

FAKULTNÍ
NEMOCNICE
U SV. ANNY
V BRNĚ



MUNI
MED

Predikce Difficult Airways, možnosti a algoritmy, VORTEX, videolaryngoskopy

Lukáš Dadák

1* AKUTNE.CZ®
years

16.11.2019





Disclaimer

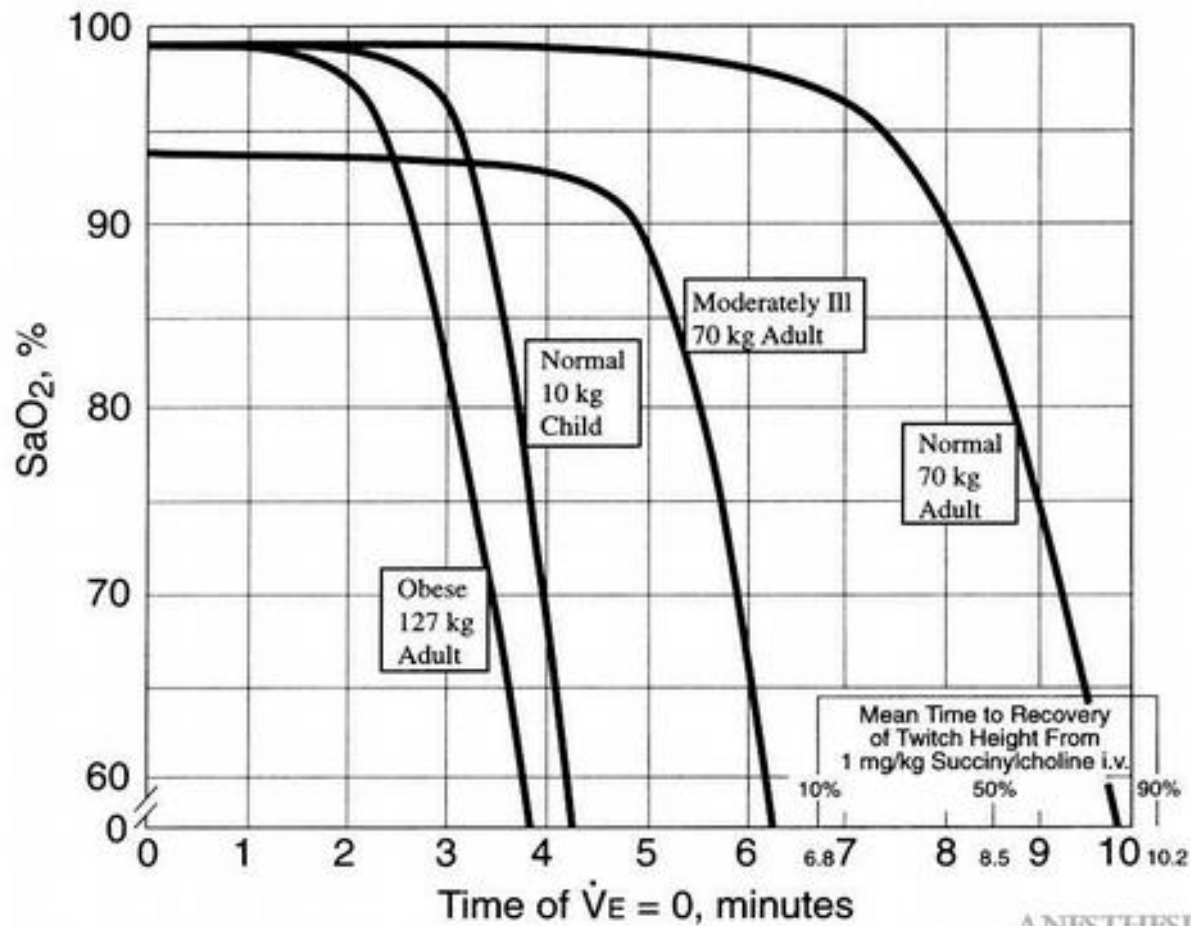
MUDr. Lukáš Dadák, Ph.D.

V posledních 11 letech přednáší na kurzech podporovaných společnostmi LMA a Teleflex.

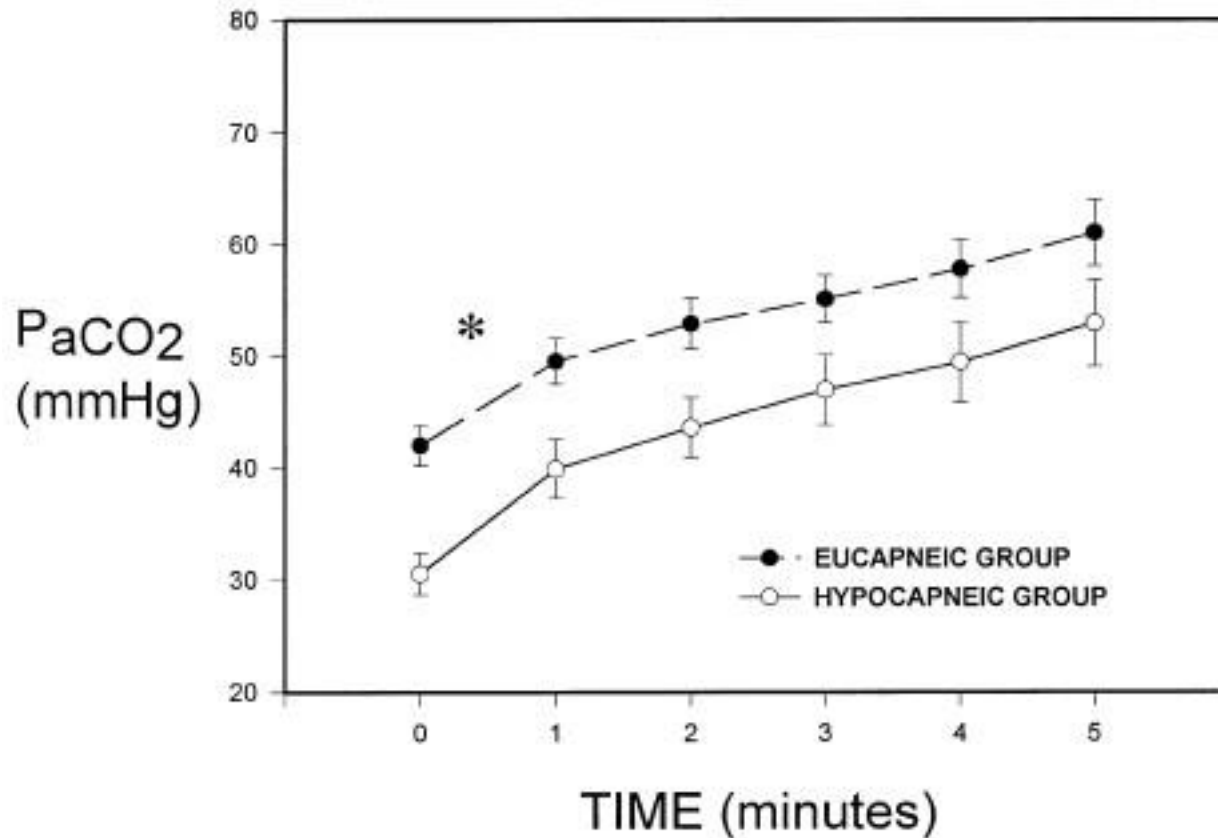
Obrázky produktů pochází z webových stránek výrobců či distributorů.

Apnoe a oxygenace

TIME TO HEMOGLOBIN DESATURATION WITH INITIAL $F_{A}O_2 = 0.87$

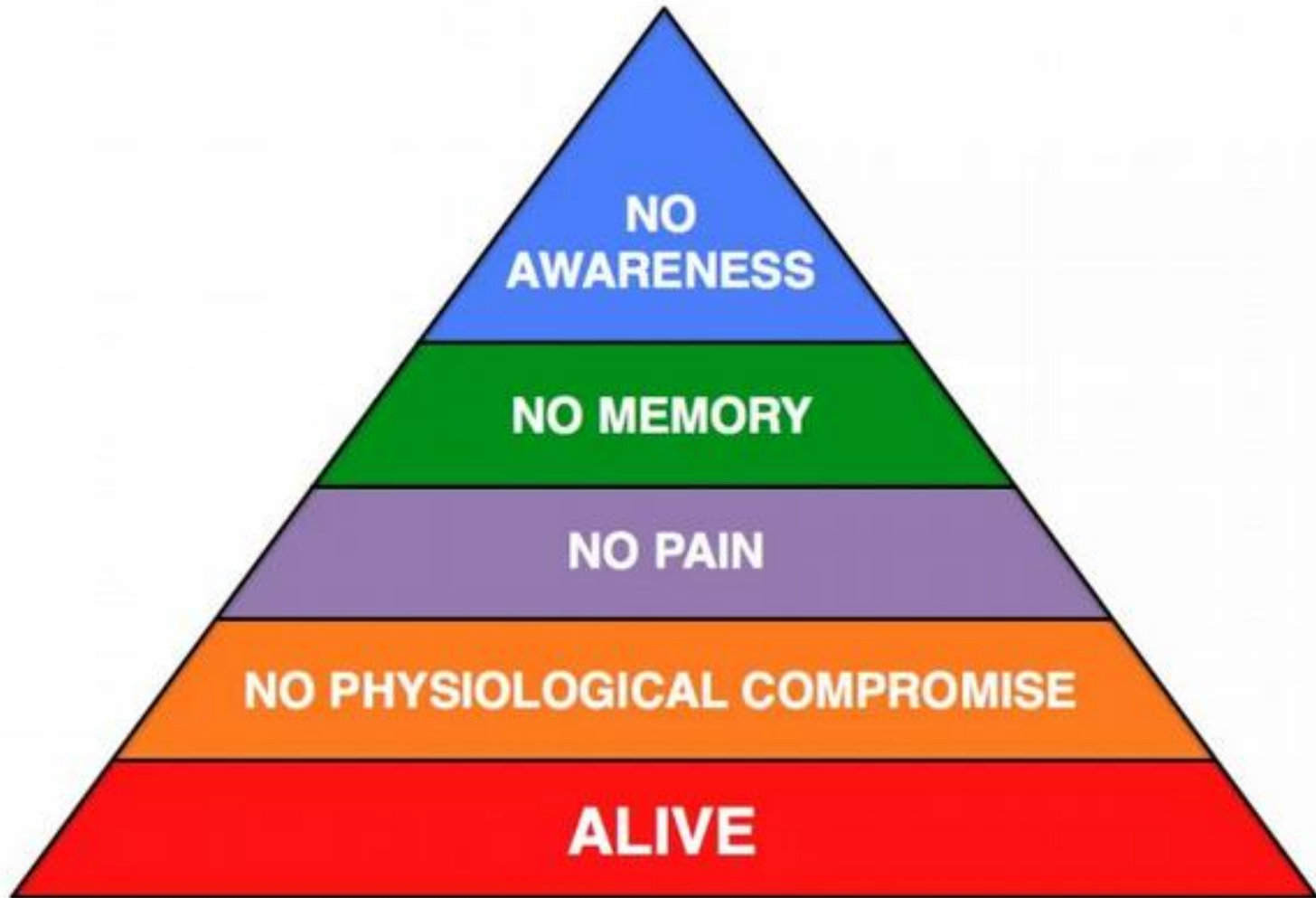


Apnoe a hyperkapnie



- **pečlivá volba priorit**
- pečlivé vyšetření dýchacích cest
... odhalí některé (70% spolehlivost)
- pečlivá preoxygenace
... získá několik minut navíc (u zdravých)
- pečlivá příprava polohy, plánu a pomůcek

Priority (D)AM



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Practice Guidelines for Management of the Difficult Airway

*An Updated Report by the American Society of Anesthesiologists
Task Force on Management of the Difficult Airway*

Airway Examination Component	Nonreassuring Findings
Length of upper incisors	Relatively long
Relationship of maxillary and mandibular incisors during normal jaw closure	Prominent "overbite" (maxillary incisors anterior to mandibular incisors)
Relationship of maxillary and mandibular incisors during voluntary protrusion of mandible	Patient cannot bring mandibular incisors anterior to (in front of) maxillary incisors
Interincisor distance	Less than 3 cm
Visibility of uvula	Not visible when tongue is protruded with patient in sitting position (e.g., Mallampati class >2)
Shape of palate	Highly arched or very narrow
Compliance of mandibular space	Stiff, indurated, occupied by mass, or nonresilient
Thyromental distance	Less than three 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

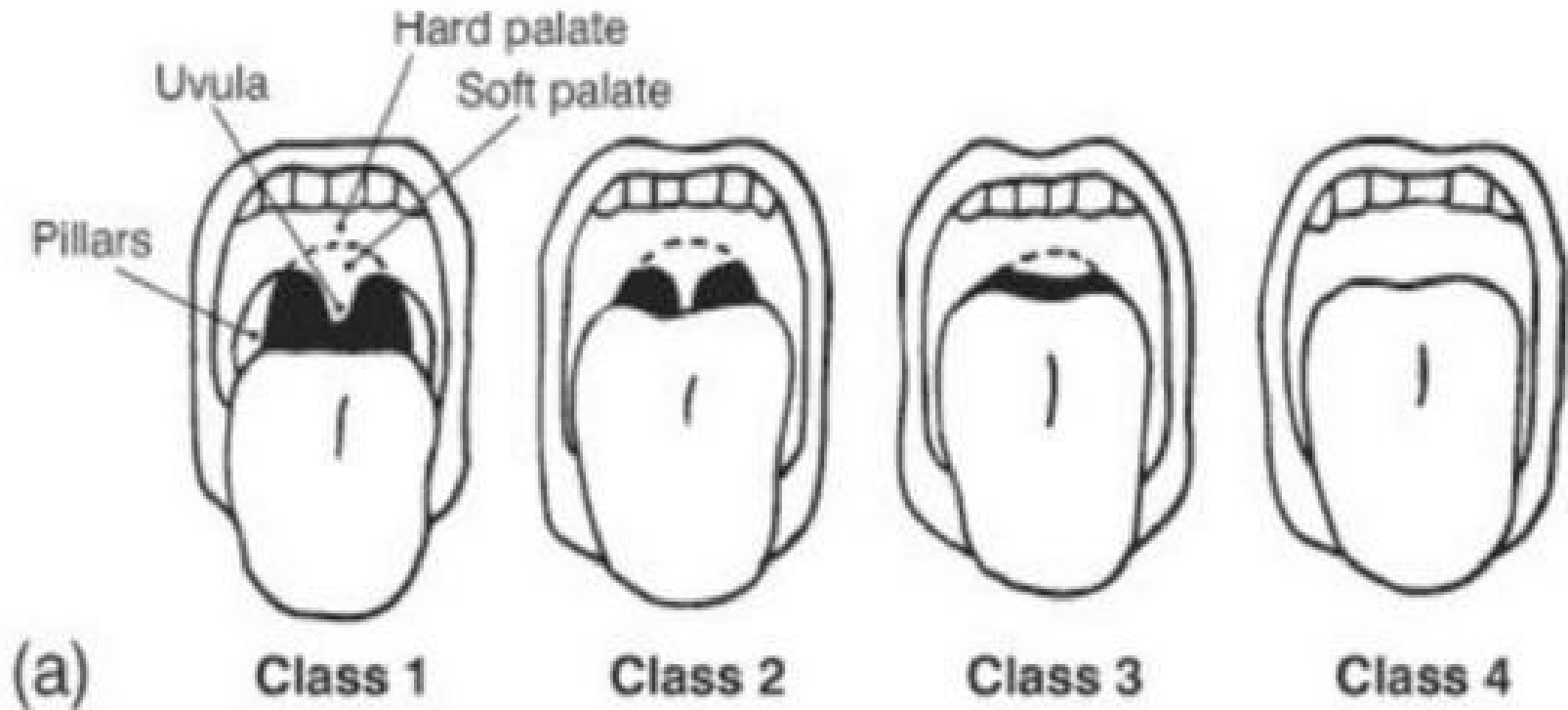
This table displays some findings of the airway physical examination that may suggest the presence of a difficult intubation. The decision to examine some or all of the airway components shown on this table is dependent on the clinical context and judgment of the practitioner. The table is not intended as a mandatory or exhaustive list of the components of an airway examination. The order of presentation in this table follows the "line of sight" that occurs during conventional oral laryngoscopy.

MACOCHA for ICU intubation

Factors	
Factors related to patient	
Mallampati class III or IV	5
Obstructive sleep Apnoea syndrome	2
Reduced mobility of Cervical spine	1
Limited mouth Opening <3 cm	1
Factors related to pathology	
Coma	1
Severe Hypoxaemia (SpO ₂ <80%)	1
Factor related to operator	
Non-Anaesthetist	1
Total points	12



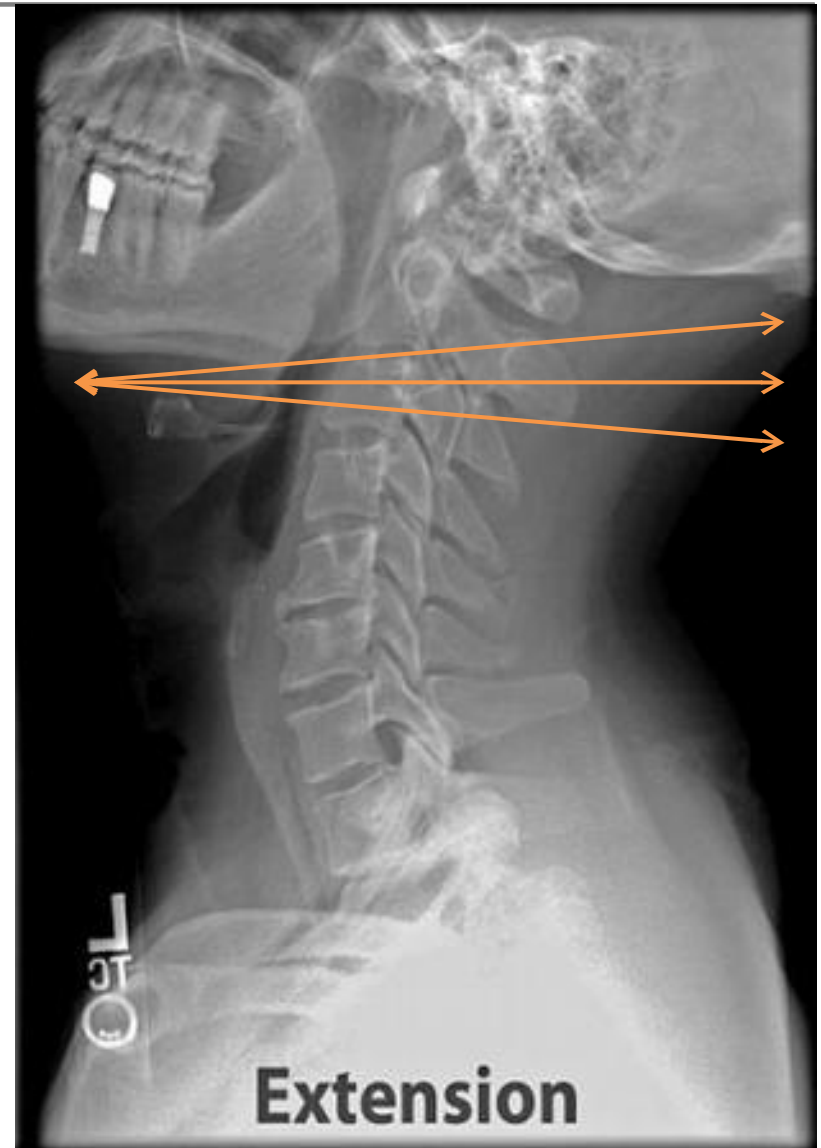
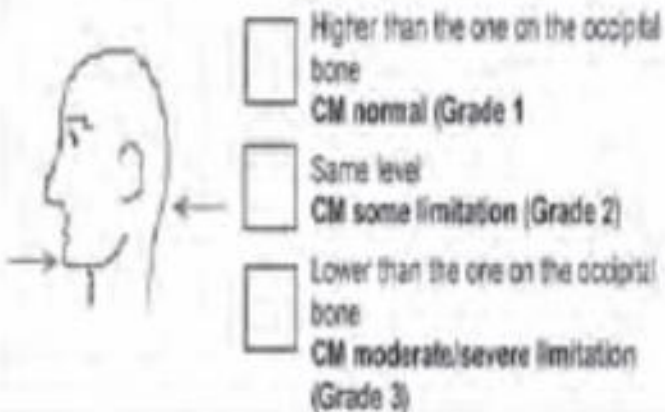
Mallanpati



Mobilita C páteře

Neck Mobility:

With patient sitting upright, place one index finger on the patient's chin and one index finger on the occipital bone. Ask the patient to completely extend the head on the neck. The finger on the chin is (CM= cervical mobility):



Otevření úst



- pečlivá volba priorit
- pečlivé vyšetření dýchacích cest
... odhalí některé (70% spolehlivost)
- **pečlivá preoxygenace**
... získá několik minut navíc (u zdravých)
- pečlivá příprava polohy, plánu a pomůcek



reoxxygenace za spont. ventilace



- obličejovou maskou
3 minuty s průtokem 10 l/min O₂
8 hlubokých vdechů během minuty **těsnící maskou**
- NIV

$$PAO_2 = P_iO_2 - [PACO_2/R]$$

Vzduch: 21% O₂

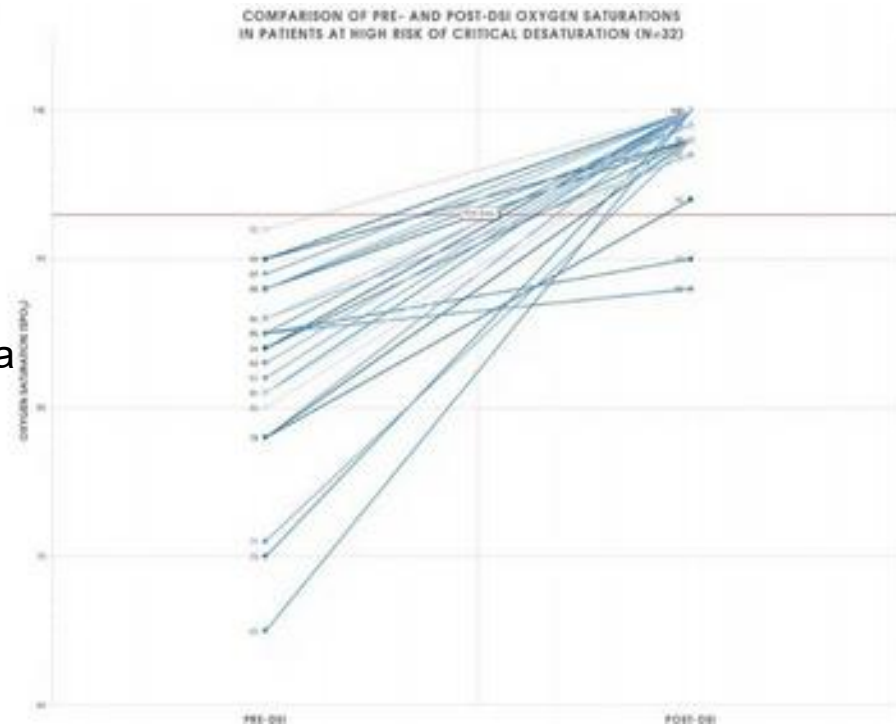
$$PAO_2 = 0.21 \times (101.3 - 6.7) - 5.3/0.8 = 13.2 \text{ kPa}$$

100% O₂:

$$PAO_2 = (101.3 - 6.7) - [5.3/0.8] = 88 \text{ kPa}$$

Kde? ... FRC ... až 1800 ml O₂

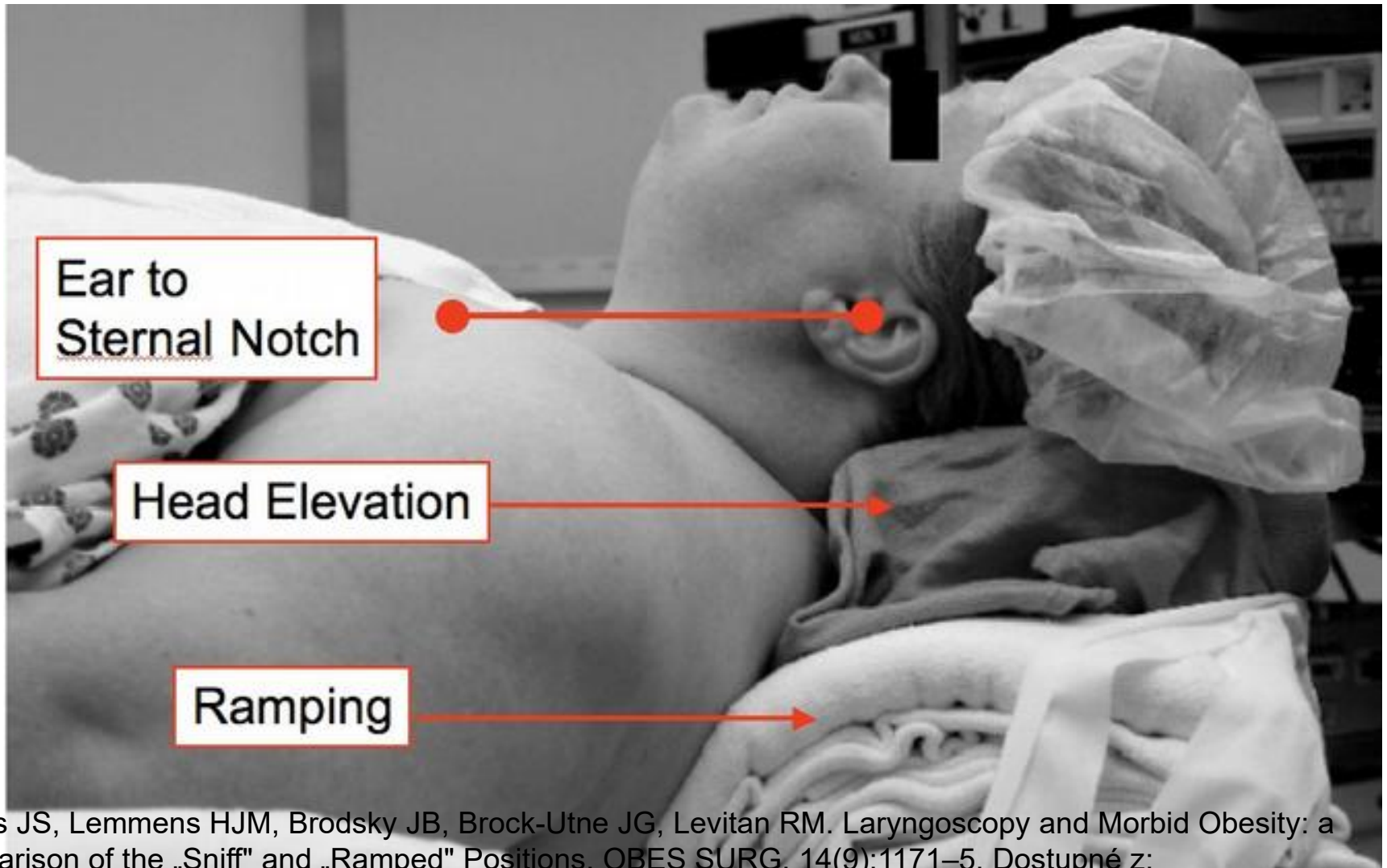
= 7 minut spotřeby



Pečlivě

- pečlivá volba priorit
- pečlivé vyšetření dýchacích cest
... odhalí některé (70% spolehlivost)
- pečlivá preoxygenace
... získá několik minut navíc (u zdravých)
- **pečlivá příprava polohy, plánu a pomůcek**

Polohování před intubací

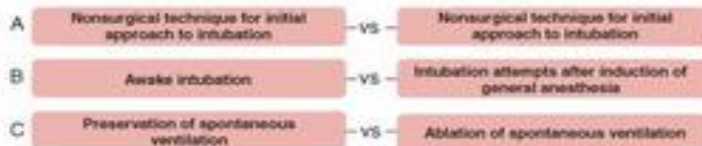


DIFFICULT AIRWAY ALGORITHM

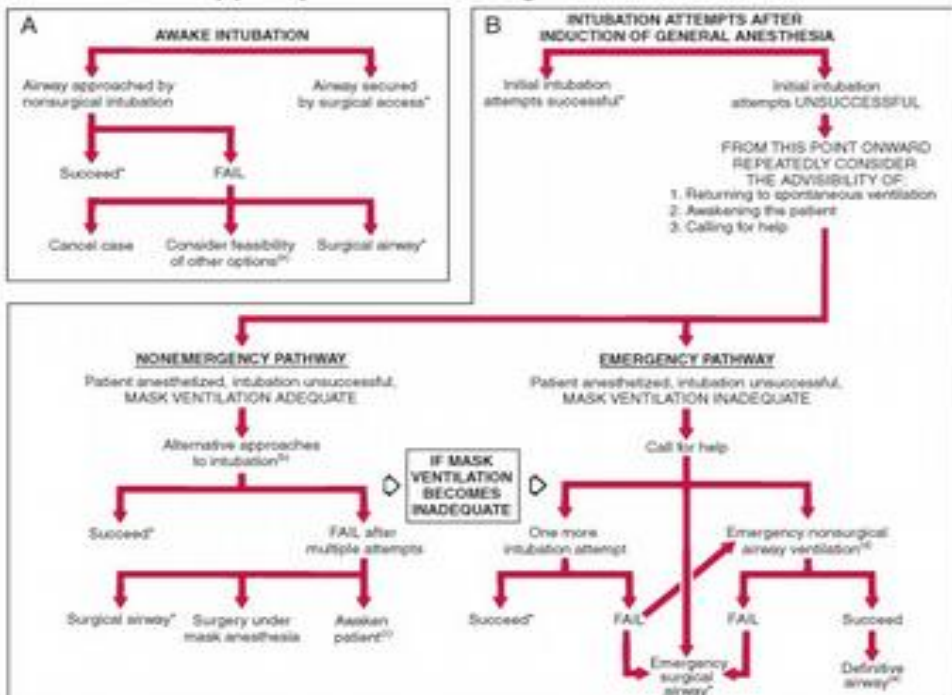
1. Assess the likelihood and clinical impact of basic management problems:

- A. Difficult intubation
- B. Difficult ventilation
- C. Difficulty with patient cooperation or consent

2. Consider the relative merits and feasibility of management choices:



3. Develop primary and alternative strategies:



1. Assess the likelihood and clinical impact of basic management problems:

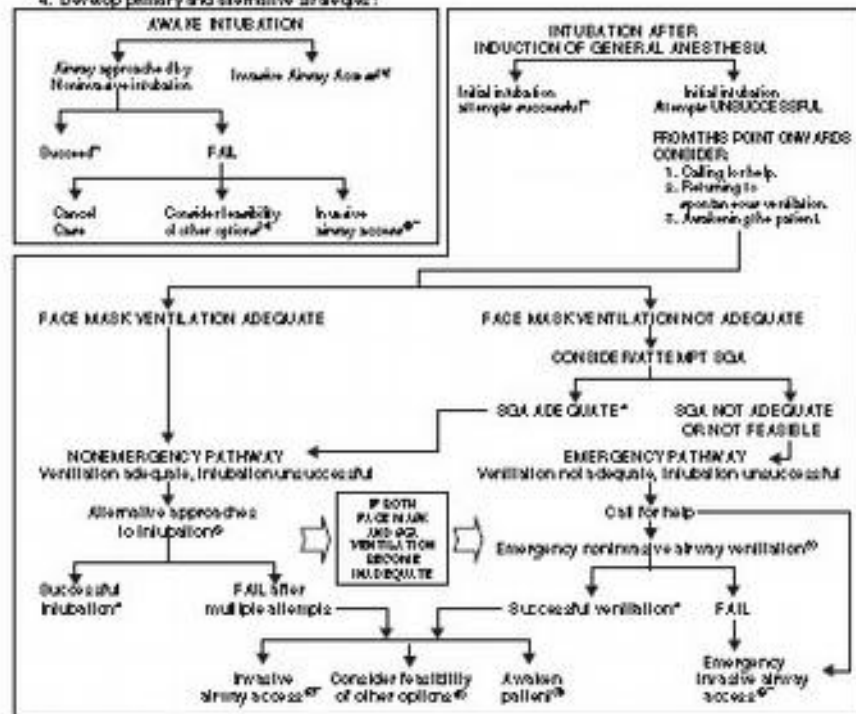
- Difficulty with patient cooperation or consent
- Difficult mask ventilation
- Difficult supraglottic airway placement
- Difficult laryngoscopy
- Difficult intubation
- Difficult surgical airway access

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 technique 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 CO₂.

- e. Other options include (but are not limited to): surgery under mask anesthesia, surgery under local anesthesia infiltration or regional nerve blockade, or intubation attempts after induction of general anesthesia.
- (c) See awake intubation.
- (d) Options for emergency non-surgical airway ventilation include, but are not limited to: transtracheal jet ventilation, laryngeal mask ventilation, or esophageal-tracheal combi-tube ventilation.
- (e) Options for establishing a definitive airway include, but are not limited to: returning to awake state with spontaneous ventilation, tracheotomy, or endotracheal intubation.
- f. 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 blow-by device, lightwand, and blind oral or nasal intubation.
- g. Consider re-positioning of the patient for awake intubation or canceling surgery.
- h. Invasive airway access includes surgical or percutaneous airway, jet ventilation, and retrograde intubation.
- i. Emergency non-invasive airway ventilation consists of a SGA.

Fig. 1. Difficult Airway Algorithm.

DAS 2004 → 2015

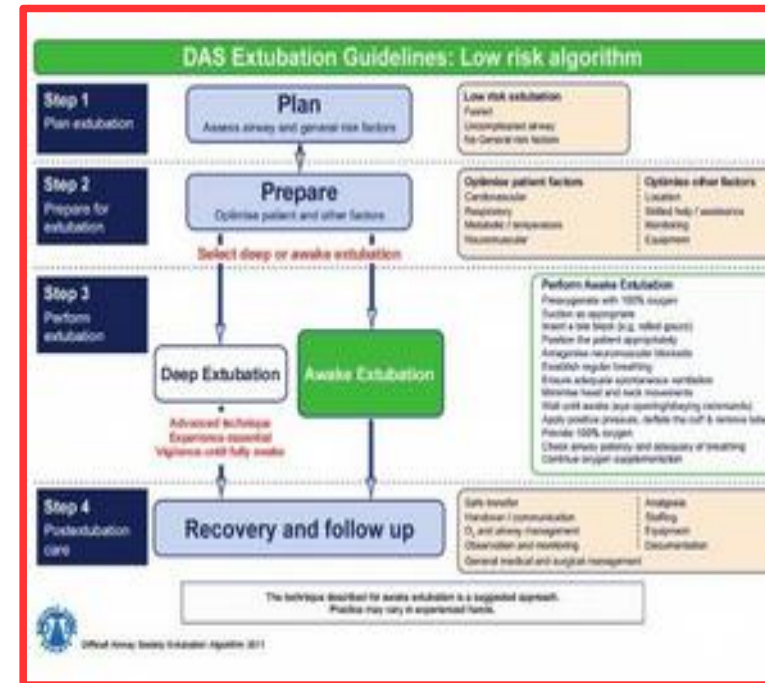
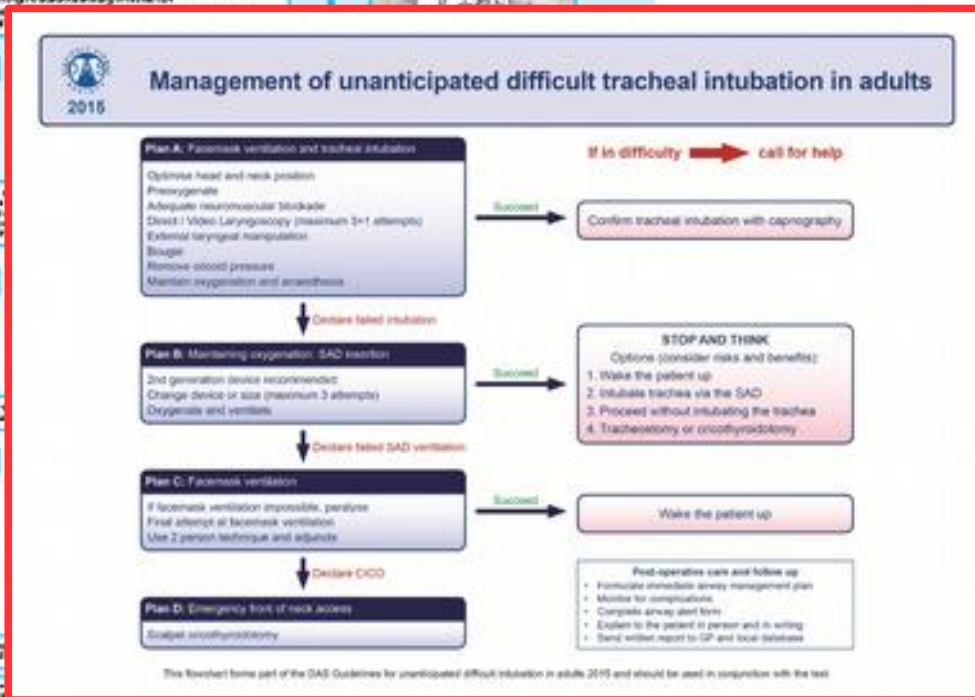
Direct laryngoscopy → Any problems → Call for help

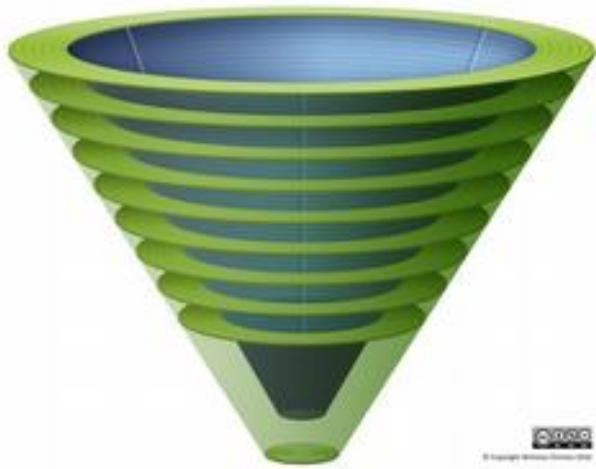
FIBRE OPTIC GUIDED TRACHEAL INTUBATION THROUGH SUPRAGLOTTIC AIRWAY DEVICE (SAD) USING AINTRE INTUBATION CATHETER

Please ensure the SAD is in place; give 100% oxygen; confirm adequate sedation/anaesthesia, ventilation & paralysis

AIMS OBJECTIVE

- maintain airway patency
- avoid airway obstruction
- avoid airway trauma
- avoid airway obstruction
- avoid airway obstruction
- avoid airway obstruction
- avoid airway obstruction
- avoid airway obstruction
- avoid airway obstruction



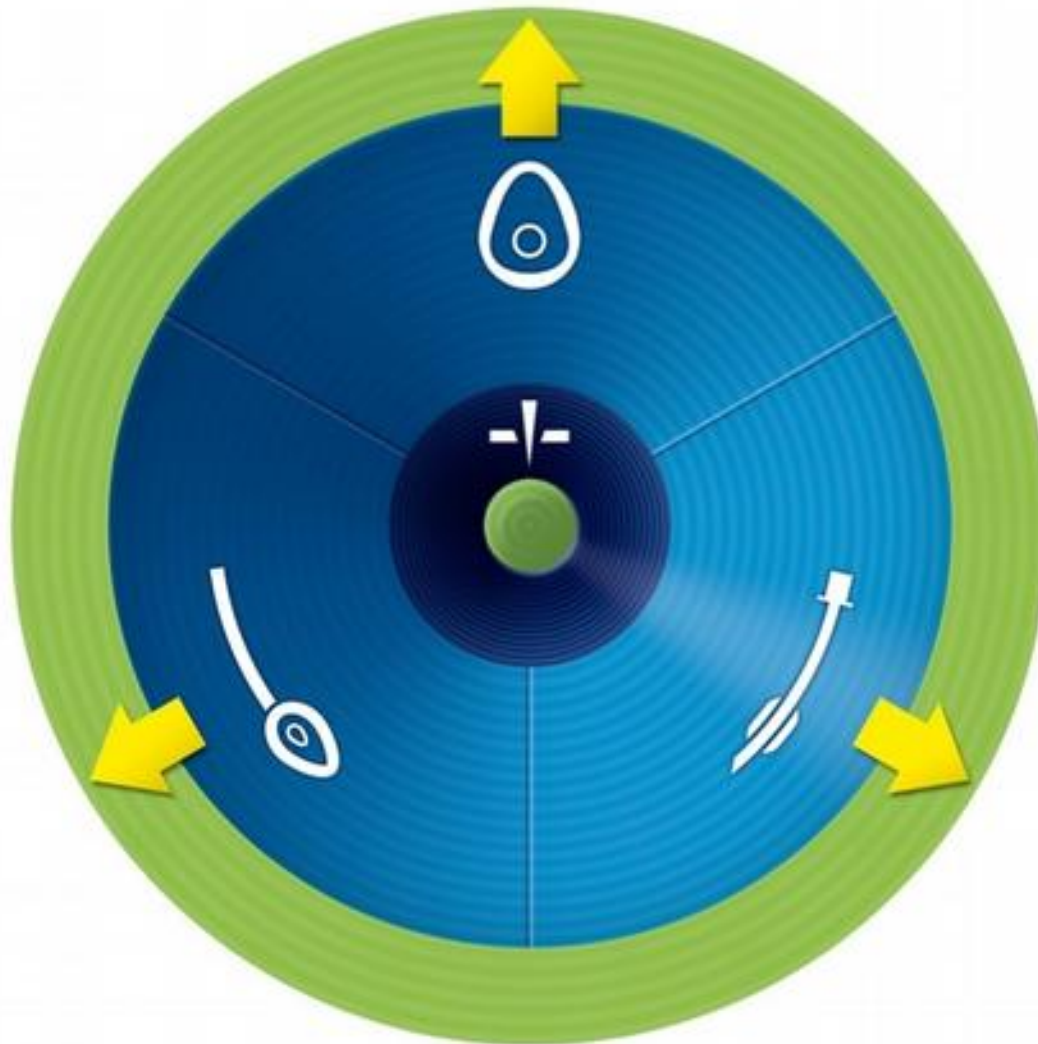


Vír



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Oxygenace a ventilace = bezpečná zóna



T H E V O R T E X

FOR EACH LIFELINE CONSIDER:



MANIPULATIONS:

- HEAD & NECK
- LARYNX
- DEVICE



ADJUNCTS



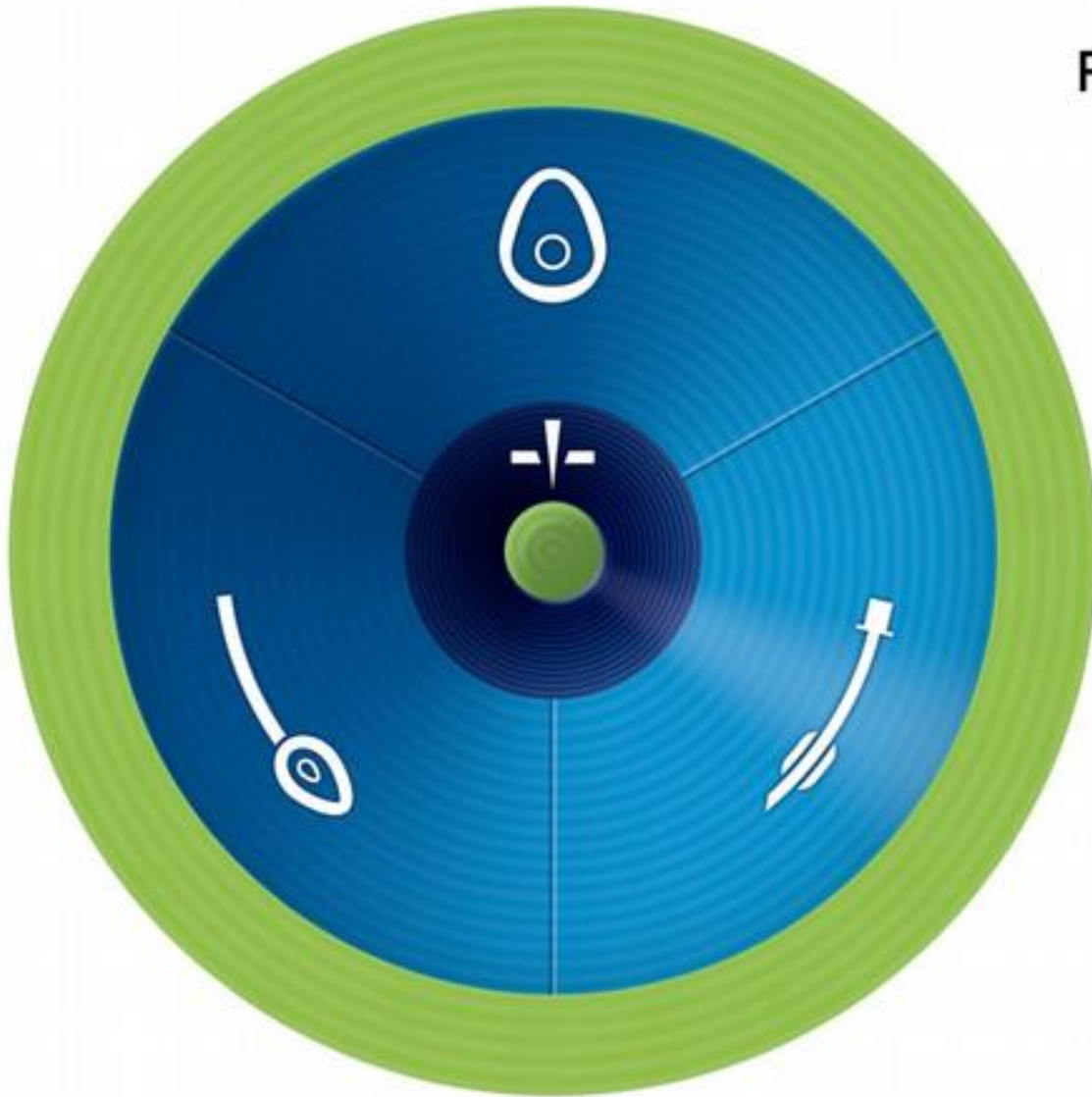
SIZE / TYPE



SUCTION / O₂ FLOW



MUSCLE TONE



MAXIMUM THREE ATTEMPTS AT EACH LIFELINE (UNLESS GAMECHANGER)
AT LEAST ONE ATTEMPT SHOULD BE BY MOST EXPERIENCED CLINICIAN
CICO STATUS ESCALATES WITH UNSUCCESSFUL BEST EFFORT AT ANY LIFELINE





spěšná ventilace

obličejovou maskou

správná velikost masky #1..#5

správná poloha hlavy

záklon

trojhmat

při jejich selhání ústní vzduchovod

mírná rotace hlavy

správná technika ventilace

obličej zvedám do masky

sledují tlaky v d. cestách (<10, <<20cm H₂O)

sledují výdech pacienta, EtCO₂

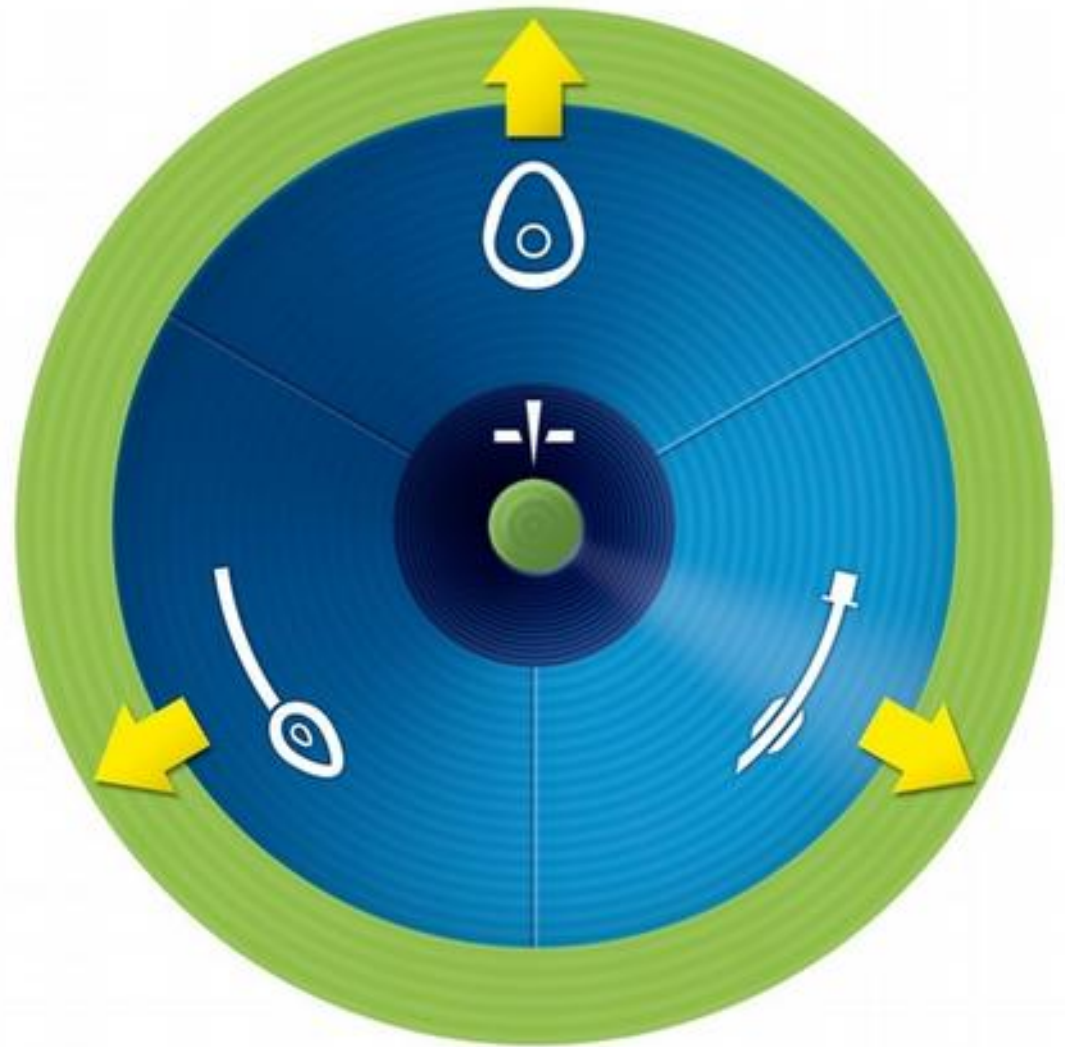


ntilace obličejovou maskou

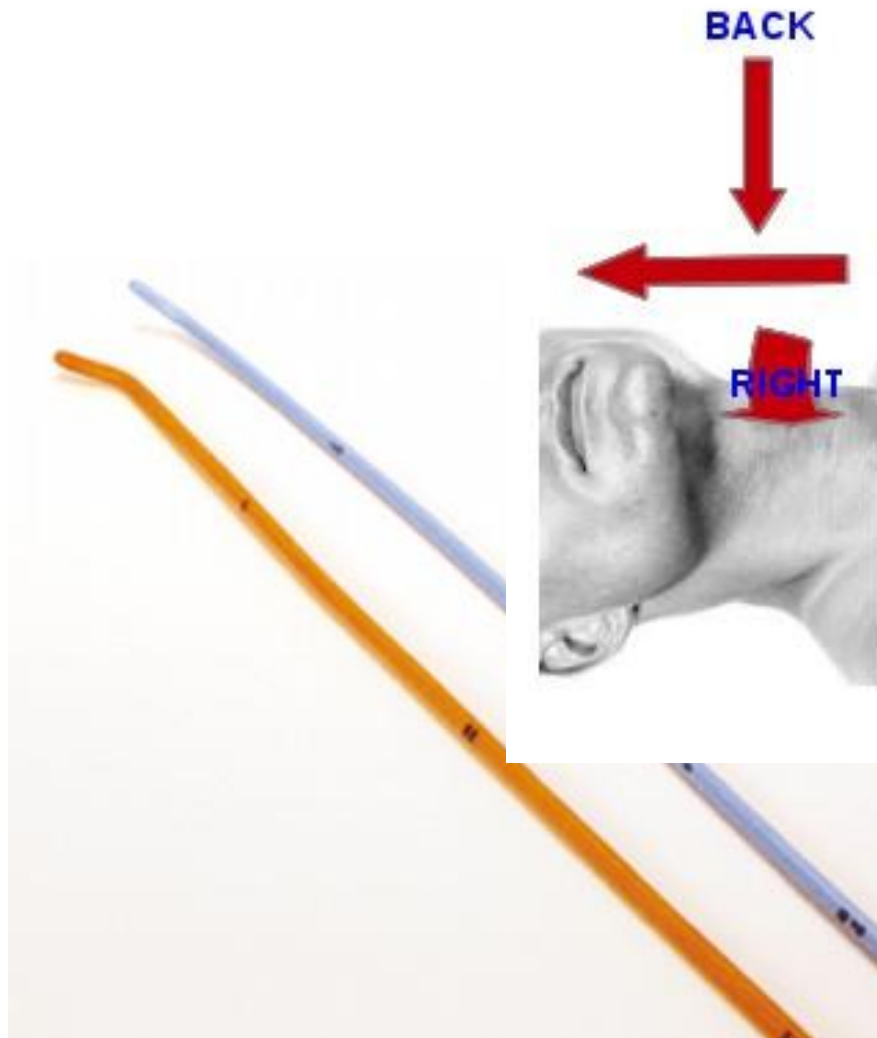
8 >> 3

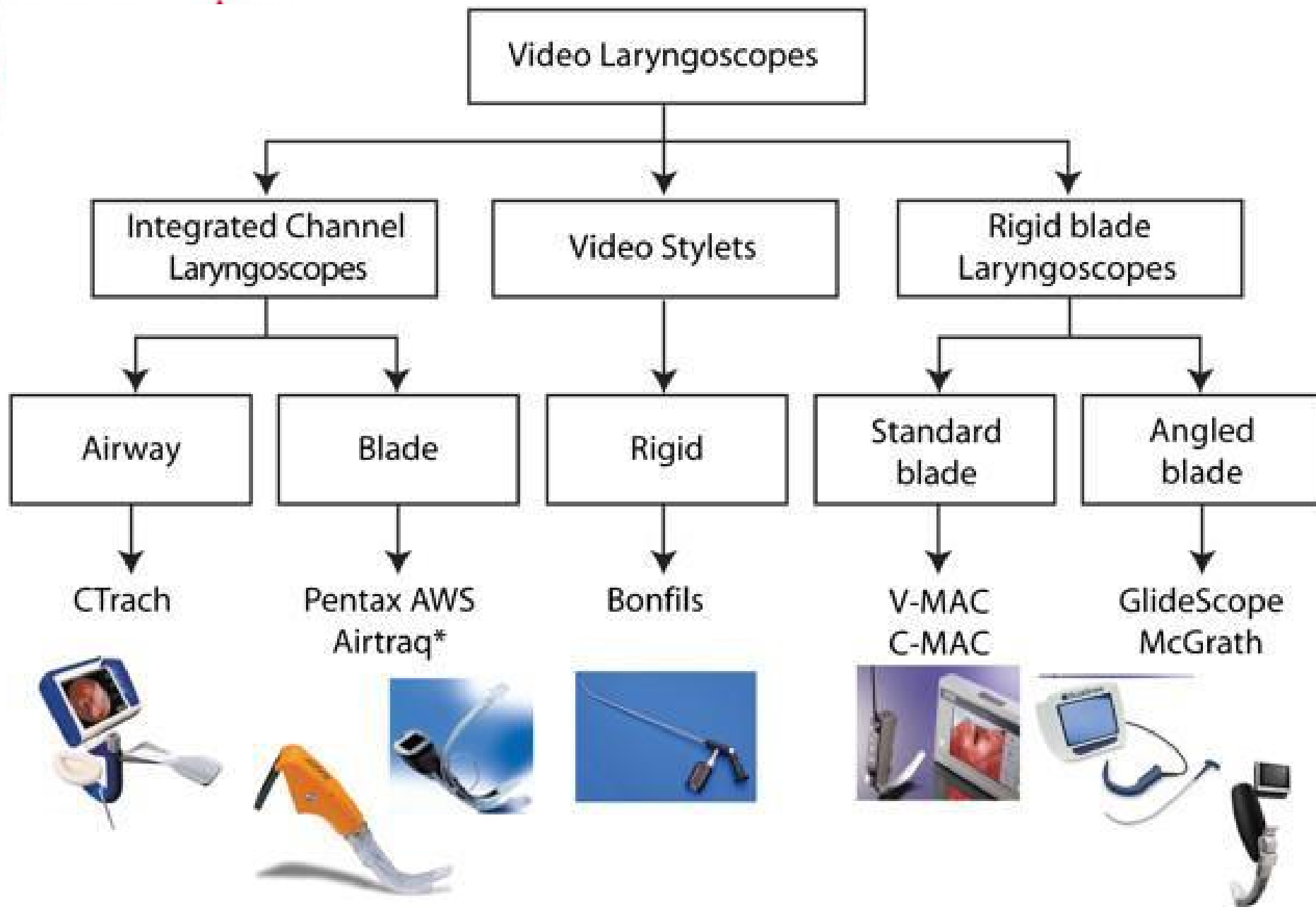


Jen 3 +1 cesty



Bužie, BURP





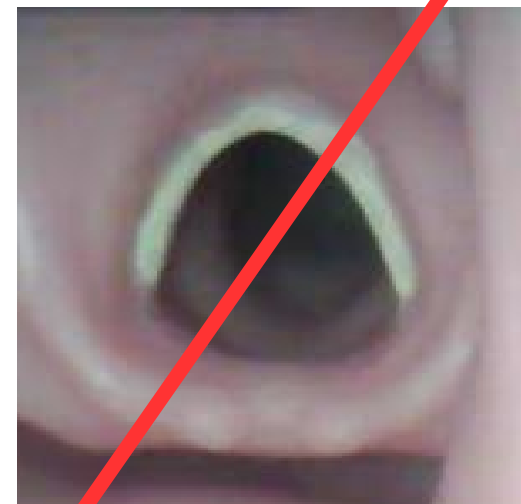
VLS GlideScope®

zavádění – **střední** čarou

- – uvula – kořen jazyka – epiglotis – glotis
- zavaděč v tracheální rource „J“



Severní polokoule larynx v horní části obrazovky



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VLS



VLS: Samá pozitiva ?

Závěry studií:

- lepší vizualizace glotis
- vyšší úspěch v zajištění difficult airways
- rychlejší učení nováčků
- dobrá spolupráce intubujícího týmu (všichni vidí)



VLS: I negativa !

- falešný pocit jistoty ...
- poranění v d.ústní (manipulace bez optické kontroly)
- krev a sekrety na optice znemožní vidění
- Magillovy kleště nejsou kompatibilní se zahnutím lžice

Závěr 1:

Vyšetřit všechny = odhalit některé (70% spolehlivost)

Preoxygenovat všechny = získat několik minut navíc

Předvídej nemožnost ventilace / intubace

Měj **plán dřív než** vznikne **problém**.

Připrav všechny **pomůcky včas**.

Vizualizace glotis **při vědomí není v anestezii**

garantována

Vizualizace glotis **včera není dnes** garantována

Závěr 2:

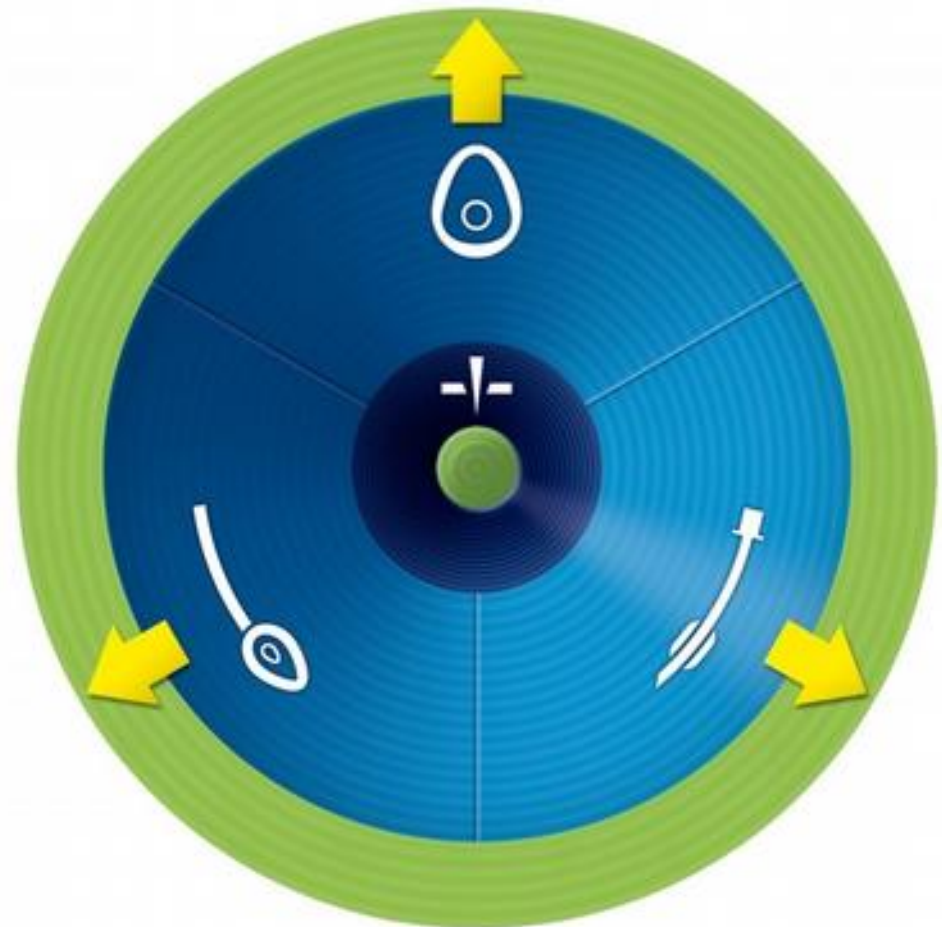
Videolaryngoskopie

- „per se“ nezajišťuje oxygenaci ani ventilaci.
- umožňuje lepší pohled na glotis
- je vhodnou alternativou přímé laryngoskopie za dobré oxygenace a ventilace pacienta
- je vhodná k výuce nováčků
(učí se pak přímou laryngoskopií rychleji)

Závěr 3:

Způsoby zajištění ventilace a oxygenace:

- 3 nechirurgické
- 1 chirurgická



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Děkuji za pozornost!

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Literatura

- <http://vortexapproach.org/>
- <http://www.das.uk.com/>
- <https://doi.org/10.1093/bja/aev460>
- Practice Guidelines for Management of the Difficult Airway: An updated report by the American Society of Anesthesiologists Task Force on management of the difficult airway. *Anesthesiology* 118:251-70, 2013.
doi:10.1097/ALN.0b013e31827773b2
- <http://anesthesiology.pubs.asahq.org/article.aspx?articleid=1918684>