Palacký University Olomouc

RESUSCITATION OF A NEONATE

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EUROPEAN RESUSCITATION COUNCIL

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European Resuscitation Council CPR Guidelines

- expert recommendations

- foundation for effective, safe,
  and evidence-based
  resuscitation in European clinical practice

- focus on all types, for us - newborn resuscitation and support the transition from fetus to newborn across all gestational ages

European Resuscitation Council CPR Guidelines

- early support of breathing (ventilation is the priority), establishment of effective lung aeration, and management of heart rate directly after birth
- the process differs from adult and pediatric resuscitation due to unique physiological transitions

CPR Guidelines 2025?

Jan '24 - Feb '24	Mar '24	Apr '24 - Jul '24	Aug '24 - Dec '24
Formation writing groups	Scope of the GL2025 chapters & topics reviewed by ERC groups	Evidence assessment (systematic review, scoping review, evidence update, etc.)	
			Preparation of GL2025 material & dissemination

Jan '25 - Mar '25	Apr '25 - May '25	Jun '25	Jul '25 - Sep '25	Oct '25
Writing of the chapters	Review (Steering Committee) & revision (writing groups)	Public comments, Board & GA signs off	Production by Elsevier	Publication GL2025 in Resuscitation

Preparation Before CPR

- Preparation of the environment,

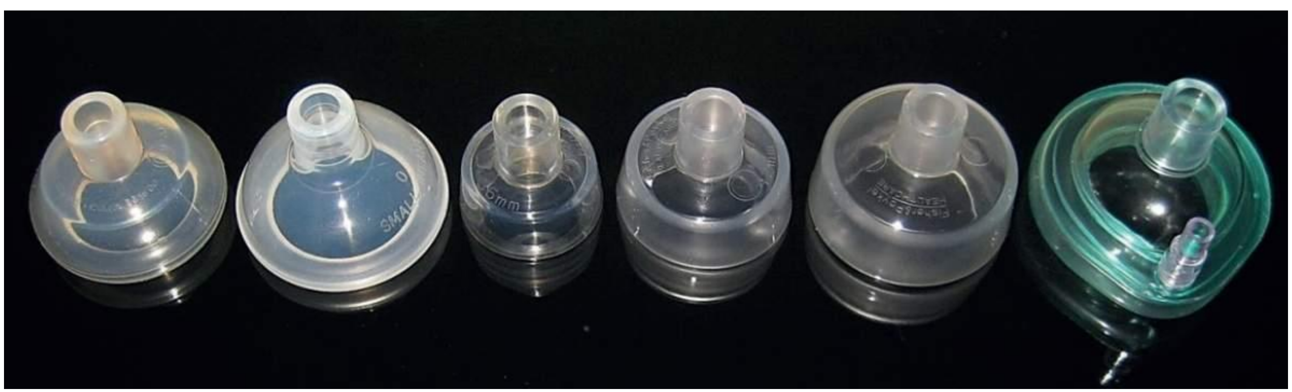
- preparation of instruments
  and equipment,

- sufficient information,

- cooperation between the teams (gynecology and neonatology).

Resuscitation Unit - PANDA

NEOPUFF - Infant T-piece Resuscitator



Lullaby* Resus Plus

T-piece resuscitation that is easy, designed for safety and economical to use

Transport Incubator


Dräger
Isolette TI500
Režim
Napájení
Baterie
Zapnuto
Režim Standby
Regulátor
Monitor teploty novorozence
°C
Teplota vzduchu
°C
Alarmy

Giraffe - Shuttle

CPR of Full-Term Newborn

- Start the timer – why?
- Just dry and cover!
- Assess vital functions (APGAR).
- In case is needed – start CPR!

APGAR Score

Apgar Score

			Score*	
Criteria	**Mnemonic**	**0**	**1**	**2**
Color	**A**ppearance	All blue, pale	Pink body, blue extremities	All pink
Heart rate	**P**ulse	Absent	< 100 beats/minute	> 100 beats/minute
Reflex response to nasal catheter/tactile stimulation	**G**rimace	None	Grimace	Sneeze, cough
Muscle tone	**A**ctivity	Limp	Some flexion of extremities	Active
Respiration	**R**espiration	Absent	Irregular, slow	Good, crying

* A total score of 7–10 at 5 minutes is considered normal; 4–6, intermediate; and 0–3, low.

Virginia Apgar

- American anesthesiologist, professor
  at Columbia University,
- developed APGAR score in 1952 to provide a quick and standardized method for assessing the physical condition of newborns immediately after birth,
- before this, there was no systematic way to identify infants in distress and determine whether they needed immediate medical attention.

CPR of Full-Term Newborn

- Neutral position of head.
- Do NOT routinely perform suctioning !!!

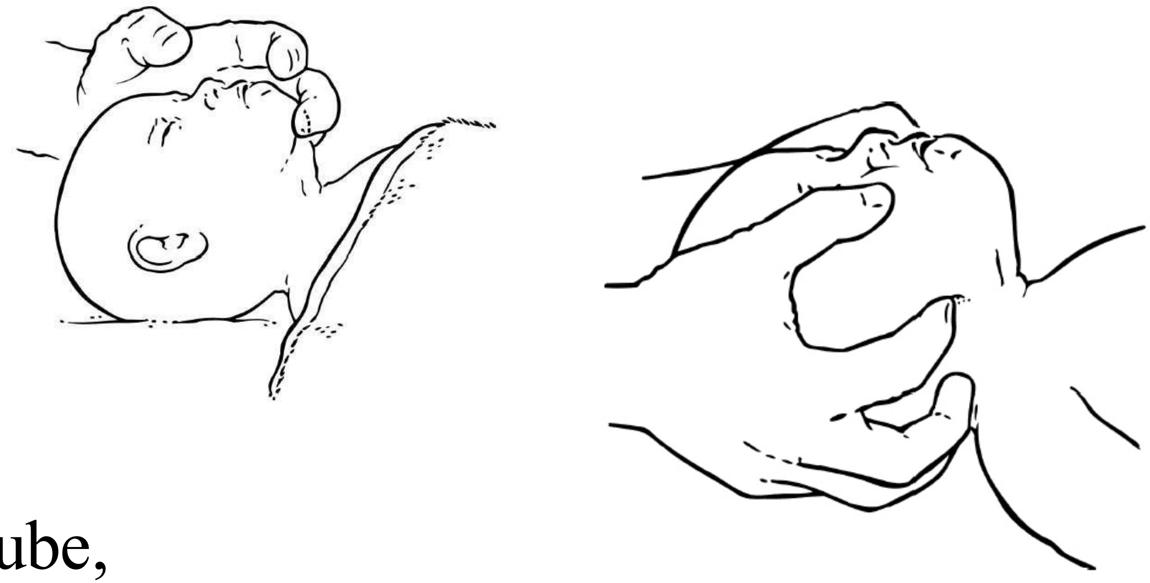
- Choosing the right size of O2 mask,
- 5 inflation breaths (2–3 seconds),
- assessment (Is the chest rising? Is the baby breathing?).

The Chest DOES NOT Rise

- Adjust the position of the head,
- check the mask for air leak,
- repeat 5 initial breaths,
- assessment (Is the chest rising? Is the baby breathing?).

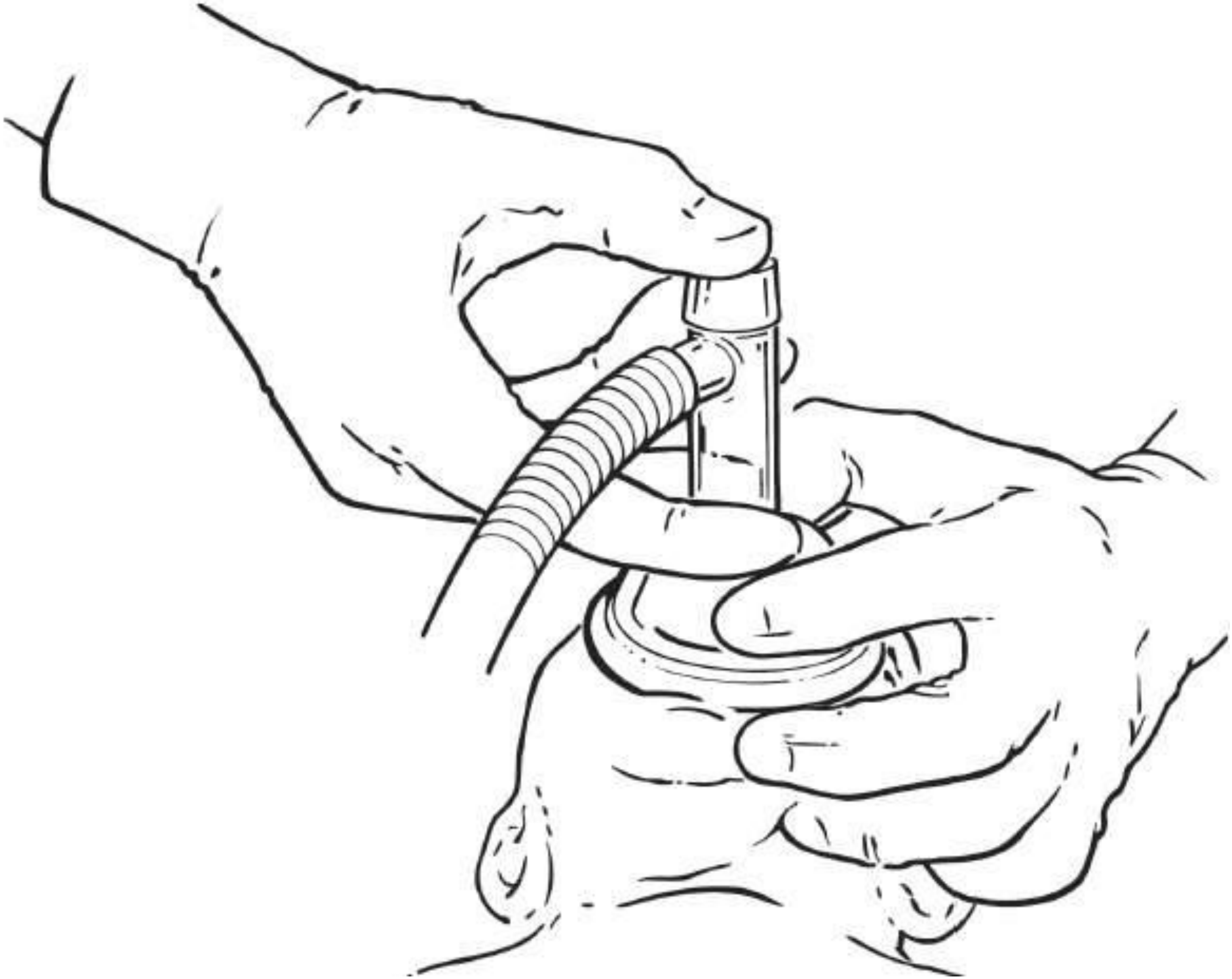
Adjust the Position of the Head

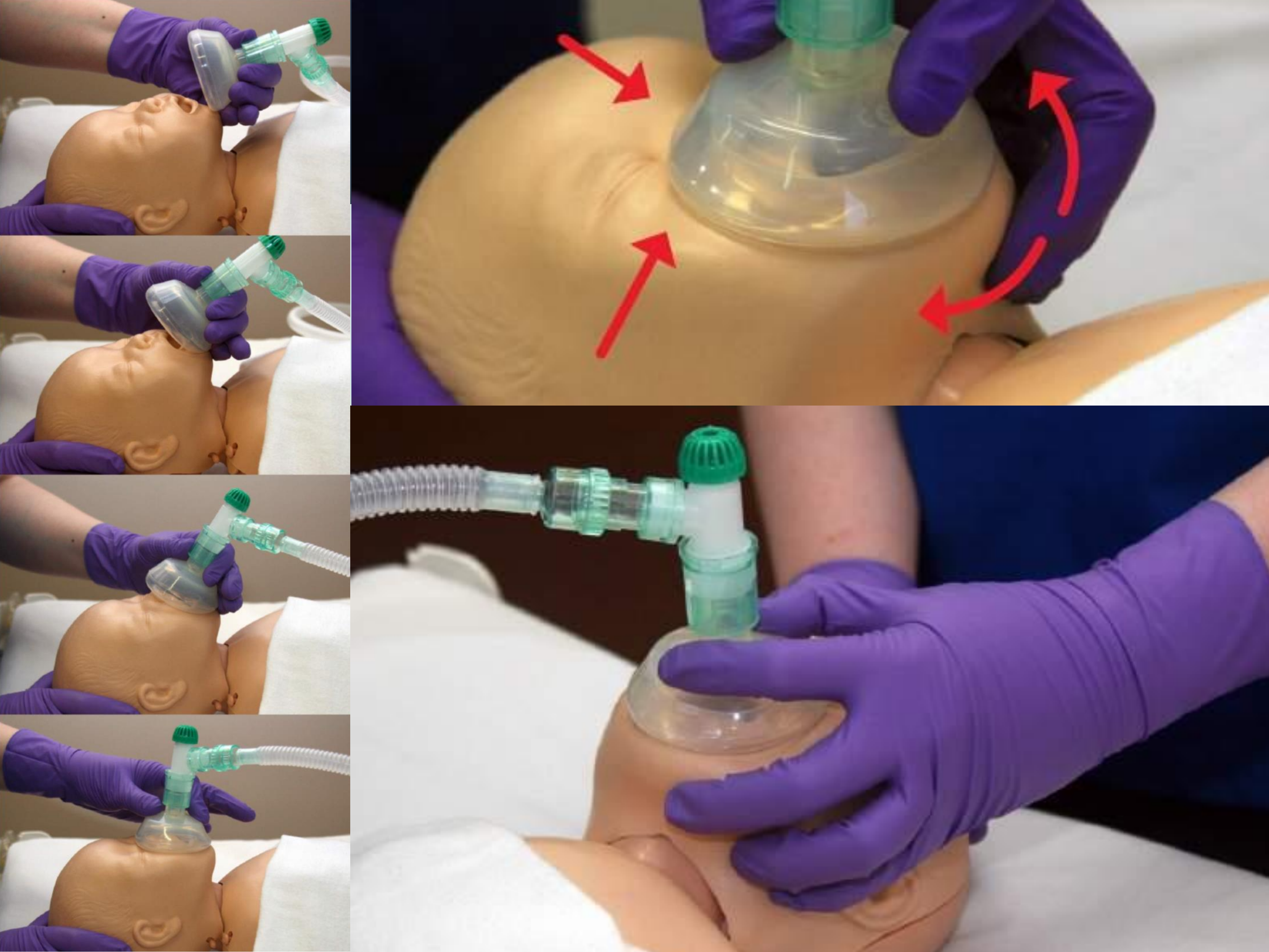
- Advance the jaw and apply the mask (best performed by two people).

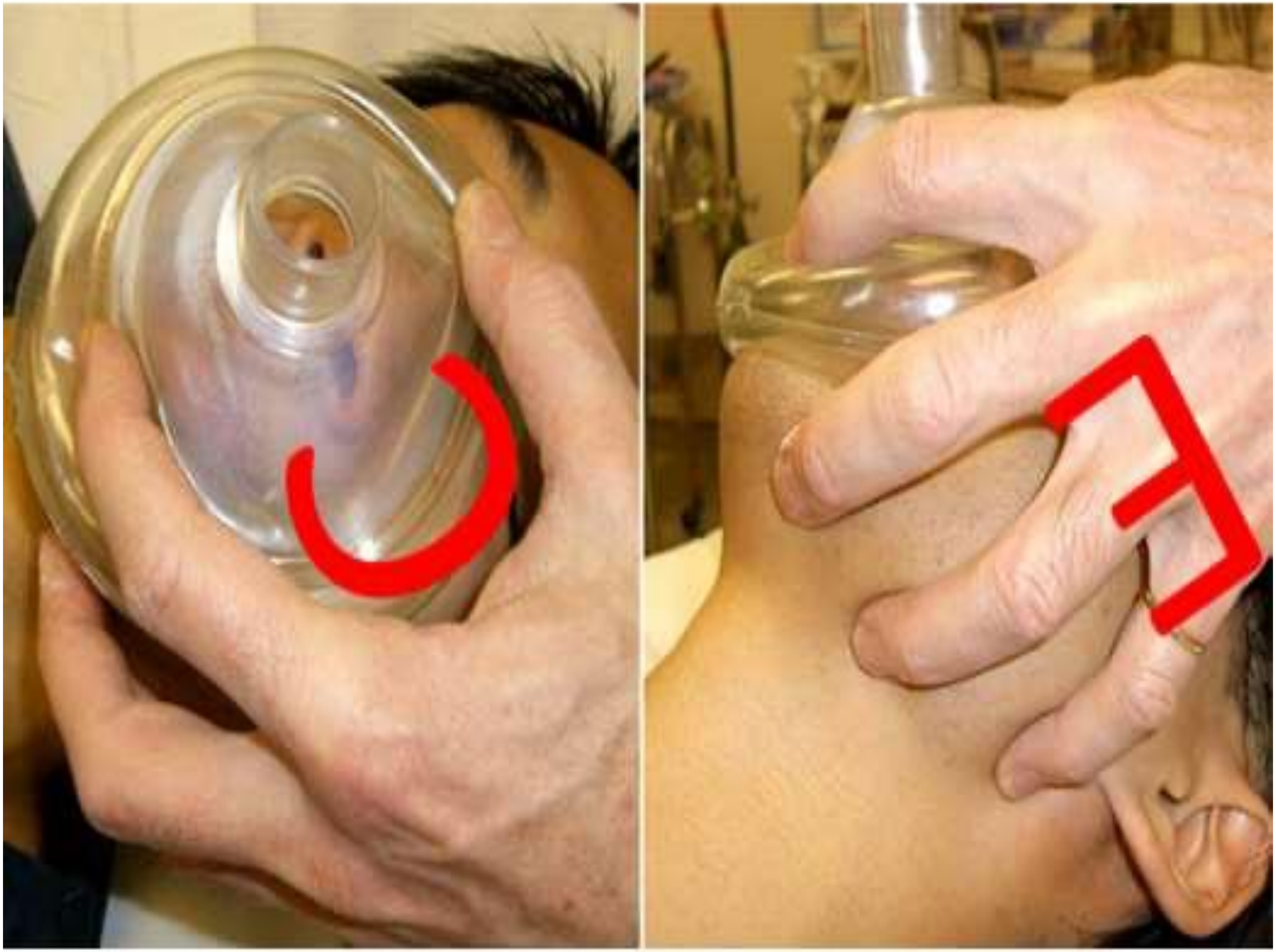


- Possible use of an air tube,
- again, 5 inflation breaths,
- assessment (Is the chest rising? Is the baby breathing? What is the Heart Rate?).

1 Person Securing the Airways







2 Persons Securing the Airways - Advantage

The chest DOES NOT rise
NO spontaneous breaths

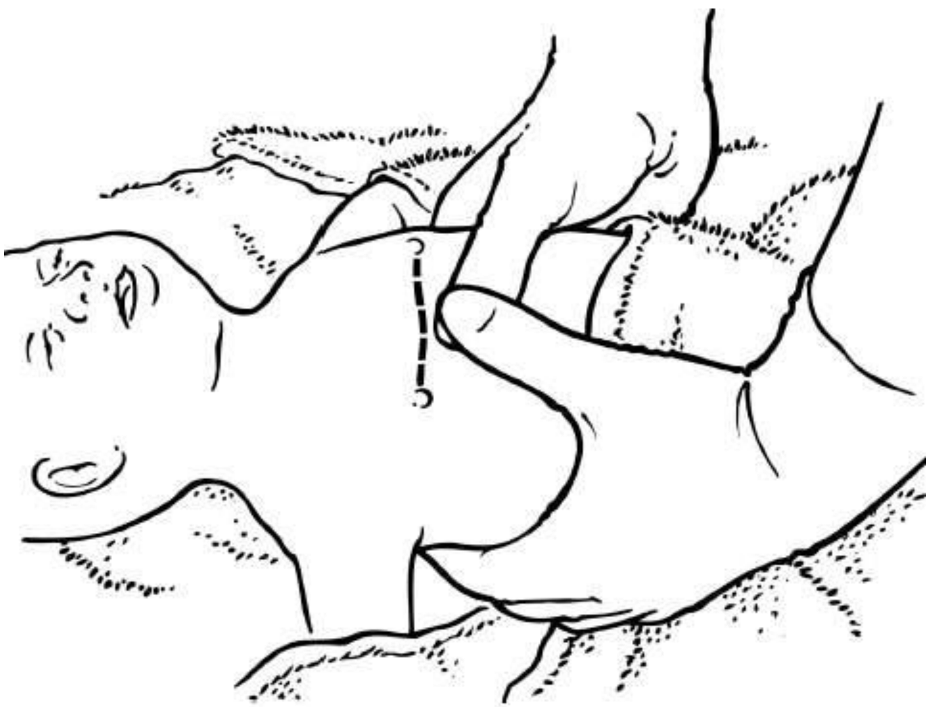
- Continue ventilation at 30–40/min for 30 seconds.
- Pulse oximetry (Right hand sensor – information about brain and heart oxygenation).

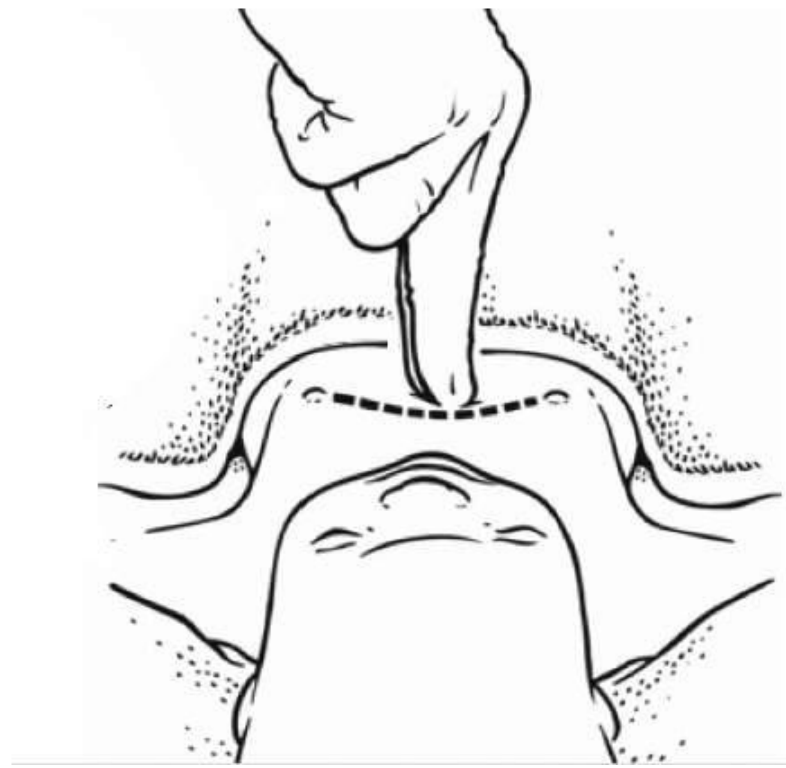
Time from birth	Acceptable (25th centile) right arm saturation
2 min	65%
5 min	85%
10 min	90%

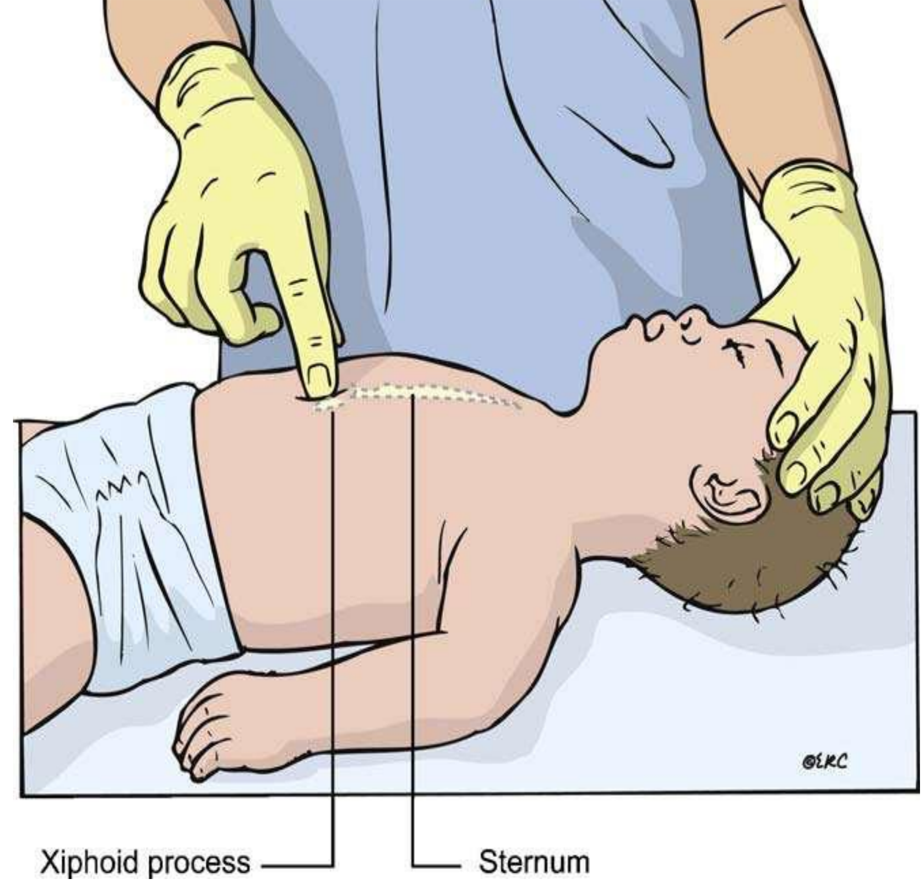
- Assessment – Is the patient breathing? Heart Rate?

HR Below 60/min

- **Start chest compressions 3:1**, one-third of the anterior-posterior diameter of the chest (25-30 mm - premature).
- Continue ventilation for 30 seconds.






©ERC
Xiphoid process
Sternum


a
b

HR Still Below 60/min

- Continue ventilation with chest compressions and administer 100% of $O_{2.}$

- Umbilical vein catheterization.

Medication:

- Adrenaline: 0,1 – 0,3 ml/kg (rate 1:10000)
- 4,2% Bicarbonate: 2 – 4 ml/kg
- Volume expansion - 10% glucose: 2,5 ml/kg

CPR of of a Premature Newborn – Differences

- Do not dry!

  ↓

- Wrap in plastic foil or NeoHelp
- PIP: max 25 cm H_2O
- PEEP: 5-7 cm H_2O

CPR – FiO2 Usage

Condition / Infant Type	Initial O_2 Concentration	Titration Recommendation	Notes
Term healthy newborn	21% (room air)	Increase according to saturation	100% O_2 not recommended resus +1
Preterm ≥ 32 weeks	21% (room air)	Titrate to saturation	Pulse oximetry monitoring recommended resus +1
Preterm 28–31 weeks	21–30%	Titrate to saturation	Air/oxygen blender desirable resus +1
Preterm < 28 weeks	30%	Titrate to saturation	Frequent saturation checks and oxygen adjustment needed resus +1
During chest compressions (CPR)	100%	After ROSC, titrate to saturations (85–95%)	Gradually reduce to 21% after return of circulation pmc.ncbi.nlm.nih +1

Stabilisation: Panda

Transport: Transport Incubator

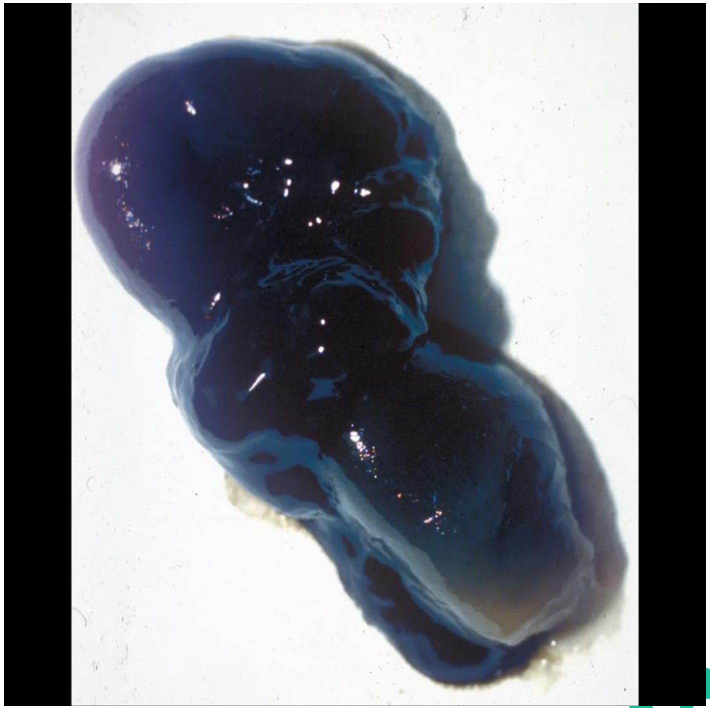
Stabilisation: Giraffe

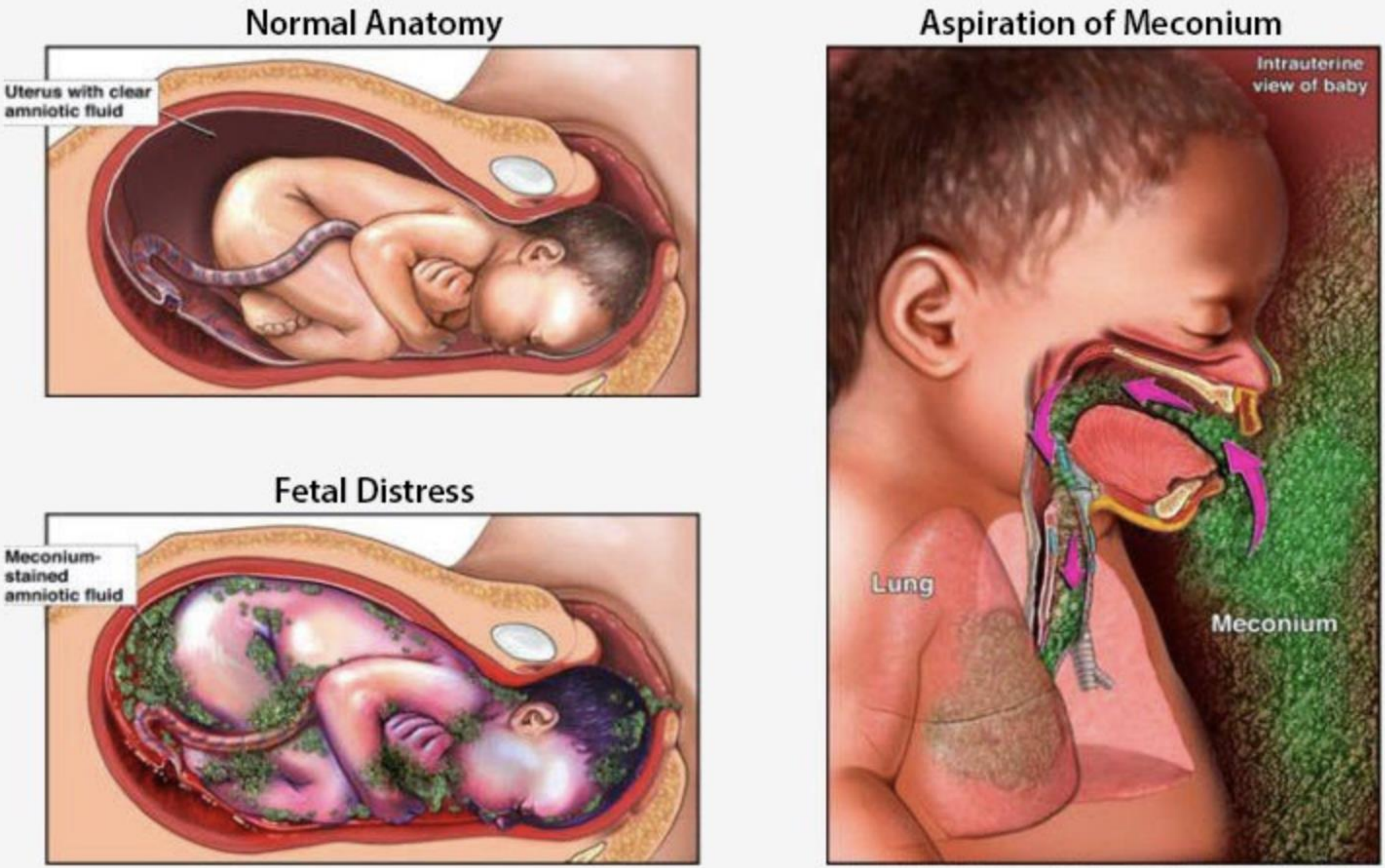
Transport: Giraffe - Shuttle

Meconium in the Airways

- Provide suction under laryngoscopic control
- possible insertion of an airway tube,
- use a Yankauer suction catheter or a catheter with the largest possible diameter, approx. 12–14 FR.

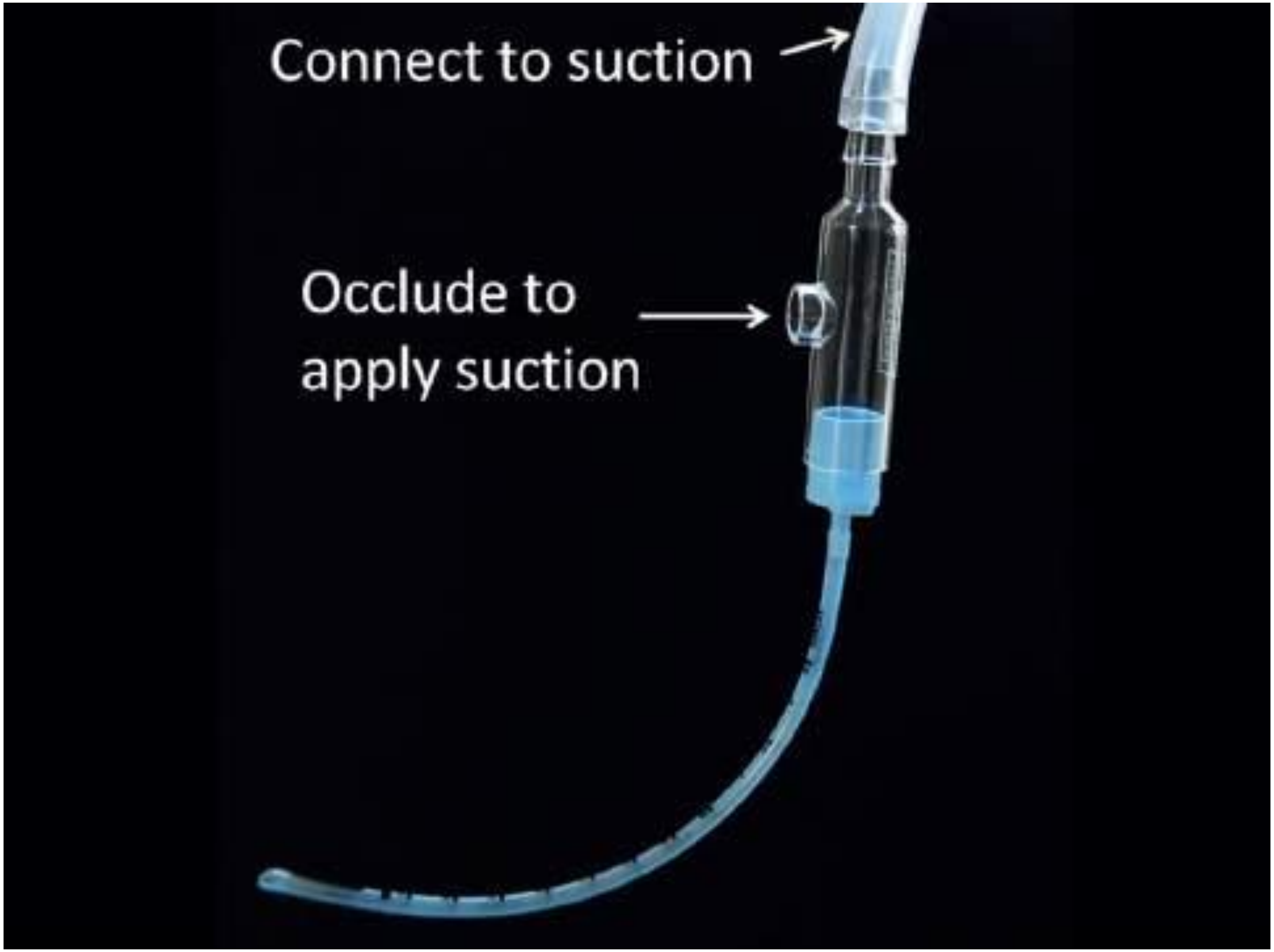
- Intubate and provide suction via ETC.





A sudden gasp by the baby causes amniotic fluid and meconium to surge in through the mouth and into the lungs

Yankauer Suction Catheter




PORTEX

NLS 2021

5 TOP MESSAGES

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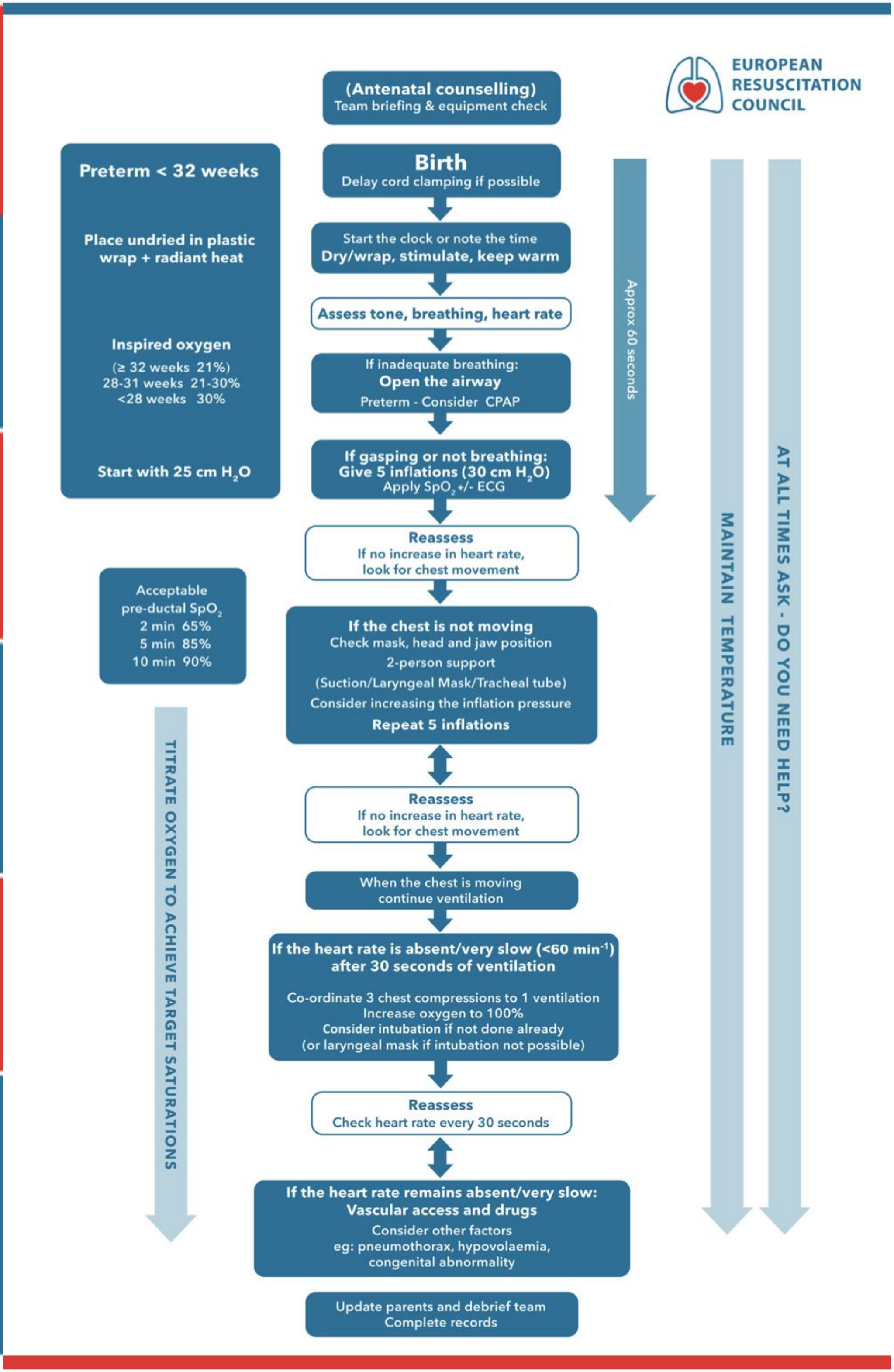
1. Delayed cord clamping can optimise condition - especially in the preterm infant

2. Effective thermal care is vital - Dry wrap and stimulate

3. Assess breathing & heart rate - A fast heart rate indicates adequate oxygenation

4. Simple steps to support airway and breathing manage most problems

5. Chest compressions only once effective ventilation is established and if the heart rate remains very slow



Valid Sources

European Resuscitation Council (ERC)

https://www.erc.edu

International Liaison Committee on Resuscitation (ILCOR)

https://www.ilcor.org

Global First Aid Reference Centre Platform (IFRC)

https://www.globalfirstaidcentre.org

Thank you for your attention