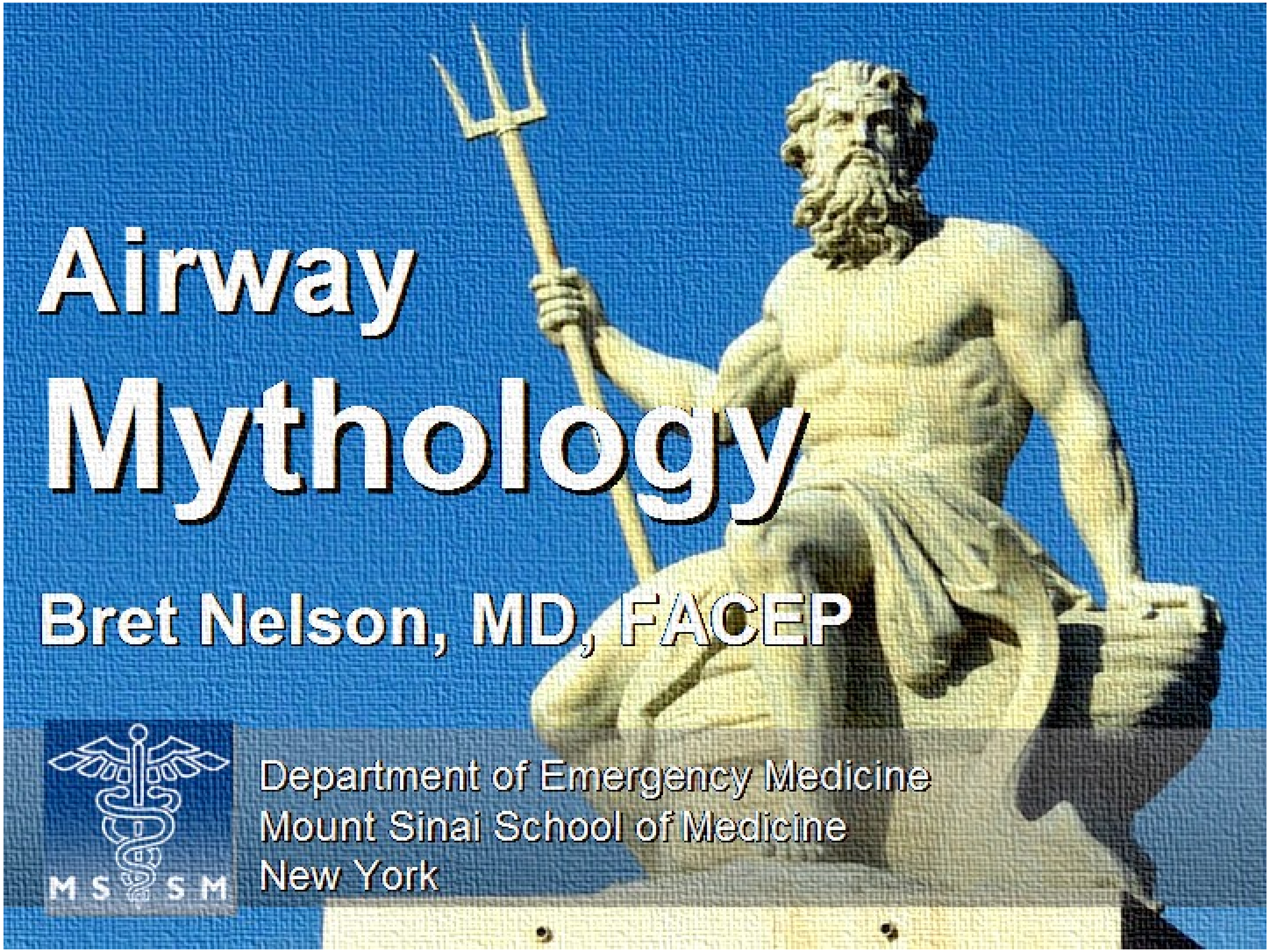
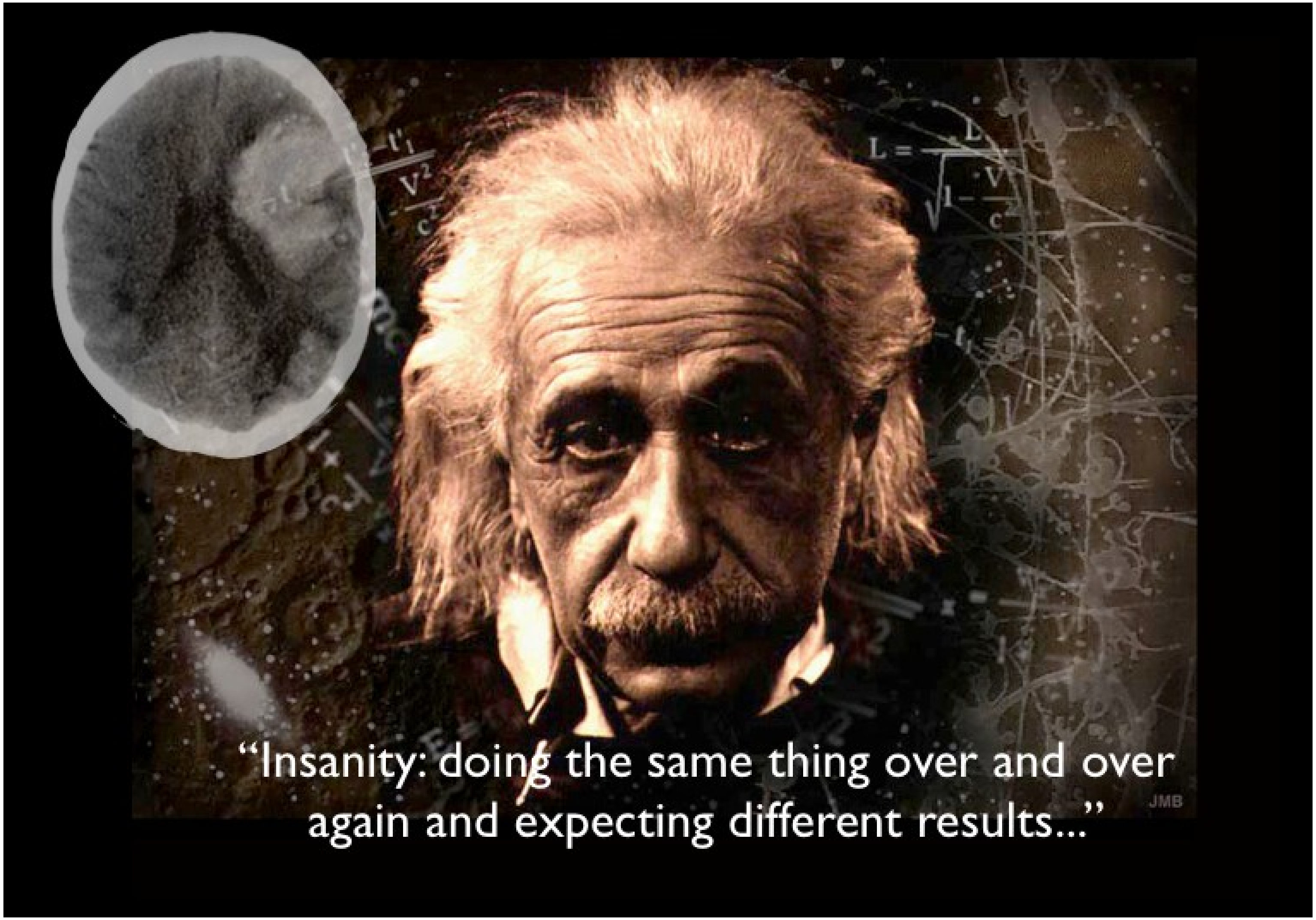
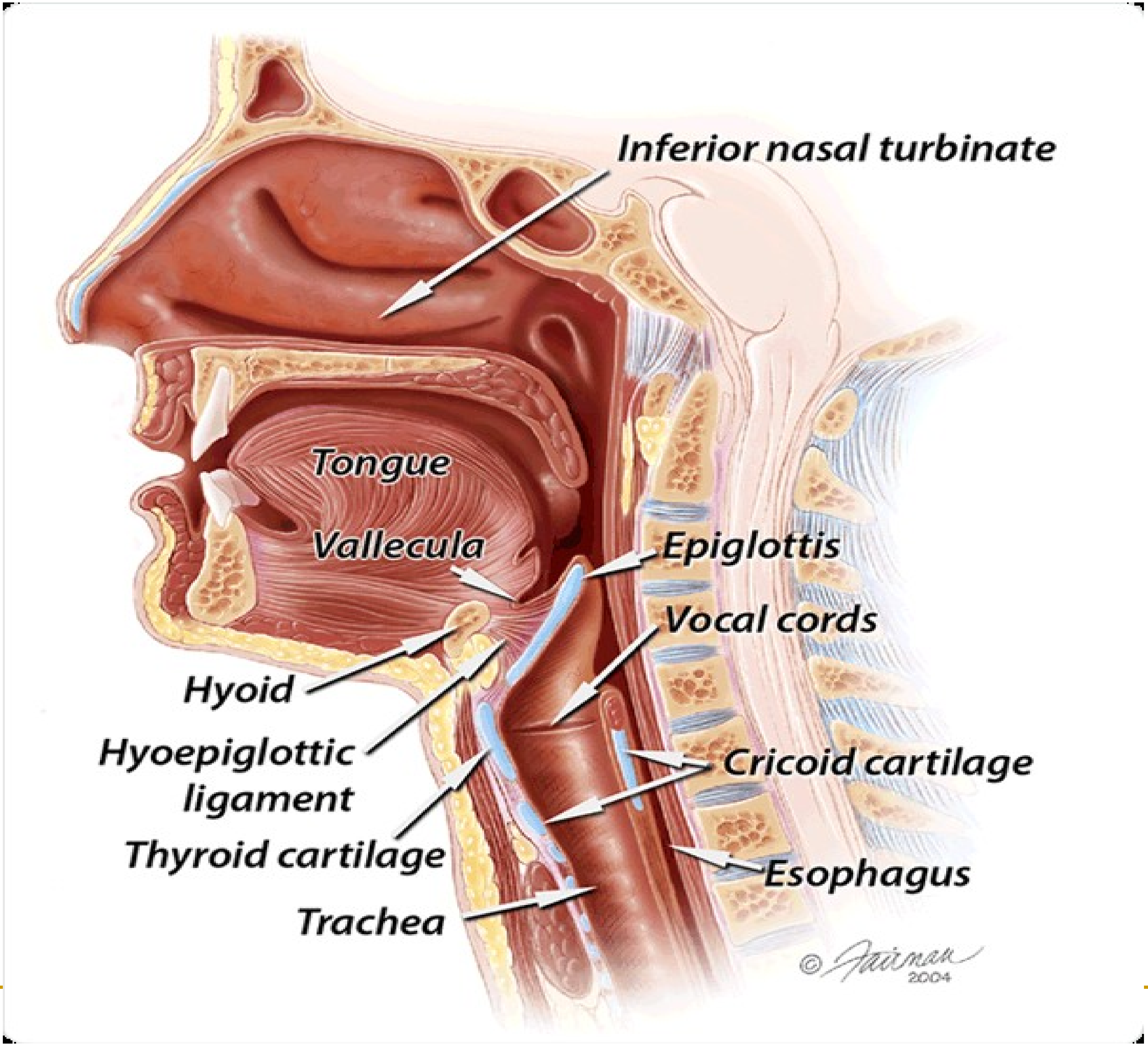
TEMEL HAVA YOLU YÖNETİMİ VE ALTERNATİF HAVAYOLU YÖNTEMLERİ

İZMİR BOZYAKA EĞİTİM VE ARAŞTIRMA HASTANESİ ACİL TIP KLİNİĞİ ADINA

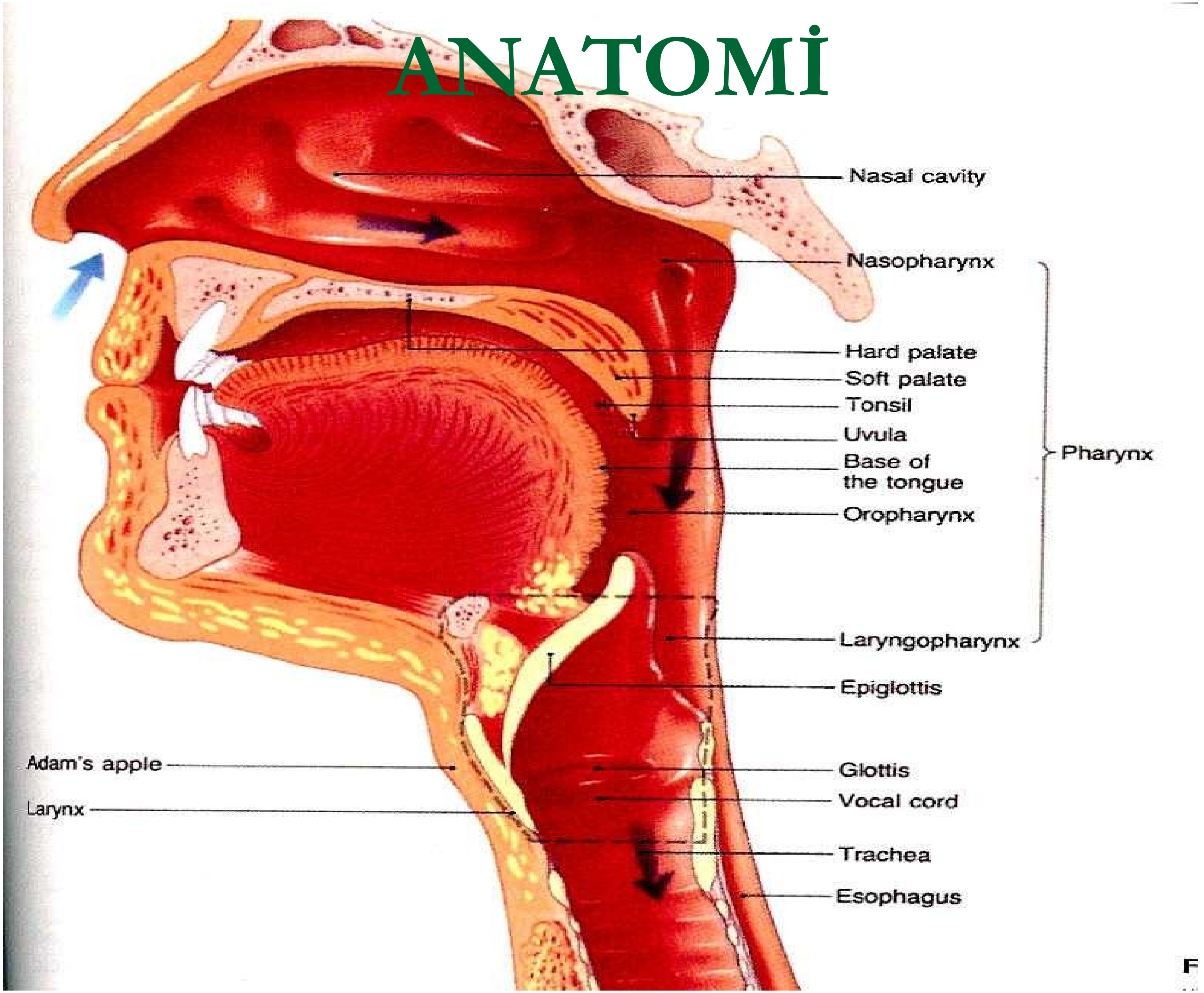
DR.İSMET PARLAK

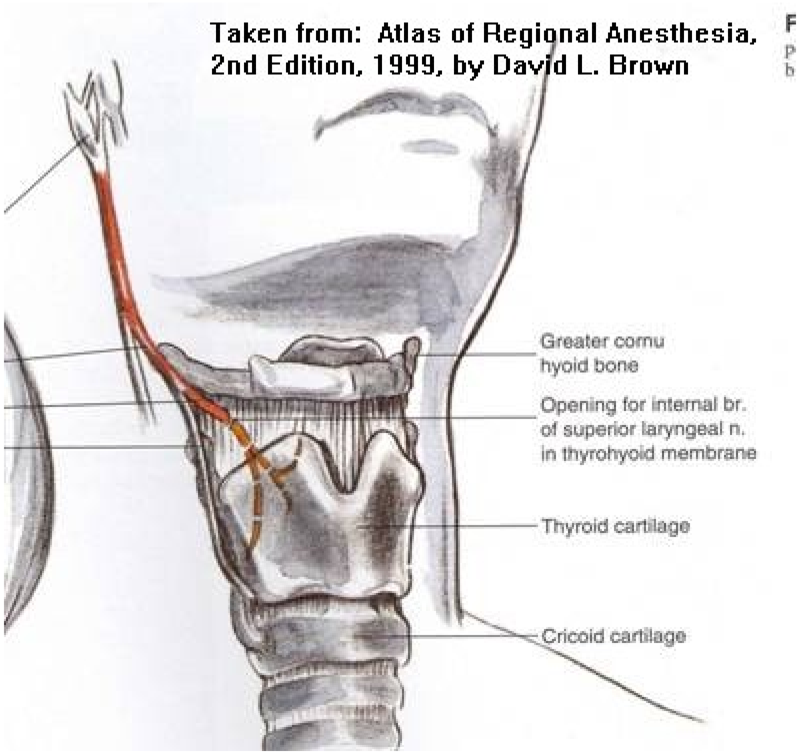

Airway
Mythology
Bret Nelson, MD, FACEP
M S S M
Department of Emergency Medicine
Mount Sinai School of Medicine
New York

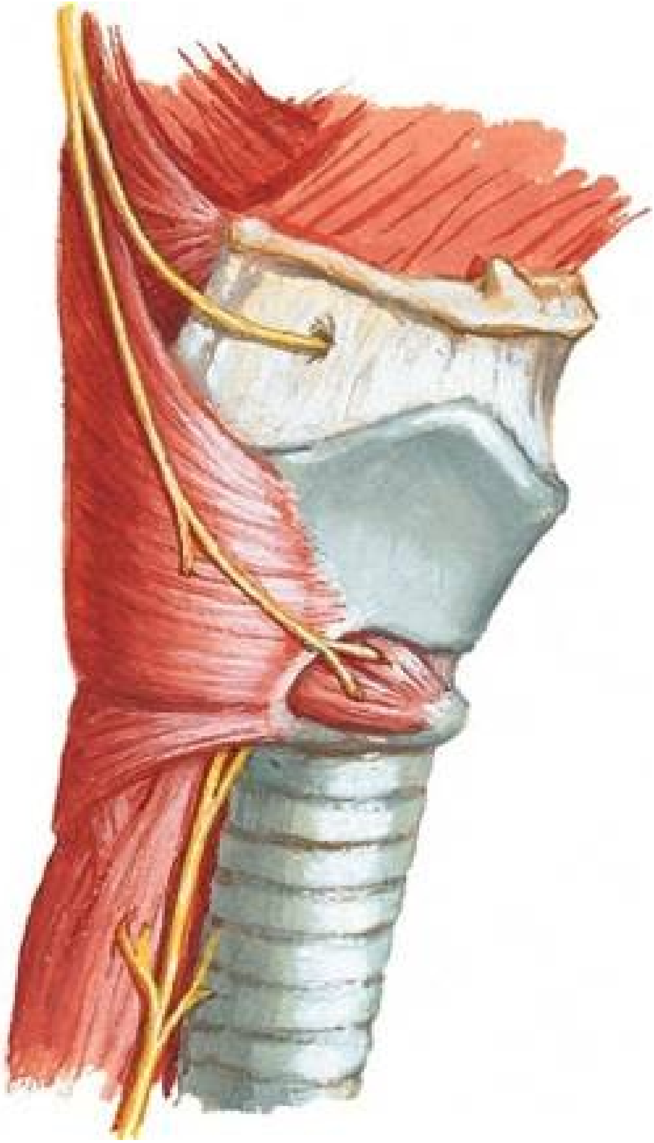

"Insanity: doing the same thing over and over again and expecting different results..."
JMB

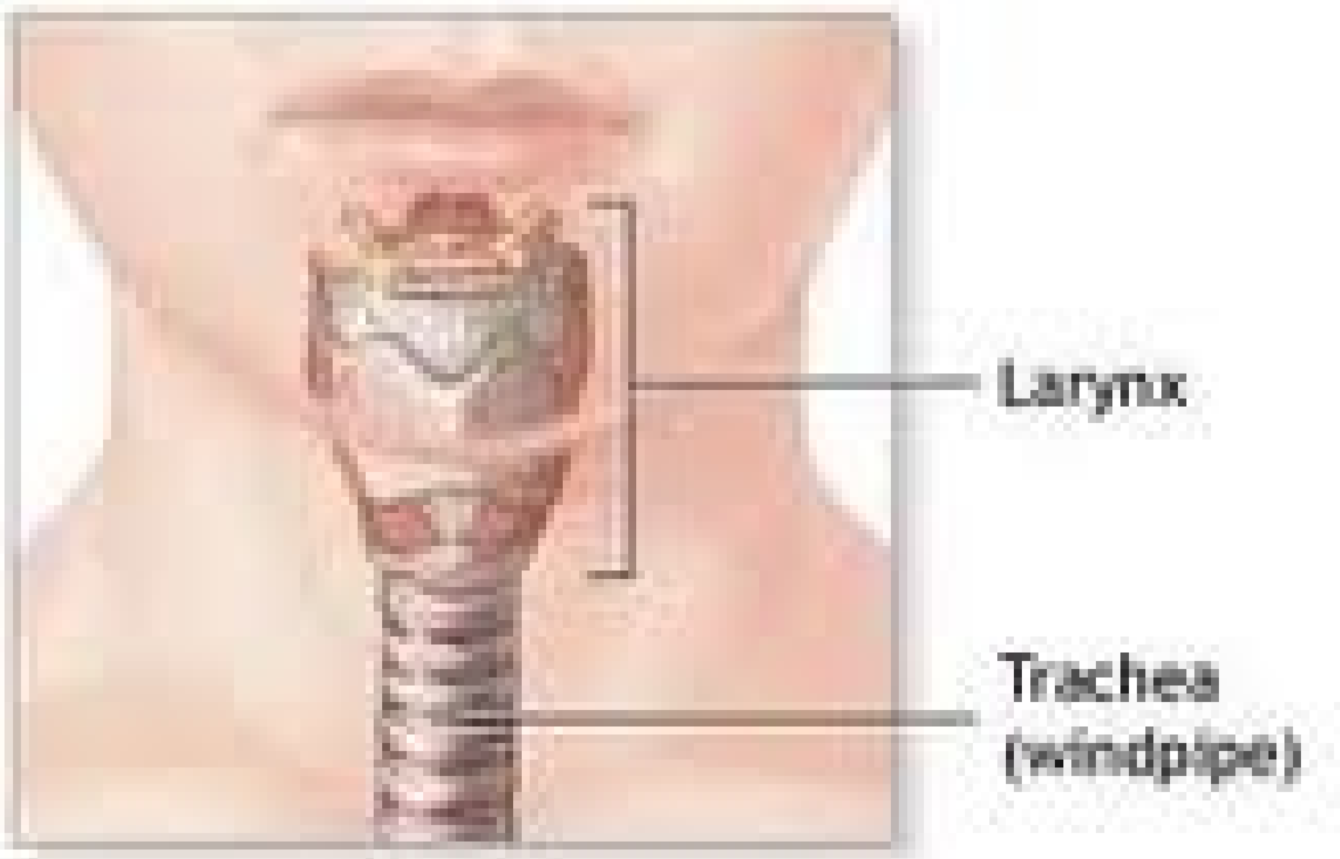

Inferior nasal turbinate
Tongue
Vallecula
Epiglottis
Vocal cords
Hyoid
Hyoepiglottic ligament
Cricoid cartilage
Thyroid cartilage
Esophagus
Trachea
© Fairman 2004

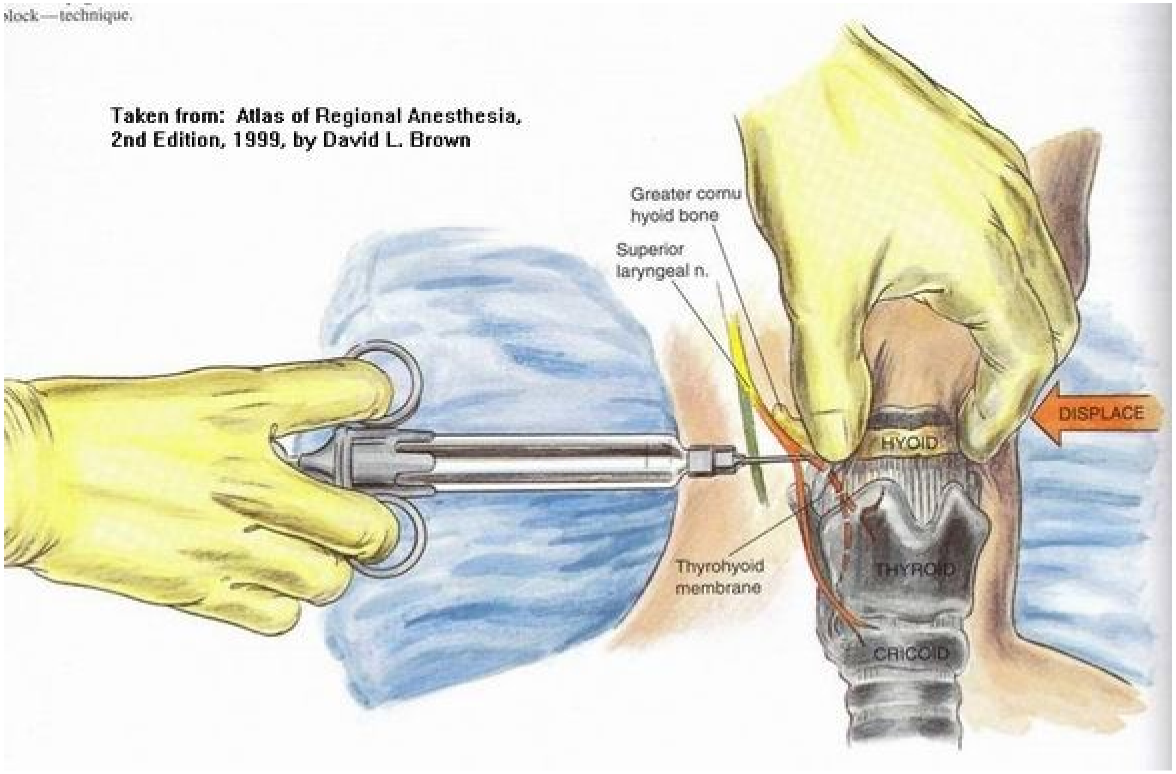
ANATOMİ


Nasal cavity
Nasopharynx
Hard palate
Soft palate
Tonsil
Uvula
Base of
the tongue
Oropharynx
Pharynx
Laryngopharynx
Epiglottis
Adam's apple
Larynx
Glottis
Vocal cord
Trachea
Esophagus

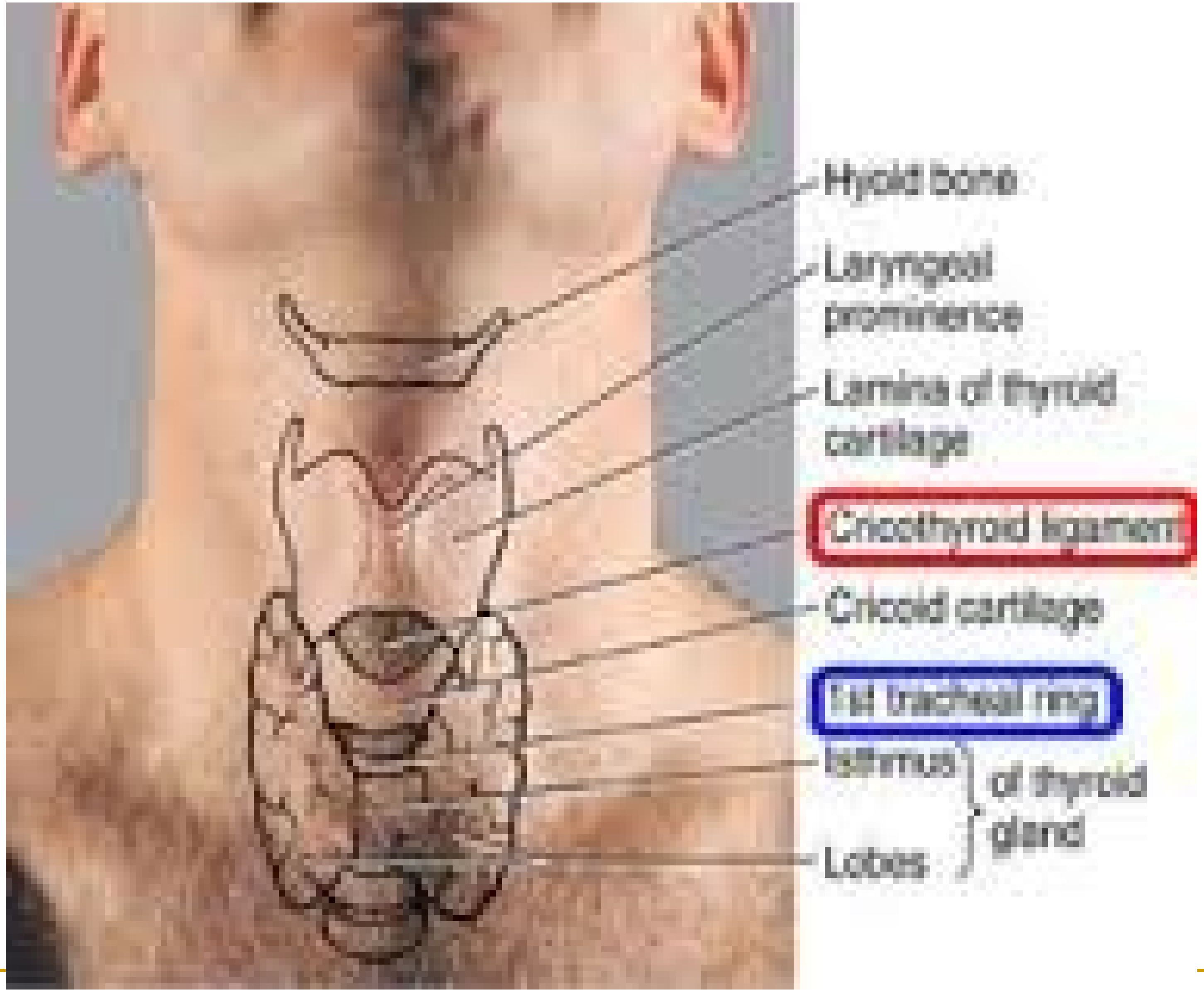

Taken from: Atlas of Regional Anesthesia,
2nd Edition, 1999, by David L. Brown
Greater cornu
hyoid bone
Opening for internal br.
of superior laryngeal n.
in thyrohyoid membrane
Thyroid cartilage
Cricoid cartilage



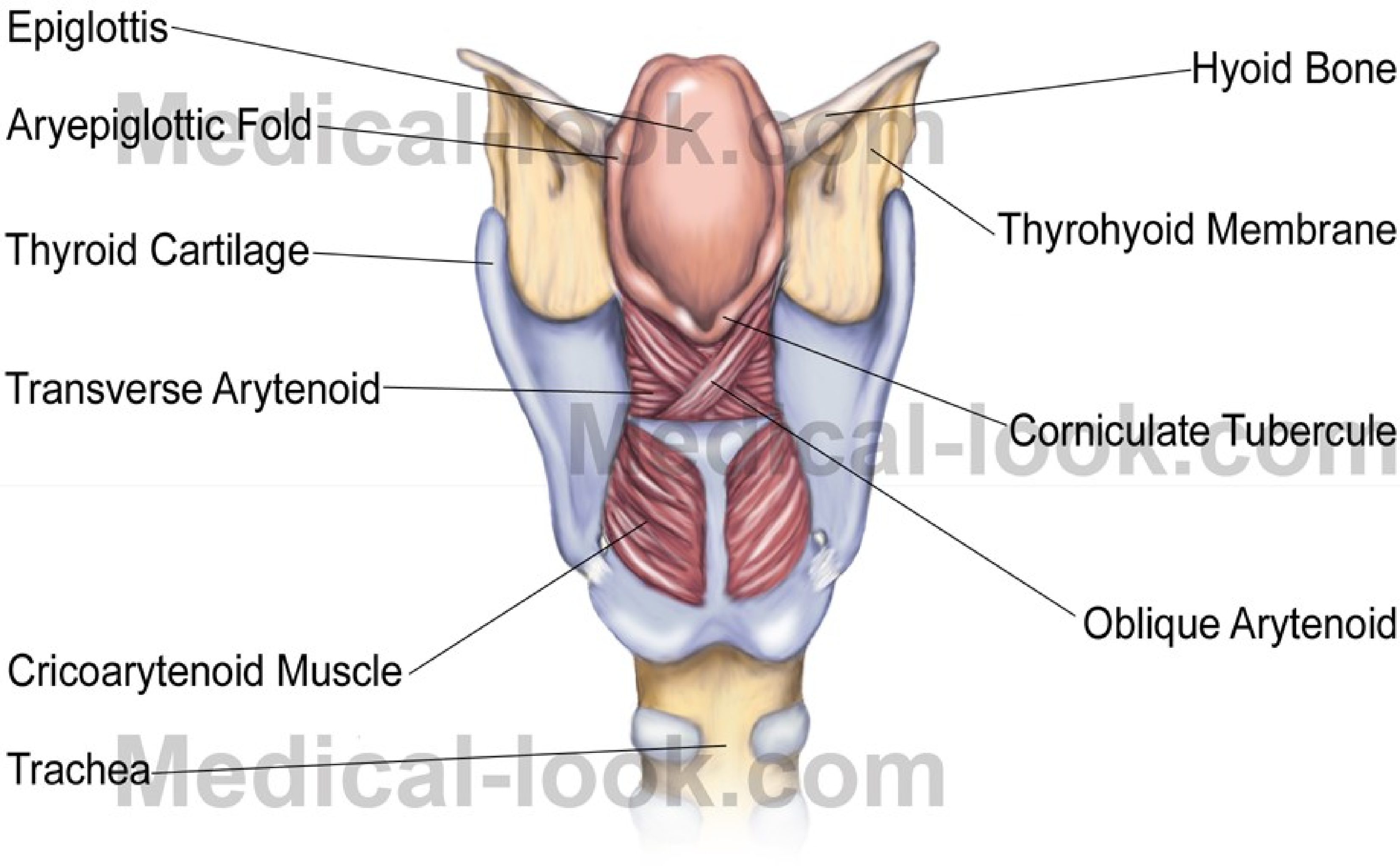

Larynx
Trachea
(windpipe)



lock—technique.
Taken from: Atlas of Regional Anesthesia, 2nd Edition, 1999, by David L. Brown
Greater cornu hyoid bone
Superior laryngeal n.
DISPLACE
HYOID
Thyrohyoid membrane
THYROID
CRICOID

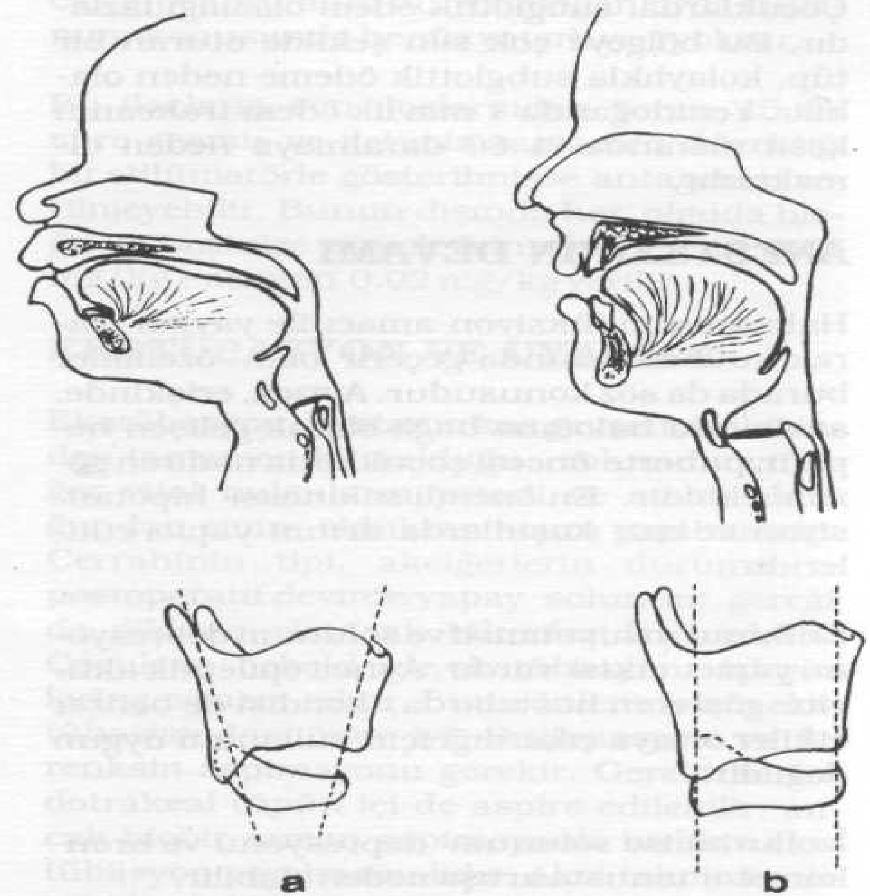


Hyoid bone
Laryngeal prominence
Lamina of thyroid cartilage
Cricothyroid ligament
Cricoid cartilage
1st tracheal ring
Isthmus
of thyroid gland
Lobes

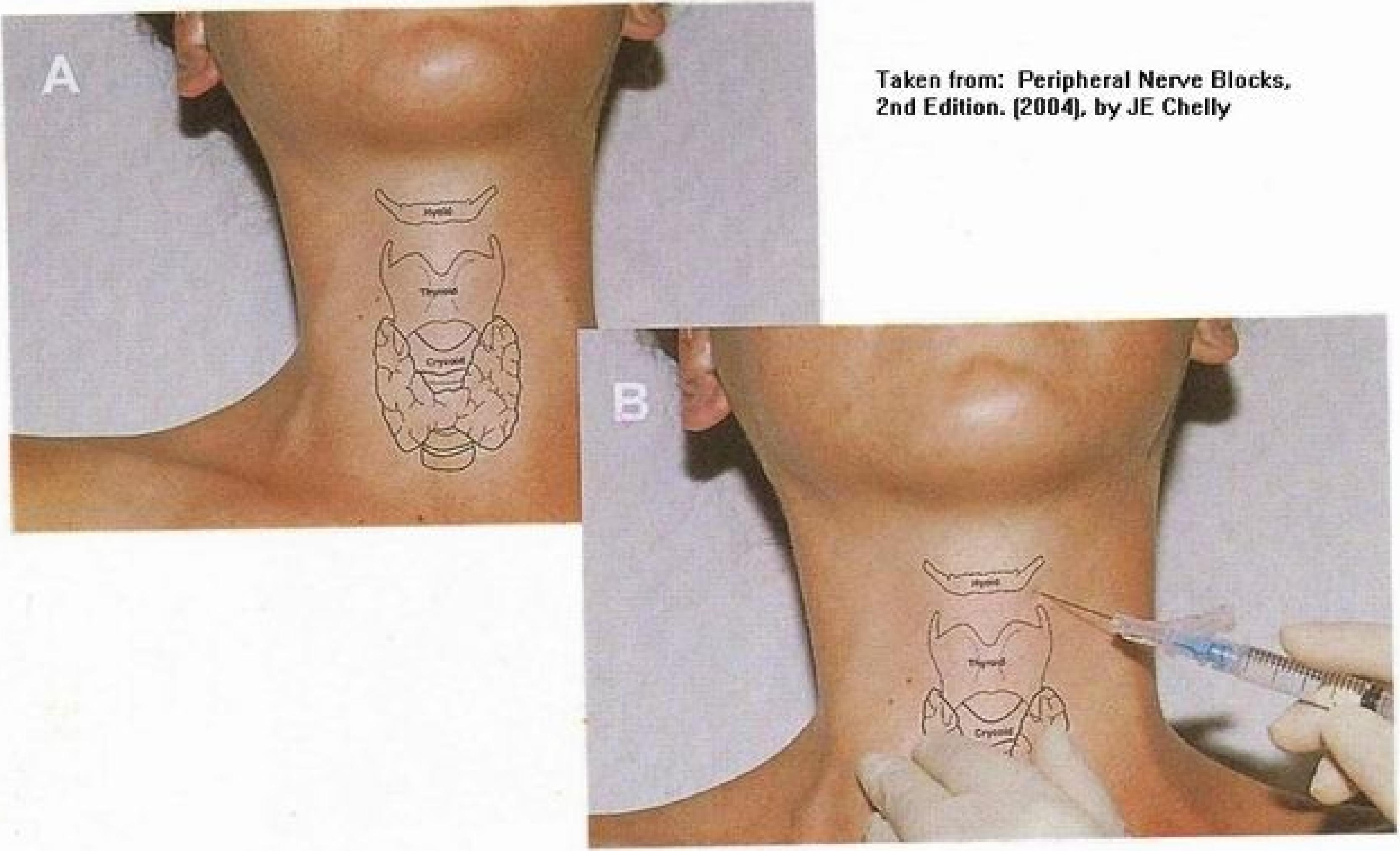

Epiglottis
Aryepiglottic Fold
Thyroid Cartilage
Transverse Arytenoid
Cricoarytenoid Muscle
Trachea
Hyoid Bone
Thyrohyoid Membrane
Corniculate Tubercule
Oblique Arytenoid
Medical-look.com
Medical-look.com
Medical-look.com

ANATOMİ

- Yeni doğanda dil büyük, larenks daha yukarda (C3-4 hizası) ve önde, epiglot sert
- Larenks aşağı doğru huni şeklinde daralır
- Hava yolunun en dar kısmı (6 mm), glottis değil krikoid halka hizasında

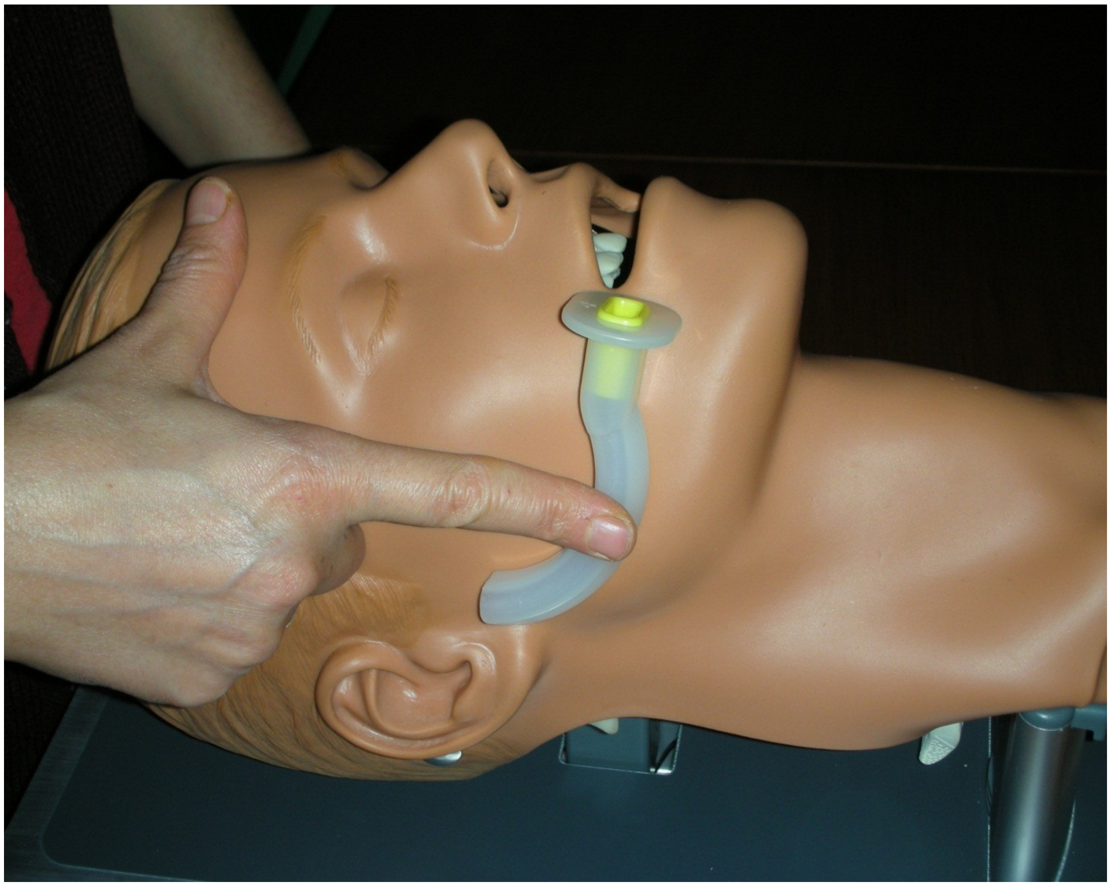


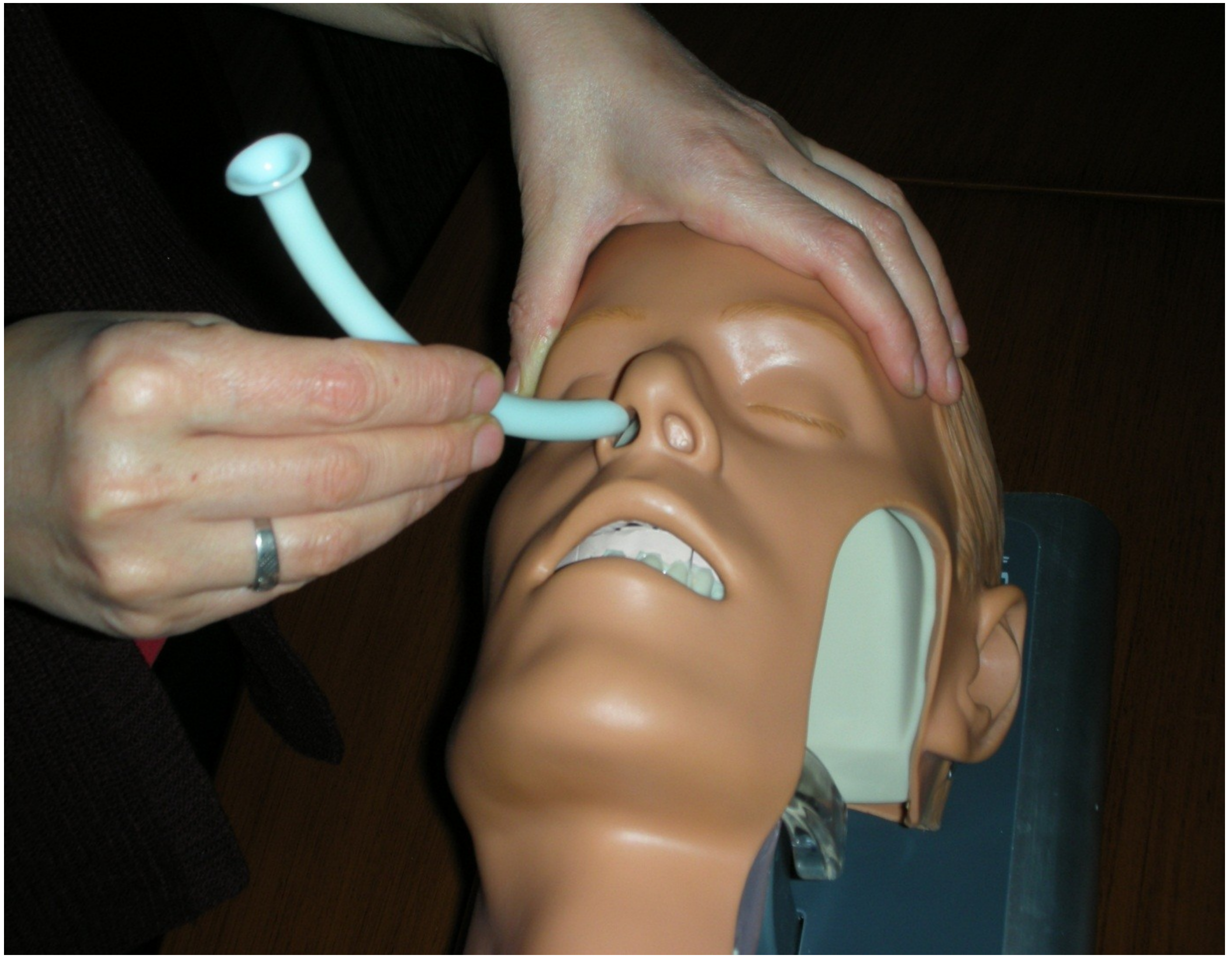
Şekil XXII.1. Bebekte **(a)** konik, erişkinde **(b)** silindirik şekildeki larenks.

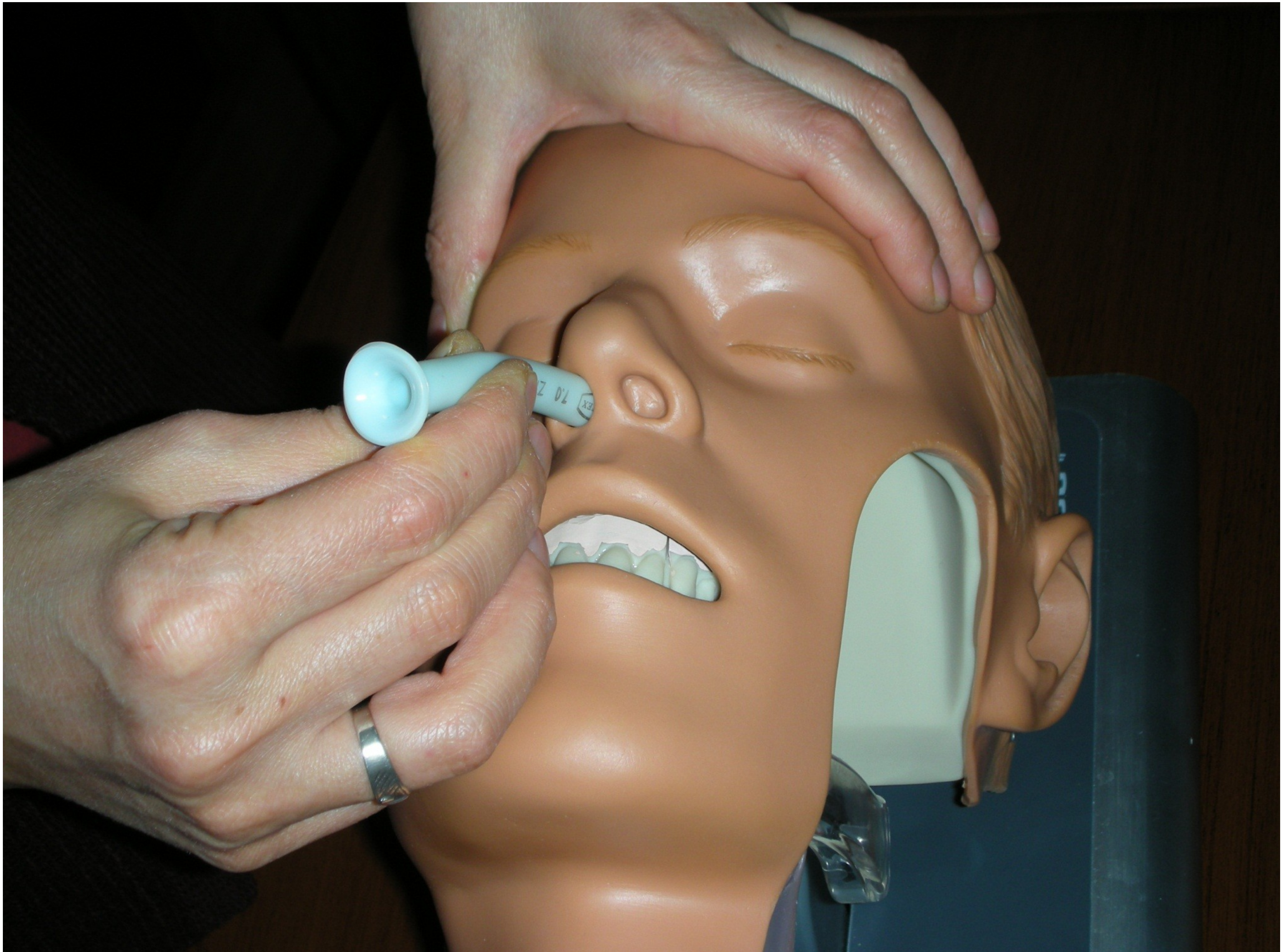


Taken from: Peripheral Nerve Blocks, 2nd Edition. (2004), by JE Chelly


18 15:58



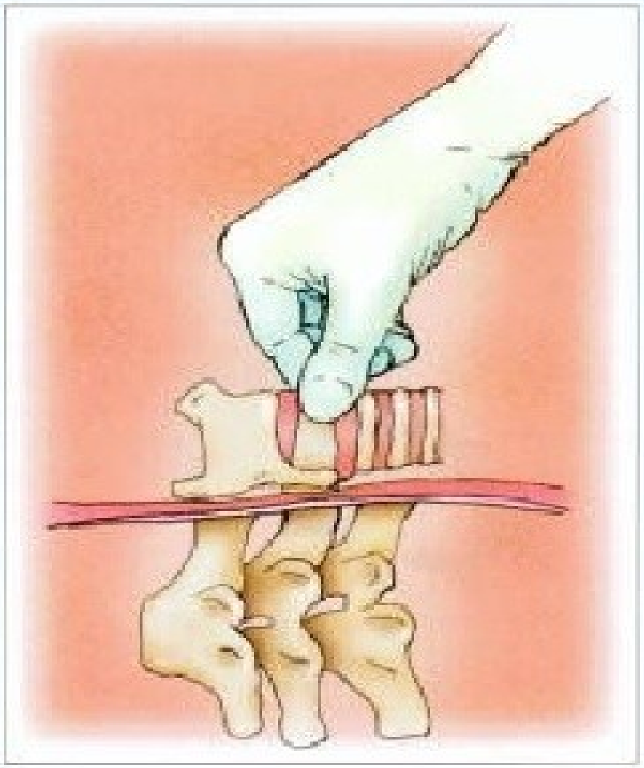



7.0


TRAINING
Ambu

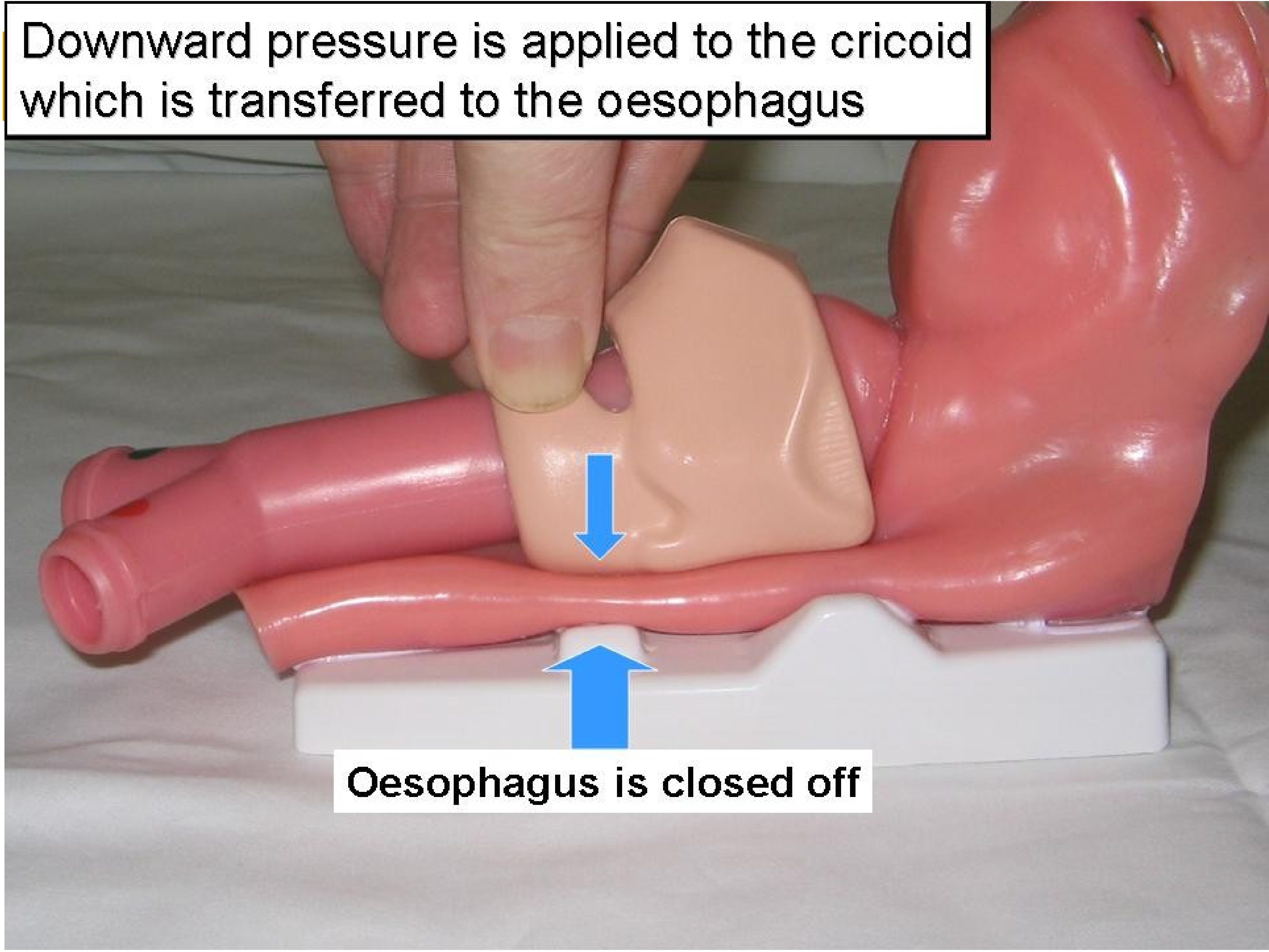

PATIENT
CE
0086

Cricoid Pressure



- Cricoid is circumferential cartilage
- Pressure obstructs esophagus to prevent escape of gastric contents
- Maintains airway patency

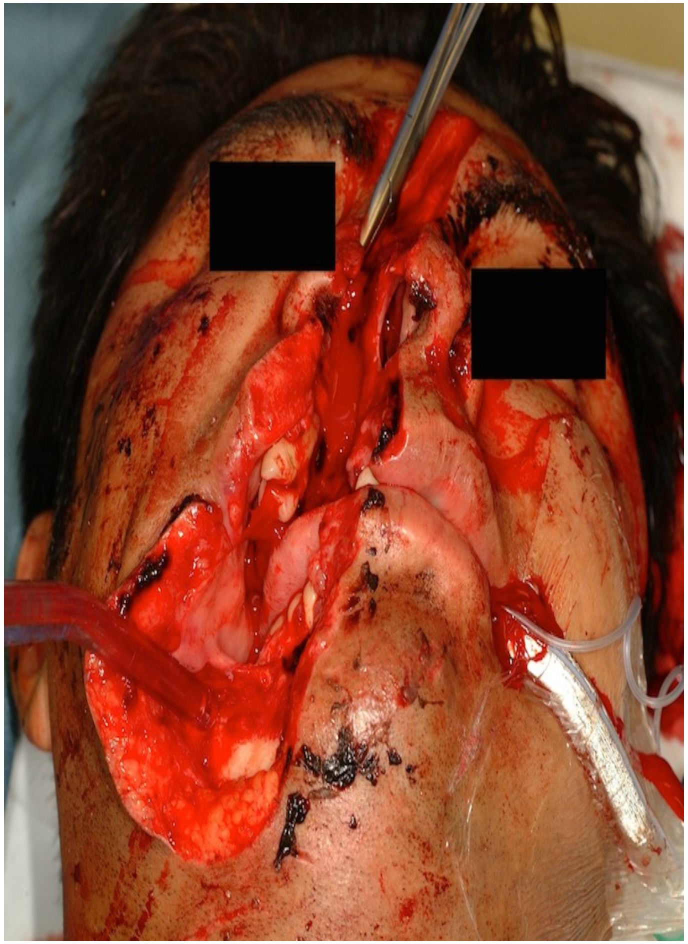
Koziol C, et al. AORN. 2000;72(6):1018-1030.

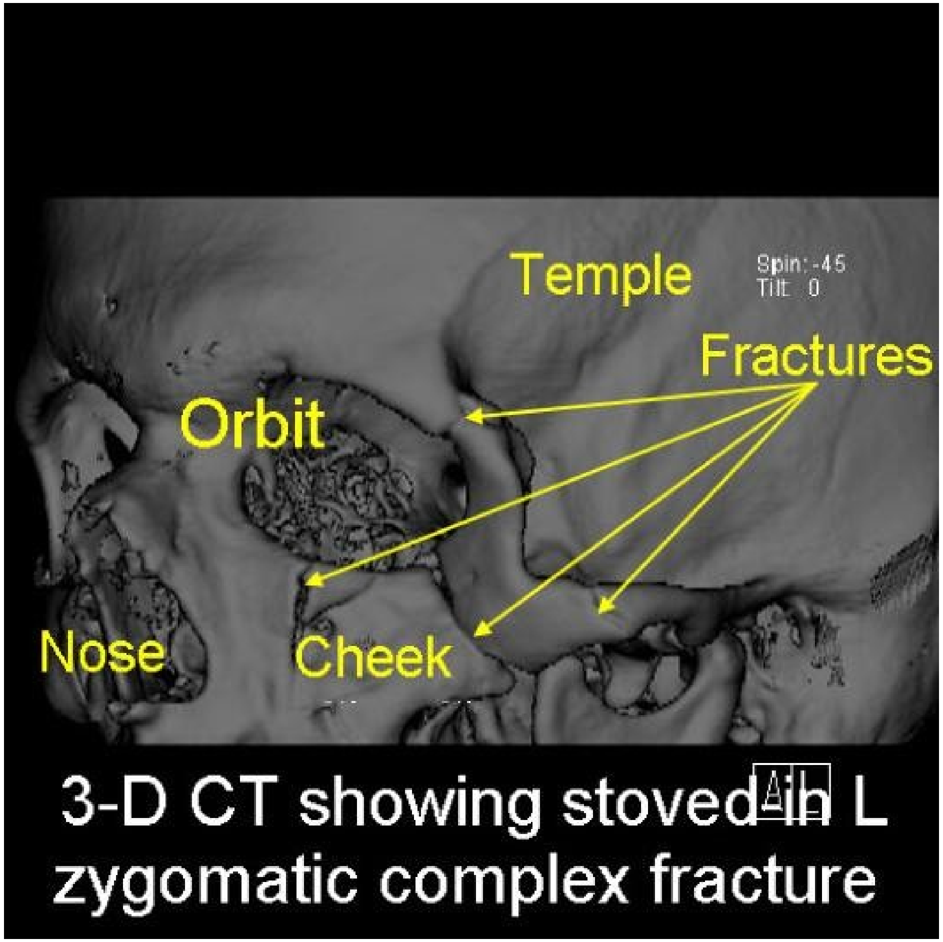

Downward pressure is applied to the cricoid which is transferred to the oesophagus
Oesophagus is closed off

Sellick manevrası-(krikoid bası)

- Hava yolu girişimi süresince krikoid bası (Sellick manevrası) kesintisiz uygulanır.
- Regürjitasyon ve aspirasyonu önler.
- Laringoskopi ve ETE'de güçlük olursa trakeanın arkaya, yukarıya, sağa doğru bastırılması (Backward, Upward, Rightward Pressure; BURP) denenir.

ZOR HAVA YOLU NEDİR VE NASIL ANLARIZ



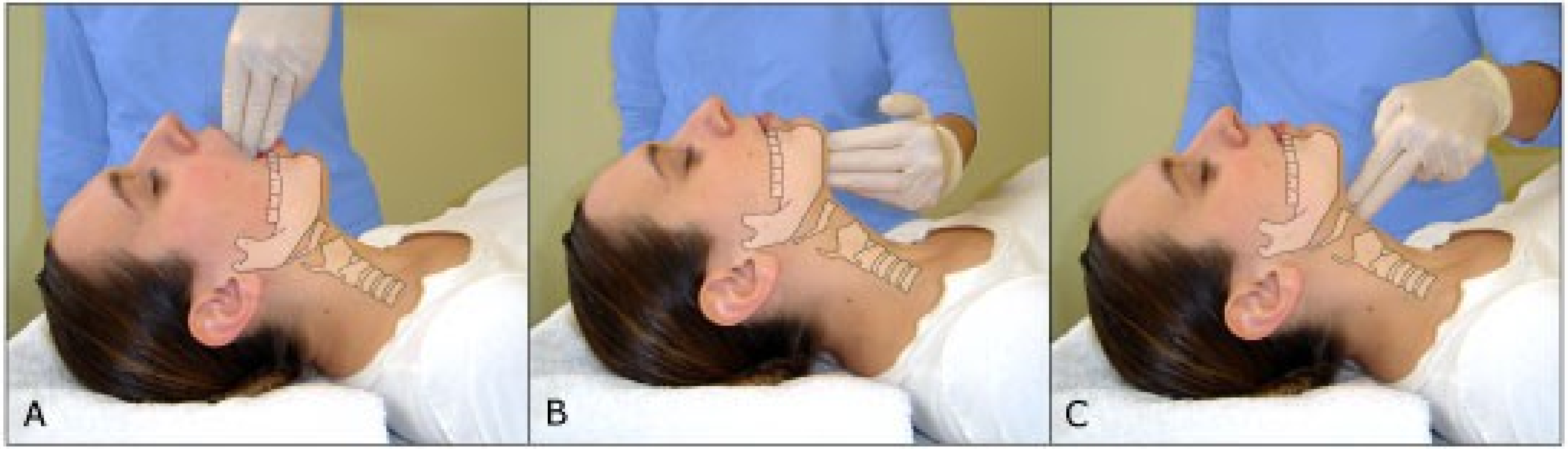

Temple
Spin: -45
Tilt 0
Fractures
Orbit
Nose
Cheek
3-D CT showing stoved-in L
zygomatic complex fracture

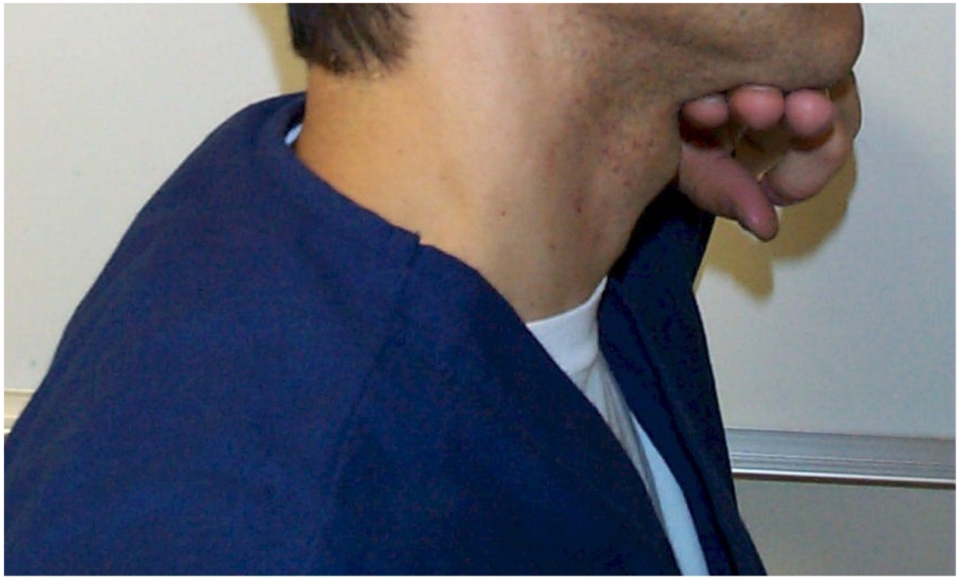
Zor Hava Yolu Nedenleri

- Oral/faringeal tümör, hematom veya hemanjiyomlar
- Submandibuler, peritonsiller veya epiglot infeksiyonları
- Laringeal atrezi gibi konjenital anomaliler
- Yabancı cisimler
- Yüz ve boyun travmaları
- İnhalasyon yanığı
- Obezite
- Yetersiz boyun ekstansiyonu
- Çene, dil, boyun ve diş anomalileri

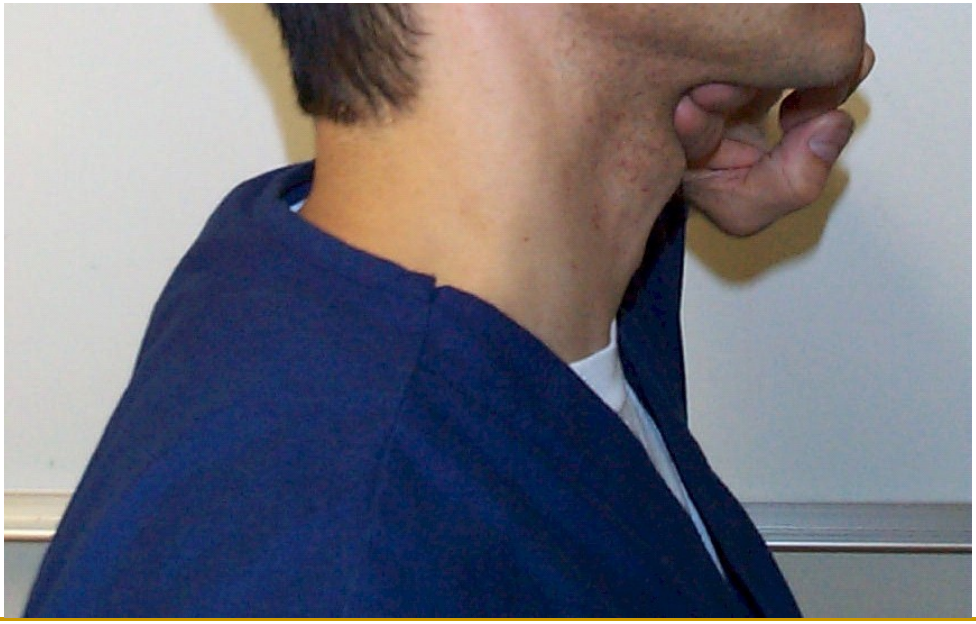
LEMON

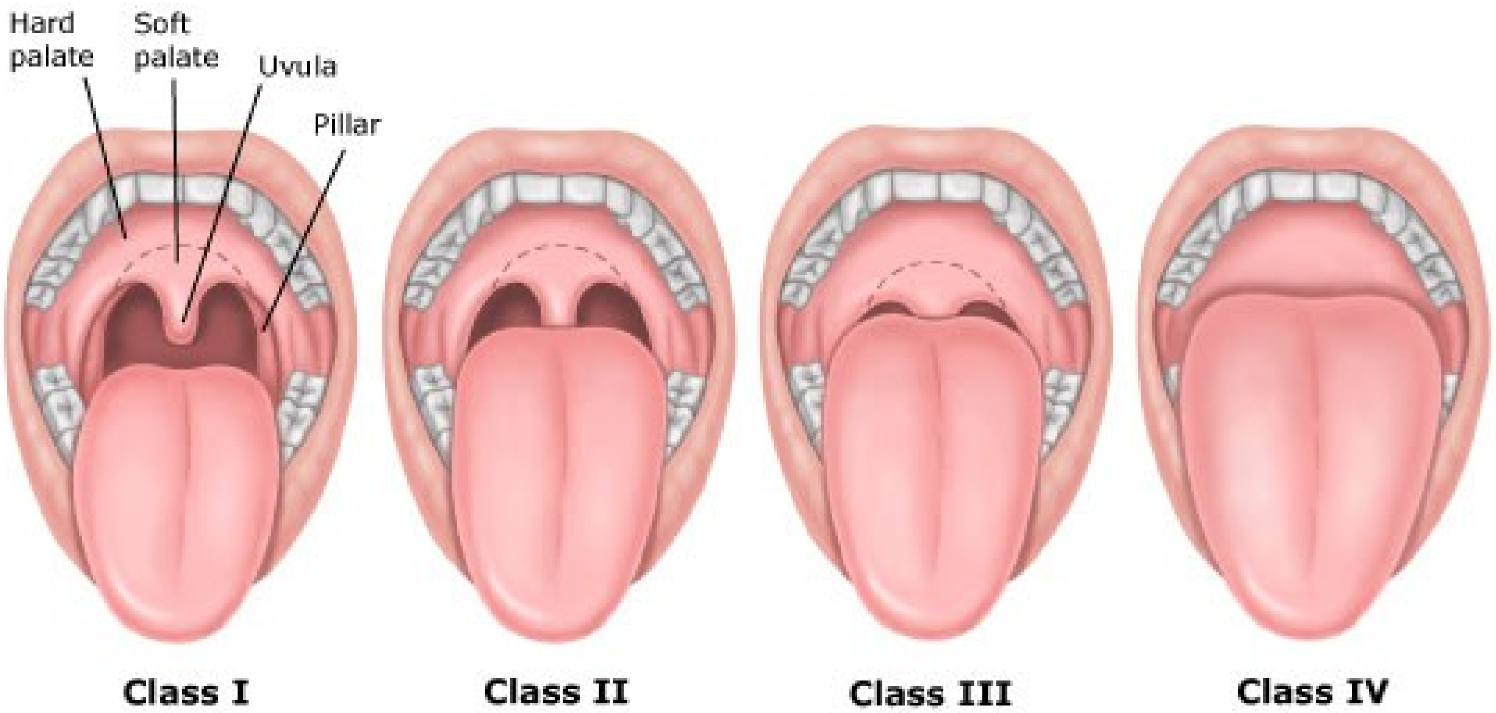
- **L**ook externally
- **E**valuate 3-3-2
- **M**allampati
- **O**bstruction?
- **N**eck mobility


A
B
C



3-3-2 rule





Hard palate
Soft palate
Uvula
Pillar
Class I
Class II
Class III
Class IV

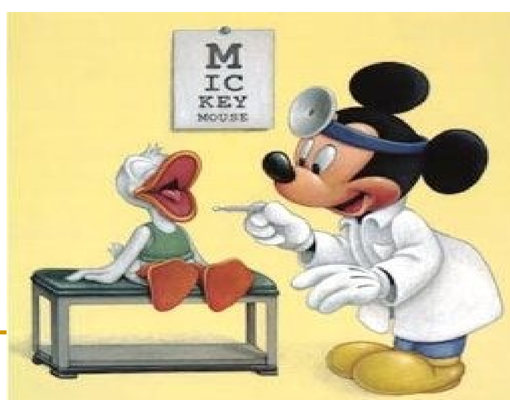
ZOR HAVA YOLU ÖNGÖRÜSÜNDE BULUNULAN ÖZELLİKLER

- Üst kesici dişler uzun
- Çene kapatılınca maksiller kesici dişler mandibuler kesicilerin belirgin olarak önünde
- Hasta istemli olarak mandibuler kesici dişleri maksiller kesicilerin önüne çıkartamıyor
- Kesici dişler arası mesafe 3 cm'den az
- Hasta oturur pozisyonda dil dışarıda iken uvula görülmüyor (Mallampati>II)
- Damak çok kavisli veya çok dar
- Mandibula boşluğu endüre, kitle ile dolu
- Tiromental mesafe 3 parmaktan kısa
- Boyun kalın ve kısa
- Çene ucu göğse değmiyor, boyun ekstansiyonu kısıtlı

- **TARD Zor havayolu kılavuzu, 2005**

MALLAMPATİ SKORLAMASI

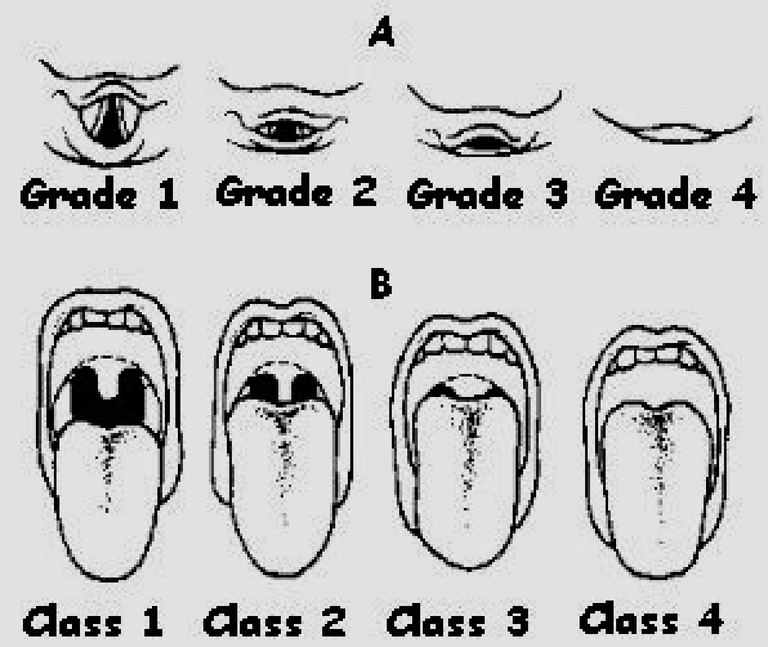
- **Sınıf I:** Uvula, yumuşak damak, tonsil yatağı, ön ve arka plikalar rahatlıkla görülebilir.
- **Sınıf II:** Uvula ve yumuşak damak görülebilir.
- **Sınıf III:** Yumuşak damak ve uvula tabanı görülebilir.
- **Sınıf IV:** Uvula dil kökü tarafından tamamen kapatılmış ve farinks duvarı görülemez.

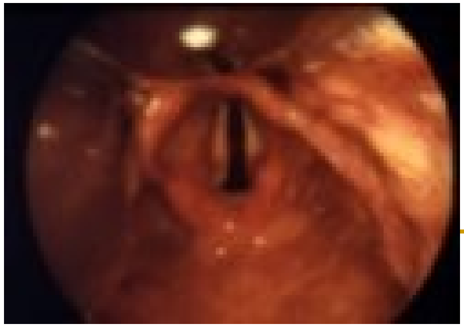


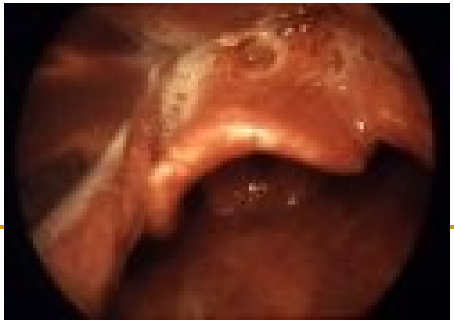
Samsoon GLT, Young JRB. Anesthesia 1987; 42:487-90

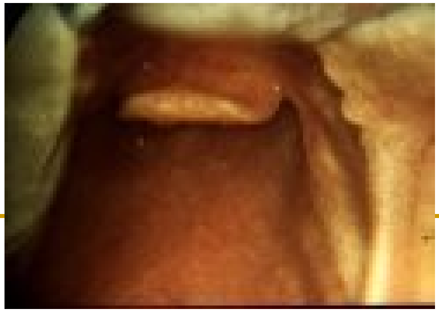
Cormack & Lehane Laringoskopik Görünüm

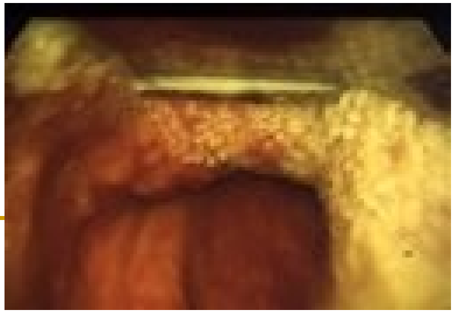
Evre I: Glottik açıklık tam olarak görülebilir.
Evre II: Anterior açıklık görülemez.
Evre III: Epiglot görülebilir, ancak glottik açıklık görülemez.
Evre IV: Epiglot görülemez.











DİĞER ÖLÇÜMLER

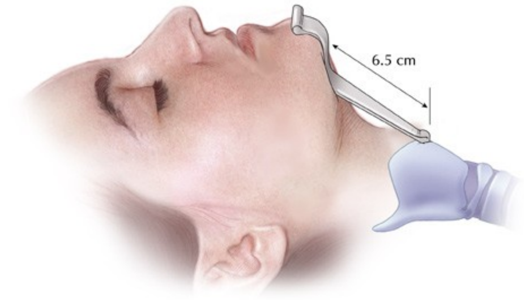
- **Tiromental mesafe**

  - Laringoskop ile dilin ne kadar yer değiştirebileceği
  - 4-7 cm

- **Sternomental mesafe**

  - Baş ve boyun hareketi
  - Baş ekstansiyonu entübasyonun zorluk veya kolaylığını belirleyen en önemli faktör
  - 12,5 – 13,5 cm

- **Ağız açıklığı (> 3 cm)**



DİĞER ÖLÇÜMLER

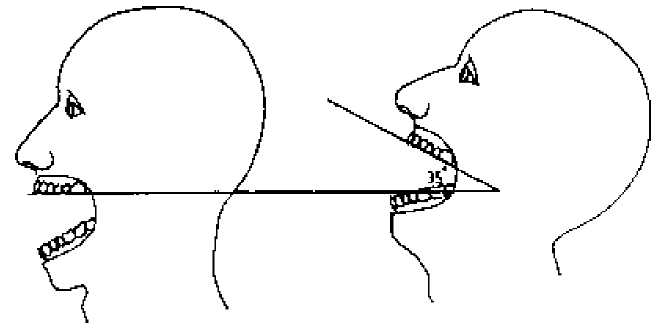
- **HYOMENTAL MESAFE (>7 CM)**

- **MANDİBULAR UZUNLUK (>9 CM)**
- **ME HAREKETİ (LATERAL POZİSYON)**

  - Mandibular dişlerin maksiller dişlerin üzerine geçmesi
  - Laringoskopi sırasında mandibulanın öne doğru yer değiştirmesi
- **Atlantooksipital eklem ve servikal omurga hareketi**
  - Fleksiyonda >30
  - Ekstensiyonda >80

- **Mandibular boşluk muayenesi**

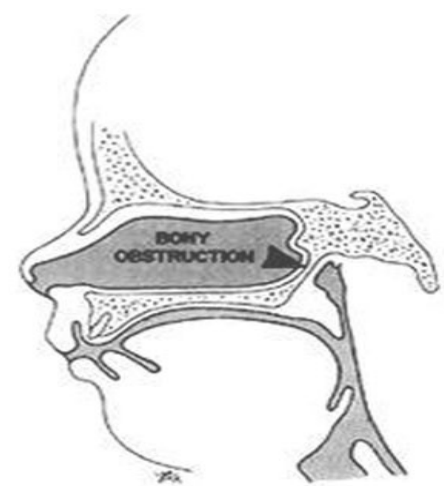
  - Parmakların bastırılabilmesi
  - Dilin laringoskopi sırasında mandibulaya itilebilmesi



HAVAYOLUNUN DEĞERLENDİRİLMESİ

1. Anamnez

Konjenital	Koanal atrezi, Pierre Robin Send., Treacher Collins Send.	
Travmatik	Maksillofasiyal, servikal omurga, larenks	
Edinsel	Enfeksiyon	Epiglottit, abse, krup
	Endokrin	Akromegali, diyabet, morbid obezite
	İnflamatuar	Ankilozan spondidlit, romatoid artrit
	Tümoral	Üst ve Alt havayolu tümörleri
	Fizyolojik	Gebelik

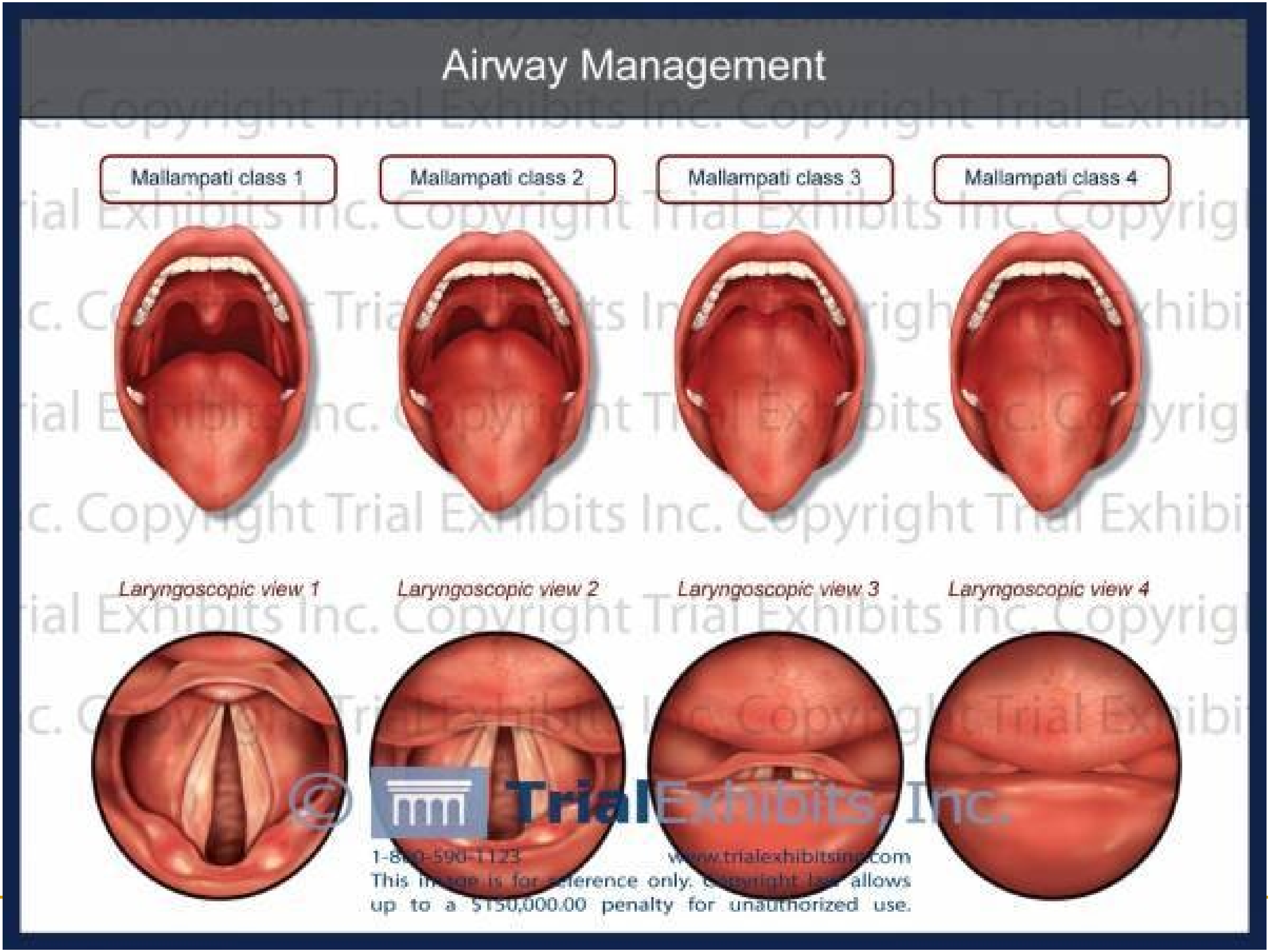


Airway Anatomy Suggesting Difficult Intubation

- **Length of upper incisors and overriding maxillary teeth**
- **Interincisor (between front teeth) distance < 3 cm (two finger tips)**
- **Thyromental distance < 7 cm**
  - tip of mandible to hyoid bone (three finger breaths)
- **Neck extension < 35 degrees**
- **Sternomental distance < 12.5 cm**
  - With the head fully extended and mouth closed
- **Narrow palate (less than three finger breaths)**
- **Mallampati score class III or IV**
- **Stiff joint syndrome**
  - About one third of diabetics characterized by short stature, joint rigidity, and tight waxy skin
  - Positive prayer sign with an inability to oppose fingers
- **No sign is foolproof to indicate intubation difficulty**

Prayer Sign

Erden V, et al. Brit J Anesth. 2003;91:159-160.


Airway Management
Mallampati class 1
Mallampati class 2
Mallampati class 3
Mallampati class 4
Laryngoscopic view 1
Laryngoscopic view 2
Laryngoscopic view 3
Laryngoscopic view 4
© Trial Exhibits, Inc.
www.trialexhibitsinc.com

Endotrakeal entübasyonda yaklaşımlar

- Orotrakeal entübasyon (klasik yol)
  - hızlı,
- Nazotrakeal entübasyon
  - zaman alır, servikal hareket daha az, komplike
- Digital ETI
- vokal kortların görülemediği aşırı sekresyon durumları
- Retrograd ETI
  - invaziv, zaman alır, deneyim
- Fiberoptik yardımcılarla ETI
- Cerrahi krikotirotomi

Trakeal entübasyon endikasyonları

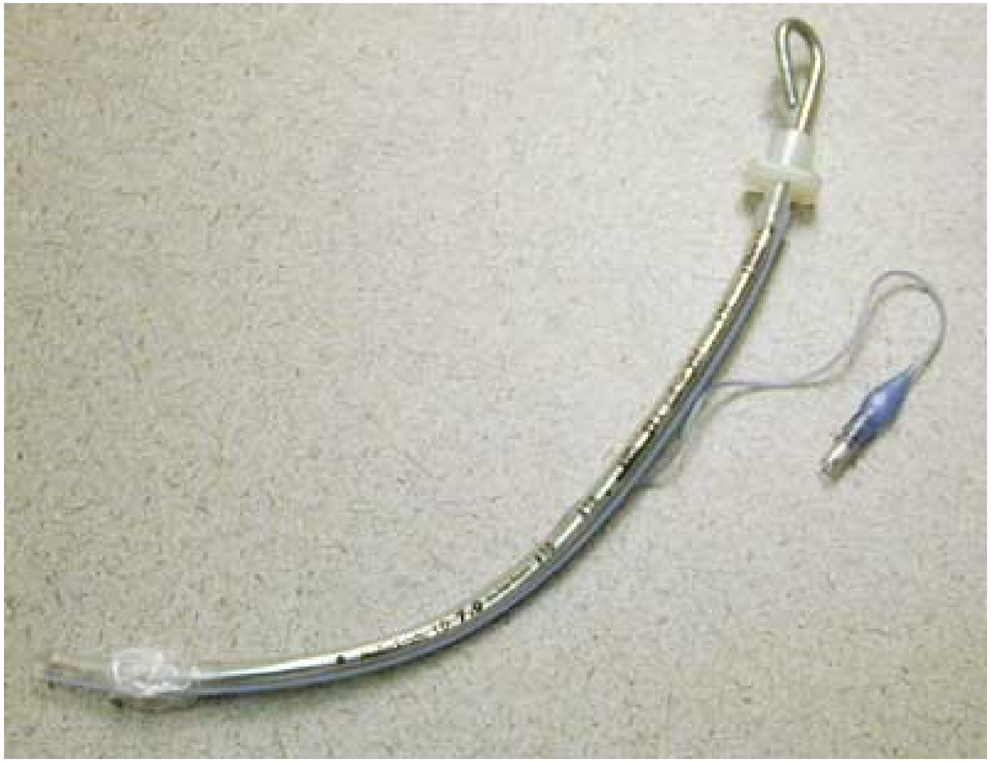
- Solunum yardımı
- Mide içeriğinin aspirasyonunu önlemek
- Kalıcı havayolu sağlamak (trisiklik anti depresan, organo fosfat entoksikasyonu, oral yanık, larinks ödemi vs)
- Ajete, saldırgan hastaların BT, MR, vs. incelemeleri amacıyla
- Seçilmiş tidal volum verilmesi
- Trakeal temizlemeyi kolaylaştırmak
- Havayolunun açıklığının korunması ve devamının sağlanması


Fentanyl Citrate

Ekipman

1. **Işığı iyi çalışan laringoskop,**
2. **Cuff kontrolü yapılmış uygun Endotrakeal tüpler,**
3. **Çocuk ve yetişkin bag-valv-maske (BVM)**
4. **Uygun büyüklükte airway**
5. **Çalışan O2 sistemi, hortum, kanül**
6. **Çalışan aspiratör ve uygun kateterleri**
7. **Stile veya guide**
8. **IV yol ekipmanı**
9. **EKG** ve **monitör**
10. **Nabız oksimetre**
11. Boş **enjektör(10ml)**
12. **Servikal collar**
13. **Pozisyon verilebilir sedye**
14. **NG sonda**
15. **ilaçlar** (özellikle lidokain, fentanyl, atropin, midazolam, etomidat, tiopental, vekuronyum, süksinilkolin)
16. **Magill pensi ve sargı bezi**
17. **Krikotirotomi seti ve alternatif hava yolu ekipmanı**
18. **End-tidal CO2** veya **özefageal detektör aygıtı**

- ***a-ENDOTRAKEAL ENTÜBASYON ENDİKASYONLARI-***
- ►Solunum arresti olan tüm hastalar
- ► Glaskow-koma skalası 10 ve altında olan travma hastaları
- ► Glaskow-koma skalası 8 ve altında olan travması olmayan hastalar
- ► Ciddi maxillo-fasial travması olan hastalar
- ►Solunum fonksiyonunu bozabilecek boyutta torax travması
- ►Vital anstabiletisi olan cerrahiye gideceği kesin olan hastalar
- ►Bilinç bulanıklığı olan, ajete-kontrolü zor hastalarda tetkik öncesi
- ►Konjestif kalb yetmezliği ve KOAH lı hastalarda ventilasyonu sağlamak için
- ►Kafa travmasına bağlı santral hipo ventilasyonu olan hastaları hiperventile etmek için
- ►Toksik doz alımı kesin olan; Organo fosfat, trisiklik antidepresan ve alkol intoksikasyon olan hastalarda için profilaktik entübasyon
- ►***Genel anlamda koruyucu hava yolu refleksi olmayan bilinci kapalı olan tüm hastalar***
- ► Solunum yetersizliği oluşturan hertür toksik madde alımı
- ►Anaflaktik reaksiyonlara ve angio ödeme bağlı solunum yolu obstriksiyonu öngörülen hastalar
- ►Pulmoner temizlik, Yeterli ventilasyonu sağlamak için pozitif end expiratuar pressure
- ► *Status astmatikus ve status epileptikus*

Hangi tüp?

- Yetişkinde kadın için 7.5-8
- Yetişkin erkek için 8-8.5 nolu tüp
- Çocukda tüp no.sunu hesaplamak için; *Tüp no= (yaş/4) 4+*
- 6-8 yaşa kadar cuff'sız tüp kullanılır
- Cuff'lar geniş volümlü düşük basınçlı olmalıdır.

Tüp boyutları

- yenidoğan –4 kg - 2.5 mm (kafsız).
- 1-6 aylık 4-6 kg – 3.5 mm (kafsız).
- 7-12 aylık 6-9 kg – 4.0 mm (kafsız).
- 1 yaş 9 kg – 4.5 mm (kafsız).
- 2 yaş 11 kg – 5.0 mm (kafsız).
- 3-4 yaş 14–16 kg - 5.5 mm (kafsız).
- 5-6 yaş 18–21 kg – 6.0 mm (kafsız).
- 7-8 yaş 22-27 kg – 6.5 mm (kafsız).

Tüp boyutları

- 9-11 yaş 28-36 kg – 7.0 mm(kaflı).
- 14 yaş ve üstü 46+ kg – 7.0 – 8.0 mm (kaflı).
- Erişkin bayan 7.0 – 8.0mm (kaflı).
- Erişkin erkek 7.5 – 8.5 mm (kaflı).

- 8 yaşından küçük tüm çocuklara kafsız tüp kullanmak gerekir, böylece çocukları kafın oluşturacağı hasarlardan korumuş oluruz

SELLİCK MANEVRASI

- Krikoid bası
- Baş ve işaret parmak ile yapılır
- İleri,yukarı ve hafif sağa
- Özefagusu vertebra üzerinde sıkıştırır,regürjitasyonu önler
- Hava yolu girişimi süresince krikoid bası kesintisiz uygulanmalıdır

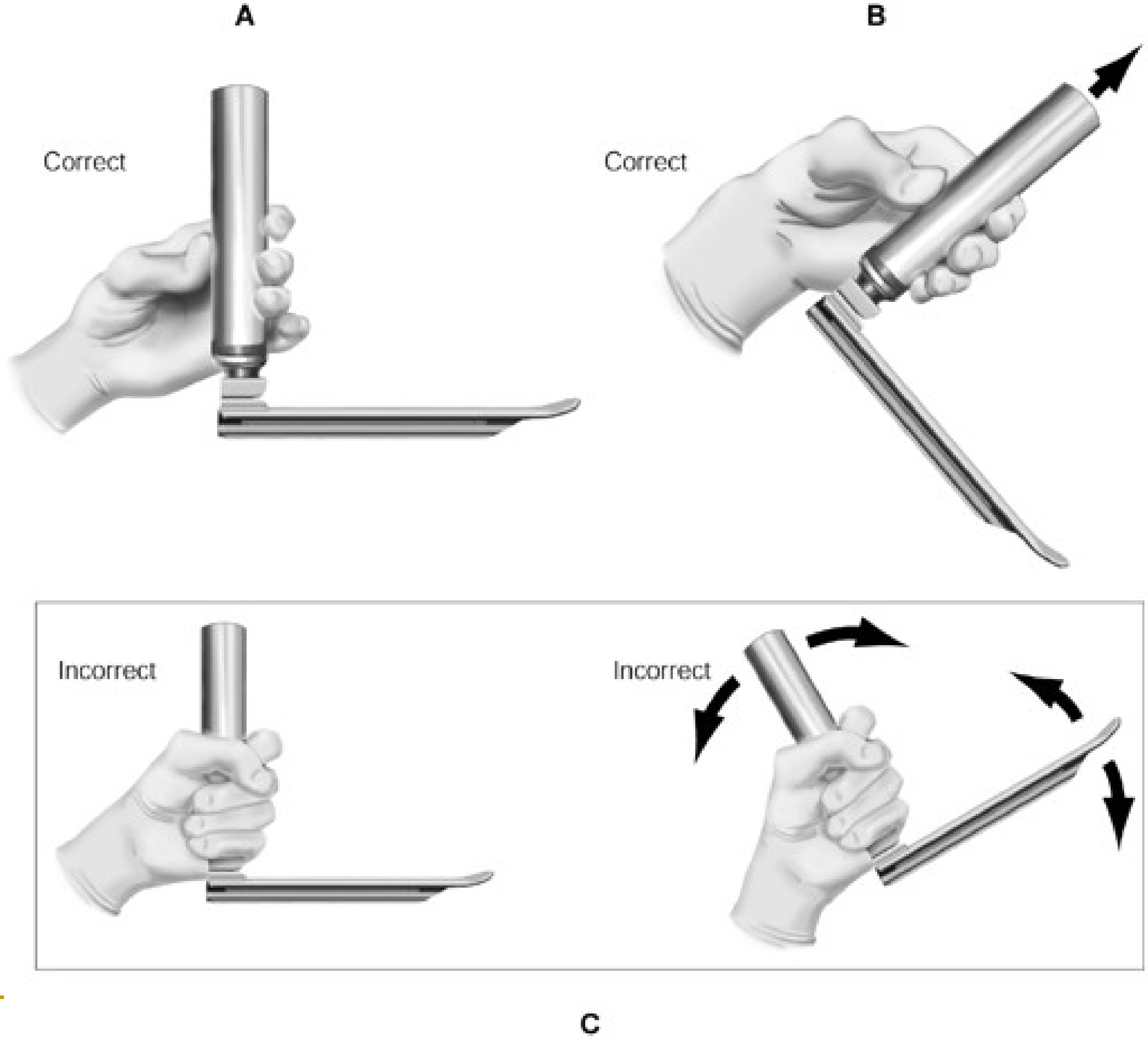
BURP MANEVRASI
Backwards
Upwards
Rightwards
Pressure

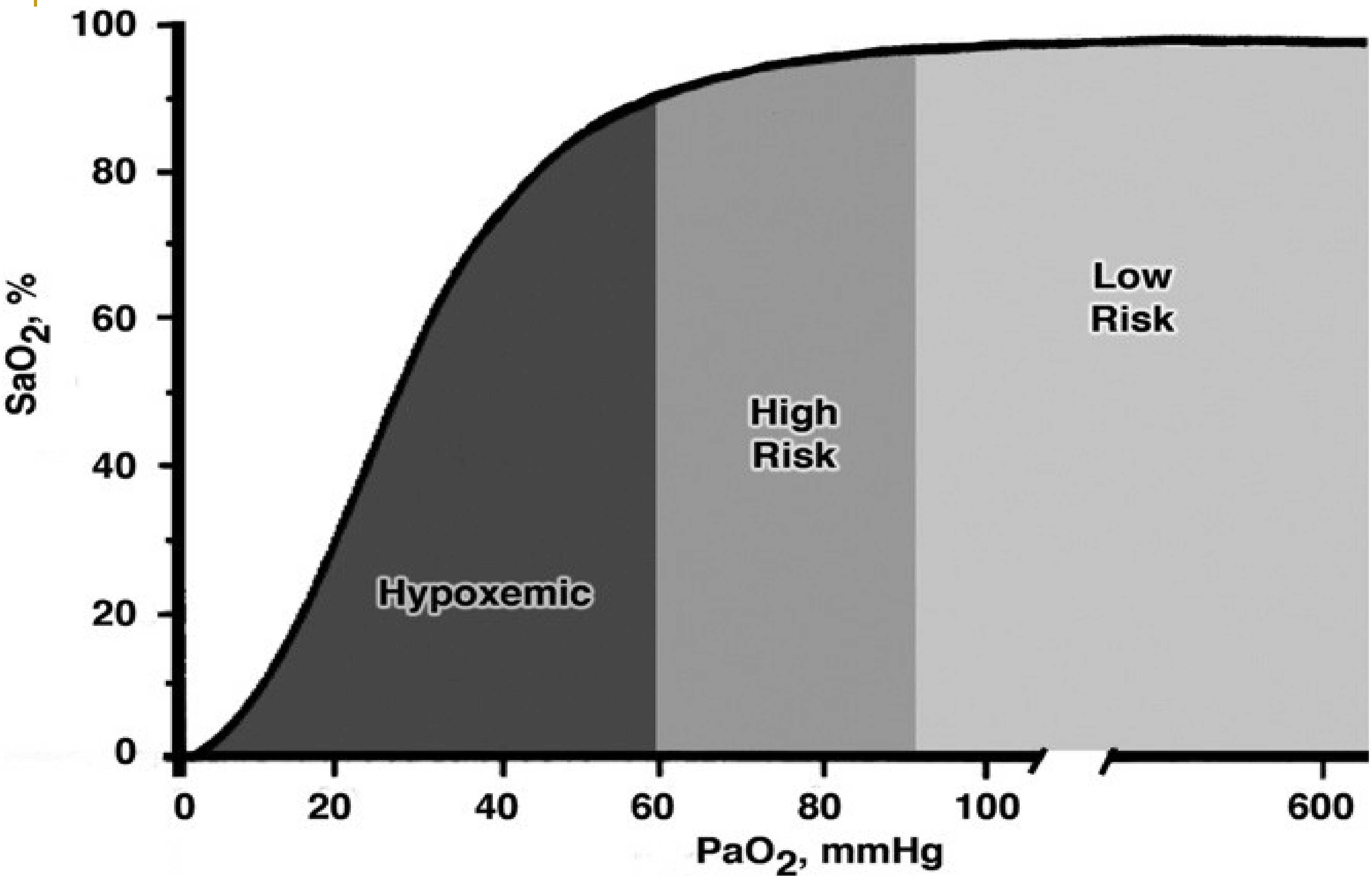
Laringoskopi-1

- **Sedyenin boyu göbek seviyesinde olmalıdır.**
- **Hastalar preoksijenize, yeterli medikasyon ve uygun baş pozisyonundan sonra;**
- **Uygun blade'in ½ ila 2/3'ü ağzın sağ tarafından sokulur ve dil sola doğru çekilir**
- **Görerek ilerlenir**
- **İlk hedef dilin ortası**
- **2.Hedef; epiglot**
- **3.Hedef; vallakula ya blade ucu yerleştirilir**

Laringoskopi-2

- Kol bilekten bükülmez
- Güç oblik karşı-yukarıya harcanır
- Kordlar iki kere görülmeli!
- 30sn içinde entübasyon gerçekleştir
- Başarılı olunamassa ,15-30sn %100 02 ile preoksijenize edilir ve tekrar denenir


A
B
Correct
Correct
Incorrect
Incorrect
C



100
80
60
40
20
0
SaO_2, %
Hypoxemic
High Risk
Low Risk
0
20
40
60
80
100
600
PaO_2, mmHg

PaO_2	Sat
40	70
50	80
60	90

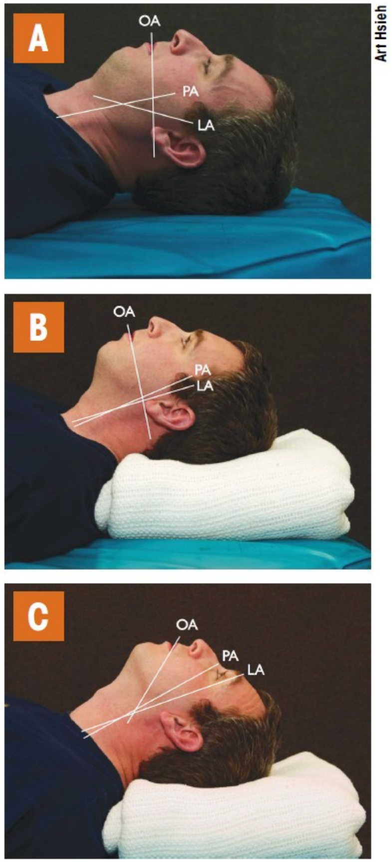
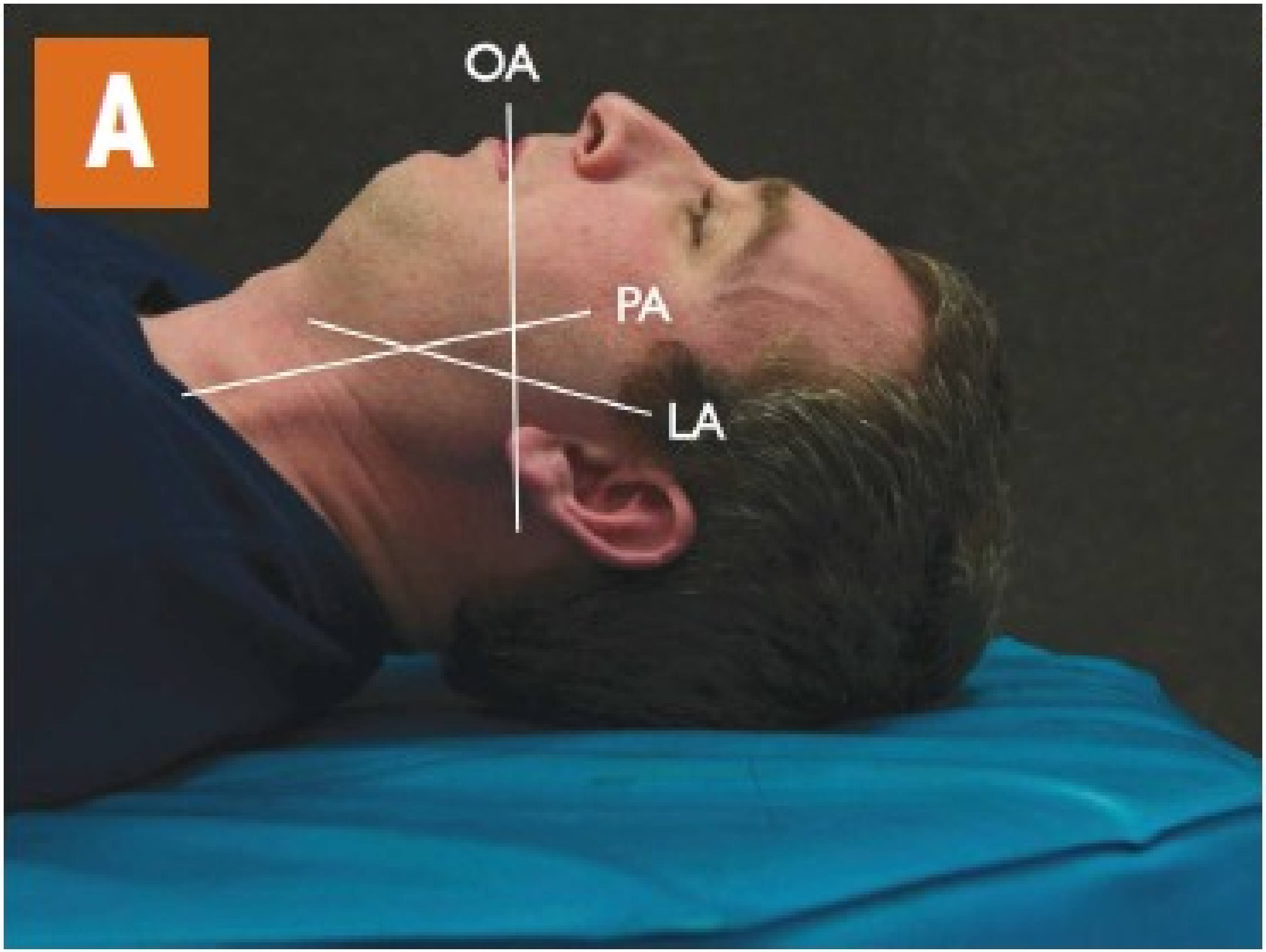
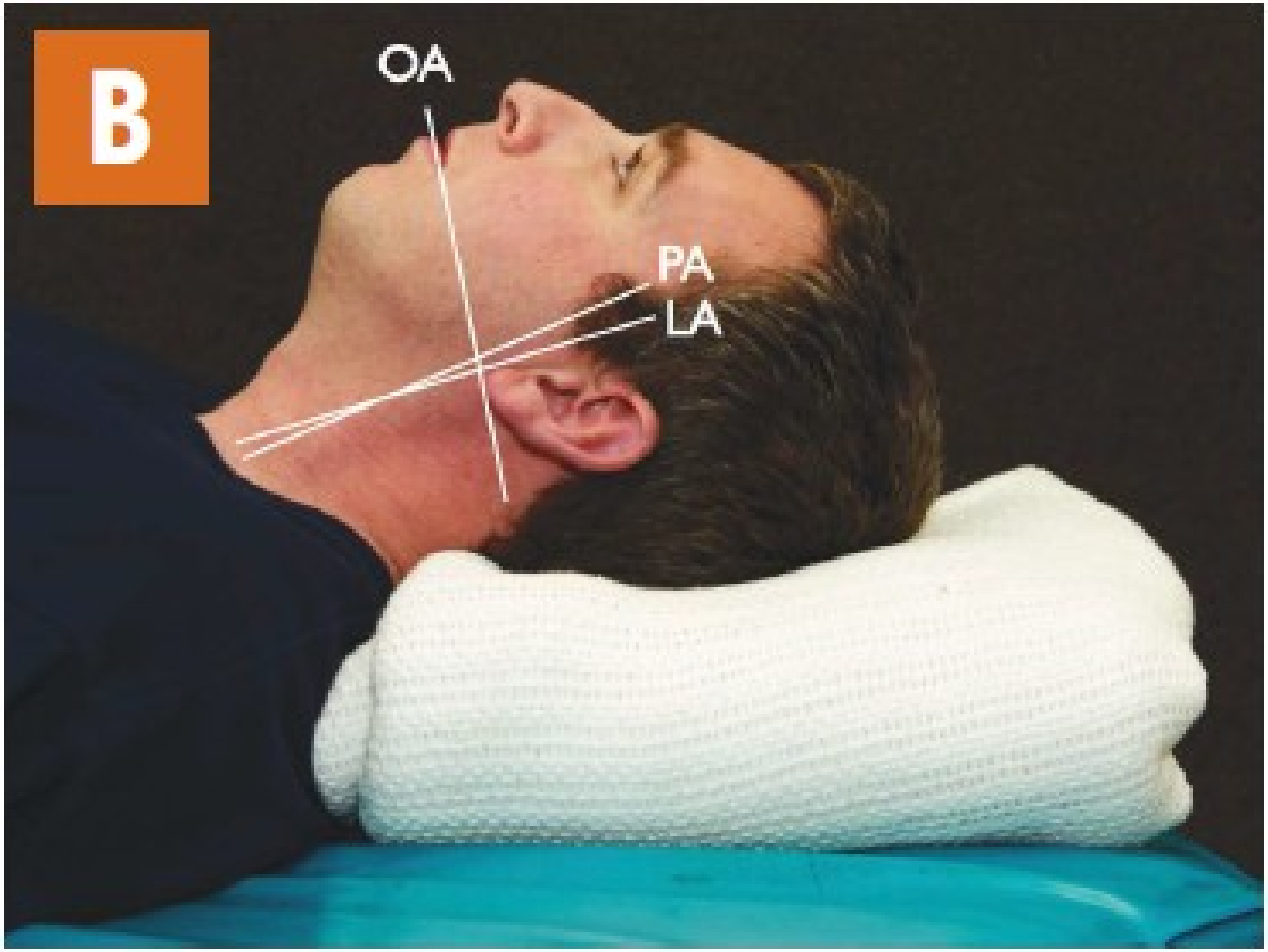


Figure 1. A: In the neutral position, the oral axis (OA), pharyngeal axis (PA), and laryngeal axis (LA) are not aligned. B: Elevating the head aligns the PA and LA. C: Head extension better aligns the OA with the PA and LA.



Art Heigh


B
OA
PA
LA

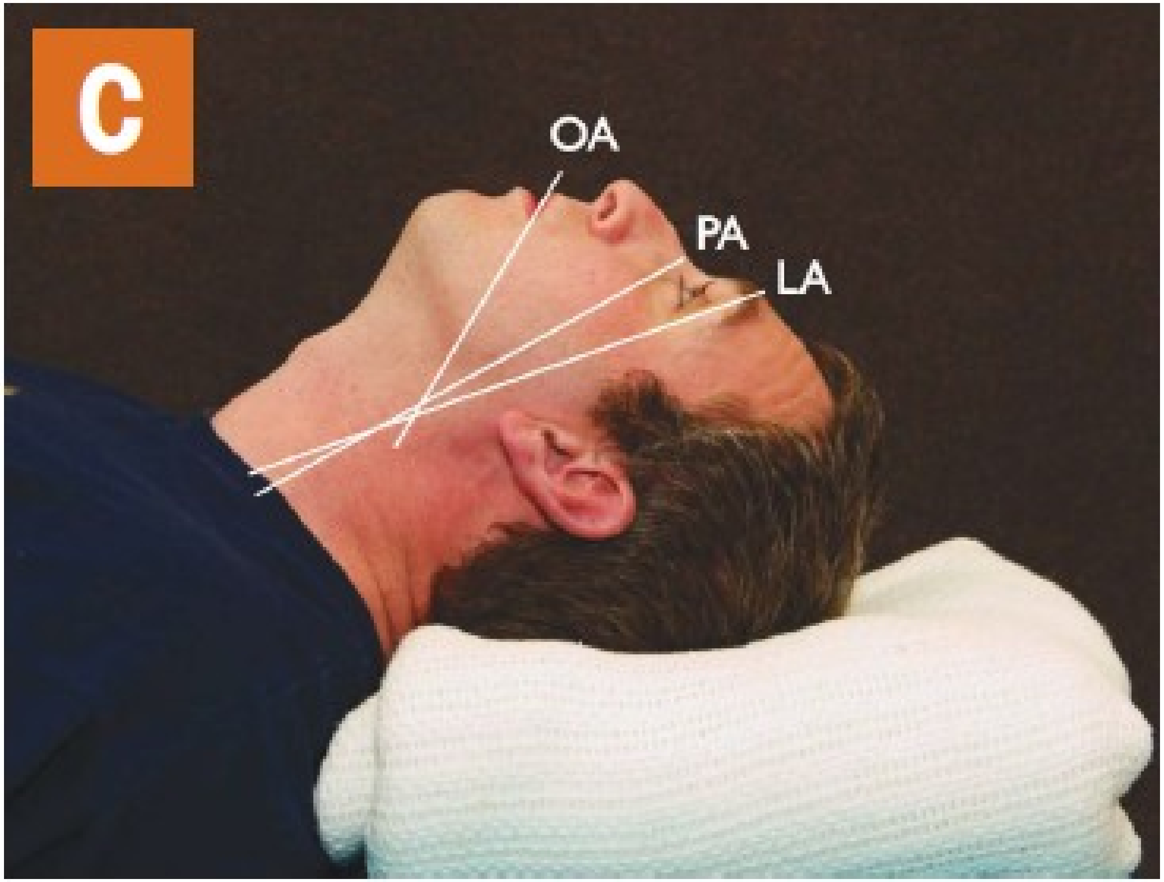
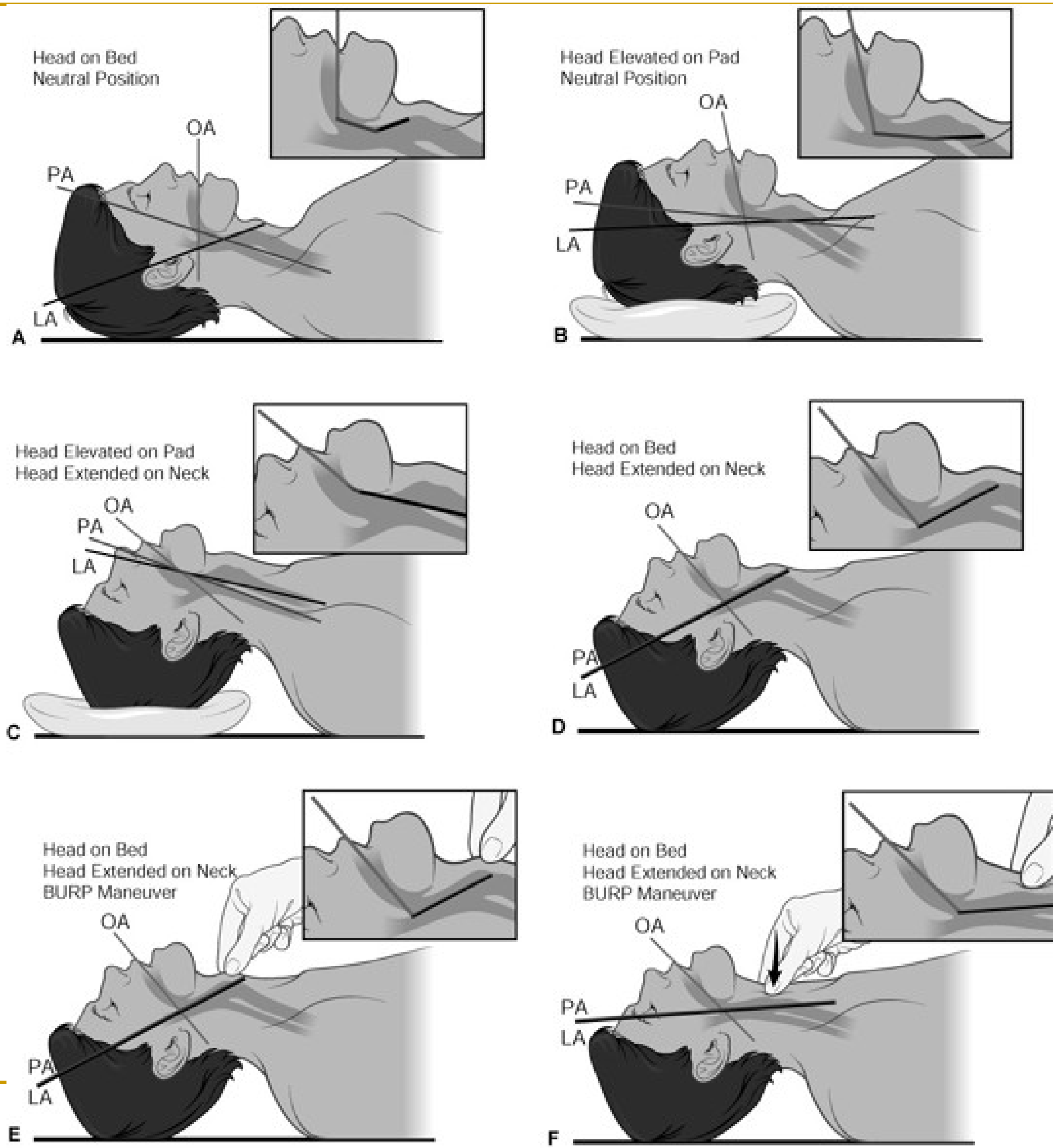


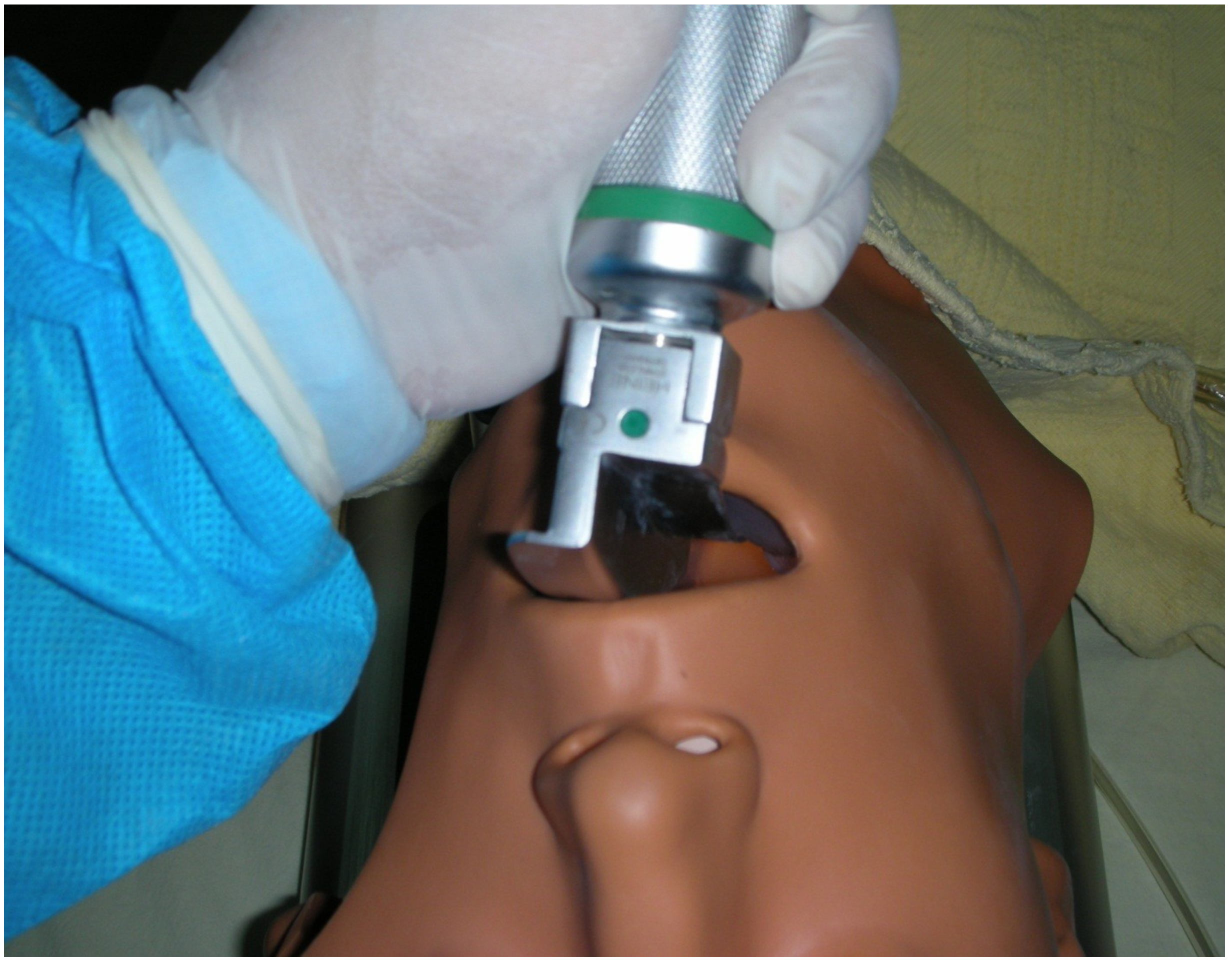
Figure 1. A: In the neutral position, the oral axis (OA), pharyngeal axis (PA), and laryngeal axis (LA) are not aligned. B: Elevating the head aligns the PA and LA. C: Head extension better aligns the OA with the PA and LA.

Figure 2. In the head-elevated position, the ear is lined up with the sternal notch, but no head extension is provided. Note the use of blankets to create a "ramp" to achieve this position. The ear canal is at the same level as the sternal notch.



Head on Bed
Neutral Position
OA
PA
LA
A
Head Elevated on Pad
Neutral Position
OA
PA
LA
B
Head Elevated on Pad
Head Extended on Neck
OA
PA
LA
C
Head on Bed
Head Extended on Neck
OA
PA
LA
D
Head on Bed
Head Extended on Neck
BURP Maneuver
OA
PA
LA
E
Head on Bed
Head Extended on Neck
BURP Maneuver
OA
PA
LA
F

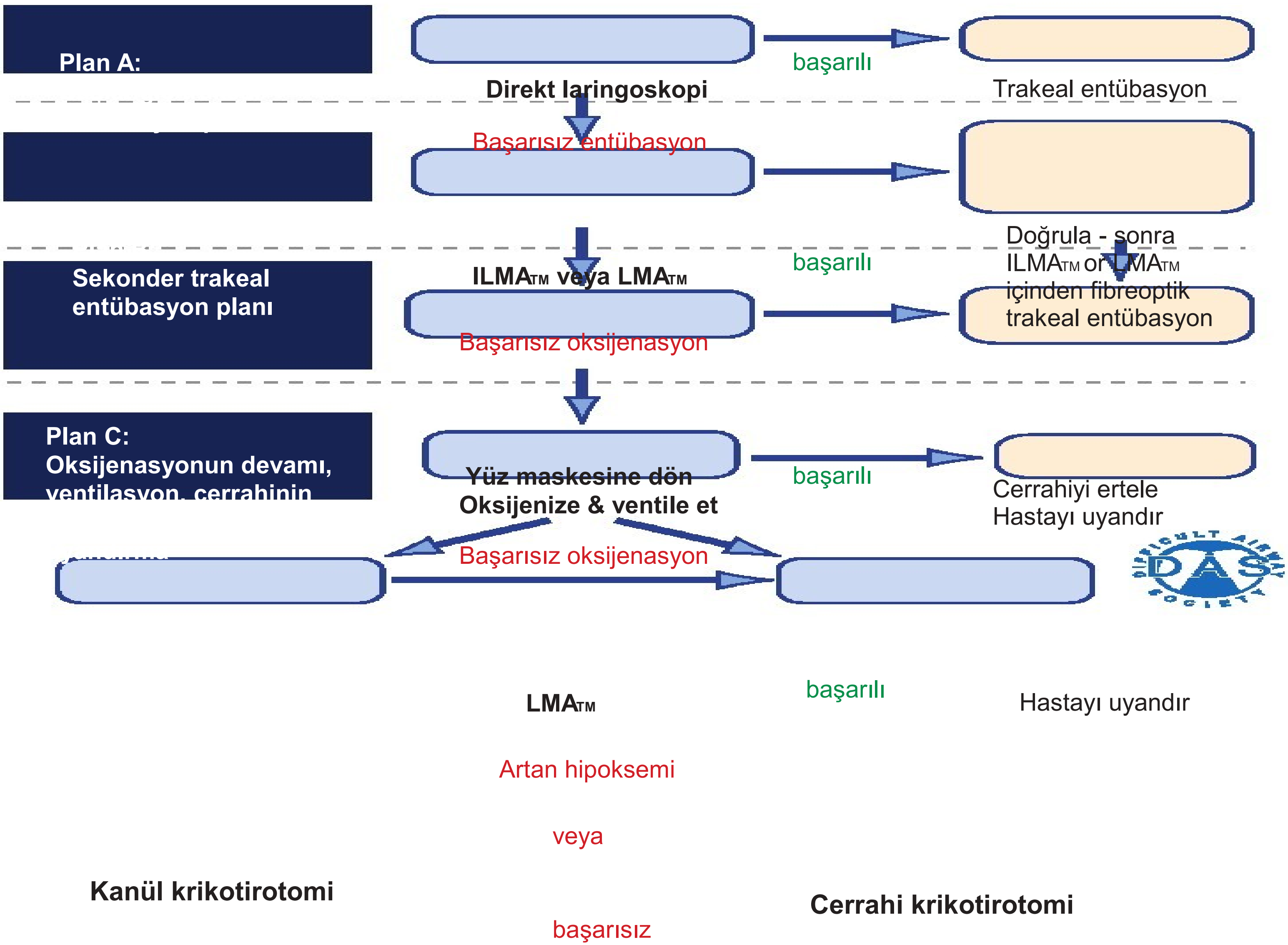

TRAINING



ZOR HAVA YOLU VE ALTERNATİF YÖNTEMLER

- Oral ve Nazal airway kullanmak
- Kılavuz (stylet) kullanmak
- Bronkoskop yardımlı entübasyon
- Laringeal maske
- Kombitüp (özofagotrakeal tüp)
- Retrograd entübasyon

TEMEL ALGORİTM



SENARYO 1: BEKLENMEDİK ZOR TRAKEAL ENTÜBASYON: YETİŞKİN BİR HASTADA RUTİN ANESTEZİ İNDÜKSİYONU

Direkt laringoskopi

Herhangi bir problem

Yardım çağır

on planı

Direkt laringoskopi – kontrol et:
Boyun fleksiyonu ve baş ekstensiyonu
Laringoskop tekniği ve kuvvet yönü
Eksternal laringeal manüplasyon
Vokal kordlar açık ve hareketsiz
Görüntü zayıfsa: İntroducer (buji) -
Klikleri veya takılmayı hisset
Ve/veya alternatif laringoskop

4 denemeden fazla yapma:
Devam et:
(1) Yüz maskesi ile oksijenasyon ve
(2) Anestezi

başarılı

Trakeal entübasyon

Trakeal entübasyonu doğrula
(1) Mümkünse görerek
(2) Kapnograf
(3) Özefageal dedektör
" Şüphe varsa, çıkar"

Başarısız entübasyon

ILMA™ veya LMA™
2 den fazla deneme
Oksijenize ve ventile et

başarılı

Doğrula: Ventilasyon, oksijenasyon, anestezi, KVS stabilitesi ve kas gevşemesi – sonra IMLA™ veya LMA™ içinden fiberoptik trakeal entübasyon – 1 deneme
LMA™ ise, uzun fleksibl metal, nazal RAE veya mikrolaringeal tüpü düşün.
Entübasyonu doğrula ve cerrahiye devam et

ILMA™ veya LMA™ ile başarısız oksijenizasyon
(örneğin FiO_2 1.0 iken $SpO_2 < 90\%$)

ILMA™ veya LMA™ ile başarısız entübasyon

Plan C: Oksijenasyon ve ventilasyonun devamı, cerrahinin ertelenmesi ve uyandırma

Yüz maskesine geç
Oksijenize ve ventile et
Nondepolarizan kas gevşeticiyi geri çevir
1 veya 2 kişiyle maske tekniği (oral/nazal airway)

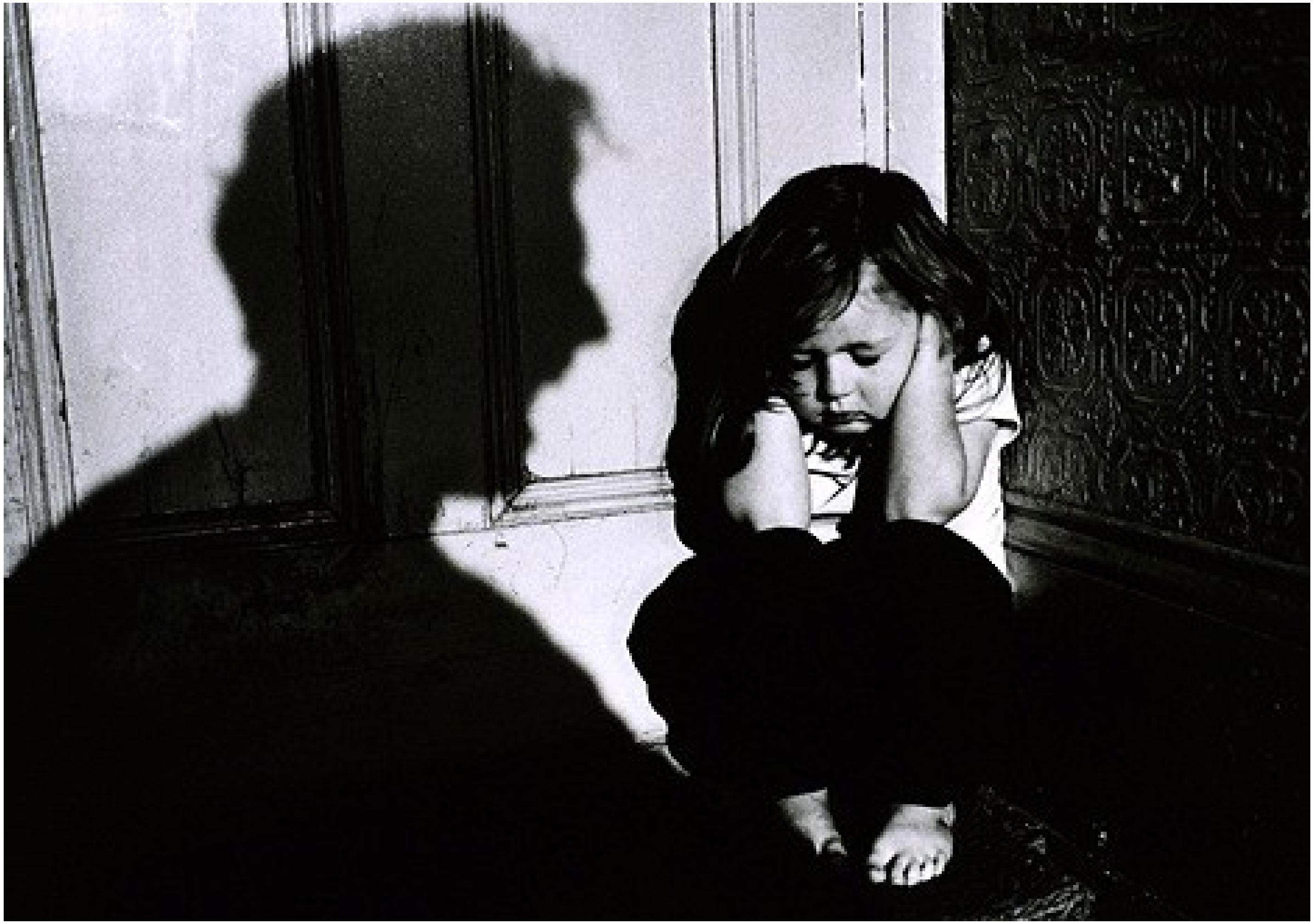
başarılı

Cerrahiyi ertele
Hastayı uyandır

Başarısız ventilasyon ve oksijenasyon

Plan D: "Entübe edememe, Ventile edememe" durumu için

DIFFICULT AIRWAY SOCIETY
DAS



Y BAG PEOPLE (Reference #6)

Table 6—*Preparation for Intubation Mnemonic*

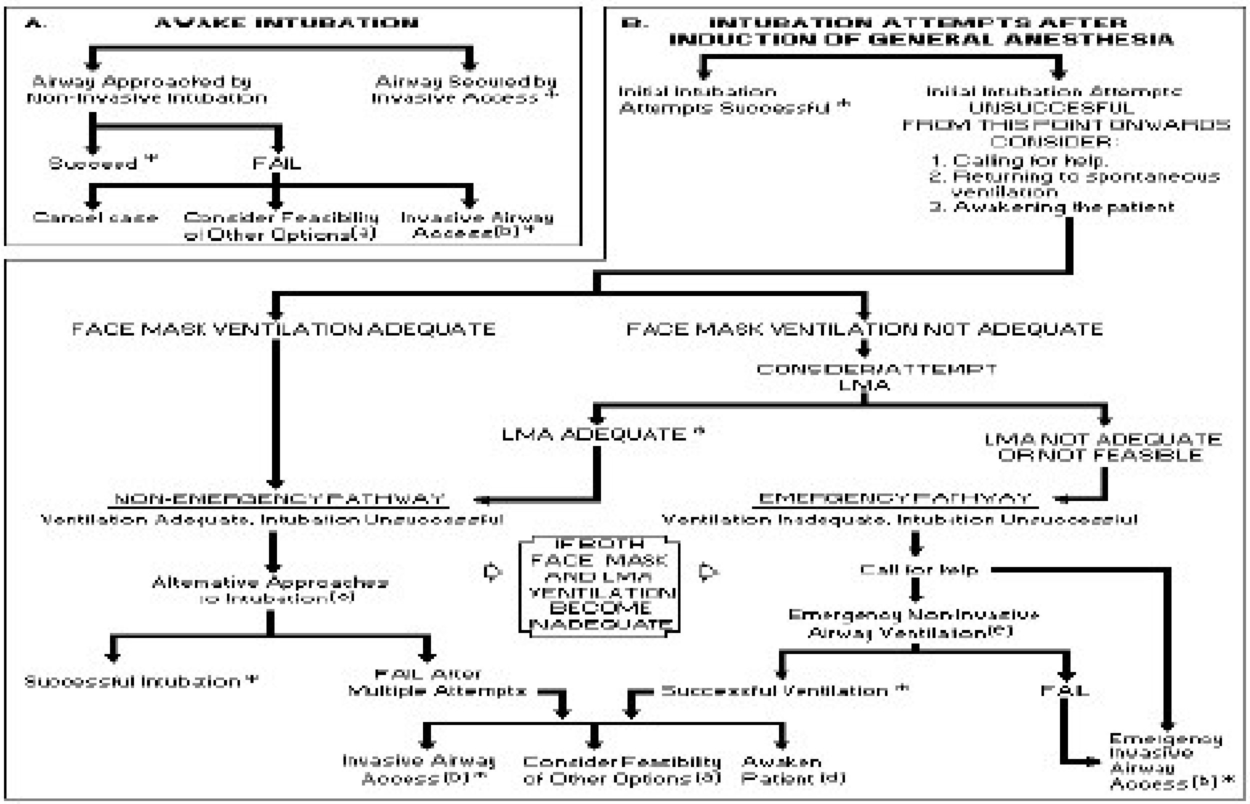
Mnemonic	Description
Y	Yankauer suction
B	Bag-valve-mask
A	Access vein
G	Get your team, get help if predict a difficult airway
P	Position patient (sniffing position if no contraindications) and place on monitor
E	Endotracheal tubes and check cuff with syringe
O	Oxygen, oropharyngeal airway available
P	Pharmacy: draw up adjunctive medications, induction agent, and neuromuscular blocker
L	Laryngoscope and blades: ensure a variety and that they are working
E	Evaluate for difficult airway: look for obstruction, assess thyromental distance < 3 finger breadths, interincisor distance < 2 finger breadths, neck immobilization

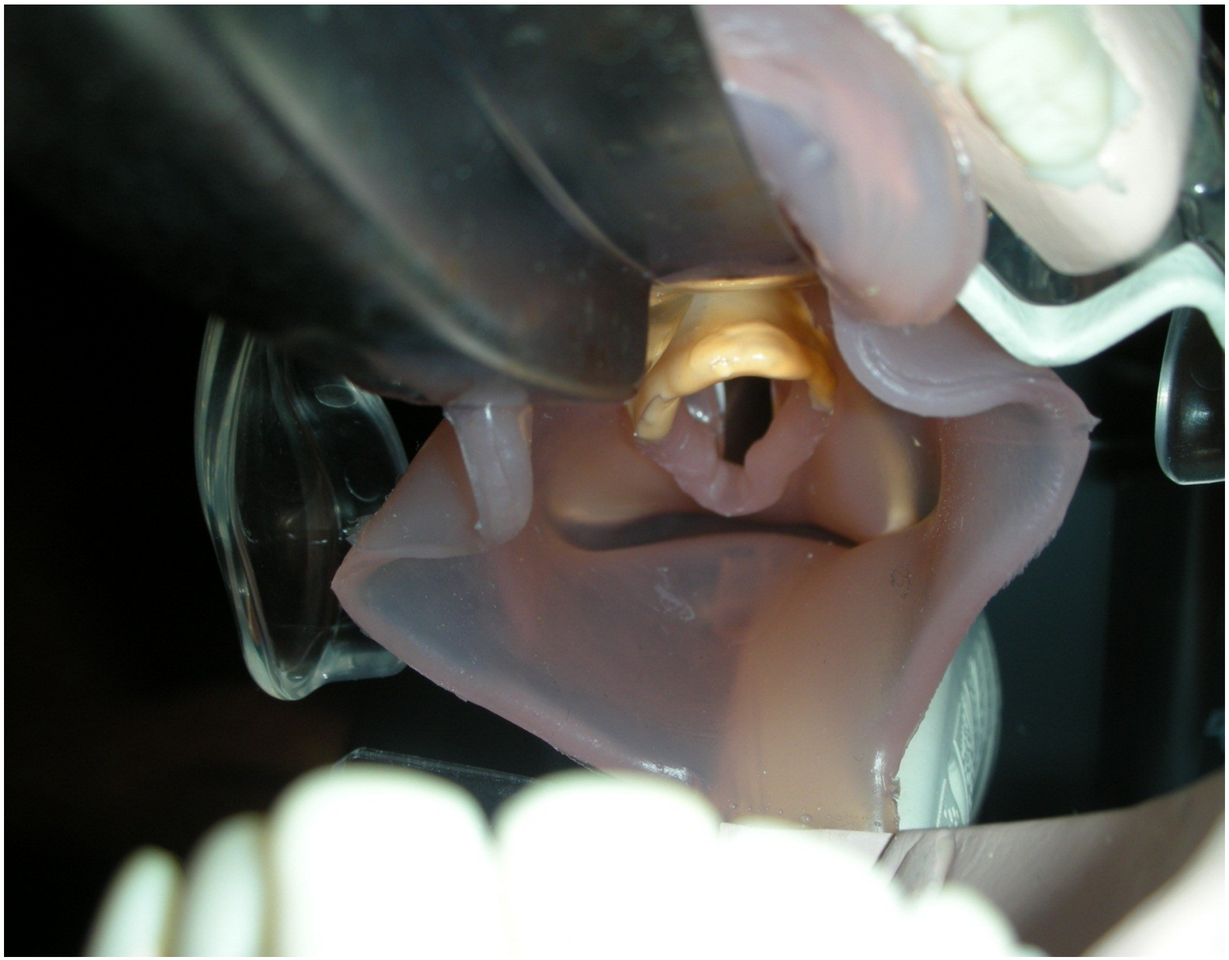
Difficult Airway Algorithm

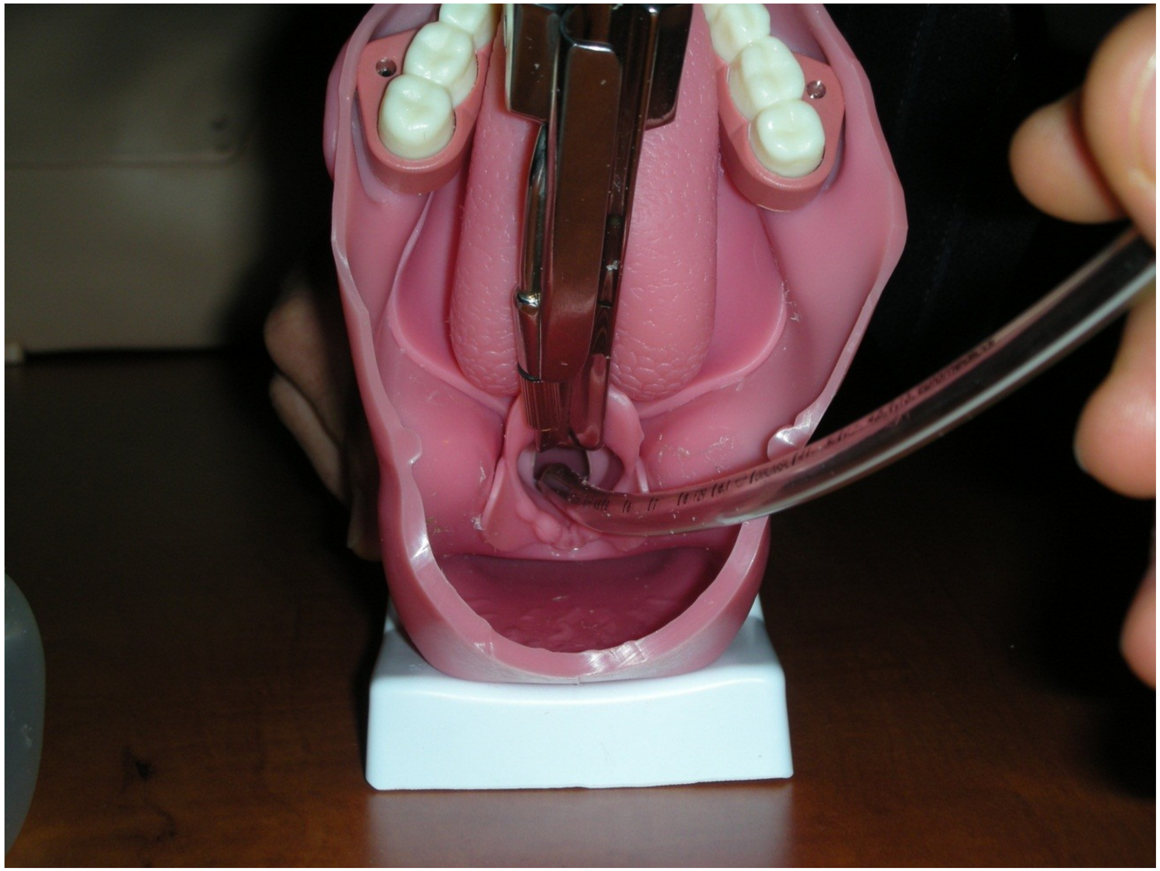
1. Assess the likelihood and clinical impact of basic management problems.
   - A. Difficult Ventilation
   - B. Difficult Intubation
   - C. Difficulty with Patient Cooperation or Consent
   - D. Difficult Tracheostomy
2. Actively pursue opportunities to deliver supplemental oxygen throughout the process of difficult airway management.
3. Consider the relative merits and feasibility of basic management choices:

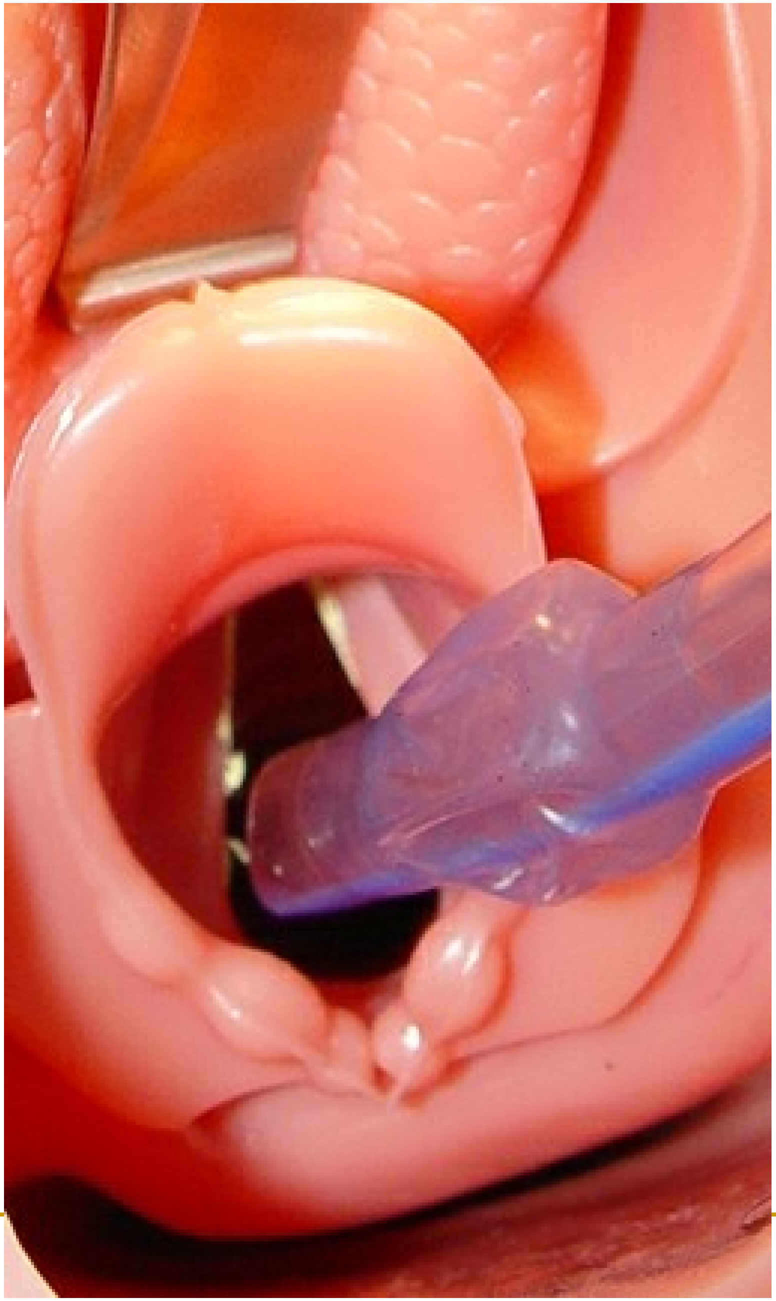
A.	Awake Intubation	vs.	Intubation Attempts after Induction of General Anesthesia
B.	Non-Invasive Technique for Initial Approach to Intubation	vs.	Invasive Technique for Initial Approach to Intubation
C.	Preservation of Spontaneous Ventilation	vs.	Ablation of Spontaneous Ventilation

4. Develop primary and alternative strategies.





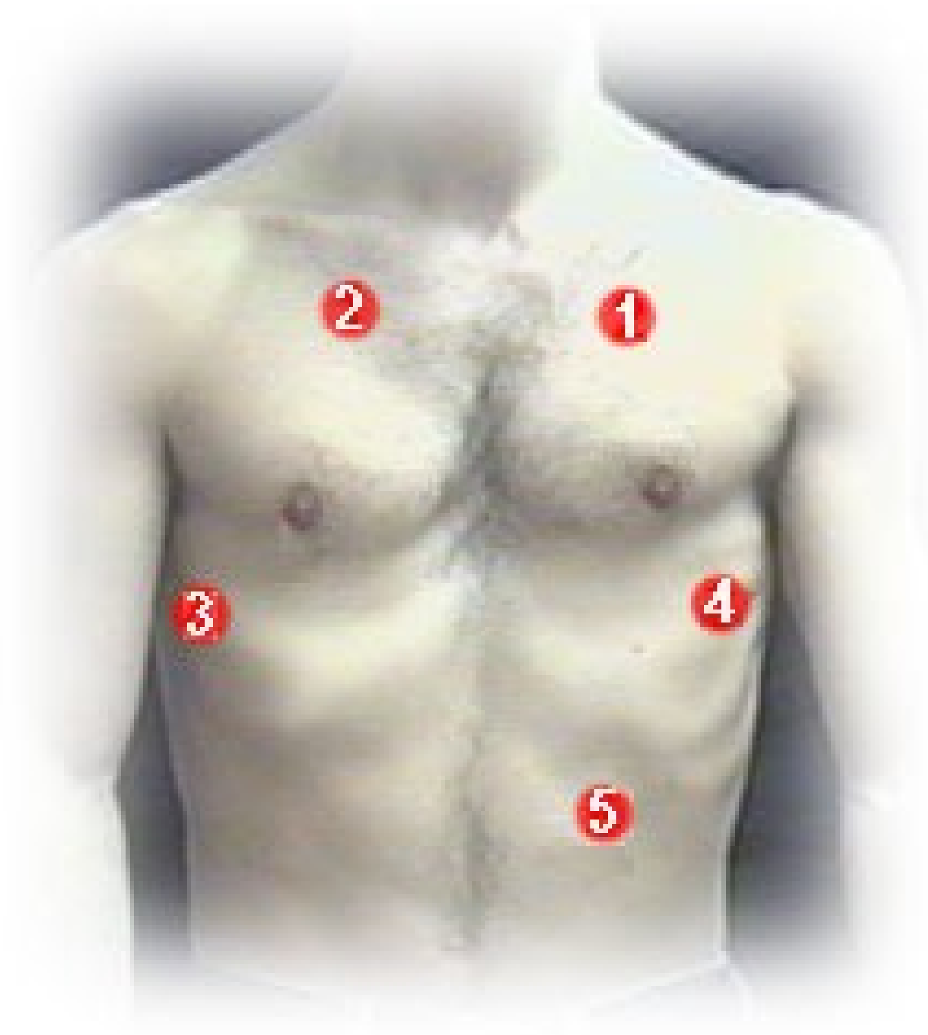





25
23
21
19
17 16:18

Confirmation of Placement

- Direct visualization
- Humidity fogging the endotracheal tube
- End tidal CO_2 which is maintained after > 5 breaths
  - Low cardiac output results in decreased delivery of CO_2
- Refill in 5 seconds of self-inflating bulb at the end of the endotracheal tube
- Symmetrical chest wall movement
- Bilateral breath sounds
- Maintenance of oxygenation by pulse oximetry
- Absence of epigastric auscultation during ventilation


2
1
3
4
5

- Entübasyonun doğrulanması-2

Entübasyon başarısız olursa?

- 30 sn içinde tüp vokal kortlardan geçirilemez ise tüp çıkarılır ve hasta %100 02 ile 15-30 sn ambulanır
- BVM yeterli oluyorsa böyle devam edilir
- Stile ile ve pozisyon vererek tekrar denenir
- BURP manevrası denenebilir
- Laringeal Mask Airway
- Digital entübasyon
- Esophageal Tracheal Combitube
- Cerrahi Havayolu, cricothyroidotomy,
- Fiber optik laringoskoplar ve video laringoskoplar
- Bujiler denenebilir
- Transtrakeal jet ventilasyonlar

Komplikasyonlar

- Özefageal entübasyon
- Havayolu travması
- Sağ ana bronş entübasyonu
- Laringospazm
- Başarısız girişim

Entübasyonun Doğrulanmasında neler vardı ve neler değişti

Entübasyonun doğrulanması-1

Tübün vokal kordlardan geçişinin görülmesi

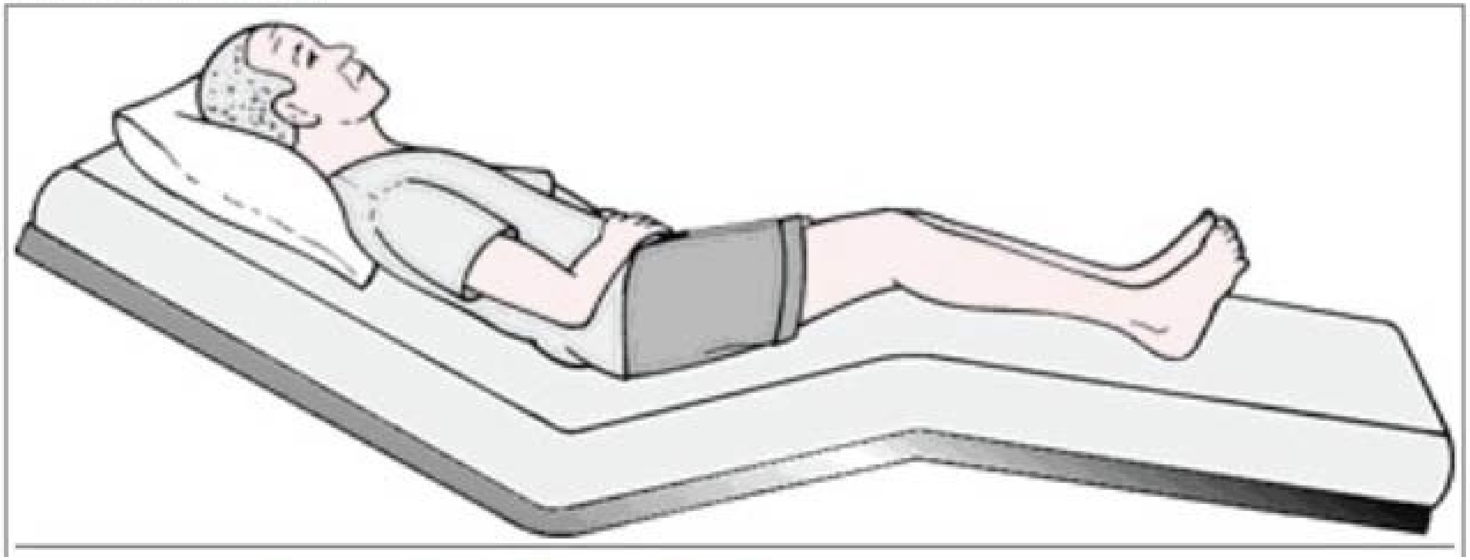
- Solunum seslerini sağ ve sol anteriyor, sağ ve sol orta axiler bölgeden, mide üzerinden (epigastriumdan) dinleme; 5 nokta kuralı
- Gögüs ekspansiyonun gözlenmesi
- Tüpte buğulanma olması (duyarlılık ve özgüllüğü en düşük)
- Yerinde PA akciğer grafisi ile tüp ucunun karinanın 1,5- 2 cm proksimalinde olması
- Nabız oksimetre değerinin yükselerek %90'ın üzerine çıkması

Değişen yada değişmesi gerekenler nelerdi???


GlideScope

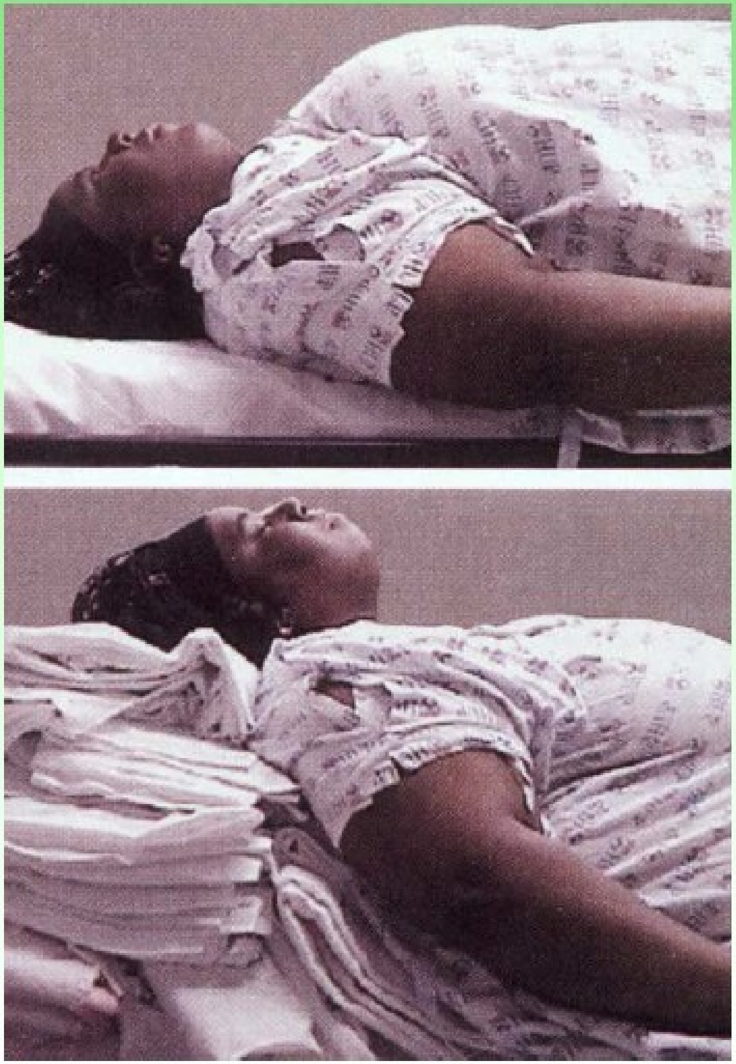
Intubate with the head of the bed elevated

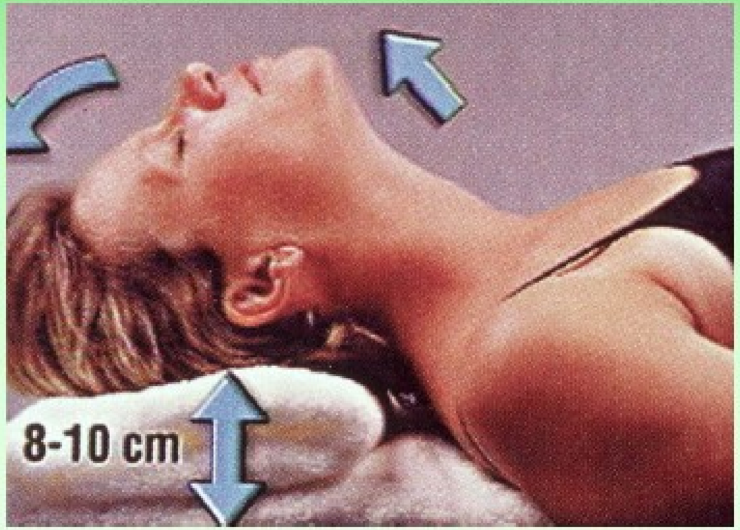
by reuben in airway



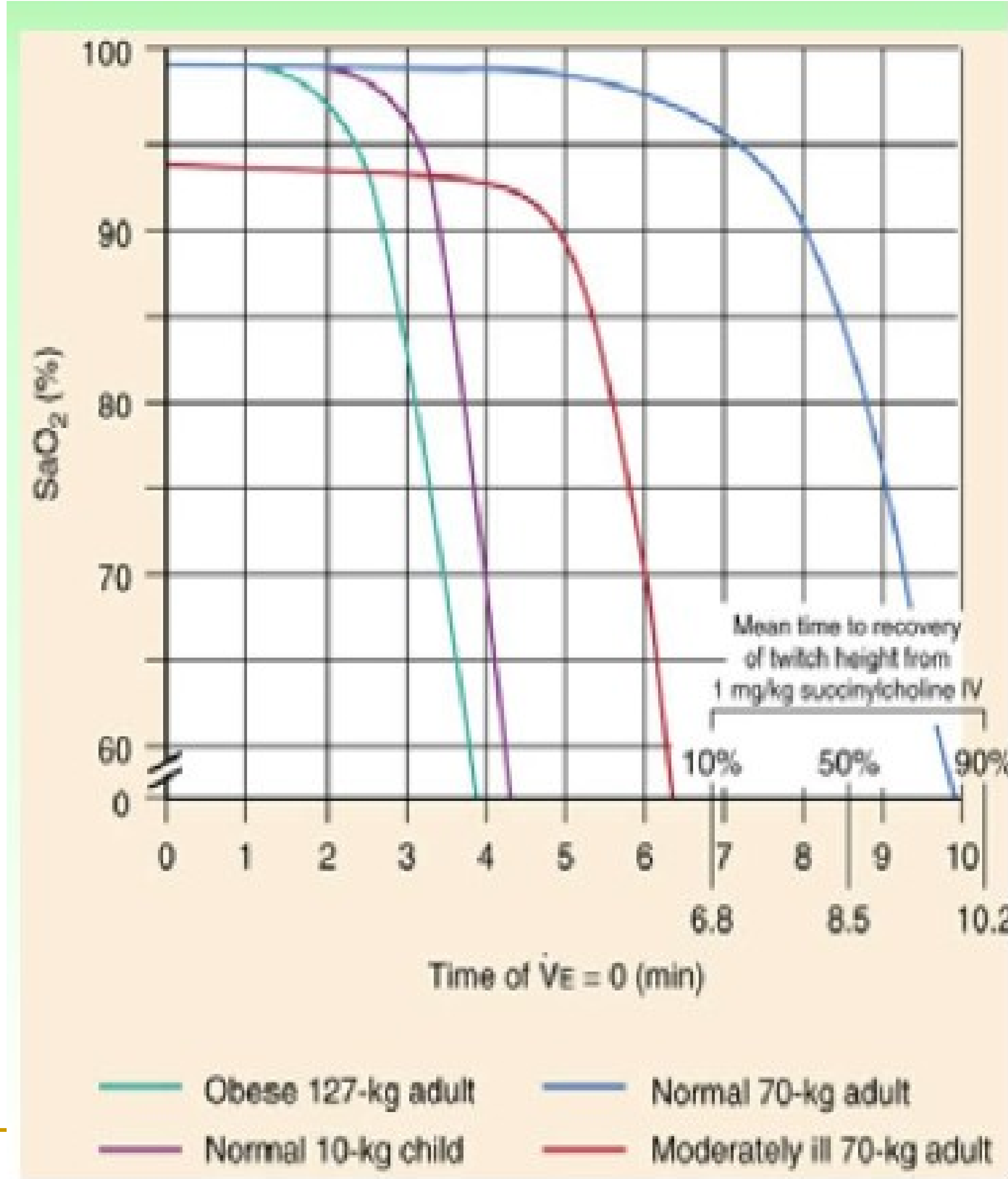
In addition to improving laryngeal view, there is now evidence that elevating the head of the bed prolongs apneic desaturation time. This makes good sense,

Baş pozisyonu





Kulak, sternal notch seviyesinde olsun
(en azından orta aksiler hattan daha yüksek bir seviyede olsun)



100
90
80
70
60
0
SaO_2 (%)
0 1 2 3 4 5 6 7 8 9 10
6.8
8.5
10.2
10%
50%
90%
Mean time to recovery of twitch height from 1 mg/kg succinylcholine IV
Time of $\dot{V}_E = 0$ (min)
Obese 127-kg adult
Normal 70-kg adult
Normal 10-kg child
Moderately ill 70-kg adult

Eschman Stylet

- Use especially if Grade III view achieved
- Direct laryngoscopy is performed
- Place Eschman where trachea is anticipated
- May feel tracheal rings against stiffness of stylet
- Thread 7.0 or 7.5 ETT over stylet with the laryngoscope still in place

Fiberoptic Scope

- Essentially what is used to do a bronchoscopy
- Can be used to thread an endotracheal tube into the trachea either while the patient is asleep or on an awake patient with a topicalized airway
- Via laryngeal mask airway in place due to inability to intubate with DL:
  - Aintree (airway exchange catheter) can be threaded over the FOB to be placed into trachea upon visualization
  - Wire-guided airway exchange catheter can also be used with one more step

The Light Wand

- Transillumination of trachea with light at distal end
- Trachea not visualized directly
- Should not be used with tumors, trauma, or foreign bodies of upper airway
- Minimal complication except for mucosal bleed
- 10% failure rate on first attempt in experienced hands

Tube sizes

- Newborn – to 4 kg - 2.5 mm (uncuffed).
- 1-6 months 4-6 kg – 3.5 mm (uncuffed).
- 7-12 months 6-9 kg – 4.0 mm (uncuffed).
- 1 year 9 kg – 4.5 mm (uncuffed).
- 2 years 11 kg – 5.0 mm (uncuffed).
- 3-4 years 14–16 kg - 5.5 mm (uncuffed).
- 5-6 years 18–21 kg – 6.0 mm (uncuffed).
- 7-8 years 22-27 kg – 6.5 mm (uncuffed).

Tube Sizes

- 9-11 years 28-36 kg – 7.0 mm(cuffed).
- 14 to adults 46+ kg – 7.0 – 80 mm (cuffed).
- Adult female 7.0 – 8.0mm (cuffed).
- Adult male 7.5 – 8.5 mm (cuffed).
- The size of the tube may also be determined by the size of the patients little finger.

N.B patients below the age of 8 require uncuffed ETT due to damage caused by the cuff in younger patients. Always monitor the ECG activity during intubation.

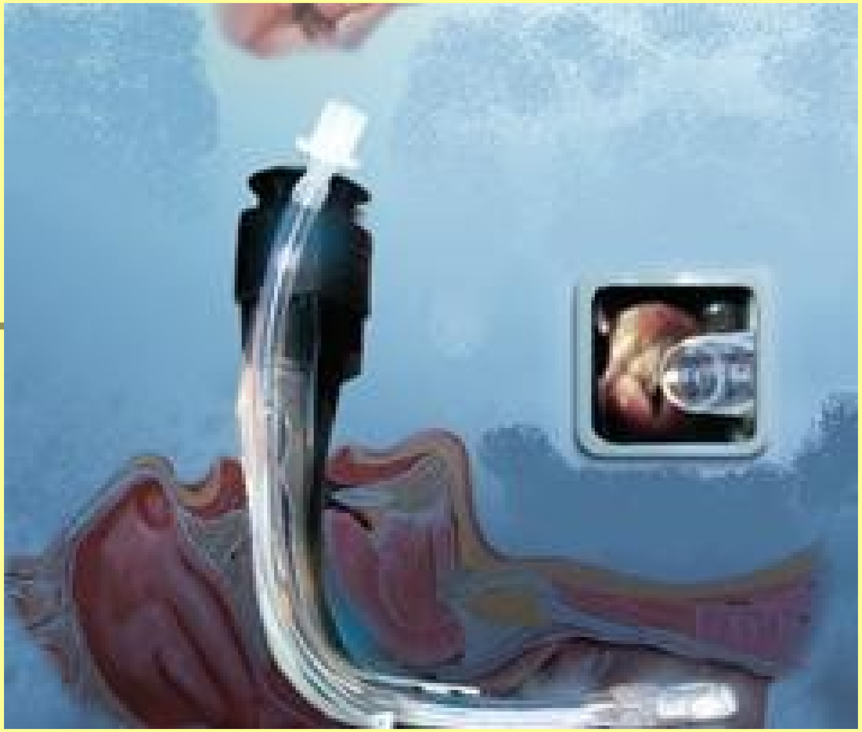
4 Rules of Suctioning

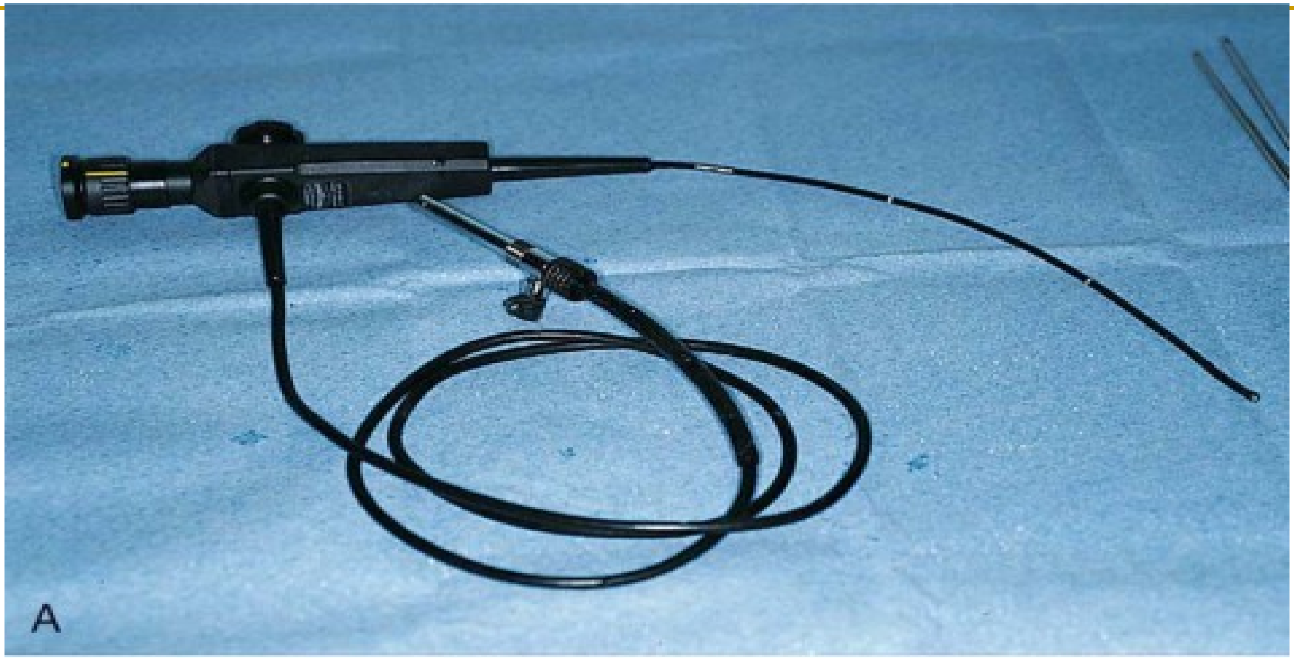
- Never suction further than you can see.
- Always suction on the way out.
- Never suction for longer than15 seconds.
- Always oxygenate the patient before and after suctioning.

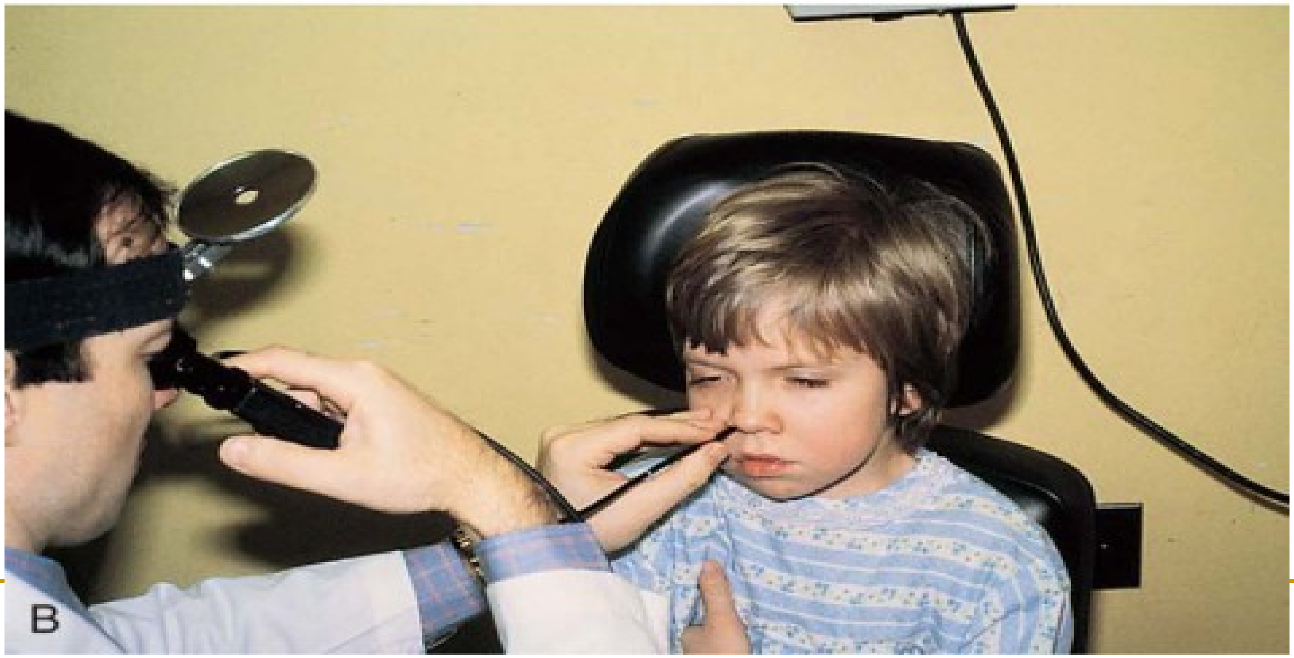
DİREKT ETE YÖNTEMLERİ

- **BEKLENEN ZOR ENTÜBASYON**
  UYANIK FOE
- **BEKLENMEYEN ZOR ETE**
- LMA/İLMA + FİBEROSKOP
- DÜZ LARİNGOSKOP
- RİJİT İNDİREKT LARİNGOSKOP
  VİDEOLARİNGOSKOP
- MACİNTOSH TİPİ
- BULLARD TİPİ: AIRTRAQ & PENTAX
- DİĞER: GLİDESKOP, MC GRATH, EVO
- OPTİK STİLE




A

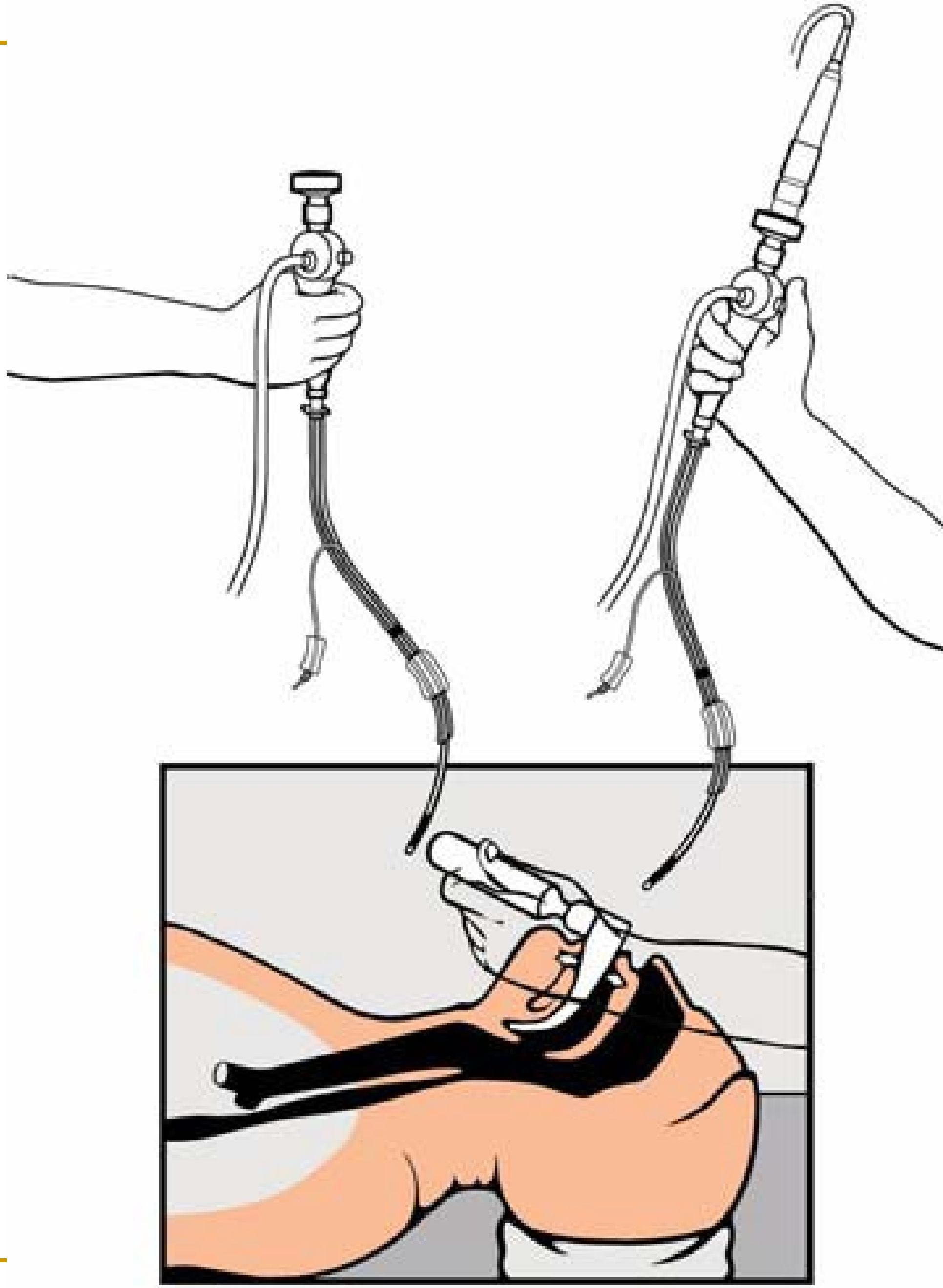

B

Flexible Video Laryngoscope

Lary Flex Video Laryngoscope



ACUTRONIC



B. Ali Impex

A Sign Of Quality

Khadim Ali Road, Kotli Behram, Sialkot, Pakistan.

L3-150: Reusable conventional Laryngoscope blades **MacIntosh** made of 304 grade stainless steel (non-megnatic) with 2.5 V lamp. Sizes available 00,0,1,2,3,4,5.
L3-155: Reusable conventional Laryngoscope blades **Miller** made of 304 grade stainless steel (non-megnatic) with 2.5 V lamp. Sizes available 00,0,1,2,3,4
L3-155V: Reusable Veterinary Conventional Laryngoscope Blades Miller made of 304 Grade stainless steel (non-megnatic), sizes available 5, 6, 7.

L3-151: Economical conventional Laryngoscope blades **MacIntosh** made of 304 grade stainless steel (non-megnatic) wit+\h 2.5V lamp. Sizes available 00,0,1,2,3,4,5. **This blade can be used as single use or reusable.**

L3-156: Economical conventional Laryngoscope blades **Miller** made of 304 grade stainless steel (non-megnatic) with 2.5V lamp. Sizes available 00,0,1,2,3,4. **This blade can be used as single use or reusable.**

L3-152: Economical conventional Laryngoscope blades **MacIntosh** made of 304 grade stainless steel (non-megnatic) with 2.5V lamp. Sizes available 00,0,1,2,3,4,5. **This blade can be used as single use or reusable.** Handle available for this blade is made of plastic & brass as indicated with one of the blade
L3-154: Single use conventional Laryngoscope blades **MacIntosh** made of 304 grade stainless steel (non-megnatic) with plastic heal. 2.5V lamp. Sizes available 00,0,1,2,3,4. **This style is also available in Miller**

HC1: Stuby Handle for conventional Laryngoscope blades made of brass chrome plated. Two AA size battery cells are accomodated in the handle.
HC2: Extra Economical Handle for conventional Laryngoscope blades made of brass chrome plated. & plastic Two AA size battery cells are accomodated
HC3: Economical Handle for conventional Laryngoscope blades made of brass chrome plated. Two C- size battery cells are accomodated.
HC4: Pen Light Handle for conventional Laryngoscope blades made of brass chrome plated. Two AA size battery cells are accomodated

HC5: Light Weight Handle for conventional Laryngoscope blades made of brass chrome plated. Two C-size battery cells are accomodated
HC6: Heavy Duty Handle for conventional Laryngoscope blades made of brass chrome plated. Two C- size battery cells are accomodated.
HC7: Heavy Duty Handle for conventional Laryngoscope blades made of brass chrome plated. Two C- size battery cells are accomodated.
HC6: Heavy Duty Handle for conventional Laryngoscope blades made of brass chrome plated. Two C- size battery cells are accomodated.

B. Ali Impex

Khadim Ali Road, Kotli Behram, Sialkot, Pakistan.

A Sign Of Quality

Blades

L-150F L-155F

L-150F: Reusable Profession MacIntosh Fiber Optic Laryngoscope Blades. These blades are made of Grade 304 Stainless Steel (Non-Megnatic)., fitted with Glass Fiber Optic light guide covered with stainless steel pipe. Sizes available 00, 0, 1, 2, 3,4,5

L-155F: Reusable Profession Miller Fiber Optic Laryngoscope Blades. These blades are made of Grade 304 Stainless Steel (Non-Megnatic)., fitted with Glass Fiber Optic light guide covered with stainless steel pipe. Sizes available 00, 0, 1, 2, 3,4.

L-151F L-156F

L-151F: Single use MacIntosh Fiber Optic Laryngoscope Blades. These blades are made of Grade 304 Stainless Steel (Non-Megnatic) with plastic heal fitted with plastic Fiber Optic light guide. Sizes available 00, 0, 1, 2, 3,4,5

L-156F: Single use Miller Fiber Optic Laryngoscope Blades. These blades are made of Grade 304 Stainless Steel (Non-Megnatic) with plastic heal fitted with plastic Fiber Optic light guide. Sizes available 00, 0, 1, 2, 3,4

L-152F L-157F

L-152F: Economical MacIntosh Fiber Optic Laryngoscope Blades. These blades are made of Grade 304 Stainless Steel (Non-Megnatic)., fitted with plastic Fiber Optic light guide. Sizes available 00, 0, 1, 2, 3,4,5

L-157F: Economical MacIntosh Fiber Optic Laryngoscope Blades. These blades are made of Grade 304 Stainless Steel (Non-Megnatic)., fitted with plastic Fiber Optic light guide. Sizes available 00, 0, 1, 2, 3,4

Handles

HF1 HF2 HF3 HF4

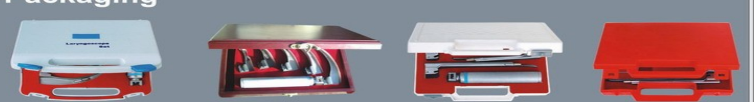
Hf1: Battery Handle for Fiber Optic Laryngoscope to accommodate C-size Battery cells. The handles are fitted withHalogen lamp. The handles are made of Brass, chrome plated.

HF2: Battery Handle for Fiber Optic Laryngoscope to accommodate AA-size Battery cells. The handles are fitted withHalogen lamp. The handles are made of Brass, chrome plated.

HF3: Battery Handle for Fiber Optic Laryngoscope to accommodate AA-size Battery cells. The handles are fitted withHalogen lamp. The handles are made of Brass, chrome plated & plastic

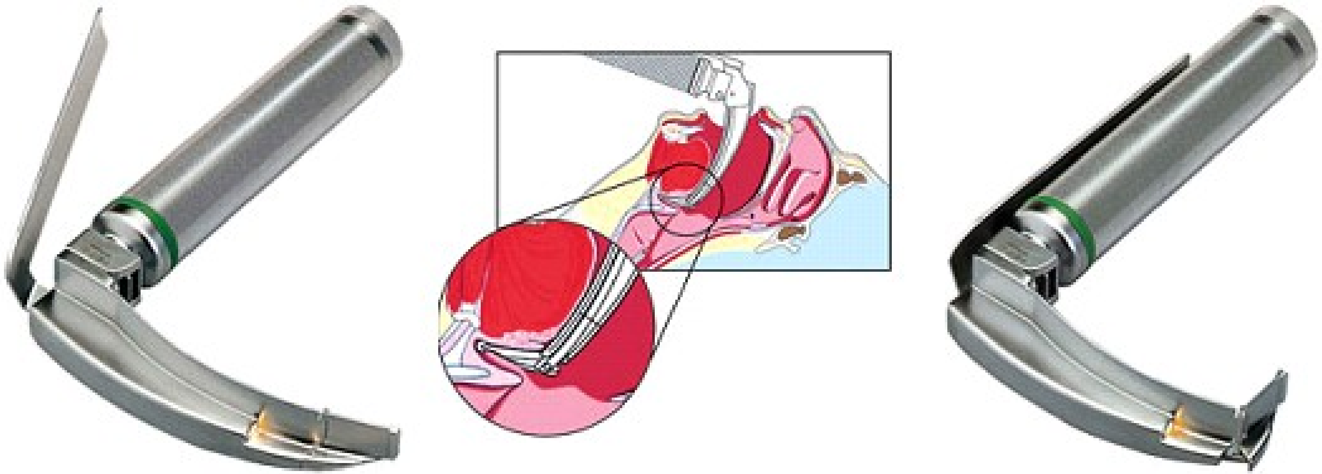
HF4: Stubby Battery Handle for Fiber Optic Laryngoscopeto accommodate AA-size Battery cells. The handles are fitted withHalogen lamp and made of brass,chrome Plated

Packaging



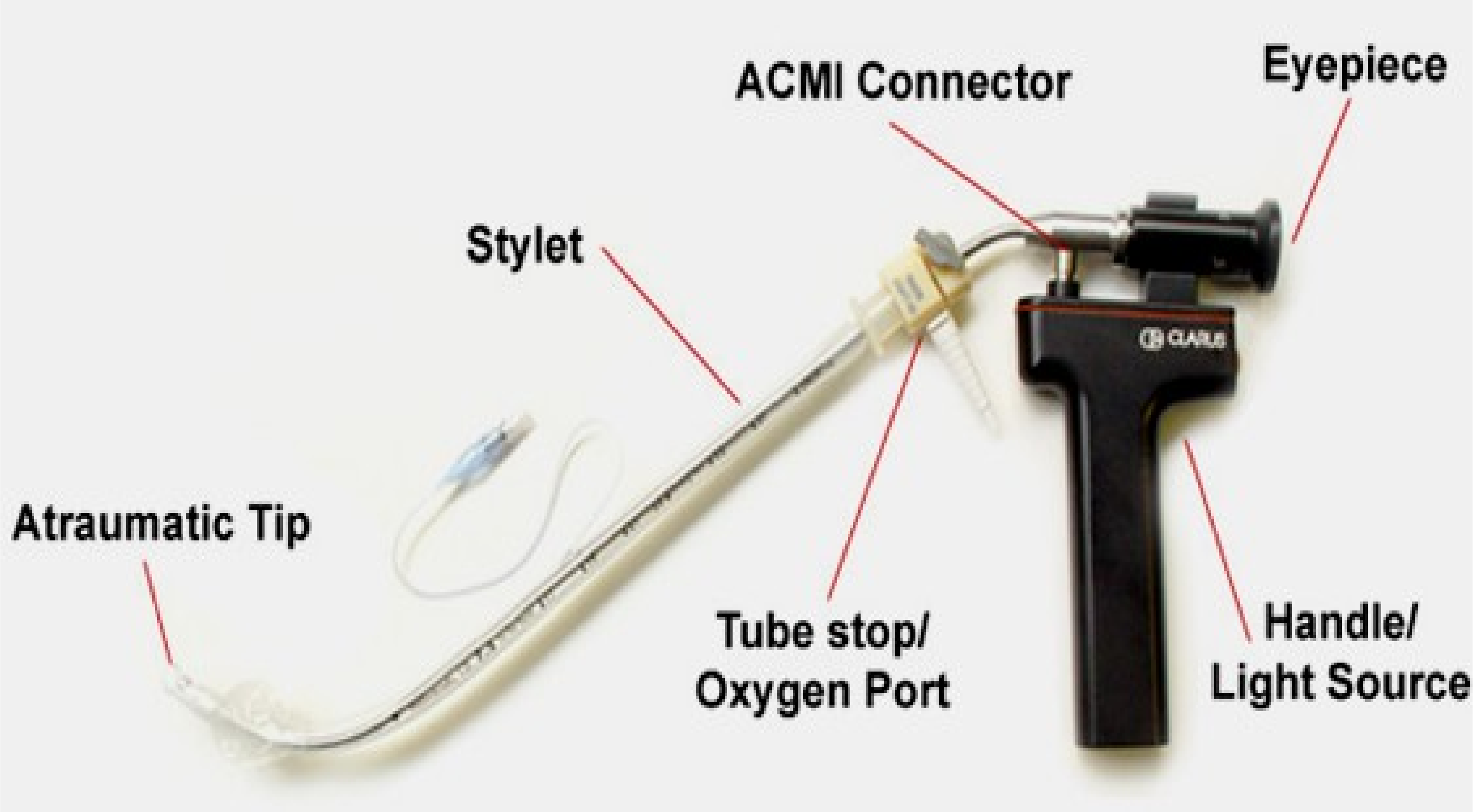
PF1 PF2 PF3 PF4

PF5 PF6

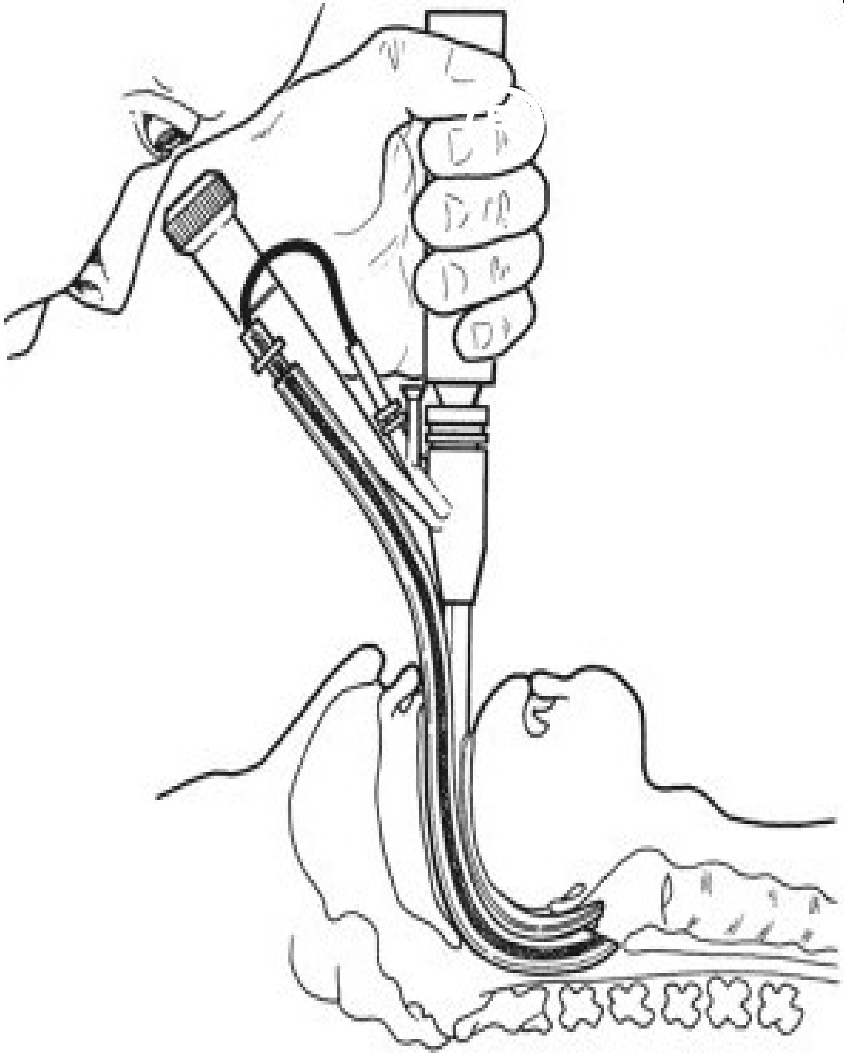


Semi-rijid Fiberoptik Laringoskopi

Levitan semi rijid fiberoptik laringoskop

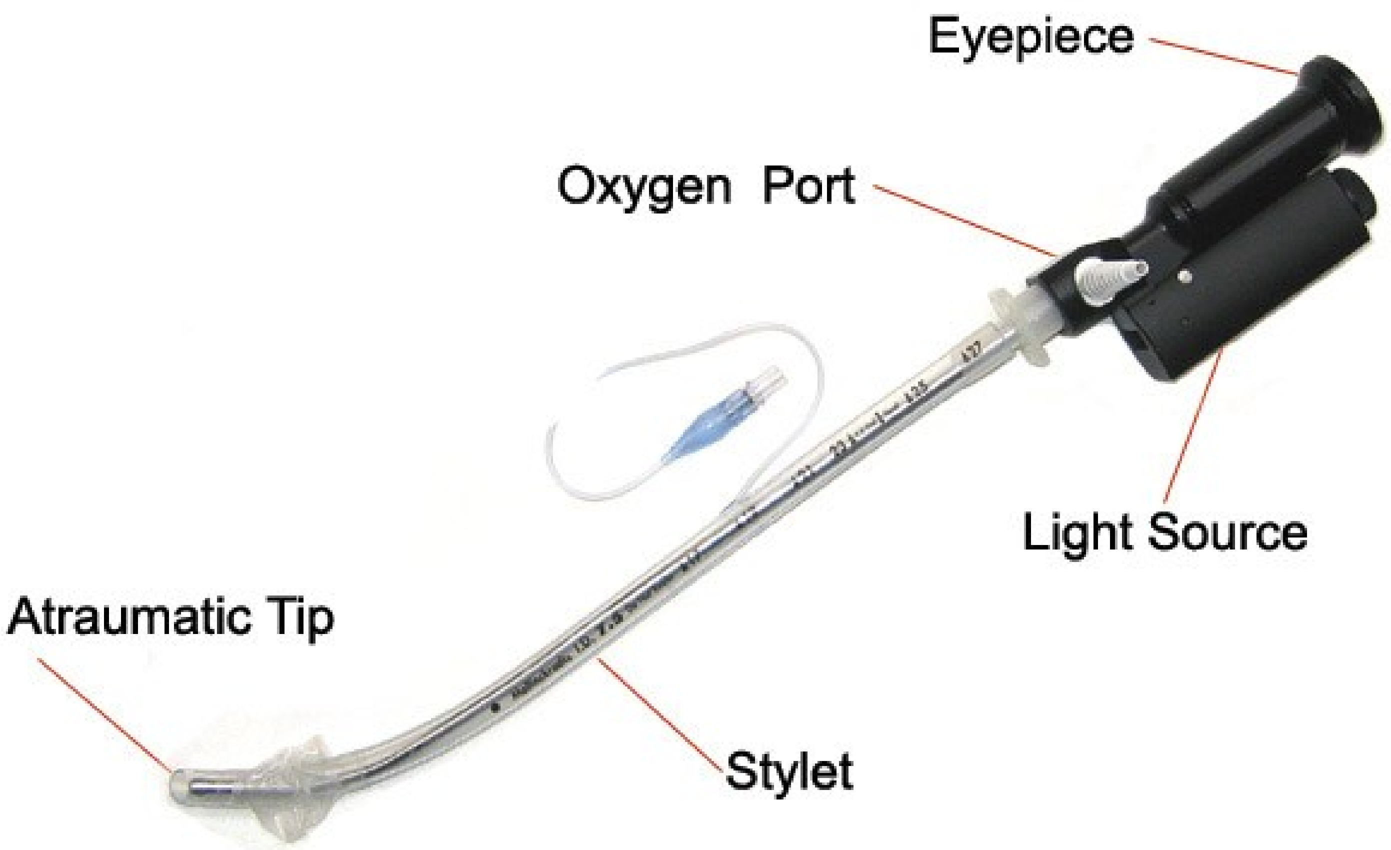

Eyepiece
ACMI Connector
Stylet
Atraumatic Tip
Tube stop/
Oxygen Port
Handle/
Light Source

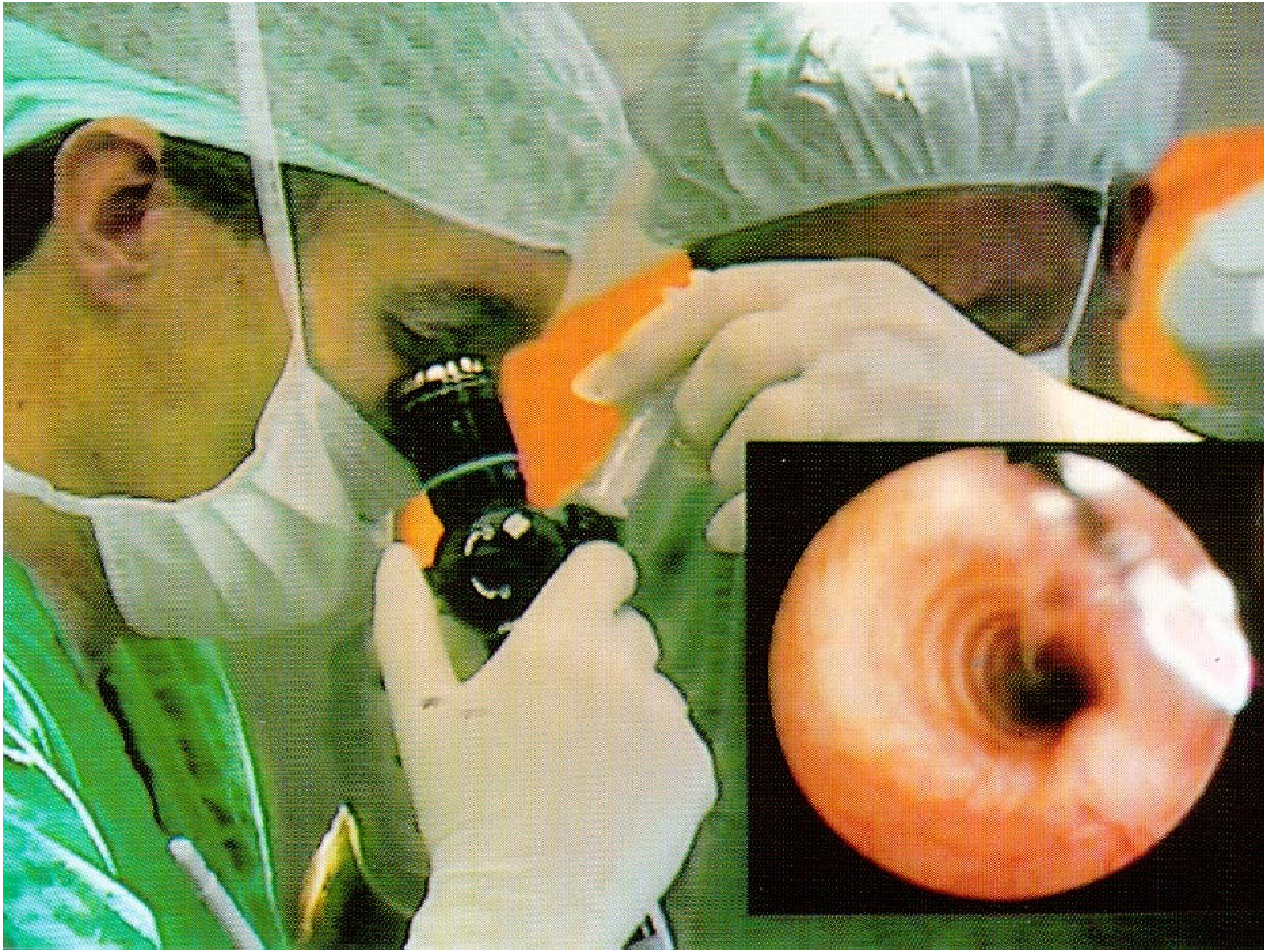
Rijid Fiberoptik Laringoskopi

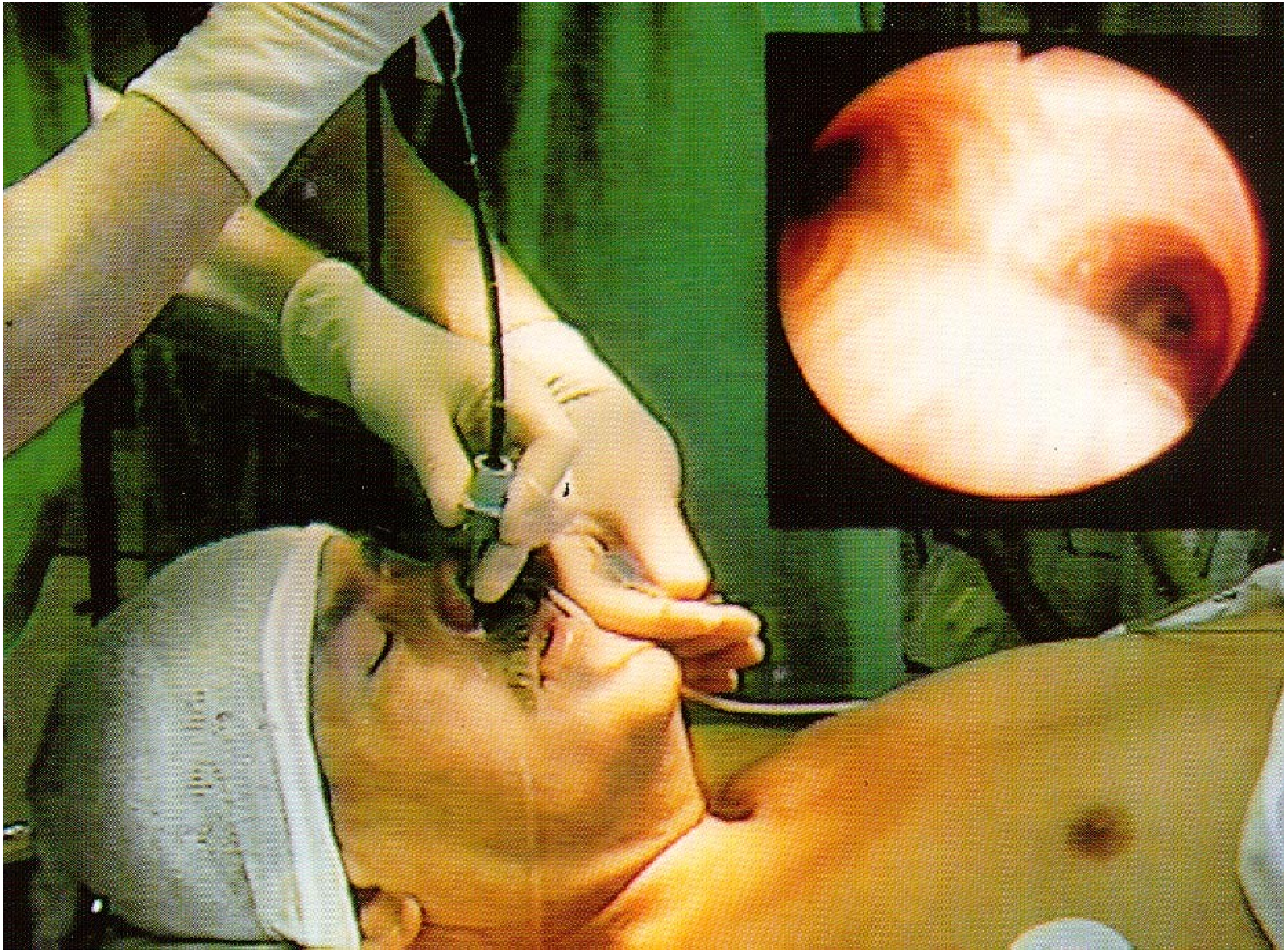


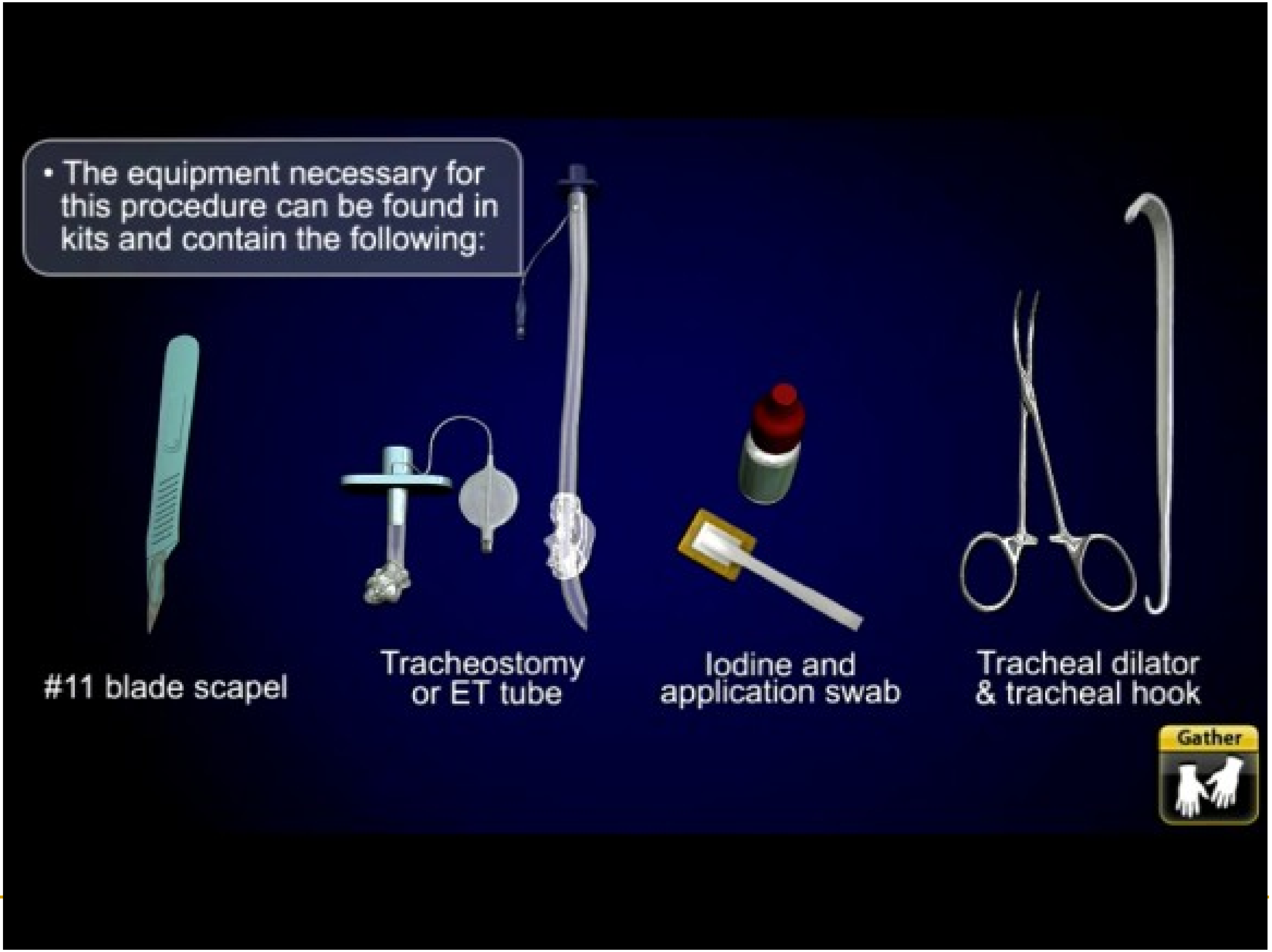
Rijid Fiberoptik Laringoskopi

Levitan Scope








• The equipment necessary for this procedure can be found in kits and contain the following:
#11 blade scapel
Tracheostomy or ET tube
Iodine and application swab
Tracheal dilator & tracheal hook
Gather





NAP4 Report and findings of the 4th National Audit Project of The Royal College of Anaesthetists

- At least one-quarter of major complications of airway management in hospitals are likely to occur in the ICU and emergency department
- Case review has identified avoidable deaths and areas of care that need improvement.
- We outline recommendations to make such improvements.
- At least one in four major airway events in a hospital are likely to occur in ICU or the ED.
- The outcome of these events is particularly adverse and these events are more likely to lead to permanent harm or death than events in anaesthesia.
- Analysis of the cases has identified repeated gaps in care that include: poor identification of at-risk patients, poor or incomplete planning, inadequate provision of skilled staff and equipment to manage these events successfully, delayed recognition of events and failed rescue due to lack of or failure of interpretation of capnography.
- The project findings suggest avoidable deaths due to airway complications occur in ICU and the emergency department

Management and outcomes of trauma during pregnancy

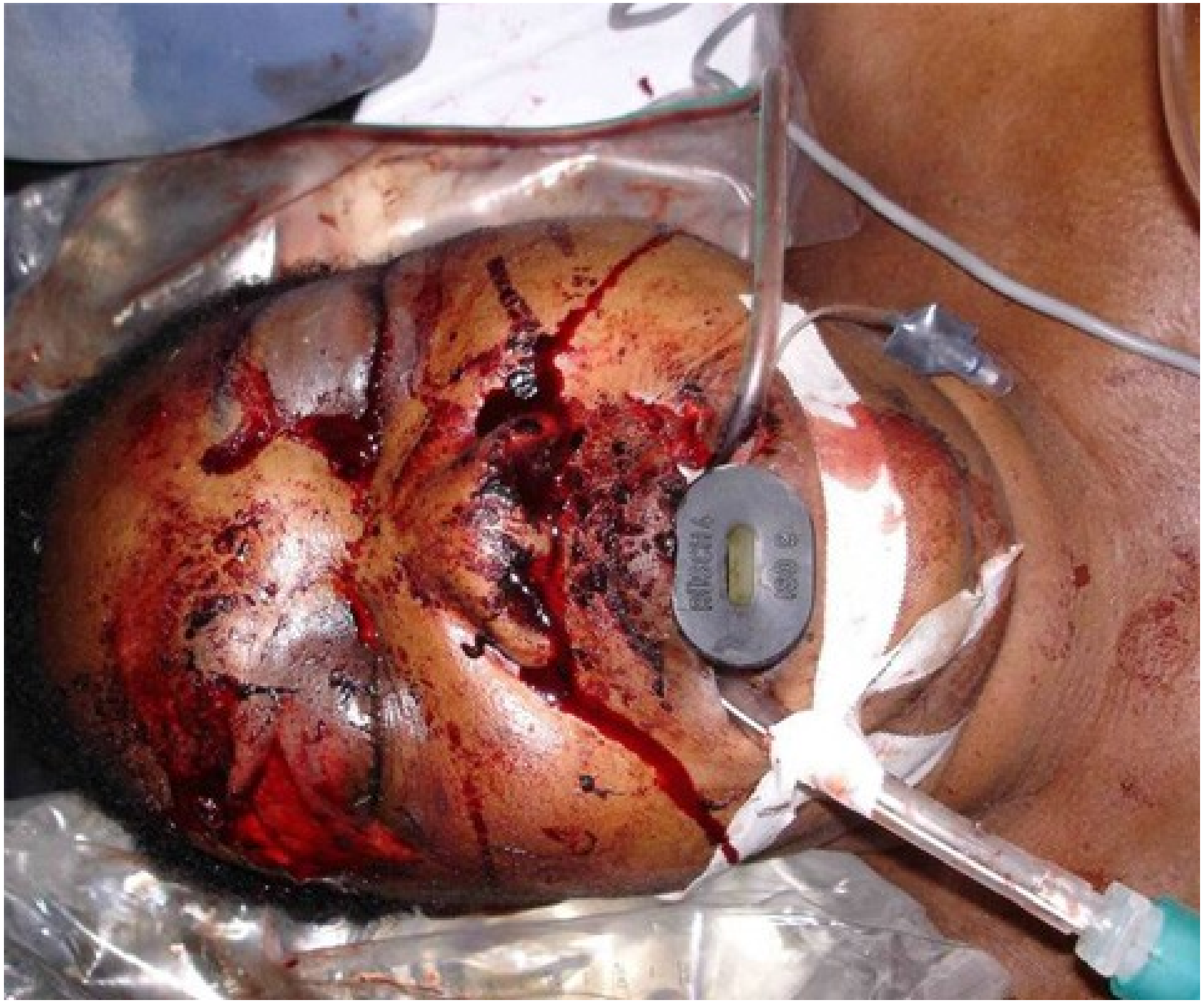
- Approximately 1% to 4% of pregnant women are evaluated in emergency/delivery room because of traumatic injury, yet there are few educational strategies targeted toward prevention/management of maternal trauma

- Use of illicit drugs and alcohol, domestic abuse, and depression contribute to maternal trauma; thus a high index of suspicion should be maintained when treating injured young women

- Treating the mother appropriately is beneficial for both the mother and the fetus

- Fetal viability should be assessed after maternal stabilization

- Pregnancy-related morbidity occurs in approximately 25% of cases and may include placental abruption, uterine rupture, preterm delivery, and the need for cesarean delivery.



HAVAYOLU YÖNETİMİ

- Kanal açıklığını sürdürmek
- Aspirasyondan korumak
- Yeterli ventilasyon
- Yeterli oksijenasyon
- Sekresyonların kontrolü
- Resusitatif ilaçların uygulanması
- (Naloxan,Atropin,Valium,Epinefrin,Lidokain)

HAVAYOLU OBSTRÜKSİYONLARI

- Dilin geriye kaçması (kardiak arrest, koma, travma)
- Dil ödemi, larengeal spazm (Anafilaksi, irritan madde)
- Larengeal, trakeal, bronş obstrüksiyon (Yabancı cisim)
- Larengeal hasar (travma)
- Larengeal ödem (infeksiyon, anafilaksi)
- Bronkospazm (astım, irritanlar, anafilaksi, yabancı cis)
- Pulmoner ödem (infeksiyon, kalp yetmezliği, şok)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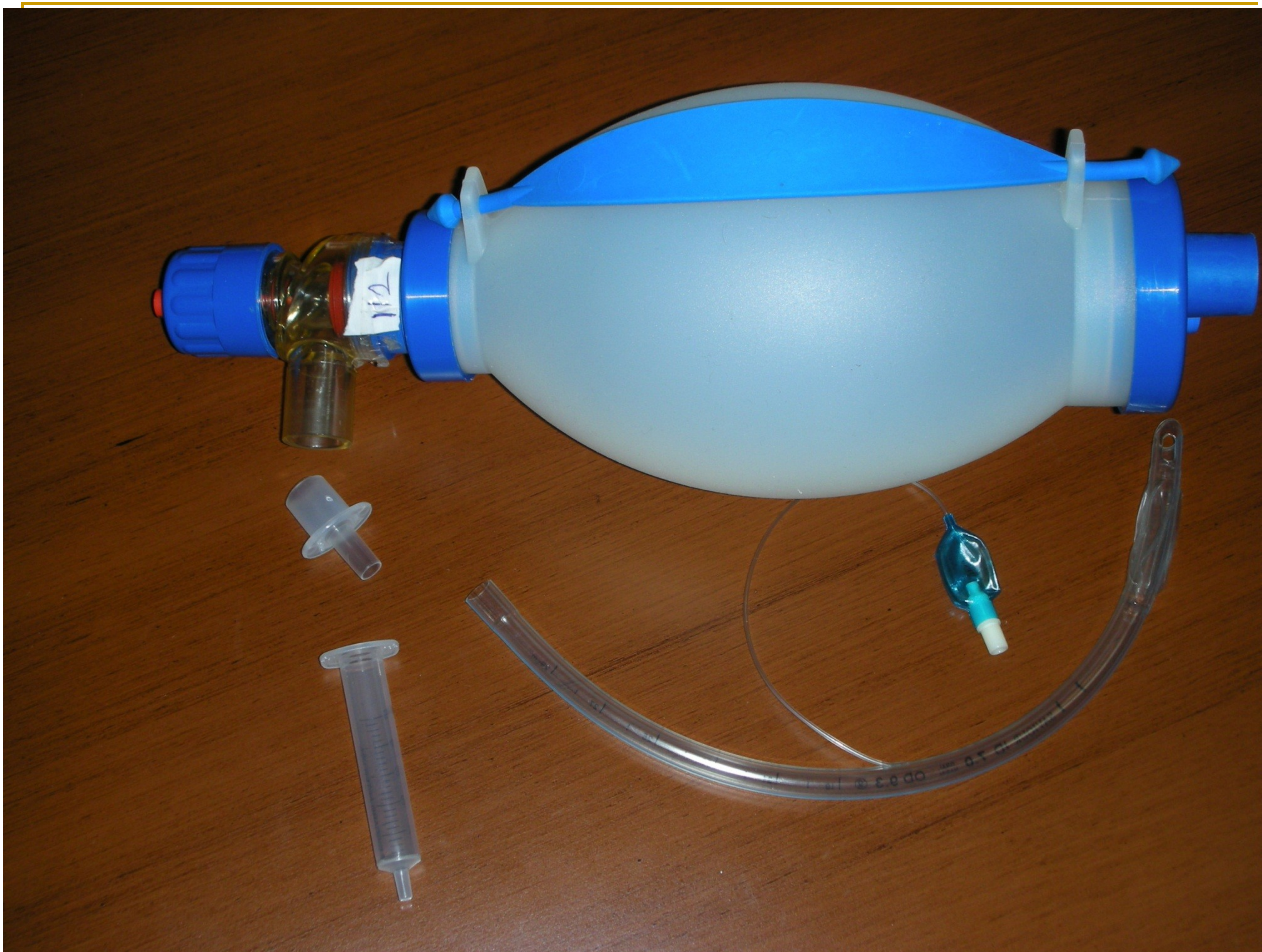
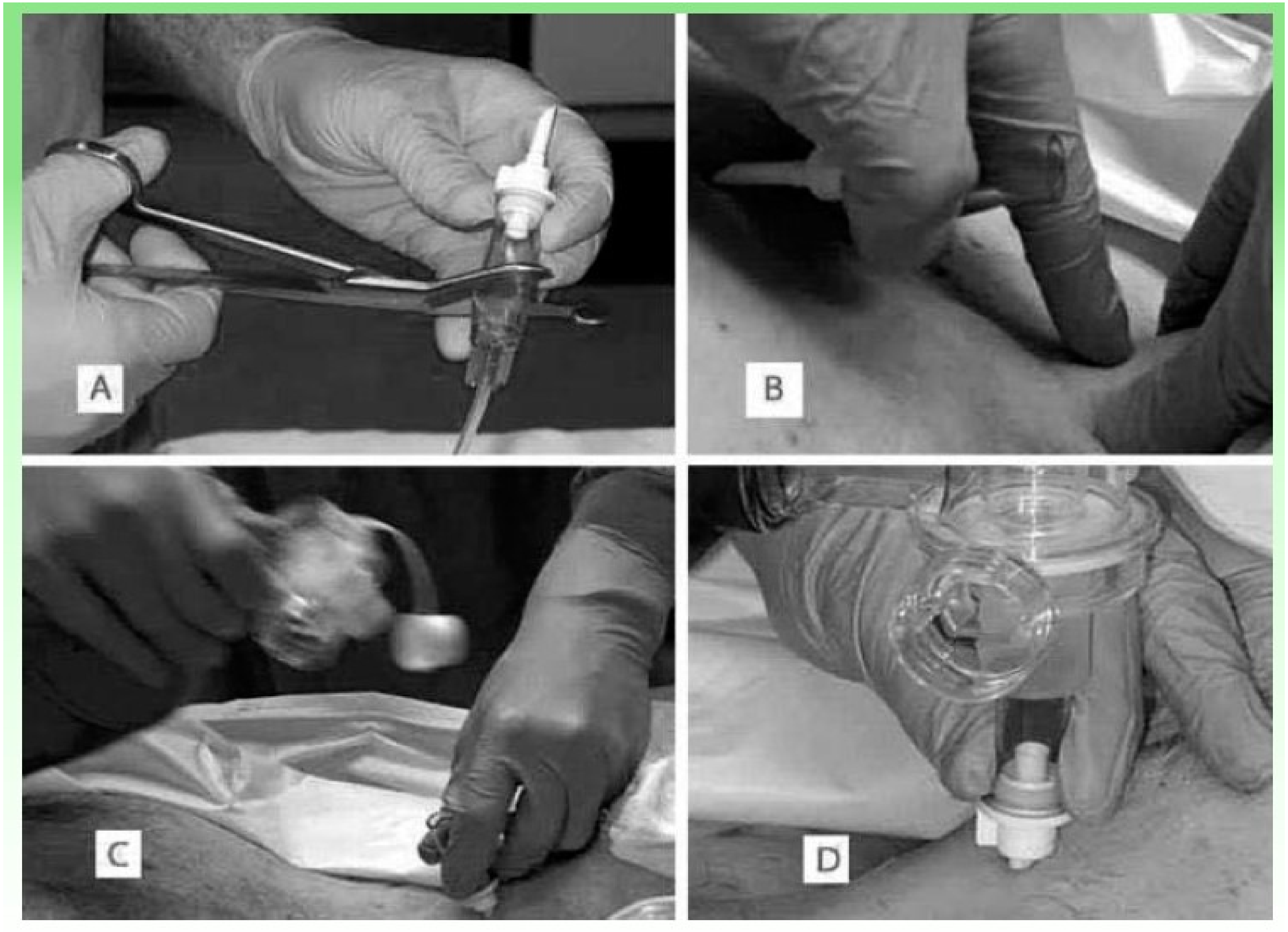
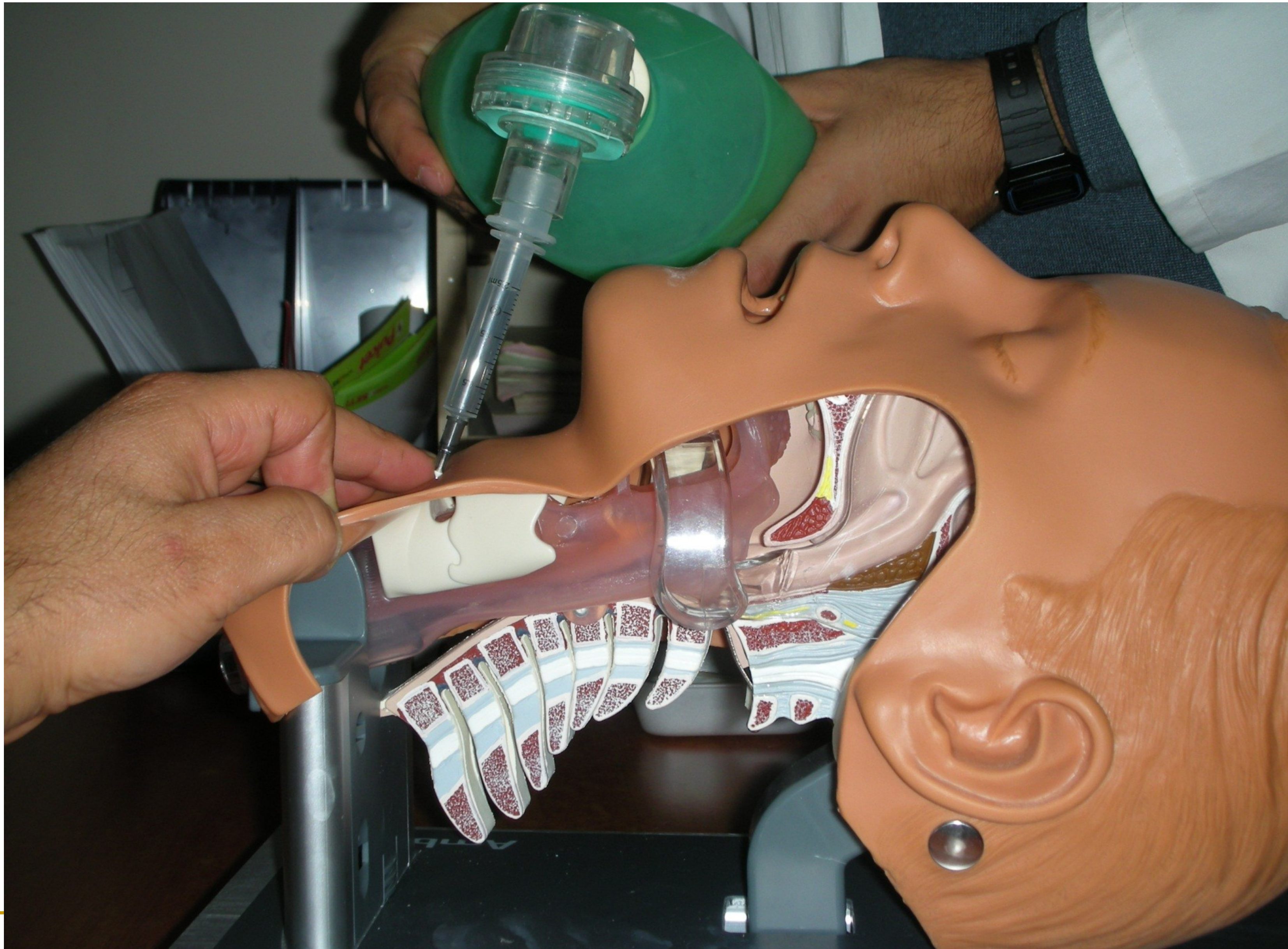
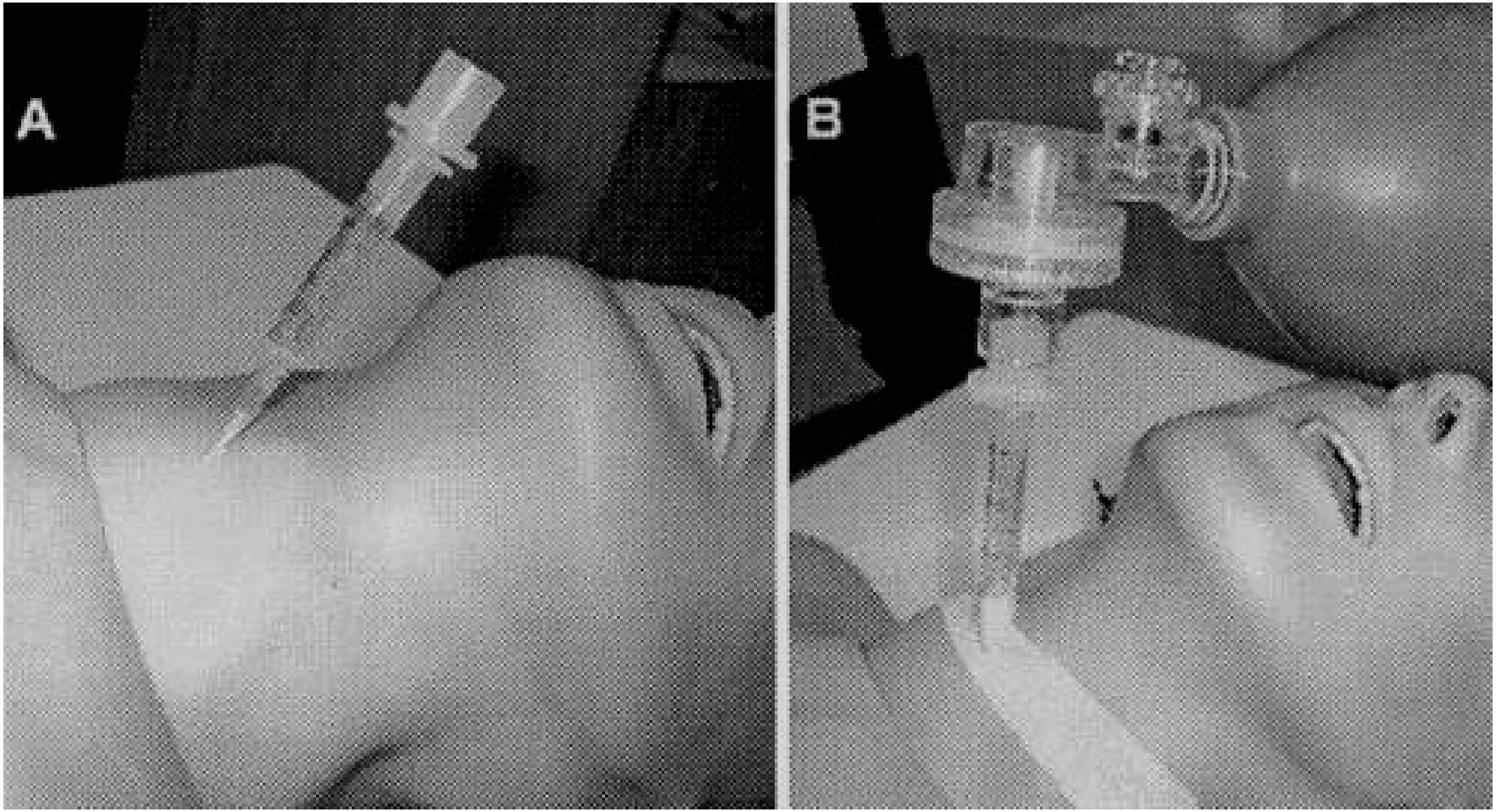
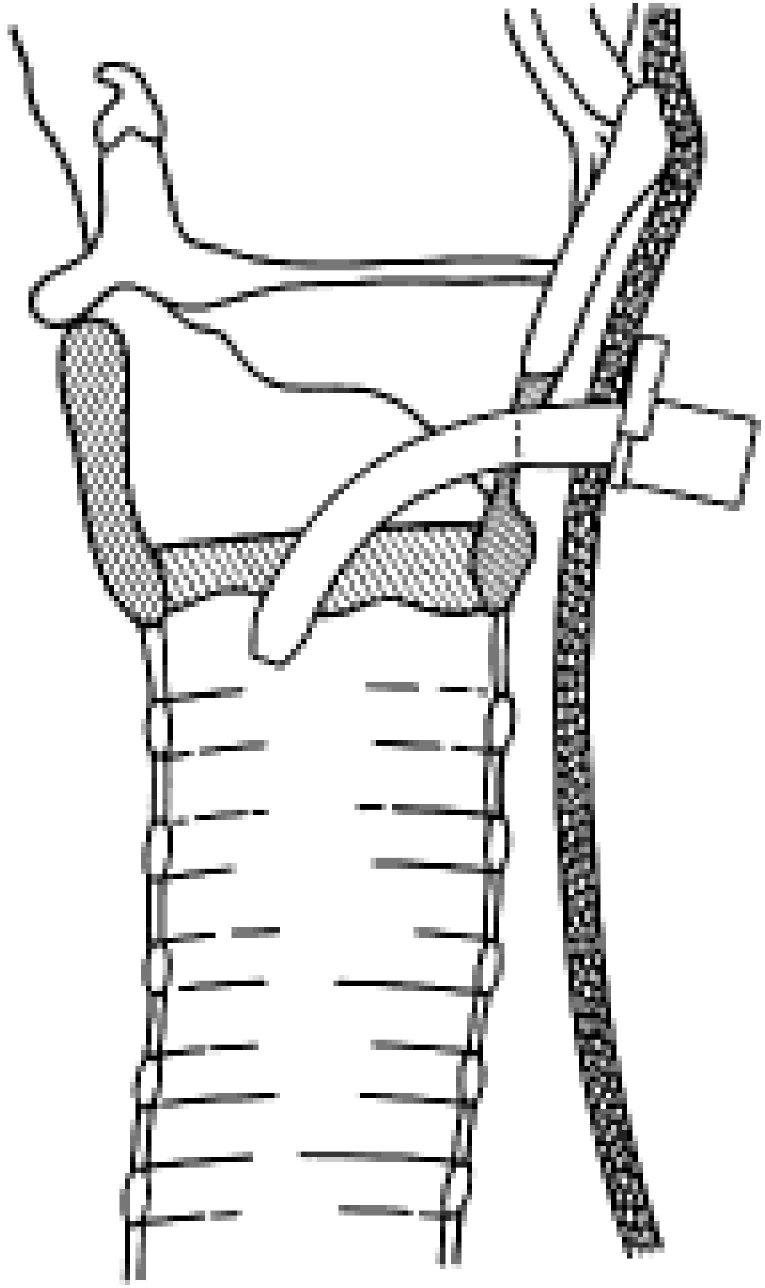
ebaumsworld.com

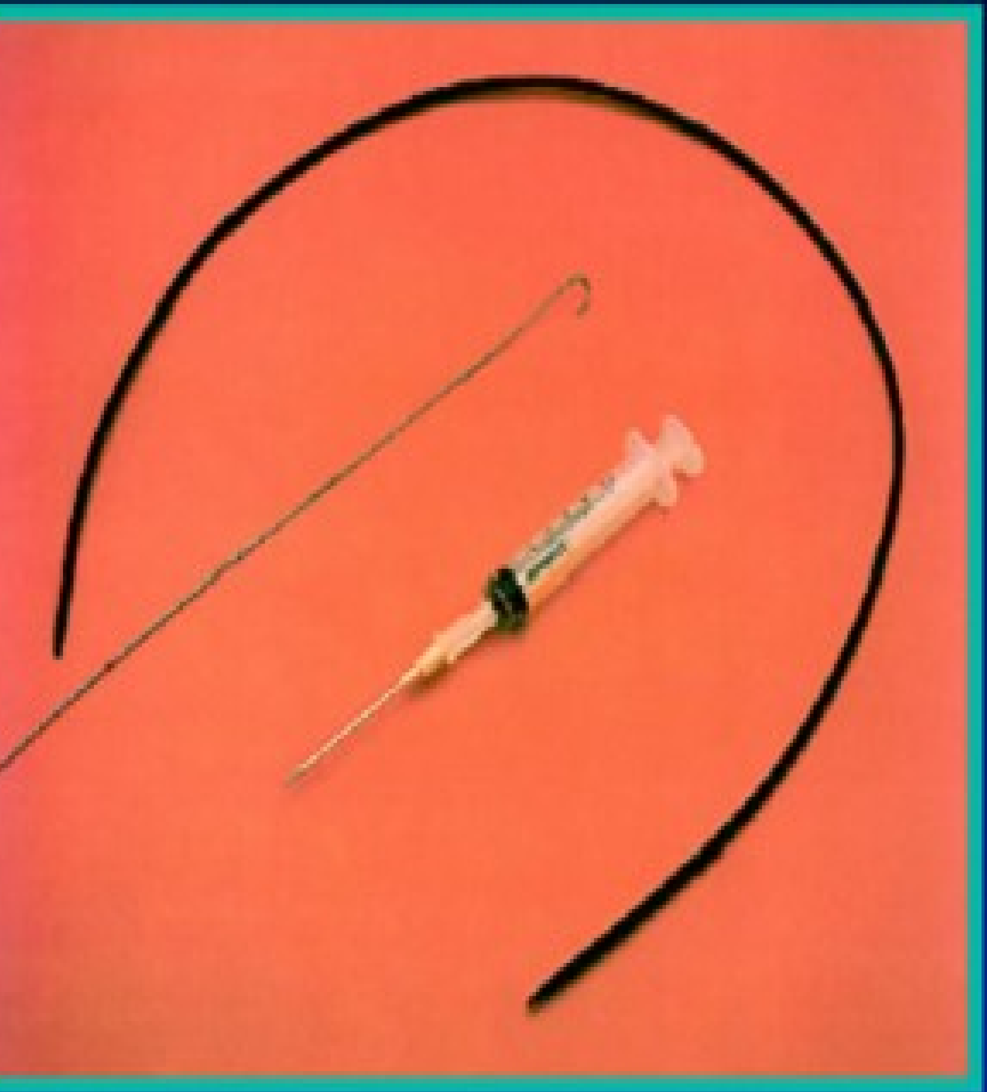


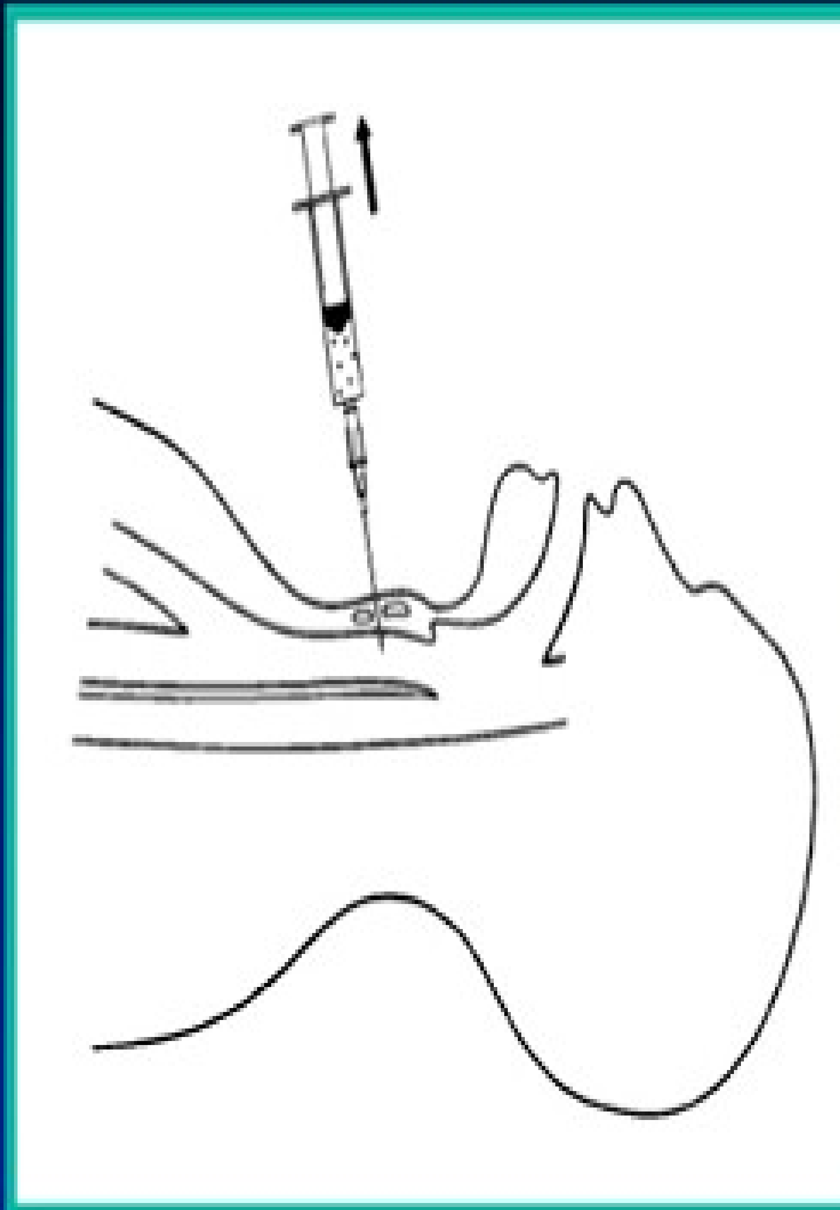

A
B
C
D

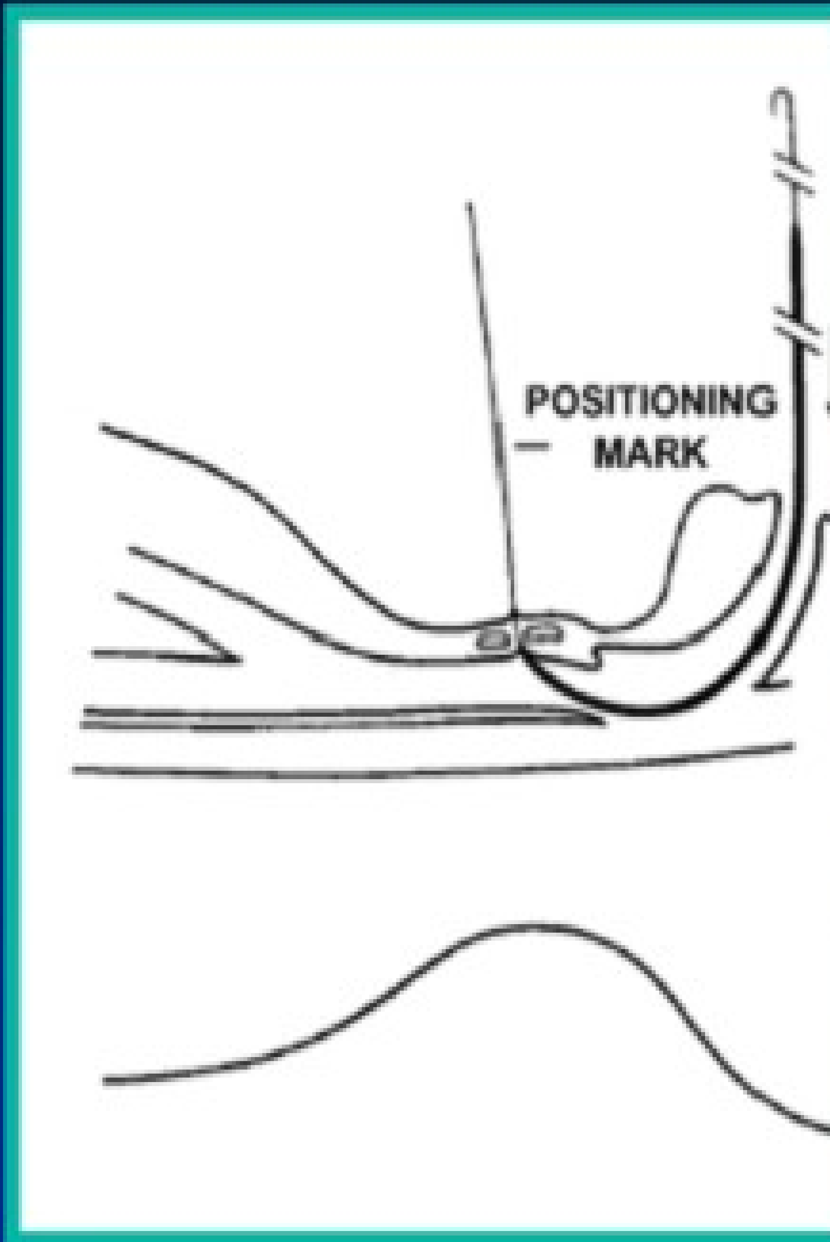


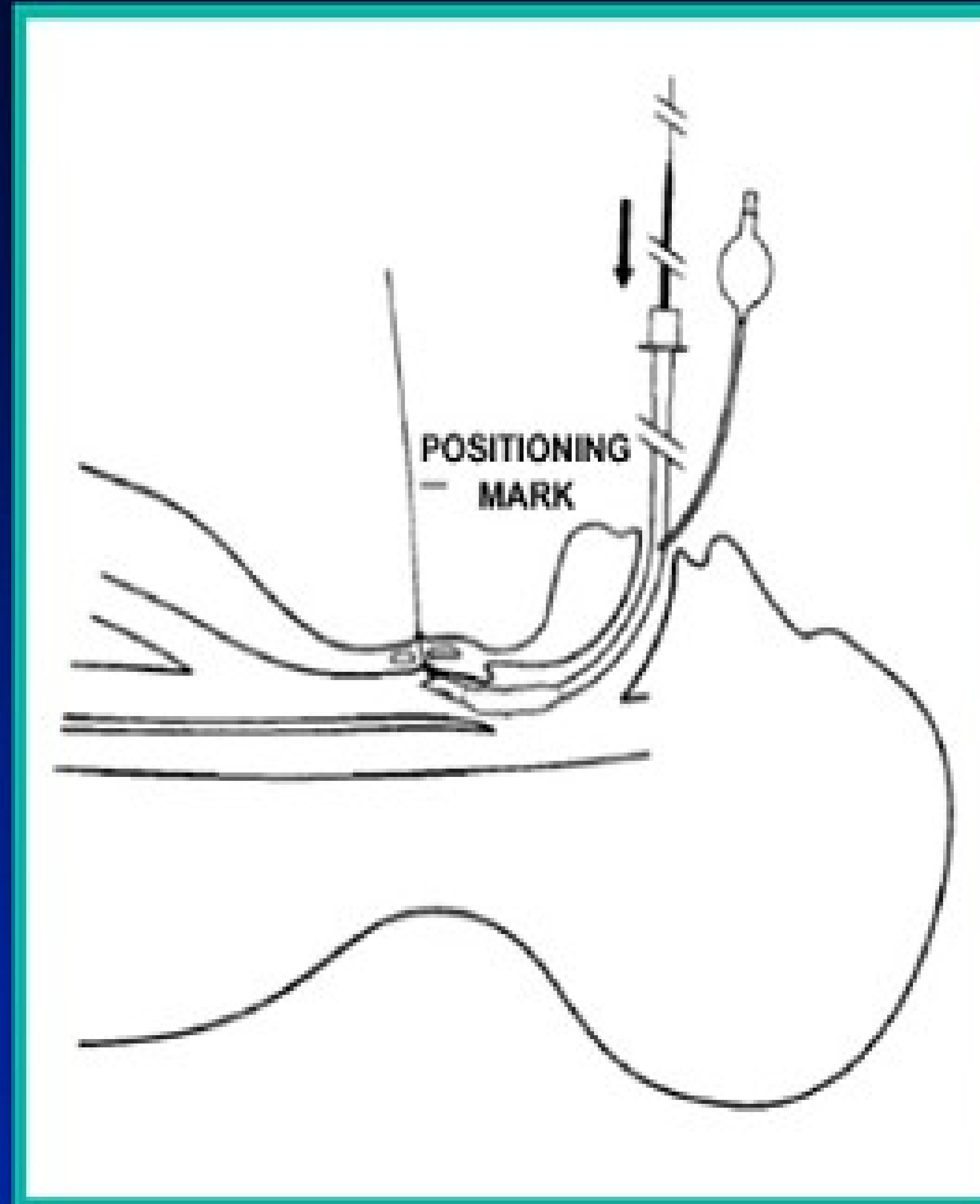

A
B

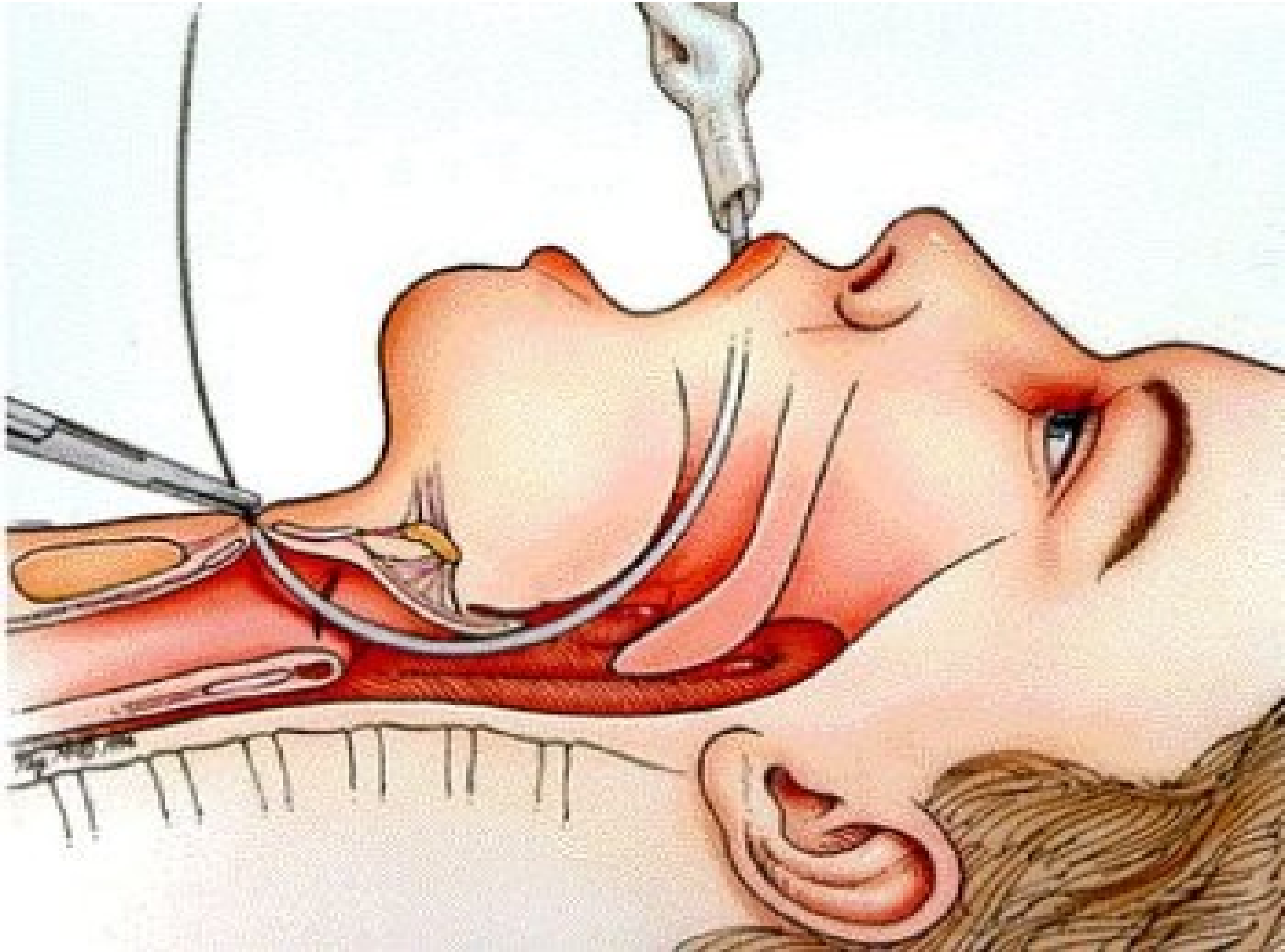


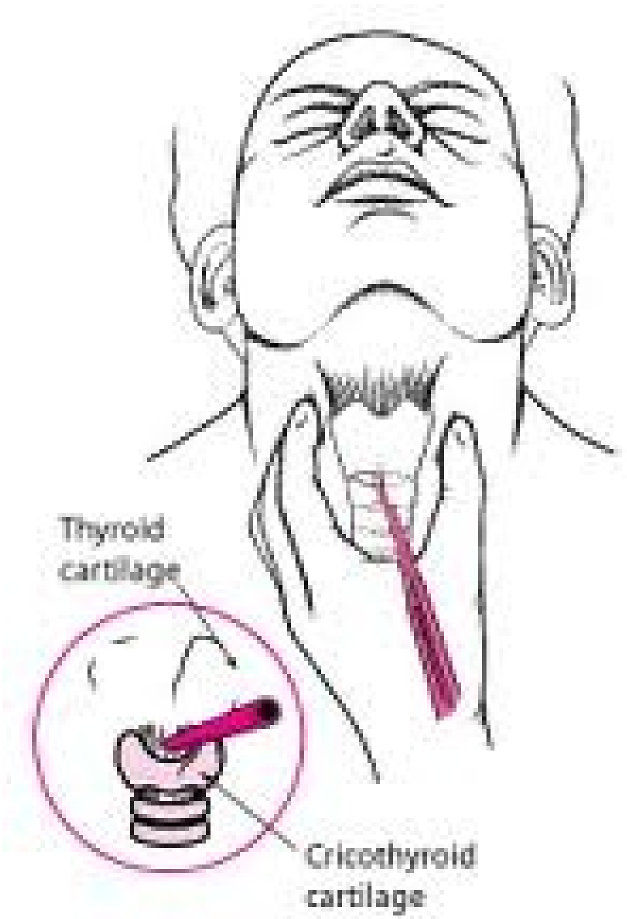


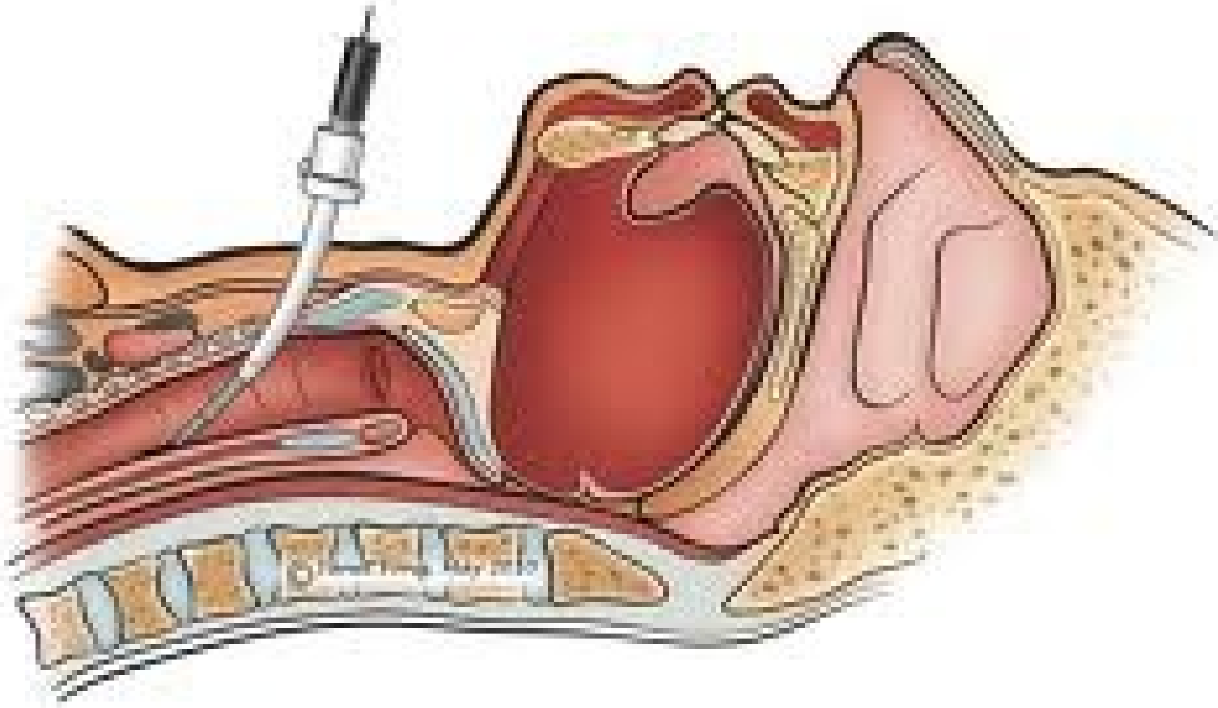


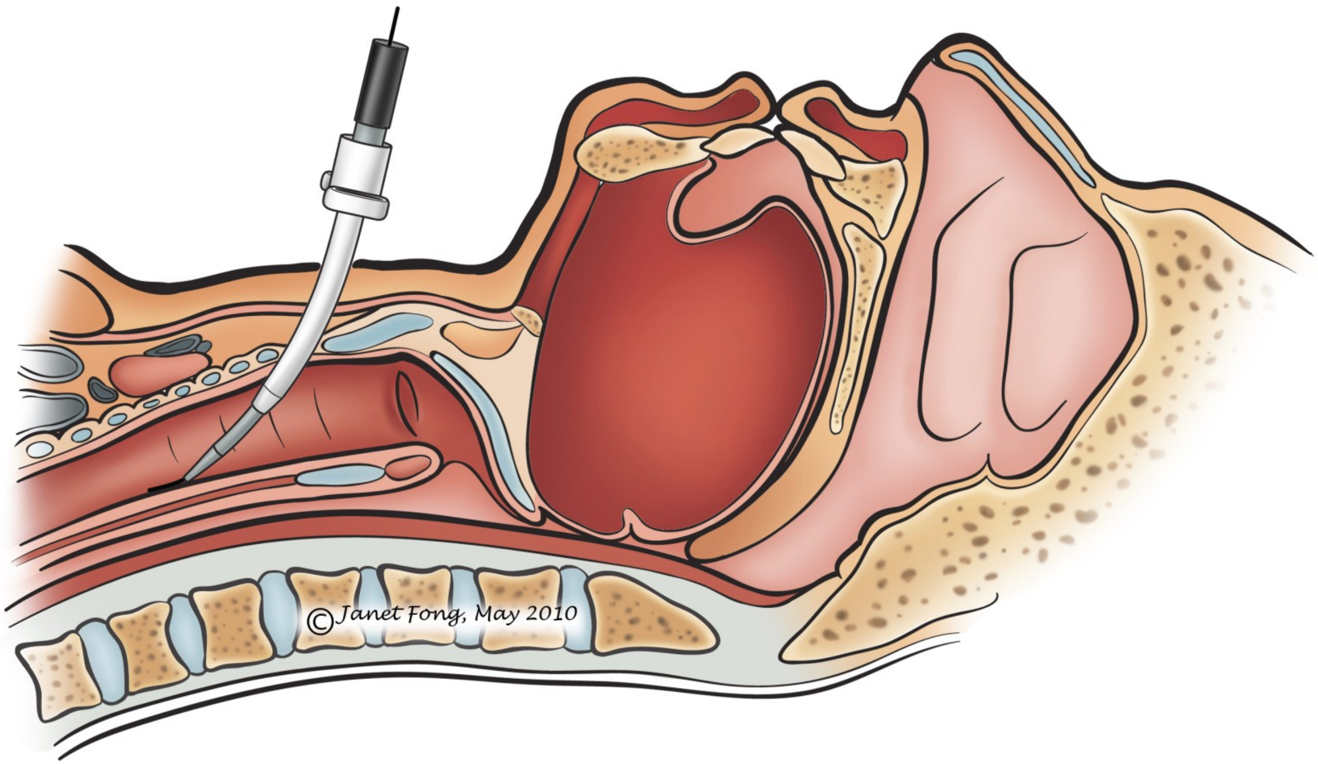

POSITIONING
MARK

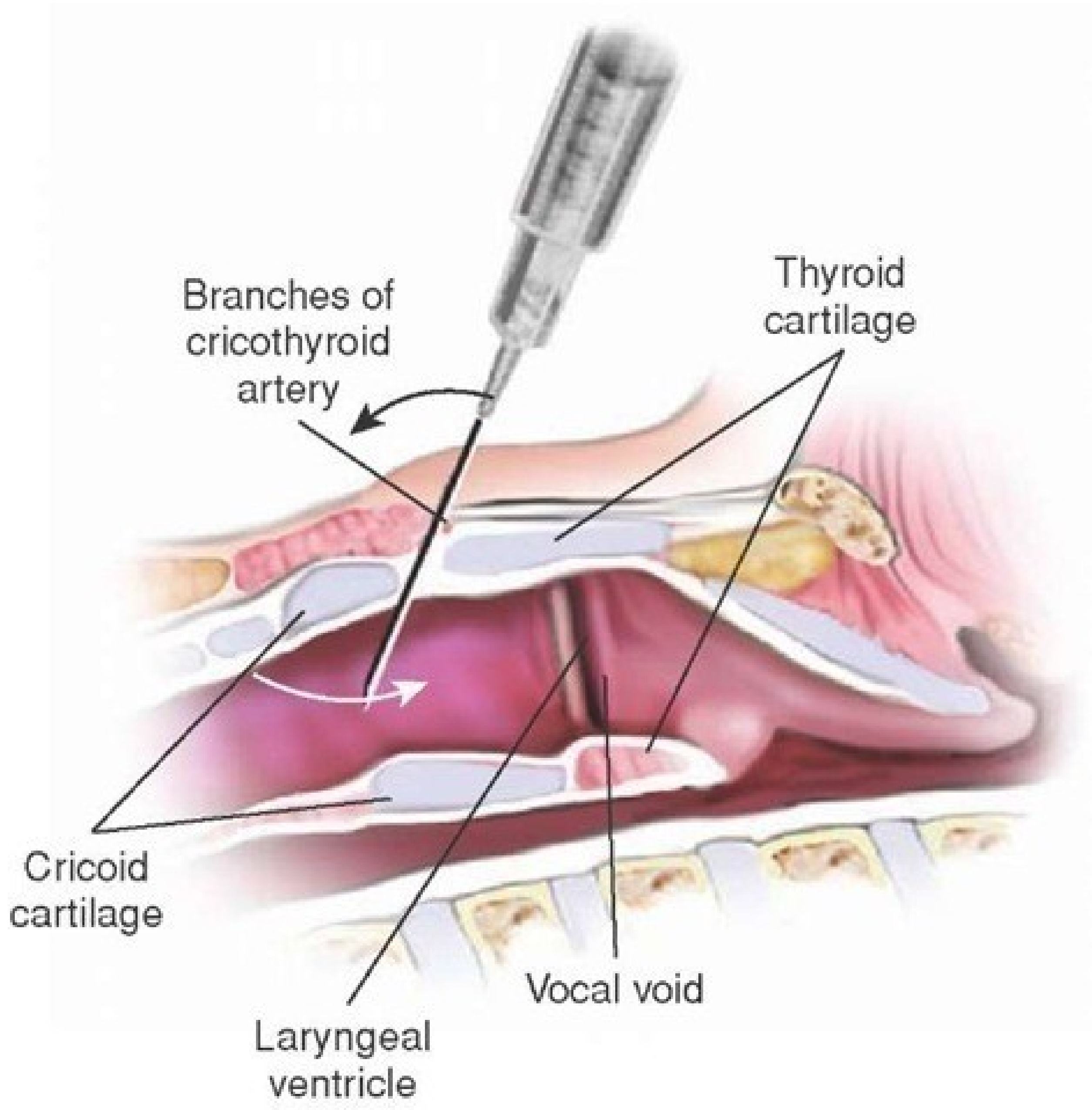

POSITIONING
MARK



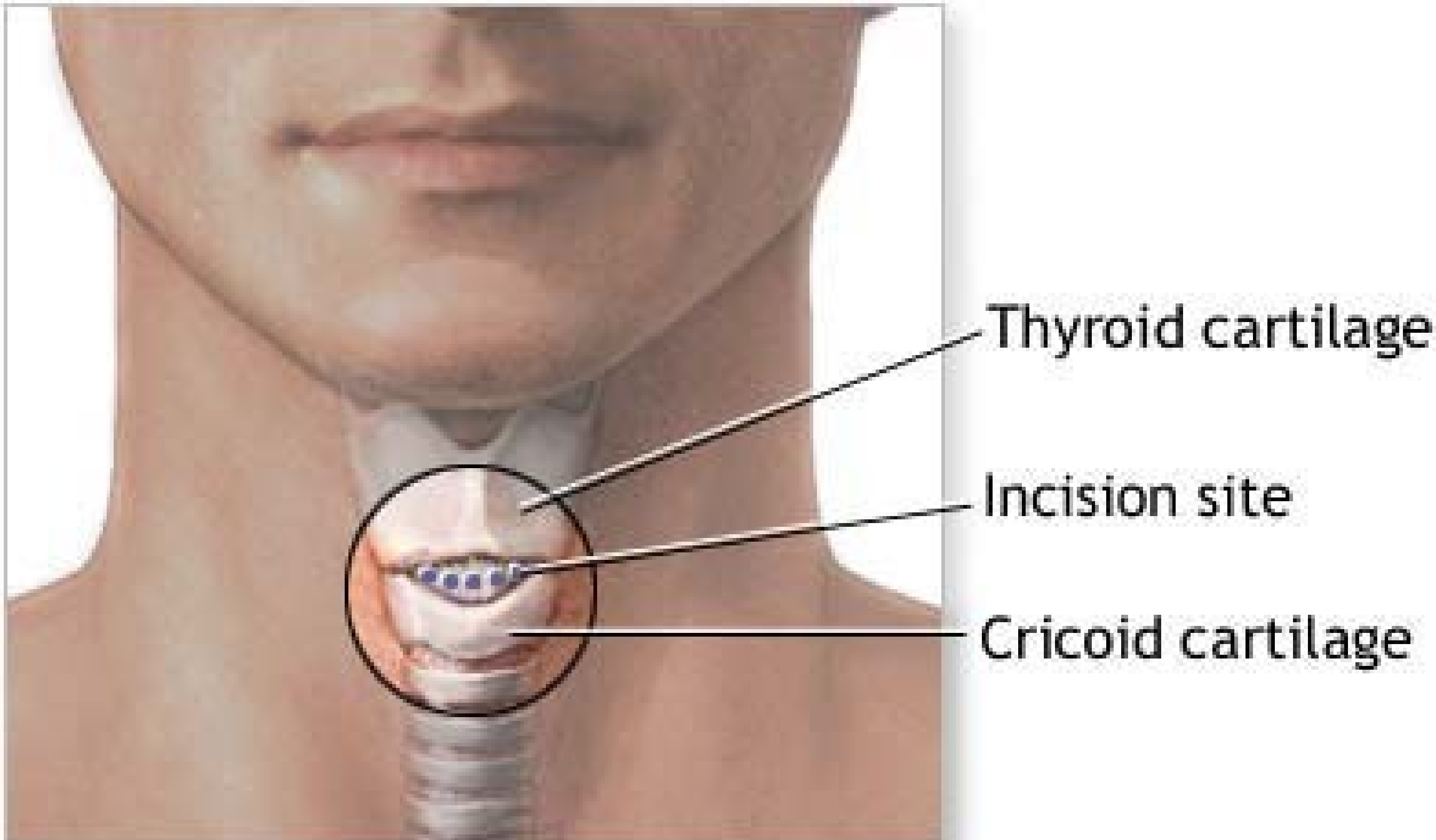

Thyroid
cartilage
Cricothyroid
cartilage



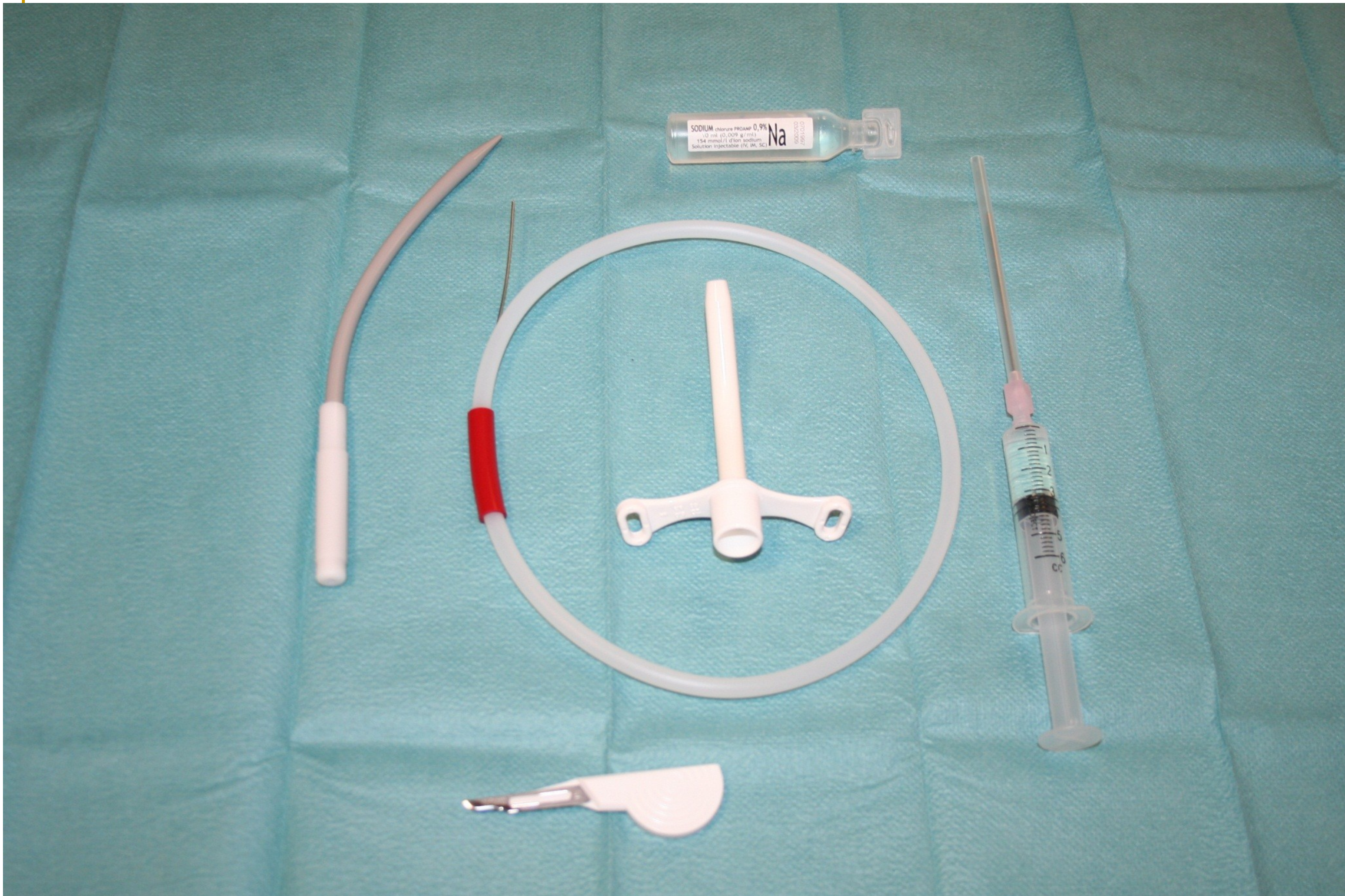

©Janet Fong, May 2010


Branches of cricothyroid artery
Thyroid cartilage
Cricoid cartilage
Vocal void
Laryngeal ventricle

Cricothyrotomy



A.D.A.M.

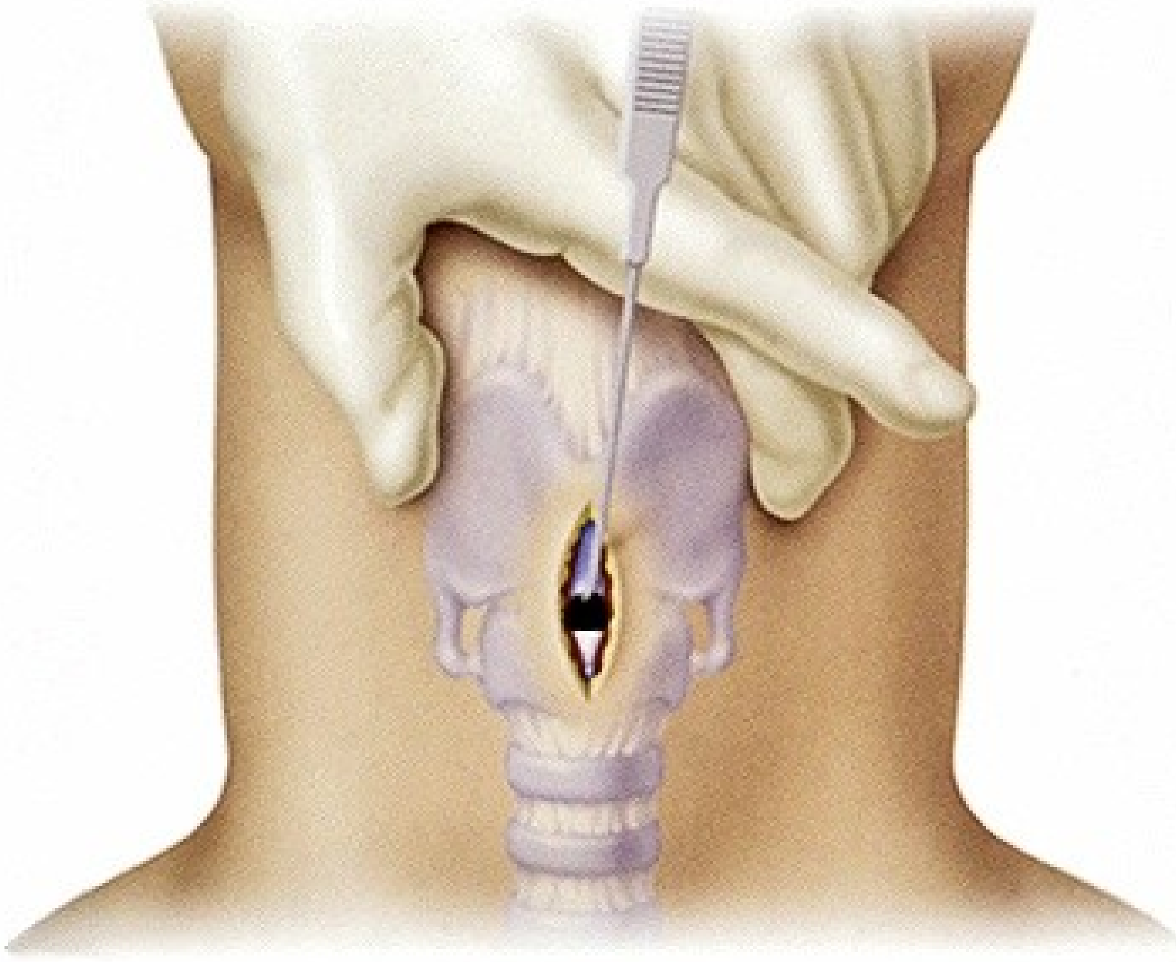

SODIUM chlorure PROAMP 0,9%
10 ml (0,009 g/ml)
154 mmol/l d'ion sodium
Solution injectable (IV, IM, SC)
Na
07019997
03/2009

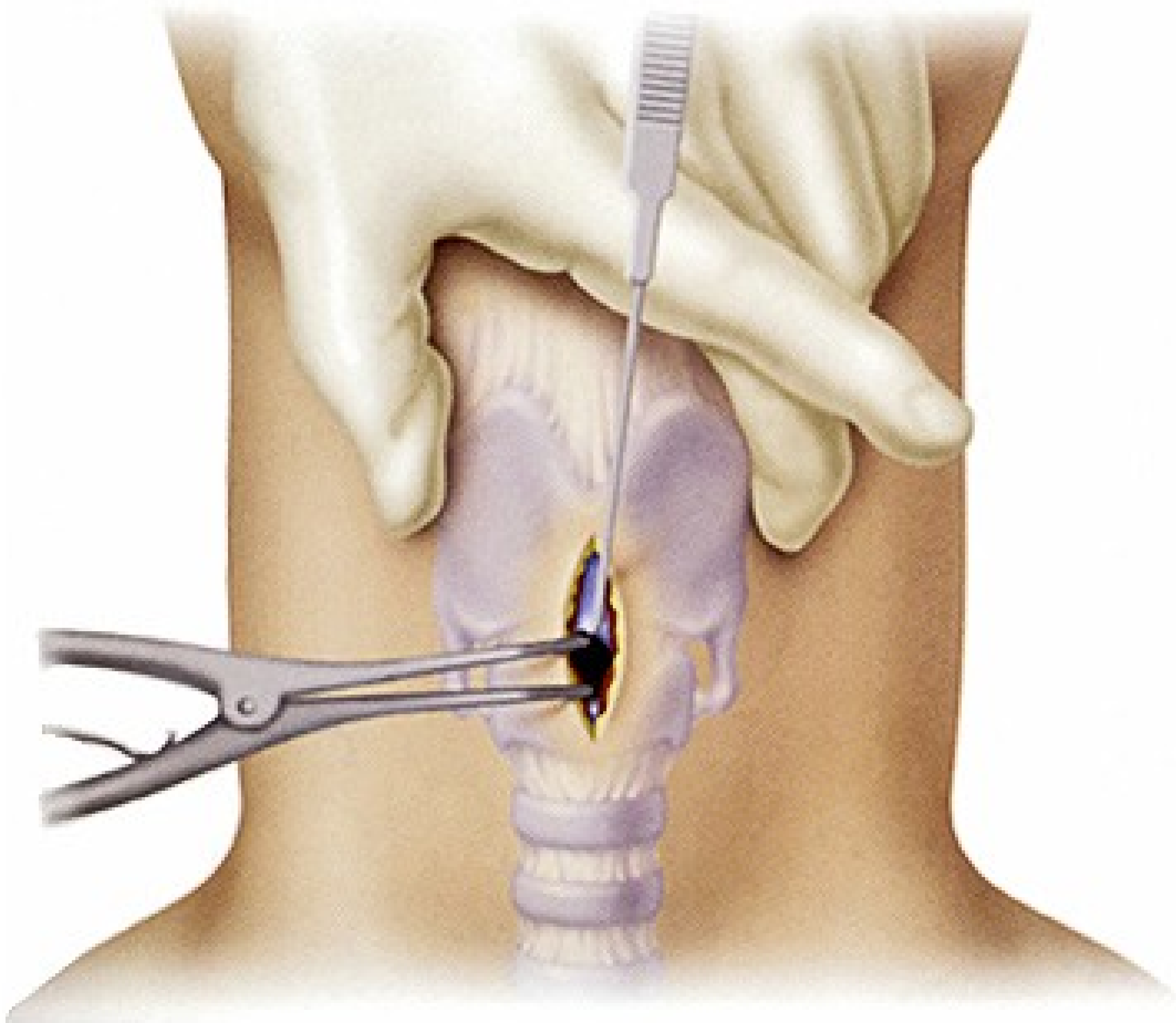

SINGLE USE ONLY
TERUMO
6.0 ORAL/NASAL 8.0 24Fr

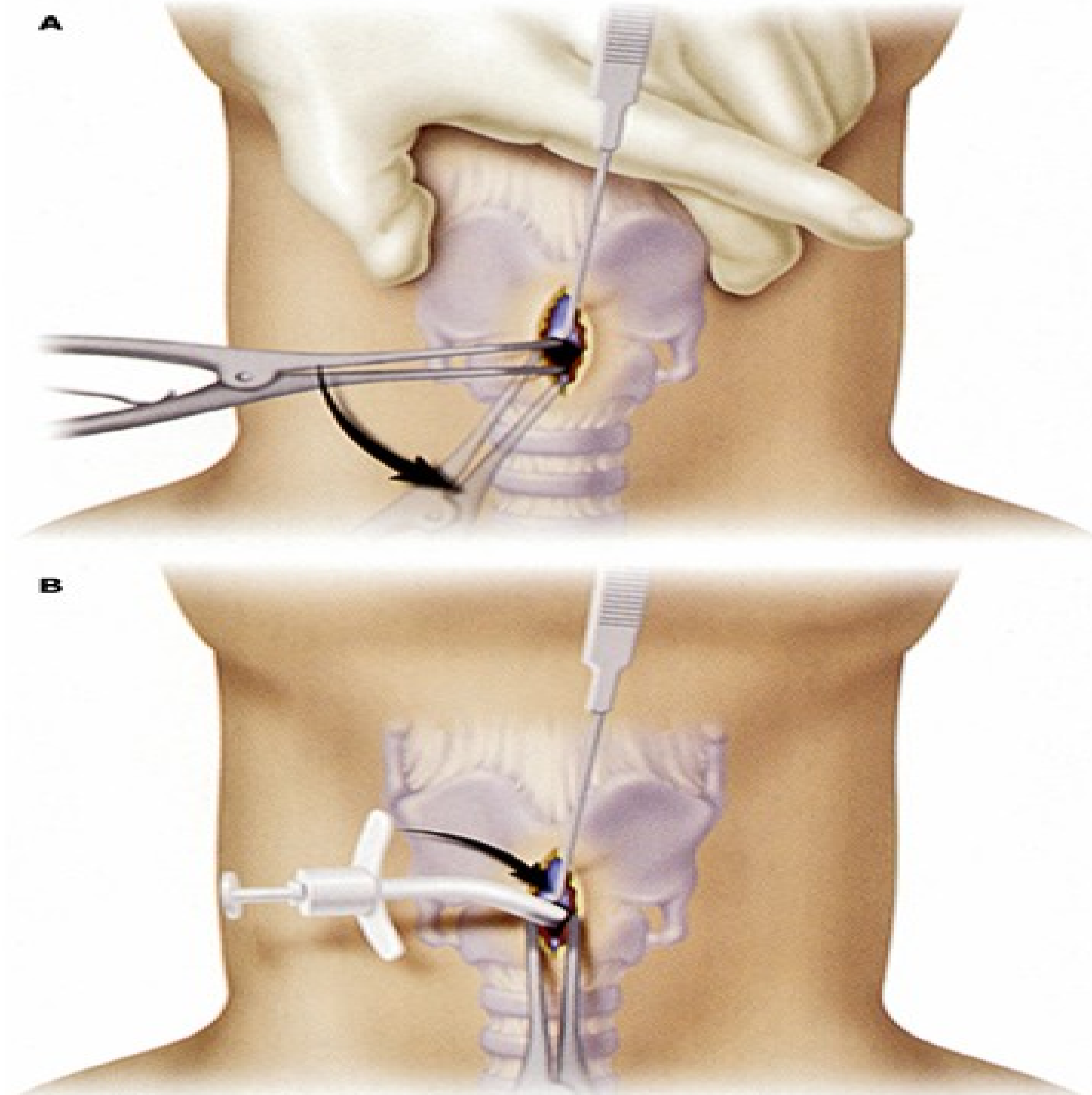


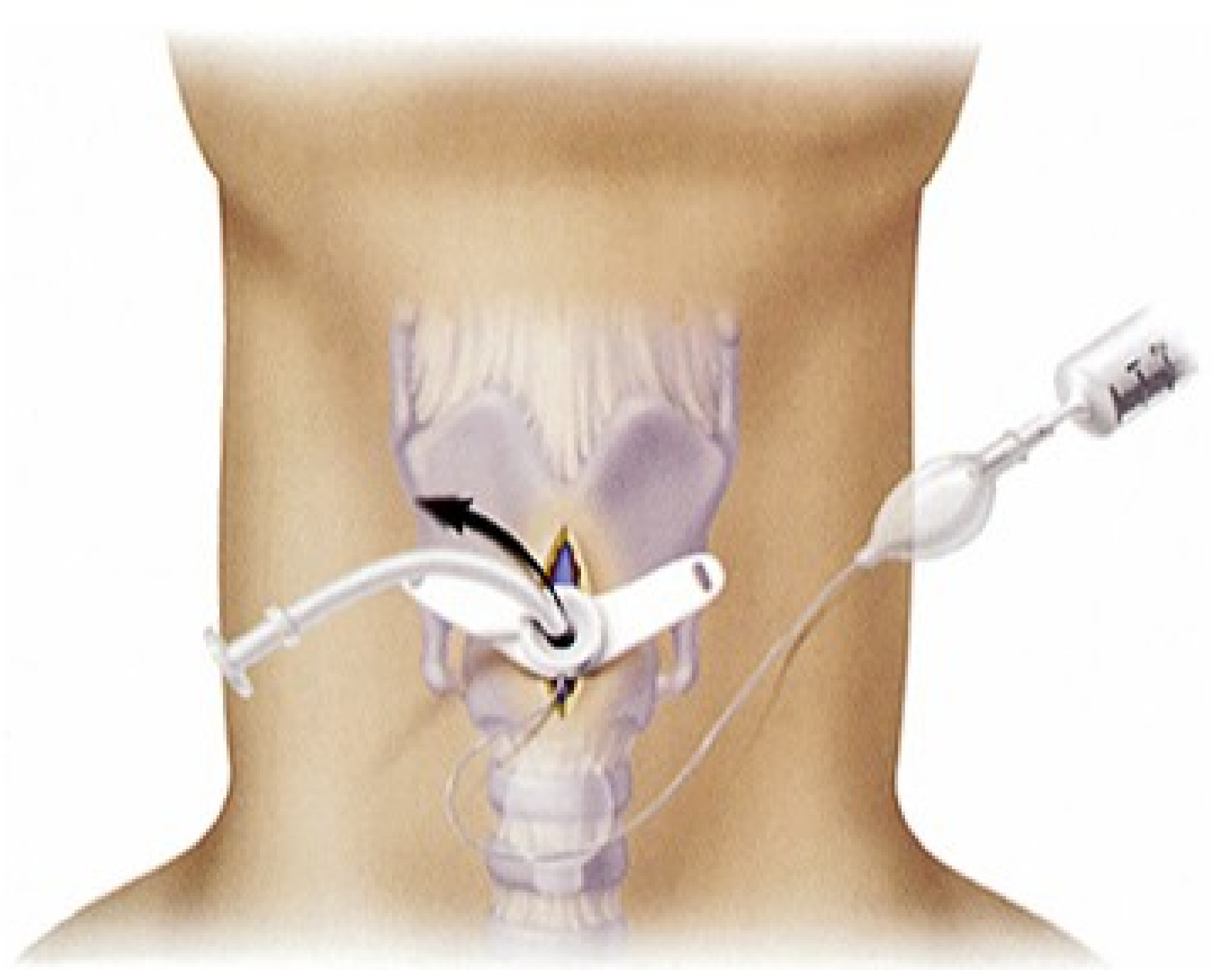

Equipment

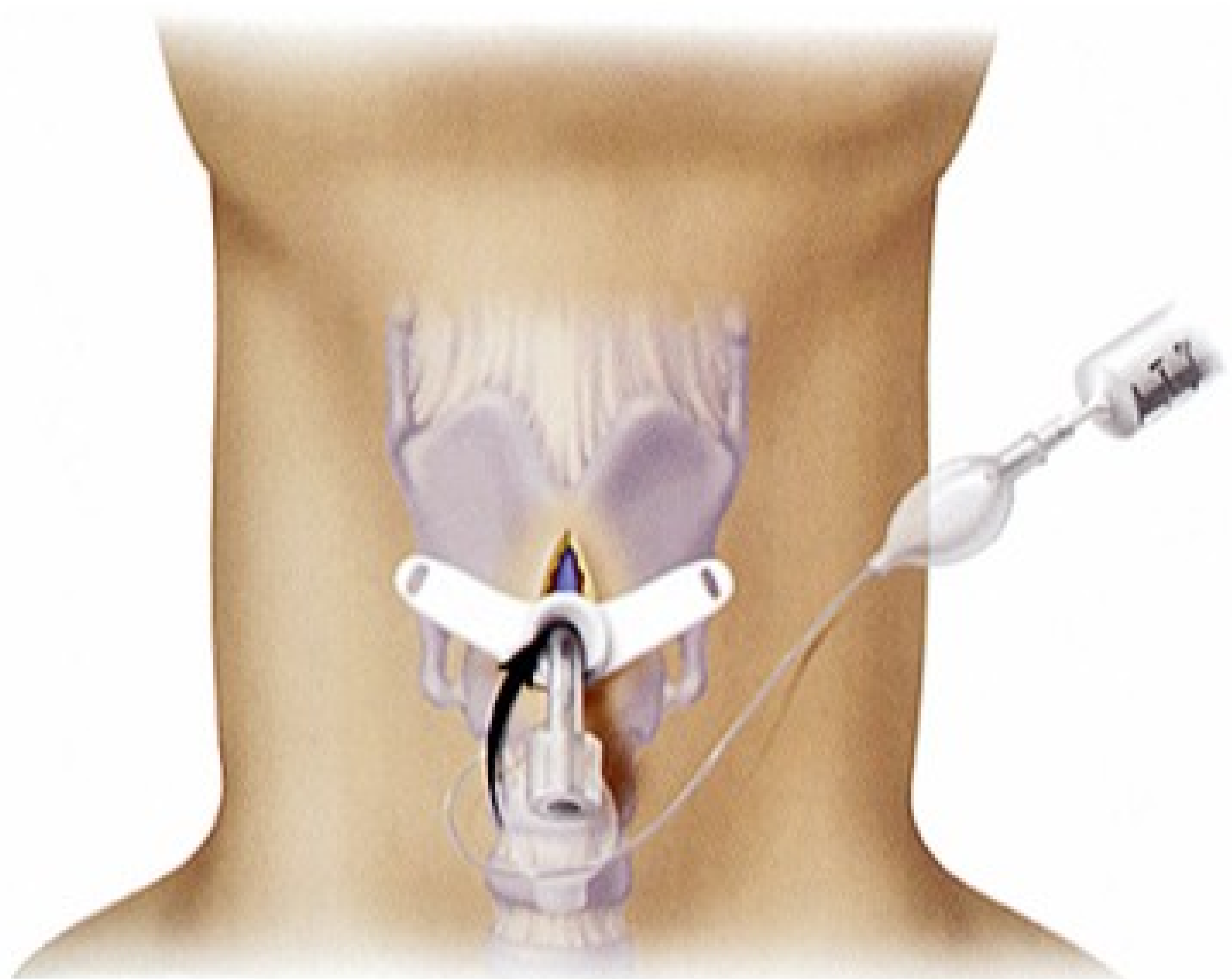
- **A.** Scalpel-No. 11 blade
- **B.** Trousseau dilator
- **C.** Tracheal hook
- **D.** 10-cc syringe
- **E.** Tracheostomy tube (No. 4 or 6 Shiley, cuffed)
- **F.** Obturator
- **G.** Inner cannula
- **H.** Circumferential tie
- **I.** Bag-valve-mask and ventilator tubing

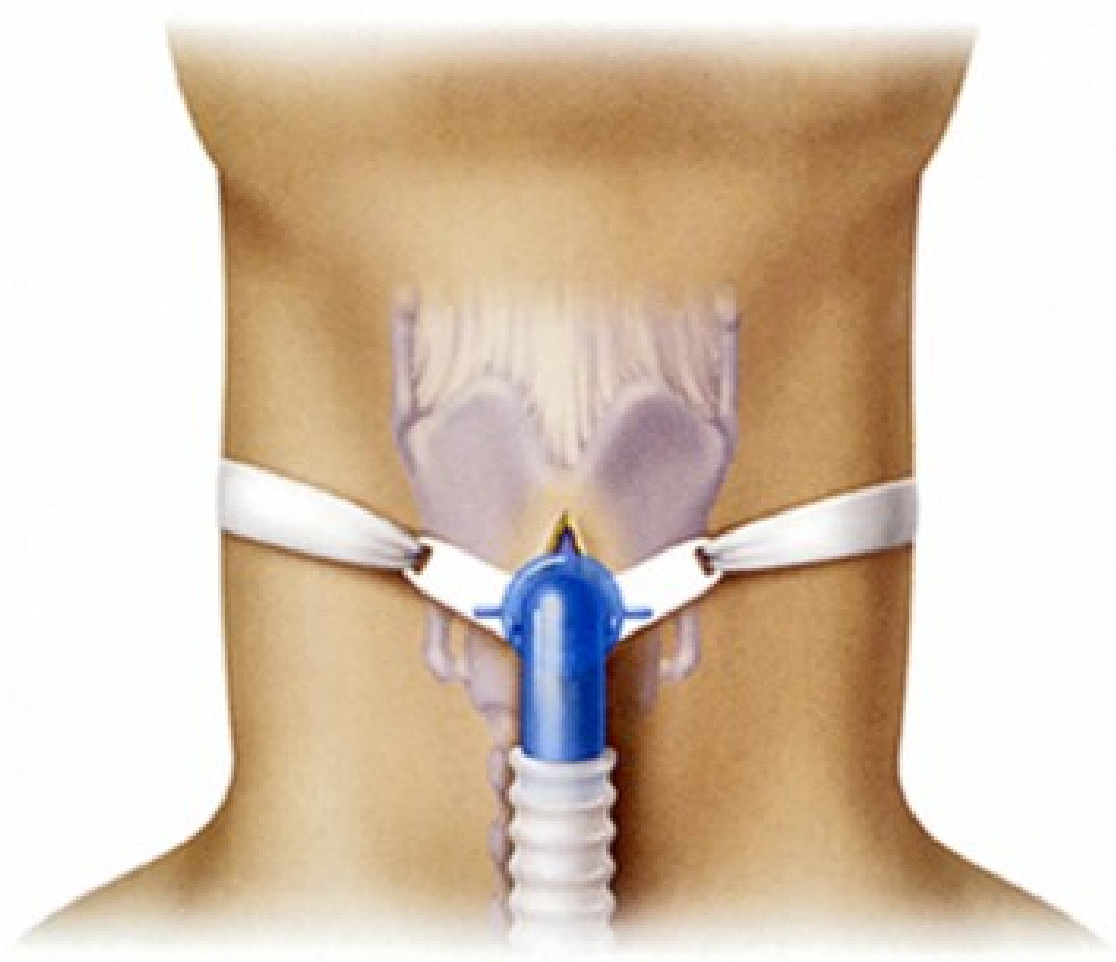





A
B



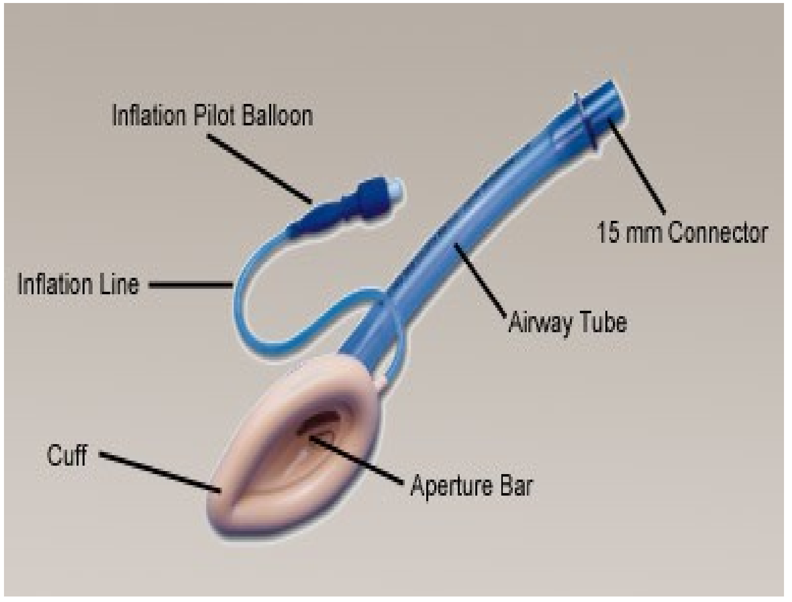


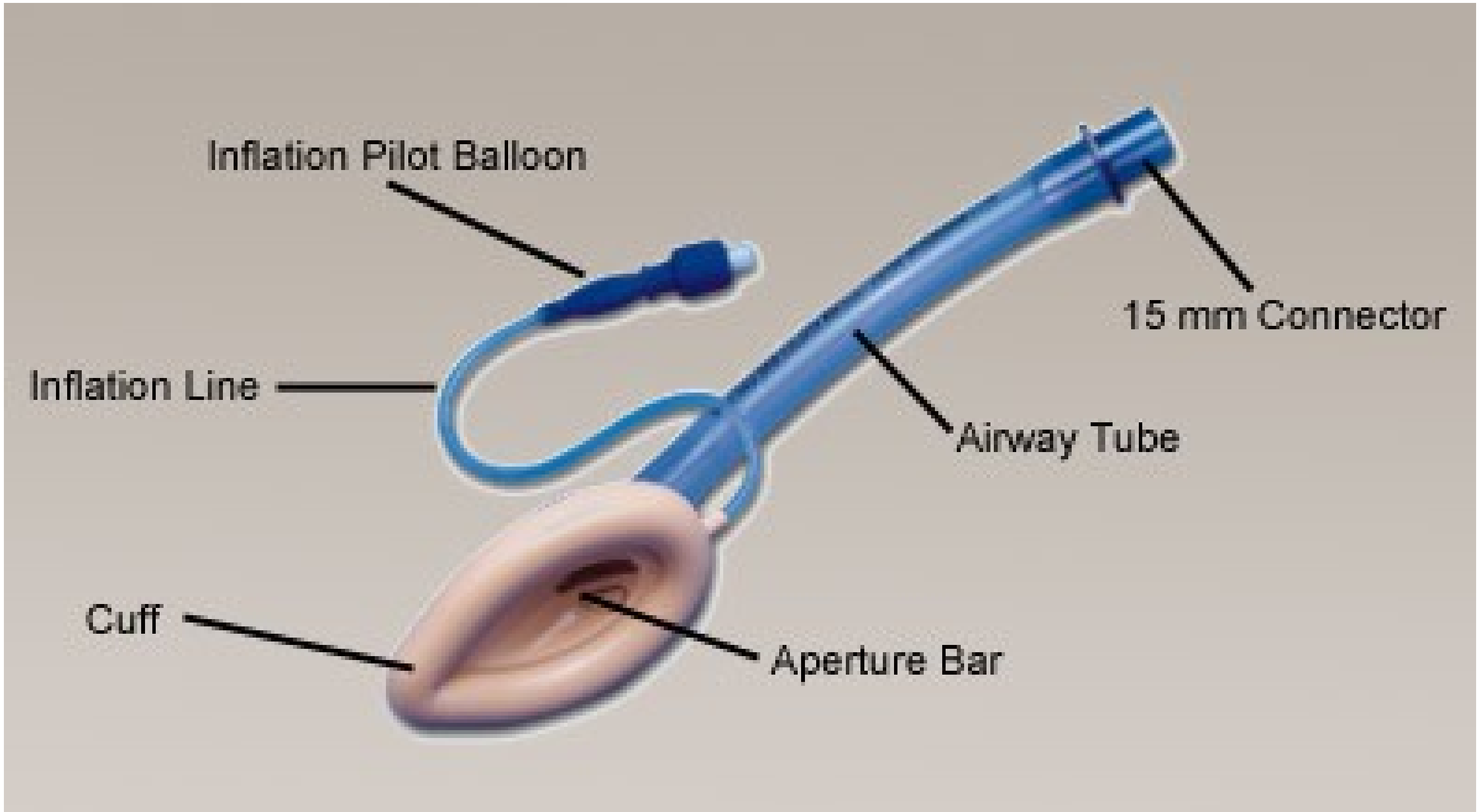


Alternative Methods

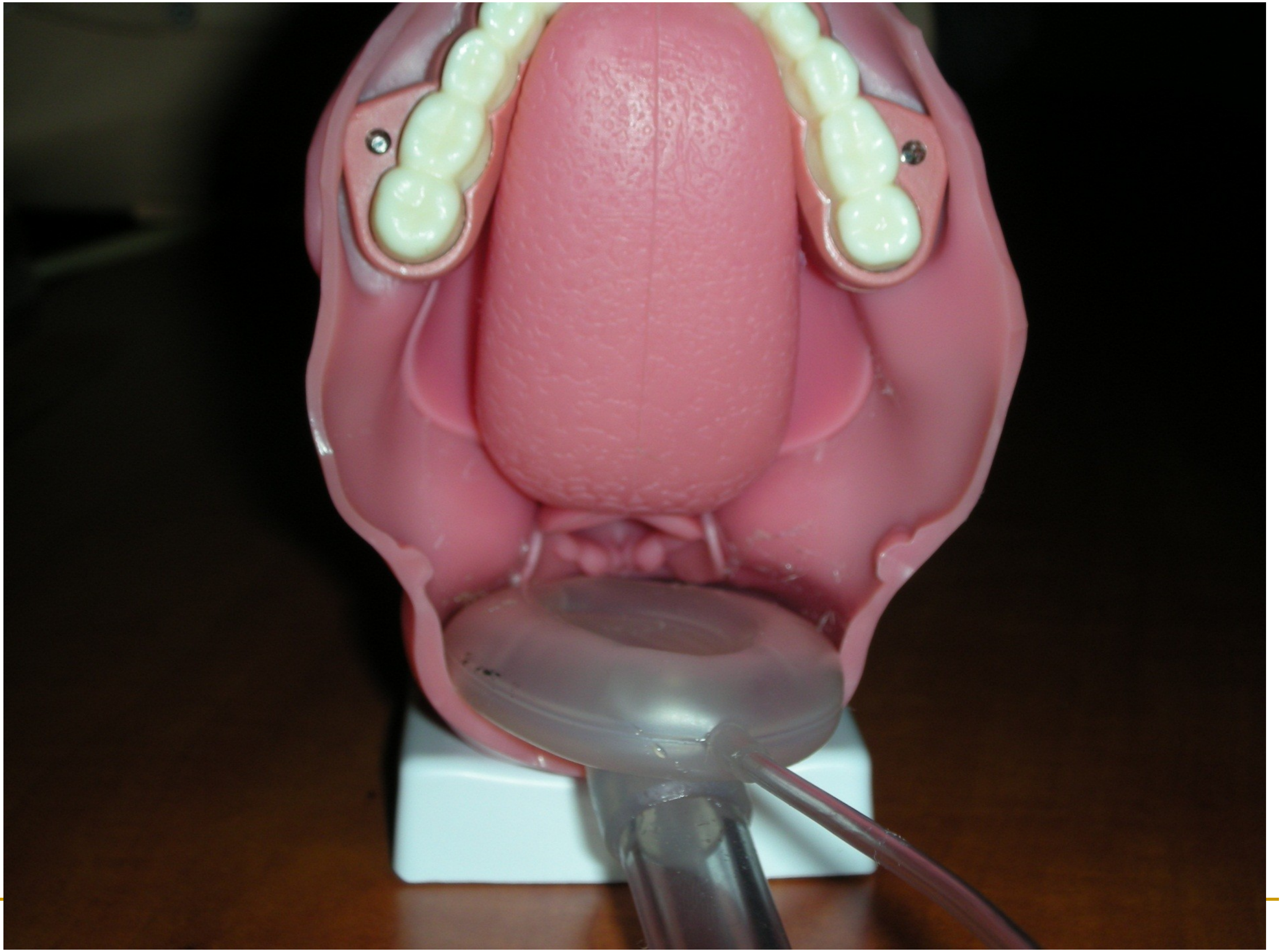
- Blind nasal intubation
  - Bleeding may cause problems with subsequent attempts.
  - Contraindicated in patients with facial trauma due to cribiform plate disruption or CSF leak
  - Avoid in immune suppressed (i.e., bone marrow transplant)
- Eschmann stylet
- Fiber optic bronchoscopic intubation
  - Awake vs. asleep
- Laryngeal mask airway
  - Allows ventilation while bridging to more definitive airway
- Light wand
- Retrograde intubation
  - Through cricothyrotomy
- Surgical tracheostomy
- Combitube

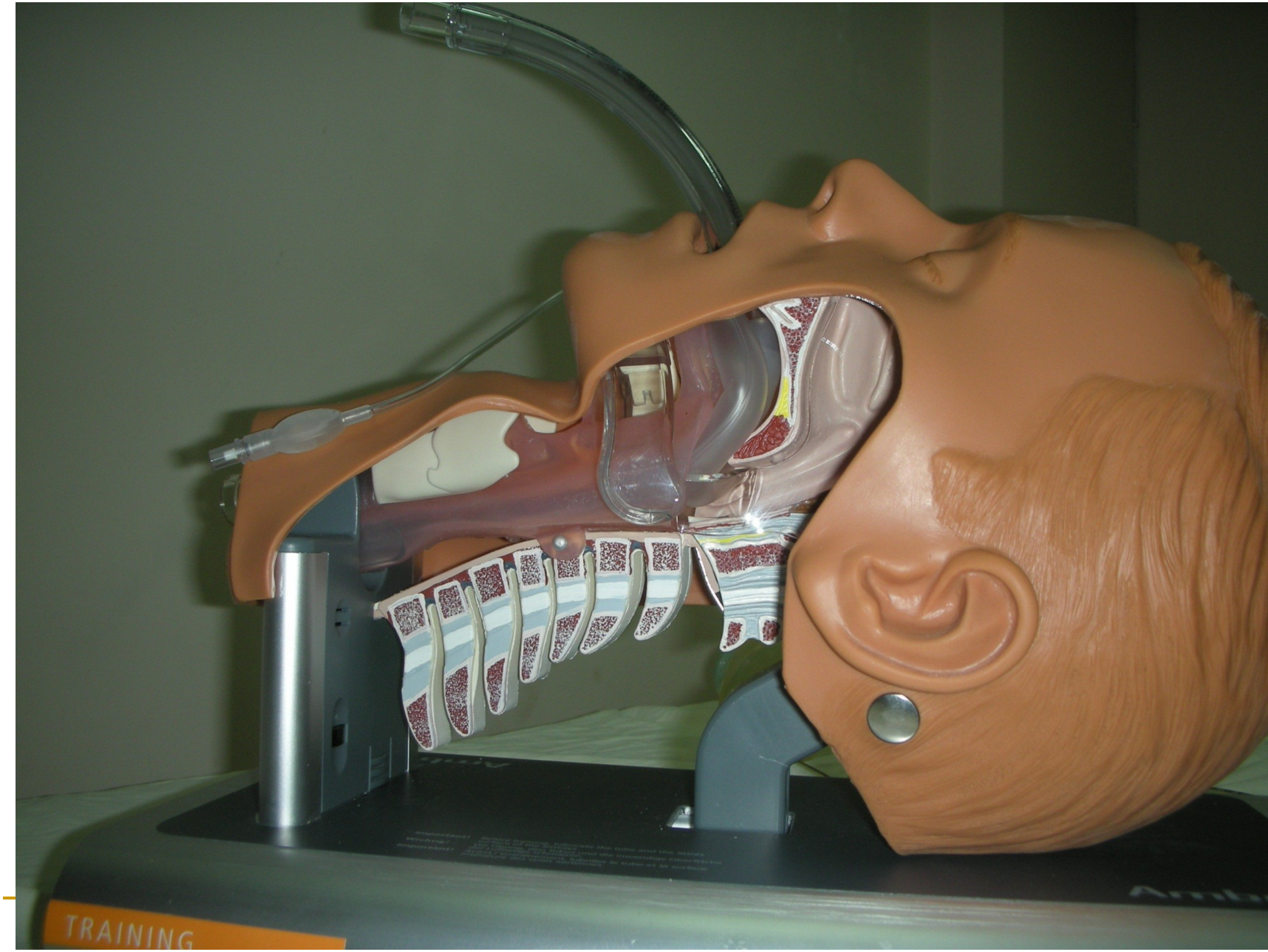
Larengeal Maske Airway(LMA)




Inflation Pilot Balloon
15 mm Connector
Inflation Line
Airway Tube
Cuff
Aperture Bar


Ambu
TRAINING




TRAINING


TRAINING
Ambu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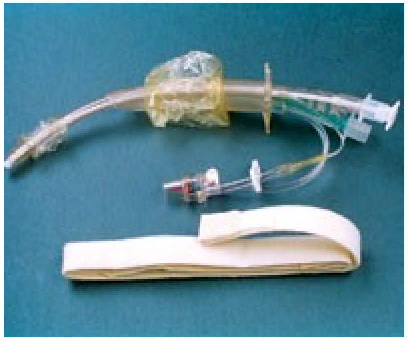
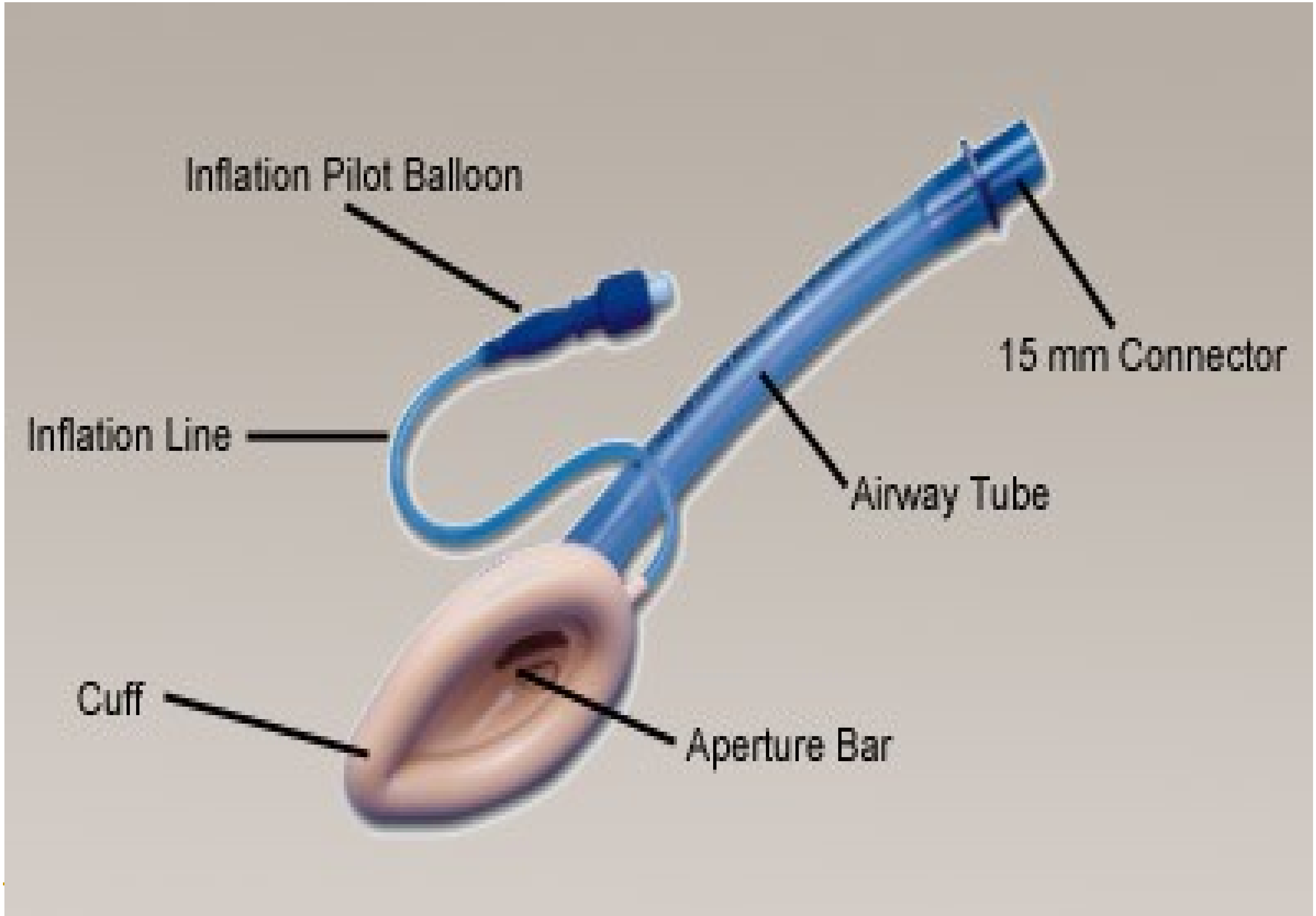
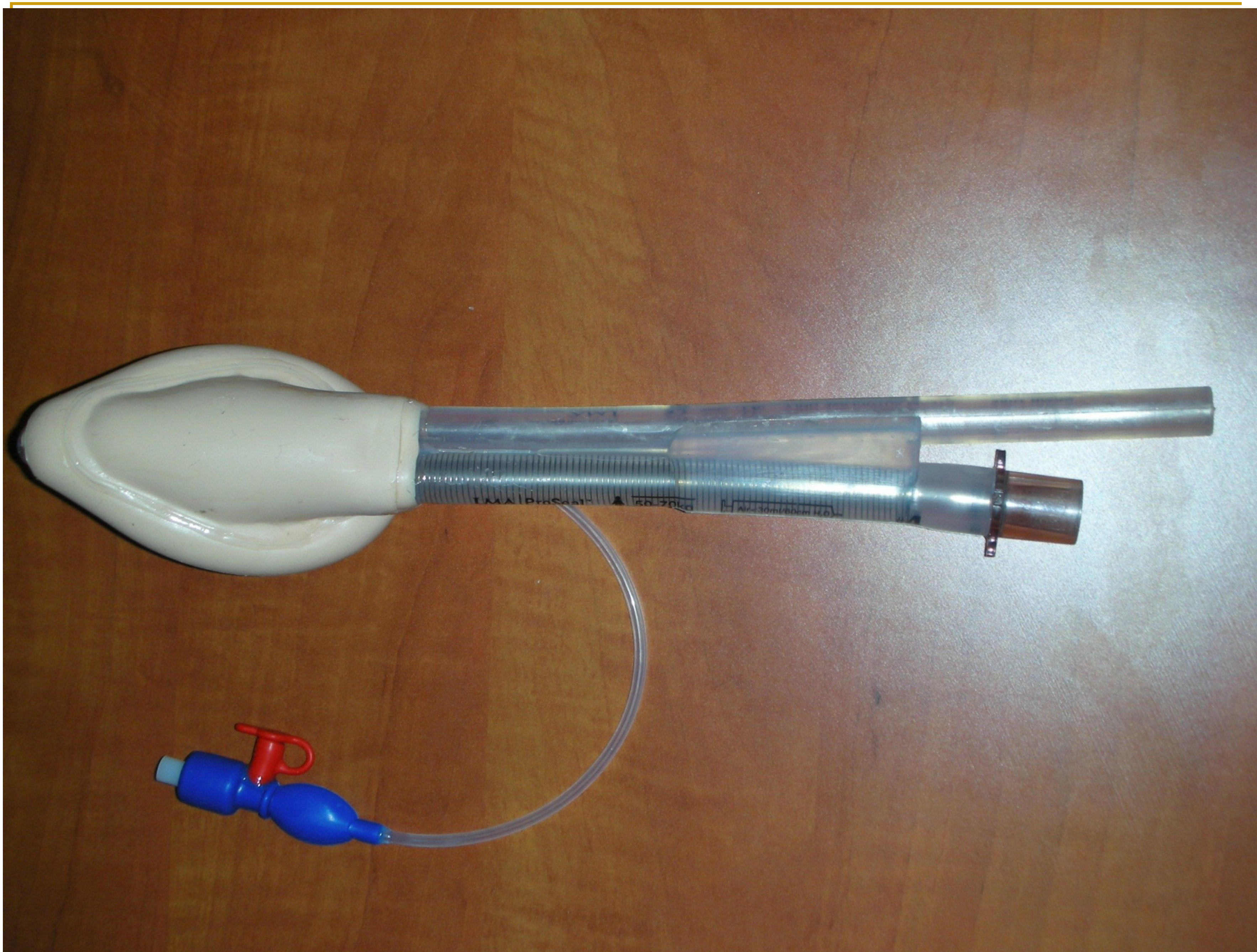
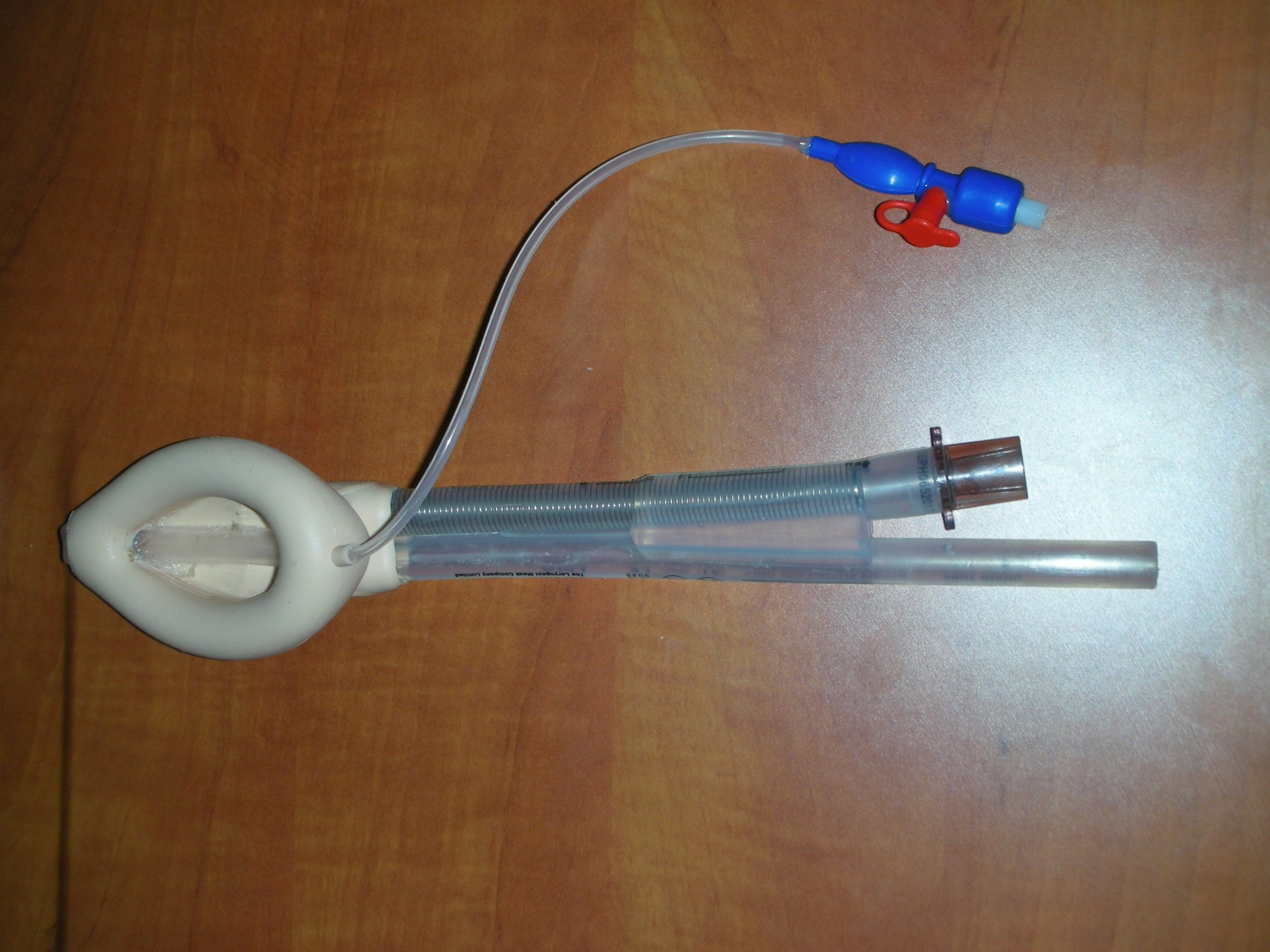
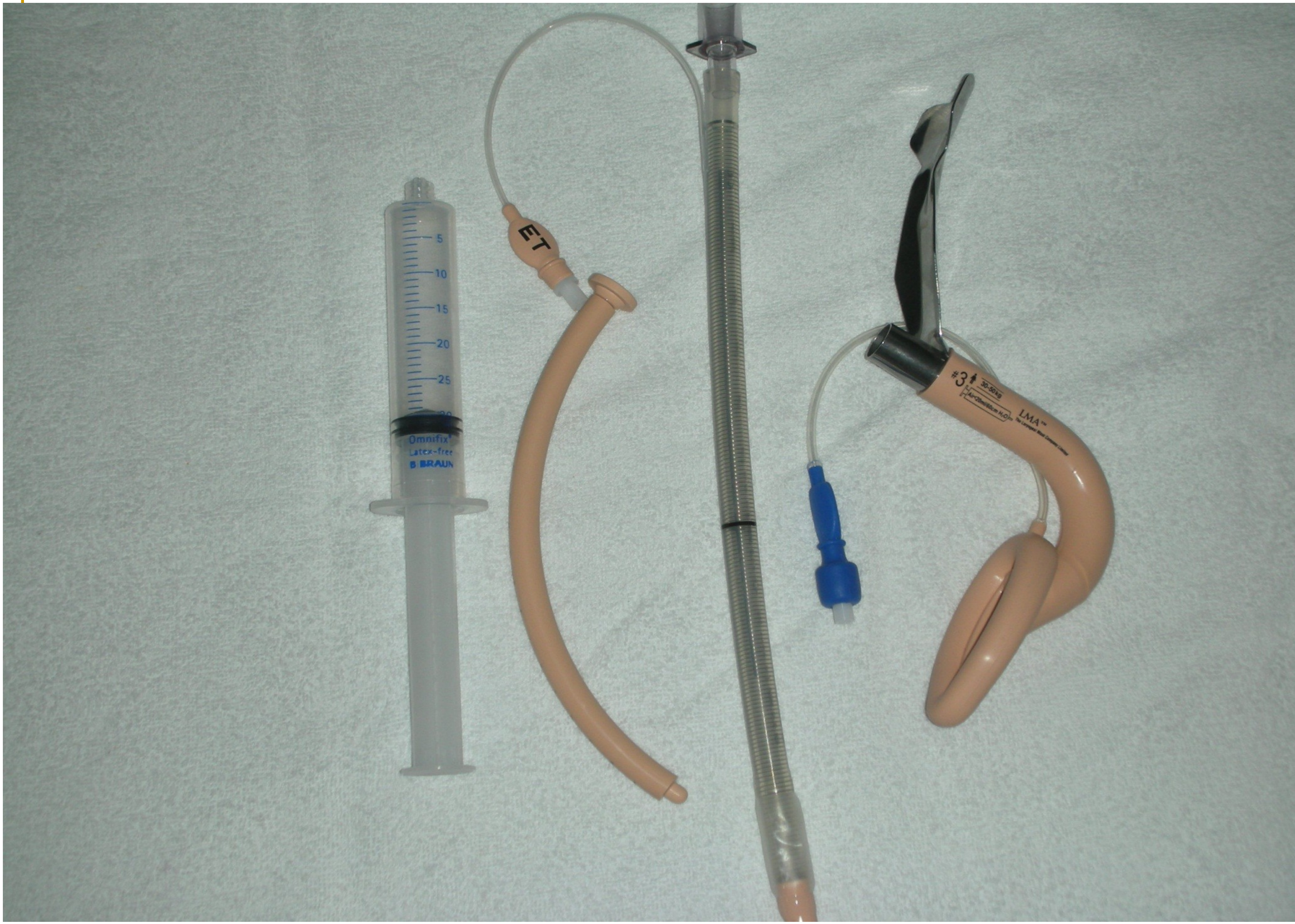
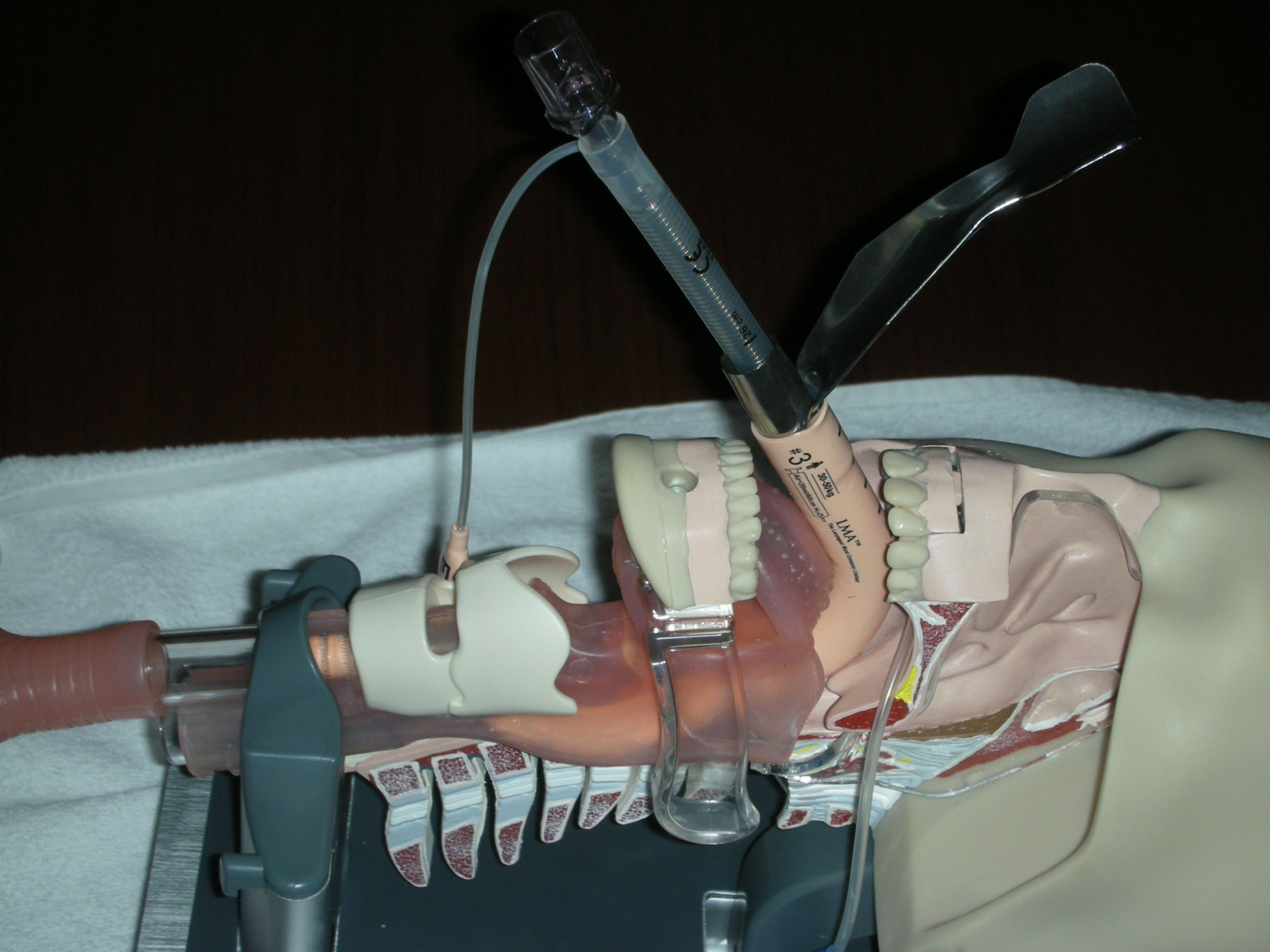



Inflation Pilot Balloon
15 mm Connector
Inflation Line
Airway Tube
Cuff
Aperture Bar

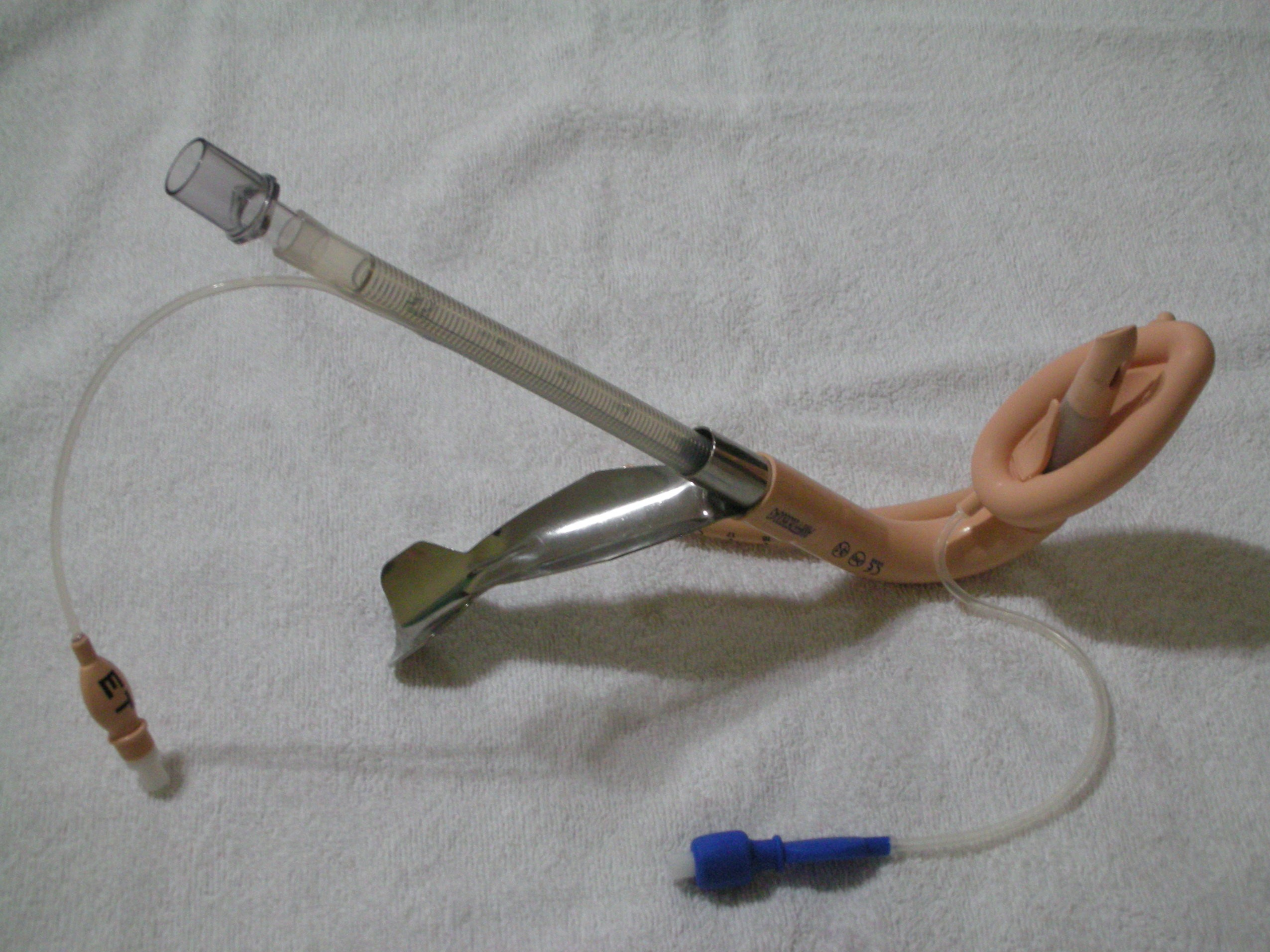

LMA ProSeal
50-70kg

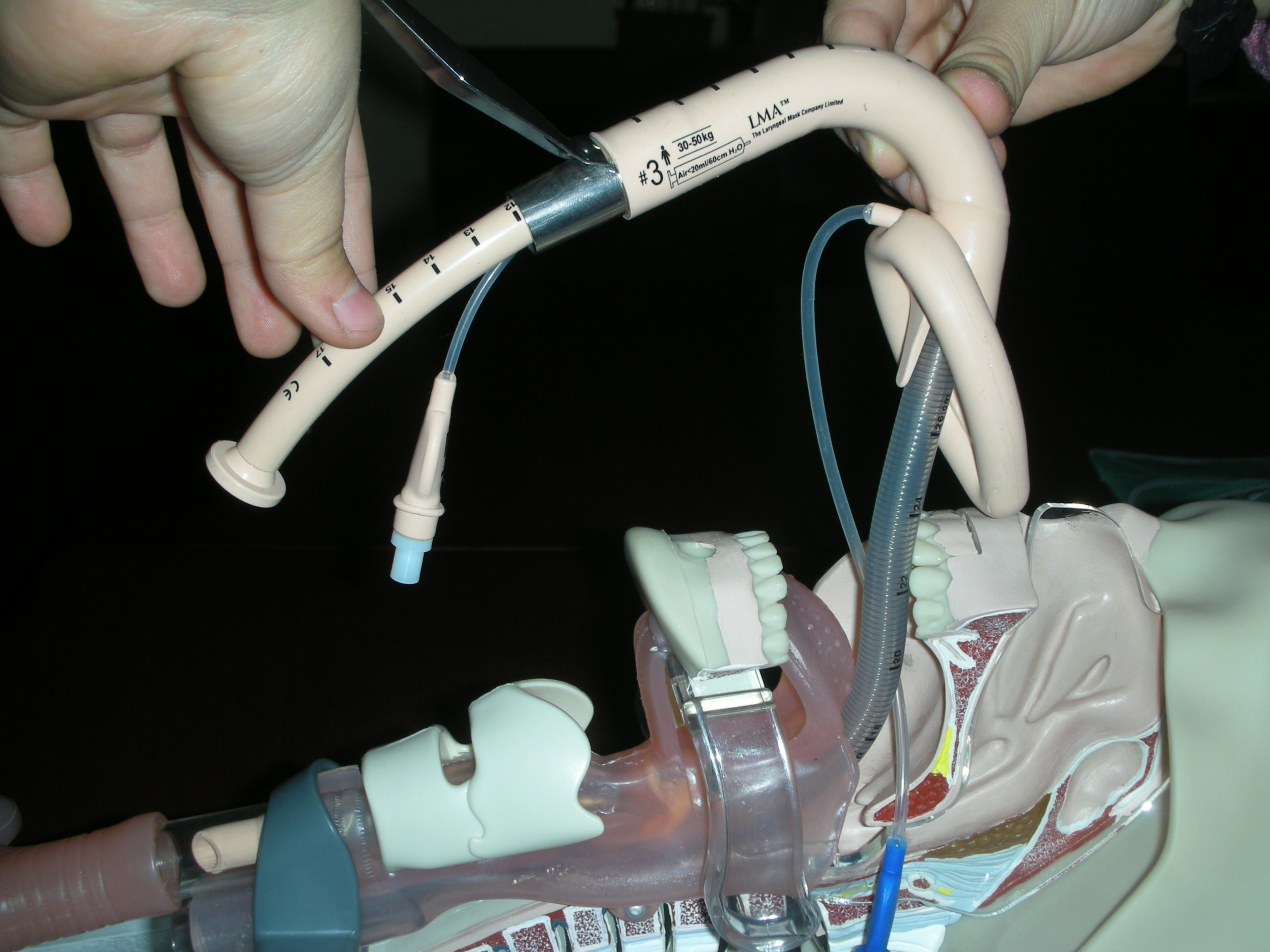

The Laryngeal Mask Company Limited
0086

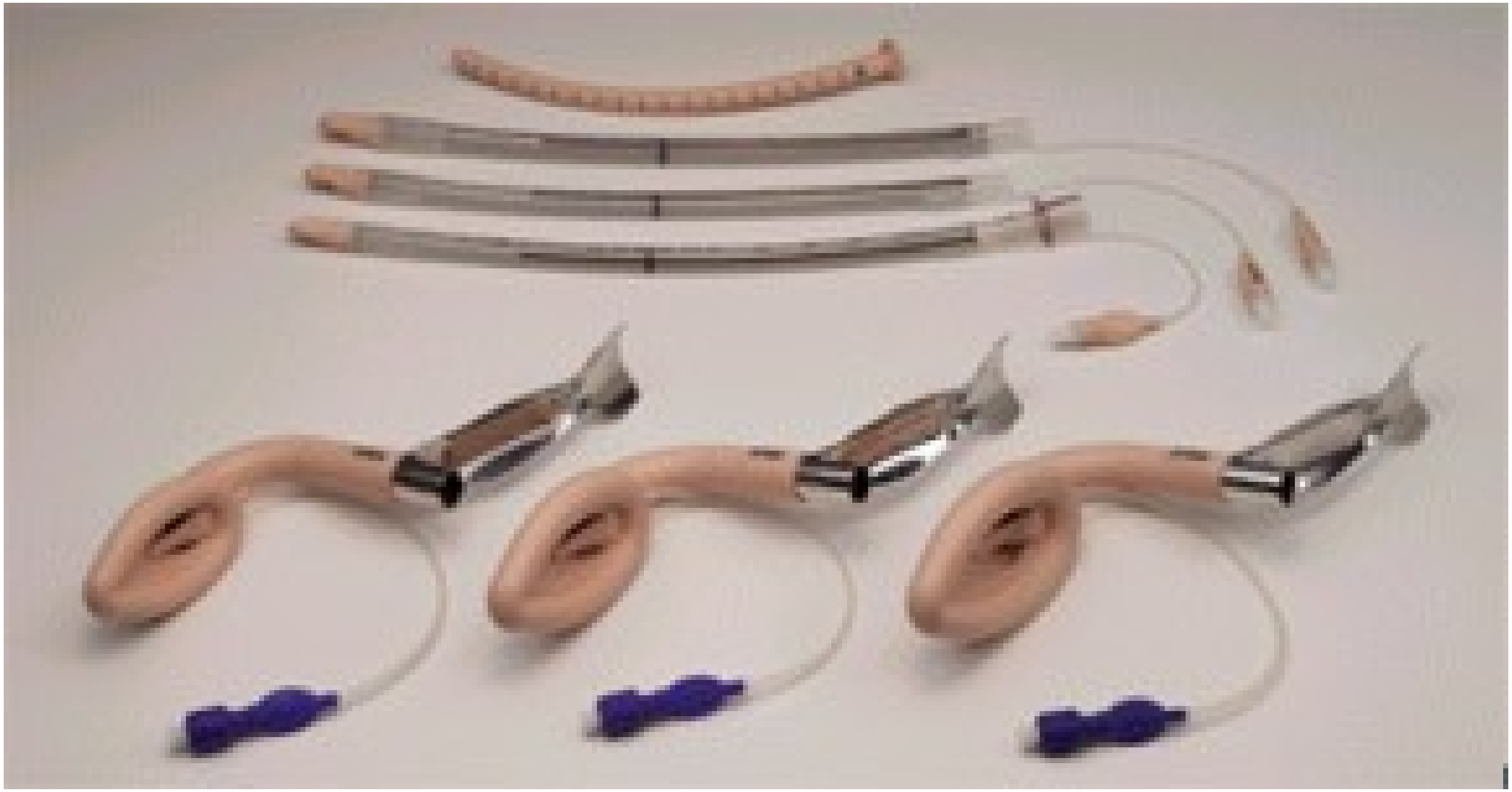

5
10
15
20
25
Omnifix®
Latex-free
B BRAUN
ET
#3
30-50kg
LMA™



#3
30-50kg
LMA™


ET


#3
30-50kg
Air<20ml/60cm H_2O
LMA™
The Laryngeal Mask Company Limited



I jel

Video Yardımcılı Laringoskopi

GlideScope McGrath Video Laringoskop

Box 10-1 Differences between 1993 and 2003 ASA Management of the Difficult Airway Algorithms

1. *Difficult ventilation* is now listed first under item 1, "Assess the Likelihood and Clinical Impact of Basic Management Problems." Also, in the same category, *Difficult tracheostomy* was added.
2. A new item 2 was inserted: "Actively pursue opportunities to deliver supplemental oxygen throughout the process of difficult airway management."
3. When considering the relative merits and feasibility of basic management choices (item 3), awake intubation versus intubation attempts after induction of anesthesia should now be considered first, before noninvasive versus invasive techniques as the initial approach to intubation.
4. Use of the laryngeal mask airway (LMA) was incorporated into the algorithm in the awake induction limb and in both the nonemergency and emergency pathways for induction after general anesthesia (either as a ventilatory device or as a conduit for tracheal intubation).
5. The option for "One more intubation attempt" was removed.
6. Use of the rigid bronchoscope was added as an option for emergency noninvasive ventilation.

Box 10-3 Techniques for Difficult Airway Management

Important: This box lists commonly cited techniques in alphabetic order. It is not a comprehensive list, and no preference for a given technique or sequence of use is implied. Combinations of techniques may be employed. The techniques chosen by the practitioner depend on the specific needs, preferences, skills, and clinical constraints in the particular case.

Techniques for Difficult Intubation

Alternative laryngoscope blades
Awake intubation
Blind intubation (oral or nasal)
Fiberoptic intubation
Intubating stylet or tube changer
Invasive airway access
Laryngeal mask airway as an intubating conduit
Light wand
Retrograde intubation

Techniques for Difficult Ventilation

Esophageal-tracheal Combitube
Intratracheal jet stylet
Invasive airway access
Laryngeal mask airway
Oral and nasopharyngeal airways
Rigid ventilating bronchoscope
Transtracheal jet ventilation
Two-person mask ventilation

Box 10-4 ASA Difficult Airway Algorithm Take-Home Messages

1. If suspicious of trouble → Secure the airway awake
2. If you get into trouble → Awaken the patient
3. Have plans B and C immediately available and in place = think ahead
4. Intubation choices → Do what you do best

HIZLI ARDIŞIK ENTÜBASYONDA TEMEL MANTIK NEDİR ???

”P” LER KURALI

- **Preparation, (Hazırlık)**
- **Preoxygenation, (Önoksijenlendirme)**
- **Pretreatment, (Öntedaviler)**
- **Paralysis with induction, (İndüksiyon ajanları ile paralizinin gerçekleştirilmesi)**
- **Protection and positioning, (Tüpü yerleştirme ve sabitleme)**
- **Placement with proof, (Tüpün yerinin doğrulanması)**
- **Postintubation management. (Entübasyon sonrası bakım)**

PREPARATION
HAZIRLIK

10 DK

3-4 dk

Entübasyon Malzemeleri ve medikasyonlar
Alternatif Hava Yolu Ekipmanları, Monitorizason, güvenli damar yolları

PREOXYGENATION
ÖN OKSİJENLENDİRME

5 DK

3-5 dk

Revervuarlı maske ile 3-5 Dakika %100 Oksijen

PRETREATMENT
ÖN İLAÇLAR

3 DK

2-3 dk

Vekuronyum 1 mg IV
Fentanil 1-2 μ/kg IV
Lidokain 1-2 mg/kg IV
Esmolol 2 mg/kg IV
Atropin 0.01mg/kg IV

PARALYSIS WITH INDUCTION
SEDASYON VE PARALİZİ

0 DK

0 dk

Tiyopental Na 3-5 mg/kg IV
Propofol 2-3 mg/kg IV
Midozolam 0,05-0.1 mg/kg IV
Ketamin 2-4 mg/kg IV
Etomidat 0.3 mg/kg

Süksünil Kolin 1.5 mg/kg IV veya
Rokuronyum 2 mg/kg IV

POSITIONING AND PROTECTION
TÜPÜ YERLEŞTİRME VE KORUMA

-30,-45 sn

Vokal kortları görerek ve Tüpün
Ağız kenarı E:23 cm, K:21 cm bırak
Tüpü sabitle

0 DK

***P**LACEMENT WİTH PROOF*
TÜPÜN YERİNİN DOĞRULANMASI

-30,-45 sn

Akc'leri 5 nokta kuralı dinle ve klasik yöntemlerle ve/veya End tidal CO dedektörleri ve Özefagial dedettör aygıtları Entübasyonu doğrula

0 DK

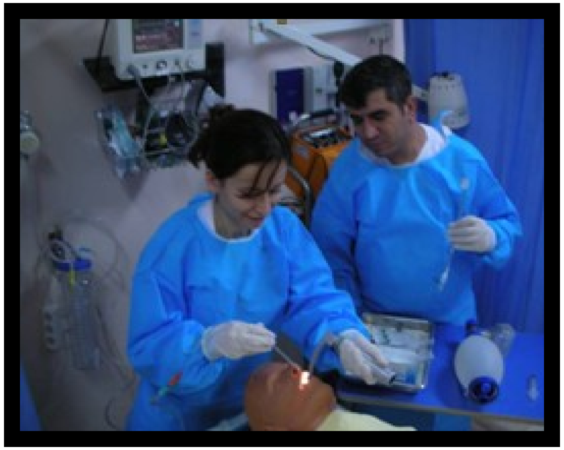
***P**OSTİNTUBATİON MANAGEMENT*
ENTÜBASYON SONRASI TAKİP

-30,-45 sn

İlk 30 dk hastanın sıkı takibi ve Yoğun bakıma yatışı

POSTİNTUBATİON MANAGEMENT
ENTÜBASYON SONRASI TAKİP

HIZLI ARDIŞIK ENTÜBASYON



Sedatif hipnotikler

Etomidat 20 mg/10cc amp.

Propofol 200 mg/20cc

Midazolam 5 mg/5cc

Thiyopental

500 mg/10cc flk.

Ketamin 500 mg/10cc

☺

Süksünilkolin

- Doz:1.5 mg/kg IV
- Etki başlangıcı 45-60 sn
- Etki süresi 6-10 dk

Rokuronyum

- Dozu 2 mg/kgIV
- Etki başlangıcı 106-124 sn
- Etki süresi 30-45 dk

☺

A. Terminology in the ASA Difficult Airway Algorithm

A. Terminology in the ASA Difficult Airway Algorithm

The original publications that introduced the ASA algorithm and provided basic terms that define a DA were relatively vague in their terminology[1]:

- *Difficult mask ventilation*: "It is *not* possible for the anesthesiologist to provide adequate face mask ventilation due to one or more of the following problems: inadequate mask seal, excessive gas leak or excessive resistance to the ingress or egress of gas."
- *Difficult laryngoscopy*: "Not being able to visualize any portion of the vocal cords after multiple attempts at conventional laryngoscopy."
- *Difficult intubation*: "When tracheal intubation requires multiple attempts in the presence or absence of tracheal pathology."
- *Failed intubation*: "Placement of the tracheal tube fails after multiple intubation attempts" (0.05% of surgical patients and 0.13% to 0.35% in obstetric patients).

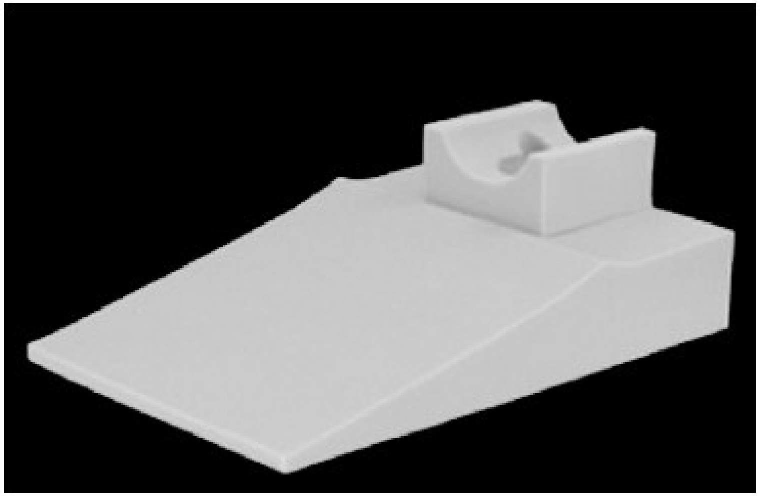
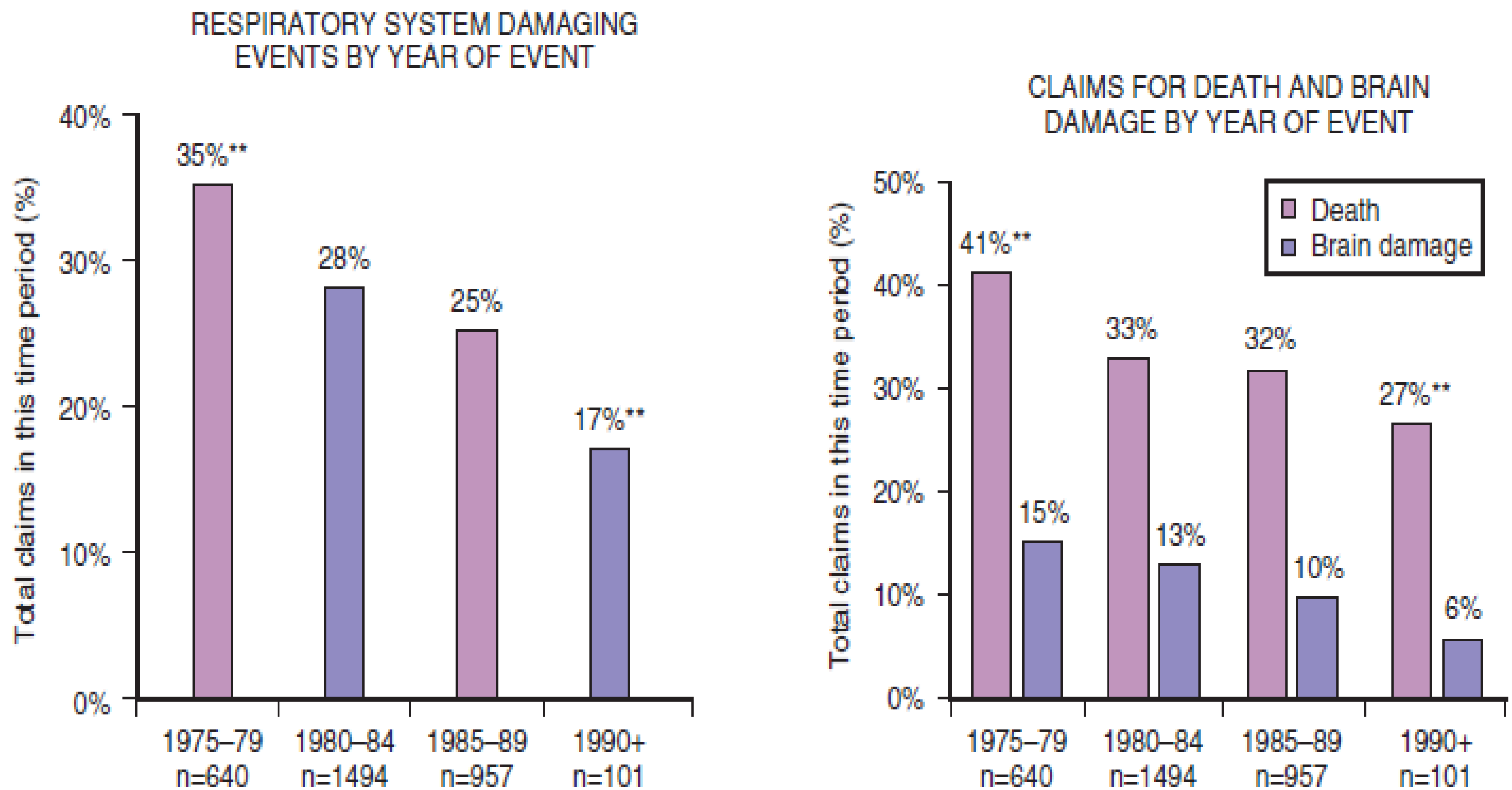


Figure 10-2 Troop Elevation Pillow with additional foam head rest. (Courtesy of Mercury Medical, Clearwater, FL.)

An *optimal-best attempt at conventional laryngoscopy* is defined as having the following characteristics[34,35]:



** $P \leq .01$ between 1975 and 1990+ time periods; N = 3282
Claims for respiratory system damaging events as a proportion of all claims in the database for each 5-year time period.
Note: N does not equal the sum of n as there are some claims in the database prior to 1975 or no date is known.
A

** $P \leq .01$ between 1975 and 1990+ time periods; N = 3282
Claims for death and brain damage as a proportion of all claims in the database for each 5-year time period.
B

Figure 10-6 **A,** The incidence of respiratory system damaging events as a proportion of all claims in the database for each 5-year period (N = 3282). ** $P \leq 0.01$ between 1975 and 1990+ time periods. **B,** Claims for death and brain damage as a proportion of all claims in the database for each 5-year time period (N = 3282). ** $P \leq 0.01$. (In both **A** and **B,** N does not equal the sum of n because there are some claims in the database for which the date is before 1975 or unknown.) (From Cheney FW: Committee on Professional Liability: Overview. *ASA Newsletter* 58:7–10, 1994.)

Box 10-5 Individual Predictors of Difficult Airway Management*

History

Congenital/acquired syndromes, malignancy, trauma, or disease states affecting the airway (e.g., diabetes, obstructive sleep apnea)
Recent difficult intubation
Prior surgery involving the larynx or neck

Physical

Facial hair (beard or mustache)
Prominent protruding teeth or dentures
Micrognathia
Limited mouth opening <4 cm
Inability to protrude mandible
Mallampati class III or IV
Thyromental distance <6 cm
Hyomental distance <4 cm
Sternomental distance <12 cm
Limited range of motion of neck <80°
Neck circumference >60 cm
Body mass index (BMI) >30 kg/m²
Upper airway obstruction
Presence of blood or vomitus in oropharynx
Tracheal deviation

*Includes predictors of difficult mask ventilation, difficult laryngoscopy, difficult intubation, and surgical airway.

TABLE 9-1

Generally Accepted Predictors of Difficult Intubation

Criterion	Suggestion of Difficult Intubation
History of difficult intubation	Positive history
Length of upper incisors	Relatively long
Interincisor distance	Less than two finger breadths (<3 cm)
Overbite	Maxillary incisors override mandibular incisors
Temporomandibular joint translation	Inability to extend mandibular incisors anterior to maxillary incisors
Mandibular space	Small, indurated, encroached upon by mass
Cervical vertebral range of motion	Cannot touch chin to chest or cannot extend neck
Thyromental distance	Less than three finger breadths (<6 cm)
Mallampati-Samsoon classification	Mallampati III/Samsoon IV—relatively large tongue: uvula not visible
Neck	Short, thick

Adapted from American Society of Anesthesiologists Task Force on Difficult Airway Management: Practice guidelines for management of the difficult airway: An updated report. *Anesthesiology* 98:1269, 2003.

A. Patient Evaluation and Risk Assessment

notch)

The ASA DAA begins with the most basic question of whether or not the presence of a DA is recognized (see

Box 10-1 Differences between 1993 and 2003 ASA Management of the Difficult Airway Algorithms

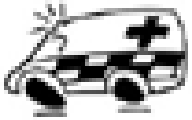
1. *Difficult ventilation* is now listed first under item 1, "Assess the Likelihood and Clinical Impact of Basic Management Problems." Also, in the same category, *Difficult tracheostomy* was added.
2. A new item 2 was inserted: "Actively pursue opportunities to deliver supplemental oxygen throughout the process of difficult airway management."
3. When considering the relative merits and feasibility of basic management choices (item 3), awake intubation versus intubation attempts after induction of anesthesia should now be considered first, before noninvasive versus invasive techniques as the initial approach to intubation.
4. Use of the laryngeal mask airway (LMA) was incorporated into the algorithm in the awake induction limb and in both the nonemergency and emergency pathways for induction after general anesthesia (either as a ventilatory device or as a conduit for tracheal intubation).
5. The option for "One more intubation attempt" was removed.
6. Use of the rigid bronchoscope was added as an option for emergency noninvasive ventilation.

TABLE 10-1

Components of the Preoperative Airway Physical Examination

Airway Examination Component	Nonreassuring Findings
Length of upper incisors	Relatively long
Relation of maxillary and mandibular incisors during normal jaw closure	Prominent "overbite" (maxillary incisors anterior to mandibular incisors)
Relation of maxillary and mandibular incisors during voluntary protrusion of the jaw	Patient's mandibular incisors anterior to (in front of) mandibular incisors
Interincisor distance	<3 cm
Visibility of uvula	Not visible when tongue is protruded with patient in sitting position (e.g., Mallampati class III or IV)
Shape of palate	Highly arched or very narrow
Compliance of mandibular space	Stiff, indurated, occupied by mass, or nonresilient
Thyromental distance	<3 ordinary finger breadths
Length of neck	Short
Thickness of neck	Thick
Range of motion of head and neck	Patient cannot touch tip of chin to chest or cannot extend neck

- J Emerg Med. 2013 Apr;44(4):750-6. doi: 10.1016/j.jemermed.2012.07.080. Epub 2013 Jan 22.
- **Videolaryngoscopy with glidescope reduces cervical spine movement in patients with unsecured cervical spine.**
- Kill C, Risse J, Wallot P, Seidl P, Steinfeldt T, Wulf H.
- **Source**
- Department of Anesthesiology and Critical Care, Philipps-University, Marburg, Germany.
- **Abstract**
- **BACKGROUND:**
- Unconscious patients with severe trauma often require urgent endotracheal intubation. In trauma victims with possible cervical spine injury, any movement of the head and neck should be avoided.
- **STUDY OBJECTIVES:**
- We investigated the effect of GlideScope videolaryngoscopy on cervical spine movement compared with conventional laryngoscopy in anesthetized patients with unsecured cervical spines.
- **METHODS:**
- Sixty patients scheduled for elective surgery with general anesthesia and without anticipated airway problems were enrolled in the study after ethics committee approval and written informed consent. Intubation was performed with videolaryngoscopy (GlideScope(®), Verathon Inc., Bothell, WA) or conventional laryngoscopy (MacIntosh). Using video motion analysis with a lateral view, the maximum extension angle α was measured with reference to anatomical points (baseline and line drawn from processus mastoideus to os frontale [glabella]). Values were analyzed using Mann Whitney U-tests.
- **RESULTS:**
- The deviation of α was a median 11.8° in the videolaryngoscope group and 14.3° in the conventional group (p = 0.045), with a maximum of 19.2° (videolaryngoscopy) vs. 29.3° (conventional). Intubation by physicians with some experience in videolaryngoscopy was associated with a reduced angle deviation (α = 10.3°) compared to inexperienced physicians (12.8°, p = 0.019). Intubation time was a median 24 s (min/max 12/75 s) in the MacIntosh group and 53 s (min/max 28/210 s) in the GlideScope group. In 3 patients randomized to the conventional group in whom conventional intubation failed, intubation could be successfully performed using videolaryngoscopy.
- ***CONCLUSION:***



Prehospital advanced airway management by ambulance technicians and paramedics: is clinical practice sufficient to maintain skills?

C D Deakin,[1] P King,[2] F Thompson[1]

Emerg Med J 2009 26: 888-891

15 ambulans ekibi ile yapılan gözlemsel çalışma (269 paramedik)

- Paramedik eğitimi standart değil
- Öğrendiklerini uygulama şansı düşük
- Eğitim tekrarı düzenli değil
- 12 ayda 0-11 ETE/paramedik
- 12 ayda 0-2 LM yerleştirmesi/paramedik
- ETE uygulanamayan olgularda paramediklerin %57,7'si BVMV'a geçiyor, LM'ye geçen %42,3
- İlk tercih olarak BVM yerine LM kullananlar %9,5

American Society of Anesthesiologists

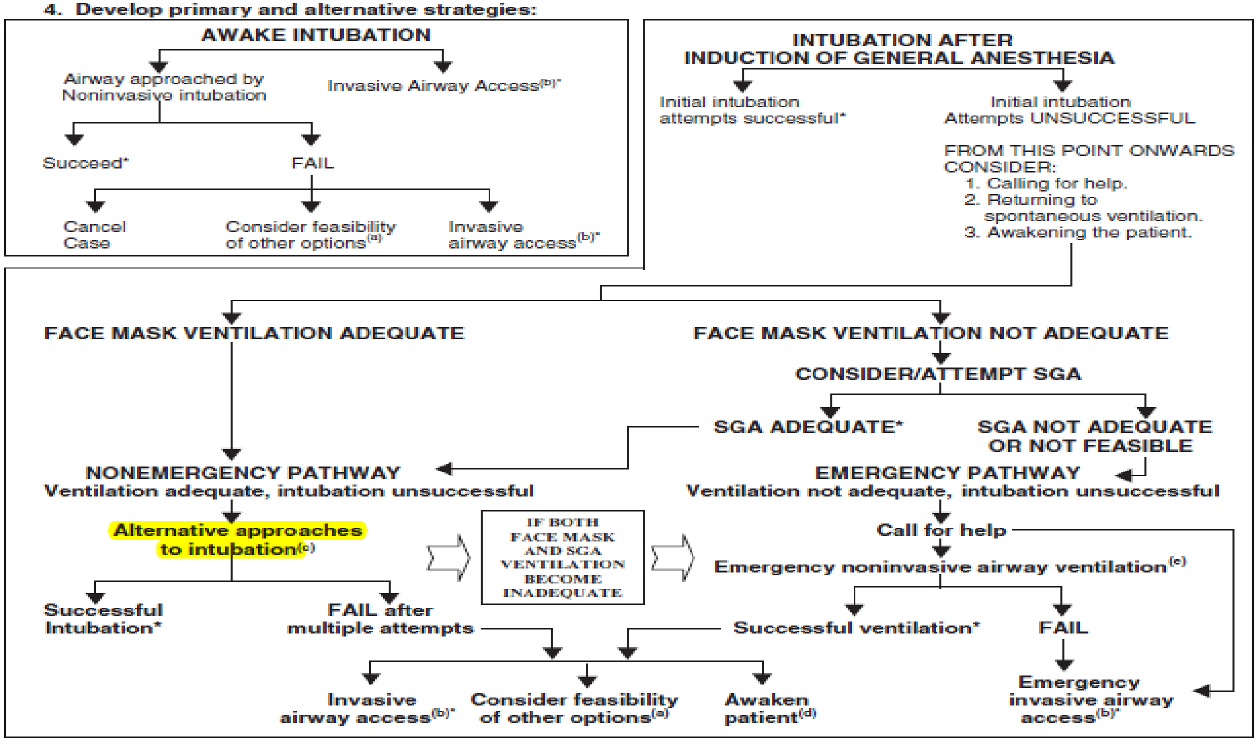
DIFFICULT AIRWAY ALGORITHM

1. Assess the likelihood and clinical impact of basic management problems:
- **Difficulty with patient cooperation or consent**
- **Difficult mask ventilation**
- **Difficult supraglottic airway placement**
- **Difficult laryngoscopy**
- **Difficult intubation**
- **Difficult surgical airway access**

2. Actively pursue opportunities to deliver supplemental oxygen throughout the process of difficult airway management.

3. Consider the relative merits and feasibility of basic management choices:
- **Awake intubation *vs.* intubation after induction of general anesthesia**
- **Non-invasive technique *vs.* invasive techniques for the initial approach to intubation**
- **Video-assisted laryngoscopy as an initial approach to intubation**
- **Preservation *vs.* ablation of spontaneous ventilation**

4. Develop primary and alternative strategies:



***Confirm ventilation, tracheal intubation, or SGA placement with exhaled CO_2.**

a. Other options include (but are not limited to): surgery utilizing face mask or supraglottic airway (SGA) anesthesia (e.g., LMA, ILMA, laryngeal tube), local anesthesia infiltration or regional nerve blockade. Pursuit of these options usually implies that mask ventilation will not be problematic. Therefore, these options may be of limited value if this step in the algorithm has been reached via the Emergency Pathway.

b. Invasive airway access includes surgical or percutaneous airway, jet ventilation, and retrograde intubation.

c. Alternative difficult intubation approaches include (but are not limited to): video-assisted laryngoscopy, alternative laryngoscope blades, SGA (e.g., LMA or ILMA) as an intubation conduit (with or without fiberoptic guidance), fiberoptic intubation, intubating stylet or tube changer, light wand, and blind oral or nasal intubation.

d. Consider re-preparation of the patient for awake intubation or canceling surgery.

e. Emergency non-invasive airway ventilation consists of a SGA.

Fig. 1. Difficult Airway Algorithm.

ÖZET

- Sürekli bir öncekine “üstün” araç-gereç geliştirilmektedir.
- Önemli olan, bu yeni araç gereçlere sahip olmak değil– onları kullanabilmektir.
- Tümüne sahip olmak ve kullanmak şart değildir.
- ETE altın standarttır – bunu unutmamak gerekir.
- En az bir supraglottik hava yolu aracını iyi kullanabiliyor olmak önemlidir.
- Okumak, izlemek önemli olsa da uygulamak ve tekrar tekrar uygulamak en önemli öğrenme şeklidir.

GÖRÜŞMEK ÜZERE SAĞLIKLI GÜNLER