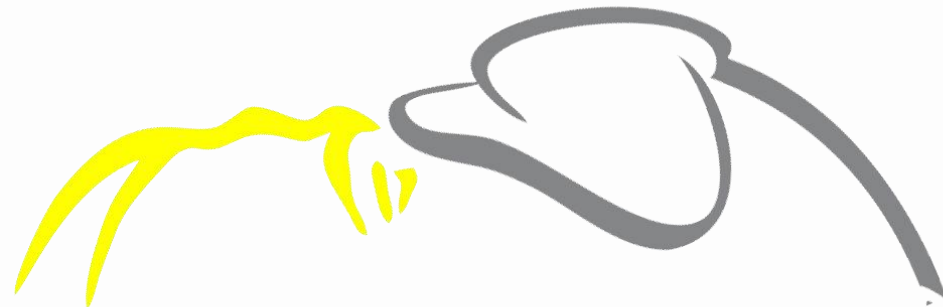


Airway Evaluation and Management



433

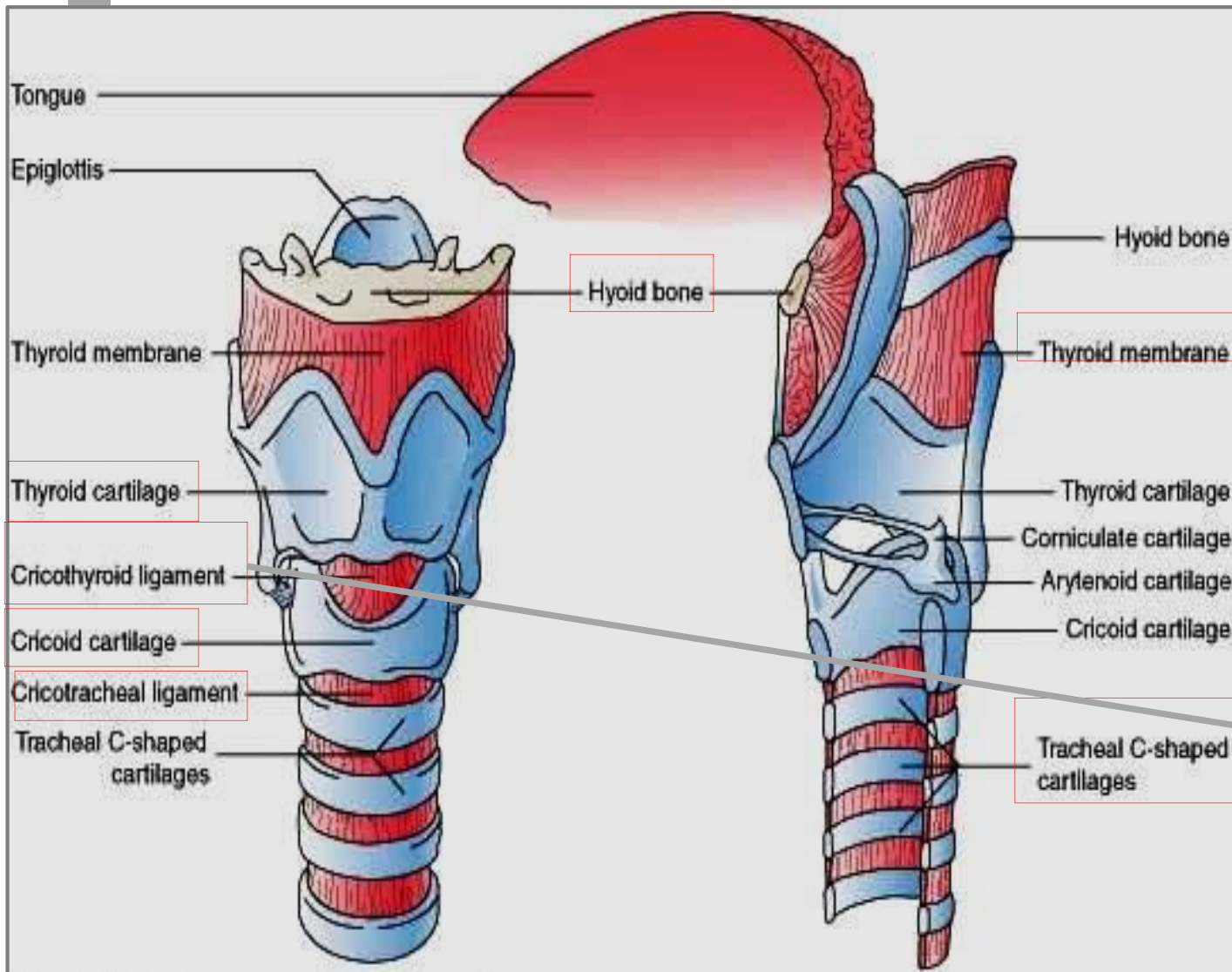
ANAESTHESIA



Objectives:

1. Learn about basic airway anatomy
2. Conduct a preoperative airway assessment
3. Identify a potentially difficult airway
4. Understand the issues around aspiration and its prevention
5. Learn about the management of airway obstruction
6. Become familiar with airway equipment.
7. Practice airway management skills including bag and mask ventilation, laryngeal mask insertion, endotracheal intubation.
8. Learn about controlled ventilation and become familiar with ventilatory parameters
9. Appreciate the different ways of monitoring oxygenation and ventilation

Airway Anatomy:



Innervation:

- **Vagus n.**
- **Superior laryngeal n. :**
 - **External** branch – motor to cricothyroid m.
 - **Internal** branch – sensory larynx **above TVC's***
- **Recurrent laryngeal n. :**
 - **Right** branch– around subclavian a.
 - **Left** branch– around Aortic arch **(board question)**
 - **Motor** to all other muscles, **Sensory** to TVC's* and trachea

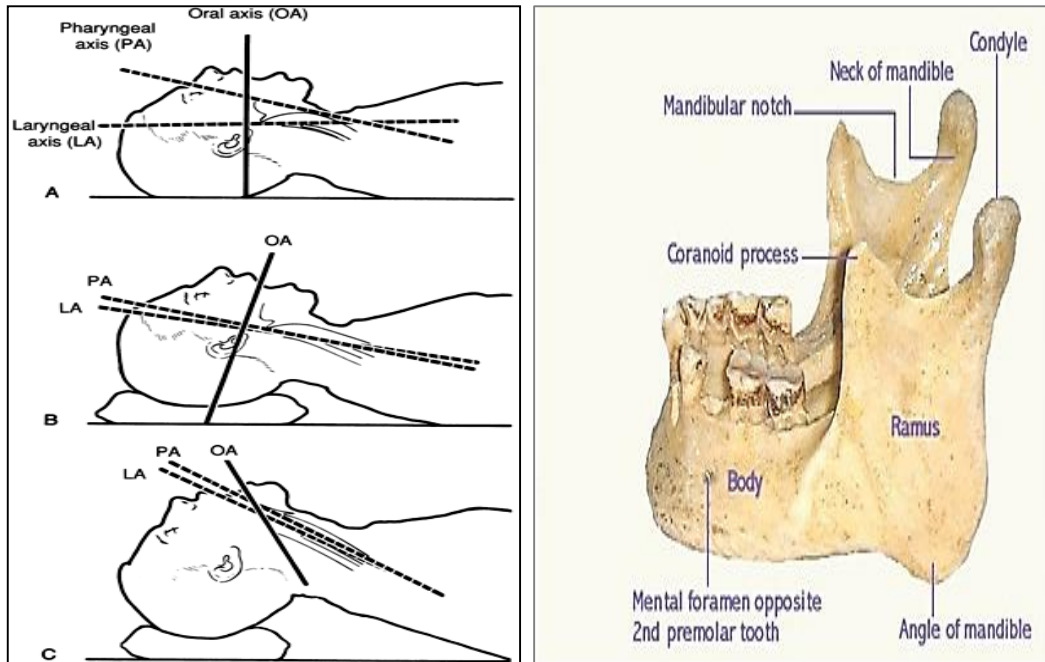
Area of cricothyroidotomy

Indications of intubation:

- Resuscitation (CPR)
- Prevention of lung soiling
- Positive pressure ventilation (GA)
- Pulmonary toilet
- Patent airway (coma or near coma)
- Respiratory failure(CO2 retention)

Requirement of successful intubation:

1. Normal Roomy Mandible
2. Normal **T-M*** , **A-O*** , And **C-spine***
3. Alignment Of 3 Axes Or Assuming **Sniffing Position**
4. Any Anomaly In These 3 Joints A-O, T-M Or C-spine Can Result In Difficult Intubation
5. Bag And Mask, oxygen Source
6. Airways Oro And Nasopharyngeal
7. Laryngoscopes Different Blades
8. ETT Different Sizes
9. Suction On



*T-M = Temporomandibular joint, *A-O= Atlantooccipital joint, *C-spine= Cervical spine

Airway Gadgets:



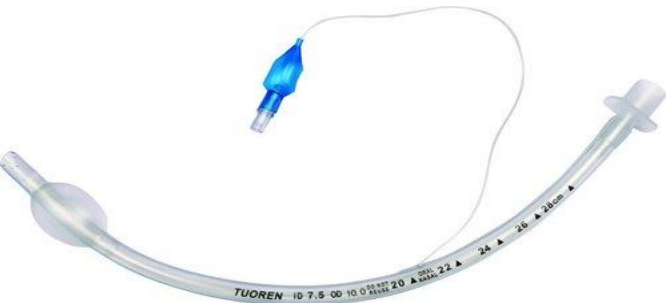
Oral airway:



Nasal airway



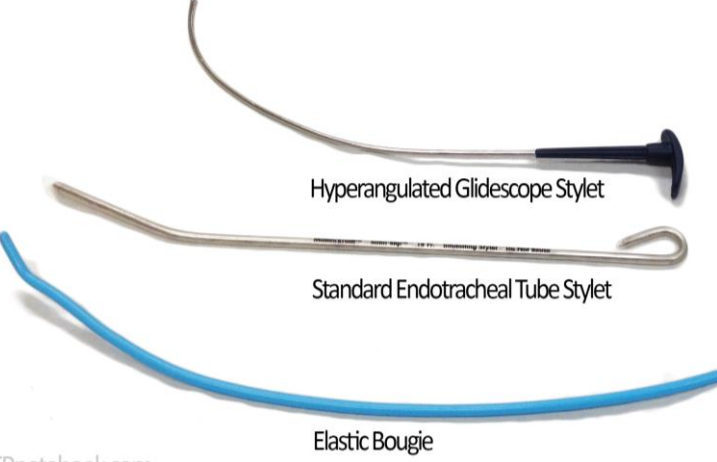
Laryngoscope



Endotrachea
l tube



Laryngeal
Mask Airway



Fpnotebook.com

For difficult intubations
we use it with
endotracheal tube

Management:

I-History:

previous history of difficulty is the best predictor (pt. should have alert card of difficult airway)

Inquire about:-Nature of difficulty (is it difficulty in intubation or ventilation)

- No of trials
- Ability to ventilate between trials
- Maneuver used to reach successful ventilation
- Complications in the documentation like vocal cord injury

II-Snoring and sleep apnea(predictors of DMV*)
especially in obese patients

DMV*= Difficult Mask Ventilation

III-Examination:

1-Look for any obvious anomaly

- Morbid obesity(BMI)
- Abnormality in Skull,Face,Jaw,Mouth,teeth and Neck movement (especially in rheumatoid artharitis= stiff neck)

2-The 3 joints movements:

- **A-O joint:** (15-20 degrees) (you have to do X-ray to see the joint)
- **C-spine :**
 - A. Presence of a gap between the Occiput and C1 is essential
 - B. The cervical spine(range>90)
- **T.M joint:-**
 - A. interdental gap(3 fingers)
 - B. subluxation of mandible (1 finger)

3-Measurements of the mandible

- Thyro-mental distance (by head extended) Normally 6.5 cm and **Less than 6 cm=expect difficulty**

Tests to predict difficulty in airway:

Mallampatti test: (high false negative)

Based on the hypothesis That when the base of the Tongue is disproportionately Large it will overshadow the larynx.

Simple easy test, **correlates with what is seen during laryngoscopy or Cormack-Lehene grades** (laryngoscope view looking for vocal cord) ,but

1-moderate sensitivity and specificity(12% false +ve)

2-Inter observer variation

3-Phonation (pt. should not say uhh) increases false negative view

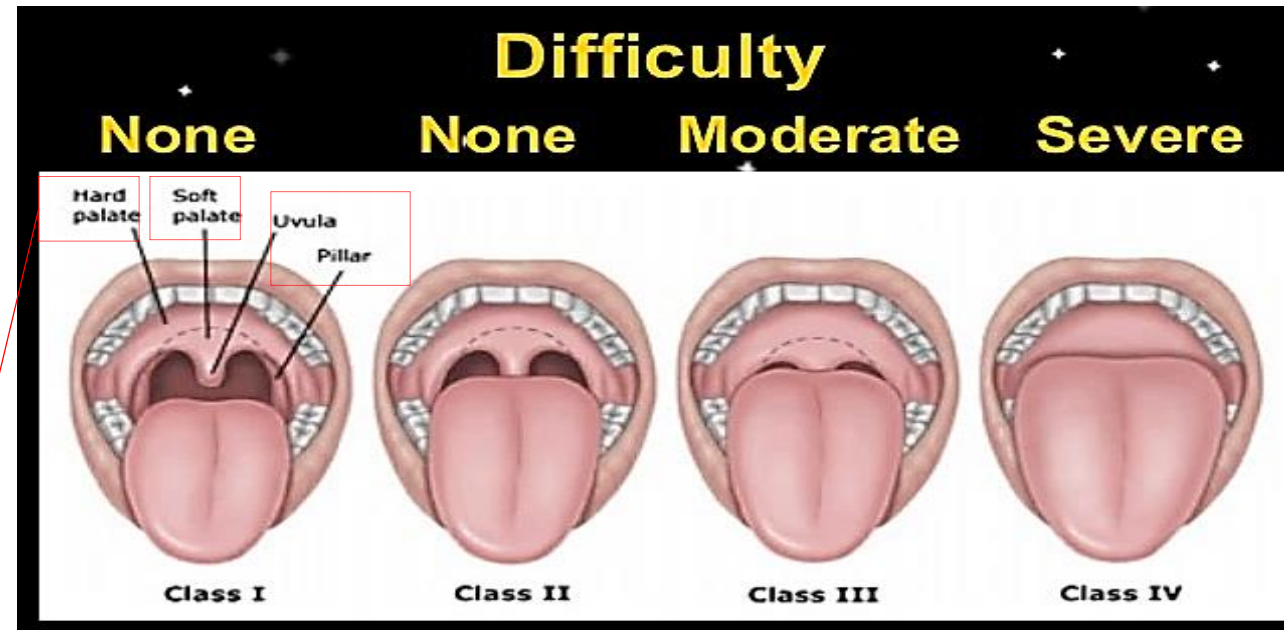
Four important parameters in mallampatti classification

Wilson test:

Consists of 5 easily assessed factors:

- 1) Body weight (n=0 ,>90=1,>110=2)
- 2) Head and neck movement
- 3) Jaw movement
- 4) Receding jaw
- 5) Buck teeth

Each factor assigned as 0 ,1 ,2 max is **10** (the table was not in slides)



Difficult Airway:

Table 1: Wilson's difficult intubation score

Risk factors	Levels	
Weight	0	< 90 kg
	1	90-110 kg
	2	> 110 kg
Head and neck Movement	0	Above 90°
	1	About 90° (i.e. ± 10°)
	2	Below 80°
Jaw movement	0	IG > 5 cm or Slux > 0
	1	IG < 5 cm and Slux = 0
	2	IG < 5 cm and Slux < 0
Receding Mandible	0	Normal
	1	Moderate
	2	Severe
Buck teeth	0	Normal
	1	Moderate
	2	Severe

Expected

Expected from history, examination

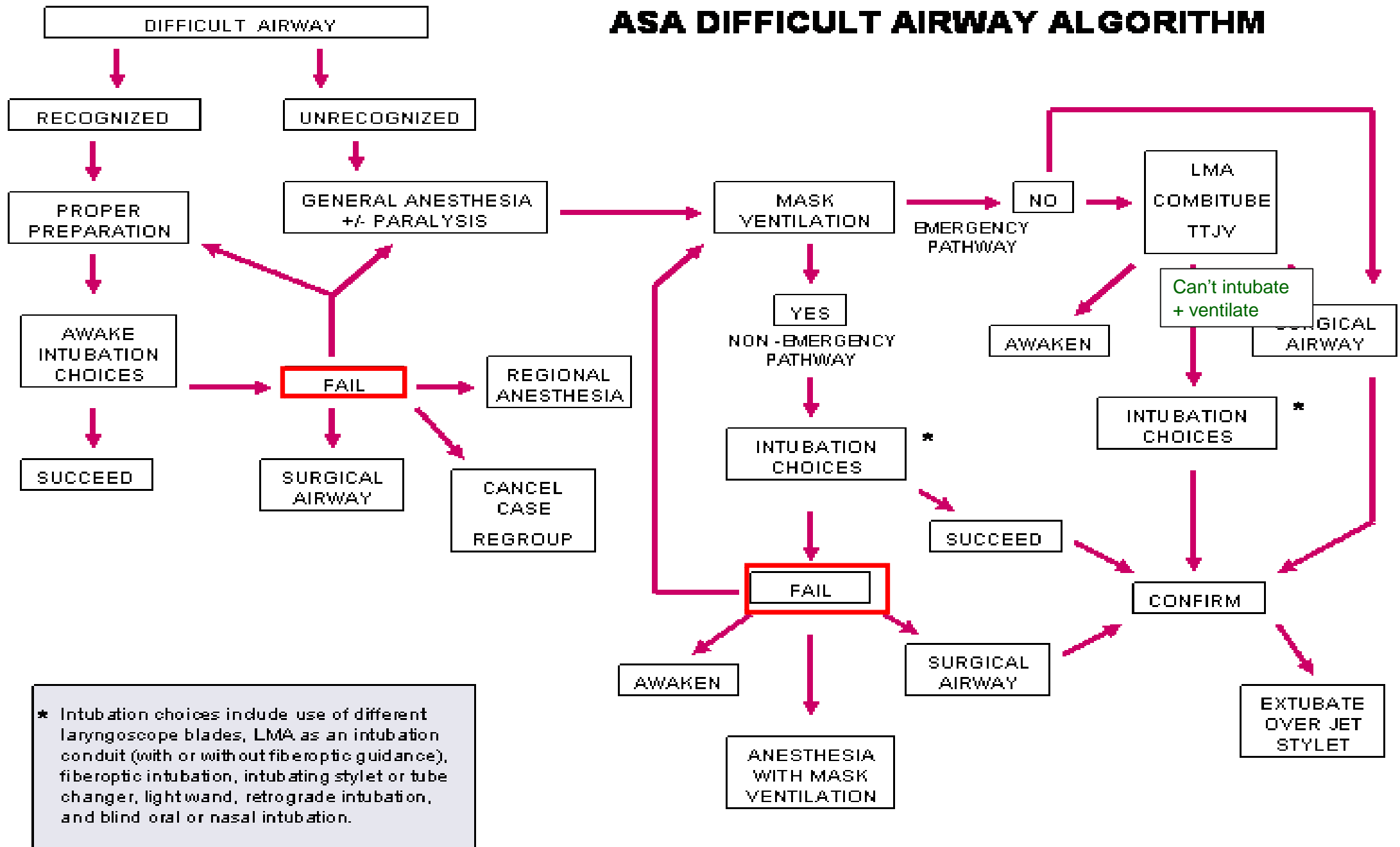
Secure airway while **awake** under LA

Unexpected

Priority for maintenance of patent airway and oxygenation

intubation is not the main point

ASA DIFFICULT AIRWAY ALGORITHM



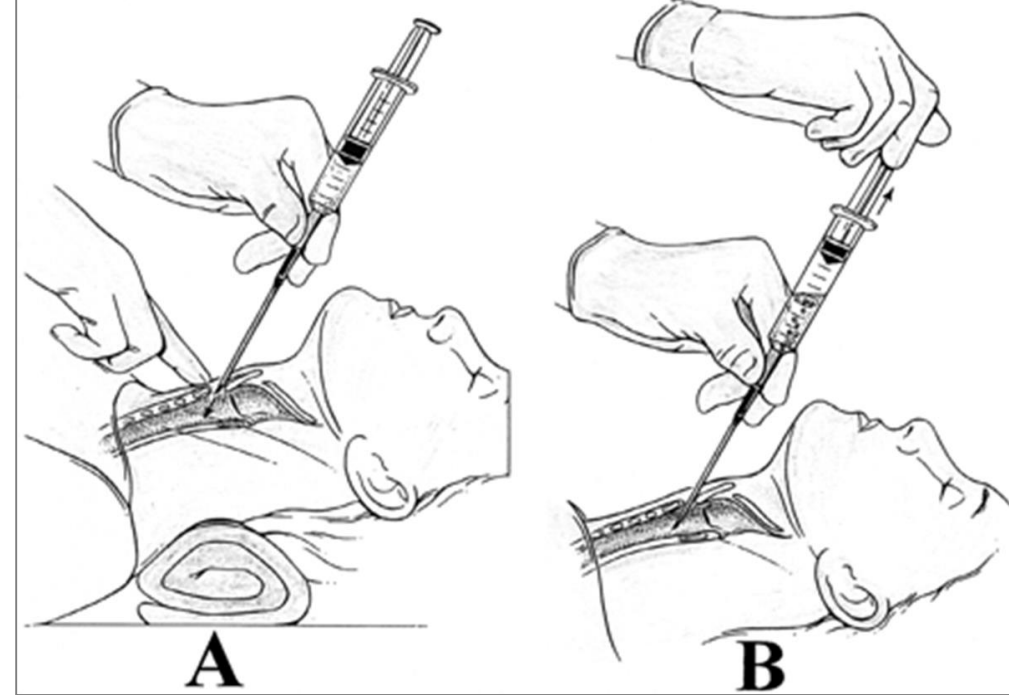
Needle cricothyroidotomy:

It is an emergency procedure stay for hours then we can do fixed tracheostomy or fibro-optic intubation

Confirm tube position:

(Endotracheal tube)

- Direct visualization of ETT between the vocal cords during laryngoscopy (1st thing)
- Bronchoscopy ;carina seen
- Continuous trace of capnography
- 3 point auscultation (Rt. and Lt. lungs and stomach)
- Esophageal detector device
- Other as bilateral chest movement, mist in the tube, CXR.



After confirming the tube position we have to confirm the level to avoid endobronchial intubation of one side of the lung usually the right side then secure the airway.

Rapid sequence induction:

Modified rapid sequence induction is different from rapid sequence induction by the using of muscle relaxant rocuronium instead of sux

Indications:

In patient with high risk of aspiration like pregnant women, emergency with full stomach and labor.

Technique:

- 1) Preoxygenation with 3-5 min with full lung capacity (here no role of ventilation due to the risk of aspiration if the lower esophageal sphincter opens)
- 2) IV induction with sux (muscle relaxant) and hypnotic agents
- 3) Cricoid pressure done by assistant to avoid regurgitation
- 4) Intubate under vision , inflate the cuff ,confirm position
- 5) Release cricoid pressure and fix the tube and connect it to the machine

Complications of intubation:

- 1-Inadequate ventilation
- 2-Esophageal intubation or endobronchial intubation
- 3-Airway obstruction like with retrosternal goiter
- 4-Bronchospasm especially asthmatic pt.
- 5-Aspiration and regurgitation
- 6- Trauma
- 7-Stress response (tachycardia, MI, hemorrhage , stroke and hypertension)

Recommendations:

- Adequate airway assessment to pick up expected D.A (difficult airway) to be secured awake
- Difficult intubation cart always ready
- Pre oxygenation as a routine (to give long period with apnea without hypoxia especially pediatric)
- **Maintenance of oxygenation not the intubation should be your aim**
- Use the technique you are familiar with
- Always have plan B,C,D in unexpected D.A

Endotracheal Intubation:

- Look for epiglottis:
 - I. If initially not found insert laryngoscope further
 - II. If this maneuver does not work slowly pull laryngoscope back
- Once epiglottis visualized, push laryngoscope into vallecula and apply traction at 45 degree angle to "push" epiglottis up and out of the way

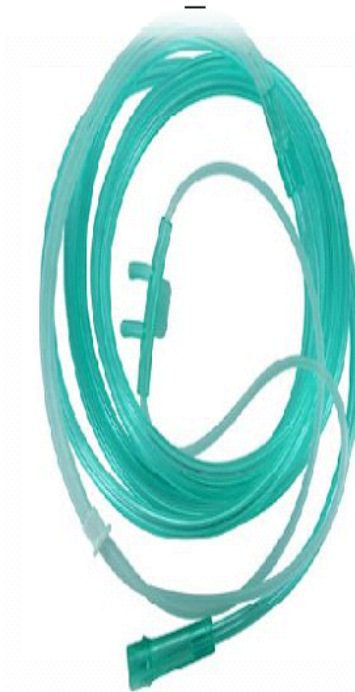
Extubation Guidelines:

1. check that neuromuscular function and hemodynamic status is normal
2. check that patient is breathing spontaneously with adequate rate and tidal volume
3. allow patient to breathe 100% O₂ for 3-5 minutes
4. suction secretions from pharynx
5. deflate cuff, remove ETT on inspiration (vocal cords abducted)
6. ensure patient breathing adequately after extubation
7. ensure face mask for O₂ delivery available
8. proper positioning of patient during transfer to recovery room, e.g. sniffing position, side lying.

Oxygen delivery systems:

1-Nasal cannula: (In Recovery Room Or In The Ward After Extubation)

- inspired oxygen concentration is dependent on the oxygen flow rate, the nasopharyngeal volume and the patient's inspiratory flow rate.
- Increases inspired oxygen concentration by 3-4%.
- Oxygen flow rates greater than 3 liters are poorly tolerated by patients due to drying and crusting of the nasal mucosa.



1 L/min:	21%to24%
2 L/min:	25% to 28%
3L/min:	29%to32%
4L/min:	33%to36%
5 L/min:	37% to 40%
6L/min:	41%to44%

2-Face masks: (three types) if the patient require more flow we shift from nasal cannula to simple face mask and can deliver up to 10 L.

A-Open facemasks:

- Are the most **simple** of the designs available.
- They **do not provide good control** over the oxygen concentration being delivered to the patient causing variability in oxygen treatment.
- A 6 L/min flow rate is the minimum necessary to prevent the possibility of rebreathing.
- Maximum inspired oxygen concentration ~ 50-60%.

B-Venturi facemasks:

- They should be used in patients with **COPD/emphysema** where **accurate** oxygen therapy is needed.
- **Arterial blood gases** can then be drawn so correlation between oxygen therapy for hypoxemia and potential risk of CO₂ retention can be made.
- Masks are available for delivering 24%, 28%, 35%, 40%, 50%.

C-Non-rebreathing facemasks:

- have an attached **reservoir bag and one-way valves** on the sides of the facemask.
- With flow rates of 10 liters an oxygen concentration of **95%** can be achieved.
- These masks provide the **highest inspired oxygen concentration for non-intubated patients.**

If not responding we will go for CPAP or re-intubation

Done by:

Noha Almndeel

Reviewed
by

Yara Alanazi

Leader

Yasmine Alshehri

Color reference:

Black-slids

Green-Notes

Blue-Book

Red-important

Contact us:

Anesthesia433

@gmail.com