

CPP

TCCC

**COMBAT PARAMEDIC/
PROVIDER**

TACTICAL COMBAT CASUALTY CARE COURSE

MODULE 9: CIRCULATION HEMORRHAGE CONTROL IN TFC



Committee on
Tactical Combat
Casualty Care
(CoTCCC)

TCCC TIER 1
All Service Members

TCCC TIER 2
Combat Lifesaver

TCCC TIER 3
Combat Medic/Corpsman

TCCC TIER 4
Combat Paramedic/Provider

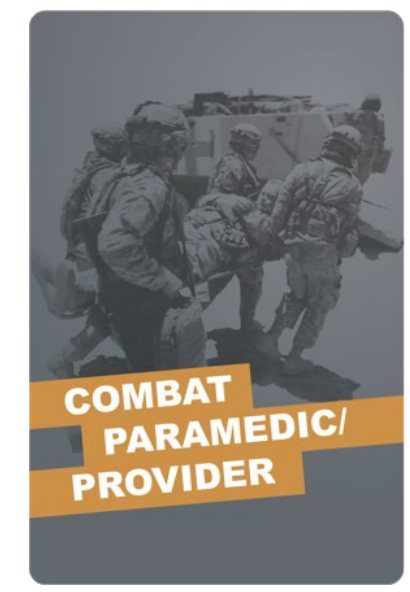
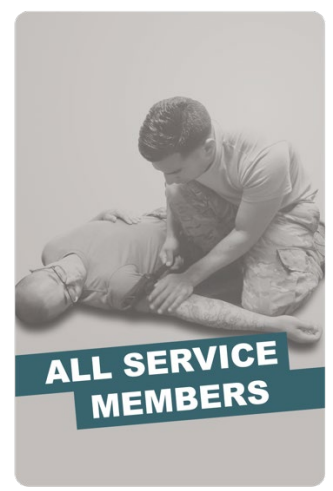


TACTICAL COMBAT CASUALTY CARE (TCCC) ROLE-BASED TRAINING SPECTRUM

ROLE 1 CARE

NONMEDICAL
PERSONNEL

MEDICAL
PERSONNEL



YOU ARE HERE

STANDARDIZED JOINT CURRICULUM



Module 9: Circulation Hemorrhage Control in TFC

1 x **TERMINAL LEARNING OBJECTIVES**

09 Given a combat or noncombat scenario, perform hemorrhage control during Tactical Field Care in accordance with CoTCCC Guidelines.

- **9.1** Identify the signs, symptoms, and considerations of a pelvic fracture.
- **9.2** Identify the indications, contraindications, and application methods of pelvic compression devices in Tactical Field Care.
- ⊘ **9.3** Demonstrate the application of a commercial pelvic compression device in Tactical Field Care.
- ⊘ **9.4** Demonstrate the application of an improvised pelvic compression device in Tactical Field Care.
- **9.5** Identify progressive strategies, indications, and limitations of controlling external hemorrhage in Tactical Field Care.
- **9.6** Identify the indications and methods of tourniquet replacement in Tactical Field Care.
- **9.7** Identify the indications and methods of tourniquet conversion in Tactical Field Care.

13 x **ENABLING LEARNING OBJECTIVES**

= Terminal Learning Objectives ● = Cognitive ELOs ⊘ = Performance ELOs



Module 9: Circulation Hemorrhage Control in TFC

1 x **TERMINAL LEARNING OBJECTIVES**

09 Given a combat or noncombat scenario, perform hemorrhage control during Tactical Field Care in accordance with CoTCCC Guidelines.

- 9.8 Demonstrate limb tourniquet replacement in Tactical Field Care.
- 9.9 Demonstrate limb tourniquet conversion in Tactical Field Care.
- 9.10 Identify the principles of wound packing and apply a pressure bandage.
- 9.11 Demonstrate wound packing and application of a pressure bandage.
- 9.12 Describe advanced hemorrhage control procedures for non-compressible torso hemorrhage.
- 9.13 Identify any evidence-based medicine, best practices, casualty data, and Subject Matter Expert consensus on the management of hemorrhage control techniques in Tactical Field Care.

13 x **ENABLING LEARNING OBJECTIVES**

= Terminal Learning Objectives ● = Cognitive ELOs ● = Performance ELOs



MARCH PAWS

LIFE-THREATENING

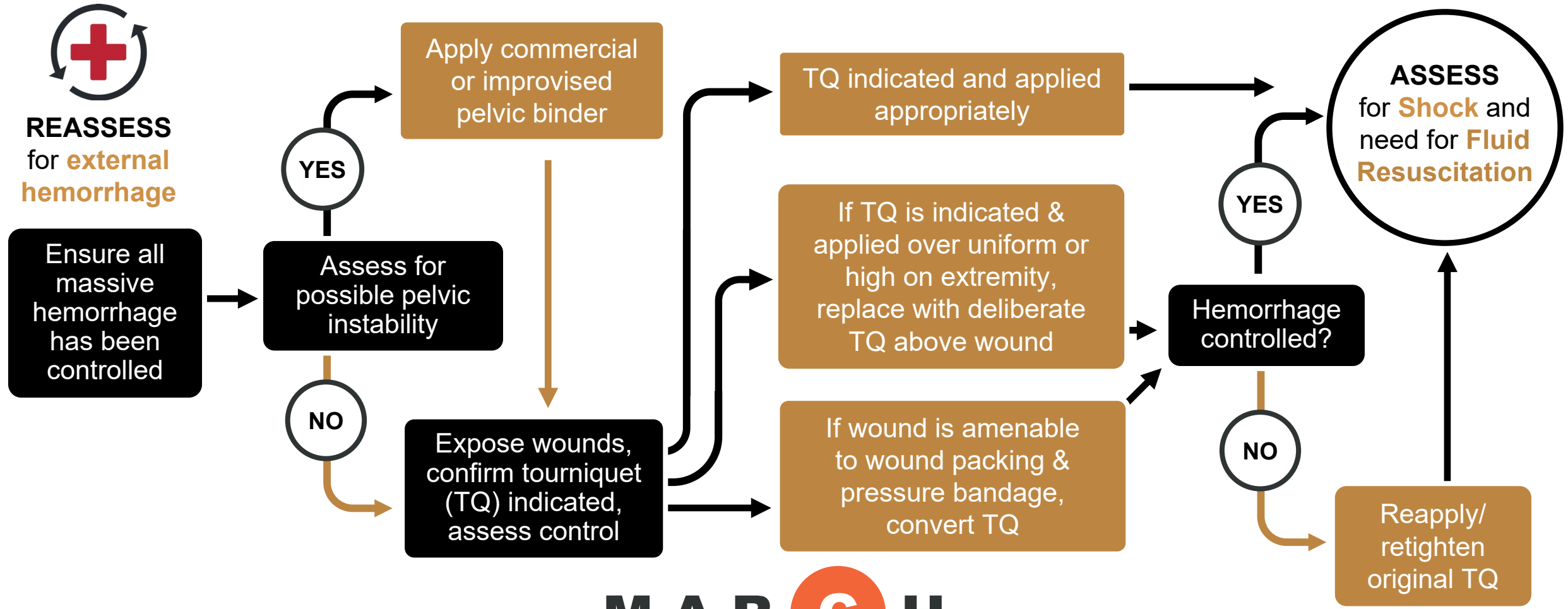
- M** MASSIVE BLEEDING
#1 Priority
- A** AIRWAY
- R** RESPIRATION (*Breathing*)
- C** CIRCULATION
- H** HYPOTHERMIA / HEAD INJURIES

AFTER LIFE-THREATENING

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



PROGRESSIVE STRATEGIES FOR CONTROLLING EXTERNAL HEMORRHAGE



REASSESS for external hemorrhage

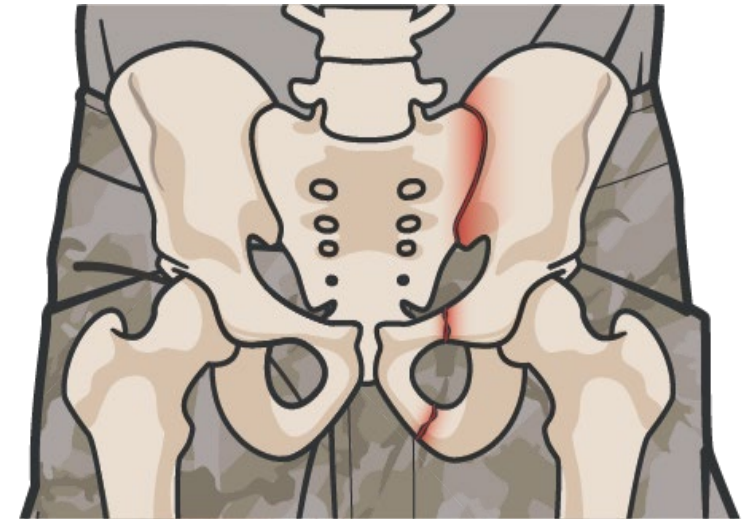




SIGNS & SYMPTOMS OF PELVIC FRACTURES

Pelvic fracture may be **suspected** if the casualty's injuries are a result of blunt force or blast with **ONE OR MORE** of the following physical signs suggesting a pelvic fracture:

- Pelvic pain
- Any Major lower limb **amputation** or **near amputation**
- **Physical exam findings** suggestive of a pelvic fracture e.g., deformities, penetrating injuries, bruising near the pelvis
- **Pelvic instability, crepitus** or unequal leg lengths
- **Unconsciousness** or **Shock**



Bleeding pelvic fractures with hemodynamic instability have up to a **40% mortality**

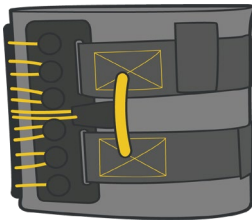
INDICATIONS AND APPLICATION METHODS OF PELVIC COMPRESSION DEVICES (PCDs)

APPLY PCD WHEN:

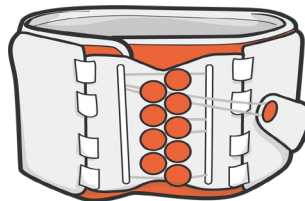
Mechanism of injury includes **severe blunt force trauma** and/or **blast injury** and casualty has **one or more of the indications** previously mentioned

PLACE at the level of greater trochanters, NOT the iliac crests

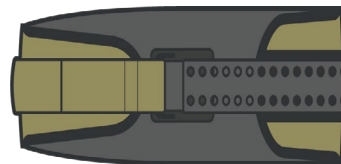
SECURE knees and/or feet together to prevent external rotation of the legs



PelvicBinder®



T-POD™ Pelvic Stabilization Device



SAM® Pelvic Sling II

Contraindications for Pelvic Compression Device:

- Open Pelvic Fractures
- Perineal Lacerations
- Intraabdominal injuries requiring surgery
- Burns
- Severe associated pelvic soft tissue injuries



Level of Evidence: C-EO



IMPROVISED PELVIC COMPRESSION DEVICES



Use casualty's uniform pants:

- **CUT** from the ankles to the greater trochanters
- **SPREAD** them out to the sides
- **DRAW** them tightly across the pelvis

Use other materials that can go around the circumference of the pelvis (sheets, blankets, tourniquets linked together, etc.)

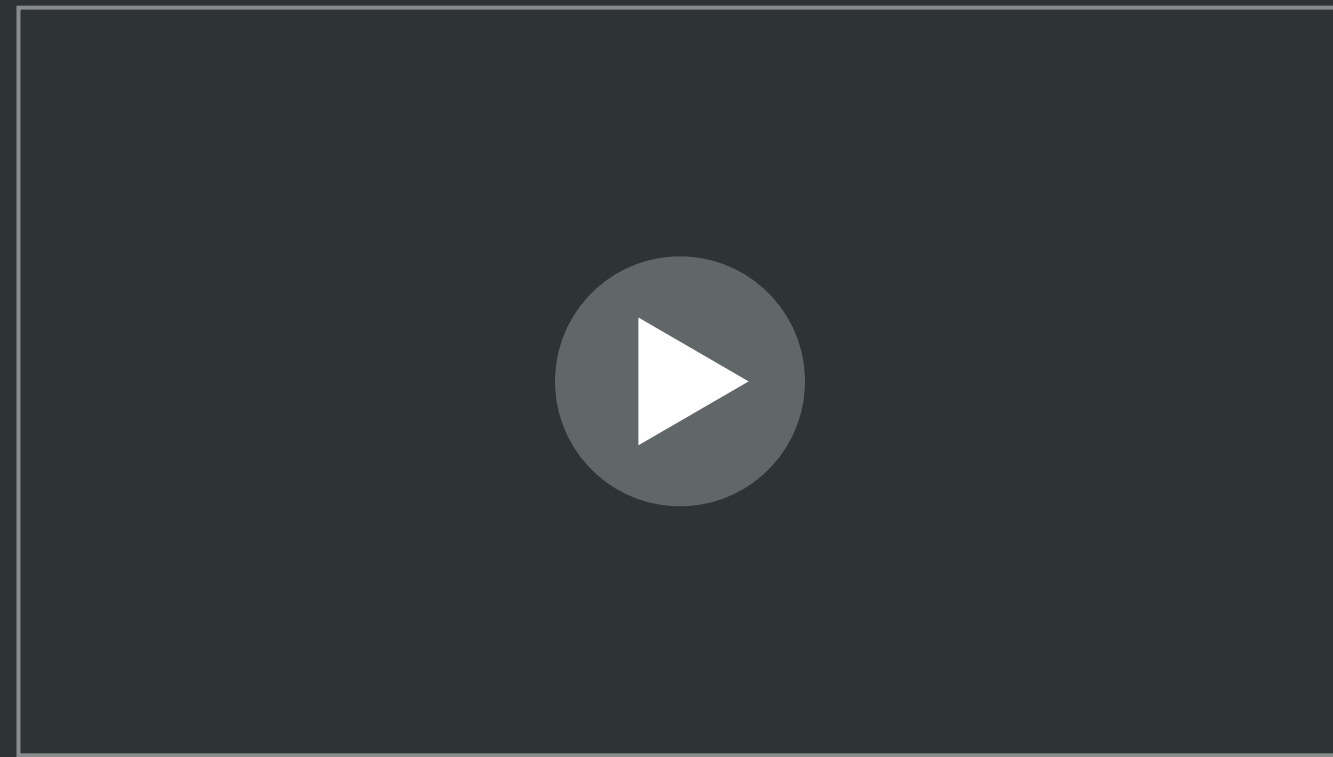
- Place them under the casualty, encircling the pelvis at the level of the trochanters
- Tighten and secure in place
- **SECURE** knees and/or feet together to prevent external rotation of the legs



MARCH



PELVIC COMPRESSION DEVICE



Video can be found on [deployedmedicine.com](https://www.deployedmedicine.com)

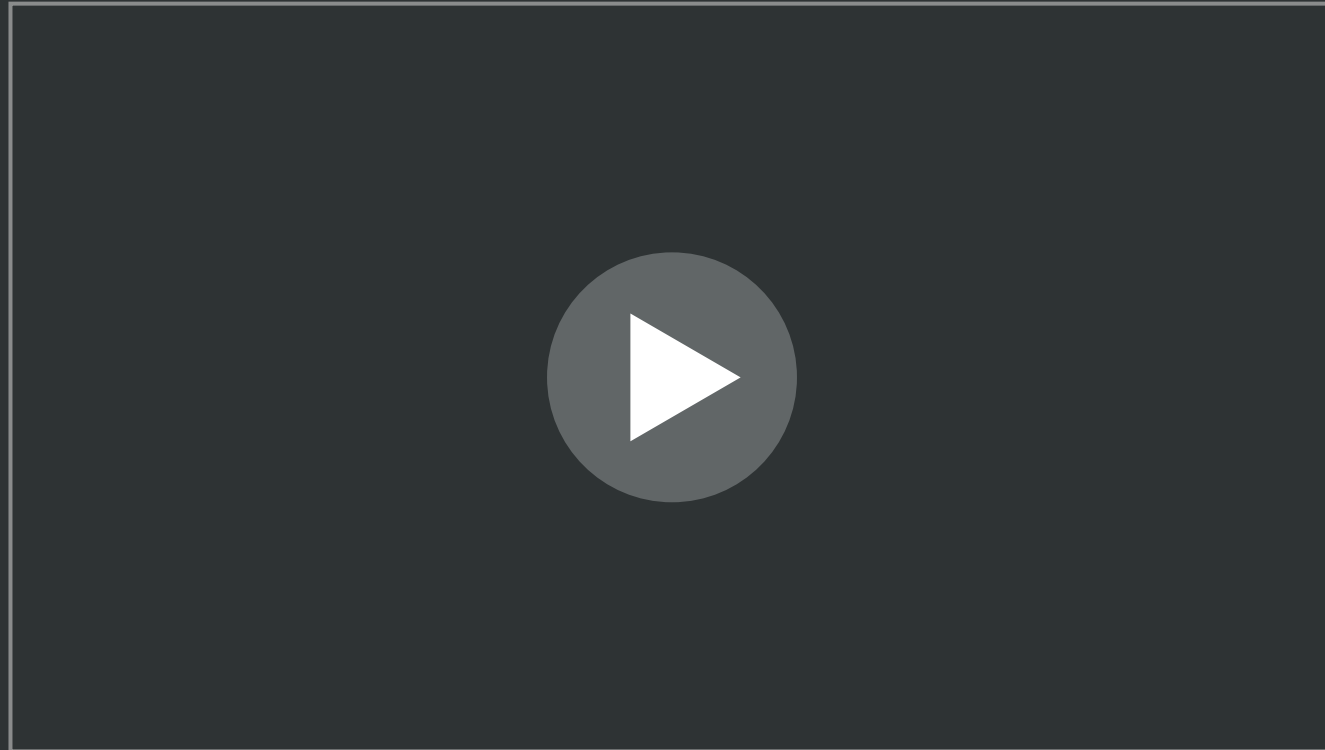


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Module 9: Circulation Hemorrhage Control in TFC

IMPROVISED PELVIC COMPRESSION DEVICE





Video can be found on [deployedmedicine.com](https://www.deployedmedicine.com)



SKILL STATION

Commercial and Improvised PCDs

-  **Commercial PCD Application**
-  **Improvised PCD Application**



WOUND EXPOSURE & ASSESSMENT



Key Points:

- **EXPOSE** all wounds, if not previously accomplished
- Use trauma shears, not unguarded sharp blades, to avoid causing additional injuries
- Assess whether tourniquet has been applied close enough to wound to minimize loss of viable tissue
- Determine if wound bleeding might be controlled without requiring a tourniquet
- Conditions **UNLIKELY** to be amenable to tourniquet replacement (or conversion)
 - Amputations
 - Severed arteries
 - Deep arterial wounds in difficult to pack/apply pressure locations

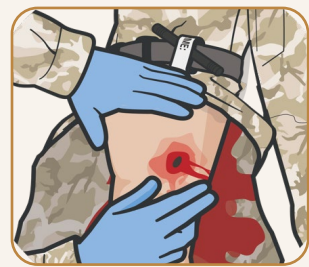




TOURNIQUET REPLACEMENT INDICATIONS AND METHODS

INDICATIONS for Tourniquet Replacement:

- Tourniquets applied over the uniform
- >2 hours to surgery
- Tourniquets applied too proximal on the extremity (>3" above the wound)



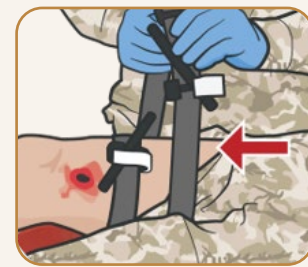
Determine if tourniquet is indicated



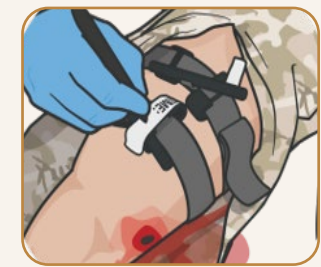
If a tourniquet is still indicated, Apply a tourniquet 2-3" proximal to wound directly on the skin



Slowly release original tourniquet, ensuring no bleeding occurs




Slide original tourniquet down proximal to the newly placed tourniquet and annotate time



Annotate time of new tourniquet placement

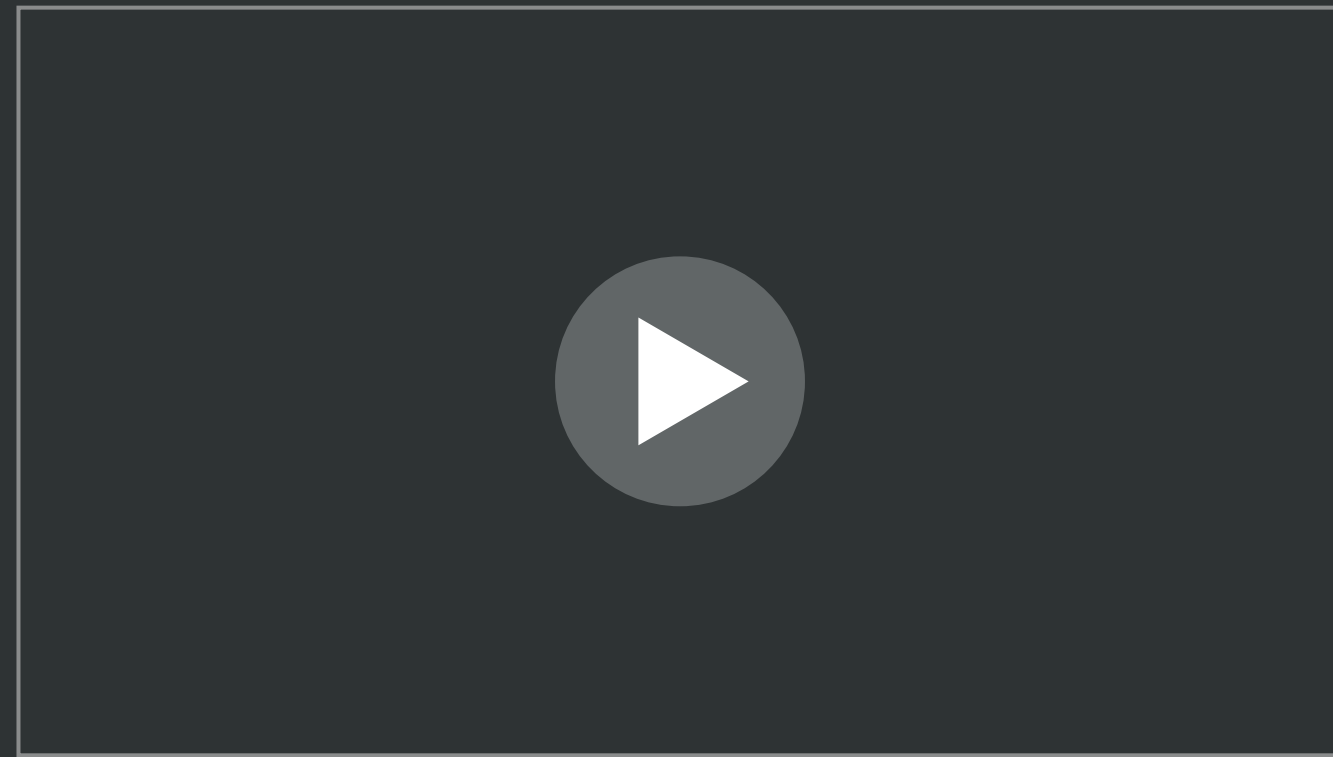
i Level of Evidence: C-EO

M A R C H

 If the TQ does **NOT** control bleeding, the original TQ can be retightened

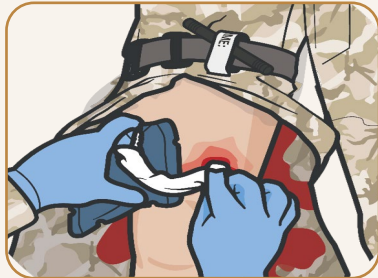


TOURNIQUET REPLACEMENT



Video can be found on deployedmedicine.com

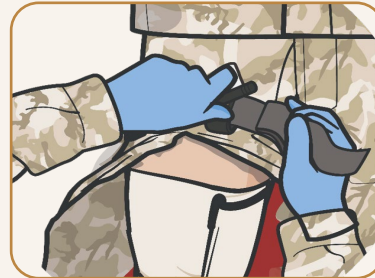
TOURNIQUET CONVERSION INDICATIONS AND METHODS



Pack wound and hold pressure for 3 minutes



Apply pressure bandage



Slowly release tourniquet over 1 minute, ensuring no rebleeding occurs



Document all findings and treatments on a DD Form 1380 TCCC Casualty Card

CONTRAINDICATIONS for tourniquet conversion:

- Shock
- Inability to closely monitor for rebleeding
- Amputation
- If the tourniquet has been in place more than 6 hours

Also, consider not converting a tourniquet if:

- Surgery is likely to be available in <2 hours
- Tactical or medical considerations make transition inadvisable

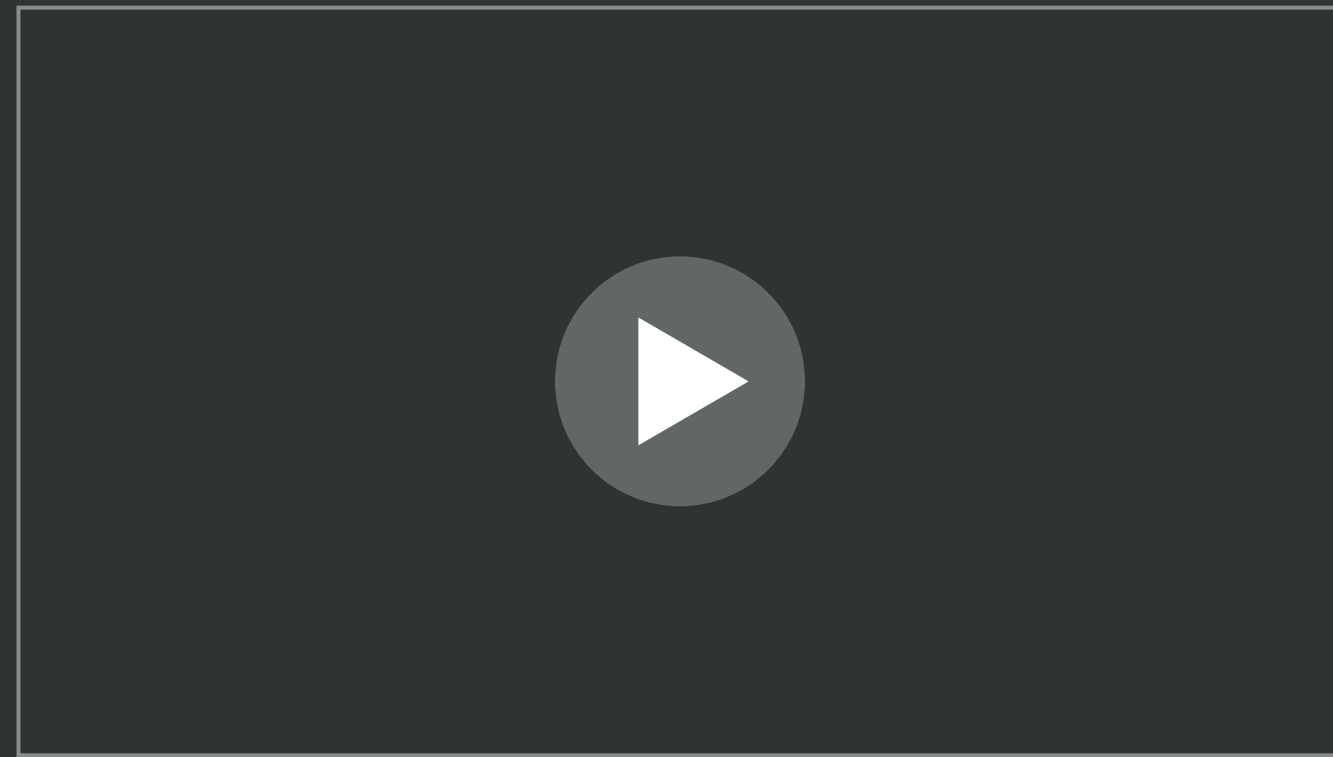


Level of Evidence: C-EO



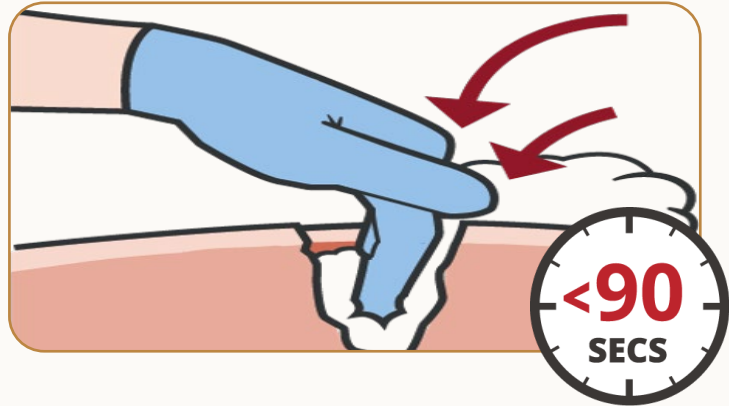


TOURNIQUET CONVERSION



Video can be found on [deployedmedicine.com](https://www.deployedmedicine.com)

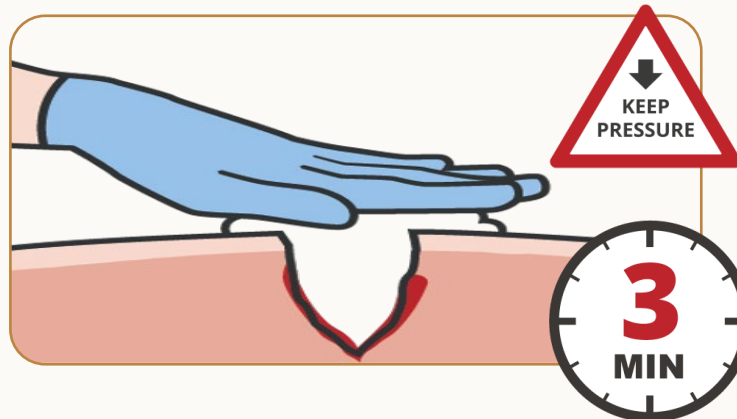
WOUND PACKING AND PRESSURE BANDAGES



Identify exact source of bleeding and **APPLY** direct pressure **UNTIL** dressing is placed

Pack the wound maintaining **CONSTANT** direct pressure within **90 SECONDS** to be effective

Fill and pack the wound tightly, ensuring dressing extends **1-2 inches** above the skin



HOLD direct pressure for at least **3 MINS** (*this is necessary*, even with the active ingredient in hemostatic dressing)

When packing a large wound, more than one hemostatic dressing and/or **additional** gauze may be **needed**.



Carefully **OBSERVE** to determine if bleeding has been **CONTROLLED**

Once you are sure the bleeding has **STOPPED**, apply a pressure bandage

WOUND PACKING AND PRESSURE BANDAGES



Bleeding has **NOT** been controlled

- (a) Hemostatic dressing, remove prior packing material and repack
- (b) Gauze or other materials, apply additional gauze materials, apply pressure (**another 3 minutes**)

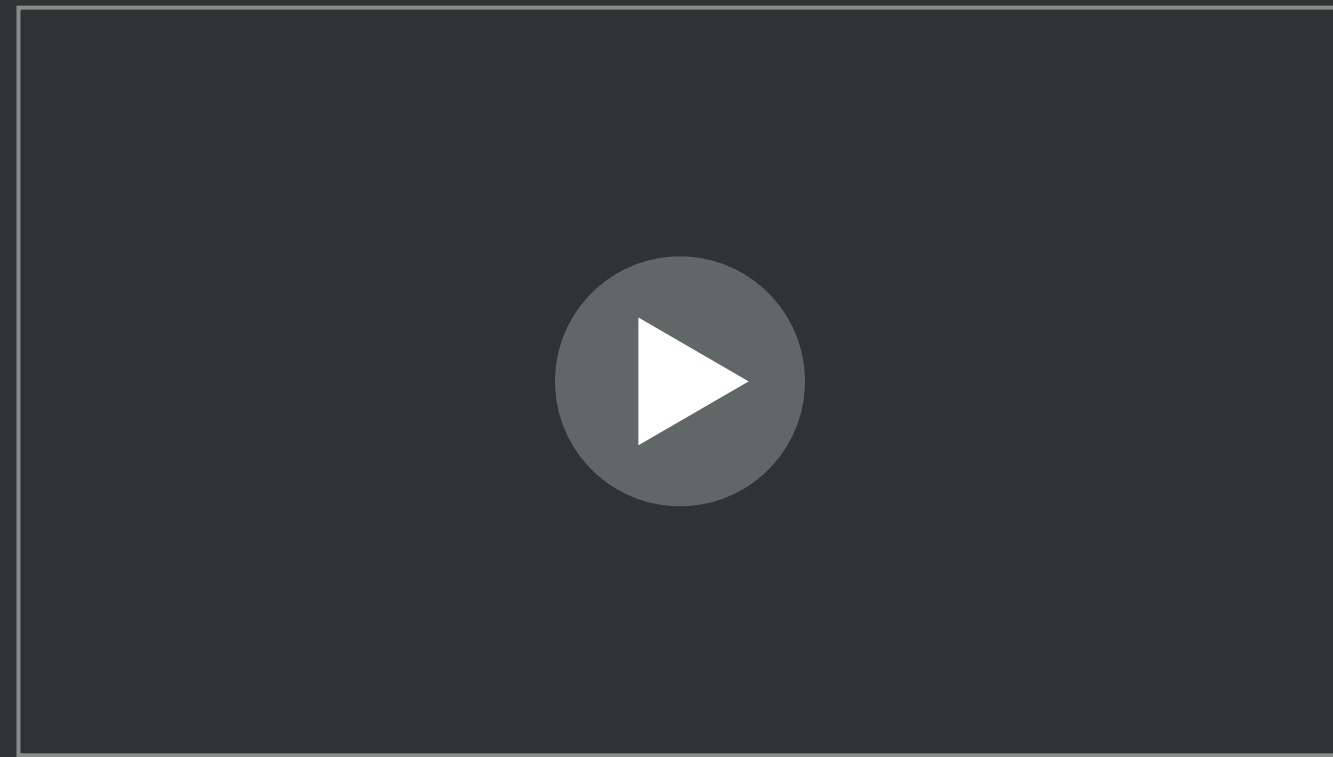
Once you are sure the bleeding has **stopped**, apply a pressure bandage.

Check for circulation below the pressure bandage by feeling for **distal pulse** (if skin becomes cool to the touch, bluish numb or distal pulse not present) the bandage may be **too tight** and should be loosened or reapplied

Document all findings and treatments on a DD Form 1380 TCCC Casualty Card



WOUND PACKING & PRESSURE BANDAGES



Video can be found on [deployedmedicine.com](https://www.deployedmedicine.com)



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SKILL STATION

Tourniquet Replacement and Tourniquet Conversion



Tourniquet Replacement

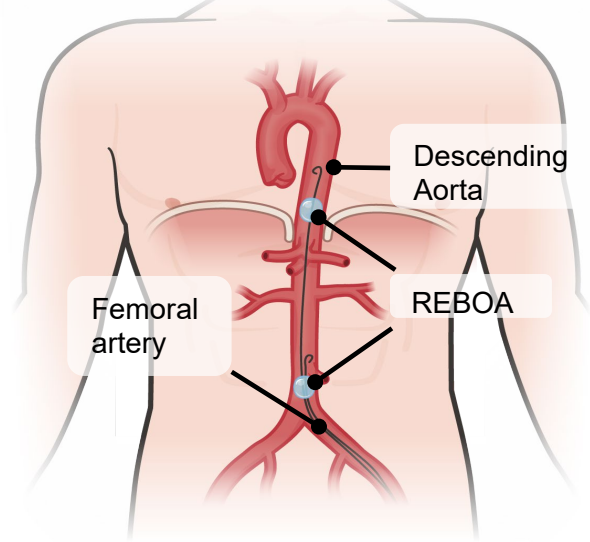


Tourniquet Conversion (using Wound Packing With Hemostatic Dressing and Pressure Bandages)



ADVANCED PRODECURES FOR NON-COMPRESSIBLE TORSO HEMORRHAGE (NCTH)

REBOA



- Resuscitative Endovascular Balloon Occlusion of the Aorta (REBOA)

Non-Compressible Torso Hemorrhage Key Points:

- May cause shock and death despite unimpressive entrance wounds
- Administer tranexamic acid
- Transport rapidly to definitive surgery
- Resuscitate with blood products

NCTH is high-grade injury in **one or more** of the following anatomic domains: **pulmonary, solid abdominal organ, major vascular or pelvic trauma**; plus, hemodynamic instability or the need for immediate hemorrhage control.

ResQFoam™




- Expands up to 35X
- Tamponades hemorrhage



ADVANCED PROCEDURES FOR NON-COMPRESSIBLE TORSO HEMORRHAGE (NCTH)

| Resuscitative Endovascular Balloon Occlusion of the Aorta (REBOA) | |
|--|---|
| INDICATIONS | LIMITATIONS |
| <ul style="list-style-type: none"> Abdominal, pelvic, or junctional bleeds | <ul style="list-style-type: none"> Device availability and trained personnel |
| <ul style="list-style-type: none"> No hemorrhage in the chest | <ul style="list-style-type: none"> Need rapid access to definitive surgery |
| <ul style="list-style-type: none"> Blast/blunt injuries with blood on ultrasound, pelvic fracture signs, massive leg wounds | <ul style="list-style-type: none"> Contraindication – cardiac tamponade, major thoracic hemorrhage |
| | <ul style="list-style-type: none"> Femoral artery access |
| | <ul style="list-style-type: none"> Tactical environment limitations |

| ResQFoam™ Intraperitoneal expanding agent | |
|---|--|
| INDICATIONS | LIMITATIONS |
| <ul style="list-style-type: none"> Coexistence of physiology consistent with severe hemorrhagic shock | <ul style="list-style-type: none"> Cannot use with abdominal evisceration |
| <ul style="list-style-type: none"> Coupled with positive confirmation of bleeding within the abdominal compartment | <ul style="list-style-type: none"> Diaphragm injuries may result in a FOAMOTHORAX so foam should be withheld in the absence of even, bilateral breath sounds |

 **Level of Evidence: C-EO**



EVIDENCE SUPPORTING HEMORRHAGE CONTROL STRATEGIES

| Subject Category | Study Types | Level of Evidence |
|---|---|-------------------|
| Pelvic Compression Devices | Clinical Consensus, Expert Opinion and Discussion | C-EO |
| Tourniquet Replacement | Clinical Consensus, Expert Opinion and Discussion | C-EO |
| Tourniquet Conversion | Clinical Consensus, Expert Opinion and Discussion | C-EO |
| Resuscitative Endovascular Balloon Occlusion of the Aorta | Clinical Consensus, Expert Opinion and Discussion | C-EO |
| Expandable Intraperitoneal Agents (ResQFoam) | Lab evaluation observational study with limitations | C-LD |

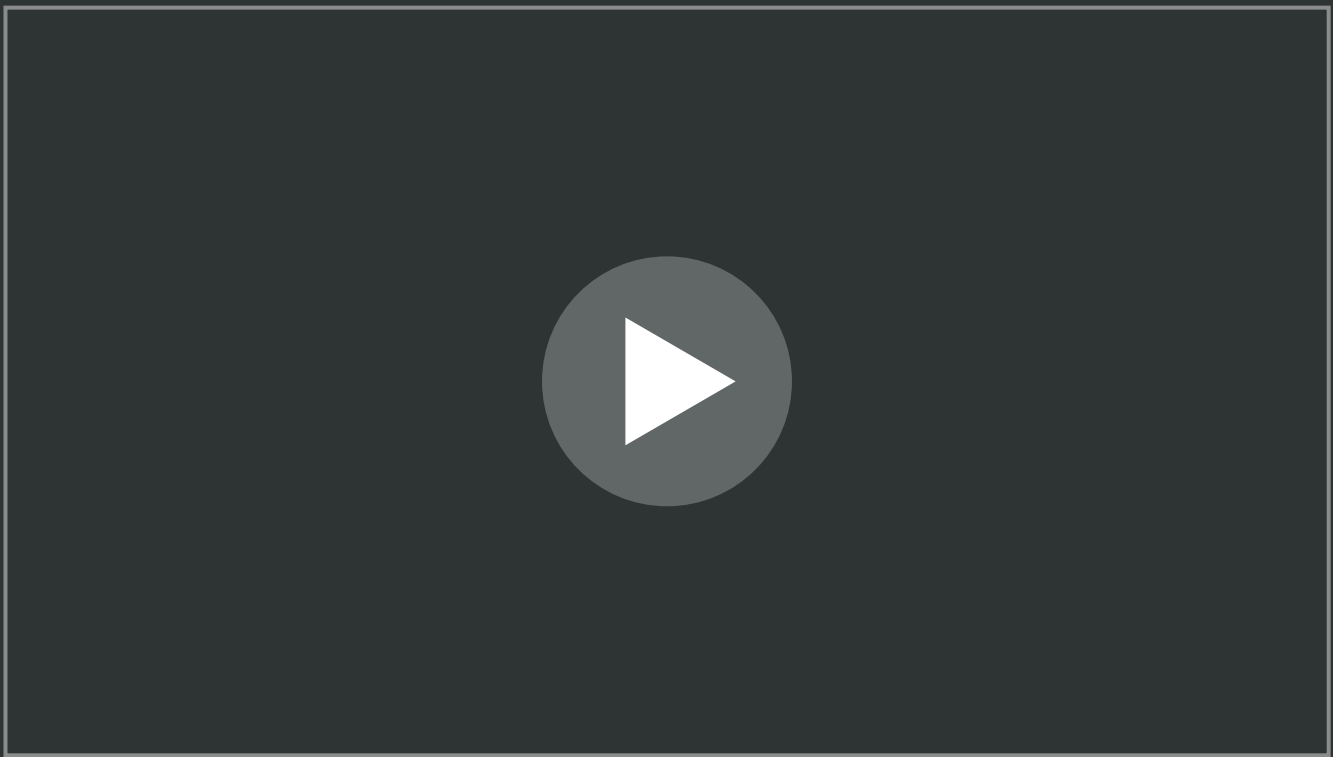


ASSESSING THE EVIDENCE FOR GUIDELINES

| Level of Evidence | AHA Recommendation System Terminology Explanation | Why the AHA Classification System? |
|-------------------|---|---|
| A | Evidence from multiple randomized clinical trials (RCT) with concordant results or from HIGH-QUALITY meta-analyses. | <ul style="list-style-type: none"> • The level of evidence recommendations allow readers to quickly glean information on the strength, certainty, and quality of evidence supporting each recommendation. • A recommendation with Level of Evidence (LOE) C does not imply that the recommendation is weak. • Although, RCTs are unavailable, there may be a very clear clinical consensus that a particular test or therapy is useful or effective. |
| B-R | Evidence from moderate-quality trials, or a meta-analysis of moderate quality (RCT) followed by an R to denote RANDOMIZED studies | |
| B-NR | Evidence from moderate-quality trials, or a meta-analysis of moderate quality followed by NR to denote NON-RANDOMIZED studies | |
| C-LD | There is no convincing evidence and is followed by LD to indicate LIMITED DATA | |
| C-EO | There is no convincing evidence and is followed by EO if the consensus is based on EXPERT OPINION , case studies or standards of care. | |



HEMORRHAGE CONTROL IN TFC



Video can be found on [deployedmedicine.com](https://www.deployedmedicine.com)



SUMMARY

Knowledge Topics






- Progressive strategies for controlling external hemorrhage
- Signs and symptoms of a pelvic fracture
- Principles of pelvic compression device placement
- Indications and methods for wound packing and pressure bandages, tourniquet replacement and tourniquet conversion
- Non-compressible torso hemorrhage advanced control procedures
- Levels of evidence supporting circulation principles/interventions

Skills and Abilities

- Tourniquet Replacement
- Tourniquet Conversion
- Wound Packing
- Pressure Bandage application
- Commercial pelvic compression device application
- Improvised pelvic compression device application



CHECK ON LEARNING

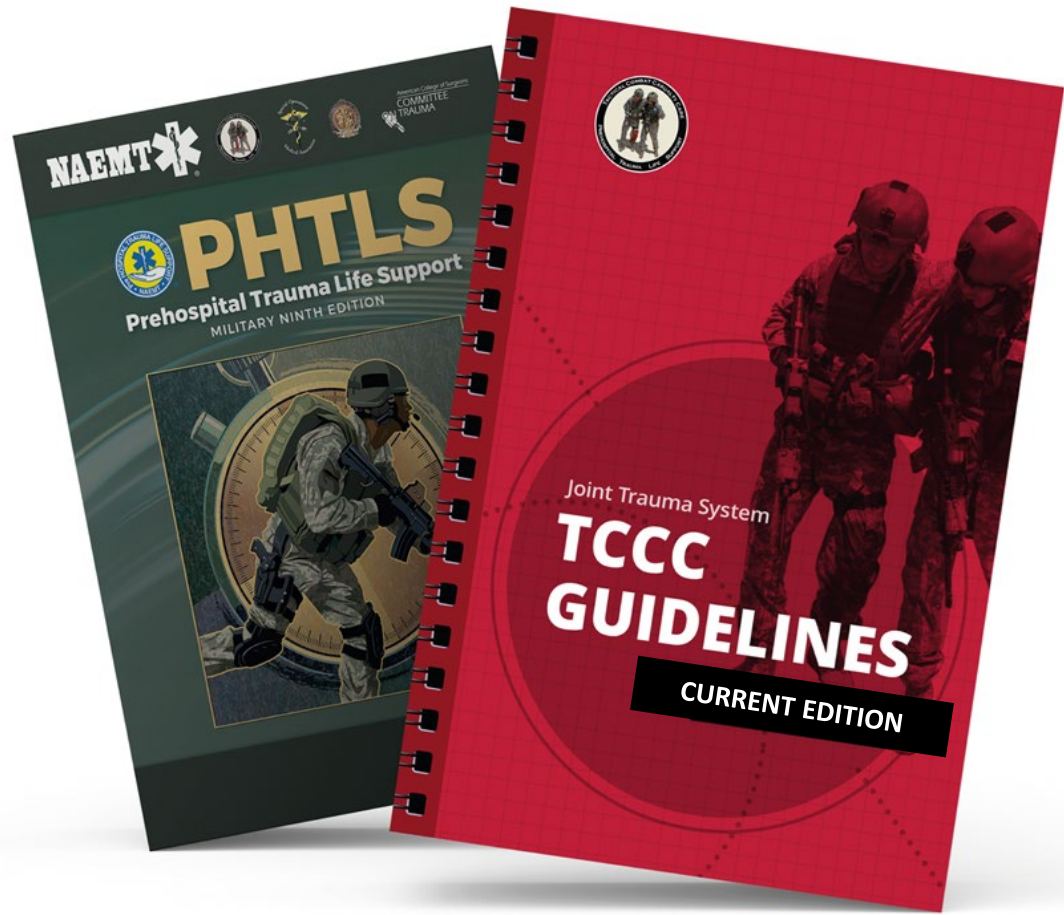
-  What signs or symptoms are suspicious for pelvic instability?
-  How do you prevent dislocation of pelvic fragments from external rotation of the lower extremities?
-  Where should you apply a deliberate tourniquet when replacing one that was placed over the uniform, like a high and tight tourniquet from Care Under Fire?
-  What are contraindications to converting a tourniquet to wound packing and a pressure bandage?
-  What is the definition of Non-Compressible Torso Hemorrhage (NCTH)?



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 (PHTLS), Military Edition, teaches and reinforces the principles of rapidly assessing a trauma patient using an orderly approach.