7F ADVANCED AIRWAY MANAGEMENT

PATIENT CARE GOALS

- To secure the airway of the patient with inadequate breathing or potentially non-patent airway.

PARAMEDIC

Use the **Universal Airway Algorithm** to guide the intubation process.

1. Determine level of responsiveness. If unconscious or unresponsive, execute the **Crash Airway Algorithm.**

2. If responsive assess the difficulty of the patient's airway[1]. If the airway is predicted to be difficult, execute **Difficult Airway Algorithm**.

3. Execute the standard **DFAM procedure** including the use of apneic oxygenation.

4. Attempt intubation. If successful, care for the patient as instructed in the **Post Intubation Management**

5. If attempt is unsuccessful, determine whether you are unable to maintain oxygen saturations greater than 90%. If unable to do so, execute the **Failed Airway Algorithm.**

6. If able to maintain oxygenation and fewer than 3 attempts have been made, return to Attempt Intubation step.

7. If 3 unsuccessful attempts have been made, execute the **Failed Airway Algorithm.**

Universal Airway Algorithm
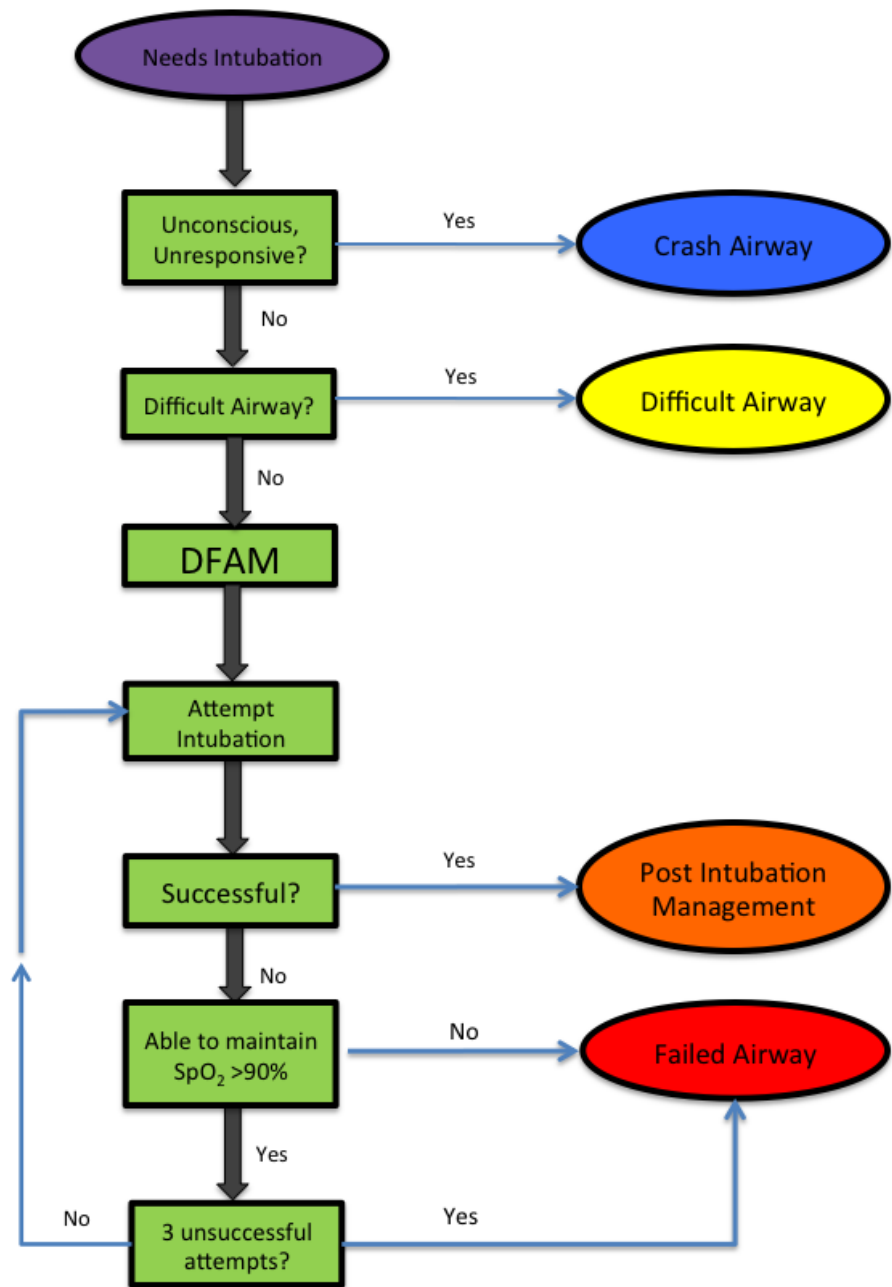
If the patient is unresponsive execute the **Crash Airway Algorithm**.

1. Attempt intubation <u>without the administration of induction agents or paralytics.</u>

2. If the attempt is successful, execute routine Post Intubation Management in the DFAM procedure.

3. If the attempt is unsuccessful, determine whether you are able to maintain oxygen saturations above 90%. If unable to do so, execute the **Failed Airway Algorithm**.
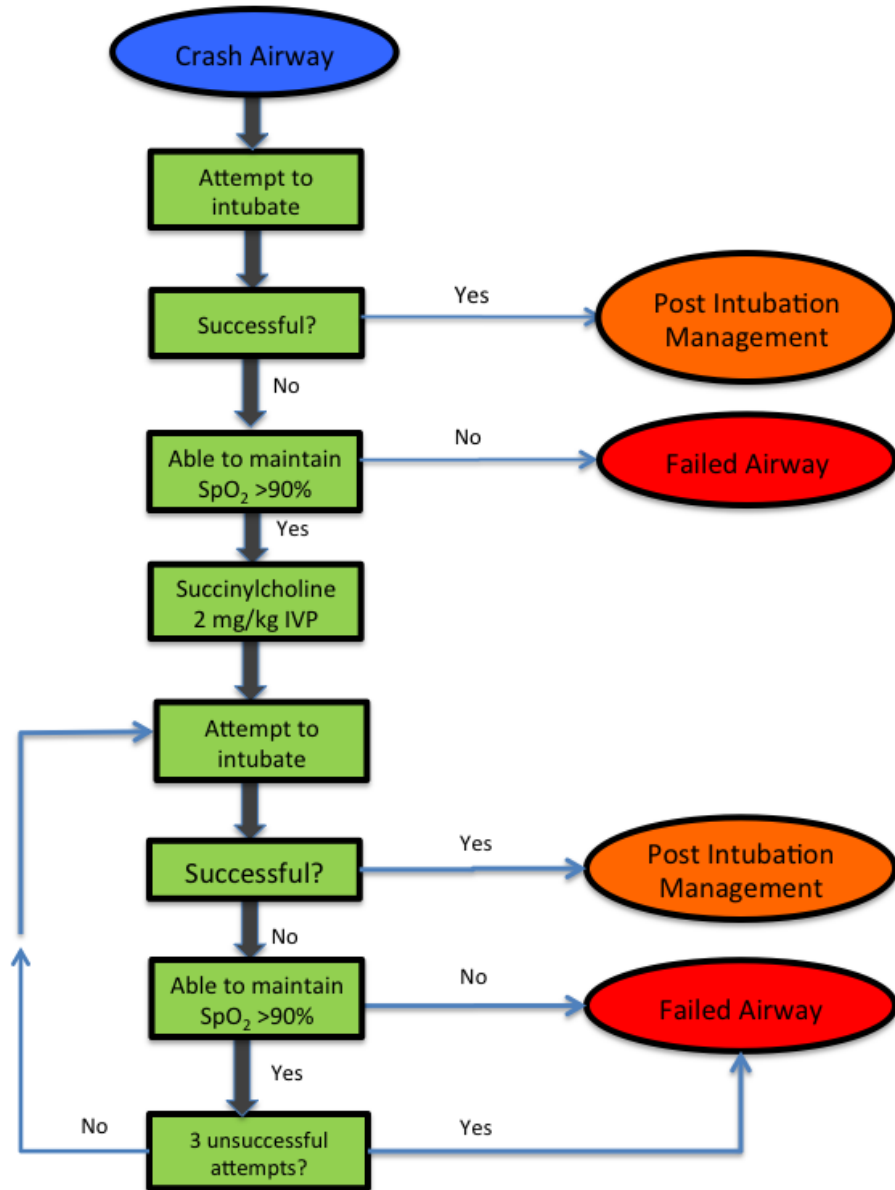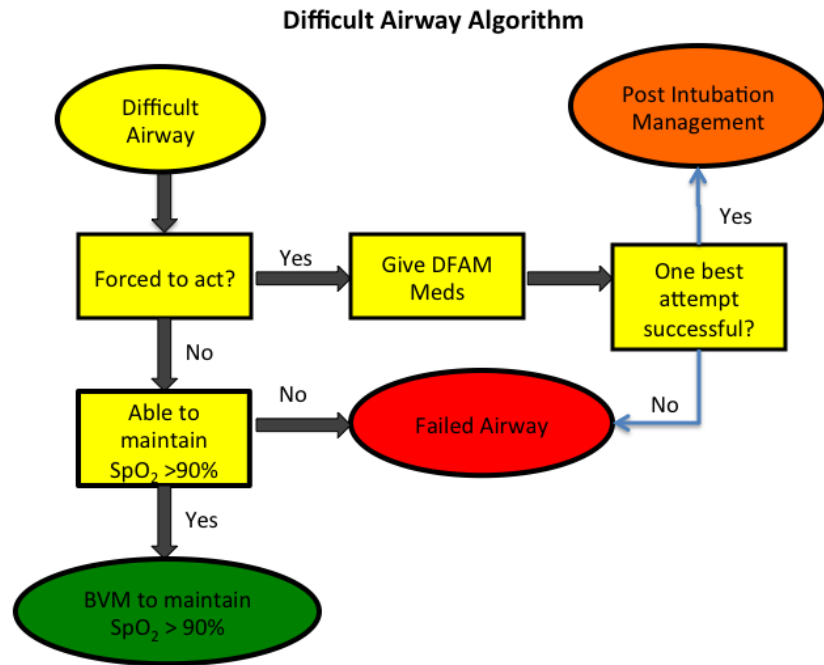
4. If able to maintain oxygenation, administer Succinylcholine 2mg/kg[3] and attempt intubation.

5. If attempt is successful, execute Post Intubation Management. If unsuccessful determine whether oxygenation can be maintained. If unable, execute Failed Airway Algorithm.

6. If able to maintain oxygenation, and fewer than 3 attempts have been made, return to Attempt Intubation step. If 3 unsuccessful attempts have been made, execute the **Failed Airway Algorithm**.

Crash Airway Algorithm

Crash Airway

Attempt to intubate

Successful? — Yes → Post Intubation Management

No

Able to maintain SpO_2 >90% — No → Failed Airway

Yes

Succinylcholine 2 mg/kg IVP

Attempt to intubate

Successful? — Yes → Post Intubation Management

No

Able to maintain SpO_2 >90% — No → Failed Airway

Yes

3 unsuccessful attempts? — No (return to Attempt to intubate) / Yes → Failed Airway

If the tools listed in the notes indicate that the airway may be especially challenging to manage, execute the **Difficult Airway Algorithm**.
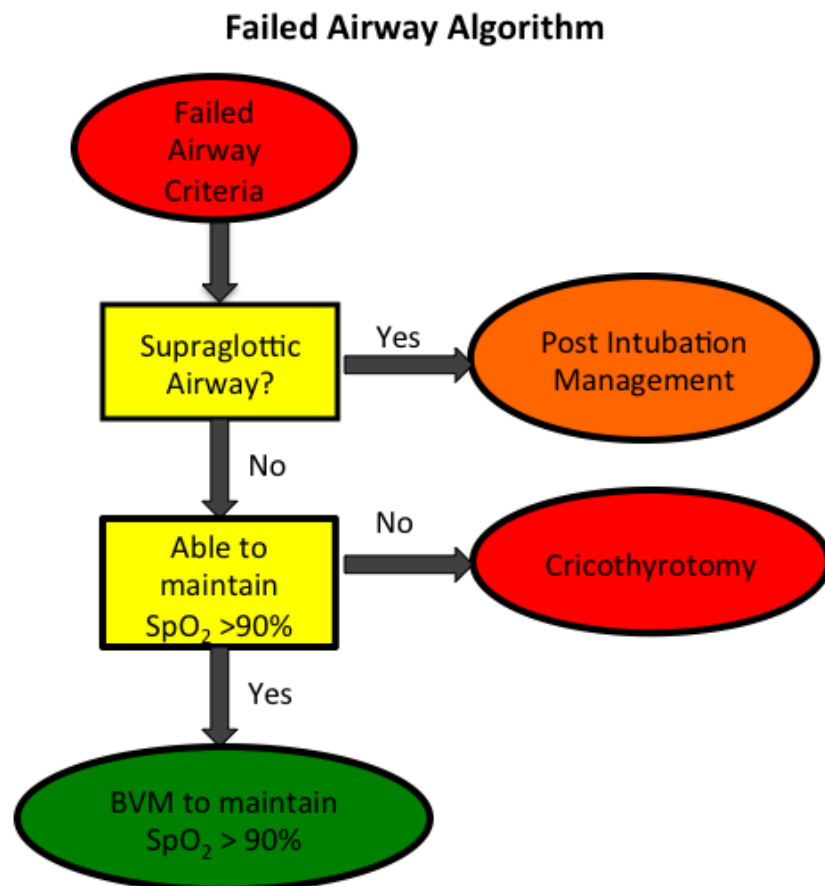
1. You are forced to act if the patient is unable to maintain a patent airway and is in significant danger for loss of airway.
2. If forced to act, administer DFAM medications and make one single attempt at intubation[2].
3. If you are able to oxygenate the patient, manage the patient's airway with basic airway adjuncts and bag-valve-mask ventilation.
4. If you are unable to maintain oxygenation, execute the **Failed Airway Algorithm**.

Difficult Airway Algorithm

```
Difficult Airway
        |
        v
   Forced to act? --Yes--> Give DFAM Meds --> One best attempt successful? --Yes--> Post Intubation Management
        |                                            |
        No                                           No
        |                                            |
        v                          No                v
   Able to maintain SpO2 >90% ----------> Failed Airway
        |
       Yes
        |
        v
   BVM to maintain SpO2 > 90%
```

The criteria for the **Failed Airway Algorithm** include the following;
- Failure at any time to maintain oxygenation
- Failure of an intubation attempt in a patient for whom oxygenation cannot be adequately maintained with A BVM
- 3 unsuccessful intubation attempts by an experienced operator but with adequate oxygenation
- A failed intubation using the *one best attempt* in the "forced to act" branch of the Difficult Airway algorithm

1. Insert a supraglottic airway. If this is successful, execute **Post Intubation Management**.
2. If able to maintain oxygenation with BVM then continue to BVM and transport.
3. If unable to secure the supraglottic airway, then perform cricothyrotomy.

Failed Airway Algorithm

```
Failed Airway Criteria
        |
        v
   Supraglottic Airway? --Yes--> Post Intubation Management
        |
        No
        |
        v
   Able to maintain SpO2 >90% --No--> Cricothyrotomy
        |
       Yes
        |
        v
   BVM to maintain SpO2 > 90%
```

Post Intubation Management

1. Confirm airway device placement using auscultation of lung and gastric sounds, oximetry, capnography, and ECG monitoring.

2. Secure airway device using appropriate commercial tube holder or tape.

3. Provide sedation, analgesia, and long-acting paralytic as outlined in procedure **7F: DFAM**.
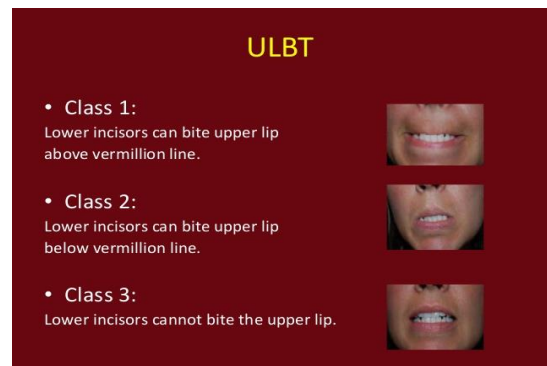
DOCUMENTATION KEY POINTS

- Rationale for advanced airway placement and choice of algorithm.

- Preparation of patient and materials for procedure.

- Use of bougie or stylet, size of ET tube, and size/type laryngoscope blade.

- Number of attempts and success of procedure including any complications encountered.

- Methods of confirmation of tube placement and depth of ET tube at patient's teeth.

NOTES

[1]Predicting a difficult airway: **LEMON: L**ook, **E**valuate, **M**allampati, Obstruction/Obesity, Neck mobility. Upper lip bite test **(ULBT)** is also a good indicator of difficult intubation.

Physical signs	Less difficult airway	More difficult airway
Look externally	• Normal face and neck • No face or neck pathology	• Abnormal face shape • Sunken cheeks • Edentulous • "Buck teeth" • Receding mandible • "Bull-neck" • Narrow mouth • Obesity • Face or neck pathology
Evaluate the 3-3-2 rule	• Mouth opening > 3F • Hyoid-chin distance > 3F • Thyroid cartilage-mouth floor distance > 2F	• Mouth opening < 3F • Hyoid-chin distance < 3F • Thyroid cartilage-mouth floor distance < 2F
Mallampati	• Class I and II (can see the soft palate, uvula, fauces +/- facial pillars)	• Class III and IV (can only see the hard palate +/- soft palate +/- base of uvula)
Obstruction	• None	• Pathology within or surrounding the upper airway (e.g. peri-tonsillar abscess, epiglottis, retro-pharyngeal abscess)
Neck mobility	• Can flex and extend the neck normally	• Limited ROM of the neck

Mallampati classification

Class 1   Class 2

Class 3   Class 4

Upper lip bite test: ULBT

ULBT

• Class 1:
Lower incisors can bite upper lip above vermillion line.

• Class 2:
Lower incisors can bite upper lip below vermillion line.

• Class 3:
Lower incisors cannot bite the upper lip.

[2] *One best attempt* should be performed by the provider most comfortable with endotracheal intubation. Best attempt should also include the following as appropriate for the situation.

- Positioning the patient in the semi-fowler position with padding under the head
- Availability of appropriate suction equipment
- Complete monitoring of vital signs including ECG, oximetry, and capnography
- Proper blade and ET tube size selection
- Elastic gum bougie available

[3] Dose of succinylcholine is <u>higher</u> (2 mg/kg) for patient not receiving induction agent.