



Evaluation and Management of the Difficult Airway

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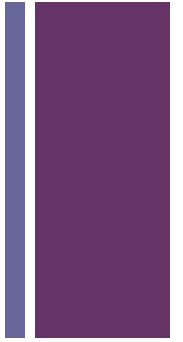
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NORTH OAKS
Health System



Financial Disclosure



I do not have any conflicts of interest or financial interest to disclose



+ Characteristics of the Emergency Airway

- Urgency and unpredictability are the 1⁰ characteristics
 - Lack of information
 - Little time for preparation
 - Lack of compliance / cooperation from the patient
 - Depends on location and equipment

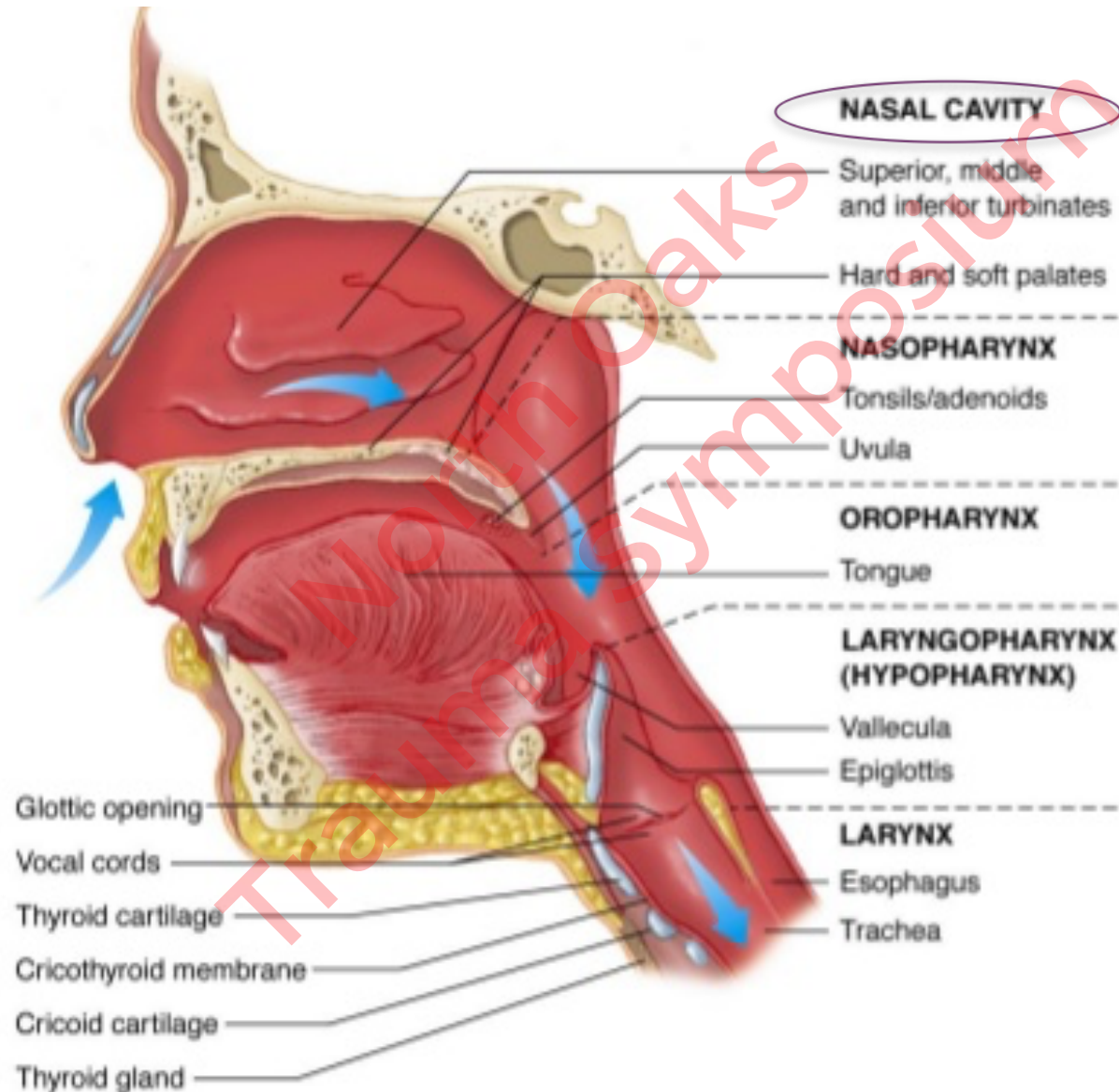


+ Airway Management

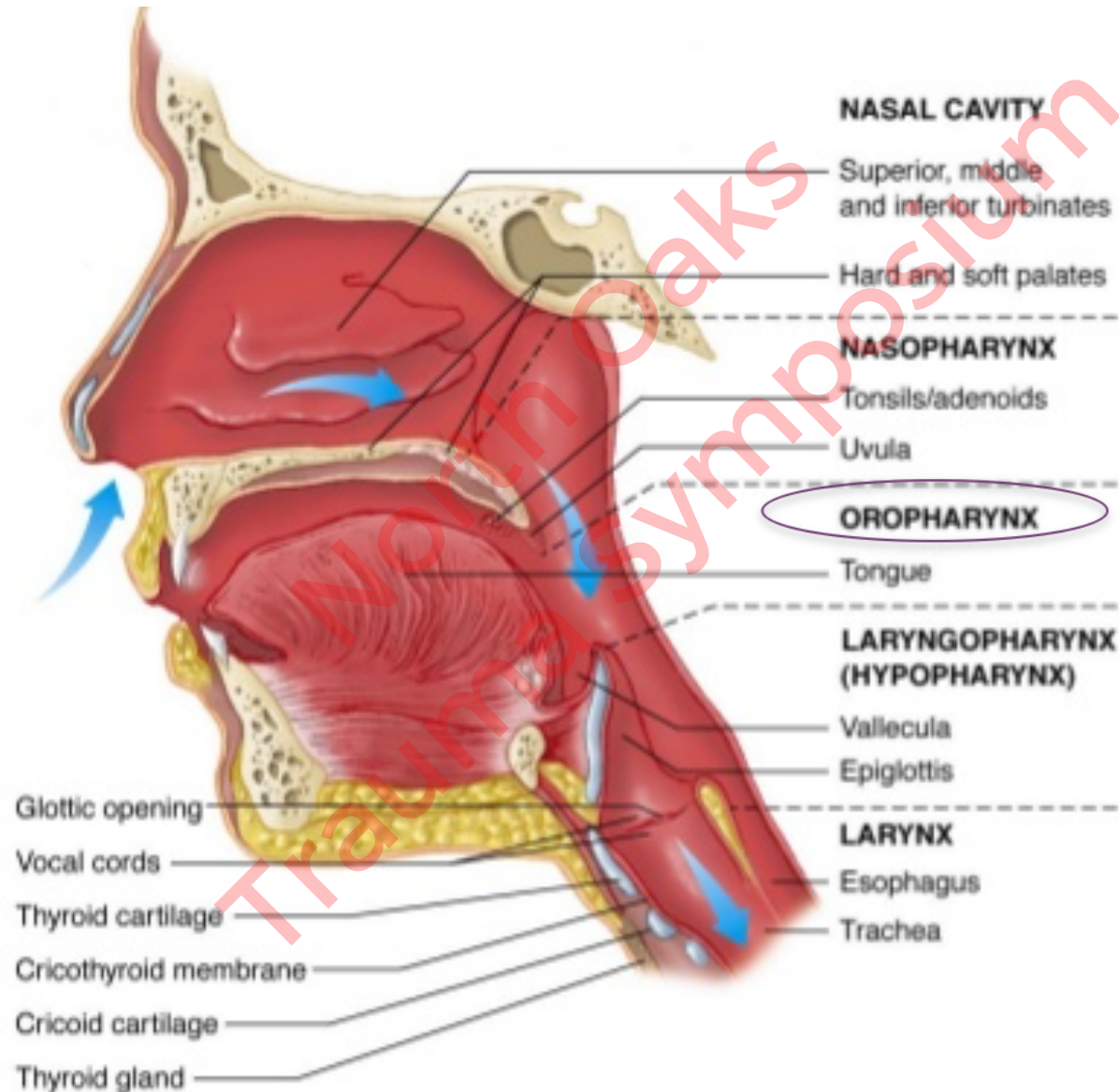
- Airway obstruction is the most **rapid demise** of the trauma patient
- Airway management is always the **first** step



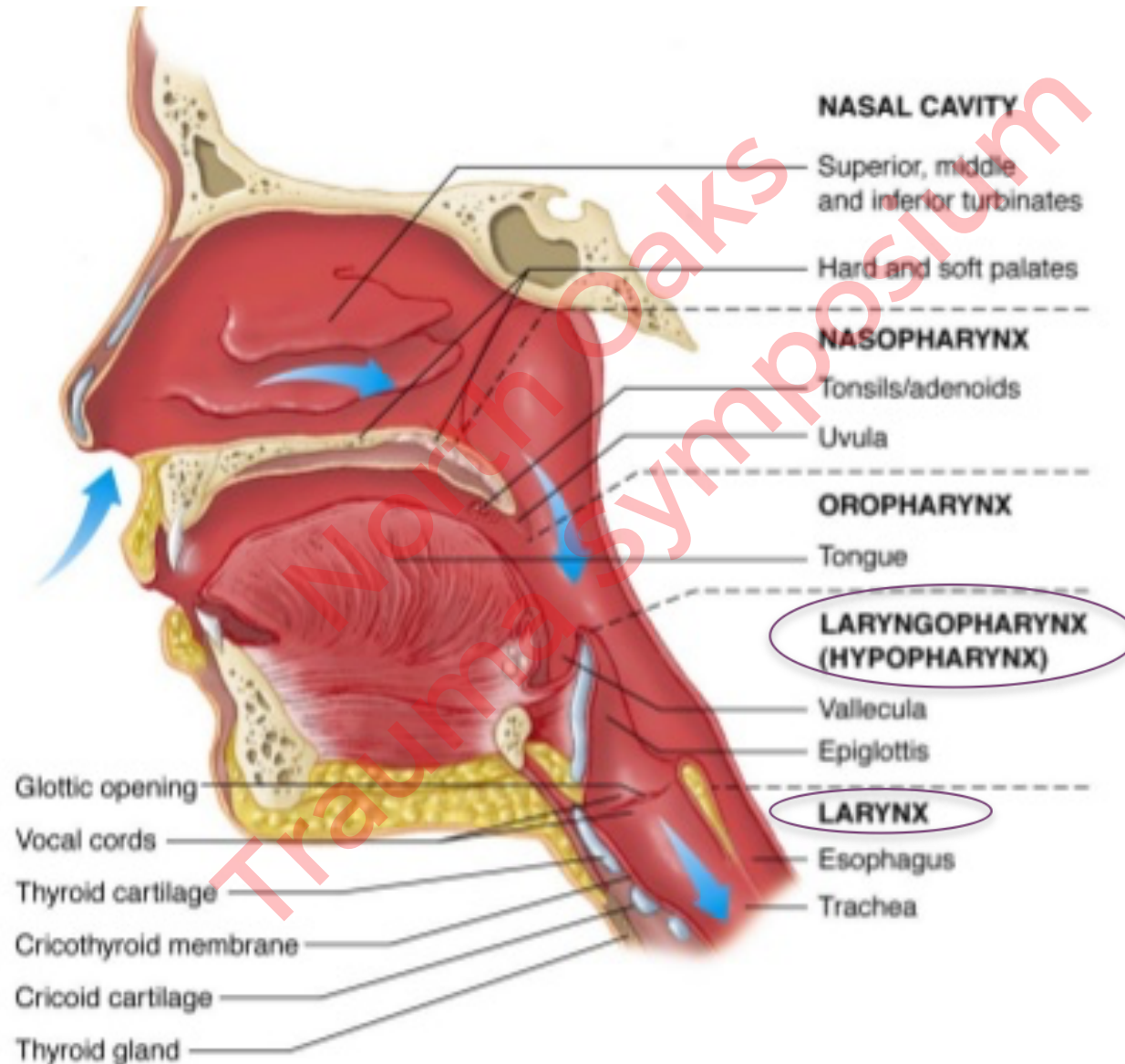
+ Anatomy of the upper airway



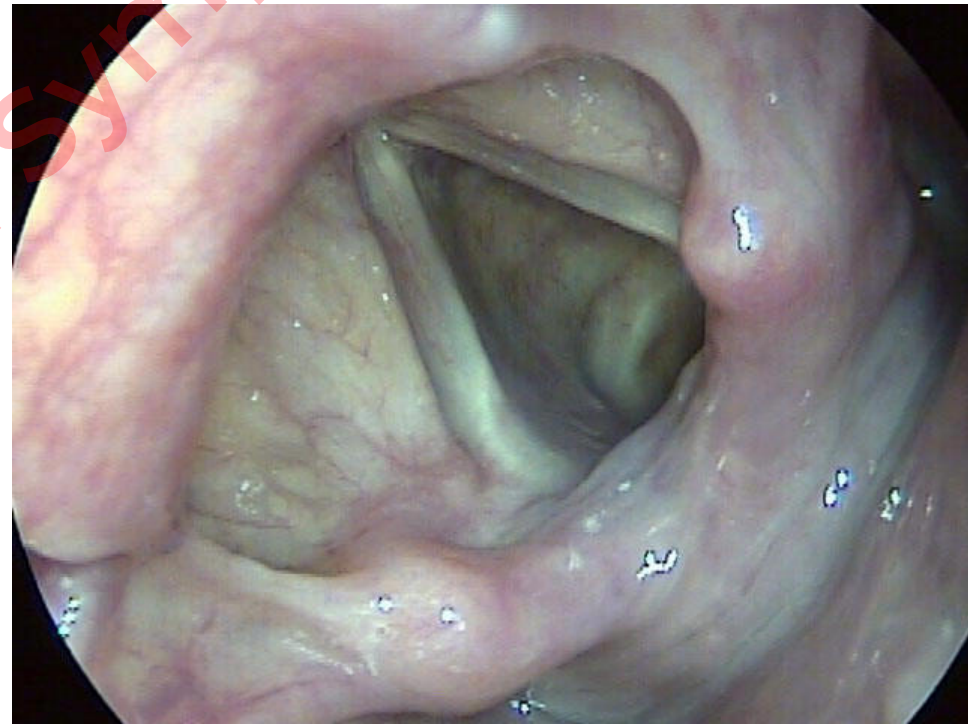
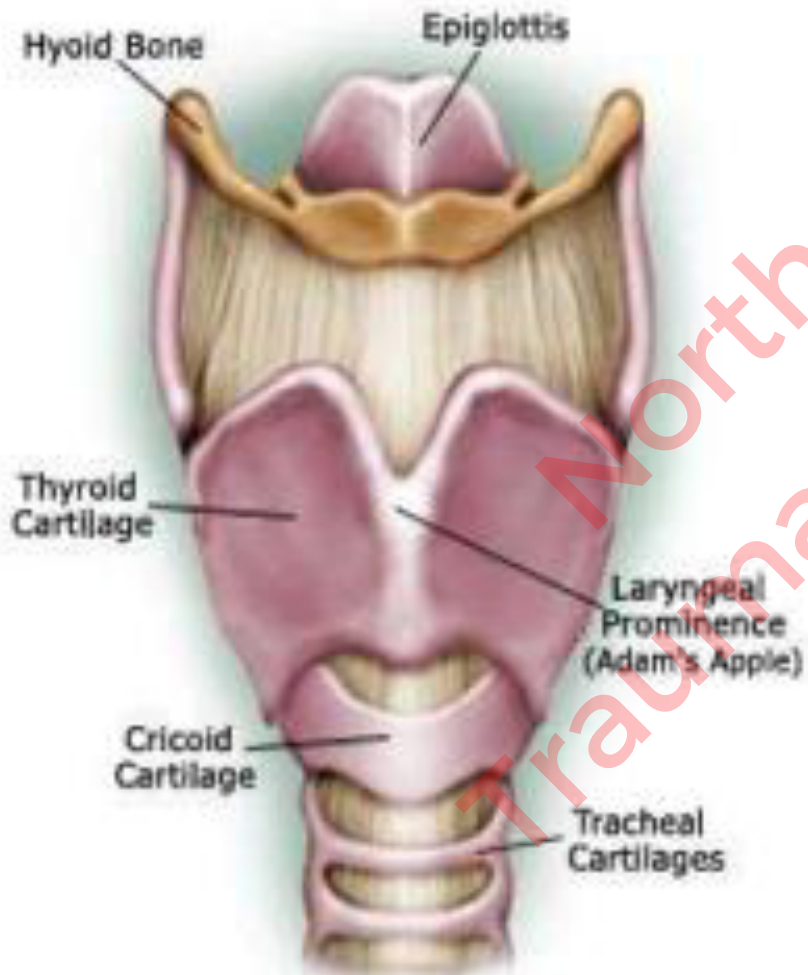
+ Anatomy of the upper airway



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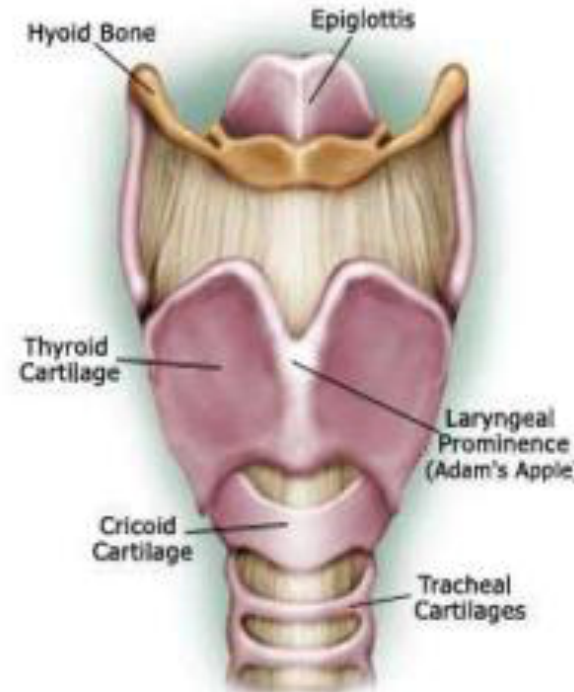
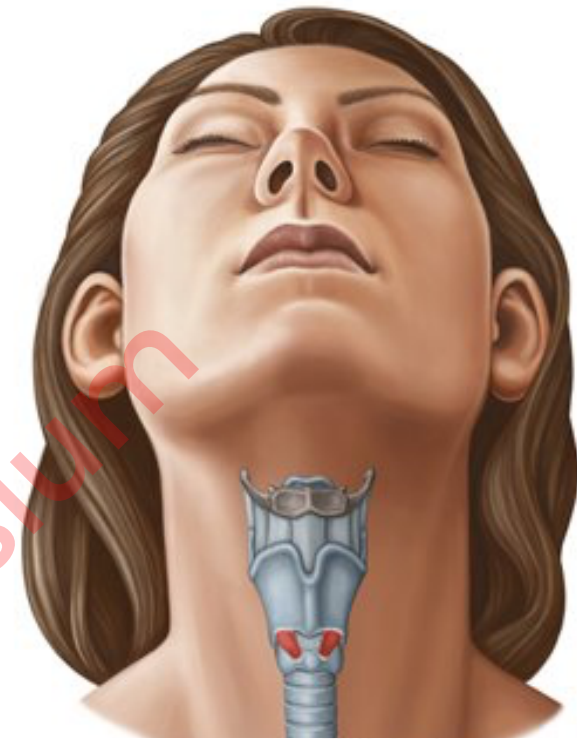
+ Anatomy of the Larynx

- Well protected

- Mandible
- Sternum
- Neck flex

- Support

- Hyoid bone
- Thyroid Cartilage
- Cricoid Cartilage



+ Oral cavity and Oropharynx

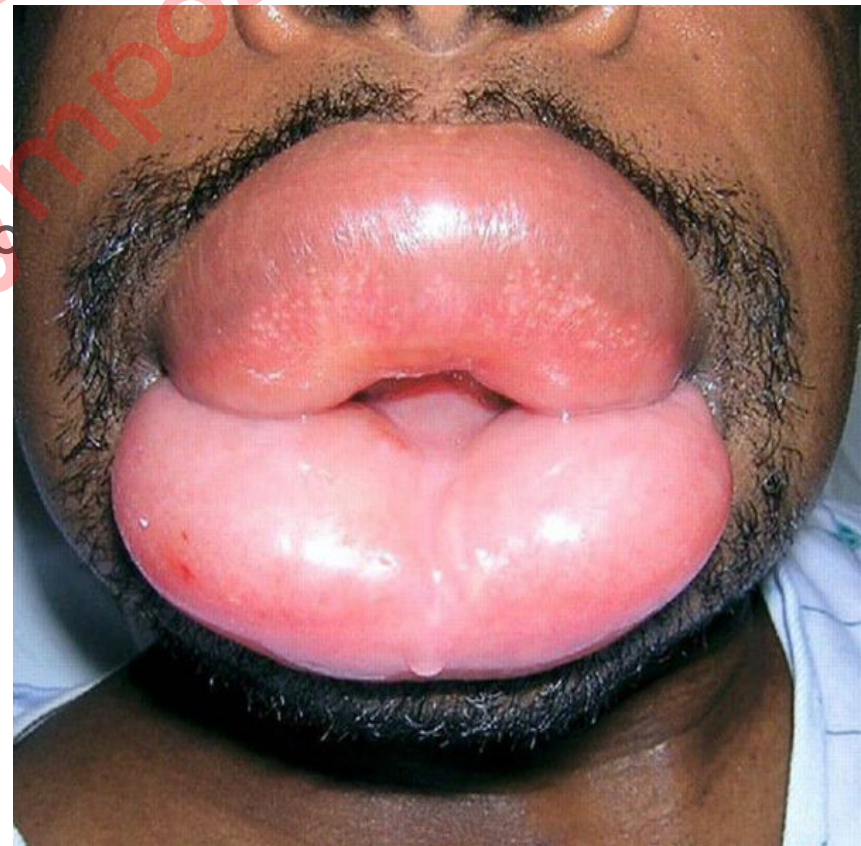
- Allergic Reactions

- Tissue swelling because of fluid leaking from small vessels
- Histamine and etc.

- Food

- Nuts, Soy, Milk, Shellfish, Medication

- Insect bites



+ Oral cavity and Oropharynx

- **Trauma**

- **Unpredictable**

- Infections

- Dental

- Angioedema

- ACE inhibitors



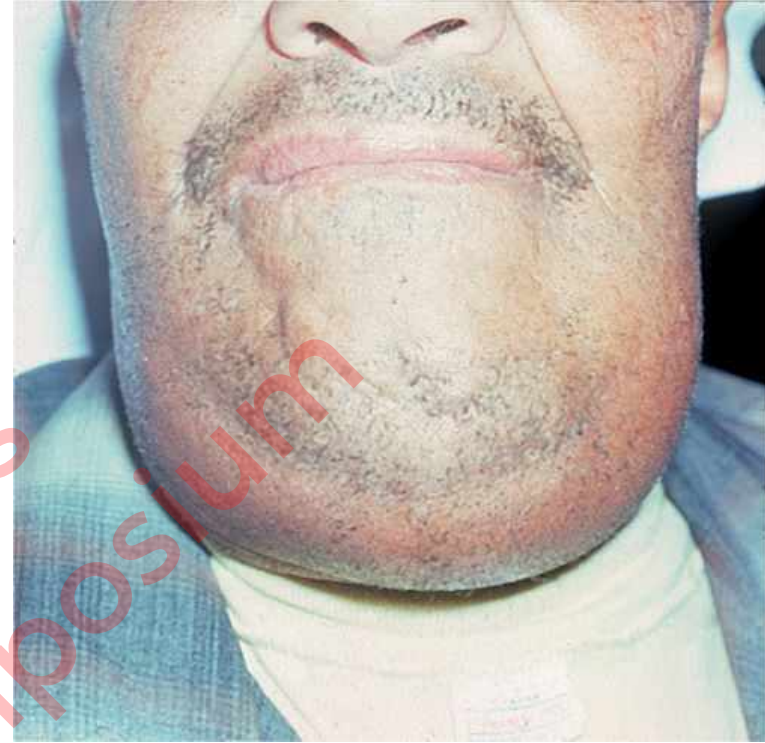
+ Oral cavity and Oropharynx

- Trauma
 - Unpredictable
- **Infections**
 - Dental
 - Mandible (XRT)
 - Ludwig's Angina
- Angioedema
 - ACE inhibitors

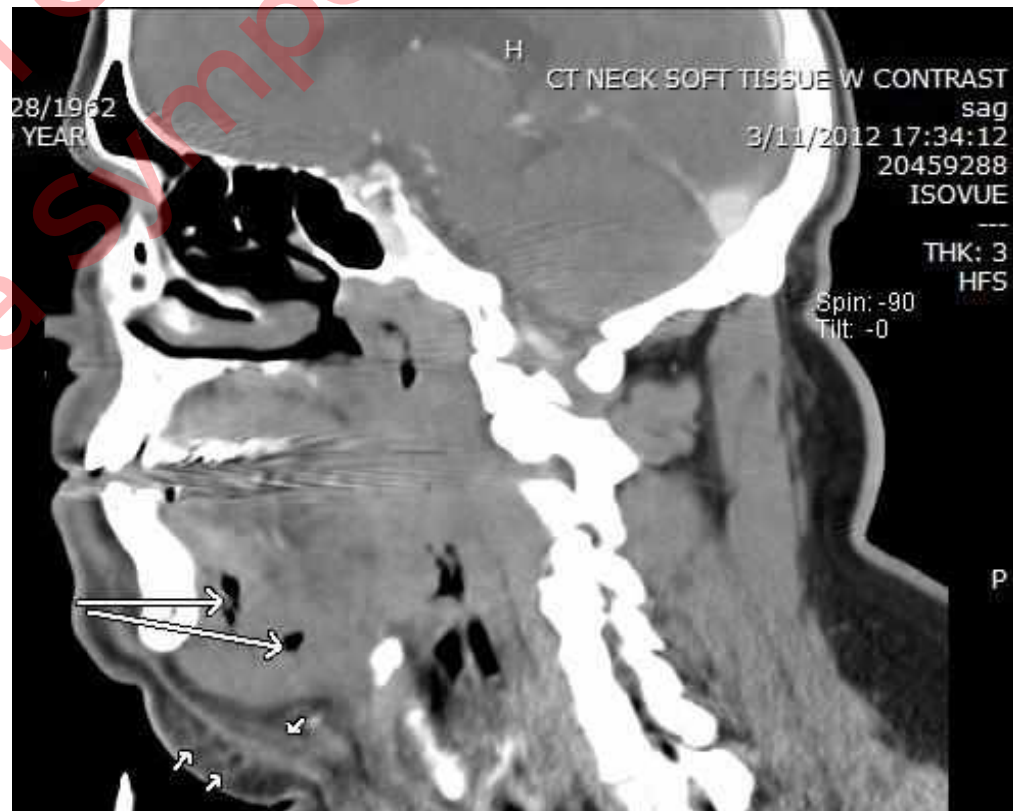
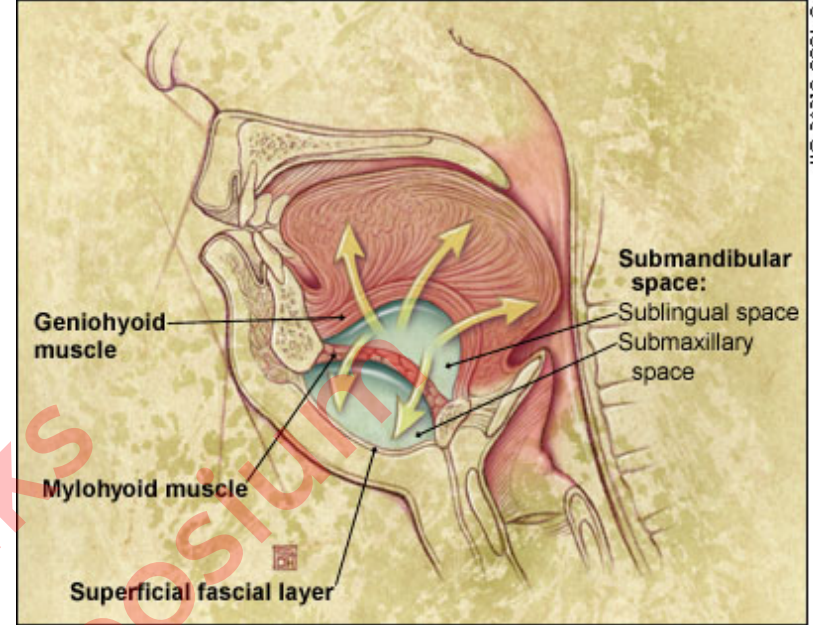


+ Ludwig's Angina

- Floor of mouth swelling causing the tongue to push against the palate
- Dental infection or trauma
- Symptoms
 - Pain/tenderness
 - Drooling
 - Issues w Speech
- Exam
 - Hardening of the floor of mouth



+ Ludwig's Angina



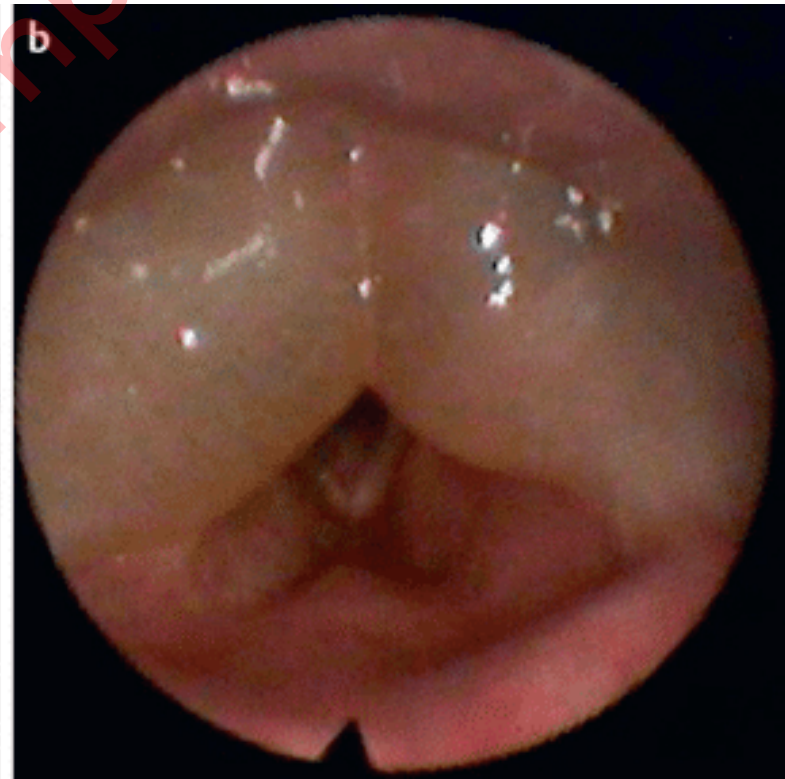
+ Oral cavity and Oropharynx

- Trauma
 - Unpredictable
- Infections
 - Dental
 - Mandible (XRT)
 - Ludwig's Angina
- Angioedema
 - **ACE inhibitors**



+

Oral cavity and Oropharynx



+ Angioedema

ACE Inhibitors

- 0.1% to 0.7% of the patients on ACE-I
 - Persistent and constant over time
 - >1/3 cases first week
 - Other 2/3 may take years to present
- 5x more likely in African descent
- 20% to 40% of ED angioedema
- 35% of all antihypertensive are ACE –I
 - 40 million people
- Absence of itching or urticaria
- Swelling occurs over minutes to hours, then peaks and resolves over 24-72 hours



Fragmentation products

Angiotensin I

ACEi

ACE

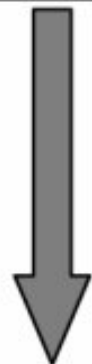
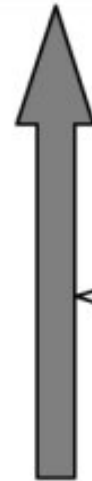
ACEi

Bradykinin

Angiotensin II

↑ Vascular permeability and angioedema

Vasoconstriction and hypertension



North Oaks Trauma Symposium

Histamine mediated

Bradykinin mediated

Swelling of lips/tongue

Urticaria

Itching

Laryngeal swelling

Facial swelling

Rapid onset

Abdominal pain

Response to epinephrine

Abdominal swelling

Nausea and vomiting

Hypotension/shock

Peripheral swelling

Wheeze

Genitourinary swelling

+ Angioedema

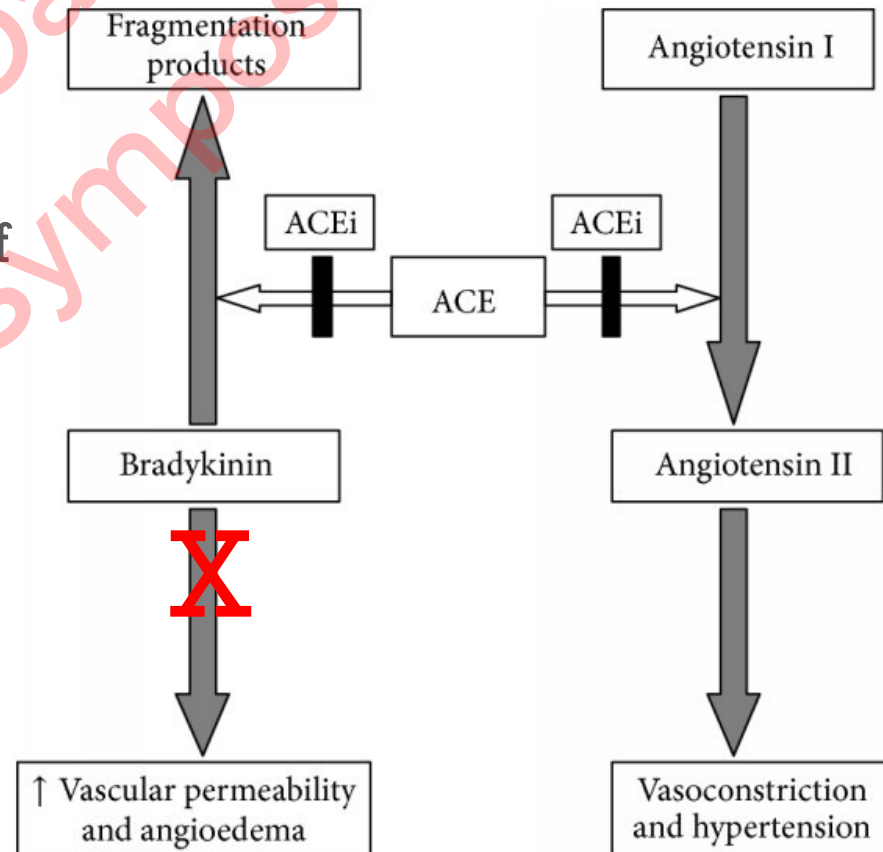
ACE Inhibitors



- **Hospitalizations for ACE-I angioedema have increased over the last 15 years likely due to more meds prescribed over this same period**
 - 2003 v 2018
- Mortality data is lacking
- Fatal laryngeal attacks within as little as 15 min has been reported
- Lack of protocols can lead to treatment errors and poor outcomes

+ What about FFPs?

- Case reports/series
- FFPs is a treatment option for hereditary angioedema 1st described in 1969 (Gewurz et al, 1969)
- FFPs contains C1-INH and ACE which catalyzes the breakdown of bradykinin
- Refractory to steroids and H1/H2 blockers
 - Most of the studies use 2U



Using Fresh Frozen Plasma for Acute Airway Angioedema to Prevent Intubation in the Emergency Department: A Retrospective Cohort Study

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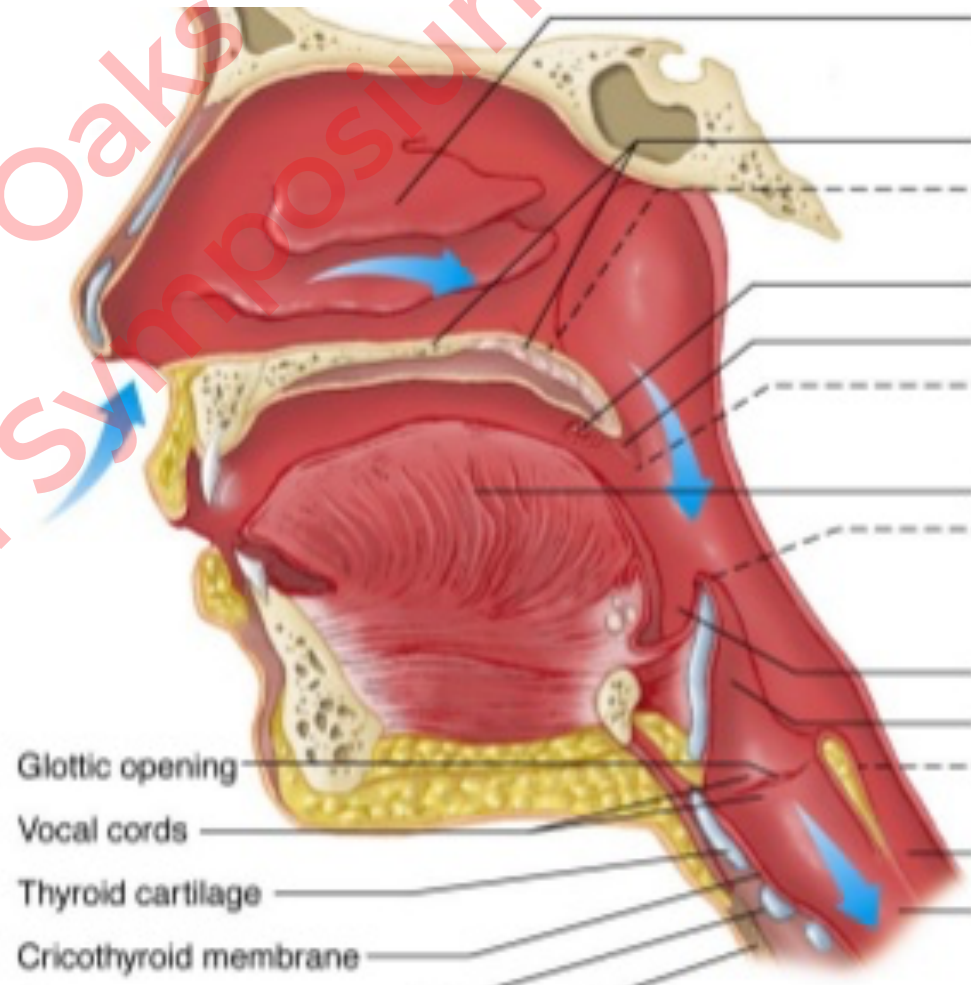
Background. Angioedema (AE) is a common condition which can be complicated by laryngeal edema, having up to 40% mortality. Although sporadic case reports attest to the benefits of fresh frozen plasma (FFP) in treating severe acute bouts of AE, little evidence-based support for this practice is available at present. **Study Objectives.** To compare the frequency, duration of intubation, and length of intensive care unit (ICU) stay in patients with acute airway AE, with and without the use of FFP. **Methods.** A retrospective cohort study was conducted, investigating adults admitted to large community hospital ICU with a diagnosis of AE during the years of 2007–2012. Altogether, 128 charts were reviewed for demographics, comorbidities, hospital courses, and outcomes. A total of 20 patients received FFP (108 did not). **Results.** Demographics and comorbidities did not differ by treatment group. However, nontreated controls did worse in terms of intubation frequency (60% versus 35%; $p = 0.05$) and ICU stay (3.5 days versus 1.5 days; $p < 0.001$). Group outcomes were otherwise similar. **Conclusion.** In an emergency department setting, the use of FFP should be considered in managing acute airway nonhereditary AE (refractory to steroid, antihistamine, and epinephrine). Larger prospective, better controlled studies are needed to devise appropriate treatment guidelines.



Evaluation and Management

(Should be able to see from across the room)

- Are they moving air?
 - Nose and mouth
 - Stridor
- Conscious?
- Can they talk / handle oral secretions?
- Oxygen saturation
 - Are they cyanotic or grey?
- Do we have suction available
 - Blood
 - Secretions / Saliva
 - Vomit



+ Evaluation and Management

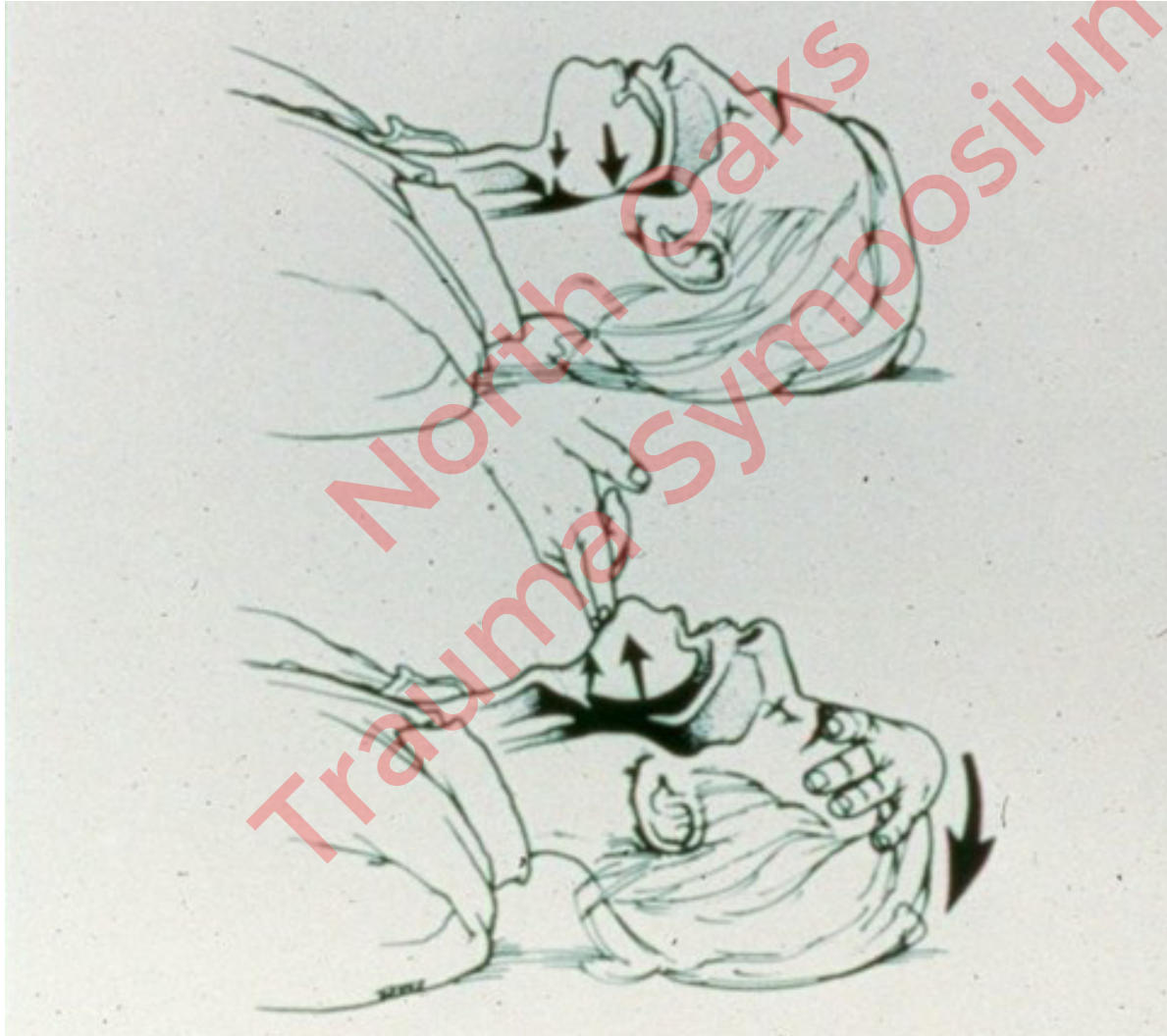
- Airway management precautions
 - Always immobilize the neck in the event of a C-spine injury
 - Avoid distraction





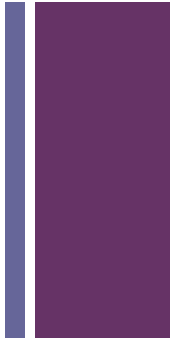
Evaluation and Management

Chin lift and head tilt



+ Evaluation and Management

Airway Adjunct

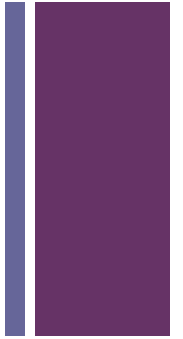


- **Nasopharyngeal airway**
 - Soft, flexible, uncuffed tube
 - Sits above the larynx /behind tongue
 - Tongue swelling
 - Bleeding / facial trauma
 - Nearly comatose but breathing spontaneously
 - Avoid in severe facial trauma
- **Oropharyngeal Airway**
- Bag – valve - mask

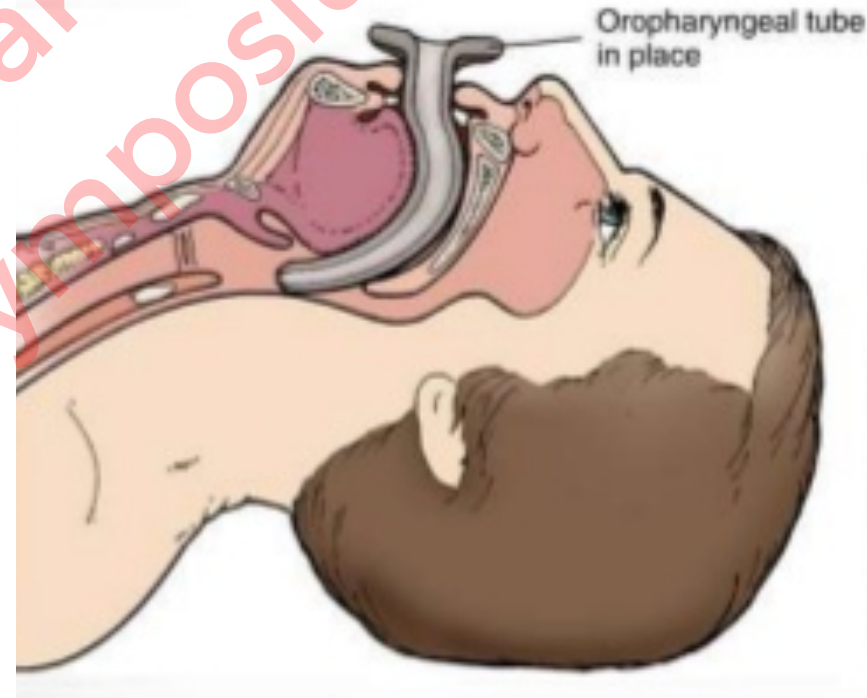


+ Evaluation and Management

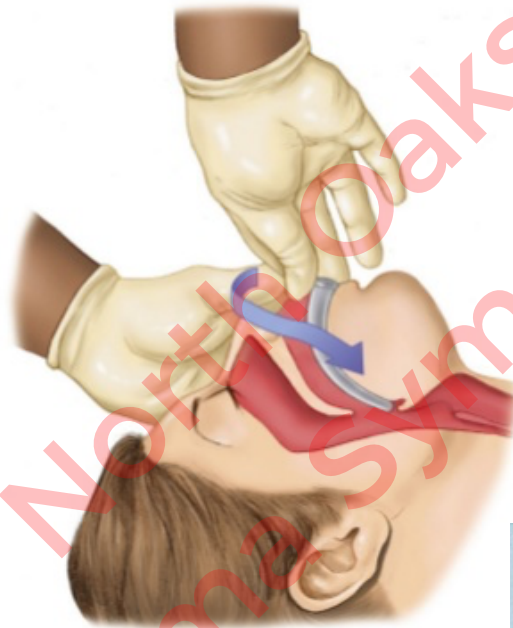
Airway Adjunct



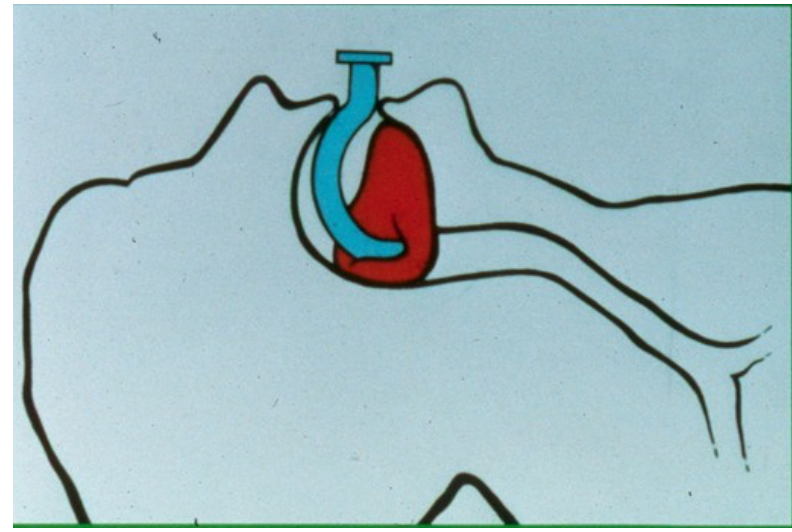
- Nasopharyngeal airway
- **Oropharyngeal Airway**
 - Curved plastic device that moves the tongue away from the posterior oropharyngeal wall
 - Place past the tongue with the flange flush with teeth
 - Unconscious patient w/o gag reflex
 - Facial trauma
- Bag – valve - mask



+ Oropharyngeal Airway

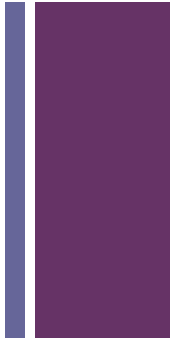


- 90° v 180°
- Can use a tongue depressor if available



+ Evaluation and Management

Airway Adjunct



- Oropharyngeal Airway
- Nasopharyngeal airway
- **Bag – valve - mask**



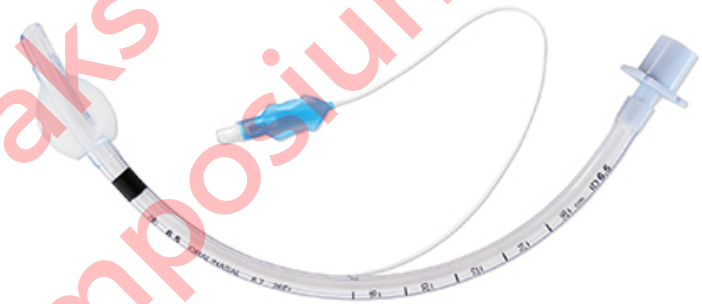
+ Endotracheal Intubation

- Can't protect the airway
- Unconscious / decreased mental status
 - Preoxygenate w bag-valve-mask
 - OK to keep w bag
- Risk of aspiration
- Disadvantage
 - Requires training and experience
 - Requires equipment
 - Requires direct visualization of the vocal cords

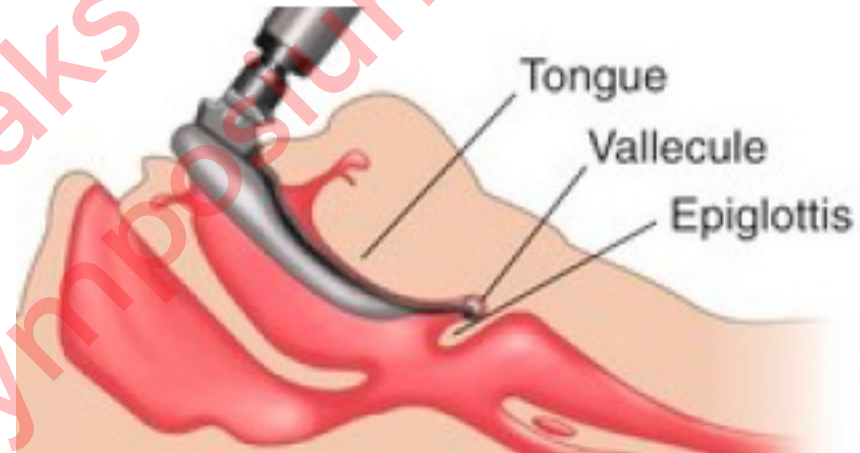
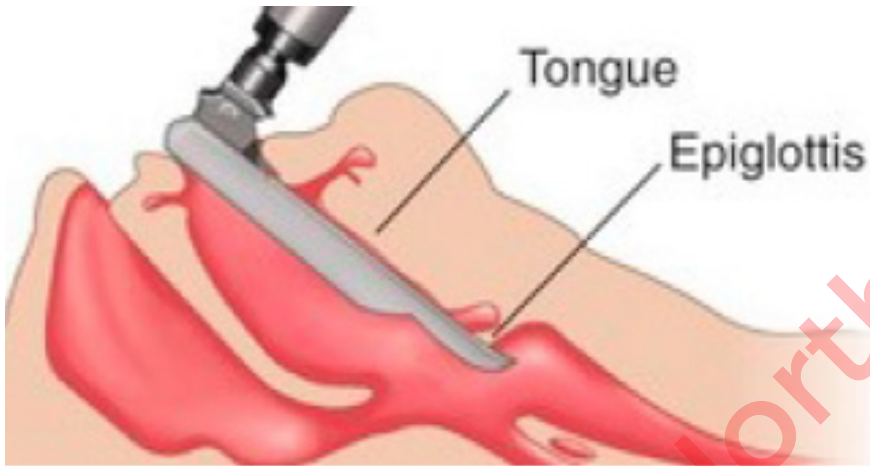


+ Evaluation and Management

- Endotracheal intubation is the preferred method of advanced airway management

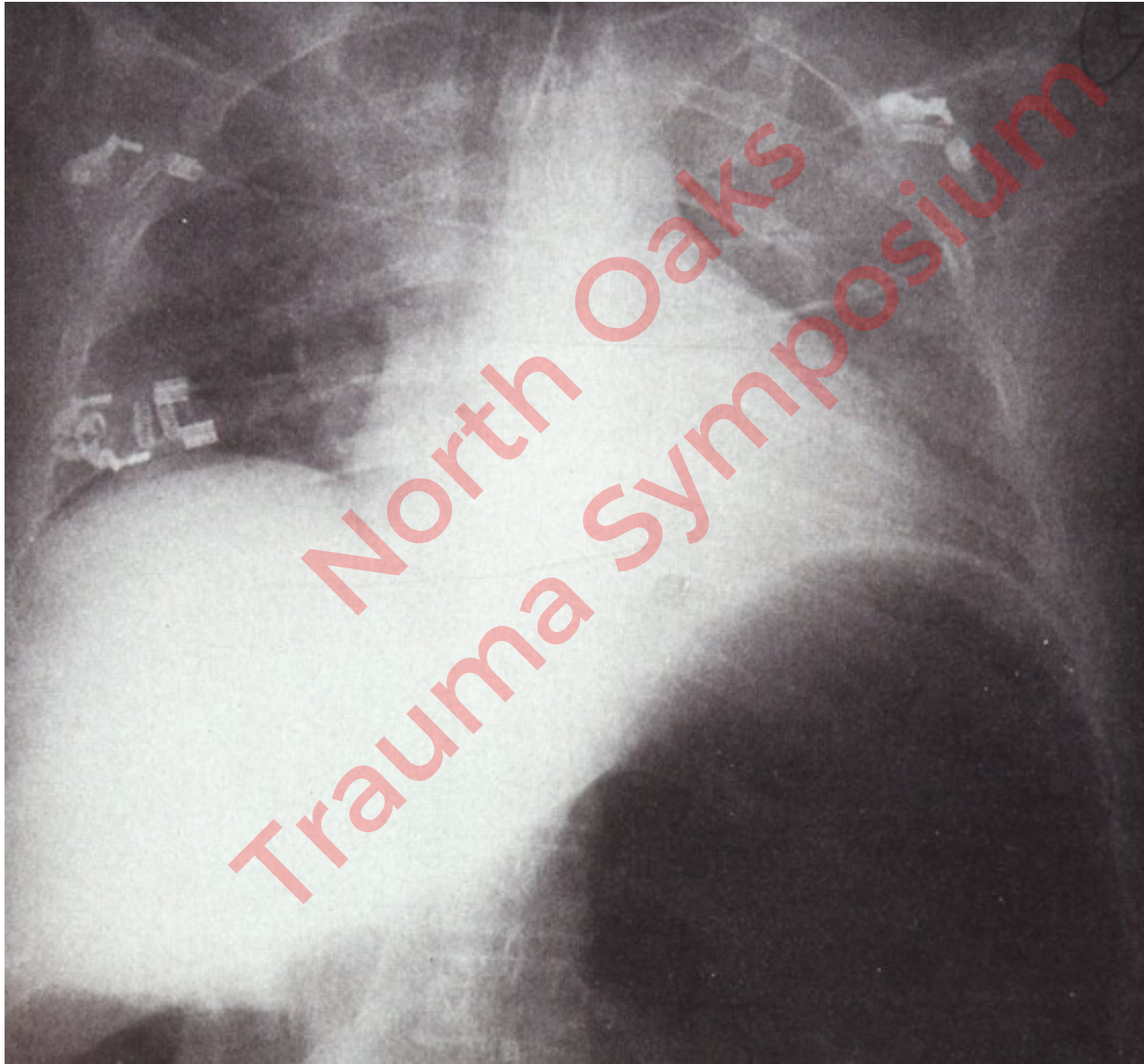


+ Endotracheal Intubation





What happened?



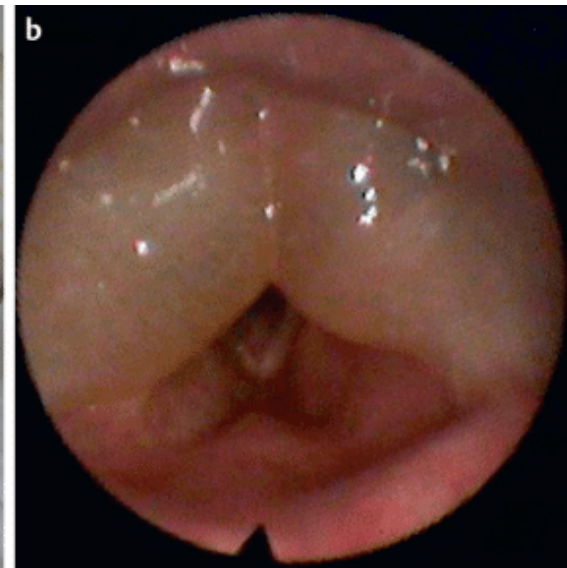
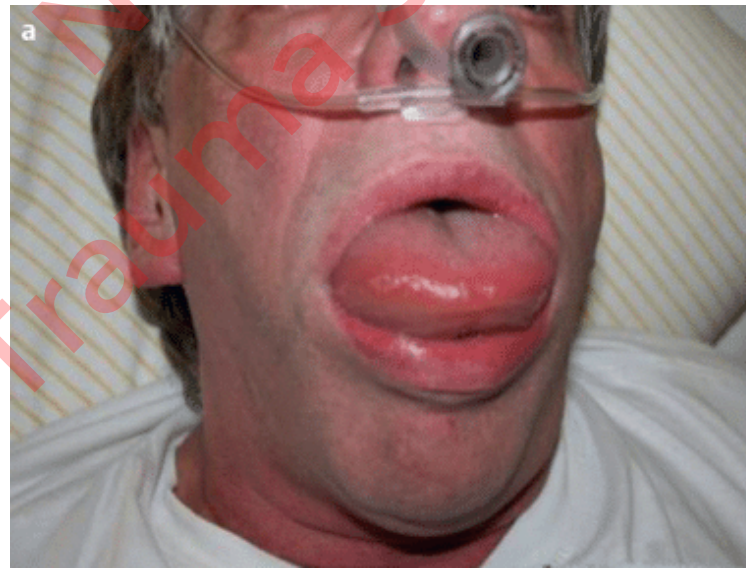
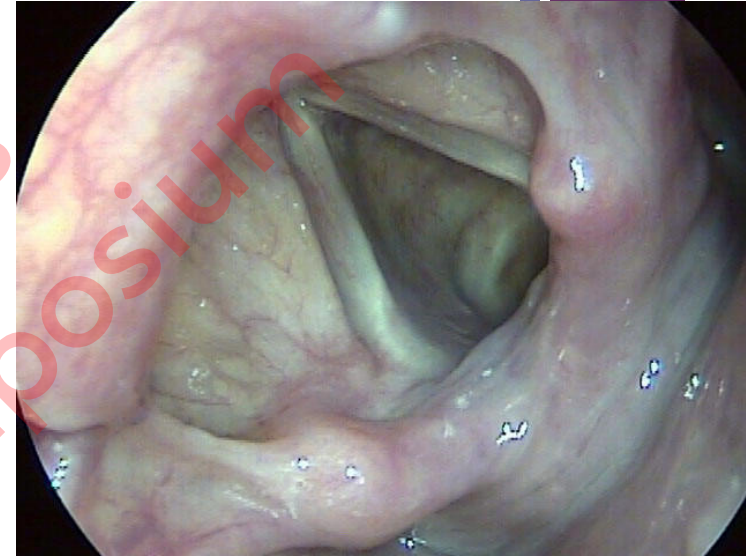
+ Intubation

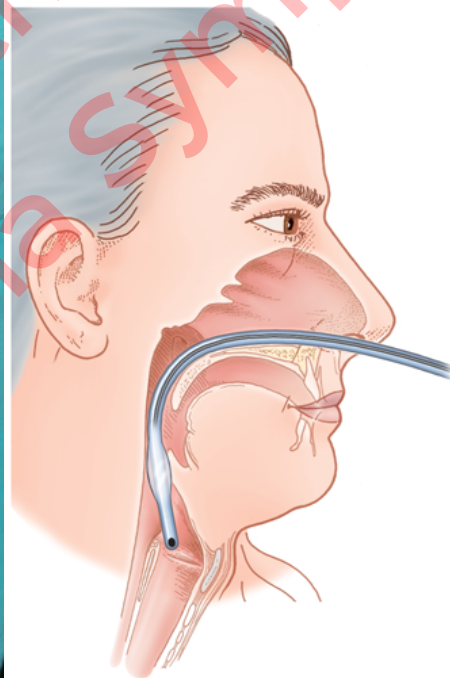
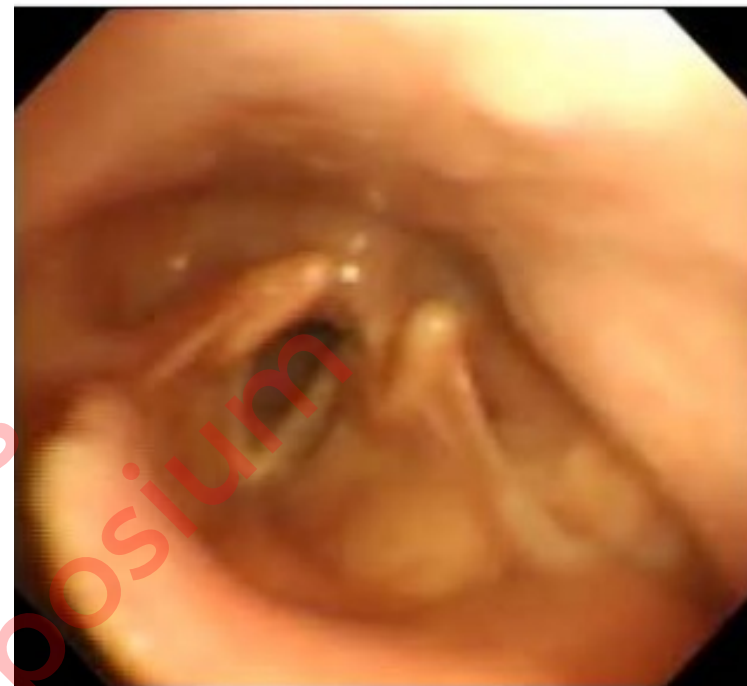
- Listen to chest
- Use end tidal CO₂ detector



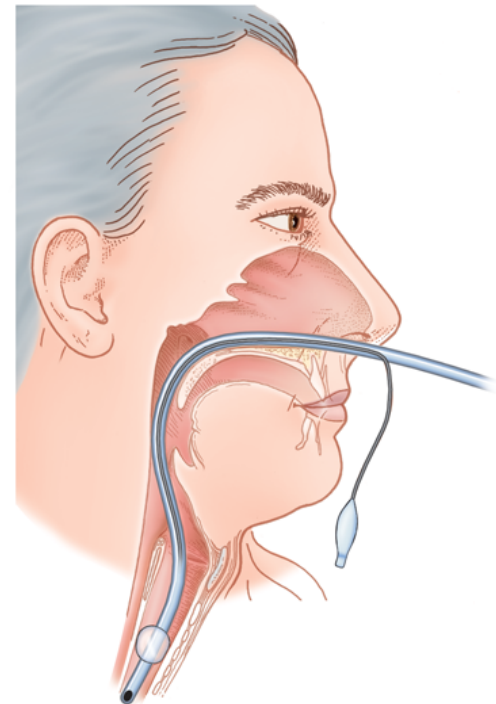
+ Nasotracheal Intubation

- Extensive facial fracture
 - Suicide attempt
 - MVC
- Too much tongue swelling
- Possible spine injury
- Clenched teeth





D





Need an Airway!!!!

**DON'T
PANIC**

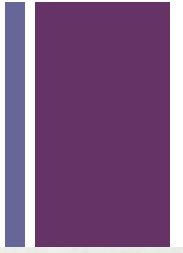


Trauma Oaks Symposium



Need an Airway!!!!

Combitube



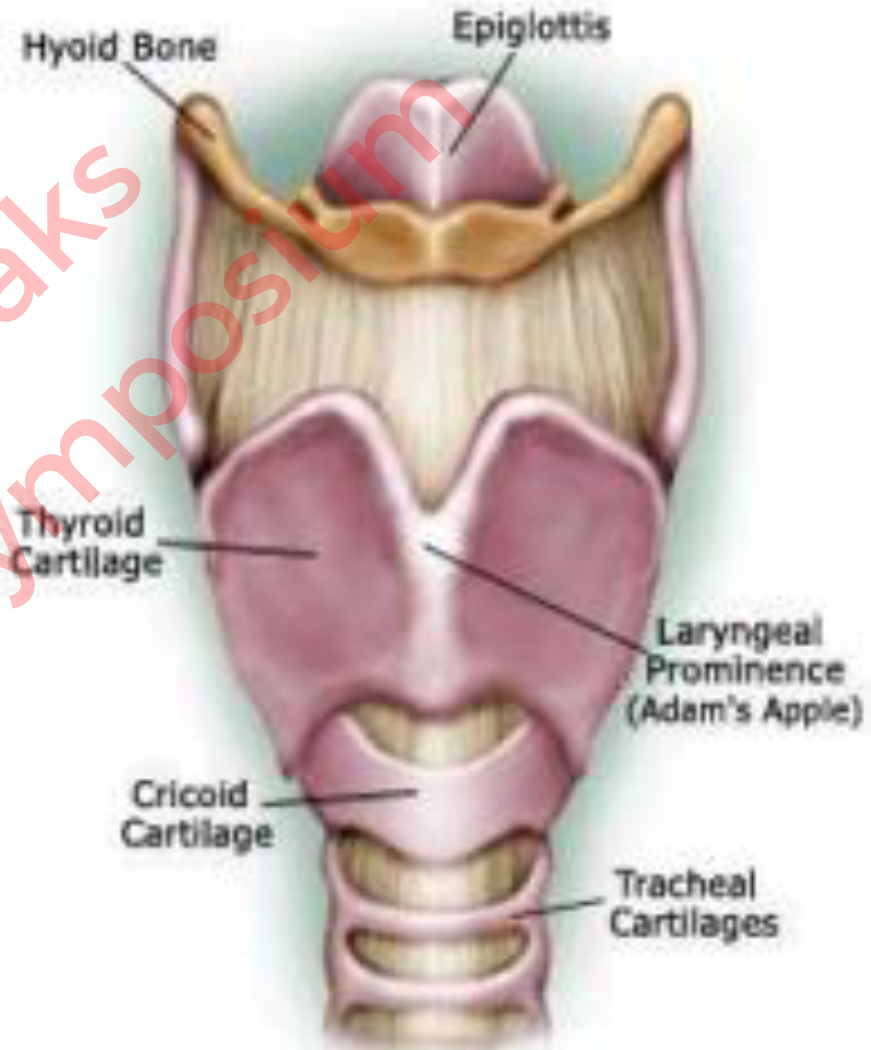


When to move on to a surgical airway?

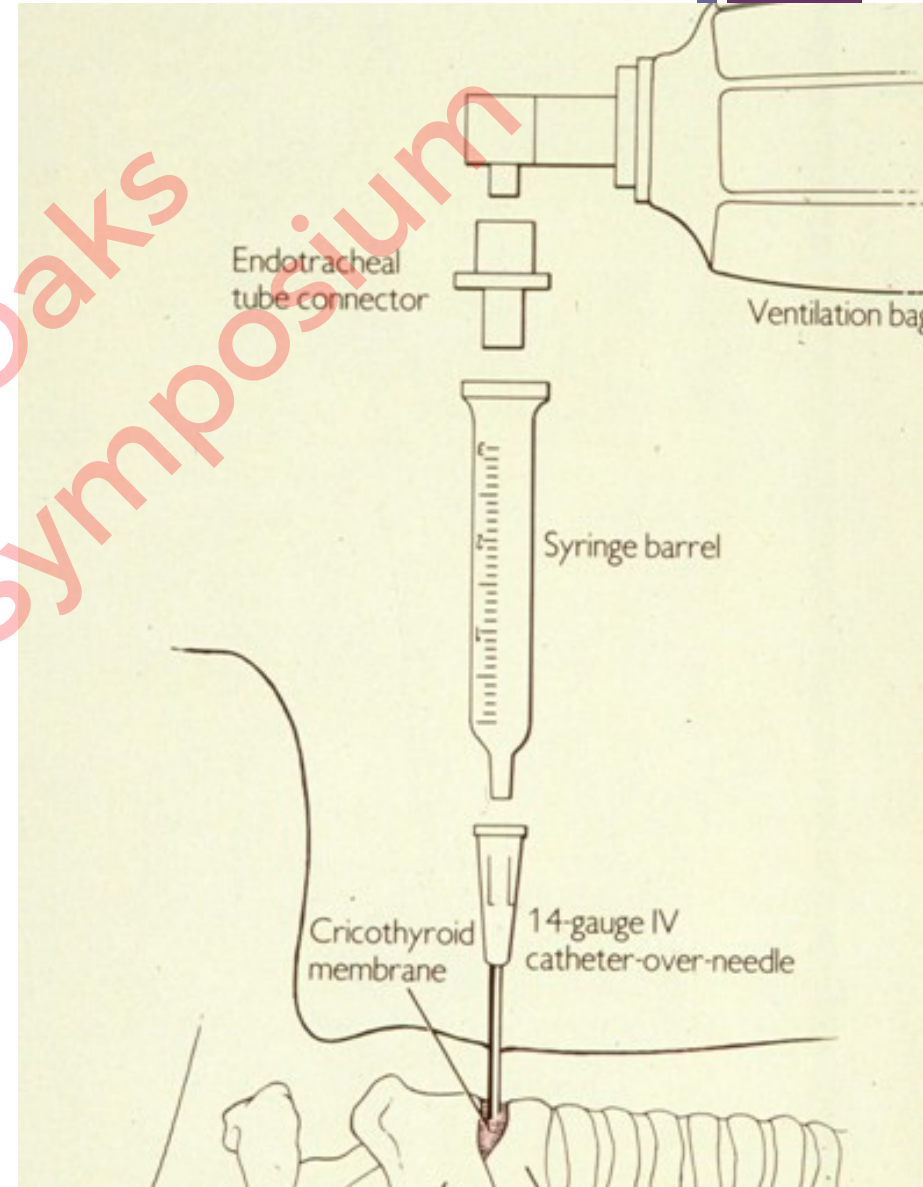
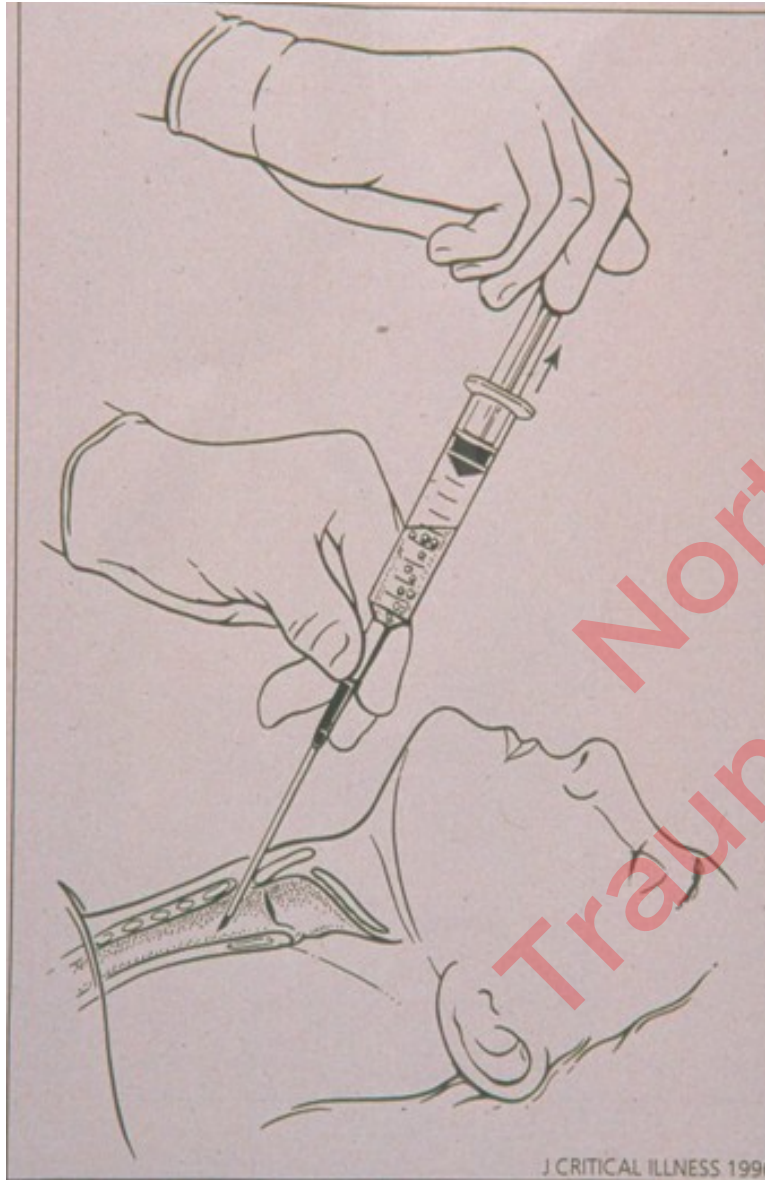
- Inability or not safe to use the nose or mouth to intubate.
- Upper airway obstructed and need an airway



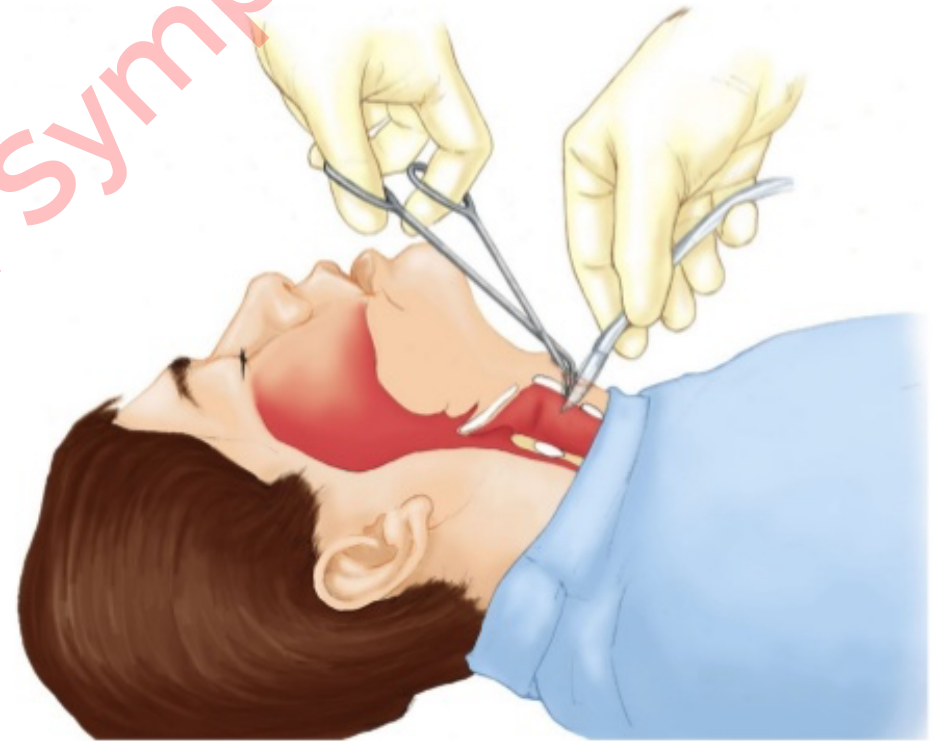
+ Cricothyrotomy



+ Cricothyrotomy



+ Cricothyrotomy



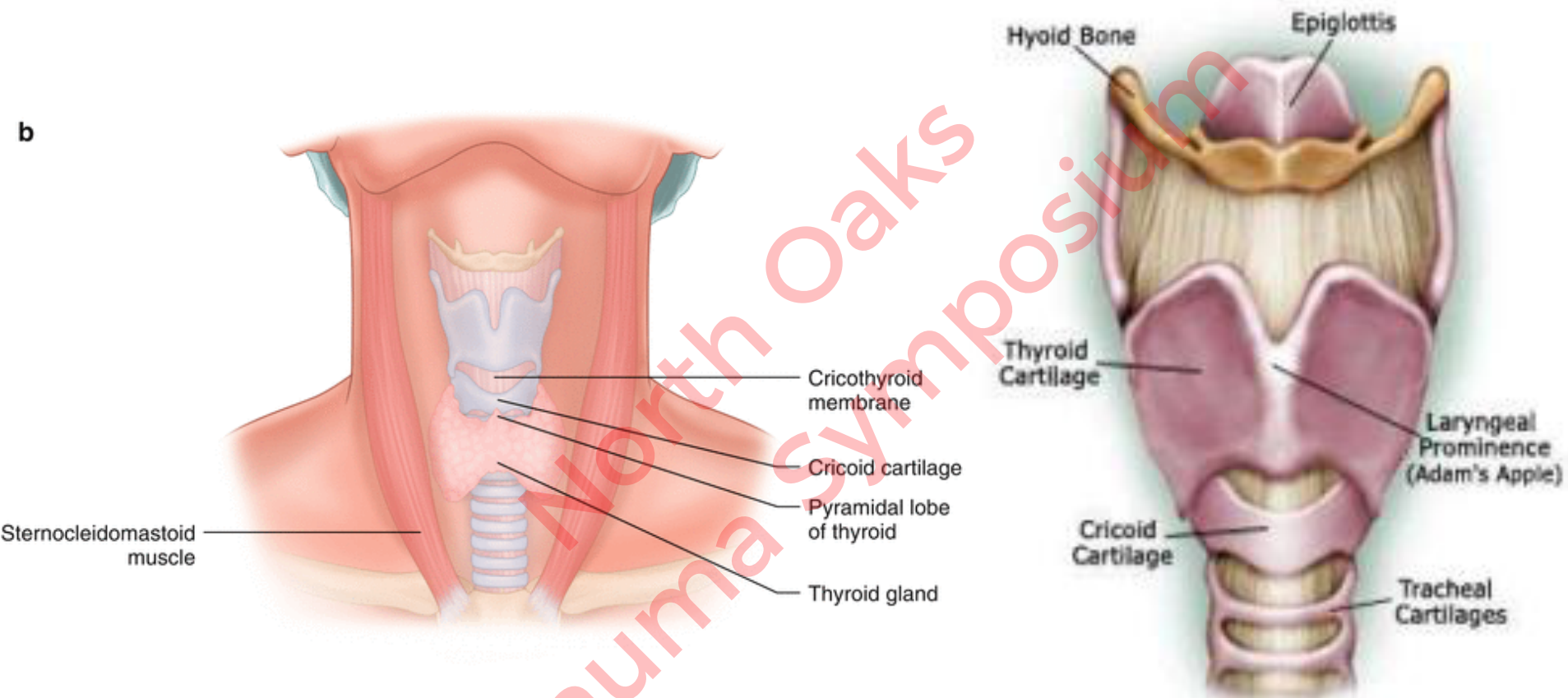
North Oaks
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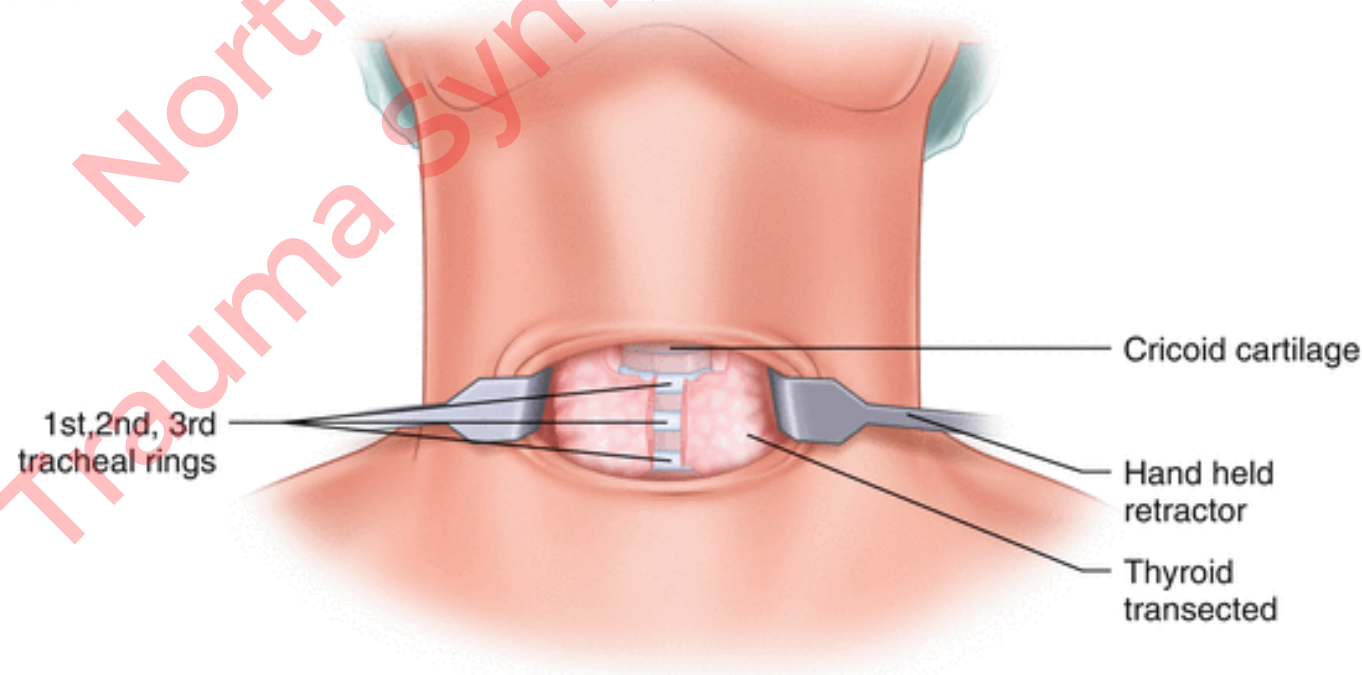
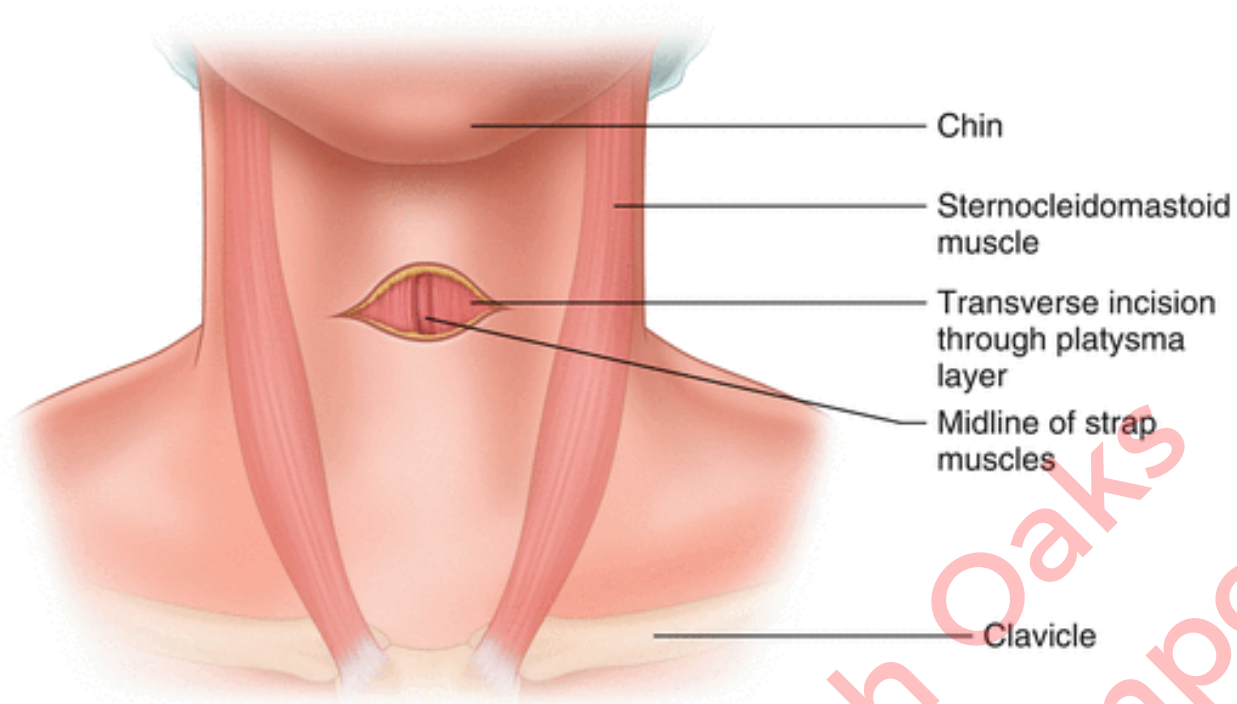


+ Cricothyrotomy

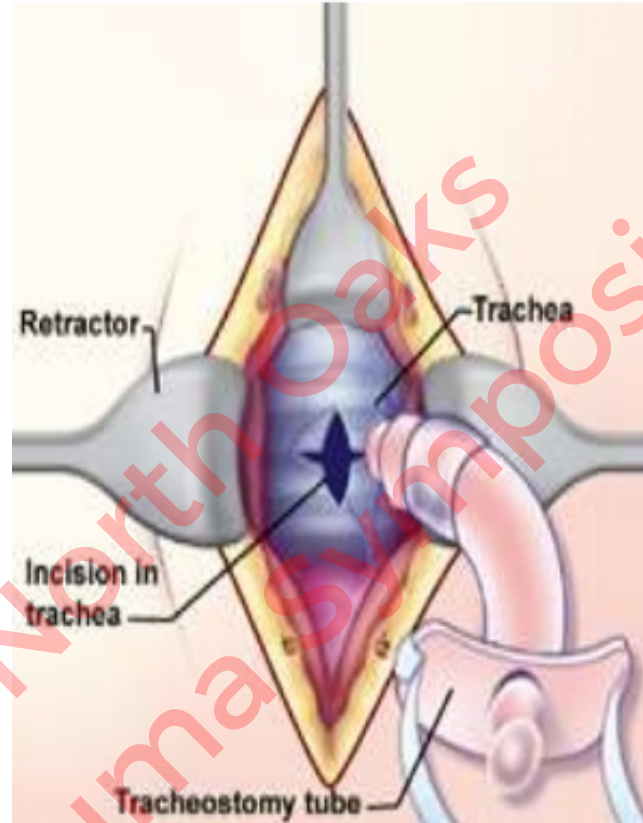
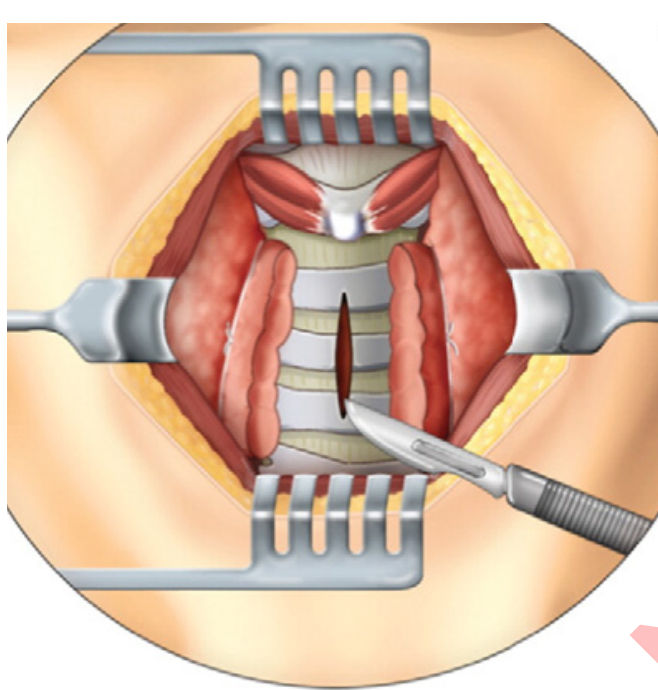


Tracheostomy

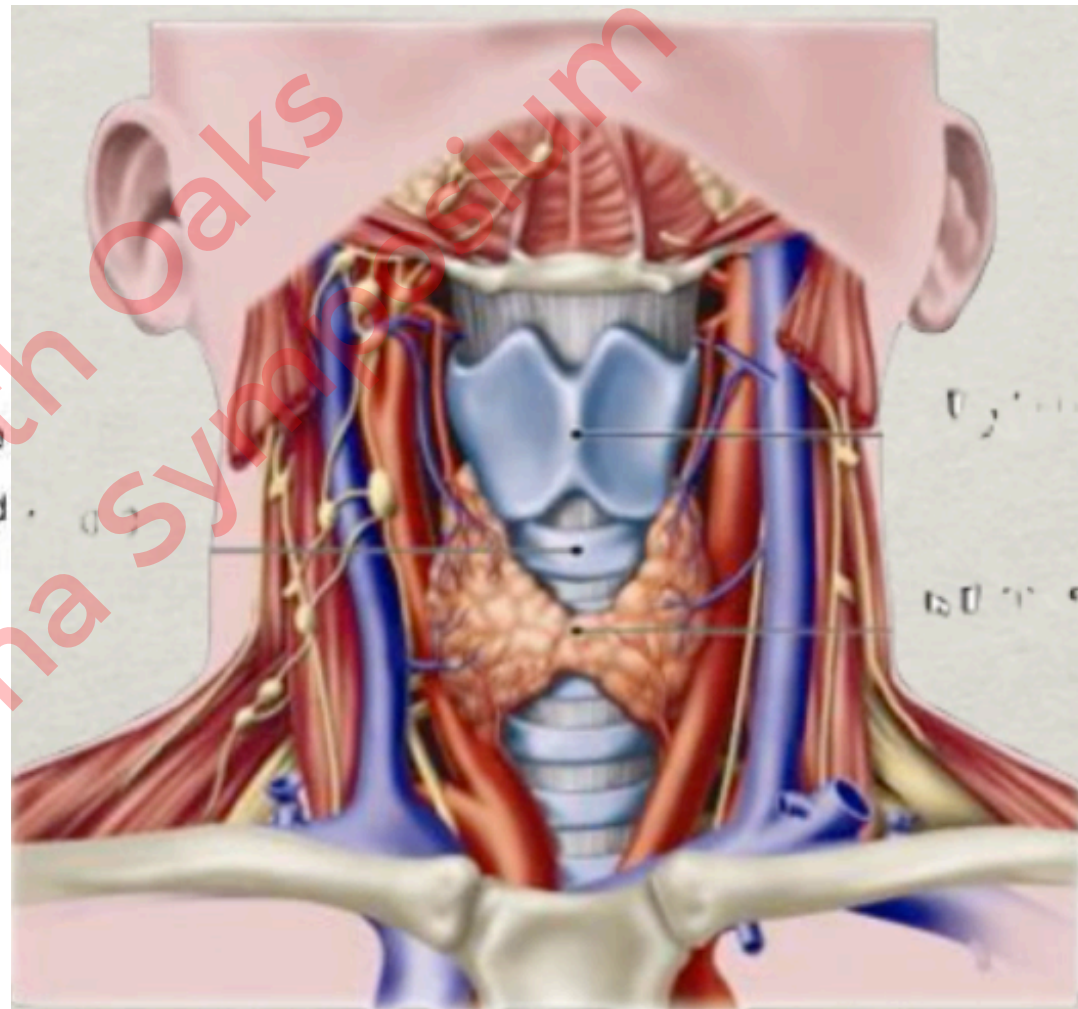




Tracheostomy



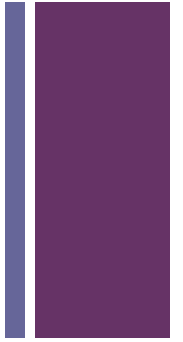
Tracheostomy







Acknowledgements



- EMS
- ED Staff
- Trauma Team
- Operating Room Staff
- ICU / Floor Nurses
- Family





Questions and Discussion

