CRICOTHYROIDOTOMY
(Emergency Surgical Airway)

Curriculum for Cricothyroidotomy

Training Package created by:
Theepica Jeyarajah, MS; Joseph Lopreiato, MD, MPH;
Rachael Dampman, BS; Mark Bowyer, MD

USU
Uniformed Services University

TRAINING DOCUMENTS

INSTRUCTOR

STUDENTS

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Congratulations! You are about to lead a training on a life-saving procedure, Cricothyroidotomy.

This is a comprehensive guide that includes all documentation needed for both you, the instructor, as well as students. Pay special attention to the pages in this training booklet, as they are noted as **"Instructor Documents"** and **"Student Documents"**. Each section includes its own set of documentation that will be used throughout the training. You are encouraged to look through the pages before leading a training session. Additionally, this package includes a comprehensively narrated Curriculum presentation – play this presentation at the beginning of the session to give students and learners a broad overview of Cricothyroidotomy and why it is the preferred procedure for an emergency surgical airway. The PowerPoint is self-narrated – you may pause the presentation at any time to ensure all students can take notes or ask questions. All information in the presentation will provide students ample knowledge to succeed in this training. Encourage students to take their notes packet home as a resource to refer back to. Supplemental refresher tools, such as the Virtual Reality Cricothyroidotomy application (for Android and Apple devices) and the Cricothyroidotomy Refresher Card (Printable) are available to students after the training to stay refreshed on essential information from the training.

En Route Care Surgical Cricothyroidotomy Training Can Save Lives: Infographic

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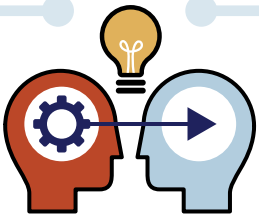
Surgical Cricothyroidotomy (SC)
is a lifesaving procedure for patients with airway compromise.

The Joint Trauma Tracking Registry found
only 68%
of en route SC's were successful.



A Mastery Learning model allows learners to practice with coaching as many times as needed to reach competence.

Training gaps among military healthcare providers include:

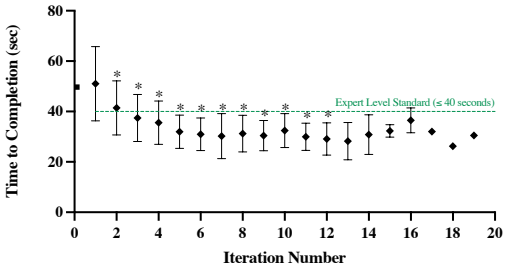
Limited knowledge of anatomy

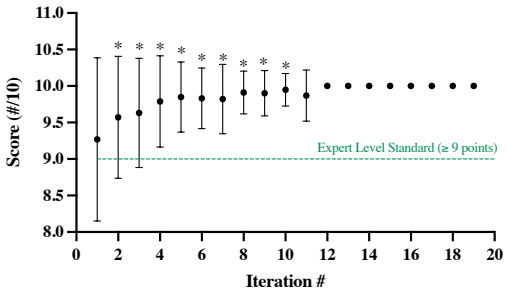
Insufficient "hands-on" learning

Non-standardized procedural checklists for SC

Limited opportunities for refresher training

POWERED BY VALIDATION DATA:





(Top) Data collected from 89 novice learners shows that the minimum number of practice attempts needed to achieve a perfect checklist score is seven attempts.

(Bottom) Data collected from the same cohort show that the number of practice attempts to achieve the target completion of the SC in under 40 seconds is ten attempts.

The Uniformed Services University of the Health Sciences (USU), 4301 Jones Bridge Rd., A1040C, Bethesda, MD 20814-4799 is the awarding and administering office.

This project was sponsored by the Uniformed Services University of the Health Sciences (USU, Award Number HU00012120018); however, the information or content and conclusions do not necessarily represent the official position or policy of, nor should any official endorsement be inferred on the part of, USU, the Department of Defense, or the U.S. Government.

Training Documents

INSTRUCTOR

GETTING STARTED: INSTRUCTOR ROLES AND RESPONSIBILITIES

Use this Roles and Responsibilities' Worksheet to guide each phase of the Surgical Cricothyroidotomy (SC) training. The Instructor will provide guidance, mentored hands-on training, and will evaluate learners, preferably in an austere medical environment. The bolded items refer to documents included in this training package – use the respective documents needed in each phase of the training outlined below.

Phase 1 - INTRODUCTIONS & DIDACTICS: Once students have been directed to the training room/ station, the Instructor begins training.

- Prepare learning materials - print a copy of the **Instructor Materials** for yourself, and adequate copies of the **Student Materials** for each student.
- Play the **Surgical Cricothyroidotomy PowerPoint** - this is a fully narrated presentation. You can pause at any time to take questions or to reinforce a point. All critical information is included in the narration. You may use the **Instructor Notes** Page for your reference if need be. Encourage students to take notes on their **Student Notes** pages.
- An optional Knowledge test can be administered after the PowerPoint presentation. You may elect to review answers with students. The **Knowledge Test Answer Key** is provided in your instructor materials.
- *This should take ~30 minutes to complete.*

Phase 2 - HANDS ON TRAINING: After Didactic Phase, consider moving to a different space with pre-set stations to start the Hands-on Training Phase.

- Set up stations with Cric Simulators (This can be a manikin or task trainer) and all surgical equipment needed.
  - Equipment List - See *Slide 10 of the PowerPoint Presentation*.
  - Review with the students all necessary equipment to perform the procedure.
    - (See **Training Set-Up Suggestions**)
  - Introducing the Cricothyroidotomy Simulator.
  - Demonstrate proper identification of landmarks on the model.
  - Demonstrate drawing landmarks on the model.
  - *This should take ~10 minutes to complete.*
- Demonstrate the procedure to the class:
  - Review proper usage and safety mechanisms of surgical tools.
  - Using the **Cric Procedural Checklist**, a student will read aloud each step while the instructor demonstrates it in real time.
  - The instructor can then choose a second student to read the checklist step-by-step while the first student completes the procedure in real time.
  - *This should take ~15 minutes to complete.*
- Full practice by students using the *Mastery Learning Model*
  - At each training table, students complete individual landmark identification on the simulator, and after instructor approval, may run through the entire procedure using the checklist at each table.
  - Students should practice all steps in the procedure, use a stopwatch or timer, and mark their progress on the **Practice Log**.
  - Ensure each student reviews the steps they took by referring back to the checklist in order to determine their practice score for each attempt.
  - The instructor can move about and provide feedback during practice.
  - Students are ready to test once the practice log has been reviewed by the instructor and the student can do the procedure at least twice consecutively under 40 seconds, with 9/10 items on the checklist completed, and no critical steps missed.
    - Critical steps are designated with an asterisk on the checklist. These are steps #3 and #8
  - On average, most students will need 10 practice attempts to complete the SC in under 40 seconds and achieve at least a 9/10 checklist score.
  - *This can take anywhere from ~20-30 minutes depending on the learner and class size.*

Phase 3 - SUMMATIVE EVALUATION: In the austere testing environment, prepare to evaluate students.

- Set up the SC Simulator in an austere environment or training lane.
- Evaluate student performance using the **Cricothyroidotomy Procedural Checklist** and a timer.
- Do not provide feedback during the test out.
- A passing performance is defined as
  - Successful completion of the procedure in under 40 seconds
  - 9/10 items on the checklist completed
  - No missing critical items
- Provide feedback following completion of procedure, retest if necessary.
- *This can take anywhere from ~20-30 minutes depending on the learner and class size*

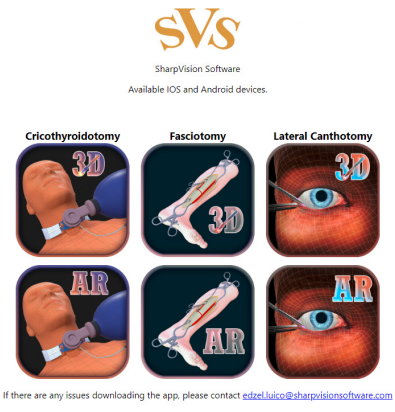
Phase 4 - DEBRIEF: Post-Summative Evaluation

- Review performance and provide suggestions to students as needed.
- *This can take ~5-20 minutes.*

POST TRAINING - Suggested Refresher Tools

- Encourage students to refresh their knowledge periodically after the training by doing the following:
  - The **Virtual Reality Cricothyroidotomy Application** (Android/Apple, pictured below) is available here:
    iOS: **http://battlefieldarassist.us/**
    Android: **https://drive.google.com/drive/folders/1dlW-91rve8iKvMKYuSZjhBB4t1MJ298O**.
    Encourage students to download the app after the training. The app can be accessed at any time to refresh their memory on knowledge and procedural practice. This application can be used to view a Cricothyroidotomy demonstration, as well as testing knowledge and skills.
  - Printable **Cricothyroidotomy Pocket Card** - Students can keep pocket cards for quick access to review Cric steps – the card is included in the student documents (pictured below).

On the PocketCard Page, add link and the above text about the VR application—this should be the 2nd to last page, the reference page will be the end of the booklet.



CRIC Procedure Pocket Card	
1	Stabilize Trachea with non-dominant hand (may use "Kung-fu grip")
2	Palpated for landmarks
*3	Vertical skin incision (correct location and 2-3 cm)
4	Re-palpate to identify cricothyroid membrane
5	Horizontal incision through cricothyroid membrane (1 cm)
6	Dilate incision with back of scalpel
7	Re-stabilize trachea for tube insertion (utilizing tracheal hook, finger grip, or leaving back of scalpel in incision)
*8	Inserts cricothyroidotomy tube into airway
9	Inflate balloon and remove inner cannula
10	Confirm with ventilation

Event Flow and Training Locations (Fillable Sheet)

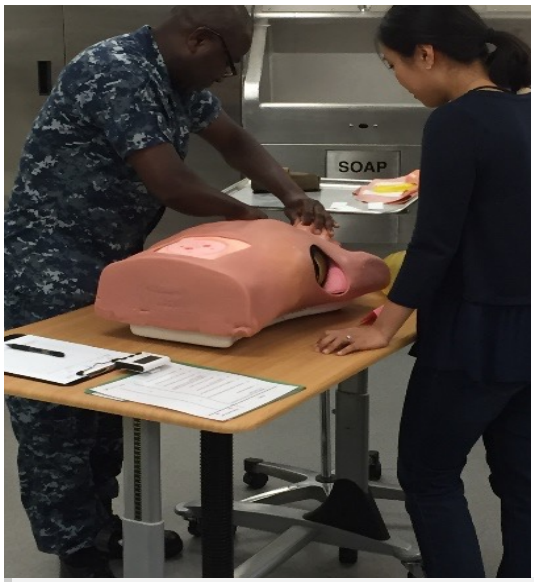
EVENT FLOW AND TRAINING LOCATIONS

Instructions: Use this Fillable Worksheet to assist in planning your training. You may want to designate spaces based on the Sub-Components of each training phase detailed below and in the "Getting Started Guide" on the previous pages.

Phases	Sub-Components	Room Location (Fill-In)
Introduction	• Introductions and Housekeeping • Review of Training • Review of Trainee expectations	
Phase 1: Didactic Training	• PowerPoint Curriculum • Knowledge Test and Review of Answers (Optional)	
Phase 2: Hands on Training	• Surgical Equipment Review • Demo of Cricothyroidotomy on task trainer by SME/Instructor and Checklist Review • Mentored practice on model • Trainees can ask questions before evaluation	
Phase 3: Testing	• Cricothyroidotomy Procedure Testing (In a "testing" environment)	
Phase 4: Post Procedures	• If trainee fails, provide extensive review with PowerPoint and Checklist • Allow trainee to retest	
Debriefing	• Subject debrief of performance	

Additional components:	Room Location
Independent study	
Breaks	

TRAINING SET-UP SUGGESTIONS: Consider the following ideas when setting up your training.

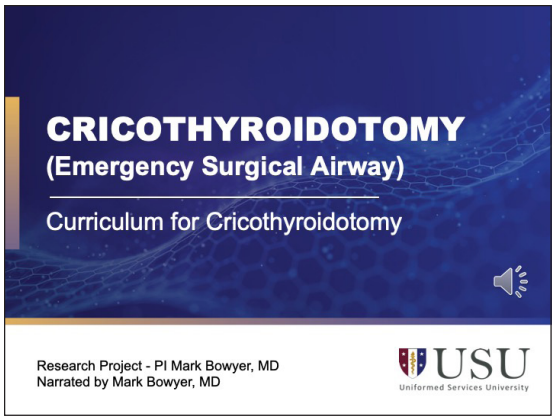


Consider setting up a multi-station room for hands-on training and practice. Subject Matter Experts (SMEs) or Instructors can circulate around the room as trainees practice and provide feedback as needed.

Suggested Task Trainer: SimuCric Surgical Airway Training Simulator by SIMULAB.

Optional suggestion, Full Body Manikin - Consider creating an austere environment that simulates a realistic field-scenario.

Instructions: Here is a preview of the slides in the PowerPoint Presentation. The PowerPoint is self-narrated – you may pause the presentation at any time to ensure all students can take notes or ask questions.



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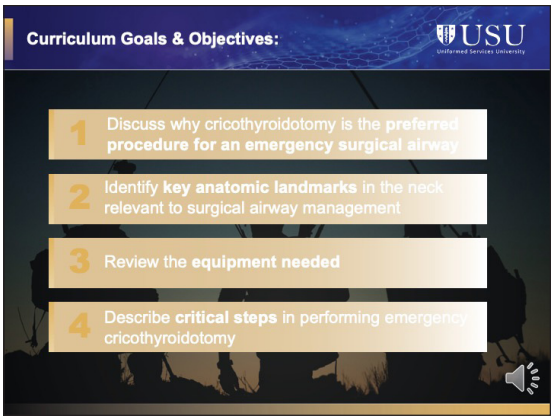

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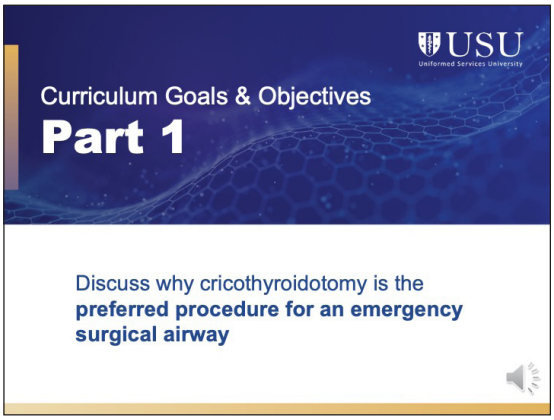

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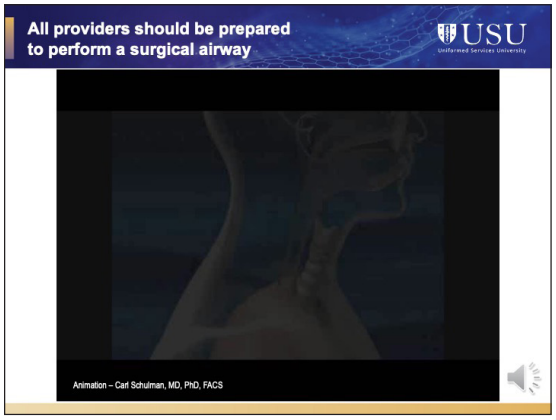

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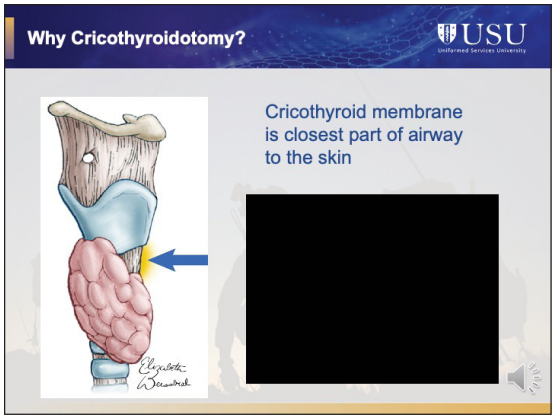
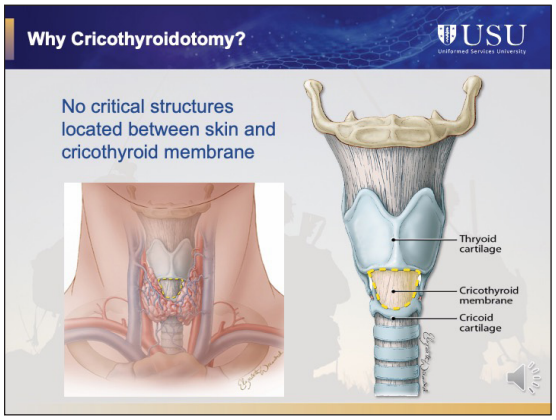
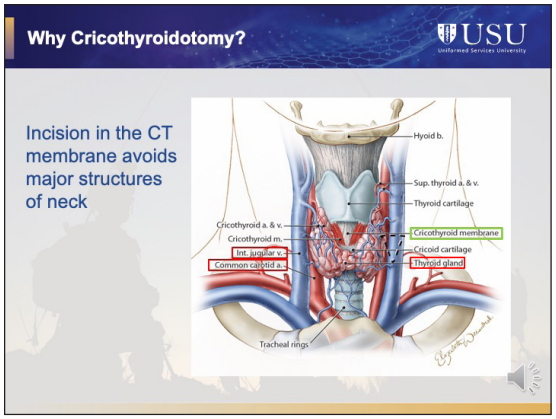

Why Cricothyroidotomy?
USU
Cricothyroid membrane is closest part of airway to the skin

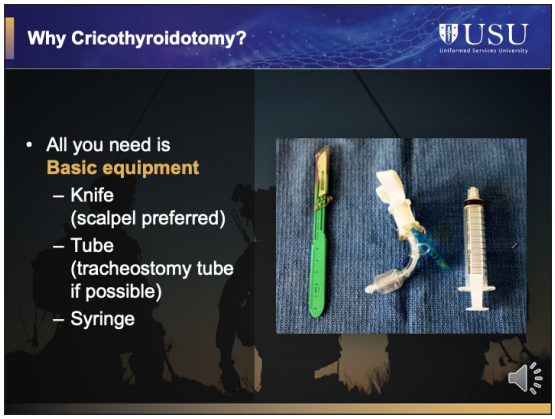
7


Why Cricothyroidotomy?
USU
No critical structures located between skin and cricothyroid membrane
Thyroid cartilage
Cricothyroid membrane
Cricoid cartilage

8


Why Cricothyroidotomy?
USU
Incision in the CT membrane avoids major structures of neck
Hyoid b.
Sup. thyroid a. & v.
Thyroid cartilage
Cricothyroid a. & v.
Cricothyroid m.
Int. jugular v.
Common carotid a.
Cricothyroid membrane
Cricoid cartilage
Thyroid gland
Tracheal rings

9


Why Cricothyroidotomy?
USU
All you need is
Basic equipment
– Knife (scalpel preferred)
– Tube (tracheostomy tube if possible)
– Syringe

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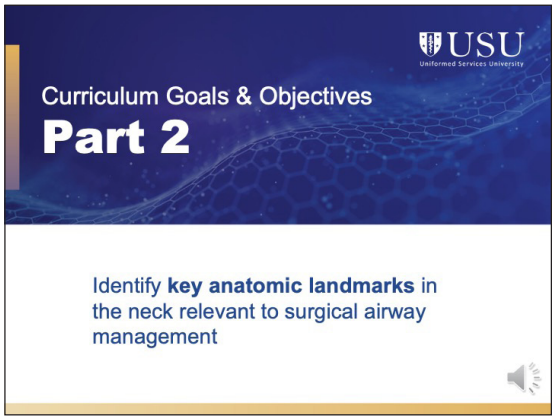
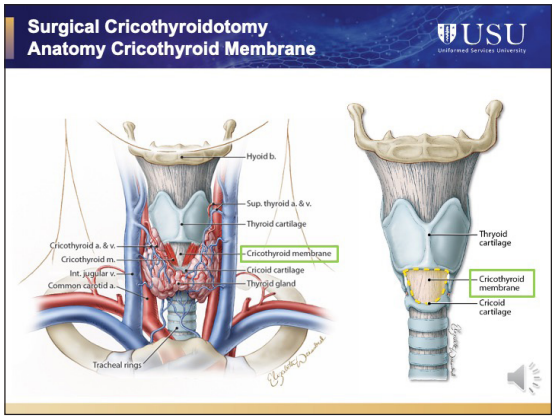
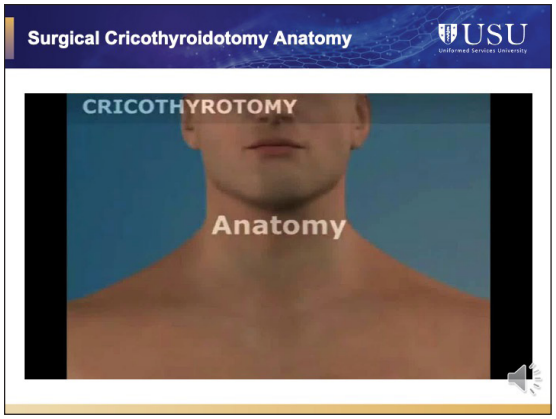

USU
Curriculum Goals & Objectives
Part 2
Identify key anatomic landmarks in the neck relevant to surgical airway management

11


Surgical Cricothyroidotomy
Anatomy Cricothyroid Membrane
USU
Hyoid b.
Sup. thyroid a. & v.
Thyroid cartilage
Cricothyroid a. & v.
Cricothyroid m.
Int. jugular v.
Common carotid a.
Cricothyroid membrane
Cricoid cartilage
Thyroid gland
Tracheal rings
Thyroid cartilage
Cricothyroid membrane
Cricoid cartilage

12



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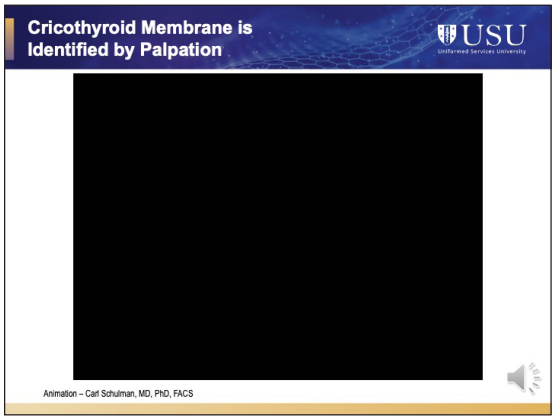

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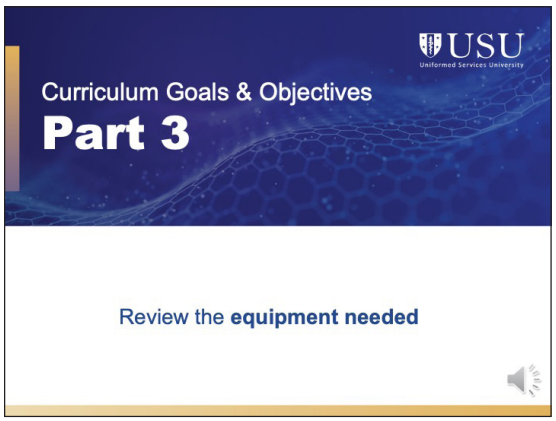

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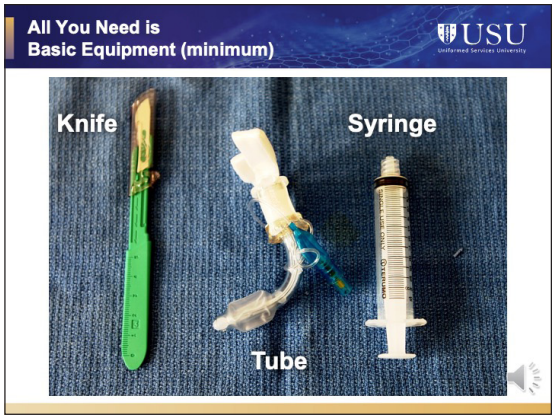

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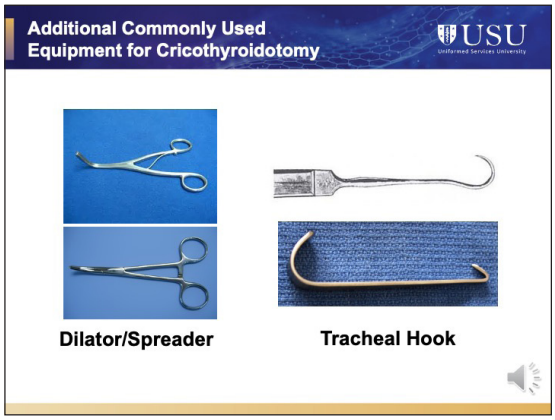

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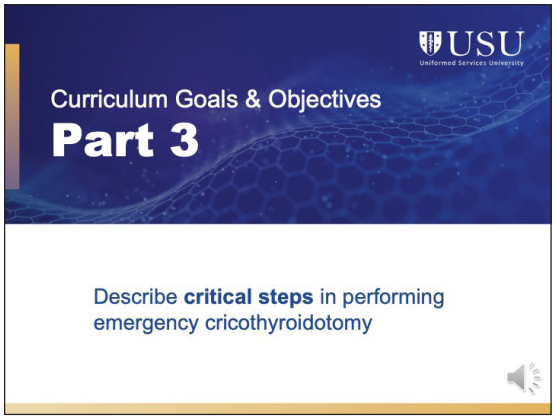

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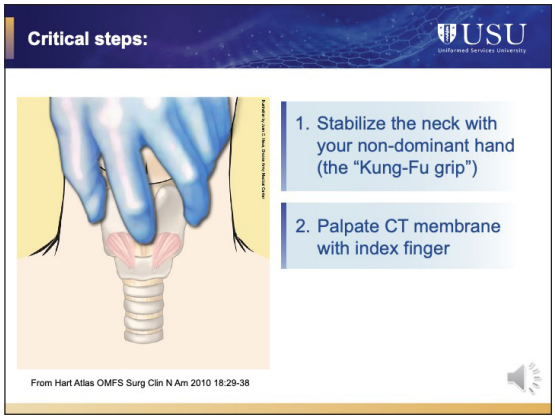

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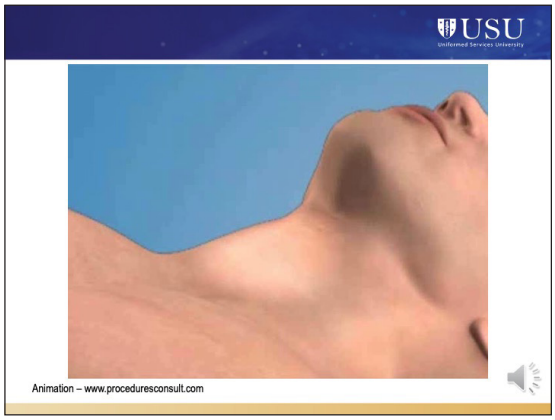

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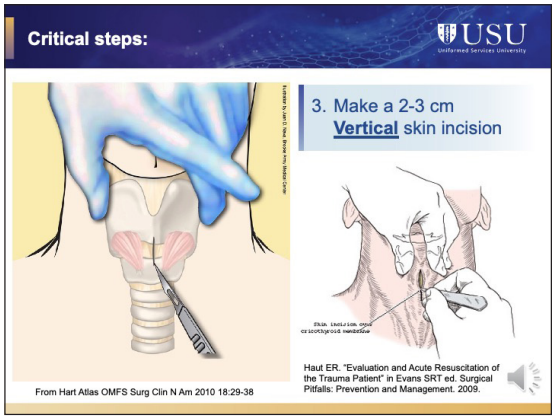

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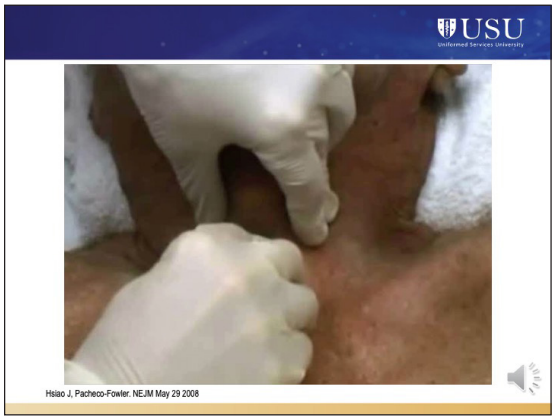

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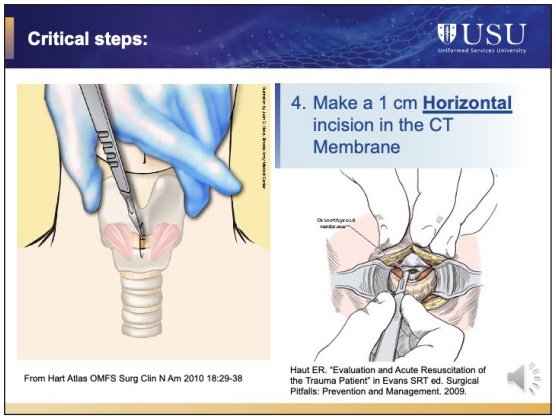

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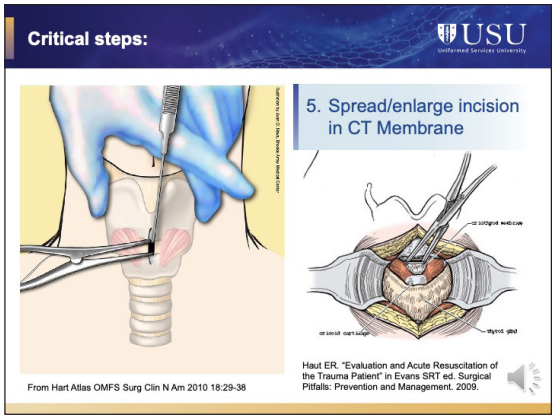

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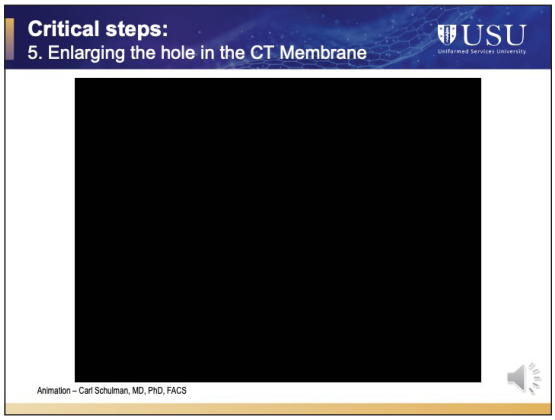

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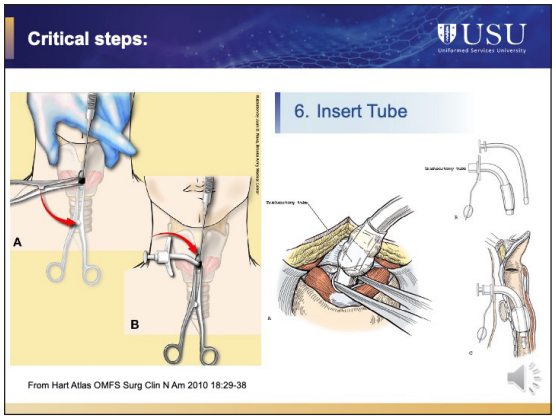

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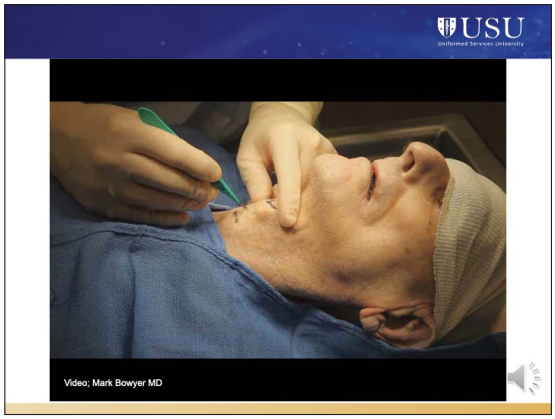

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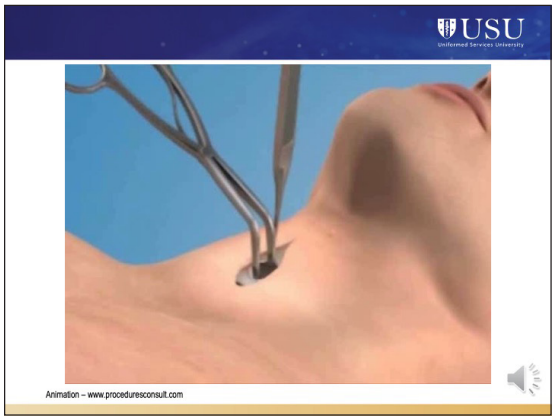

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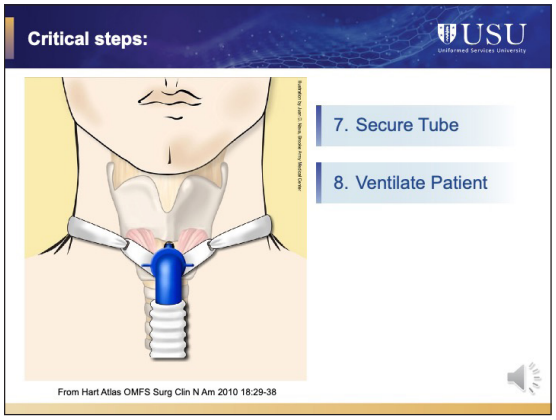

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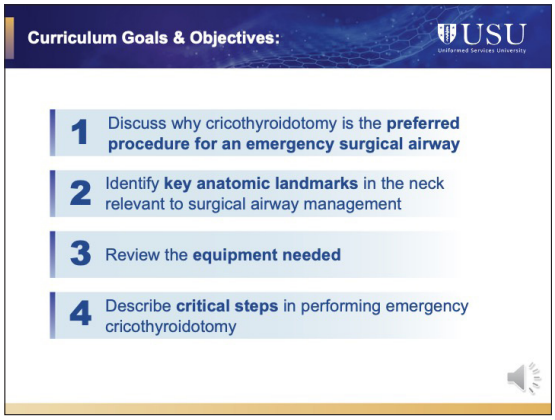

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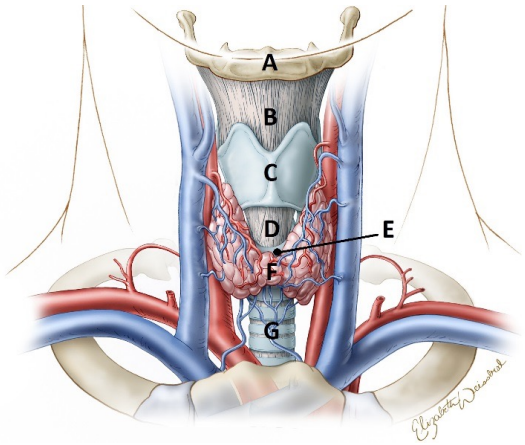
Any questions or inquiries can be directed to Dr. Mark Bowyer, email: mark.bowyerusuhs.edu

Instructions: Assess your knowledge on Cricothyroidotomy using this quiz.

1. Please insert the letter in the picture next to the anatomical structure it represents:



__F__ Thyroid Isthmus

__C__ Thyroid Cartilage

__D__ Cricothyroid Membrane

__A__ Hyoid Bone

__G__ Trachea

__E__ Cricoid Cartilage

__B__ Thyroid Membrane

2. Please indicate (with an X or check mark) which of the following pieces of equipment are essential (the bare minimum) needed for performing an Emergency Cricothyroidotomy:

a. _____ Povidone Iodine Prep

b. __X__ A Syringe

c. __X__ An endotracheal or tracheostomy tube

d. _____ A tracheal Hook

e. __X__ A Scalpel

f. _____ Local Anesthesia

g. __X__ Ties to secure the tube

h. _____ A Tracheal Dilator

3.True or False: The cricothyroid membrane is the closest part of the neck airway to the skin:

__X__ TRUE _____ FALSE

4. Prioritize the correct sequence of steps required to perform an Emergency Cricothyroidotomy with 1 being the most important (select only those which are essential):

____ Cleanse the neck with iodine

__4__ Identify the Cricothyroid Membrane via palpation

__3__ Midline vertical skin incision

__9__ Inflate the balloon and remove cannula

____ Vertical incision Cricothyroid Membrane

__8__ Insert the tube

____ Horizontal incision between tracheal rings

____ Infiltrate incisions with local anesthesia

__*11__ Secure the tube

__2__ Palpate for Landmarks

__1__ Stabilize the neck with a 'Kung-Fu" grip

____ Horizontal skin incision

__5__ Horizontal incision Cricothyroid Membrane

__10__ Ventilate the patient

__6__ Dilate hole in membrane with back of scalpel

____ Vertical incision between tracheal rings

__7__ Stabilize incisions

** Trainees may want to assemble necessary equipment before performing an emergency CRIC including testing the balloon.*

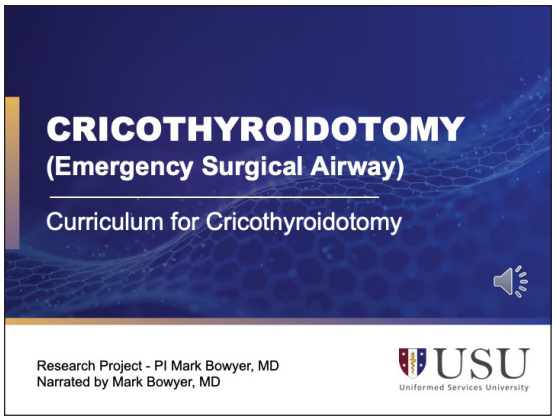
END OF THE INSTRUCTOR TRAINING GUIDE

Training Documents

STUDENTS

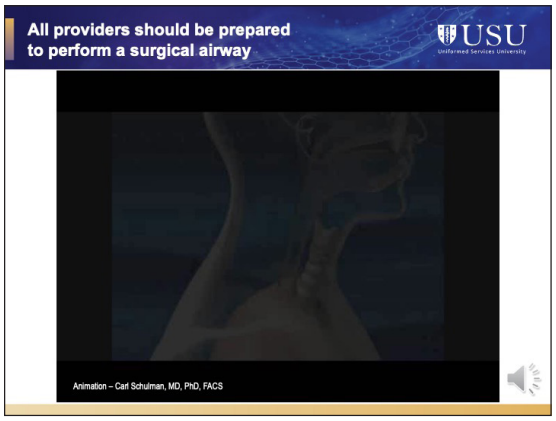
WARNING:
The following content includes graphic images.

Instructions: Here is a preview of the slides in the PowerPoint Presentation. You are encouraged to take notes or ask questions as needed.

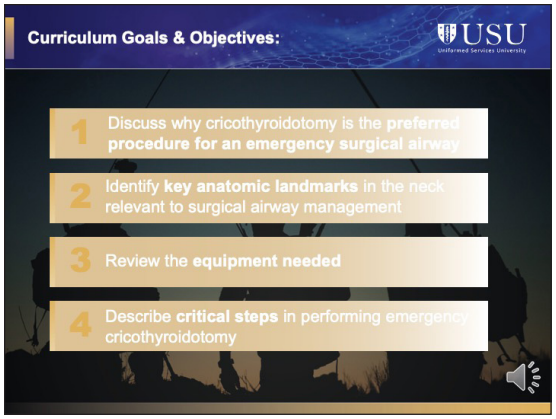


1

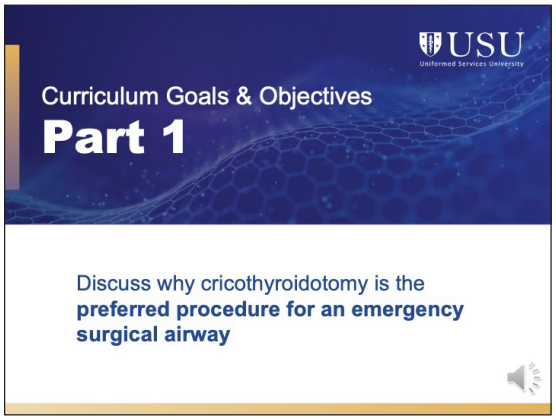
2



3


Curriculum Goals & Objectives:
USU
Uniformed Services University
1 Discuss why cricothyroidotomy is the preferred procedure for an emergency surgical airway
2 Identify key anatomic landmarks in the neck relevant to surgical airway management
3 Review the equipment needed
4 Describe critical steps in performing emergency cricothyroidotomy

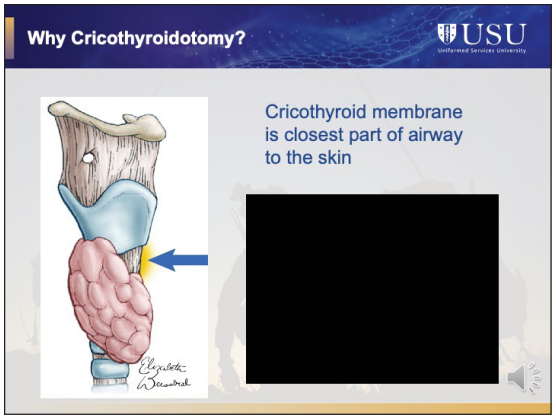
4


USU
Uniformed Services University
Curriculum Goals & Objectives
Part 1
Discuss why cricothyroidotomy is the preferred procedure for an emergency surgical airway

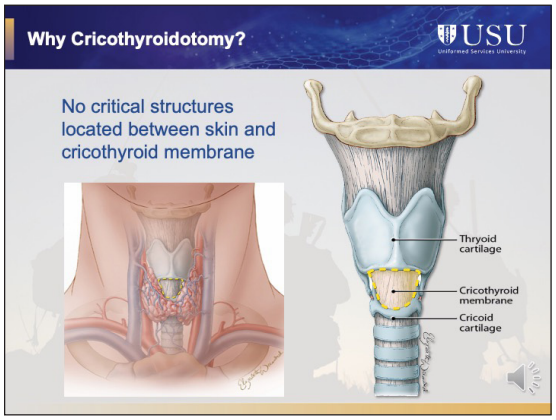
5


Why Cricothyroidotomy?
USU
Uniformed Services University
Time is critical in the EMERGENCY surgical airway
Ideally want…
Fastest Route
Safest Route
Basic Equipment

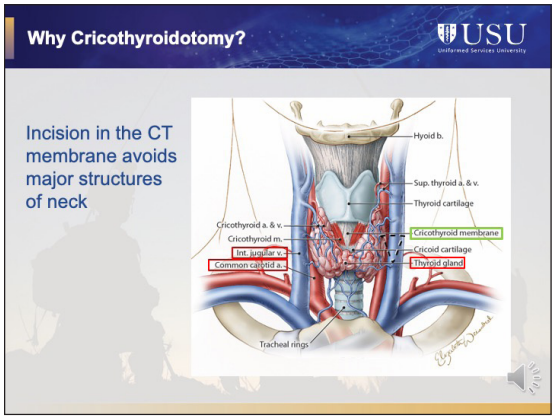
6


Why Cricothyroidotomy?
USU
Cricothyroid membrane is closest part of airway to the skin

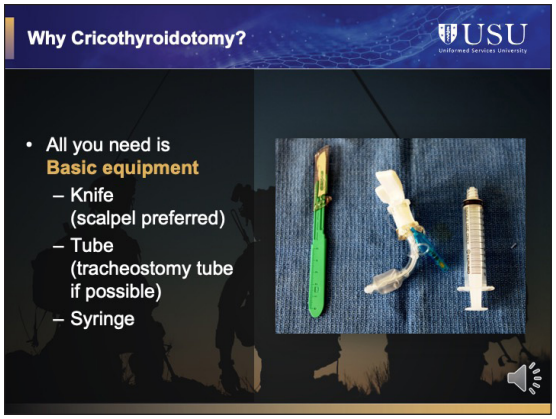
7


Why Cricothyroidotomy?
USU
No critical structures located between skin and cricothyroid membrane
Thryoid cartilage
Cricothyroid membrane
Cricoid cartilage

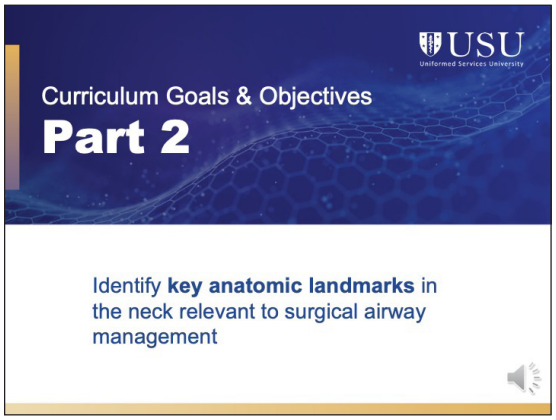
8


Why Cricothyroidotomy?
USU
Incision in the CT membrane avoids major structures of neck
Hyoid b.
Sup. thyroid a. & v.
Thyroid cartilage
Cricothyroid a. & v.
Cricothyroid m.
Int. jugular v.
Common carotid a.
Cricothyroid membrane
Cricoid cartilage
Thyroid gland
Tracheal rings

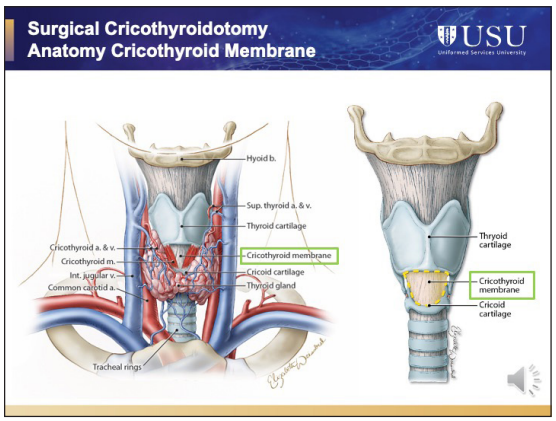
9


Why Cricothyroidotomy?
USU
Uniformed Services University
• All you need is
Basic equipment
– Knife
(scalpel preferred)
– Tube
(tracheostomy tube
if possible)
– Syringe

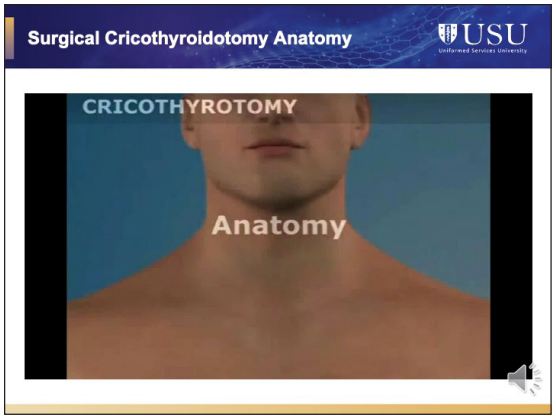
10


USU
Uniformed Services University
Curriculum Goals & Objectives
Part 2
Identify key anatomic landmarks in the neck relevant to surgical airway management

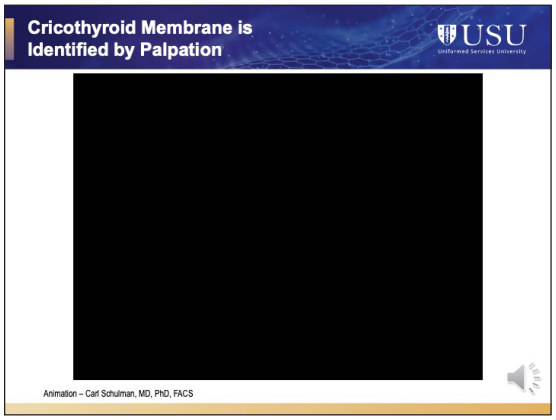
11


Surgical Cricothyroidotomy
Anatomy Cricothyroid Membrane
USU
Uniformed Services University
Hyoid b.
Sup. thyroid a. & v.
Thyroid cartilage
Cricothyroid a. & v.
Cricothyroid membrane
Cricothyroid m.
Cricoid cartilage
Int. jugular v.
Thyroid gland
Common carotid a.
Tracheal rings
Thyroid cartilage
Cricothyroid membrane
Cricoid cartilage

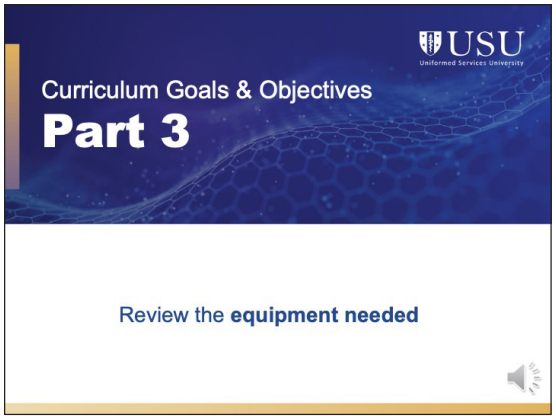
12


Surgical Cricothyroidotomy Anatomy
USU
CRICOTHYROTOMY
Anatomy

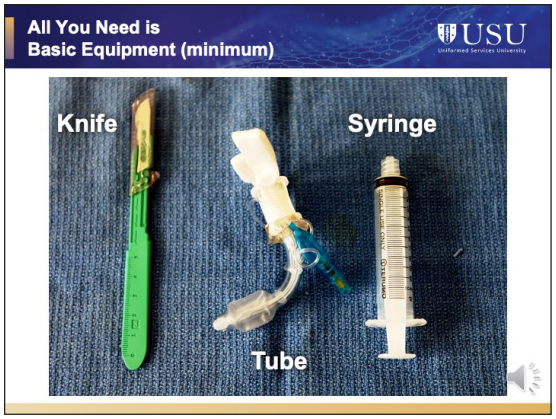
13


Cricothyroid Membrane is Identified by Palpation
USU
Animation – Carl Schulman, MD, PhD, FACS

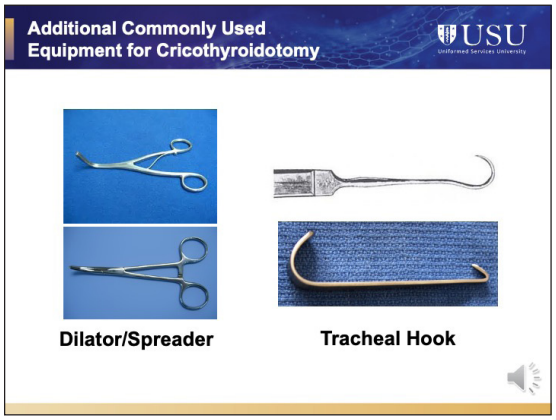
14


USU
Curriculum Goals & Objectives
Part 3
Review the equipment needed

15


All You Need is
Basic Equipment (minimum)
USU
Knife
Syringe
Tube

16


Additional Commonly Used
Equipment for Cricothyroidotomy
USU
Dilator/Spreader
Tracheal Hook

17


Prepackaged
Cricothyroidotomy Kits
USU

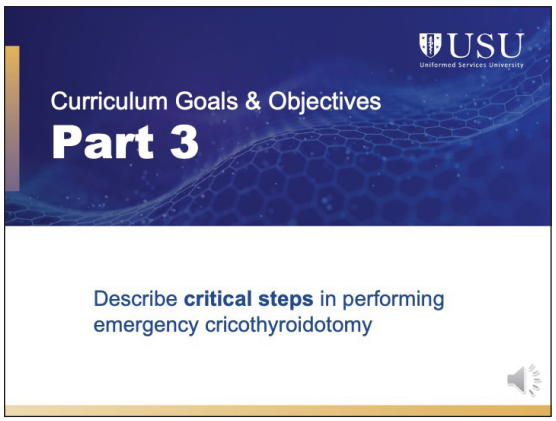
18


The Tactical Crickit –
(Will be used in this study)
USU
Uniformed Services University
TACTICAL CRICKIT
Tactical Cricothyroidotomy Kit

19

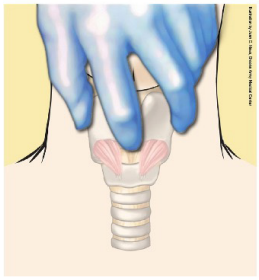

The Tactical Crickit –
(Will be used in this study)
USU
Uniformed Services University
Knife
Tube &
syringe
Hook
TACTICAL CRICKIT
Tactical Cricothyroidotomy Kit

20


USU
Uniformed Services University
Curriculum Goals & Objectives
Part 3
Describe **critical steps** in performing
emergency cricothyroidotomy

21

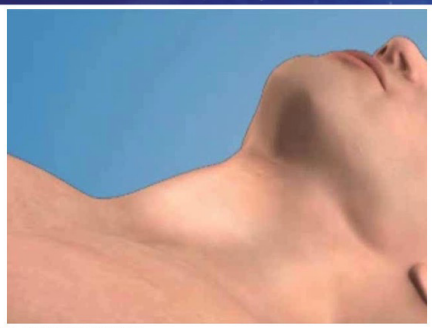
Critical steps:



1. Stabilize the neck with your non-dominant hand (the "Kung-Fu grip")
2. Palpate CT membrane with index finger

From Hart Atlas OMFS Surg Clin N Am 2010 18:29-38

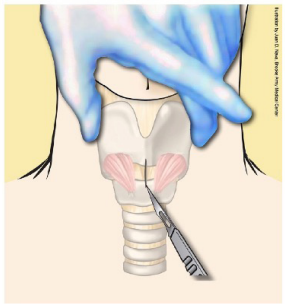
22



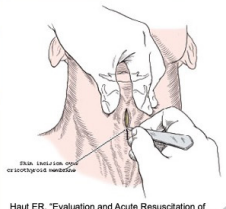
Animation – www.proceduresconsult.com

23

Critical steps:



3. Make a 2-3 cm **Vertical** skin incision



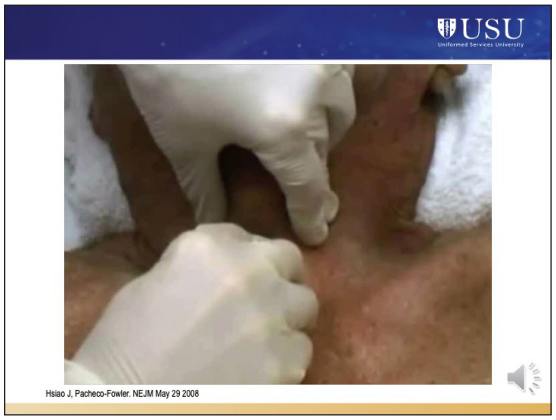
From Hart Atlas OMFS Surg Clin N Am 2010 18:29-38

Haut ER. "Evaluation and Acute Resuscitation of the Trauma Patient" in Evans SRT ed. Surgical Pitfalls: Prevention and Management. 2009.

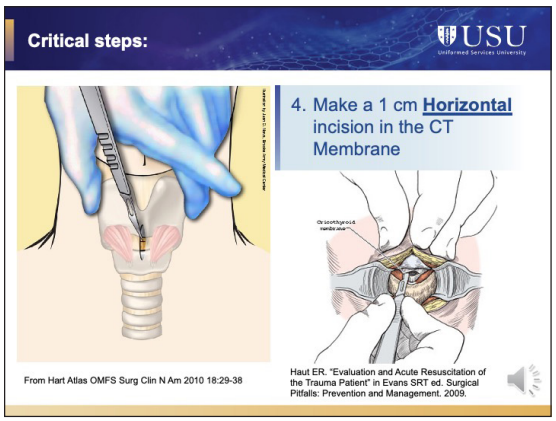
24


USU
Uniformed Services University
Animation – www.proceduresconsult.com

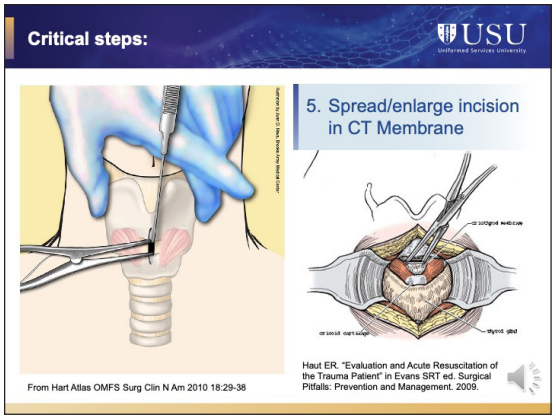
25


USU
Uniformed Services University
Hsiao J, Pacheco-Fowler. NEJM May 29 2008

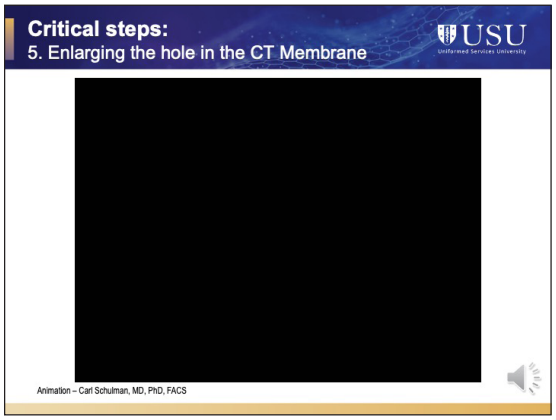
26


Critical steps:
USU
Uniformed Services University
4. Make a 1 cm Horizontal incision in the CT Membrane
From Hart Atlas OMFS Surg Clin N Am 2010 18:29-38
Haut ER. "Evaluation and Acute Resuscitation of the Trauma Patient" in Evans SRT ed. Surgical Pitfalls: Prevention and Management. 2009.

27


Critical steps:
USU
Uniformed Services University
5. Spread/enlarge incision in CT Membrane
From Hart Atlas OMFS Surg Clin N Am 2010 18:29-38
Haut ER. "Evaluation and Acute Resuscitation of the Trauma Patient" in Evans SRT ed. Surgical Pitfalls: Prevention and Management. 2009.

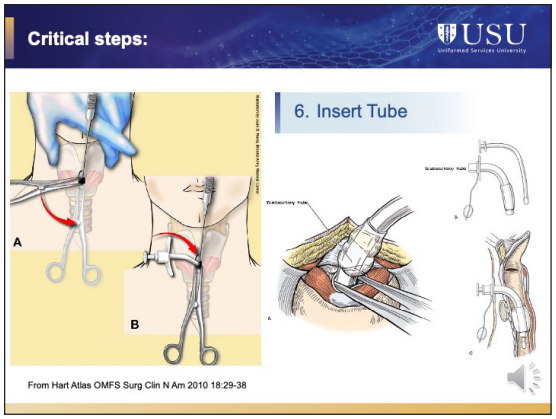
28


Critical steps:
5. Enlarging the hole in the CT Membrane
USU
Uniformed Services University
Animation – Carl Schulman, MD, PhD, FACS

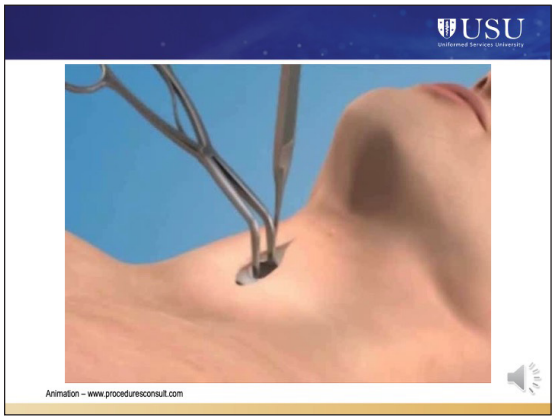
29


USU
Uniformed Services University
Animation – www.proceduresconsult.com

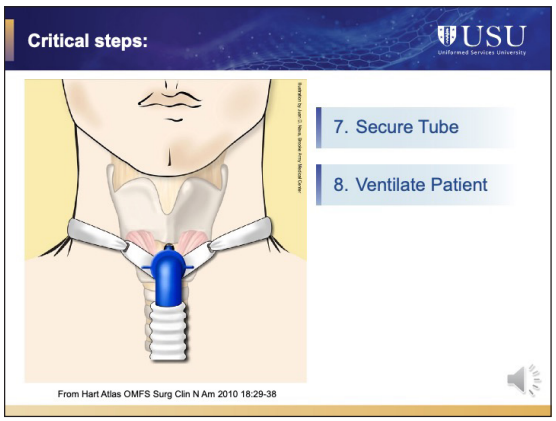
30


Critical steps:
USU
Uniformed Services University
6. Insert Tube
A
B
From Hart Atlas OMFS Surg Clin N Am 2010 18:29-38

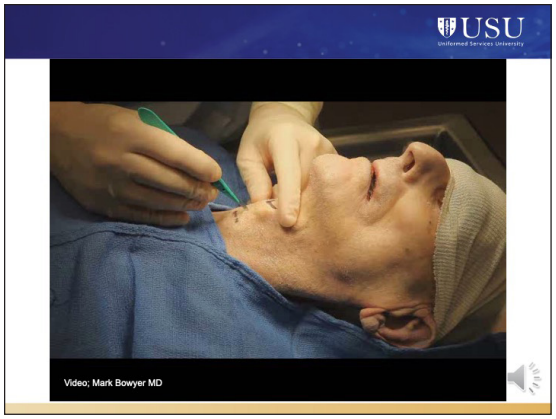
31


USU
Uniformed Services University
Animation – www.proceduresconsult.com

32


Critical steps:
USU
Uniformed Services University
7. Secure Tube
8. Ventilate Patient
From Hart Atlas OMFS Surg Clin N Am 2010 18:29-38

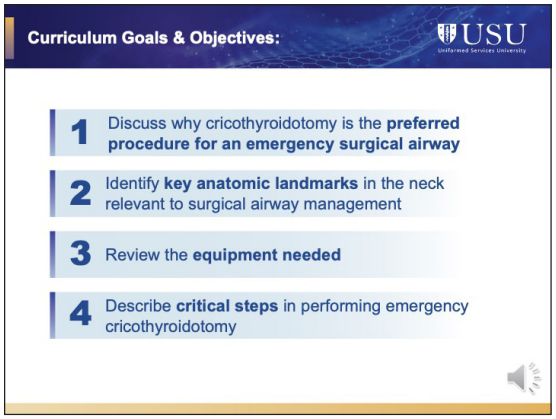
33


USU
Uniformed Services University
Video; Mark Bowyer MD

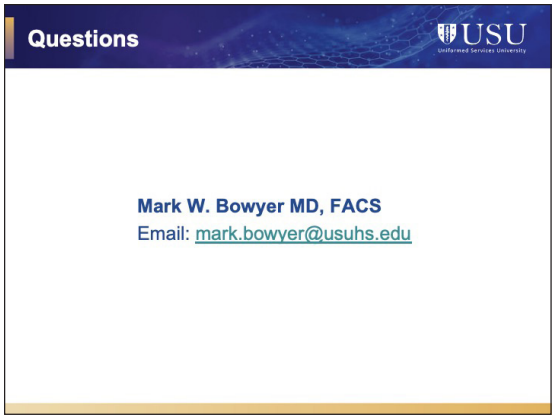
34


USU
Uniformed Services University
Video; Peter Rhee MD

35


Curriculum Goals & Objectives:
USU
Uniformed Services University
1 Discuss why cricothyroidotomy is the preferred procedure for an emergency surgical airway
2 Identify key anatomic landmarks in the neck relevant to surgical airway management
3 Review the equipment needed
4 Describe critical steps in performing emergency cricothyroidotomy

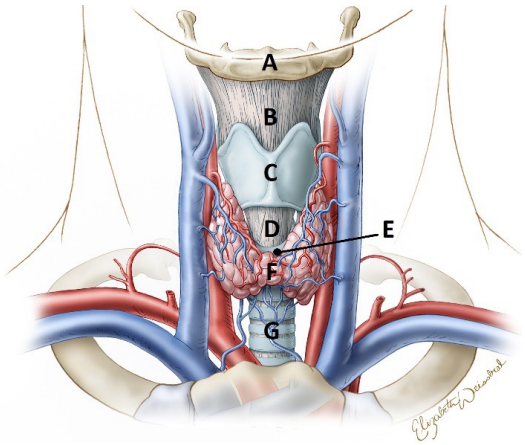
36


Questions
USU
Uniformed Services University
Mark W. Bowyer MD, FACS
Email: mark.bowyer@usuhs.edu

37

Instructions: Assess your knowledge on Cricothyroidotomy using this quiz.

1. Please insert the letter in the picture next to the anatomical structure it represents:



_____ Thyroid Isthmus

_____ Thyroid Cartilage

_____ Cricothyroid Membrane

_____ Hyoid Bone

_____ Trachea

_____ Cricoid Cartilage

_____ Thyroid Membrane

2. Please indicate (with an X or check mark) which of the following pieces of equipment are essential (the bare minimum) needed for performing an Emergency Cricothyroidotomy:

a. _____ Povidone Iodine Prep

b. _____ A Syringe

c. _____ An endotracheal or tracheostomy tube

d. _____ A tracheal Hook

e. _____ A Scalpel

f. _____ Local Anesthesia

g. _____ Ties to secure the tube

h. _____ A Tracheal Dilator

3.True or False: The cricothyroid membrane is the closest part of the neck airway to the skin:

_____ TRUE _____ FALSE

4. Prioritize the correct sequence of steps required to perform an Emergency Cricothyroidotomy with 1 being the most important (select only those which are essential):

____ Cleanse the neck with iodine

____ Identify the Cricothyroid Membrane via palpation

____ Midline vertical skin incision

____ Inflate the balloon and remove cannula

____ Vertical incision Cricothyroid Membrane

____ Insert the tube

____ Horizontal incision between tracheal rings

____ Infiltrate incisions with local anesthesia

____ Secure the tube

____ Palpate for Landmarks

____ Stabilize the neck with a 'Kung-Fu" grip

____ Horizontal skin incision

____ Horizontal incision Cricothyroid Membrane

____ Ventilate the patient

____ Dilate hole in membrane with back of scalpel

____ Vertical incision between tracheal rings

____ Stabilize incisions

Name: _____

Instructions: Use the procedural checklist below to guide you, step-by-step, on how to perform the Cricothyroidotomy. Steps 3 and 8 on the Cricothyroidotomy Procedural Checklist are considered critical steps for a successful Surgical Cricothyroidotomy (SC). If one or both critical steps are not completed correctly, the attempt should be scored as a failed attempt.

With stop watch total time: _____ min/sec **(40s or less is the required standard)**

	Criteria	Criteria performed? Yes	No
1	Stabilize Trachea with non-dominant hand (may use "Kung-fu grip")		
2	Palpated for landmarks		
*3	Vertical skin incision (correct location and 2-3 cm)		
4	Re-palpate to identify cricothyroid membrane		
5	Horizontal incision through cricothyroid membrane (1 cm)		
6	Dilate incision with back of scalpel		
7	Re-stabilize trachea for tube insertion (utilizing tracheal hook, finger grip, or leaving back of scalpel in incision)		
*8	Inserts cricothyroidotomy tube into airway		
9	Inflate balloon and remove inner cannula		
10	Confirm with ventilation		

Score _____/ 10

Did trainee complete both critical items? Y / N

Did trainee meet criteria? Y / N (**Score > 9/10**, completed both critical items)

Comments:

_____

_____

_____

_____

Name: _____

Instructions: Use the practice log to track practice progress and opportunities for improvement. Note that Steps 3 and 8 on the **Cricothyroidotomy Procedural Checklist** are considered critical steps for a successful Surgical Cricothyroidotomy (SC). If one or both critical steps are not completed correctly, the attempt should be scored as a failed attempt. Ensure steps are completed correctly (by confirming with the instructor) and under 40 seconds to be scored as a successful passing attempt. Practice until comfortable or at least 10 practice attempts before testing.

Practice Attempt #	Total Time to completion (sec)	Checklist Score (x/10)	Comments
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			

To be completed by Instructor:

By what attempt was the student ready for testing? _____

Instructor Sign-off: _____

Printable Pocket Card: Keep this card for quick reference and access to review the Cricothyroidotomy steps in case an emergent surgical airway is needed.

	CRIC Procedure Pocket Card
1	Stabilize Trachea with non-dominant hand (may use "Kung-fu grip")
2	Palpated for landmarks
*3	Vertical skin incision (correct location and 2-3 cm)
4	Re-palpate to identify cricothyroid membrane
5	Horizontal incision through cricothyroid membrane (1 cm)
6	Dilate incision with back of scalpel
7	Re-stabilize trachea for tube insertion (utilizing tracheal hook, finger grip, or leaving back of scalpel in incision)
*8	Inserts cricothyroidotomy tube into airway
9	Inflate balloon and remove inner cannula
10	Confirm with ventilation

PRINTING INSTRUCTIONS

1. Print this card out, preferably on cardstock
2. Cut out card on dotted lines
3. Place card in wallet or in an easily accessible place for easy reference when needed
4. Optional – Laminate if possible

The **Virtual Reality Cricothyroidotomy Application** (Android/Apple, pictured below) is available here:

iOS: **http://battlefieldarassist.us/**

Android: **https://drive.google.com/drive/folders/1dlW-91rve8iKvMKYuSZjhBB4t1MJ298O**.

Encourage students to download the app after the training. The app can be accessed at any time to refresh their memory on knowledge and procedural practice. This application can be used to view a Cricothyroidotomy demonstration, as well as testing knowledge and skills.

References & Award Information

Study References

1. Haana McMurray, MSC, USA, Laura S Kraemer, MC, USN, Edward Jaffe, MC, USN, Sorana Raiciulescu, MS, Julia M Switzer, USAF, MSC, Gerardo Capo Dosal, MC, USA, Rachael Dampman, MS, Theepica Jeyarajah, MS, Joseph Lopreiato, MD, MPH, CHSE-A, MC, USN (Ret.), Mark W Bowyer, MD, FACS, DMCC, FRCS, USAF, MC (Ret.), Development of a Simulation Surgical Cricothyroidotomy Curriculum for Novice Providers: A Learning Curve Study, Military Medicine, 2021;, usab520, https://doi.org/10.1093/milmed/usab520

2. Patel SA, Meyer TK. Surgical airway. Int J Crit Illn Inj Sci. Jan 2014;4(1):71-6. doi:10.4103/2229-5151.128016

3. Bennett BL, Cailteux-Zevallos B, Kotora J. Cricothyroidotomy bottom-up training review: battlefield lessons learned. Mil Med. Nov 2011;176(11):1311-9. doi:10.7205/milmed-d-11-00054

4. Mabry RL, Kharod CU, Bennett BL. Awake Cricothyrotomy: A Novel Approach to the Surgical Airway in the Tactical Setting. Wilderness Environ Med. Jun 2017;28(2s): S61-s68. doi: 10.1016/j.wem.2017.02.003

5. Biron VL, Harris M, Kurien G, et al. Teaching Cricothyrotomy: A Multisensory Surgical Education Approach for Final-Year Medical Students. J Surg Educ. Mar-Apr 2013;70(2):248-53. doi: 10.1016/j.jsurg.2012.11.004

6. Fradet L, Iorio-Morin C, Tissot-Therrien M, Fortier PH, Colas MJ. Training Anaesthetists in Cricothyrotomy techniques using video demonstrations and a hands-on practice session: a shift towards preferred surgical approaches. Br J Anaesth. Jul 2020;125(1): e160-e162. doi: 10.1016/j.bja.2019.11.021

Award Information

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Uniformed Services University

4301 Jones Bridge Road
Bethesda, MD 20814
usuhs.edu