

FAKULTNÍ
NEMOCNICE
U SV. ANNY
V BRNĚ



Predikce Difficult Airways, možnosti a algoritmy, VORTEX, videolaryngoskopy

Lukáš Dadák

1  AKUTNE.CZ[®]
years

17.11.2018





Disclaimer

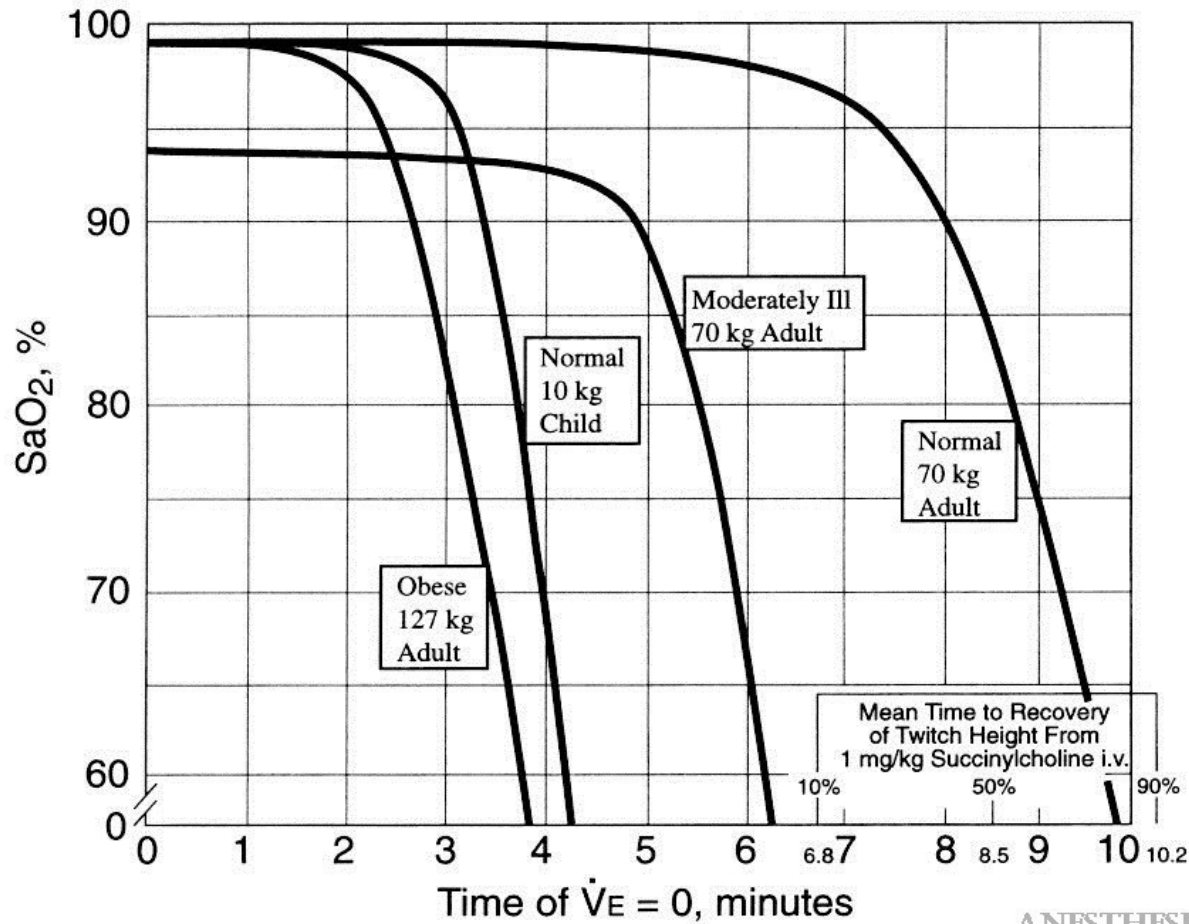
MUDr. Lukáš Dadák, Ph.D.

V posledních 10 letech přednáší na kurzech podporovaných společnostmi LMA a Teleflex.

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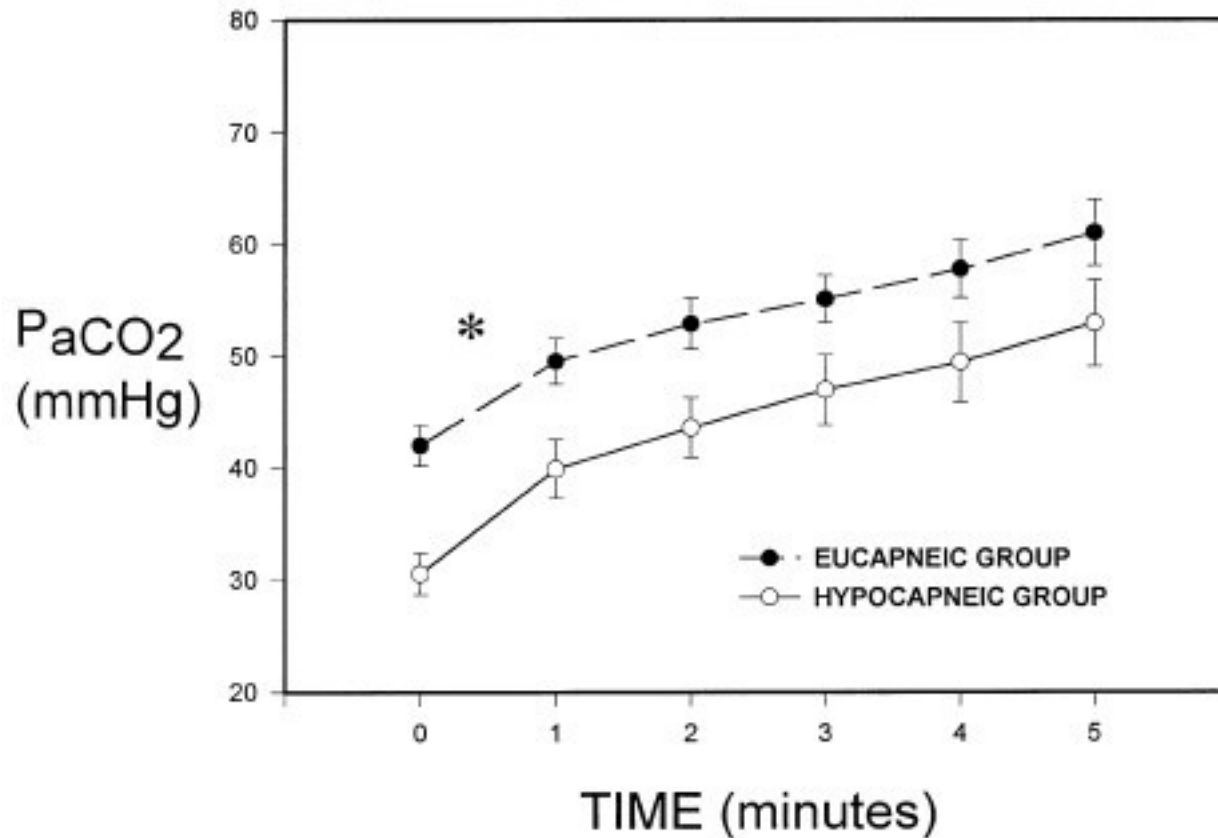
Apnoe a oxygenace

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



ANESTHESIOLOGY

Apnoe a hyperkapnie

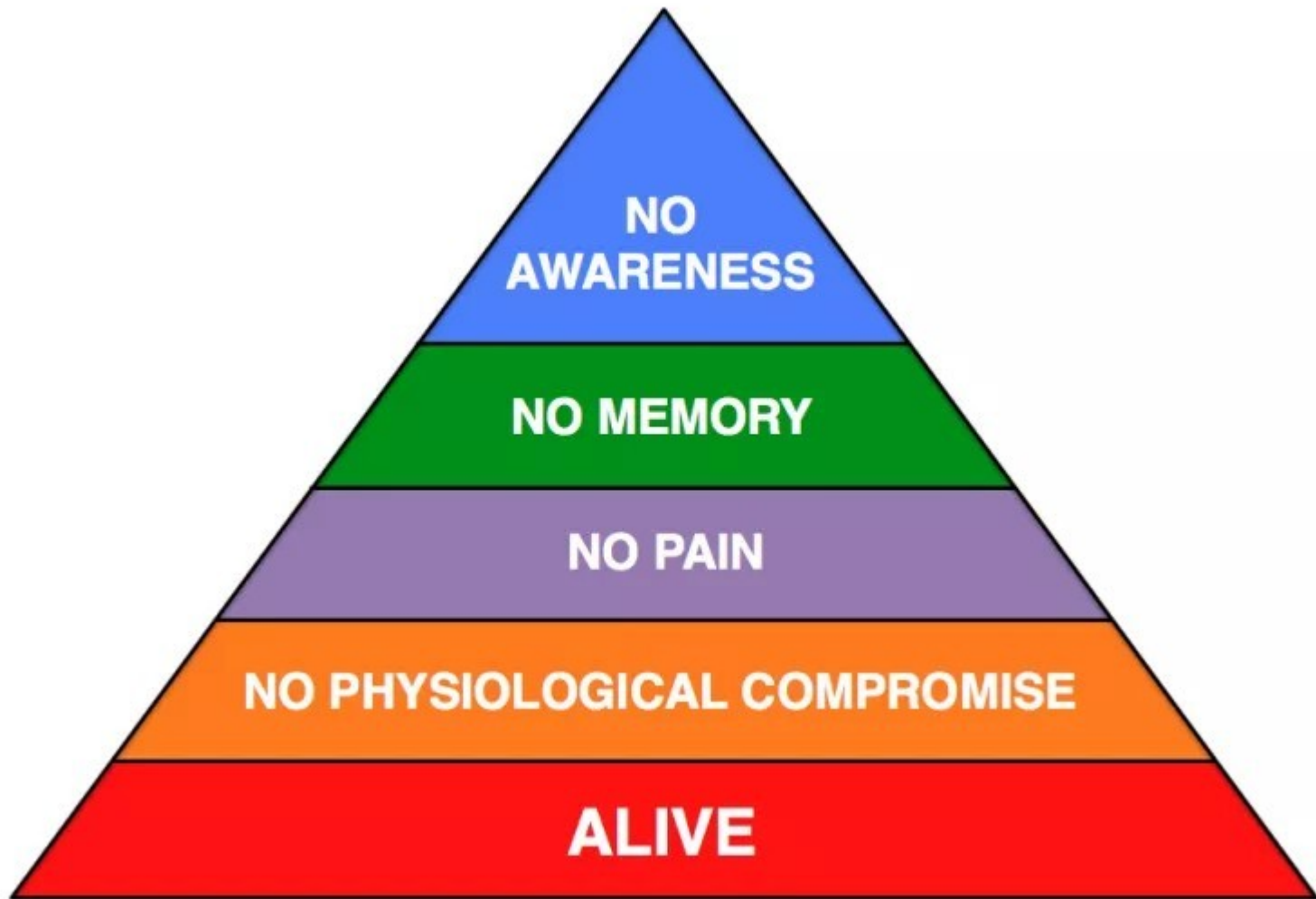




Pečlivě

- **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

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.

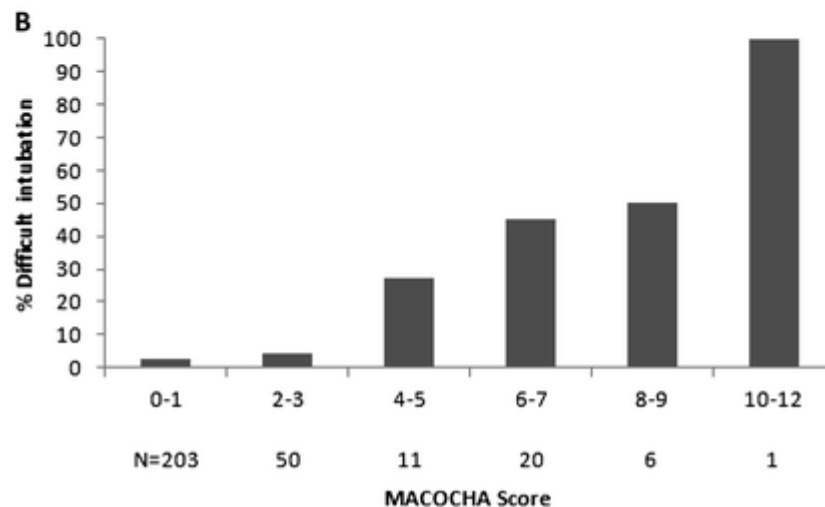
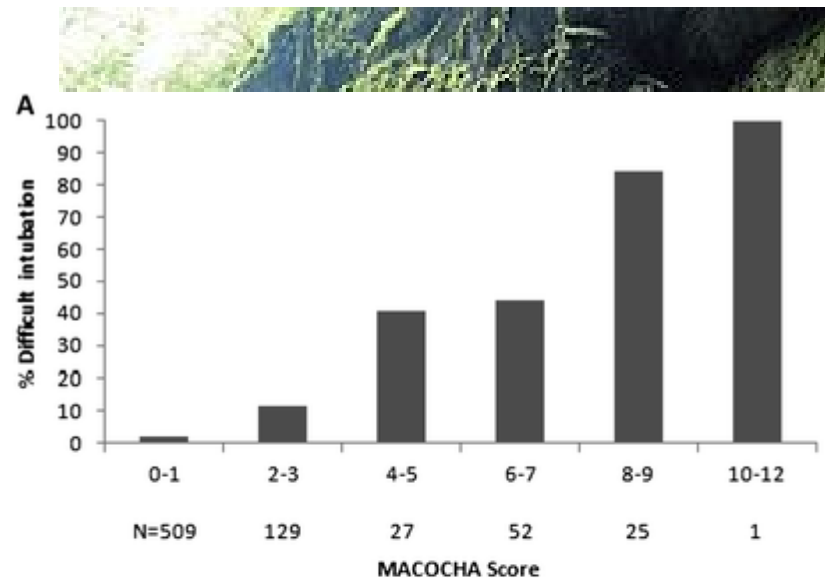
MACOCHA for ICU intubation

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

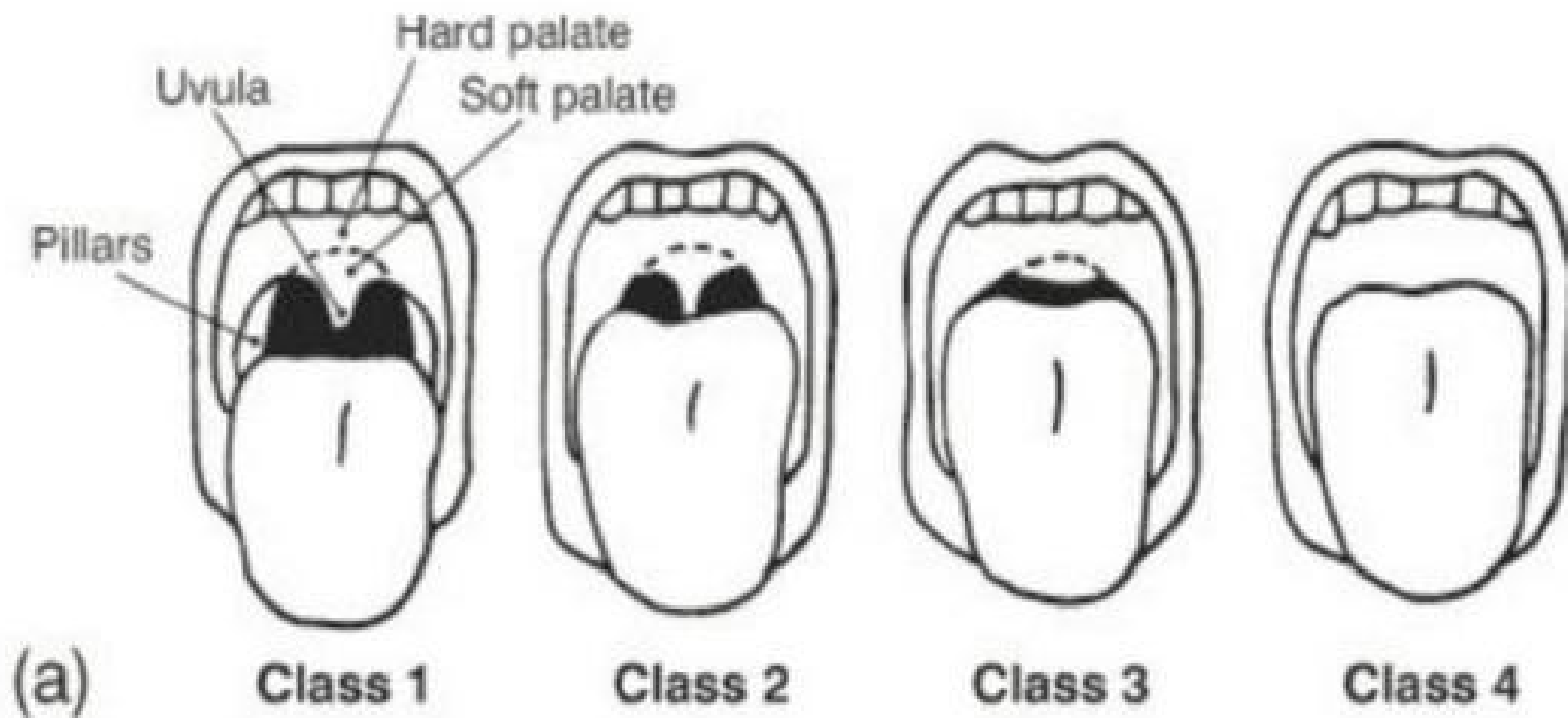


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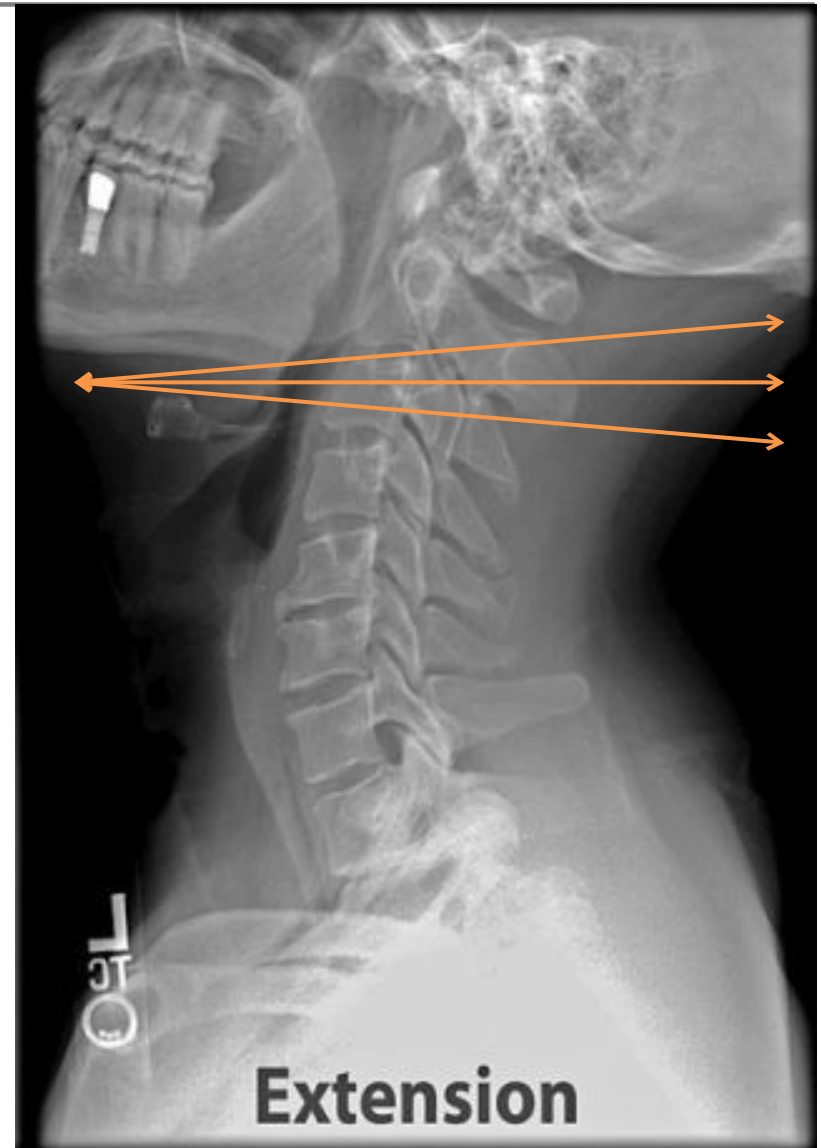
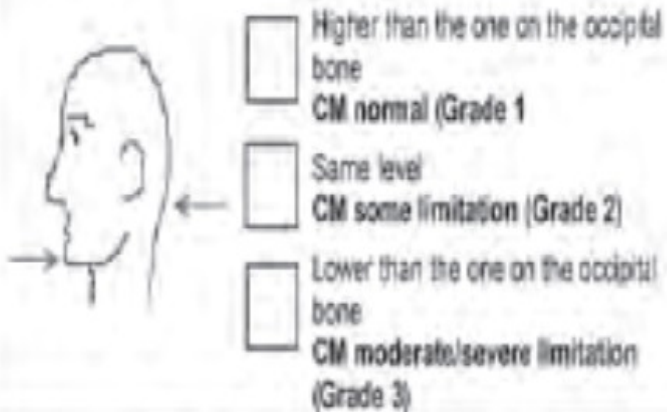
Mallanpati



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



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



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

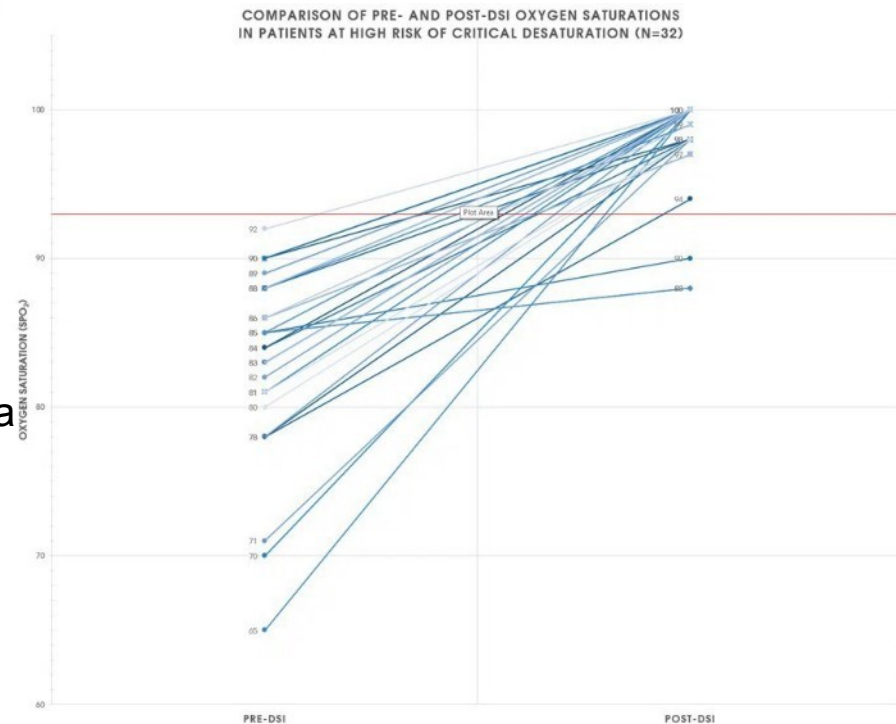
$$PAO_2 = 0.21 \times (101.3 - 6.7) - 5.3/0.8 = 13.2 \text{ kPa}$$

100% O₂:

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

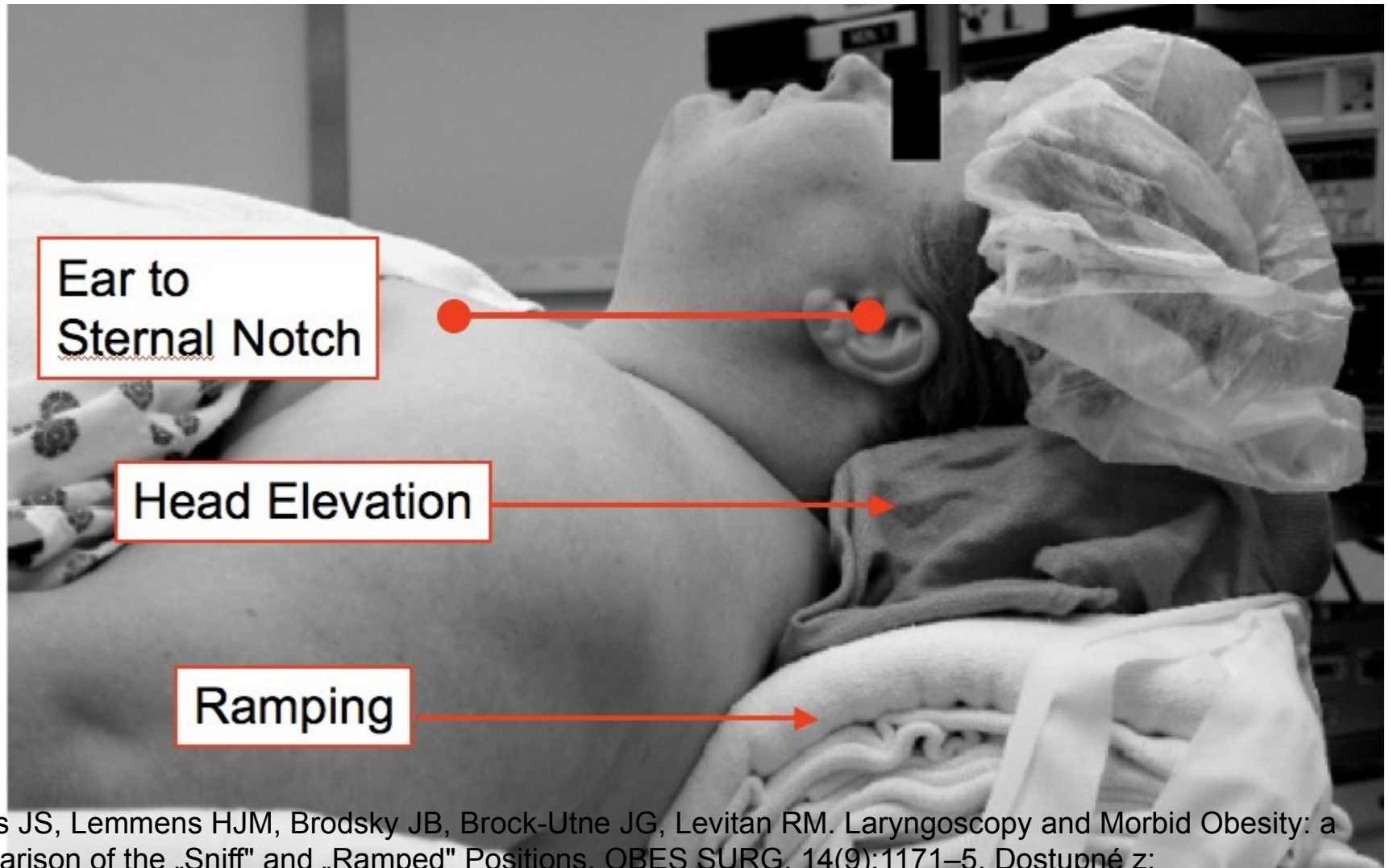
Kde? ... FRC ... až 1800 ml O₂

= 7 minut spotřeby



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Polohování před intubací

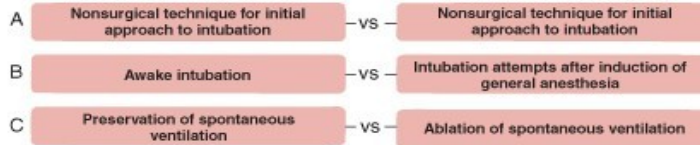


DIFFICULT AIRWAY ALGORITHM

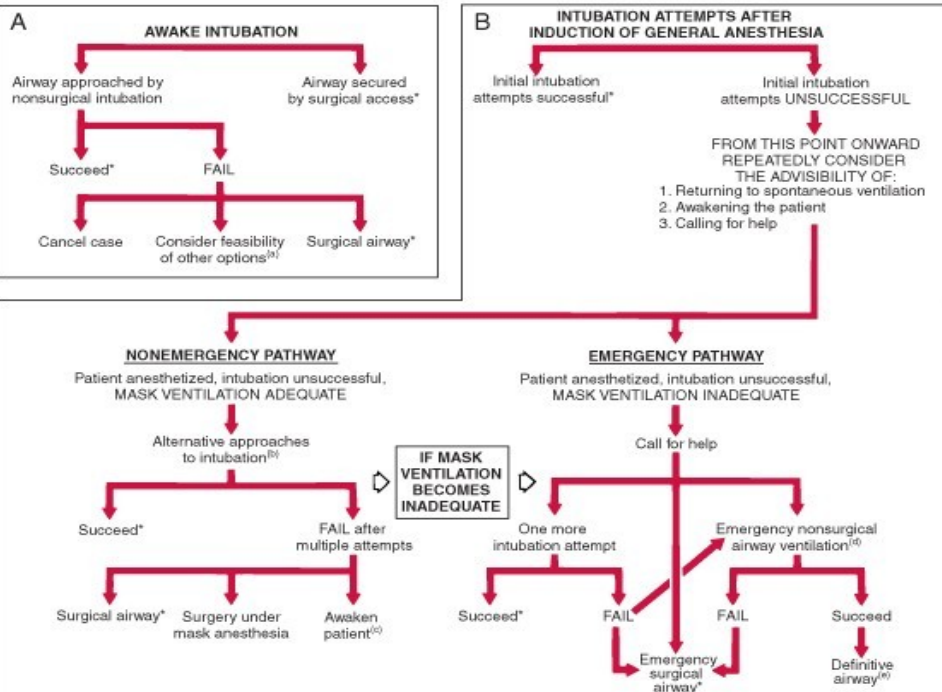
1. Assess the likelihood and clinical impact of basic management problems:

- Difficult intubation
- Difficult ventilation
- Difficulty with patient cooperation or consent

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



3. Develop primary and alternative strategies:



* CONFIRM INTUBATION WITH EXHALED CO₂

(a) 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.

(b) Alternate approaches to difficult intubation include, but are not limited to: use of different laryngoscope blades, awake intubation, blind oral or nasal intubation, fiberoptic intubation, intubating stylet or tube changer, light wand, retrograde intubation, and surgical airway access.

(c) See awake intubation.

(d) Options for emergency nonsurgical airway ventilation include, but are not limited to: transtracheal jet ventilation, laryngeal mask ventilation, or esophageal-tracheal combitube 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.

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

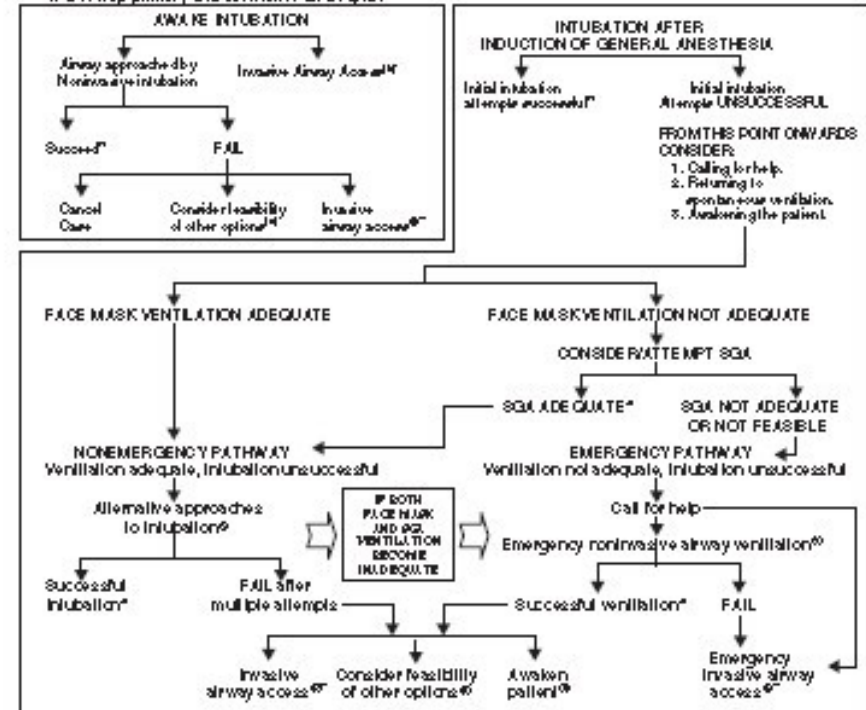
- Difficulty with patient cooperation or consent
- Difficult mask ventilation
- Difficult supraglottic airway placement
- Difficult laryngoscopy
- Difficult intubation
- Difficult surgical airway access

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:



^(a)Confirm ventilation, tracheal intubation, or SGX placement with exhaled CO₂.

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

^(c)Alternate approaches to difficult intubation include (but are not limited to): video-assisted laryngoscopy, alternate laryngoscope blades, SGX (e.g., LMA or iLMA) or an intubation conduit (with or without fiberoptic guidance), fiberoptic intubation, intubating stylet or tube changer, lightwand, and blind oral or nasal intubation.

^(d)Consider re-positioning of the patient for awake intubation or canceling surgery.

^(e)Emergency non-invasive airway ventilation consists of a SGX.

Fig. 1. Difficult Airway Algorithm.

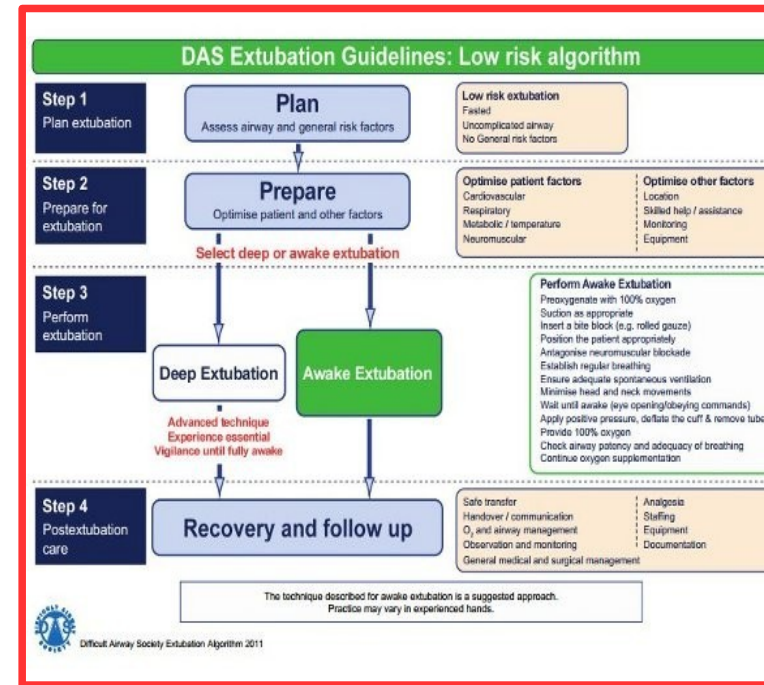
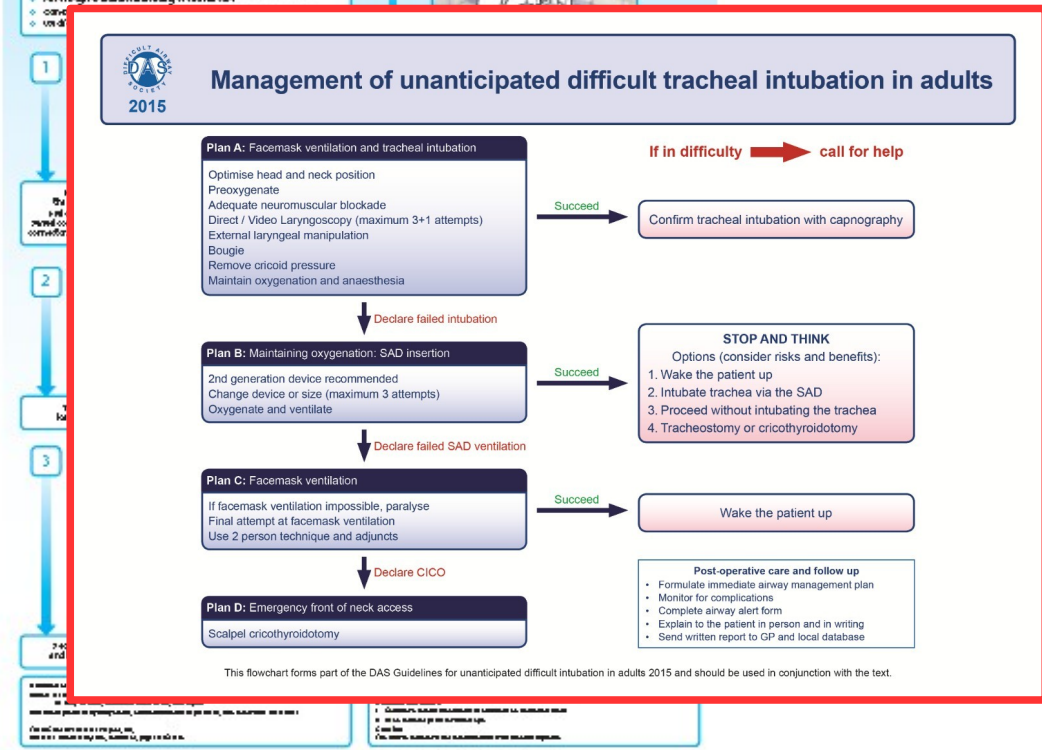
DAS 2004 → 2015

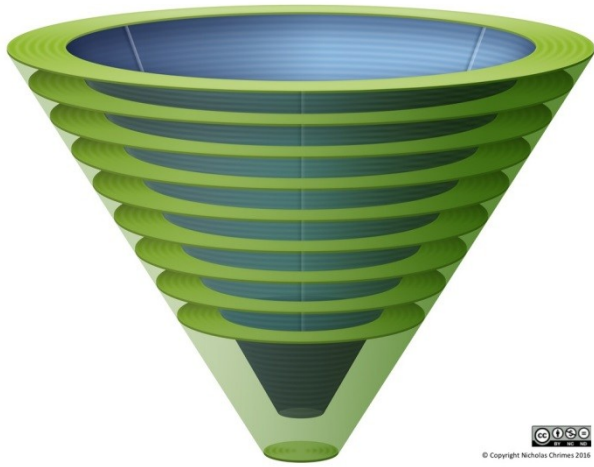
Direct laryngoscopy → Any problems → Call for help

FIBREOPTIC GUIDED TRACHEAL INTUBATION THROUGH SUPRAGLOTTIC AIRWAY DEVICE (SAD) USING AINTREE INTUBATION CATHETER

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

- Aintree catheter
 - mean length 30cm or higher
 - mean OD 28mm or higher, 4mm inner diameter
 - solid proximal end of tube compatible for double lumen fiberoptic
 - flexible enough to bend 180°
 - flexible enough for loading on fiberoptic
 - flexible enough to facilitate insertion of tracheal tube
 - clear
 - sterile





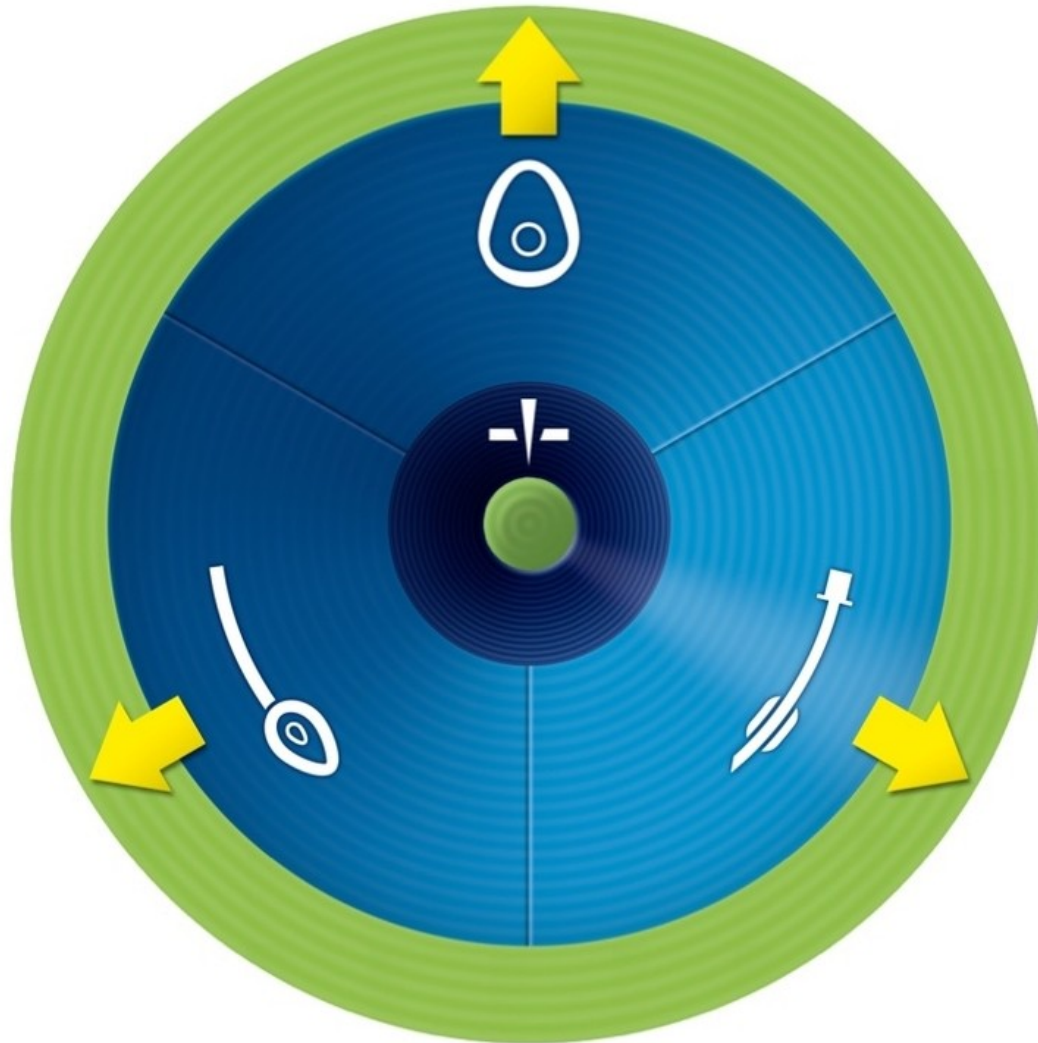

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Vír

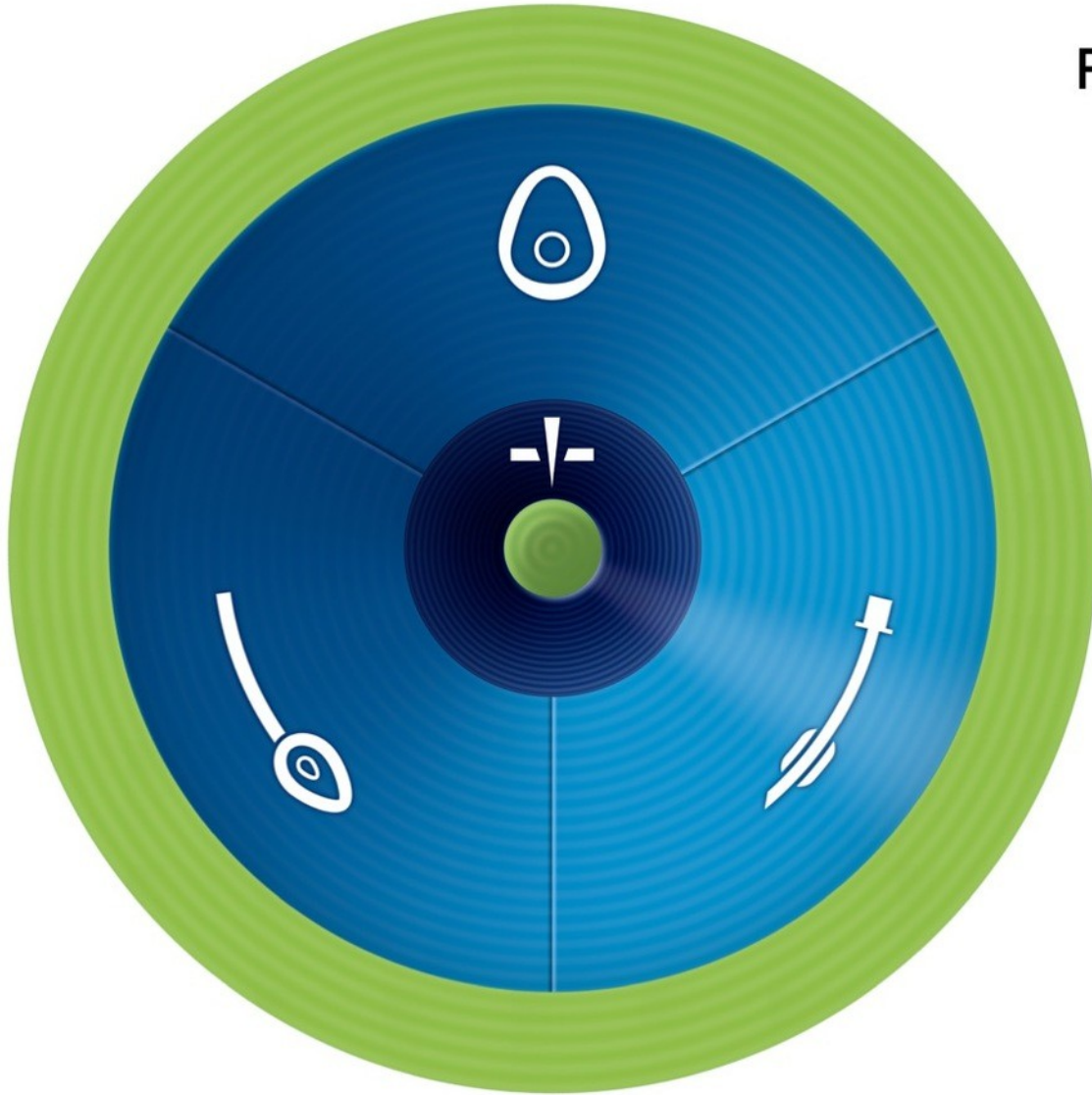


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Oxygenace a ventilace =
bezpečná zóna



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**



VortexApproach.org

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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

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

sleduji výdech pacienta. EtCO₂



ntilace obličejovou maskou

3 prsty << 8 prstů

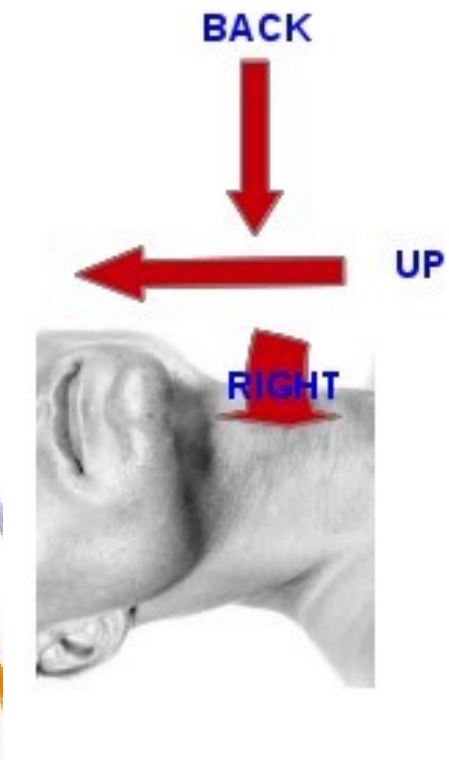


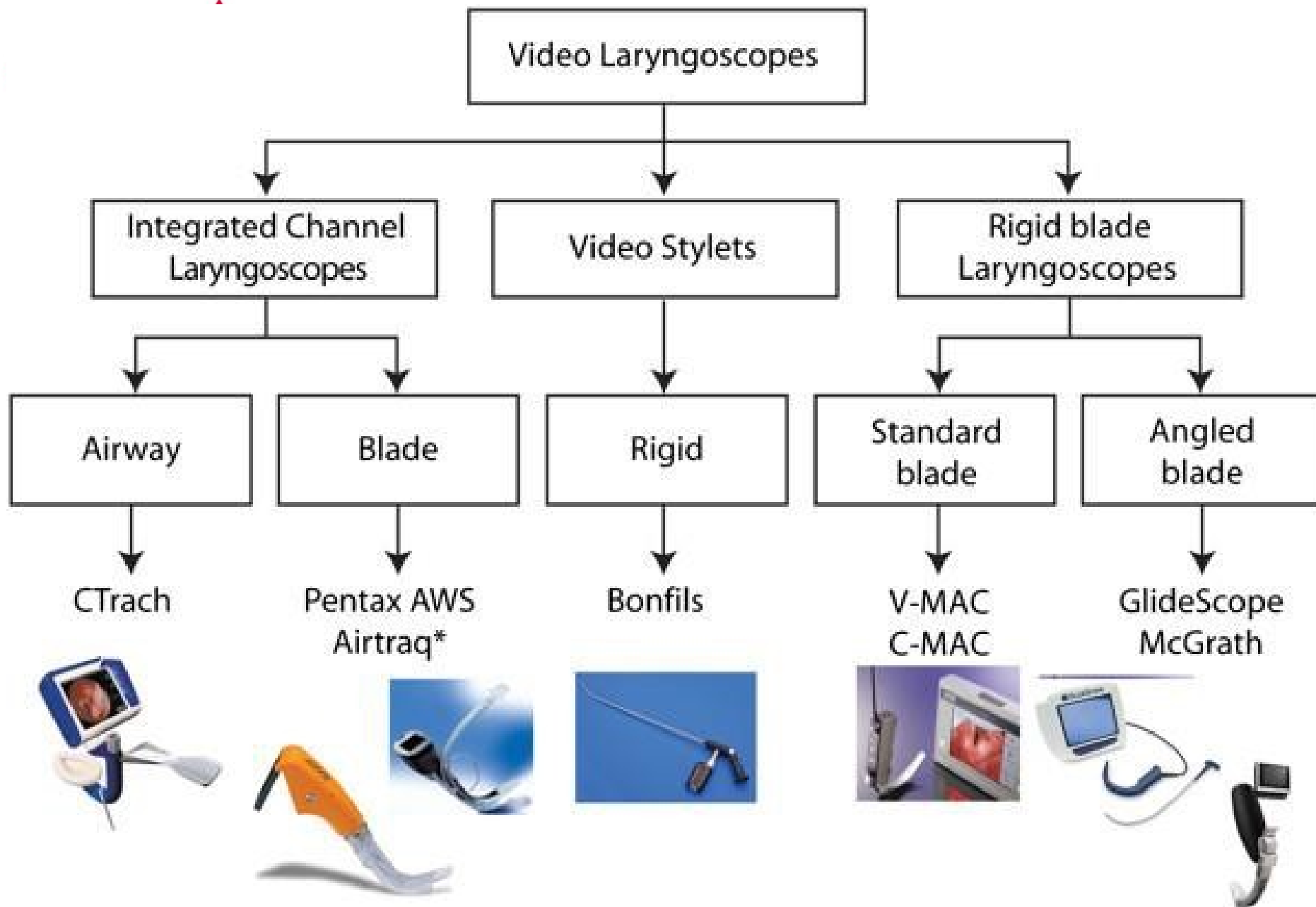
Jen 3 +1 cesty



Bužie, BURP

Co ještě můžu zlepšit?





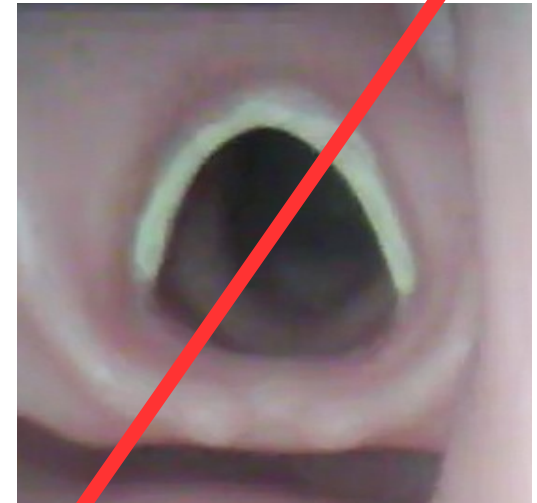
VLS GlideScope®

zavádění – **střední** čarou

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



Severní polokoule larynx v horní části obrazovky





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 anestezi**

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



Děkuji za pozornost!

Kontakt:

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Literatura

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- <http://www.das.uk.com/>
- <https://doi.org/10.1093/bja/aev460>
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- <http://anesthesiology.pubs.asahq.org/article.aspx?articleid=1918684>