

# AIRWAY & ANAESTHESIA

## Emergency Anaesthesia For Major Trauma

1. Emergency anaesthesia for the major trauma patient is a high risk intervention that has significant potential benefits.
2. The anaesthetist attending a major trauma will be a minimum of ST5 in their training and will have received appropriate orientation to this document and the resuscitation bays.
3. RSI is indicated when the benefits outweigh the potential risks – this is a clinical judgement. The decision to RSI will be made by the Trauma Team Leader and the trauma team anaesthetist(s).
4. It is strongly recommended that ketamine is used as the induction agent of choice in major trauma.
5. Vasopressors should be avoided in the acute phase of major trauma in all but the most exceptional circumstances; preference is for blood product transfusion and balanced anaesthesia.
6. In almost all trauma patients, it will not be appropriate or possible to wake the patient or reverse muscle relaxants once administered. In the event of airway difficulty, The relevant DAS algorithms should be adhered to.
7. In addition to standard intubating equipment, consideration of videolaryngoscopy and equipment for Plan B & Plan D CICV must be confirmed in all cases.

## Background

Rapid sequence induction of anaesthesia (RSI) in major trauma is performed to prevent aspiration of gastric contents in patients who are inadequately starved; to stabilise physiology; and to facilitate investigation and treatment. The essential features of RSI are safety, pre-oxygenation, intravenous induction (using a pre-determined induction dose), insertion of a tracheal tube prior to mechanical ventilation of the lungs and transfer to radiology or definitive care. It is imperative to avoid hypoxia, hypercarbia, hypotension and aspiration during the procedure.

Emergency anaesthesia for the major trauma patient is a high risk intervention that has significant potential benefits. If performed poorly, anaesthesia in the non-theatre environment for a patient population that often have unstable cardiovascular and respiratory systems can result in unnecessary morbidity and mortality.

The purpose of this standard operating procedure is to provide a consistent, standardised approach to emergency anaesthesia in major trauma, reducing the cognitive load and the potential for human error and avoiding significant patient harm.

The anaesthetist attending a major trauma will be a minimum of ST5 in their training and will have received appropriate orientation to this document and the resuscitation bays. They are part of the major trauma bleep, but can be contacted on bleep 9034 if they have not attended or a trauma call has not gone out.

## Indications for RSI

RSI is indicated when the benefits outweigh the potential risks – this is a clinical judgement. The decision to RSI will be made by the Trauma Team Leader and the trauma team anaesthetist(s).

Possible indications for RSI include, but are not limited to, the following categories:

- A. Airway** – Obstruction or impending obstruction. This would include a reduced conscious level with loss of airway reflexes, seizures resistant to treatment or head injuries. *A Glasgow Coma Score (GCS) less than 15 is an indication to consider RSI to optimise oxygenation and ventilation. A GCS <9 is significant and mandates RSI in all but the most exceptional of cases.*
- B. Breathing** – Oxygenation and ventilation are inadequate or potentially inadequate.
- C. Clinical course** – e.g. the patient with multiple contaminated open fractures that will be heading to theatre imminently; anaesthesia will facilitate further investigation and management.

In massive haemorrhage, anaesthesia will allow continued resuscitation, but consideration should be given to administration of blood products to counteract the instability of induction.

In some circumstances anaesthesia can be administered for humane reasons, e.g. extreme pain from significant burn injuries, or highly agitated or combative patients in whom anaesthesia will facilitate further management.

In making the decision to perform an RSI, numerous risks must be considered:

- **Anticipated Difficult Airway:** any indication of a difficult airway pre-induction will have to be carefully considered.
- **Anxiety of the Intubator:** anxiety for any reason can affect judgement and performance; this will clearly hamper the RSI process and further increase the possibility of harm.
- **Personnel** - Are the most appropriate personnel available to perform the procedure? If not how long until they are available?
- **Resources** – Are any additional resources essential to the process that are not present?

## Preparation

### Briefing:

- When responding to a major trauma the trauma team leader will provide a briefing of the inbound patient.
- It may be possible after the initial brief to determine if anaesthesia is required. At this time the RSI checklist can be used to guide preparation (Appendix G, page 253).
- It is the responsibility of the anaesthetist to check the presence of equipment they may wish to use.

### Environment:

- The majority of major trauma patients are received into a resuscitation bay in the Emergency Department. (Appendix C, page 233) Ensure there is 360-degree access to the patient to allow for further interventions as required (e.g. thoracostomy)
- Low noise level – allows effective team communication.

### Identify roles:

- Manual in-line stabilisation, if suspected cervical injury.
- 1<sup>st</sup> Intubator
- 2<sup>nd</sup> Intubator (Either Bleep 9030 anaesthetic consultant or TTL)
- Airway Nurse – airway equipment, cricoid pressure and external laryngeal manipulation.
- **Drug delivery**

### Monitoring:

- Full monitoring (ECG, NIBP, SpO<sub>2</sub>, EtCO<sub>2</sub>). Ensure monitoring is switched on, particularly the End tidal CO<sub>2</sub> module as it takes 1-2 minutes to warm up.
- Do not delay RSI for insertion of arterial line.

## Equipment

### Suction:

- Confirm suction is working with appropriate sized “yankauer” suction catheter attached and placed on the right hand side of the patients’ head. It may be appropriate to arrange for a second suction unit to be available if significant, hard to manage, airway soiling is anticipated e.g. maxillofacial trauma.

**Ventilator:**

- The trauma resuscitation bays have a Dräger Oxylog 3000 ventilator.
- The ventilator should be tested prior to use.
- Confirm suitable initial settings for the patient: e.g.tidal volumes of 400mL, respiratory rate 18 breaths/minute, PEEP 5cmH<sub>2</sub>O, on a Continuous Mandatory Ventilation setting. The aim is to achieve tidal volumes of 6mL/kg (ideal body weight) with a minute ventilation appropriate to the desired EtCO<sub>2</sub>.
- Note the peak pressure at commencement of ventilation, adjusting pressure alarms accordingly. Change in peak pressure is an early indication of expanding pneumothoraces, or spontaneous breath attempts.
- Ensure correct tubing is attached and the circuit tested for any leaks.
- Ensure a self-inflating bag with oxygen tubing is immediately to hand, in case of ventilator failure.

**Videolaryngoscope:**

A CMAC videolaryngoscope is available; if it is not immediately available in the emergency department contact the anaesthetic co-ordinator (Bleep 9666) to borrow from Level 2 theatres. Arrange early to avoid delay.

Airway equipment: should be placed on top of the airway trolley ready for use.

**Minimum layout:**

- Laryngoscope x 2 [size 3 and 4 blade]
- Bougie - routinely used in all emergency department intubations.
- Tracheal tube with subglottic suction port, endotracheal cuff tested (7.0mm ID ETT for female and 8.0mm ID ETT for male).
- Catheter mount and HME filter
- 10 ml syringe
- Alternative smaller tracheal tube.
- 2 x nasopharyngeal airways
- 1 x oropharyngeal airway
- Bag-mask connected to O<sub>2</sub> tubing, side stream EtCO<sub>2</sub> attached.
- (Mapleson "C" circuit available if desired)
- Nasal cannula

**Confirm availability of:**

- Airway "Plan B" – Supraglottic Airway device (I-gel)
- Alternative laryngoscope [alternative blade size/type].
- Anticipated difficult airway equipment e.g. C-Mac.
- Airway "Plan D" - Difficult airway kit [surgical airway]

## Drugs

Induction drugs and dose will be based on clinical assessment and practitioners experience of their use. This must include consideration of drugs recently given for analgesia and procedural sedation in the pre-hospital phase of care.

It is strongly recommended that ketamine is used as the induction agent of choice in major trauma due to its' relative haemodynamic stability and wide therapeutic margin. A 10-20% context specific overdose is unlikely to cause harm.

**The following regimes are strongly recommended:**

- **Standard "3:2:1" - Fentanyl 3mcg/kg, Ketamine 2mg/kg and Rocuronium 1mg/kg**  
Consideration to slight delay (approx. 30-60 seconds) between drugs (dependent on the patient's clinical condition) to allow the drugs to achieve maximal effect at the point of intubation
- **Hypovolaemic "1:1:1" - Fentanyl 1mcg/kg, Ketamine 1mg/kg and Rocuronium 1mg/kg**  
If severe hypovolaemia is suspected fentanyl may be omitted, in some circumstances it may be appropriate to administer a paralysing agent alone. Simultaneous administration of blood products to support blood pressure is strongly recommended rather than vasopressor/ inotrope use.

### Rescue drugs

Vasopressors should be avoided in favour of appropriate induction/ maintenance doses and blood products. The use of vasopressors for the management of hypotension due to hypovolaemia in trauma is associated with increased mortality. In exceptional circumstances vasopressors and inotropes are available in the emergency department.

**Suggamadex is available from level 2 theatres if anaphylaxis to rocuronium is suspected.**

### Specific circumstances

On occasion it may be appropriate to use a propofol/opiate based induction regime. E.g. Isolated head injuries.

### Procedural sedation to facilitate induction

Some patients may be agitated and uncooperative. They will require incremental sedation to facilitate pre-oxygenation and induction. Small doses of the planned induction drug e.g. 10-20mg Ketamine boluses titrated to effect. 1-2mg Midazolam can be used, particularly in head injured patients. In all cases caution must be exercised and you must be in a position to immediately maintain the airway and provide ventilation.

### Maintenance

Continued fentanyl boluses and Propofol infusions are available for maintenance of anaesthesia. The CT scanner is close to the resuscitation bays: Do not delay a transfer to scan to await infusions to be commenced. If not immediately available maintenance can be achieved with ongoing boluses of ketamine (10min intervals) and opiate. Alternatively, a fentanyl midazolam “bolus” regime can be used.

**Regular administration of muscle relaxants is appropriate in major trauma patients.**

## Patient Preparation

### Optimal positioning for patient:

- In the trauma patient with possible C-spine injury the head should be placed in the neutral position with manual in line immobilisation, and any spinal immobilisation (including collars) removed.
- The obese patient may require “ramping” with head and chest elevated above the level of the patient’s navel.

### IV/IO Access:

- Ensure two large bore intravenous access are inserted, patent, flushed and accessible. Intraosseous devices can be used for all anaesthetic drugs in the event of inadequate IV access. Ensure all drugs are flushed in. Ensure IO insertion site is appropriate to the pattern of injury. e.g humeral in presence of pelvic injury. An alternative option is insertion of a wide bore subclavian line.
- Simultaneous resuscitation with blood products may be required for haemodynamically compromised patients.

### History & Examination:

Any history and examination are ideally performed before anaesthesia, but in some cases the urgency for airway control will take precedence. Minimum information prior to RSI should include:

- Glasgow Coma Score
- Pupillary size and response
- Any evidence of chest injuries. (Anticipating the need for thoracostomies).
- Abdominal tenderness and guarding
- Neurological function distal to significant limb injury
- Limb movement

**Predicting a difficult airway:**

- History of Ankylosing spondylitis, Rheumatoid arthritis, previous head and neck cancer/surgery
- Morbid obesity, prominent upper incisors, receding mandible.
- Facial trauma or excessive bleeding
- Neck trauma (haematoma), burns to neck or face.

**Pre-oxygenation:**

- For 3 minutes, by bag valve mask (BVM) or Waters circuit.
- If agitated: face mask with reservoir bag +/- incremental sedation (midazolam or ketamine, followed by subsequent reduction in induction drug doses).
- In instances of respiratory distress augmentation of ventilation with BVM can be used, but is often difficult.
- Pre-oxygenation with significant maxillofacial injuries should be done in a comfortable position for the patient, but such that they can rapidly be re-positioned to facilitate intubation.
- Apnoeic oxygenation via nasal cannulae. On induction of anaesthesia flow is increased to 15 l/min.

**Conduct - Predicted Steps in Process****Decision to RSI**

- Appropriate people alerted
- Pre-oxygenation commenced
- Equipment assembled
- Challenge response checklist (Appendix G, page 253)
- Induction drugs administered
- Nasal cannula to 15l/min
- Cricoid pressure (if used)
- Laryngoscopy and intubation
- Confirm tracheal tube placement and secure
- Cricoid pressure released
- Patient assessment performed
- Prepare for transfer



## Post Intubation Checks

Perform a rapid re-assessment of Airway, Breathing, Circulation and Disability.

The following should be actioned and communicated to the TTL and scribe:

- Confirmation of tracheal tube position: Bilateral chest movement, auscultation, continued CO2 trace on monitor and direct visualisation at the time of intubation.
- Monitor values: SpO2, NIBP, ECG, EtCO2, peak ventilation pressures and minute ventilation.
- Set NIBP to a 1 to 2.5 minute cycle. This often requires repeating as the monitor resets when disconnected from the base unit.
- ANY subsequent changes to ventilator settings or maintenance drugs
- Complete RSI audit form.

## Emergency Actions

**Anticipated or Unanticipated Difficult Intubation:**

- As per the difficult airway society guidelines (Appendix H, page 254)
- In the majority of trauma patients reversal of the muscle relaxant is not an option.
- “Can’t intubate, **CAN** ventilate”: a supraglottic device can be used temporarily.  
“Can’t intubate, **CAN’T** oxygenate”: **A SURGICAL AIRWAY** is an appropriate solution.
- Any additional “difficult airway” equipment, is available via the theatre co-ordinator or on-call anaesthetic assistant lead. Delay in procuring equipment needs to be balanced against the urgency of the anaesthesia requirement.

**Desaturation:**

- Confirm oxygen supply by tracing from cylinder to tracheal tube.
- Confirm correct tube placement with EtCO2 and auscultation of the chest
- Confirm adequate cardiac output – NIBP, pulse, EtCO2
- Exclude/ treat pathology:
  - ▶ Pneumothorax +/- tension (Often predictable, peak pressures/ minute ventilation on ventilator may suggest a problem)
  - ▶ Anaphylaxis
  - ▶ Bronchospasm of other cause e.g. asthma
  - ▶ Malignant hyperpyrexia

## **Hypotension:**

Exclude the following causes of hypotension post induction:

- Drug induced vasodilation.
- Tension Pneumothorax.
  - ▶ Treatment involves finger thoracostomy anterior to the mid axillary line in the fourth intercostal space on the affected side.
  - ▶ If suspected and unilateral decompression does not relieve the problem repeat on the opposite side of the chest.
  - ▶ If performed in a sterile manner with skin prep the thoracostomy may be converted to a formal chest drain.
- Hyperventilation
  - In low cardiac output states raised intrathoracic pressure impedes venous return and hence a hypotensive state ensues. The effect can be reduced with reduction of PEEP, early bolus of blood products, and pressure limiting the ventilator.
- Myocardial impairment
  - Direct injury, hypovolaemia, pericardial effusion.

## Emergency Surgical Airway

1. This guideline is to be used in conjunction with the Emergency Anaesthesia SOP to provide a consistent, standardised approach to performing an emergency surgical airway.
2. Emergency surgical airway may be needed either following failed intubation in the “can’t intubate can’t oxygenate” situation or where initial intubation is not possible and oxygenation is not possible by other means.
3. Surgical airway equipment should be removed from the drawer in the difficult airway trolley when it is anticipated that an airway will be particularly difficult.
4. The DAS unanticipated difficult intubation algorithm should be followed in call cases.

## Background

The purpose of this standard operating procedure, in conjunction with the emergency anaesthesia SOP is to provide a consistent, standardised approach to performing an emergency surgical airway. This may need to be performed either following failed intubation in the “can’t intubate can’t oxygenate” situation or where initial intubation is not possible and oxygenation is not possible by other means.

## Surgical Cricothyroidotomy

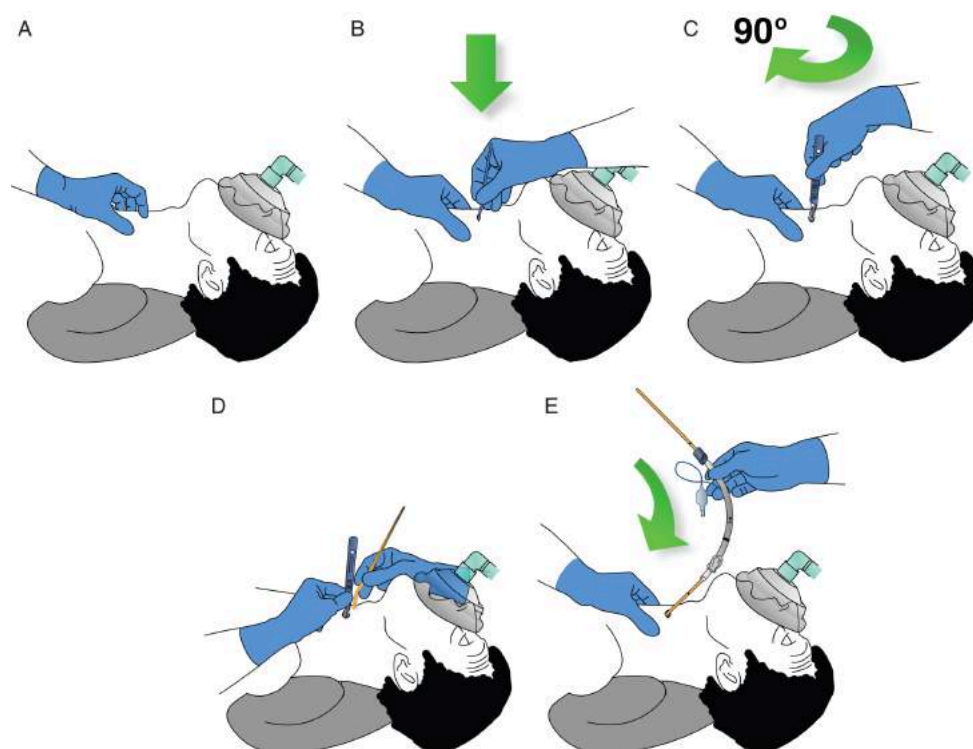
The surgical airway equipment should be removed from the drawer in the difficult airway trolley when it is anticipated that an airway will be particularly difficult. For example:

- Airway trauma
- Difficult anatomy
- Burns to face and neck precluding jaw movement
- Possible airway burns
- Severe maxillo-facial trauma

The technique suggested minimises two commonly encountered problems namely bleeding from the incision and loss of the incision into the airway before or during tube insertion. It differs slightly from the DAS algorithm.

## Method

- Extend the patients neck as much as feasible. In this setting airway management should take precedence over the risk of cervical spine instability.
- Insert a number 22 scalpel blade horizontally into the cricoid membrane using a “stab / rocking” technique
- Leave the blade in position until the tips of a tracheal dilator are pushed into the airway incision on either side of the blade and opened as widely as possible.
- Remove the scalpel blade, rotate the tracheal dilators 90 degrees (handle caudally, jaws cranially). Keep the jaws wide open throughout. This will facilitate easier passage of the endotracheal tube.
- Insert a **6.5mm** cuffed tracheal tube (over a lubricated intubating bougie if necessary) into the hole held open by the dilators.
- Inflate the cuff, confirm tube position in the normal way and commence ventilation
- Fix the tube into position with a tie or Elastoplast.
- The procedure should take around 30 seconds



Cricothyroidotomy technique. Cricothyroid membrane palpable: scalpel technique; ‘stab, twist, bougie, tube’. **(A)** Identify cricothyroid membrane. **(B)** Make transverse stab incision through cricothyroid membrane. **(C)** Rotate scalpel so that sharp edge points caudally. **(D)** Pulling scalpel towards you to open up the incision, slide coude tip of bougie down scalpel blade into trachea. **(E)** Railroad tube into trachea.

Difficult Airway Society 2015 guidelines for management of unanticipated difficult intubation in adults

C. Frerk, V. S. Mitchell, A. F. McNarry, C. Mendonca, R. Bhagrath, A. Patel, E. P. O’Sullivan, N. M. Woodall and I. Ahmad, Difficult Airway Society intubation guidelines working group  
British Journal of Anaesthesia, 115 (6): 827–848 (2015) doi:10.1093/bja/aev371

## Management of Oral and Maxillofacial Injuries

1. Initial assessment of maxillofacial injury should be done by Emergency Department staff
2. There must be an assessment for cervical spine injury. This must be clearly documented in the medical notes and discharge summary.
3. Specific imaging is required for maxillofacial injuries. Full imaging requirements are described in the guidelines below.
4. The on-call maxillofacial surgical team, based at the BRI, are available 24/7 through switchboard – full contact information outlined below.

## Maxillofacial Contact Information

**On call Maxillofacial Surgical team available 24/7.**

**Based at the BRI, but can assess patients at Southmead**

Please allow travel time as team may be required to operate at BRI, Children's Hospital or Bath.

**Contact through switchboard**

Rota is with switchboard of Southmead and UHB.

If no reply from 1<sup>st</sup> on call then move up to 2<sup>nd</sup> on call then 3<sup>rd</sup> (consultant) as team may be between hospitals or operating.

Registrar and Consultant on call 1700 – 0900h. Before then 1<sup>st</sup> on call will discuss with available OMFS registrar/ consultant at closest relevant hospital.

## Mandibular Fractures

**Patient assessed by ED staff.**

**Assessment for cervical spine injury:** If none, then document in medical notes and in discharge summary – as these may be all we get on transfer.

**Imaging:** OPG and PA mandible (lateral obliques of mandible left and right sides NOT acceptable instead).

**Definitive diagnosis made.**

**Discuss with on call OMFS team.**

**Ideal surgical intervention is within 24 hours.**

- If concomitant injuries for management at Southmead then maxillofacial team will need to operate there.
- Otherwise immediate transfer to BRI and commence intravenous antibiotics (co-amoxiclav 1.2g IV TDS) and preparation for surgery the next day.

The maxillofacial team will arrange CT for complex comminuted fractures and condyle fractures if further imaging required.

## Complex Facial Trauma

10% chance of cervical spine injuries – this must be assessed and outcome clearly documented in medical notes and discharge summary.

Any patient undergoing CT scan for c-spine with facial injuries should have the same scan protocol extended cephalad to include the full face and cranium IN THE SAME SCAN (Fine cut hard tissue window CT from inferior border of mandible to vertex of cranium).

- This is a hard tissue sequence and whilst the soft tissues are represented poorly this is sufficient for maxillofacial needs and minimises radiation dose.

There is no need for additional soft tissue scans; adding craniofacial structures to hard tissue CT scans gives adequate information for operative planning and patient management and minimises radiation exposure.

- Radiography teams are often unwilling to increase radiation doses by automatically scanning the face; this delays intervention and management planning and also increases dose due to subsequent rescan later.

Admit at Southmead for 24 hour neurological observations if head injury or other injuries, or discuss with on call OMFS team as to whether to transfer to BRI if not concomitantly injured.

If soft and hard tissue injuries please do not arrange soft tissue closure by another team prior to maxillofacial team assessment. We will undertake this after complete assessment of injuries.

## Orbital Fractures

**Imaging:** CT fine cut scans through the orbits and reconstructed in sagittal and coronal views.  
Ophthalmic and orthoptic assessment referral made.  
Discuss with on call OMFS team.

**IF retro bulbar haemorrhage** urgent OMFS review at Southmead or BRI.  
Otherwise review in 3-5 days maxillofacial clinic.

## Zygomatic Arch and Body Fractures

**Patient assessed by ED staff.**

**Assessment for cervical spine injury:** if none, then document in medical notes and in discharge summary.

**Imaging:** PA face, Occipitomenal (OM) 15 degrees, OM 30 degrees and submentovertex views

**Definitive diagnosis made.**

**Ideal surgical intervention is within 2 weeks.**

Discuss with SHO OMFS on call and arrange follow up 3-5 days later in maxillofacial clinic.

Instruct patient not to blow nose (as surgical emphysema can be caused periorbitally).

Usually no antibiotics are required.

**IF orbit involvement** i.e. obvious clinical indications of eye / orbit involvement

- CT orbits with coronal and sagittal reformats if orbit involvement
- If any doubt then discuss with on call OMFS team who may choose to order at review appointment.

## Nasal Bone Fractures

**Imaging not required**

**Review:** Maxillofacial clinic in 3-5 days

## Naso-orbitoethmoid Fractures

**Patient assessed by ED staff.**

**Assessment for cervical spine injury:** if none, then document in medical notes and in discharge summary.

**Imaging:** Fine cut CT from inferior border of mandible to vertex of cranium.

Admit at Southmead for 24 hour neuro obs if head injury otherwise discuss with on call OMFS team as to whether to transfer to BRI if isolated injury.

**Ophthalmic and orthoptic review.**

## Cranial Fractures

**Imaging:** Hard tissue windows cranial vertex down including skull base (and facial bones if involved) as part of CT brain.

**Discuss with Neurosurgical team at Southmead.**

**If facial injuries also:** discuss with OMFS team on call, who will need to assess on neurosurgical ward at Southmead.

## Dentoalveolar Fractures

OPG (and/ or dental periapicals in the morning maxillofacial clinic). Call on call OMFS team as may require transfer to BRI for dental splinting.



## Airway & Anaesthesia References

### Emergency Anaesthesia for Major Trauma:

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3. Benger J, Nolan J, Clancy M. Emergency airway management. Cambridge, UK; New York: Cambridge University Press, 2008
4. Cook TM, Woodall N, Harper J, Benger J. Major complications of airway management in the UK: results of the Fourth National Audit Project of the Royal College of Anaesthetists and the Difficult Airway Society. Part 2: intensive care and emergency departments. *Br J Anaesth*. 2011 May;106(5):632–42.
5. Henderson JJ, Popat MT, Latto IP and Pearce AP. Difficult Airway Society guidelines for management of the unanticipated difficult intubation. *Anaesthesia*. 2004; 59: 675–694
6. Intensive Care Society. Standards for Capnography in Critical Care. London: Intensive Care Society, 2009. [http://www.ics.ac.uk/intensive\\_care\\_professional/standards\\_and\\_guidelines/capnography\\_guidelines](http://www.ics.ac.uk/intensive_care_professional/standards_and_guidelines/capnography_guidelines).
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### Emergency Surgical Airway:

1. Difficult Airway Society 2015 guidelines for management of unanticipated difficult intubation in adults  
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<https://academic.oup.com/bja/article/115/6/827/241440/Difficult-Airway-Society-2015-guidelines-for>  
[https://www.das.uk.com/guidelines/das\\_intubation\\_guidelines](https://www.das.uk.com/guidelines/das_intubation_guidelines)

### Oral and Maxillofacial Injuries:

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3. Arslan ED et al. Assessment of maxillofacial trauma in the emergency department. *World Journal of Emergency Surgery*. 2014; 9(1):13  
<https://www.ncbi.nlm.nih.gov/pubmed/24484727>



## Appendix G - RSI Checklist

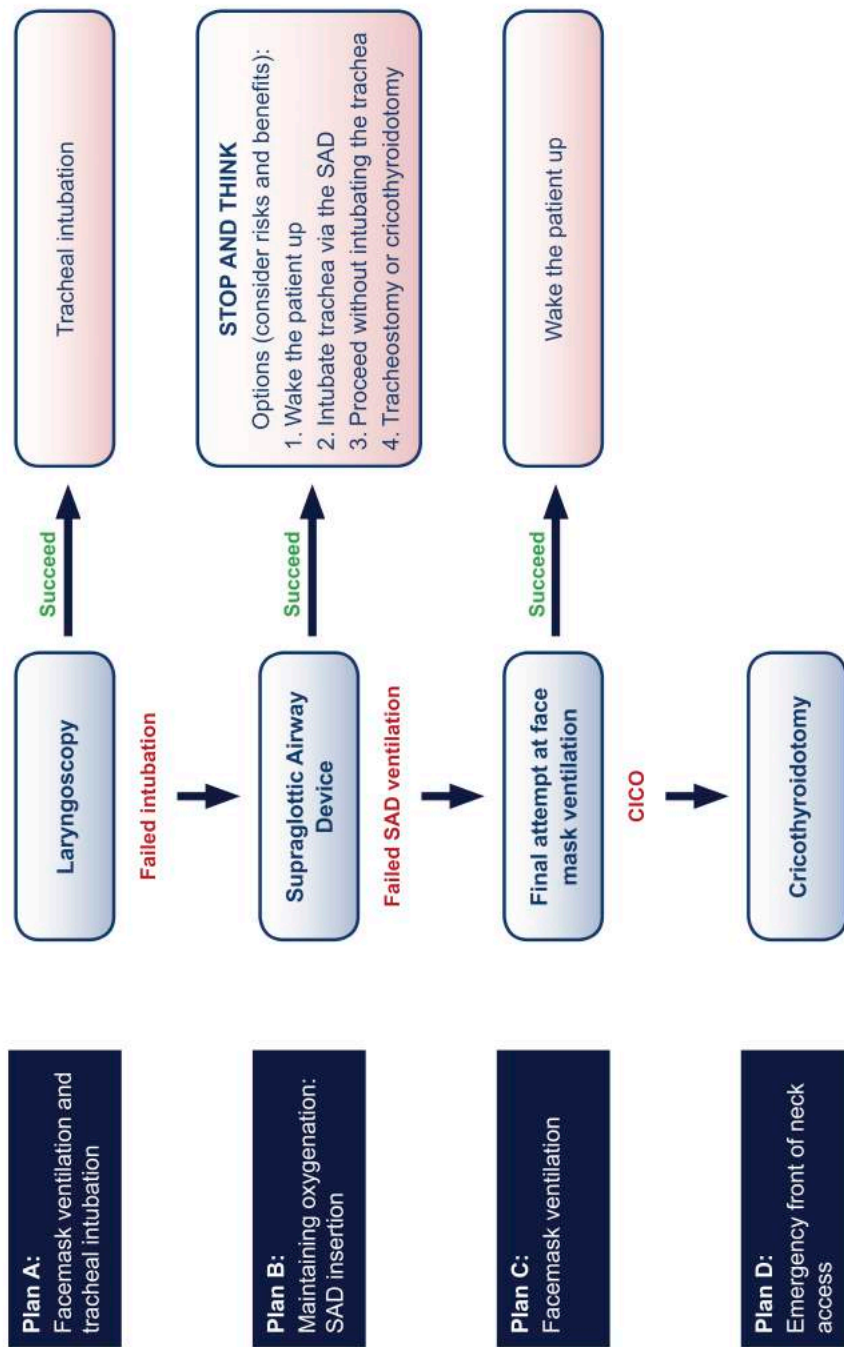
### EMERGENCY INDUCTION CHECKLIST

Prepare Patient	Prepare Equipment	Prepare Team	Prepare for difficulty
<ul style="list-style-type: none"> <li><input type="checkbox"/> Is preoxygenation optimal?</li> <li><input type="checkbox"/> Is the patient's position optimal?</li> <li><input type="checkbox"/> Can the patient's condition be optimised any further before intubation?</li> <li><input type="checkbox"/> How will anaesthesia be maintained after induction?</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> What monitoring is applied?                             <ul style="list-style-type: none"> <li><input type="checkbox"/> ECG</li> <li><input type="checkbox"/> Blood pressure</li> <li><input type="checkbox"/> Sats probe</li> <li><input type="checkbox"/> Capnography</li> </ul> </li> <li><input type="checkbox"/> What equipment is checked and available?                             <ul style="list-style-type: none"> <li><input type="checkbox"/> Self-inflating bag</li> <li><input type="checkbox"/> Suction</li> <li><input type="checkbox"/> 2 ET tubes</li> <li><input type="checkbox"/> 2 laryngoscopes</li> <li><input type="checkbox"/> Bougie</li> </ul> </li> <li><input type="checkbox"/> Do you have all the drugs required, including vasopressors?</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Who is ...?                             <ul style="list-style-type: none"> <li><input type="checkbox"/> Team leader</li> <li><input type="checkbox"/> First Intubator</li> <li><input type="checkbox"/> Second Intubator</li> <li><input type="checkbox"/> Cricoid Pressure</li> <li><input type="checkbox"/> Intubator's Assistant</li> <li><input type="checkbox"/> Drugs</li> <li><input type="checkbox"/> MILS (if indicated)</li> </ul> </li> <li><input type="checkbox"/> How do we contact further help if required?</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> If the airway is difficult, could we wake the patient up?</li> <li><input type="checkbox"/> If the intubation is difficult, how will you maintain oxygenation? (Plans A, B, C, D)</li> <li><input type="checkbox"/> Where is the relevant equipment, including alternative airway?</li> <li><input type="checkbox"/> Are any specific complications anticipated?</li> </ul>

The checklist should be completed as a challenge/response process. Ensure the patient has a tightly applied reservoir mask/ BVM and that the reservoir is moving with respiration throughout the conduct of the checklist. In extreme cases the rapid checklist may be used.

Appendix H - Difficult Airway Algorithms

**DAS Difficult intubation guidelines – overview**

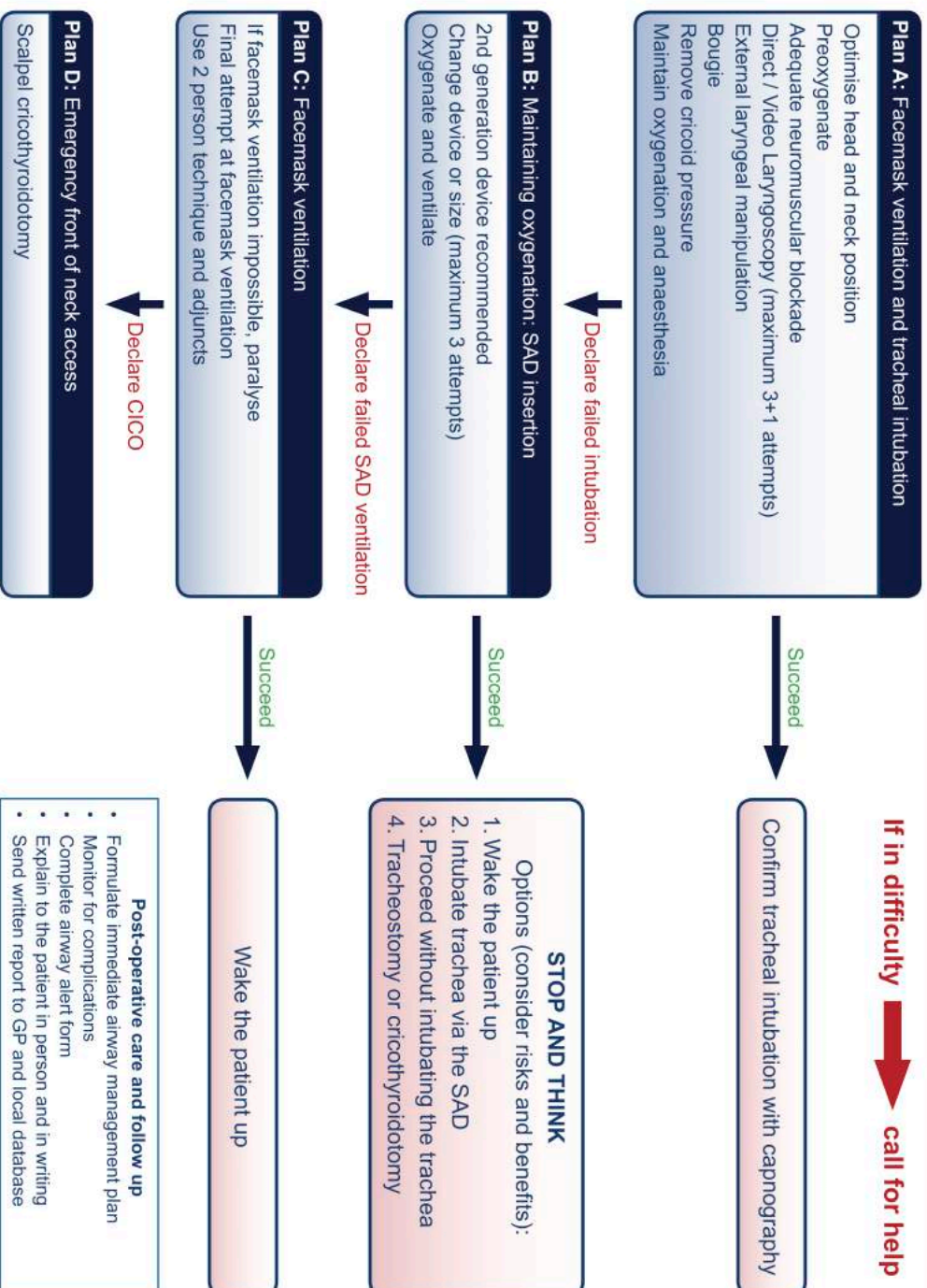


This flowchart forms part of the DAS Guidelines for unanticipated difficult intubation in adults 2015 and should be used in conjunction with the text.

**Difficult Airway Society 2015 guidelines for management of unanticipated difficult intubation in adults**

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British Journal of Anaesthesia, 115 (6): 827–848 (2015) doi:10.1093/bja/aev371

# Management of unanticipated difficult tracheal intubation in adults



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



## Failed intubation, failed oxygenation in the paralysed, anaesthetised patient

**CALL FOR HELP**



**Continue 100% O<sub>2</sub>**  
**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

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