به نام خدا

CPR

Cardio Pulmonary Resuscitation

احیاء قلبی ریوی

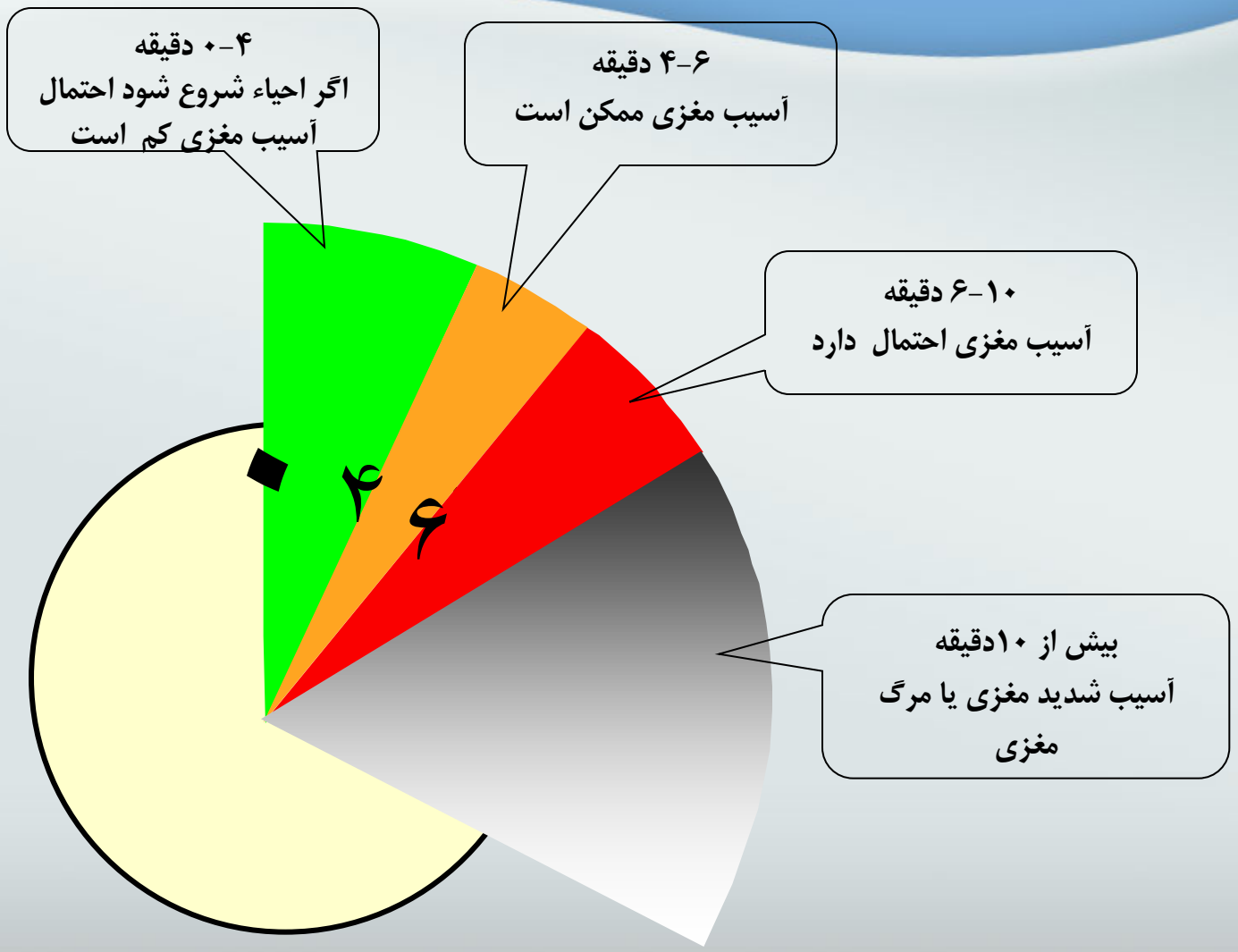
Presented by:
Abbas bagheri
MSN - EMS Educator

- علی رغم پیشرفت های حاصل شده در زمینه پیشگیری از بیماریهای قلبی ، هنوز ایست قلبی تنفسی یک مشکل عمده ای برای سلامتی و علت مرگ در جهان می باشد. (۴۶ ٪ در ایران)

- ایست قلبی هم در داخل و هم در خارج از بیمارستان رخ می دهد.

- حدود ۳۵۰۰۰۰ نفر در سال (تقریبا نیمی در بیمارستان) دچار ایست قلبی می شوند و عملیات احیا را دریافت می کنند.

شانس زنده ماندن به ازاء هر دقیقه عدم درمان به شدت کاهش می یابد



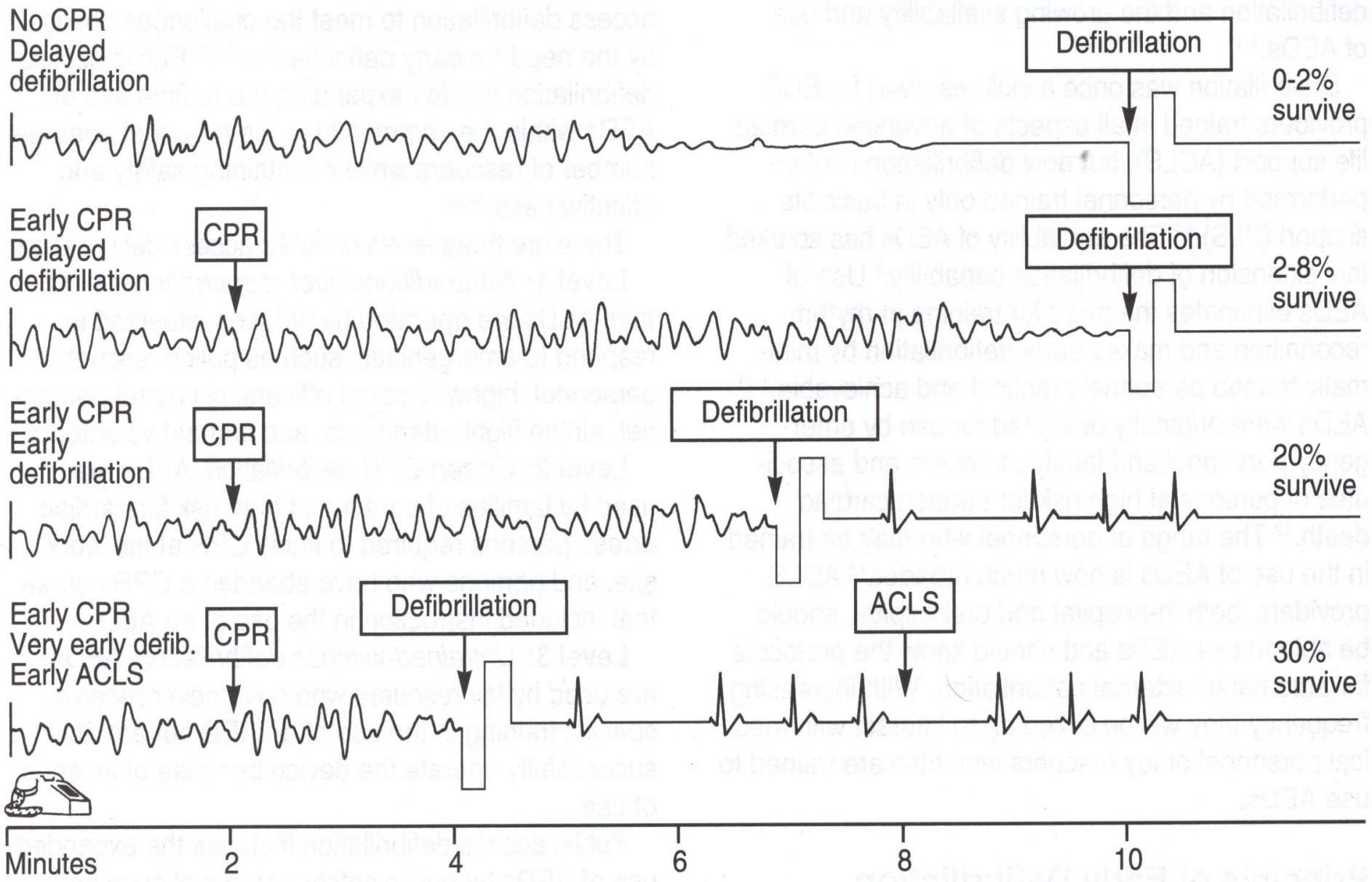


Fig 2. Survival rates are estimates of probability of survival to hospital discharge for patients with witnessed collapse and with ventricular fibrillation as initial rhythm. Estimates are based on a large number of published studies, collectively reviewed in References 33 and 34.

CHAIN OF SURVIVAL

Immediate recognition and activation

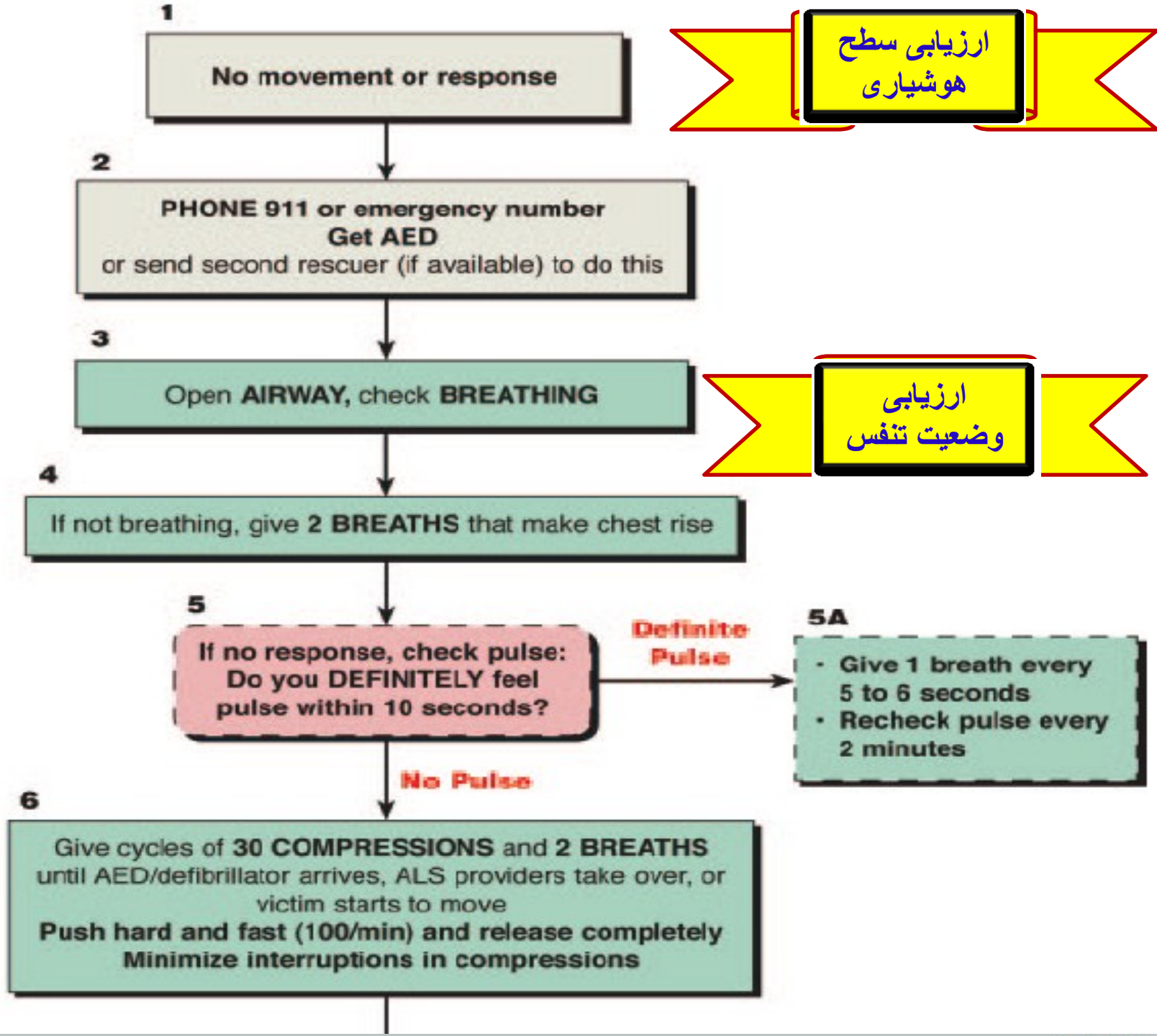
Early CPR

Defibrillation,

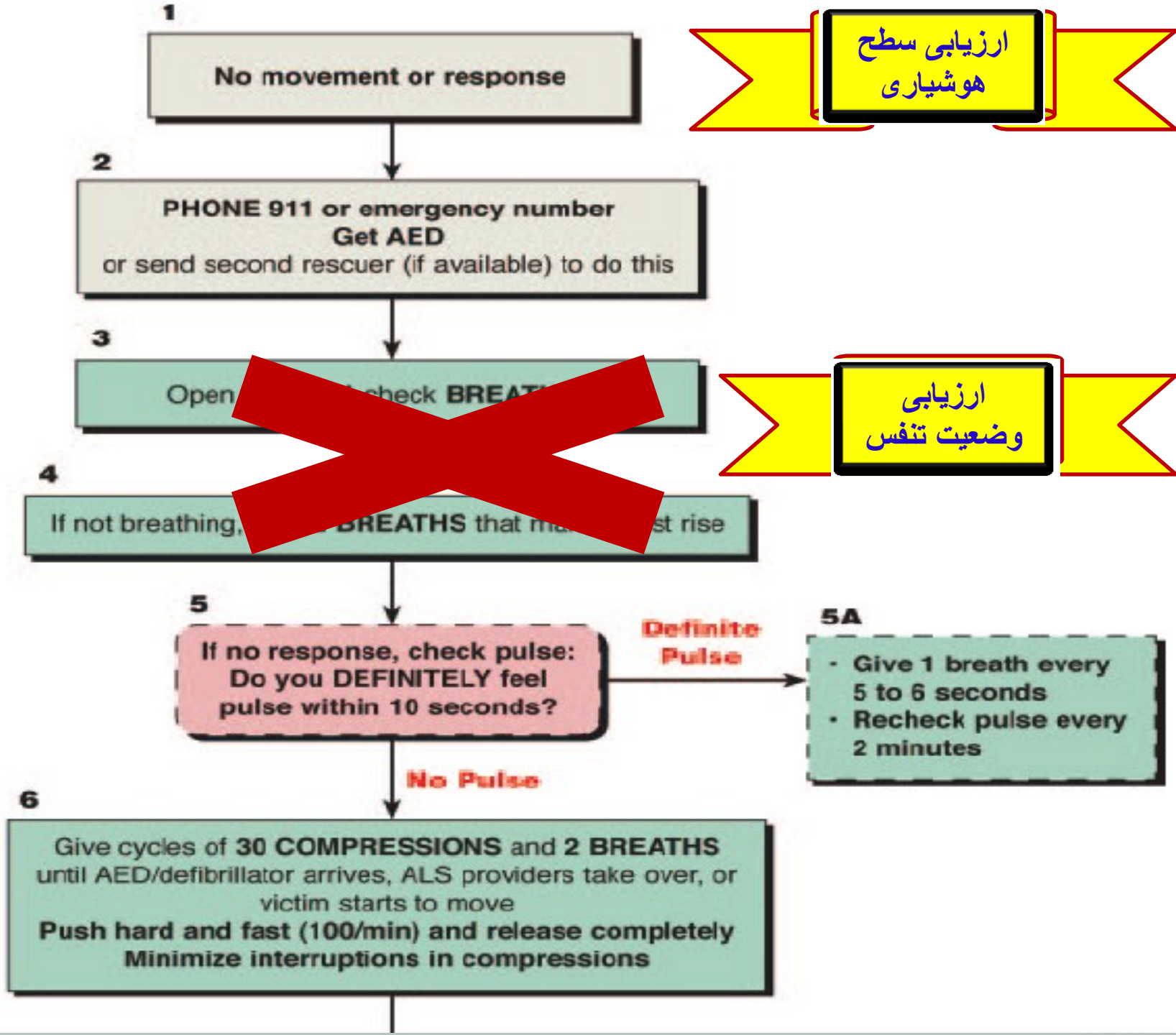
Advanced life support

Integrated post-cardiac arrest care.

BLS 2005


1
No movement or response
ارزیابی سطح هوشیاری
2
PHONE 911 or emergency number
Get AED
or send second rescuer (if available) to do this
3
Open AIRWAY, check BREATHING
ارزیابی وضعیت تنفس
4
If not breathing, give 2 BREATHS that make chest rise
5
If no response, check pulse:
Do you DEFINITELY feel pulse within 10 seconds?
Definite Pulse
5A
· Give 1 breath every 5 to 6 seconds
· Recheck pulse every 2 minutes
No Pulse
6
Give cycles of 30 COMPRESSIONS and 2 BREATHS until AED/defibrillator arrives, ALS providers take over, or victim starts to move
Push hard and fast (100/min) and release completely
Minimize interruptions in compressions

BLS 2005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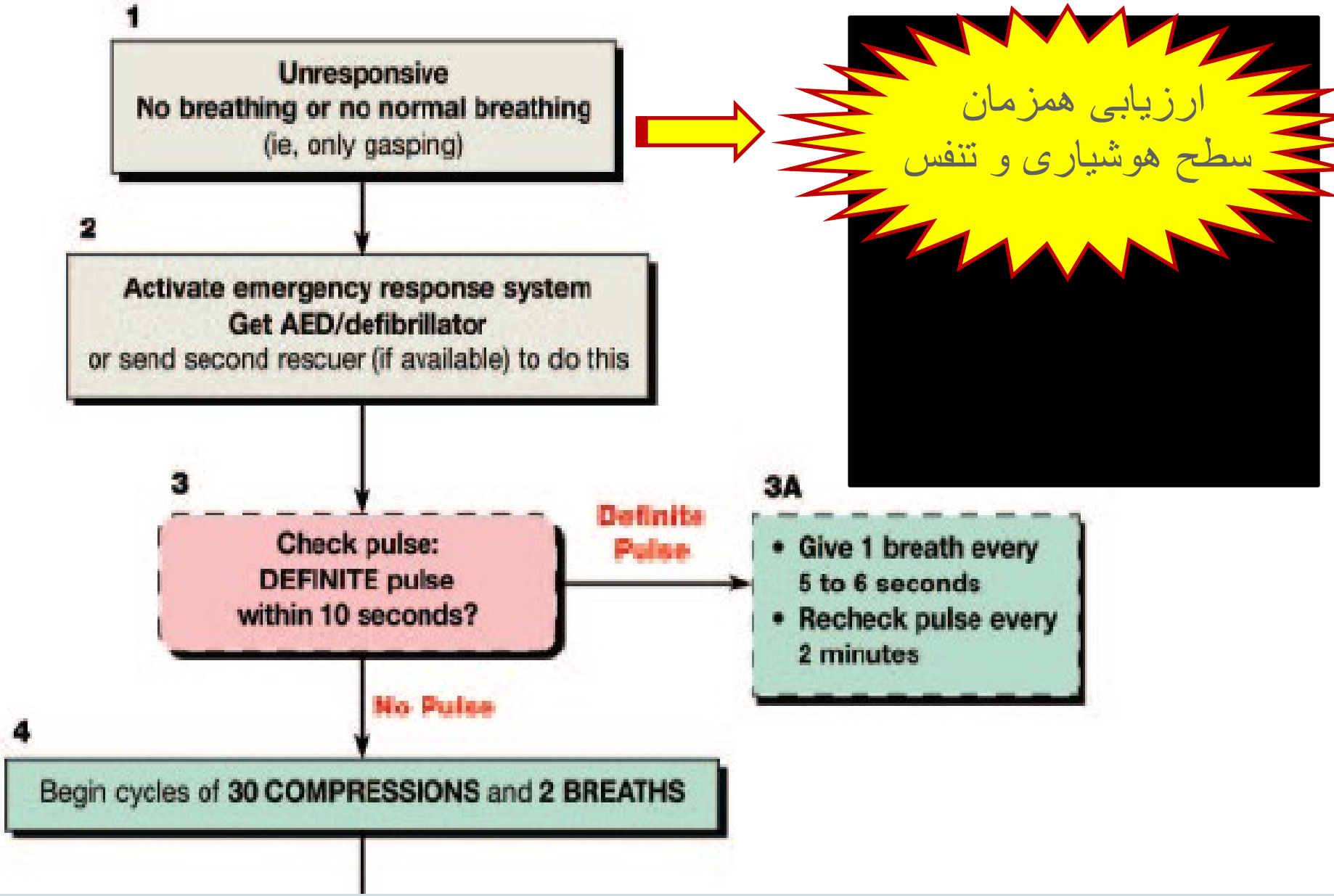
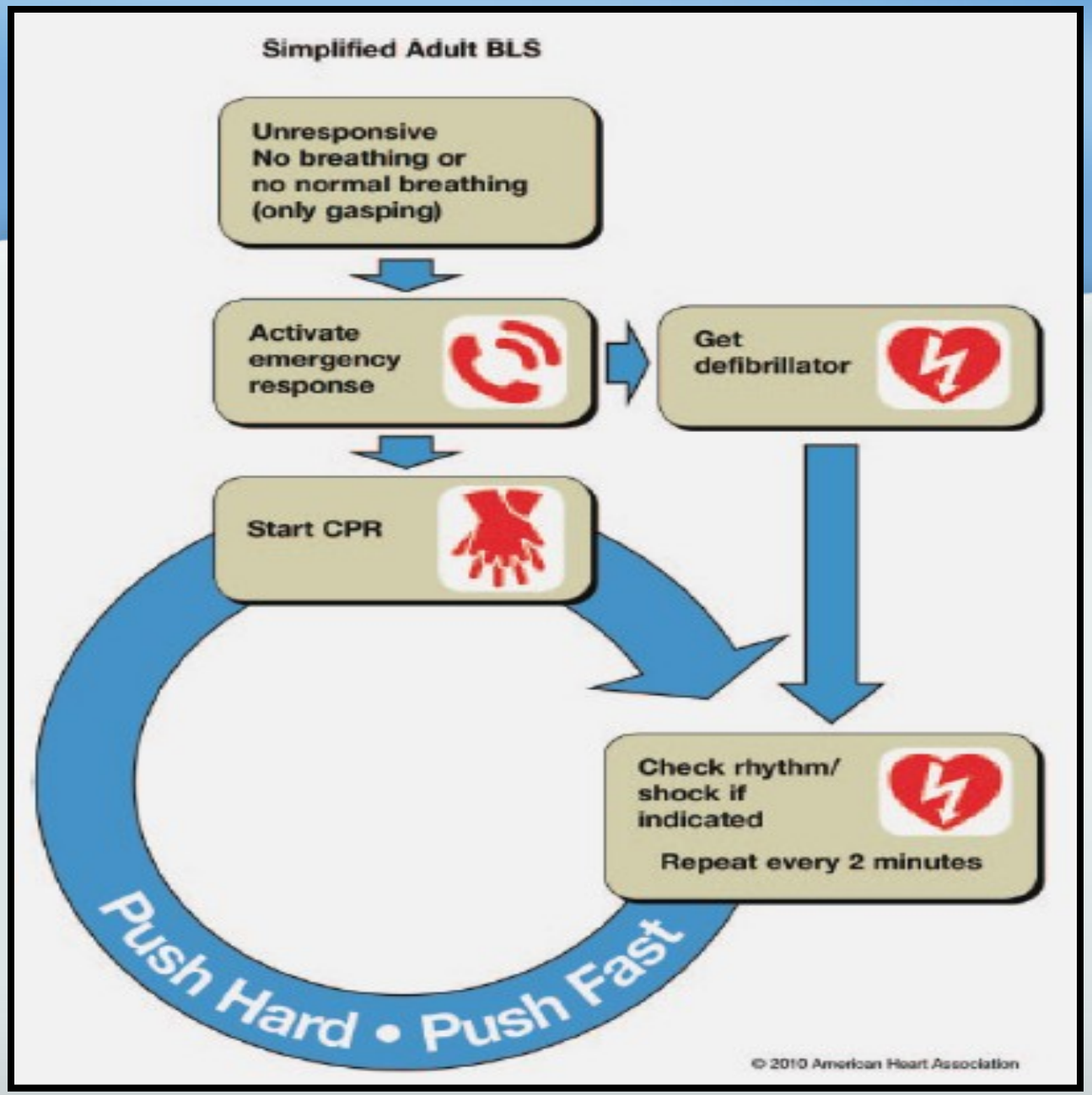
Give cycles of 30 COMPRESSIONS and 2 BREATHS until AED/defibrillator arrives, ALS providers take over, or victim starts to move
Push hard and fast (100/min) and release completely
Minimize interruptions in compressions

LOOK , LISTEN ,FEEL

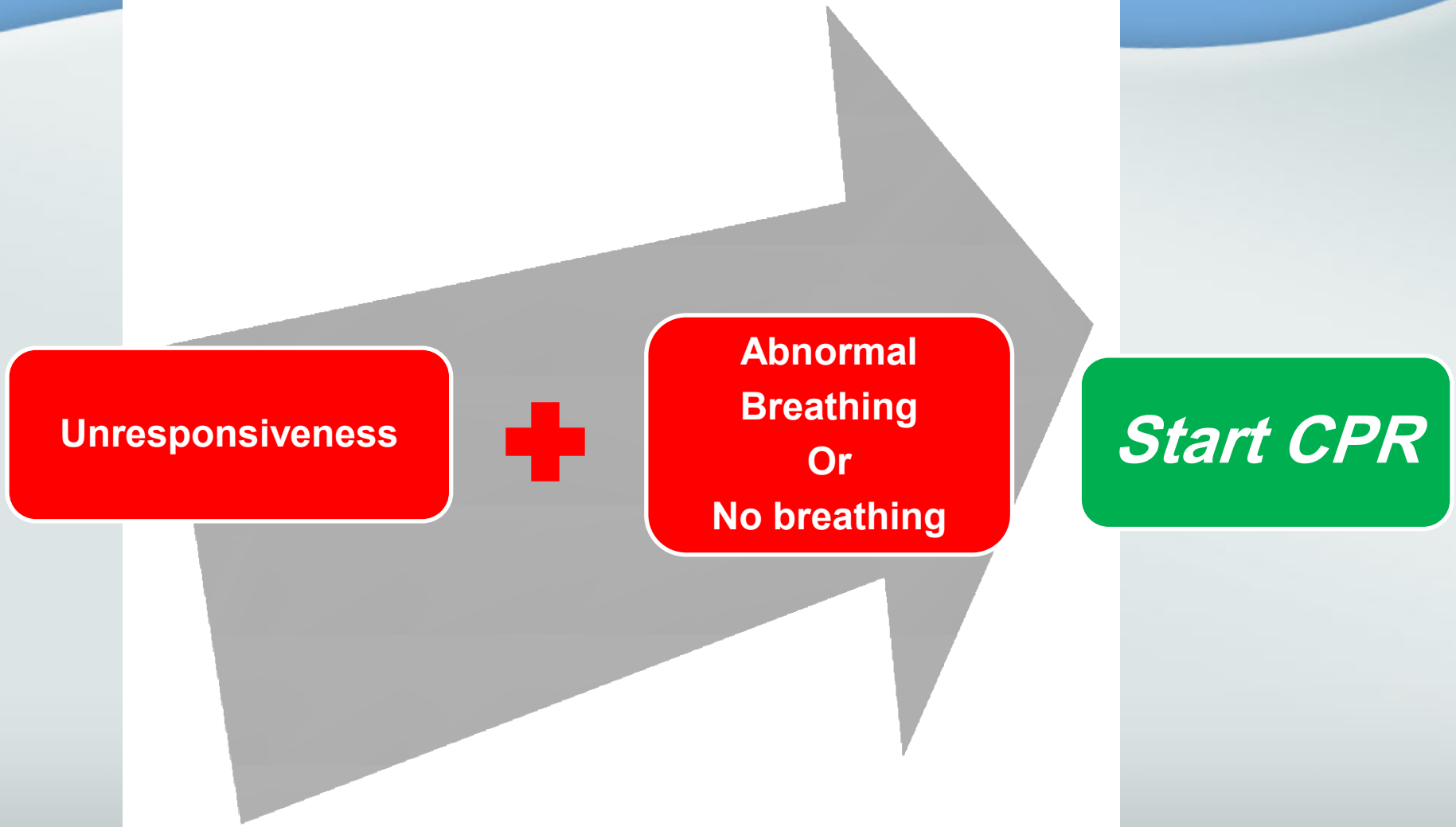


BLS 2010



BLS 2010

Start CPR When …… :



ABC ???


ABC
(Airway-Breathing-Circulation)
First Aid And CPR
Training Services


RESUSCITATION
A
B
C


ABCPR
Health & Safety Training

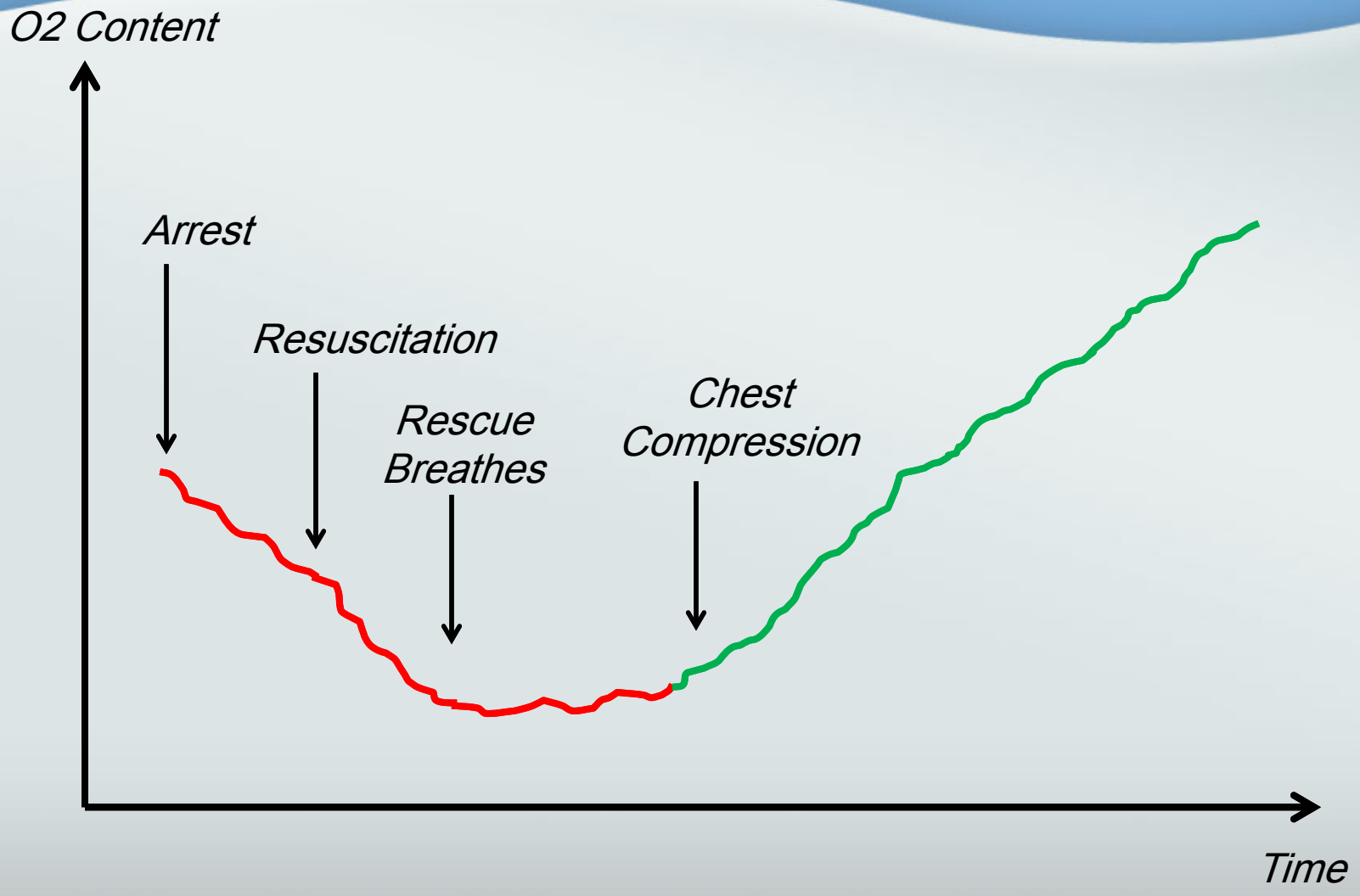
A B C

SINCE 1960

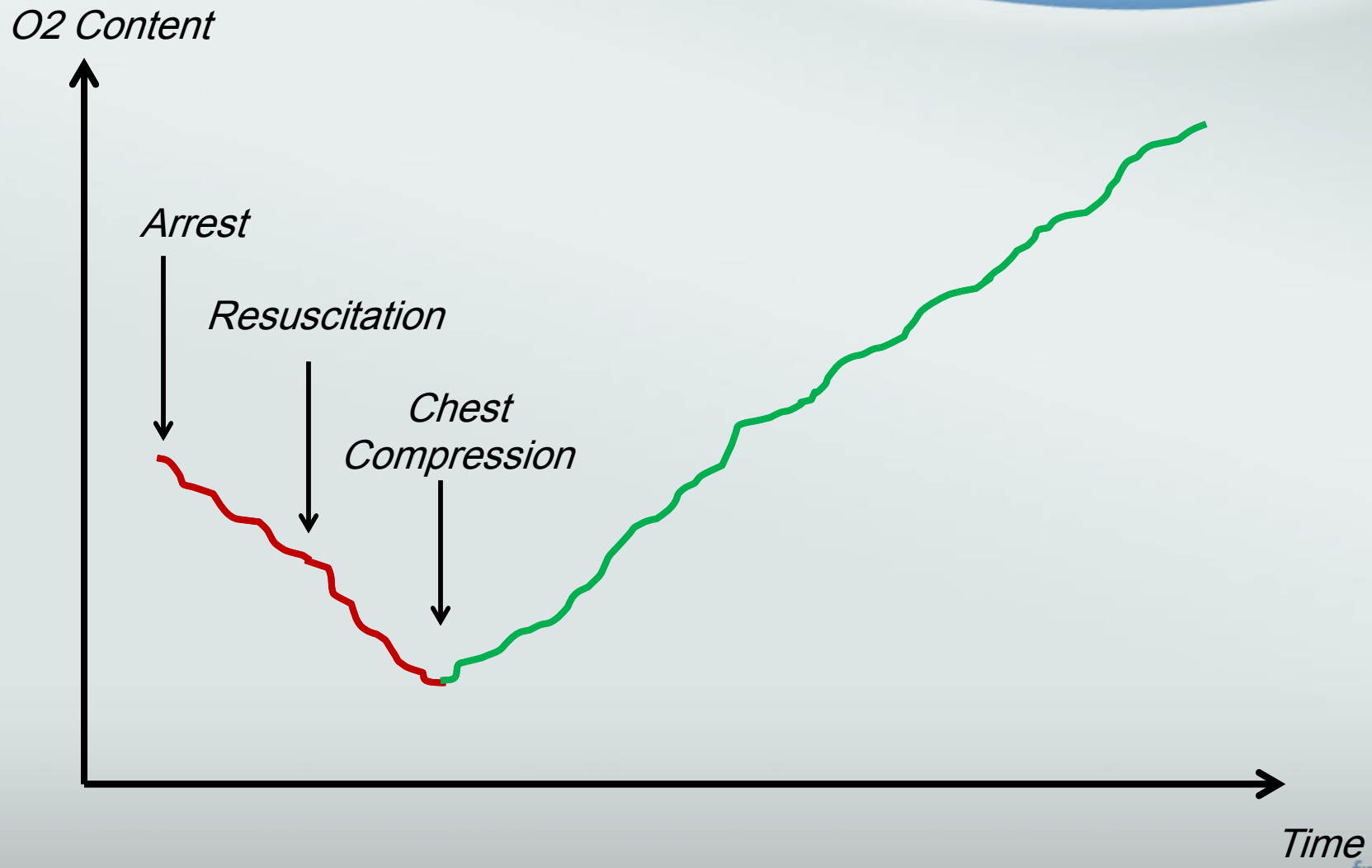
C A B

GIUDELINE 2010

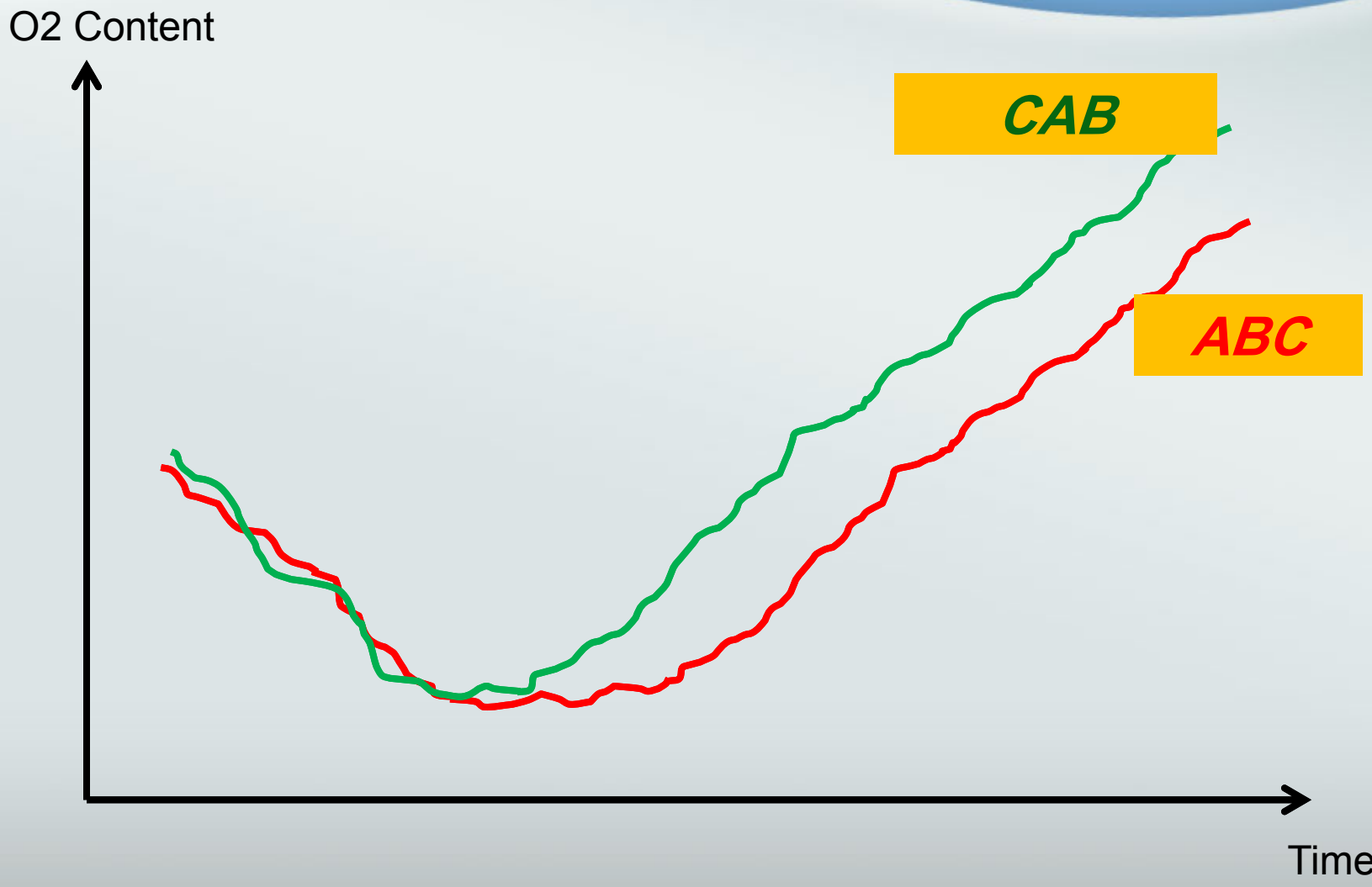
Arterial Blood O_2 Content (ABC)



Arterial Blood O_2 Content (CAB)



CAB vs ABC



CPR is as easy as

C-A-B

Compressions

Push hard and fast on the center of the victim's chest

Airway

Tilt the victim's head back and lift the chin to open the airway

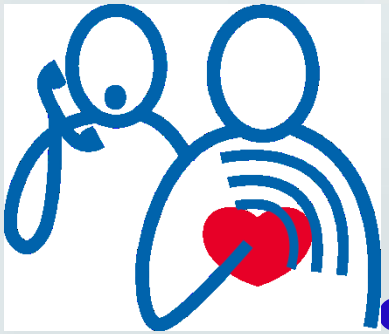
Breathing

Give mouth-to-mouth rescue breaths

American Heart Association

Learn and Live

BASIC LIFE SUPPORT



- Approach safely
- Check response
- Check breathing
- Shout for help & Call 115
- 30 chest compressions
- 2 rescue breaths

APPROACH SAFELY!

Scene

Rescuer

Victim

Bystanders

- Approach safely
- Check response
- Check breathing

- Shout for help & Call 115
- 30 chest compressions
- 2 rescue breaths

CHECK RESPONSE - CHECK BREATHING

- Approach safely
- Check response
- Check breathing
- Shout for help & Call 115
- 30 chest compressions
- 2 rescue breaths

CHECK RESPONSE

- Shake shoulders gently
- Ask “Are you all right?”
- If he responds
- Leave as you find him.
- Find out what is wrong.
- Reassess regularly.

AGONAL BREATHING & GASPING

- Occurs shortly after the heart stops
  in up to 40% of cardiac arrests
- Described as barely, heavy, noisy or gasping breathing
- Recognise as a sign of cardiac arrest

SHOUT FOR HELP

- Approach safely

- Check response
- Check breathing

- Shout for help & Call 115

- 30 chest compressions
- 2 rescue breaths

Call ١١٥

- Approach safely
- Check response
- Check breathing
- Shout for help & Call 115
- 30 chest compressions
- 2 rescue breaths

Check pulse

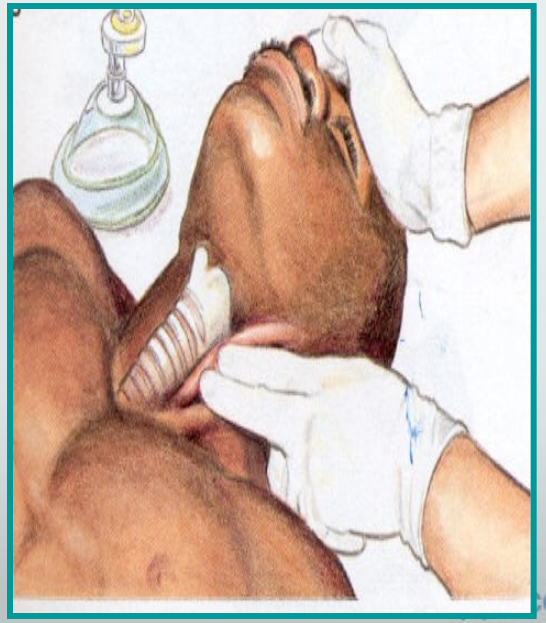
Only for healthcare provider

Feel within 10 sec

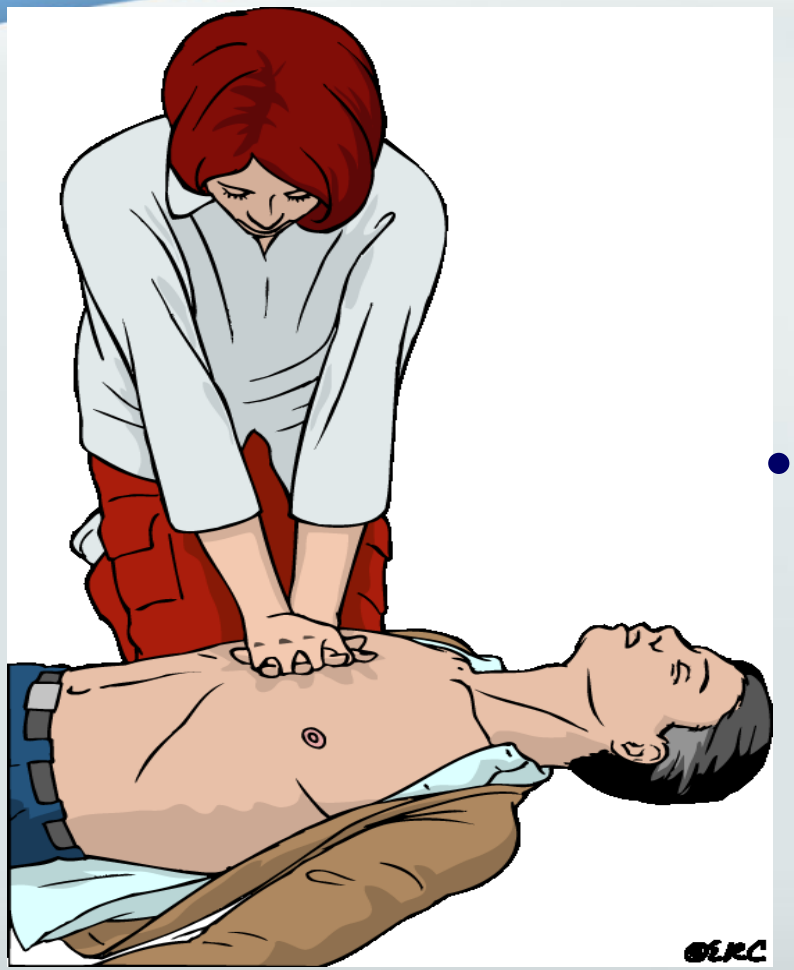
1. definite pulse → give 1 breath / q 5-6 s

2. recheck pulse q 2 min.

3. no pulse → next step



CHEST COMPRESSIONS



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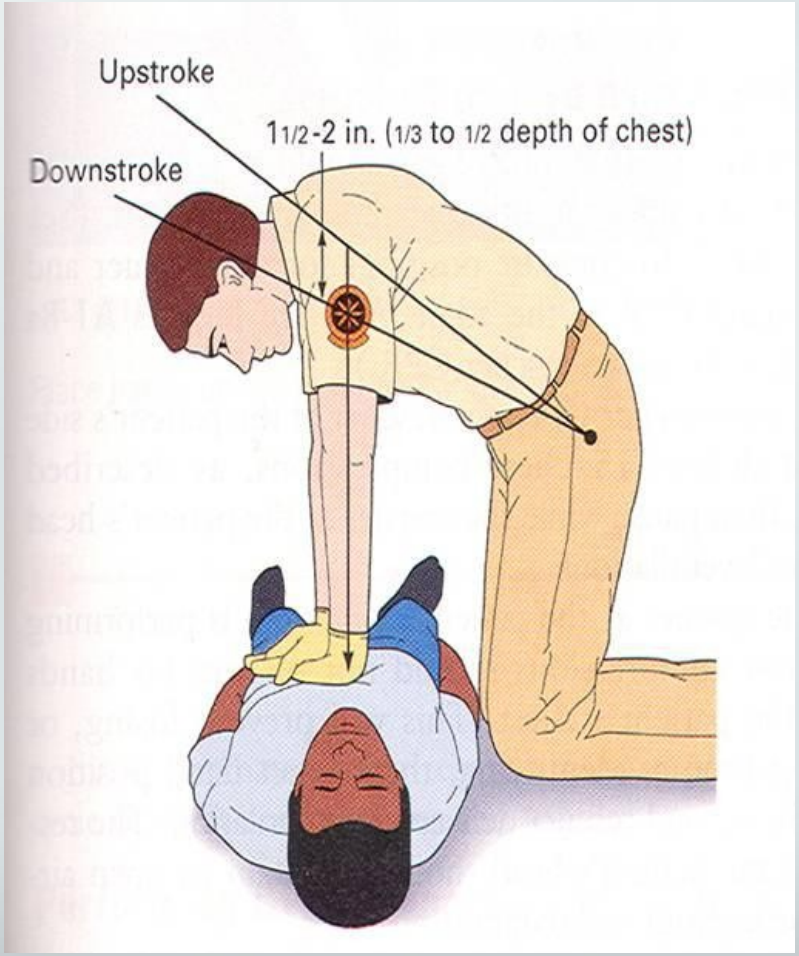
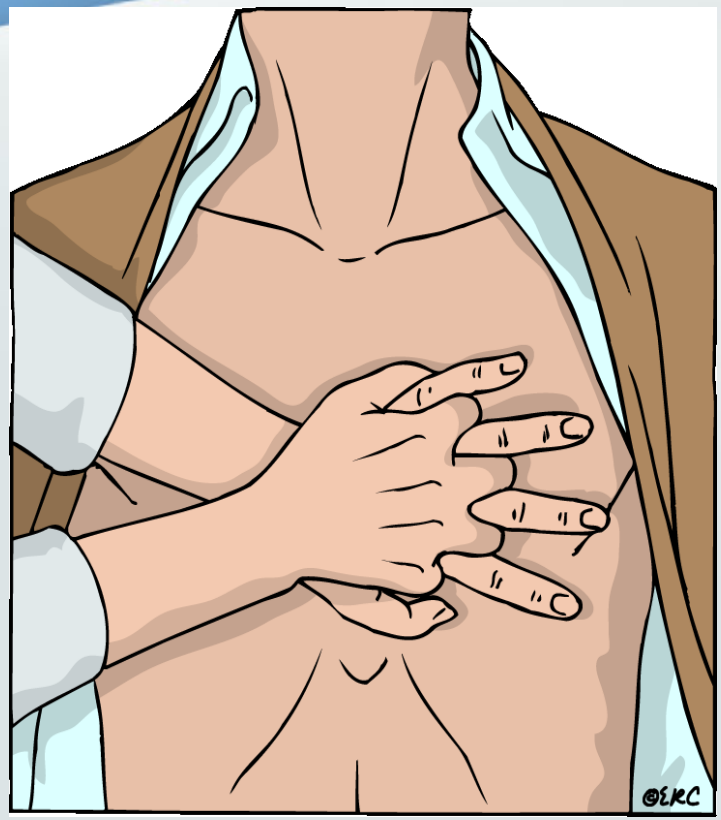
CHEST COMPRESSION

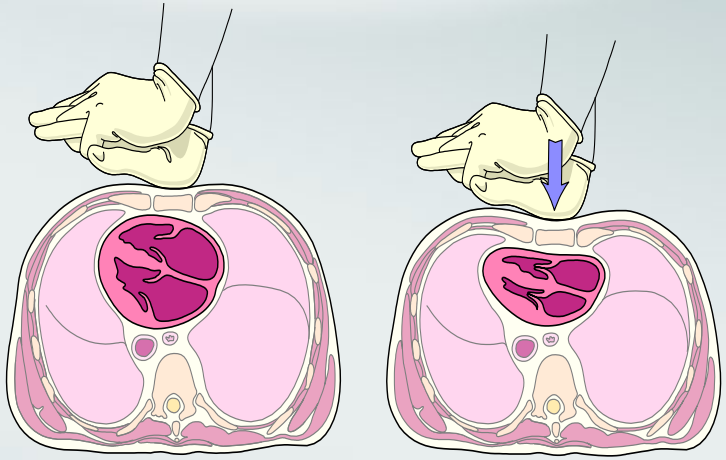


CHEST COMPRESSIONS



- supine victim on a hard surface
- Place the heel of one hand in the centre of the chest (lower half)
- Place other hand on top
- Interlock fingers

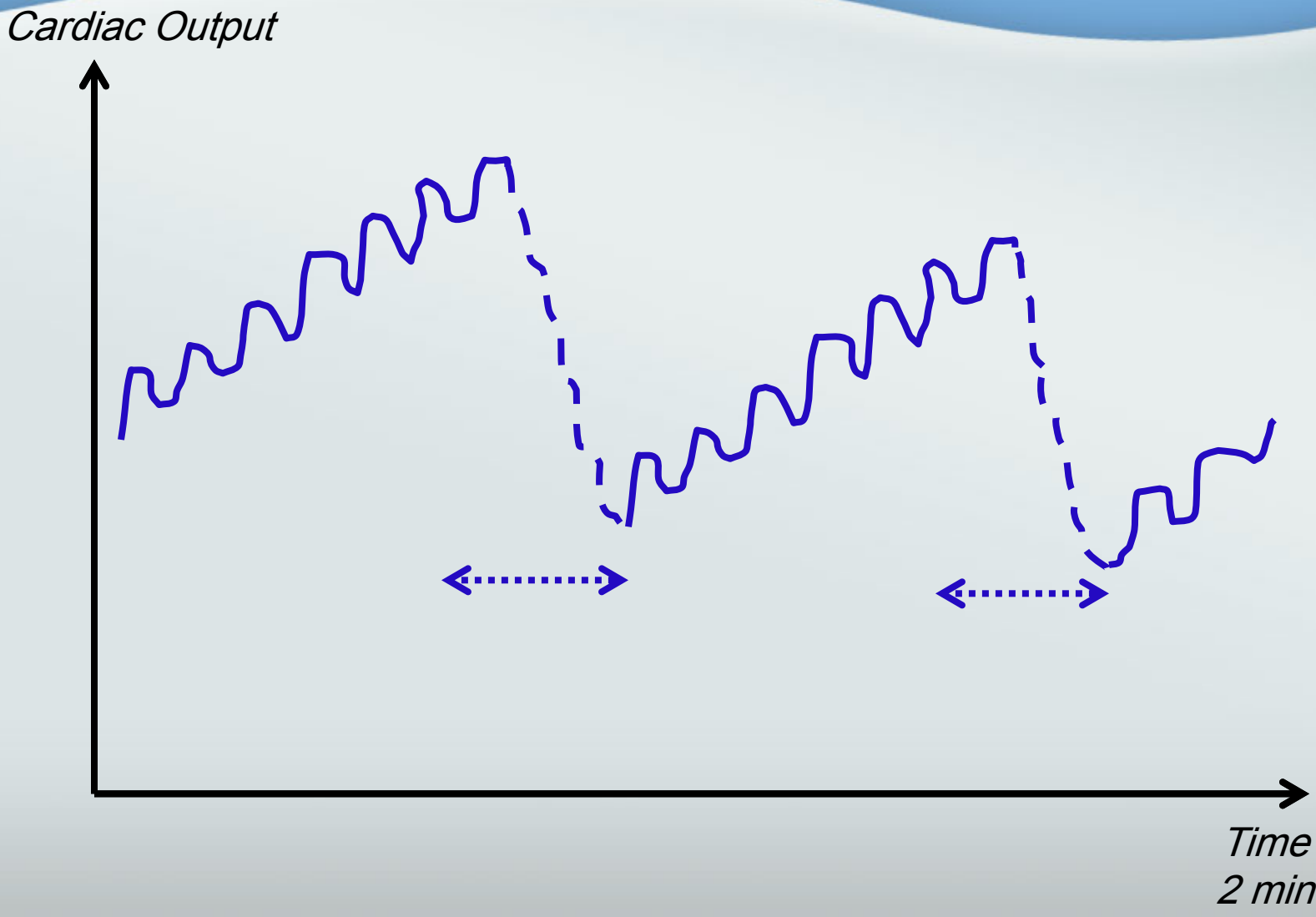
CHEST COMPRESSIONS



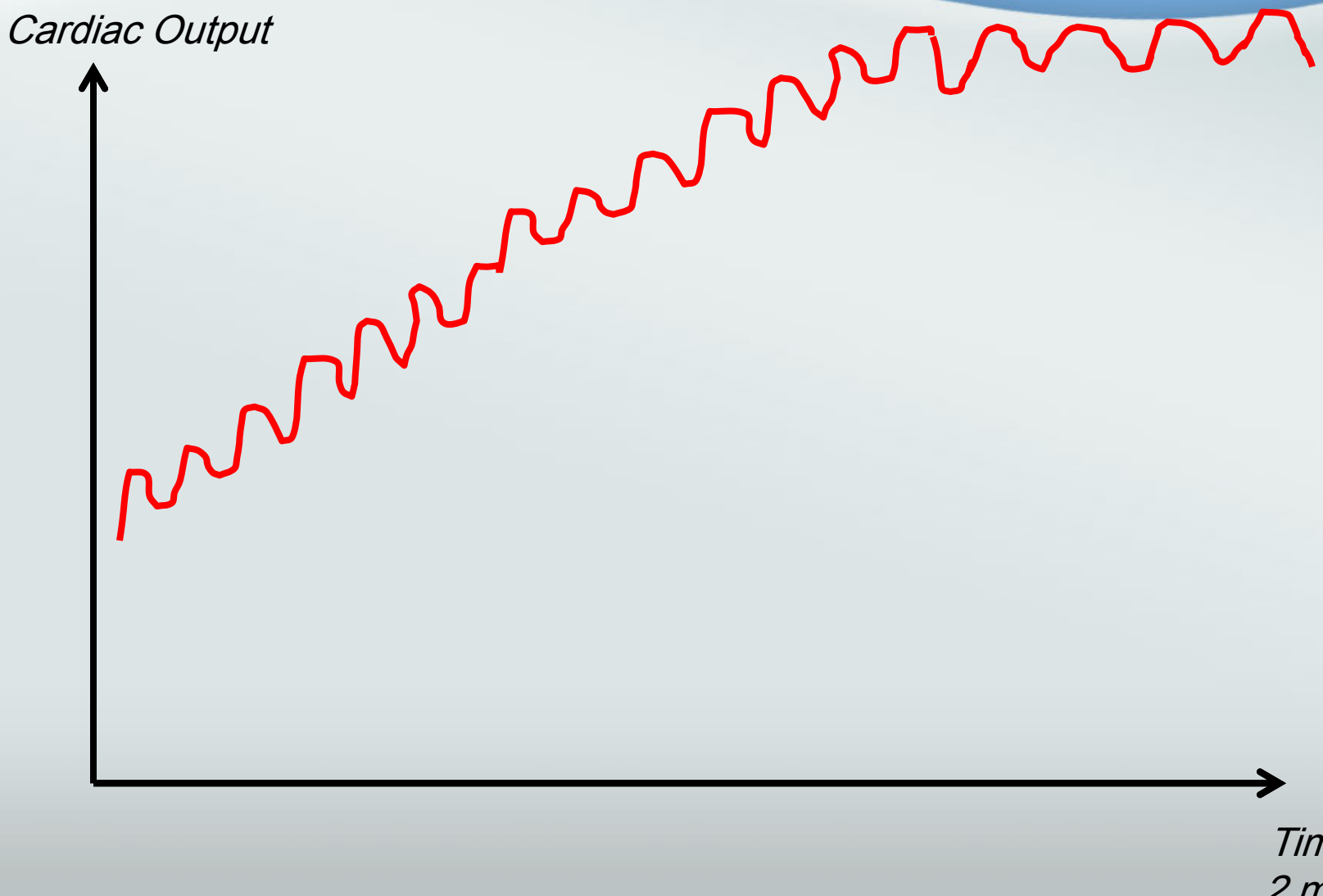
- Push hard and fast the chest:
  - Rate at least 100 /min
  - Depth 5 cm
  - Equal compression / relaxation
  - Minimize interruptions in chest compressions.

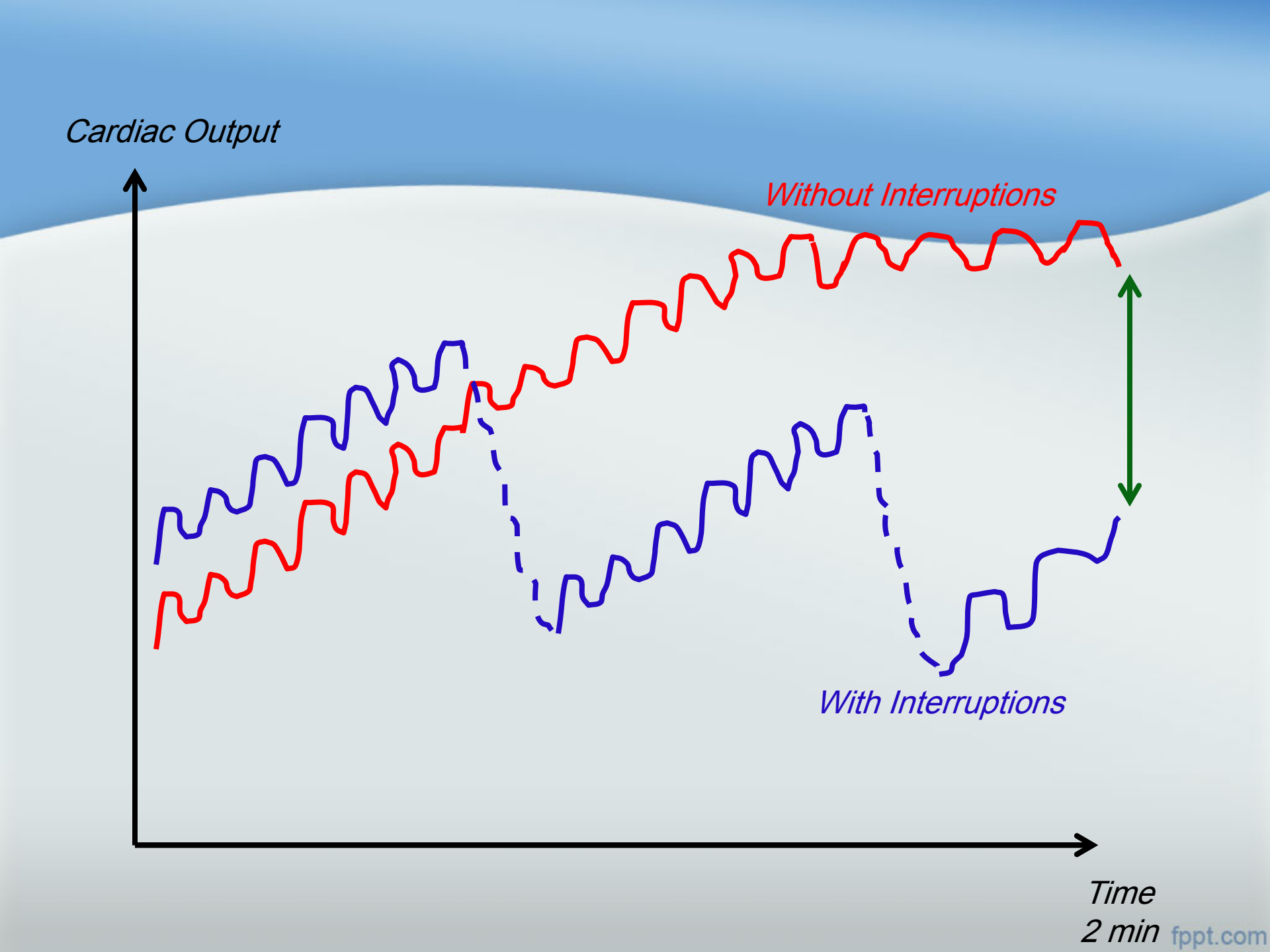
- When possible change CPR operator every 2 min

Interruptions During Chest Compression

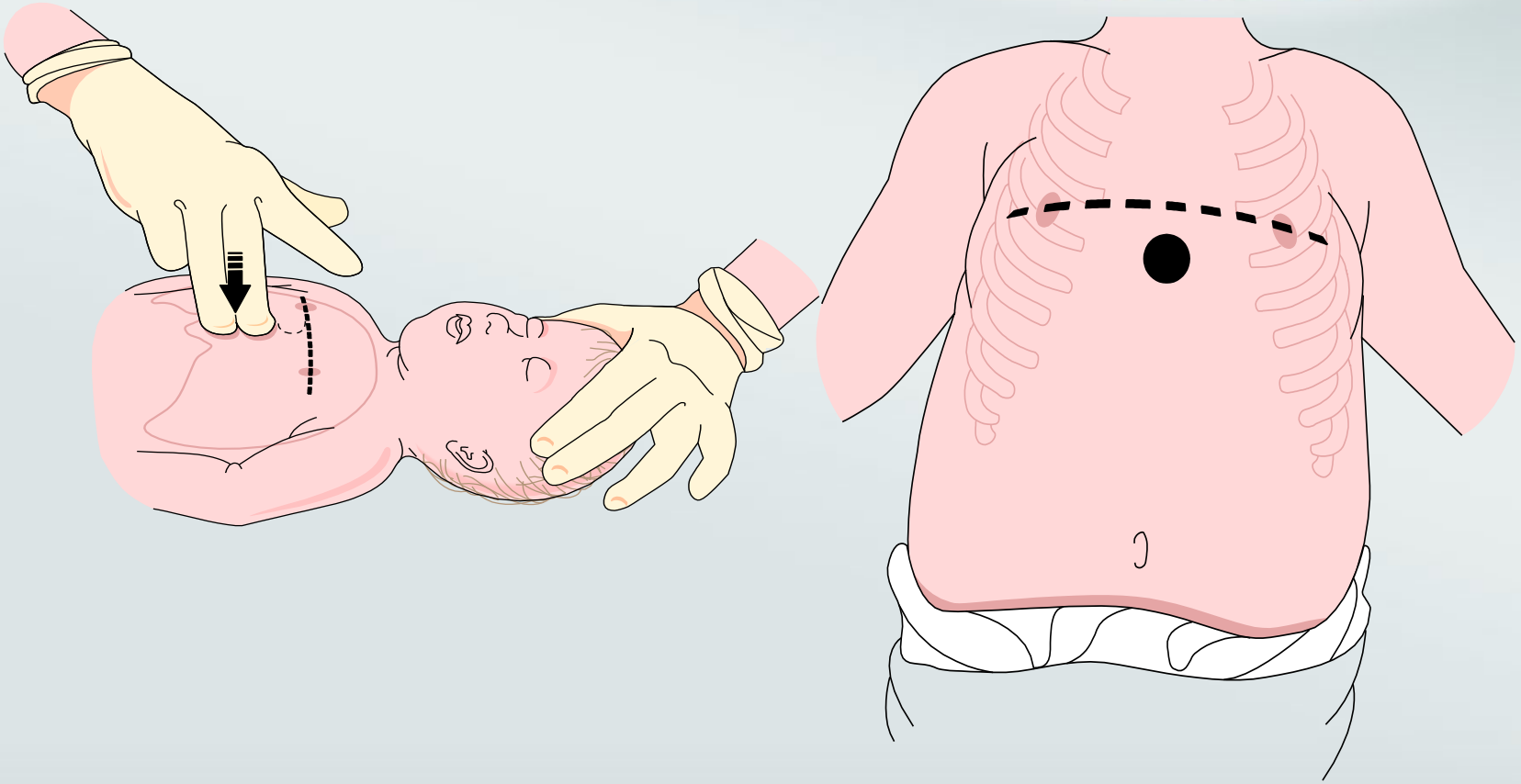


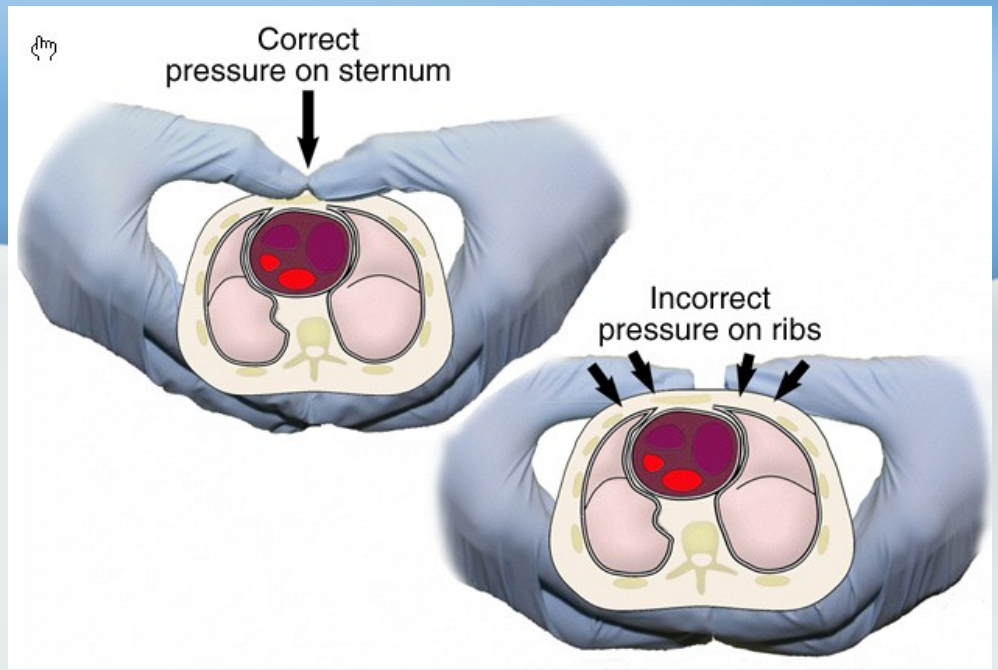
Without Interruptions During Chest Compression

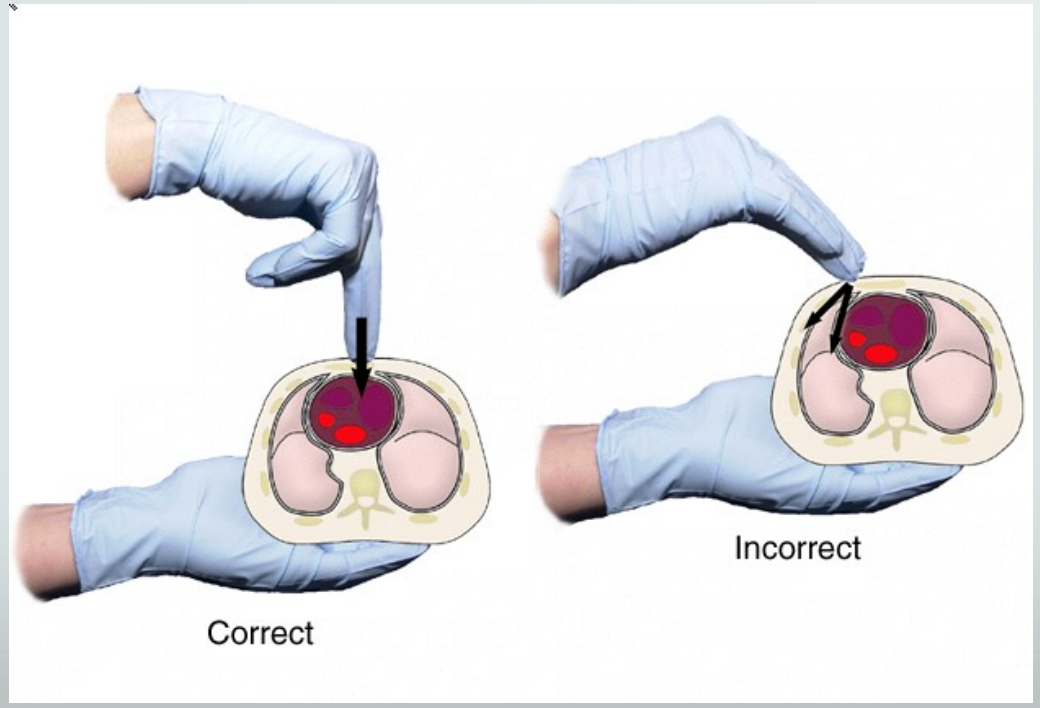



Cardiac Output
Without Interruptions
With Interruptions
Time
2 min

CHEST COMPRESSION




Correct
pressure on sternum
Incorrect
pressure on ribs

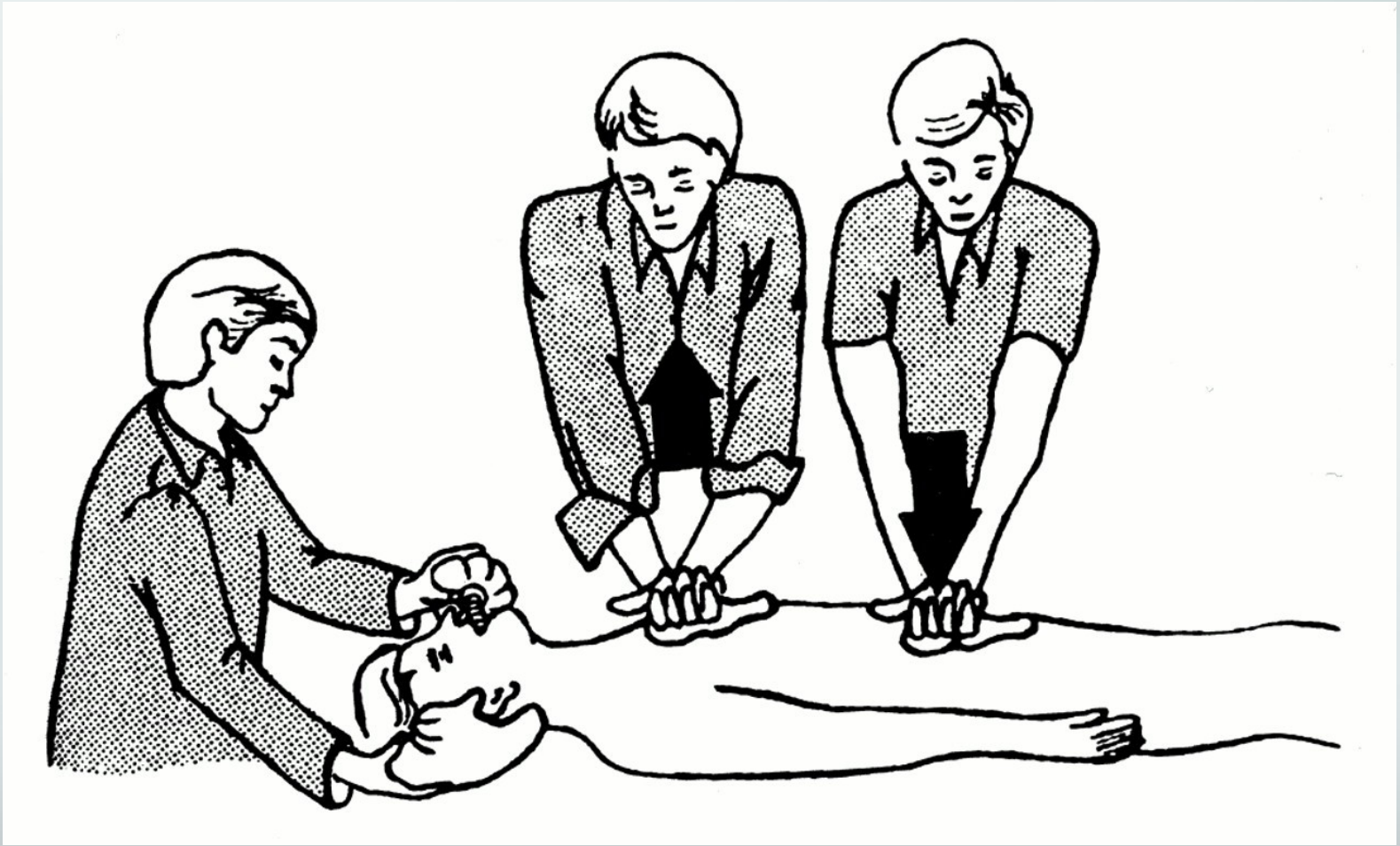

Correct
Incorrect


AutoPulse
REVIVANT
HEAD
REVIVANT
AutoPulse™ Resuscitation System

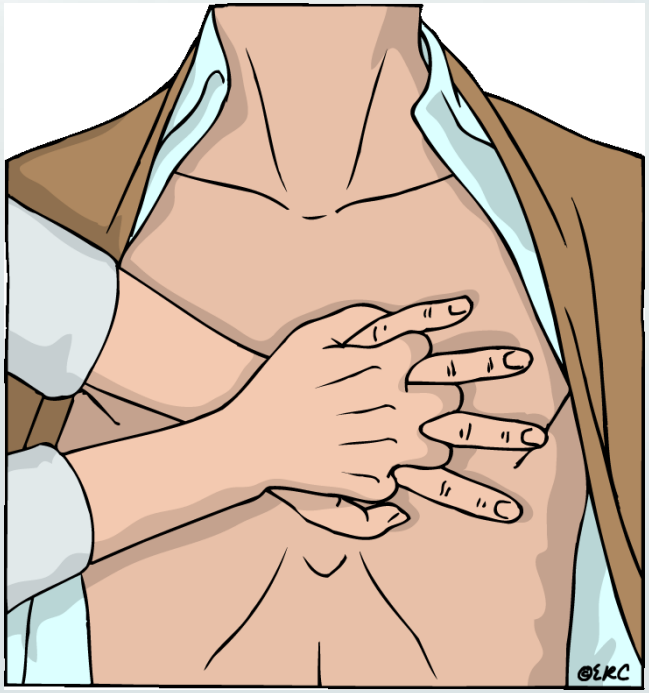
Compression

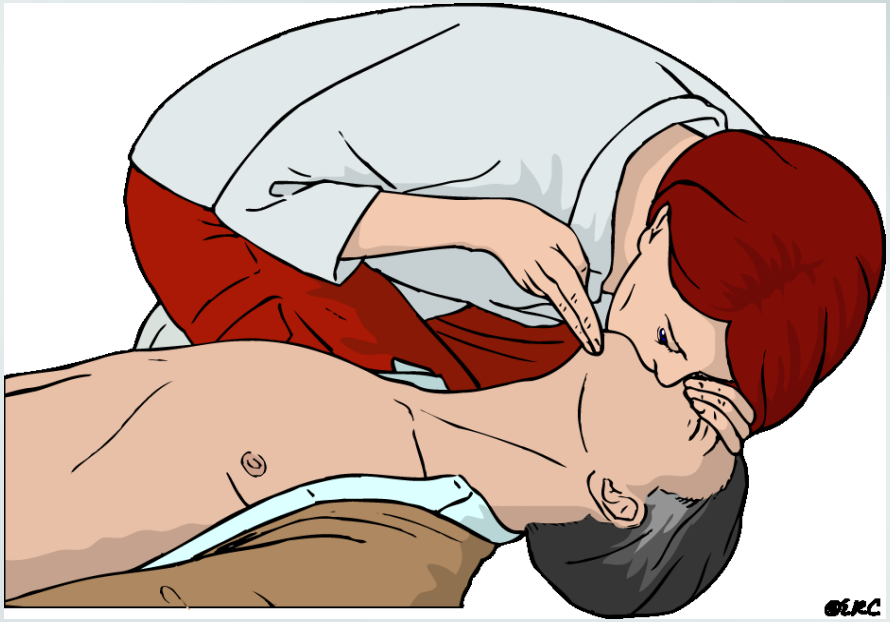
Decompression

Interposed abdominal counter pulsation is designed to augment diastolic aortic pressure and improve blood flow.



Compressions To Ventilations Ratio





30

2

C.T.V. ratio

1 rescuer

30 : 2

2 rescuer

Adult

30:2

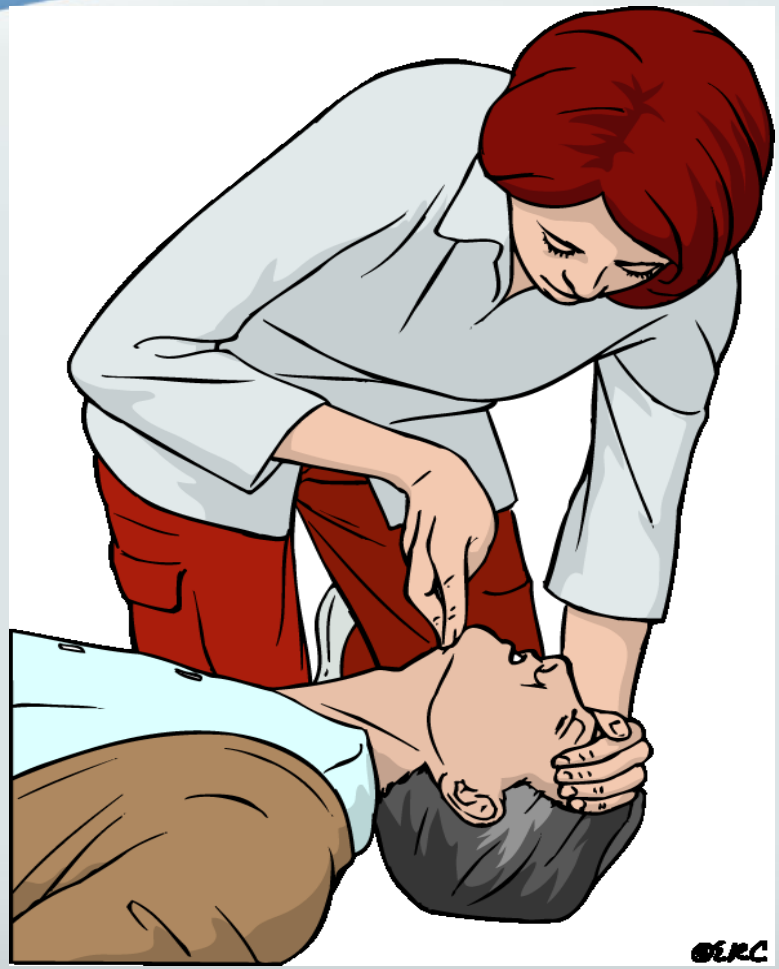
< 8 yr.

15:2

RESCUE BREATHS

- Approach safely
- Check response
- Check breathing
- Shout for help & Call 115
- 30 chest compressions
- 2 rescue breaths

OPEN AIRWAY
(head tilt , chin lift -- jaw thrust)



- Approach safely

- Check response
- Check breathing

- Shout for help & Call 115

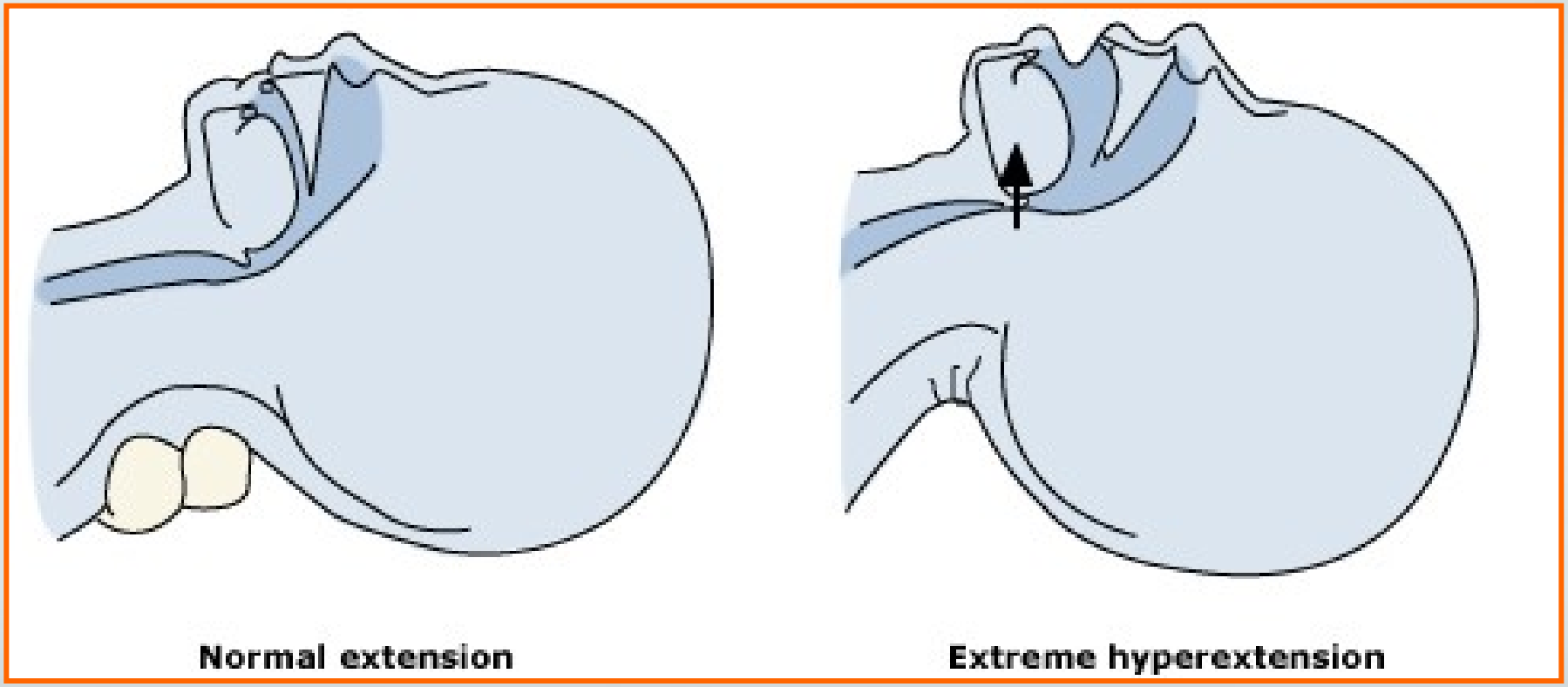
- 30 chest compressions
- 2 rescue breaths

Open Airway

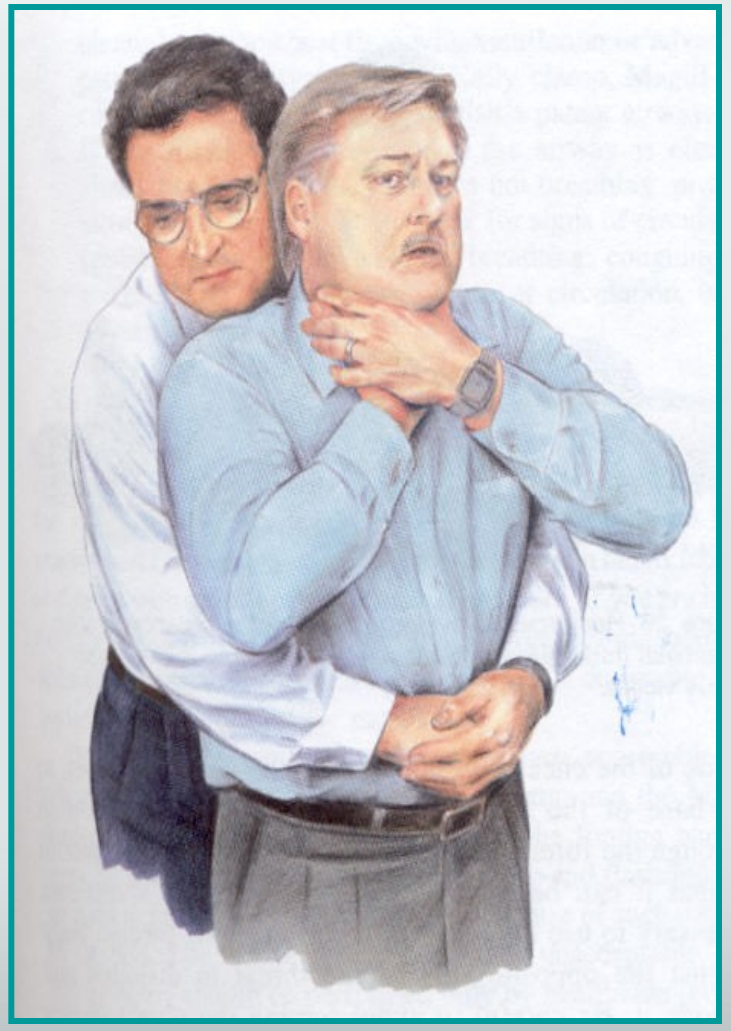
Head Tilt- Chin Lift

Jaw Thrust

Airway maintenance techniques and assessment of ventilation in pediatric resuscitation



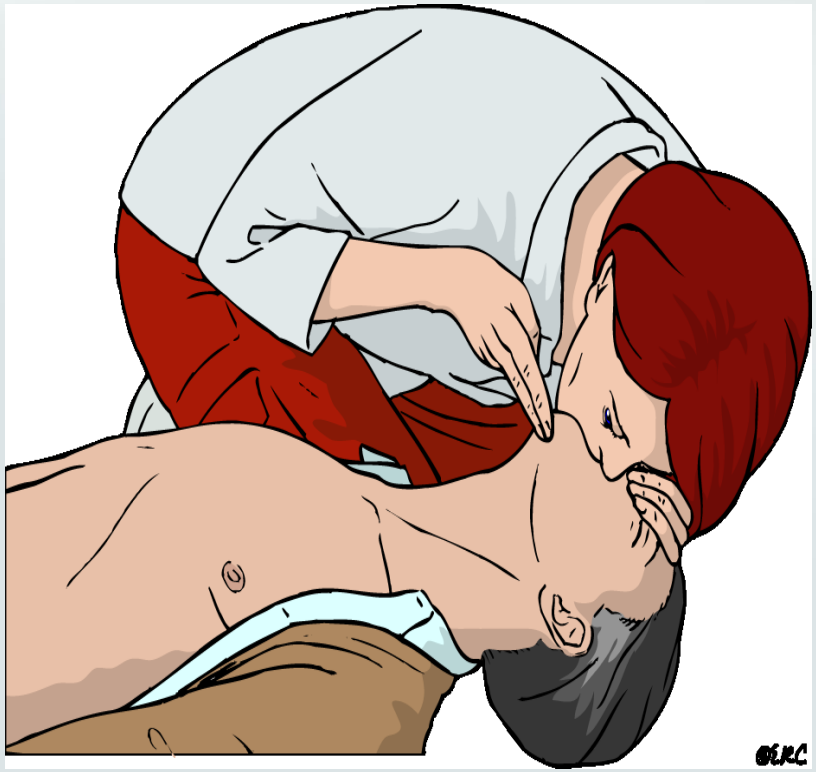
Heimlich Maneuver



Give 2 BREATH

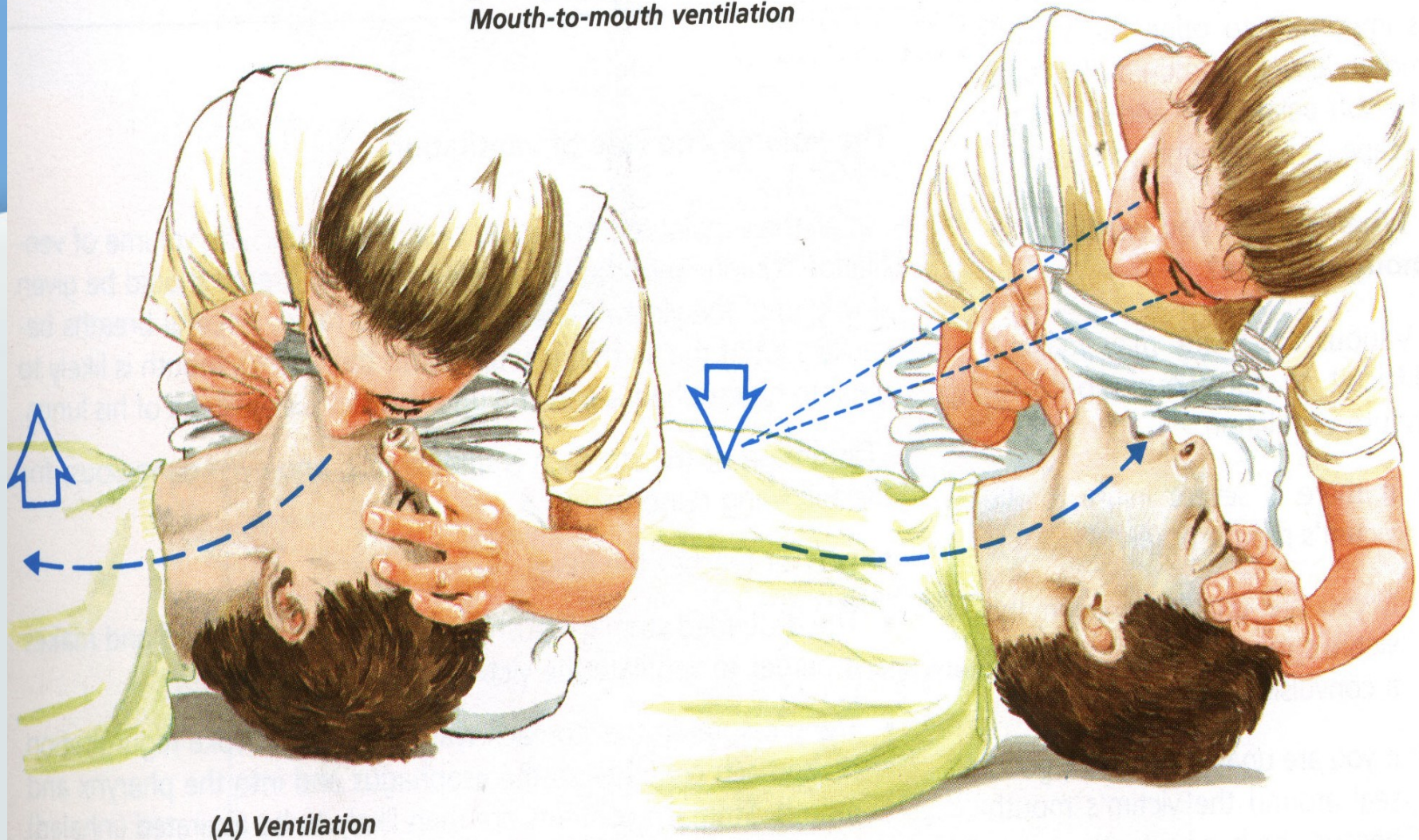
- Deliver each breath **over 1 second**
- Give a sufficient tidal volume ***produce visible chest rise .***
- Avoid rapid or forceful breaths.

2 RESCUE BREATHS



- Pinch the nose
- Take a normal breath
- Place lips over mouth
- Blow until the chest rises
- Take about 1 second
- Allow chest to fall
- Repeat

6
Mouth-to-mouth ventilation



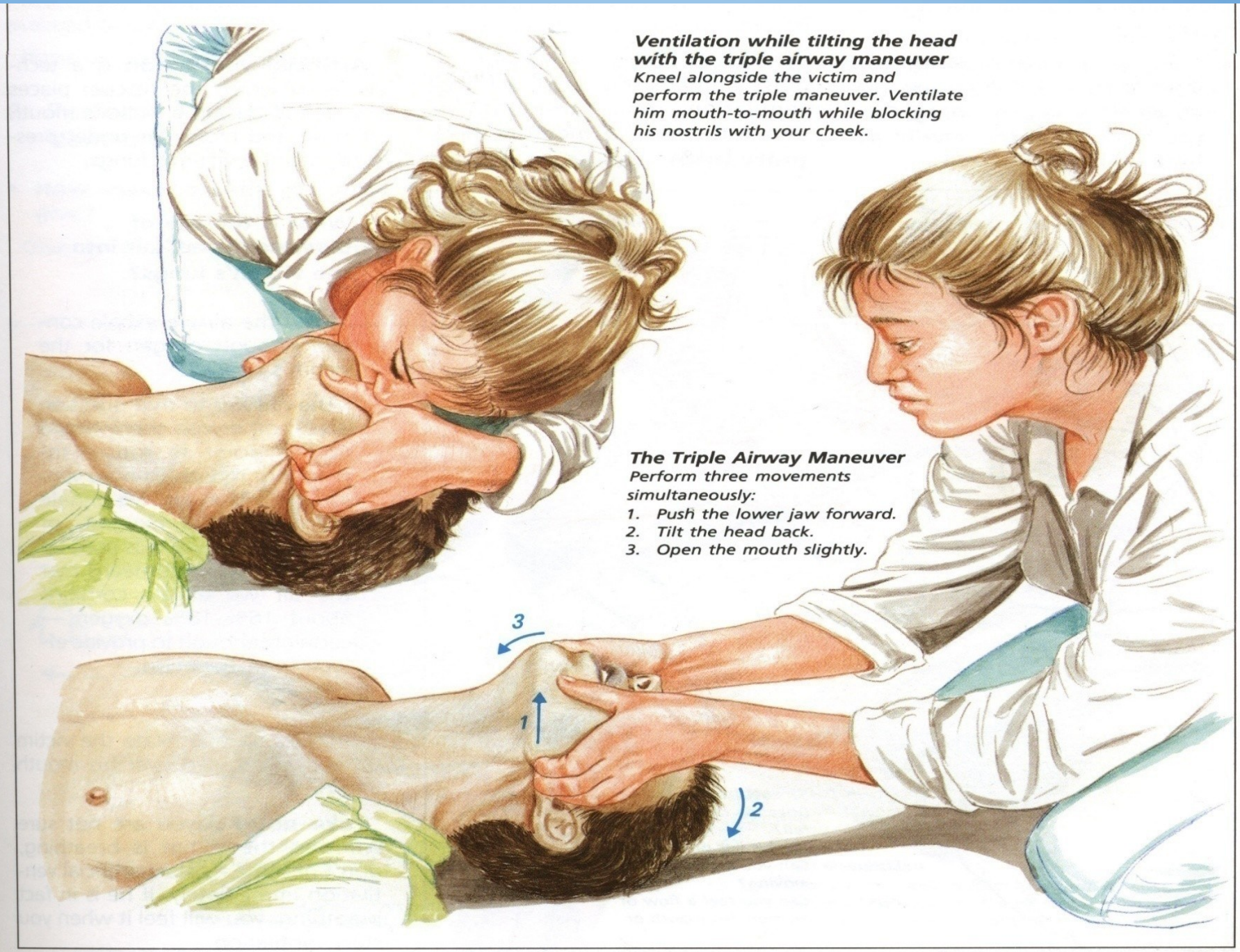
(A) Ventilation

With the fingers of your hand that is on the victim's forehead, pinch his nostrils closed.

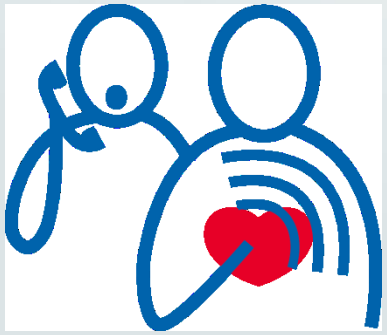
Seal your lips around his mouth and exhale until you see his chest rise.

(B) Relaxation

Remove your mouth from his mouth and let go of his nose. Let the air escape from his lungs through his mouth and nose.


Ventilation while tilting the head with the triple airway maneuver
Kneel alongside the victim and perform the triple maneuver. Ventilate him mouth-to-mouth while blocking his nostrils with your cheek.
The Triple Airway Maneuver
Perform three movements simultaneously:
1. Push the lower jaw forward.
2. Tilt the head back.
3. Open the mouth slightly.
3
1
2

BASIC LIFE SUPPORT



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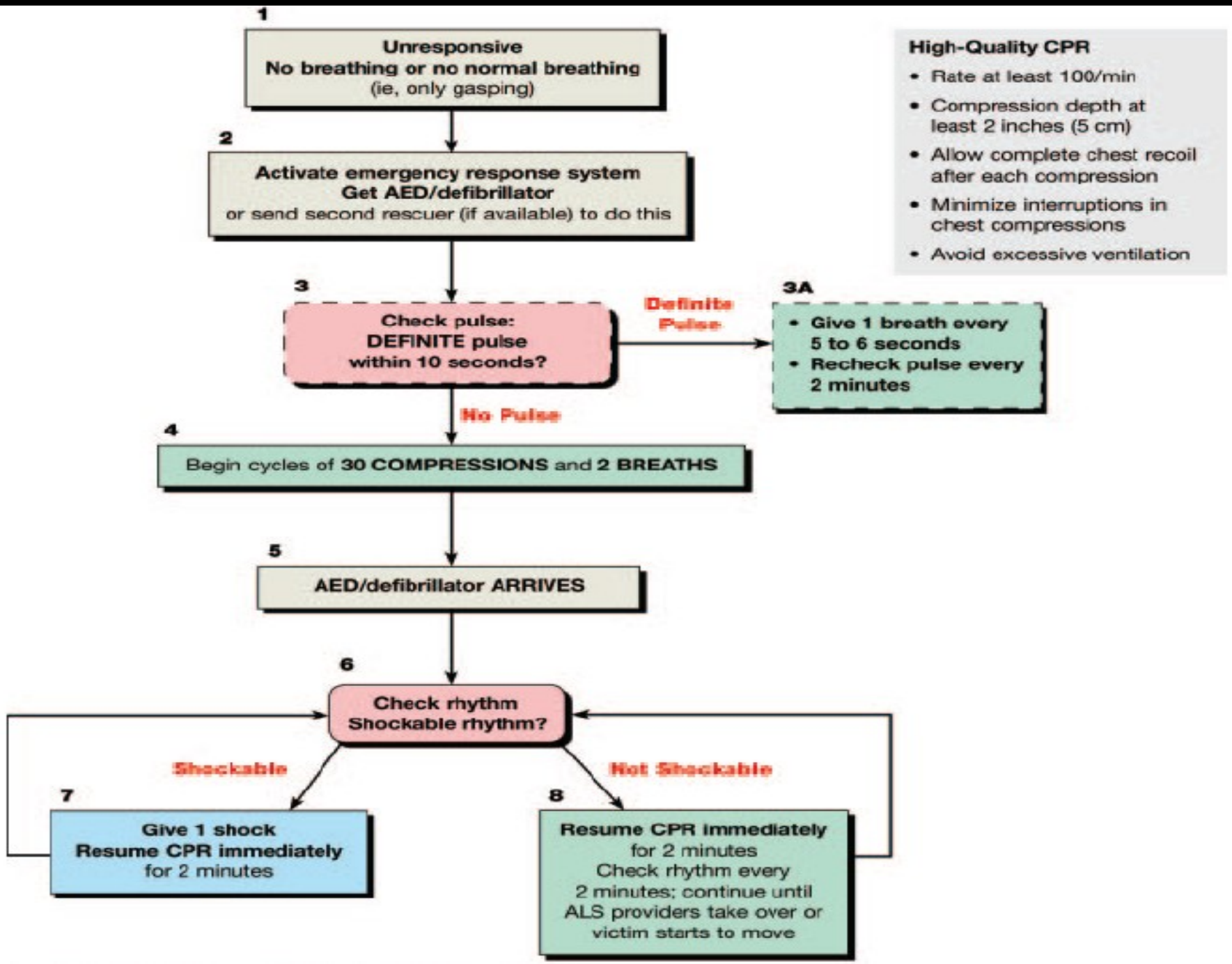
- 30 chest compressions
- 2 rescue breaths


1
Unresponsive
No breathing or no normal breathing
(ie, only gasping)
2
Activate emergency response system
Get AED/defibrillator
or send second rescuer (if available) to do this
3
Check pulse:
DEFINITE pulse
within 10 seconds?
Definite Pulse
3A
Give 1 breath every 5 to 6 seconds
Recheck pulse every 2 minutes
No Pulse
4
Begin cycles of 30 COMPRESSIONS and 2 BREATHS
5
AED/defibrillator ARRIVES
6
Check rhythm
Shockable rhythm?
Shockable
Not Shockable
7
Give 1 shock
Resume CPR immediately
for 2 minutes
8
Resume CPR immediately
for 2 minutes
Check rhythm every 2 minutes; continue until ALS providers take over or victim starts to move
High-Quality CPR
Rate at least 100/min
Compression depth at least 2 inches (5 cm)
Allow complete chest recoil after each compression
Minimize interruptions in chest compressions
Avoid excessive ventilation

	Recommendations		
Component	**Adults**	**Children**	**Infants**
Recognition	Unresponsive (for all ages)		
	No breathing or no normal breathing (ie, only gasping)	No breathing or only gasping	
	No pulse palpated within 10 seconds for all ages (HCP only)		
CPR sequence	C-A-B		
Compression rate	At least 100/min		
Compression depth	At least 2 inches (5 cm)	At least ⅓ AP diameter About 2 inches (5 cm)	At least ⅓ AP diameter About 1½ inches (4 cm)
Chest wall recoil	Allow complete recoil between compressions HCPs rotate compressors every 2 minutes		
Compression interruptions	Minimize interruptions in chest compressions Attempt to limit interrruptions to <10 seconds		
Airway	Head tilt–chin lift (HCP suspected trauma: jaw thrust)		
Compression-to-ventilation ratio (until advanced airway placed)	30:2 1 or 2 rescuers	30:2 Single rescuer 15:2 2 HCP rescuers	
Ventilations: when rescuer untrained or trained and not proficient	Compressions only		
Ventilations with advanced airway (HCP)	1 breath every 6-8 seconds (8-10 breaths/min) Asynchronous with chest compressions About 1 second per breath Visible chest rise		
Defibrillation	Attach and use AED as soon as available. Minimize interruptions in chest compressions before and after shock; resume CPR beginning with compressions immediately after each shock.		

Abbreviations: AED, automated external defibrillator; AP, anterior-posterior; CPR, cardiopulmonary resuscitation; HCP, healthcare provider.
*Excluding the newly born, in whom the etiology of an arrest is nearly always asphyxial.

Two steps to save a life:

Call 911

Push hard and fast in
the center of the chest

HandsOnlyCPR.org

American Heart Association

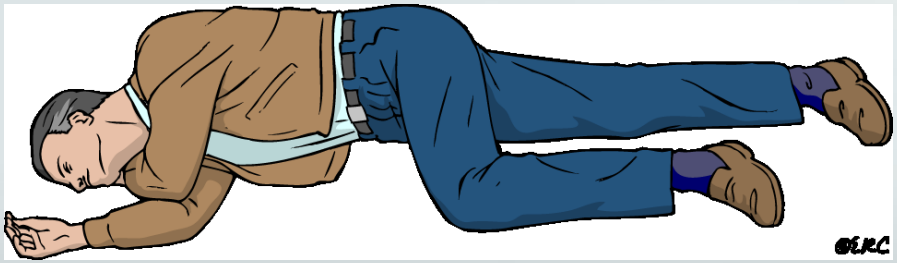
Recovery Position

نحوه قرارگیری مصدوم در وضعیت ریکاوری

1

2

3



4

ACLS

Advance cardiac life support

مهمترین تغییرات گاید لاین احیا ۲۰۱۵

- ✓ تعداد ماساژ قلبی از ۱۰۰ تا ۱۲۰ در دقیقه
- ✓ عمق ماساژ از ۲ تا ۲.۴ اینچ (۶ سانتیمتر)
- ✓ حذف وازوپرسین از چرخه احیا و تاکید بر اپی نفرین
- ✓ استفاده از میزان حداکثری اکسیژن در طول احیا و کاهش آن پس از ROSC

مهمترین تغییرات گاید لاین احیا ۲۰۱۵

- پایین بودن CO2انتهای بازدمی در بیماران اینتوبه پس از ۲۰دقیقه CPR نشان دهنده احتمال بقای خیلی پایین است،واین فاکتور باید همراه با سایر فاکتورهایی که در تعیین خاتمه CPRبه ما کمک می کند،استفاده شود.
- در بیمارانی که در حالت کما به‌سر می‌برند، نقطه دمای بدنشان را ۳۲ تا ۳۶ درجه سانتی‌گراد برای حداقل مدت ۲۴ ساعت در نظر بگیرید و از بروز تب پیشگیری کنید.
- اگر ایست قلبی بیمار به دلیل فیبریلاسیون/تاکی‌کاردی بطنی بوده، از لیدوکائین استفاده کنید.

مراحل CPR:

1) **Basic cardiac life support**
- Circulation
- Airway control
- Breathing

2) **Advance cardiac life support**
- Drug and fluids
- Electrocardiography
- Fibrillation treatment

3) **Prolonged cardiac life support**
- Gauging
- Human mentation
- Intensive care

Airway Management

توجه

مشکلات راه هوایی = اختلال تنفس

هر نوع اختلال تنفسی = تهدید فوری حیات

!!! پس !!!

DO : ASSESSMENT & MANAGEMENT IN THE SAME TIME

مشکلات راه هوایی

- انسداد
- اسپاسم
- ادم
- آسپیراسیون
- بیماریهای سیستم تنفسی
- دفورمیتی ناشی از تروما

عوامل انسداد راه هوایی

- **زبان** (شایعترین علت و همراه با تنفس صدادار و معمولا وابسته به پوزیشن سر و گردن)
- **جسم خارجی**
- **آنافیلاکسی/آنژیو ادم**
- **سوختگی های راه هوایی فوقانی**
- **اپیگلوتیتیس**
- **سندرم کروپ**

علائم انسداد راه هوایی

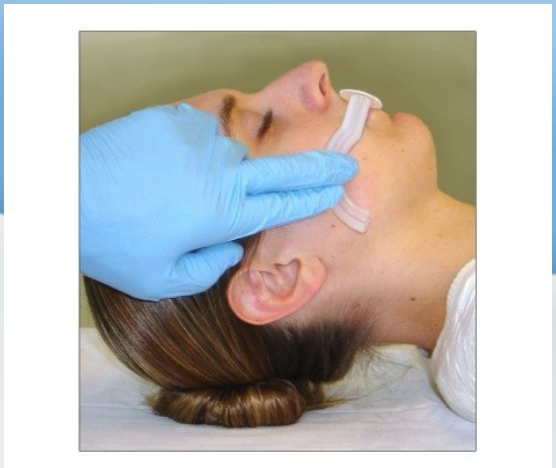
- سرفه
- حالت خفگی
- دهان باز و گرفتن گلو توسط بیمار
- تنگی نفس یا عدم تنفس
- عدم توان صحبت کردن

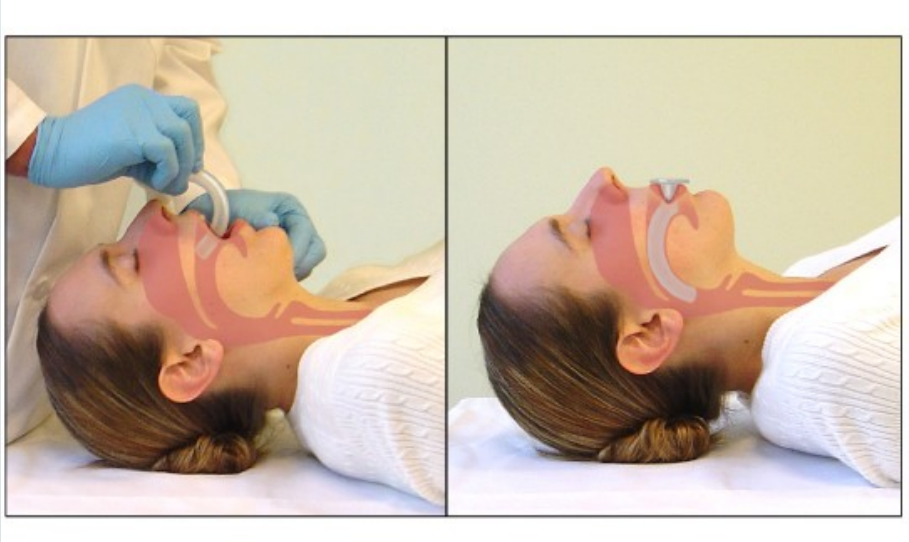
تکنیکهای باز کردن راه هوایی

- سر عقب چانه بالا (Head tilt & chin lift)
- باز کردن فک (Jaw-thrust)
- فشار بر سینه و ضربه به کمر(Chest thrusts-back blows)

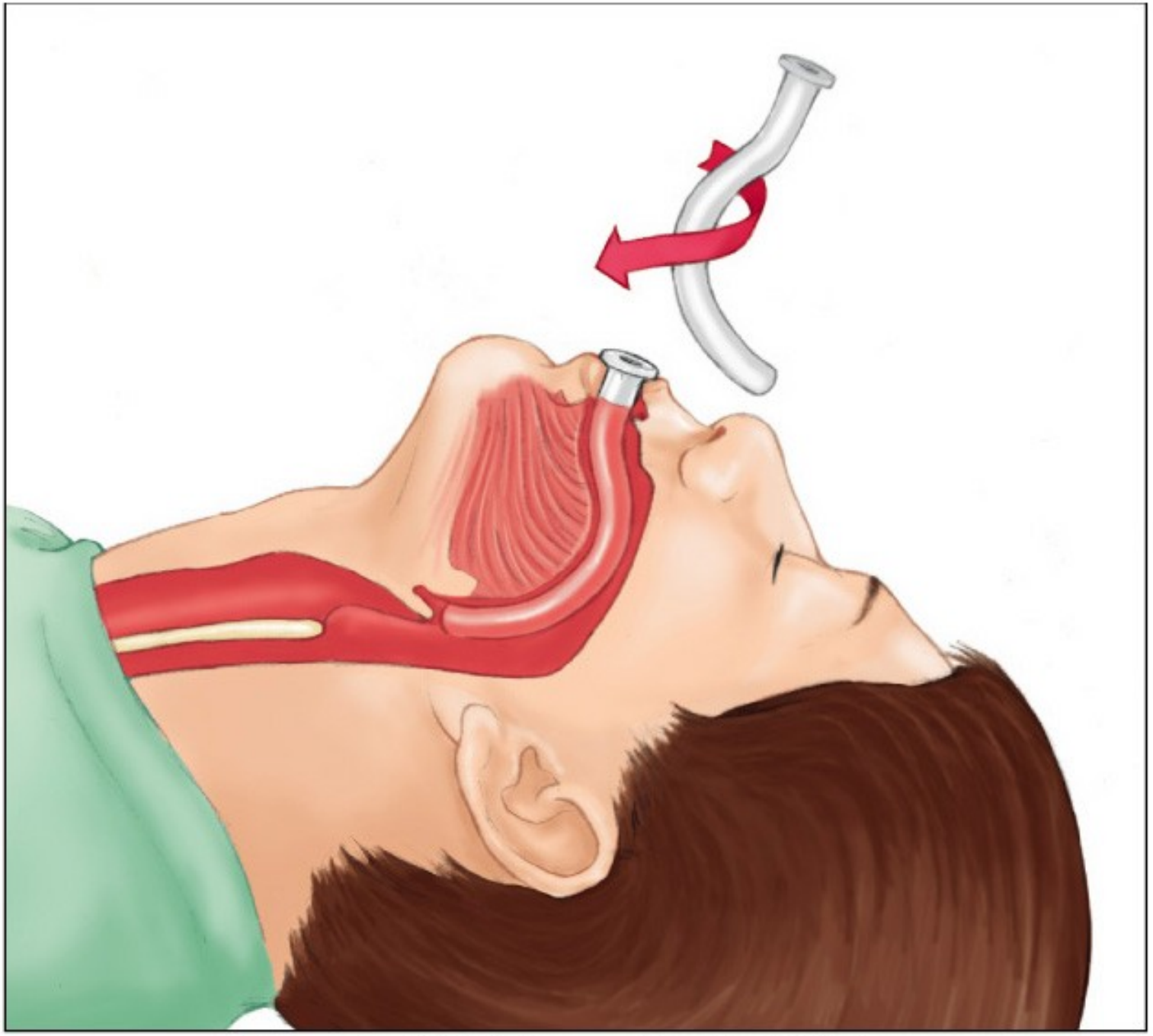
تجهیزات پر کاربرد مدیریت راه هوایی

- Oral air way
- Nasal air way
- BVM
- ETT
- ETC
- LMA

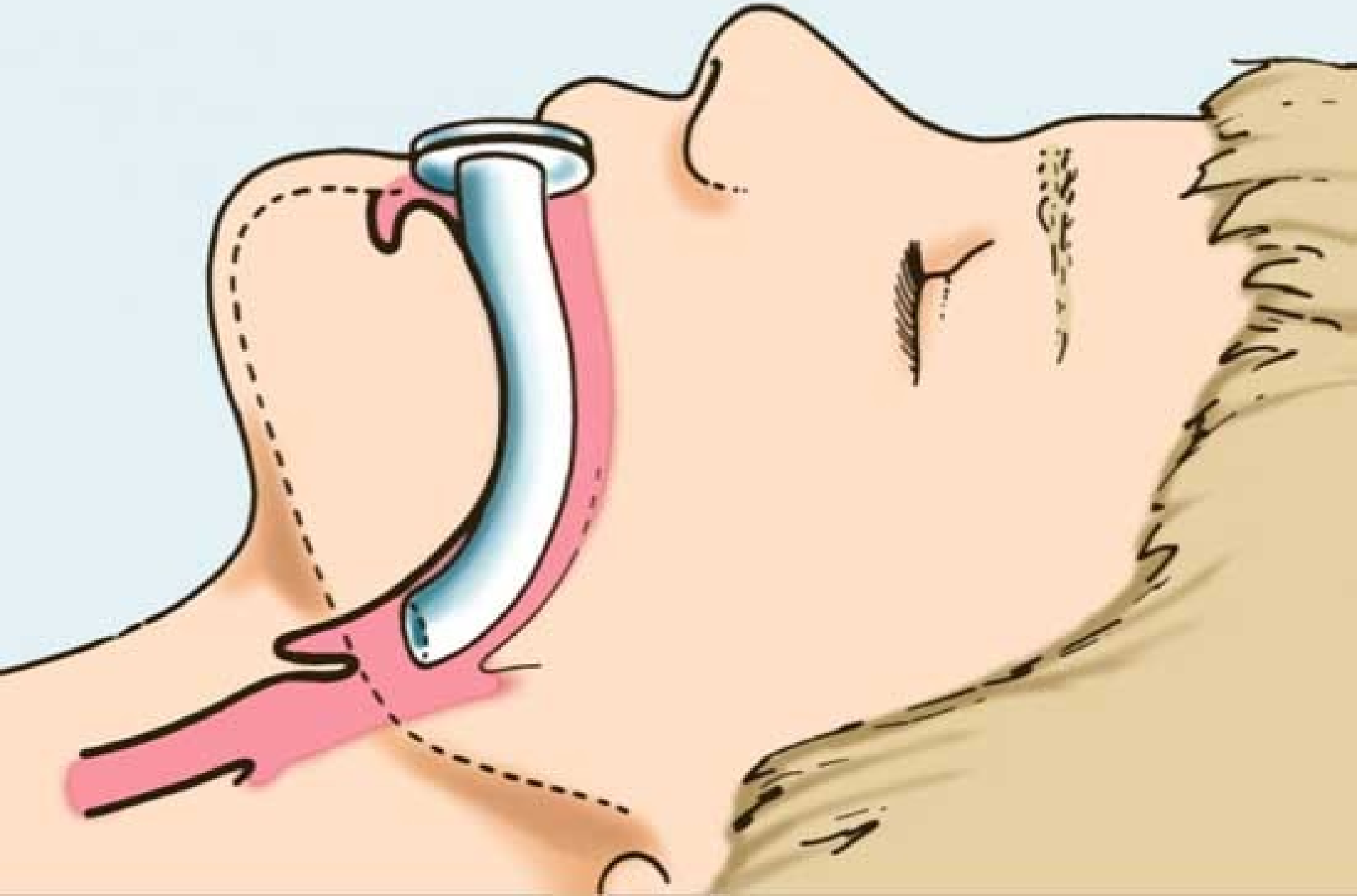




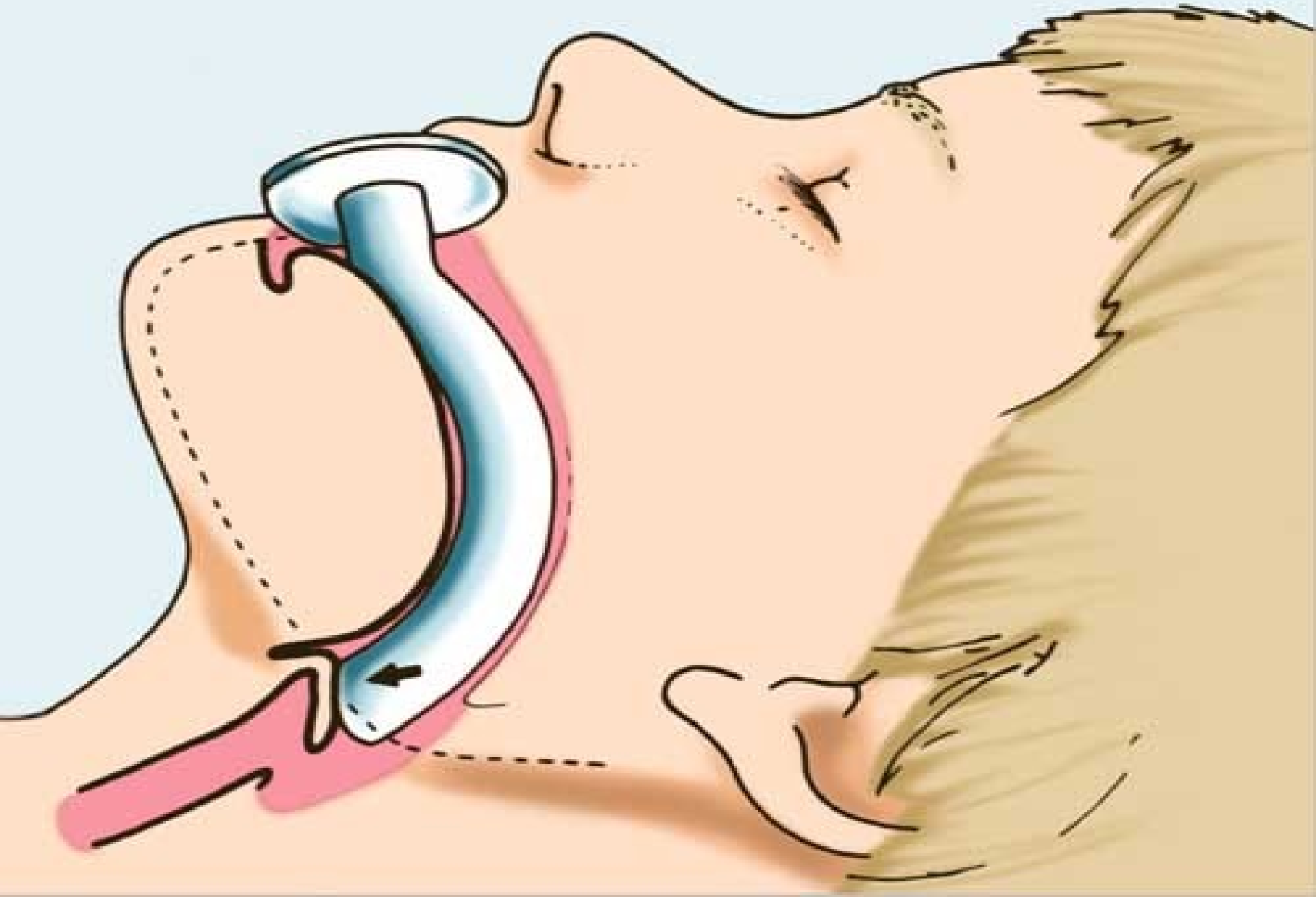
Select the proper size (corner of the mouth to tip of the ear)]



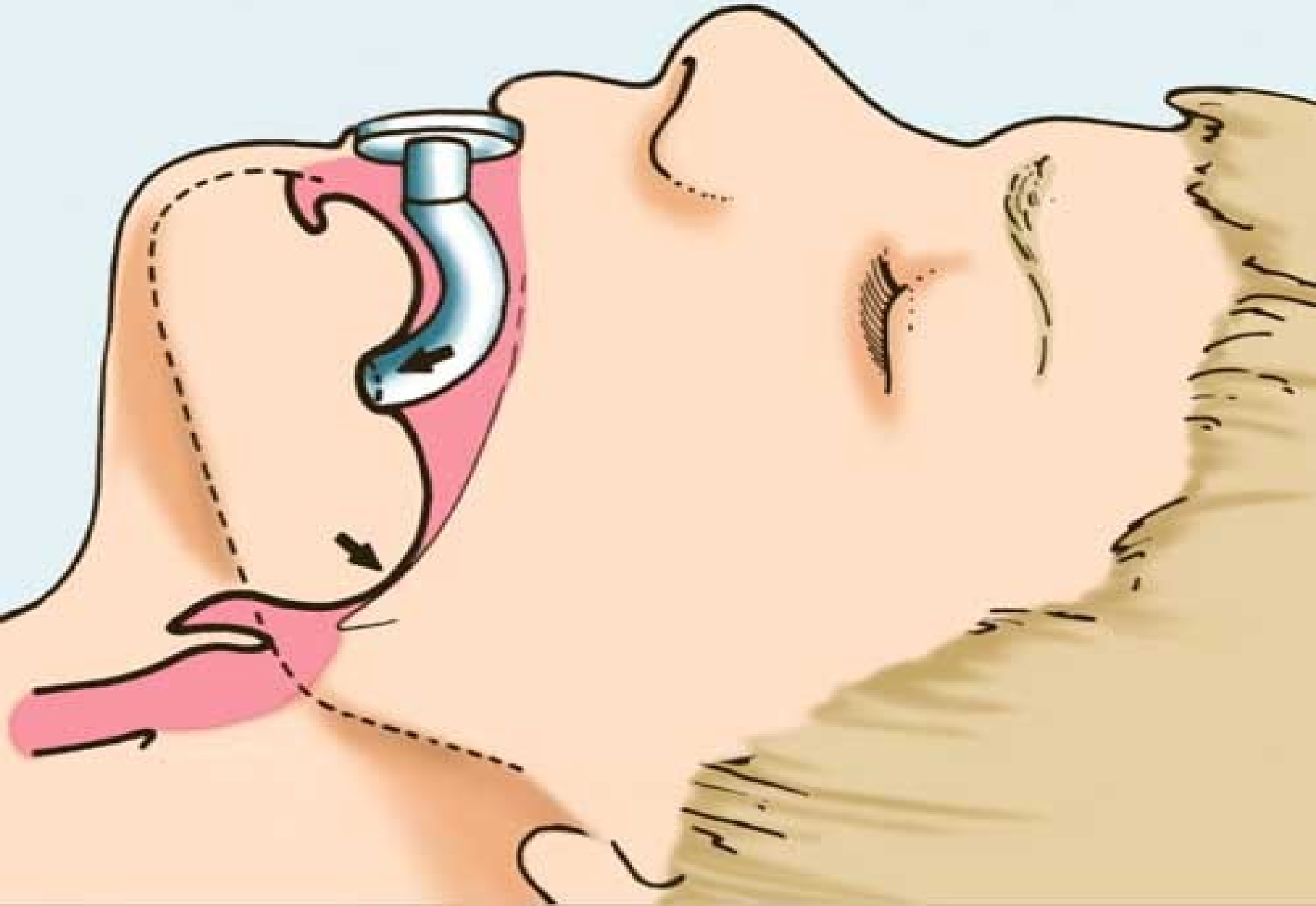
Oropharyngeal Tube Placement: Proper length

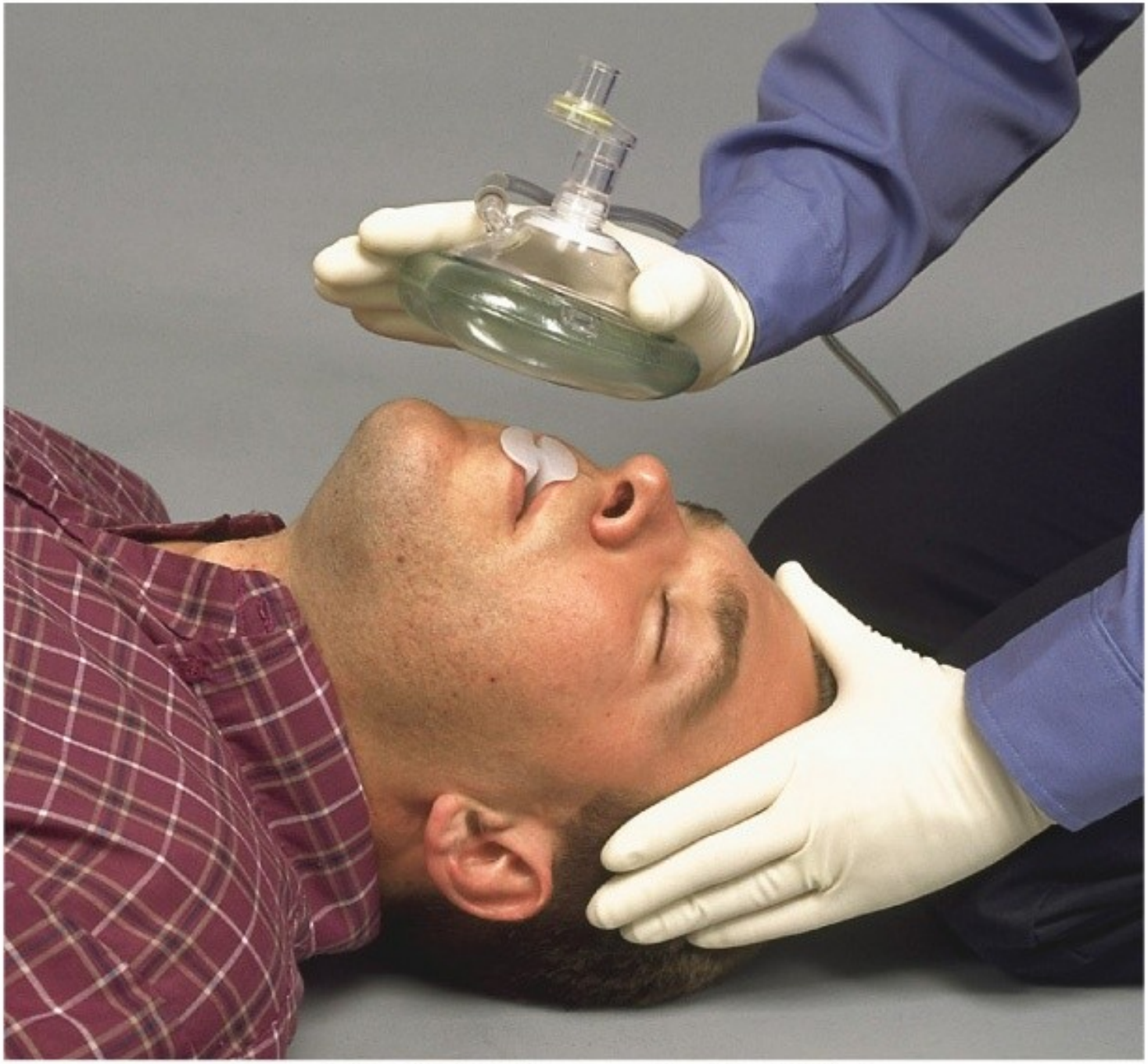


Oropharyngeal Tube Placement: Overly long tube



Oropharyngeal Tube Placement: Short tube





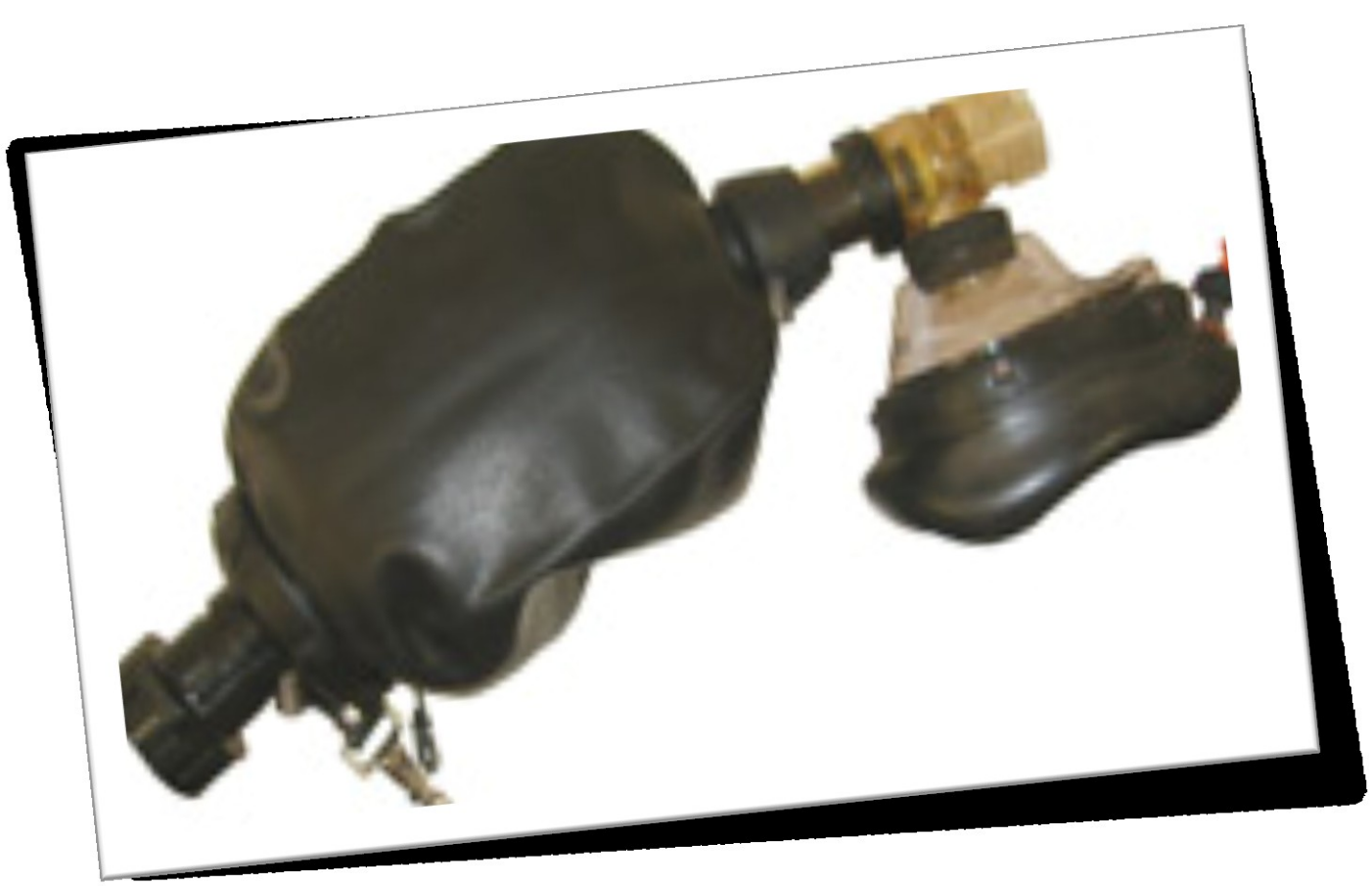
E-C clamp technique

Bag-Valve-Mask Components

One-Person BVM Technique

How much is Oxygen Delivered?

1-Delevery oxygen by pure ambo bag :

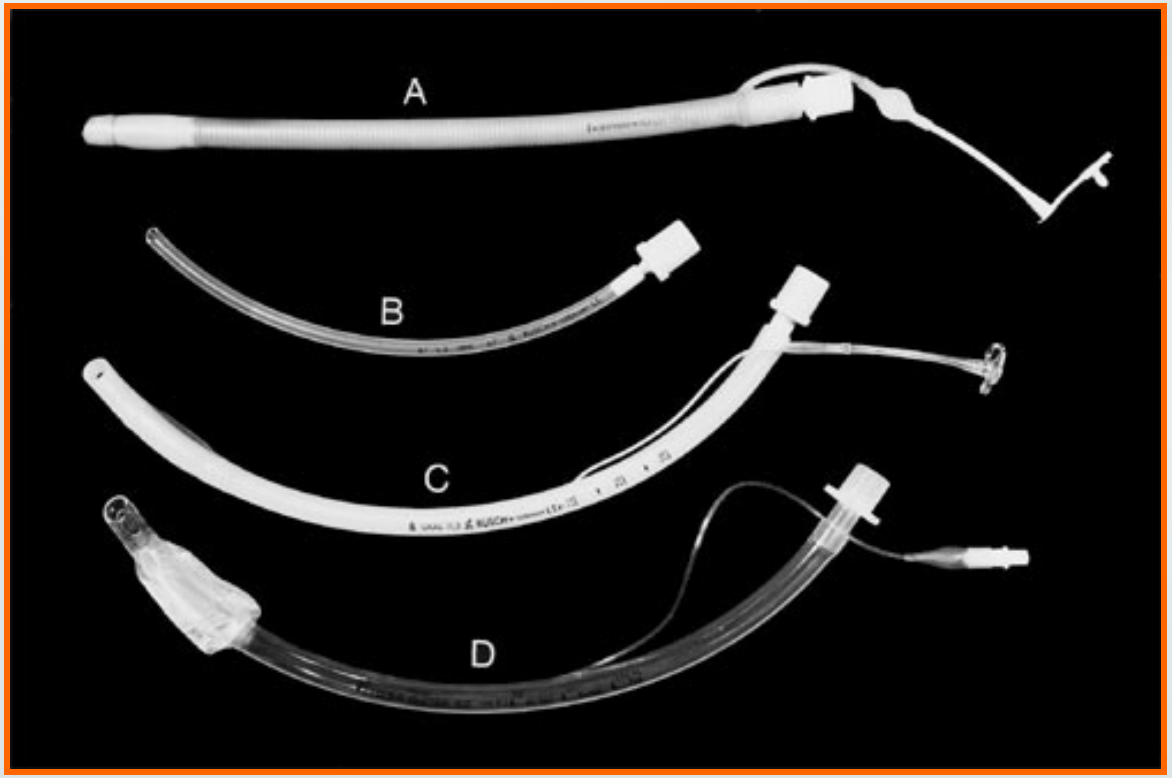


2- Ambo bag plus Oxygen :

40-60%

3- Ambo bag with reservoir bag plus oxygen:>90%

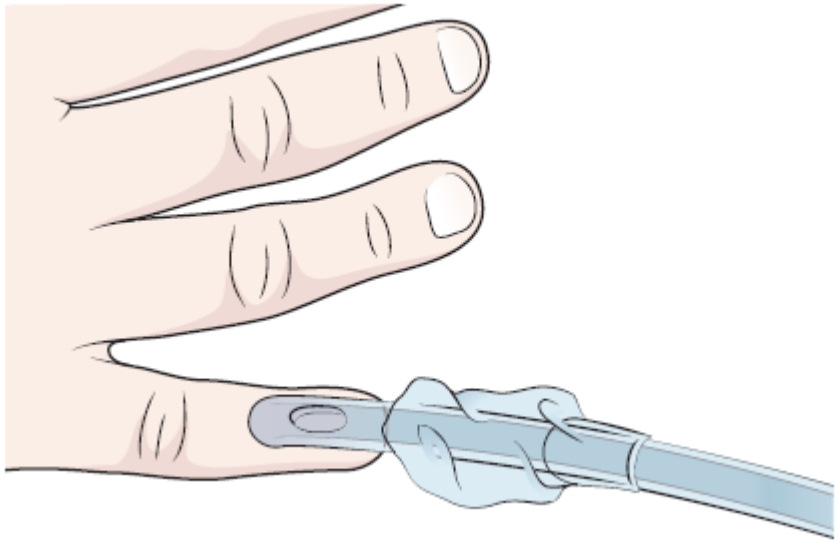
Endotracheal tube (ETT)



سایز مناسب لوله تراشه

AGE	INTERNAL DIAMETER (mm)
Children	
Newborn	2.5
6 mo	3.5
1 yr	4.5
2 yr	5.0
4 yr	5.5
6 yr	6.0
8 yr	6.5
10 yr	7.0
12 yr	7.5
14 yr	8.0
Adults	
Female	7.0–8.0
Male	7.5–9.0
Special cases	

انتخاب لوله تراشه در اطفال

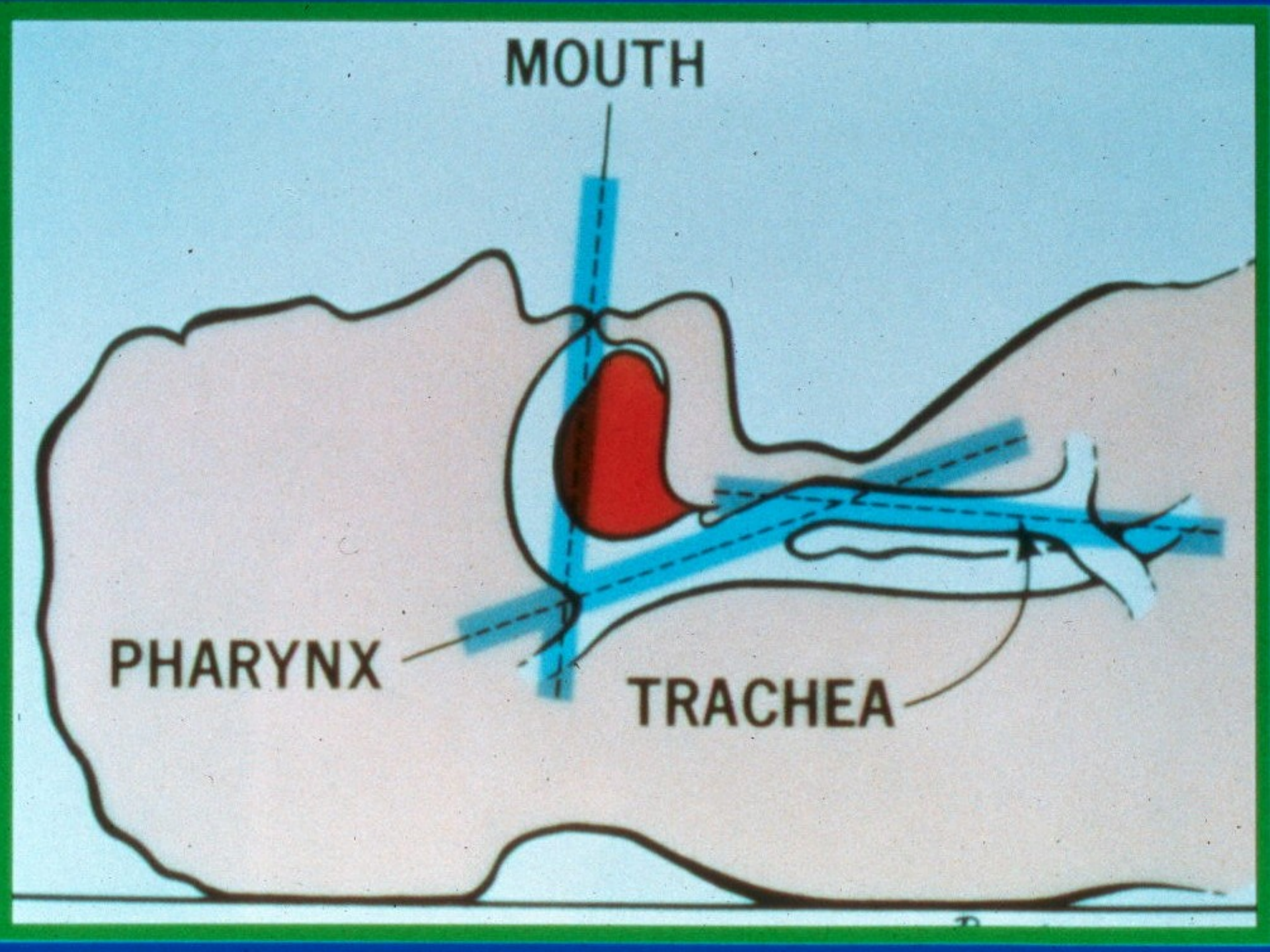


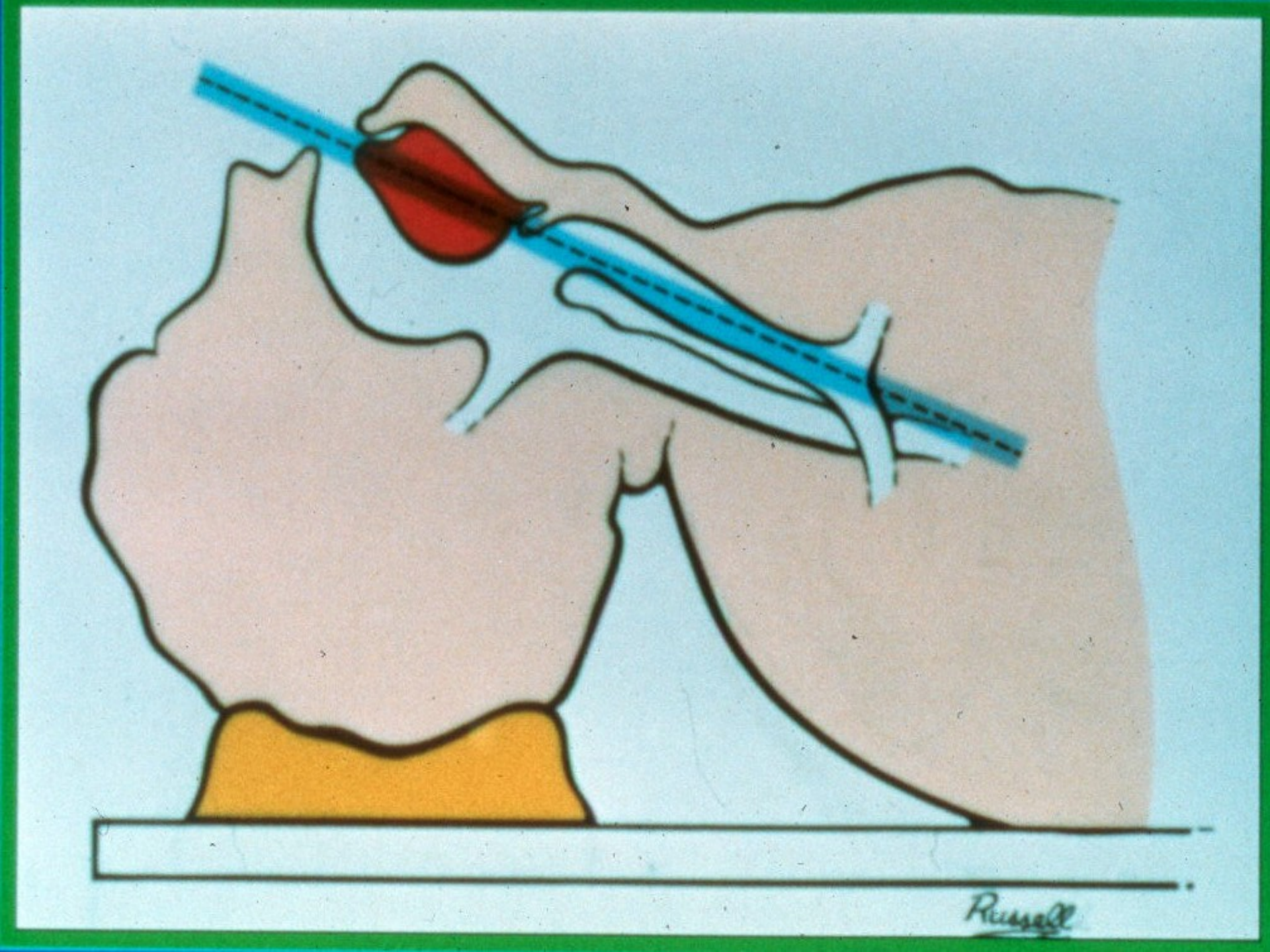
$$\text{Uncuffed tube size (mm)} = [4 + \text{Age (yr)}]/4$$

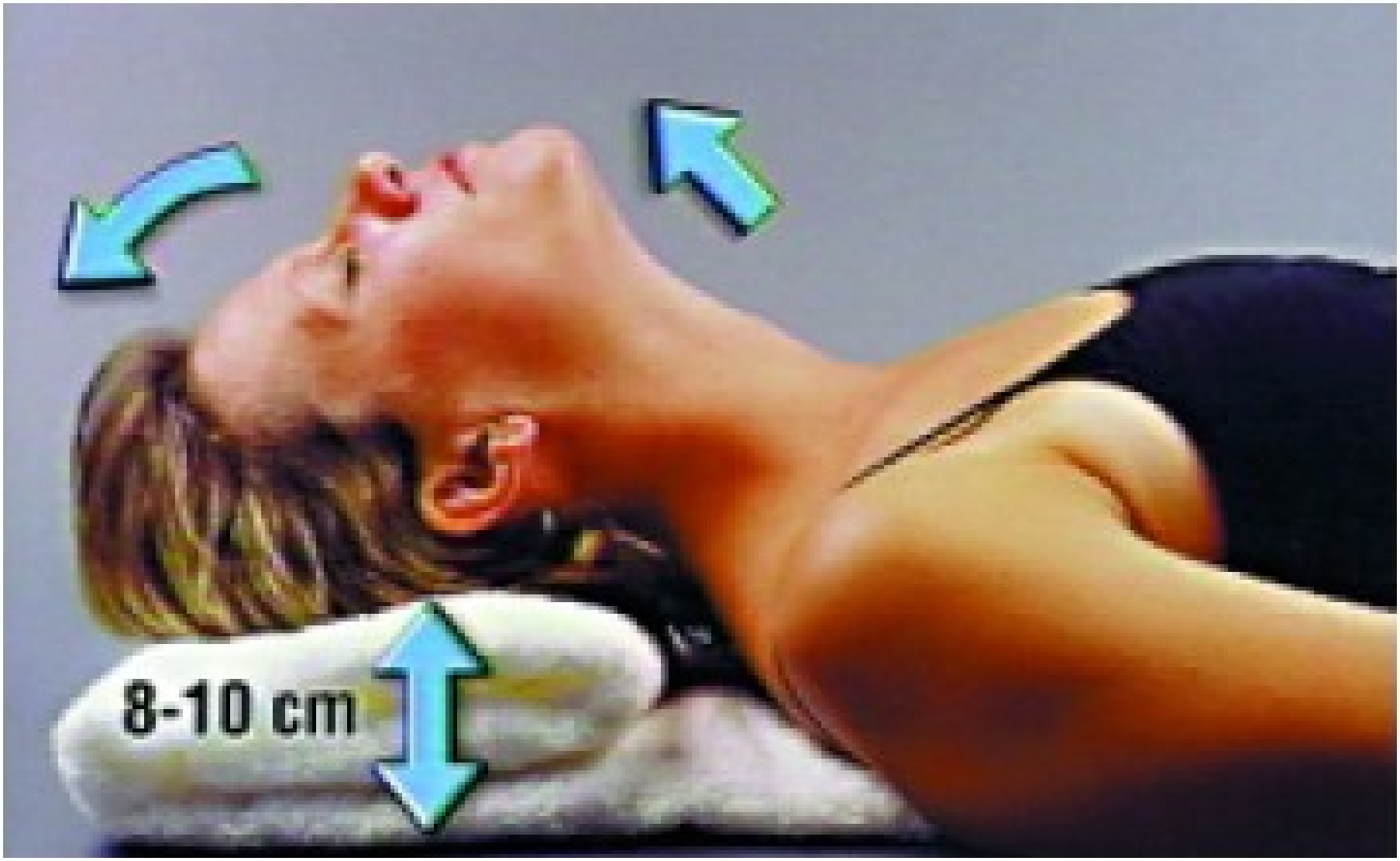
$$\text{Cuffed tube size (mm)} = [3 + \text{Age (yr)}]/4$$

نکات مهم حین اینتوباسیون بیمار

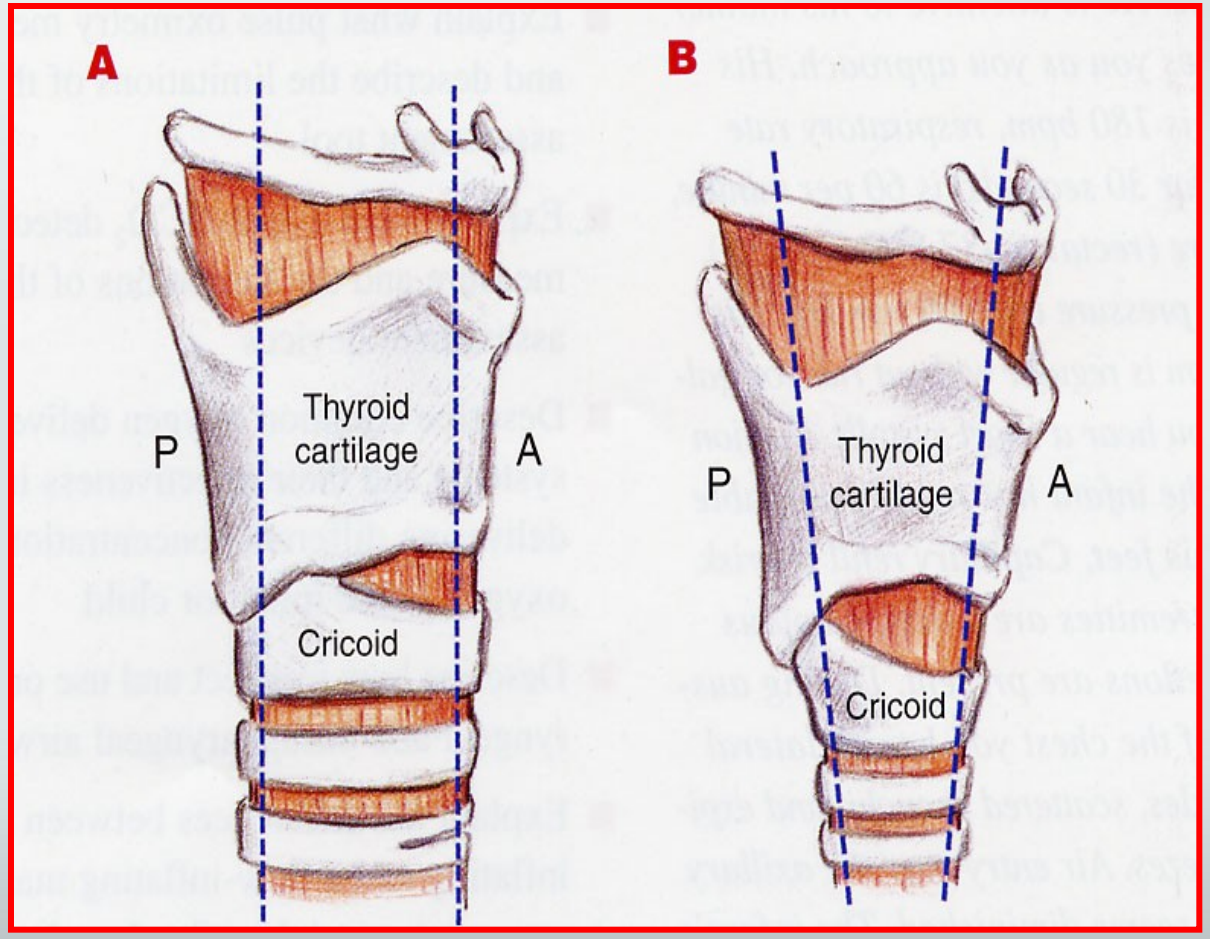
- دقت به وضعیت آناتومی راه هوایی بیمار(به ویژه اطفال)
- تمیز کردن راه هوایی بیمار (ساکشن کردن ترشحات و خارج کردن دندان مصنوعی)
- هیپرونتیله با BVM حداقل به مدت۳دقیقه با O2 ۱۰۰%
- رعایت حداکثر زمان لارنگوسکپی (۱۵ثانیه)در هر مرتبه و حداکثر ۳مرتبه و در صورت عدم موفقیت استفاده از روش جایگزین
- میزان مناسب وارد کردن لوله تراشه در نای
- فیکس کردن لوله تراشه


MOUTH
PHARYNX
TRACHEA


Russell


8-10 cm

Children Are Very Different Than Adults !!!

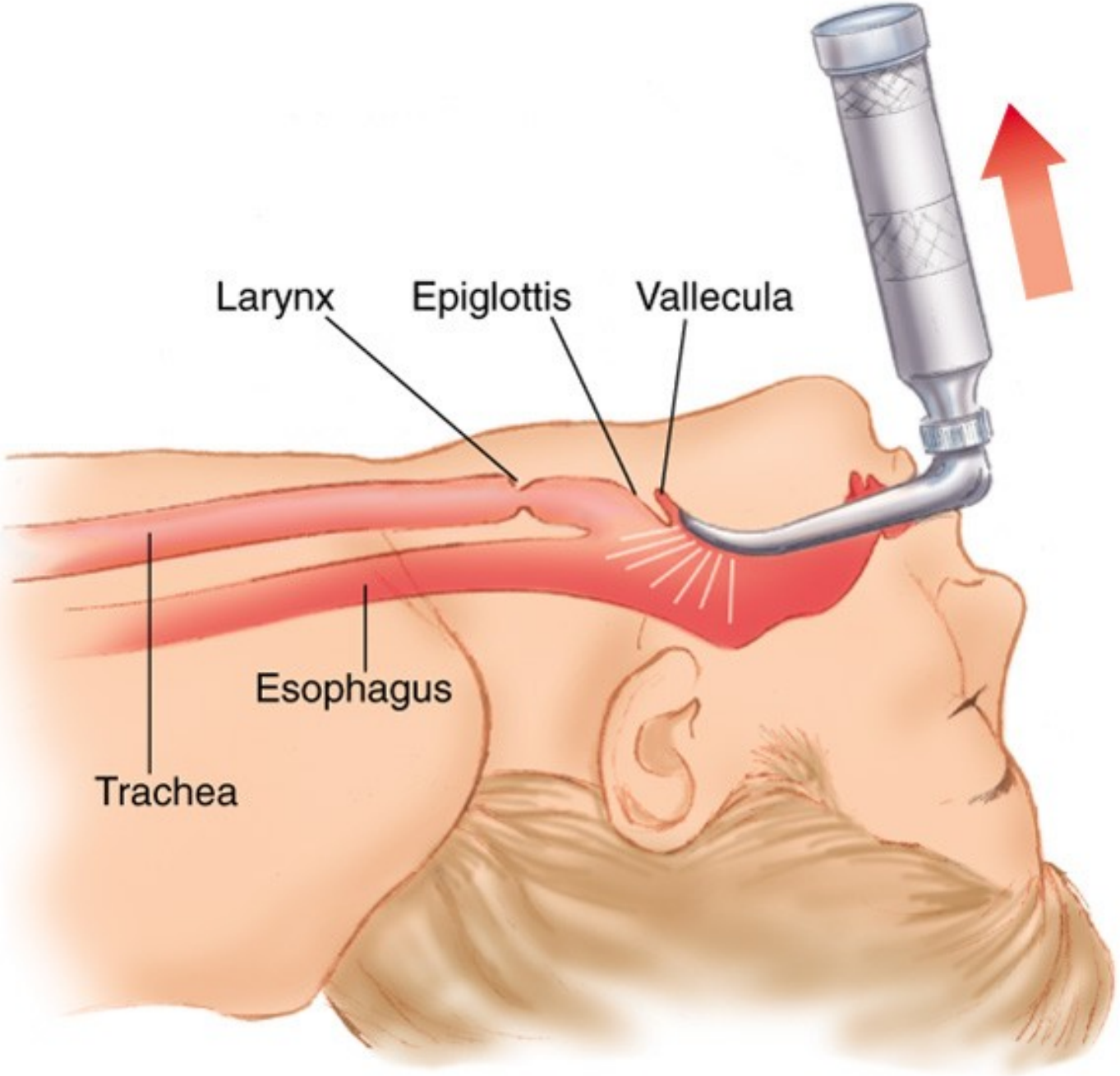


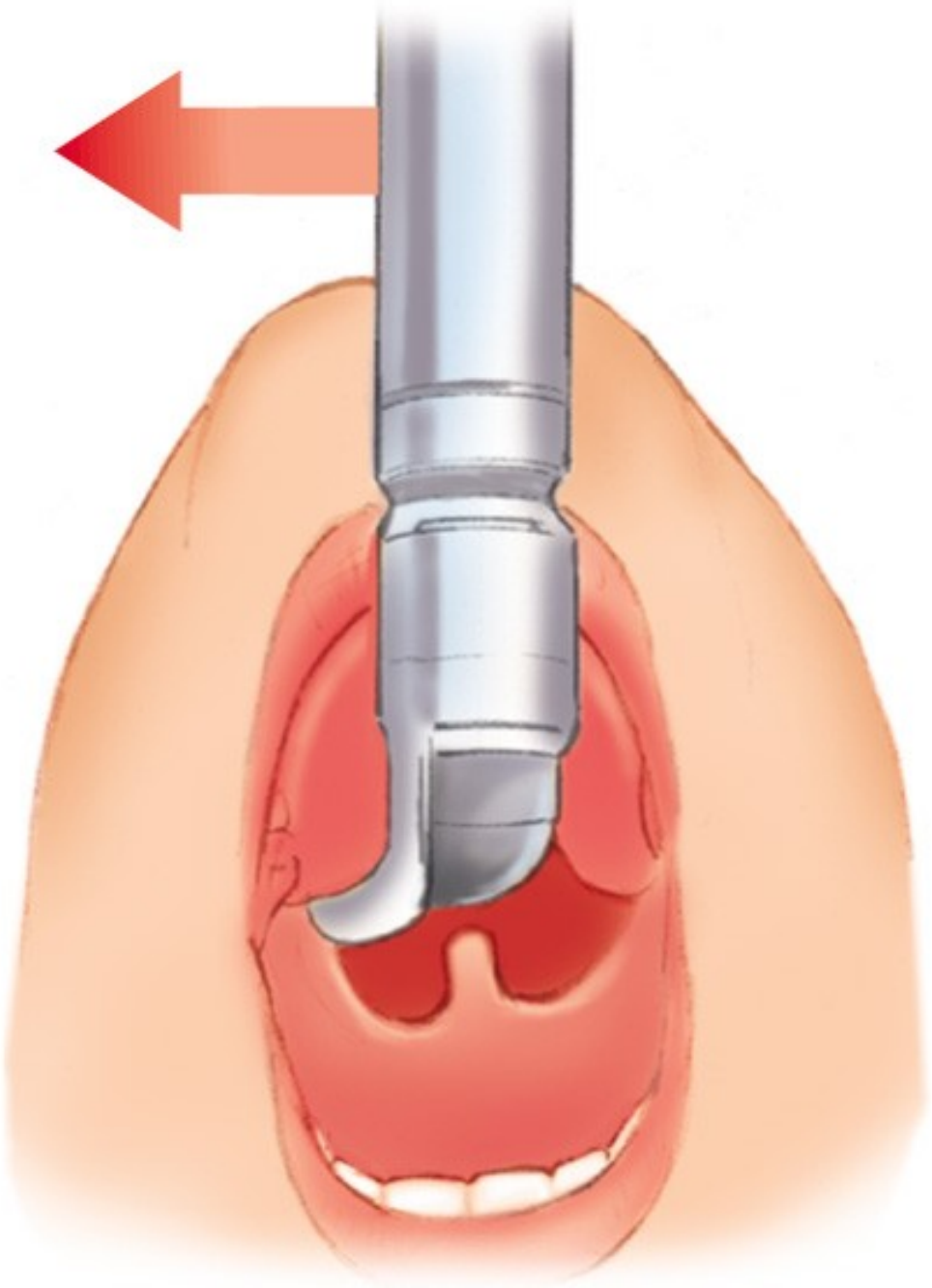
In children < 2 y/o

Correct position

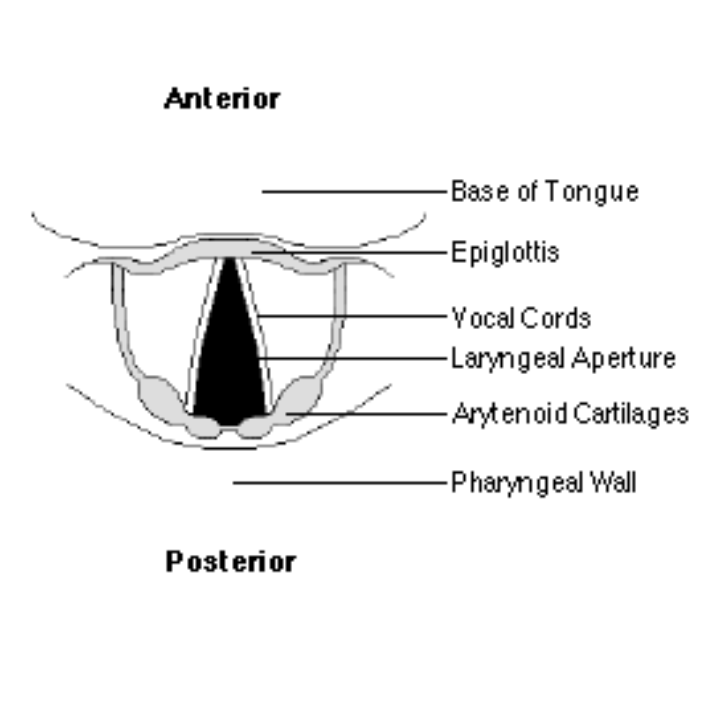
Prepare Laryngoscope

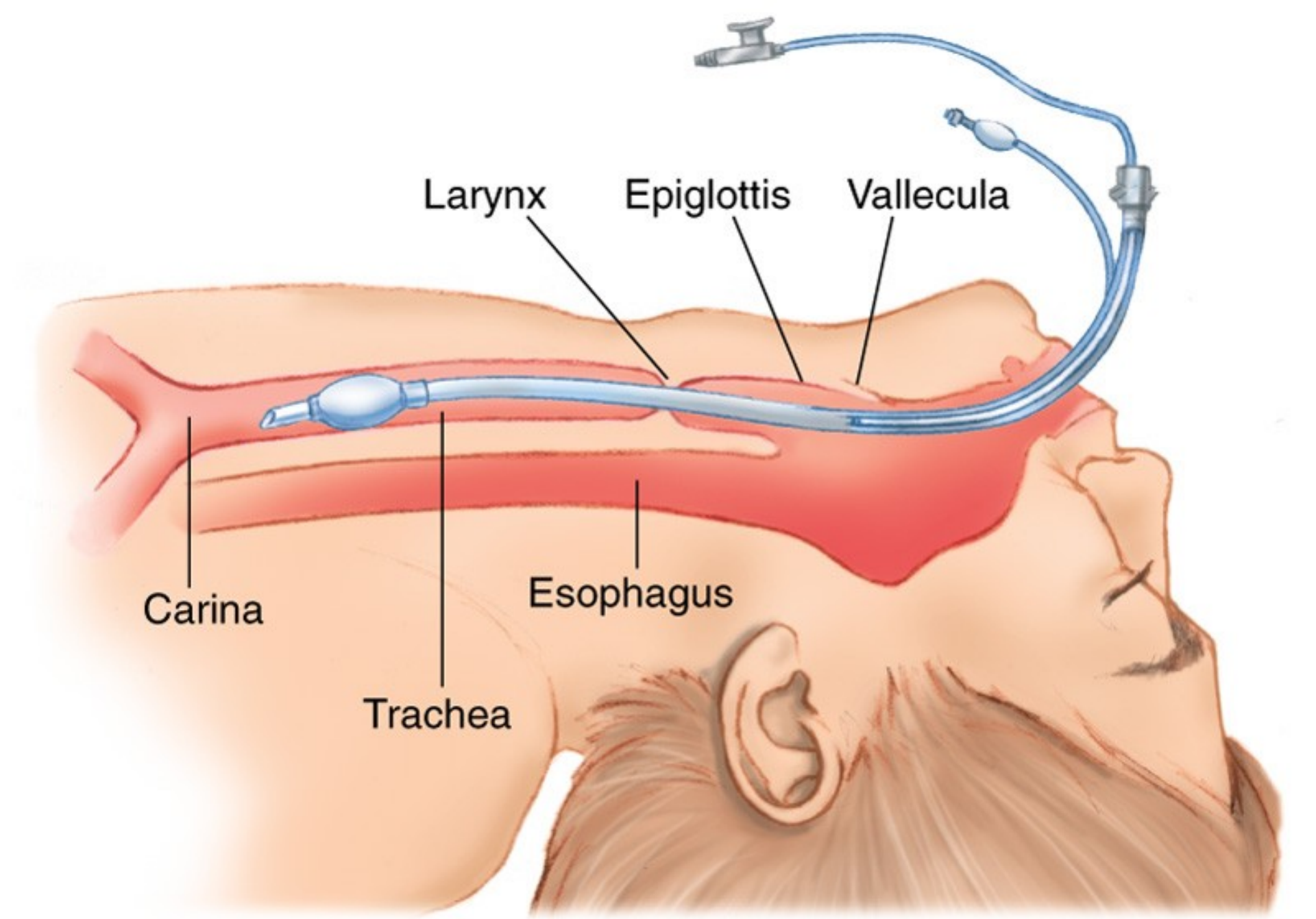
Laryngoscope Should Be In Your <u>LEFT</u> Hand





Find Your Landmarks





عوارض اینتوباسیون

- تروما (شکستگی دندان/لارنگواسپاسم یا برونکواسپاسم)
- دیس ریتمی های قلبی در اثر تحریک عصب واگ
- جاگذاری غلط لوله تراشه و هیپوکسی بیمار
- وارد کردن بیش از حد لوله تراشه و تهویه یک ریه و آتلکتازی یک ریه
- آسپیرایون محتویات معده یا ترشحات دهان و حلق

Capnography

کاپنومتر سطح CO_2 را می سنجد .
سطح طبیعی ۴۰ mmHg است.

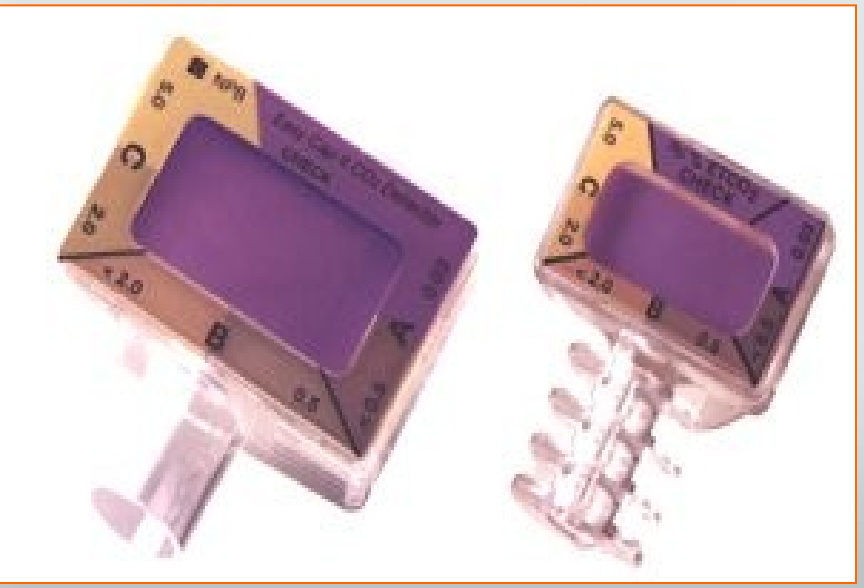
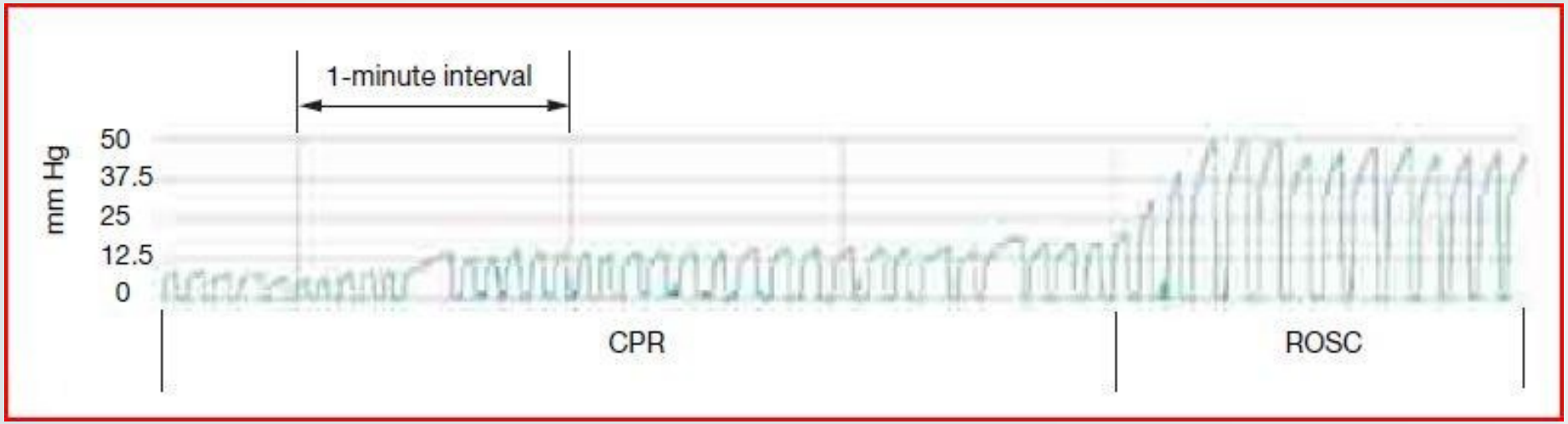


Figure 1-3. End-tidal CO_2 detector before application. The indicator is purple, which indicates failure to detect CO_2. This is the appearance when the esophagus is intubated.

Figure 1-4. Positive detection of CO_2 turns the indicator yellow, indicating tracheal placement of the endotracheal tube.

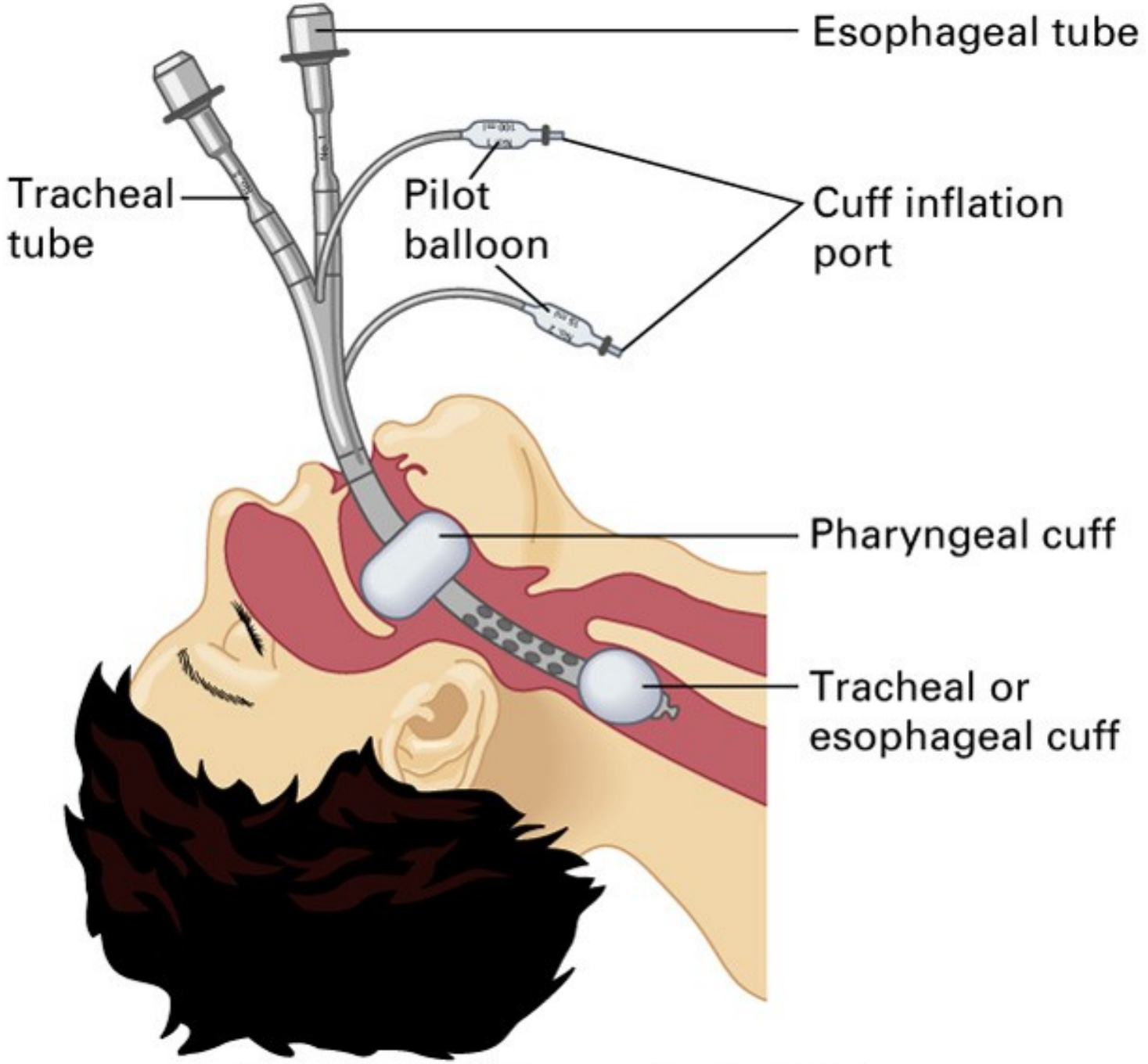
Capnography to monitor effectiveness of resuscitation efforts



Esophageal/Tracheal Double Lumen Airway (Combitube®)

Esophageal/Tracheal Double Lumen Airway (Combitube®)

Indications and Use for the Prehospital Provider



(b)

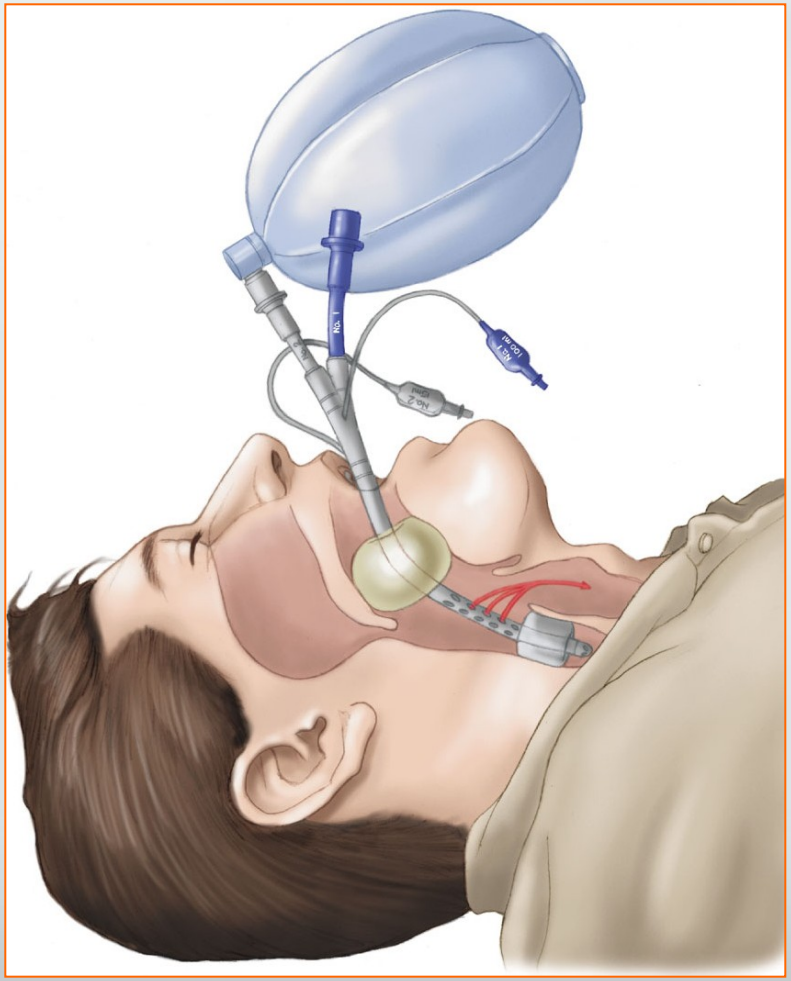
esophageal-tracheal combitube

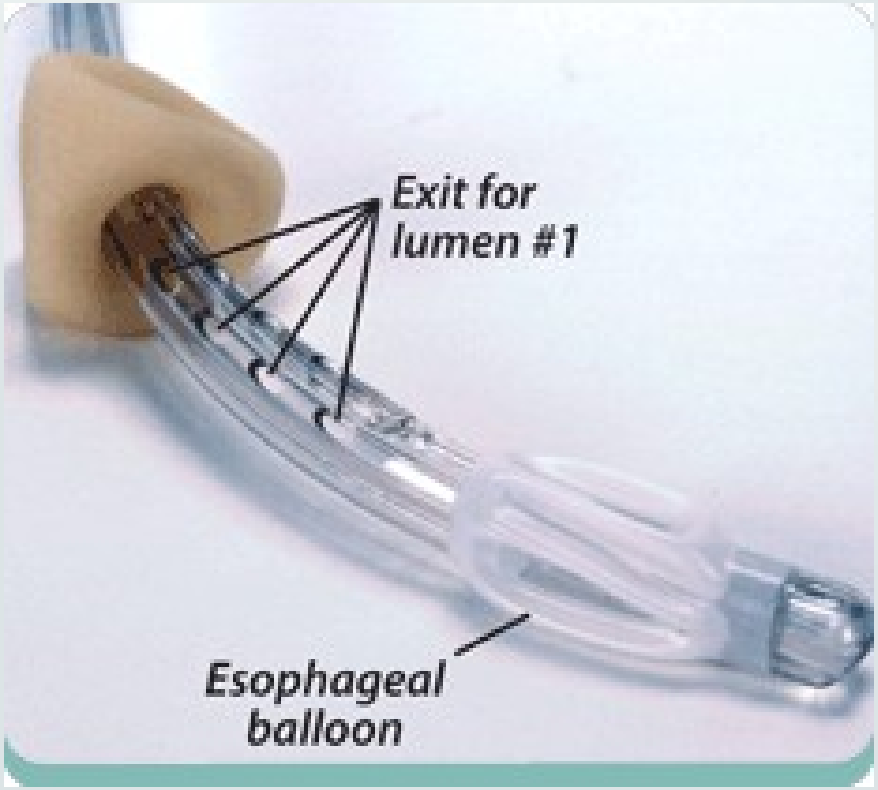
حالتهای ممکن در استفاده از کامبی تیوب

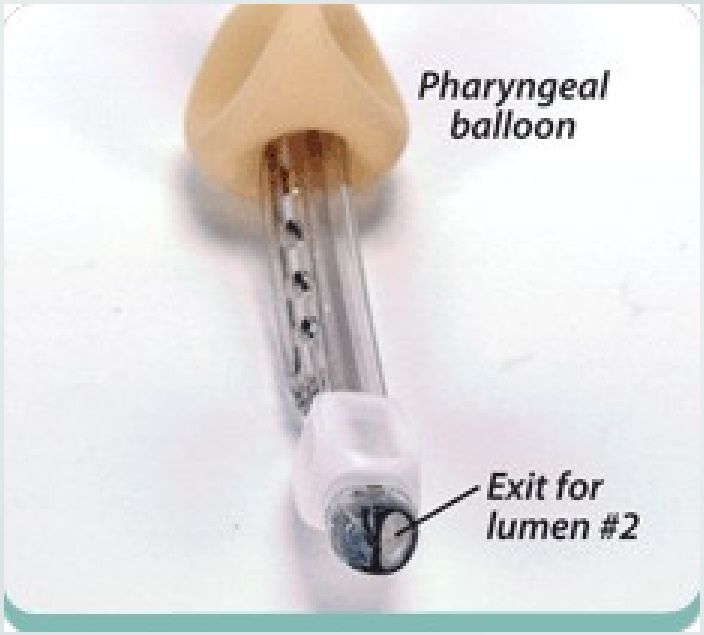
۹۵٪ داخل مری

۵٪ داخل نای

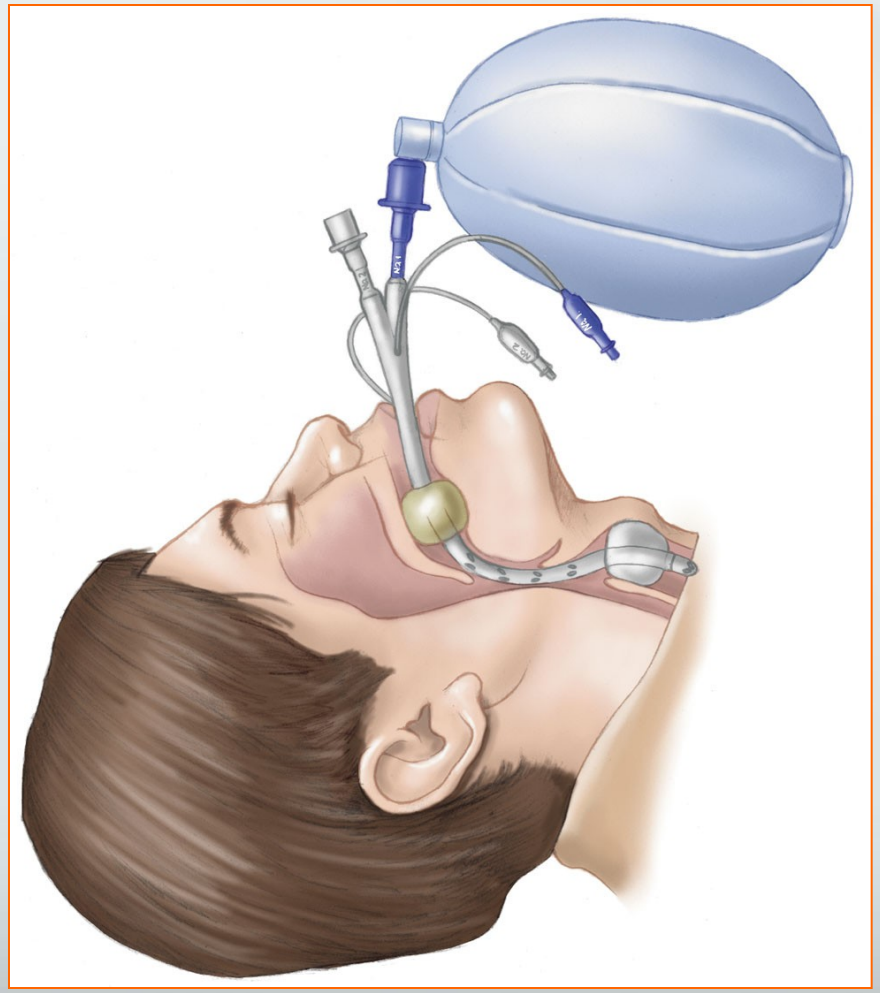
ETC airway—esophageal placement




Exit for
lumen #1
Esophageal
balloon


Pharyngeal
balloon
Exit for
lumen #2

ETC airway—tracheal placement



Indications

- Respiratory failure in an unconscious patient without an intact gag reflex
- Secondary method of airway management for paramedics when orotracheal intubation is not possible
- Primary method of airway management for EMT-B's (where allowed by local protocols)

Contraindications

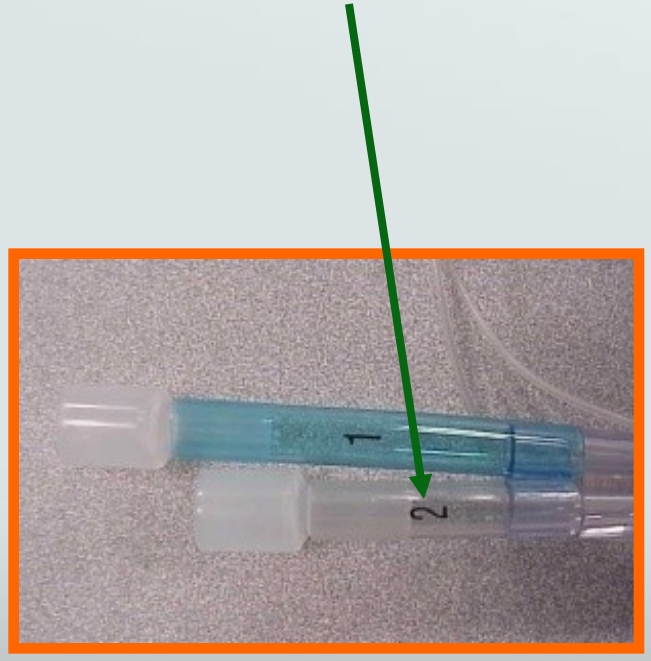
- The patient has in intact gag-reflex
- The patient is less than 5 feet tall(<152.5cm) or under 16 years old
- The patient has known esophageal disease
- The patient has ingested a chemical substance
- Burns involving the airway
- The patient has an allergy or sensitivity to latex (the pharyngeal balloon contains latex)

Insertion Procedures

- Inflate both balloons prior to insertion to test the integrity of the balloons
- Should either balloon fail after insertion, maintenance of the patient's airway cannot be assured

Insertion Procedures

If auscultation of breath sounds is absent and gastric inflation is positive, then begin ventilation through the shorter clear tube labeled #2



Insertion Procedures

- Place the patient in a supine position
- Provide artificial ventilation via BVM and hyperventilate the patient with 100% oxygen prior to device insertion

Insertion Procedures

- Position the patient's neck in a neutral position.
- Lubricate the tube with sterile, water soluble lubricant
- Lift the tongue and lower jaw upward to open the oropharynx

Insertion Procedures

- Insert the Combitube so that it curves in the same direction as the natural curvature of the pharynx
- If resistance is met, withdraw tube and attempt to reinsert

Insertion Procedures

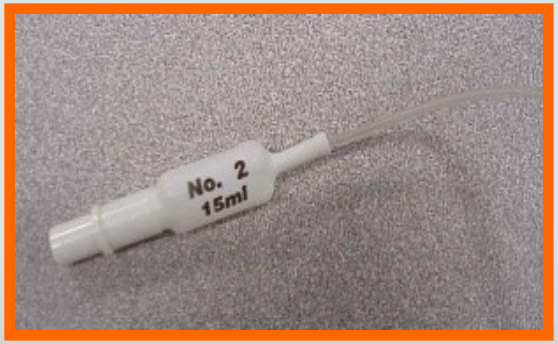
Advance tube until the patient's teeth are between the two black lines

Insertion Procedures

Inflate the #1 blue pilot cuff with 100ml of air from the large syringe

Insertion Procedures

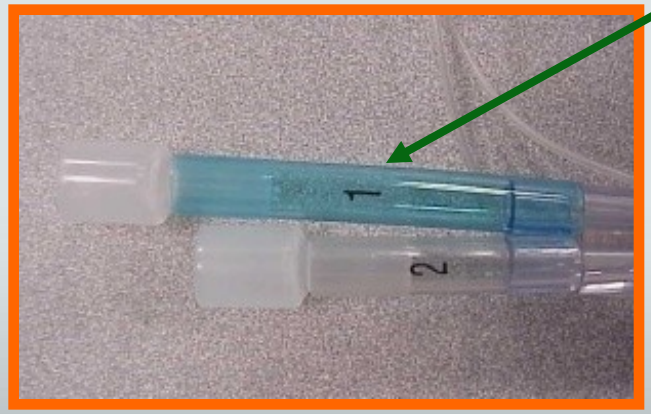
Inflate the #2 white pilot cuff with 15ml of air from the small syringe



Insertion Procedures

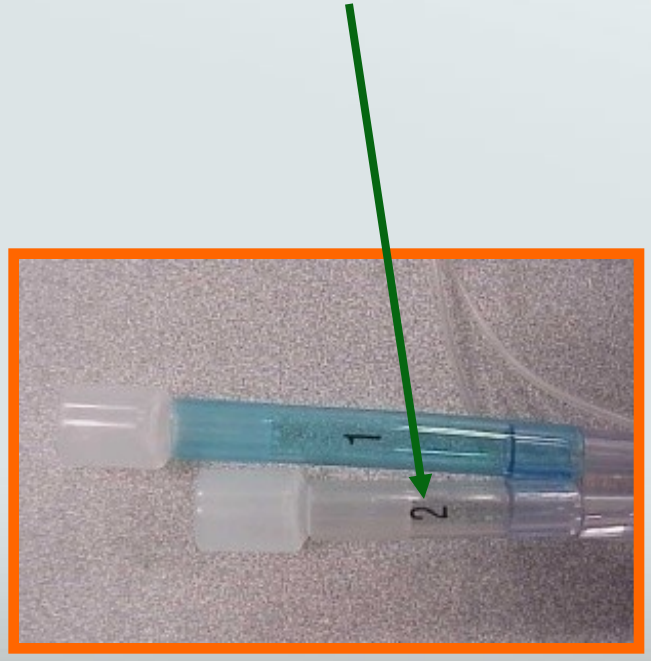
Begin ventilation through the longer blue tube labeled#1.

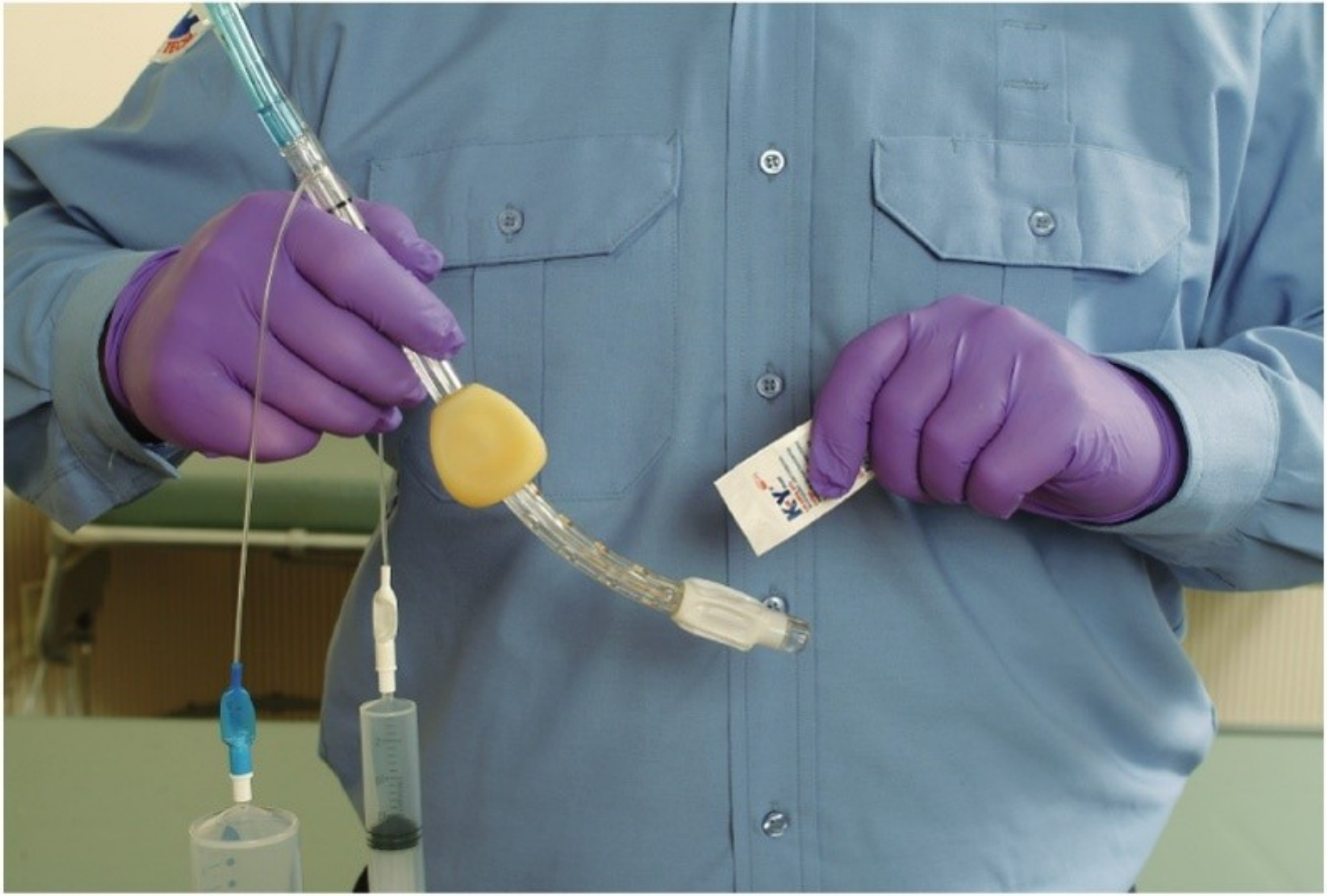
If auscultation of breath sounds is good and gastric inflation is negative, continue.

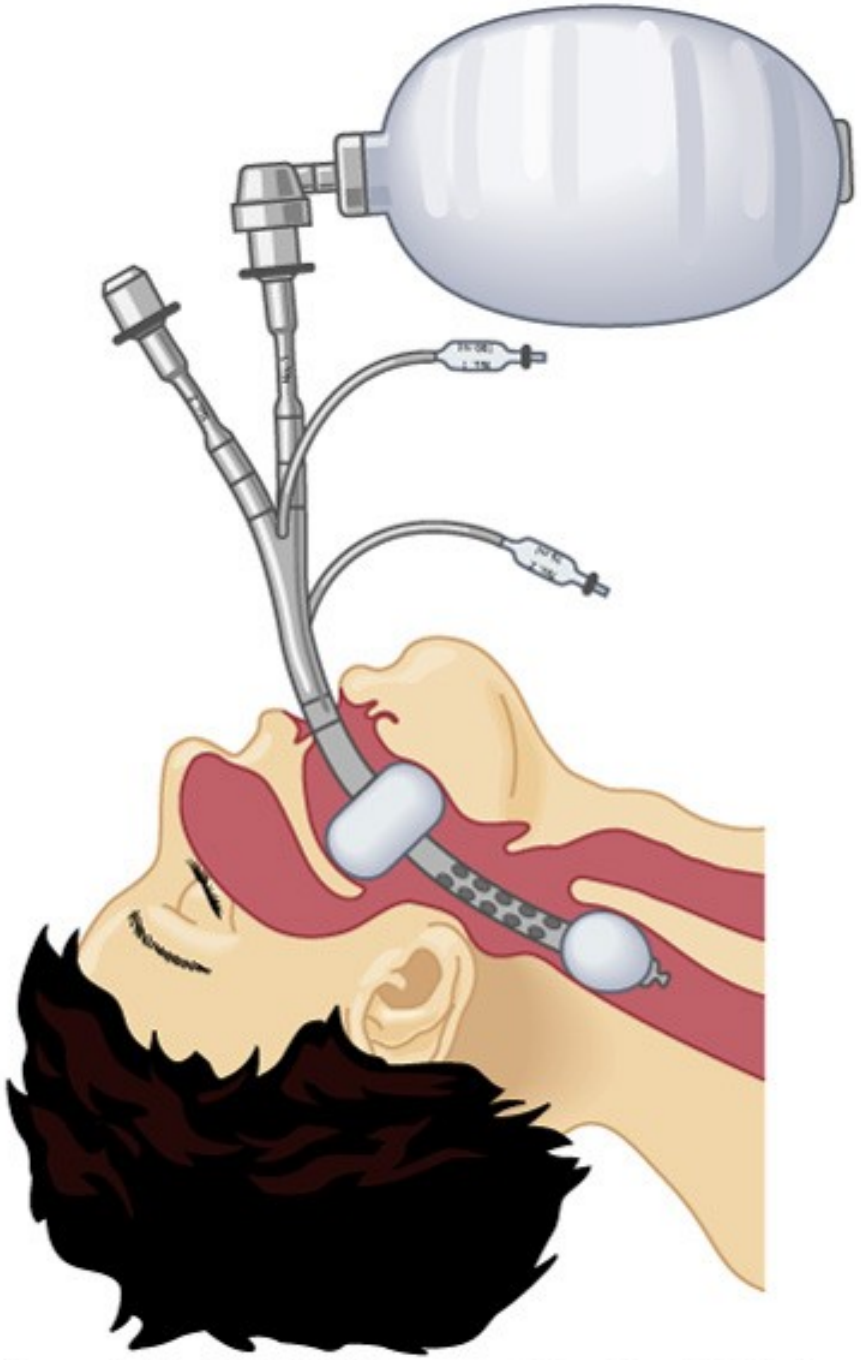


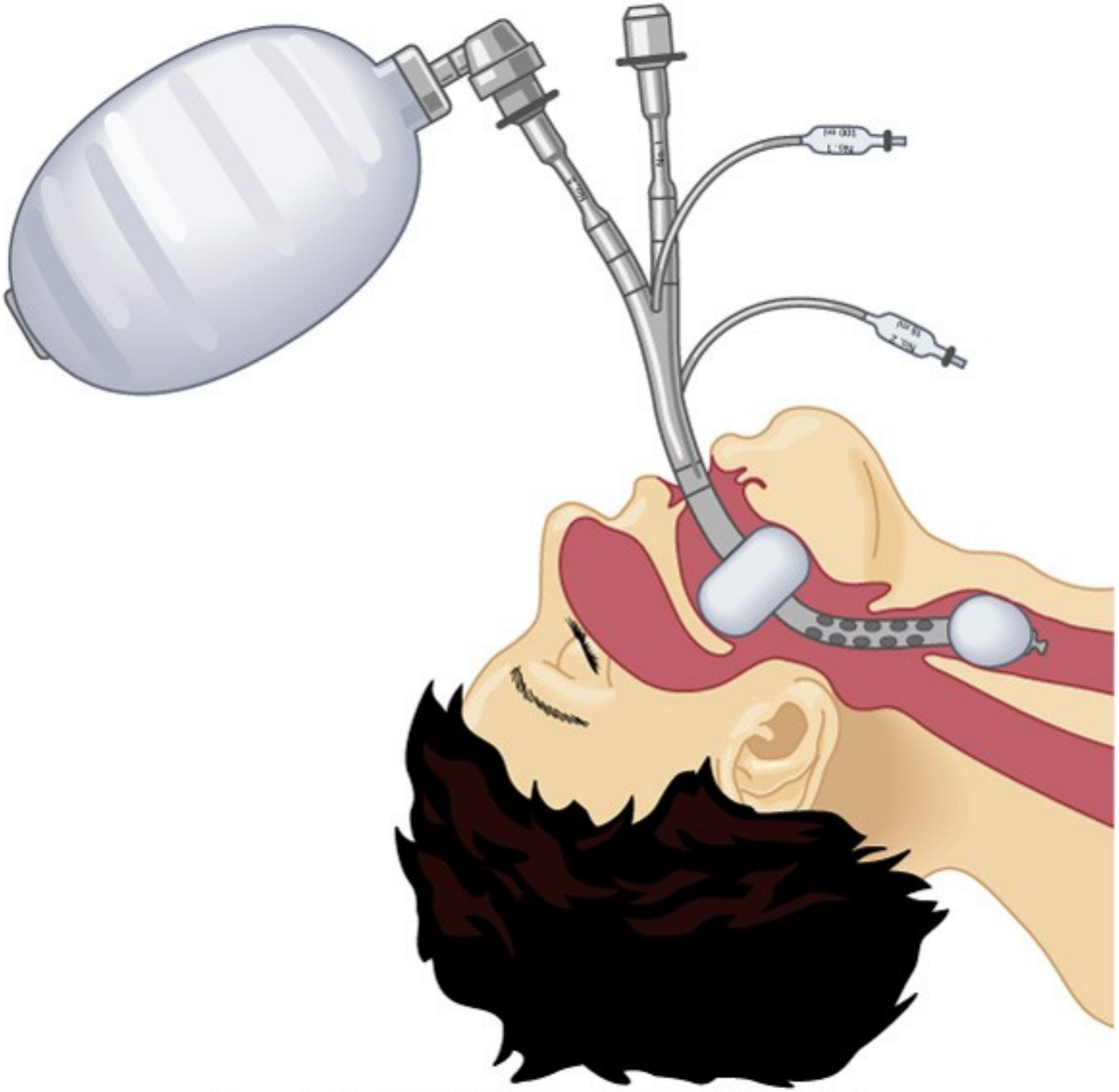
Insertion Procedures

If auscultation of breath sounds is absent and gastric inflation is positive, then begin ventilation through the shorter clear tube labeled #2









مزایای کامبی تیوب

- زمانی که تکنیک های لوله گذاری مرسوم ناموفق یا غیرقابل دسترس هستند ETCبه عنوان وسیله ای جایگزین برای کنترل راه هوایی به کارمی رود.
- جای گذاری آن در محل سریع و آسان است.
- جای گذاری آن به مشاهده حنجره یا تجهیزات خاص نیاز ندارد.
- بالون حلقی ، لوله را در پشت کام سخت گیر می اندازد.
- بیمار ممکن است بدون توجه به محل لوله (مری یا نای) تهویه شود.
- ETCبه طور قابل توجهی اتساع معده و پس زدن محتویات آن را کاهش می دهد.
- ETCمی تواند در بیماران ترومایی مورد استفاده قرار گیرد ، زیرا گردن می تواند در حین لوله گذاری در وضعیت خنثی قرار گیرد.
- اگر لوله در مری قرار بگیرد ، برای کاهش فشار می توان محتویات معده را از طریق منفذ دیستال ساکشن کرد.

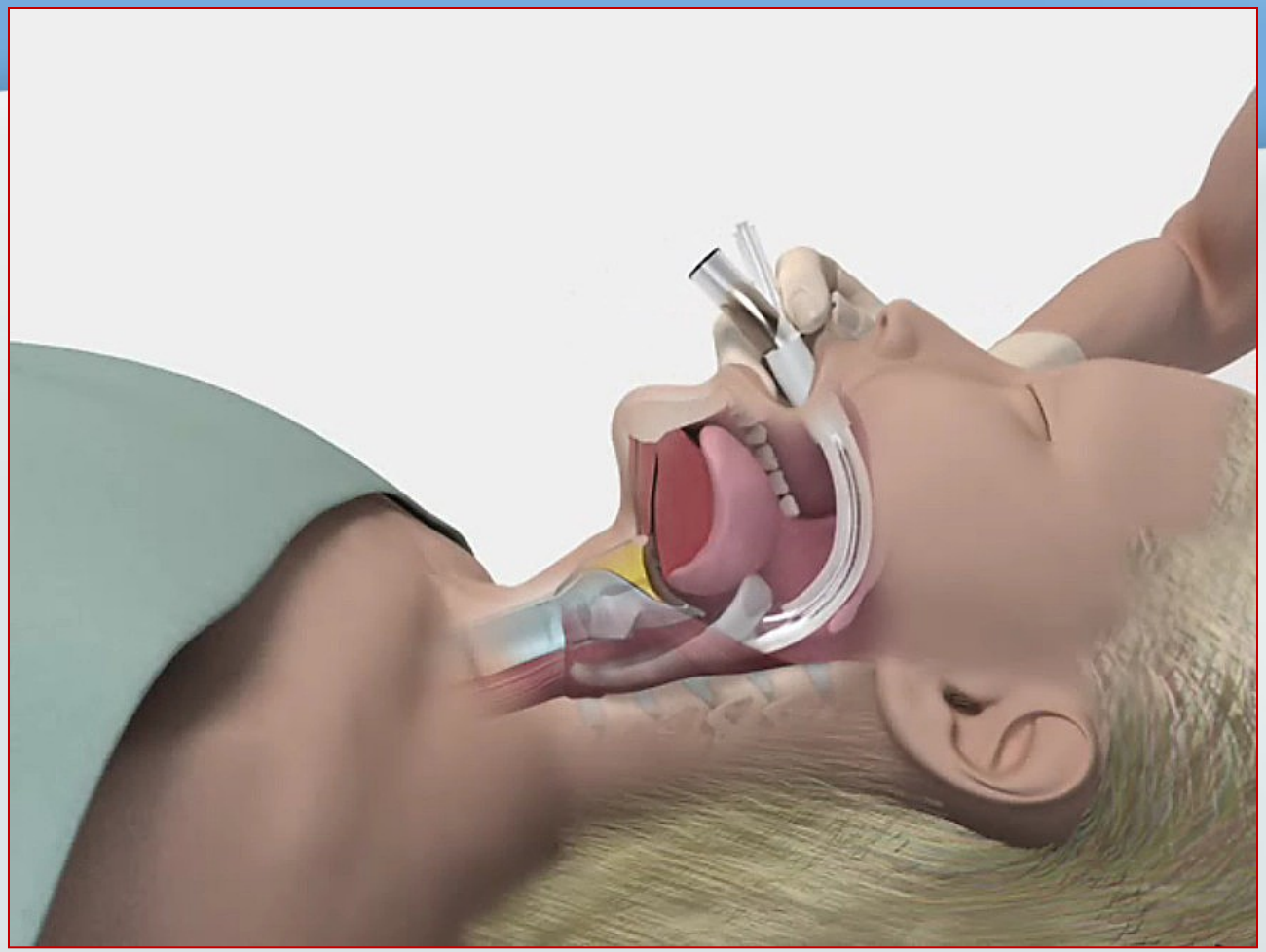
معایب کامبی تیوب

- زمانی که لوله در مری قرار گرفته است ساکشن کردن ترشحات نای غیرممکن می باشد.
- ETCنمی تواند در بیماران هوشیار یا دارای رفلکس عق زدن مورد استفاده قرار گیرد.
- کاف ها می توانند باعث ایجاد ایسکمی در مری ، نای ، و بخش تحتانی حلق شوند.
- ETCنمی تواند نای را مجزا کرده و به طور کامل از آن محافظت کند.
- این لوله نمی تواند در بیماران مبتلا به بیماری مری یا سوزش سردل مورد استفاده قرار گیرد.
- این وسیله نمی تواند در کودکان به کاربرود.

Laryngeal mask airway

LMA

LMA



SIZE	PATIENT
1	<5 kg
1.5	5-10kg
2	10-20kg
2.5	20-30kg
3	30-50kg
4	50-70kg
5	70-100kg
6	>100kg

(a)

(b)

Defibrillation

شوک الکتریکی :

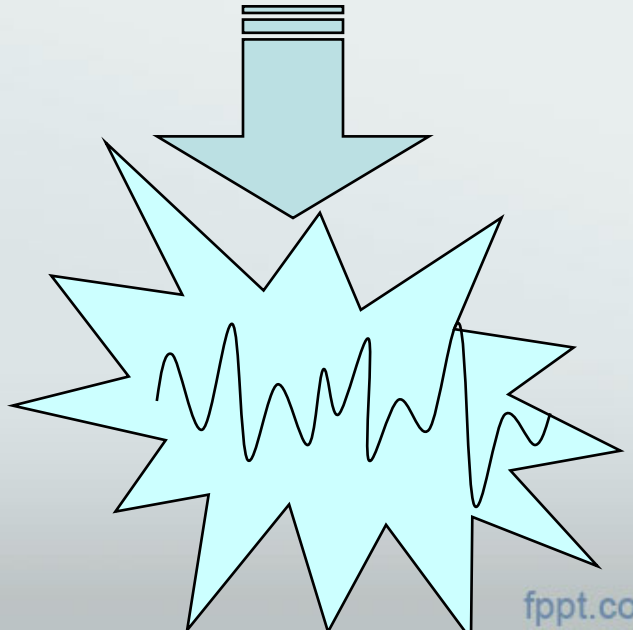
- عبور دادن جریان مستقیم الکتریسیته از سلولهای میوکارد که باعث می شود تمام سلولهای میوکارد به طور همزمان دپلاریزه شده و در نتیجه نقاط نابجا سرکوب گردیده و با تقویت پیس میکرهای قلب اجازه می دهد گره سینوسی دهلیزی عملکرد خود را به عنوان اصلی ترین پیس میکر از سر گیرد.

start

The patient

Not monitored

Monitored



Types of Defibrillators :

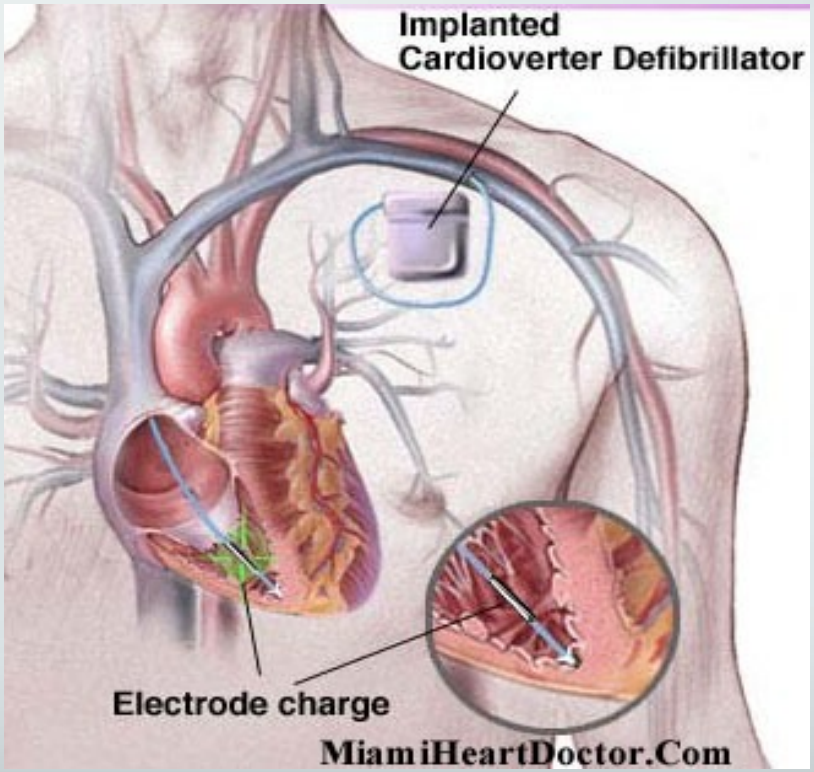
- External Manual Defibrillator

- Internal Manual Defibrillator

Types of Defibrillators :

- **Automated External Defibrillator (AED)**

- **Implantable Cardioverter-Defibrillator**




AED
AED
LIFEPAK
RO

Check rhythm

VT , VF

PEA, Asystole

Rhythm

Shockable	Nonshockable
VF	Asystole
Pulseless VT	PEA

Shockable rhythm

VF, Pulseless VT

Witnessed, early mins

2 rescue breath

First shock

Late

2 rescue breath

2min chest copm.
then shock

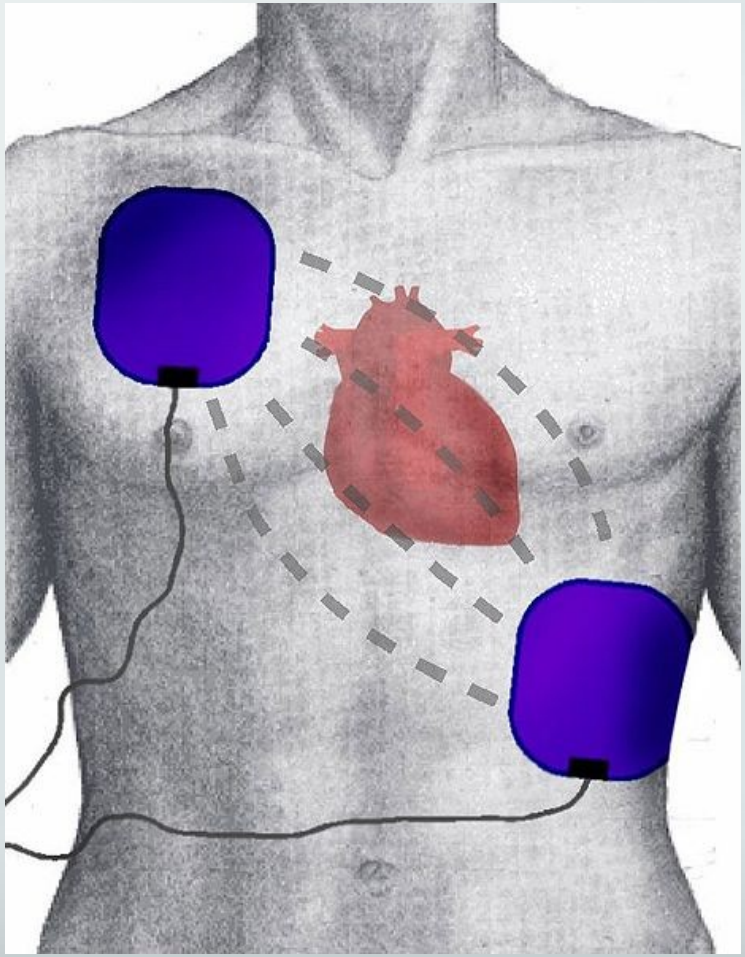
Shock ?

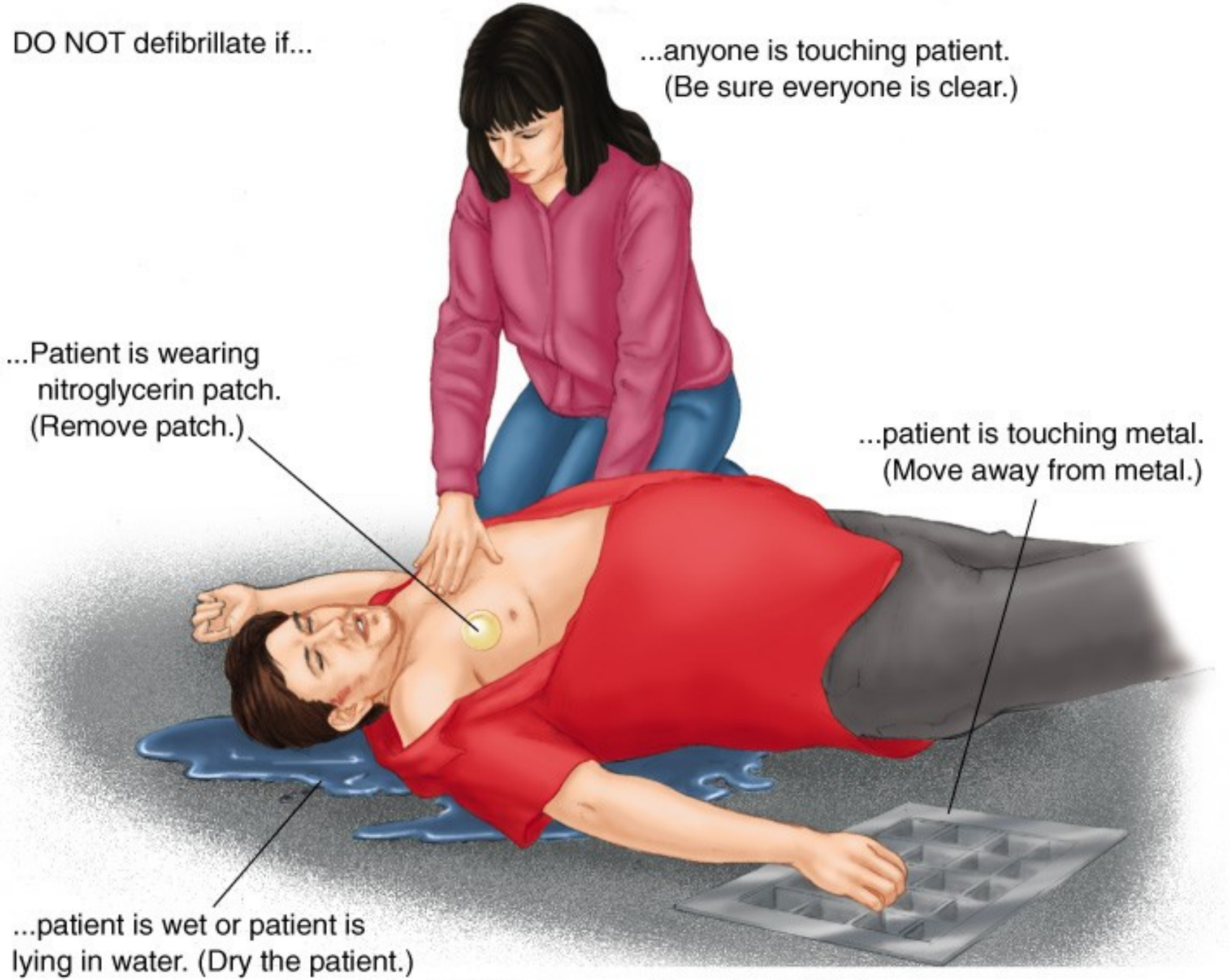
Monophasic → ***360 J / at beginning***

Biphasic → ***120 J / then 200 J***

Children → ***first 2 J/kg then 4 J/kg***

Defibrillation Electrode Position





Drug:

1) Anti arrhythmics :

- **Amiodarone :**

300 mg first dose

if needed after 15-20 min,

150 mg max, 450 mg

- **Lidocaine :**

1.5 mg/kg first dose

if needed Q 10 min--- 0.75 mg/kg for 2 doses max. 3 mg/kg

2) Vasopressors :

- **Epinephrine :**

NS rhythms

1 mg- IV, ET

Q 3-5 min/ cont to END

- **Atropine:**

Only asystole & PEA with HR<60

1 mg- IV, ET

Q 3-5 min max. 3 mg

Drug :

As a law:

Drugs injections in CPR must be:

PUSH

ETT administration:

2 - 2.5 times as IV doses

plus

5-10 ml distilled water

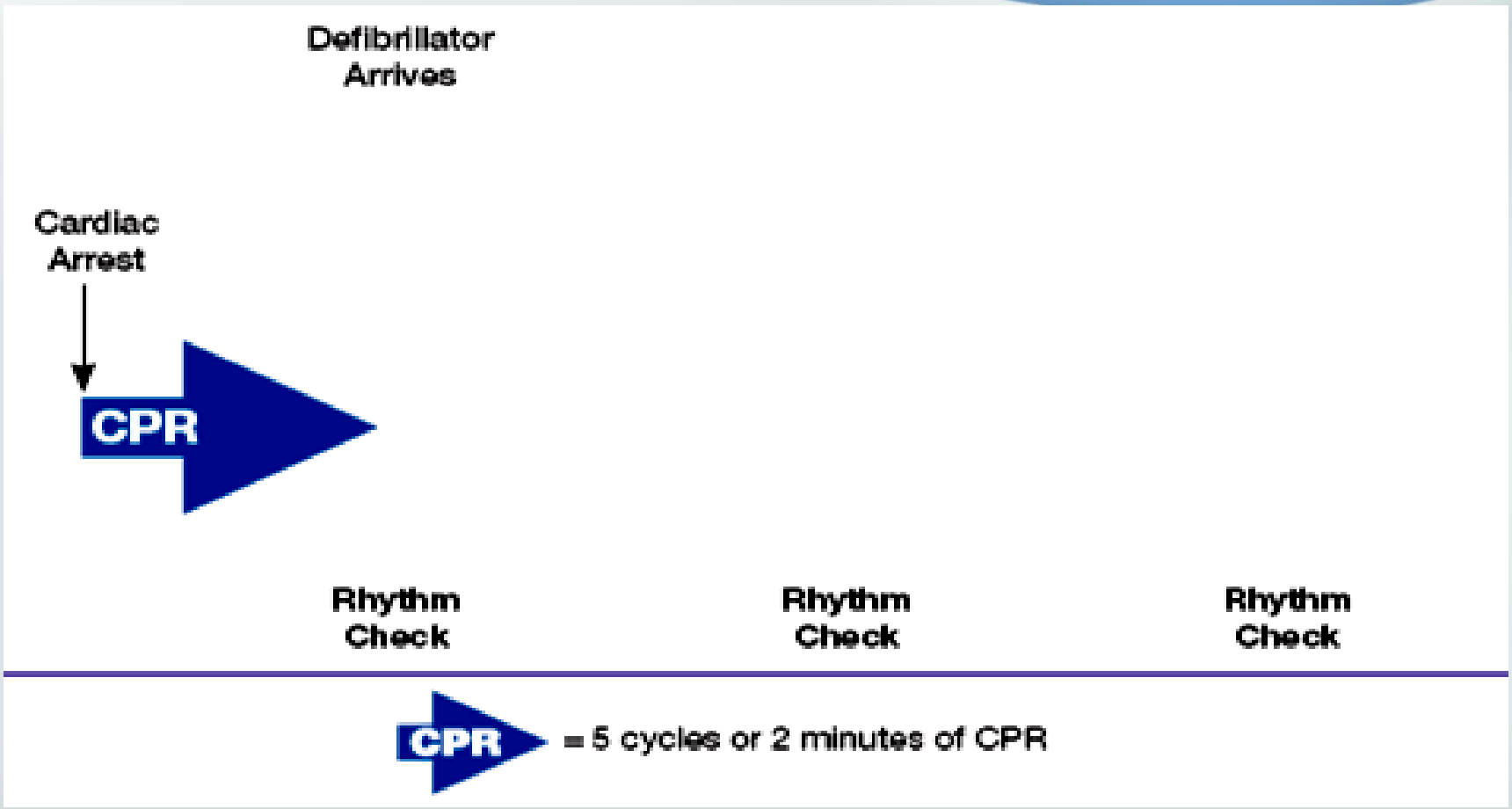
داروهایی که می توان از طریق لوله تراشه بکار برد :

- اپی نفرین
- آتروپین
- لیدوکائین
- نالوکسان
- برتیلیوم

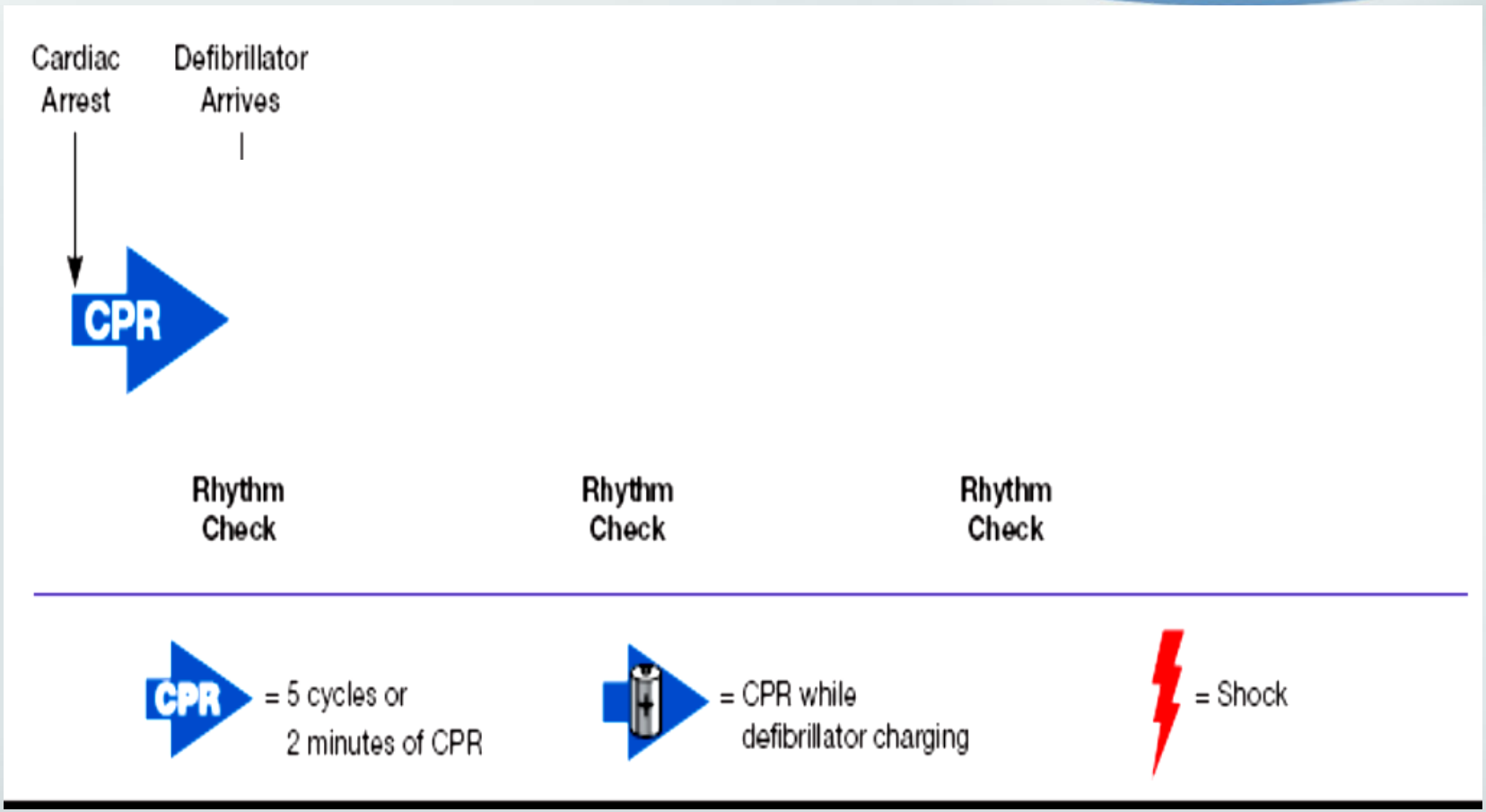
Alternative IV Sites and Techniques

- Intraosseous (IO) needles
  - Used for emergency venous access when other IV access is difficult or impossible
  - Often patients are experiencing a life-threatening situation.
  - Generally inserted in the proximal tibia

Asystole & PEA



VT / VF



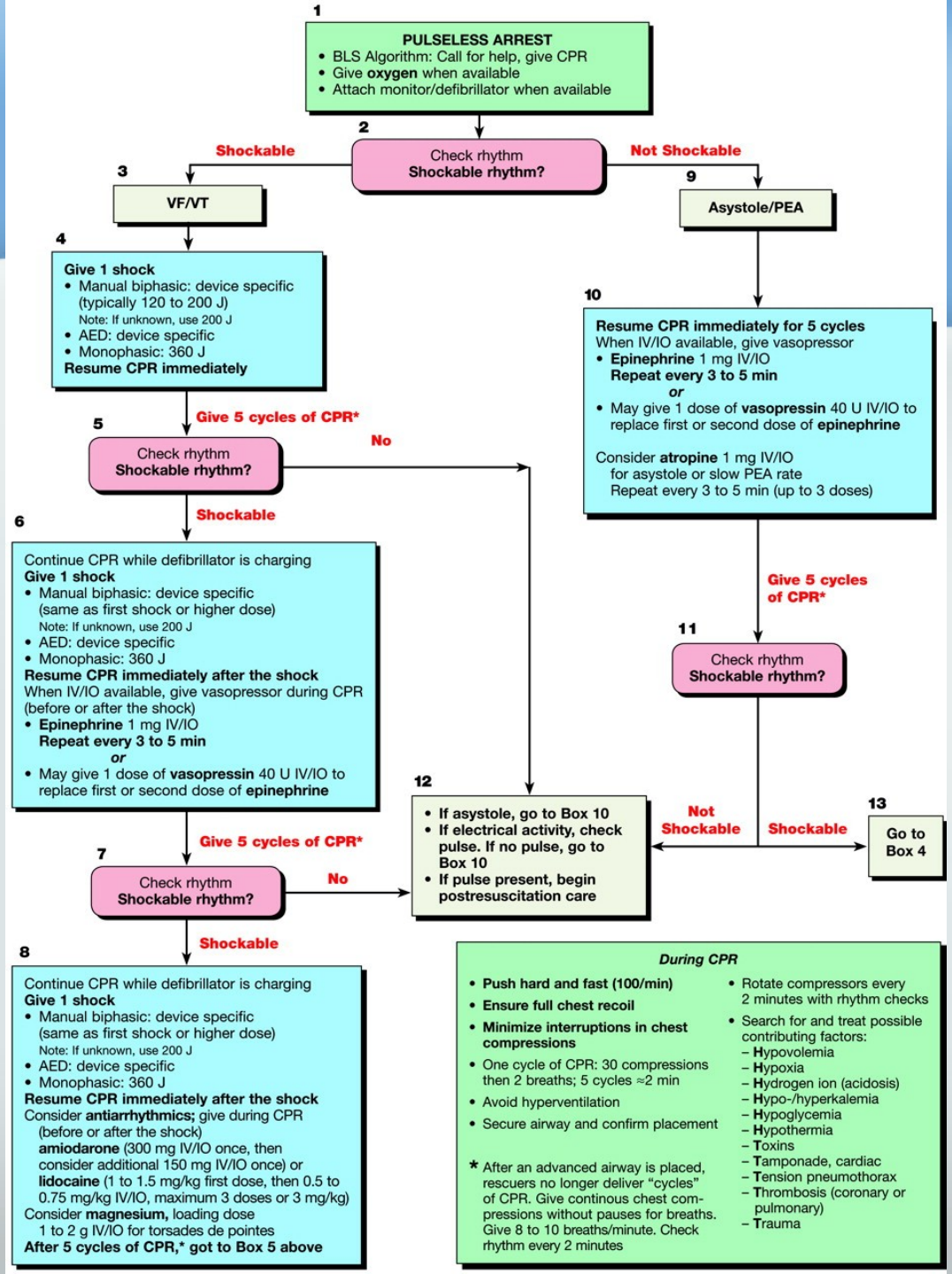
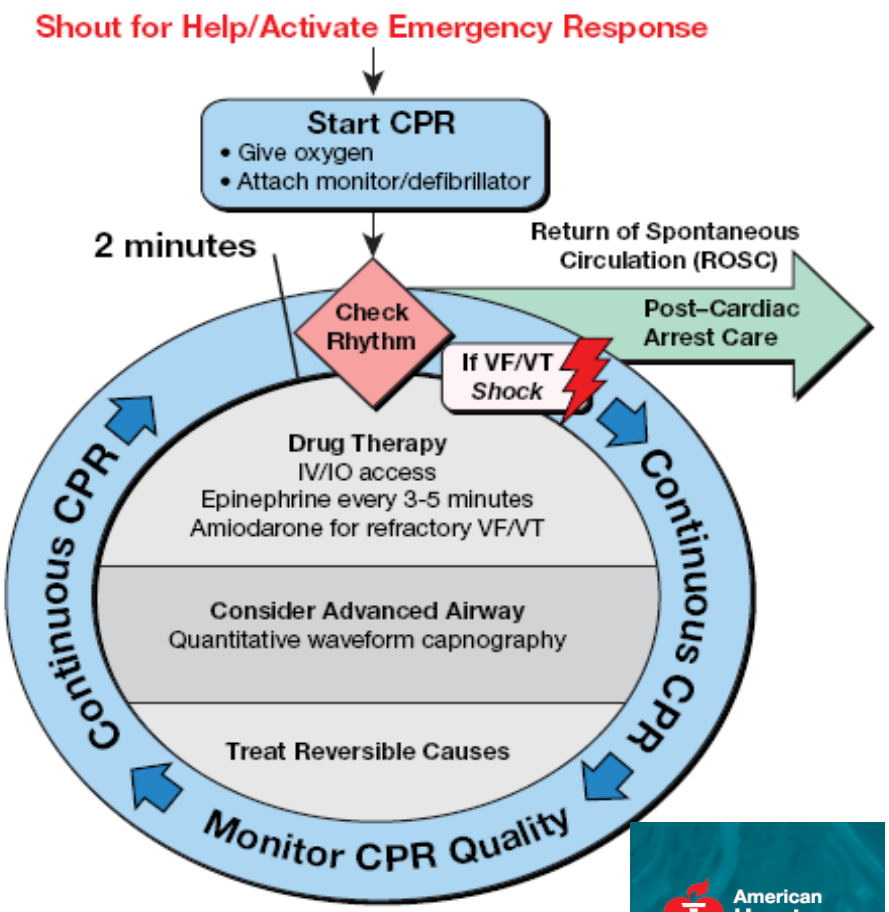

1
PULSELESS ARREST
• BLS Algorithm: Call for help, give CPR
• Give oxygen when available
• Attach monitor/defibrillator when available
2
Check rhythm
Shockable rhythm?
Shockable
Not Shockable
3
VF/VT
9
Asystole/PEA
4
Give 1 shock
• Manual biphasic: device specific (typically 120 to 200 J)
Note: If unknown, use 200 J
• AED: device specific
• Monophasic: 360 J
Resume CPR immediately
10
Resume CPR immediately for 5 cycles
When IV/IO available, give vasopressor
• Epinephrine 1 mg IV/IO
Repeat every 3 to 5 min
or
• May give 1 dose of vasopressin 40 U IV/IO to replace first or second dose of epinephrine
Consider atropine 1 mg IV/IO
for asystole or slow PEA rate
Repeat every 3 to 5 min (up to 3 doses)
Give 5 cycles of CPR*
5
Check rhythm
Shockable rhythm?
No
Shockable
6
Continue CPR while defibrillator is charging
Give 1 shock
• Manual biphasic: device specific (same as first shock or higher dose)
Note: If unknown, use 200 J
• AED: device specific
• Monophasic: 360 J
Resume CPR immediately after the shock
When IV/IO available, give vasopressor during CPR (before or after the shock)
• Epinephrine 1 mg IV/IO
Repeat every 3 to 5 min
or
• May give 1 dose of vasopressin 40 U IV/IO to replace first or second dose of epinephrine
Give 5 cycles of CPR*
11
Check rhythm
Shockable rhythm?
12
• If asystole, go to Box 10
• If electrical activity, check pulse. If no pulse, go to Box 10
• If pulse present, begin postresuscitation care
Not Shockable
Shockable
13
Go to Box 4
7
Check rhythm
Shockable rhythm?
No
Shockable
8
Continue CPR while defibrillator is charging
Give 1 shock
• Manual biphasic: device specific (same as first shock or higher dose)
Note: If unknown, use 200 J
• AED: device specific
• Monophasic: 360 J
Resume CPR immediately after the shock
Consider antiarrhythmics; give during CPR (before or after the shock)
amiodarone (300 mg IV/IO once, then consider additional 150 mg IV/IO once) or
lidocaine (1 to 1.5 mg/kg first dose, then 0.5 to 0.75 mg/kg IV/IO, maximum 3 doses or 3 mg/kg)
Consider magnesium, loading dose 1 to 2 g IV/IO for torsades de pointes
After 5 cycles of CPR,* go to Box 5 above
During CPR
• Push hard and fast (100/min)
• Ensure full chest recoil
• Minimize interruptions in chest compressions
• One cycle of CPR: 30 compressions then 2 breaths; 5 cycles ≈2 min
• Avoid hyperventilation
• Secure airway and confirm placement
* After an advanced airway is placed, rescuers no longer deliver "cycles" of CPR. Give continous chest compressions without pauses for breaths. Give 8 to 10 breaths/minute. Check rhythm every 2 minutes
• Rotate compressors every 2 minutes with rhythm checks
• Search for and treat possible contributing factors:
– Hypovolemia
– Hypoxia
– Hydrogen ion (acidosis)
– Hypo-/hyperkalemia
– Hypoglycemia
– Hypothermia
– Toxins
– Tamponade, cardiac
– Tension pneumothorax
– Thrombosis (coronary or pulmonary)
– Trauma

Figure 4
Circular ACLS Algorithm



CPR Quality
- Push hard (≥2 inches [5 cm]) and fast (≥100/min) and allow complete chest recoil
- Minimize interruptions in compressions
- Avoid excessive ventilation
- Rotate compressor every 2 minutes
- If no advanced airway, 30:2 compression-ventilation ratio
- Quantitative waveform capnography
  - If P_{ETCO_2} <10 mm Hg, attempt to improve CPR quality
- Intra-arterial pressure
  - If relaxation phase (diastolic) pressure <20 mm Hg, attempt to improve CPR quality

Return of Spontaneous Circulation (ROSC)
- Pulse and blood pressure
- Abrupt sustained increase in P_{ETCO_2} (typically ≥40 mm Hg)
- Spontaneous arterial pressure waves with intra-arterial monitoring

Shock Energy
- **Biphasic:** Manufacturer recommendation (120-200 J); if unknown, use maximum available. Second and subsequent doses should be equivalent, and higher doses may be considered.
- **Monophasic:** 360 J

Drug Therapy
- **Epinephrine IV/IO Dose:** 1 mg every 3-5 minutes
- **Vasopressin IV/IO Dose:** 40 units can replace first or second dose of epinephrine
- **Amiodarone IV/IO Dose:** First dose: 300 mg bolus. Second dose: 150 mg.

Advanced Airway
- Supraglottic advanced airway or endotracheal intubation
- Waveform capnography to confirm and monitor ET tube placement
- 8-10 breaths per minute with continuous chest compressions

Reversible Causes
- Hypovolemia
- Hypoxia
- Hydrogen ion (acidosis)
- Hypo-/hyperkalemia
- Hypothermia
- Tension pneumothorax
- Tamponade, cardiac
- Toxins
- Thrombosis, pulmonary
- Thrombosis, coronary

American Heart Association. GUIDELINES CPR ECC 2010

Reversible Causes :

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در چه زمانی عملیات احیا را شروع نکنیم ؟

- **اگر بیمار نشانه های آشکار مرگ را داشت:**
  - جمود نعشی که ۶ تا ۱۰ ساعت پس از مرگ پیدا میشود (سفت شدن بدن)
  - کبودی وابسته به جاذبه
  - گندیدگی (فساد) یا تجزیه بدن
  - وجود شواهدی از آسیبهای غیر قابل برگشت به زندگی :
    - جدا شدن سر از بدن
    - سوختگی های شدید که شناسایی مصدوم ممکن نباشد

در چه زمانی عملیات احیا را شروع نکنیم ؟

کبودی وابسته به جاذبه

معیار پایان CPR :

- در صورت احساس نبض و تنفس در مددجو
- وجود علائم مرگ
- خستگی احیاگر

موفق باشید

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