CMC TCCC

COMBAT MEDIC/ CORPSMAN

DHA Defense Health Agency JOINT TRAUMA SYSTEM

TACTICAL COMBAT CASUALTY CARE COURSE

MODULE 6: MASSIVE HEMORRHAGE CONTROL

Committee on Tactical Combat Casualty Care (CoTCCC)

TCCC TIER 1
All Service Members

TCCC TIER 2
Combat Lifesaver

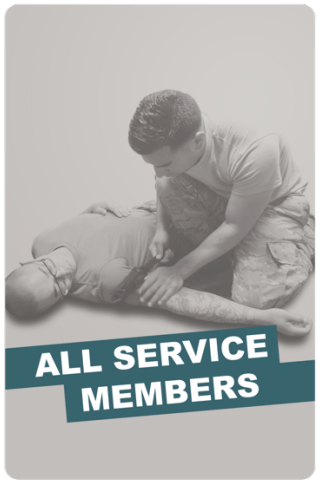
TCCC TIER 3
Combat Medic/Corpsman

TCCC TIER 4
Combat Paramedic/Provider

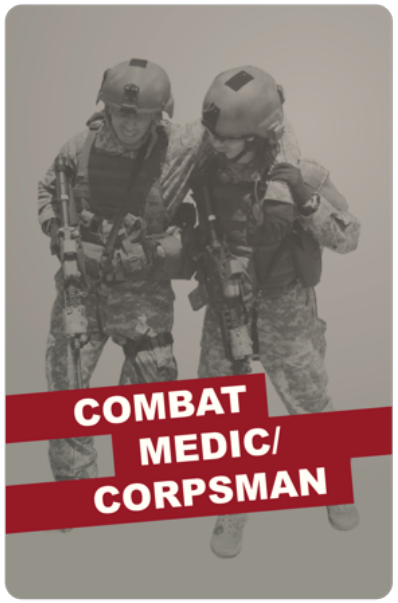
TACTICAL COMBAT CASUALTY CARE (TCCC) ROLE-BASED TRAINING SPECTRUM

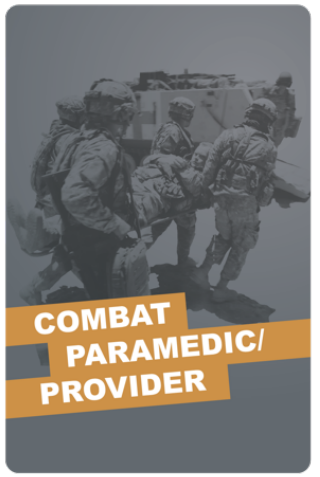
ROLE 1 CARE

NONMEDICAL PERSONNEL



MEDICAL PERSONNEL





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STANDARDIZED JOINT CURRICULUM

1 x TERMINAL LEARNING OBJECTIVE

07 Given a combat or noncombat scenario, perform massive hemorrhage control during Tactical Field Care (TFC) in accordance with Committee on Tactical Combat Casualty Care (CoTCCC) Guidelines.

- **7.1** Identify life-threatening hemorrhage (bleeding) (CLS T7:E37) .
- **7.2** Identify the importance of early application of limb tourniquets to control life-threatening bleeding in TFC.
- **7.3** Identify anatomical sites for applying direct and indirect pressure to control bleeding. (CLS T7:E39)
- **7.4** Identify risks associated with applying an improvised limb tourniquet. (CLS T7:E41)
- **7.5** Demonstrate an evaluation of previously applied tourniquets for hemorrhage control effectiveness.
- **7.6** Demonstrate the appropriate application of a CoTCCC-recommended limb tourniquet.
- **7.7** Demonstrate the application of an improvised limb tourniquet.
- **7.8** Identify the principles of wound packing and applying pressure bandages.
- **7.9** Demonstrate the application of a CoTCCC-recommended hemostatic dressing.
- **7.10** Demonstrate wound packing and applying a pressure bandage.
- **7.11** Demonstrate improvised junctional hemorrhage control with hemostatic dressing and direct pressure.
- **7.12** Demonstrate the application of a CoTCCC-recommended junctional tourniquet.
- **7.13** Demonstrate the application of an injectable hemostatic agent.
- **7.14** Demonstrate the application of a wound closure device.

14 x ENABLING LEARNING OBJECTIVES

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

Three PHASES of TCCC

MASSIVE HEMORRHAGE CONTROL spans all phases of TCCC

1. **CARE UNDER FIRE (CUF) / THREAT**
   - RETURN FIRE AND TAKE COVER
2. **TACTICAL FIELD CARE (TFC)**
   - WORK UNDER COVER AND CONCEALMENT
3. **TACTICAL EVACUATION CARE (TACEVAC)**
   - MORE DELIBERATE ASSESSMENT AND PRE-EVACUATION PROCEDURES

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MARCH PAWS

DURING 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

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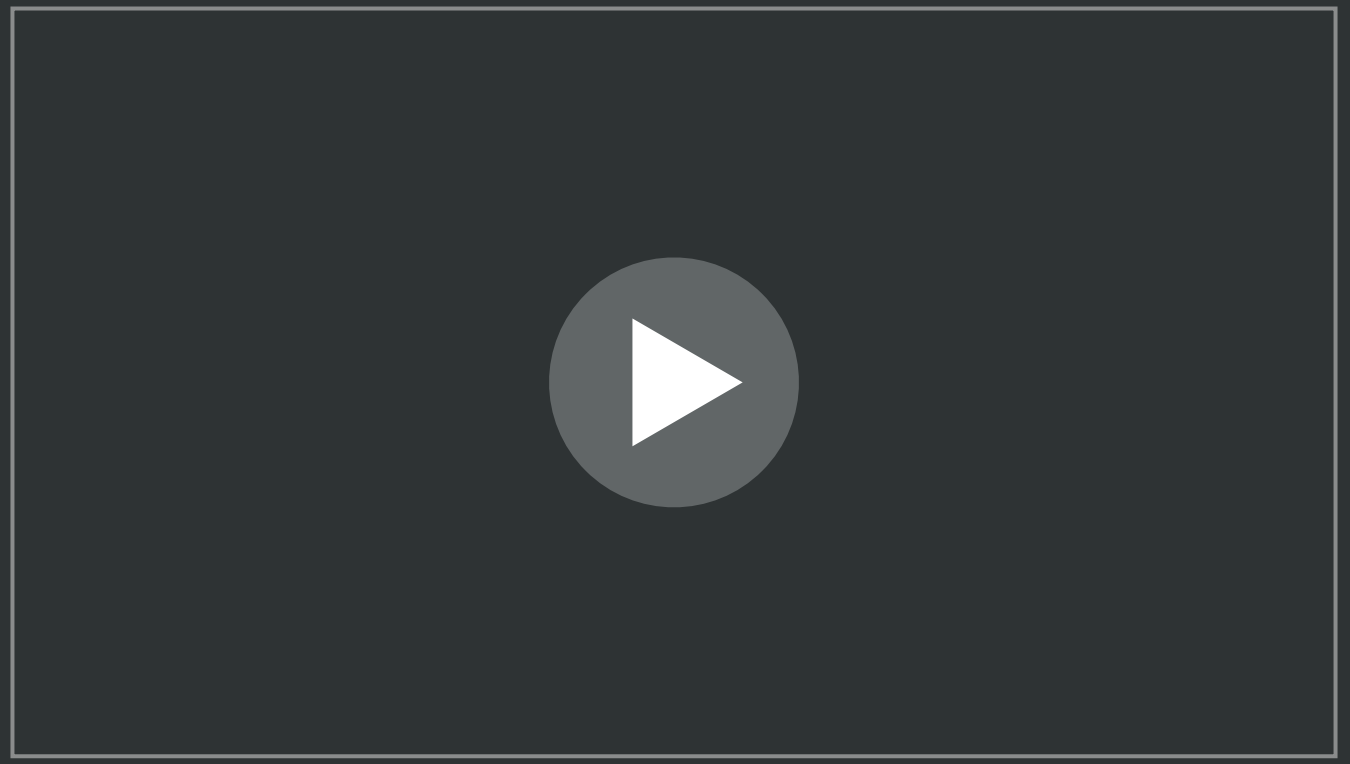
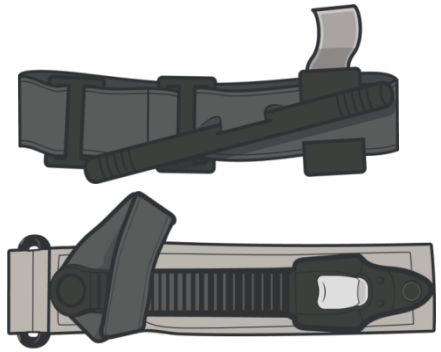
MASSIVE HEMORRHAGE OVERVIEW IN TFC



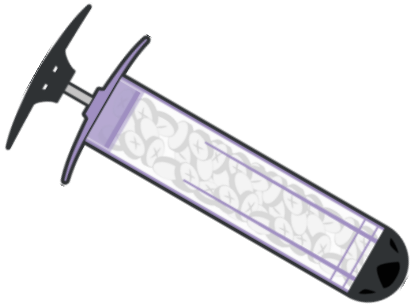
Video can be found on deployedmedicine.com

TOOLS FOR LIFE-THREATENING HEMORRHAGE CONTROL



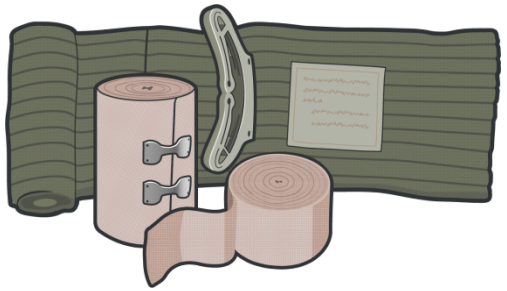
CoTCCC recommended
LIMB TOURNIQUETS

HEMOSTATIC GAUZE
and other dressings



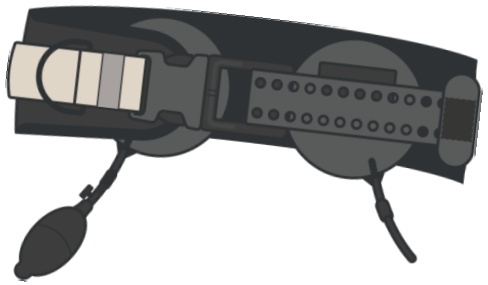
INJECTABLE HEMOSTATIC AGENT (XSTAT)

DIRECT PRESSURE

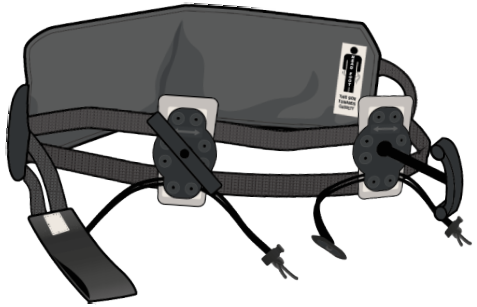


PRESSURE BANDAGES

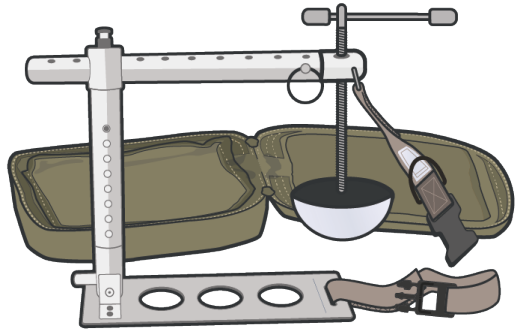
PRESSURE DELIVERY DEVICE



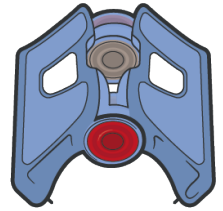
SAM JUNCTIONAL TOURNIQUET



JETT JUNCTIONAL TOURNIQUET



CROC JUNCTIONAL TOURNIQUET



WOUND CLOSURE DEVICE

MASSIVE HEMORRHAGE REASSESSMENT

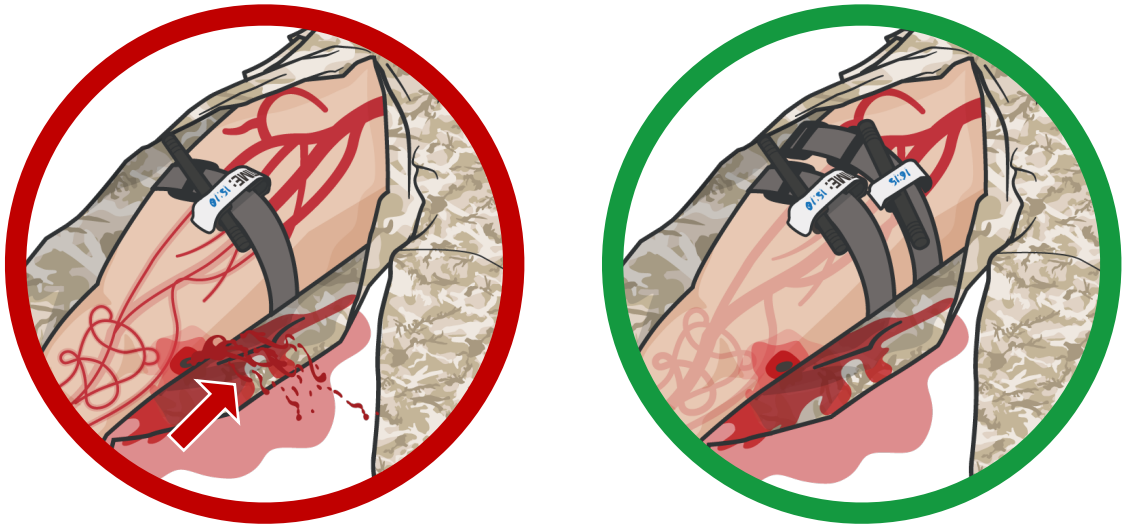
REASSESS any interventions performed in **Care Under Fire**

If a tourniquet (TQ) was previously applied in **CUF** and is not effective in **TFC**:

- **ASSESS** for effectiveness (bleeding has stopped and distal pulses are absent)
- **APPLY** direct pressure to control bleeding
- **PLACE** a deliberate tourniquet 2-3 inches above the wound directly on the skin

MASSIVE HEMORRHAGE REASSESSMENT

REASSESS any interventions performed in **Tactical Field Care**



If a tourniquet (TQ) was previously applied,

- **ASSESS** for effectiveness (bleeding has stopped and distal pulses are absent)
- If **ineffective**, apply a second tourniquet **side-by-side** with the first

BODY SUBSTANCE ISOLATION (BSI)

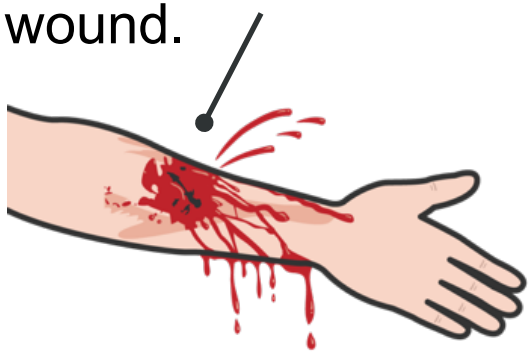
As a **precaution,** the responder should don **latex-free** gloves whenever possible

If a Combat Lifesaver is available, direct them to assist

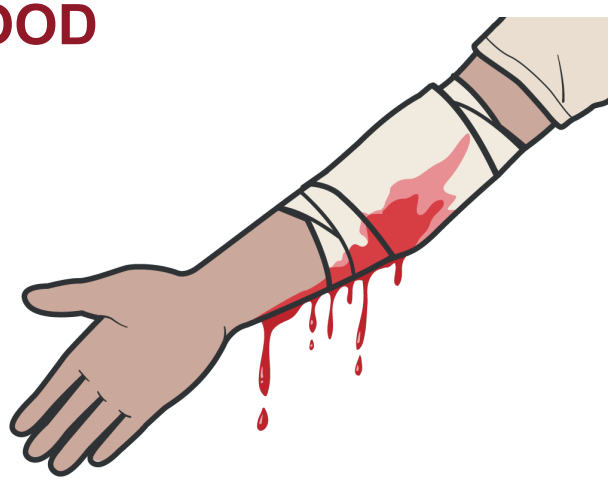
⚠ In tactical situations, BSI may not be feasible due to life threatening bleed, TFC has now turned into CUF, etc.

IDENTIFICATION OF LIFE-THREATENING HEMORRHAGE

There is **PULSATILE** or **STEADY BLEEDING** from the wound.



Overlying clothing becoming **SOAKED WITH BLOOD**



BRIGHT RED BLOOD is pooling on the ground

Traumatic **AMPUTATION** of the **arm** or **leg**

Bandages or makeshift bandages used to cover the wound are **INEFFECTIVE** and steadily becoming **SOAKED WITH BLOOD**

EARLY CONTROL OF SEVERE HEMORRHAGE IS CRITICAL

How long does it take to **BLEED TO DEATH** from a **MAJOR ARTERY**?

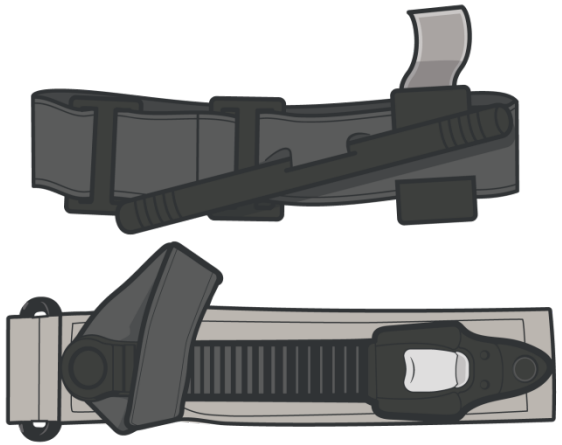
- Casualties with such an injury can bleed to death in **3 Minutes**
- Prevent **late stage** of shock
- Tourniquets are safe when applied for **< 2 hours**

Early Tourniquet Use Prevents Limb Exsanguination and Saves Lives!

Hemorrhage remains the predominant cause of preventable death in combat fatalities

Prolonged (> 6 hours) use of a tourniquet can potentially result in the loss of a limb

TOURNIQUETS IN TACTICAL FIELD CARE



Use a TQ to control life-threatening external hemorrhage that is anatomically amenable to TQ use or for **ANY traumatic amputation**

Apply directly to skin **2-3 INCHES ABOVE THE BLEEDING SITE**

If bleeding is **NOT** controlled with the first TQ, apply a second **side-by-side** with the first

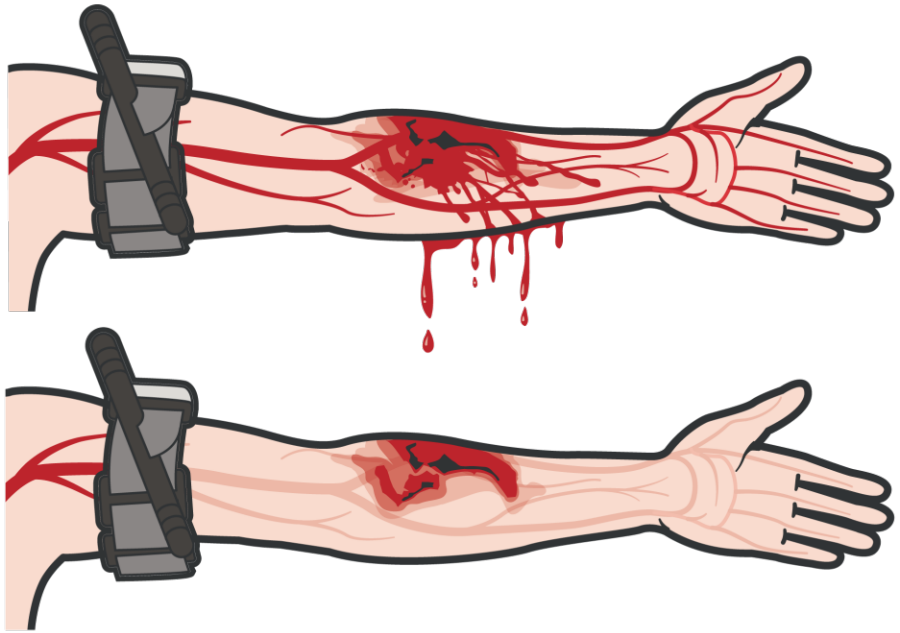
TQs need to be applied rapidly. The bleeding should be stopped **WITHIN ONE MINUTE** and the TQ fully secured within 3 minutes

Time of TQ that is placed should be documented during the TFC and **NOT** the CUF phase

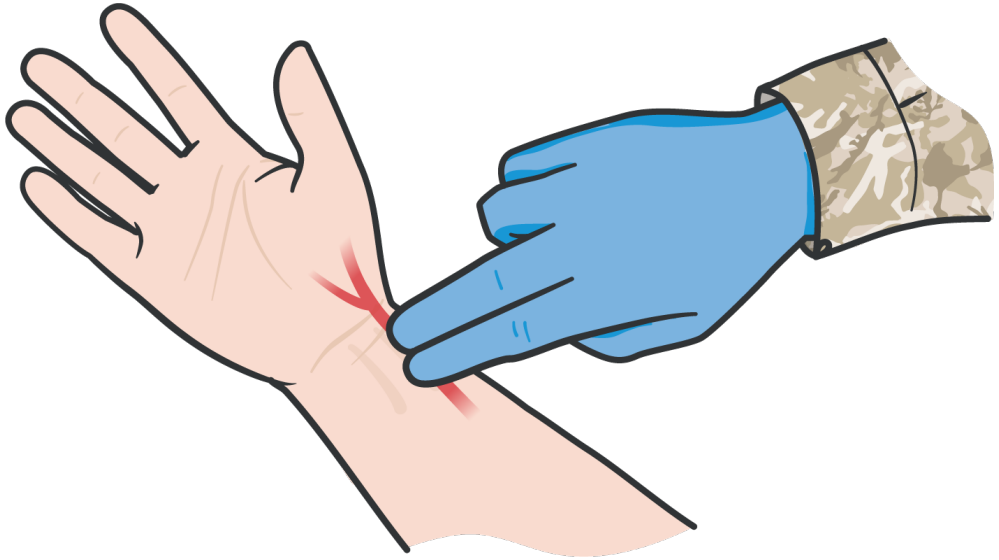
TQ application time is **important** in helping manage TQs

TOURNIQUET EFFECTIVENESS CHECKS

TQs can be assessed for effectiveness by:



Ensuring that the
BLEEDING HAS STOPPED



Checking a pulse distally on the limb where the TQ is applied to ensure there is **NO PULSE**

PRIORITIZING MULTIPLE CASUALTIES

Casualties with these injuries must be treated first

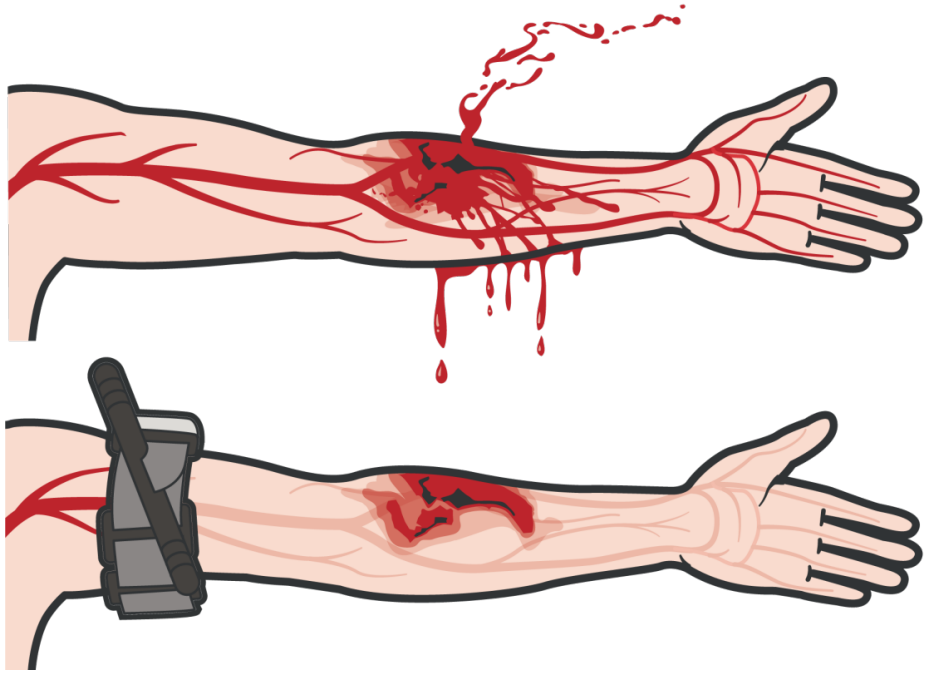
1. **Massive Bleeding** — #1 Priority
2. **Airway** Compromised
3. **Respiratory** Distress
4. Altered Mental Status
5. **Hemorrhagic** Shock

BLOOD SWEEP

AFTER treating ***obvious*** **MASSIVE HEMORRHAGE**, do a rapid **head-to-toe** check for any **unrecognized life-threatening bleeding**

- Check the **neck**, **axillary,** and **inguinal** areas
- Check the **legs**, **arms**, **abdomen**, **chest,** and **back** (in a sweeping motion)

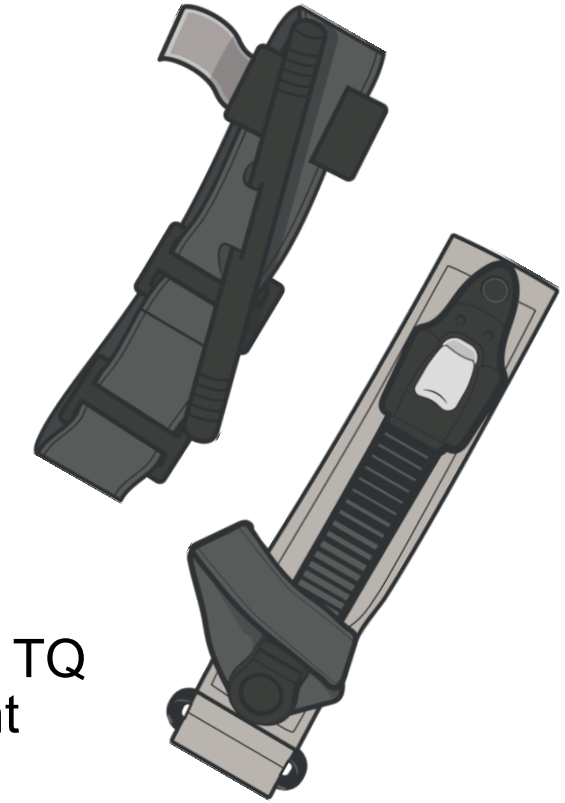
LIMB TOURNIQUETS



A device placed around a bleeding **ARM** or **LEG** that works by **compressing large blood vessels** (arterial and venous) to **stop blood flow** to the injured extremity.

The TQ that should be used as the **FIRST option** is the **CASUALTY'S TQ** from **THEIR own JFAK**

If this is not possible, or more than one tourniquet is needed, then use the **next available option** such as a TQ from unit mission equipment



You should have a **new TQ** in your JFAK; it is designed as a **ONE-TIME USE DEVICE**

DELIBERATE TOURNIQUETS

A TQ applied in **Care Under Fire** should be **reassessed** in **Tactical Field Care**

A TQ applied in TFC will be a **deliberate TQ**, applied **2-3 INCHES ABOVE THE WOUND**, directly on the skin (**not over clothing or on a joint**)

In TFC the **source of bleeding** can be **identified** to ensure that TQs are more deliberately placed

TQs applied during **CUF** are **sometimes inadequate** due to the inability to properly expose and assess the wound; it may be necessary to tighten the TQ and/or apply an **additional SIDE-BY-SIDE TQ**

INITIAL DIRECT PRESSURE
BEFORE INTERVENTION

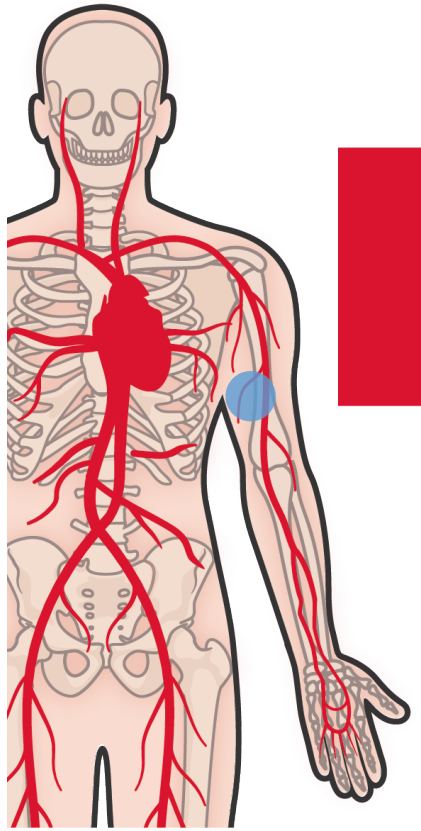
DIRECT PRESSURE can and **should be used** as a temporary measure **until** a **tourniquet** or **dressing** is in place

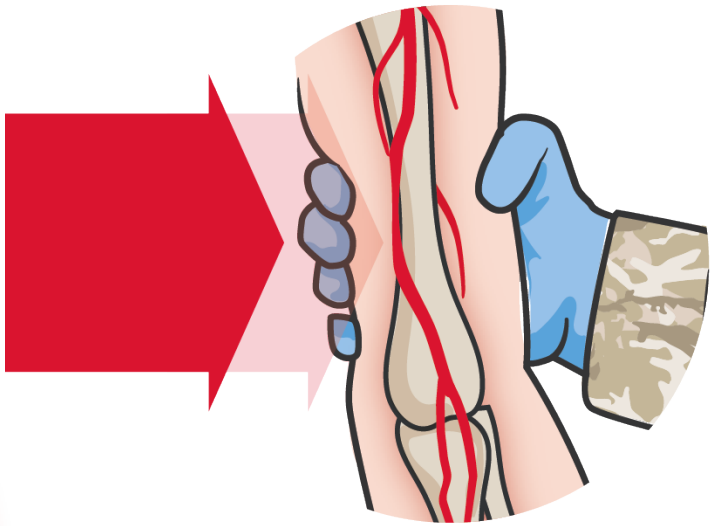
- It is hard to use direct pressure alone to control significant bleeding or while moving the casualty
- Direct pressure can be **used** if a treatment no longer maintains control of the bleeding **while a new treatment is started**

⚠ **REMEMBER** to ask other first responders to assist as needed.

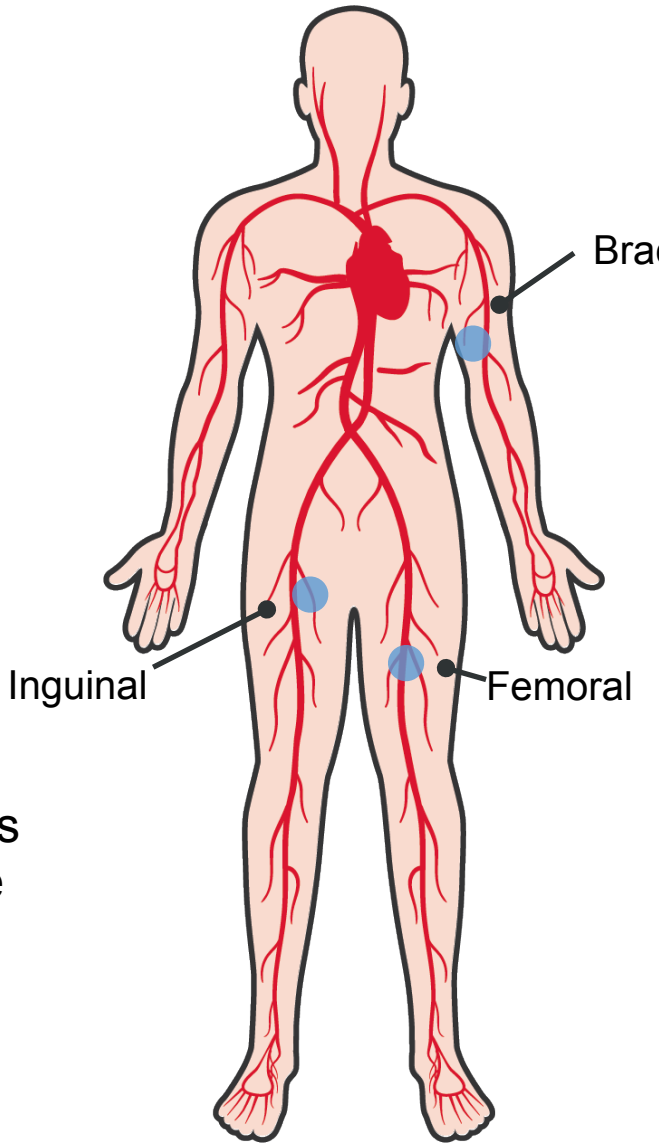
INDIRECT PRESSURE

INDIRECT PRESSURE can be used as a temporary control of bleeding until a **tourniquet** or **pressure bandage** can be applied





APPLY PRESSURE to the appropriate point to compress the artery proximal to the site of bleeding



REMEMBER to ask other first responders to assist as needed.

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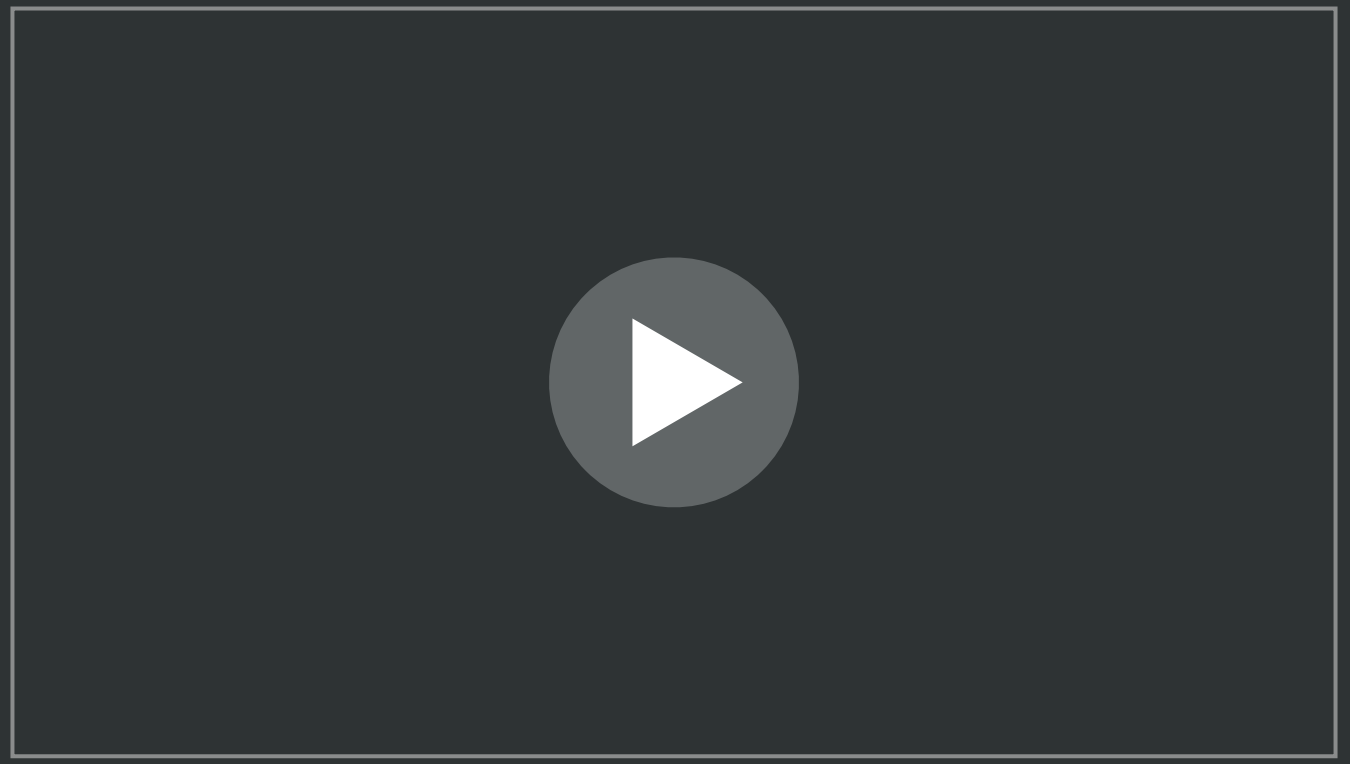
TWO-HANDED RATCHET TOURNIQUET IN TFC



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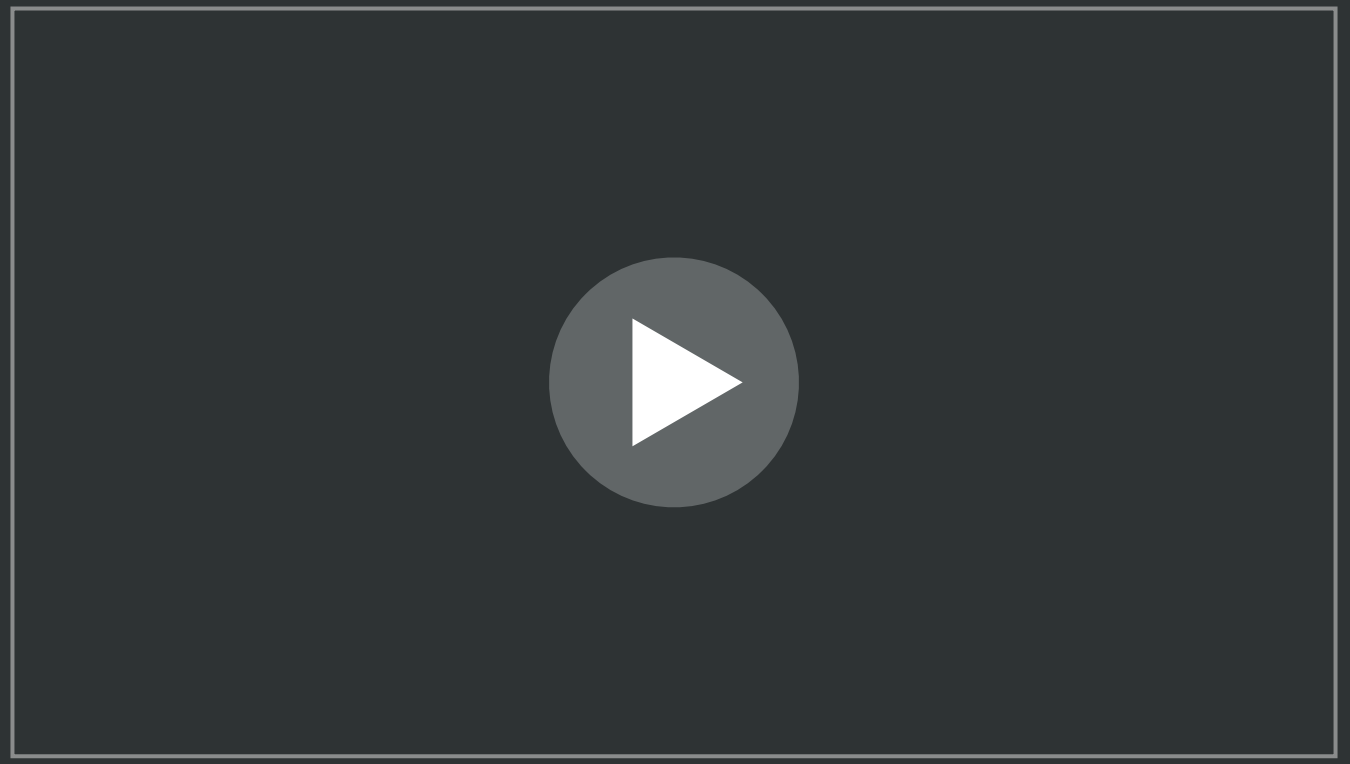
TWO-HANDED WINDLASS TOURNIQUET IN TFC



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TOURNIQUET DRILL

- [x] Apply TQ to your buddy
- [x] Self-apply a TQ

IMPROVISED TOURNIQUET

SUITABLE

- ✓ At least 2 inches in width
- ✓ Sturdy windlass
- ✓ Fastening devices to prevent loosening

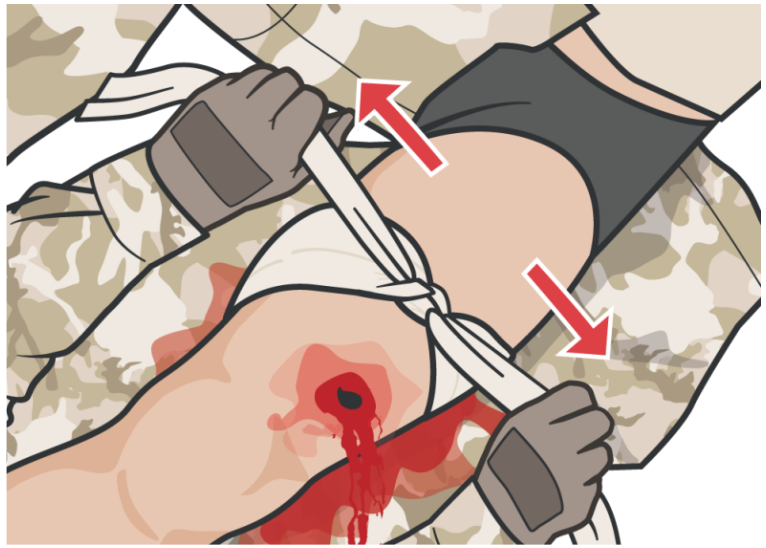
UNSUITABLE

- ✗ Too narrow (<2 inches)
- ✗ No windlass/ inadequate windlass

RISKS Associated with ALL improvised tourniquets:

- **DAMAGE** may occur to skin if the band is too narrow
- Bleeding may **WORSEN**
- Bleeding **MAY NOT BE COMPLETELY CONTROLLED**
- An improvised TQ may likely **LOOSEN** over time from not being properly secured

IMPROVISED TOURNIQUET



Appropriate tourniquet band material placed **2-3 inches above the wound** and tightened with a half knot

Full knot completed over a sturdy windlass rod of appropriate length

Windlass rod rotated to tighten **until bleeding is stopped** and **no distal pulse**

Securing materials used to secure windlass rod, maintain tension, and prevent loosening

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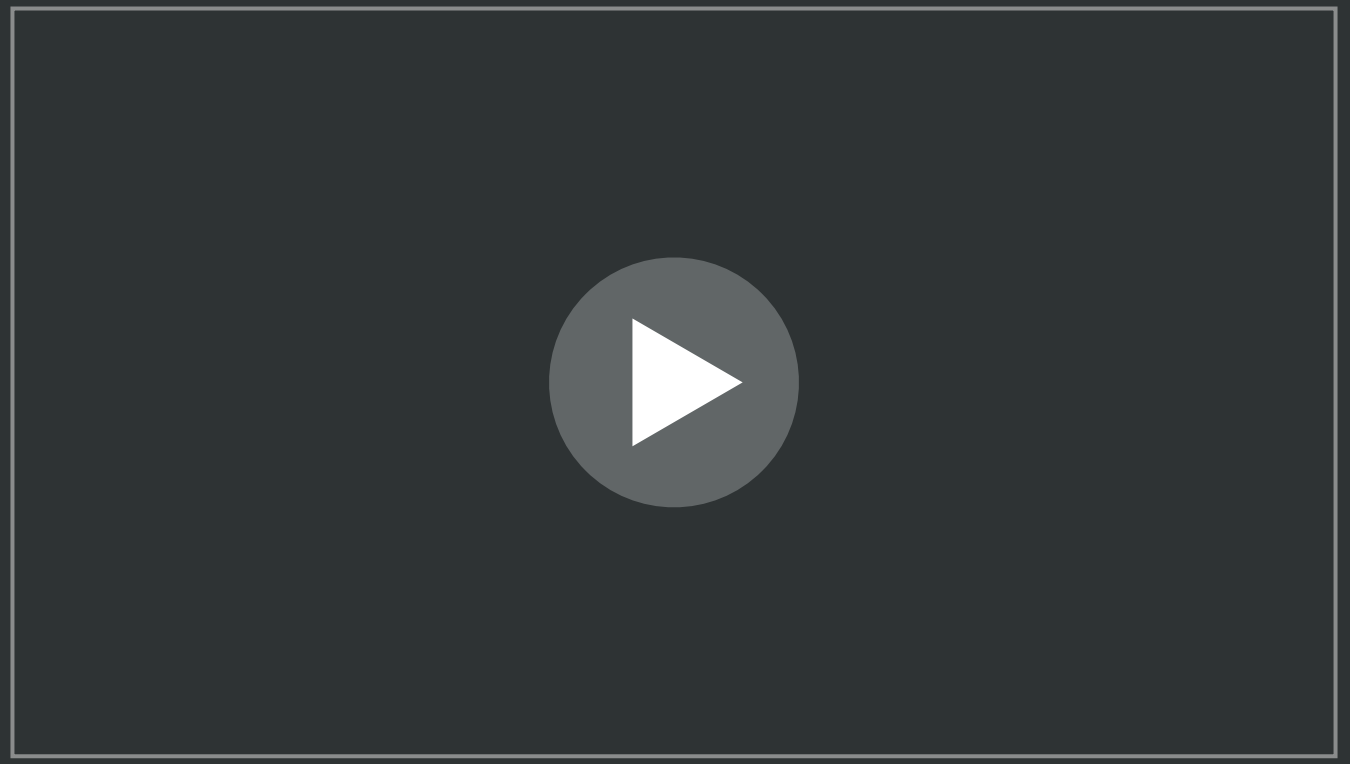
IMPROVISED LIMB TOURNIQUET



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COMMON TOURNIQUET ERRORS

- **NOT** using one when you should or waiting too long to put it on
- **NOT** pulling all the slack out before tightening
- **NOT** making it tight enough – the TQ should stop the bleeding **AND** eliminate the distal pulse
- **NOT** using a second TQ, if needed
- Using a TQ for minimal bleeding *(However, **when in doubt**, apply a TQ)*
- Putting it on too proximally if the bleeding site is clearly visible
- Loosening TQs for a period to allow recirculation of a limb
- Taking a TQ off **prematurely** when it is still needed for hemorrhage control
- **DON'T** put TQs over joints!

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SKILL STATION

TFC Hemorrhage Control (skills)

- Two-Handed (Windlass) TQ Application in TFC
- Two-Handed (Ratchet) TQ Application in TFC
- Improvised Limb TQ Application

HEMOSTATIC GAUZE

For compressible (external) hemorrhage not amenable to limb TQ (places where a tourniquet cannot be effectively applied), if a TQ is not available, or for bleeding from wounds not requiring a TQ,
use a **CoTCCC-recommended hemostatic gauze**

HEMOSTATIC GAUZE with or without a pressure bandage **CAN** be used to control compressible junctional hemorrhage

⚠ REMEMBER:

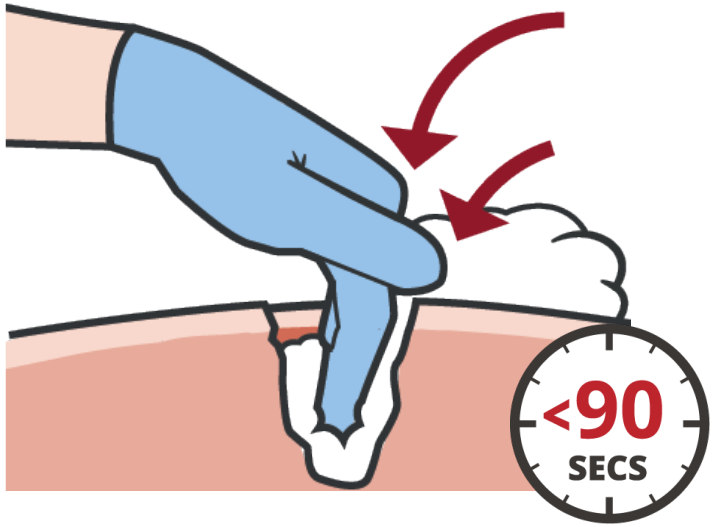
- **DO NOT** pack hemostatic gauze into the chest wounds
- A JFAK contains **one hemostatic gauze** and **one dry sterile gauze**

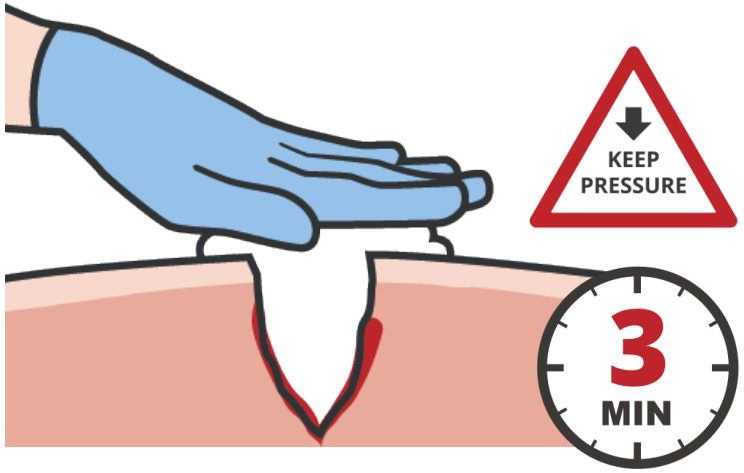
HEMOSTATIC GAUZE

CoTCCC-recommended hemostatic gauze is safe and contains active ingredients that assist with blood-clotting at the bleeding site

A JFAK contains **one hemostatic** gauze and **one dry sterile gauze**

WOUND PACKING



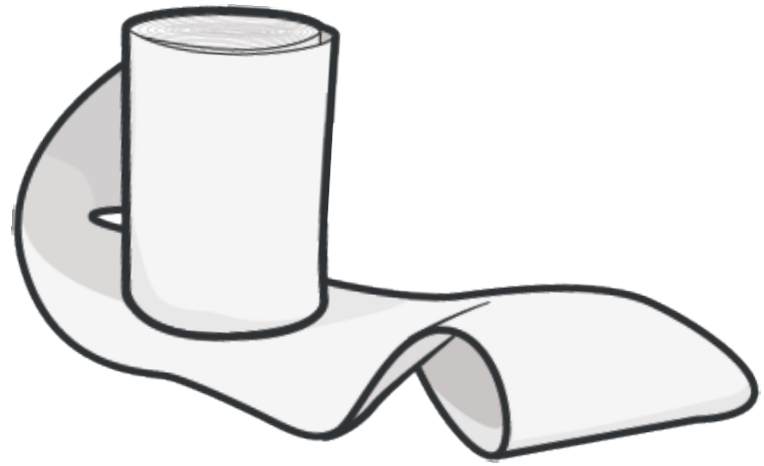


- Identify **exact source** of bleeding and **APPLY direct pressure UNTIL** gauze is placed
- Pack the wound **maintaining CONSTANT** direct pressure within **90 SECONDS** to be effective
- Fill and pack the wound tightly, ensuring gauze extends 1-2 inches above the skin
- **HOLD** direct pressure for at least **3 MINS** *(**this is necessary**, even with the active ingredient in hemostatic gauze)*
- When packing a large wound, more than one hemostatic gauze 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 REPACKING FOR FAILED CONTROL

- If packed with hemostatic gauze, **remove** packing material and **repack** with a new hemostatic gauze, if available
- It may be a **fresh** hemostatic dressing of the **same type** or a **different type** if available

- Alternatively, additional **non-hemostatic** gauze **CAN** be applied on top of the first gauze



- If hemostatic gauze is **NOT** readily available, use dry sterile gauze or some other materials to pack the wound

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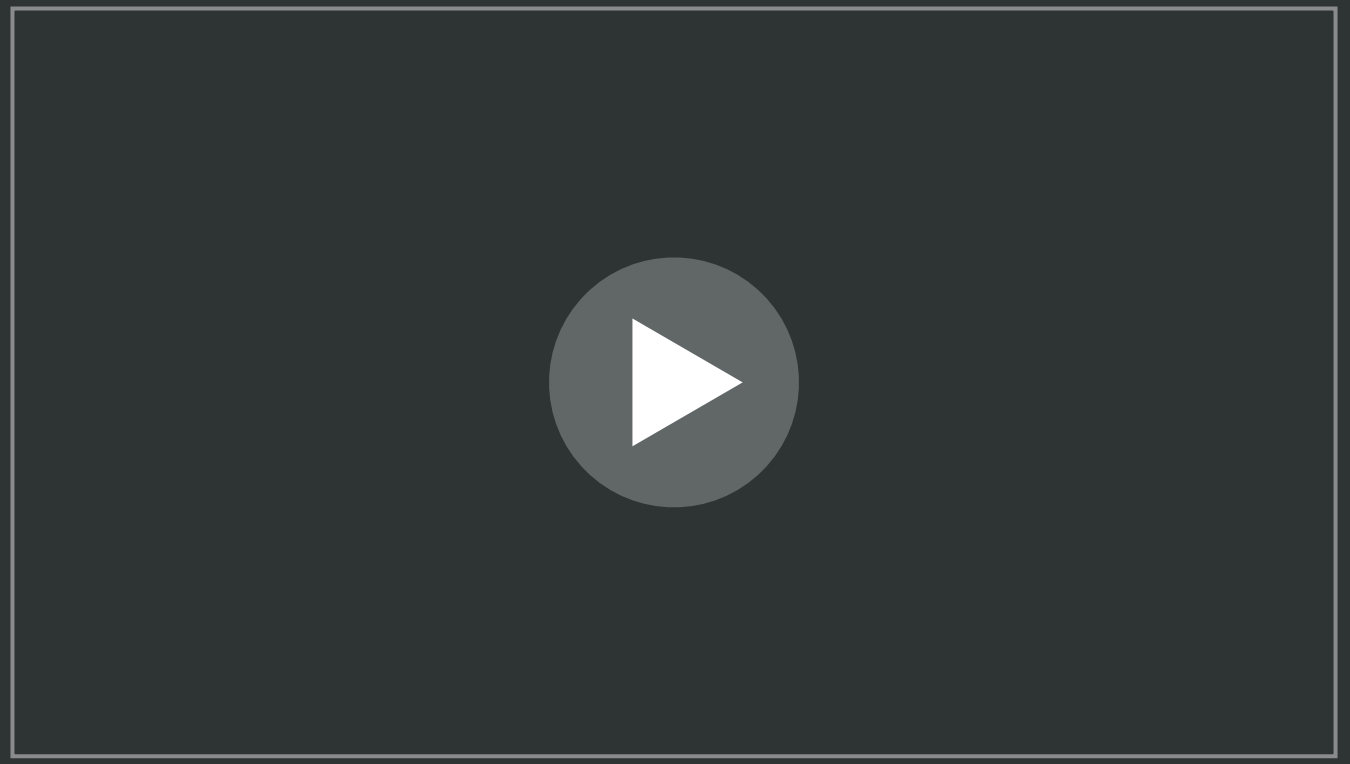
HEMOSTATIC DRESSING AND WOUND PACKING



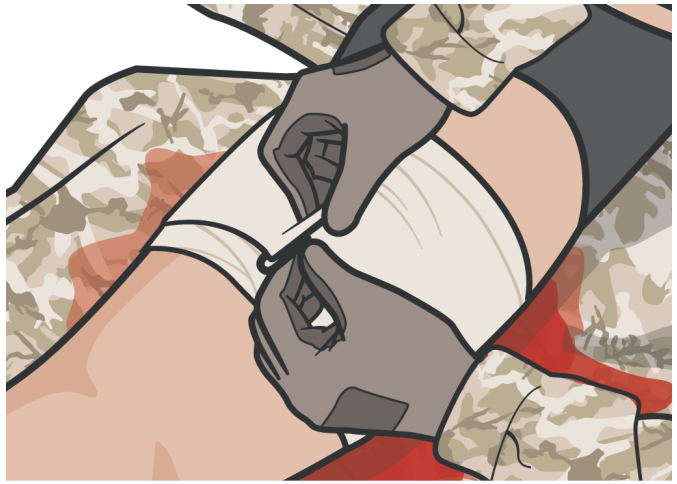
Video can be found on deployedmedicine.com

PRESSURE BANDAGES

ALL dressings for **significant** bleeding **should be secured** with pressure bandages

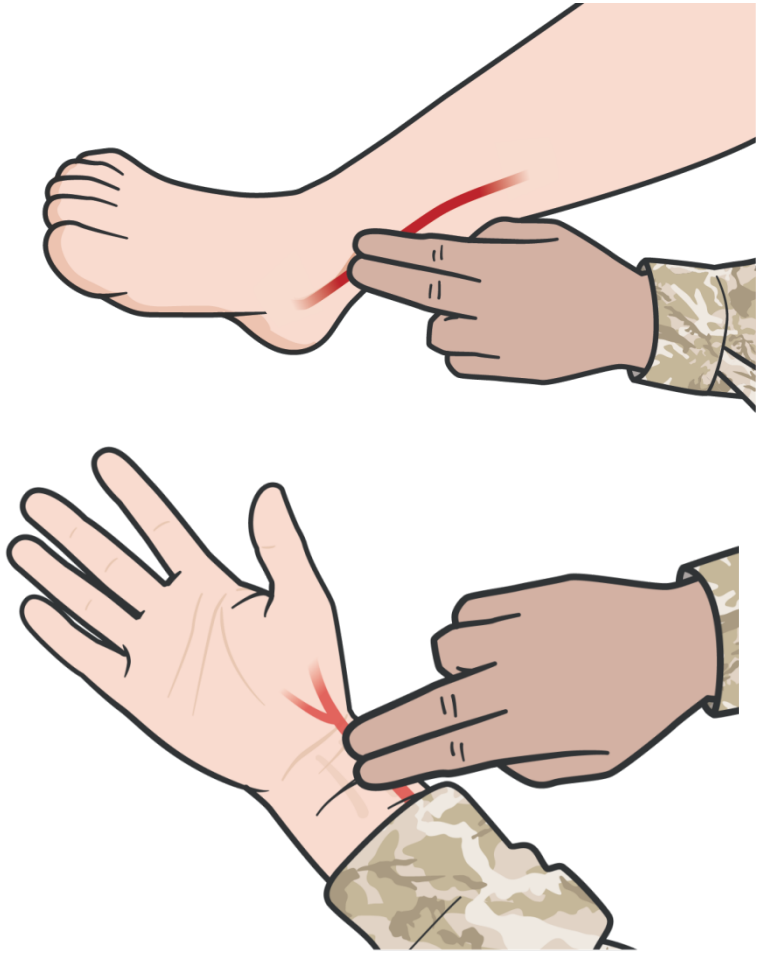
Place the bandage pad **directly** on the dressing, **continuing to apply direct pressure**

Wrap the pressure/elastic bandage **tightly**, focusing pressure over the wound



SECURE the hooking **ends** of the hook and loop or closure bar onto the last wrap of the bandage

PRESSURE BANDAGE ASSESSMENT



Key Points:

- Check for **circulation BELOW** the pressure bandage by **feeling for distal pulse** (a pulse below the bandage)
- If the **skin BELOW** the pressure bandage becomes **cool** to the touch, **bluish**, or **numb**, or if the **pulse** below the pressure bandage is **no longer present**, the pressure bandage may be **too tight**
- If the pressure bandage is acting as a tourniquet, **loosen** and resecure the bandage
- Dressings and bandages should be **reassessed** and checked frequently and **EVERY TIME a casualty is moved**

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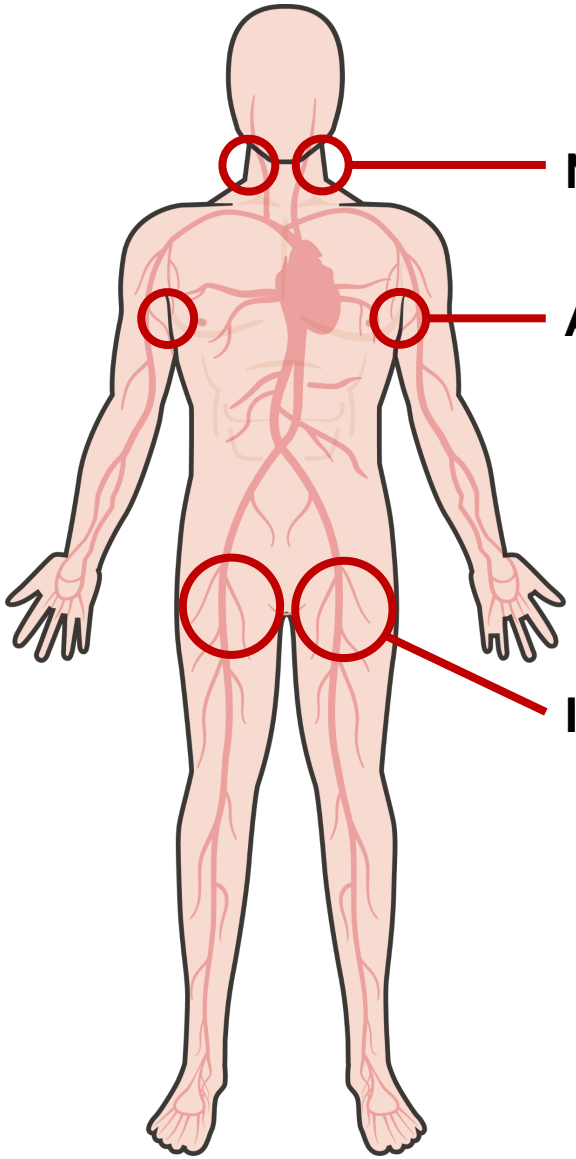
SKILL STATION

TFC Hemorrhage Control (skills)

Wound Packing With Hemostatic Gauze and Pressure Bandage

Pressure Bandage Application

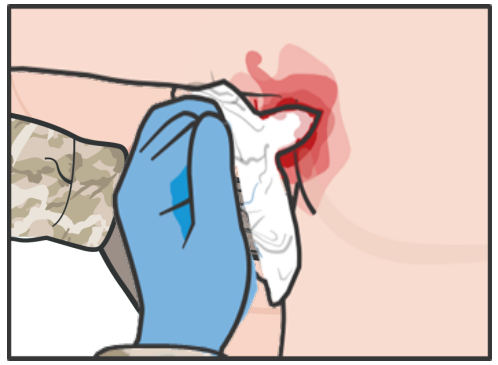
JUNCTIONAL ANATOMY



Junctional areas are located at the **junctions of the extremities** and **neck** with the torso

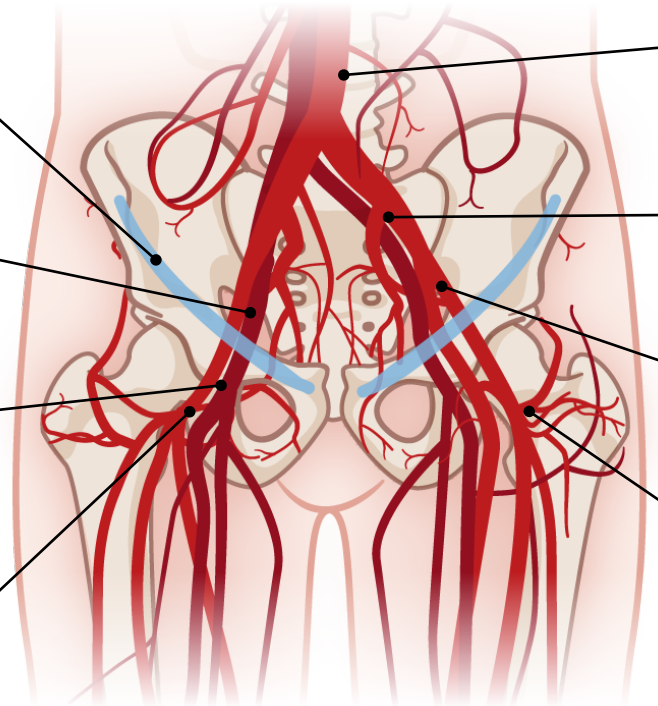
Junctional hemorrhage occurs with injury to the large blood vessels that pass through the junctional areas

Junctional hemorrhage can also occur on the extremities if the **injury** is **TOO CLOSE** **to the torso** for a limb tourniquet to be applied



Blood vessels at **junctional areas are LARGER** than in the limbs but **can still be COMPRESSED** with direct pressure

JUNCTIONAL ANATOMY



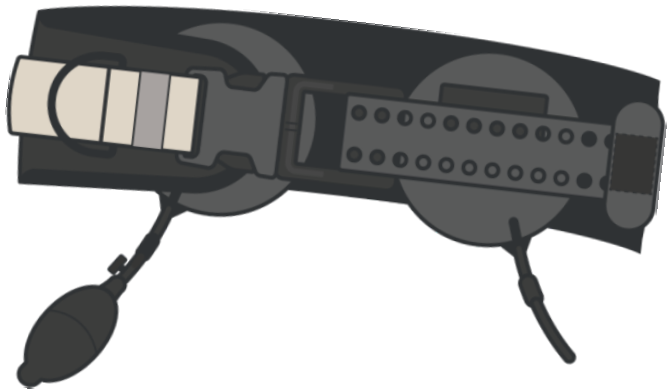
BOTTOM LINE:

For a piece of shrapnel, the high thigh and groin are **target rich environments** not covered by body armor

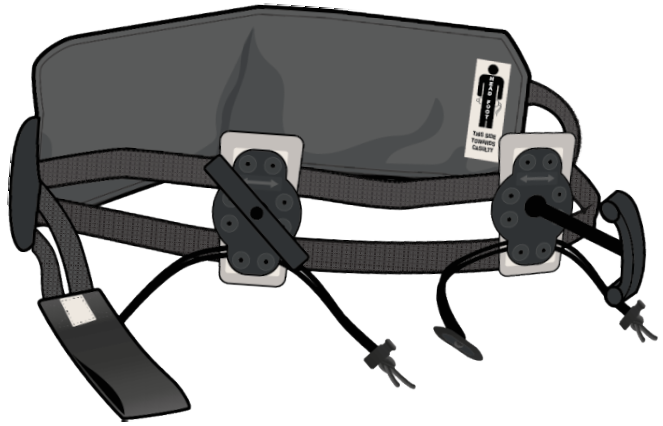
The aorta can be compressed near the umbilicus

The femoral arteries can be compressed in the groin

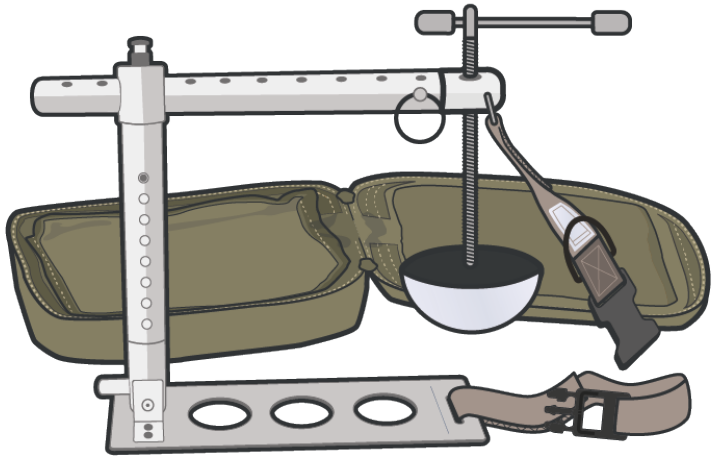
JUNCTIONAL TOURNIQUETS



SAM JUNCTIONAL TOURNIQUET



JETT JUNCTIONAL TOURNIQUET

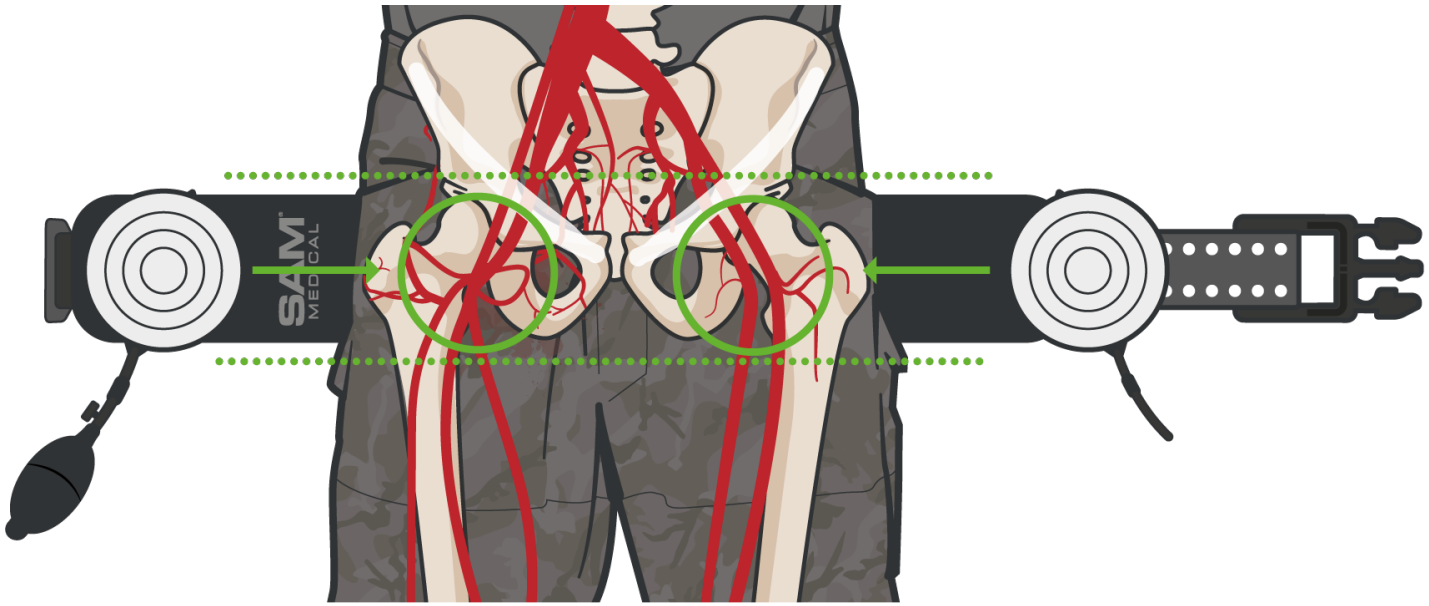


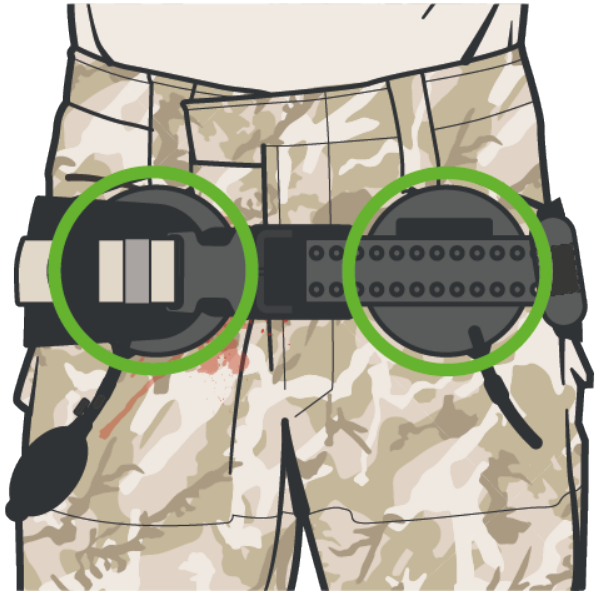
CROC JUNCTIONAL TOURNIQUET

Apply direct pressure and/ or pack with hemostatic dressing while preparing the junctional tourniquet

REMEMBER: Junctional TQs should be applied after proper wound packing of any open wounds

SAM JUNCTIONAL TOURNIQUET

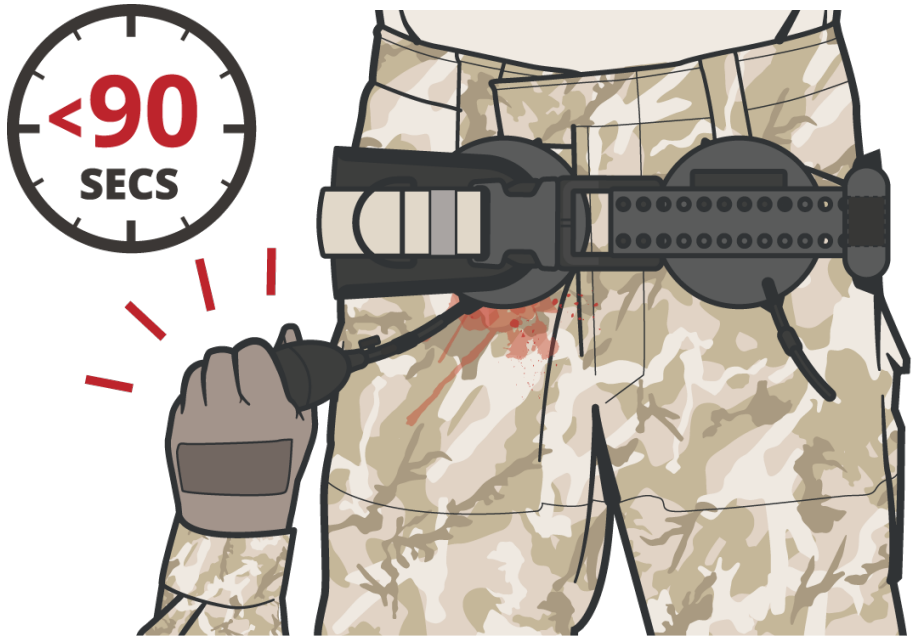




Targeted compression devices (TCDs) must be positioned appropriately below the inguinal ligament to compress the large vessels and control bleeding

For effective hemorrhage control, an audible click should be heard when the belt and buckle are appropriately secured; all slack must be removed from the belt before TCD inflation

SAM JUNCTIONAL TOURNIQUET



- **Inflate TCD(s)** until the hemorrhage stops and distal pulse is no longer present
- The bleeding should be stopped **WITHIN 90 SECONDS**
- When treating bilateral junctional injuries, use a second TCD following the same procedure
- **DOCUMENT** time of junctional TQ placement

REMEMBER: Monitor for hemorrhage control and adjust device as needed, especially after any casualty movement

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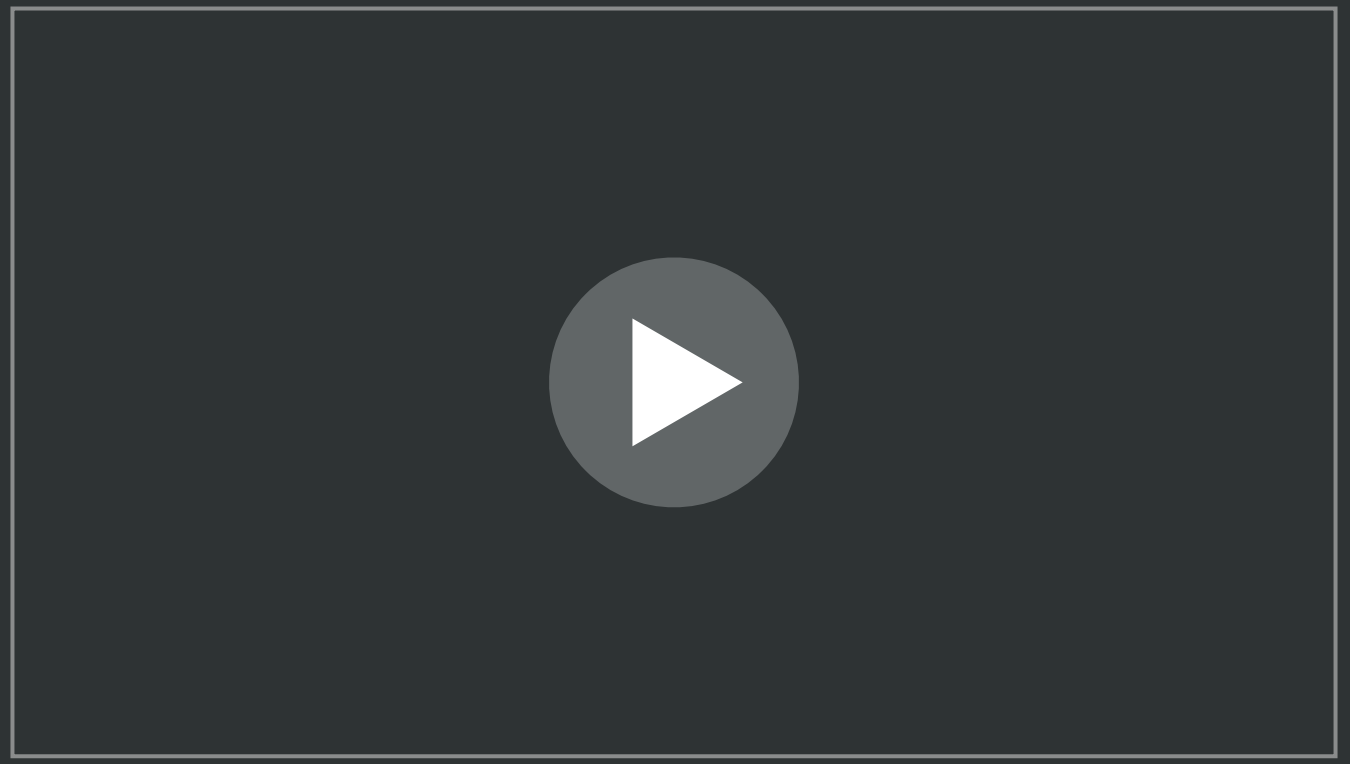
SAM JUNCTIONAL TOURNIQUET



Video can be found on deployedmedicine.com

COMBAT READY CLAMP (CRoC) JUNCTIONAL TOURNIQUET

- **Tighten pressure disc** until the hemorrhage stops and distal pulse is no longer present
- The bleeding should be stopped **WITHIN 90 SECONDS**
- When treating bilateral junctional injuries, a second CRoC would be used following the same procedure
- Document the time of junctional TQ placement

REMEMBER: Monitor for hemorrhage control and adjust device as necessary especially after any casualty movement

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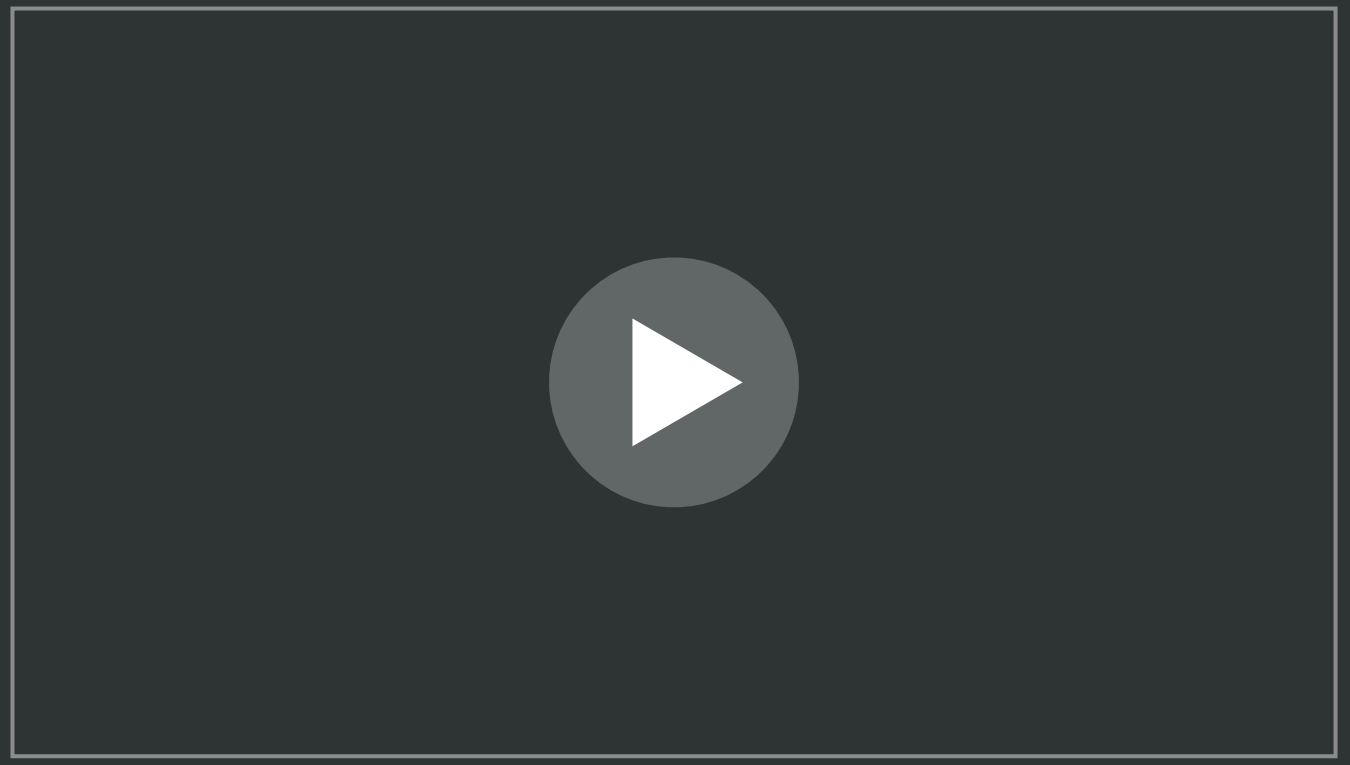
COMBAT READY CLAMP (CRoC) JUNCTIONAL TOURNIQUET



Video can be found on deployedmedicine.com

JUNCTIONAL EMERGENCY TREATMENT TOOL

- **Tighten pressure pads** until hemorrhage stops and distal pulse is no longer present
- The bleeding should be stopped **WITHIN 90 SECONDS**
- When treating bilateral junctional injuries, tighten the second pressure pad following the same procedure
- Document the time of junctional TQ placement

REMEMBER: Monitor for hemorrhage control and adjust device as necessary especially after any casualty movement

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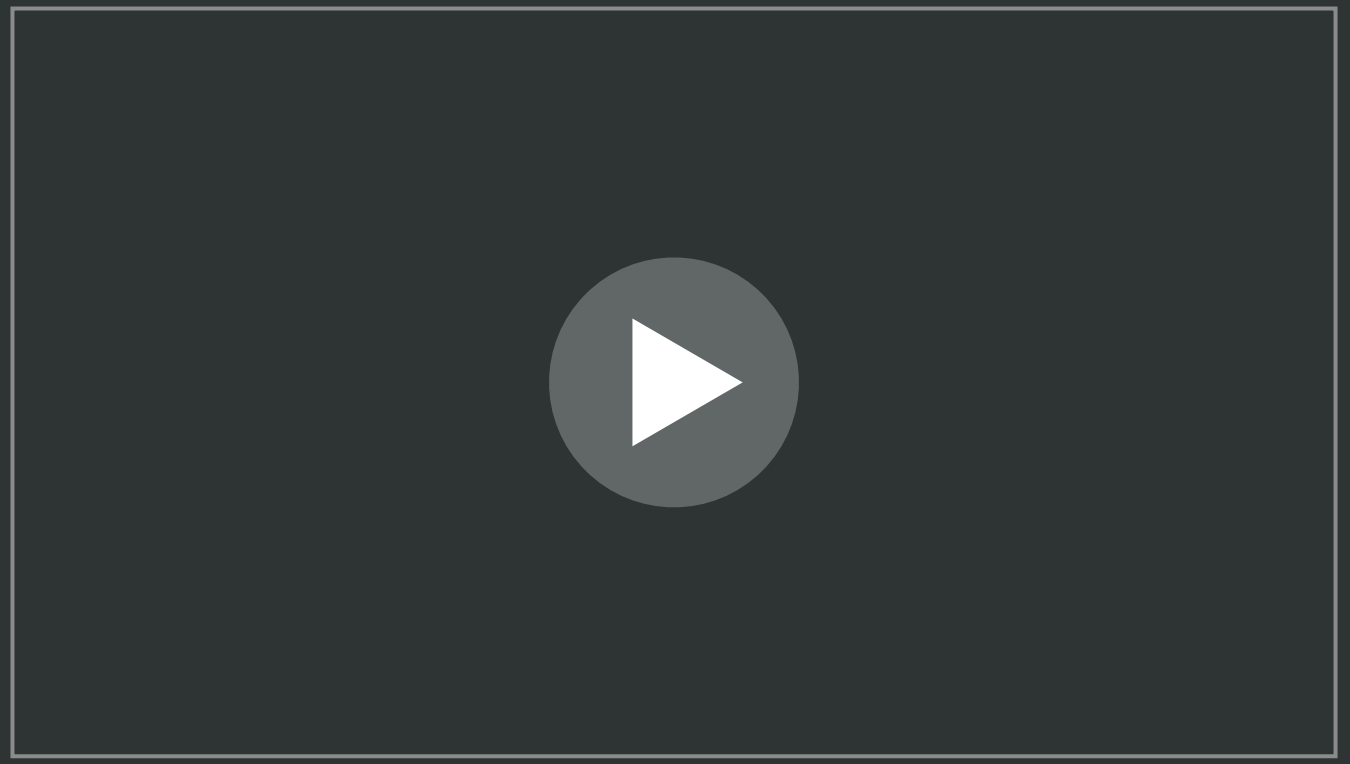
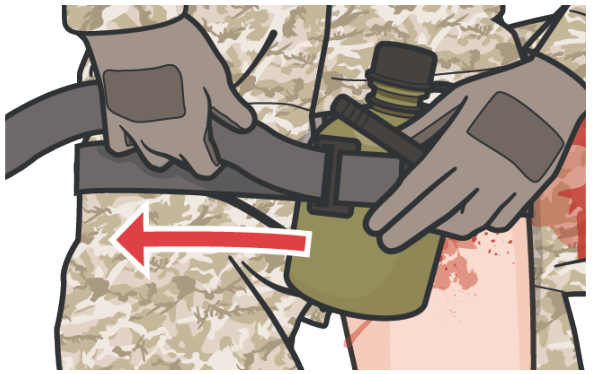
JUNCTIONAL EMERGENCY TREATMENT TOOL (JETT)



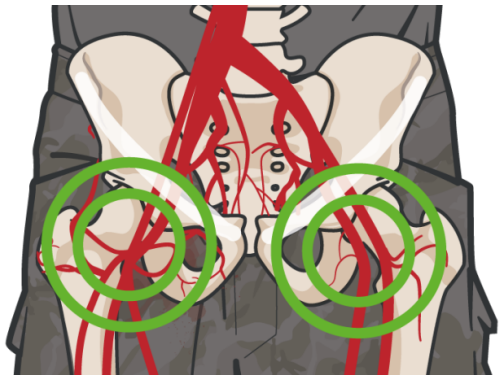
Video can be found on deployedmedicine.com

JUNCTIONAL HEMORRHAGE CONTROL WITH IMPROVISED PRESSURE DELIVERY DEVICE

A **Pressure Delivery Device (PDD)** can be made by using materials such as a **shoe/boot, canteen, or strong polycarbonate material**



Pack groin injuries with hemostatic gauze and then use an **improvised PDD** for additional targeted, sustained pressure



The PDD is placed in the inguinal gutter while **MAINTAINING CONSTANT pressure** on the gauze-packed wound

The PDD is then **secured** with a tourniquet* and **tightened** to add **ADDITIONAL** pressure

* ***Two TQs*** *may need to be joined* ***TOGETHER*** *when securing an improvised PDD*

CAUTION: Expose all wounds
REMEMBER: Monitor for hemorrhage control and adjust device as necessary especially after any casualty movement

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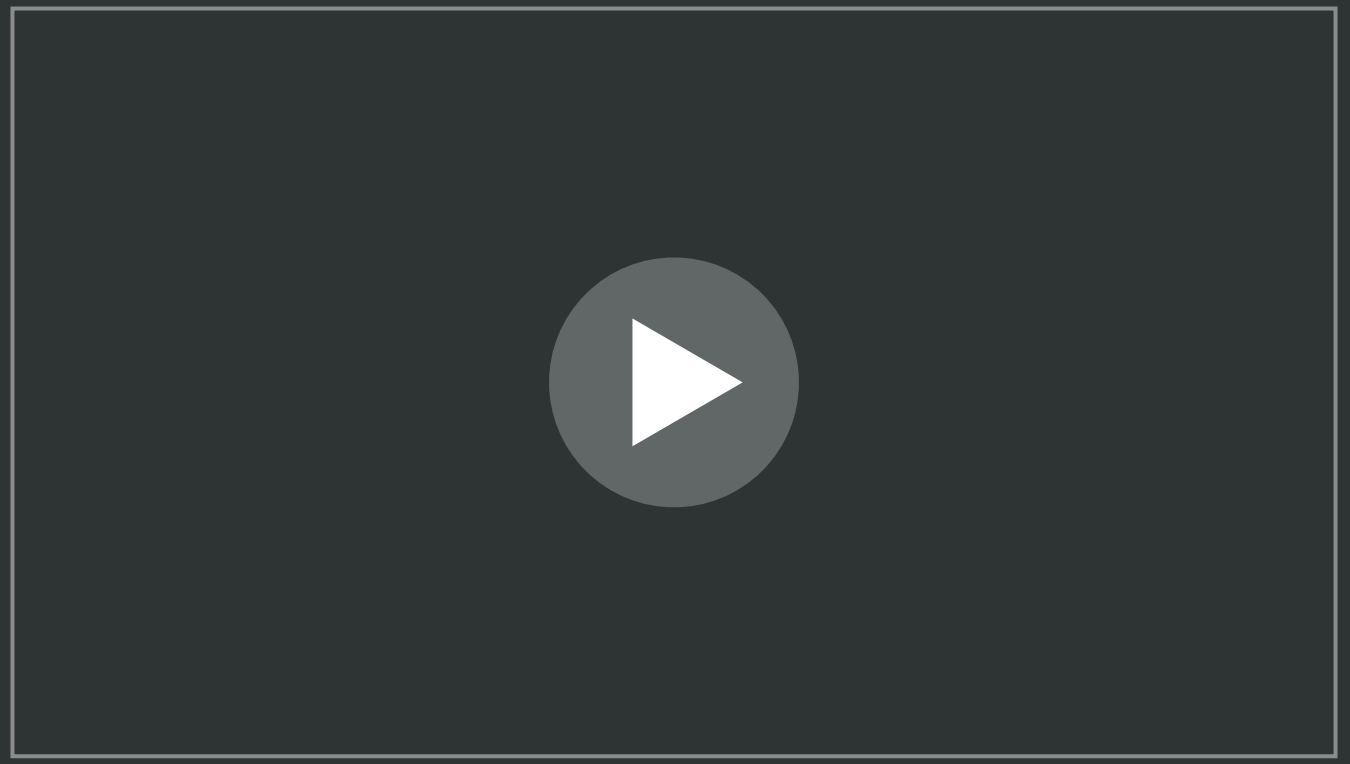
INGUINAL IMPROVISED JUNCTIONAL PDD



Video can be found on deployedmedicine.com

NECK JUNCTIONAL HEMORRHAGE CONTROL

Pack the wound with hemostatic dressing until the wound cavity is filled

Apply firm, manual pressure for **3 MINS**

Secure with bandage

While maintaining pressure, wrap the pressure bandage diagonally across the chest under the opposite axilla

Swath the arm on the injured side

REMEMBER: Monitor for hemorrhage control and adjust device as needed, especially after any casualty movement; **DO NOT FORGET** to ask other first responders to assist as needed

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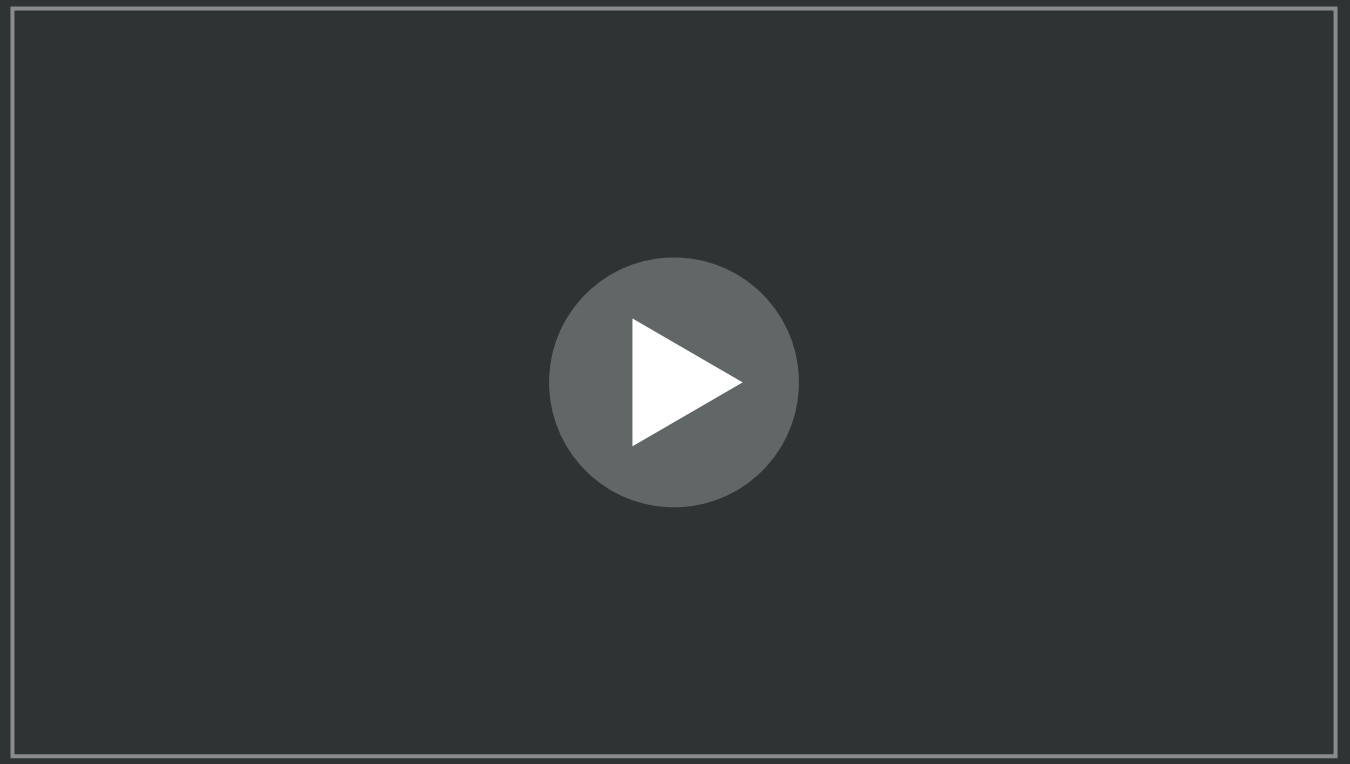
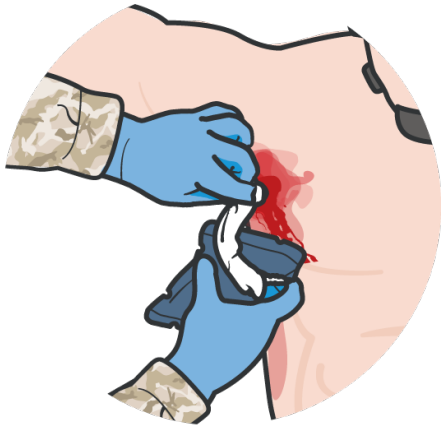
NECK JUNCTIONAL HEMORRHAGE CONTROL



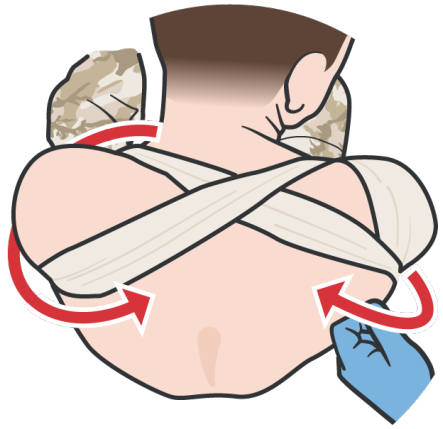
Video can be found on deployedmedicine.com

AXILLARY JUNCTIONAL HEMORRHAGE CONTROL

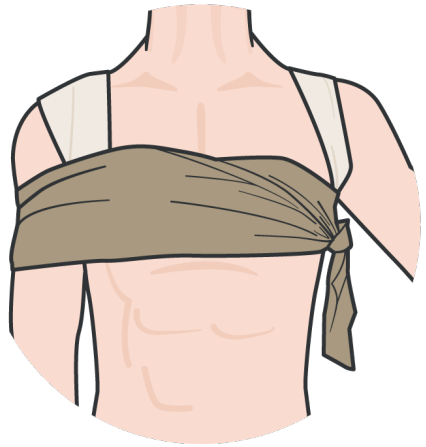
Lift the arm to expose the wound and assess the bleeding source



Pack the wound tightly with hemostatic gauze



Wrap elastic bandage across, back, and under opposite axilla, anchoring around opposite shoulder



Swath the upper arm on injured side to the chest using a **cravat**

REMEMBER: Monitor for hemorrhage control and adjust device as needed, especially after any casualty movement; **DO NOT FORGET** to ask other first responders to assist as needed

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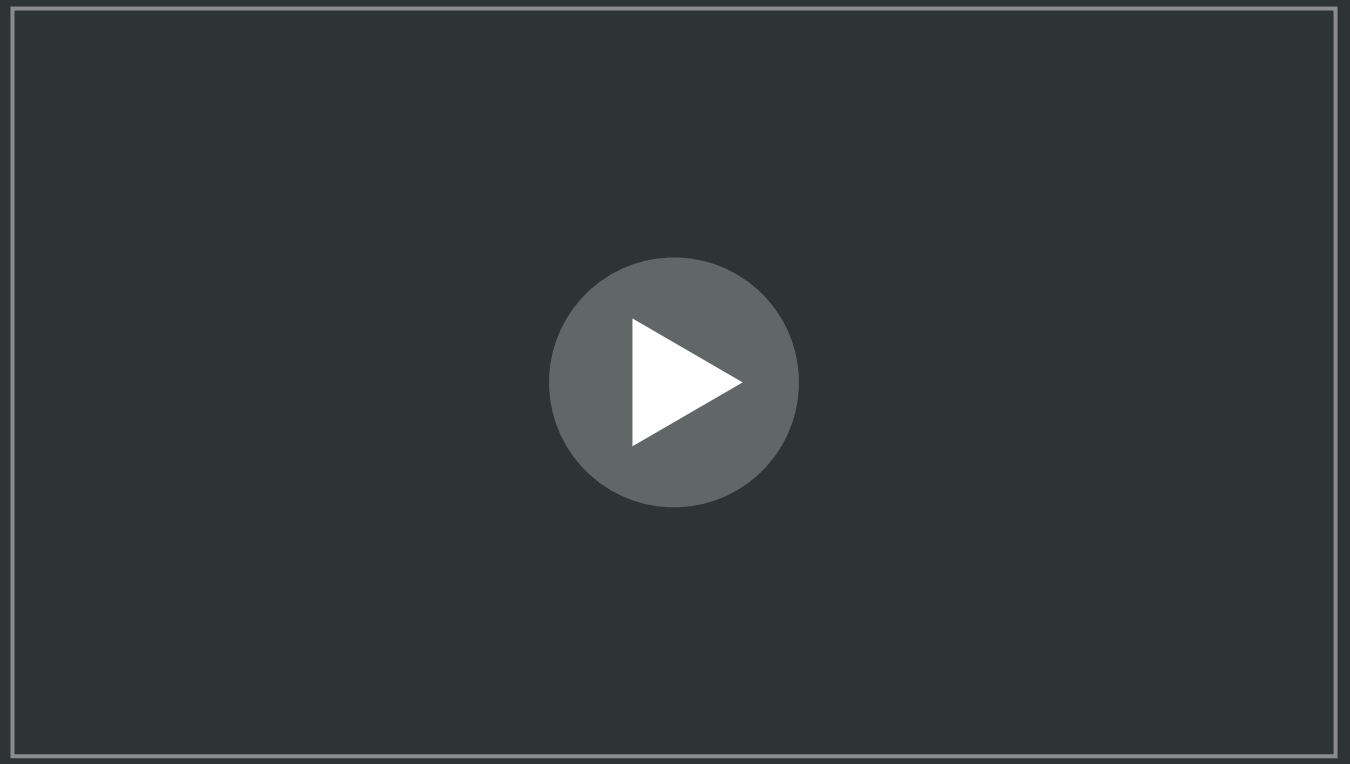
AXILLARY JUNCTIONAL HEMORRHAGE CONTROL



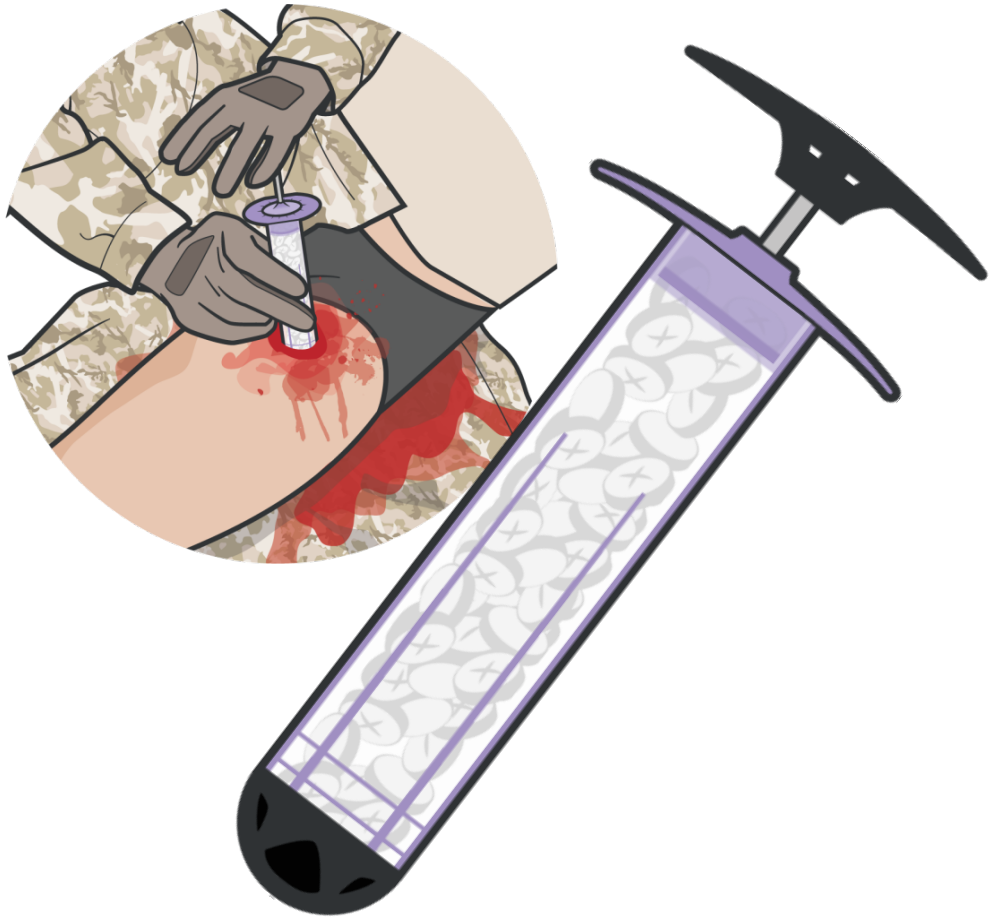
Video can be found on deployedmedicine.com

INJECTABLE HEMOSTATIC AGENT: XSTAT

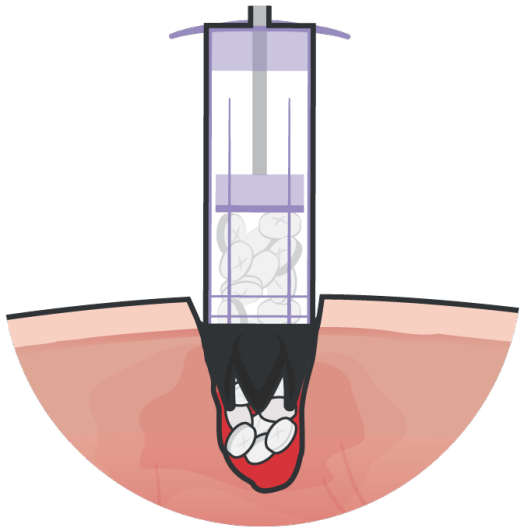
- Compressed foam sponges in syringe applicator
- Sponges expand on contact with blood
- Best suited for narrow tract and junctional wounds

⚠ **REMEMBER: Is not** indicated for use in thorax, pleural cavity, mediastinum, abdomen, retroperitoneal space, sacral space, above the inguinal ligament, and tissues above the clavicle

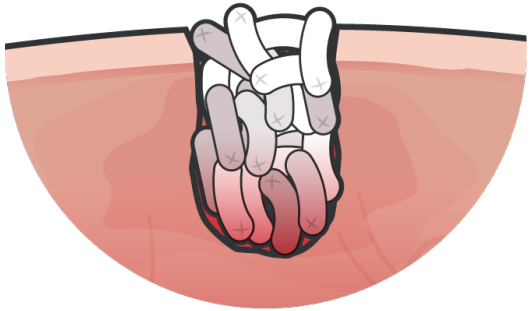
DO NOT attempt to remove sponges in the field



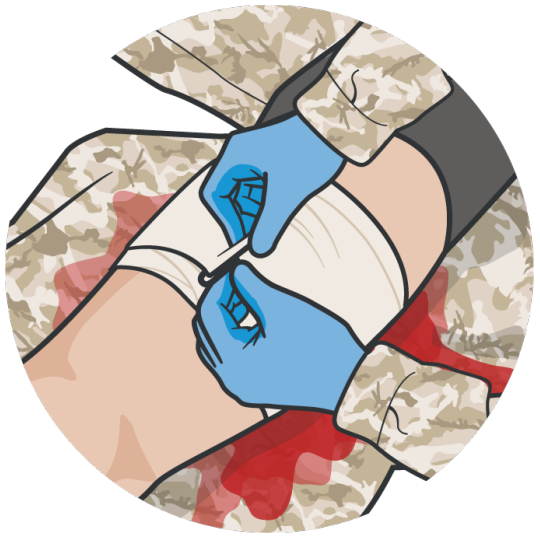
INJECTABLE HEMOSTATIC AGENT: XSTAT



- Insert applicator tip into the wound as close to the bleeding source as possible
- Deploy the mini-sponges into the wound tract or cavity



- Pack into the wound tract to the same density you would gauze
- Use additional applicators as necessary to completely pack the wound cavity/tract



- Apply manual pressure over the wound for 3 minutes until bleeding is controlled and apply a pressure bandage

⚠ Document treatment(s) on **DD 1380**

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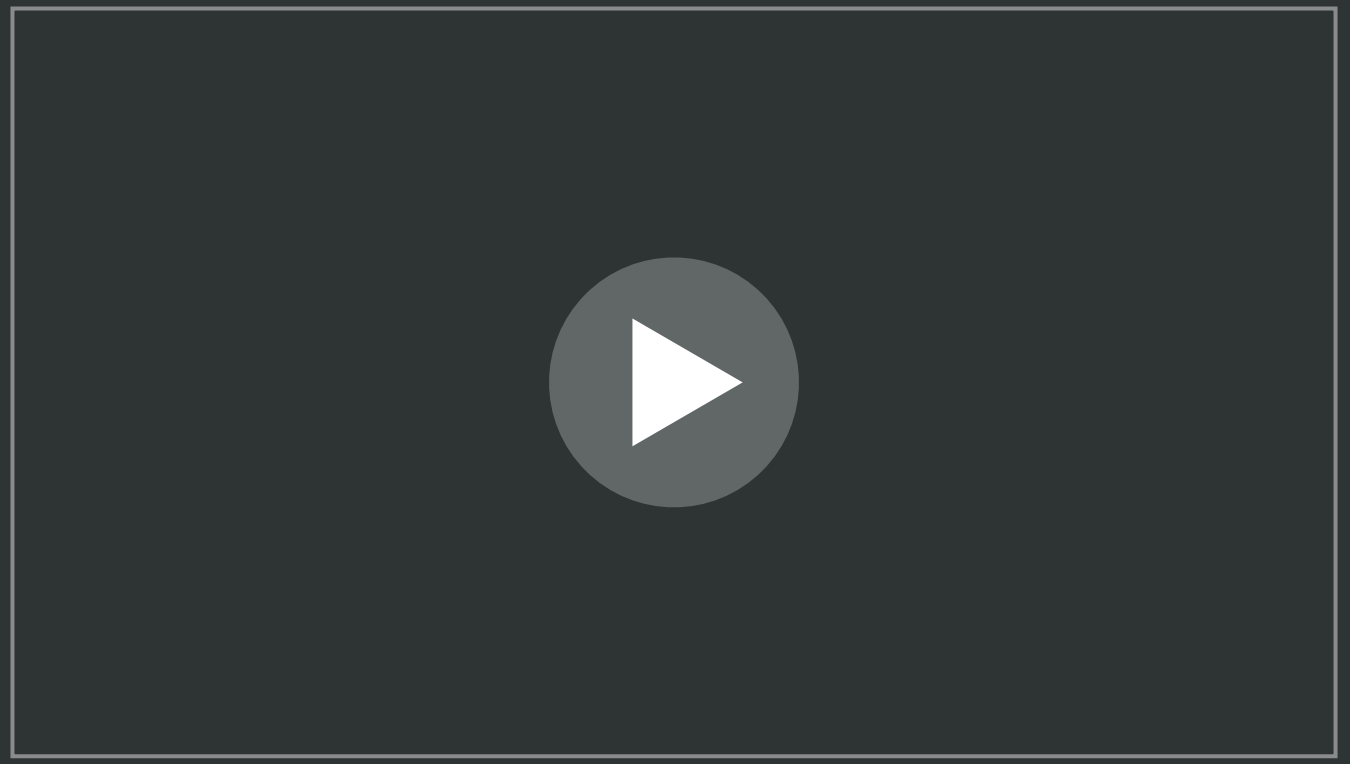
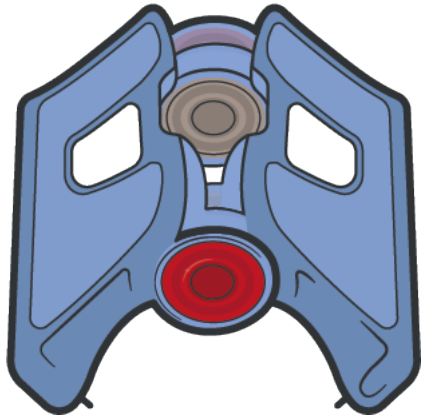
INJECTABLE HEMOSTATIC AGENT (XSAT) VIDEO

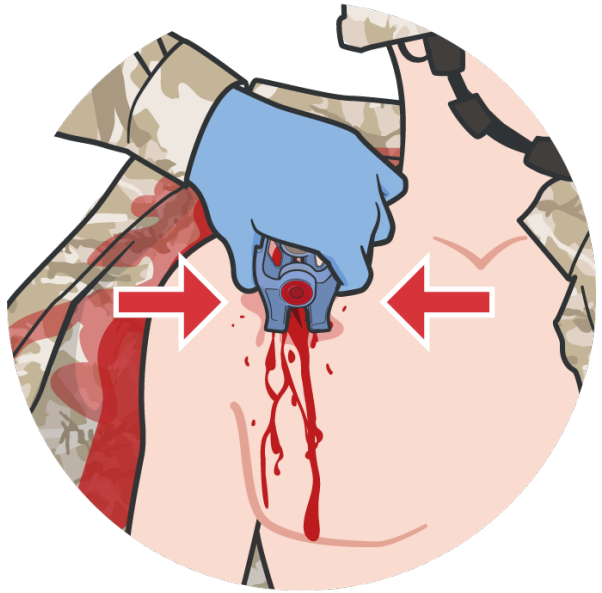


Video can be found on deployedmedicine.com

WOUND CLOSURE DEVICE

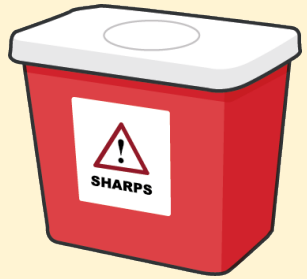
The **WOUND CLOSURE DEVICE** (such as the iTClamp) can be used in conjunction with other hemorrhage control interventions such as wound packing or hemostatic agents





Best suited for scalp, neck, or extremity, but can be used on some junctional wounds in the groin or axilla

CAUTION:
Do not use near the eye.



SHARPS HAZARD:
Handle with care to avoid injury and dispose of properly

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SKILL STATION

TFC Hemorrhage Control (skills)

- Wound Closure Device Application
- Neck Junctional Hemorrhage Control
- Axillary Junctional Hemorrhage Control
- Inguinal Hemorrhage Control With Improvised Junctional Pressure Delivery Device (PDD)

SUMMARY

- **MASSIVE HEMORRHAGE** (the **M** in MARCH) is the priority in TFC
- **Reassess TQs** applied in CUF and place deliberate TQs for extemity hemorrhage not previously addressed
- **Treat junctional hemorrhage** without delay using direct pressure, hemostatic dressings, and CoTCCC-recommended junctional TQs or improvised techniques
- Injectable hemostatic agents and wound closure devices can also address massive hemorrhage

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CHECK ON LEARNING

What is the proper distance a deliberate tourniquet should be placed from the bleeding site?

What are the differences between the high & tight tourniquets used in Care Under Fire and the deliberate tourniquets placed in TFC?

How long should direct pressure be applied on a packed hemostatic dressings?

Why is it important to check the pulse after applying a pressure bandage?

What is junctional hemorrhage and how is it treated?

Injectable hemostatic agent is contraindicated in which anatomical locations?

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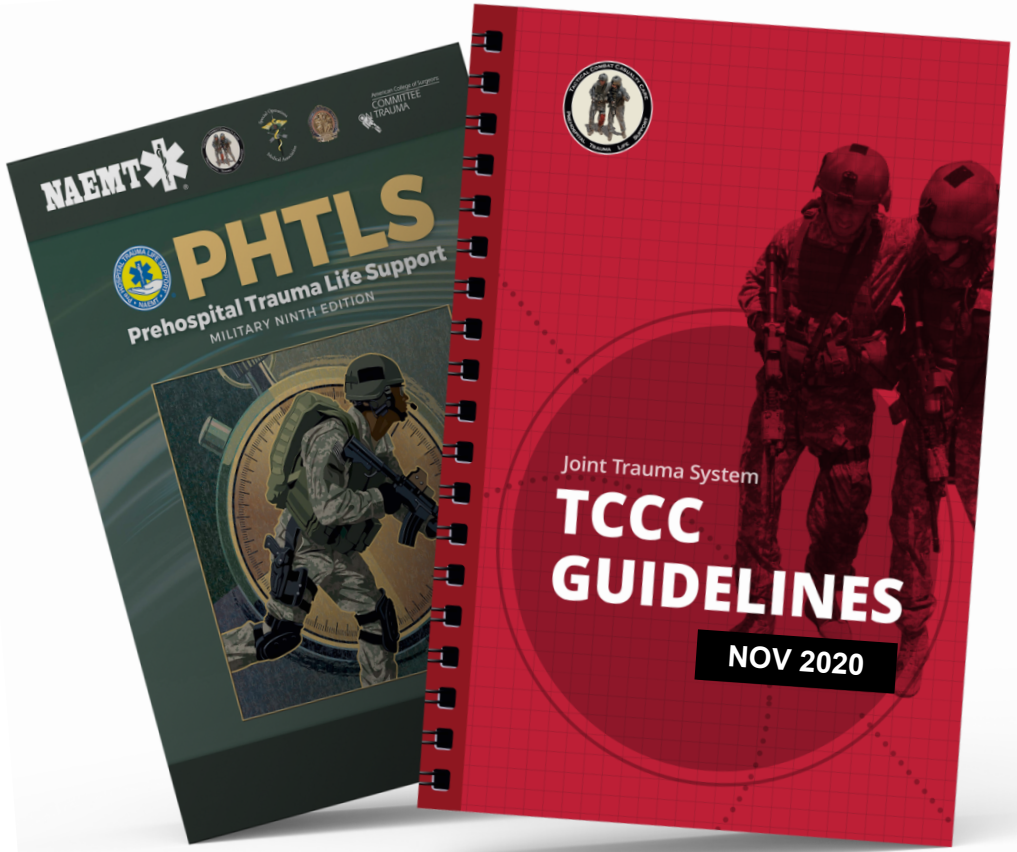
ANY QUESTIONS?

REFERENCES



TCCC: Guidelines

by JTS/CoTCCC

Updated regularly – latest edition dated 5 November 2020

These guidelines are the result of decisions made by the Committee on Tactical Combat Casualty Care as they explore evidence-based research regarding best practices

PHTLS: Military Edition

by NAEMT

Prehospital Trauma Life Support, Military Ninth Edition