

The Tough Stuff: Difficult Airway Management



By Rory Putnam, AA, NREMT-P, EMS I/C,
President/CEO-Owner

Atlantic Life Safety Services

Instructor-Emergency Medical Teaching Services

Paramedic-Boothbay Regional Ambulance Service

rputnam@atlanticlifesafety.com

Some people will do anything for a tube.....



Things I've Learned From Children

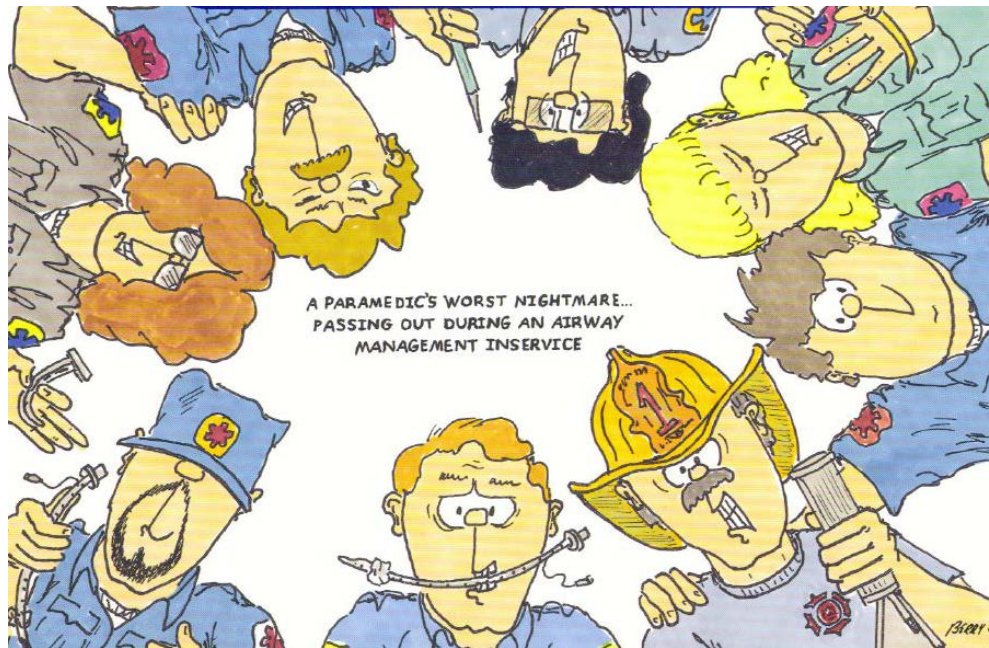
- ◆ Garbage bags do not make good parachutes.
- ◆ When you hear the toilet flush and the words “Uh-oh,” it’s already too late.
- ◆ Super glue is forever.
- ◆ VCR’s do not eject PB&J sandwiches even though TV commercials show they do.
- ◆ A king size waterbed holds enough water to fill a 2000 sq. foot house 4 inches deep.



...So I said “Hey Ya’ll...watch this”.....

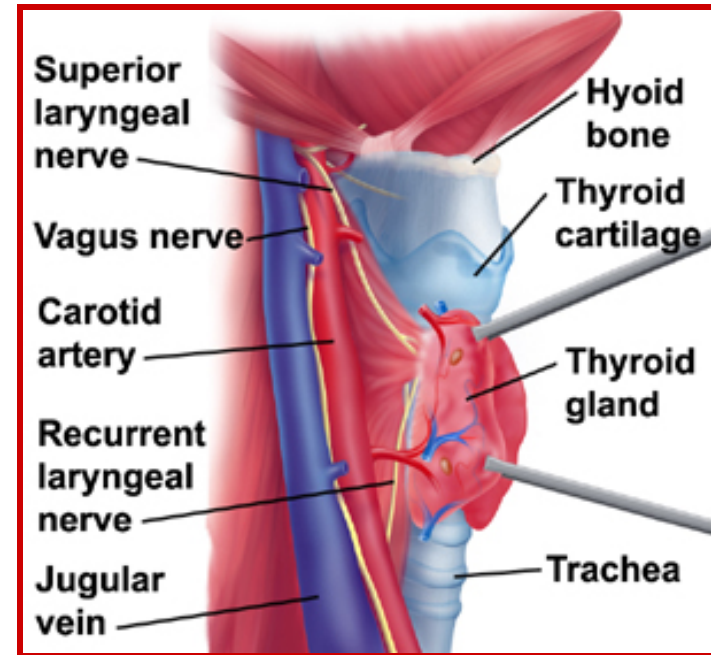
Goals

- ◆ Predict a difficult airway based on clinical criteria
- ◆ Plan for appropriate action in the difficult airway
- ◆ Initiate appropriate plans of attack with confidence in the “Can’t Ventilate/Can’t Intubate” (CVCI) situation
- ◆ Become informed about airway options available.



What this class assumes :

- ◆ You already understand basic airway anatomy
- ◆ You already have a basic understanding of BLS airway maneuvers and ET Intubation by Oral and Nasal means
- ◆ That the concept and procedure of RSI is well understood
- ◆ You are familiar with needle and traditional surgical airway procedures.
- ◆ You are an experienced operator in the field of EMS.



As Such:

- ◆ I have skipped over some of the basics to fit new stuff in the time allotted
- ◆ I have tried to entice your interest with some of the “Hot Topics” in airway management.
- ◆ Because:

**“A mind once stretched by new Ideas
never regains its original
dimensions...”**

Top 10 Lies told by Paramedics

1. Its not my fault, he kept moving.
2. This might hurt a little.
3. I did say clear first.
4. I know where I'm going.
5. It's OK, I'll cut along the seams.
6. The ambulance is clean.
7. It's the flu, not a hangover.
8. The gloves are for your protection.
9. The patient refused the treatment.
10. I'm in this for the money.

Why do we Intubate?

- ◆ Inability to protect and maintain patent airway.
- ◆ Failure of oxygenation or ventilation.
- ◆ Anticipated need based on clinical course



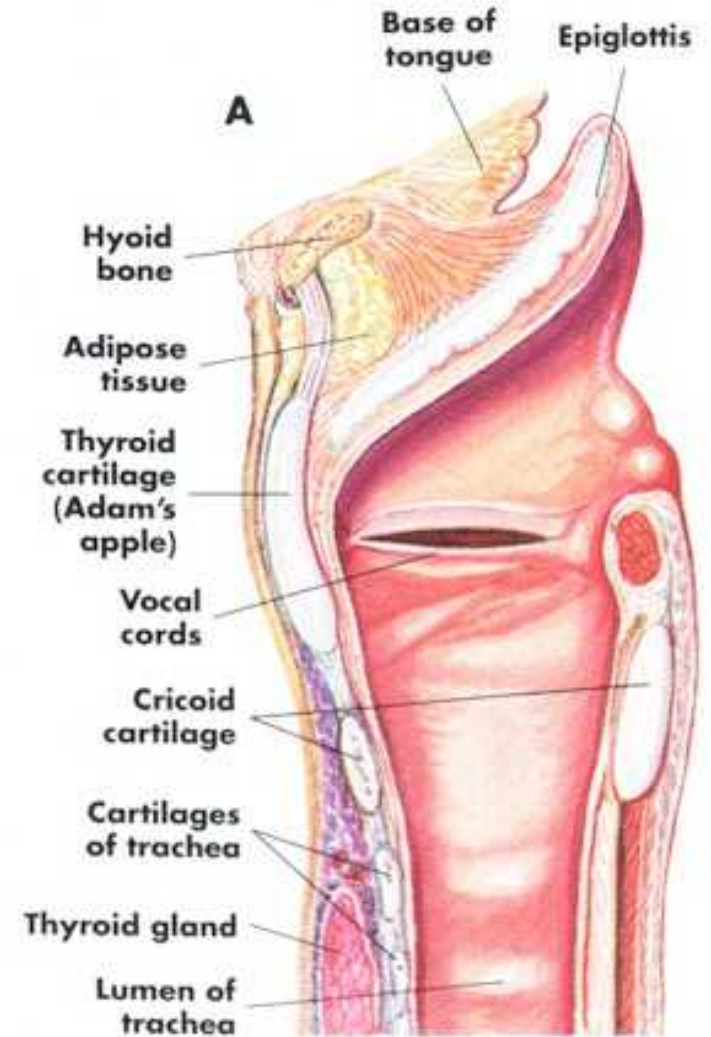
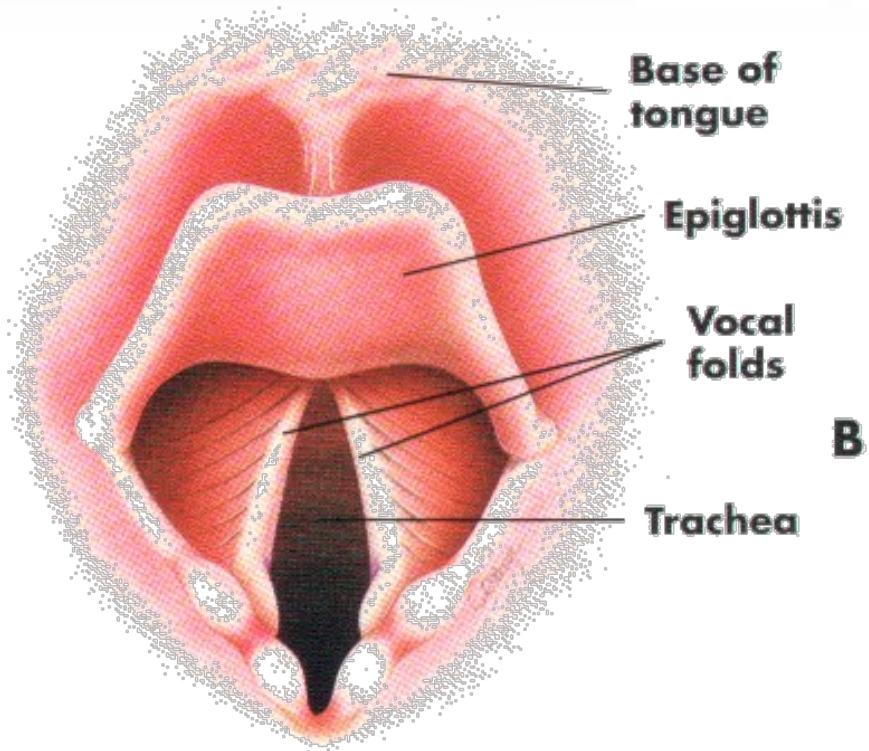
Ideal conditions for intubation

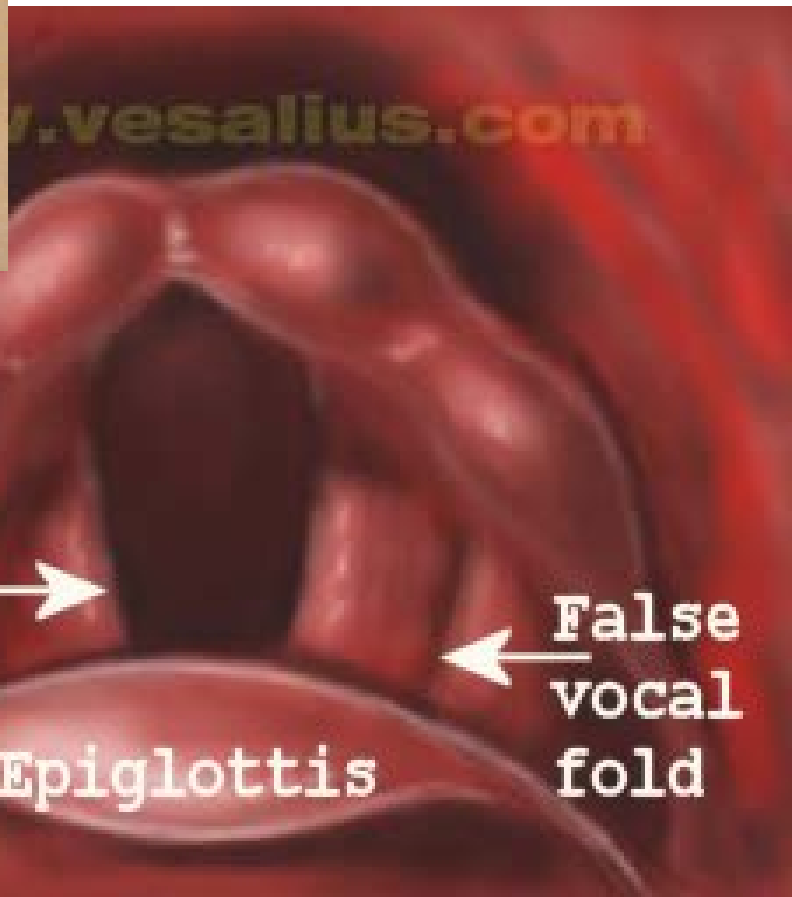
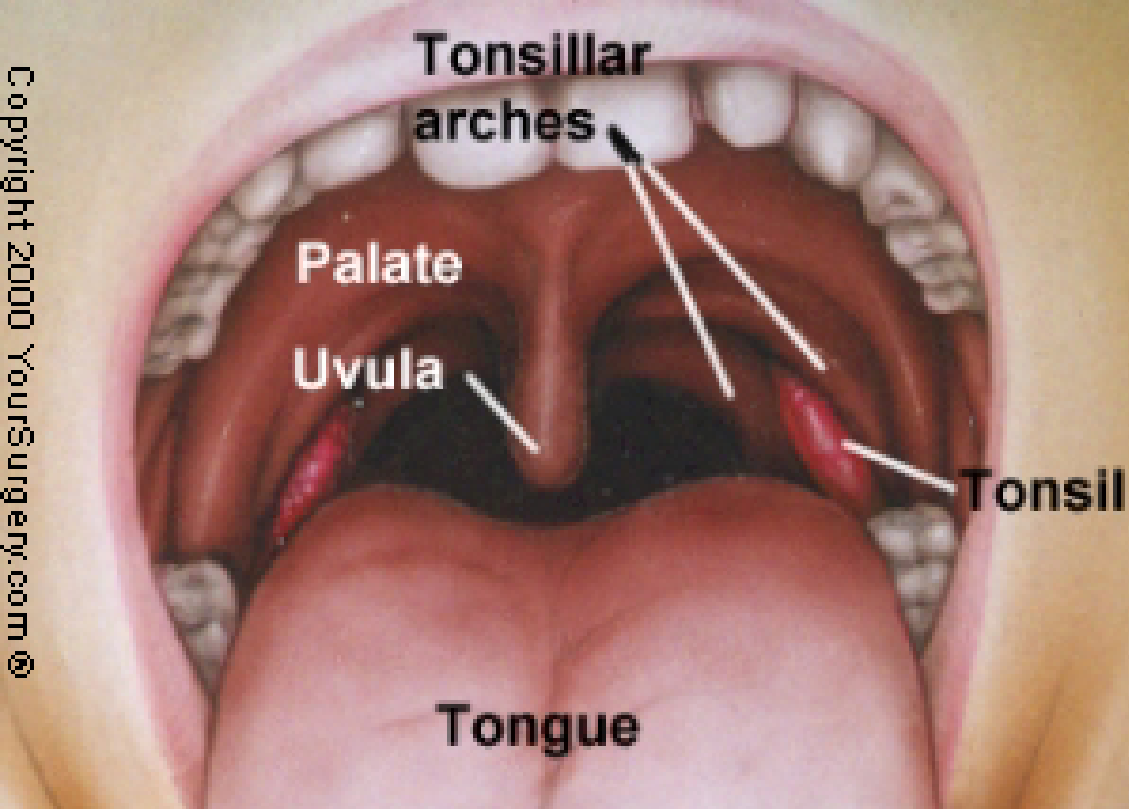
- ◆ Ideal Lighting, positioning, etc.
- ◆ Plenty of assistance
- ◆ Time to prepare, plan, discuss
- ◆ Option to Abort
- ◆ Empty Stomach
- ◆ Back up available.

Ideal Pt. for intubation

- ◆ Intact, clear airway
- ◆ Wide open mouth
- ◆ Pre-Oxygenated
- ◆ Intact respiratory drive
- ◆ Normal dentition/good oral hygiene
- ◆ Clearly identifiable and intact Neck and Face
- ◆ Big open Nostrils
- ◆ Good Neck Mobility
- ◆ Greater than 90 KG, Less than 110 kg.

Upper Airway Anatomy





If only they looked this good...

Pedi and Adult Normal Trachea



How many of our Pt's are like That?

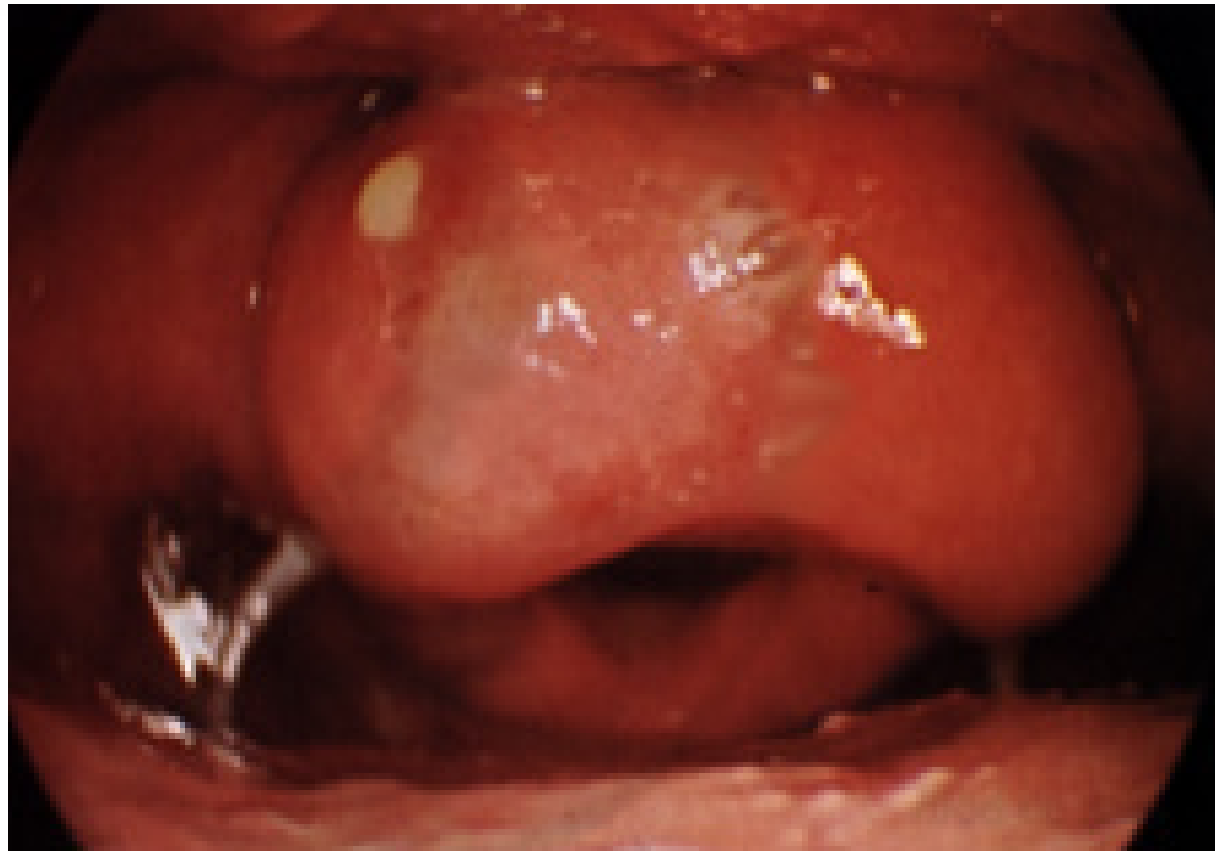


In Reality Our patients are:

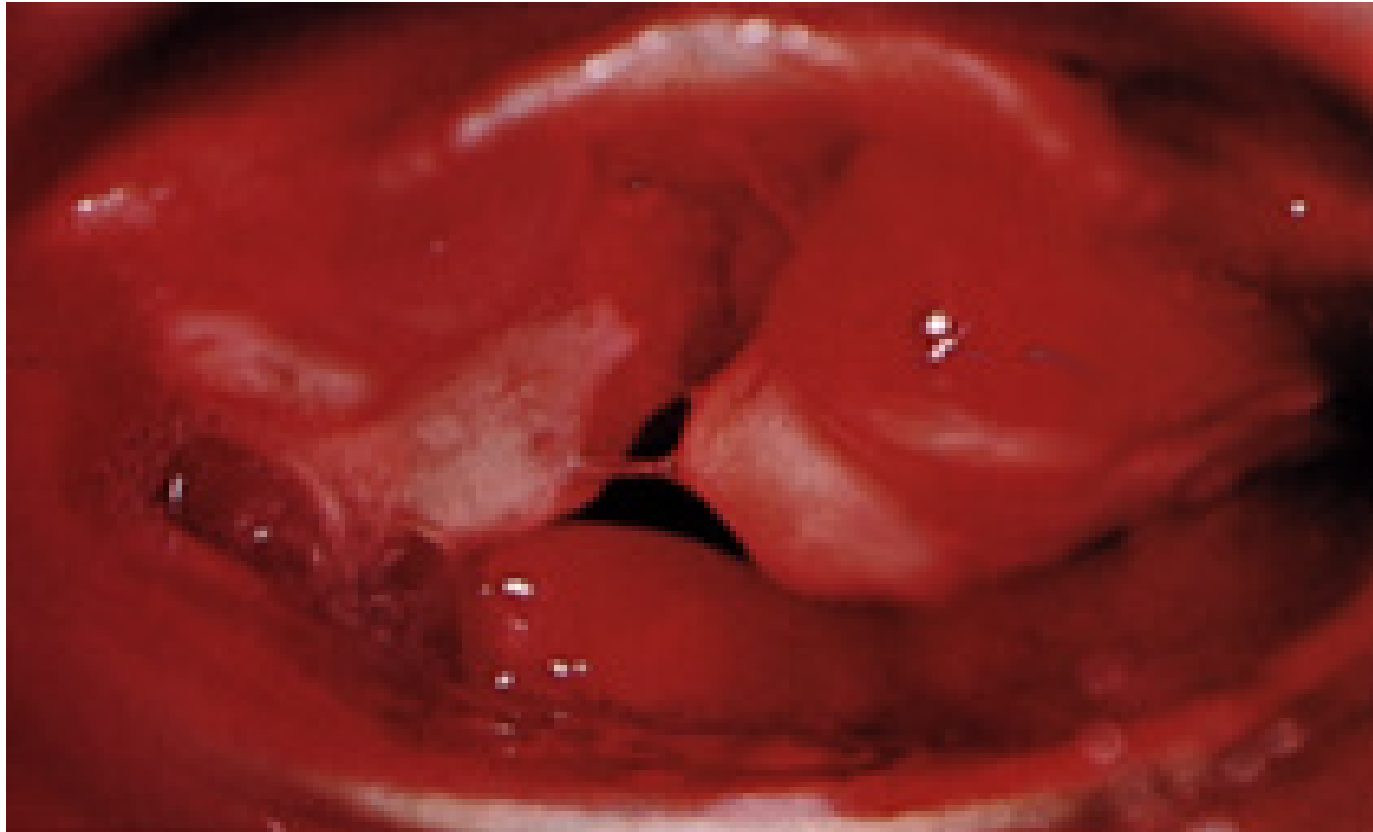
- ◆ Immobilized
- ◆ Traumatized
- ◆ Compromised
- ◆ Prioritized
- ◆ Beer~n~Pizza~ized



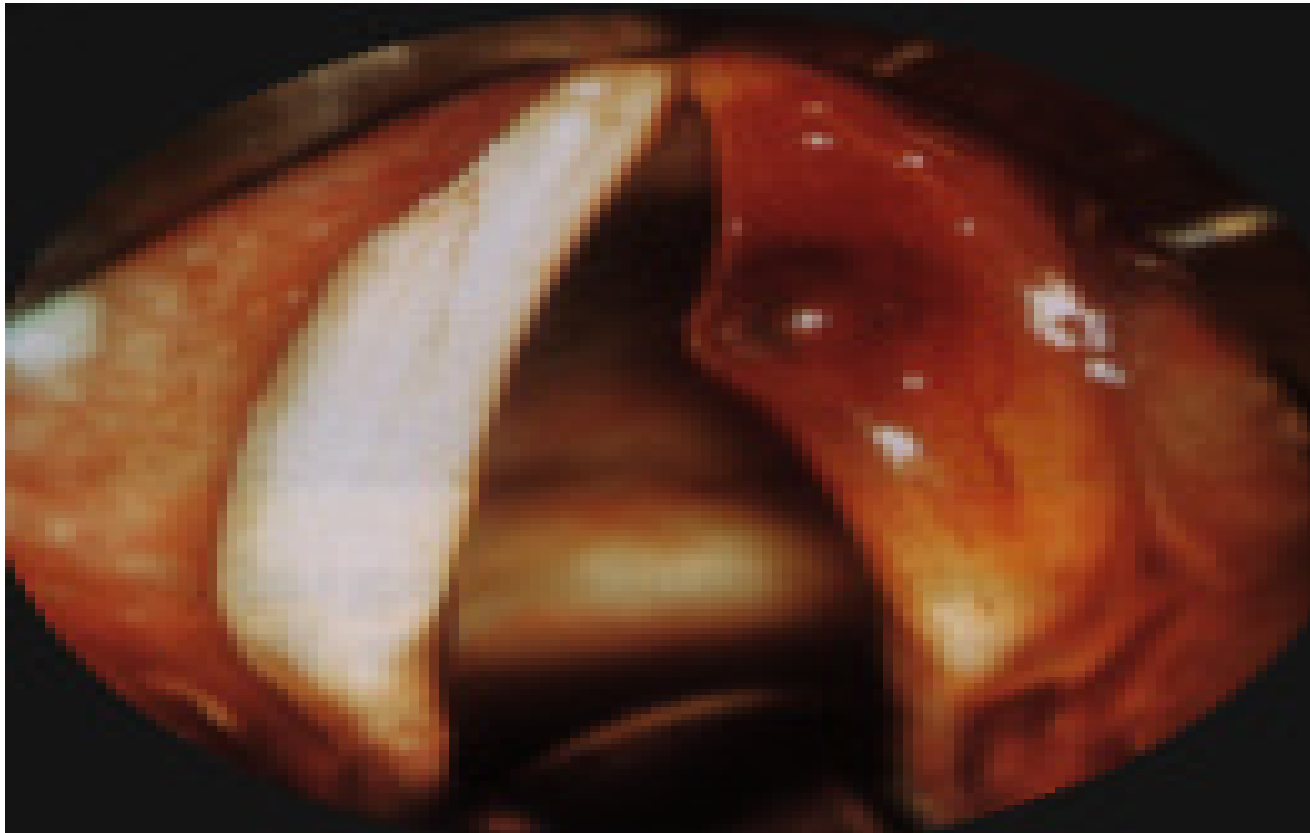
They Tend to look like This:



And This:



And This (after failed ETT attempt)



Most of our Patients are already
“difficult airways” by “OR” Standards.
Why should EMS personnel try to
further identify a difficult airway?



*"Nurse, get on the internet, go to SURGERY.COM,
scroll down and click on the 'Are you totally lost?'
icon."*



The American Society of Anesthesiology (ASA) has noted:

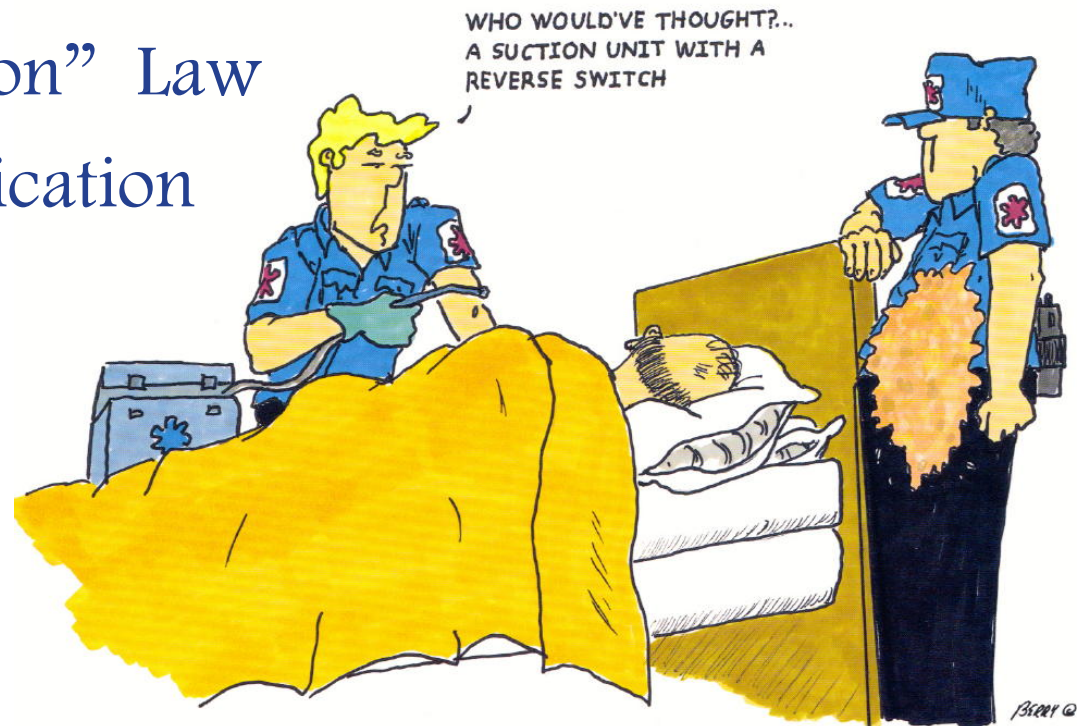
- ◆ “... there is strong agreement that preparatory efforts enhance success and minimize risk.”
- ◆ And “...The literature provides strong evidence that specific strategies facilitate the management of the difficult airway “
- ◆ Thus, identifying a potentially difficult airway is essential to preparation and developing a strategy.

What does this mean to us?

- ◆ Many Anesthesiologists have the option to “Abort” induction, or to work through a problem with as much assistance as needed.
- ◆ In the REAL WORLD of EMS that is seldom the case.
- ◆ However many of the BASIC principles are valid in the clinical evaluation of Patients, and thus valuable in our education as medics.
- ◆ Knowing these principles will improve our decision making process and patient care.

How can we further identify a difficult airway?

- ◆ PMHx
- ◆ Basic Physical Exam
- ◆ Thyromental Distance
- ◆ Dr. Binnions “Lemon” Law
- ◆ Mallampati Classification
- ◆ 4 D’s Rule
- ◆ “BONES”
- ◆ “OBESE”



Past Medical History

- ◆ Rheumatoid Arthritis
- ◆ Ankylosing Spondylitis: Painful Stiffening of the Joints
- ◆ Cervical Fixation Devices
- ◆ Klippel-Fiel Syndrome: Short wide neck, reduction in number of cervical vertebrae, and possible fusion of vertebrae.
- ◆ Thyroid or major neck surgeries
- ◆ Pierre Robin Syndrome: Small Jaw, Cleft Pallet, no gag reflex, downward displacement of tongue
- ◆ Acromegaly: Thickening of Jaw, soft tissue structures of the face, associated with middle age

Past Medical History (Continued)

- ◆ Reduced Jaw Mobility
- ◆ Epiglottitis
- ◆ Tumors, Known Abnormal Structures
- ◆ Previous Problems in surgery

Basic Physical Exam

- ◆ Anything that would limit movement of the neck
- ◆ Scars that indicate neck surgeries
- ◆ Kyphosis
- ◆ Burns
- ◆ Trauma, especially instability of the facial and neck structures.



CLUES TO LOOK FOR:

- ◆ Prominent incisors
- ◆ Limited jaw / mouth opening
- ◆ Short neck
- ◆ Big tongue
- ◆ Small mandible
- ◆ Limited cervical mobility
- ◆ Facial trauma
- ◆ Burns
- ◆ Neck injury
- ◆ Obesity
- ◆ Foreign bodies
- ◆ Children
- ◆ Infections
- ◆ Allergic edema
- ◆ Inhalation injuries
- ◆ Facial hair

ThyroMental Distance

- ◆ Measure from upper edge of thyroid cartilage to chin with the head fully extended.
- ◆ Short thyromental distance equates with an anterior larynx that is at a more acute angle and also results in less space for the tongue to be compressed into by the laryngoscope blade.
- ◆ Greater than 7 cm is usually a sign of an easy intubation
- ◆ Less than 6 cm is an indicator of a difficult airway
- ◆ Relatively unreliable test unless combined with other tests.

Dr. Binnions Lemon Law: An easy way to remember multiple tests...

- ◆ Look externally.
- ◆ Evaluate the 3~3~2 rule.
- ◆ Mallampati Scale
- ◆ Obstruction?
- ◆ Neck mobility.

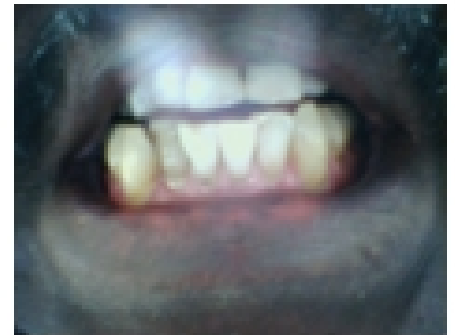
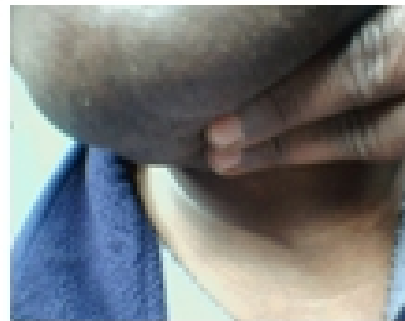
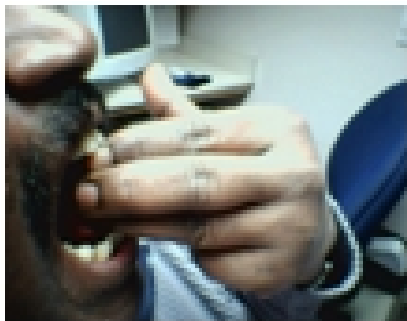


L: Look Externally

- ◆ Obesity or very small.
- ◆ Short Muscular neck
- ◆ Large breasts
- ◆ Prominent Upper Incisors (Buck Teeth)
- ◆ Receding Jaw (Dentures)
- ◆ Burns
- ◆ Facial Trauma
- ◆ S/S of Anaphylaxis
- ◆ Stridor
- ◆ FBAO

E: Evaluate the 3-3-2 rule

- ◆ 3 fingers fit in the mouth
- ◆ Greater than three fingers from Jaw (chin) to Neck
- ◆ 2 fingers fit from mandible to top of thyroid cartilage (top of neck)
- ◆ Any less than those is considered difficult airway!



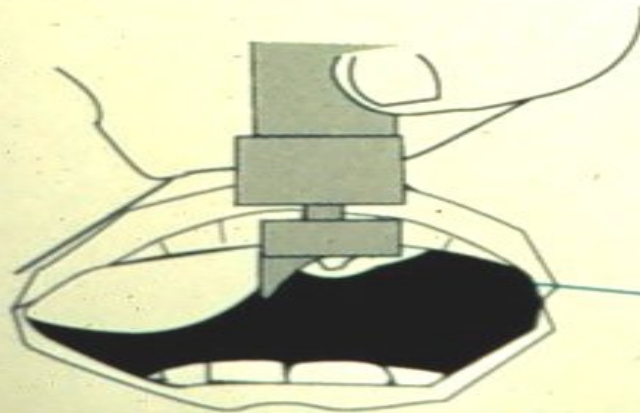
Checking for an Anterior Larynx



Distance from chin's inner rim to hyoid bone should = 3 fingers breadth in adult. If you only fit 2 fingers, expect anterior airway.



From side, patients with less than 2 finger breadth often appear to have hypoplastic mandibles (receding chins).



ARYTENOIDS

Anterior larynx: larynx appears anterior to your field of view. Here you see the arytenoids. Often you see no landmarks, making intubation difficult.

M: Mallampati classification

- ◆ A Method used by Anesthesiologists, reliable to predict difficult direct Laryngoscopy (Cormack & Lehane grading)
- ◆ A Class I view is a Grade I Intubation 99% of the time
- ◆ A Class IV view is a Grade III or IV intubation 99% of the time

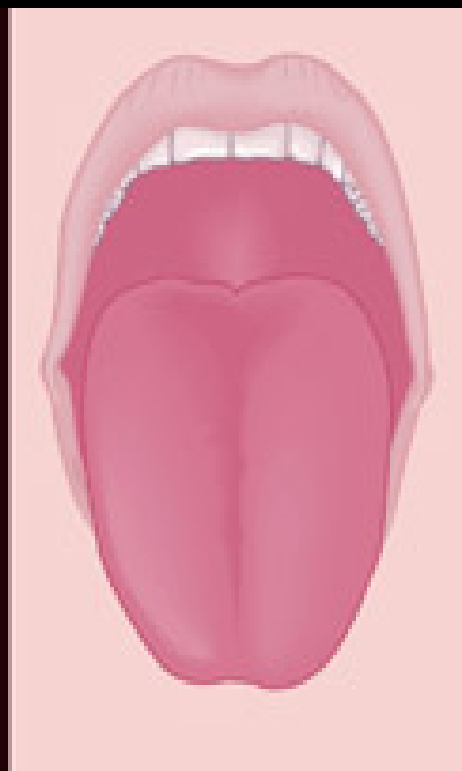
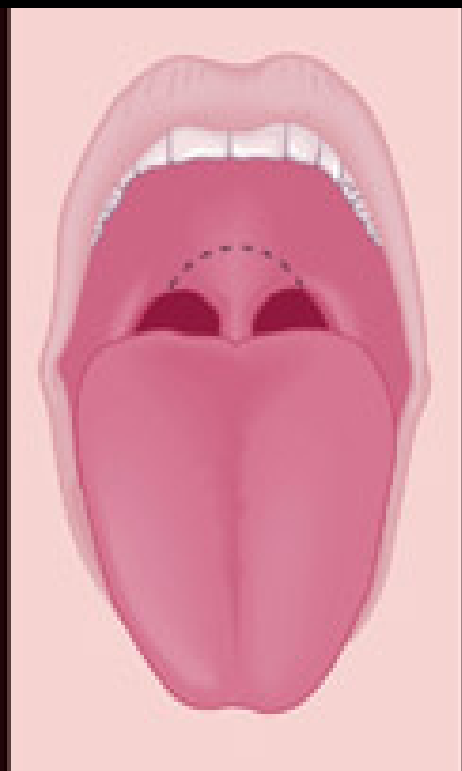
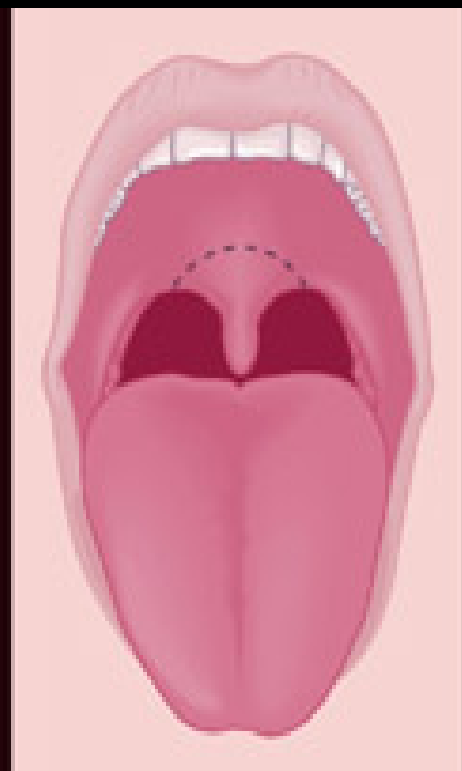
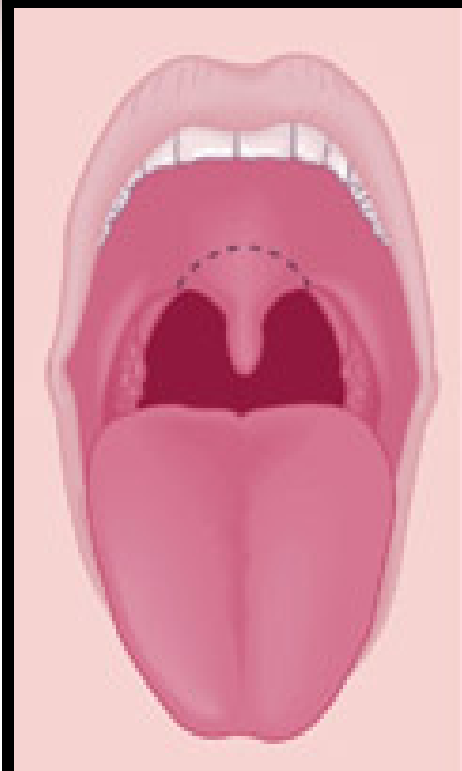
Mallampati Classification

Class I

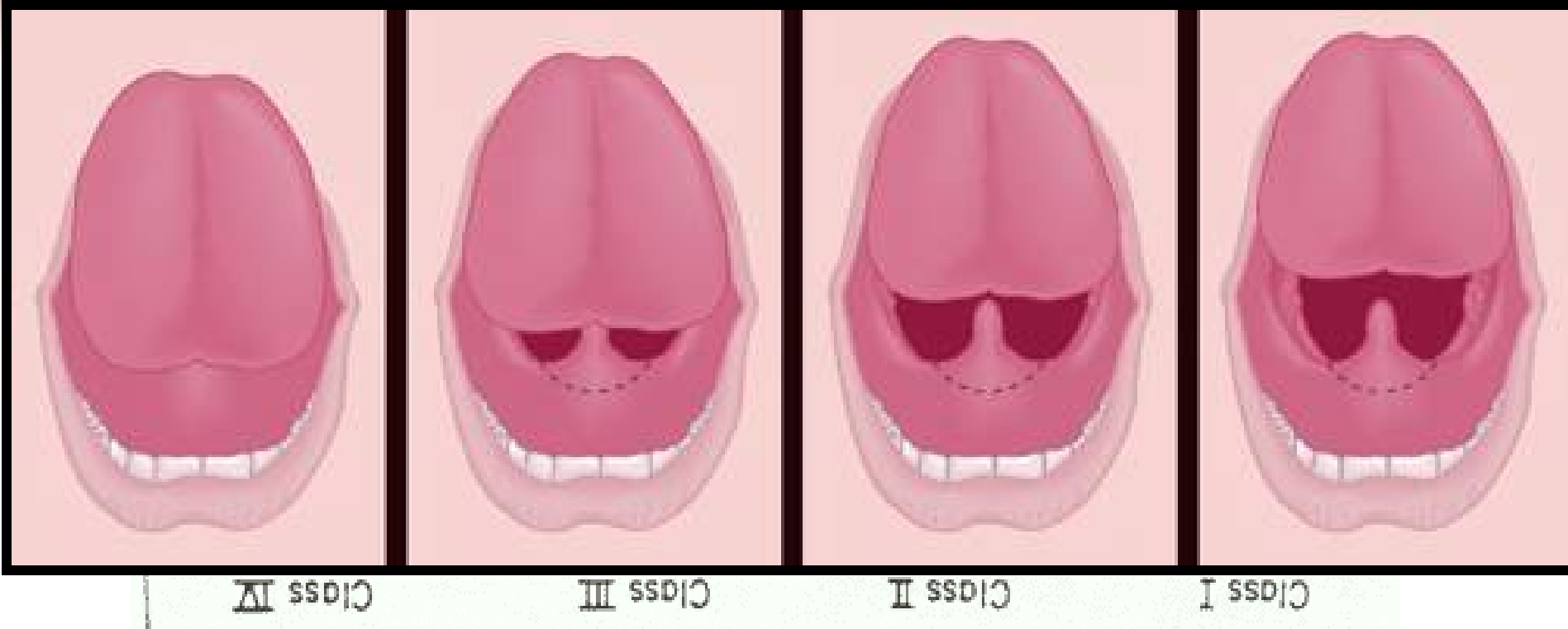
Class II

Class III

Class IV

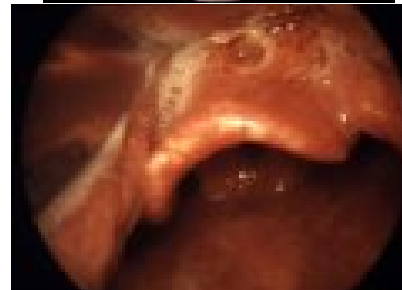
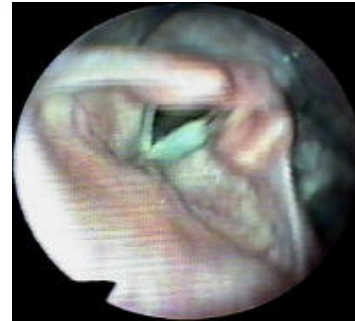


Tough to do when intubating, so lets take another look

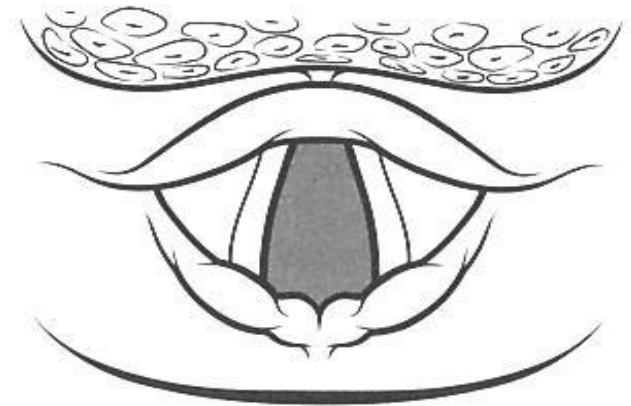


- ◆ Or have your patient stick their tongue out at you before they go unconscious.

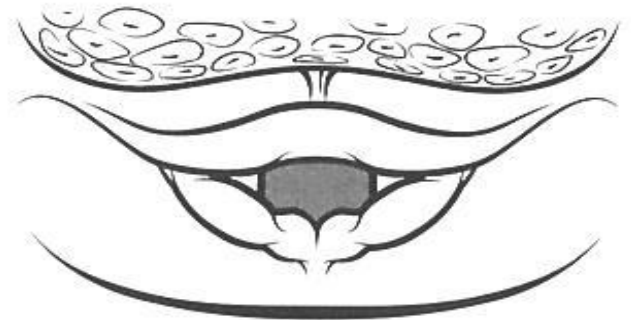
Cormack & Lehane Grading



Grade 1



Grade 2



Grade 3



Grade 4



O: Obstruction?

- ◆ Blood
- ◆ Vomitus
- ◆ Chicklets (Teeth)
- ◆ Epiglottitis
- ◆ Dentures
- ◆ Tumors
- ◆ Impaled Objects



N: Neck Mobility

- ◆ Spinal Precautions
- ◆ Impaled Objects
- ◆ Lack of access
- ◆ See PMHx for others.

What do we do when we have a difficult airway?



FOUR D's

- ◆ Distortion
- ◆ Disproportion
- ◆ Dymobility
- ◆ Dentition

MNEUMONIC “BONES”

- ◆ Beard
- ◆ Obese
- ◆ No teeth
- ◆ Elderly
- ◆ Snoring (sleep apnea)

OBESE

- ◆ The **O**bese (body mass index > 26 kg/m²)
- ◆ The **B**earded
- ◆ The **E**lderly (older than 55 y/o)
- ◆ The **S**norers
- ◆ The **E**dentulous (without teeth)

STOP

- ◆ **S** = Skull (Hydro and Microcephalus)
- ◆ **T** = Teeth (Buck, protruded, & loose teeth. Macro and Micro mandibles)
- ◆ **O** = Obstruction (due to obesity, short Bull Neck and swellings around the head and neck)
- ◆ **P** = Pathology (Craniofacial abnormalities & Syndromes: Treacher Collins, Goldenhar's, Pierre Robin, Waardenburg syndromes)

The ASA calls a Failed/Difficult Laryngoscopy a:

- ◆ Any airway that takes more than 3 attempts.
- ◆ Any airway that takes more than 10 minutes to secure.
- ◆ No wonder they say they have a 90 % success rate.
- ◆ If we had those standards our Pt's would be dead.

So what do we do?



IF YOUR PATIENT
IS HARD OF
HEARING...
AVOID SUCH
COMMENTS AS
"BIG BREATHS"

A little pre-planning goes a long way...



Before intubation

- ◆ Is there another means of getting our desired results BEFORE we attempt Direct Oral ETT?
- ◆ CPAP ?
- ◆ PPV with BVM or Demand Valve?
- ◆ Nasal ETT?
- ◆ Do we have all the help we need & all airway equipment with us? (Suction?)

What are we going to do if we don't get the Tube?

- ◆ Plans “A”, “B” and “C”
- ◆ Know this answer before you tube.



Plan “A”: (ALTERNATE)

- ◆ Different Length of blade
- ◆ Different Type of Blade
- ◆ Different Position



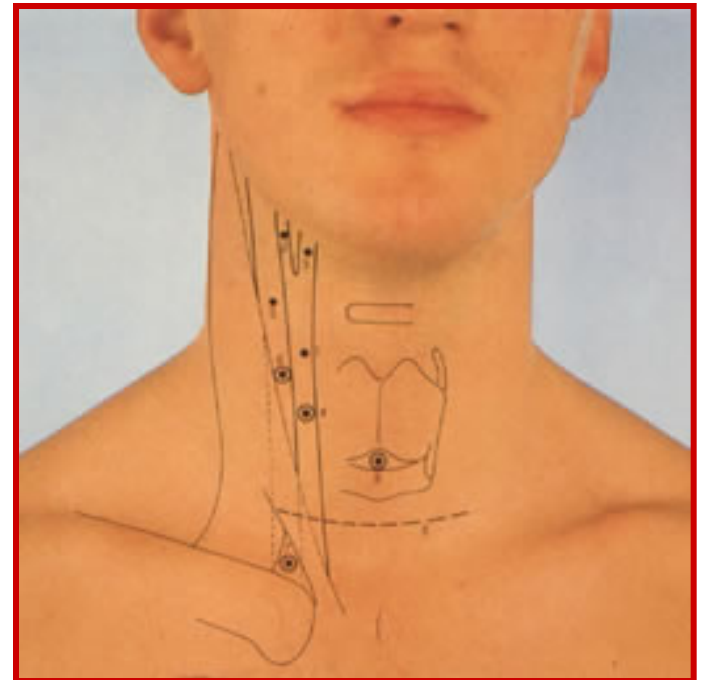
Plan “B”: (BVM and BLIND INTUBATION Techniques)

- ◆ Can you ventilate with a BVM? (Consider two NPA’s and a OPA)
- ◆ Combi-Tube?
- ◆ EOA, EGTA?
- ◆ LMA?
- ◆ Retrograde Intubation?



What do we do when faced with a Can't Intubate Can't Ventilate situation?

- ◆ Plan “C”: (CRIC) Needle, Surgical.



Do YOU feel ready to enact Plans A, B, C at a drop of a hat?

- ◆ Feel familiar with all those tools and techniques?



Securing the Airway once you get it!

- ◆ Headblocks
- ◆ Collar
- ◆ Spineboard
- ◆ Commercial tube secure device
- ◆ Note position and depth

WE KNOW IT'S AN OPEN
HEAD INJURY, FRANK.
NOW CUT
THAT
CRAP
OUT!

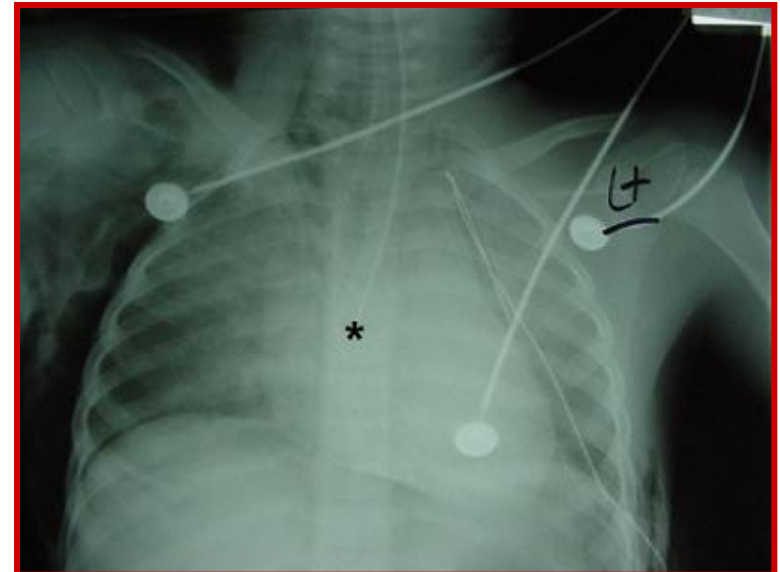
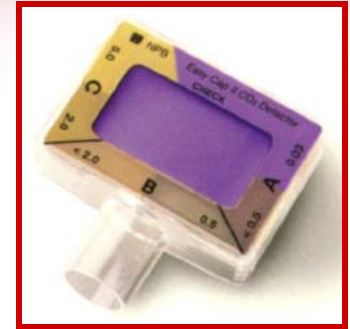


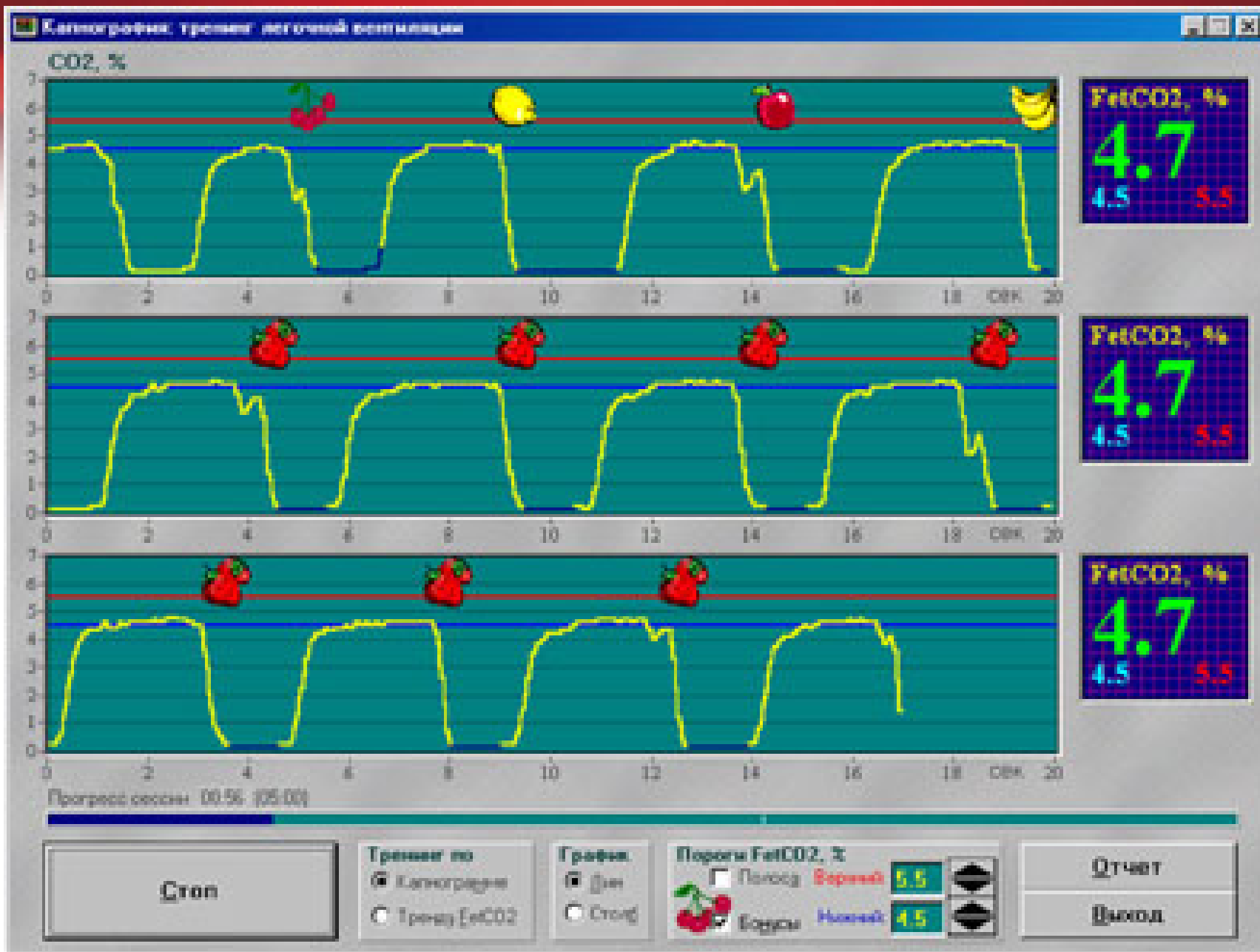
BREATH SOUNDS
ARE CLEAR AND
EQUAL BILATERALLY.



Prove you had the airway

- ◆ Confirm in 3 or more ways
 - Chest rise and fall
 - ETCO₂-waveform or End Cap Detector
 - Lung Sounds
 - Absence of epigastric sounds
 - Mist in tube
 - O₂ sat increase
 - Visualize through cords
 - ‘Turkey Baster’ Esophageal Detector Device (EDD)
 - Xray





OK , Here You Go!

- ◆ Mandibular Aplasia



The View



The 'Real Thing' View

Time to Play - Can you get the airway?

- ◆ Paul Bunyan
- ◆ Santa Claus
- ◆ Grizzly Adams
- ◆ Rory



Paul Bunyan In Bangor, Maine

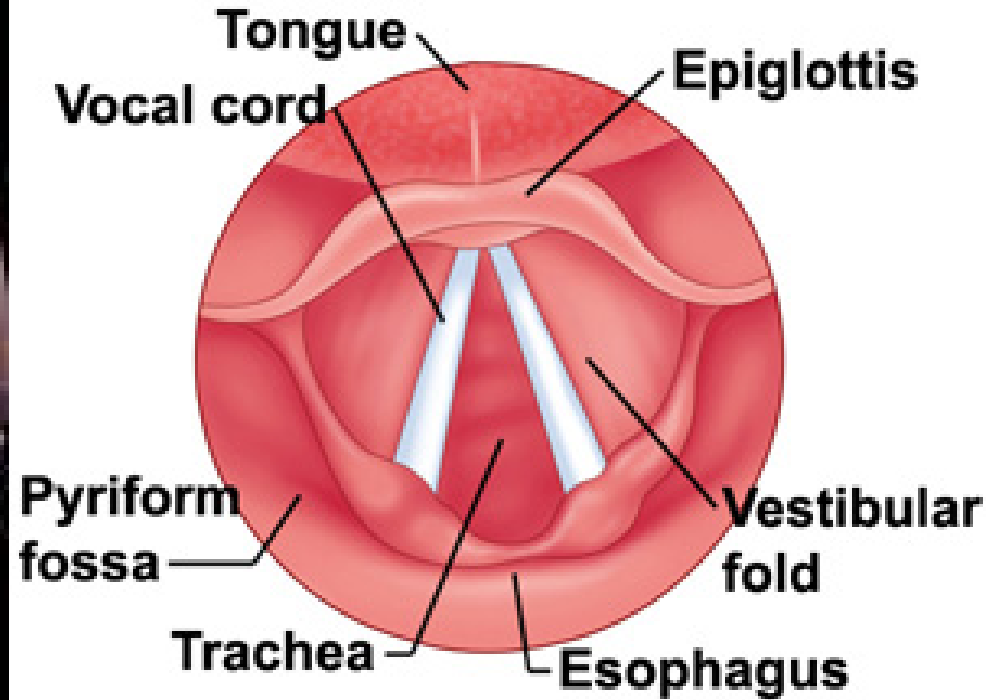
© Greg Hartford from AcadiaMagic.com







Normal Cords



Pictures of Difficult Airways-Cords



Muscle Tension Dysphonia



Vocal Cord Polyp



Carcinoma

Aryepiglottoid Granuloma





Acute Hemorrhage



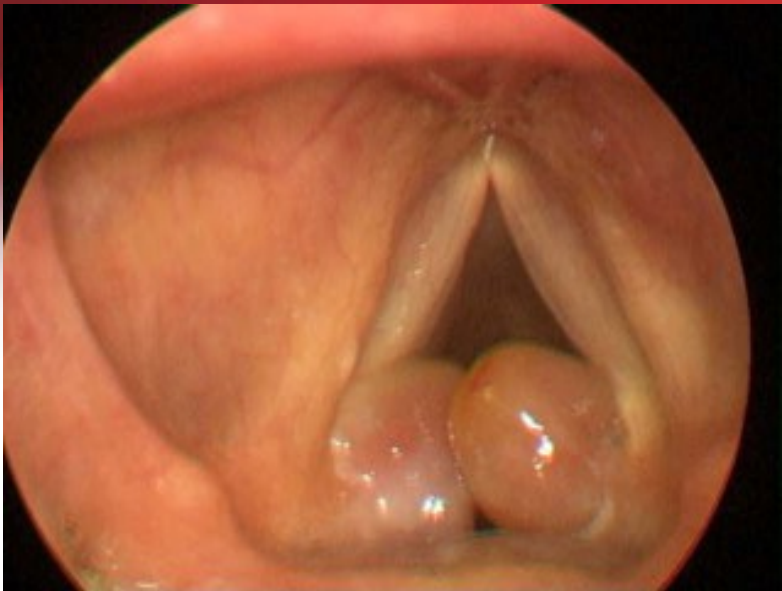
Vocal Cord Paralysis



Contact Ulcers



Cyst



Large Granulomas



Laryngeal Paralysis



70 Laryngitis



Larynx Mass



Larynx CA



Larynx CA



Larynx CA



Larynx CA



Papilloma



Paralysis-CVA



Reinkes Edema



Superior Laryngeal
Paralysis

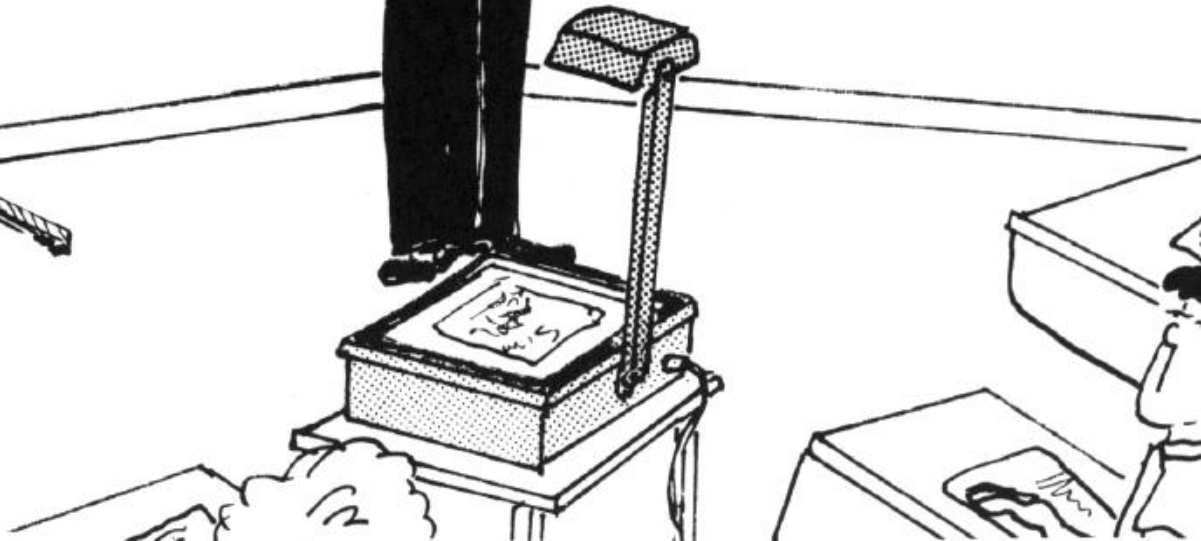
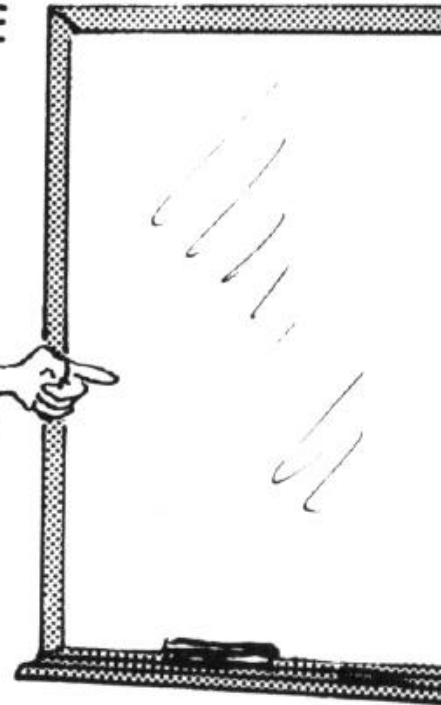
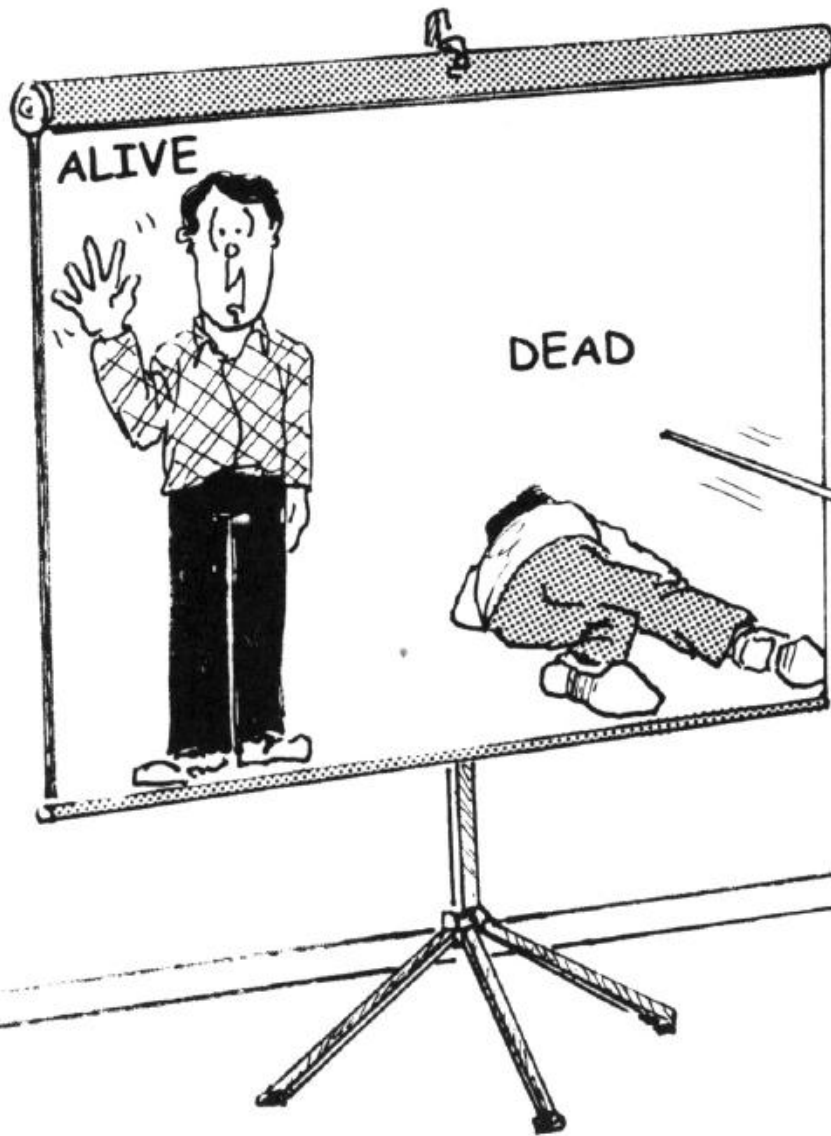
Review

- ◆ Remember to have your tools ready
- ◆ Have alternatives ready
 - Combitube
 - LMA
 - BVM, OPA, NPA
- ◆ Remember your visual prediction tools.
 - LEMON
 - 332 rule
 - Mallampati
 - Lehane-Cormack
 - BONES
 - 4 D's



Final page of the Medical Boards

YES...YOU IN THE
BACK. YOU HAVE
A QUESTION?



Contact info...

Rory S Putnam, AA, NREMT-P, I/C
President-CEO/Owner



EMERGENCY SERVICES EDUCATION & CONSULTING

- EMT, FIRST AID/CPR/ACLS/PALS & SPECIALTY COURSES -
- PROGRAM DEVELOPMENT- DISASTER PREPAREDNESS PLANNING -
- OSHA COMPLIANCE TRAINING - EQUIPMENT & EVENT SERVICES -

11 LONG LANE

WINDHAM, ME 04062

207-899-5911

rputnam@atlanticlifesafety.com

Your Total Safety Solution Resource
Learn it...for Life!

www.atlanticlifesafety.com