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Extubation

5th British-Ukranian Symposium Trends in Anaesthesiology, Pain Medicine and ITU

April 2013

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NHS Foundation Trust

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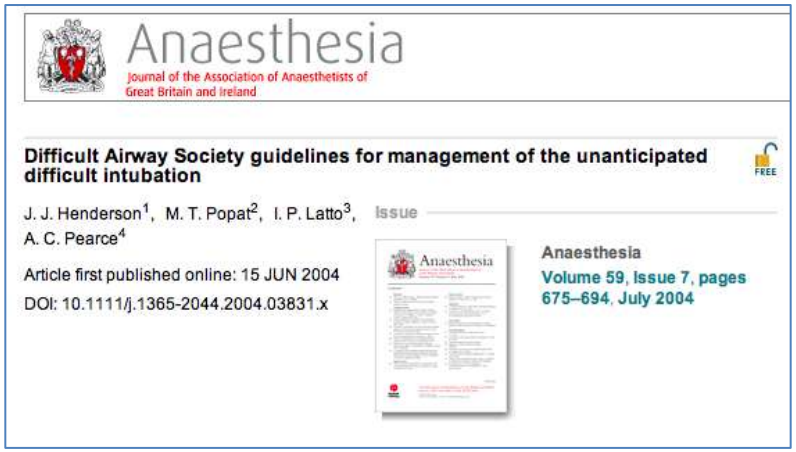
http://das.uk.com



Anaesthesia

Journal of the Association of Anaesthetists of Great Britain and Ireland

Difficult Airway Society guidelines for management of the unanticipated difficult intubation

FREE

J. J. Henderson[1], M. T. Popat[2], I. P. Latto[3], A. C. Pearce[4]

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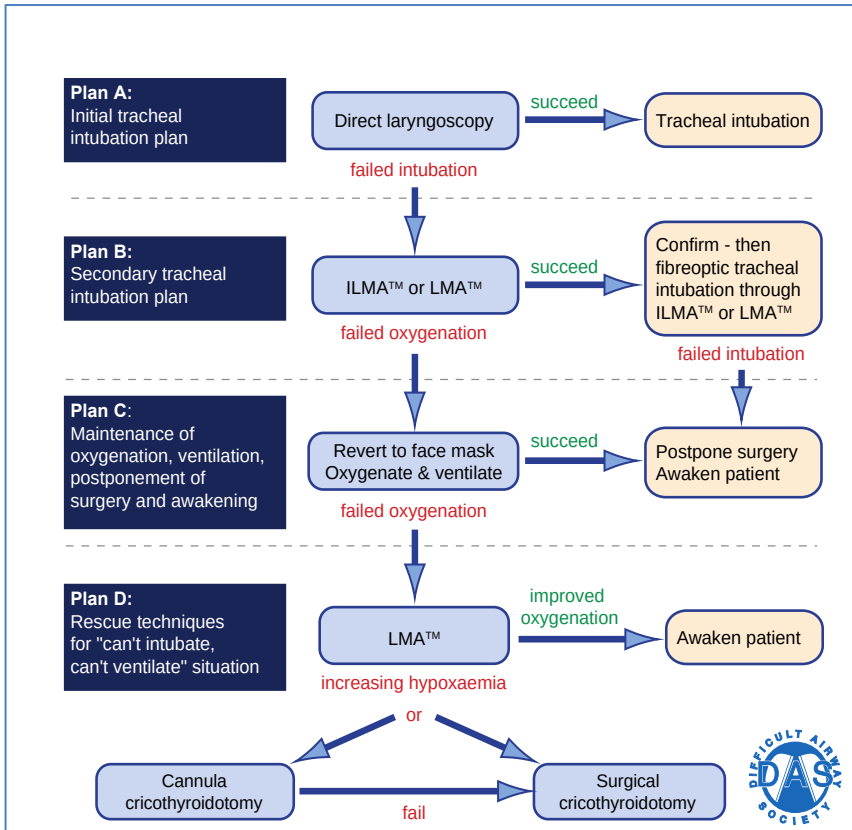
Issue

Anaesthesia

Volume 59, Issue 7, pages 675–694, July 2004



Management of the Difficult Airway: a Closed Claims Analysis

ASA Guidelines 1993

	1985-1992	1993-99
Induction	71%	63%
Extubation	8%	14%
Recovery	3%	7%

Management of the Difficult Airway: a Closed Claims Analysis
Peterson GN, Domino KB, Caplan RA, Posner KL, Lee LA, Cheney FW. Anesthesiology 2005:103;33-39

The Difficult Airway Society

The Royal College of Anaesthetists

The Intensive Care Society

The College of Emergency Medicine

NHS National Patient Safety Agency Patient Safety Division

The National Patient Safety Agency Patient Safety Division

Major Complications of Airway Management NAP4

Major complications of airway management in the UK

NAP4

38/133 cases in anaesthesia group (28%)

- 2 Deaths
- 1 Brain damage

Major complications of airway management in the UK

NAP4

Laryngospasm	
POPO 10% of all cases	13/38
Airway surgery	18/38
Oedema: head down position	3/38
Obesity, asthma, COPD	

Major complications of airway management in the UK

The executive summary highlighted:

Failure to plan for failure

Poor judgement

Lack of training and education

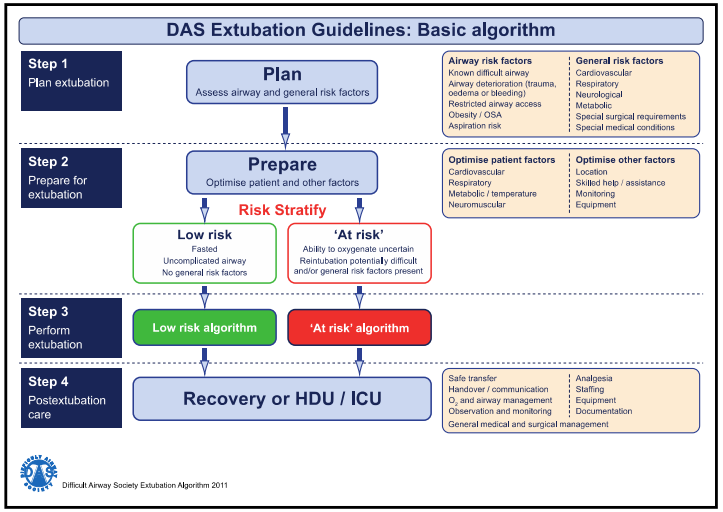
Difficult Airway Society guidelines for management of unanticipated difficult intubation 2004

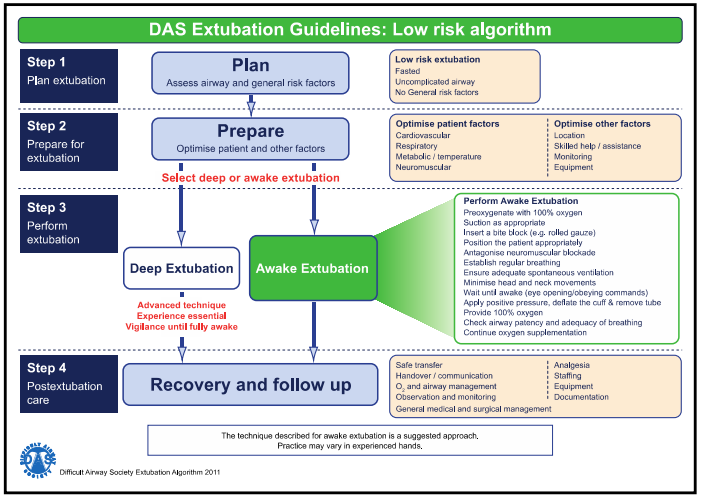
An airway strategy should be drawn up for each patient to cover the entire period of anaesthetic care, particularly at the start and end of anaesthesia.

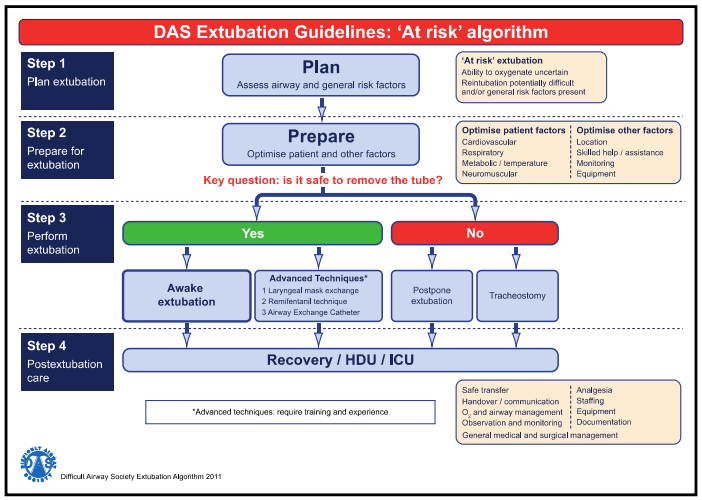
J. J. Henderson, M. T. Popat, I. P. Latto, A. C. Pearce. Anaesthesia 59: 675–694, July 2004

A strategy , not a plan

DAS Extubation Algorithms







DAS Extubation Guidelines: Basic algorithm

Step 1
Plan extubation

Plan
Assess airway and general risk factors

Airway risk factors
- Known difficult airway
- Airway deterioration (trauma,oedema or bleeding)
- Restricted airway access
- Obesity / OSA
- Aspiration risk

General risk factors
- Cardiovascular
- Respiratory
- Neurological
- Metabolic
- Special surgical requirements
- Special medical conditions

Step 2
Prepare for extubation

Prepare
Optimise patient and other factors

Optimise patient factors
- Cardiovascular
- Respiratory
- Metabolic / temperature
- Neuromuscular

Optimise other factors
- Location
- Skilled help / assistance
- Monitoring
- Equipment

Risk Stratify

Low risk
Fasted
Uncomplicated airway
No general risk factors

'At risk'
Ability to oxygenate uncertain
Reintubation potentially difficult
and/or general risk factors present

Step 3
Perform extubation

Low risk algorithm

'At risk' algorithm

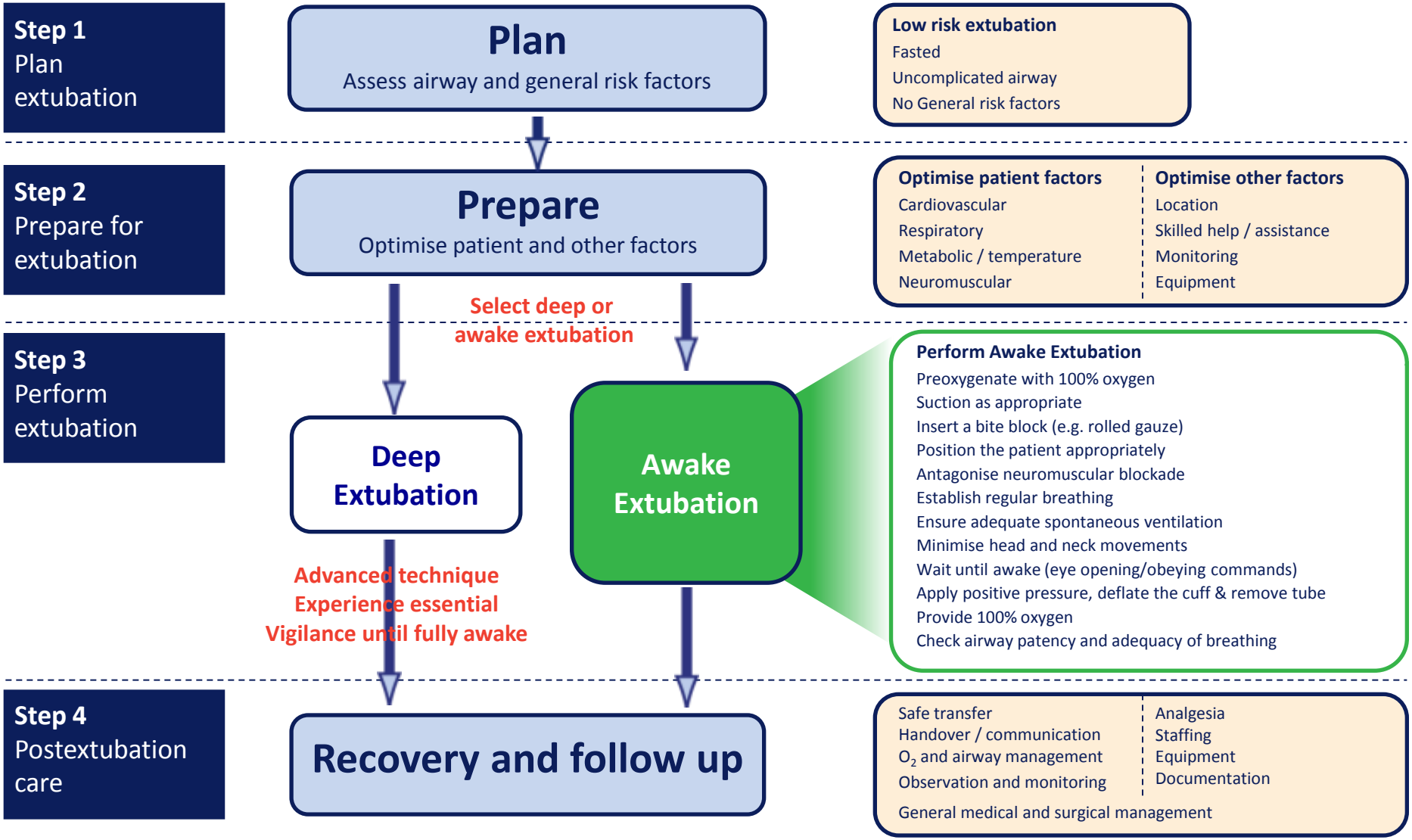
Step 4
Postextubation care

Recovery or HDU / ICU

- Safe transfer
- Handover / communication
- O_2 and airway management
- Observation and monitoring
- Analgesia
- Staffing
- Equipment
- Documentation

General medical and surgical management

DAS Extubation Guidelines: Low risk algorithm



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

DAS Extubation Guidelines: 'At risk' algorithm

Step 1
Plan extubation

Plan
Assess airway and general risk factors

'At risk' extubation
Ability to oxygenate uncertain
Reintubation potentially difficult and/or general risk factors present

Step 2
Prepare for extubation

Prepare
Optimise patient and other factors

Optimise patient factors
Cardiovascular
Respiratory
Metabolic / temperature
Neuromuscular

Optimise other factors
Location
Skilled help / assistance
Monitoring
Equipment

Key question: is it safe to remove the tube?

Step 3
Perform extubation

Yes

Awake extubation

Advanced Techniques*
1 Laryngeal mask exchange
2 Remifentanil technique
3 Airway Exchange Catheter

No

Postpone extubation

Tracheostomy

Step 4
Postextubation care

Recovery or HDU / ICU

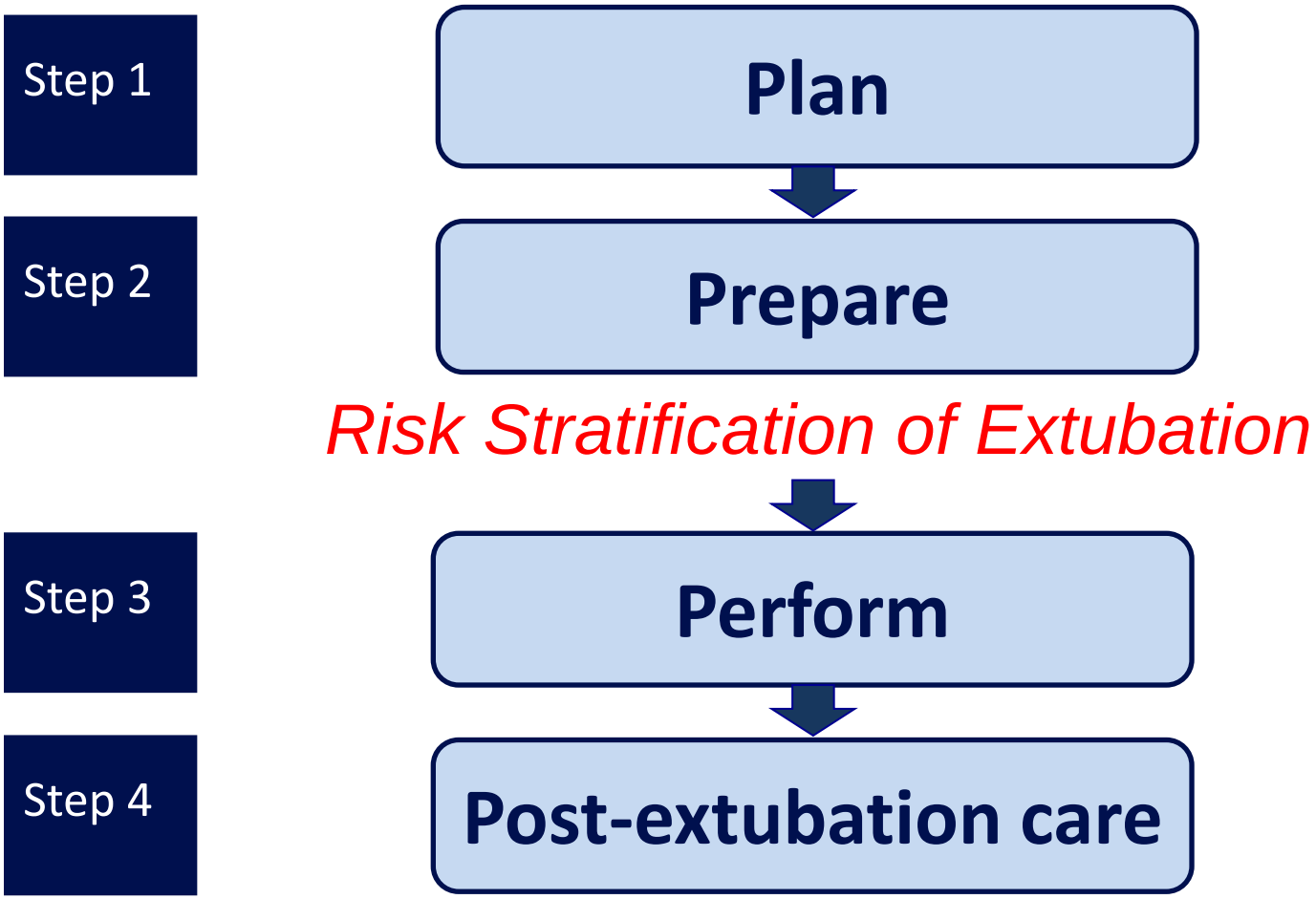
Safe transfer
Handover / communication
O_2 and airwaymanagement
Observation and monitoring

Analgesia
Staffing
Equipment
Documentation

General medical and surgical management

*Advanced techniques: require training and experience

Extubation *strategy*: a series of steps



DAS Extubation Guidelines: Basic algorithm

Step 1
Plan extubation

Plan

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Airway risk factors	General risk factors
Known difficult airway	Cardiovascular
Airway deterioration (trauma,oedema or bleeding)	Respiratory
Restricted airway access	Neurological
Obesity / OSA	Metabolic
Aspiration risk	Special surgical requirements
	Special medical conditions

Airway risk factors

Known difficult airway
Deteriorating airway (trauma, oedema, bleeding)
Restricted airway access
Obesity / OSA
Aspiration risk

General risk factors

Cardiovascular stability
Respiratory function
Neurological
Metabolic
Special surgical requirements
Special medical conditions

DAS Extubation Guidelines: Basic algorithm

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Obesity / OSA	Metabolic
Aspiration risk	Special surgical requirements
	Special medical conditions

Step 2
Prepare for extubation

Prepare
Optimise patient and other factors

Optimise patient factors	Optimise other factors
Cardiovascular	Location
Respiratory	Skilled help / assistance
Metabolic / temperature	Monitoring
Neuromuscular	Equipment

Optimise Patient factors
- Cardiovascular
- Respiratory
- Metabolic
- Temperature
- Neuromuscular

Optimise other factors
- Location
- Assistance / Skilled help
- Equipment
- Monitoring

DAS Extubation Guidelines: Basic algorithm

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Step 3
Perform extubation

Low risk algorithm

'At risk' algorithm

Low risk

Fasted

Uncomplicated airway

No general risk factors

DAS Extubation Guidelines: Low risk algorithm

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Low risk extubation
Fasted
Uncomplicated airway
No General risk factors

Step 2
Prepare for extubation

Prepare
Optimise patient and other factors

Optimise patient factors	Optimise other factors
Cardiovascular	Location
Respiratory	Skilled help / assistance
Metabolic / temperature	Monitoring
Neuromuscular	Equipment

Step 3
Perform extubation

Low risk

Deep Extubation

Awake Extubation

Perform Awake Extubation
Preoxygenate with 100% oxygen
Suction as appropriate
Insert a bite block (e.g. rolled gauze)
Position the patient appropriately
Antagonise neuromuscular blockade
Establish regular breathing
Ensure adequate spontaneous ventilation
Minimise head and neck movements
Wait until awake (eye opening/obeying commands)
Apply positive pressure, deflate the cuff & remove tube
Provide 100% oxygen
Check airway patency and adequacy of breathing

★ Advanced technique
★ Experience needed
★ Airway at risk until fully awake

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

DAS Extubation Guidelines low riskalgorithm

Low risk

Fasted
Uncomplicated airway
No general risk factors

Awake extubation

Preoxygenate with 100% oxygen
Suction as appropriate
Insert a bite block eg rolled gauze
Position the patient appropriately
Antagonise neuromuscular blockade
Establish regular respiration
Ensure adequate spontaneous ventilation
Minimise head and neck movements
Wait until awake
Apply +ve pressure, deflate cuff, remove tube
Provide 100% oxygen
Check airway patency & breathing
Continue oxygen supplementation

Bite block

DAS Extubation Guidelines: Basic algorithm

Step 1
Plan extubation

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Step 3
Perform extubation

Low risk algorithm

'At risk' algorithm

Step 4
Postextubation care

Recovery or HDU / ICU

Safe transfer	Analgesia
Handover / communication	Staffing
O_2 and airway management	Equipment
Observation and monitoring	Documentation

General medical and surgical management

‘At Risk’ algorithm

‘At risk’

Ability to oxygenate uncertain
Reintubation may be difficult
+/- general risk factors present

Examples:

- Unstable patient
- Access not guaranteed (e.g. halo, wires)
- Airway distorted (surgery, blood, fluid)
- Difficulty at intubation
- Obese, OSA

Decide: is it safe to remove the tube?

No

Postpone Extubation

Tracheostomy

‘At Risk’ algorithm

‘At risk’

Ability to oxygenate uncertain
Reintubation may be difficult
+/- general risk factors present

Examples:

- Unstable patient
- Access not guaranteed (e.g. halo, wires)
- Airway distorted (surgery, blood, fluid)
- Difficulty at intubation
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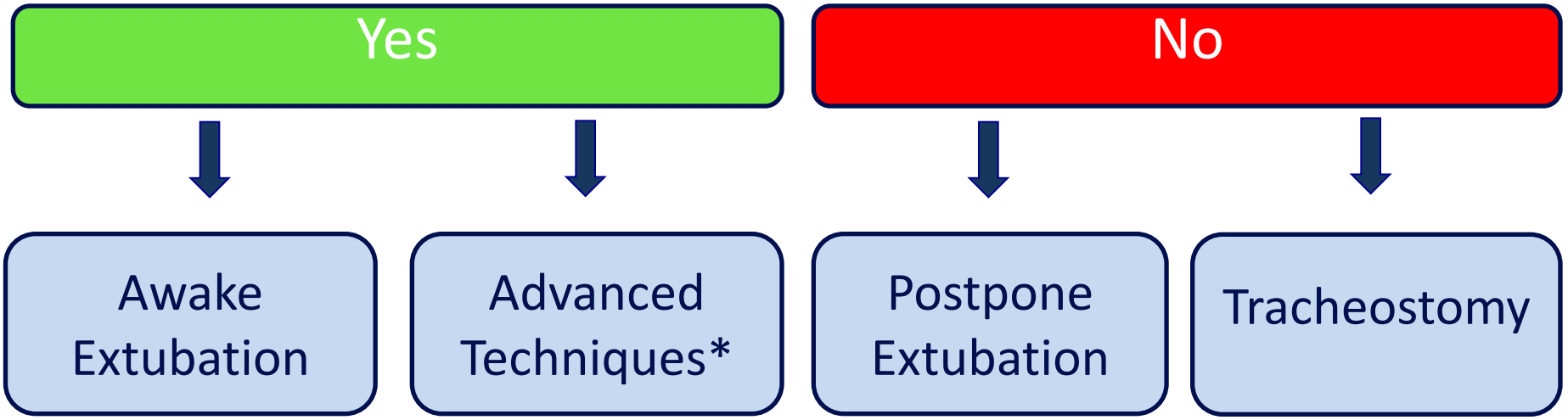
Decide: is it safe to remove the tube?



Advanced Techniques*

1. LMA Exchange
2. Awake + remifentanil technique
3. Airway exchange catheter

1. LMA exchange

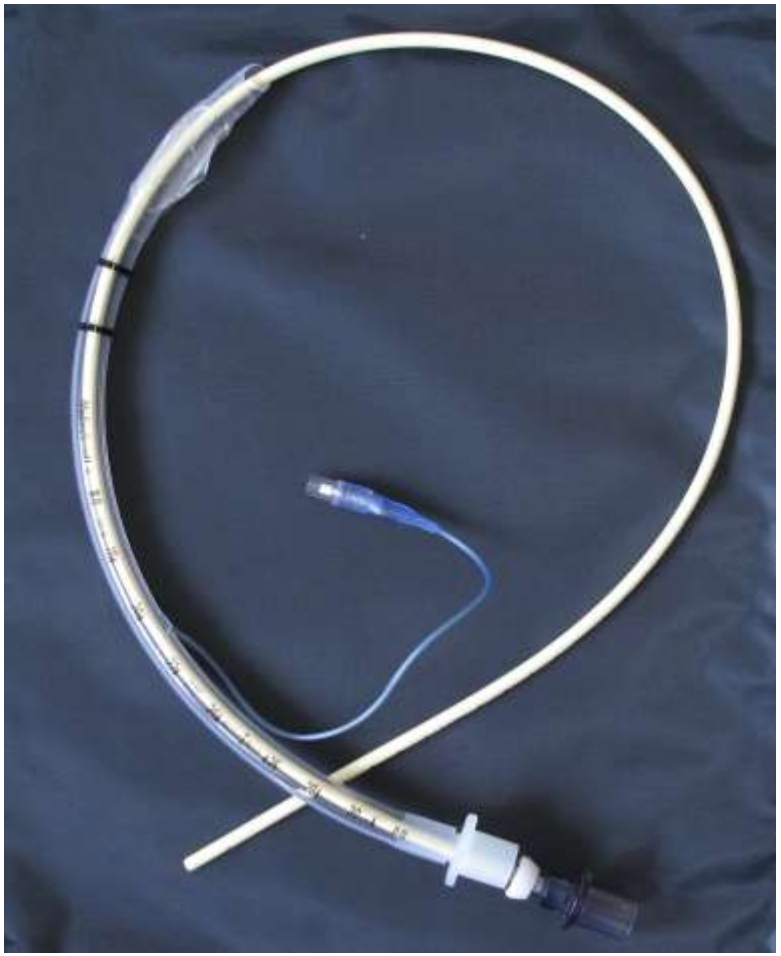
Complications at extubation

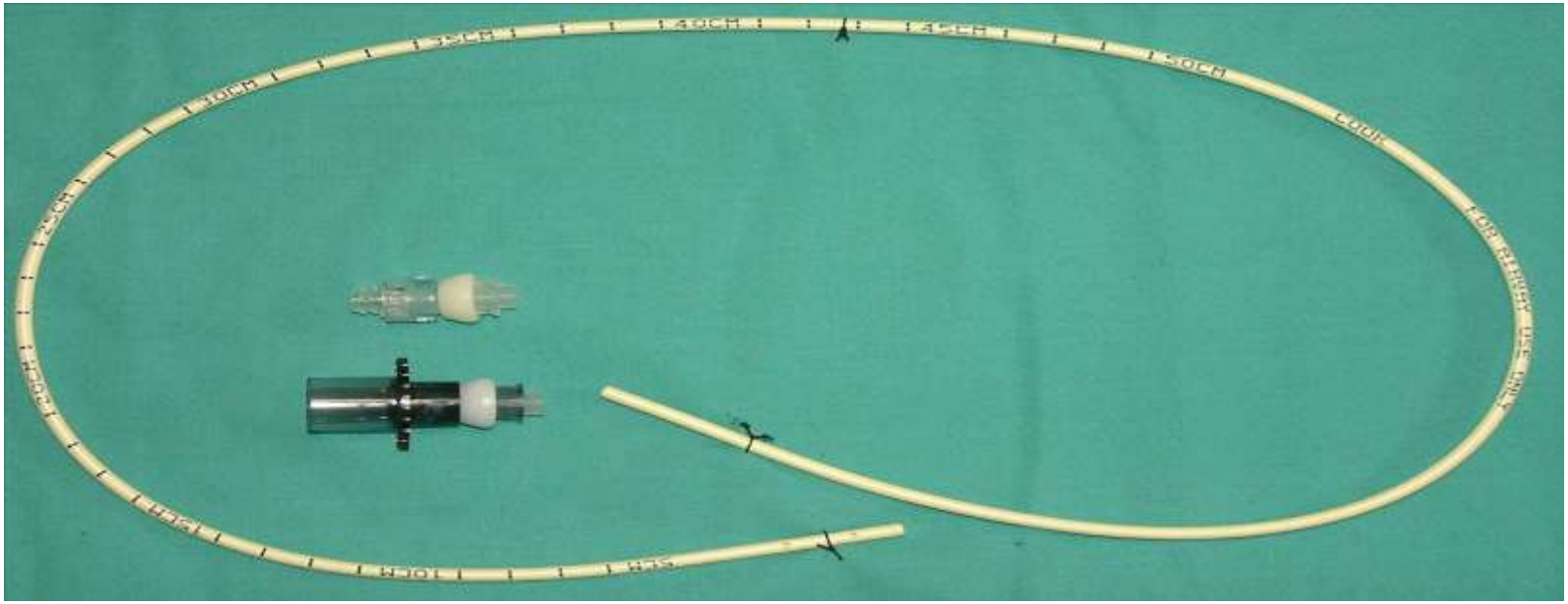
N = 20	**None**	Bucking	SpO2 <95%	Obst'n	Cough
Awake	**2**	18	2	-	-
Deep	**3**	-	1	17	-
LMA	**16**	-	-	-	3

Respiratory complications associated with tracheal intubation and extubation.
T Asai, K Koga and RS Vaughan. BJA. (1998) 80 (6): 767-775.doi: 10.1093/bja/80.6.767

2. Remifentanil

3. Airway exchange catheter





Airway Exchange Catheters: Simple Concept, Potentially Great Danger

Benumof, Jonathan L.

UK NEWS

MEDICS COULD HAVE SAVED MAN WHO DIED IN PINKIE OP

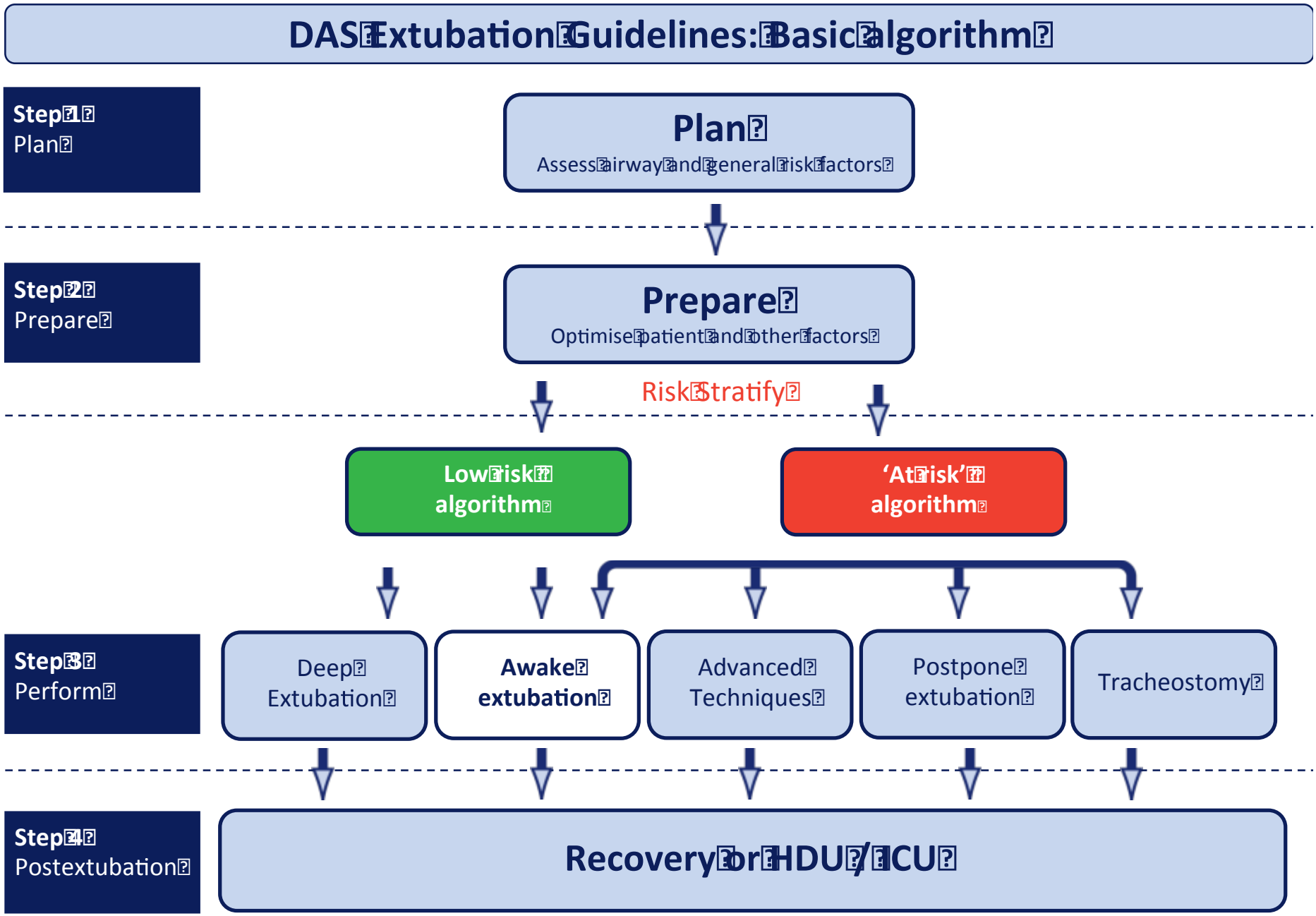
A man who died during "routine" surgery to repair a fractured pinkie could have survived

Friday April 9,2010

By Stephen Wilkie

A MAN who died during "routine" surgery to repair a fractured pinkie could have survived if anaethetists had simply woken him up, a sheriff has ruled.

Gordon Ewing broke his little finger while playing with one of his children and was later treated at Hairmyres Hospital, in East Kilbride, Lanarkshire. However, the injury did not set properly and needed a further operation.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Deep Extubation
Awake extubation
Advanced Techniques
Postpone extubation
Tracheostomy
Step 4
Postextubation
Recovery or HDU / ICU

Step 4

Postextubation care

Safe transfer
Handover/communication
Airway Management
Observation & monitoring
General medical and surgical management
Analgesia
Staff
Equipment
Documentation

Documentation

This patient has a

LARYNGECTOMY

and CANNOT be intubated or oxygenated via the mouth

Follow the LARYNGECTOMY algorithm of breathing difficulties

Performed on (date) .....

Tracheostomy tube size (if present) .....

Hospital / NHS number .....

Notes:

There may not be a tube in the stoma.
The trachea (wind pipe) ends at the neck stoma

Emergency Call: Anaesthesia ICU ENT MaxFax Emergency Team

www.tracheostomy.org.uk

This patient has a

TRACHEOSTOMY

There is a potentially patent upper airway (Intubation may be difficult)

Surgical / Percutaneous

Performed on (date) .....

Tracheostomy tube size (if present) .....

Hospital / NHS number .....

Notes: Indicate tracheostomy type by circling the relevant figure.
Indicate location and function of any sutures.
Laryngoscopy grade and notes on upper airway management.
Any problems with this tracheostomy.

Emergency Call: Anaesthesia ICU ENT MaxFax Emergency Team

www.tracheostomy.org.uk

APPENDIX 4
Example patient with at-risk airway proforma for ICU

ROYAL UNITED HOSPITAL, BATH
ICU DIFFICULT AIRWAY FORM

PATIENT'S NAME	
HOSPITAL NUMBER	
REASON FOR ANTICIPATED DIFFICULT AIRWAY	
ANTICIPATED PROBLEM	Intubation ☐ re-intubation after accidental extubation ☐ re-establishing tracheostomy after displacement ☐ difficult planned extubation ☐

PLAN:

PLAN A	
PLAN B	
PLAN C	

CONFIRM:

DATE							
Plan A equipment available on ICU							
Plan B equipment available on ICU							
Plan C equipment available on ICU							
Third on-call anaesthetist aware							
Any additional staff required informed							

NAME AND GRADE OF DOCTOR (please print).....

SIGNED.....

Summary

- Extubation strategy needed for all cases
- Address technical and non-technical factors
- Practice makes perfect..

General Principles

- Recognise the risks
- Plan to avoid difficulty
- Have a back-up plan to deal with difficulty

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Journal of the Association of Anaesthetists of Great Britain and Ireland

Guidelines

Difficult Airway Society Guidelines for the management of tracheal extubation

Membership of the Difficult Airway Society Extubation Guidelines Group: M. Popat (Chairman)[1], V. Mitchell[2], R. Dravid[3], A. Patel[4], C. Swampillai[5], A. Higgs[6]

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Issue

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Airway risk factors
Known difficult airway

General risk factors
Cardiovascular stability

Optimise Patient factors
- Cardiovascular
- Respiratory
- Metabolic
- Temperature
- Neuromuscular

Optimise other factors
- Location
- Assistance / Skilled help
- Equipment
- Monitoring

ICU

General medical and surgical management