



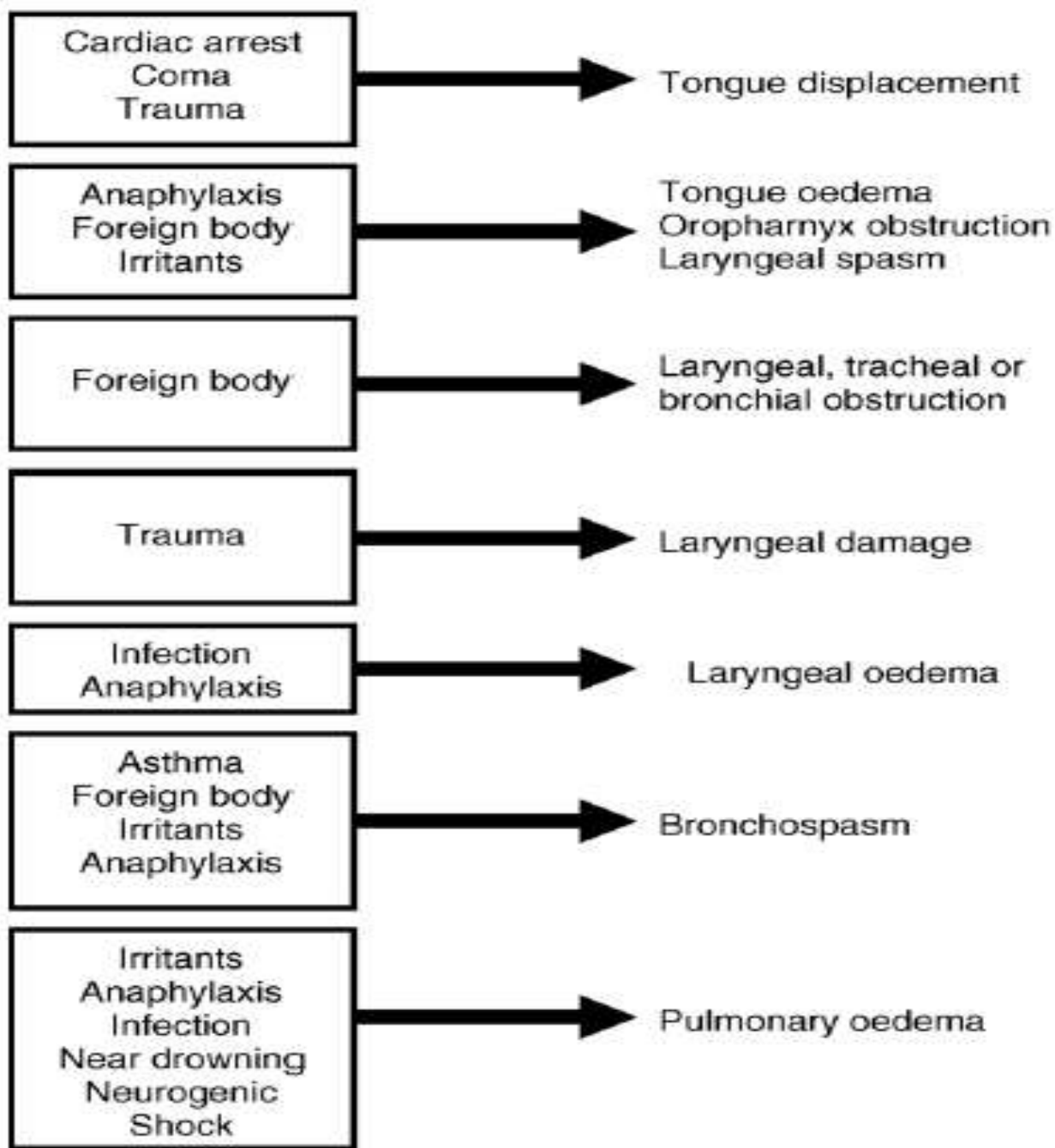
# AIRWAY MANAGEMENT

Jozef Firment, MD PhD

Department of  
Anaesthesiology & Intensive Care Medicine  
Šafárik University Faculty of Medicine, Košice

# Aims of airway management equipment...

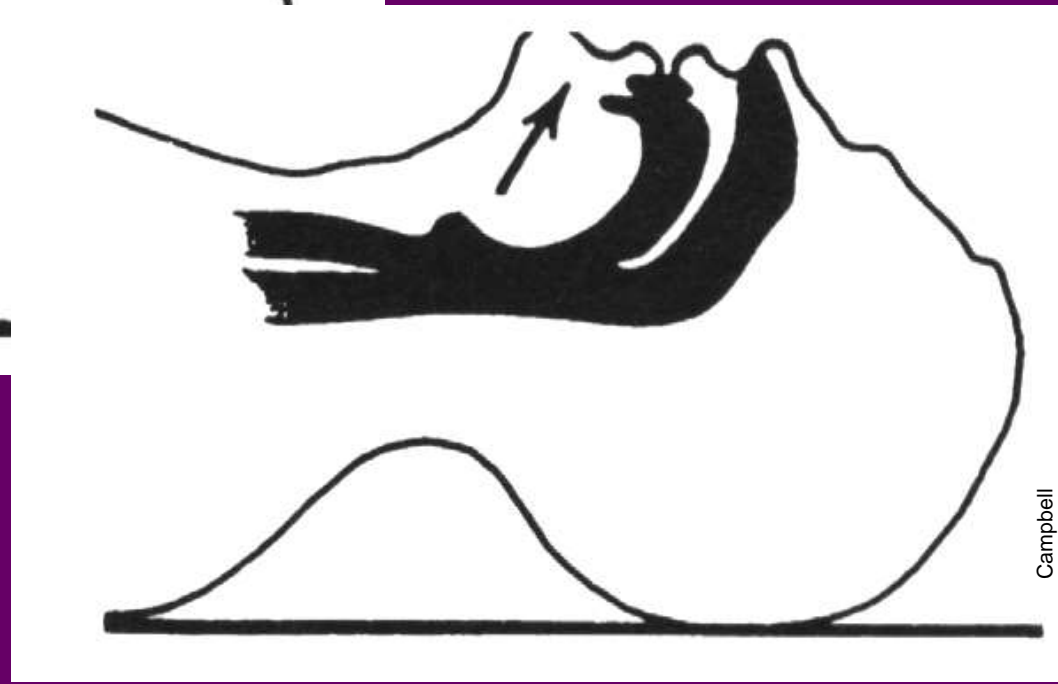
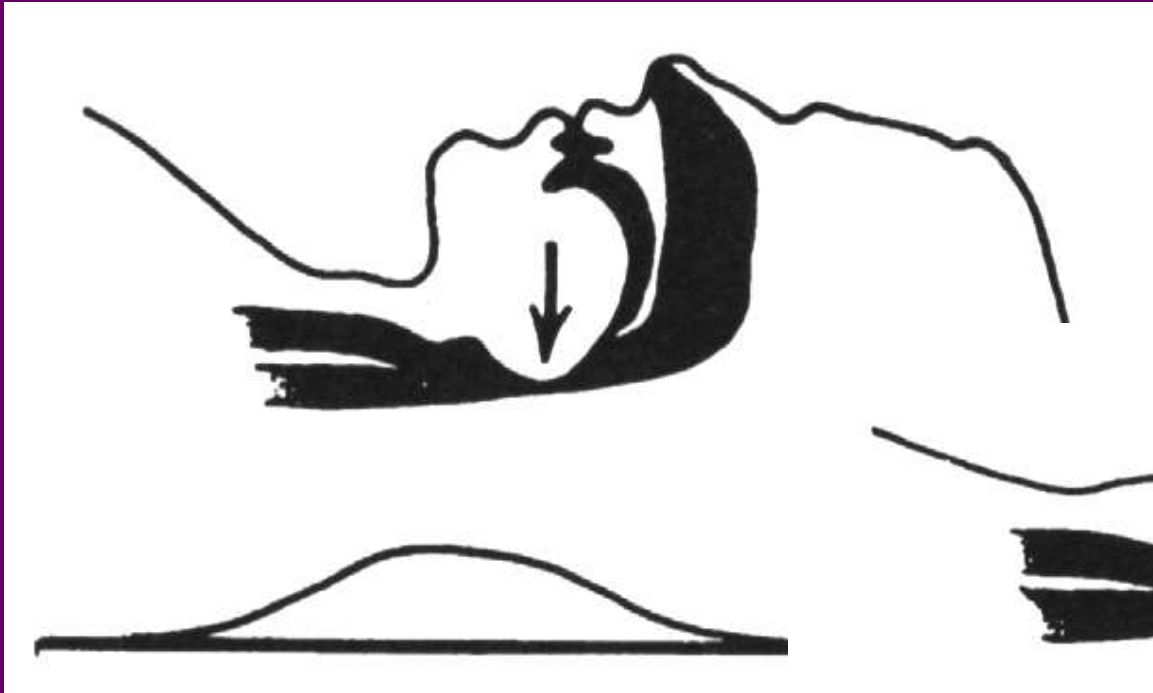
- Keeping airways open
  - During spontaneous breathing
  - During artificial ventilation
- Interface for connection patient - machine 15/22 mm



**Figure 4.3** Causes of airway obstruction.



# AIRWAY OPENING BY NECK EXTENSION



Campbell



## „Magic touch“



Figure 4.4 Head tilt and chin lift. © 2005 European Resuscitation Council.

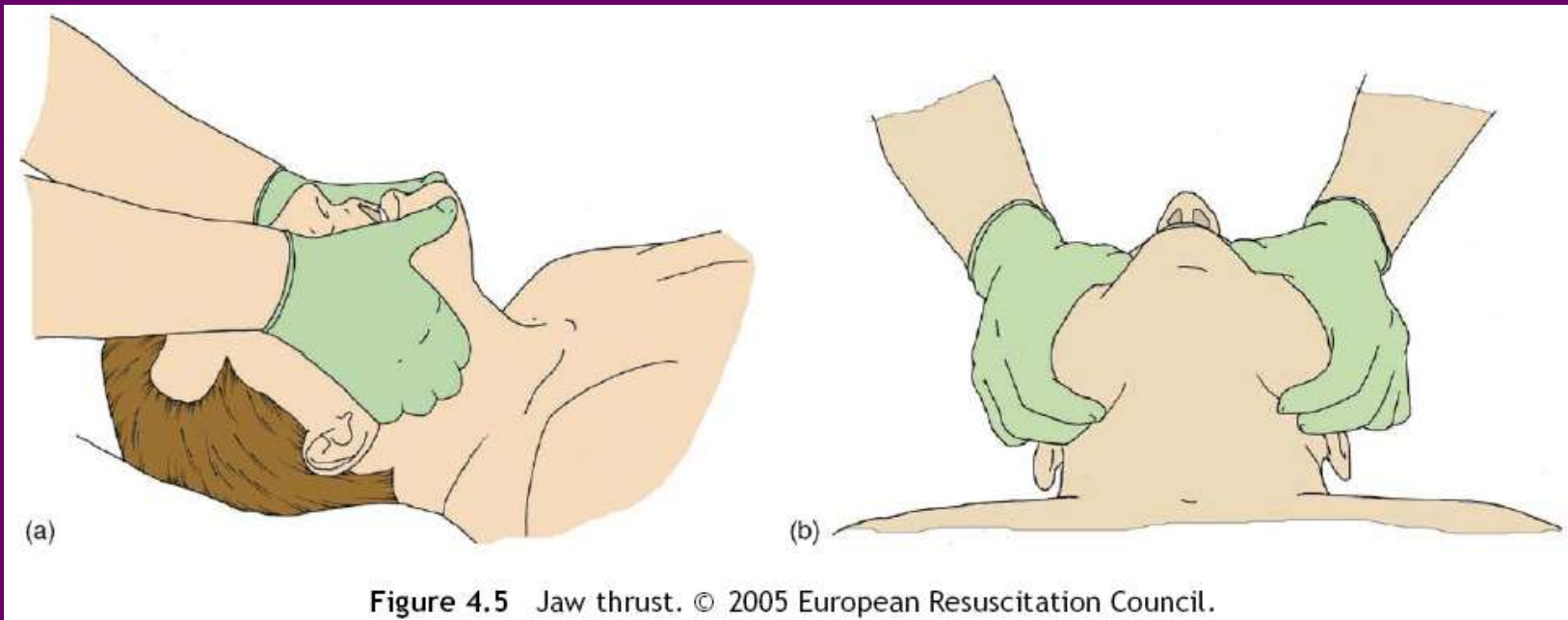


Figure 4.5 Jaw thrust. © 2005 European Resuscitation Council.

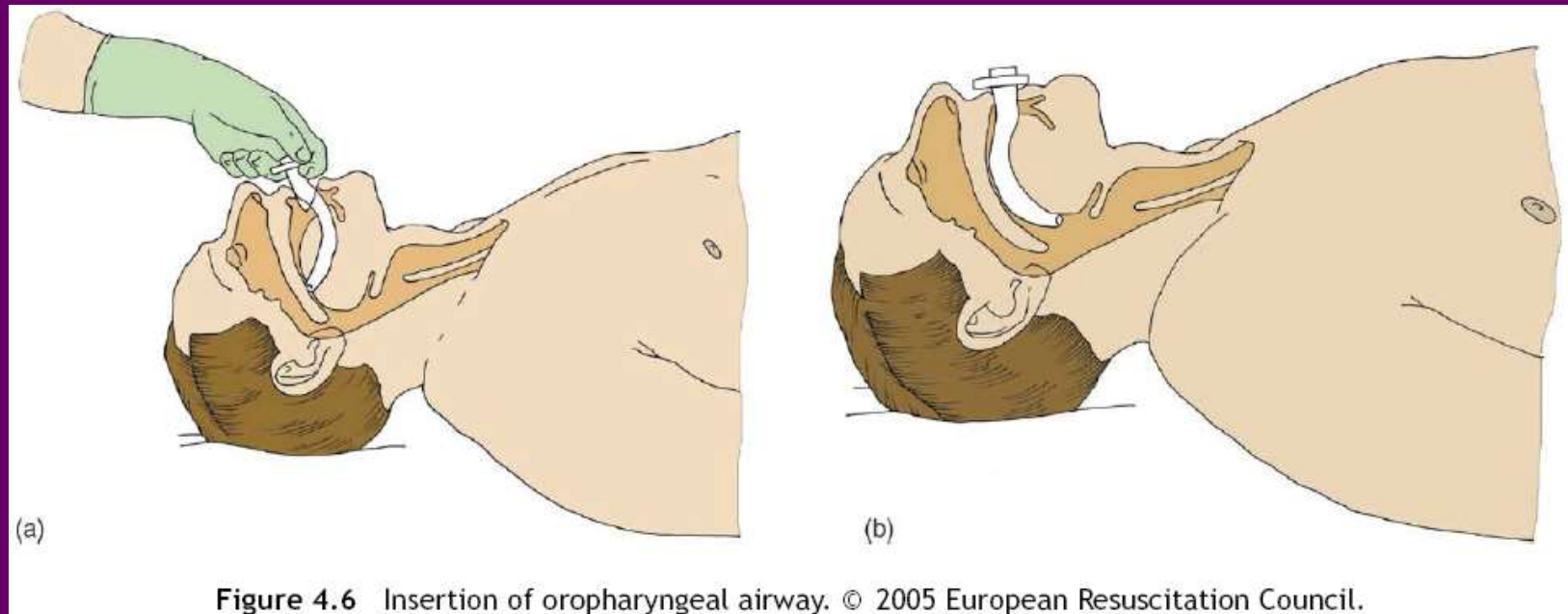
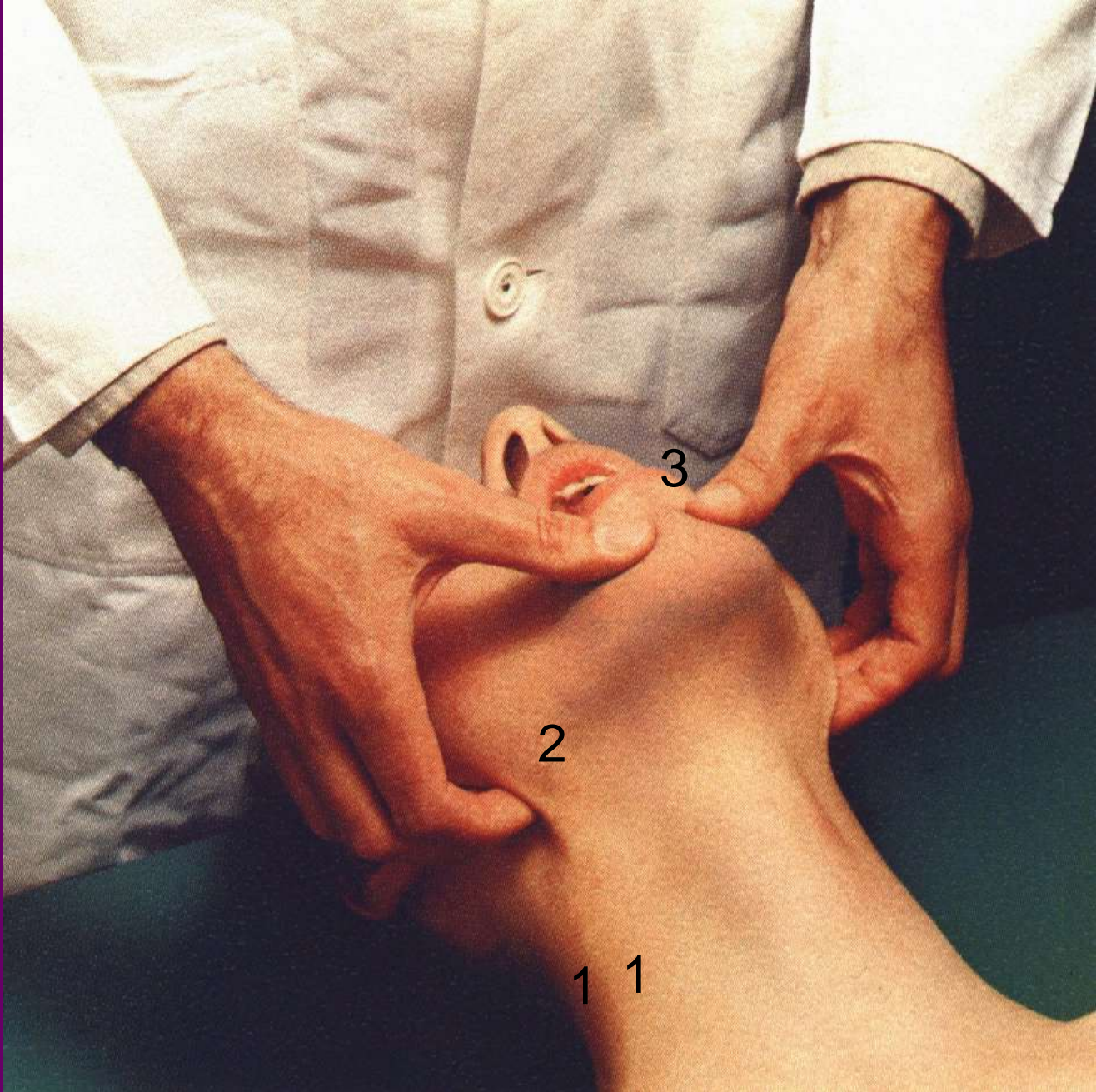


Figure 4.6 Insertion of oropharyngeal airway. © 2005 European Resuscitation Council.





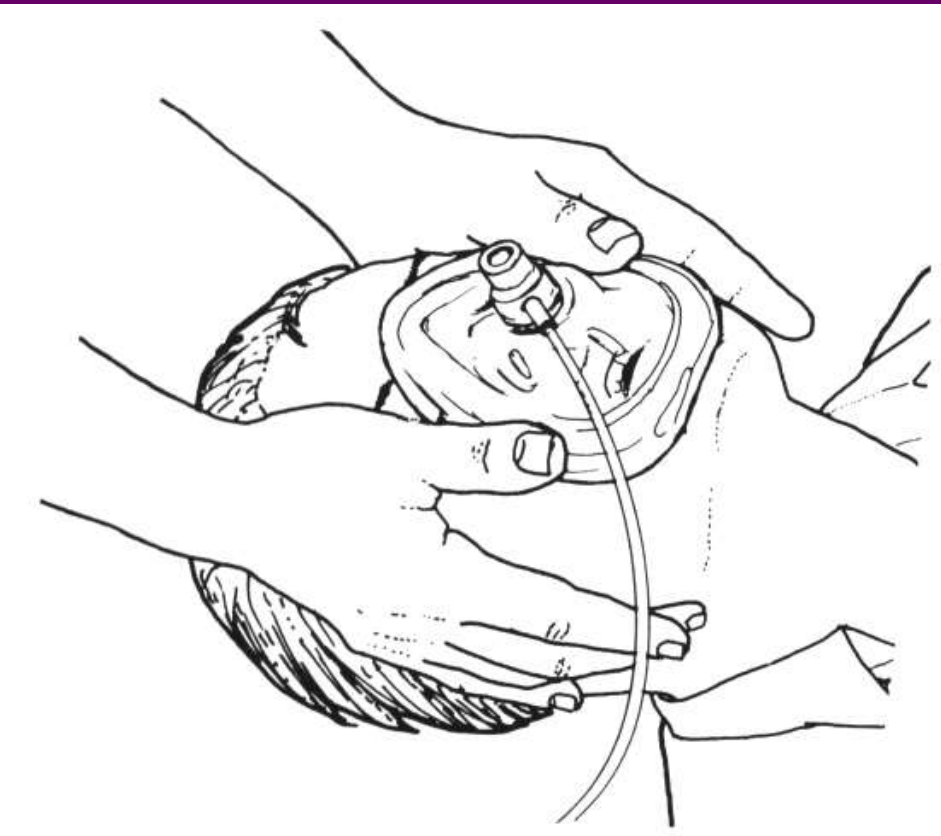
# ESMARCH TRIPLE MANOEUVRE

# Heimlich manoeuvre





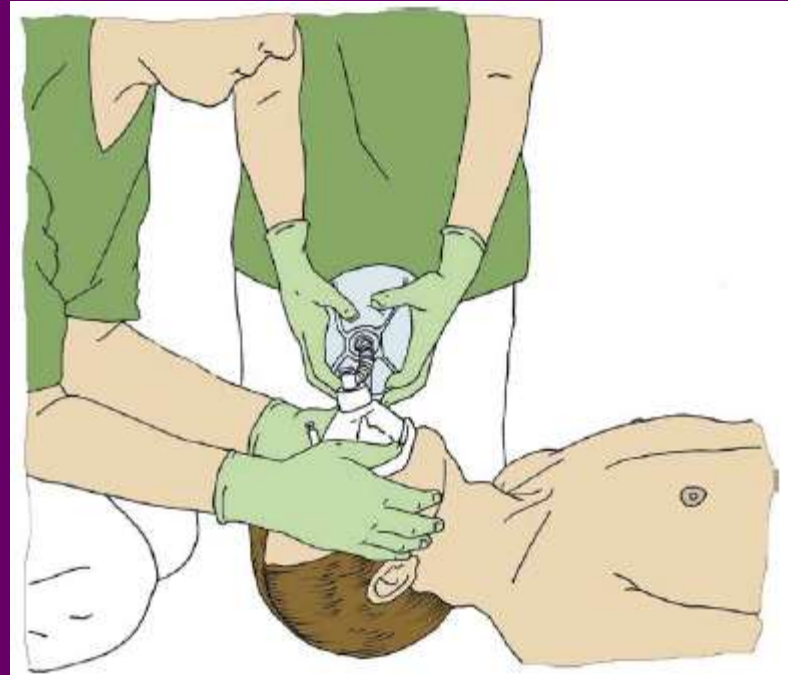
# ESMARCH TOUCH & FACE MASK



Eubanks & Bone 1994

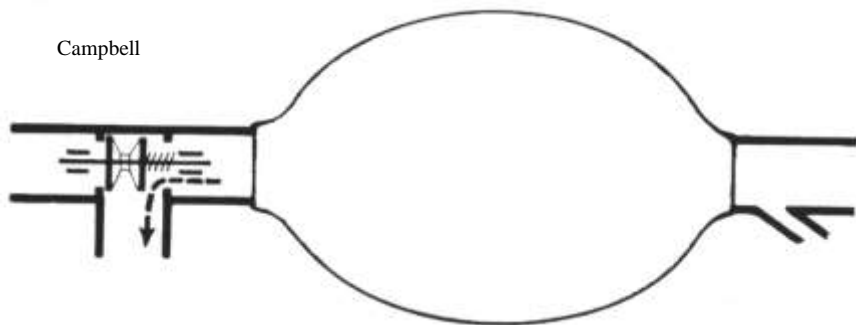


**Figure 4.7** Mouth-to-mask ventilation. © 2005 European Resuscitation Council.



**Figure 4.8** The two-person technique for bag-mask ventilation. © 2005 European Resuscitation Council.

Campbell



dospeli:

- " -

deti

- " -

O<sub>2</sub>  
l/min

13

4

5

2

FiO<sub>2</sub>  
%

85-100

>40

85-100

>40

V<sub>T</sub> x f

1000 x 15

dtto

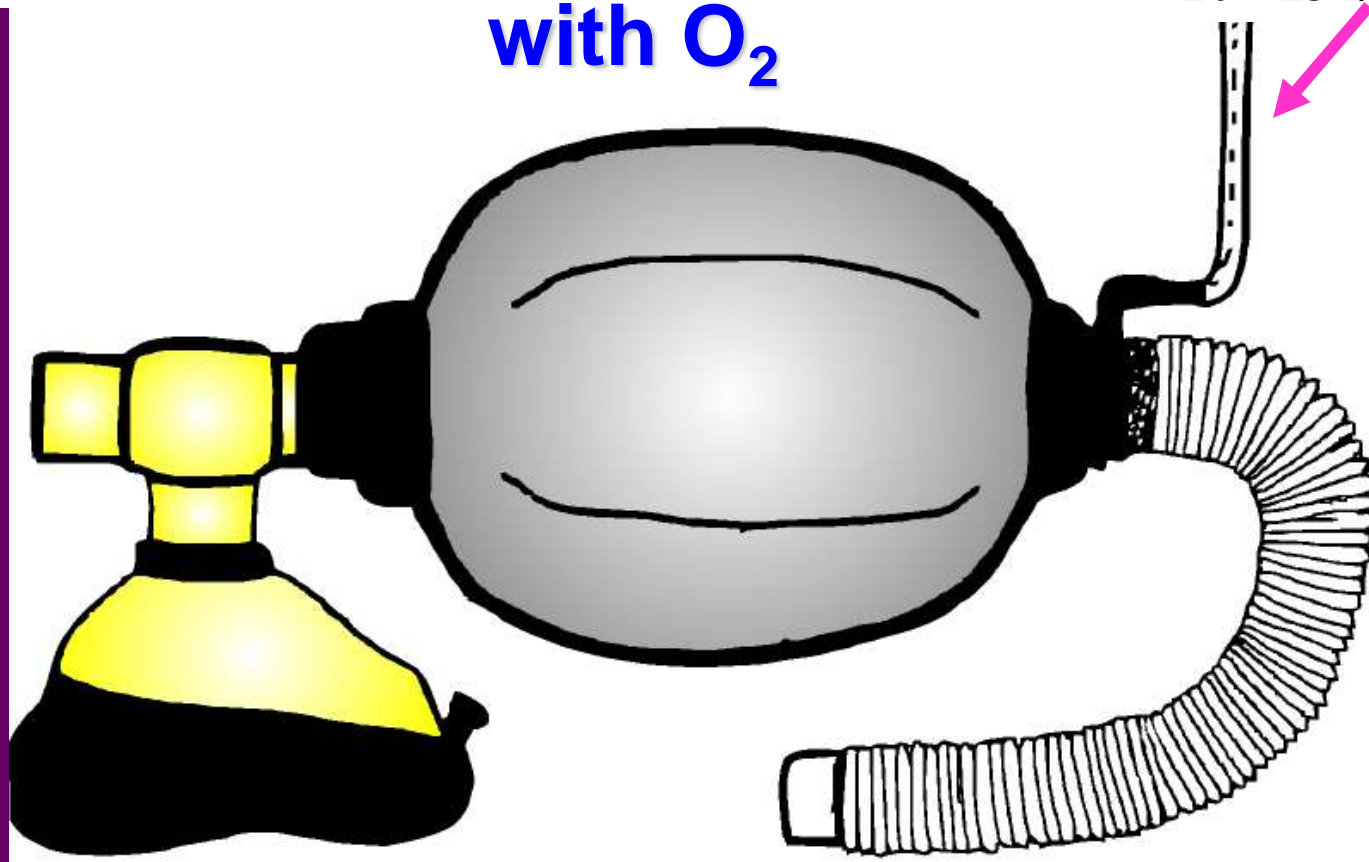
300 x 20

dtto

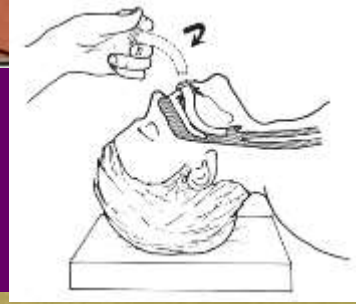
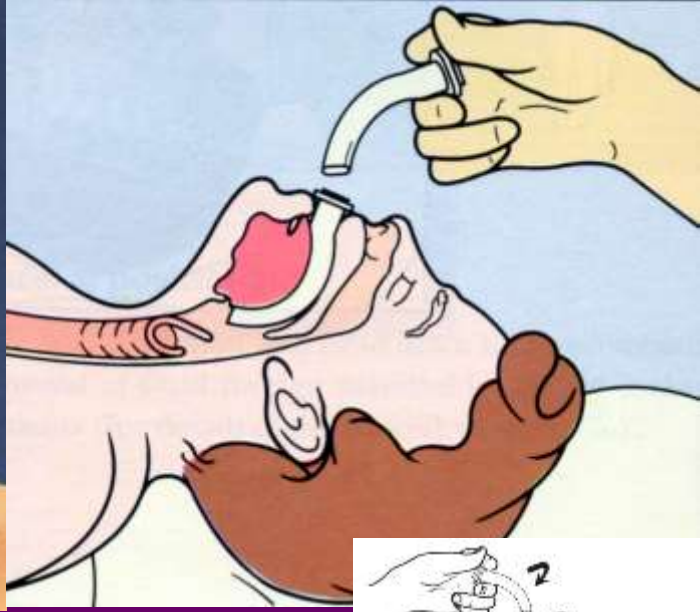


# Selfexpanding Bag with O<sub>2</sub>

Prívod O<sub>2</sub>  
10 - 13 l/min



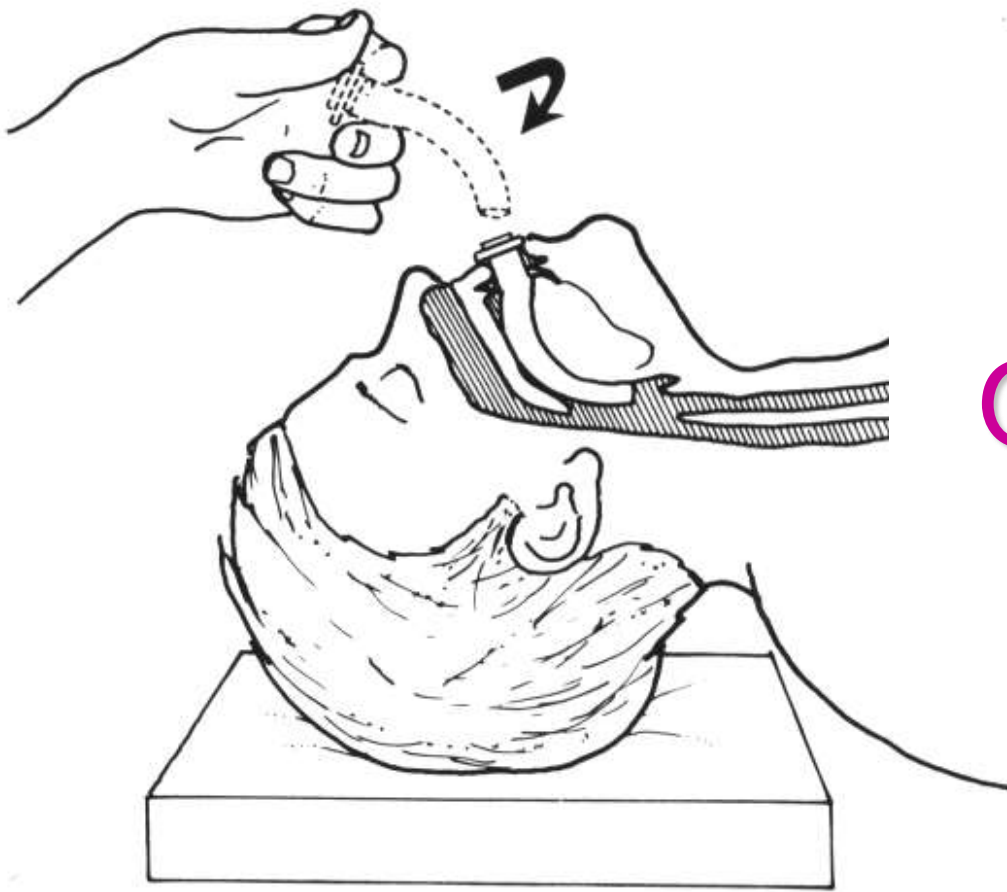




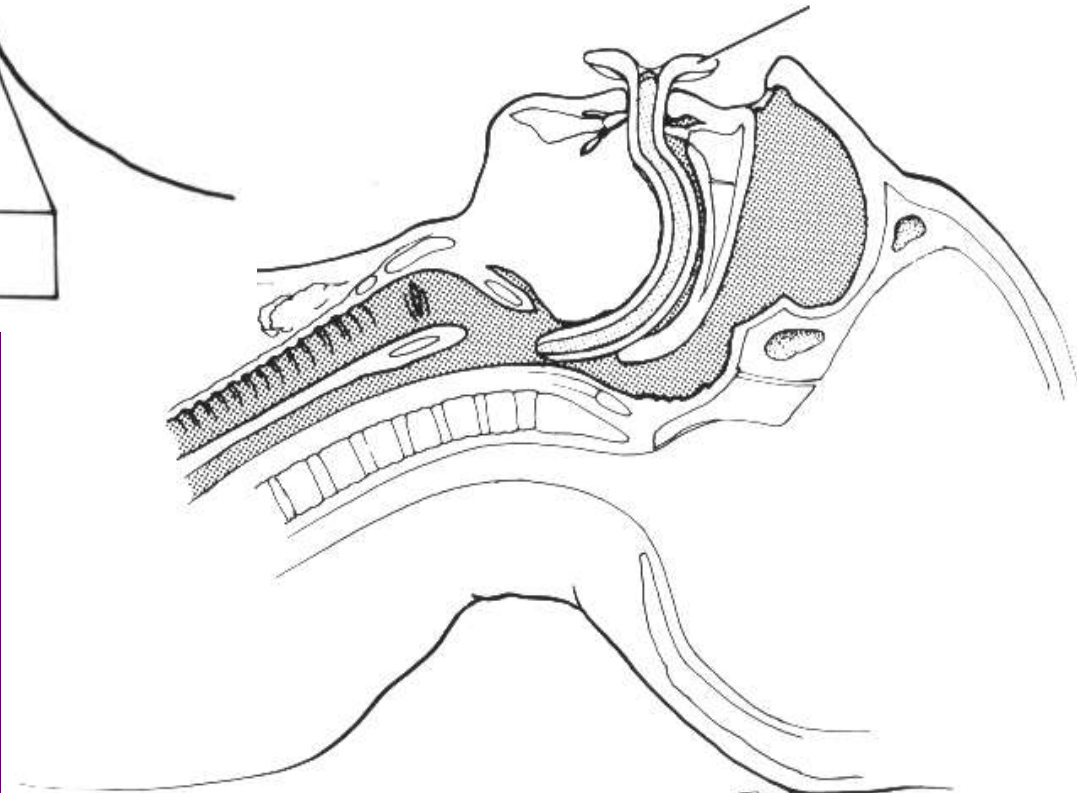
# ORAL AIRWAY

O.K.





# ORAL AIRWAY





# EVALUATION OF DIFFICULT AIRWAY

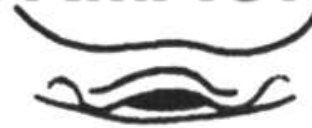
## CORMACK - LEHANE



Grade I



Grade II

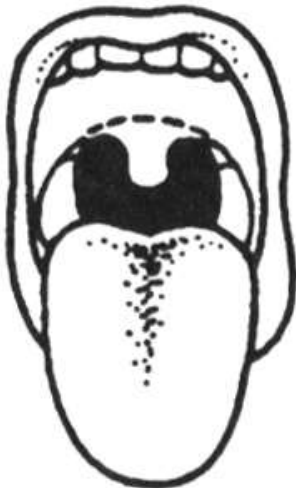


Grade III



Grade IV

## MALLAMPATTI



Class 1



Class 2



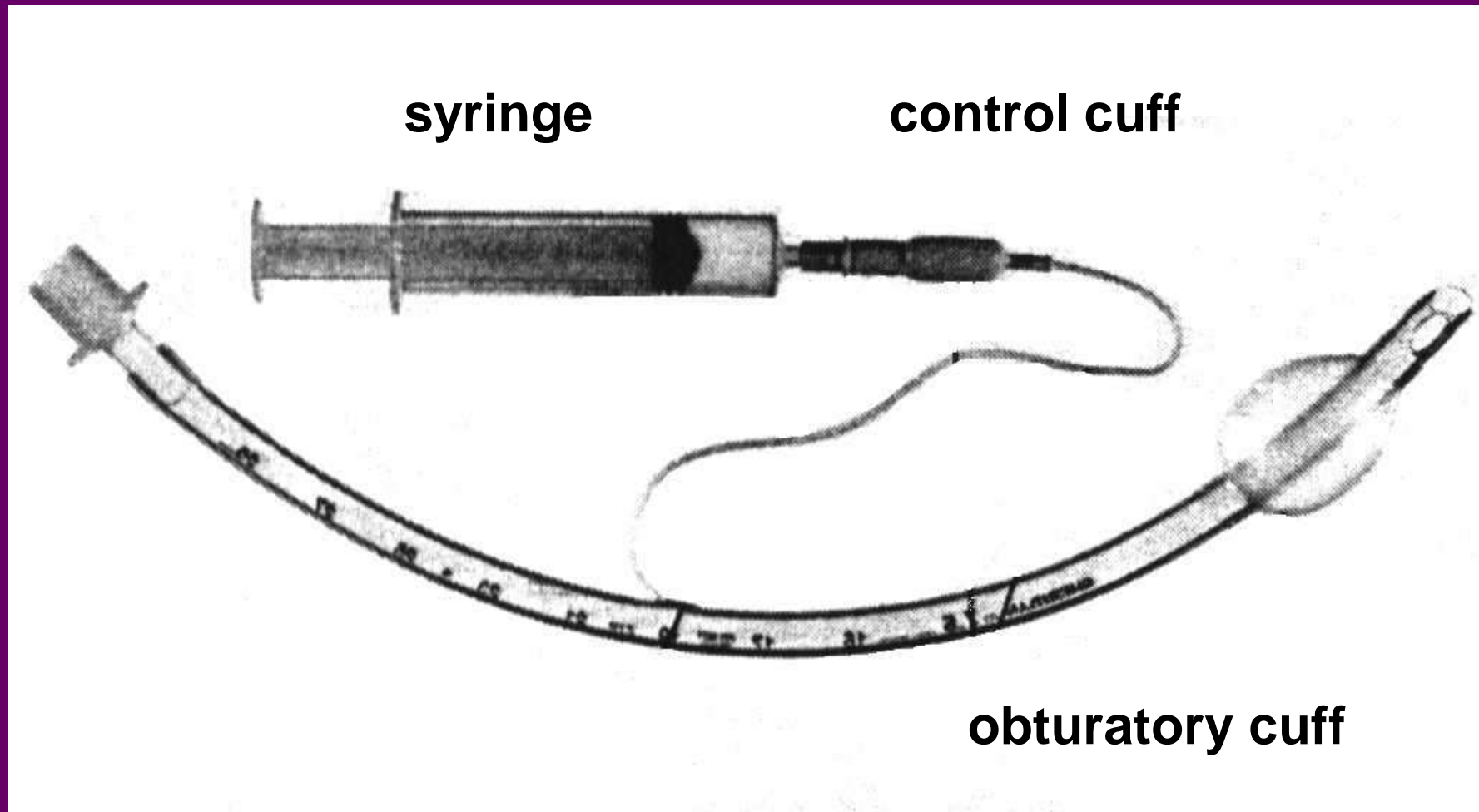
Class 3



Class 4

# ENDOTRACHEAL TUBE

= gold standard for airway management



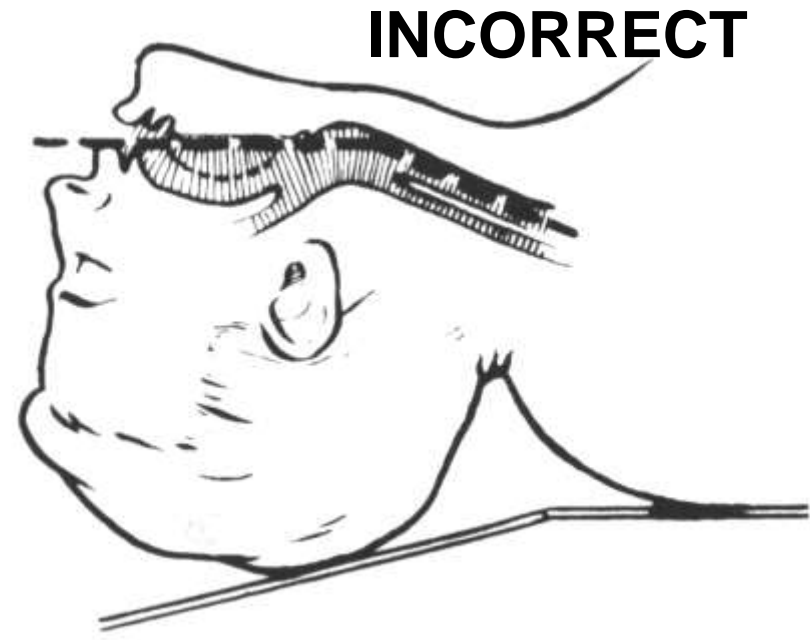
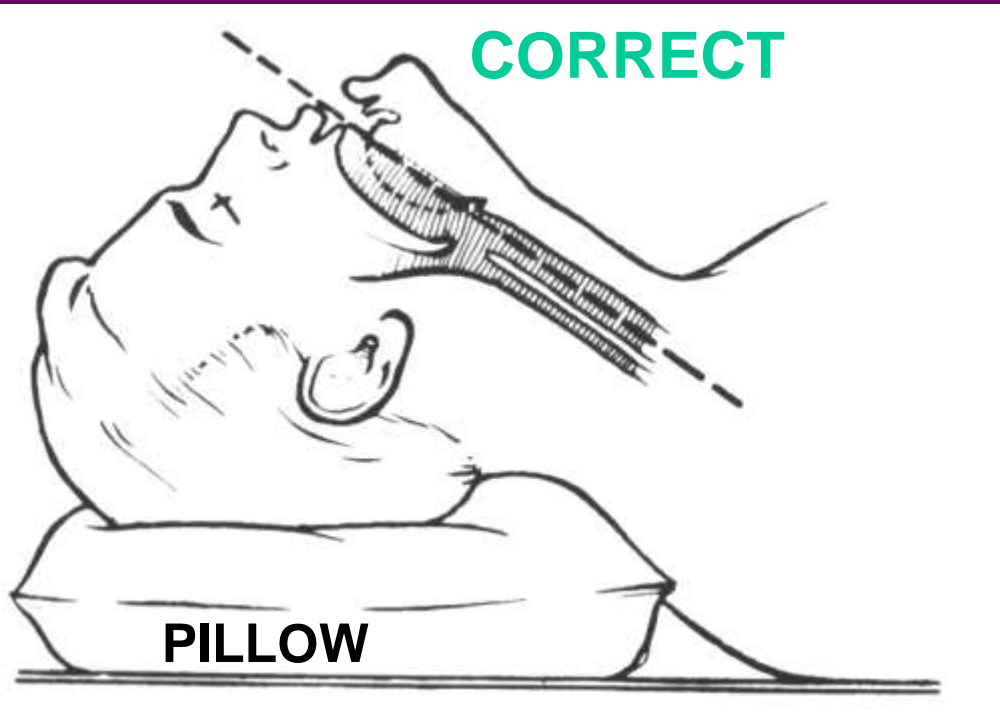
## Endotracheal Tube Cuffed



## Endotracheal Tube Plain



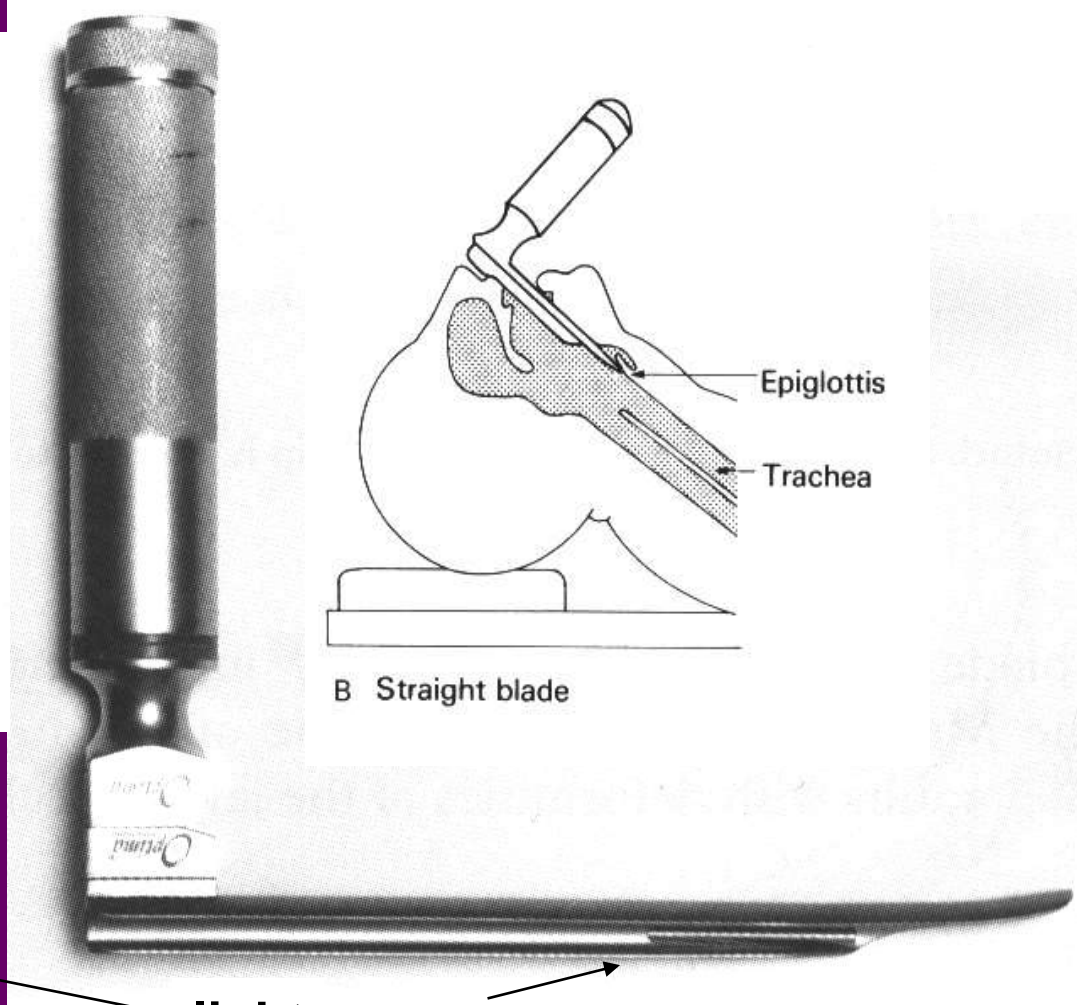
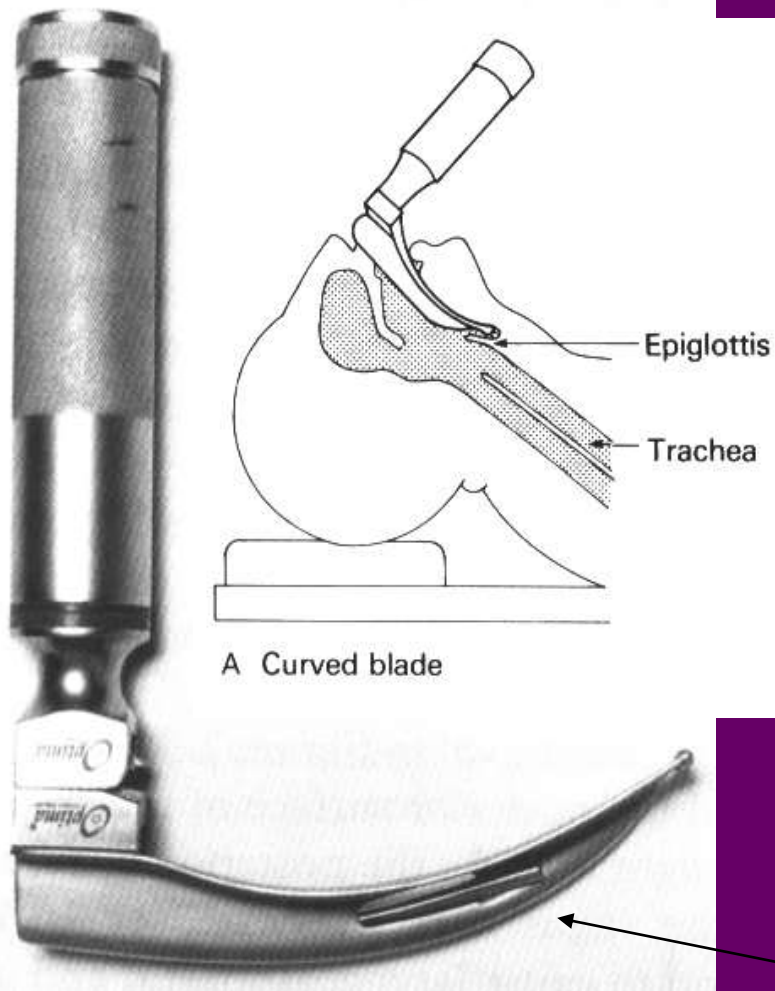
# HEAD POSITIONING DURING ENDOTRACHEAL INTUBATION



# DIRECT LARYNGOSCOPY

**MACINTOSH**

**MAGILL**

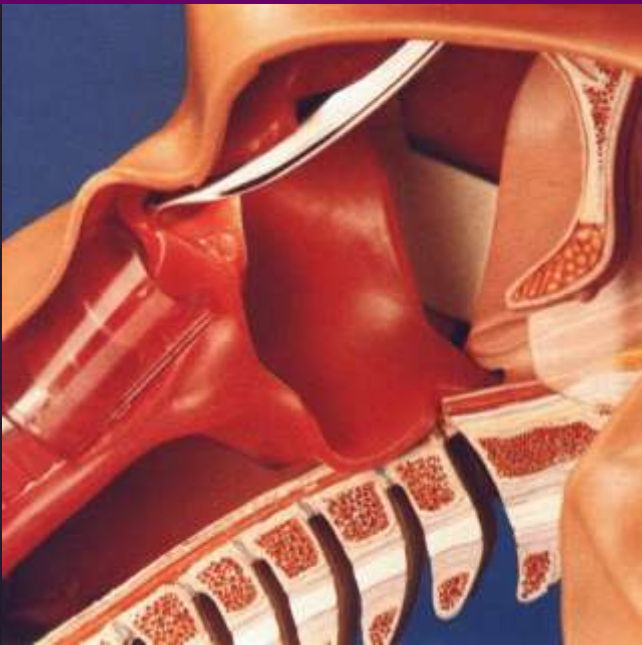
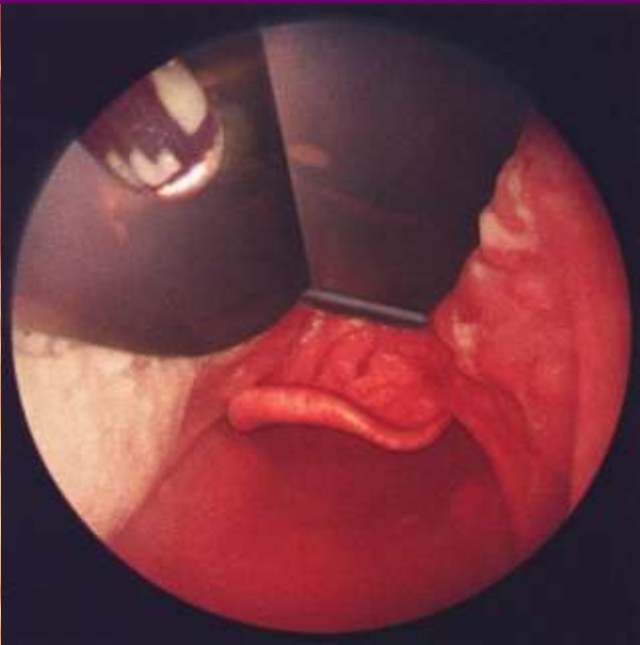
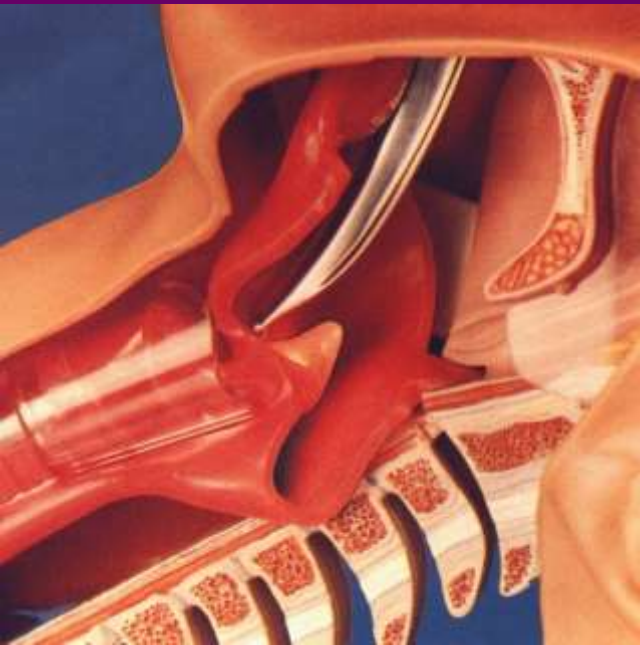


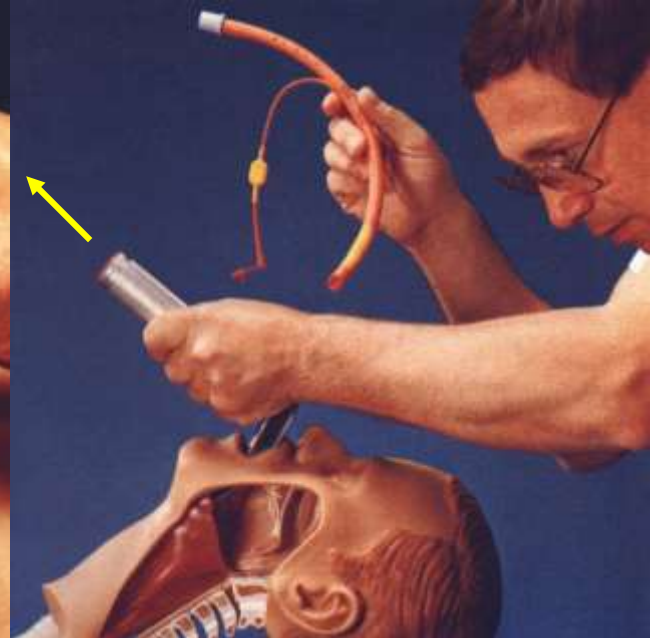
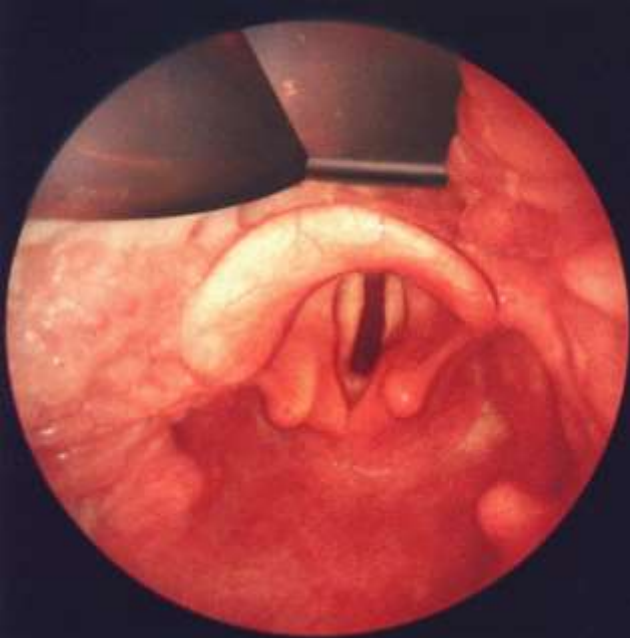
light





# OROTRACHEAL INTUBATION 1/2

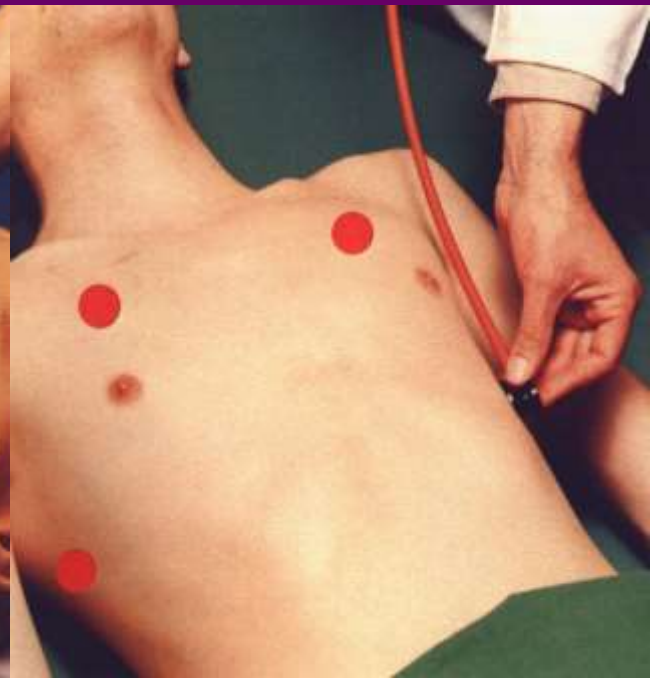




# OROTRACHEAL INTUBATION 2/2



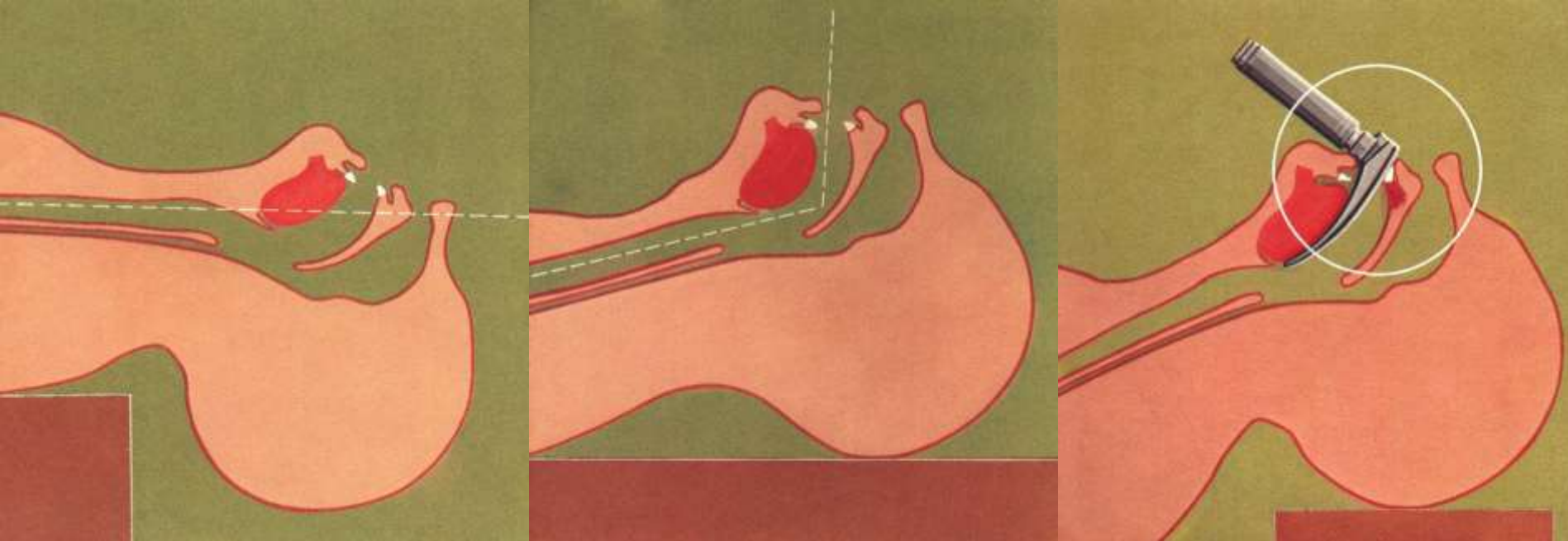
17-25 cmH<sub>2</sub>O



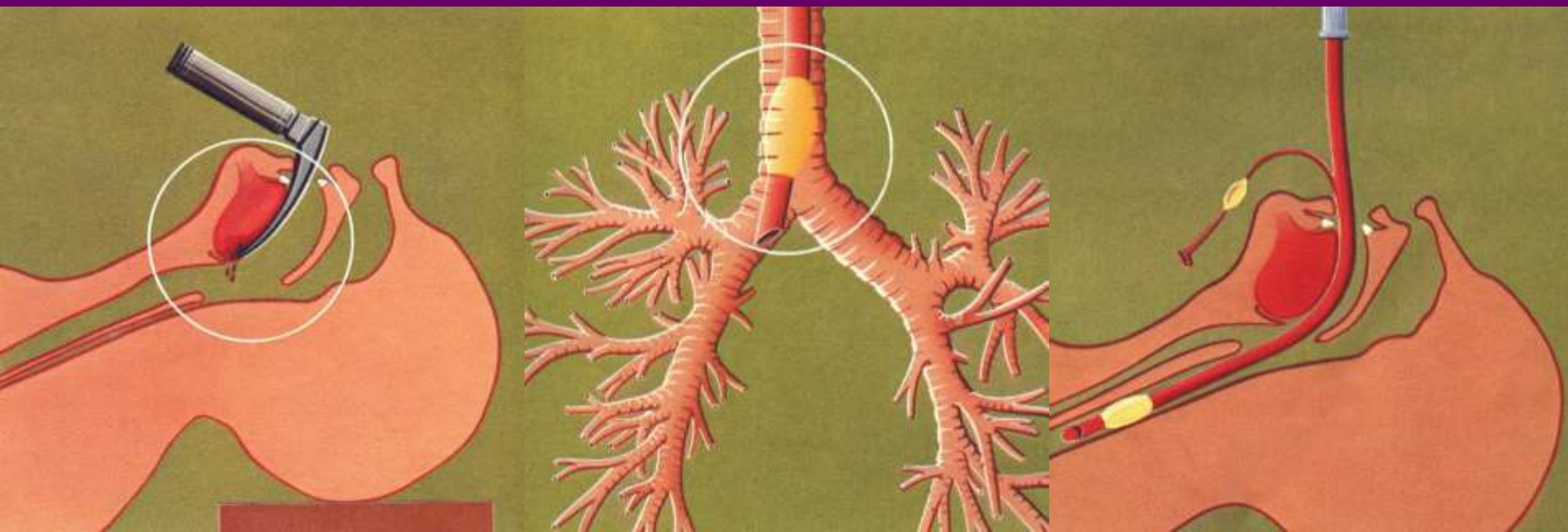




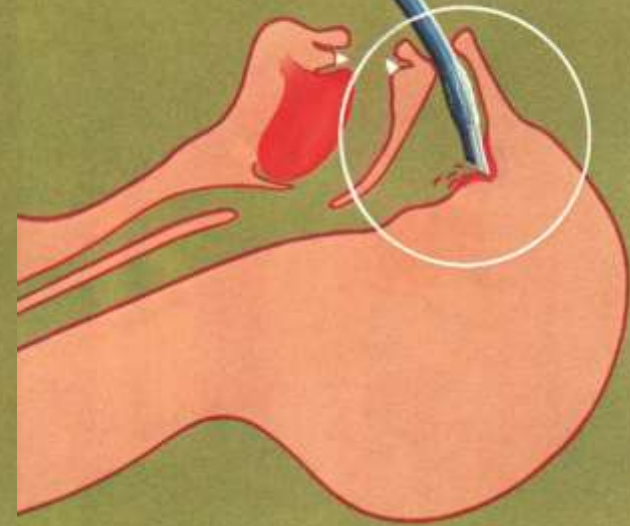
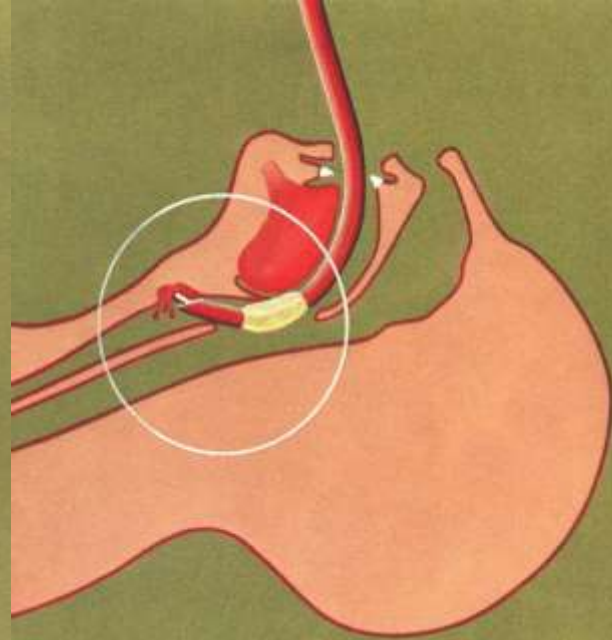
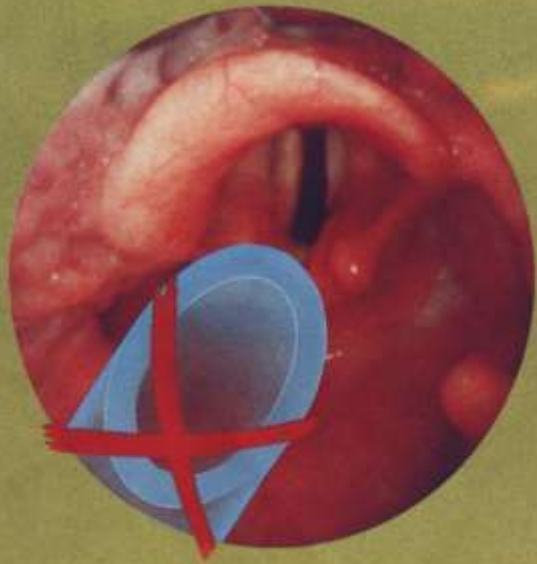
# OPENING THE MOUTH MANOEUVRE



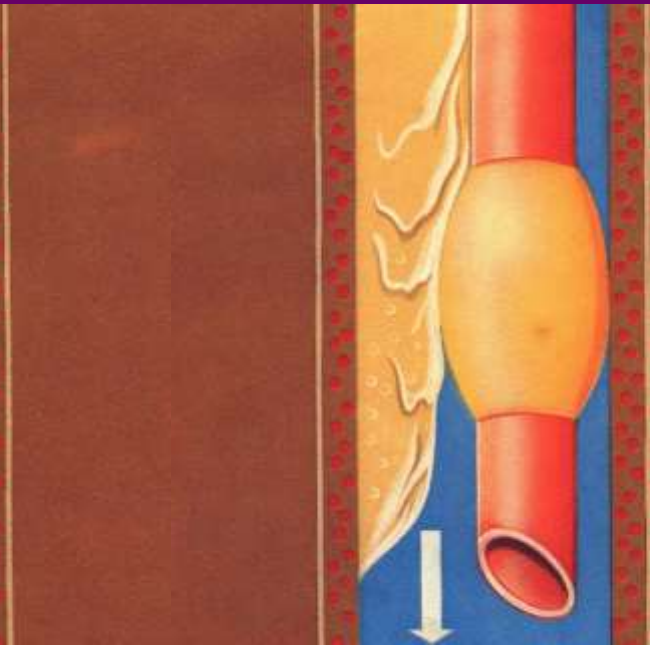
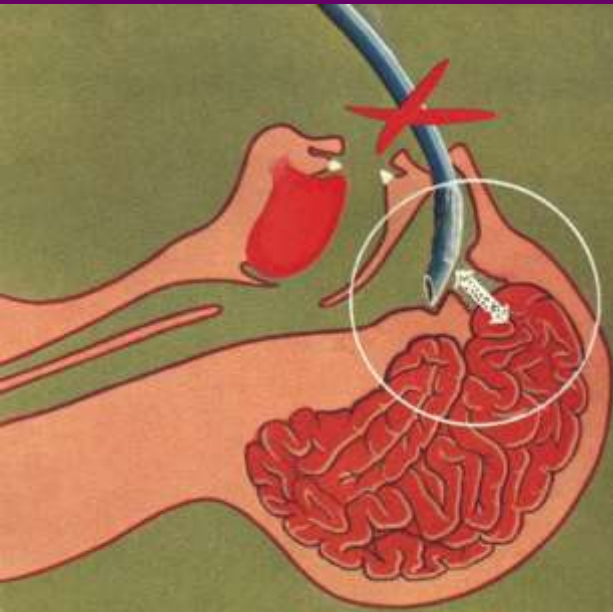
## PROBLEMS & COMPLICATIONS <sup>1/3</sup>







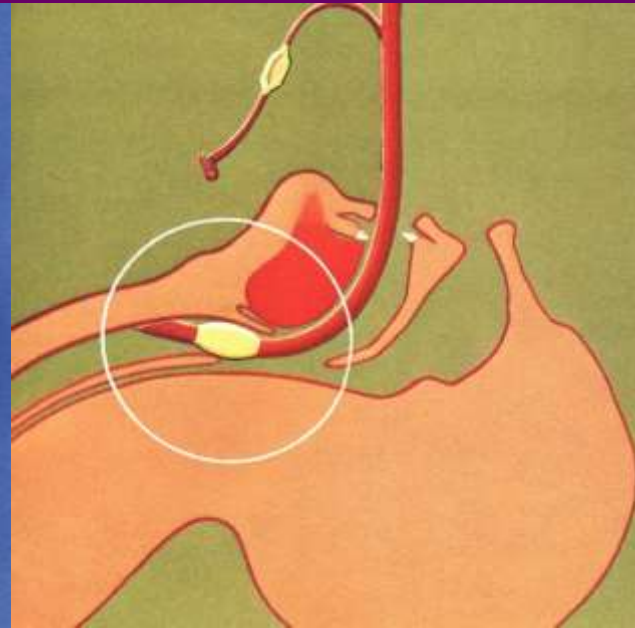
## PROBLEMS & COMPLICATIONS 2/3

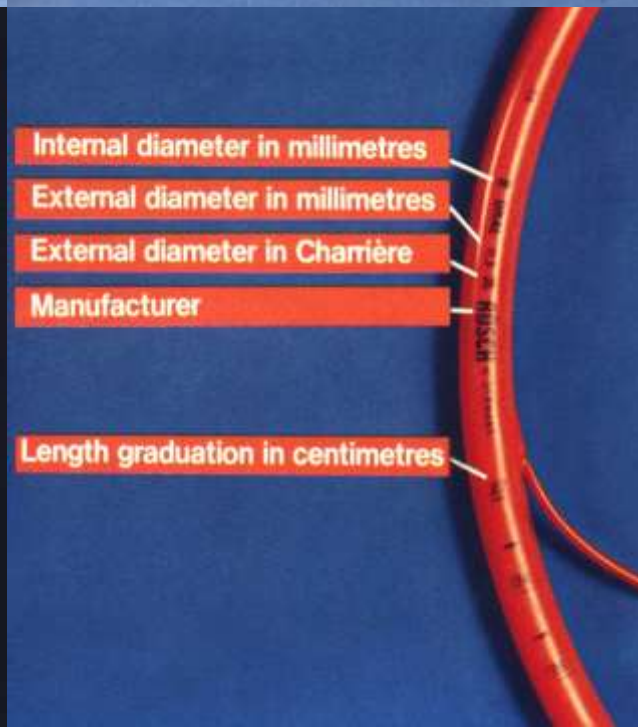
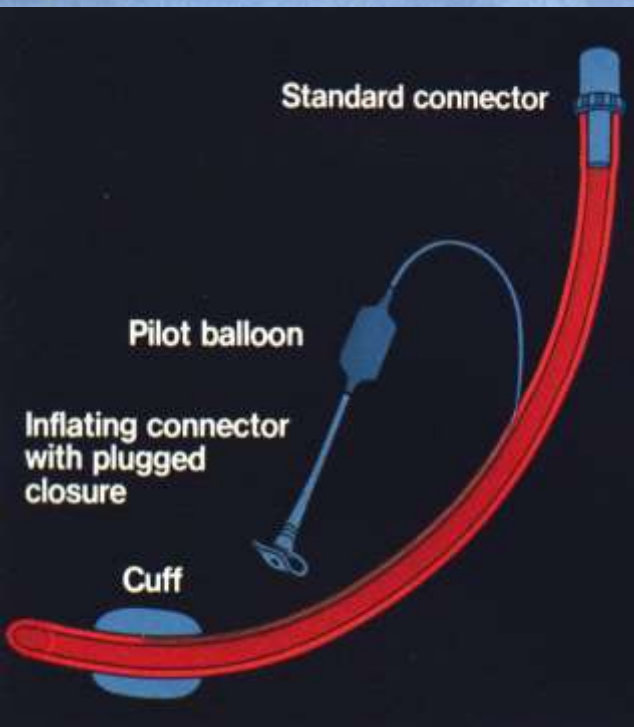
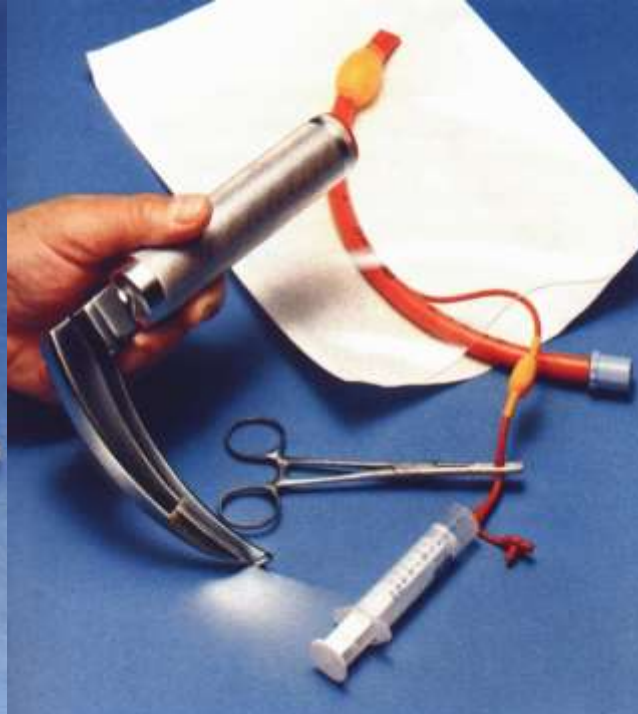






## PROBLEMS & COMPLICATIONS <sup>3/3</sup>







# Levering Laryngoskope (McCoy)

## Heine Flexible Tip



# GlideScope



- CMOS active pixel sensor (CMOS APS), videokamera a LCD s vysokým rozlíšením.
- Postupné **50-60° ohyby lyžice** pri vizualizácii hlasiviek znižuju potrebu výrazného predsunutia jazyka.
- Kamera je lokalizovaná na poslednom ohybe lyžice – lepší prehľad pracovného poľa (50°)
- Zanorená kamera - nižšie znečistenie
- Ohrievaná šošovky proti zahmlievaniu
- Potrebne **použitie vodiča ETT** (napr. Verathon 60°)
- **93-99% úspešnosť** intubácie v rôznych štúdiách
- Možnosťou záznamu, **výučba**
- Aj pri zlej polohovateľnosti hlavy dosiahne Cormack and Lehane grade I-II
- Vhodný najmä u **morbídnej obezity** (Cobalt)
- Vhodný pre **pre-hospital** podmienky (Glidescope Ranger)
- 2009 prvá tracheálna intubácia v teréne navádzané **telemedicínskou** technológiou z nemocnice

[http://www.verathon.eu/verathon\\_GlideScope.html](http://www.verathon.eu/verathon_GlideScope.html)

Cooper RM et al: Early clinical experience with a new videolaryngoscope (GlideScope) in 728 patients.

Can J Anaesth. 2005, 52, 2, 191-8.

Rovsing L et al: GlideScope® Video Laryngoscope for Tracheal Intubation in Morbidly Obese Patients. 27

2008 WFSA Cape Town Abstract

# AirTraq

- **Jednorázový VL**, určený pre obtiažnu intubáciu a pre neštandardné polohy pacienta a krku.
- Dva samostatné kanály:
  - **optický**: optický systém na batériu, okulár (video).
  - **vodiaci**: zadržiava ETT a vedie ju medzi hlasivky.
- Systém proti zahmlievaniu, nízokoteplotné svetlo.
- Bežné ETT.
- Ďalšie použitie AIRTRAQ:
  - Zavádzanie **fibroskopu** alebo **gastroskopu**
  - **Dvojlúmenové ETT**





# McGrath®

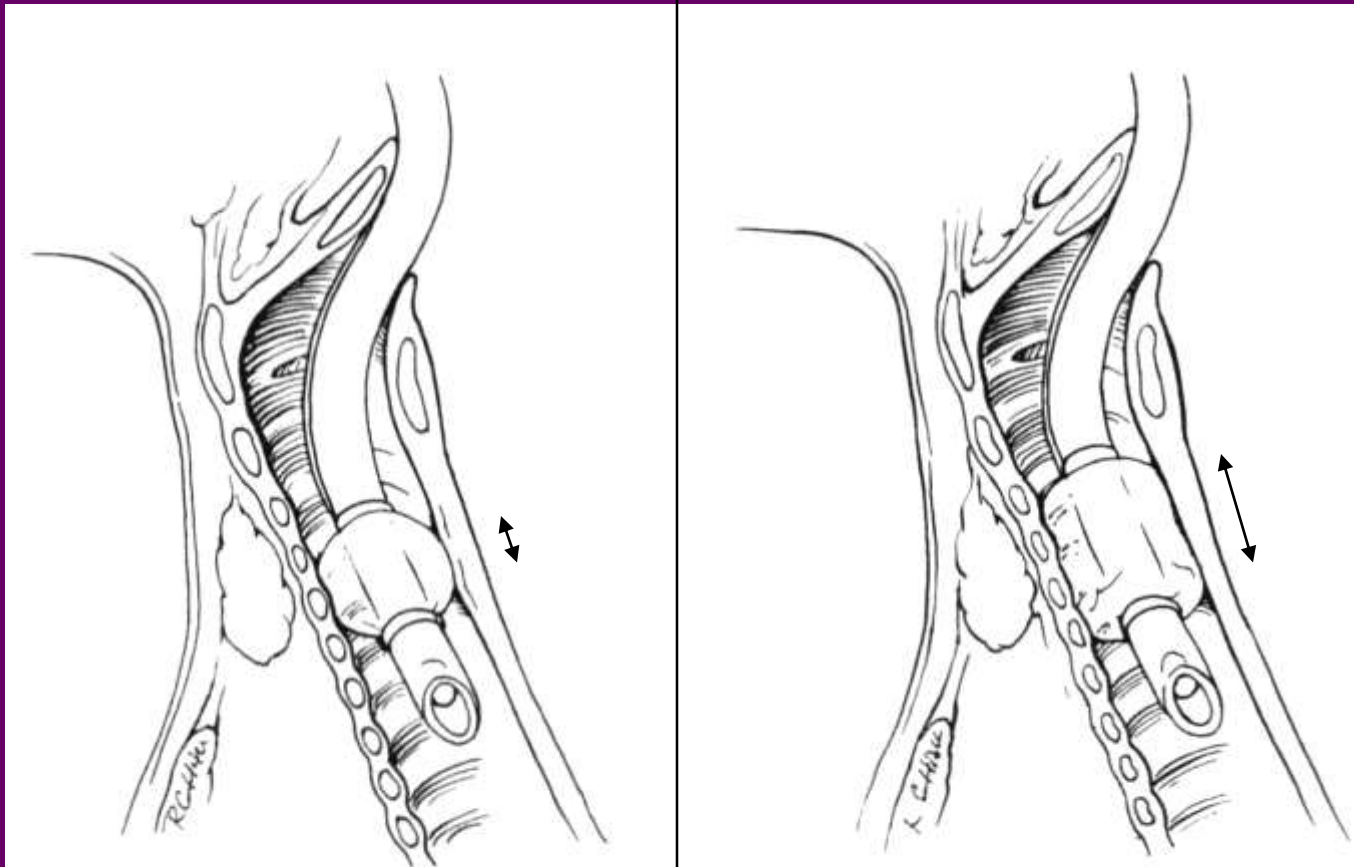


- The McGrath® Series 5 Video Laryngoskop určený najmä na **obtiaznu** intubáciu
- Má **jednorázové** optické lyžice brániace prenosu infekcie
- Dĺžka lyžice je **prispôsobiteľná** pacientovi
- Kompaktná **plochá obrazovka** na vrchole rukoväte

# CUFF TYPE & MUCOSAL DAMAGE RISK

LowVolume-HighPressure

HighVolume-LowPressure



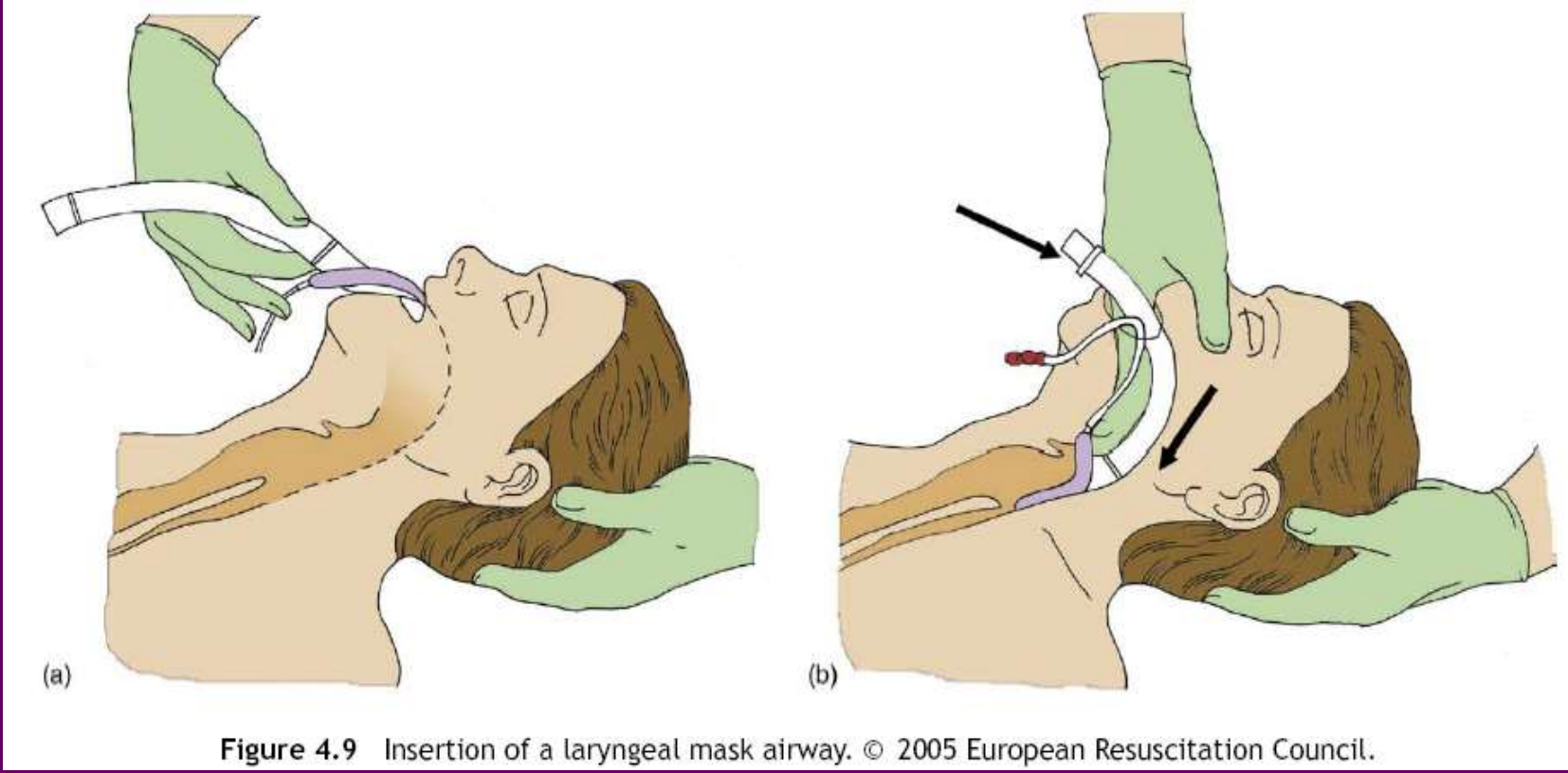
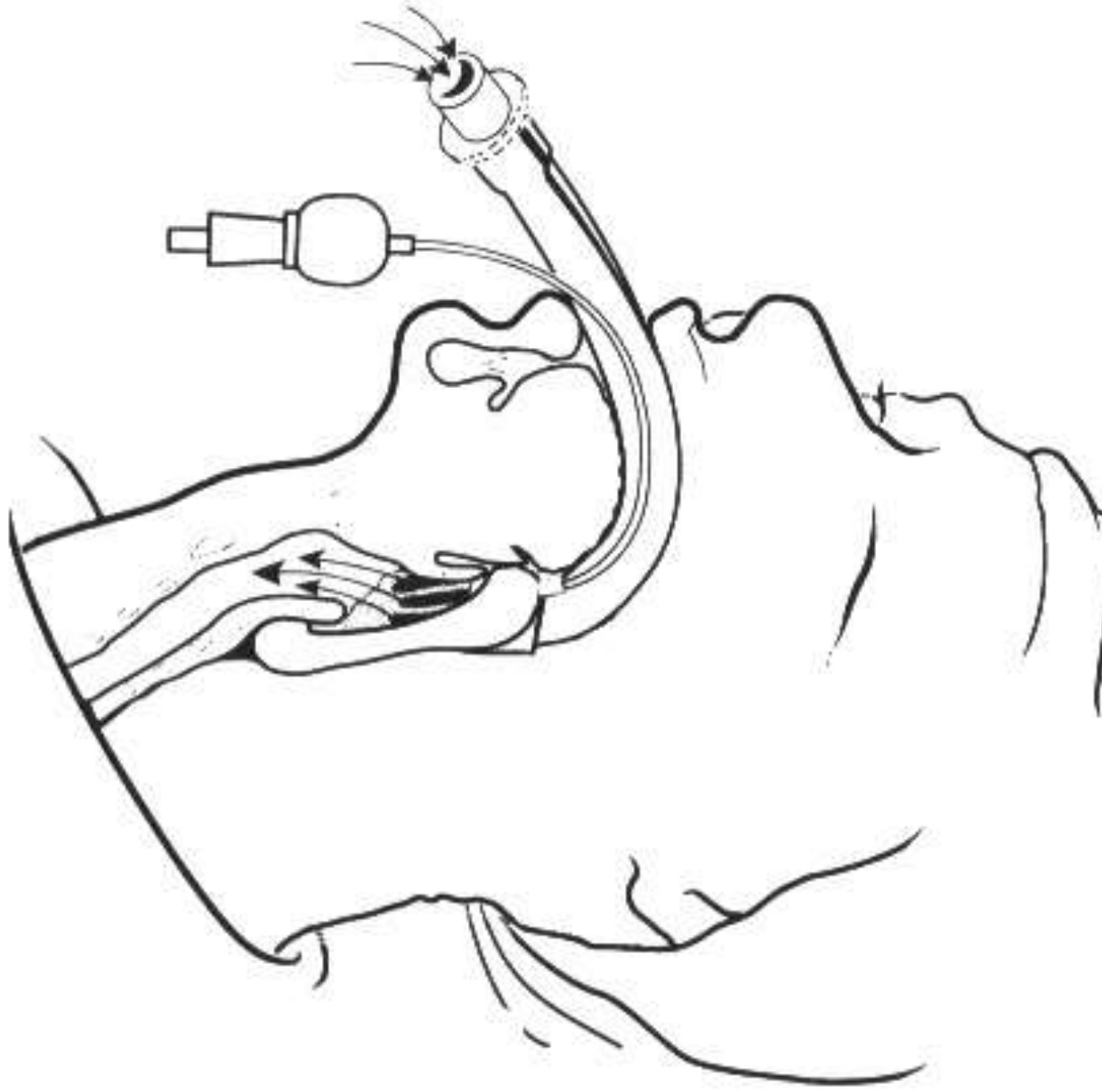


Figure 4.9 Insertion of a laryngeal mask airway. © 2005 European Resuscitation Council.



**Fig. 16.39** Diagram of a laryngeal mask in situ.

# LARYNGEAL MASK

# Laryngeal Tube (LTS-II®)

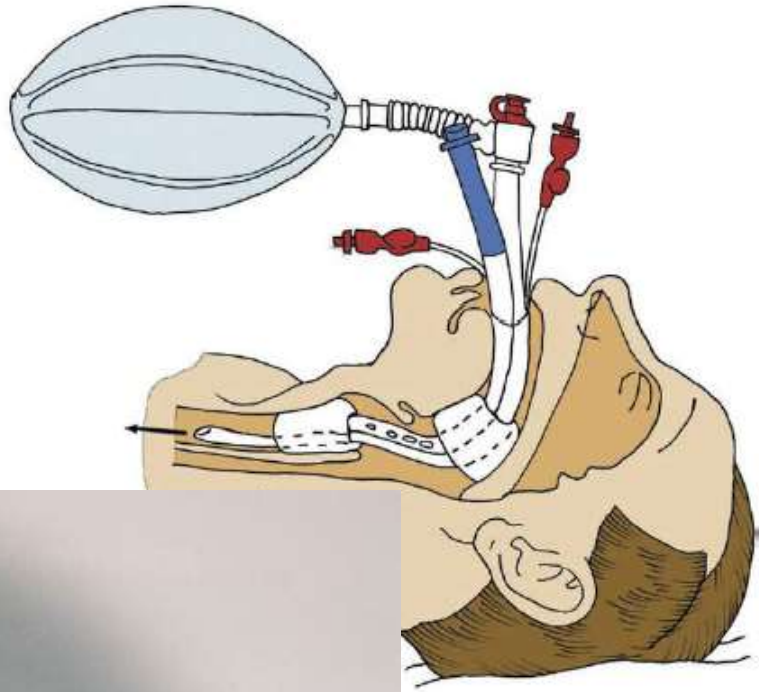
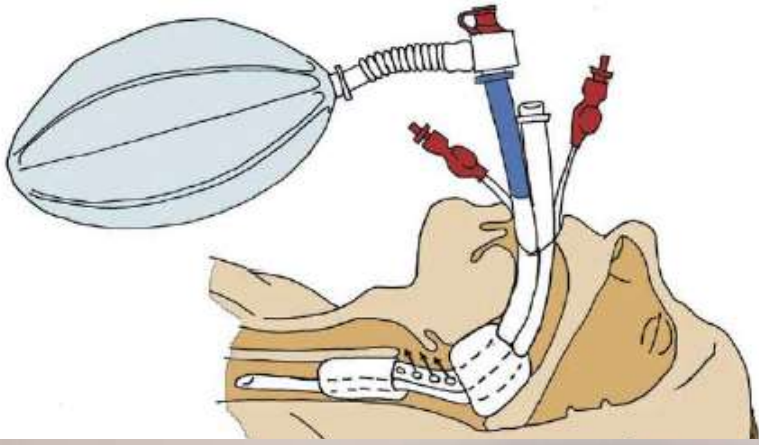
Laryngeálny tubus LTS-II s dvojitým lúmenom **dýchanie** + s možnosťou odsávania alebo zavedenia **žalúdovej** sondy.

Je **alternatívou** na vykonávanie umelého dýchania maskou, laryngeálnou maskou alebo v prípadoch, keď nie je nutná tracheálna intubácia.

- bezlatexový
- na opakované použitie
- autoklávovateľný do 134°C
- zavádzanie je atraumatické pre zuby a hlasivky
- orientačné značky pre zuby
- veľkoobjemové balóniky sa dobre anatomicky prispôbia
- účinné dýchanie
- dobrá tesnosť pri vyšších dýchacích tlakoch
- možnosť odsávania z dýchacích ciest a fibrobronchoskopie
- možnosť odsávania z pažeráka a zavedenie žalúdovej sondy



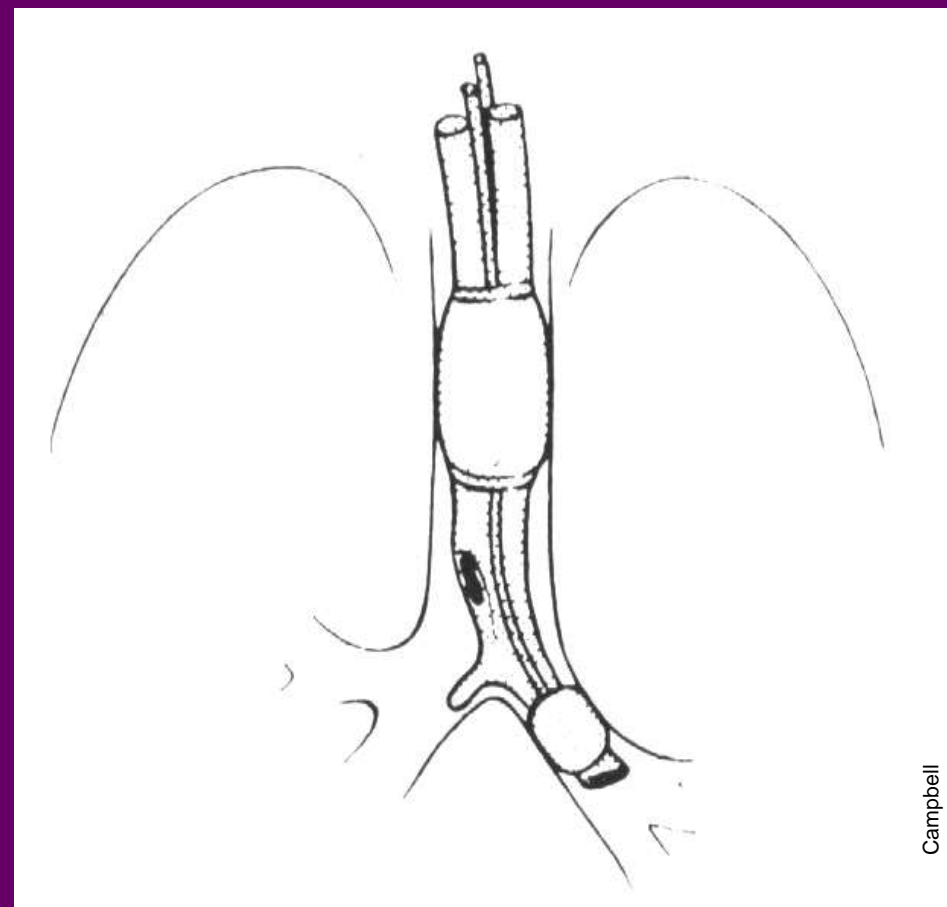
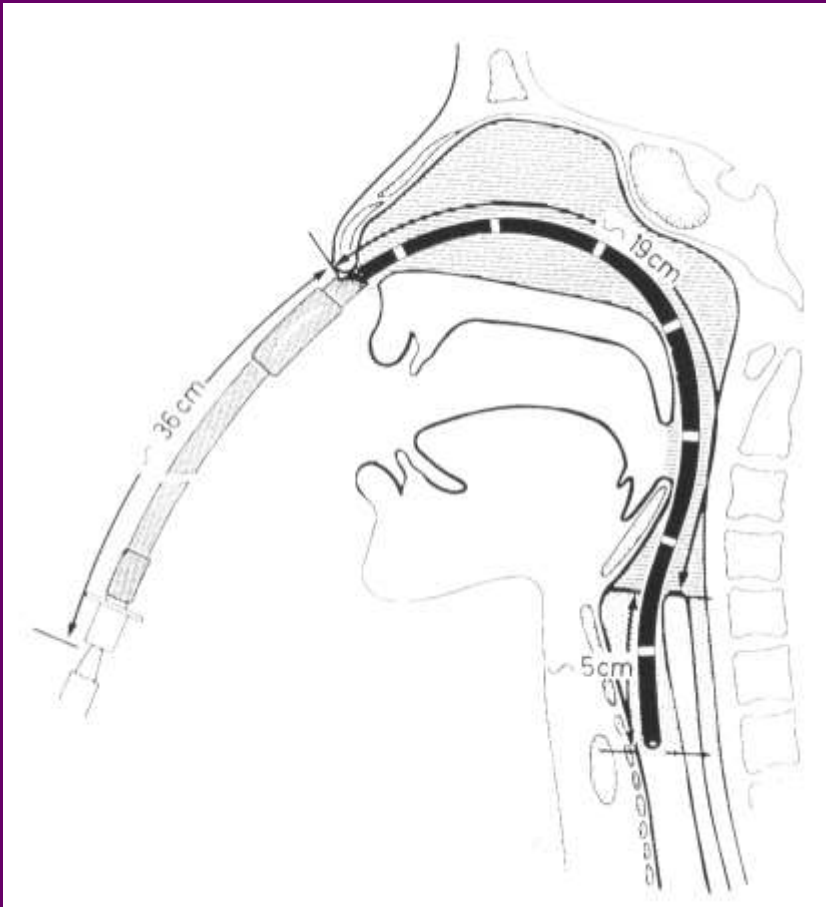


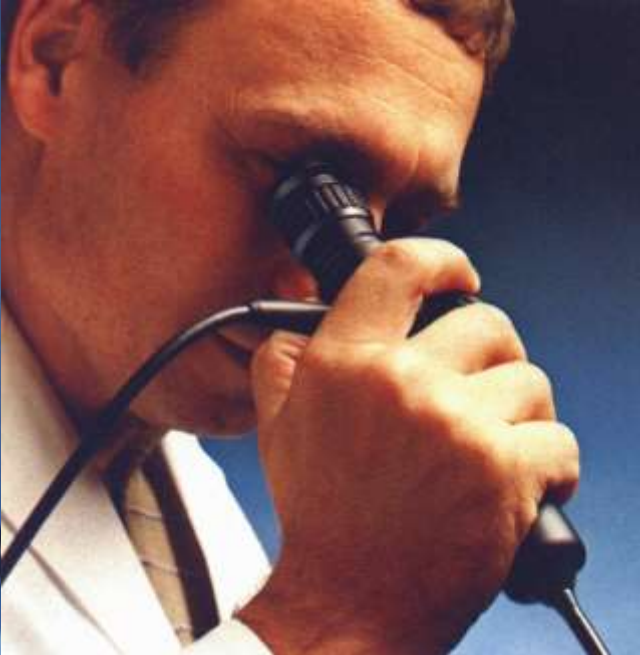
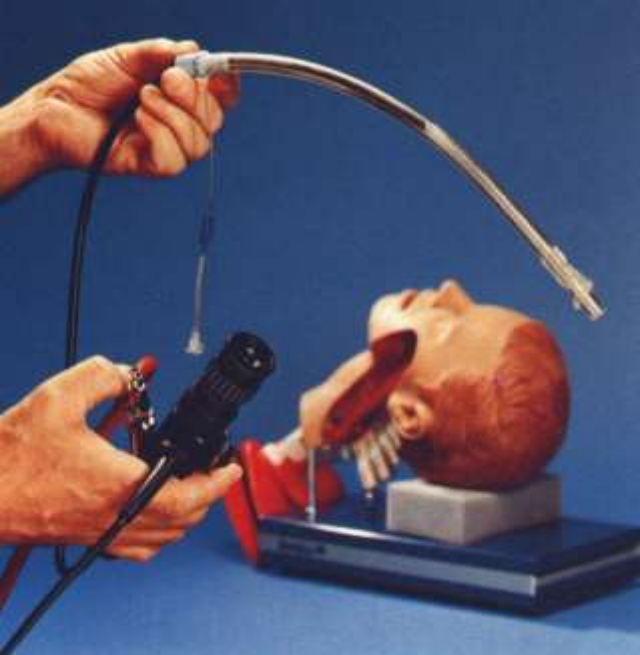


osition. © 2005 European

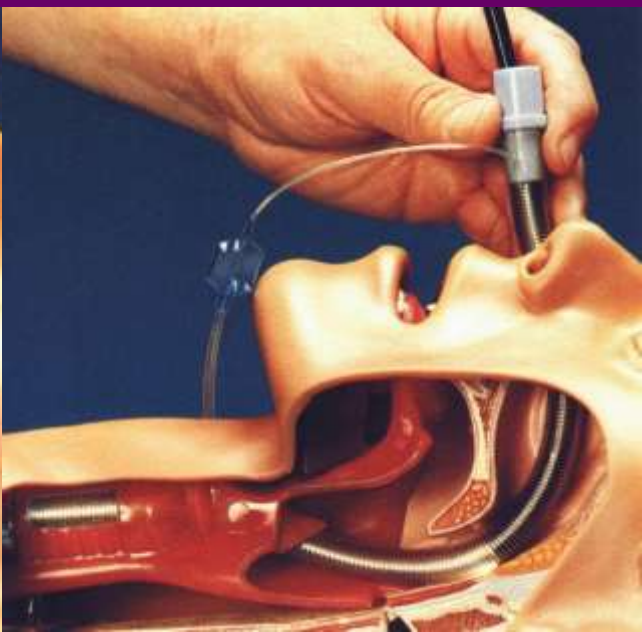
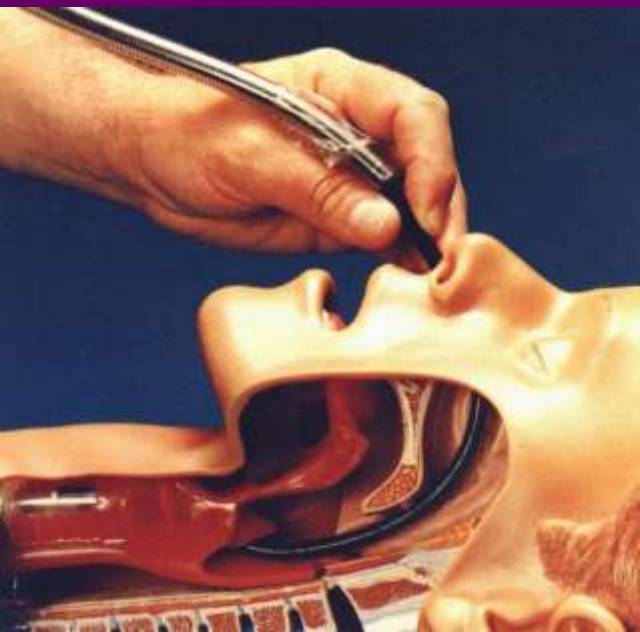
# FIBEROPTIC NASAL INTUBATION

# POSITION OF LEFT- SIDED DOUBLE- LUMEN CATHETER



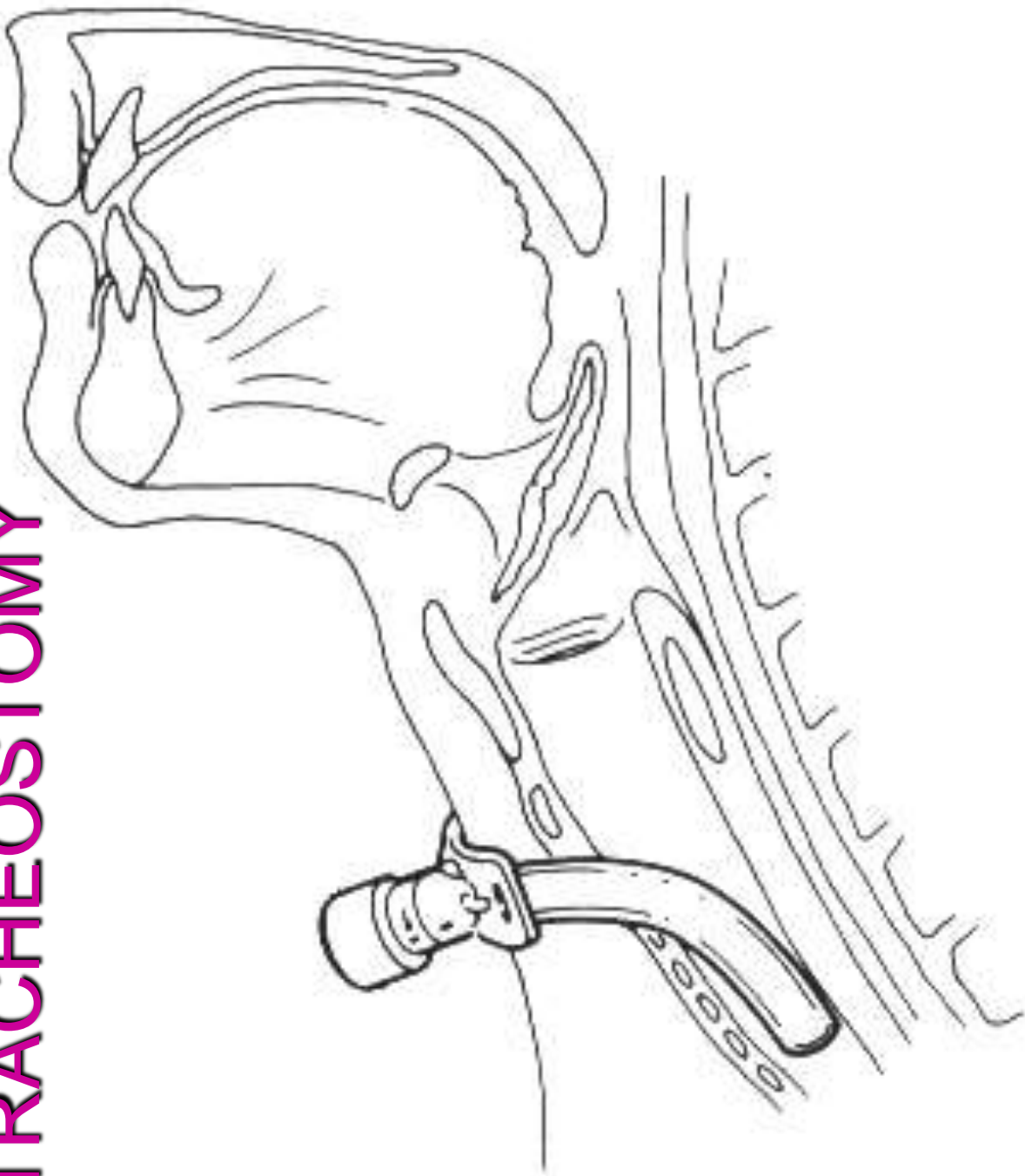


# FIBEROPTIC NTI



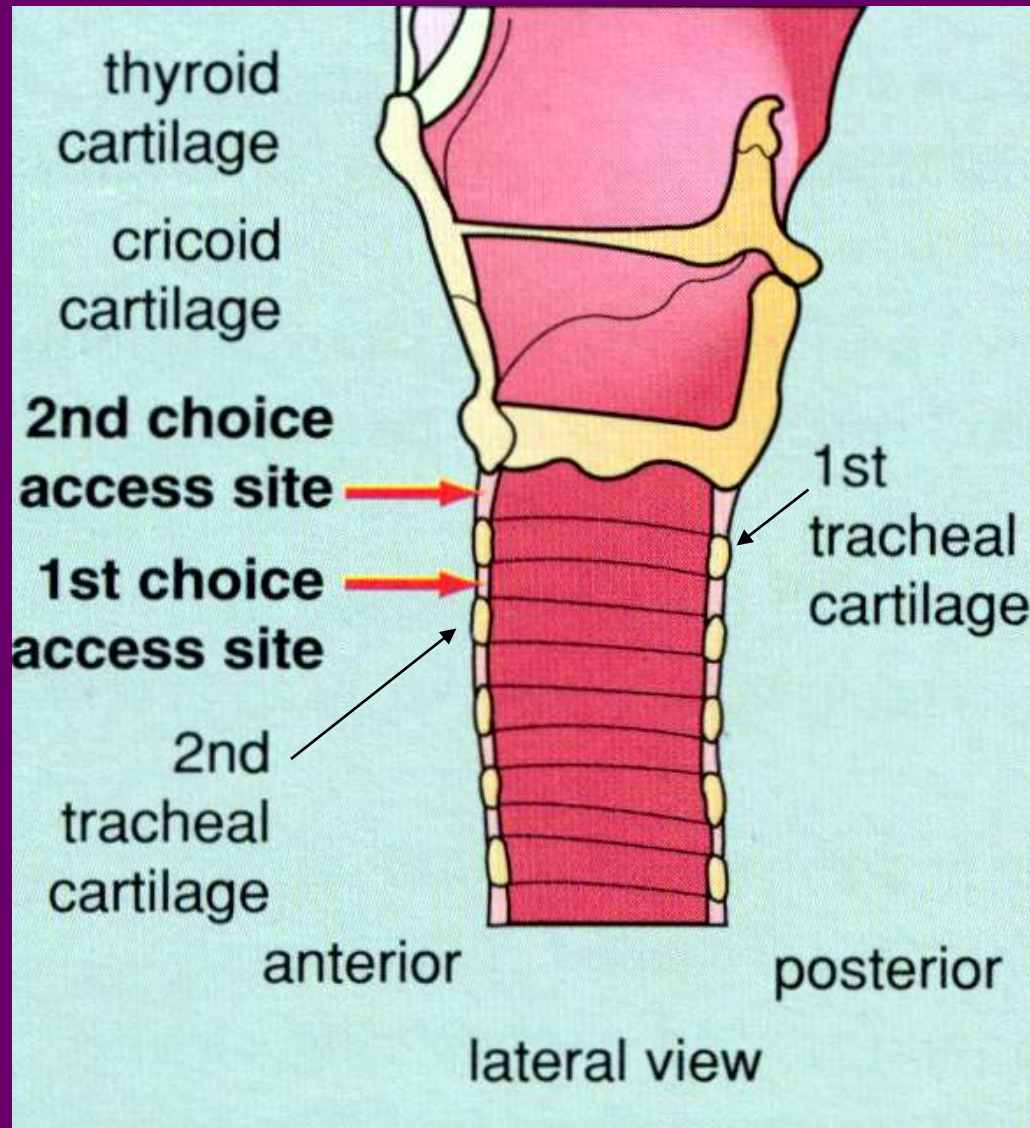


# TRACHEOSTOMY





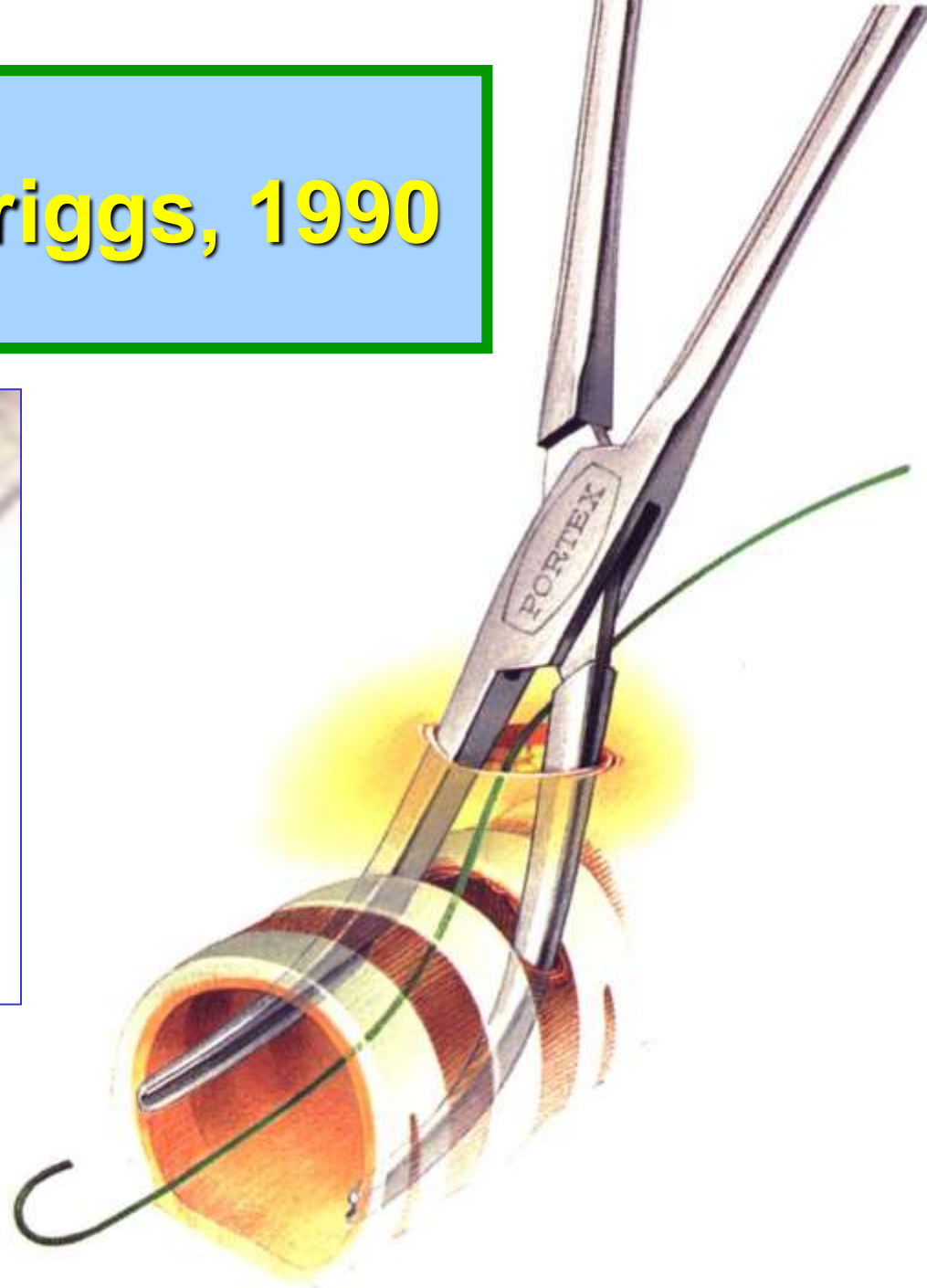
# TRACHEOSTOMY Places



# PDT Griggs, 1990



Forceps with  
groove  
for guidewire



# QuickTrach





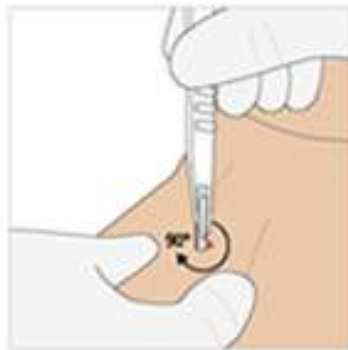
# Emergency Cricothyroidotomy

Based on the simple description of 'stab, twist, bougie, tube', the ScalpelCric is meant to facilitate the execution of the scalpel technique.

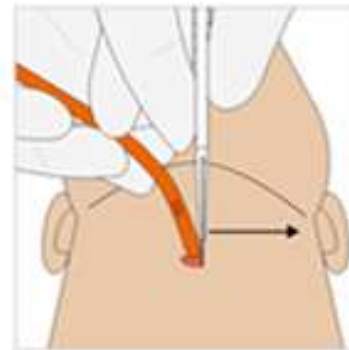
## Scalpel-Bougie-Tube



1. stab



2. twist

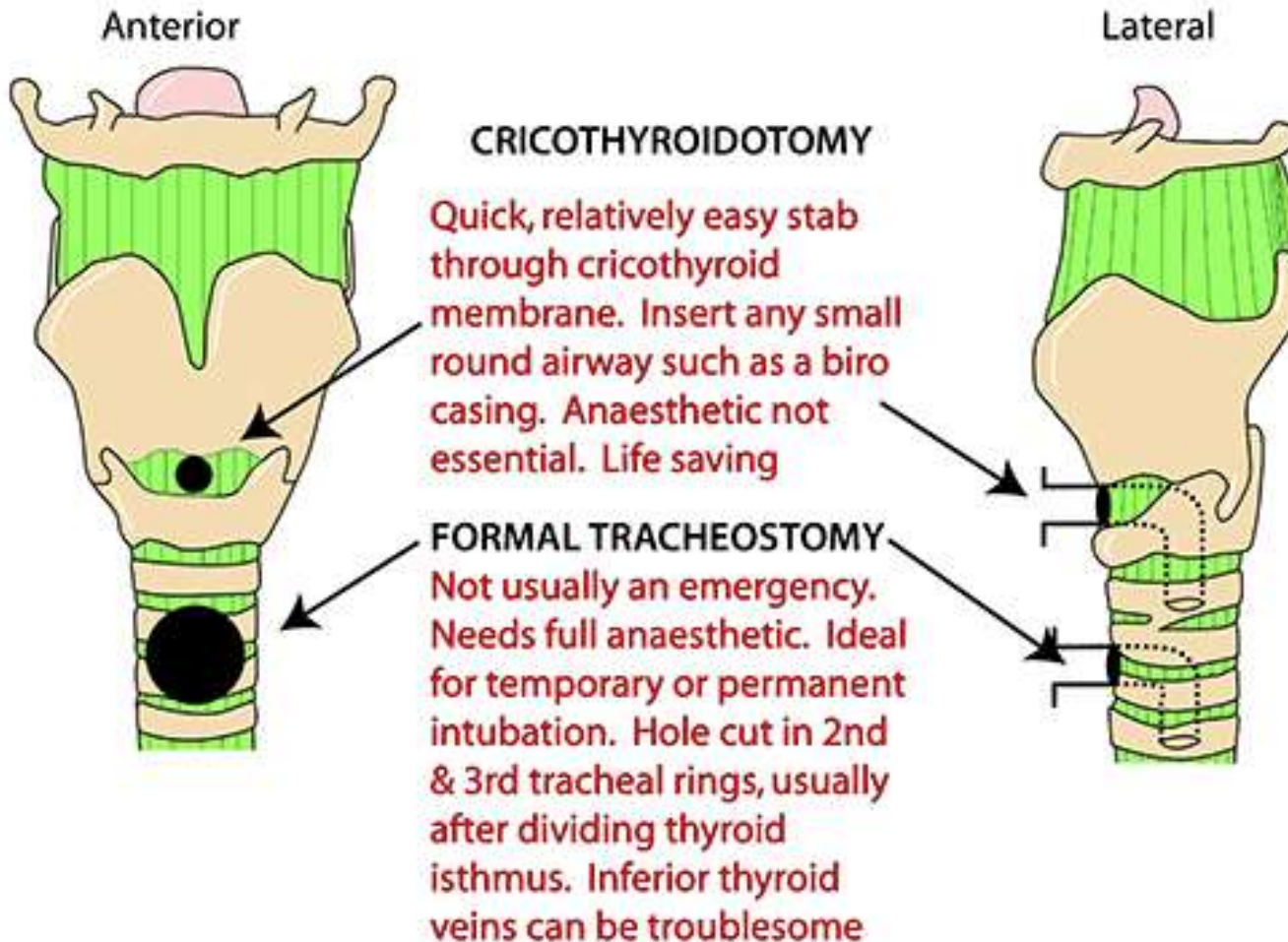


3. bougie

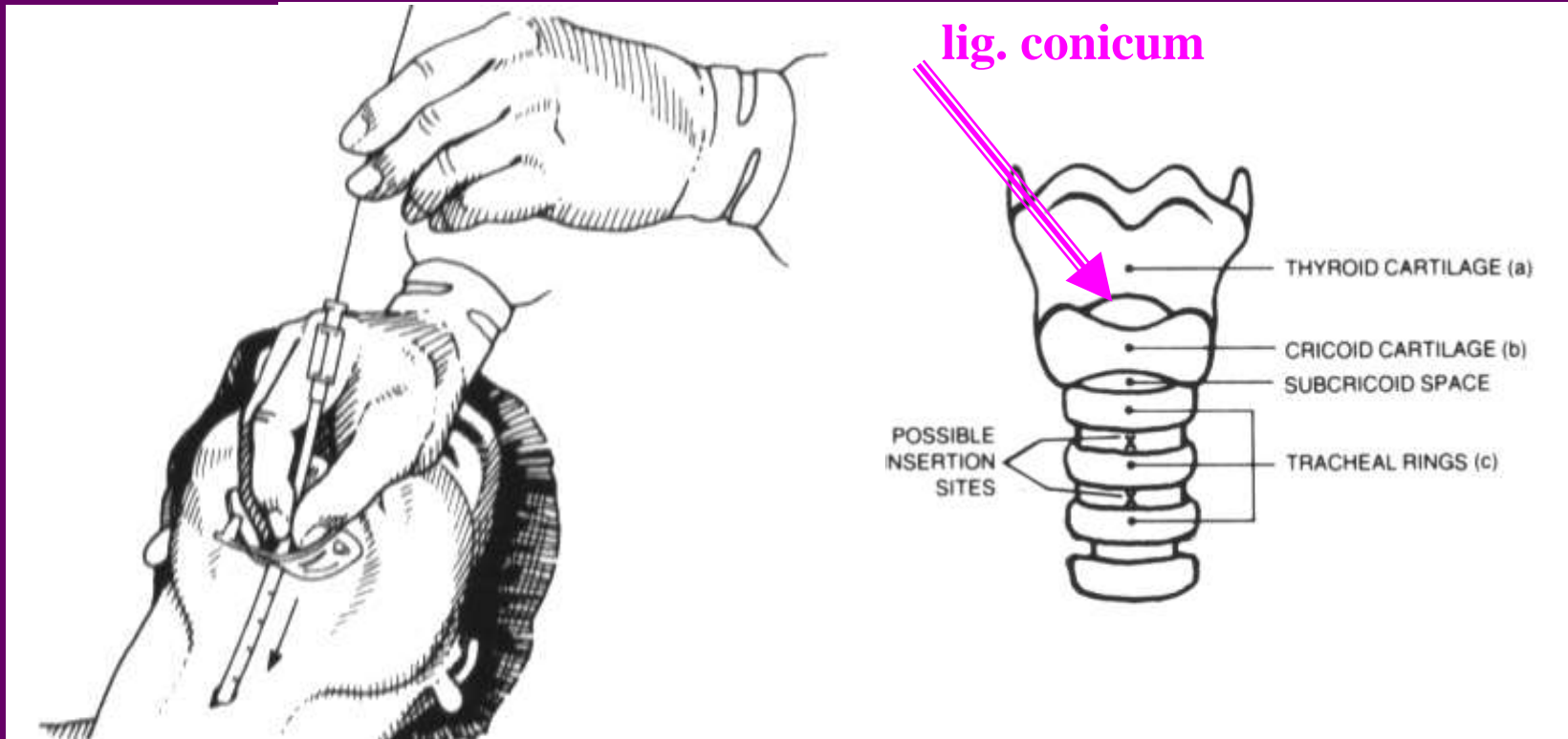


4. tube

## EMERGENCY ACCESS TO TRACHEA



# MINITRACH Seldinger



Cricothyroidotomy: 5. x = 96% <40 s,  
David T. Wong et al.: What Is the Minimum Training Required for Successful Cricothyroidotomy?  
A Study in Mannequins. *Anesthesiology* 2003; 98:349–53.





# Result of ETI

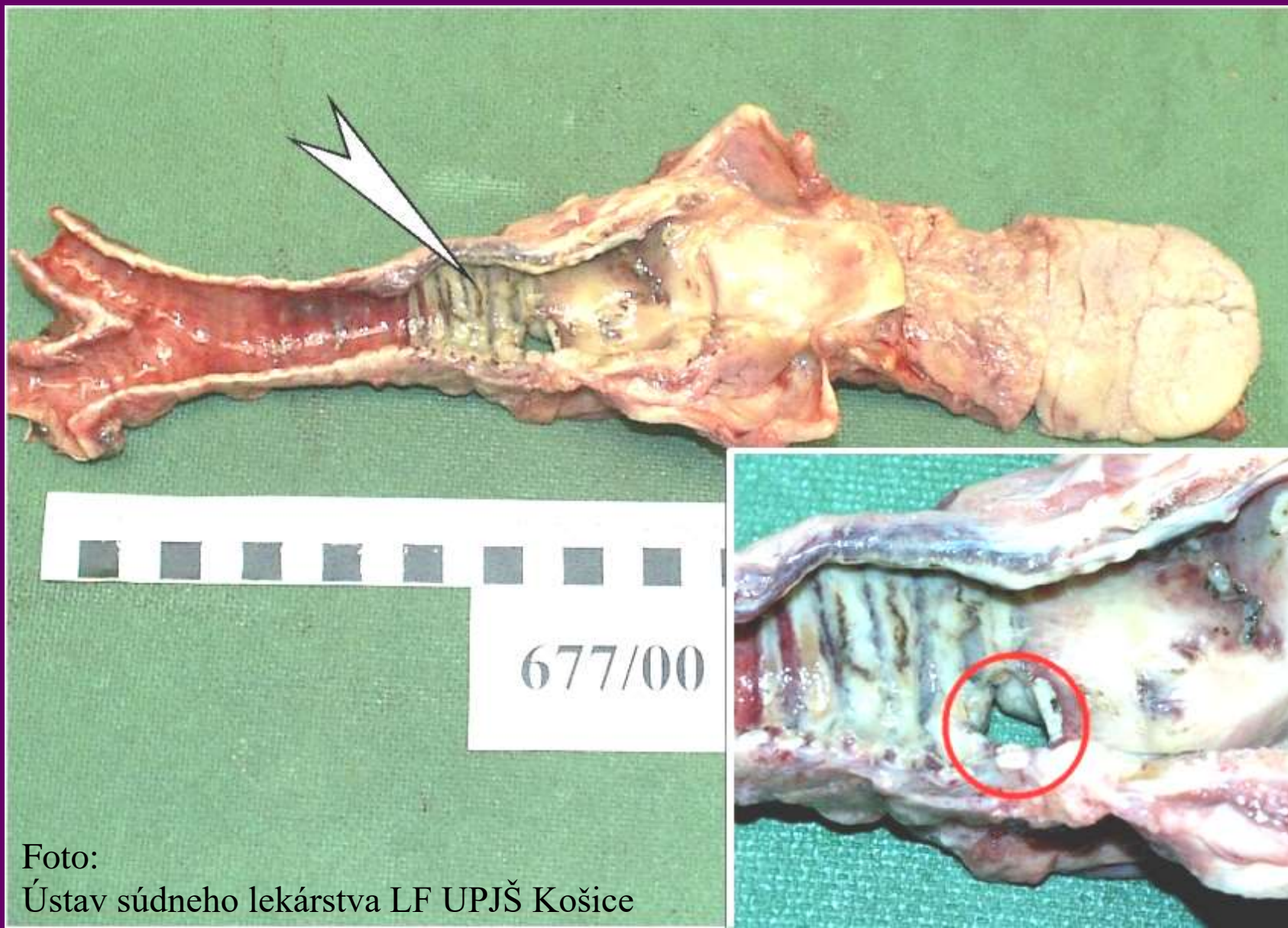


Foto:  
Ústav súdneho lekárstva LF UPJŠ Košice

## Complicating Anatomical Factors in Infants

Narrow Nares

Large Tongue

High Glottis

Slanting Vocal Cords

Narrow Cricoid Ring

C<sub>4</sub>

Large Occiput

*A. J. Juce*

# DIFFERENCIES IN LARYNX SHAPE IN ADULTS (A) & CHILDREN (B)

