



**SOUTH AFRICAN  
SOCIETY OF  
ANAESTHESIOLOGISTS  
(SASA)**

# **SASA Airway Guidelines**

SASA Working Group for  
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# Airway Management Resources in Operating Theatres

## Provisional recommendations for South African hospitals and clinics

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### INTRODUCTION

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These guidelines were first published in 2008. Since then there have been major advances in the field of airway management, including a revision of the American Society of Anesthesiologists (ASA) algorithm (1) for airway management and the publication of a simple but effective approach to airway management, VORTEX, from Australia (2). An important recent publication from the British Difficult Airway Society (DAS) is a guideline for extubation (3). The algorithms contained in these guidelines are reprinted in Appendix 1.

General anaesthesia (GA) requires airway instrumentation to facilitate spontaneous or mechanical ventilation. The endotracheal tube (ETT) remains the airway management device of choice where mechanical ventilation is required in intensive care, emergency medicine and anaesthesia, particularly where muscle relaxants are used and airway protection is required. Endotracheal intubation remains an essential skill for anaesthesia practitioners, intensivists and emergency physicians.

The variety of airway devices has proliferated since 2008. The proliferation of devices is likely to indicate the ideal device/s for management of airway difficulties, has yet to be invented. The intention of this review is to provide a suggested guideline for the equipment currently obtainable in South Africa that should be available in healthcare facilities (HCFs) where intubation is performed for GA.

The utility of Supraglottic Airway Devices (SADs) as rescue devices in the event of difficult or failed intubation best described for the LMA™ and the subsequent LMA™ variants designed for specific clinical scenarios (4). SADs available in SA are listed in Appendix 2.

### Requirement for endotracheal intubation

The decision to perform endotracheal intubation is dependent on both patient and procedural factors that will not be discussed in this article, but which have been extensively reviewed (5).

### Airway Assessment

The goals of airway assessment have recently been redefined by the American Society of Anaesthesiologists (1):

#### 1. Are there problems with Consent and/or Cooperation

#### 2. Is laryngoscopy going to be difficult?

The detailed description of airway assessment in the ASA guidelines may be summarised by the four D's (Figure 1):

#### 3. Is mask ventilation going to be difficult?

The features associated with difficult mask ventilation may be summarised by the acronym "BONES" (6):

#### 4. Is intubation going to be difficult?:

Situations where the larynx is easily seen but an ETT may still be difficult to pass are most often due to subglottic stenosis (tracheal stricture) (Figure 1) (7):

- Previous history of endotracheal intubation esp. in ICU
- Voice changes
- Dyspnea and reduced effort tolerance that may be treated as "Unresponsive asthma"

#### 5. Is airway rescue going to be difficult?:

- By supraglottic airway device (SAD)  
Difficulty with SAD rescue can be defined by the acronym "RODS (Figure 1) (6):
- By infraglottic (surgical) cricothyrotomy  
Difficulty with infraglottic rescue, required if supraglottic rescue fails, may be defined by the acronym "SHORT" (6):



<p>Difficult Laryngoscopy (The 4 Ds)</p> <ol style="list-style-type: none"> <li>1. Disproportion</li> <li>2. Distortion</li> <li>3. Dysmobility</li> <li>4. Dentition</li> </ol>	<p>Difficult Mask Ventilation (BONES)</p> <p>B - Beard O - Obesity N - No Teeth E - Extremes of Age (Neonates / Elderly) S - Snores</p>	<p>Difficult Cricothyrotomy</p> <p>MARK the Cricothyroid membrane if difficult intubation suspected</p> <p>S - Surgery on the neck H - Haematoma from trauma or surgery O - Obesity &amp; Sepsis (Ludwig's Angina) R - Radiation destroys tissue planes and reduces compliance T - Tumour esp. goitre</p>
<p>Difficult Intubation (Tracheal stenosis)</p> <ol style="list-style-type: none"> <li>1. Previous intubation (&gt;3hours / ICU)</li> <li>2. Voice Changes</li> <li>3. Unresponsive "asthma"</li> </ol>	<p>Difficult Supraglottic rescue (RODS)</p> <p>R - Restricted mouth opening O - Obstruction at the larynx or below D - Distortion esp. anatomical SADs S - Stiff lungs (↓Compliance - ARDS) ↑Resistance - Asthma</p>	

Figure 1

**Table I:** The requirement for airway equipment according to the Healthcare Facility (HCF)

Equipment requirement	All HCFs including clinics, where GA and intubation are not routinely performed (OPD/ER/ICU)	District hospitals where GA and intubation are performed infrequently	Regional and tertiary hospitals and busy district hospitals, where GA is performed frequently
Performance of endotracheal intubation	Yes	Yes	Yes
Additional routine equipment for difficult airway	No	Yes – limited choice of items (see below).	Yes – wider choice of additional items (see below).
Equipment for emergency "can't intubate/can't ventilate"	Yes – <b>emergency airway kit:</b> including LMA and scalpel.	Yes – <b>emergency airway kit:</b> including LMA and scalpel.	Yes – <b>emergency airway kit:</b> including LMA, scalpel <b>and</b> one or more of: 1. EasyTube <b>or</b> laryngeal tube suction (LTS) <b>or</b> Combitube 2. Seldinger cricothyrotomy instruments 3. Rigid bronchoscope.
Alternative devices for airway rescue	No	Yes – <b>airway resource cart</b> with a limited choice of items. Must include LMA and variants, depending on patients treated (see below).	Yes – <b>airway resource cart</b> with a wider choice of equipment depending on procedures being done and available expertise (see below).
Alternative devices for establishing a definitive airway	No	Yes – <b>airway resource cart</b> with contents depending on the levels of training of available staff (see below).	Yes – <b>airway resource cart</b> with wider choice of equipment, depending on procedures being done and the available expertise (see below).

Following airway assessment, the person performing the intubation should be in a position to decide between three possible options:

- 95% of patients will have no abnormalities on the airway assessment in Figure 1. They can be managed by a routine induction of anaesthesia including muscle relaxants if required.
- 4% of patients will have difficulties identified, especially with laryngoscopy. Should the intubator have assessed mask ventilation and supraglottic rescue as easy the patient may be induced, either by a volatile or intravenous agent, and laryngoscopy performed ("quick look"), preferably with a video laryngoscope.
- 1% of patients will have difficulty in all the assessments in Figure 1. They need to be intubated awake using a flexible scope with a suction port. Alternatives would include awake video or direct laryngoscopy, awake tracheostomy, retrograde intubation or awake blind nasal intubation according to available resources and skills

### Classification of airway equipment

From the various scenarios discussed above, airway devices can be classified into three classes:

- **Routine equipment for endotracheal intubation, INCLUDING** additional equipment for facilitation of intubation, where there is no difficulty with mask ventilation.
  - These devices should be available in ALL THEATRES.
- **Alternative devices for establishing a definitive airway,** including devices for a surgical airway.
  - These devices should be found in the **AIRWAY RESOURCE CART** (see appendix 3).
  - These devices should ideally be used electively, when a difficult airway has been identified during pre-anaesthetic assessment. They can also be used if laryngoscopy with additional equipment remains difficult, and yet mask ventilation remains possible.
- The devices chosen will depend on the patients being treated, and the skills of the treating clinicians.



- **Emergency airway equipment**, where laryngeal visualisation AND mask ventilation are BOTH difficult. These devices should form an easily accessible **EMERGENCY AIRWAY KIT** (see appendix 2).

The requirement for airway equipment is based on the level of facility in which intubation is being performed, and also on whether the intubation is an elective or emergency procedure.

### Equipment for performance of endotracheal intubation

Suppliers of the equipment discussed below are detailed in Appendix 5

**Table II:** Equipment necessary for performing endotracheal intubation

Facemasks	Size 3-5 for adults Size 0-3 for paediatrics
Guedel airways	Size 3-5 for adults Size 0-2 for paediatrics
Two laryngoscope handles	
Laryngoscope blades	
• Macintosh (curved)	Size 3-5 for adults Size 1/2 for paediatrics
• Miller (straight)	Size 3/4 for adults Size 0/1/2 for paediatrics
Endotracheal tubes	Size 5.5-8 cuffed (two per 0.5 increment) for adults Size 2.5-5 cuffed <b>and</b> uncuffed (two per 0.5 increment) for paediatrics
Yankauer suction nozzles (adult and paediatric) and tubing	
Suction catheters to fit available endotracheal tubes	
Magill's forceps, including a smaller size for paediatrics	
Bag valve mask with oxygen	

### Additional devices available in any theatre where GA is performed

- Malleable stylet, including a smaller size for paediatrics
- Malleable bougies including:
  - Re-useable / Single use bougie
  - Hollow Frova ± stylet
  - Solid Eschman

Two useful mnemonics to assist in preparation for endotracheal intubation are shown in figure 2:

### 2. Equipment for emergency CAN'T INTUBATE/ CAN'T VENTILATE airway management.

This equipment may be available for routine airway management or on the Airway Resource Cart. However, for an emergency situation, intervention will be more rapid and effective if the necessary equipment is available in a clearly marked container in an identified location.

The contents of the container should include laryngeal masks, a scalpel and a selection of the other items listed below.

YBAGPEOPLE <sup>(7)</sup>

Y – Yankauer suction  
 B – Bag valve mask resuscitator  
 A – Access to a vein  
 G – Get a team for assistance  
 P – Position patient appropriately  
 E – Endotracheal tubes: variety of sizes  
 O – Oxygen and Oropharyngeal (Guedel) airways  
 P – Pharmacological agents for induction, paralysis and resuscitation  
 L – Laryngoscope with spare handle and variety of blades  
 E – Evaluation for airway difficulty

The 7 Ps of RSI <sup>(6)</sup>

Preparation  
 Preoxygenation  
 Pre-treatment: Antacid / Anticholinergic  
 Push induction drug ± Paralytic agent  
 Position and Protect (C-spine)  
 Placement of ETT with Proof by capnography  
 Post-intubation care

Figure 2

A list should be provided in the container, so that items may be replaced when they are used. Disposable items are preferred to reusable items as they are easy to replace and less likely to be lost.

### Emergency airway kit

**1. Supraglottic Airway Device (SAD) (See appendices).**

- Variety of other Supraglottic Airway Devices (SADs)
- Specific Clinical Scenarios  
 Morbid Obesity / Pregnancy  
 LMA Proseal™ (or other SADs with a oesophageal drainage port)  
 Definitive airway required  
 LMA Fastrach Disposable™

**2. Non-anatomical SADs**

- Laryngeal tube and laryngeal tube suction
- EasyTube
- Combitube

**3. Cricothyrotomy**

<ul style="list-style-type: none"> <li>• Needle (14-20G)</li> <li>• ET tube + scalpel</li> <li>• Single stab kit</li> <li>• Non-Seldinger</li> <li>• Seldinger</li> </ul>	<ul style="list-style-type: none"> <li>• For paediatrics: &lt;5 kg: 18-20G 5-10 kg: 18-16G 10-20 kg: 14-16G</li> <li>• Requires adapter: Size 7 ETT connector + 2ml syringe barrel Size 3ETT connector</li> <li>• Insufflation (10-15 l/min) only: <b>No</b> jet ventilation</li> <li>• NOT recommended for adults after NAP-4</li> <li>- Size 6 ET tube</li> <li>- Scalpel blade and handle</li> <li>- Introducer/Bougie</li> <li>- Portex PCK</li> <li>- Portex Minitrach</li> <li>- Cook Melker</li> <li>- Portex Minitrach</li> <li>- Cook Melker</li> </ul>
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**4. Rigid bronchoscope – cardiothoracic/ENT theatres**



## Airway resource cart

Alternative equipment for establishing a definitive airway	
<ul style="list-style-type: none"> <li>Specialised ET tubes for blind nasal intubation               <ul style="list-style-type: none"> <li>a. LMA Fastrach ET tube</li> <li>b. Parker Flextip ET tube</li> </ul> </li> </ul>	
<ul style="list-style-type: none"> <li>McCoy laryngoscope</li> </ul>	
<ul style="list-style-type: none"> <li>Retrograde intubation kit</li> </ul>	
<ul style="list-style-type: none"> <li>Surgical tracheostomy equipment <b>or</b></li> </ul>	
<ul style="list-style-type: none"> <li>Percutaneous dilatational tracheostomy</li> </ul>	
<ul style="list-style-type: none"> <li>Alternative laryngoscopes</li> </ul>	<ul style="list-style-type: none"> <li>- C-Mac</li> <li>- Glidescope</li> <li>- Airtraq</li> <li>- McGrath (Covidien)</li> <li>- Co-Pilot</li> <li>- AWS</li> </ul>
<ul style="list-style-type: none"> <li>Flexible video stylet (TrachView)</li> </ul>	
<ul style="list-style-type: none"> <li>Malleable video stylet</li> </ul>	<ul style="list-style-type: none"> <li>- Levitan/Shikani</li> </ul>
<ul style="list-style-type: none"> <li>Rigid video stylet</li> </ul>	<ul style="list-style-type: none"> <li>- Bonfils</li> </ul>
<ul style="list-style-type: none"> <li>Flexible scope</li> </ul>	<ul style="list-style-type: none"> <li>- A-scope</li> </ul>
<ul style="list-style-type: none"> <li>Fibreoptic</li> </ul>	<ul style="list-style-type: none"> <li>- Storz/Pentax/Olympus</li> </ul>

The alternative devices chosen should be housed in a single location, either in a mobile trolley or a fixed cupboard<sup>(8)</sup>. The smaller emergency airway kit may form part of this airway

resource location. This resource location should be checked daily, and after every use, with the regular replacement of used / expired components.

Staff should be trained in the use of any equipment purchased. Every effort should be made to use equipment in an elective setting prior to emergency use. Invasive procedures should be practiced at least quarterly on a mannequin.

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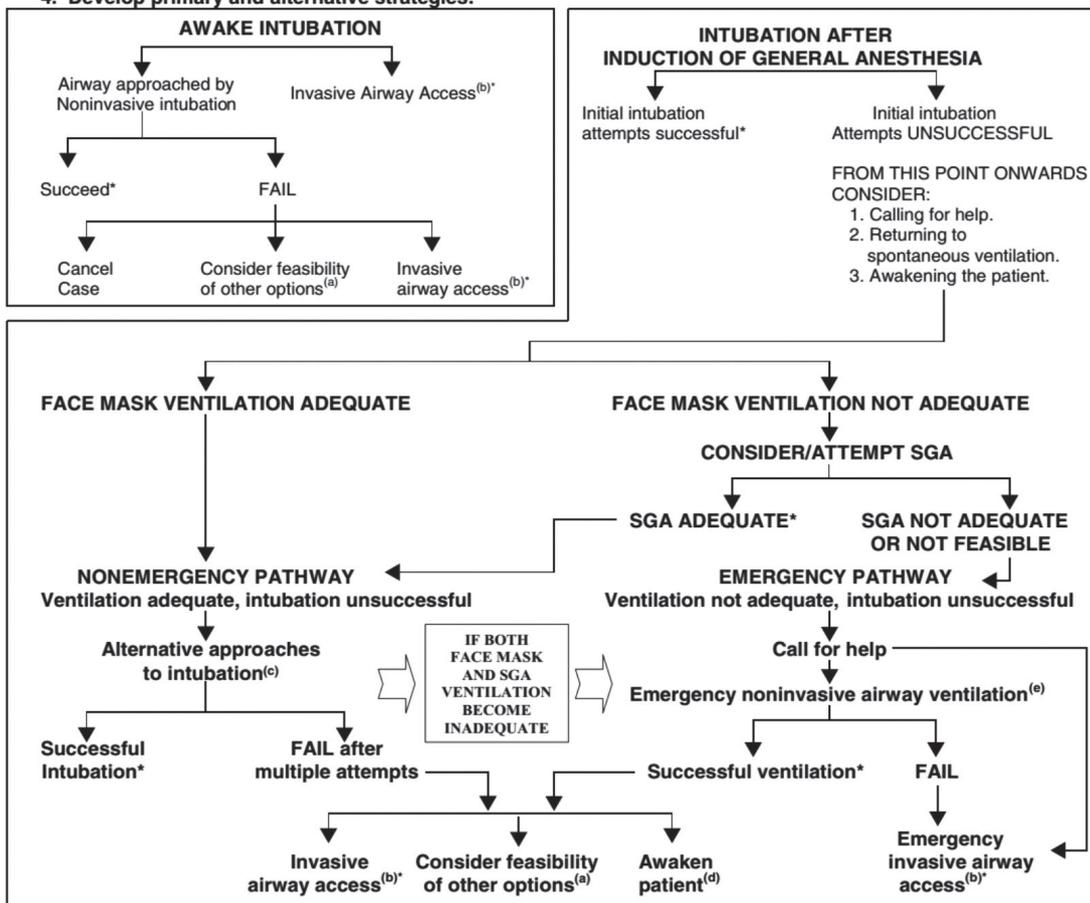
# Appendix 1

## A: ASA airway assessment and management algorithm

Anesthesiol 2013;118(2):251-270



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:



\*Confirm ventilation, tracheal intubation, or SGA placement with exhaled CO<sub>2</sub>.

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

b. Invasive airway access includes surgical or percutaneous airway, jet ventilation, and retrograde intubation.

c. 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 tube changer, light wand, and blind oral or nasal intubation.

d. Consider re-preparation of the patient for awake intubation or canceling surgery.

e. Emergency non-invasive airway ventilation consists of a SGA.

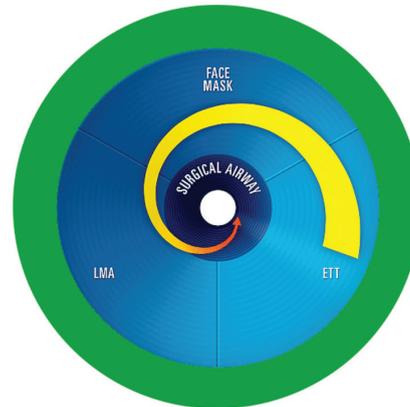


**B. Vortex approach**

<https://www.smashwords.com/books/view/277513>  
[http://www.youtube.com/watch?v=HE\\_uy\\_1Skq8](http://www.youtube.com/watch?v=HE_uy_1Skq8)



The Vortex: An Approach to the Unexpected Difficult Airway  
 DR NICHOLAS CHRIMES, FANZCA  
 DR PETER FRITZ, FACEM  
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The Vortex Approach



**For each NSA Technique Consider:**

1. Manipulations:
  - Head & Neck
  - Larynx
  - Device
2. Adjuncts
3. Size/Type
4. Suction
5. Pharyngeal Muscle Tone

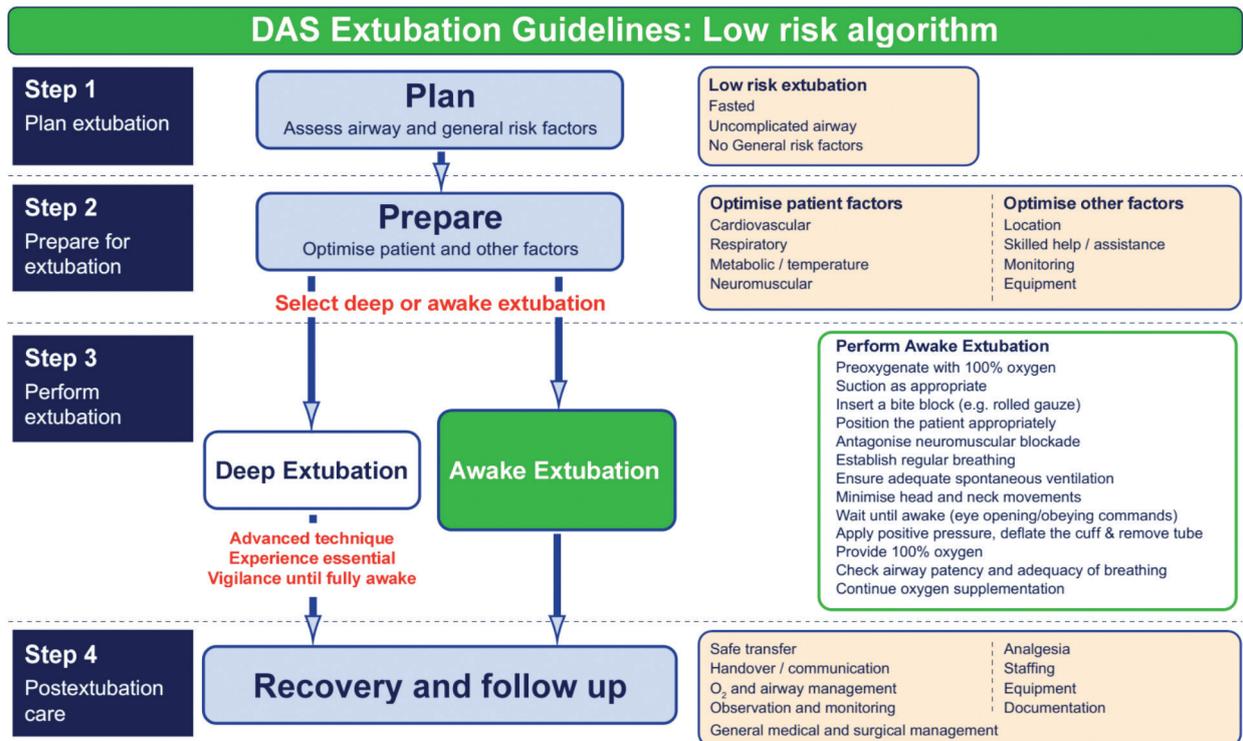
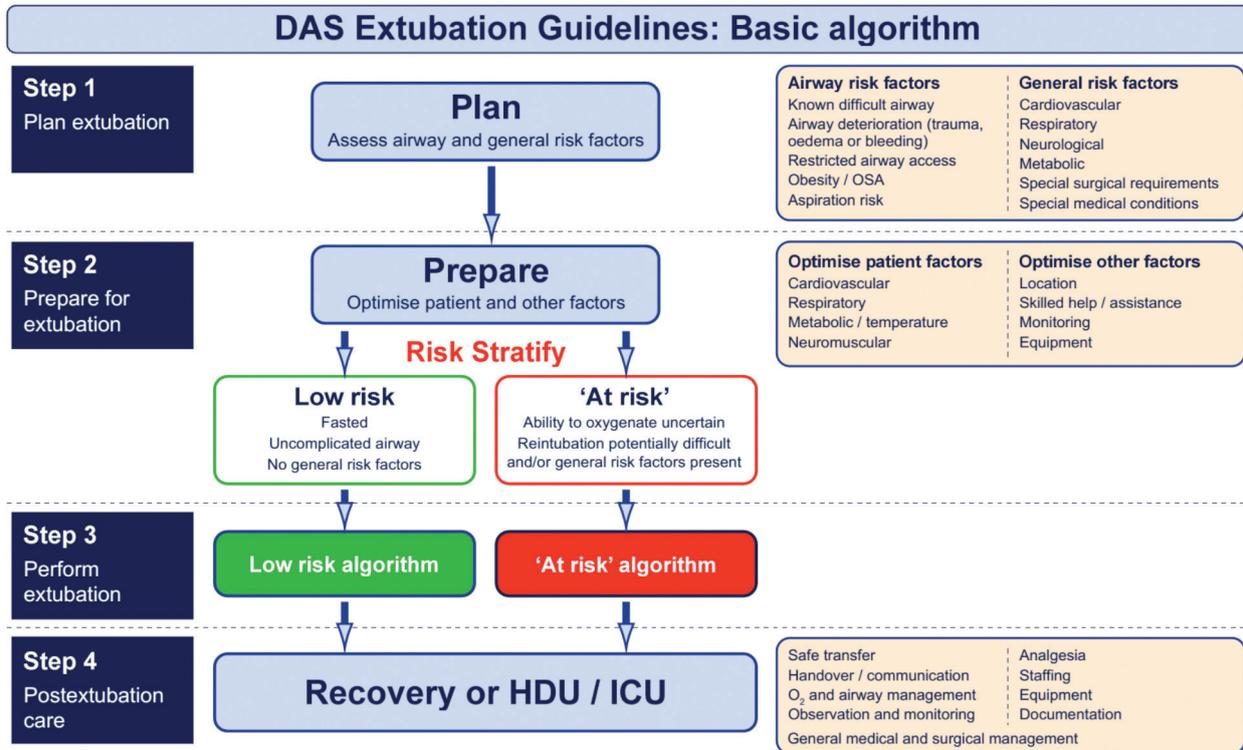
**NO MORE THAN THREE ATTEMPTS AT EACH NSA TECHNIQUE**

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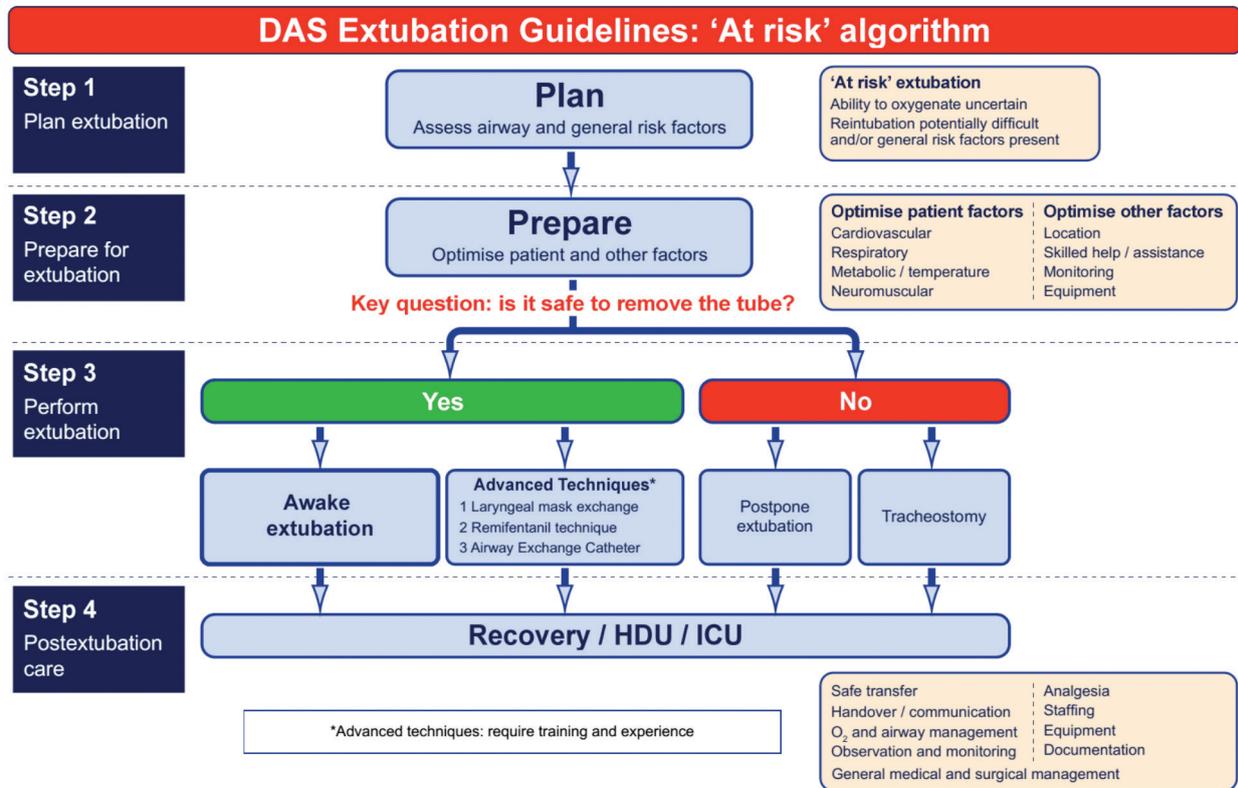


# Appendix 2

## DAS extubation guidelines



The technique described for awake extubation is a suggested approach. Practice may vary in experienced hands.



'Reproduced from Popat M, Mitchell V, David R, Patel A, Swampillai C, Higgs A. Difficult Airway Society Guidelines for the management of tracheal extubation. Anaesthesia 2012; 67: 318-340, with permission from the Association of Anaesthetists of Great Britain & Ireland/Blackwell Publishing Ltd'



# Appendix 3

## Difficult intubation equipment suppliers

### 1. Supraglottic airway devices

First generation SAD		
Simple airway device designed for routine use during general anaesthesia.		
Description	Supplier	Motivation
<b>LMA</b>		
1. LMA Classic™ 2. LMA Unique™ 3. LMA Flexible™ 4. LMA Flexible™ disposable 5. LMA Fastrach™ 6. LMA Fastrach™ disposable	All devices Teleflex Medical	1. Bench mark against which other first generation devices are measured. There is no robust evidence of any device outperforming the LMA Classic™. <i>In vivo</i> work supports 60 uses <sup>2</sup> , and <i>in vitro</i> 130 uses <sup>3</sup> . 2. Disposable version of LMA Classic™. 3. Additional benefit of kink-resistant tube. 4. Disposable version of LMA Flexible™. 5. Gold standard as conduit for intubation via SAD. 6. Disposable version of LMA Fastrach™.  Benefit or equivalence of disposable devices to reusable devices has largely not been demonstrated.
<b>LM</b>		
1. Portex® Soft Seal® - PVC - Silicone  2. SureSeal with Cuff Pilot™ 3. Ambu® - AuraStraight™ - Aura40™ - AuraOnce™ - AuraFlex™ 4. Solus™ 5. Ambu® Aura-i™ (use with Ambu aScope)	1. Smiths Medical  2. Teleflex Medical 3. SSEM Mthembu  4. Intersurgical 5. SSEM Mthembu	All devices are disposable. Changing to disposable use laryngeal masks requires a ≈ 60-fold increase in the number manufactured, packaged, transported, stored and disposed of. Supply line reliability and shelf life to be considered. There have, to date, been no reported instances of prion (or viral) cross infection after reuse of (reusable) airway equipment. <sup>4</sup>  1 – 4. There is no robust evidence of any of these devices outperforming another during routine anaesthesia. Selection for use in specific hospitals should be individualized, based on the preference of resident Anaesthetists. Consider opting for devices with epiglottic bars.  5. Intubating LM. Benefit or equivalence to LMA Fastrach™ has not been demonstrated.
<b>Non-anatomical SAD</b>		
1. VBM laryngeal Tube™	1. SSEM Mthembu	1. Disposable. In South Africa known as the LTA or LT. Locally the LT has gained only limited popularity in routine elective anaesthesia.
Second-generation SAD		
Airway devices for routine use during general anaesthesia. Design features specifically to reduce the risk of aspiration in the event of regurgitation.		
Description	Supplier	Motivation
<b>LMA</b>		
1. LMA Proseal™  2. LMA Supreme™	1. Teleflex Medical  2. Teleflex Medical	1. Supported by more clinical evidence of both efficacy and safety than any other second generation SAD. <i>In vivo</i> work supports 60 uses <sup>2</sup> , and <i>in vitro</i> 80 uses <sup>3</sup> . 2. This is <b>not</b> a disposable version of the LMA Proseal™. It combines the desirable features of the LMA Proseal™ and LMA Fastrach™. The device lacks the body of evidence underpinning the LMA Proseal™.
<b>LM</b>		
1. i-Gel®	1. Intersurgical	1. Disposable. Thermoplastic elastomer non-inflatable cuff.



### Non-anatomical SAD

1. VBM Laryngeal Tube Suction II™	1. SSEM Mthembu	1. Disposable. In South Africa known as the LTAS or LT. Locally the LT has gained only limited popularity in routine elective anaesthesia.
2. Combitube™	2. Covidien	2. And 3 are disposable crossover devices between ETT <sup>3</sup> and SAD <sup>5</sup> , and they have characteristics of second generation SAD <sup>5</sup> but they are rarely used for anaesthesia. They are disadvantaged by cost, trauma with insertion, and the potential for confusion with the dual tubes. May have a role in out-of-hospital airway rescue <i>for those trained in their use.</i>
3. EasyTube®	3. Teleflex Medical	

### Third-generation SAD

Specific attributes not yet defined – most likely would favour role as intubation-conduit in addition to (existing) qualities of second generation SAD.

Description	Supplier	Motivation
<b>LM</b>		
1. Baska Mask®	1. ProAct Medical	1. New device. Insufficient evidence. Incorporates “features of a third-generation” SAD. <sup>5</sup>
2. 3gLM	2. Manufactured by CurveAir	2. Not commercially available. First trial just completed.

LMA; laryngeal mask airway. A protected term describing a laryngeal mask (of any type) manufactured by the original manufacturers of the device. LM; laryngeal mask. A laryngeal mask manufactured by anyone other than the original manufacturers. SAD; supraglottic airway device. LT; laryngeal tube. LTA; laryngeal tube airway. LTAS; laryngeal tube airway suction. ETT; endotracheal tube.

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## 2. Airways

Description	Supplier	Manufacturing code	Motivation
Ovassapian airways	SSEM-Mthembu		Facilitates the placing of endotracheal tube orally while using the fibre-optic bronchoscope.
Berman airways	SSEM	4.0-11.0 mm GAAW-61540-11	Facilitates oral fibre-optic intubation. The tubular structure and different sizes are useful with excess upper airway soft tissue.
MADgic airway	Teleflex		An oral fibre-optic intubation guide that incorporates a mucosal atomiser device for administration of local anaesthetic and an insufflation port for oxygen.
Nasopharyngeal airways	Smiths Covidien SSEM-Mthembu	Size 6: 100/210/060 Size 7: 100/210/070 Size 7: Sizes: 2.5-9.00 mm WL321025-90	In a patient who cannot open his mouth, this soft airway can be placed through the nose.  This airway has built-in tubes to connect to the oxygen source and capnogram.
Fibre-optic bronchoscope swivel connector	Smiths	100/257/000	Place fibre-optic scope through this connector. Can view vocal cords and bronchi while still ventilating.

## 3. Alternative laryngoscopes

Description	Supplier	Manufacturing code	Motivation
Airraq	Teleflex Medical	Regular 7-8,5 ATQ-011 Small 6-7,5 ATQ-021 Paed 4-5,5 ATQ-031 Infant 2,5-3,5 ATQ-041 Double lumen 28-41Fr ATQ-071	Portable, disposable laryngoscope allowing laryngeal visualisation with minimal anatomical displacement.
McGrath scope	Covidien		Portable, reusable laryngoscope allowing laryngeal visualisation with minimal anatomical displacement.
Glidescope	SSEM (Verathon)	Reusable blades available for patients <1 kg to the morbidly obese GVL2/3/4/5  Disposable blades sizes 0-4 400 g to the morbidly obese SBS 0270.0679-0628	Video laryngoscope allowing laryngeal visualisation with minimal anatomical displacement.
C-Mac	Karl Storz	Blades available for patients <1 kg to the morbidly obese GVL2/3/4/5  Blade sizes 0-4 and a difficult airway blade Codes 8401 GXC/DXC/KXC/ AXC/BXC/HX	Video laryngoscope allowing laryngeal visualisation by conventional laryngoscope blades. Ideal for training.
King Vision	SSEM (Ambu)	Size 4 blade Size 3 and paediatric blade from April 2014 KVL03/KVIS01	Hand-held monitor with disposable laryngoscope blades. Video laryngoscope allowing laryngeal visualisation with minimal anatomical displacement.
IntuBrite videolaryngoscope	Statmedical	Blades: paediatric, adult and difficult adult Codes: VLS 2/3/4A	Video laryngoscope allowing laryngeal visualisation with minimal anatomical displacement.



Description	Supplier	Manufacturing code	Motivation
AWS videolaryngoscope	Pentax	Blades: Adult, paediatric and neonatal blades Codes: ITL-S/T/P/N	Video laryngoscope allowing laryngeal visualisation with minimal anatomical displacement.
CoPilotVL™	Shelelela Medical	Adult blade with size 3 and 4 disposable sheaths Sz 4: code 1740 Sz 4: code 1740	The CoPilot VL® videolaryngoscope was designed to facilitate intubation by incorporating a novel bougie (endotracheal introducer) guide channel, or "bougie port". This provides the clinician the option of using either a stylet or an endotracheal tube introducer (bougie).

#### 4. Endotracheal tubes

Description	Supplier	Manufacturing code	Motivation
Parker Flex Tip tubes	SSEM	Uncuffed 2,5-5.5mm: PAIPFUO-25 to 55 Cuffed-4.0- 8.5mm PAIPFHV40-85	These tubes are useful when tubing a patient with the fibre-optic scope, as they are designed to hug the scope and therefore pass through the vocal cords more easily.
Microlaryngoscopy tubes (MLT)	Tyco Smiths	Cuffed 4.0 mm-9.0 mm: I-PFRC-40 to 90	These are adult-length tubes with cuffs, but are very narrow in diameter, allowing intubation and airway protection in patients with pathologically narrowed airways.
Standard endotracheal tubes		Uncuffed 2-6.5 Cuffed 6.0-9.0	
Reinforced tubes (armoured)		Cuffed 6.0-9.0	

#### 5. Invasive intubation via the trachea

Description	Supplier	Manufacturing code	Motivation
Retrograde intubation kits	Cook Marcus Medical	C-RETRO-14.0-70-38J-110 CAE C-RETRO-11.0-70-38J-110 C-RETRO-6.0-50-38J-110	Percutaneous entry via cricothyroid membrane permits retrograde placement of a wire guide orally or nasally. Anterograde introduction of a hollow guiding catheter allows oxygenation and then intubation.
Seldinger cricothyrotomy sets	Teleflex Cook Marcus Medical Smiths	C-TCCS-400 C-TCCS-350 Minitrach	Used to establish an airway through the trachea in an emergency situation, if no airway access is possible through the mouth. Percutaneous entry via cricothyroid membrane.
Single stab cricothyrotomy	Smiths SSEM	PCK Quicktrach II 2.0 mm and 4.0 mm: VB30-04-002.1 VB30-10-004-1, respectively	Single incision required. Tracheal entry indicated by loss of resistance, followed by immediate advancement of a cuffed endotracheal tube.
Dilatational tracheostomy kits	Cook Marcus Medical Smiths Medical Perry Hill International Teleflex	Blue Rhino UniPerc percutaneous tracheostomy: 7.0, 8.0, 9.0 mm. Code 100/597/070 /080 /090 Traceo TraceoQuick: 2.0 mm and 4.00 mm: 120600-000020/040	Used for establishing a definitive airway after rescue, where long-term upper airway obstruction is expected.



## 6. Local anaesthesia administration devices

Description	Supplier	Manufacturing code	Motivation
Laryngotracheal anaesthesia kit (LTA) 360 degree	Smiths Medical SSEM Mthembu	7031/61 DVCAN.KITB	Enables topicalisation via vocal cords of the trachea.
Mucosal atomisation devices	Teleflex	MADgic laryngo-tracheal atomiser Adult and paediatric: MAD 600/700/720/800	Atomisation of local anaesthesia of nasal mucosa and pharyngeal mucosa through the mouth is made really easy.
Hudson's humidifier		RD7800	A plastic facemask with a nebulisation facility. Mask attaches to wall oxygen.

## 7. Exchange catheters

Description	Supplier	Manufacturing code	Motivation
Cook airway exchange catheters	Marcus Medical	G07833 C-CAE-8.0-45 G06732 C-CAE-11.0-83 G07873 C-CAE-14.0-83 G05880 C-CAE-19.0-83	Used for uncomplicated atraumatic endotracheal tube exchange. Use of removable Rapi-Fit® adapter permits use of ventilatory device necessary during exchange procedure.
VBM tube exchanger	SSEM	11Fg, 14Fg, 19Fg VBM33.45.800.1 VBM33.46.800.1 VBM33.47.800.1	Used for uncomplicated atraumatic endotracheal tube exchange.

## 8. Intubating stylets/bougie

Description	Supplier	Manufacturing code	Motivation
Frova intubating introducer	Marcus Medical Cook  SSEM	<b>With stiffening cannula</b> C-CAE-8.0-35-FII C-CAE-14.0-65-FII <b>Without stiffening</b> C-CAE-14,0-65-FI VB33-70-650-1 15Fg	Used to facilitate endotracheal intubation. Angled tip assists in blindly placing bougie through vocal cords if anterior larynx. Can ventilate through hollow tube.
Eschmann bougie	Covidien		Flexible bougie, placed blindly between unseen vocal cords.
Parker Flex-It	SSEM	<b>Use in 5 mm tube</b> <b>REF PAFLEX 5000</b> <b>Use in 5.5-6.0 mm tube</b> <b>REF PAFLEX 5560</b> <b>Use in 6.5-7.0mm tube</b> <b>REF PAFLEX 6570</b> <b>Use in 7.5-8 mm tube</b> <b>REF PAFLEX 7580</b>	Placed inside endotracheal tube and enables acute angulation of tip of tube.
Pocket bougie	Shelelela	OLE 12102	Intubating bougie that is compact, self-lubricated and malleable. Fits endotracheal tubes as small as 5.0 mm.
VBM Bougies	SSEM Malleable SSEM Flexible	8Fg, 12Fg, 14Fg Code: VBM33-08-400-1/VBM 33-12-650-1/VBM 33-14-650-1 12Fg, 14Fg VBM33.12.800.1 VBM33.14.800.1	Malleable or flexible devices to assist with difficult intubations.



## 9. Lighted stylets

Description	Supplier	Manufacturing code	Motivation
Light wand	GRS Medical	VS 3960	Used in difficult intubations. Flexible lighted stylet can be used to intubate without a laryngoscope.
Bonfils intubation fibroscope: adult, paediatric, neonatal	Karl Storz		Non-malleable rigid fibreoptic scope. Combines the transillumination of the lighted stylet with the ability to visualise structures at the tip of the ET tube.
Levitan and Shikani optical stylets	Clarus/R Moloney		Rigid fibreoptic stylet with limited malleability. Combines the transillumination of the lighted stylet with the ability to visualise structures at the tip of the ET tube.
TrachView	R Moloney		Flexible video stylet without steering capability. Allows visualisation of the structures at the tip of an ETT as the tube is placed.

## 10. Flexible intubation scopes

### a. Fibreoptic scopes

These are sophisticated devices that allow visualisation from the scope tip, which is steerable. Ideally a scope should be available with a video output allowing magnification and viewing of the image by all members of the anaesthesia and surgical teams rather than just the endoscopist.

The three main suppliers of flexible fibreoptic scopes in South Africa are:

- Karl Storz
- Olympus
- Pentax

### b. Flexible scope

A single-use flexible scope utilising LED light and CMOS image capture without fibreoptics, the aScope is available from SSEM-Ambu with an accompanying portable monitor (aView).

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