Emergency Airway Management

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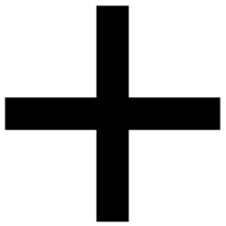
Disclosures

None

- I have no financial interests or other relationships to disclose.

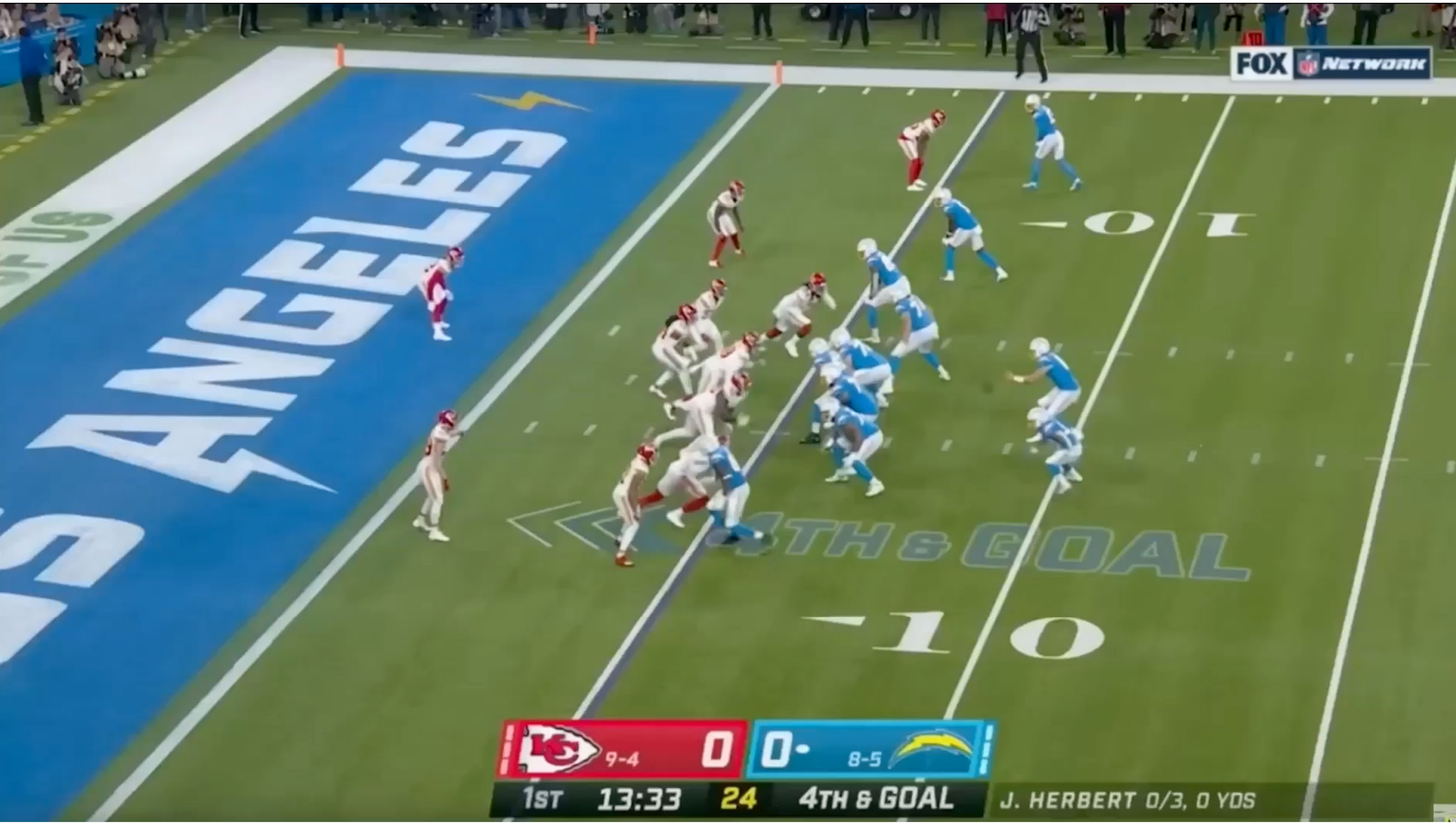
Objectives

- Review basic airway maneuvers and management
- Review airway anatomy
- Understand the indications and methods for advanced airway management in a field/sports environment
  - Endotracheal intubation
  - Supraglottic airways
  - Surgical cricothyrotomy
- Case review



Airway Emergencies

Airway Management Physician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Basic Airway Management

Bag-Mask Ventilation

Primary method for providing assisted ventilations to patients with respiratory failure

- Initial stabilization and preoxygenation
- Advanced airway may be difficult or impossible
  - Re-oxygenation/ventilation between attempts
  - Avoiding a failed airway

"bag-mask ventilation is a challenging skill that requires considerable practice for competency"

- American Heart Association Guidelines update for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care

Photo Source: Prehospital Manual Ventilation: NAEMSP Position Statement

Technique

One-handed

E-C

E-O

Two-handed

E-C

Thenar Eminence

Rate and Volume

- 10 breaths/minute (1 breath every 6 seconds)
- Tidal volume 500-600mL
  - 6-8mL/kg ideal body weight

*Avoid tendency to hyperventilate!

Adjuncts

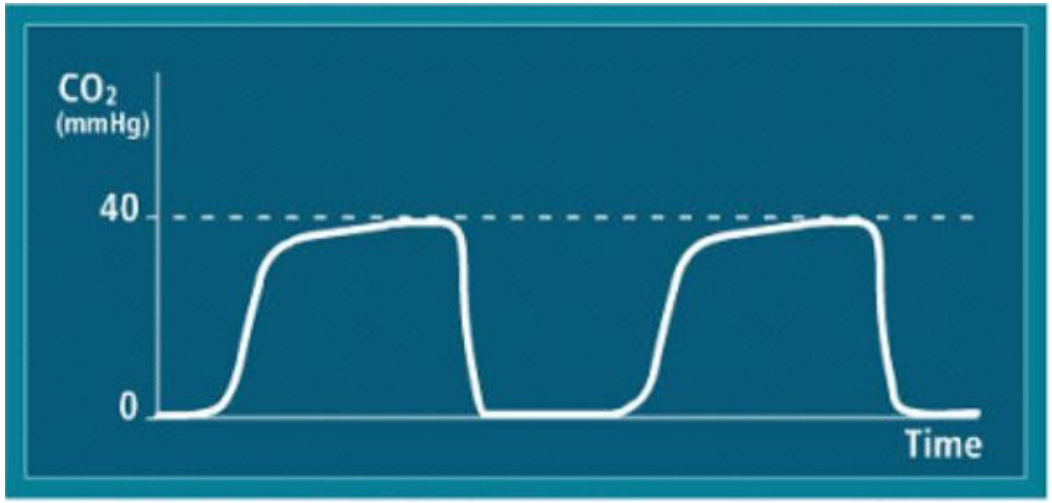
OPA

NPA

Adjuncts

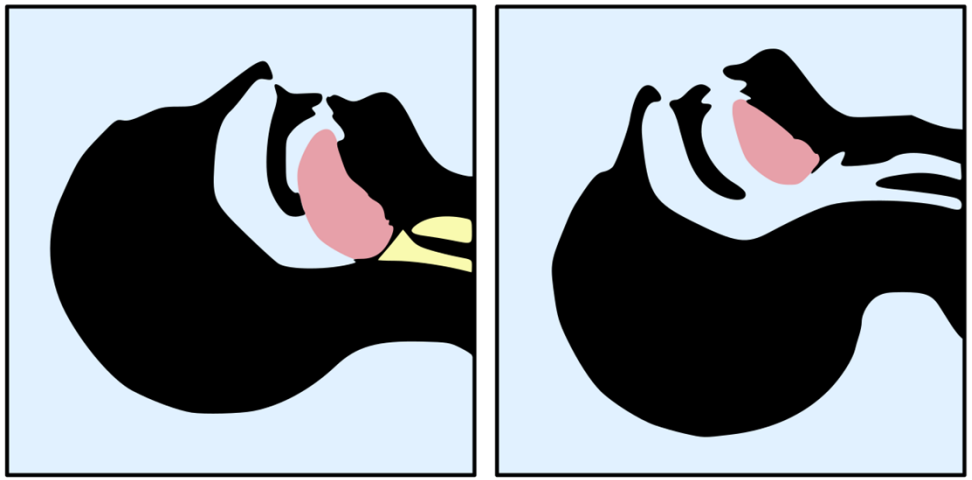
Assessing Quality

- **Chest rise** – subjective
- **SpO2** – objective
  - Depends on perfusion and therefore limited
  - Tendency to over-rely (cessation of ventilations may not be apparent for 2 minutes)
- **EtCO2** – objective
  - Waveform capnography is best currently available method
  - Measure of exhaled tidal volume

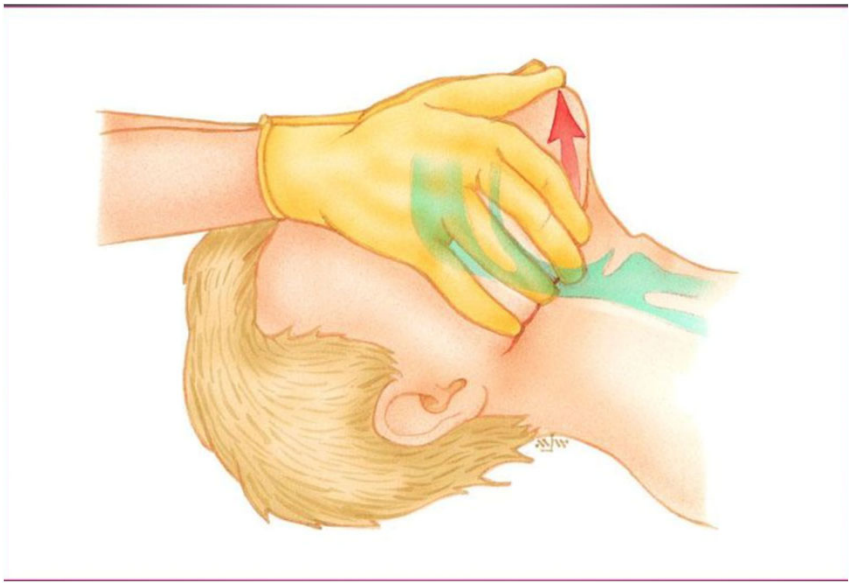


Positioning

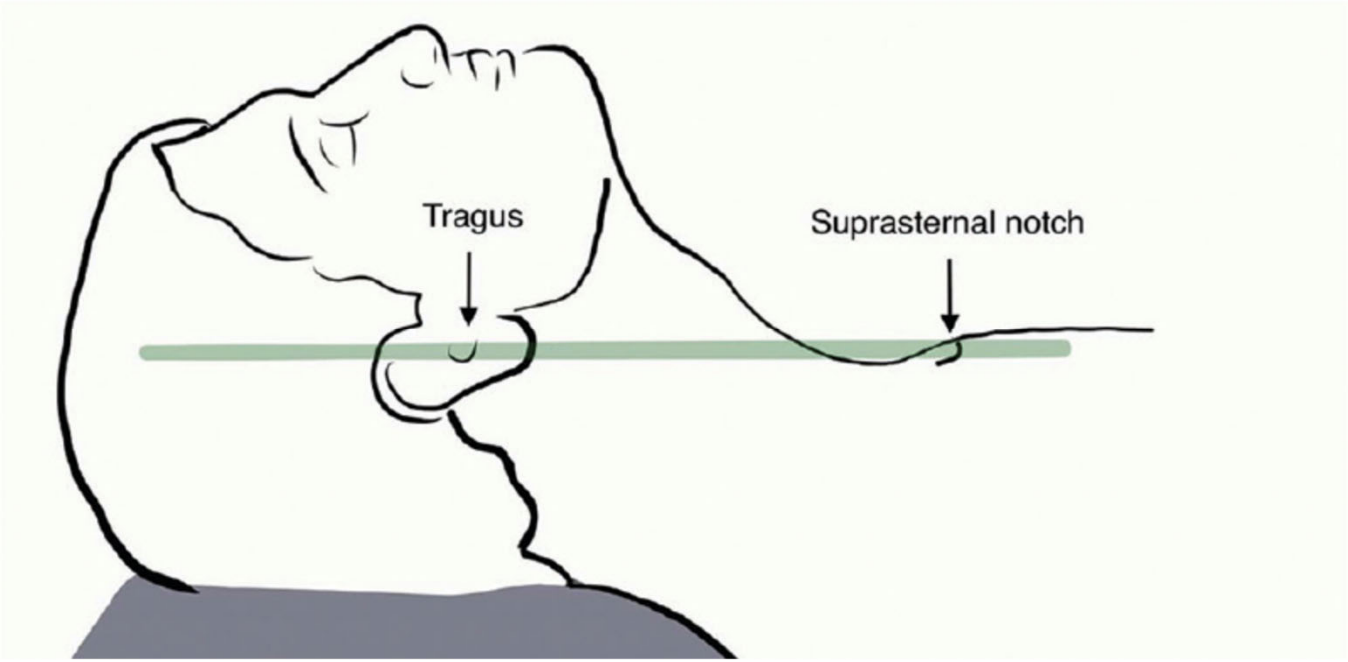
Head-tilt chin lift

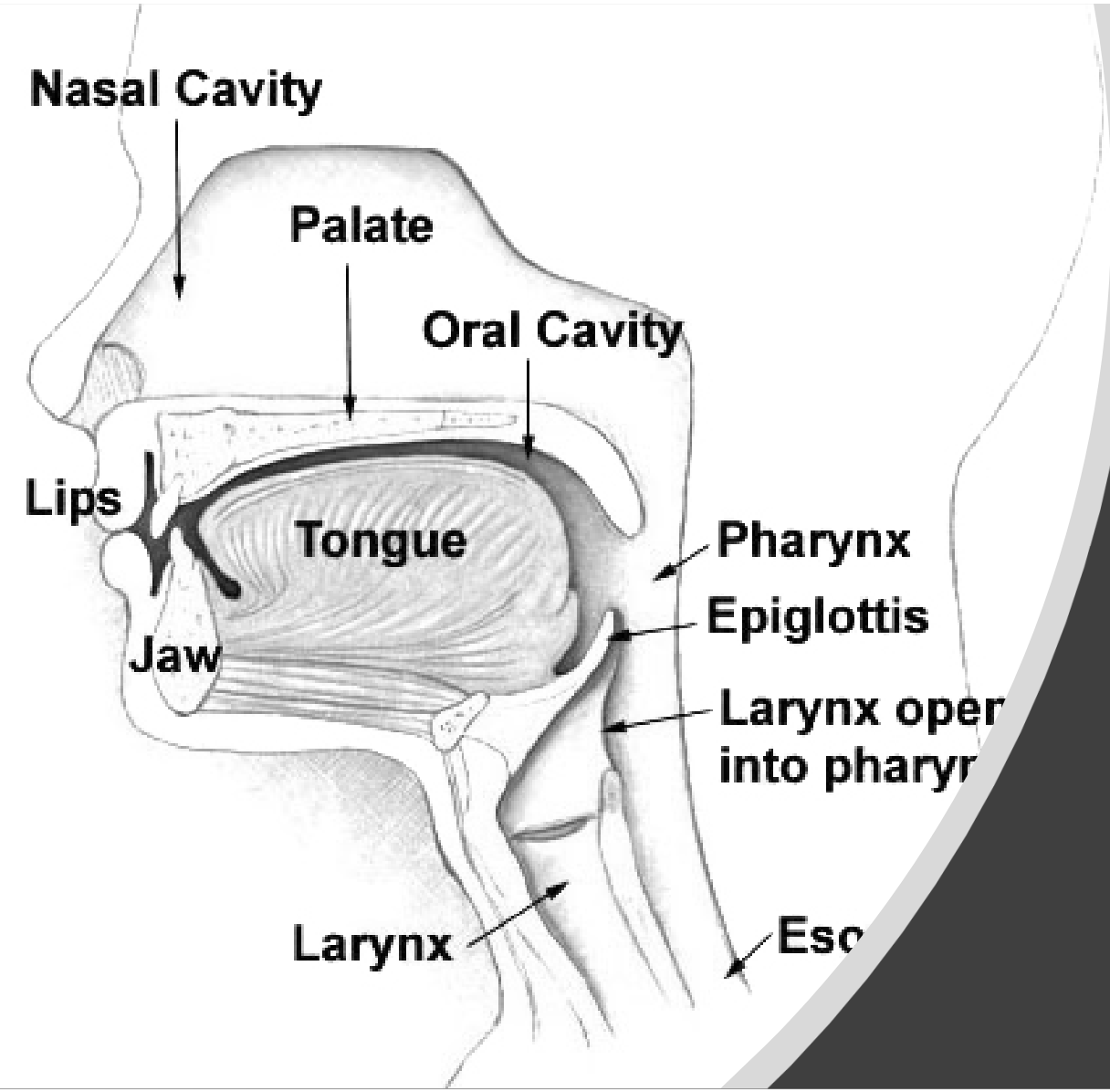


Jaw thrust

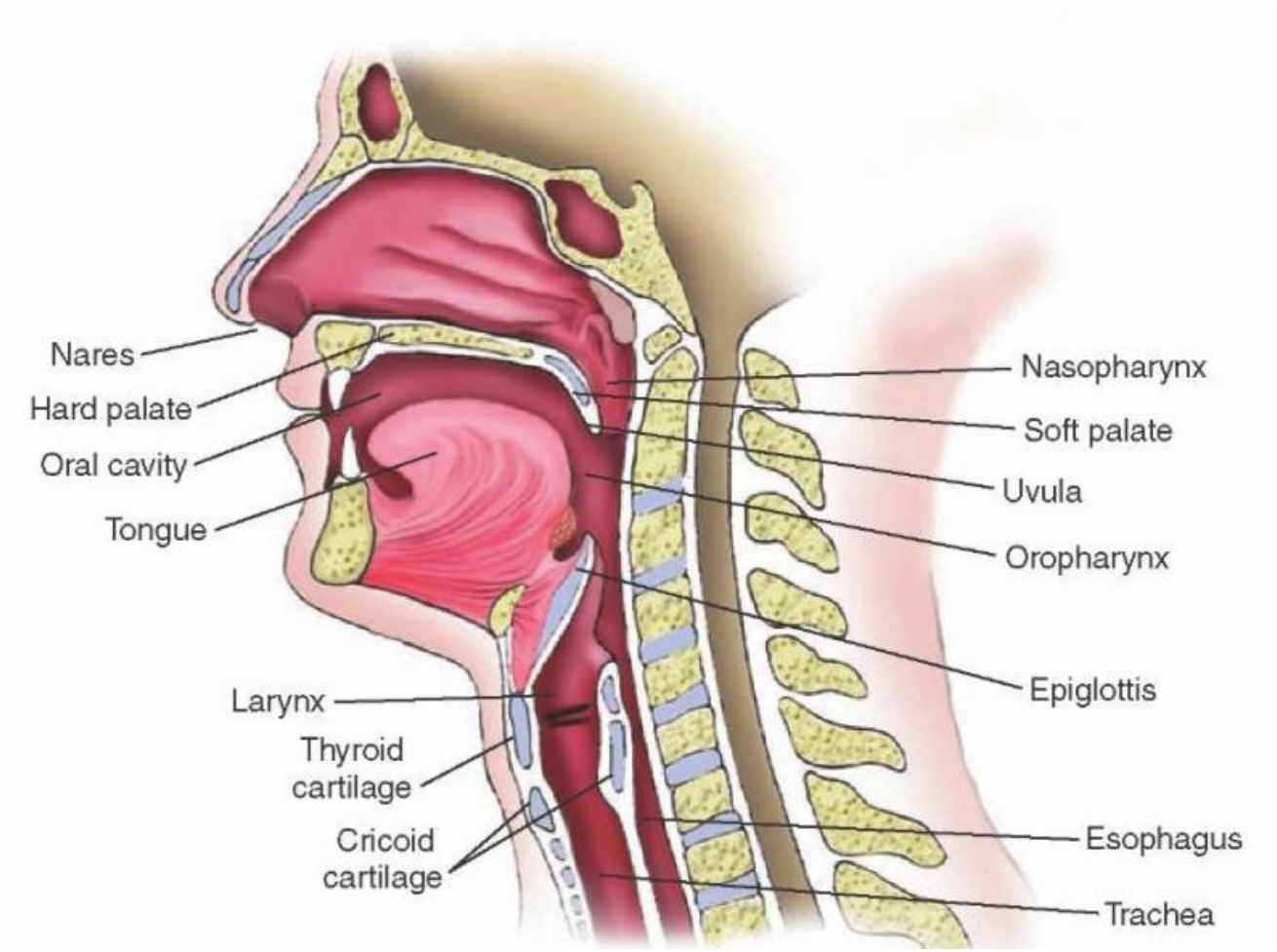


Positioning



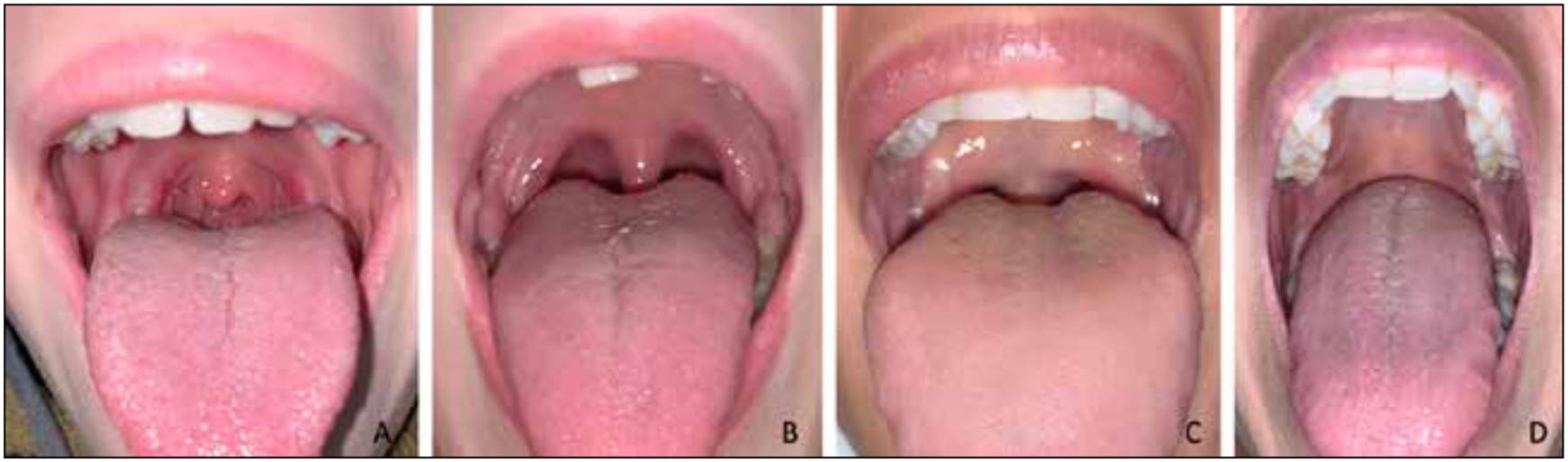


Airway Anatomy


Nares
Hard palate
Oral cavity
Tongue
Larynx
Thyroid cartilage
Cricoid cartilage
Nasopharynx
Soft palate
Uvula
Oropharynx
Epiglottis
Esophagus
Trachea

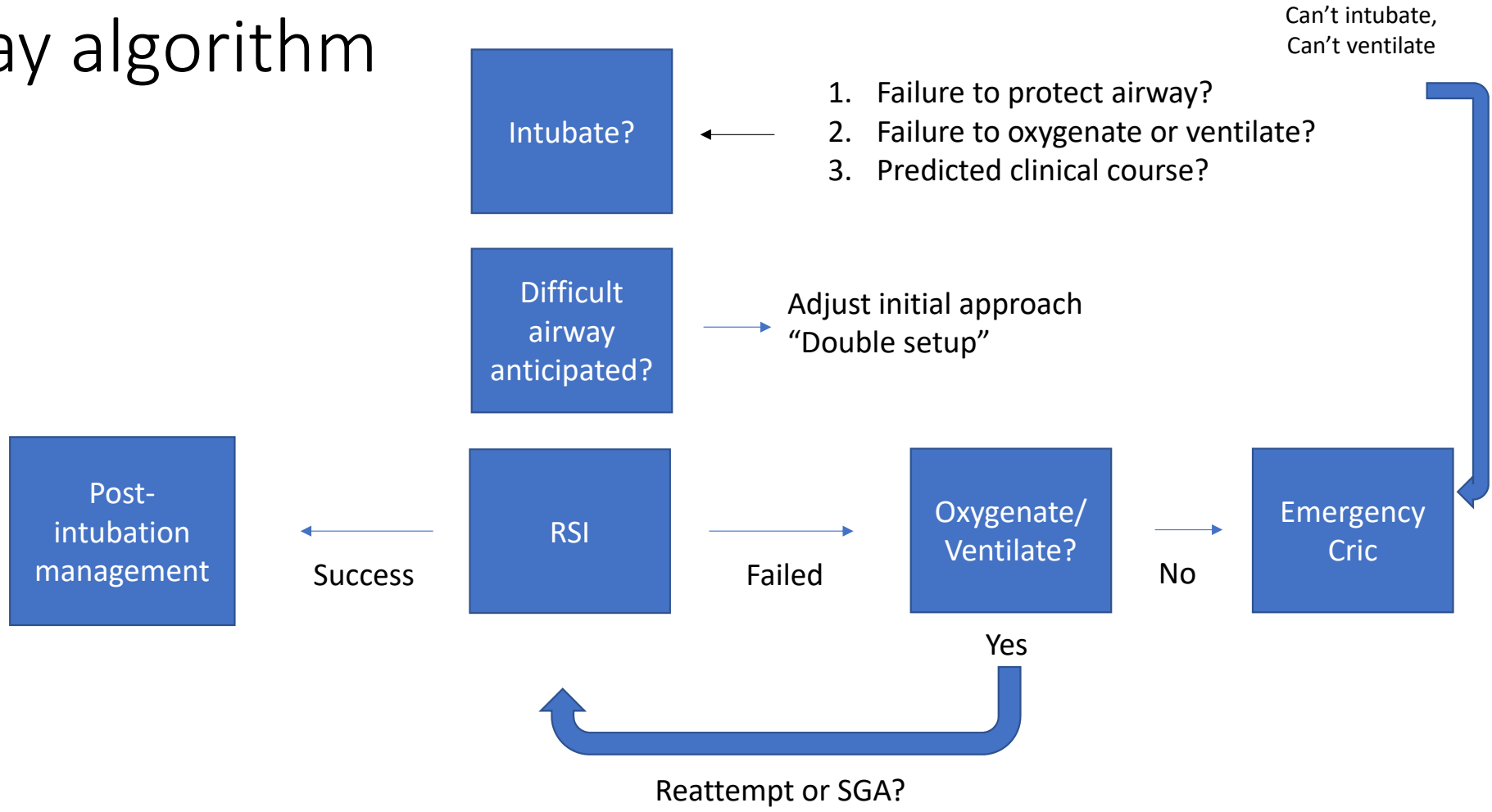
3-3-2 Rule

Mouth opening	Tip of mentum to hyoid bone	Thyromental distance
		
Access to airway and obtaining glottic view	Can tongue be deflected to accomdate laryngoscope	Predicts location larynx to base of the tongue. If larynx high angles difficult


A
B
C
D

Advanced Airway Management

Airway algorithm



Difficult Airway Assessment

L – Look externally

E – Evaluate (3-3-2 rule)

M – Mallampati score

O – Obstruction/Obesity

N – Neck mobility

Anticipated Difficult Airway?

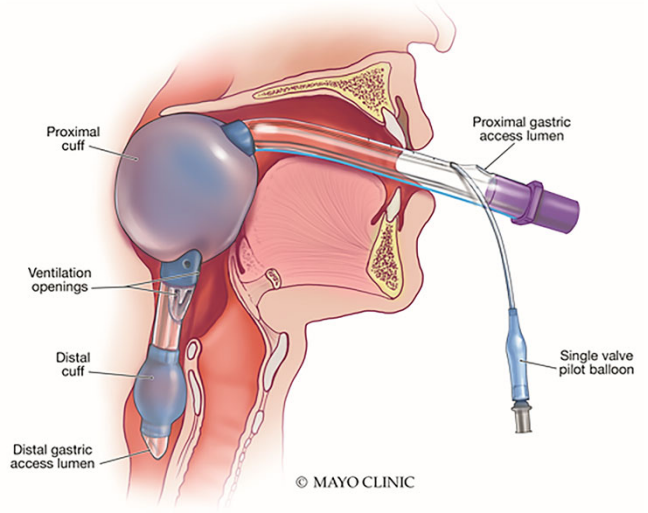
- Adjust initial approach
- “Double setup”

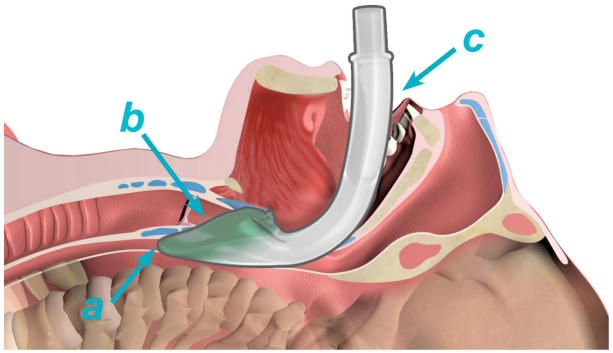
Video laryngoscopy

SGA

Supraglottic Airways (SGAs)

- Primary or secondary airway device
- King LTS-D, i-gel, LMAs
- RCTs evaluating SGAs in OHCA
  - PART
  - AIRWAYS-2

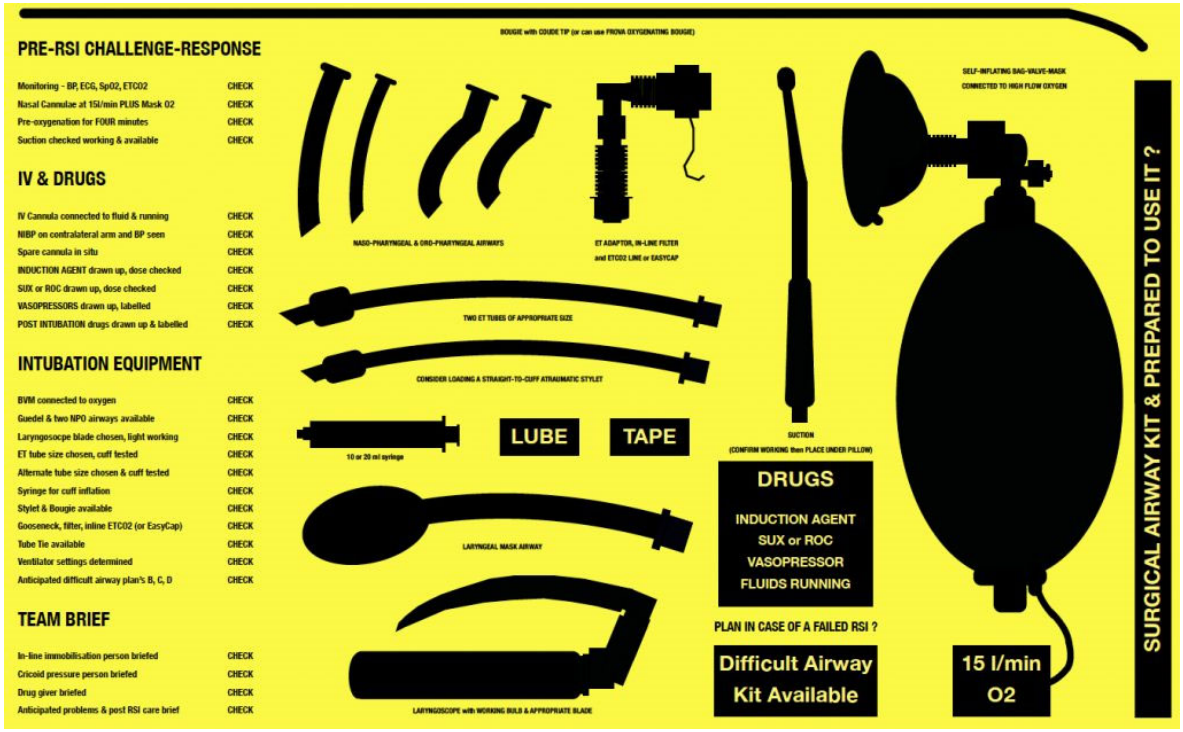




Rapid Sequence Intubation (RSI)

- Prepare
- Preoxygenate
- Premedicate
- Position
- Paralyze with induction
- Place with proof
- Post-intubation management

Prepare



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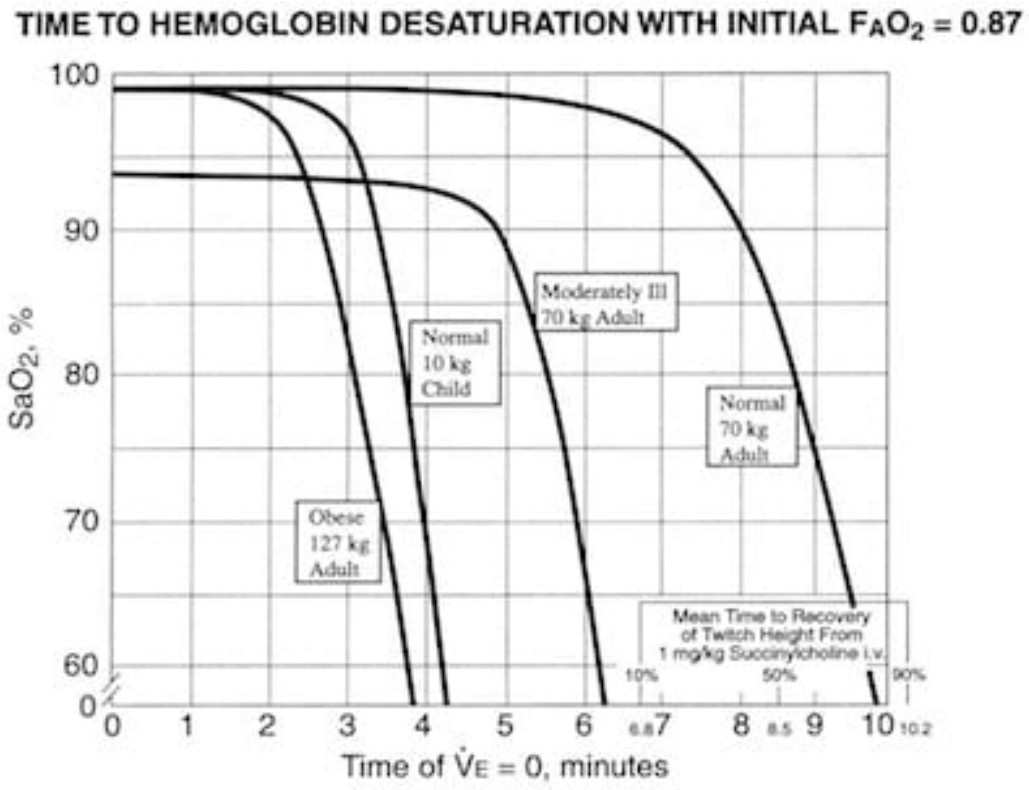
Preoxygenate

- 3 minutes of tidal volume breathing with high FiO2 or,
- 8 vital capacity breaths with high FiO2



Positioning

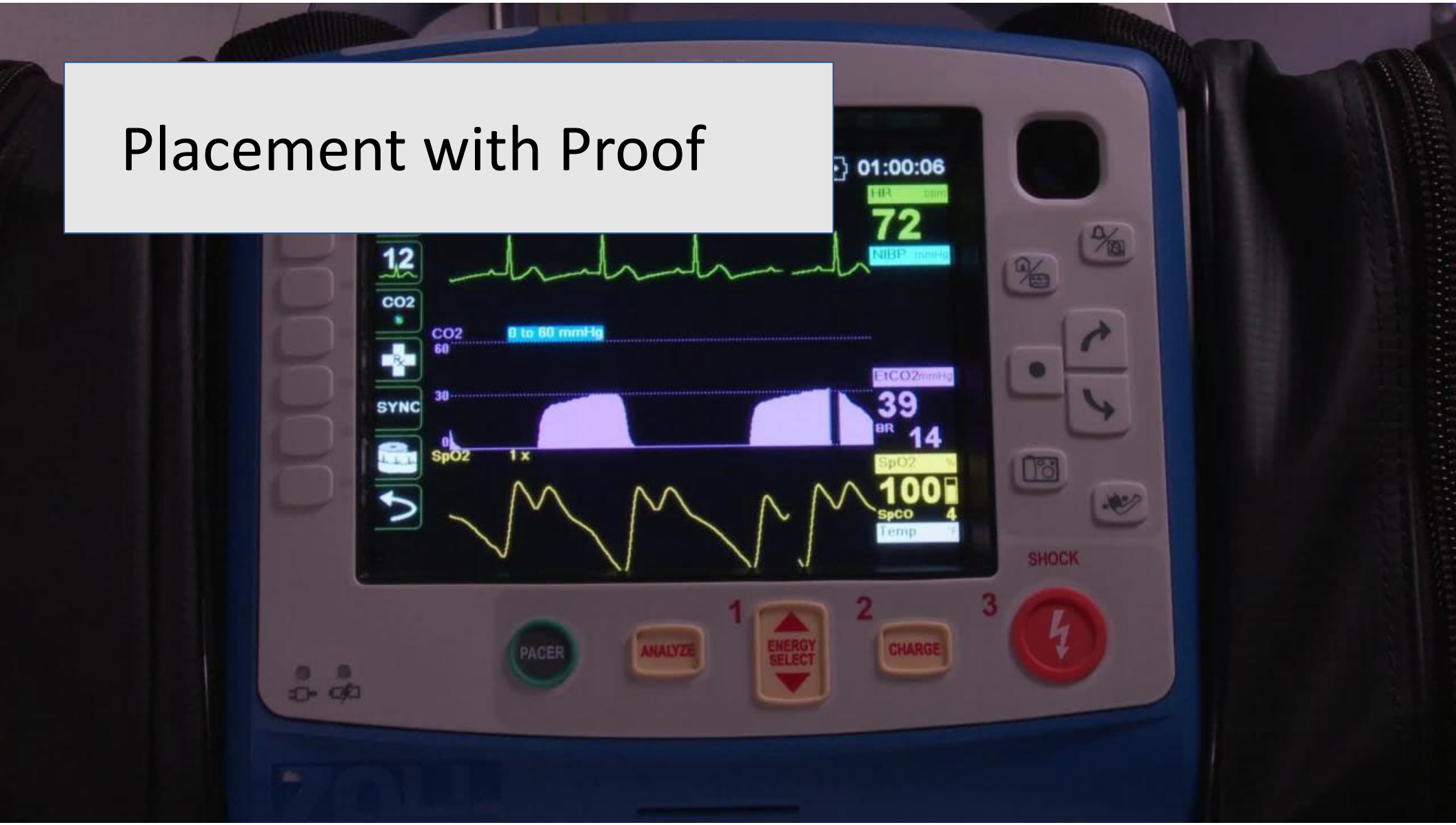
Induction Agents

Agent	Dose	Onset (sec)	Duration (min)	Indications	Adverse Effects
Etomidate	0.3 mg/kg IV	10-15	5-10	Almost all emergency RSI	Adrenal insufficiency Myoclonic activity
Ketamine	1.5mg/kg IV	45-60	10-20	Asthma, hypovolemic shock	Increased HR, BP, IOP
Propofol	1.5mg/kg IV	15-45	5-10	Hemodynamically stable, status epilepticus	Hypotension Myocardial depression

Paralytics

Agent	Dose	Onset (sec)	Duration (min)	Indications	Adverse Effects
Succinylcholine	1.5 mg/kg IV	45	5-10	RSI – some contraindications	Hyperkalemia
Rocuronium	1 mg/kg IV	60-75	40-60	Preference or succinylcholine contraindicated	

Placement with Proof

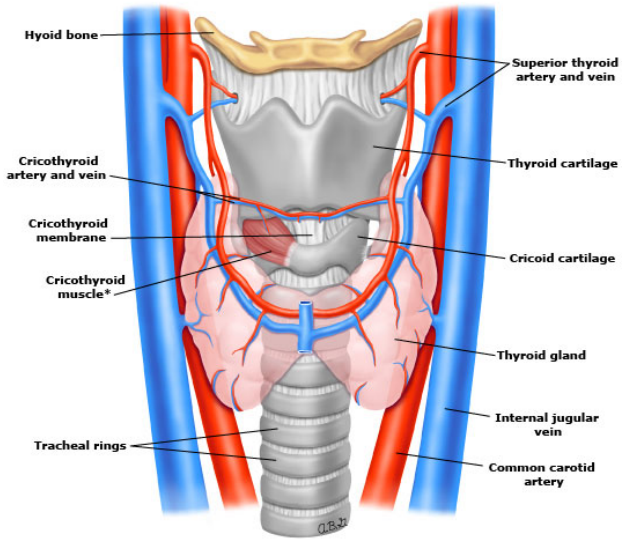


Post-intubation management

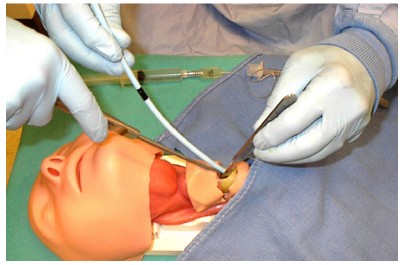
- Intubation is painful and stressful
- Treat pain/analgesia
  - Opioids
  - Ketamine
- Sedation
  - Propofol
  - Ketamine
  - Benzodiazepines

Emergency Cricothyrotomy

- Failed airway, can't oxygenate, can't ventilate



1. Open surgical



2. Bougie Aided

3. Percutaneous Kits

Supplies

AMP Backpack Inventory List

Compartment 1	QTY	Expiration
Patient Care Records Folder	1	N/A
Pharmacy RSI Kit Sheet	1	N/A
Glidescope Go (loaned from Chargers)	1	N/A
Size 3 Blade	1	10/13/23
Size 4 Blade	1	10/14/23
Hyperangulated Stylet	1	N/A
Camera	1	N/A
Charger	1	N/A
Meret Airway Bag		
Laryngoscope Handle	2	N/A
Mac 3	1	N/A
Mac 4	1	N/A
Miller 3	1	N/A
OPA 10	1	N/A
OPA 11	1	N/A
NPA 4	1	N/A
Spare Batteries Size C	2	N/A
Surgilube	5	5/31/21
10 cc syringe	3	N/A
6 cc syringe	1	N/A
3 cc syringe	1	N/A
IV Start Kit	1	N/A
Heplock	2	N/A
Y Extension catheter	1	N/A
20 G Angiocath	1	5/31/24
Blunt Fill Needle	1	N/A
Bougie	1	N/A
ET Tube Size 8.0	1	7/17/22
ET Tube Size 7.5	1	7/1/22
Zip Lock Bag		N/A
ET Tube Size 7.5	1	10/16/22
Stylet	2	N/A
Stethoscope	1	N/A
Hyperangulated Stylet (pre-loaded)	1	N/A
Surgilube	2	3/31/23
Back Zipper Compartment		
ET Tube Holder	2	N/A
Tape	1	N/A
In-Line ETCO2 Detector	2	N/A
Inner Net Space		
Colormetric ETCO2 Detector	1	1/10/23
Hyperangulated Stylet (pre-loaded)	1	N/A
ET Tube Size 8.0	1	9/8/26

Compartment 2	QTY	Expiration
Pocket BVM Manual Ventilator	1	N/A
AirQ Intubating LMA Size 4.5	1	2/10/23
10 cc syringe	1	N/A
Igel Supraglottic Airway Size 4	1	5/31/24
Igel Supraglottic Airway Size 5	1	1/31/24
ET Tube Size 7.0	1	2/27/23
ET Tube Size 8.0	1	3/7/23
ET Tube Size 8.5	1	3/22/23
ET Tube Holder	1	N/A
Stylet	1	N/A

Compartment 3		
Trauma Shears	1	N/A
Gloves (Pair)	3	N/A
Surgical Masks	10	N/A
N95 Masks (BYD)	2	N/A
N95 Mask (Honeywell)	1	N/A
Needle Decompression Kit	2	4/15/25
Cric Kit		
Tracheostomy Tube	1	4/1/23
Scalpel 10 Blade	1	N/A
Tracheal Hook	1	N/A
Iodine Pad	1	N/A
Alcohol Pad	1	N/A
10 cc Syringe	1	N/A
Trach Tube Holder	1	N/A

Compartment 4		
Coban	1	9/1/26
Medication Labeling System	1	N/A
IV Start Bag		
Alcohol Pads	6	N/A
Luerlock	1	N/A
IV Start Kit	1	N/A
20 G Angiocath	1	5/31/24
Saline Flush 10cc	1	5/21/24
10 cc syringe	1	7/31/25
Medication Administration Bag		
Saline Flush 10cc	5	5/21/24
10 cc syringe	2	N/A
Blunt Fill Needle	11	4/20/26
6 cc syringe	3	8/31/26
3 cc syringe	4	N/A
20 G 1.5 in needle	2	5/31/26
12 cc syringe	2	7/31/25

Drug ***Use WAC inventory***	Quantity
Succinylcholine 200mg/10ml 1-1.5mg/kg IV	2
Rocuronium 50mg/5ml 0.6-1.2mg/kg IV	3
Etomidate 20mg/10ml 0.3mg/kg IV	2

Propofol 200mg/20ml 2

Case Example

Medical Team Setup

- Athletic Trainer
- Team Physicians
- Airway Management Physician
- 2 Paramedics + 2 EMTs
- Transport ambulance on standby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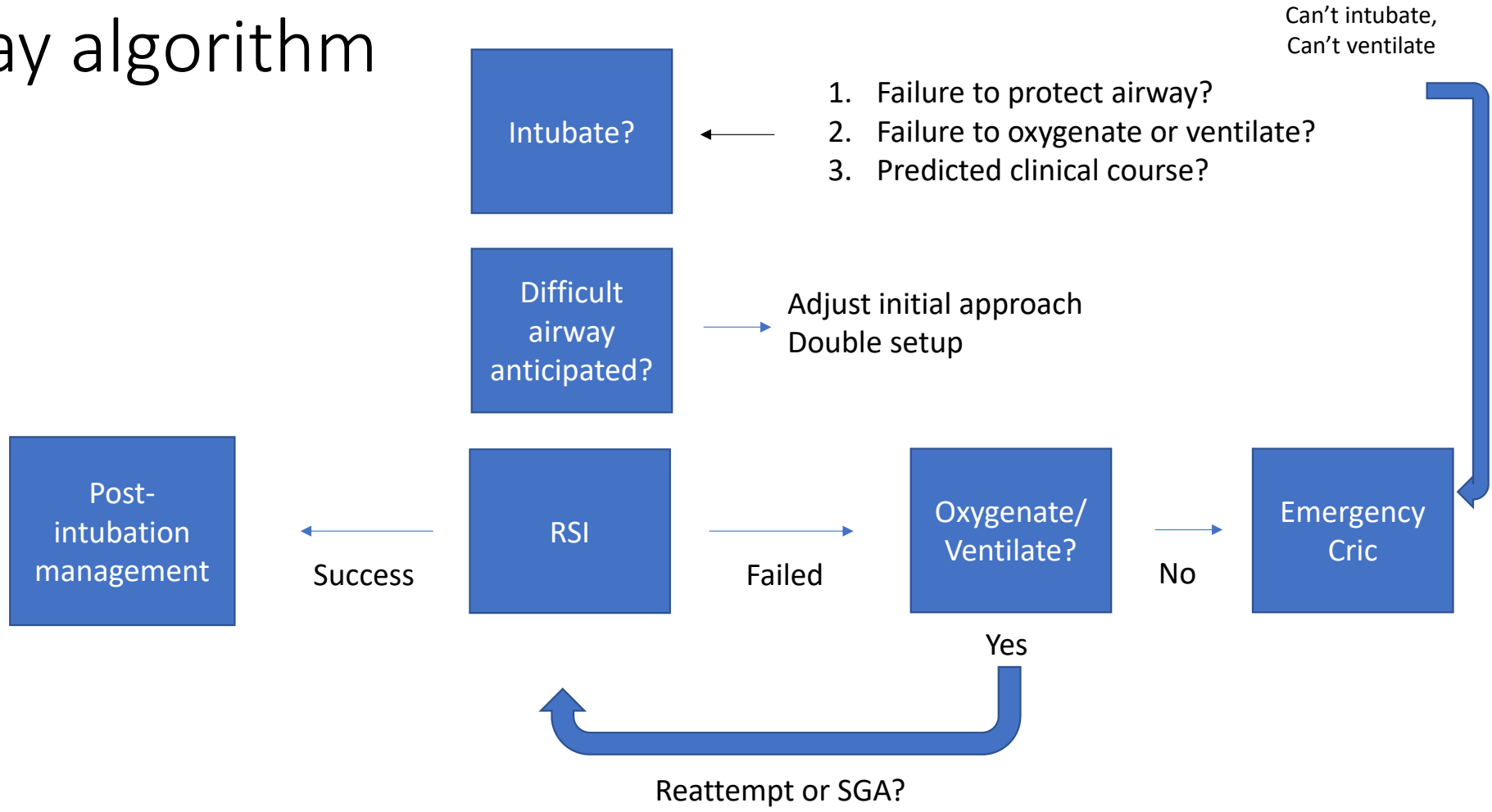
Airway algorithm



Resources

The National Association of EMS Physicians Compendium of Airway Management Position Statements and Resource Documents
Prehospital Emergency Care, Volume 26, Issue sup1 (2022)