CMC TCCC

COMBAT MEDIC/ CORPSMAN

DHA Defense Health Agency JOINT TRAUMA SYSTEM

TACTICAL COMBAT CASUALTY CARE COURSE

MODULE 7:
AIRWAY MANAGEMENT IN TFC

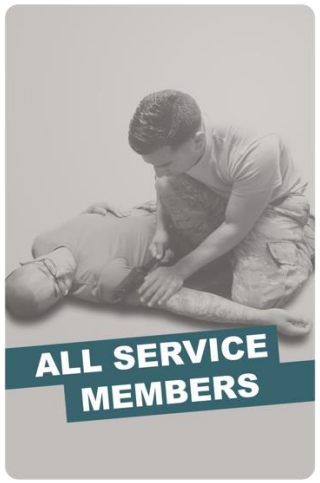
Committee on Tactical Combat Casualty Care (CoTCCC)

TCCC TIER 1	TCCC TIER 2	TCCC TIER 3	TCCC TIER 4
All Service Members	Combat Lifesaver	Combat Medic/Corpsman	Combat Paramedic/Provider

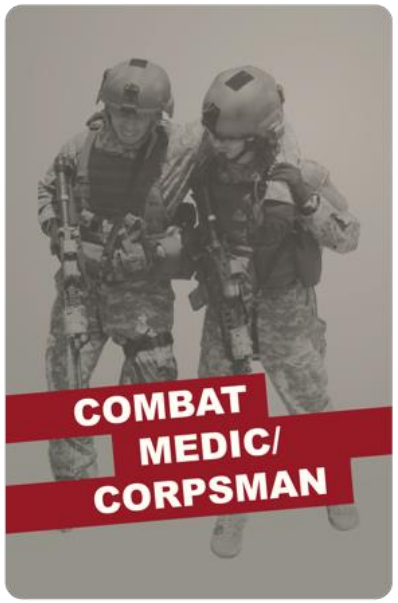
TACTICAL COMBAT CASUALTY CARE (TCCC) ROLE-BASED TRAINING SPECTRUM

ROLE 1 CARE

NONMEDICAL PERSONNEL



MEDICAL PERSONNEL



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STANDARDIZED JOINT CURRICULUM

1 x TERMINAL LEARNING OBJECTIVES

08 Given a combat or noncombat scenario, perform airway management during Tactical Field Care in accordance with CoTCCC Guidelines.

- **8.1** Identify signs of an airway obstruction. (ASM T5:E20)
- **8.2** Identify spinal immobilization considerations for casualties with suspected cervical spine injuries.
- **8.3** Describe the progressive strategies for airway management and the indications, contraindications, and limitations of airway management techniques in Tactical Field Care.
- **8.4** Demonstrate the placement of a casualty in the recovery position in Tactical Field Care. (CLS T8:E47)
- **8.5** Demonstrate opening the airway with the head-tilt/chin-lift or jaw-thrust maneuver. (CLS T8:E46)
- **8.6** Demonstrate suctioning the airway of a casualty with a Manual Suction Unit.
- **8.7** Demonstrate suctioning the airway of a casualty with a Mechanical Suction Unit.
- **8.8** Identify the indications, contraindications, and techniques for performing cricothyroidotomy in Tactical Field Care.
- **8.9** Identify the indications, contraindications, and administration methods of lidocaine as a local anesthesia when performing a cricothyroidotomy in Tactical Field Care.
- **8.10** Demonstrate the procedures for performing a cricothyroidotomy in Tactical Field Care.
- **8.11** Describe the technique for ventilating a casualty with a bag valve mask (BVM) in Tactical Field Care.
- **8.12** Demonstrate the insertion of a nasopharyngeal airway in a casualty in Tactical Field Care. (CLS T8:E48)
- **8.13** Demonstrate ventilating a casualty with a BVM in Tactical Field Care.
- **8.14** Identify the considerations, indications, and limitations for oxygen administration in Tactical Field Care.
- **8.15** Identify the importance, considerations, limitations, and application of pulse oximetry monitoring in Tactical Field Care.

15 x ENABLING LEARNING OBJECTIVES

\# = **Terminal Learning Objectives** = Cognitive ELOs = Performance ELOs

MARCH PAWS

DURING LIFE-THREATENING

- **M** MASSIVE BLEEDING — #1 Priority
- **A** AIRWAY
- **R** RESPIRATION
- **C** CIRCULATION
- **H** HYPOTHERMIA / HEAD INJURIES

AFTER LIFE-THREATENING

- **P** PAIN
- **A** ANTIBIOTICS
- **W** WOUNDS
- **S** SPLINTING

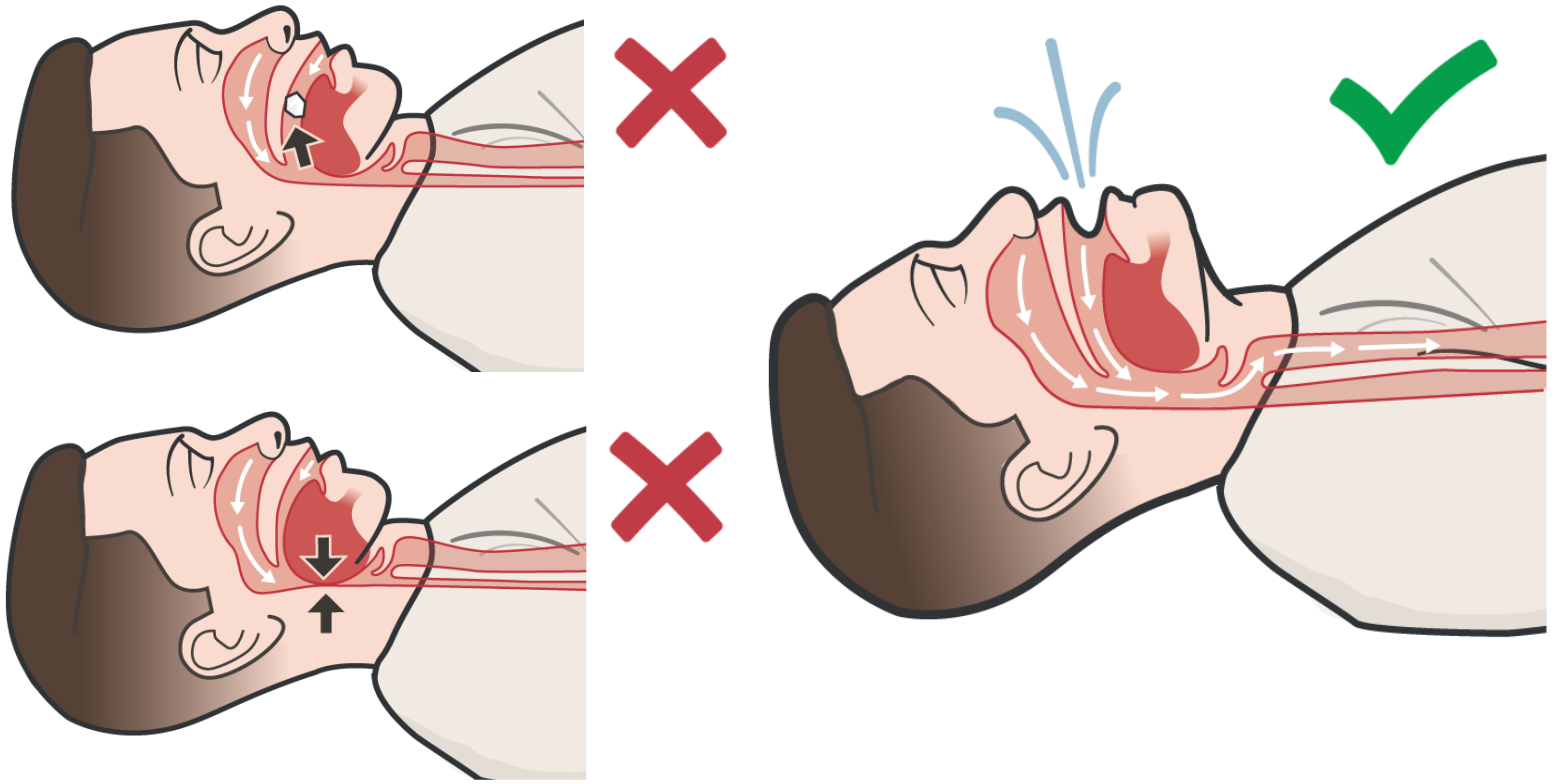
AIRWAY MANAGEMENT INTRODUCTION

Airway obstruction on the battlefield is often due to **maxillofacial trauma**

- **Unconscious** casualties can also lose their airway when the muscles of their tongue relax, causing the tongue to block the airway by sliding to the back of the pharynx and covering the tracheal opening
- Airway obstruction on the battlefield is often easily corrected with simple maneuvers

MARCH

IDENTIFYING AN OBSTRUCTED AIRWAY



IMPORTANT! Remove any visible objects, but **DO NOT** perform a blind finger sweep

M A R C H

SIGNS AND SYMPTOMS AIRWAY MAY BE BLOCKED:

- Casualty is in distress and indicates they can't breathe properly
- Casualty is making snoring or gurgling sounds
- Visible blood or foreign objects are present in the airway
- Maxillofacial trauma (severe trauma to the face) is observed

SPINAL IMMOBILIZATION CONSIDERATIONS IN TFC

Consider the mechanism of injury when determining risk of spinal injury

The jaw-thrust method is the preferred airway opening maneuver in case of suspected spinal injuries

If immobilization is indicated a second responder may be needed to maintain an open airway

C-Spine stabilization is **NOT** necessary for casualties who have sustained penetrating trauma to the **FACE** or **NECK ONLY**

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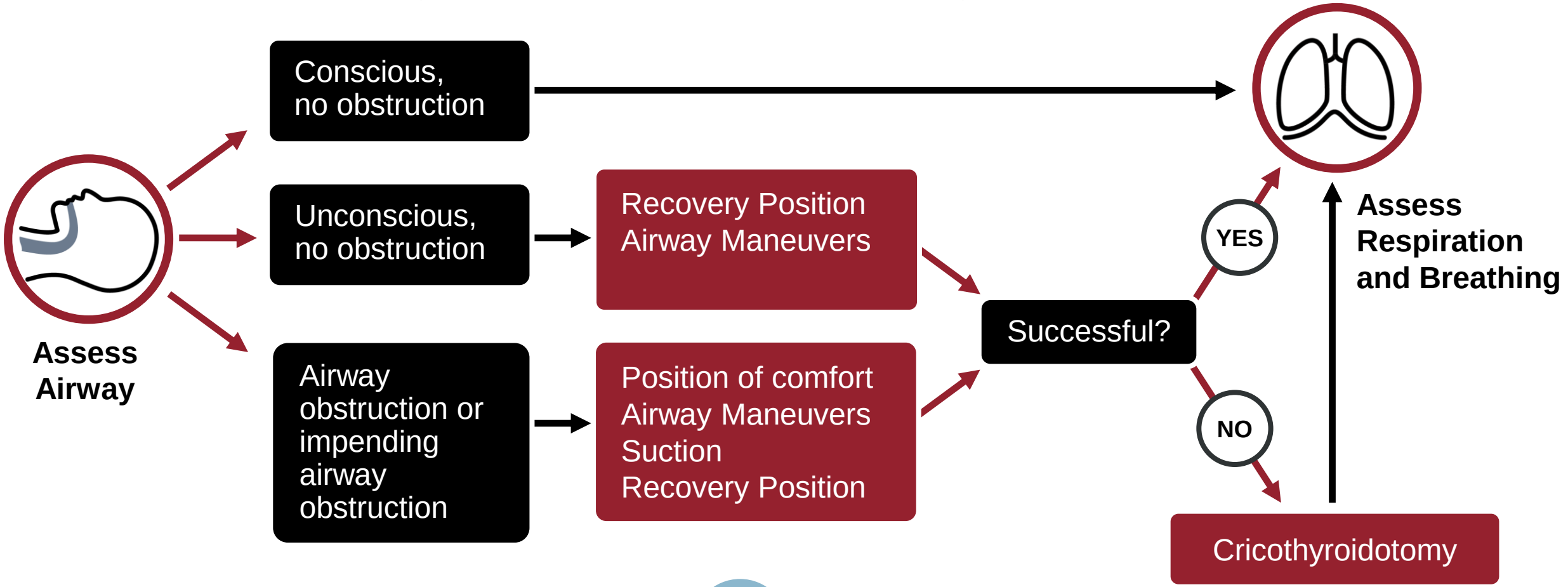
PROGRESSIVE STRATEGIES FOR AIRWAY MANAGEMENT



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LIMITATIONS OF AIRWAY MANAGEMT IN TFC

Contraindications of Airway Management may include:

- Burns to the airway
- Intracranial Pressure
- Cerebral Spinal Fluid

Limitations of Airway Management:

- Massive Trauma
- Familiarization
- Skill Instructions
- Anatomical Landmarks
- Training
- Capabilities

MARCH

CASUALTY POSITION: MAINTAINING THE AIRWAY

If a casualty **can breathe on their own**, let them assume the best position that best protects the airway, including sitting up and/or leaning forward

If a casualty can **breathe on their own in a position of their choice**, **DO NOT** force them into a position or perform airway procedures that causes them difficulties in breathing

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CASUALTY POSITION: RECOVERY POSITION

For an **unconscious** casualty **not in shock**, or **conscious** casualty that **can tolerate any position**, place them into the **RECOVERY POSITION**

Clinical indications occasionally dictate which side is lower in the **RECOVERY POSITION**

⚠ During transport patient may need to be returned to a supine position

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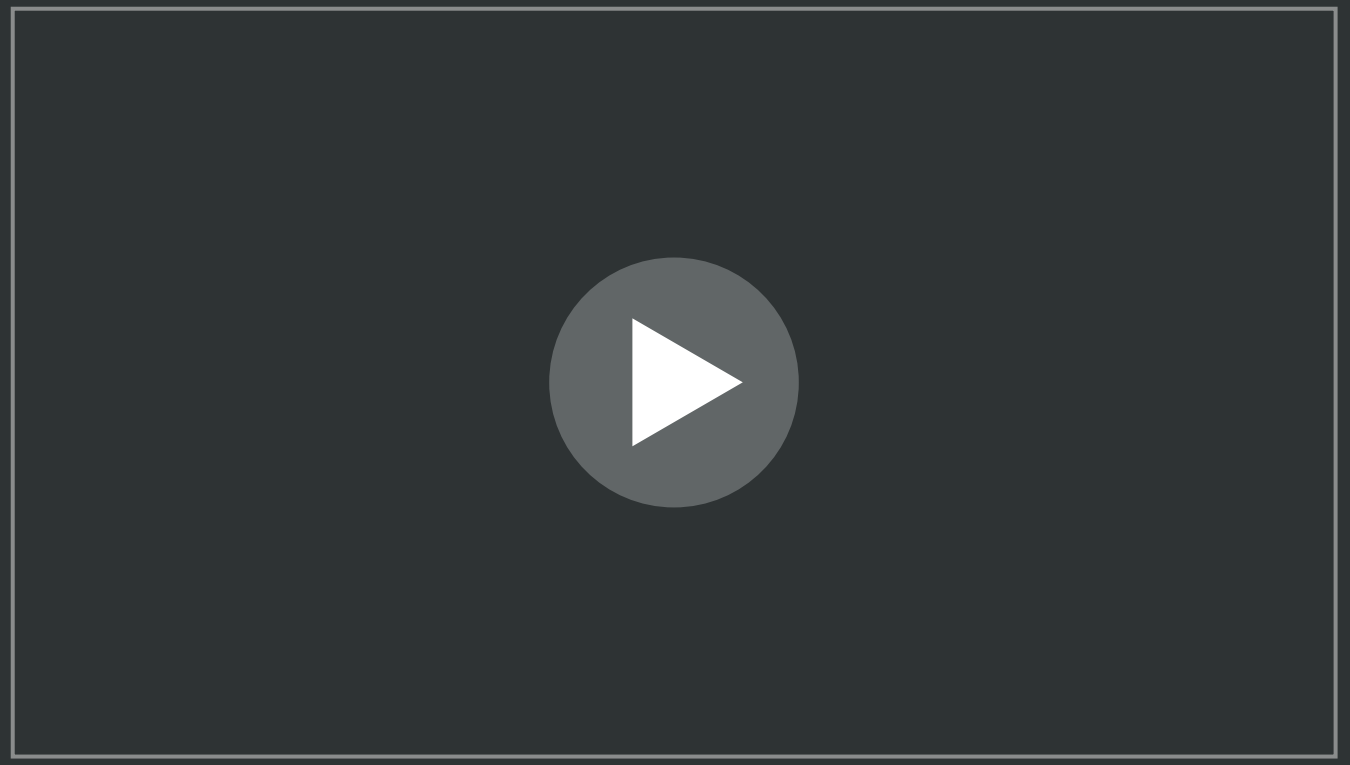
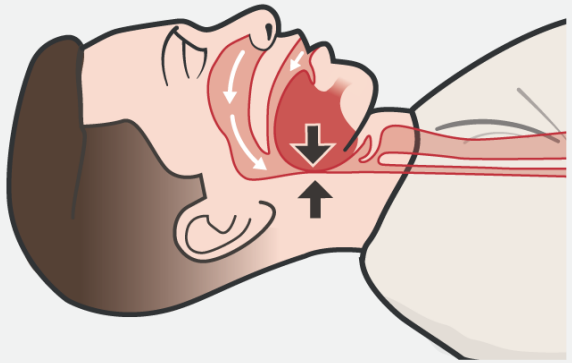
RECOVERY POSITION TECHNIQUE VIDEO



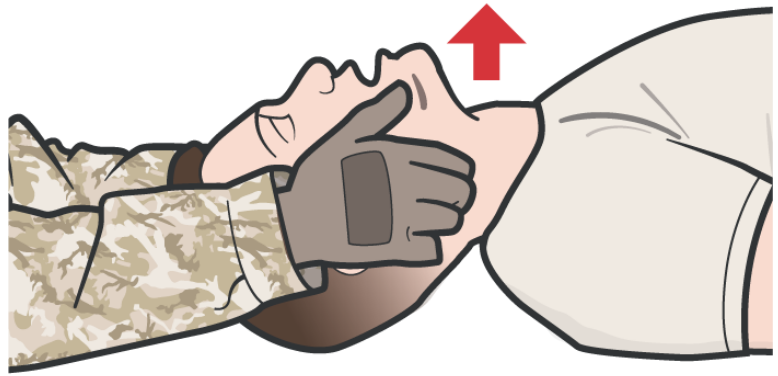
Video can be found on deployedmedicine.com

AIRWAY MANEUVERS



UNCONSCIOUS
casualty's tongue may have **relaxed**, causing the tongue to **BLOCK** the airway by sliding to the back of the mouth, **occluding the airway**

HEAD-TILT/CHIN-LIFT



JAW-THRUST

⚠ If you suspect that the casualty has suffered a neck or spinal injury, use the jaw-thrust method if tactically feasible.

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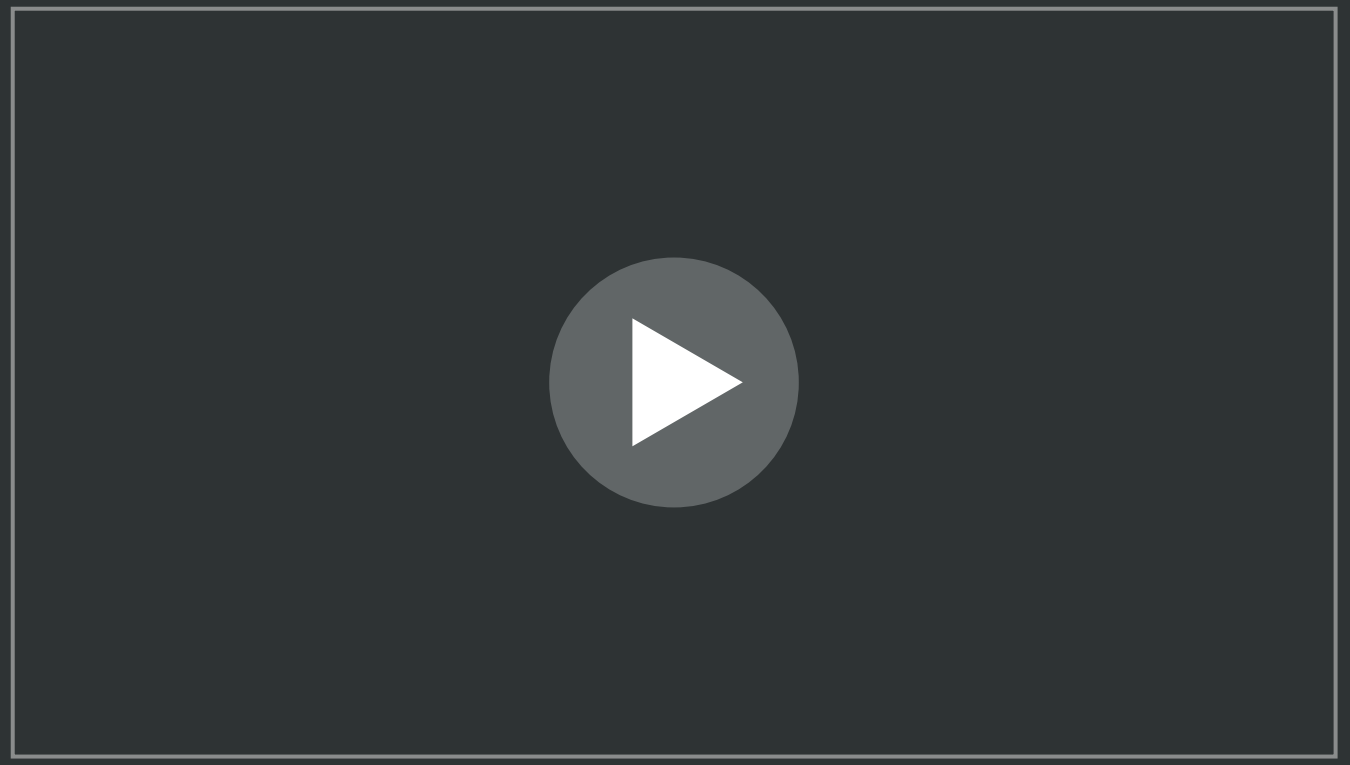
HEAD-TILT/CHIN-LIFT MANEUVER VIDEO



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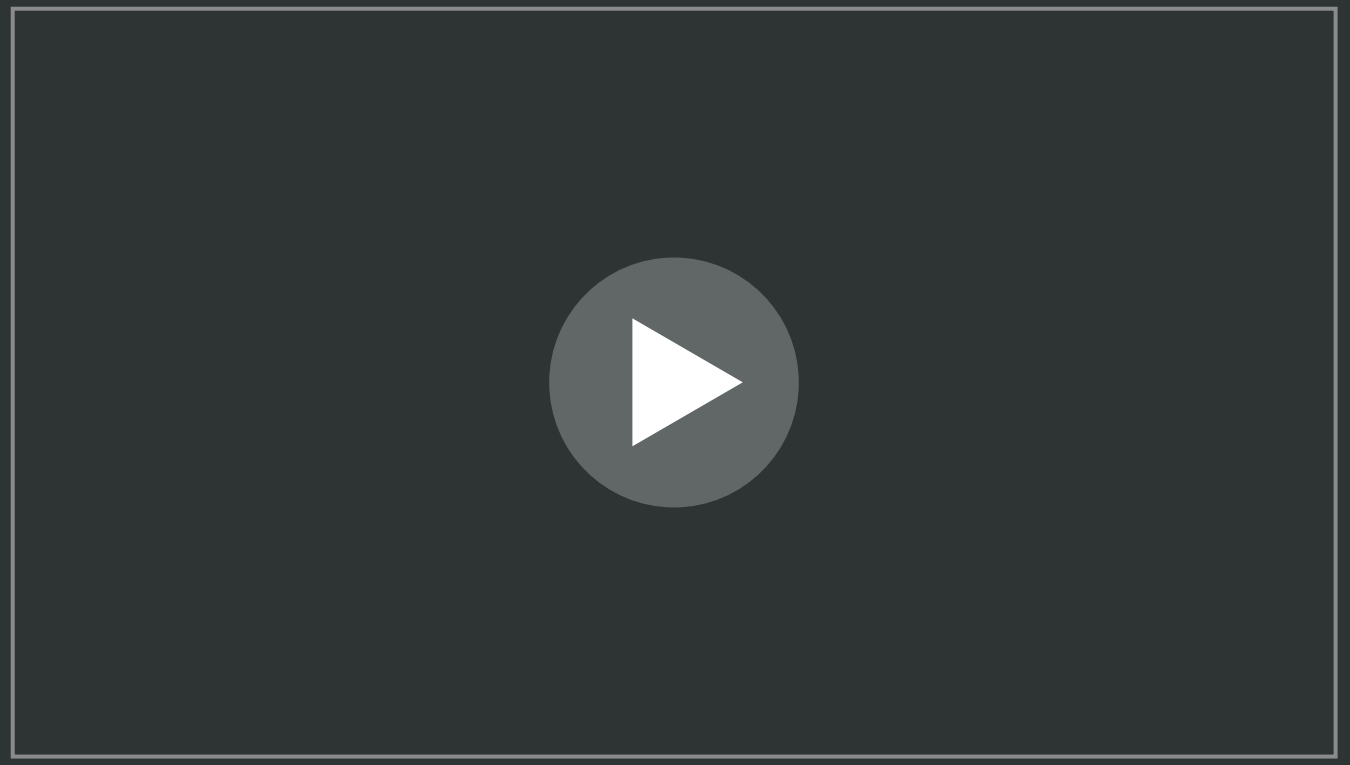
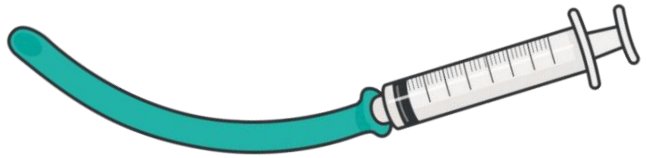
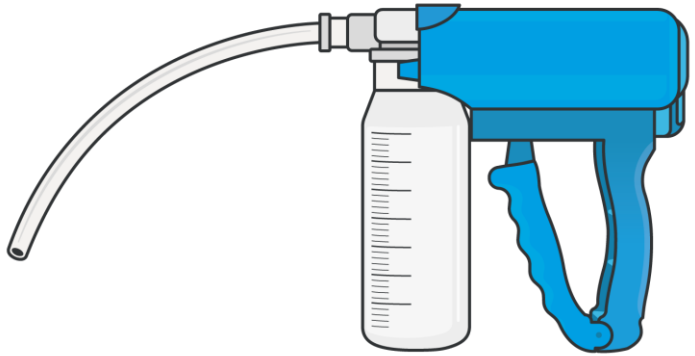
JAW-THRUST MANEUVER VIDEO

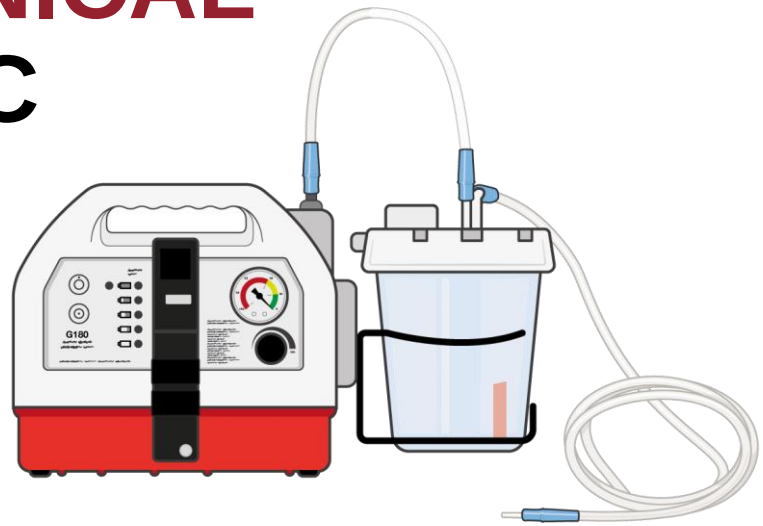


Video can be found on deployedmedicine.com

MANUAL AND MECHANICAL SUCTIONING IN TFC







GOOD:
Improvised suction device

BETTER:
Manual suction device

BEST:
Mechanical suction device

- Only insert as far as you can see to avoid eliciting a gag reflex
- Limit the suction time to **NO more than** 10 seconds
- Suction should only be applied when withdrawing the catheter

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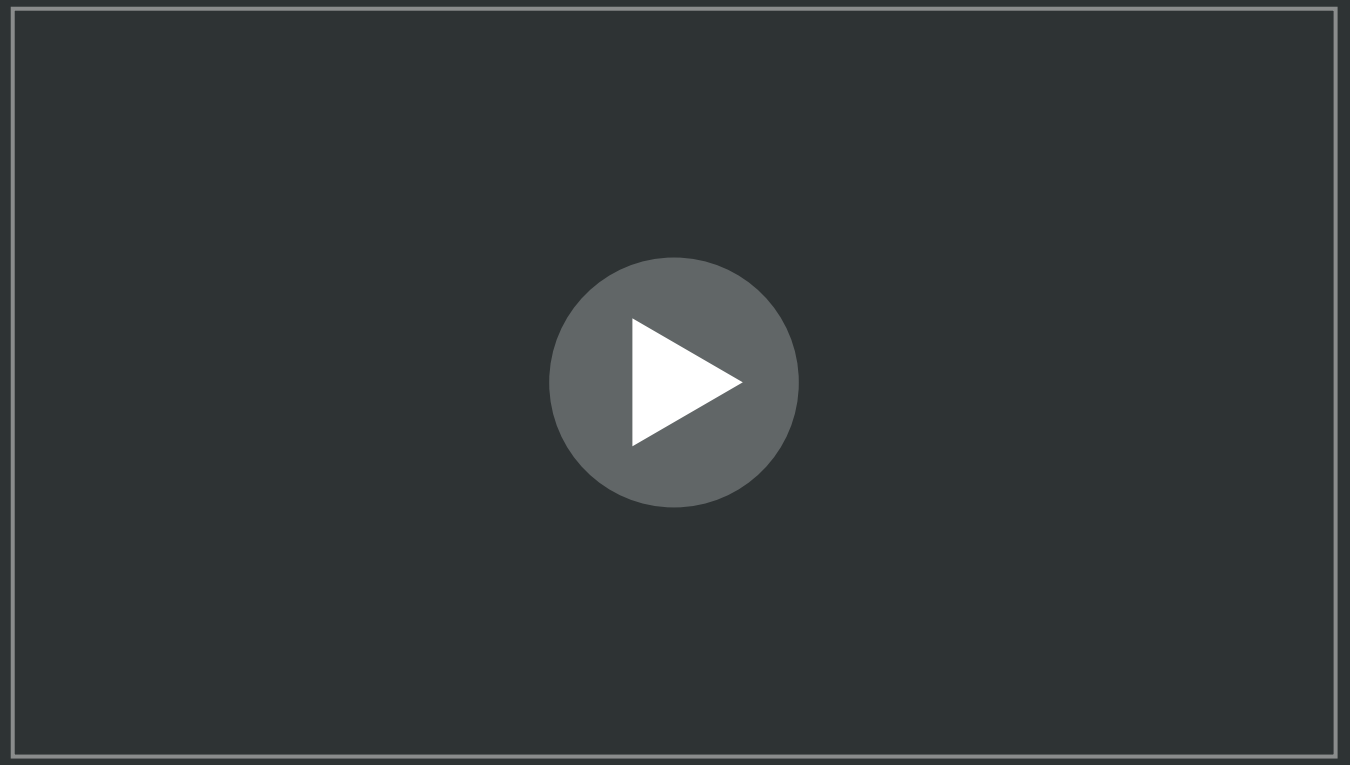
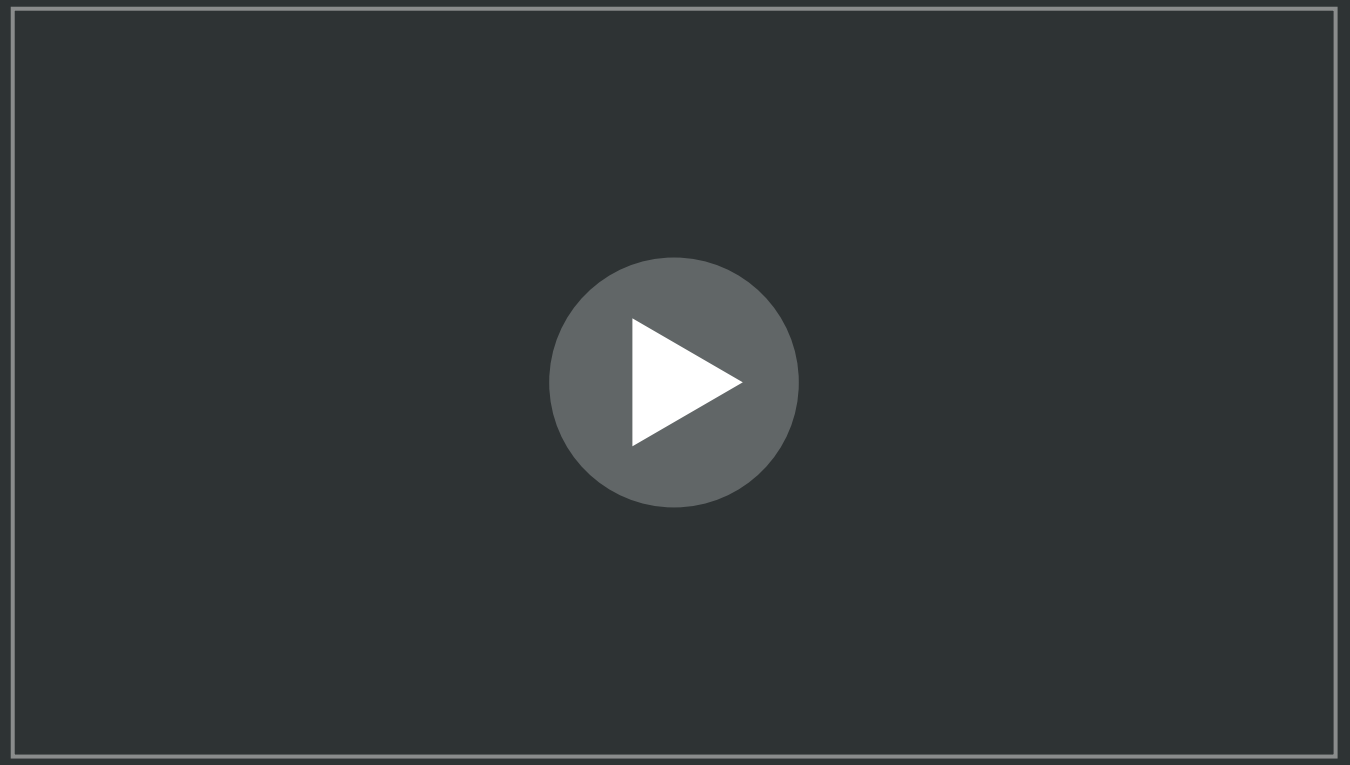
MANUAL SUCTION VIDEO



Video can be found on deployedmedicine.com

MECHANICAL SUCTION VIDEO



Video can be found on deployedmedicine.com

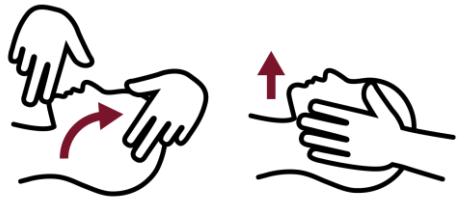
SKILL STATION

Airway Maneuvers and Suctioning

- Head-Tilt/Chin-Lift
- Jaw-Thrust Maneuver
- Recovery Position
- Manual Suctioning
- Mechanical Suctioning

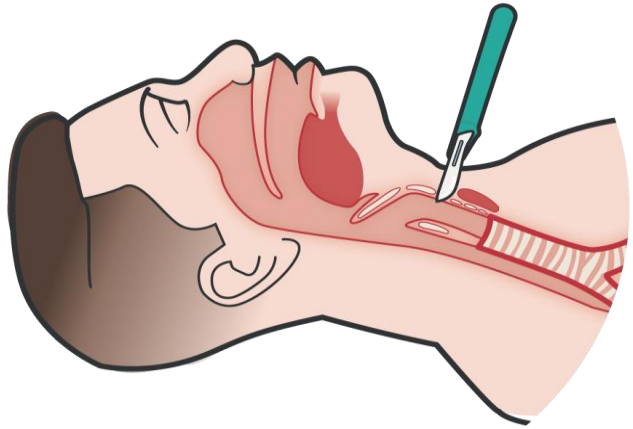
CRICOTHYROIDOTOMY
INDICATIONS

PRIMARY INDICATION
UNSUCCESSFUL airway management with:



Airway maneuvers

Suction
(if appropriate)



CRICOTHYROIDOTOMY is indicated for maxillofacial injuries, to include partial or complete airway obstruction

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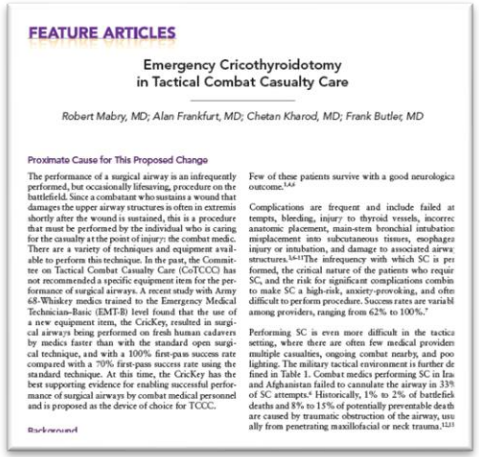
Thermal and toxic gas injuries are additional indications for cricothyroidotomy

Contraindications:

- Ability to secure less invasive airway
- Tracheal transection
- Massive swelling
- Age Younger than 10-12 years old
- Massive Swelling
- Massive Airway Trauma

CRICOTHYROIDOTOMY TECHNIQUES



FEATURE ARTICLES

Emergency Cricothyroidotomy in Tactical Combat Casualty Care

Robert Mabry, MD; Alan Frankfurt, MD; Chetan Kharod, MD; Frank Butler, MD

Proximate Cause for This Proposed Change

The performance of a surgical airway is an infrequently performed, but occasionally lifesaving, procedure on the battlefield. Since a combatant who sustains a wound that damages the upper airway structures is often in extremis shortly after the wound is sustained, this is a procedure that must be performed by the individual who is caring for the casualty at the point of injury: the combat medic. There are a variety of techniques and equipment available to perform this technique. In the past, the Committee on Tactical Combat Casualty Care (CoTCCC) has not recommended a specific equipment item for the performance of surgical airways. A recent study with Army 68-Whiskey medics trained to the Emergency Medical Technician-Basic (EMT-B) level found that the use of a new equipment item, the CricKey, resulted in surgical airways being performed on fresh human cadavers by medics faster than with the standard open surgical technique, and with a 100% first-pass success rate compared with a 70% first-pass success rate using the standard technique. At this time, the CricKey has the best supporting evidence for enabling successful performance of surgical airways by combat medical personnel and is proposed as the device of choice for TCCC.

Few of these patients survive with a good neurological outcome.[1,6]

Complications are frequent and include failed attempts, bleeding, injury to thyroid vessels, incorrect anatomic placement, main-stem bronchial intubation misplacement into subcutaneous tissues, esophageal injury or intubation, and damage to associated airway structures.[1,6-11]The infrequency with which SC is performed, the critical nature of the patients who require SC, and the risk for significant complications combine to make SC a high-risk, anxiety-provoking, and often difficult to perform procedure. Success rates are variable among providers, ranging from 62% to 100%.[7]

Performing SC is even more difficult in the tactical setting, where there are often few medical providers, multiple casualties, ongoing combat nearby, and poor lighting. The military tactical environment is further defined in Table 1. Combat medics performing SC in Iraq and Afghanistan failed to cannulate the airway in 33% of SC attempts.[5] Historically, 1% to 2% of battlefield deaths and 8% to 15% of potentially preventable deaths are caused by traumatic obstruction of the airway, usually from penetrating maxillofacial or neck trauma.[12,13]

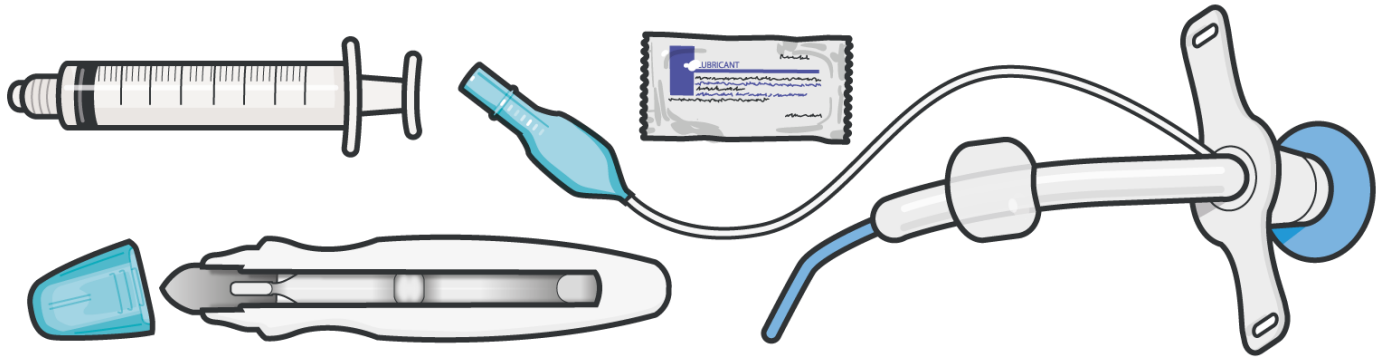
CoTCCC research results:
Preferred method: Cric-Key™

Alternate methods:

- Standard open surgical method
- Bougie-aided open surgical method

Cricothyroidotomy considerations:

- **DO NOT** make incision too short
- Practice locating anatomical landmarks frequently
- **Avoid** a “stabbing” technique
- Palpate cricothyroid membrane with the index finger, identifying the landmark to make a horizontal incision



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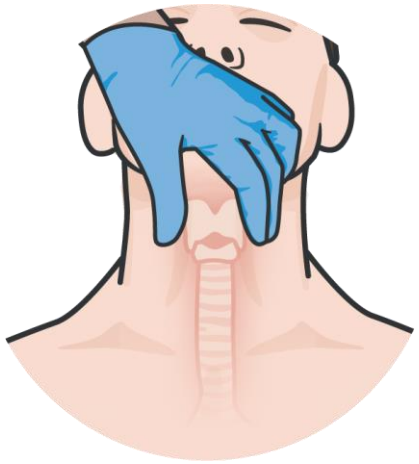
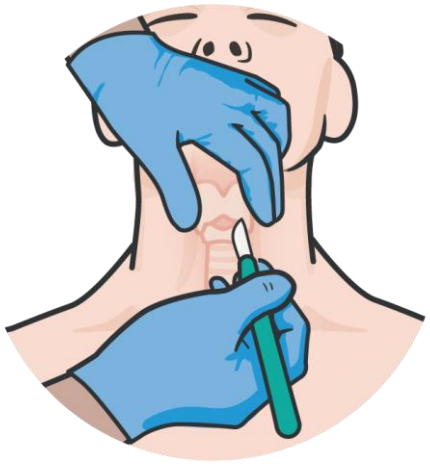
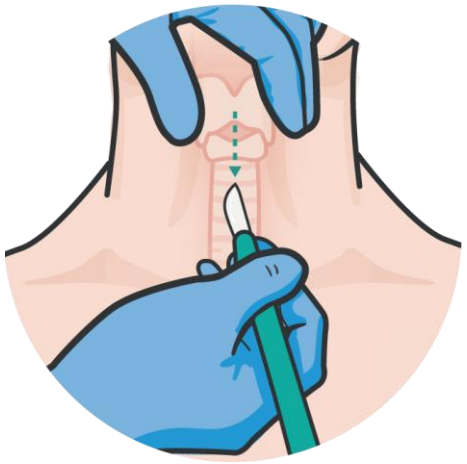
TECHNIQUES *(cont.)*



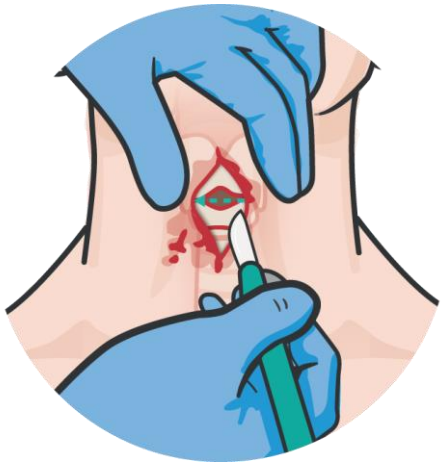
Identify cricothyroid membrane



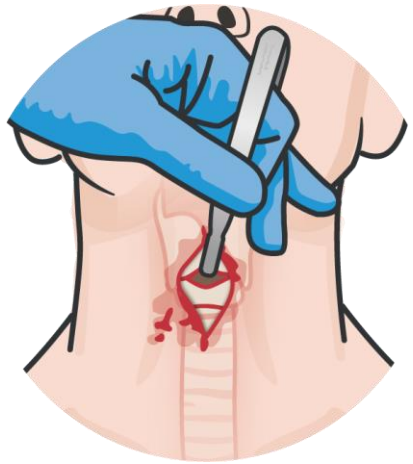
Stabilize larynx



Make 1” vertical incision



Make horizontal incision through membrane



Hook cartilage and lift to stabilize and maintain the opening.

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LIDOCAINE USAGE IN FIELD CRICOTHYROIDOTOMIES

Consider **LIDOCAINE** for **conscious** or **semi-conscious** casualties, or casualties with a **response to painful stimuli**

- Use lidocaine **after** identifying anatomical **landmarks**
- Anesthetize subcutaneous structures **without penetrating** the cricothyroid **membrane** or **trachea**

Contraindications:

Miscalculation of the dose, injection of the drug into a blood vessel or repeated administration of therapeutic doses are the major causes of systemic toxicity

⚠ The clinical or tactical situation may be a contraindication to lidocaine usage prior to placing the airway

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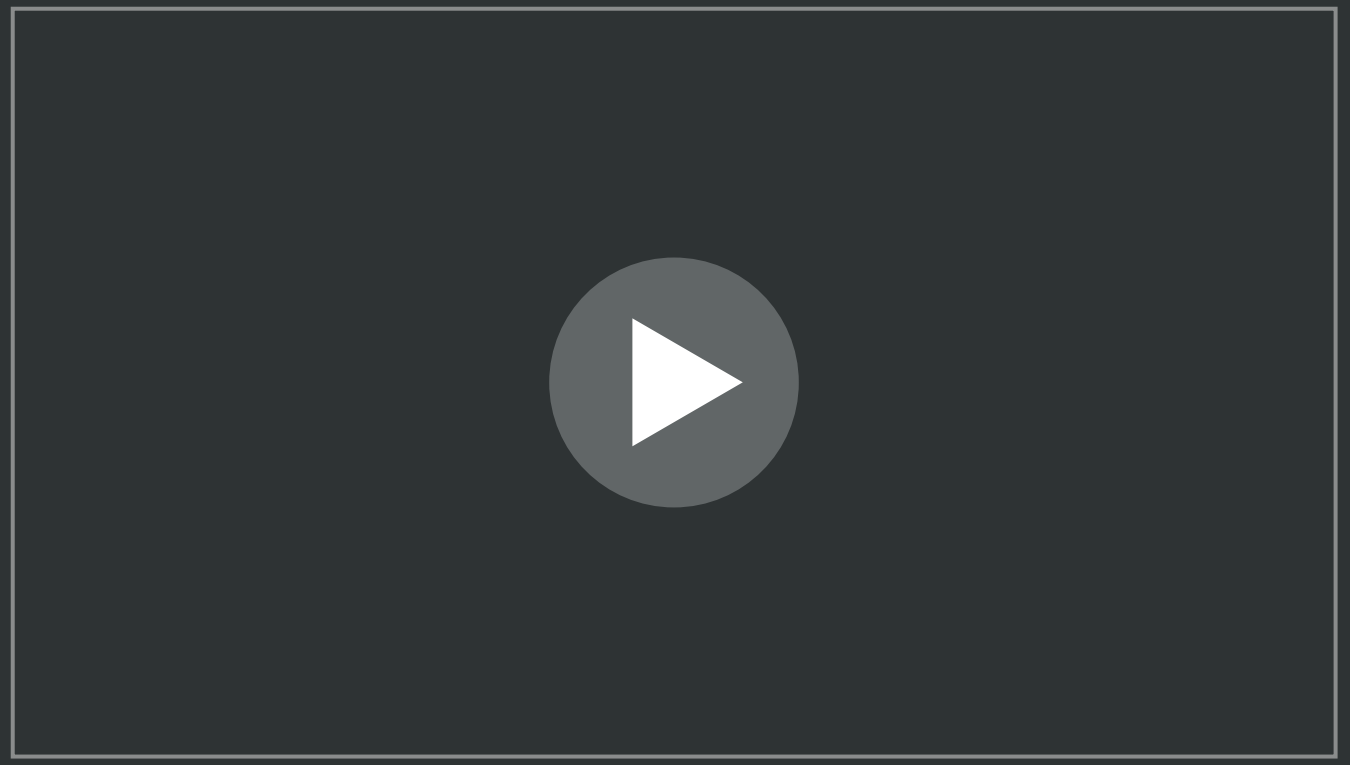
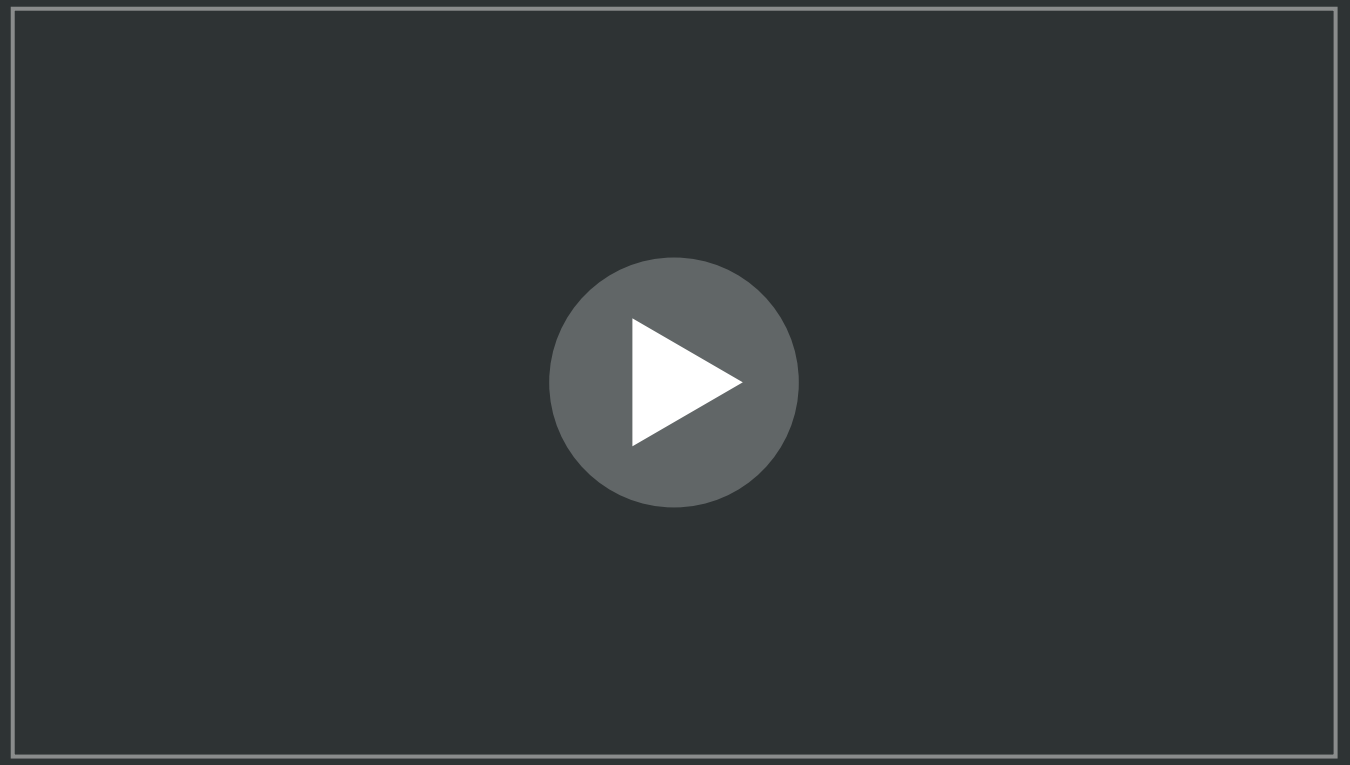
CRIC-KEY CRICOTHYROIDOTOMY VIDEO



Video can be found on deployedmedicine.com

BOUGIE-AIDED CRICOTHYROIDOTOMY VIDEO



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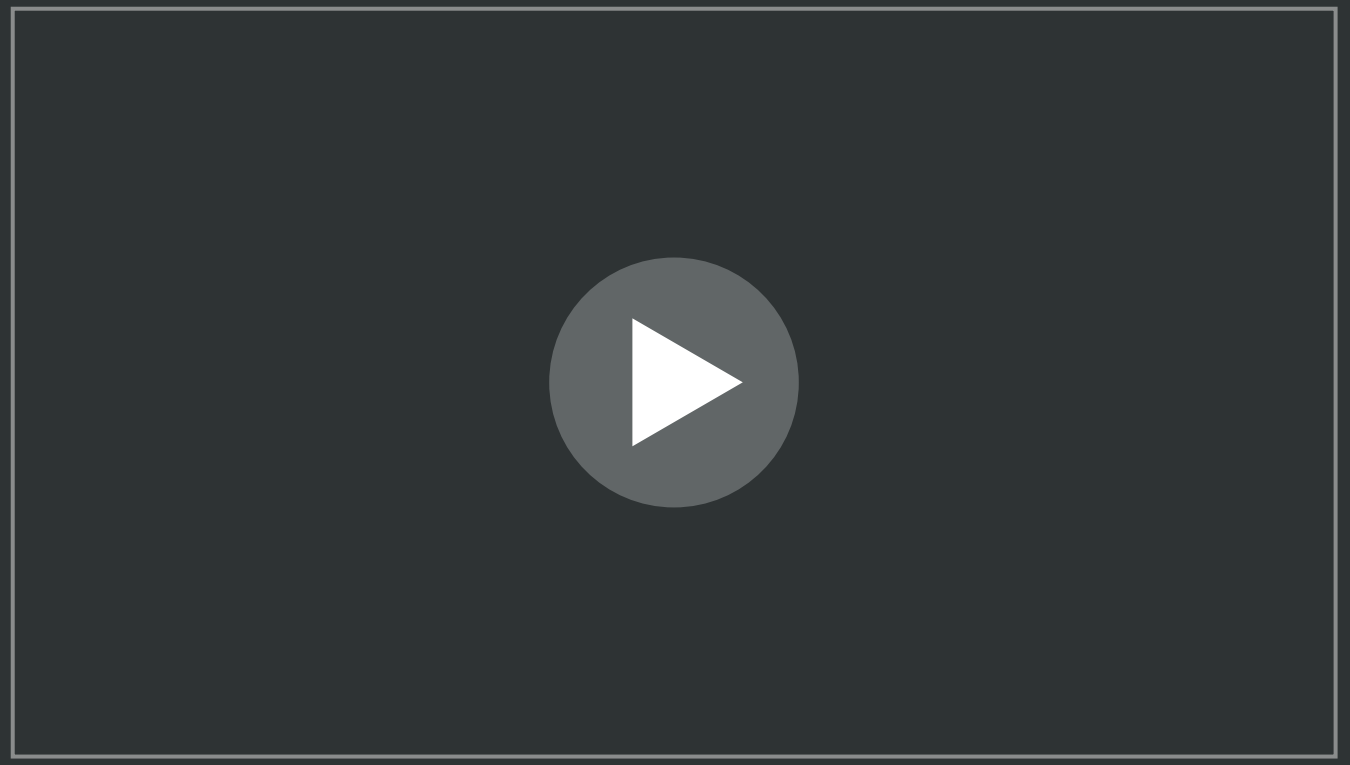
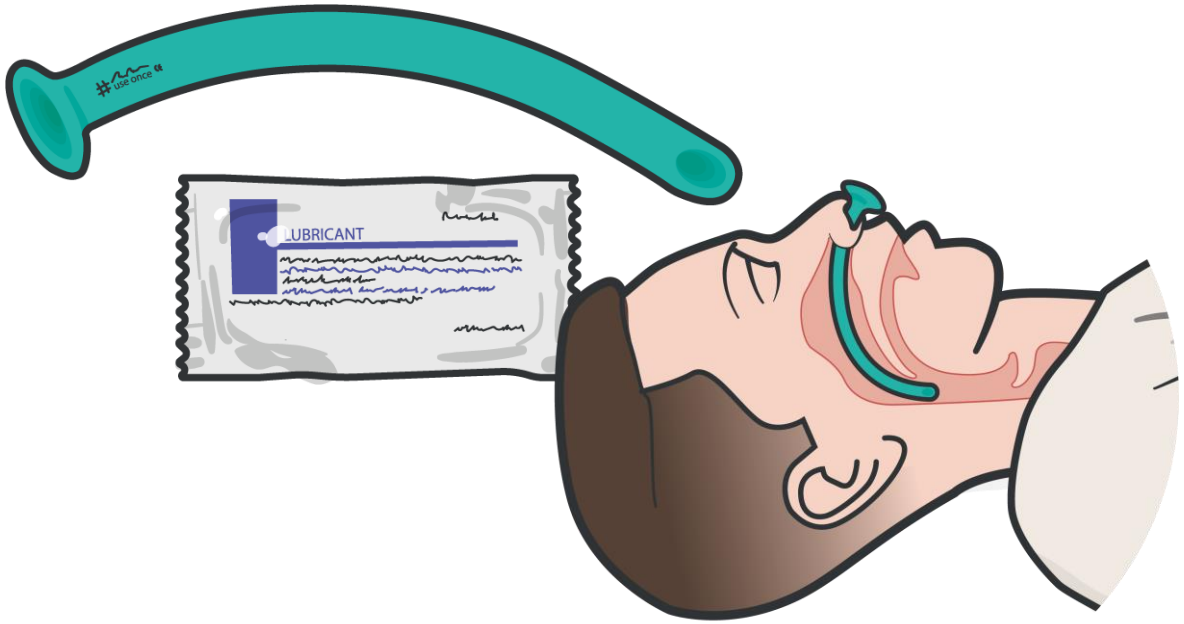
OPEN CRICOTHYROIDOTOMY VIDEO



Video can be found on deployedmedicine.com

NASOPHARYNGEAL AIRWAYS

- Can be used on both **unconscious** or **semiconscious** casualties with **NO** airway obstruction
- Excellent success in Afghanistan and Iraq
- **Lubricate** before inserting
- **Insert at 90-degree** angle to the face, NOT along the axis of the external nose
- **Tape it** in place after insertion
- To be used in conjunction with the use of a BVM



DO NOT attempt to insert an NPA if there is clear fluid coming from nose or ears, signs of inhalation burns, or moderate to severe trauma to the nose

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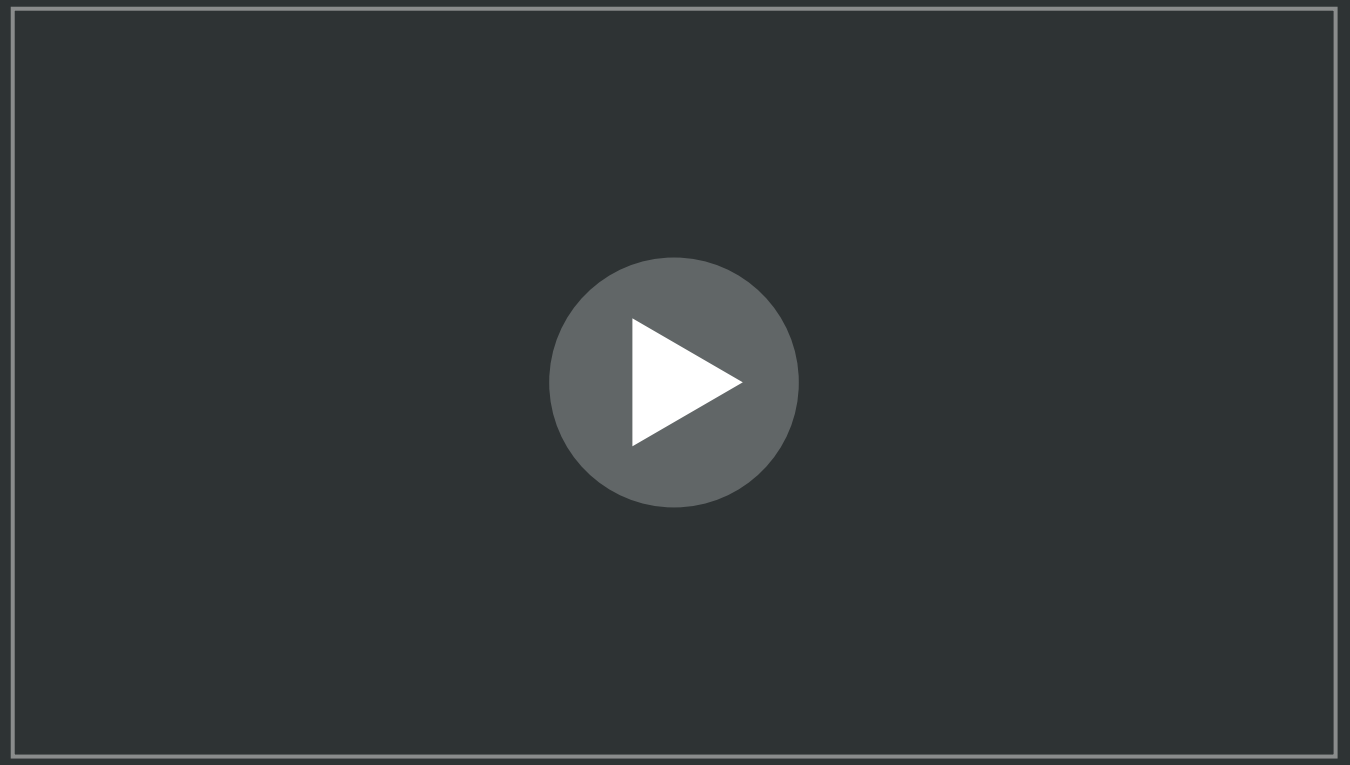
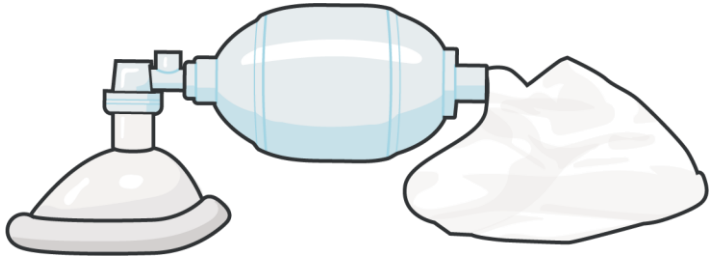
NPA INSERTION VIDEO



Video can be found on deployedmedicine.com

BAG VALVE MASK (BVM) CONSIDERATIONS



Provide one breath every 5-6 seconds

Use **SLOW**, **STEADY** squeeze over 1-2 seconds

Situations where ventilation support may be needed:

- A casualty **NOT** breathing on their own
- Progressive hypoxic respiratory distress
- Progressive hypercapnic respiratory distress
- Semi-conscious or conscious patients with mental status changes

- The EC technique is also taught to Combat Lifesavers so they can support you
- Ventilations can be performed alone or with two people working together

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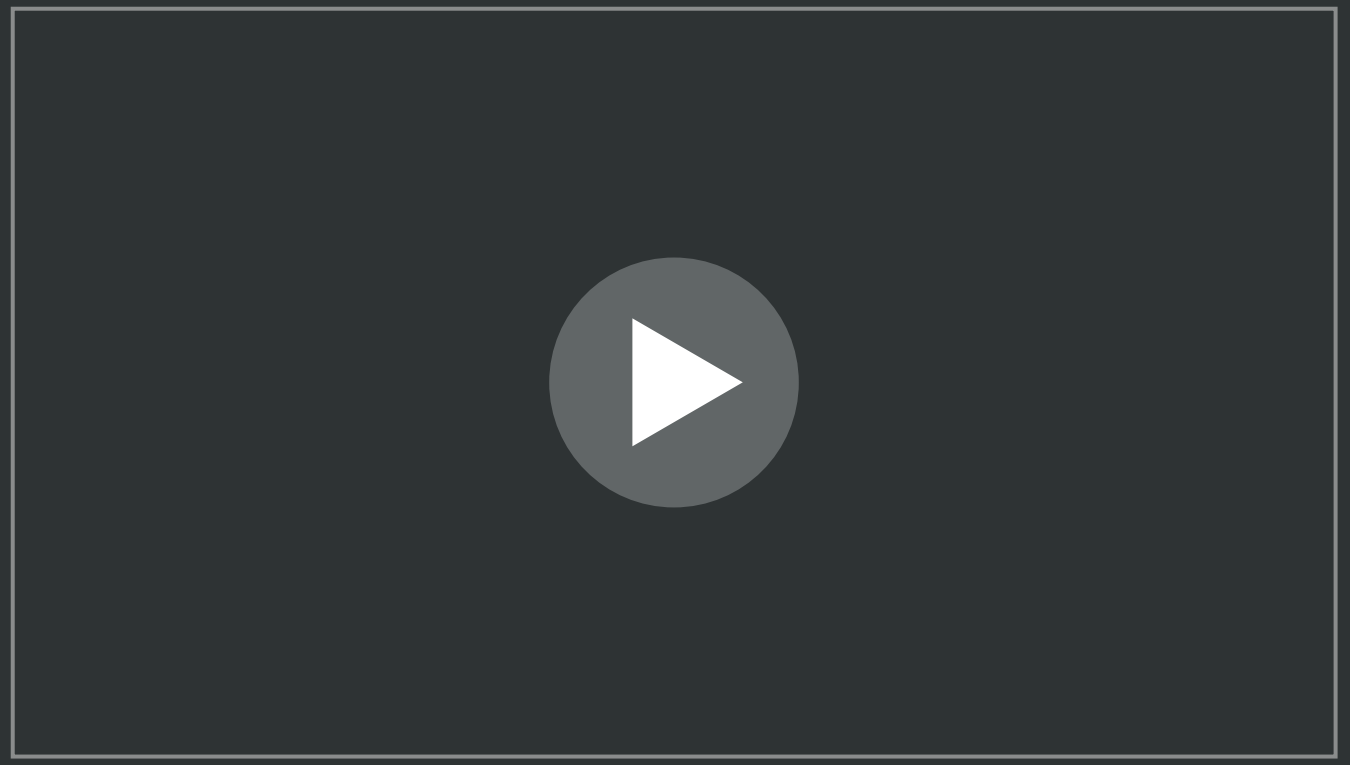
BAG VALVE MASK TECHNIQUES VIDEO



Video can be found on deployedmedicine.com

SKILL STATION
ADVANCED AIRWAY AND BAG VALVE MASK SKILL STATION

- Cric-Key Cricothyroidotomy
- Bougie-Aided Cricothyroidotomy
- Open Surgical Cricothyroidotomy
- Bag Valve Mask with NPA

OXYGEN ADMINISTRATION IN TFC CONSIDERATIONS

- Availability of oxygen is very limited in TFC
- Oxygen may be present at aid stations, casualty collection points or on convoys
- Current TCCC Guidelines only recommend oxygen for refractory shock and TBI patients

Maintain O2 saturation >90%

Flow rate often 3 liters/min
usually limited by O2 generation

Tactical Evacuation Phase indications:

- **Low oxygen** saturation
- Injuries with **impaired oxygenation**
- **Shock**
- **Smoke** inhalation
- Trauma at **altitude**

If available, consider initiating oxygen during TFC, just prior to evacuation

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PULSE OXIMETRY MONITORING

Hypoxemia in TFC is difficult to assess

- **Low-light** conditions mask signs
- Physical findings impaired by the **tactical environment**

Use pulse oximetry in casualties with:

- Injuries that impair oxygenation
  Blasts, chest injuries, etc.
- Traumatic brain injury
  Ensure O2 sats >90%

NOTE: *Shock is **not** always preceded by a fall in O2 saturation levels*

Factors Affecting Pulse Ox Readings

Low readings may be seen with:

- **Shock**
- **Cold temperatures**

High readiness may be seen with:

- **Carboxyhemoglobinemia**

Impaired readings may be seen with:

- Nail polish
- Very bright environments
- Skin pigmentations
- Motion artifact

TCCC Guideline Recommendation:
Monitor the hemoglobin oxygen saturation in casualties to help assess airway patency

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SUMMARY

Knowledge Topics

- **Signs** of airway obstruction
- **Considerations** for spinal immobilization
- Progressive **strategies** for airway management
- **Indications** for an advanced airway
- **Considerations** for using oxygen
- Importance of pulse oximetry

Skills and Abilities

- Airway maneuvers (head-tilt/chin-lift or jaw-thrust method)
- Recovery position
- Manual and mechanical suctioning
- Cricothyroidotomy
- Bag valve mask ventilation with NPA

CHECK ON LEARNING

What are the signs of an airway obstruction?

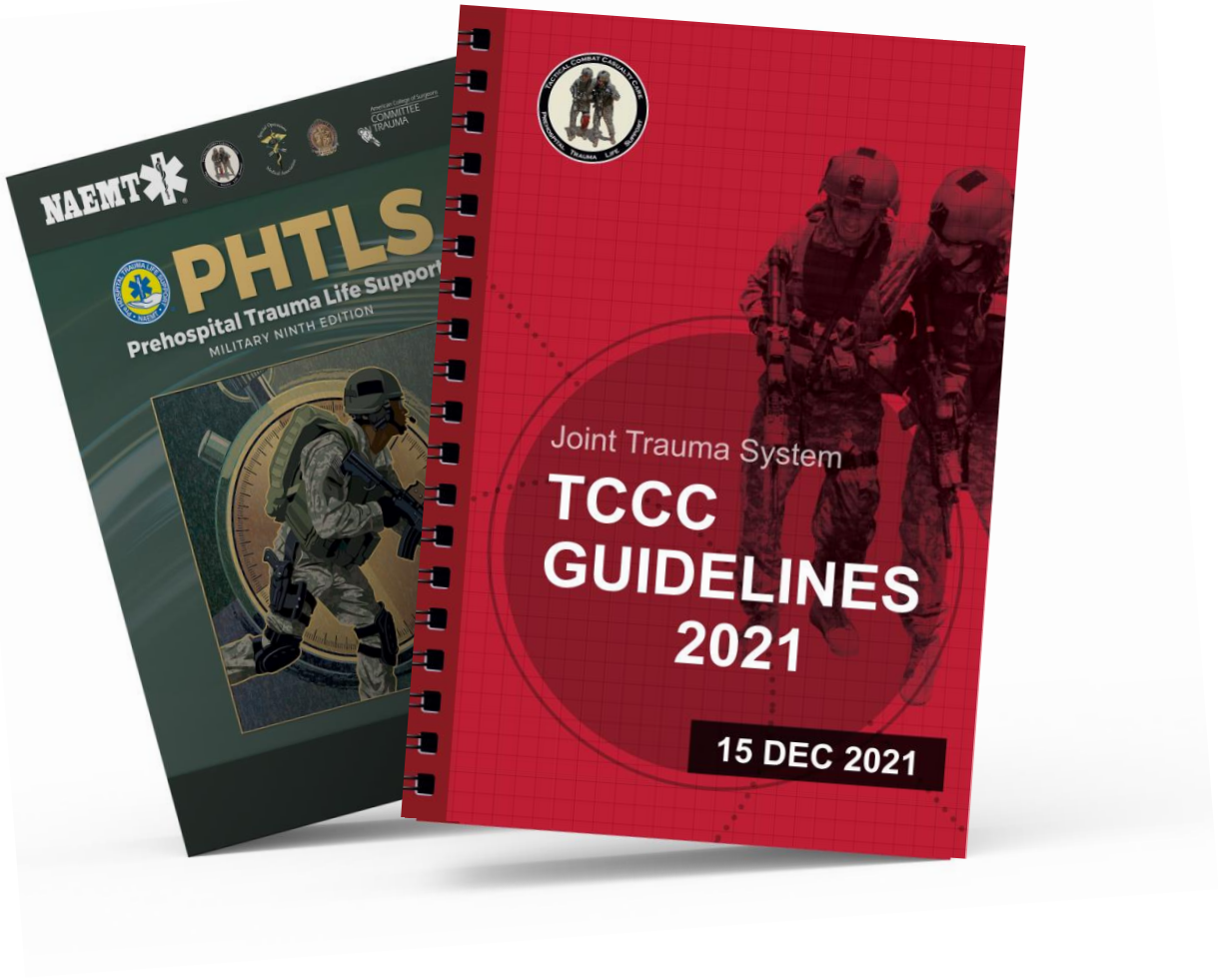
What is the best position for a conscious casualty that is breathing on their own?

What are common errors when performing a cricothyroidotomy?

What condition warrants oxygenation in TFC according to the TCCC Guidelines?

ANY QUESTIONS?

REFERENCES



TCCC: Guidelines

by JTS/CoTCCC

These guidelines, updated regularly, are the result of decisions made by CoTCCC in exploring evidence-based research on best practices.

PHTLS: Military Edition, Chapter 25

by NAEMT

Prehospital Trauma Life Support,
Military Ninth Edition