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TRAUMA

Airway Management

Indication	Frequency	Percentage	95% CI
Traumatic head injury	2,030	12	11-12
Altered mental status, not overdose	1,759	10	10-11
Overdose	1,343	7.7	7.3-8.1
Cardiac arrest	1,234	7	6.7-7.5
Pneumonia	1,007	5	6.2
Polytrauma	1,000	5	.1
Coma	889	5	.5
CHF	885	5	.4
Medical shock	827	4	.5-5.1
Stroke	798	4.6	4.3-4.9
COPD	757	4.4	4.1-4.7
Gunshot/knife stab wound	708	4.1	3.8-4.4
Seizure	667	3.8	3.6-4.1
Other	644	3.7	3.4-3.9
Combative trauma	637	3.7	3.4-4.0
Face/neck trauma	389	2.2	2.0-2.5
GI bleed	334	1.9	1.7-2.1
Asthma	326	1.9	1.7-2.0
Airway obstruction	296	1.7	1.5-1.9
Burn/inhalation injury	279	1.6	1.4-1.8
Traumatic arrest	230	1.3	1.2-1.5
Acute MI	216	1.2	1.1-1.4
Traumatic shock	178	1.0	0.9-1.2
Pulmonary embolism	85	0.5	0.4-0.6
Anaphylaxis	59	0.3	0.3-0.4
Intracranial hemorrhage	17	0.1	0.1-0.1
Total	17,583	100	

CI, Confidence interval; *CHF*, congestive heart failure; *COPD*, chronic obstructive pulmonary disease; *MI*, myocardial infarction.

IN ED

20 ~ 30 % Intubations for TRAUMA

http://dx.doi.org/10.1016/j.annemergmed.2014.10.036

Assessment of

Traumatized Airway

Treat the **greatest threat** to life first

The lack of a definitive diagnosis should **never impede** the application of an indicated treatment

Detailed history is not essential to **begin** the evaluation of a patient with acute injuries.

Talking ≠ Good !

Just for Now !!!!

Ask why not ?

If not talking ?

Unconscious ? GCS<8 **Intubation !**

Can't phonate ? **Emergent Airway !**

Check for symptoms and signs of **respiratory distress**

Look for symptoms and signs of **shock**

Perform a standard airway evaluation

Remember the risk of **aspiration**

Determine the **mechanism** of trauma

Evaluate for **associated injuries**

Evaluate any **structural damage** to the airway

General Approach

Orotracheal intubation with

Direct Laryngoscopy (DL)

by Rapid Sequence Intubation (RSI)

The tracheal intubation procedure

of choice for trauma patients

Ketamine ?

Propofol ?

Both the Drug and the Dose

have to be carefully selected

Etomidate ?

Succinylcholine ?

Reversal with **Sugammadex**

Rocuronium ?

Risk for Rapid desaturation during intubation

Apneic oxygenation

Delayed sequence intubation

with Ketamine

Not indicated for all emergent RSI

Cricoid pressure

Prevent gastric insufflation

Anesthesiology. 2017;126:738–752. JAMA Surg. 2019;154:9–17

DL ?

99% Success Rate

Anesth Analg. 2009;109:866–872.

VL ?

FOB ?

Measure $EtCO_2$!

Especially waveform Capnography

Indications for Securing the Airway

In Trauma setting

Need for Ventilation or Oxygenation

ATLS (2018)	EAST (2012)
Inadequate respiratory efforts	Hypoventilation
Tachypnea, hypoxia, hypercarbia, cyanosis	Persistent hypoxemia
Acute neuro deterioration (GCS ≤ 8)	Cognitive impairment (GCS ≤ 8)
Apnea	Hemorrhagic shock Cardiac Arrest

Need for Airway Protection

ATLS (2018)	EAST (2012)
Severe maxillofacial fx.	
Laryngeal or Tracheal injury	Airway obstruction
Inhalation injury Facial burn	Major inhalation injury Facial burns
Traumatic brain injury	

Difficulty with

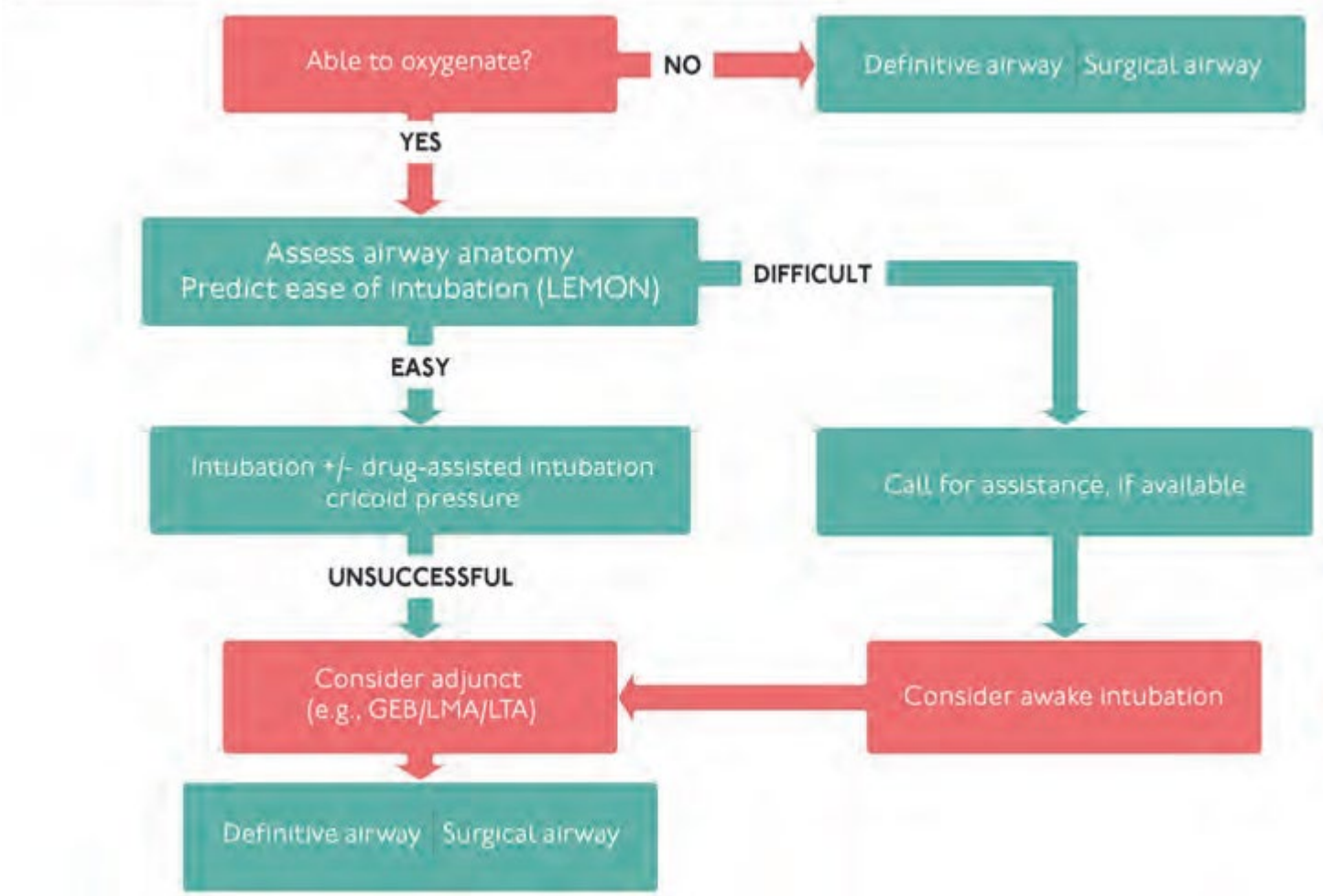
Laryngoscopy & Intubation

" Difficult Airway "

Bag Mask Ventilation (BMV)

Supraglottic Device Ventilation

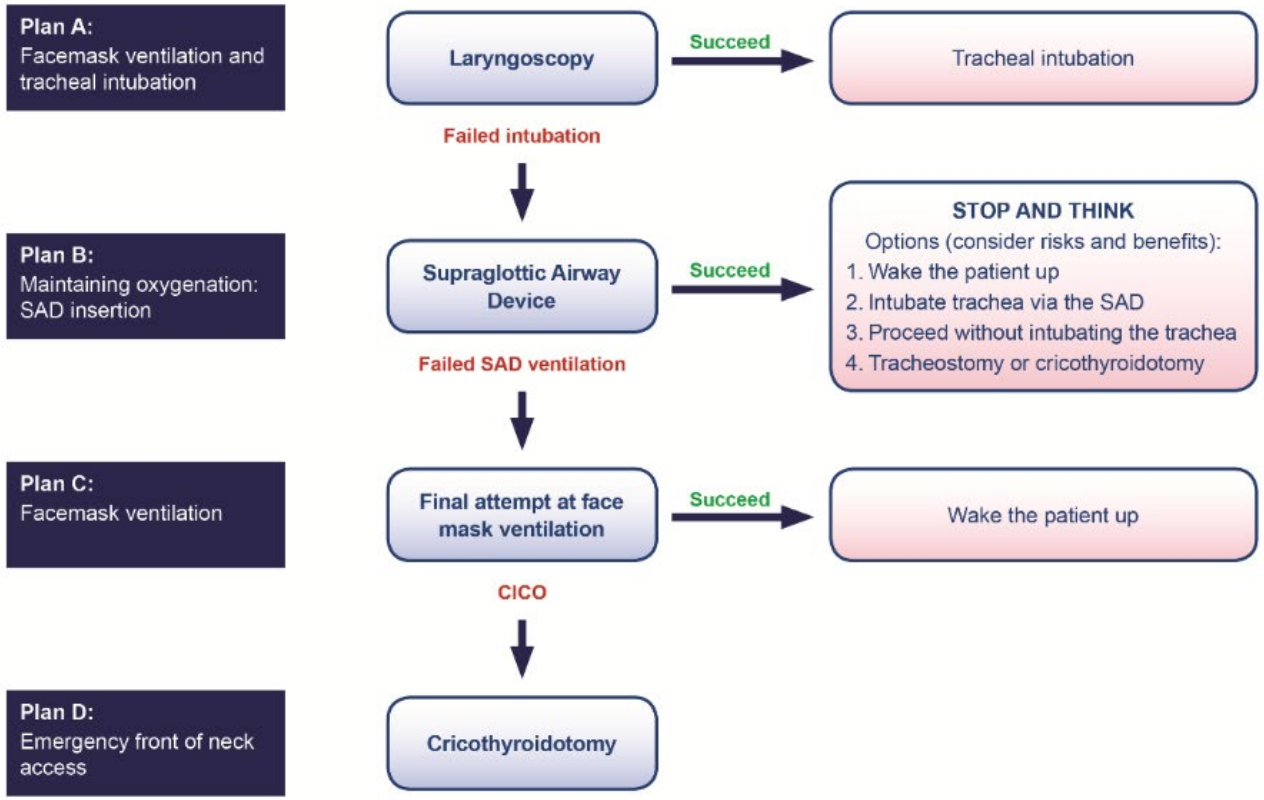
Front Of Neck Airway (FONA) access



2018 ATLS® : Airway Decision Scheme

DAS Difficult intubation guidelines – overview

2015

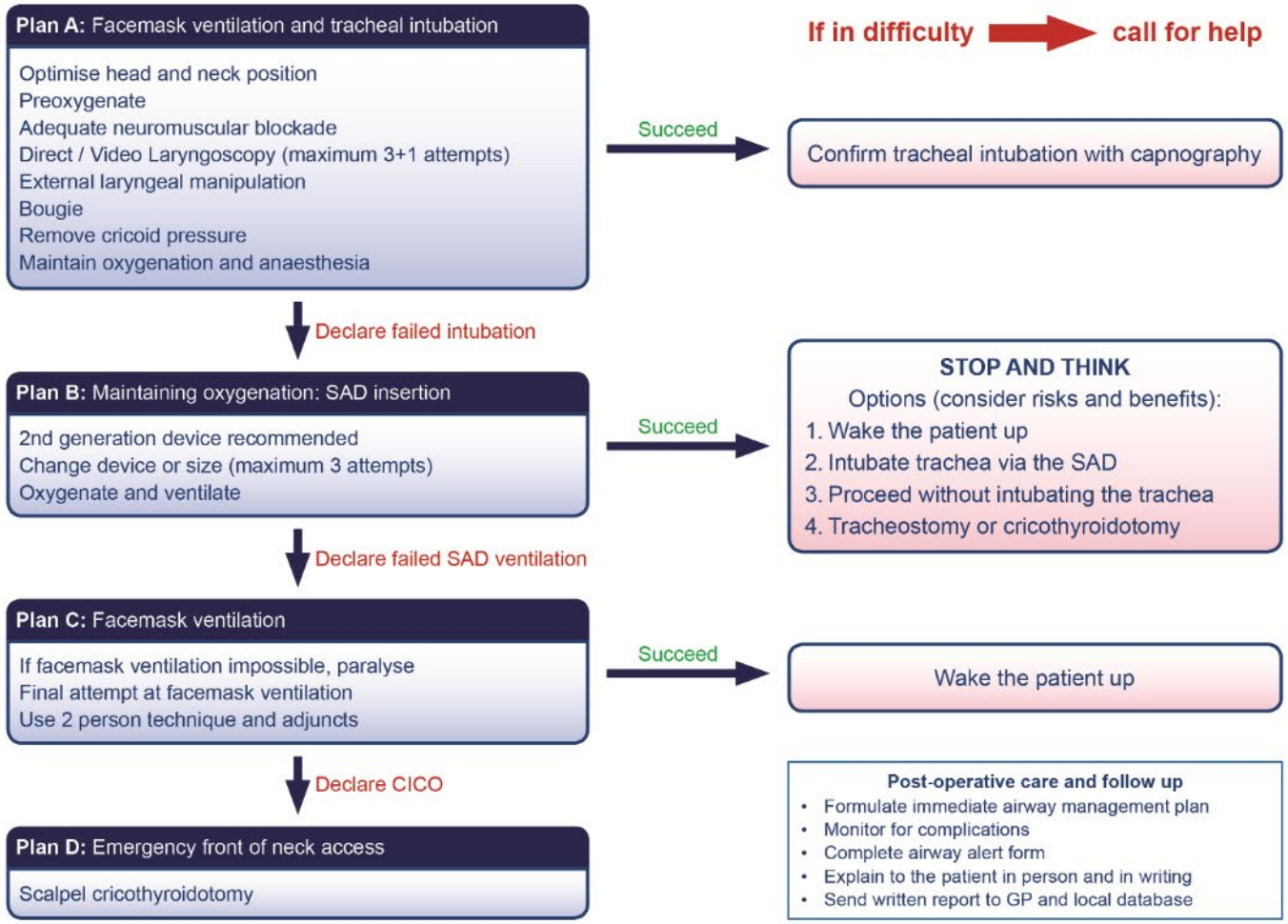


This flowchart forms part of the DAS Guidelines for unanticipated difficult intubation in adults 2015 and should be used in conjunction with the text.

2015 Difficult Airway Society (DAS)

Management of unanticipated difficult tracheal intubation in adults

2015



This flowchart forms part of the DAS Guidelines for unanticipated difficult intubation in adults 2015 and should be used in conjunction with the text.

2015 Difficult Airway Society (DAS)

Failed intubation, failed oxygenation in the paralysed, anaesthetised patient

2015

CALL FOR HELP

↓ Continue 100% O_2
Declare CICO

Plan D: Emergency front of neck access

Continue to give oxygen via upper airway
Ensure neuromuscular blockade
Position patient to extend neck

Scalpel cricothyroidotomy

Equipment: 1. Scalpel (number 10 blade)
2. Bougie
3. Tube (cuffed 6.0mm ID)

Laryngeal handshake to identify cricothyroid membrane

Palpable cricothyroid membrane
Transverse stab incision through cricothyroid membrane
Turn blade through 90° (sharp edge caudally)
Slide coude tip of bougie along blade into trachea
Railroad lubricated 6.0mm cuffed tracheal tube into trachea
Ventilate, inflate cuff and confirm position with capnography
Secure tube

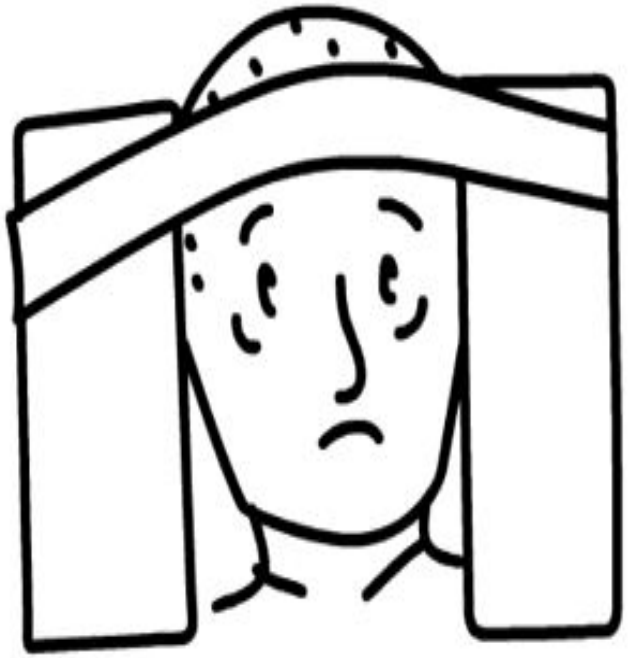
Impalpable cricothyroid membrane
Make an 8-10cm vertical skin incision, caudad to cephalad
Use blunt dissection with fingers of both hands to separate tissues
Identify and stabilise the larynx
Proceed with technique for palpable cricothyroid membrane as above

Post-operative care and follow up
- Postpone surgery unless immediately life threatening
- Urgent surgical review of cricothyroidotomy site
- Document and follow up as in main flow chart

This flowchart forms part of the DAS Guidelines for unanticipated difficult intubation in adults 2015 and should be used in conjunction with the text.

2015 Difficult Airway Society (DAS)

Inability to Position



d/t

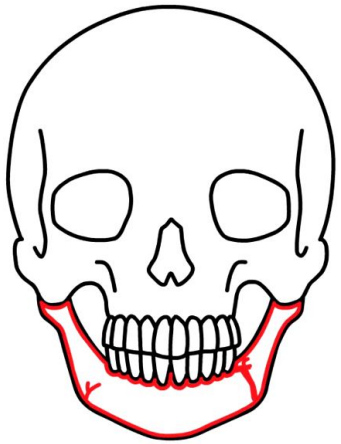
Neck Collar

Laryng[illegible] Intubation

(Improper) MILS

Trismus

Poor sealing



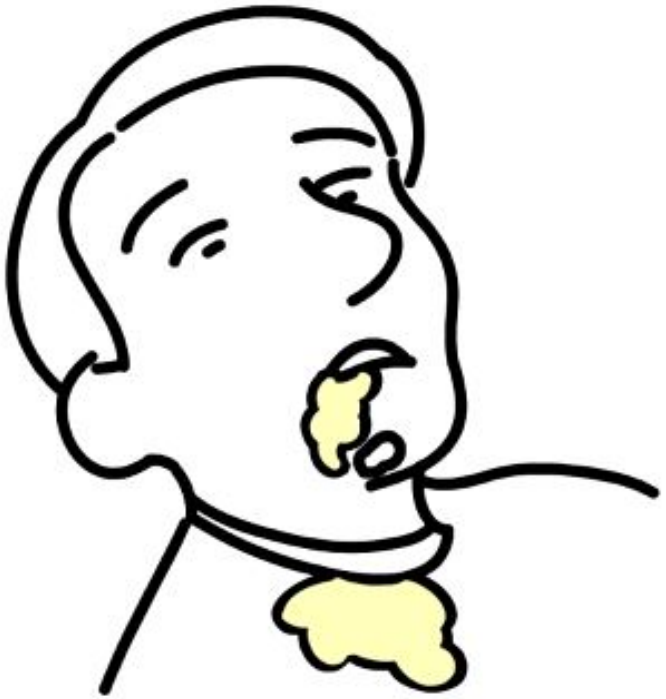
d/t

Bag Mask Ventilation (BMV)

Mandibilar Fx

Facial injury with swelling

Blood or Vomitus



d/t

Laryngoscopy & Intubation

Facial injury

Bag Mask Ventilation (BMV)

DIFFICULT

Full stomach

Supraglottic Device Ventilation

Delayed gastric emptyng

Disrupted or Distorted airway

Laryngoscopy & Intubation

d/t

Bag Mask Ventilation (BMV)

Penetrating or Blunt

DIFFICULT

Supraglottic Device Ventilation

Neck Trauma

Front Of Neck Airway (FONA) access

Airway Obstruction

Loss of Pharyngeal tone (m/c)

Fracture of Maxilla — **obstruction of Nasopharyngeal Airway**

of anterior Mandible — **obstruction of Oropharyngeal Airway**

Hemorrhage

Soft tissue swelling and edema

Trauma to Larynx and Trachea — **obstruction of Cervical Airway**

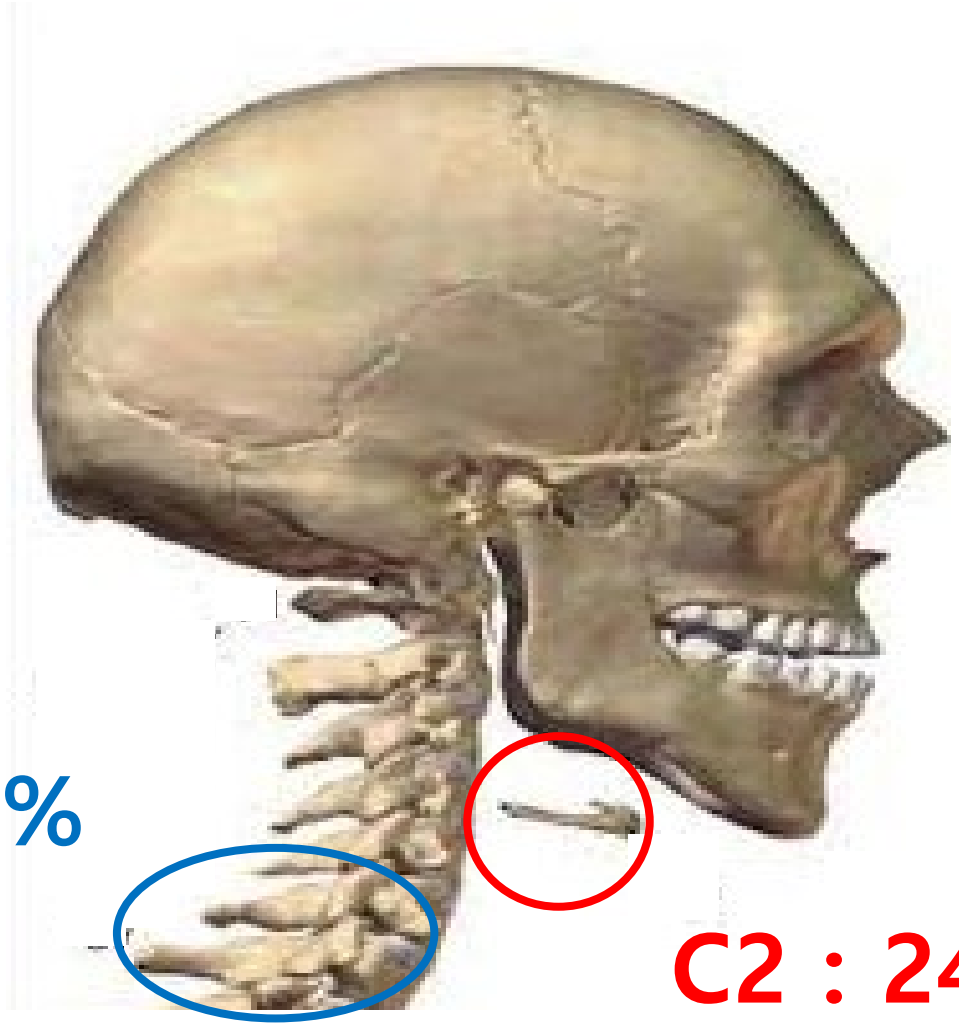
- Cervical spine considerations
- Facial and neck trauma
- COVID-19 precautions

Trauma resuscitations typically proceed under the assumption that the patient has an unstable cervical spine (c-spine) injury until proven otherwise

3 ~ 5 % of Trauma Pt. Spinal Fracture

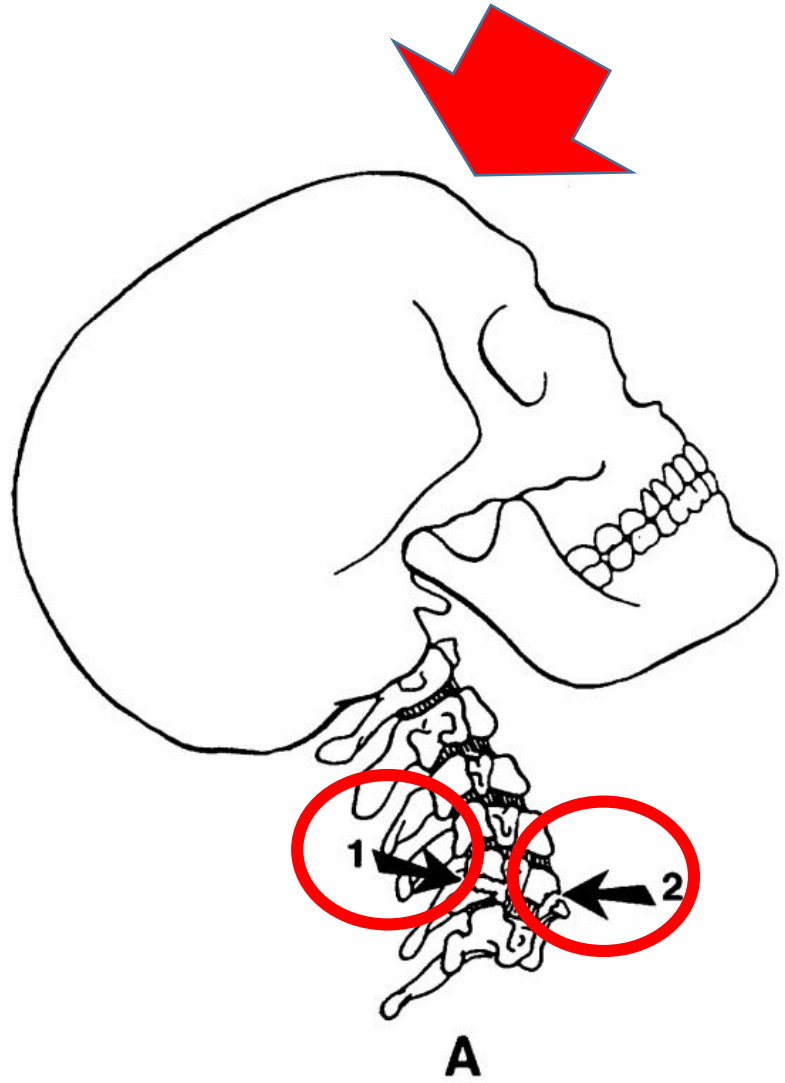
20 % of Trauma Pt. Spinal cord injury

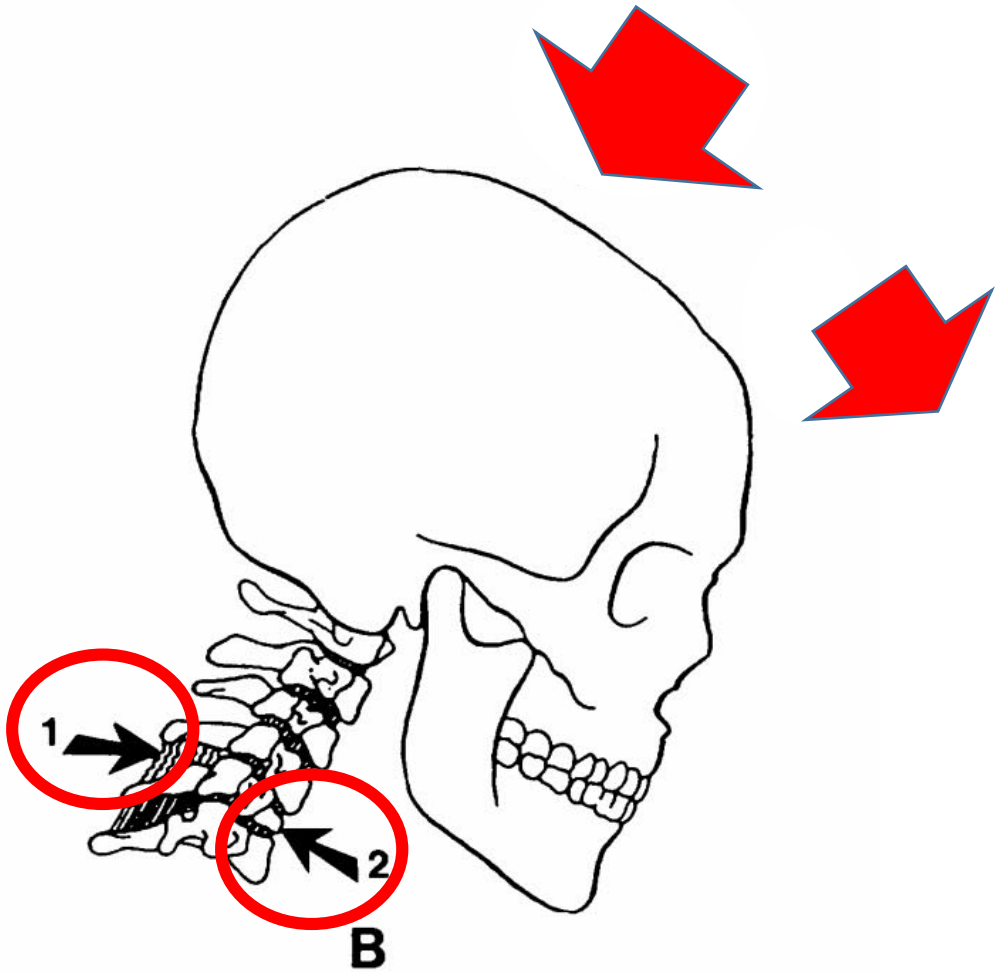
2 % of Trauma Pt. Cervical Spinal cord injury



C6, C7 : 39.3%

C2 : 24 %


1
2
A


1
2
B

The possibility of secondary injury during tracheal intubation

0.03%

is a **rare** but important consideration.

Spinal Immobilization

(1) Restoration and Maintenance of spinal alignment

(2) Protection of the cord
with preservation of intact pathways

(3) Establishment of spinal stability

Cervical collars

Traction force

Manual In-line Immobilization (MILI)

The goal of manual in-line immobilization (MILI)

Apply sufficient forces to the head and neck

to limit the movement

which might result during medical interventions,

most notably, airway management

Head-of-bed assistant

Side-of-bed assistant

On comparing the use of

MILS, traction, or cervical collar

MILI provided **less movement**

with **adequate glottic visualization** during DL

Direct laryngoscopy (DL) ?

IN MILI Applied situation

Video laryngoscopy (VL) ?

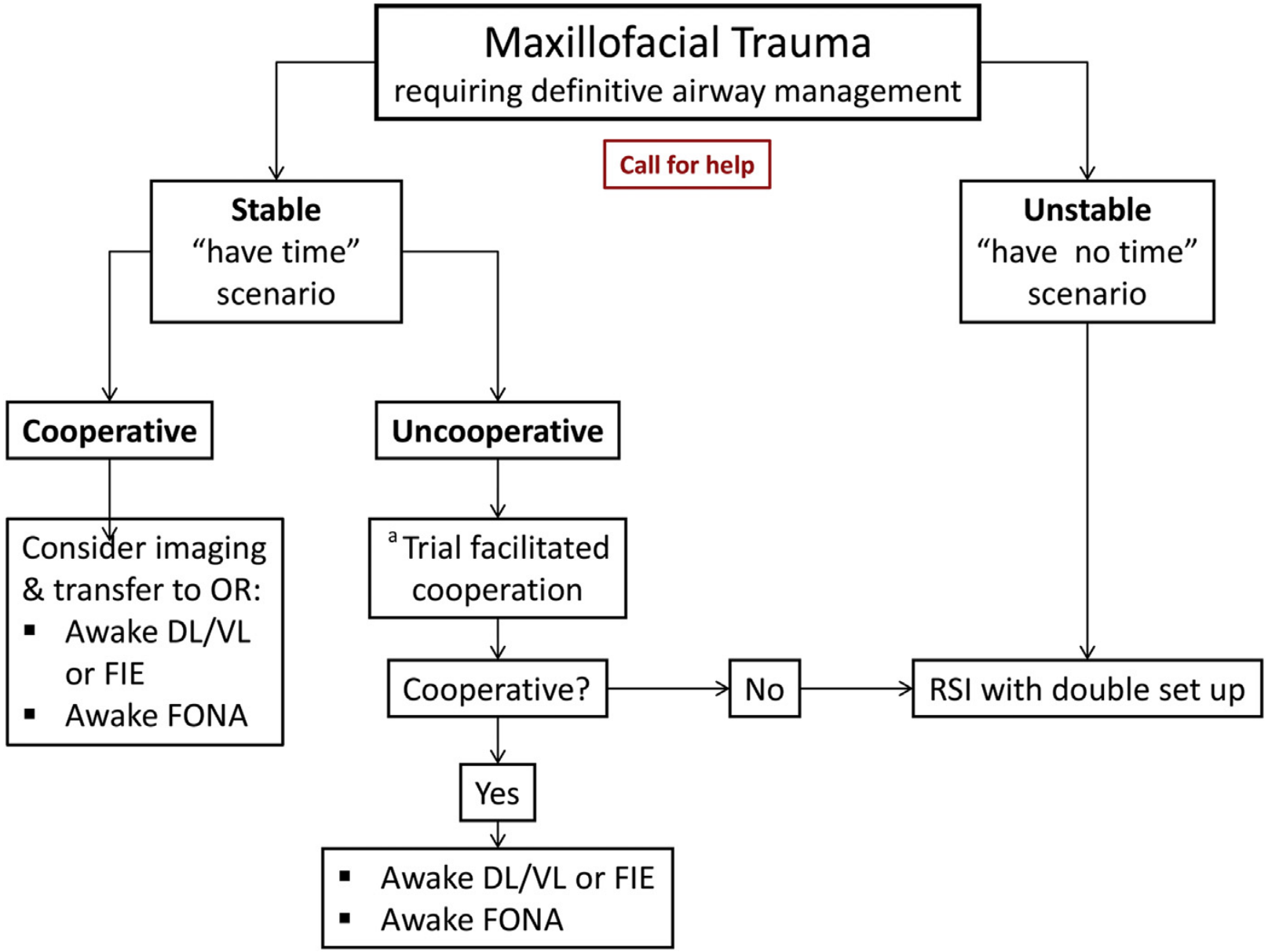
The use of VL

does not represent a standard of care

during MILI

as visualization does not necessarily

lead to improved ability to intubate.

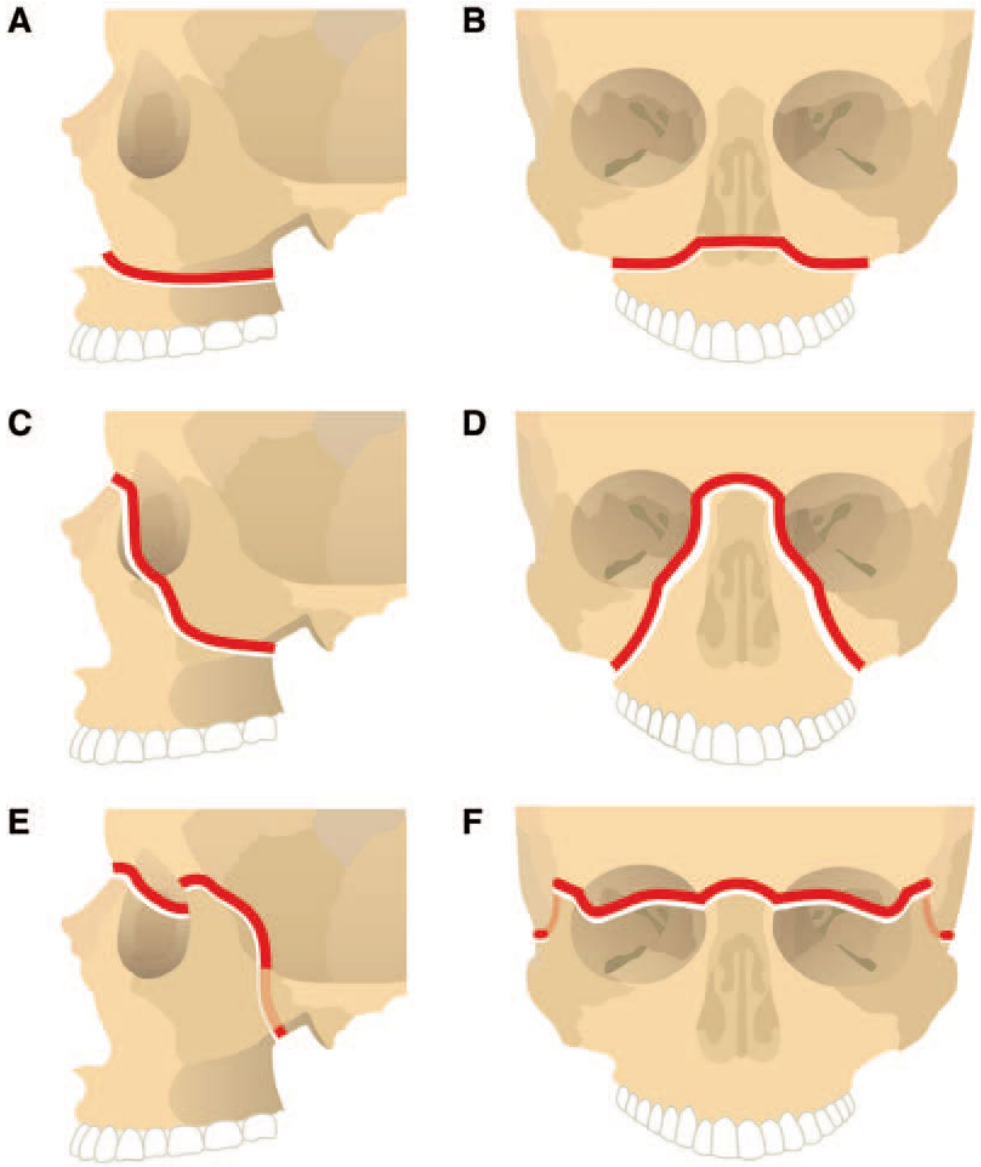


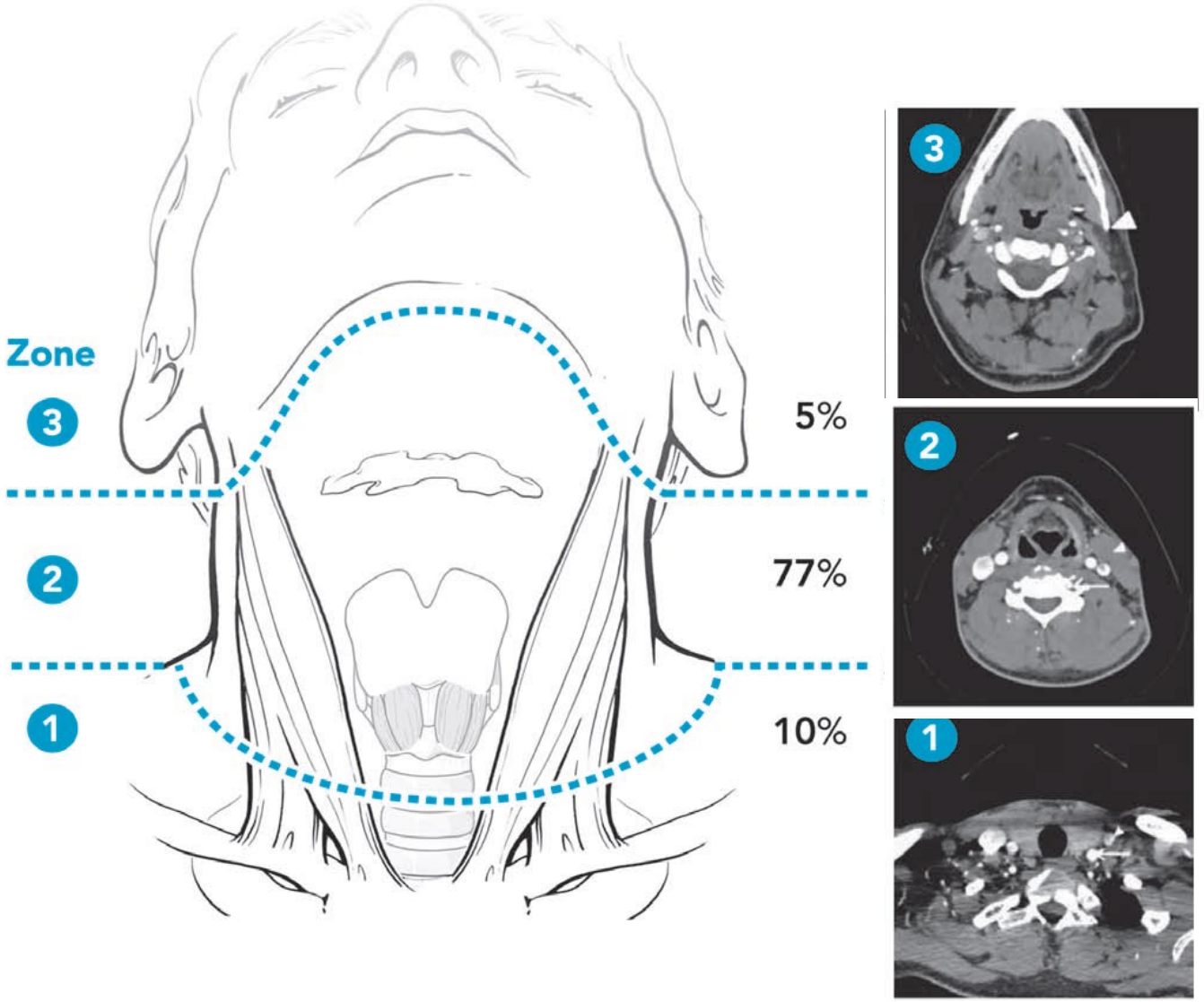
Br J Anaesth 2016;117(Suppl 1):i55

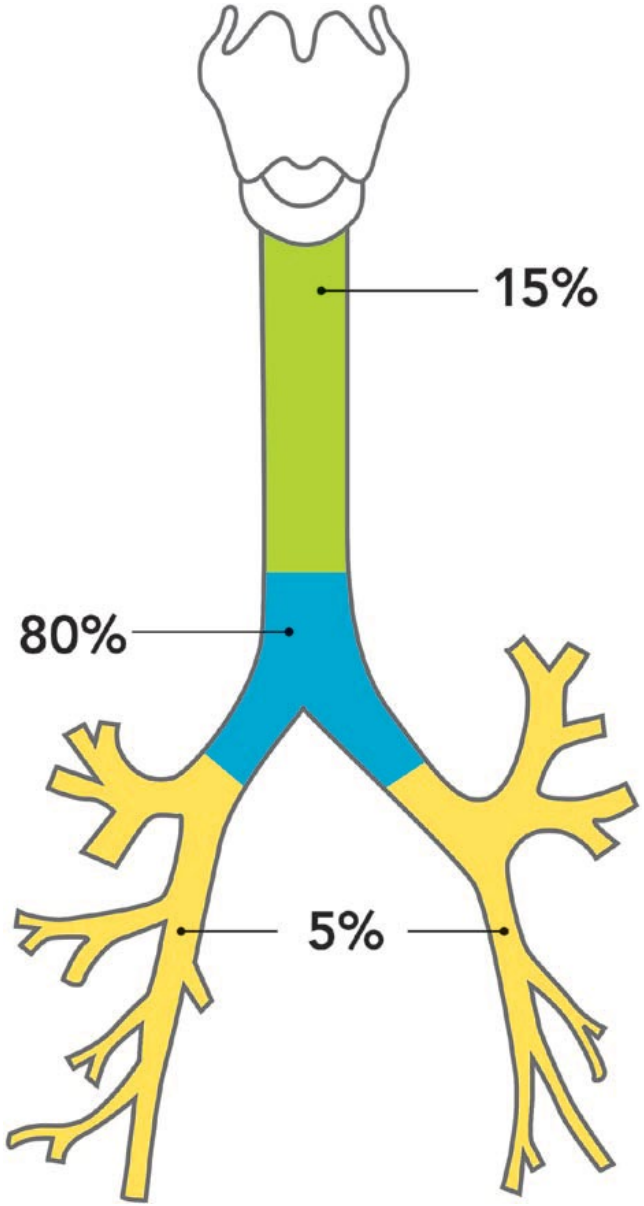
Le Fort I Fx.

Le Fort II Fx.

Le Fort III Fx.




Zone
3
2
1
5%
77%
10%
3
2
1



Wilson WC: Trauma airway management, Trauma Anesthesia. Edited by Smith CE. New York, Cambridge University Press, 2008, pp 9–54

Recommended actions for intubation in patients with or suspected of having COVID-19

Avoid awake flexible scope intubation

Use RSI

Pre-O_2 for 3-5 min (O_2 flow < 6 L/min) target end-tidal O_2 90%

Consider ketamine 1-2 mg/kg

Succinylcholine 1.5 mg/kg or Rocuronium 1.2 mg/kg

Ensure full neuromuscular blockade before attempting tracheal intubation

Anaesthesia. 2020;75:785–799., Anesth Analg. 2020;131:326–334., Anesth Analg. 2020;131:677–689.

Recommended actions for intubation in patients with or suspected of having COVID-19

Do not BMV unless needed for O_2 desaturation*

(*2-person, low flow, small TV, use VE-grip)

Intubation by experienced clinician

If intubation fails, use 2nd-generation SGA

that allows TT insertion guided by a flexible bronchoscope

Anaesthesia. 2020;75:785–799., Anesth Analg. 2020;131:326–334., Anesth Analg. 2020;131:677–689.


EVERYTHING
WILL BE OK