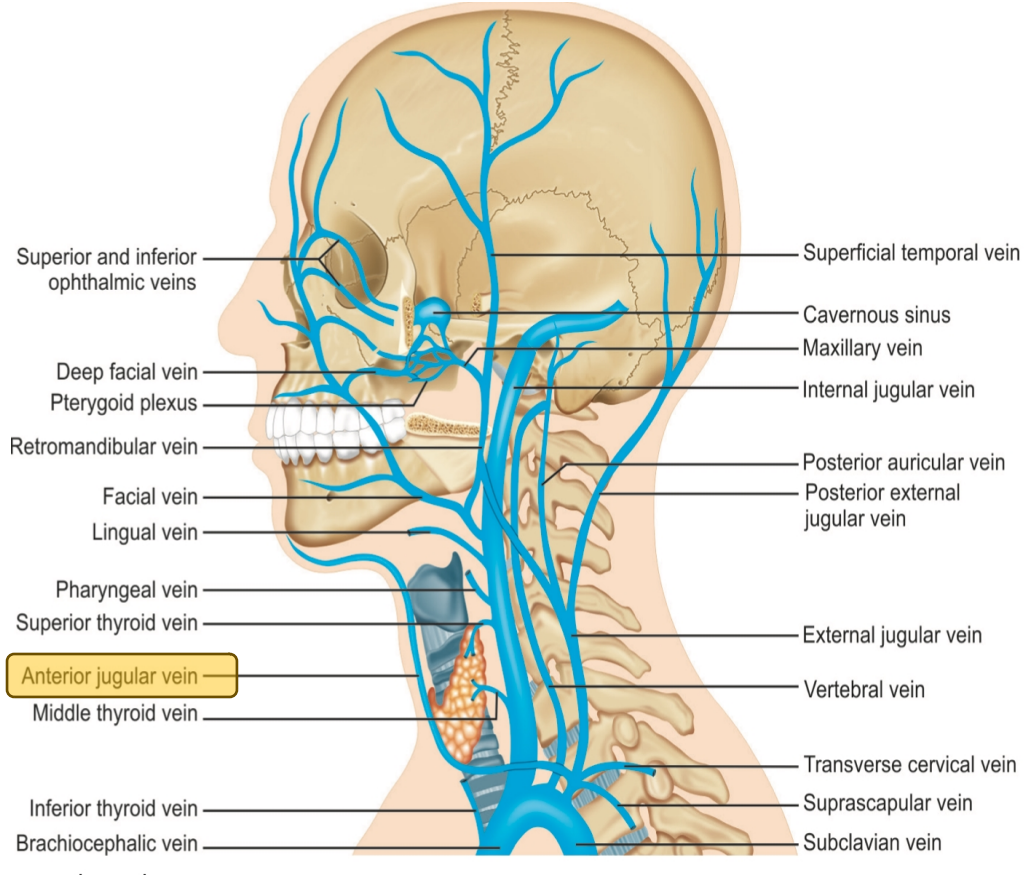
Fig. 32.4: External muscles of larynx.

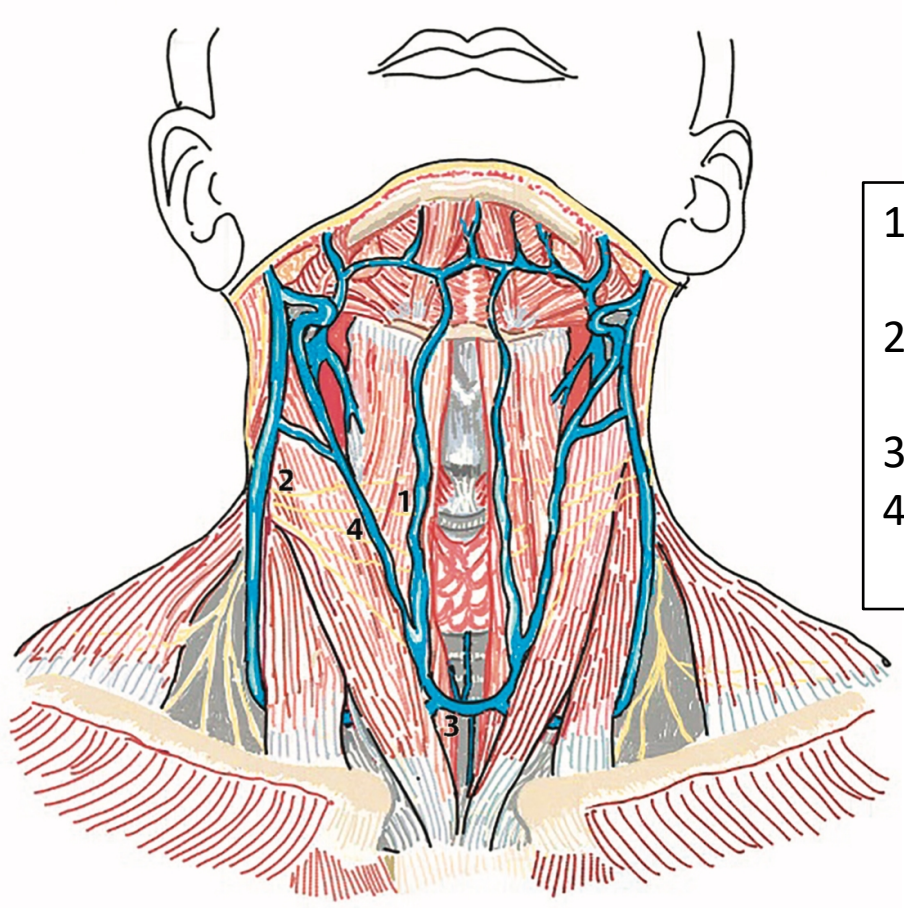
- STRAP MUSCLES terdiri atas :

1. M. Sternohyoid
2. M. Omohyoid
3. M. Sternothyroid
4. M. Thyrohyoid



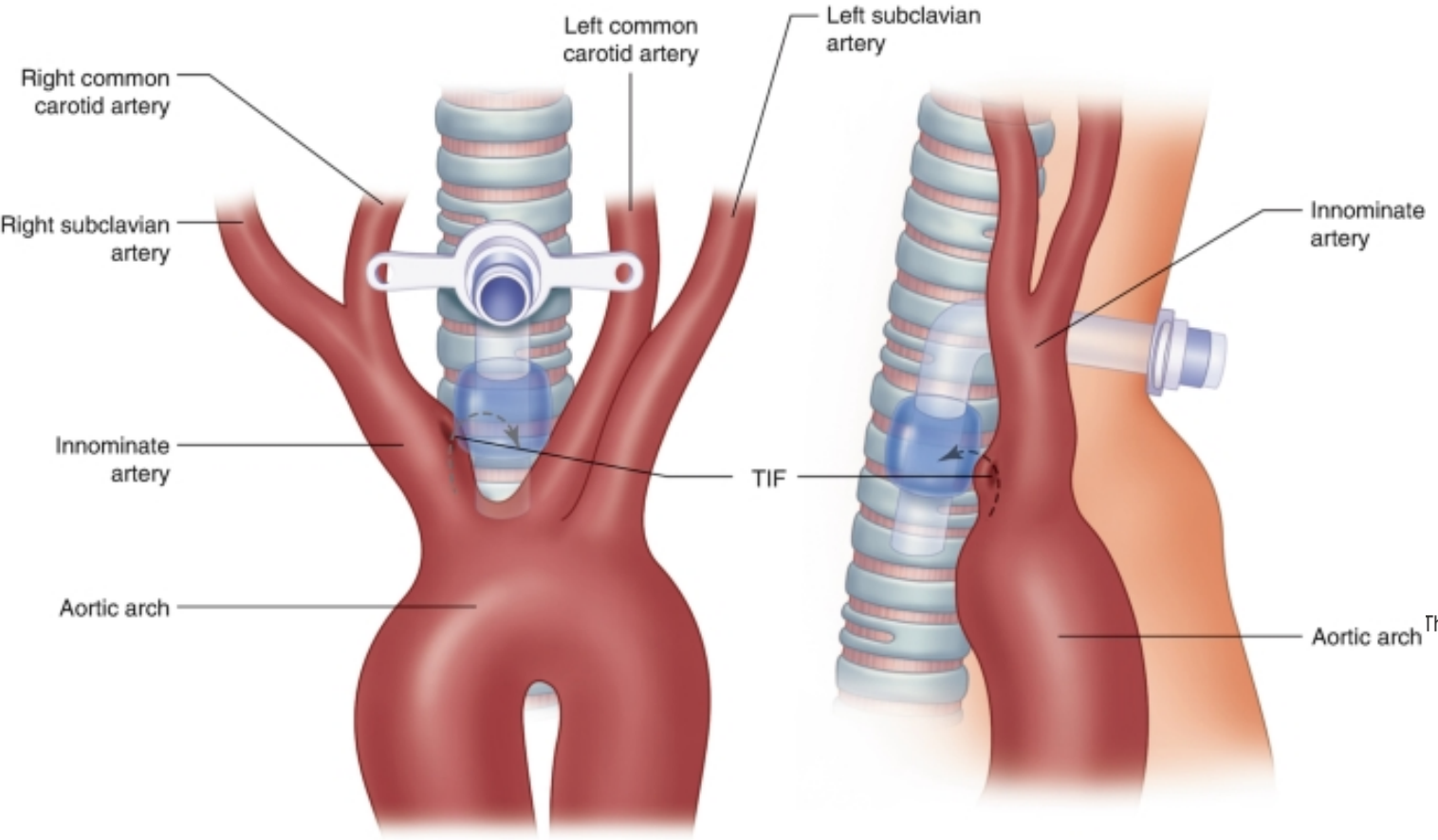
Vena

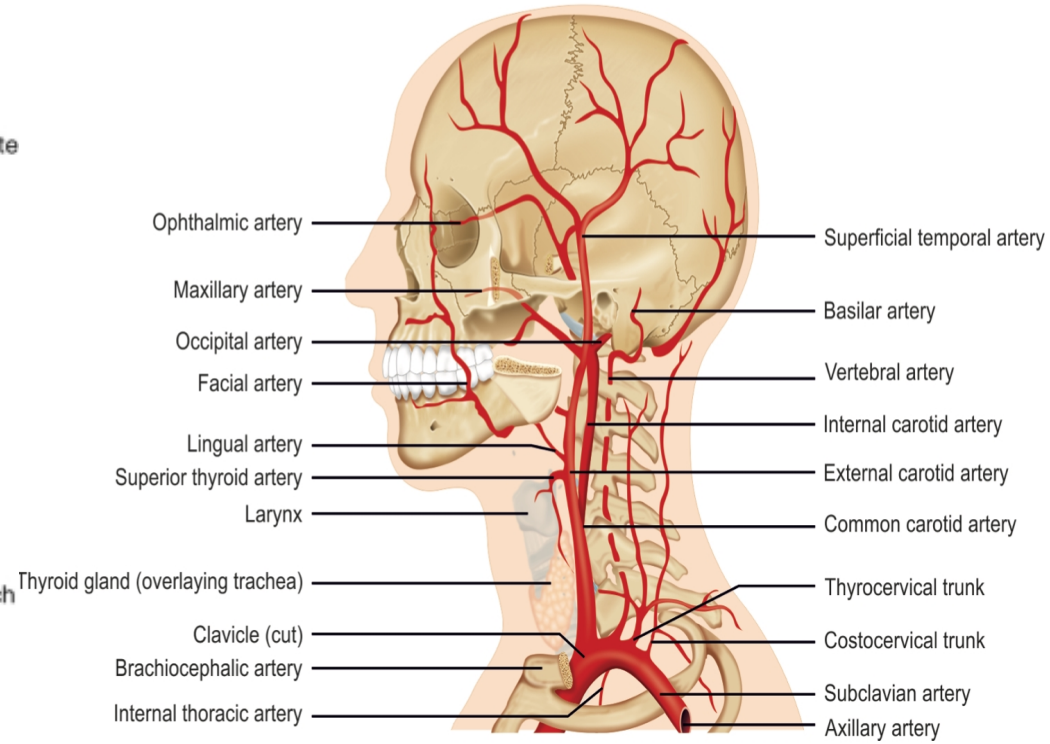




1. Anterior Jugular Vein
2. Eksternal Jugular Vein
3. Arkus Jugular Vein
4. Communicating Vein

Arteri Innominate, setinggi Cincin trakea 6-9





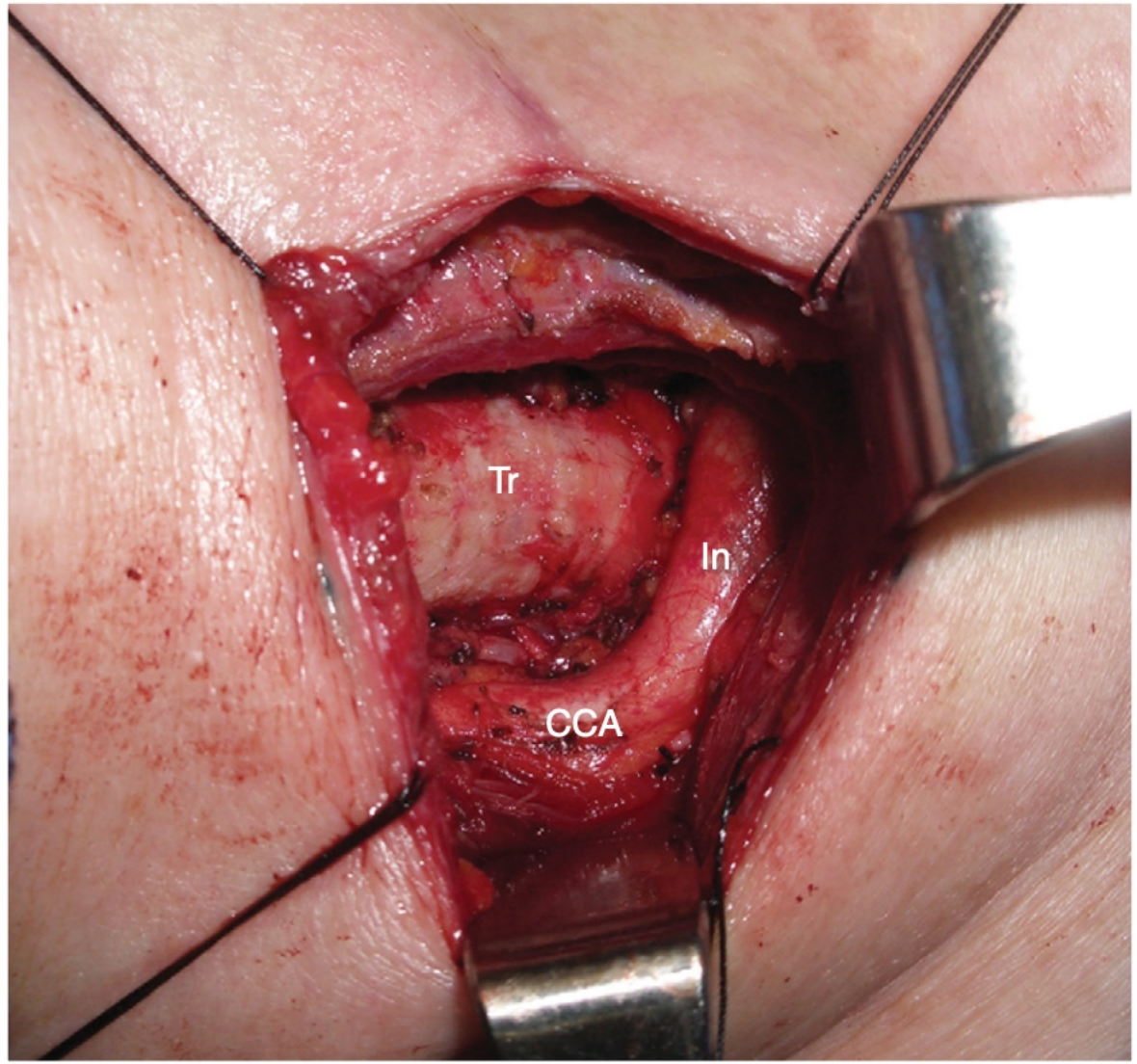
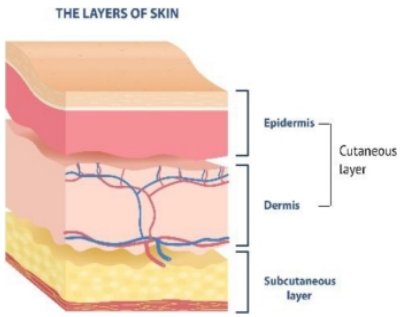
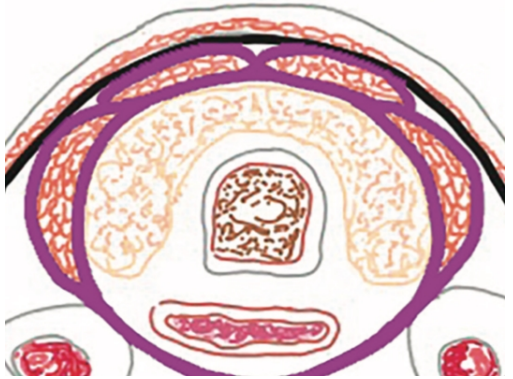


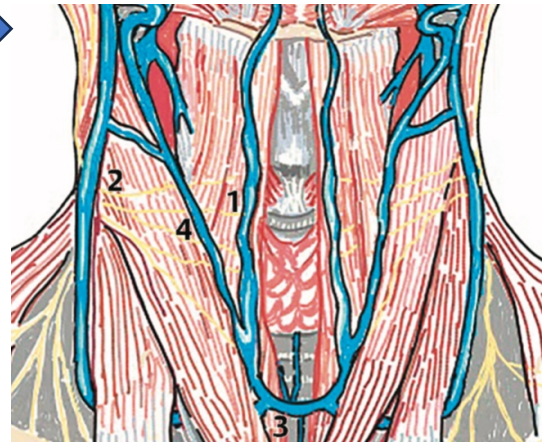
Figure 34-3. Intraoperative identification of a high-riding innominate artery. The central neck is shown here after thyroidectomy and central neck dissection. The innominate artery *(In)* is seen crossing the trachea *(Tr)* at the fifth tracheal ring, after which it divides into the common carotid artery *(CCA)* and the right subclavian artery (not shown).

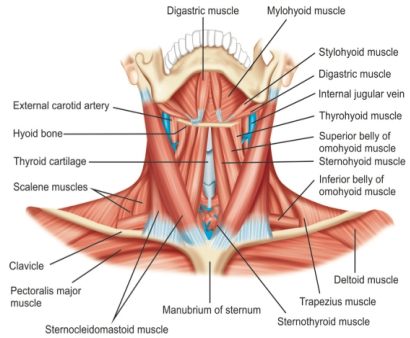
URUTAN LAPISAN

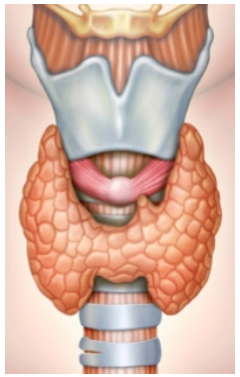
1. KULIT
2. SUBKUTIS/LEMAK
3. INVESTING FASIA
4. ANTERIOR JUGULAR VEIN
5. STRAP MUSCLES
6. ISTHMUS THYROID
7. TRAKEA

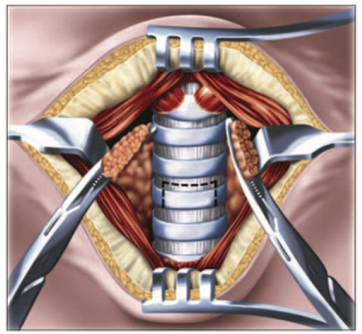






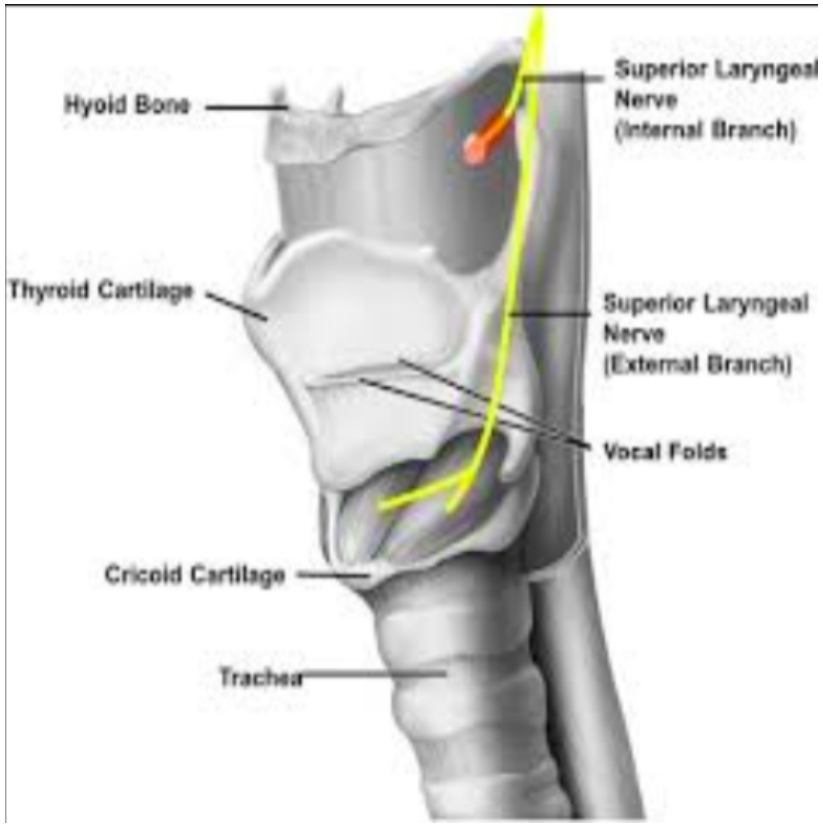


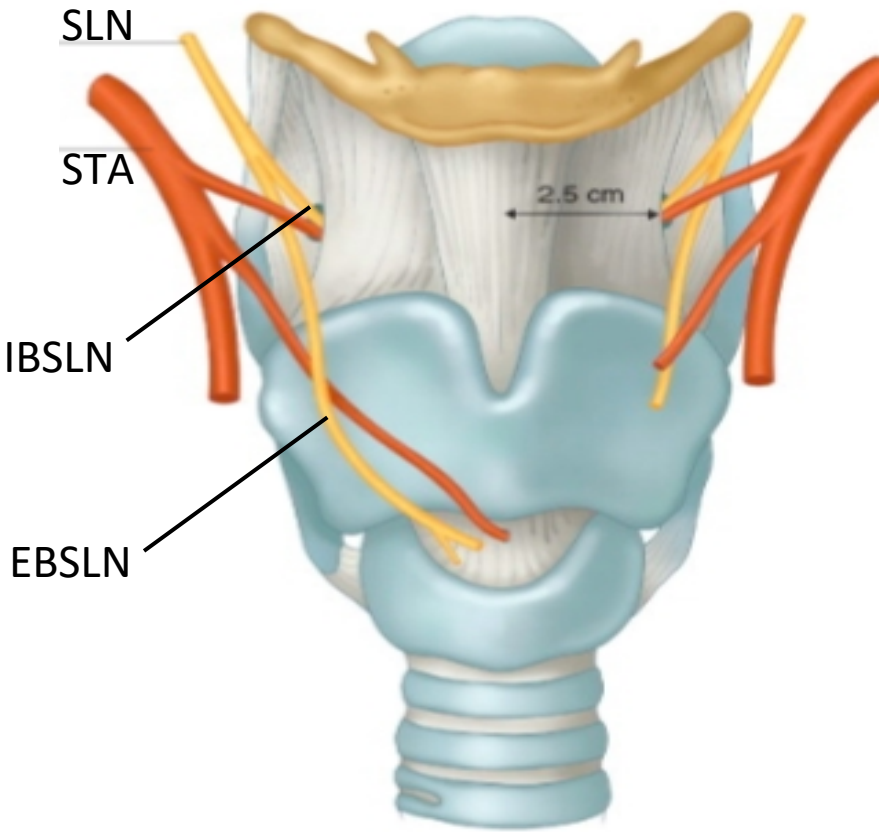




PERSARAFAN

- IBSLN memasuki laryng melalui Thyrohyoid membran, sensoris area supraglotis.
- EBSLN menginervasi motorik M. Cricothyroid, kerusakan dapat mengganggu vokal Pitch (nada tinggi)





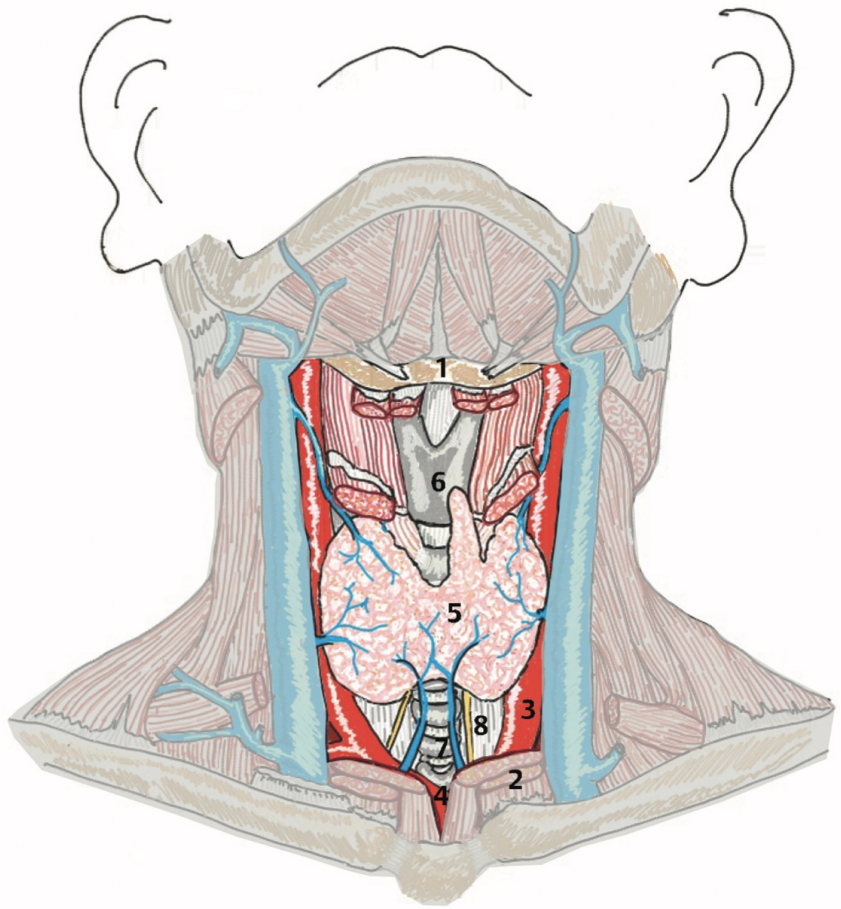
- ***Recurrent Laryngeal Nerve (RLN)***

Menginnervasi M. Laryngeal intrinsik dan sensoris area glotis

- ***Left RLN***

Turun Melalui F. Jugulare bersama dengan N.Vagus melingkari aorta di mediastinum. Masuk ke ***Tracheoesophageal groove*** 12 cm di atas Aorta.

Reccurent Laringeal Nerve (RLN)



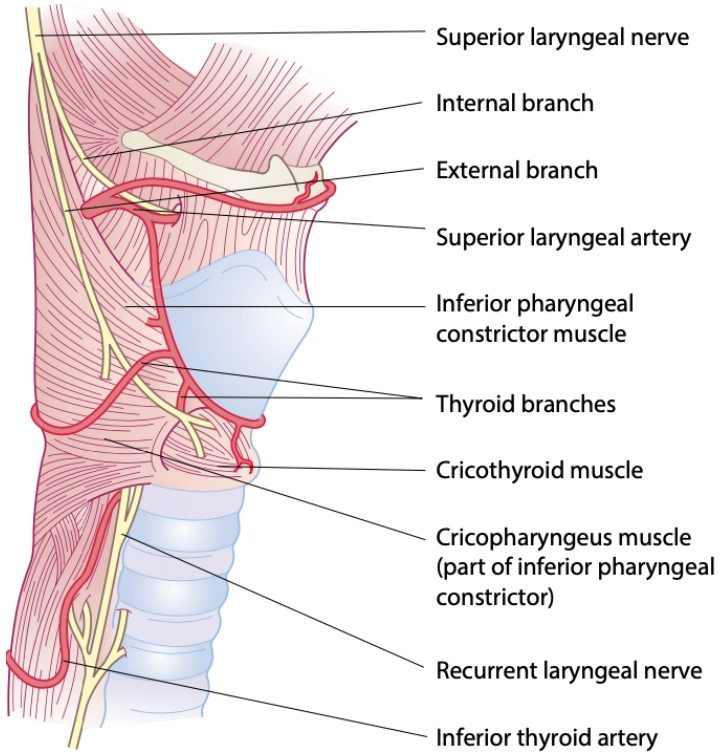
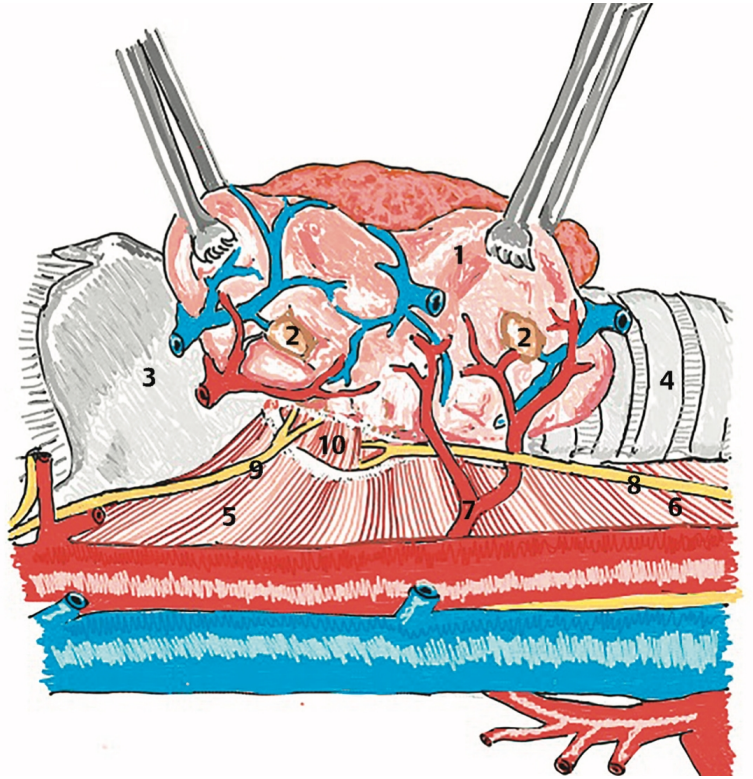


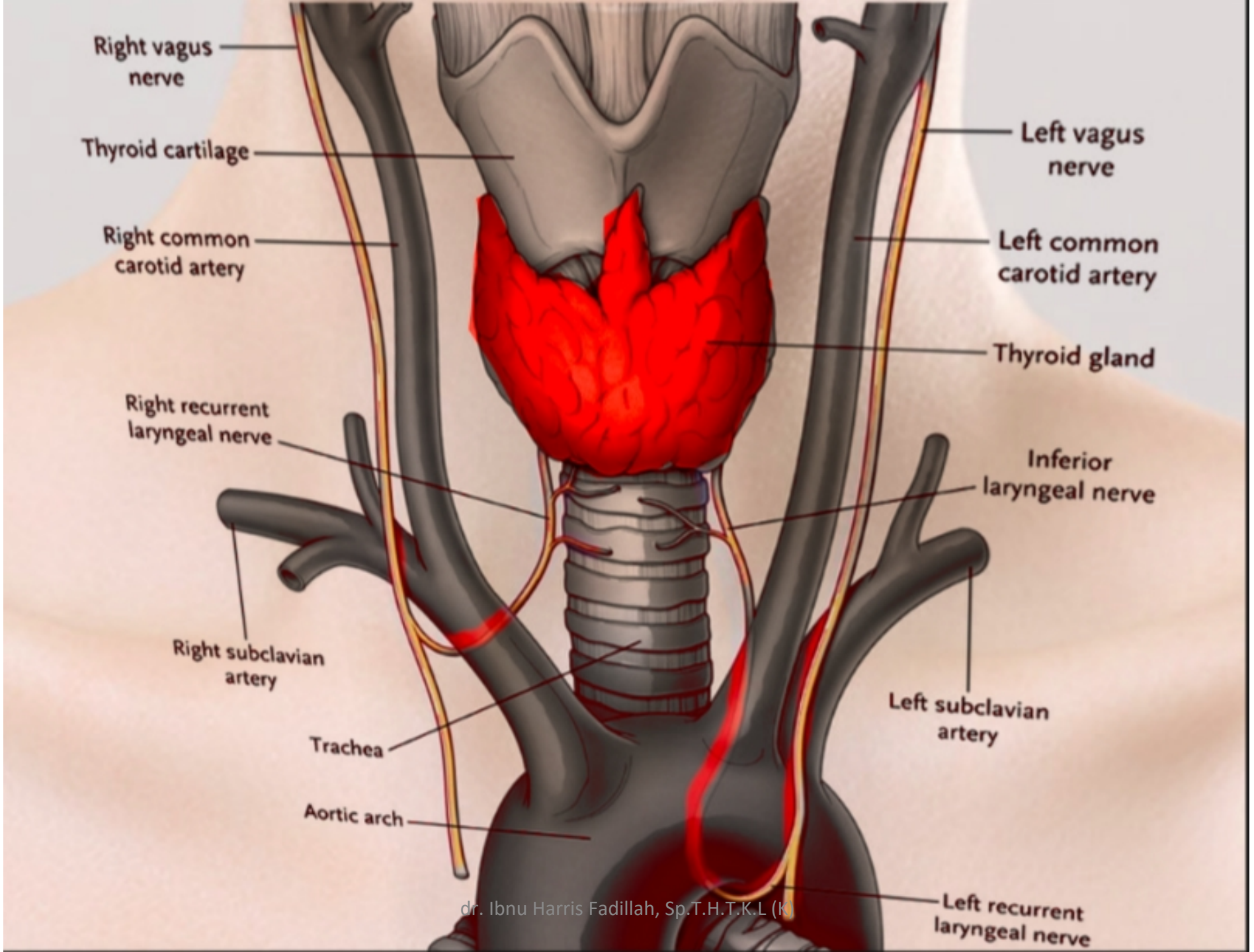
Figure 58.8 Lateral view of the larynx (complete).



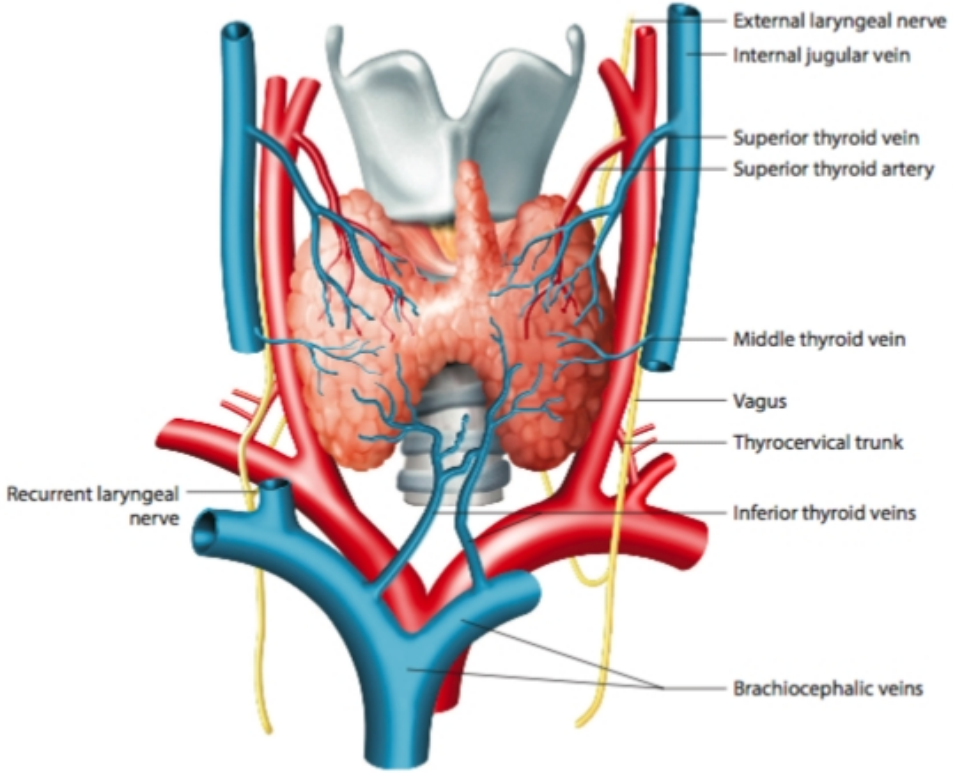
- ***Right RLN***

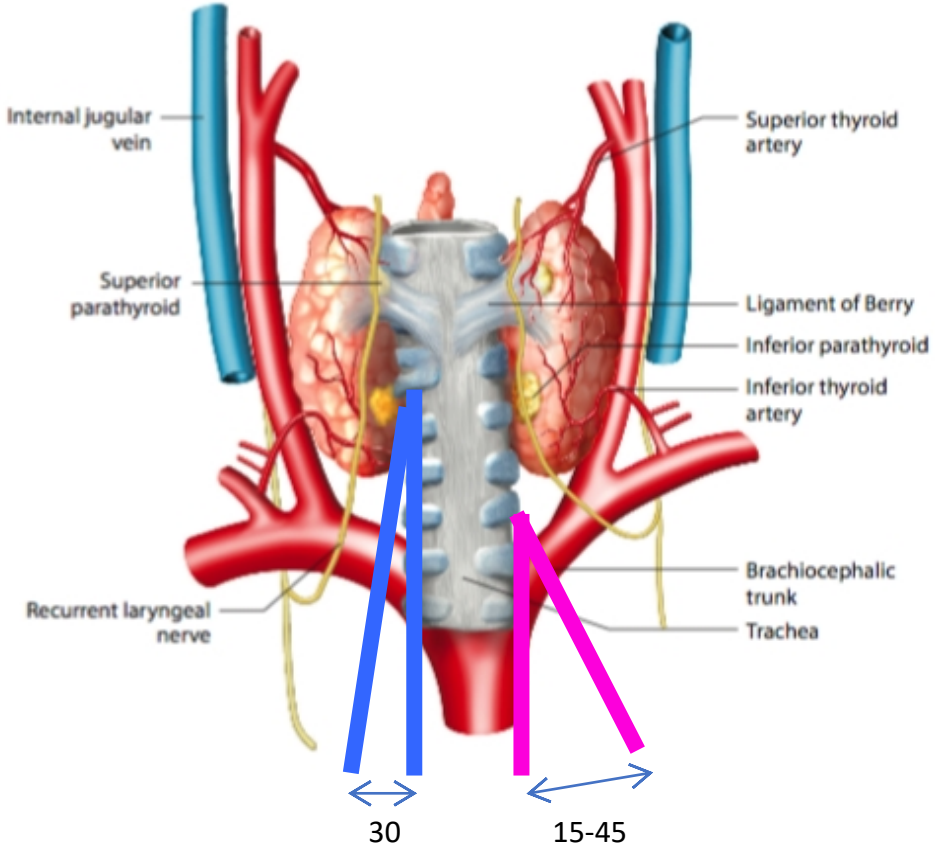
Nerve lebih pendek, melingkari A. Subklavia masuk ke tracheoesophageal groove

RLN memasuki laryng posterior menuju cricothyroid joint memiliki peran motorik, sensorik dan parasimpatetik.



STRUKTUR ANATOMI





3 landmark RLN :

*ITA *Tracheoesophageal groove *Berry Ligament

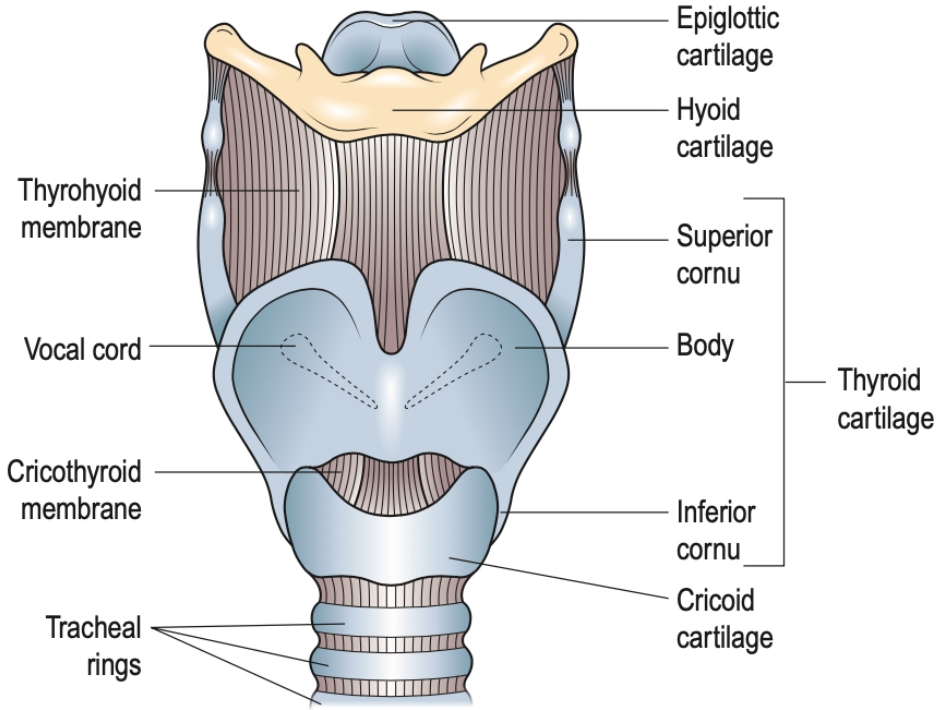


Fig. 3.4 The cartilages forming the laryngeal framework.

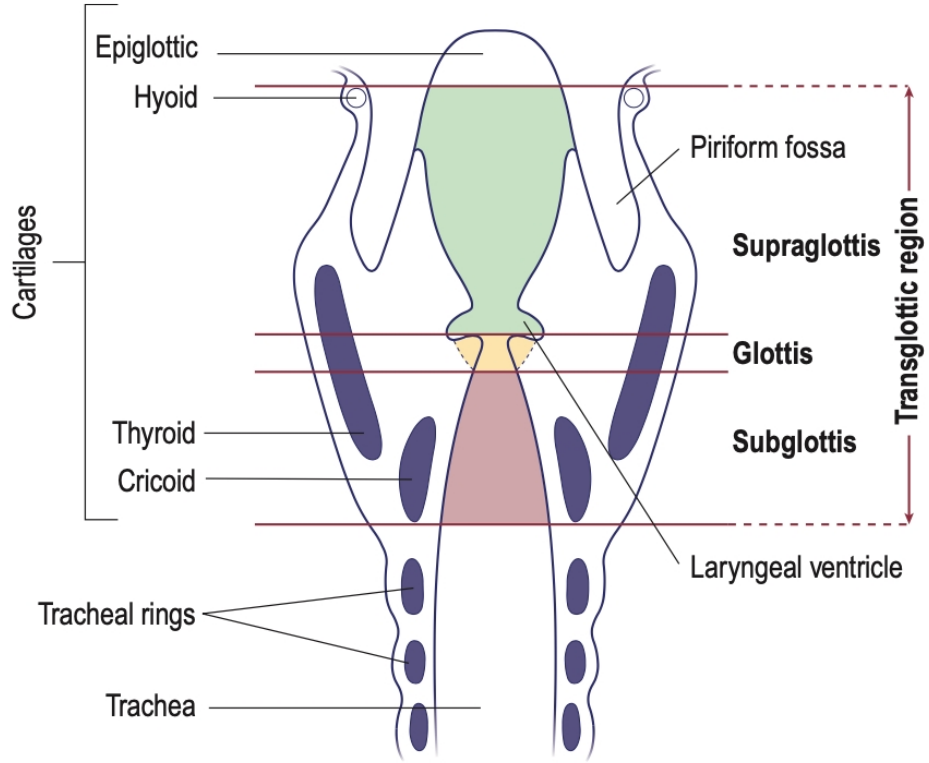
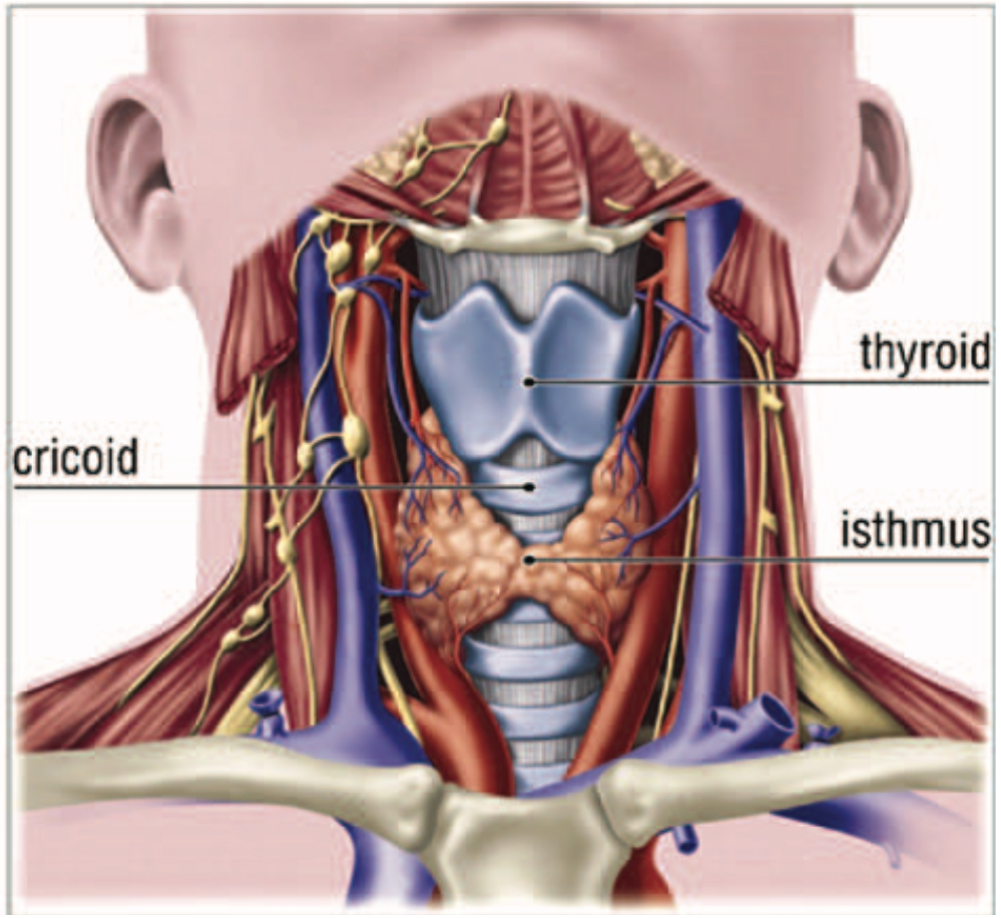


Fig. 3.5 Coronal section of the larynx showing three major regional subdivisions.



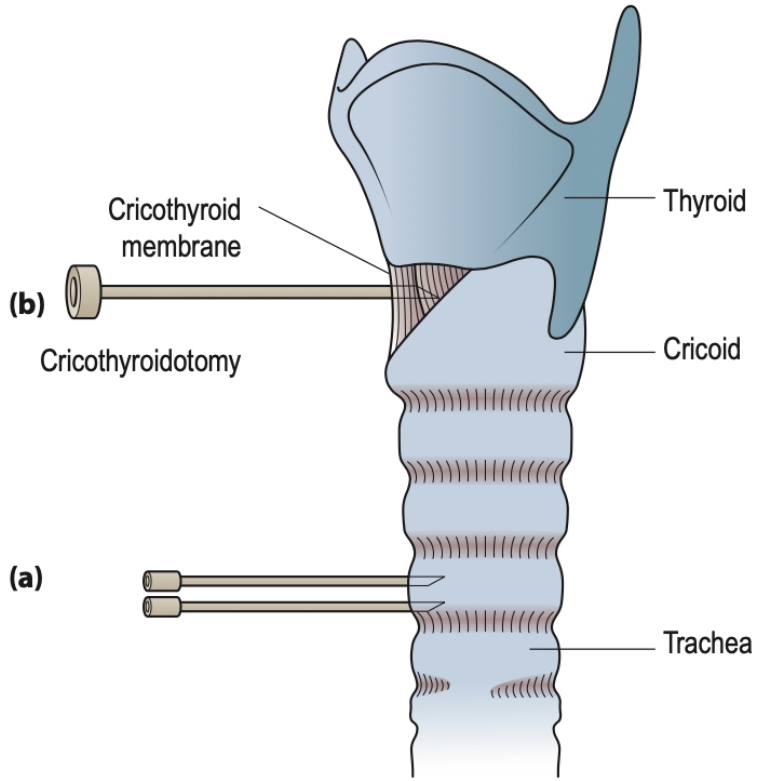


Fig. 3.36 Emergency methods to secure the airway in cases of life-threatening respiratory obstruction. **(a)** Needles inserted directly into the trachea. **(b)** The airway entered through the cricothyroid membrane (cricothyroidotomy; laryngotomy). In this instance a wide-bore venous cannula has been used.

TEKNIK TRAKEOSTOMY

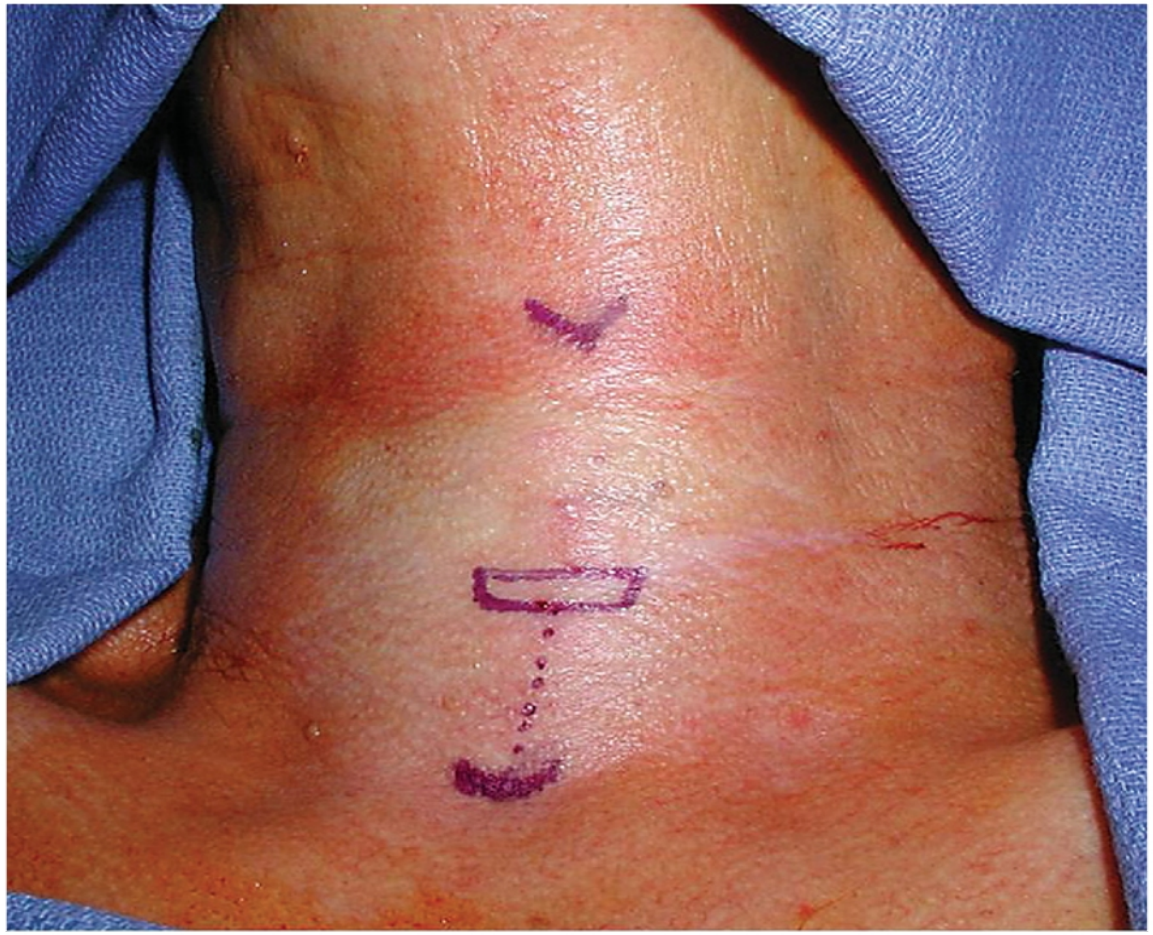


Figure 32-3. Palpable landmarks of the upper airway for emergency tracheotomy planning include the thyroid notch, the cricothyroid space, and the sternal notch.

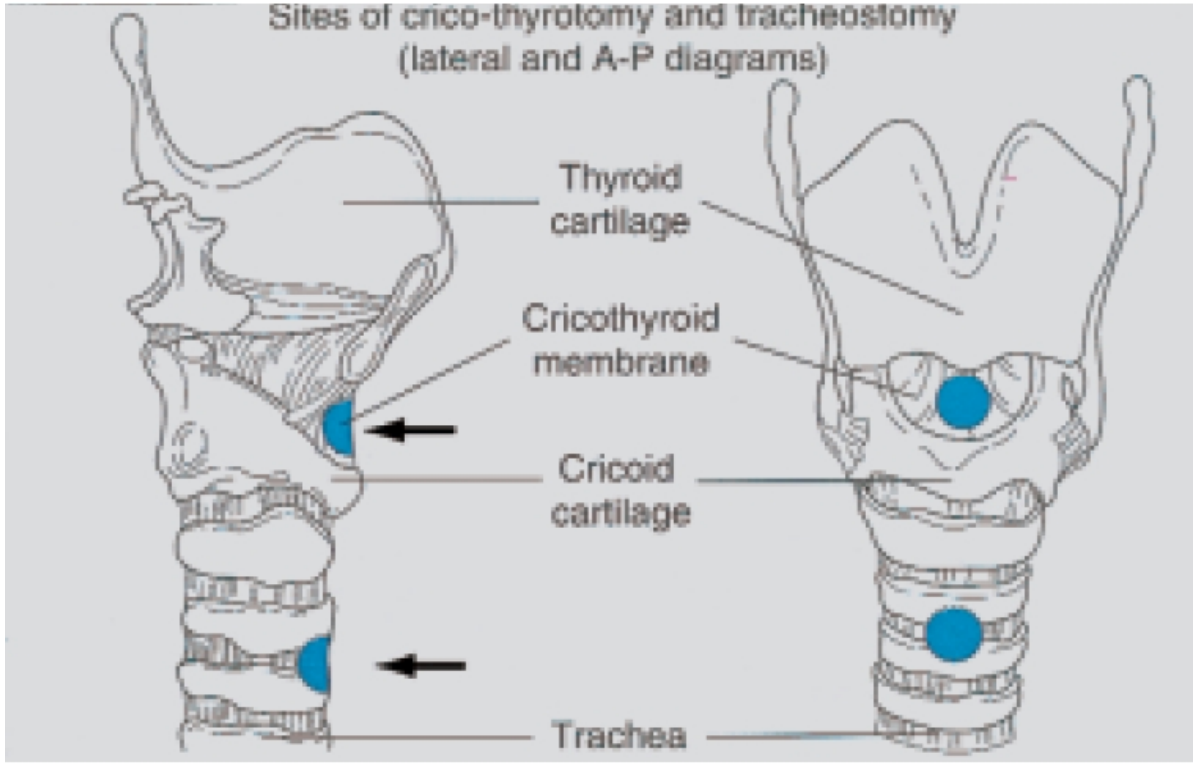
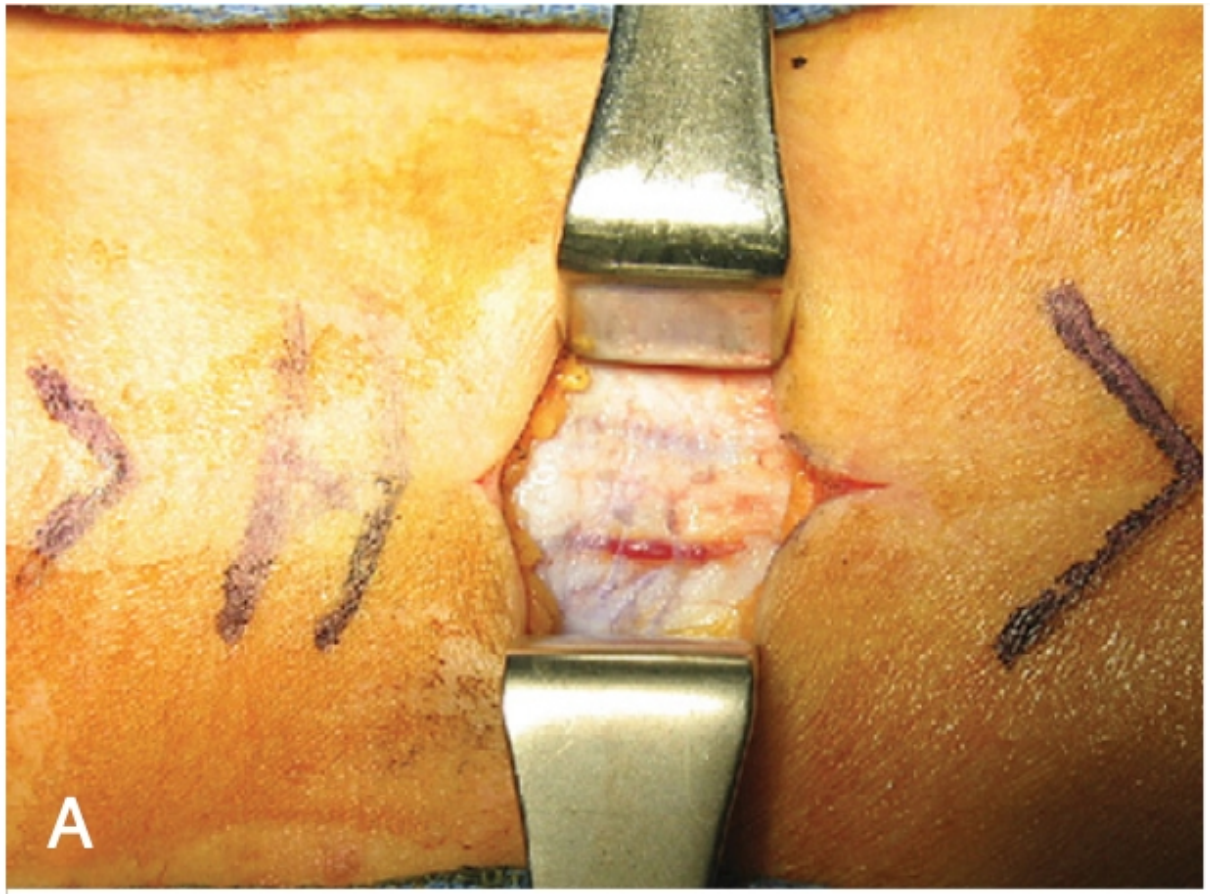


Fig. 4.**104** **Tracheostomy.** Openings are usually made between the 2nd and 3rd tracheal rings. A "higher" tracheostomy predisposes to stenosis of the larynx in the subglottic region. The airway is most accessible and superficial at the level of the cricothyoid membrane, and in acute laryngeal obstruction an opening through the membrane will restore the airway. The cricothyrotomy opening is, however, for an emergency, and is only temporary. Indwelling tubes at this site lead to subglottic stenosis of the larynx.

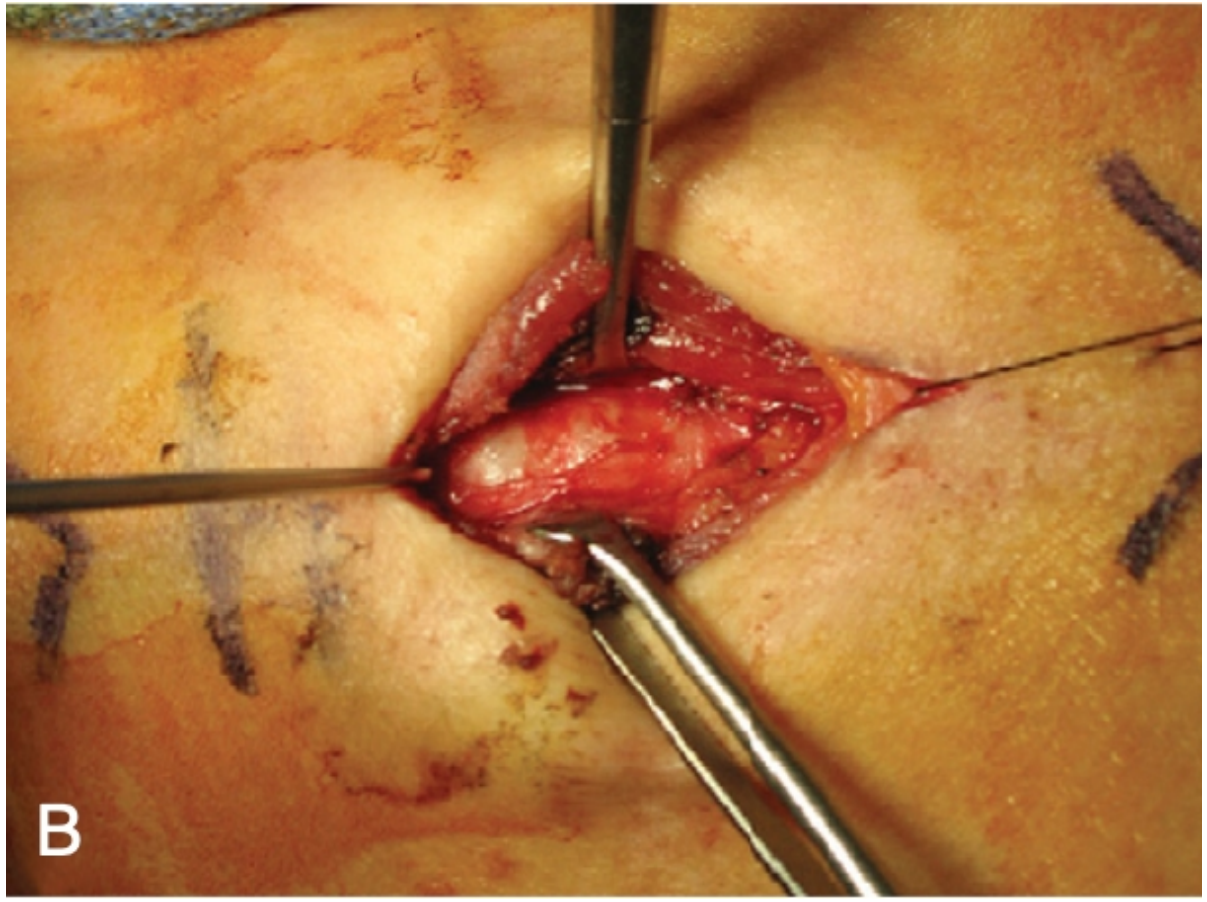
Langkah Operasi



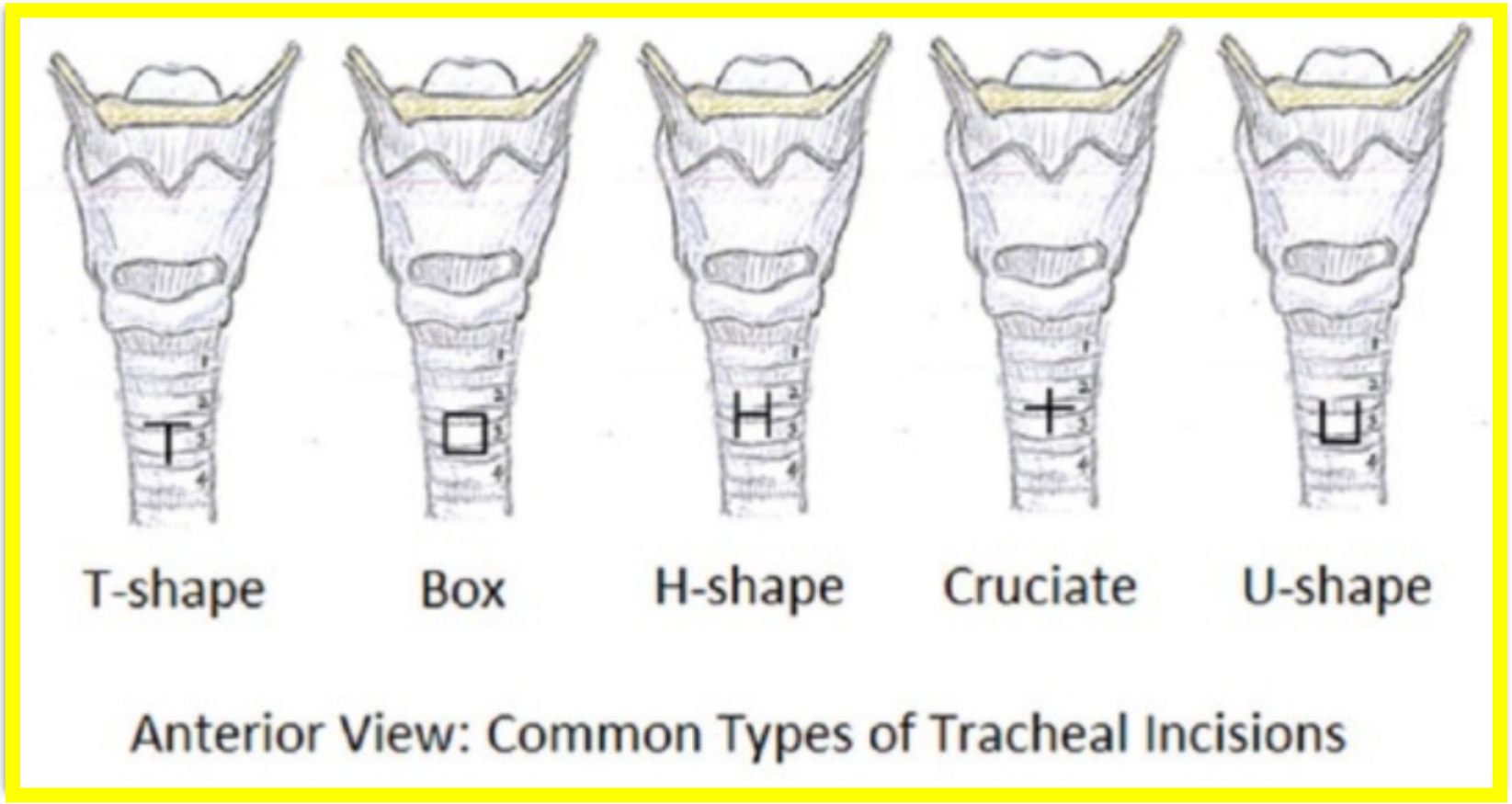
- Insisi vertical sepanjang 3 cm
- Lakukan diseksi jaringan subkutaneus hingga didapatkan Investing fasia
- Hindari trauma pada anterior jugular vein (AJV)

Langkah Operasi

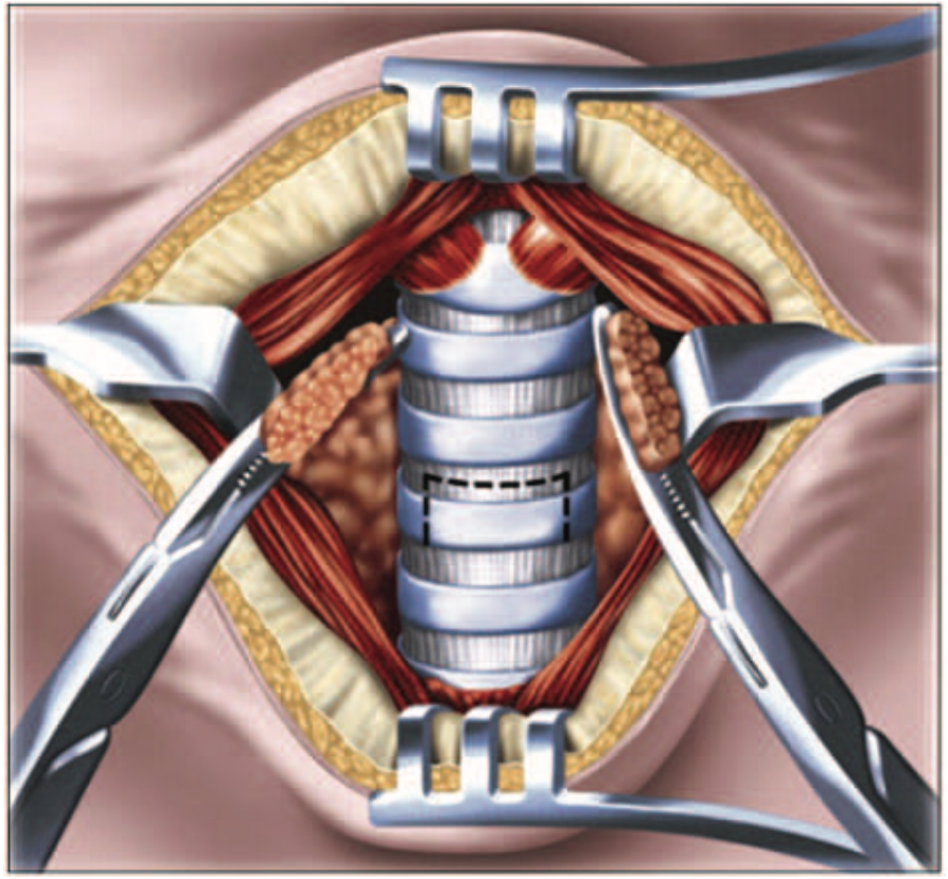
- Lakukan diseksi tumpul menggunakan klem dan pinset
- Lakukan retraksi strap muscle ke lateral hingga trakea teridentifikasi
- Bila isthmus thyroid menghalangi, dilakukan retraksi atau dipisahkan dengan dijahit ligasi



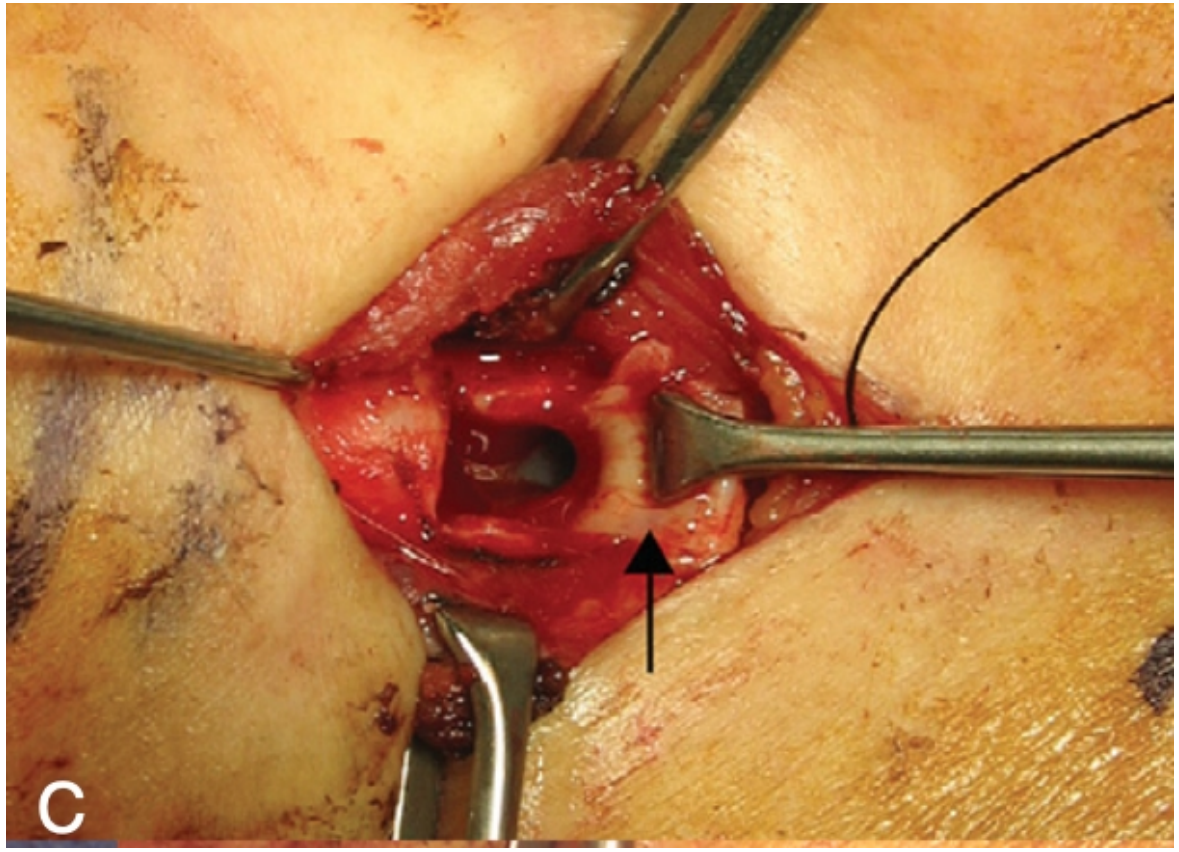
Insisi pada trakea



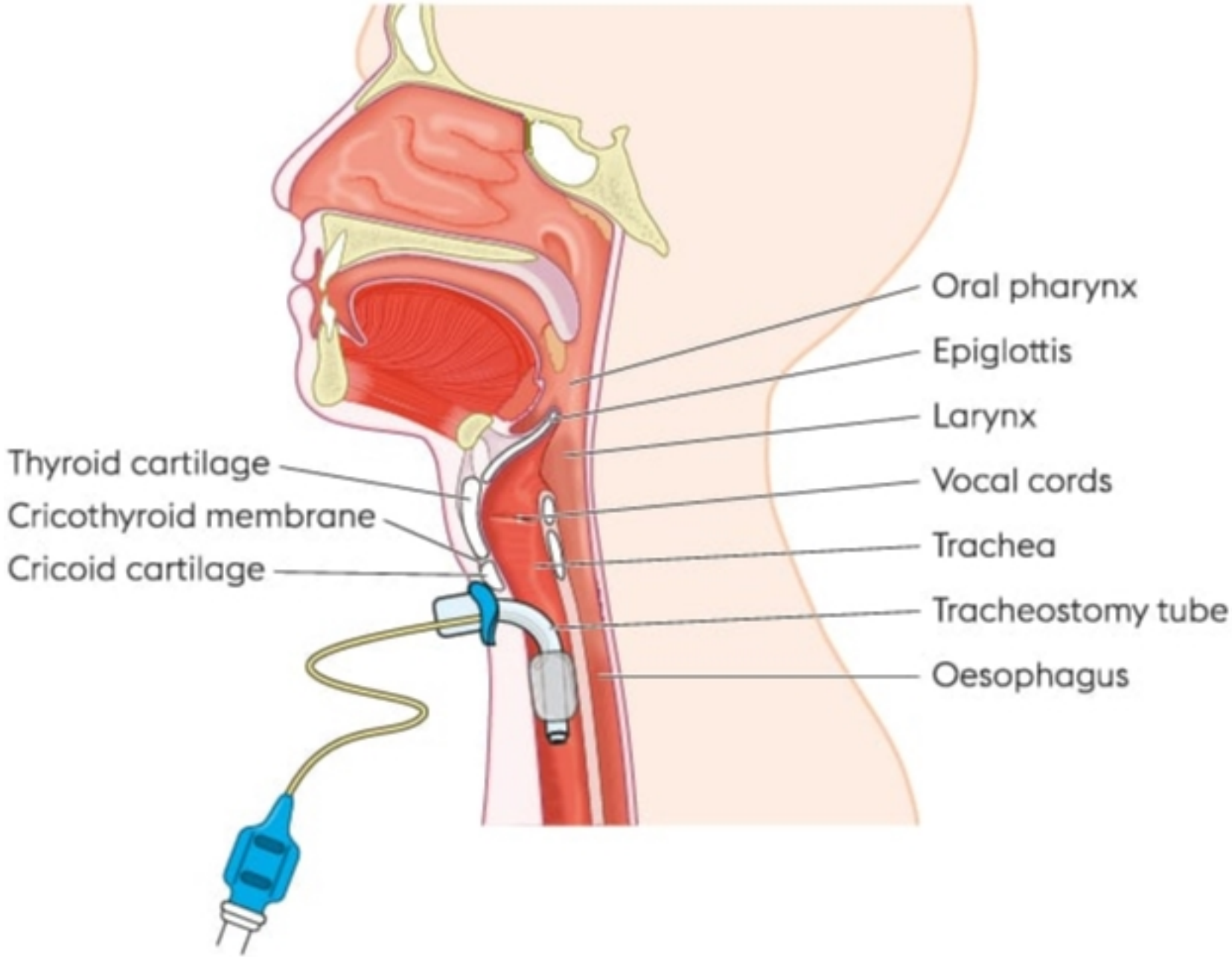
Langkah Operasi



- Insisi horizontal dibuat diantara cincin trakea ke 2-3
- Dilanjutkan dengan insisi lateral U shape (Bjork Flap) atau ∩. Flap boleh dijahit/tidak



- Trekeostomi tube dimasukan secara visual
- Pasang kanul dalam, kembangkan balon
- Pastikan tidak terjadi ”False root” dan terkoneksi dengan ventilator


Oral pharynx
Epiglottis
Larynx
Vocal cords
Trachea
Tracheostomy tube
Oesophagus
Thyroid cartilage
Cricothyroid membrane
Cricoid cartilage

Ukuran kanul

- Beberapa hal yang perlu diperhatikan dalam pemilihan kanul trakeostomi adalah :
    1. Panjang kanul
    2. Diameter kanul : dalam kanul
       luar kanul

Pemilihan kanul harus berdasar pada ukuran luar kanul.

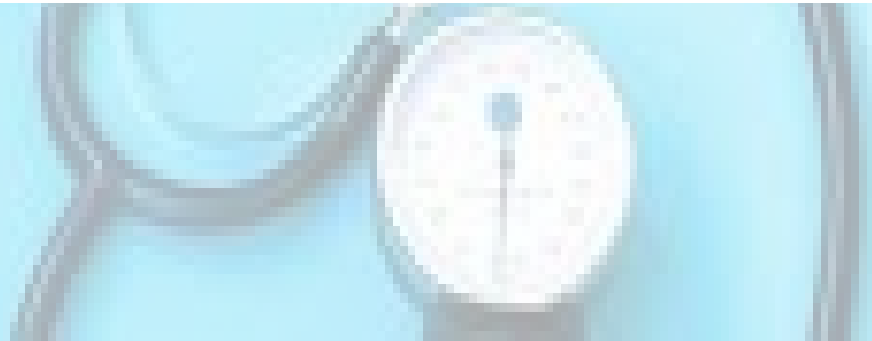
Fig 3-1 Portex® Blue Line Ultra ® tracheostomy tube

Ukuran kanul

- ID, inner diameter
- OD, outer diameter
- OD harus berukuran 2/3 atau ¾ dari diameter trakea
- Secara umum Wanita dewasa dapat dipasangkan kanul dengan OD 10 mm
- Laki-laki dewasa OD 11 mm
- Mengacu pada ETT terpasang

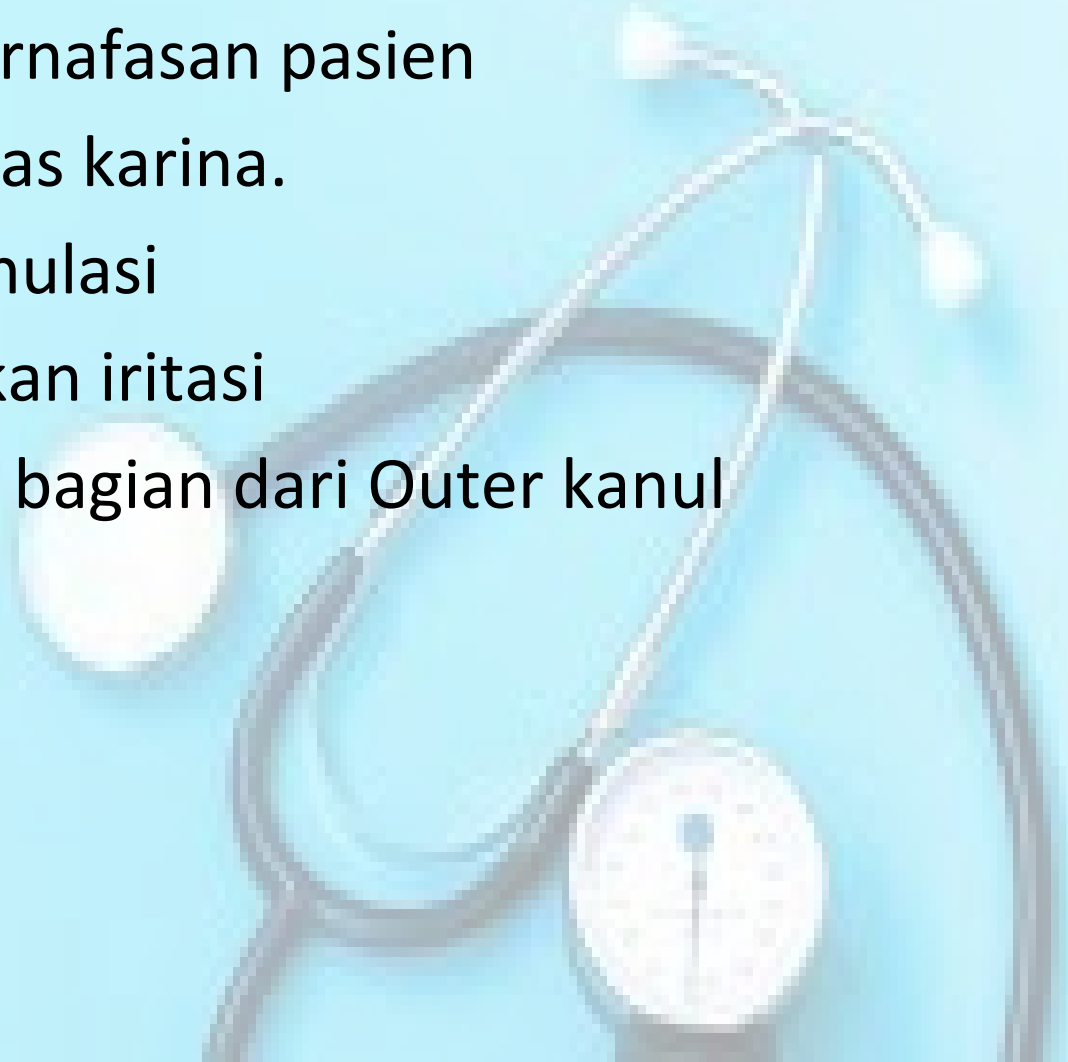
Tracheostomy tube dimensions

	ID without inner cannula	ID with inner cannula	Outside diameter	Length
Shiley LPC	n/a	7.6mm	12.2mm	81mm
Shiley DCT	n/a	7.6mm	12.2mm	79mm
Kapitex Tracheotwist	n/a	8.0mm	11.4mm	76mm
Portex Blue Line Ultra	8.0mm	6.5mm	11.9mm	75.5mm



Ukuran kanul

- ID akan mempengaruhi kinerja pernafasan pasien
- Posisi kanul yang ideal sedikit diatas karina.
- Kanul terlalu pendek, resiko dekanulasi
- Kanul terlalu panjang, menyebabkan iritasi
- Ukuran konektor 15 mm, menjadi bagian dari Outer kanul



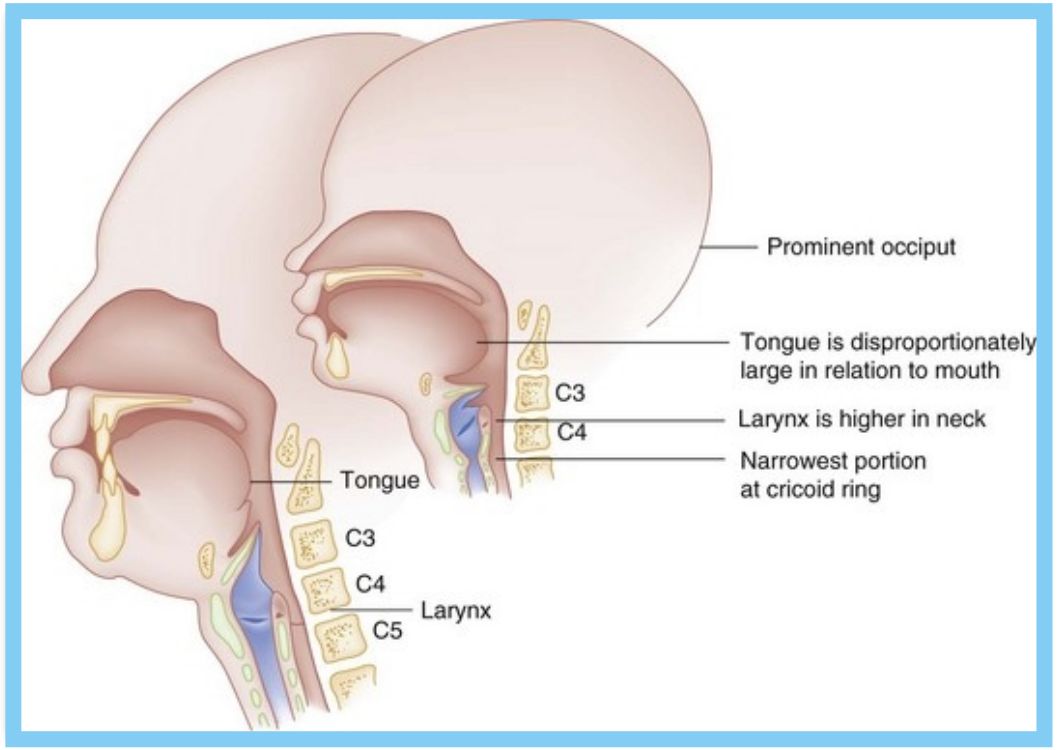
Jenis kanul

- Single kanul digunakan untuk trakeostomi sementara/darurat
- Dual kanul terbagi atas Fenestrated/perforated dan Non fenestrated/non perforated

Tekanan cuff

- Untuk menghindari cedera trakea, tekanan cuff harus dijaga antara 20-30 cmH2O
- Tekanan harus di cek setiap 8-12 jam
- Penggunaan cuff kanul bertujuan untuk mencegah kebocoran pada penggunaan ventilator, dan mencegah terjadinya aspirasi

Trakeostomi pada anak



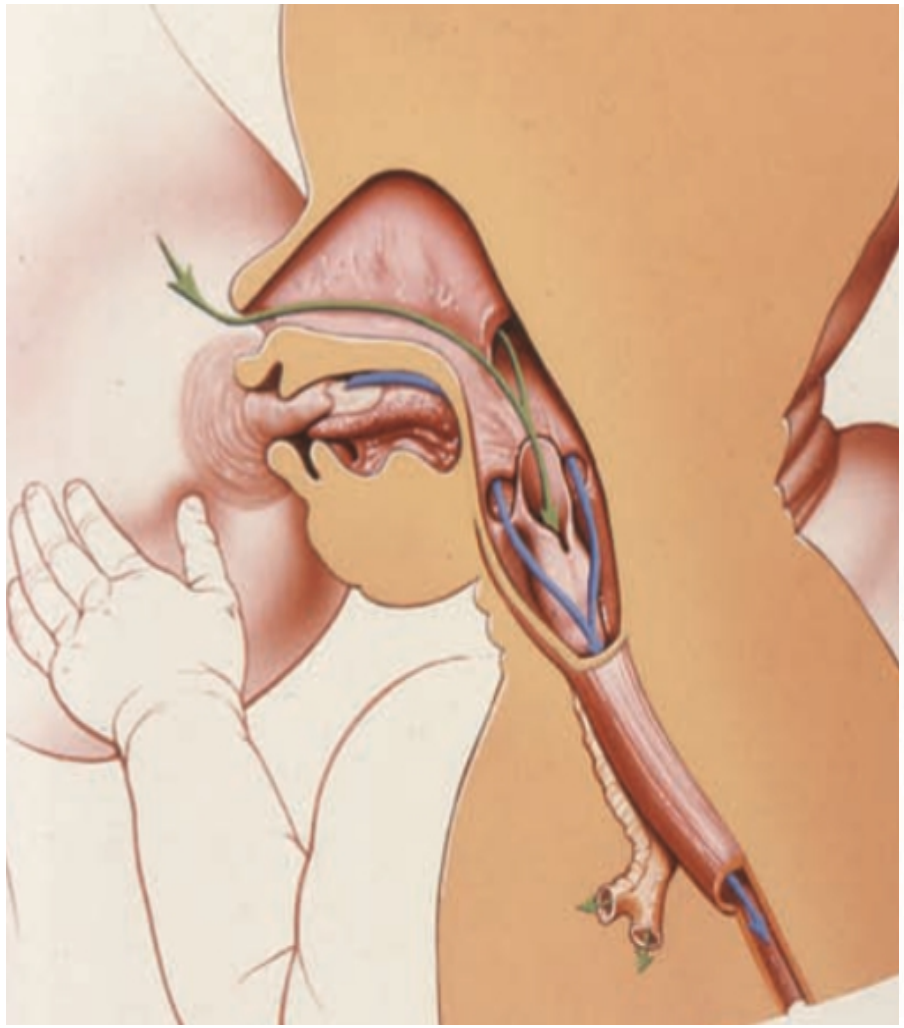
Perbedaan anatomy anak dan dewasa :

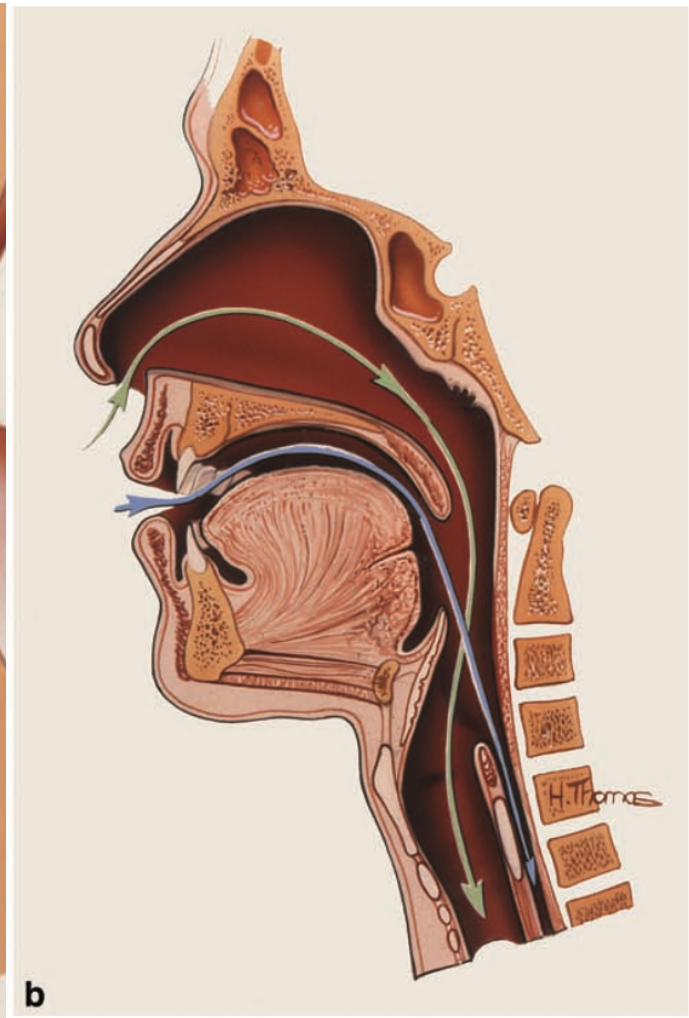
1. Posisi Laring anak lebih tinggi, obligate nasal breathing
2. Airway yang lebih kecil
3. Rasio/proporsi lidah yang lebih besar

Kartilago thyroid masih berkembang, overlap dengan hyoid

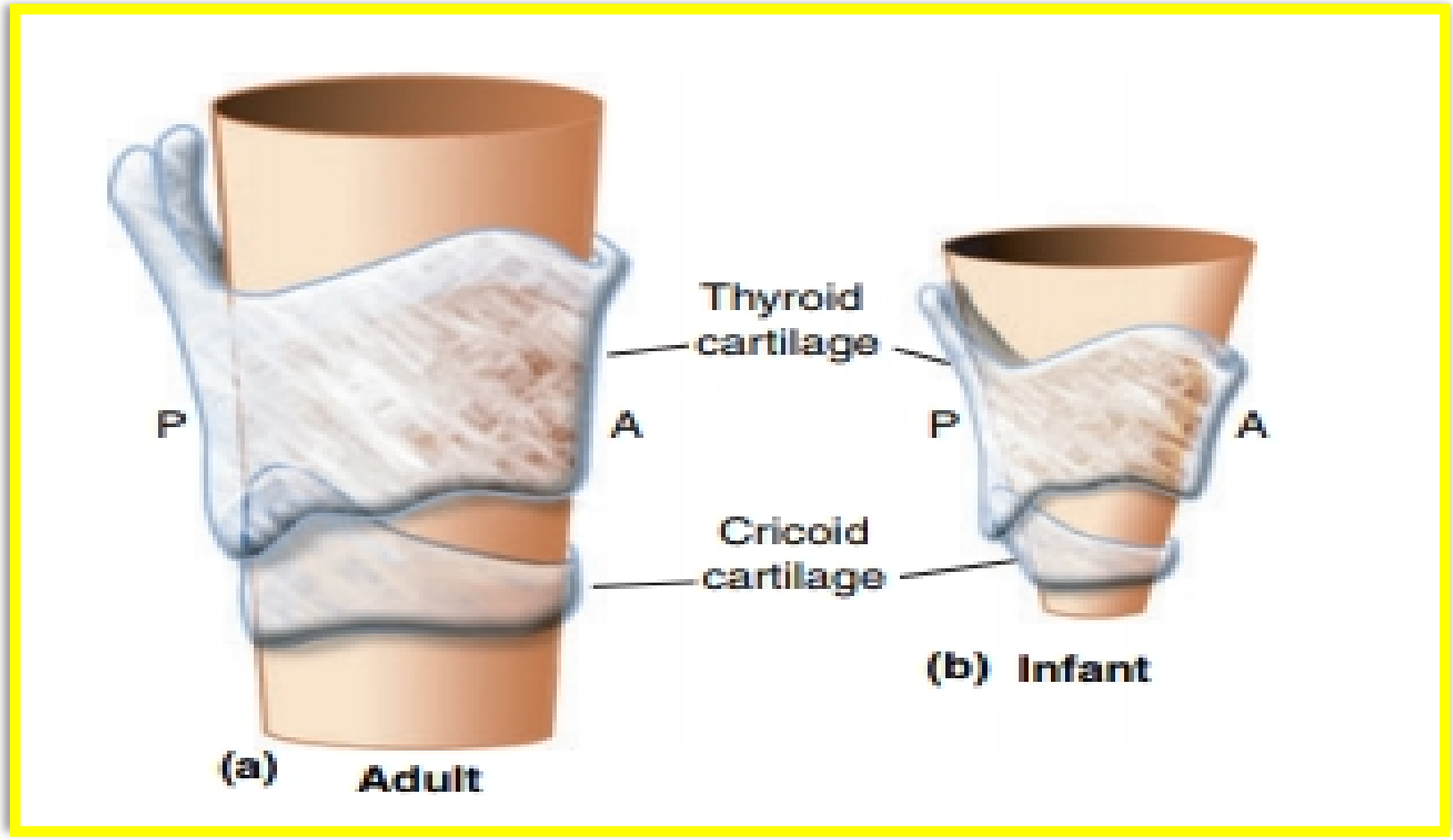
TRAKEOSTOMI PADA ANAK
Anatomi Laring

- Posisi laring yang tinggi memungkinkan seorang bayi untuk dapat menelan dan bernafas diwaktu yang bersamaan

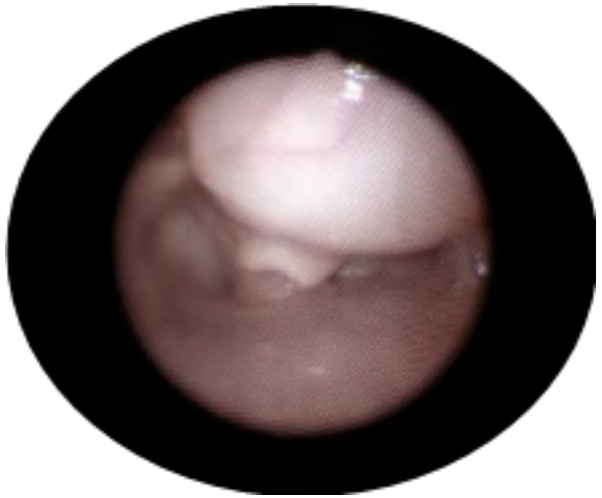




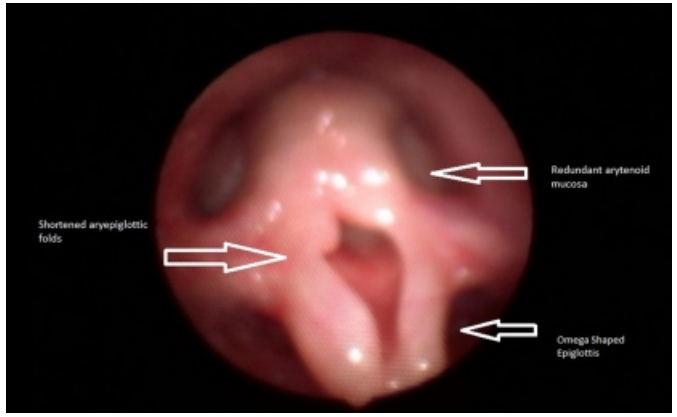
Bentuk Laring Funnel-Shape



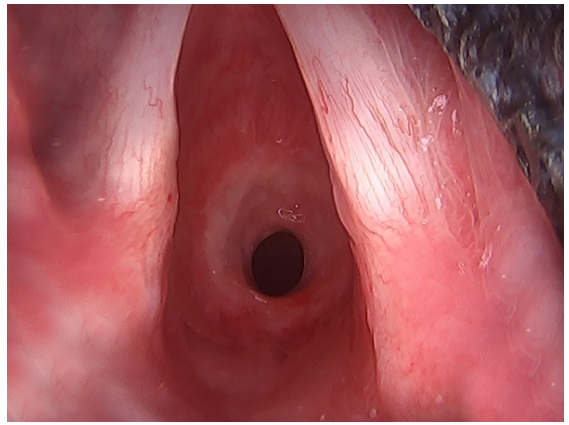
Kelainan yang memerlukan trakeostomi pada anak



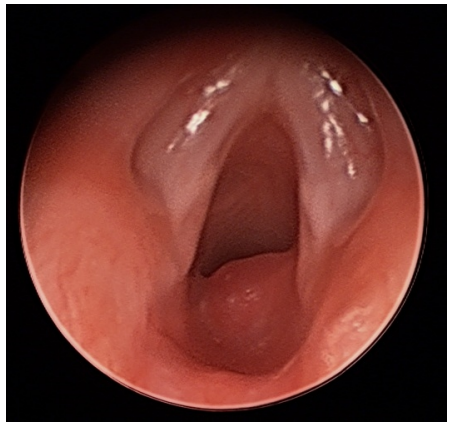
1. Valekula Cyst



2. Laryngolmalasia

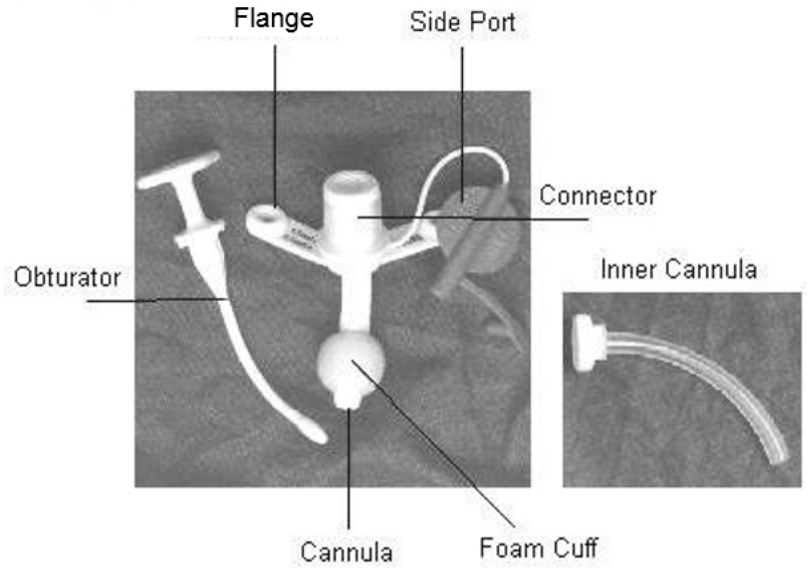


3. Subglotik stenosis



4. Subglotik hemangioma

Cuffed Trach

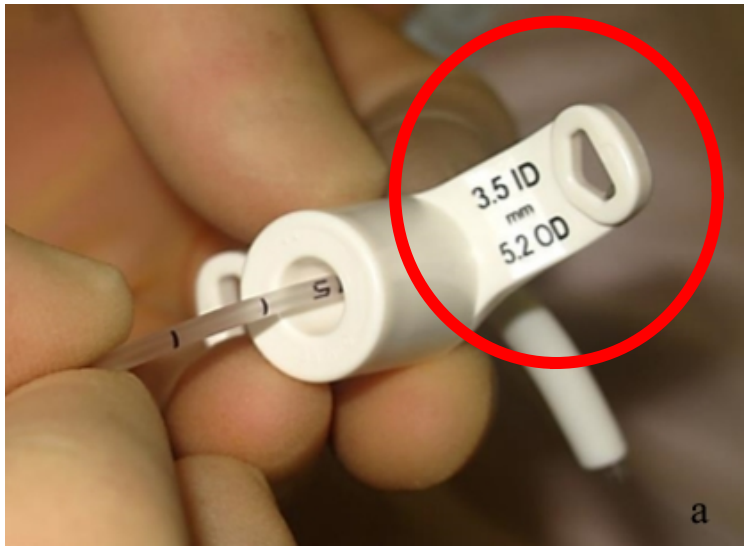


Uncuffed Trach

Connector between tracheostomy tube and anesthetic tubing

Age	Tube size
0-1month	3.0
1-6months	3.5
6-18months	4.0
18months - 3yrs	4.5
3-6yrs	5.0
6-9yrs	5.5
9-12yrs	6.0
12-14yrs	6.5

Age-appropriate tracheostomy tube sizes. Tube sizes vary with different companies having different outer diameters. The figures stated refer to Shiley tubes



Measuring the correct suction tubing length which should not extend >5 mm past the tip of the tracheostomy tube

Tracheostomy Technique

Head Position

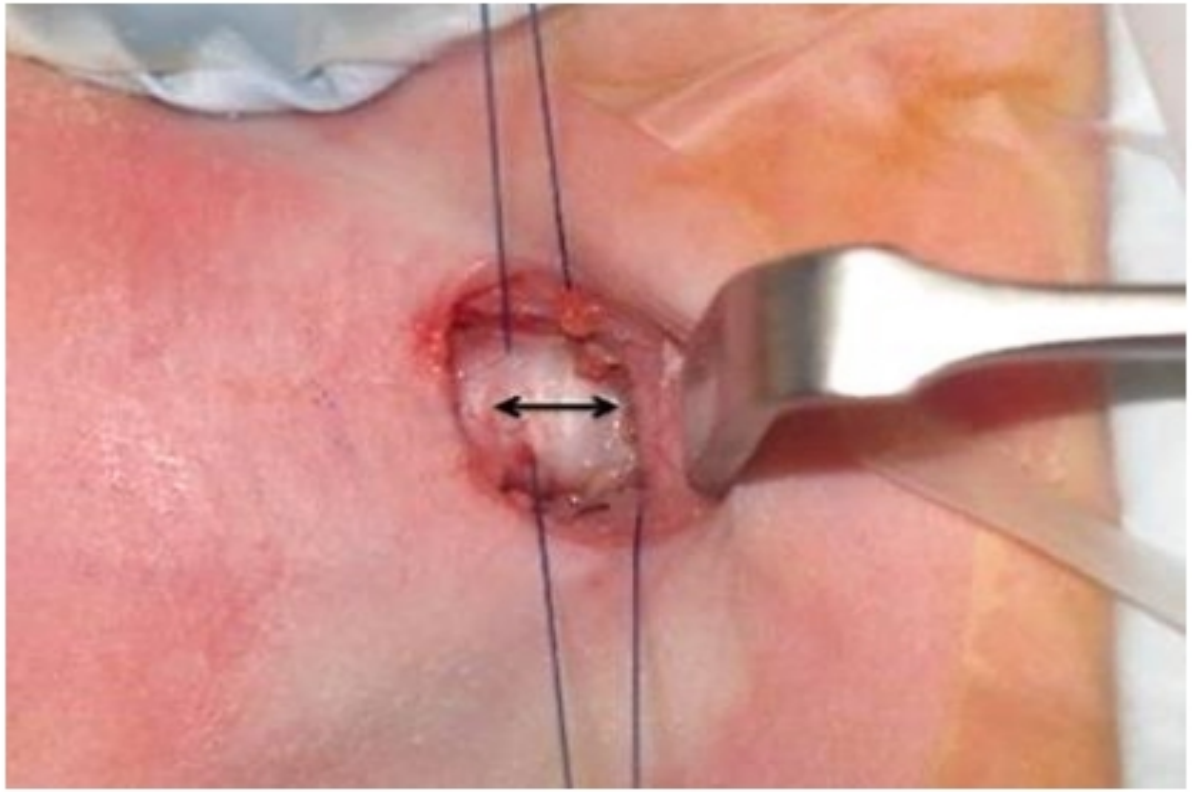
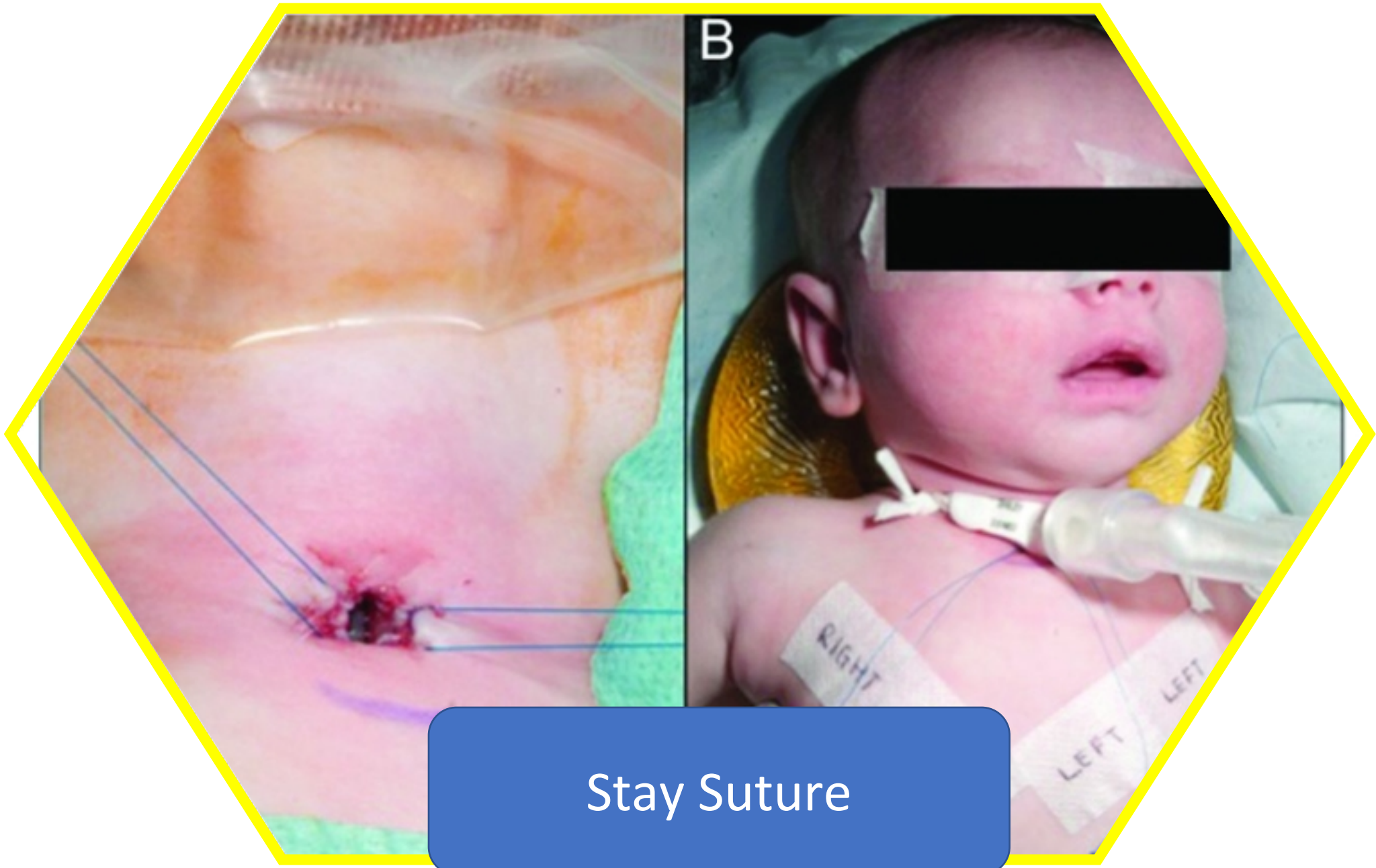
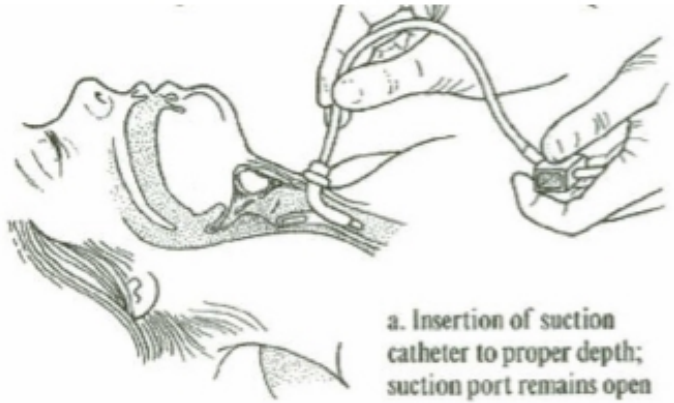


Figure 8: Placement of bilateral stay sutures in the tracheal wall on either side of the planned tracheal incision (double arrow)

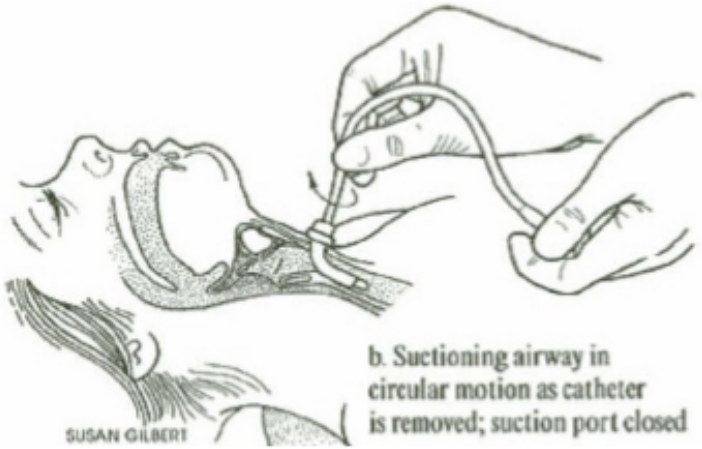
Stay Suture



Stay Suture



a. Insertion of suction catheter to proper depth; suction port remains open



SUSAN GILBERT

b. Suctioning airway in circular motion as catheter is removed; suction port closed

Suction Catheter Sizing to Tracheostomy Tubes

TRACH TUBE (I.D.) mm	SUCTION CATH.
2.5	5fr.
3.0	6fr.
3.5	8fr.
4.0	8fr.
4.5	8fr.
5.0	10fr.
6.0	10fr.
7.0	12fr.
8.0	14fr.
9.0	16fr.
10.0	16fr.

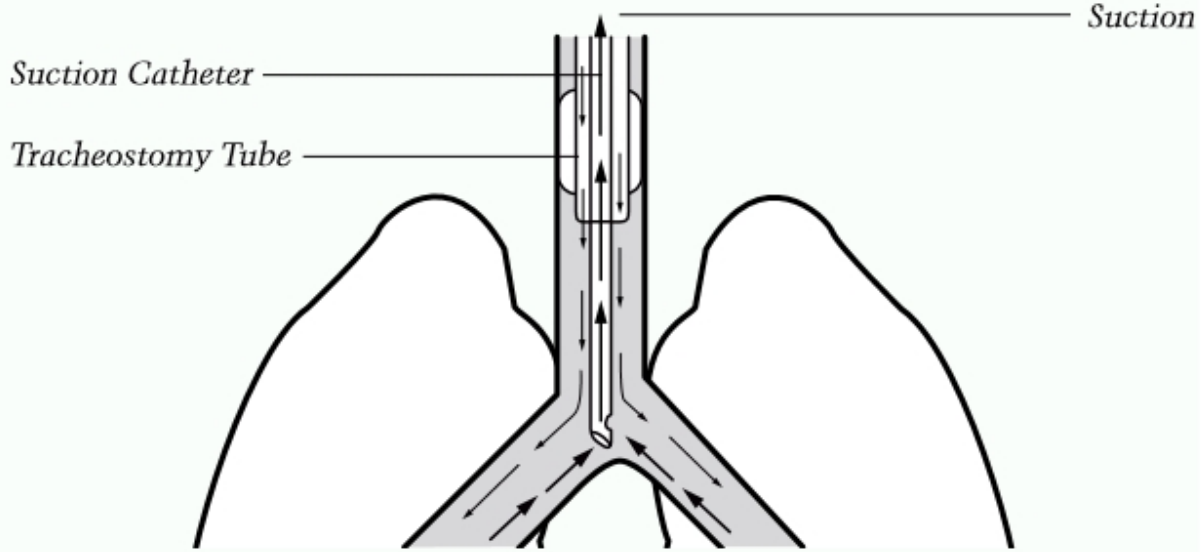


Figure 1.

Measuring Distance for Suction Depth

If the suction catheter does not have any numbers on it, use a tape measure to get the number of centimeters. (See picture below.)

KOMPLIKASI

- Komplikasi yang berkaitan dengan tracheostomy : (Nora H)
    1. Perdarahan
    2. Pneumothorax
    3. Stenosis subglotik
    4. Trakeoesofageal fistula
    5. Disfungsi Vocal Cord
    6. Granulasi stoma
    7. Jaringan skar

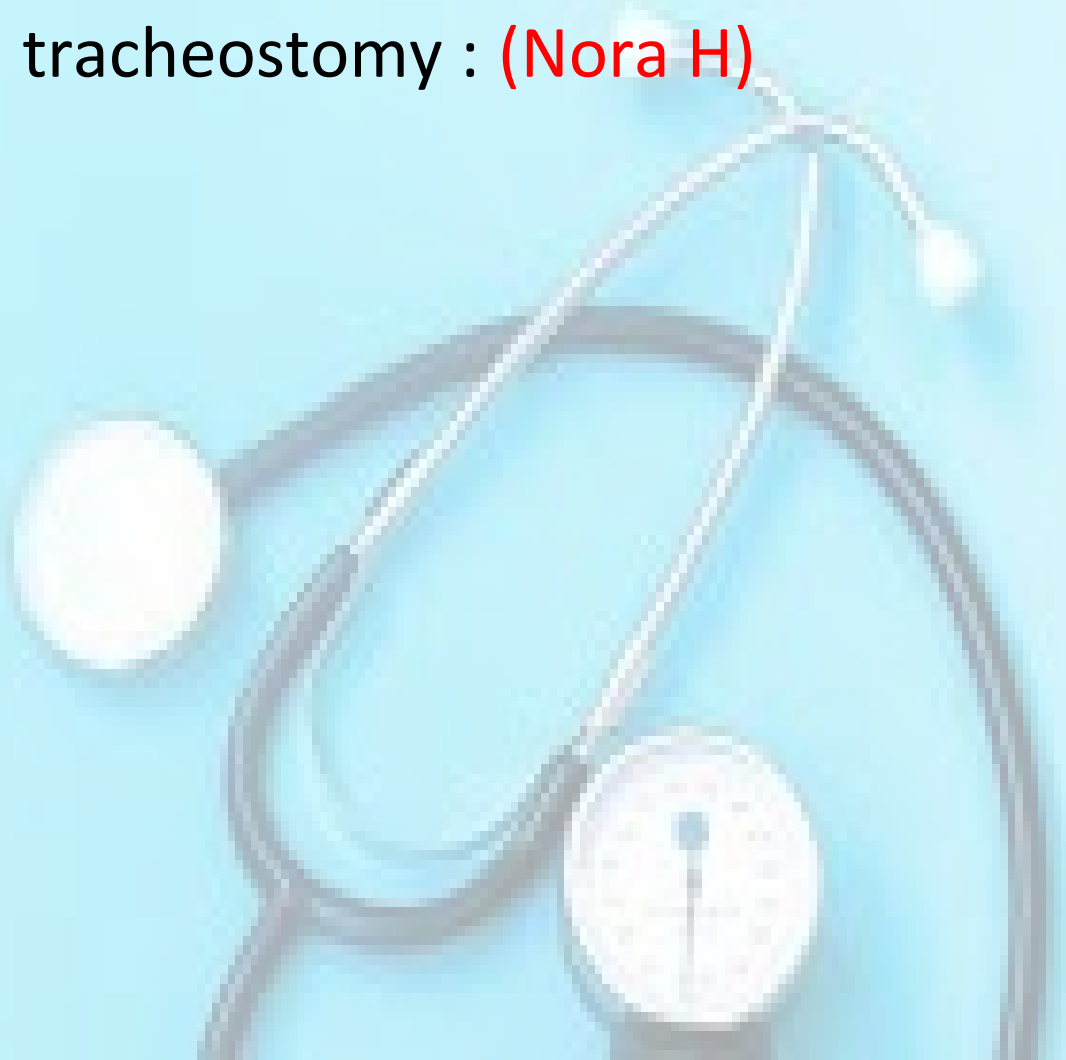


Table 2. Complications of Tracheostomy

Immediate Complications	Early Complications	Late Complications
Hemorrhage	Hemorrhage	Tracheal stenosis
Structure damage to trachea	Tube displacement	Granulation tissue
Failure of procedure	Pneumothorax	Tracheomalacia
Aspiration event	Pneumomediastinum	Pneumonia
Air embolism	Subcutaneous emphysema	Aspiration event
Loss of airway	Stomal infection	Tracheoarterial fistula
Death	Stomal ulceration	Tracheoesophageal fistula
Hypoxemia, hypercarbia	Accidental decannulation	Accidental decannulation
	Dysphagia	Dysphagia

TIPS AND TRICK

1. Pahami anatomi leher dan trakea.
2. Kenali adanya Anomali posisi trakea akibat pendesakan
3. Lakukan persiapan pra op dengan baik, kelengkapan instrument, suction, cek cuff kanul,
4. Ketahui kedalaman insisi, layer by layer
5. Tetap di garis tengah, hindari memotong otot
6. Perhatikan kekuatan retraksi/tarikan (pada anak)
7. Gunakan jari sebagai identifikator, bila terjadi disorientasi posisi

TERIMA KASIH

KELOMPOK STUDI ONKOLOGI BEDAH KEPALA LEHER, PERHATI-KL

Website : https://www.kankertht-kepalaleher.info/

YouTube https://www.youtube.com/channel/UCgueWzXz4jyK8mC8tUw.

https://instagram.com/oncology_ent?igshid=6cu31h7teqqf

https://www.facebook.com/oncology.headneck

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3. Gavilan J, et al. Functional and Selective Neck Dissection, 2nd ed. New York, Thieme Medical Publisher; 2020.
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