

TACTICAL COMBAT CASUALTY CARE COURSE

MODULE 06: MASSIVE HEMORRHAGE CONTROL



Committee on
Tactical Combat
Casualty Care
(CoTCCC)

TCCC TIER 1
All Service Members

TCCC TIER 2
Combat Lifesaver

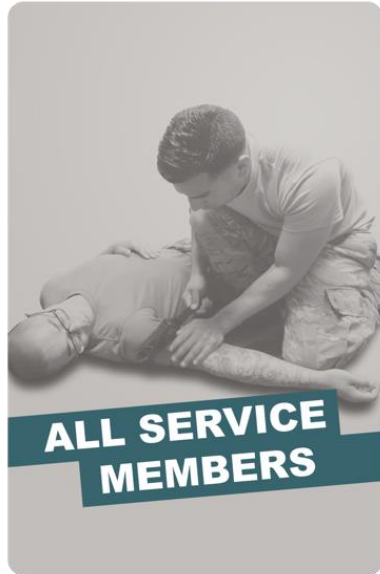
TCCC TIER 3
Medic/Corpsman

TCCC TIER 4
Combat Paramedic/Provider

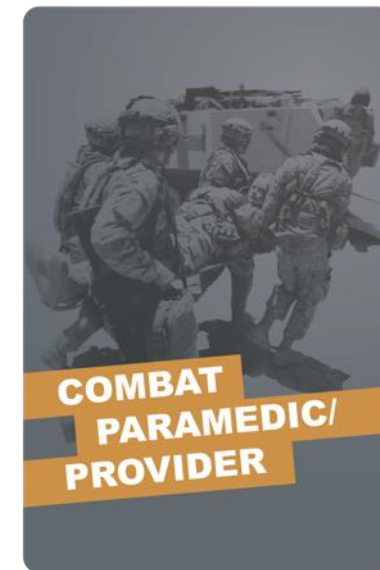
TACTICAL COMBAT CASUALTY CARE (TCCC) ROLE-BASED TRAINING SPECTRUM

ROLE 1 CARE

NONMEDICAL PERSONNEL



MEDICAL PERSONNEL



◀ **YOU ARE HERE**

STANDARDIZED JOINT CURRICULUM

STUDENT LEARNING OBJECTIVES

TERMINAL LEARNING OBJECTIVE

07 Given combat or noncombat scenario, perform massive hemorrhage control during Tactical Field Care in accordance with CoTCCC Guidelines

- **37** Identify non-life-threatening hemorrhage (bleed)
- **38** Identify life-threatening hemorrhage (bleed)
- **39** Identify the importance of early application of limb tourniquets to control life-threatening bleed
- **40** Identify anatomical sites for applying direct and indirect pressure to control bleeding
- **41** Demonstrate the appropriate application of a CoTCCC-recommended limb tourniquet
- **42** Identify risks associated with applying an improvised limb tourniquet
- **43** Demonstrate the application of a CoTCCC-recommended hemostatic dressing
- **44** Demonstrate an evaluation of previously applied tourniquets for hemorrhage control effectiveness
- **45** Demonstrate improvised junctional hemorrhage control with hemostatic dressing and direct pressure

09 ENABLING LEARNING OBJECTIVES (ELOs)

● = Cognitive ELOs ● = Performance ELOs

Three PHASES of TCCC

1 CARE UNDER FIRE

RETURN FIRE
AND TAKE COVER

Quick decision-making:

- Consider scene safety
- Identify and control life-threatening bleeding
- Move casualty to safety

2 TACTICAL FIELD CARE

COVER AND
CONCEALMENT

Basic management plan:

- Maintain tactical situational awareness
- Triage casualties as required
- Conduct MARCH PAWS assessment



YOU ARE HERE

3 TACTICAL EVACUATION CARE

More deliberate assessment and treatment of unrecognized life-threatening injuries

- Pre-evacuation procedures
- Continuation of documentation

NOTE: This is covered in more advanced TCCC training!

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

HEMORRHAGE OVERVIEW IN TFC



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

SECURITY AND SAFETY IN TACTICAL FIELD CARE

Establish a security perimeter in accordance with unit tactical standard operating procedures (SOPs) and/or battle drills

Maintain tactical situational awareness



CASUALTIES WITH ALTERED MENTAL STATUS SHOULD HAVE

Weapons cleared and secured

Communications secured

Sensitive items redistributed

NOTE: Weapons and radios **DO NOT** mix well with **shock** or **narcotics**



PRIORITIZING **MULTIPLE** CASUALTIES

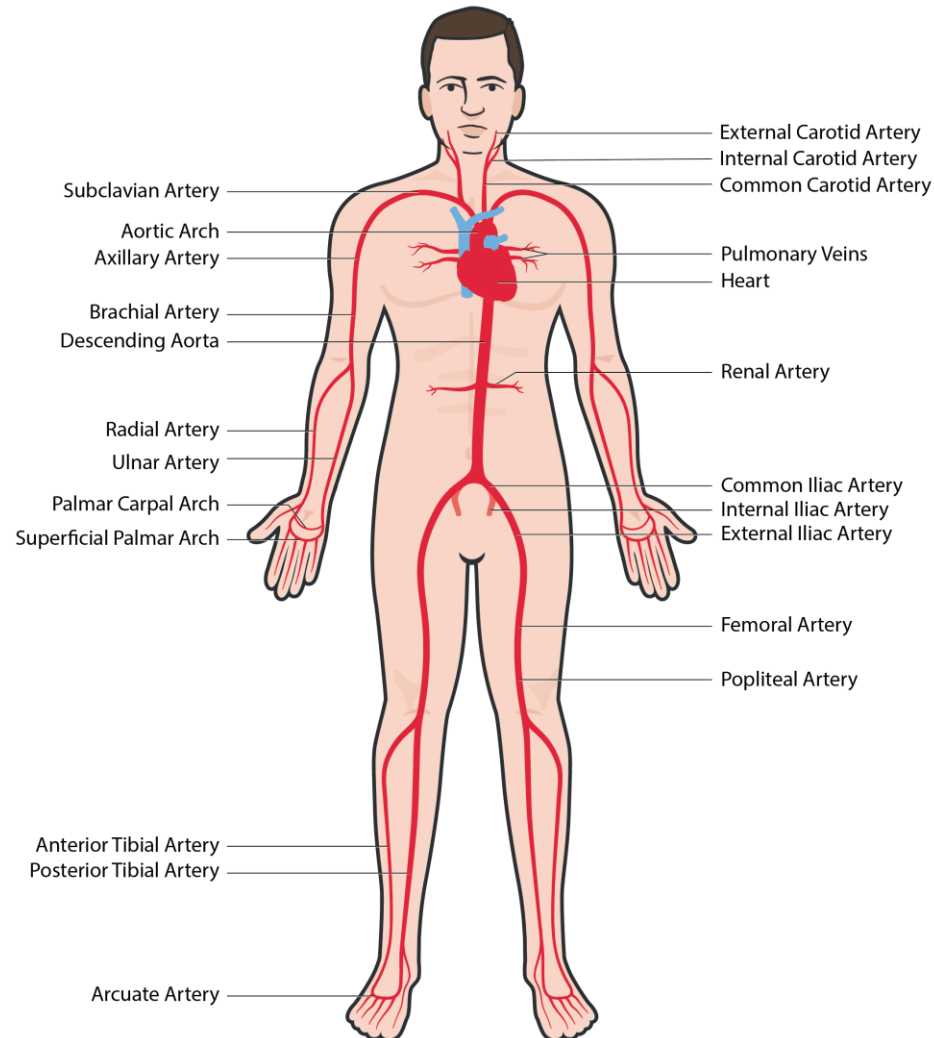
Casualties with these injuries must be treated first:

- #1 **Massive bleeding**
- #2 **Penetrating** trauma into the box (torso)
- #3 **Airway** compromise
- #4 **Respiratory** distress
- #5 **Altered** mental status



WHEN IS BLEEDING LIFE-THREATENING?

THE VASCULAR SYSTEM



CHARACTERISTICS OF ARTERIES

Arteries carry oxygenated blood away from the heart (except the pulmonary artery)

Aorta is the largest artery in the human body

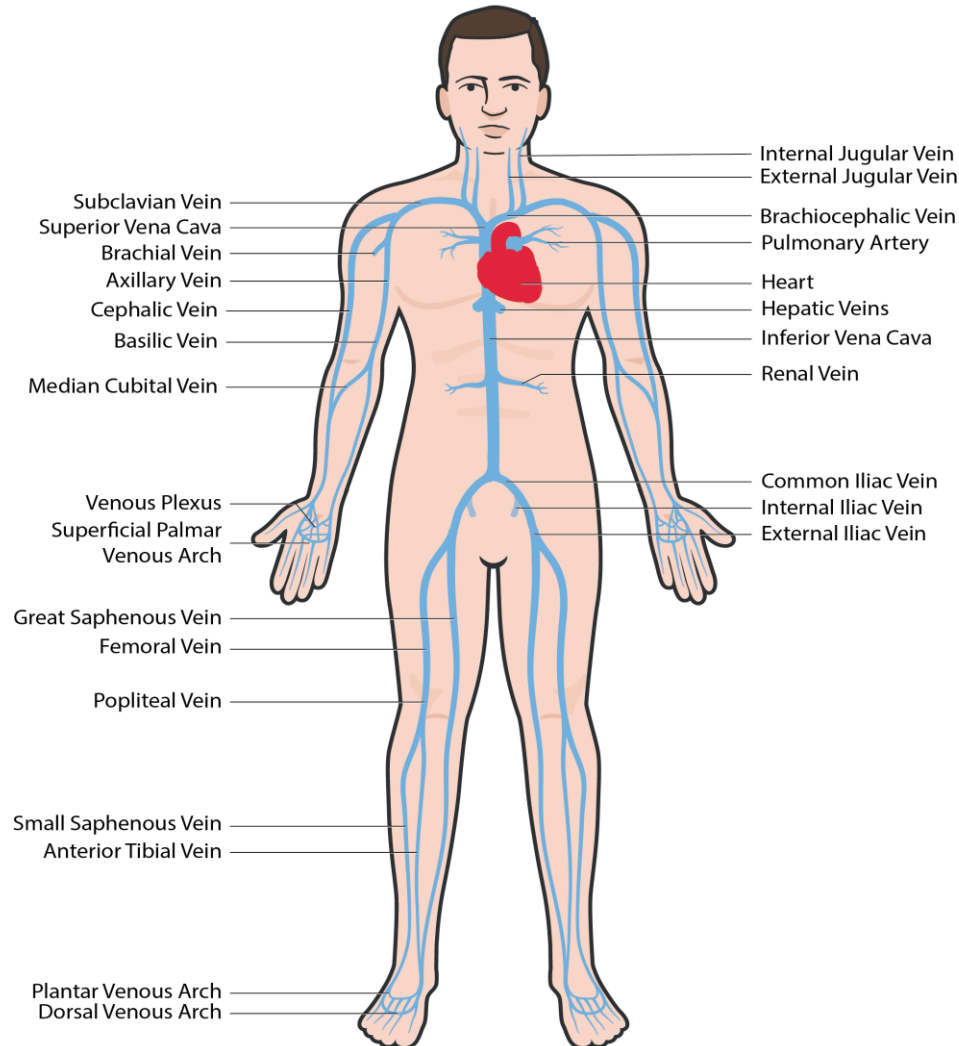
Arterial injuries require rapid treatment

Arteries have smaller branches called arterioles

Arteries have thick walls and a muscular layer that keep blood moving

WHEN IS BLEEDING LIFE-THREATENING?

THE VASCULAR SYSTEM



CHARACTERISTICS OF VEINS

Veins carry deoxygenated blood towards the heart and are located close to the skin

The Inferior Vena Cava is the largest vein in the human body

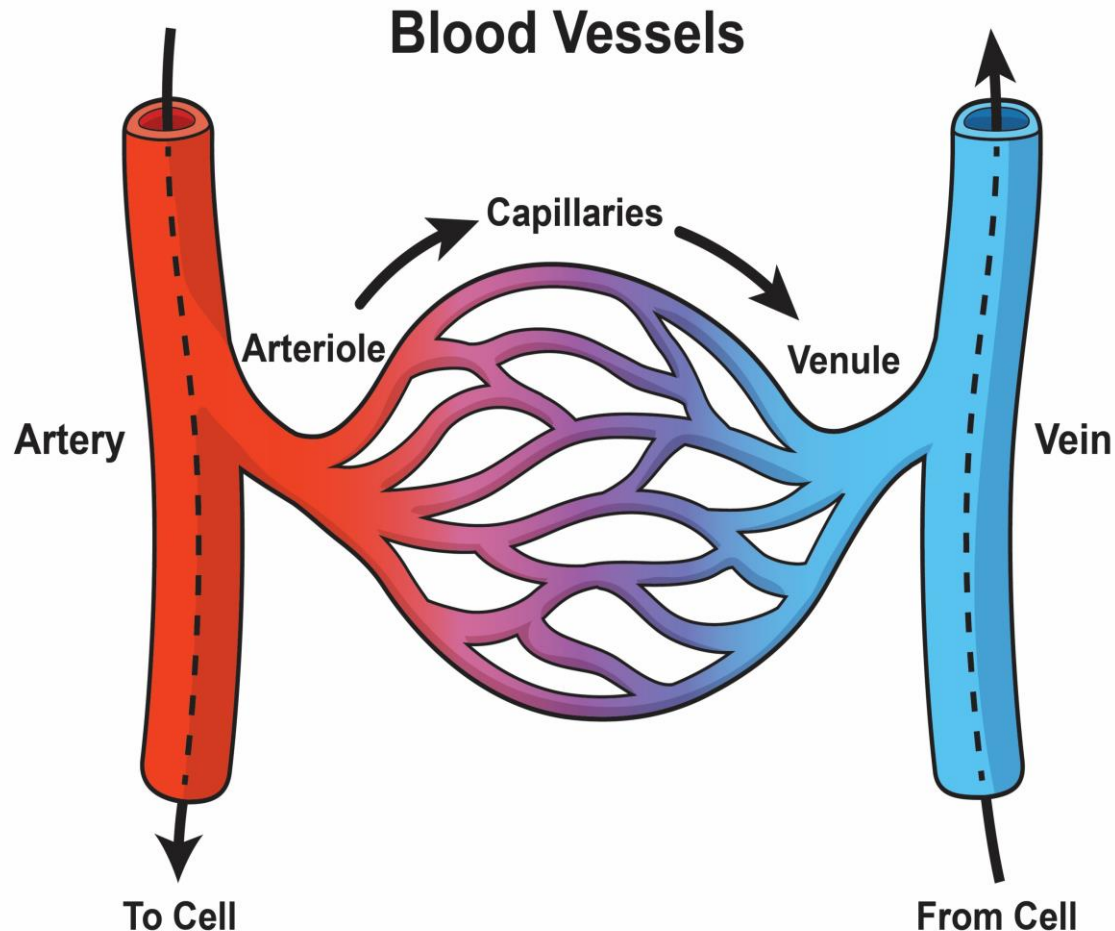
Veins rely on valves to keep blood moving

Veins start as tiny blood vessels called venules

Veins have thin vessel walls and a thin layer of muscular tissue inside

WHEN IS BLEEDING LIFE-THREATENING?

THE VASCULAR SYSTEM



CHARACTERISTICS OF CAPILLARIES

Capillaries connect arteries to veins and are in all tissues

Capillaries are the smallest type of blood vessel

Capillaries can be as tiny as 5 micrometers (which is less than a third of a hair's width)


Capillaries walls allow oxygen, nutrients, and waste to pass to and from tissue cells

Capillaries vessels walls do not have muscle tissue or valves

WHEN IS BLEEDING LIFE-THREATENING?

THREE MAIN TYPES OF HEMORRHAGE

THREE MAIN TYPES OF BLEEDING				
SOURCE	COLOR	PRESENTATION	SEVERITY	INJURY TYPES
CAPILLARY/ Capillary	Red or Dark Red	Oozing or trickling from injury	Non-life-threatening <ul style="list-style-type: none"> • Easy to control 	Abrasions, scrapes to the surface of the skin e.g., road rash
VENOUS/ Vein	Dark Red	Steady flow from injury	Non-life-threatening* <ul style="list-style-type: none"> • Easier to control 	Superficial lacerations, gunshots wounds, etc.
ARTERIAL/ Artery	Bright Red	Spurting from injury	Life-threatening <ul style="list-style-type: none"> • Urgent & often difficult to control 	Amputations, penetrating trauma, shrapnel wounds, etc.



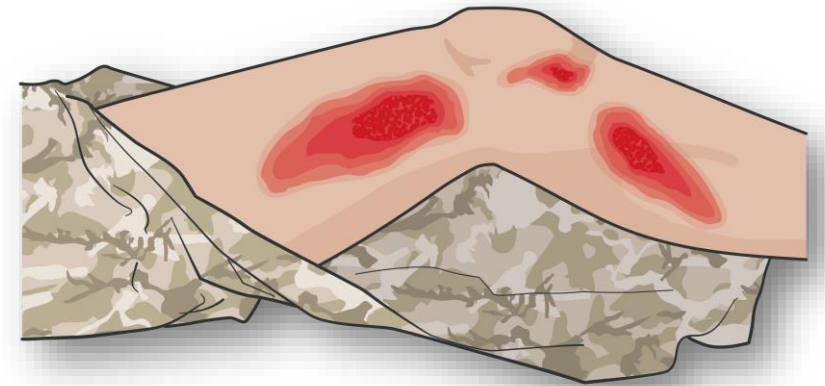
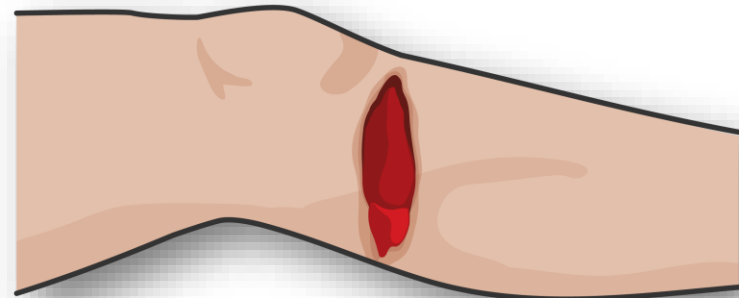
*Venous bleeds are less severe than arterial bleeding but can still be life-threatening and depend on the amount of blood lost.

WHEN IS BLEEDING LIFE-THREATENING?

NON-LIFE-THREATENING BLEEDING

Characteristics of Non-Life-Threatening Bleeds:

- Absence of pulsating (arterial) or steady bleeding (venous) from the wound
- Absence of blood pooling on the ground
- Overlying clothes are NOT soaked with blood
- Bandages or improvised bandages are effective and NOT becoming steadily soaked with blood
- Absence of partial or complete traumatic limb amputation



WHEN IS BLEEDING LIFE-THREATENING?

EARLY CONTROL OF SEVERE HEMORRHAGE IS **CRITICAL**



BRIGHT RED BLOOD is pooling on the ground

The **overlying clothes** are **SOAKED** with blood



There is **pulsatile** (pulsing) or **steady** bleeding from the wound

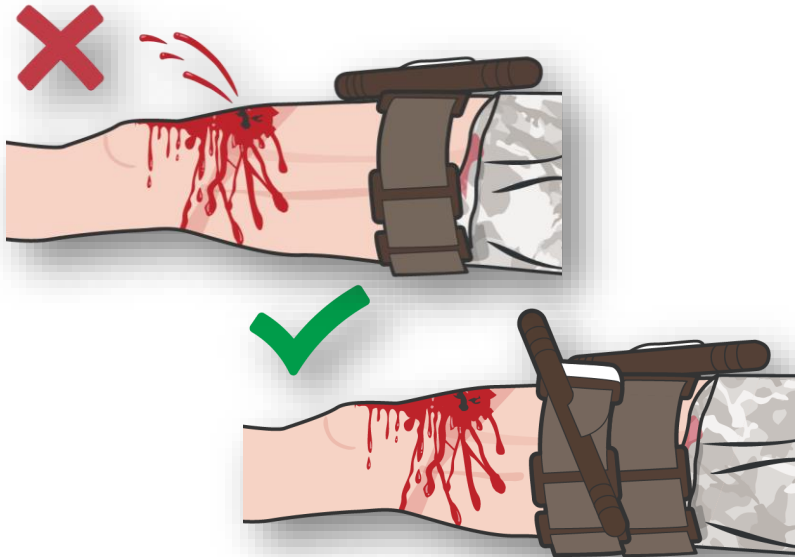


Bandages or makeshift bandages used to cover the wound are **INEFFECTIVE** and steadily becoming **soaked** with blood

There is a traumatic **amputation** of an arm or leg

MASSIVE HEMORRHAGE CONTROL

MASSIVE HEMORRHAGE **REASSESSMENT**



Reassess any interventions performed in CUF

If a tourniquet 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



Perform a **blood sweep** and **expose** the casualty to look for other **life-threatening bleeding**, stopping to immediately treat anything identified, and look for non-life-threatening bleeding to address later

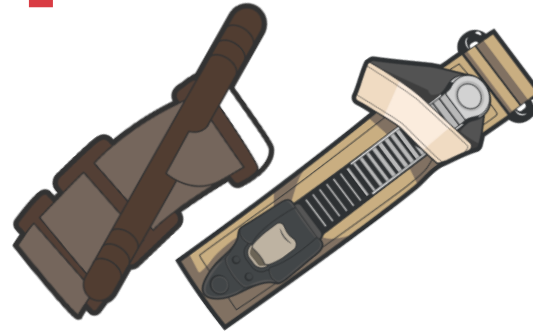
MASSIVE HEMORRHAGE CONTROL

TOOLS FOR LIFE-THREATENING HEMORRHAGE CONTROL

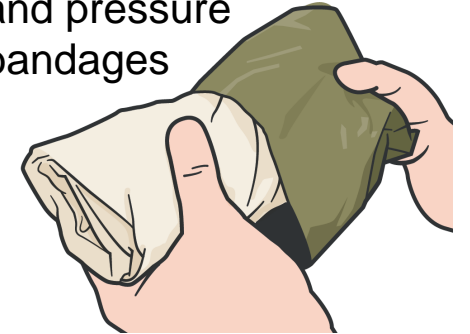
Direct pressure



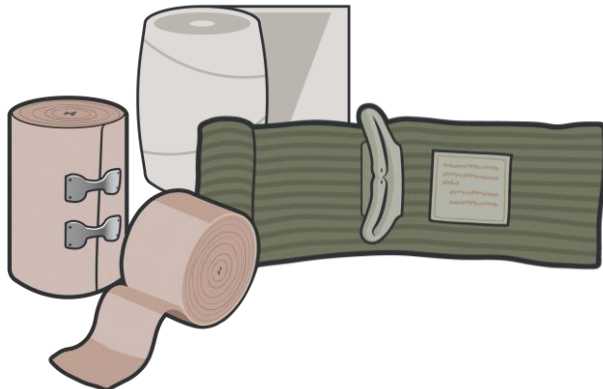
CoTCCC-recommended
Tourniquet (TQ)



hemostatic dressing
and pressure
bandages



Gauze/other dressings
and pressure bandages



Pressure Delivery
Device



MASSIVE HEMORRHAGE CONTROL

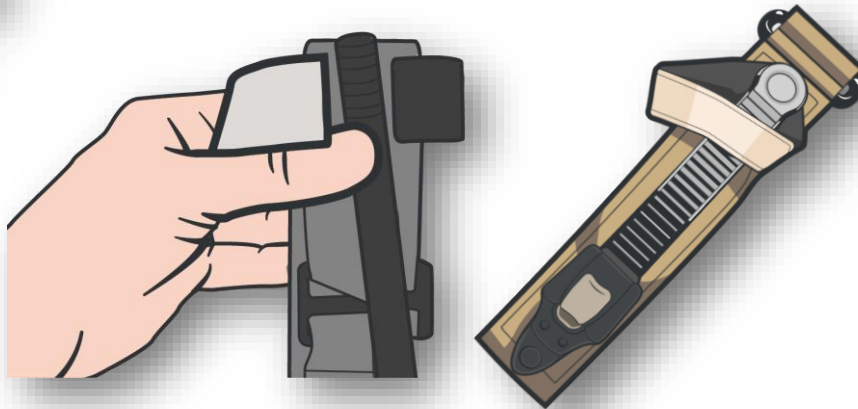
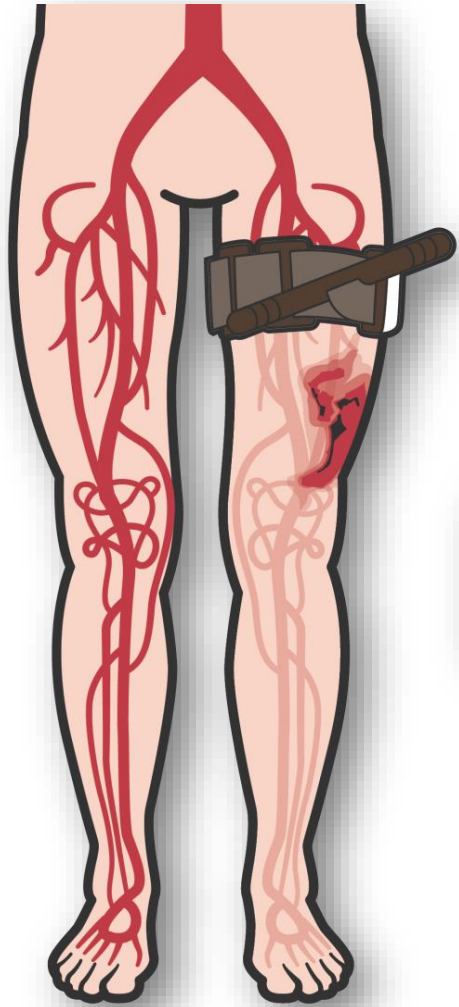
INITIAL DIRECT PRESSURE BEFORE INTERVENTION

- Direct pressure can and **should be used** as a temporary measure **until** a **tourniquet** or **dressing is in place**
- It is difficult 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**



MASSIVE HEMORRHAGE CONTROL

TOURNIQUETS



A device stopping the flow of blood to an **arm** or **leg** by applying circumferential (around) pressure to the limb

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

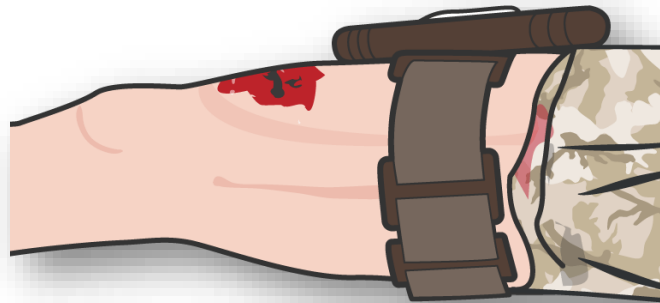
If this is not possible, or more than one tourniquet is needed, then you may apply the TQ from your own JFAK or a TQ from unit mission equipment

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



MASSIVE HEMORRHAGE CONTROL

DELIBERATE TOURNIQUETS

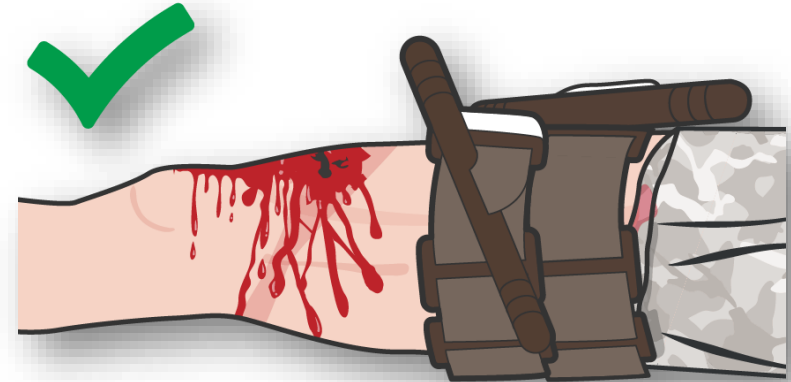


A TQ applied in TFC will be a **deliberate TQ**, applied **2-3 inches above the wound**, directly on the skin (**not over clothing**)

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



A TQ applied in **CUF** should be **reassessed**



TQs applied during **CUF** are **sometimes inadequate** due to the inability to properly expose and assess the wound, and application of an **additional side-by-side TQ** may be necessary

MASSIVE HEMORRHAGE CONTROL

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 the skin 2-3 inches above the bleeding site

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

1
MIN



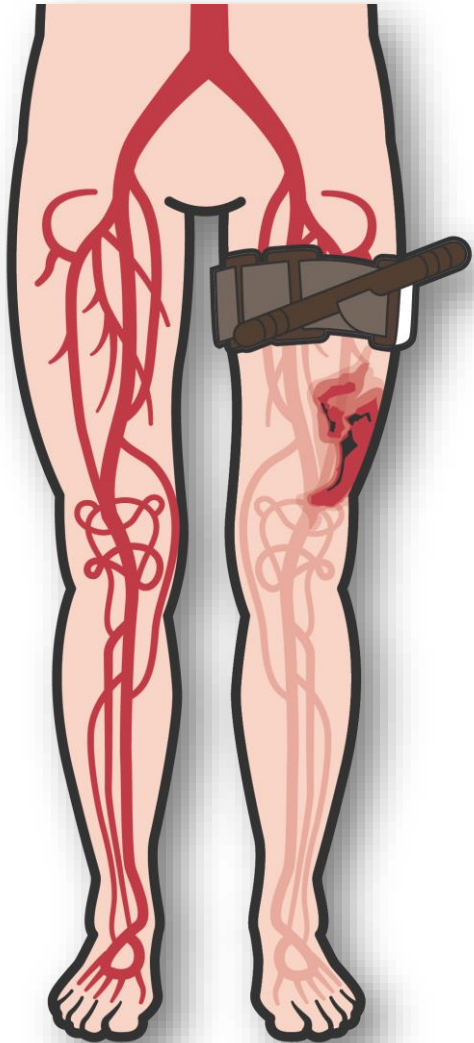
TQs need to be applied rapidly. The bleeding should be stopped **WITHIN ONE MINUTE** and the TQ fully secured within three minutes

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



Time should be documented during the TFC phase, not the CUF phase

TOURNIQUET **EFFECTIVENESS** CHECKS



TQs can be assessed for effectiveness by:

- Ensuring that the **BLEEDING HAS STOPPED**
- Checking a pulse **distally** (further out) on the limb where the TQ is applied to ensure there is **NO PULSE**



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MASSIVE HEMORRHAGE CONTROL

TWO-HANDED RATCHET TFC



Video can be found on DeployedMedicine.com

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MASSIVE HEMORRHAGE CONTROL

TWO-HANDED WINDLASS TFC



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

MASSIVE HEMORRHAGE CONTROL

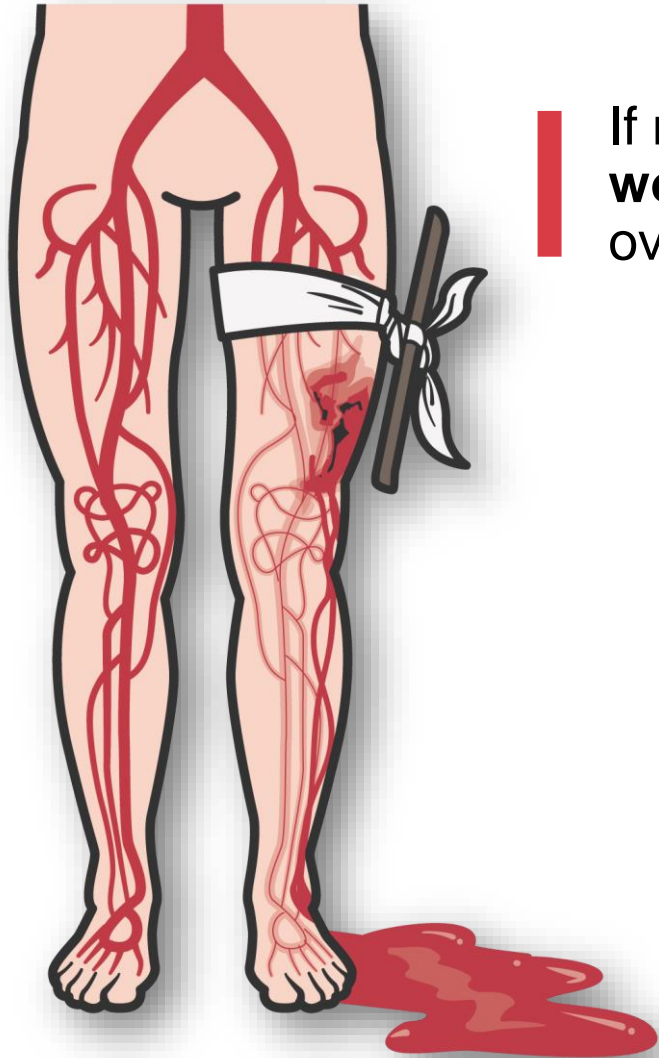
TOURNIQUET **PITFALLS/MISTAKES**



- **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 (too high) if the bleeding site is clearly visible
- Loosening TQs for a period to allow recirculation of a limb
- Taking it off (this should be performed **ONLY** by **medical personnel** at a **higher level of care**)
- **DON'T** put TQs over joints!

RISKS WHEN USING IMPROVISED TOURNIQUETS

DON'T USE AN IMPROVISED TOURNIQUET!



If no TQ is available, **pack the wound** and hold **direct pressure** over the main source of bleeding



RISKS ASSOCIATED WITH 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

WHEN IS BLEEDING LIFE-THREATENING?

TOURNIQUET APPLICATION REASSESSMENT

TOURNIQUET?

1

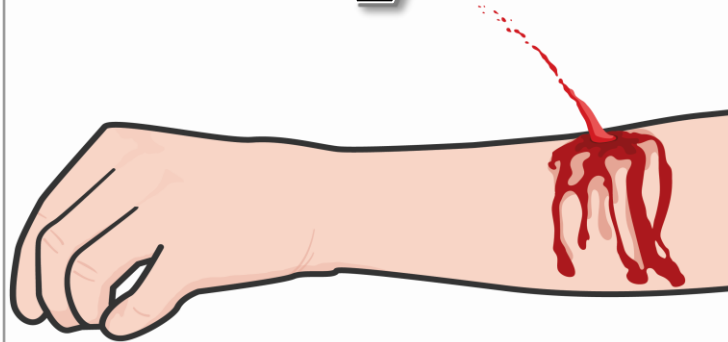


OR



TOURNIQUET?

2



OR



TOURNIQUET?

3



OR



WHEN IS BLEEDING LIFE-THREATENING?

TOURNIQUET APPLICATION

REASSESSMENT

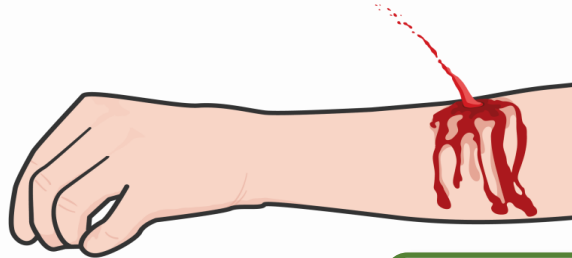
TOURNIQUET?



1



TOURNIQUET?



2



TOURNIQUET?



3



WHEN IS BLEEDING LIFE-THREATENING?

TOURNIQUET APPLICATION

REASSESSMENT

TOURNIQUET?

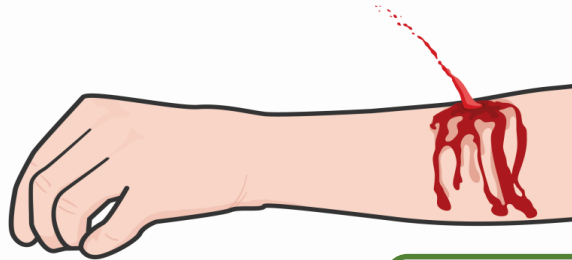


1



RATIONALE: Deep wound with minimal venous and capillary bleeding **DOES NOT** require a tourniquet.

TOURNIQUET?

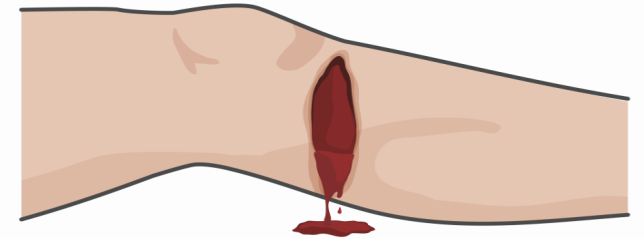


2



RATIONALE: Penetrating wound with bright red pulsatile (squirting) blood from the injury.

TOURNIQUET?



3



RATIONALE: Deep wound with dark venous bleeding likely controlled with direct pressure and pressure dressing/bandage.

SKILL STATION

TFC Hemorrhage Control (skills)

- Two-Handed Ratchet Tourniquet Application in TFC
- Two-Handed Windlass Tourniquet Application in TFC

MASSIVE HEMORRHAGE CONTROL

HEMOSTATIC DRESSING



- CoTCCC-recommended hemostatic dressing is safe and contains active ingredients that assist with blood-clotting at the bleeding site
- hemostatic dressing can also be used for controlling bleeding in conjunction with tourniquets
- A JFAK contains one hemostatic dressing and one dry sterile gauze

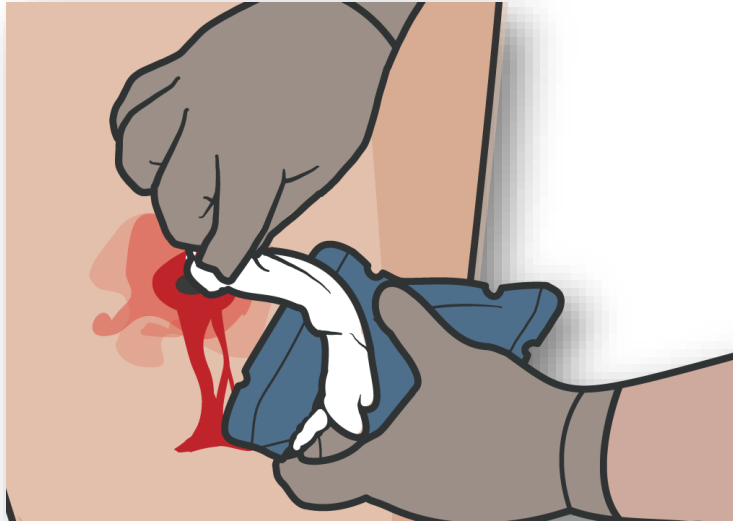


MASSIVE HEMORRHAGE CONTROL

HEMOSTATIC DRESSING



hemostatic dressing with or without a pressure bandage **CAN** be used to control compressible junctional hemorrhage



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

Remember:

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



Identify the **exact source** of bleeding and **APPLY direct pressure** as a **temporary** measure **UNTIL** gauze is placed

Pack the wound, **maintaining CONSTANT** direct pressure at the source of bleeding within **90 SECONDS** for it to be effective



MASSIVE HEMORRHAGE CONTROL

WOUND PACKING



HOLD direct pressure on the gauze over the wound for at least **3 MINUTES** (**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

MASSIVE HEMORRHAGE CONTROL

WOUND REPACKING FOR **FAILED CONTROL**



If packed with hemostatic dressing, **remove** before packing material and **repack** with a new hemostatic dressing, as available

It may be a **fresh** dressing of the **same** or a **different type**



Alternatively, additional **hemostatic** or **nonhemostatic dressing CAN** be applied on top of the first gauze



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

MASSIVE HEMORRHAGE CONTROL

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 Velcro or closure bar onto the last wrap of the bandage

MASSIVE HEMORRHAGE CONTROL

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 dressing is **no longer present**, the pressure bandage may be **too tight**

If circulation is **BLOCKED** or **STOPPED**, **loosen** and **retie** the bandage

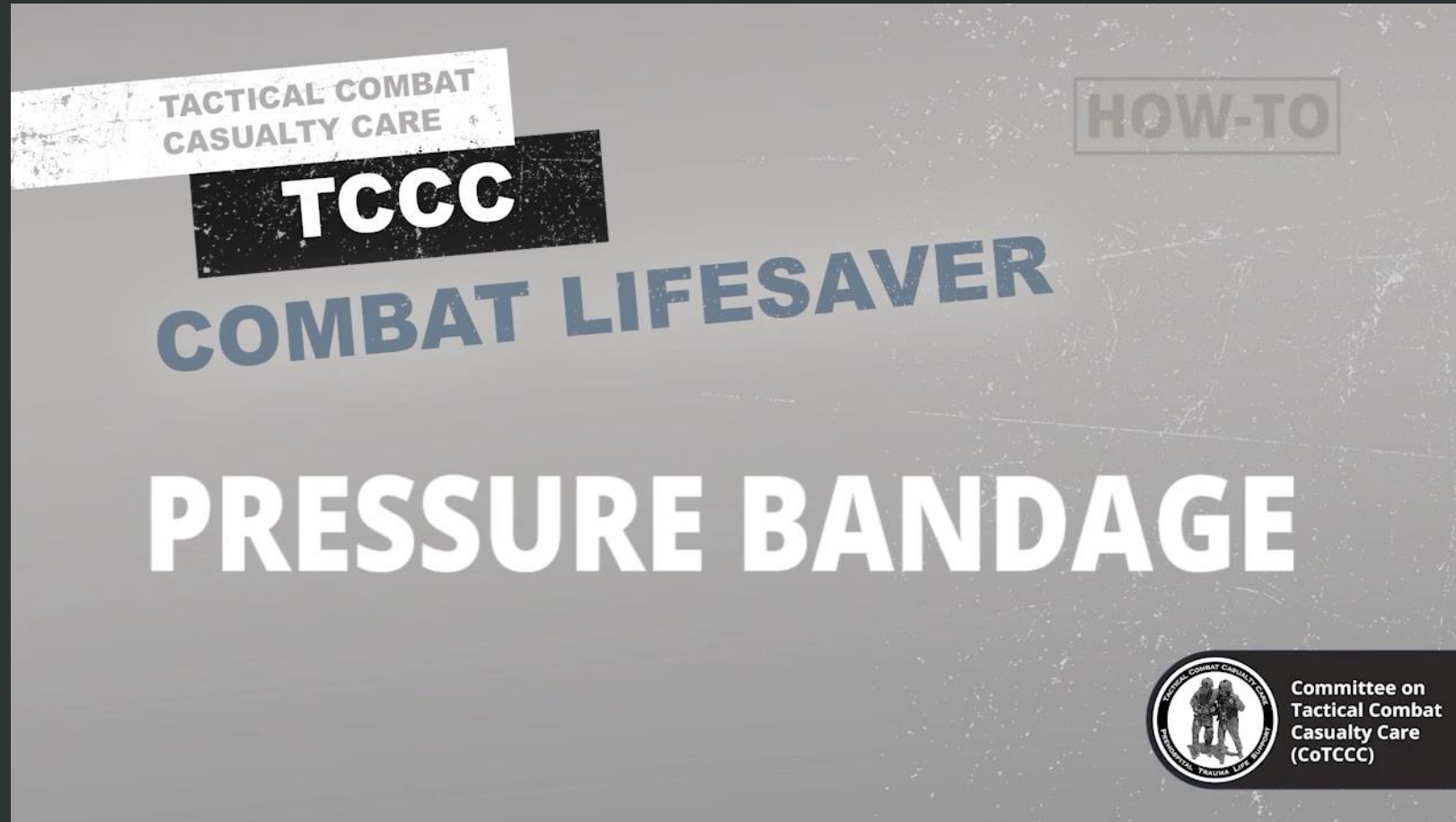
Dressings and bandages should be **reassessed** and checked routinely and **EVERY TIME** a **casualty** is **moved**

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MASSIVE HEMORRHAGE CONTROL

PRESSURE BANDAGES

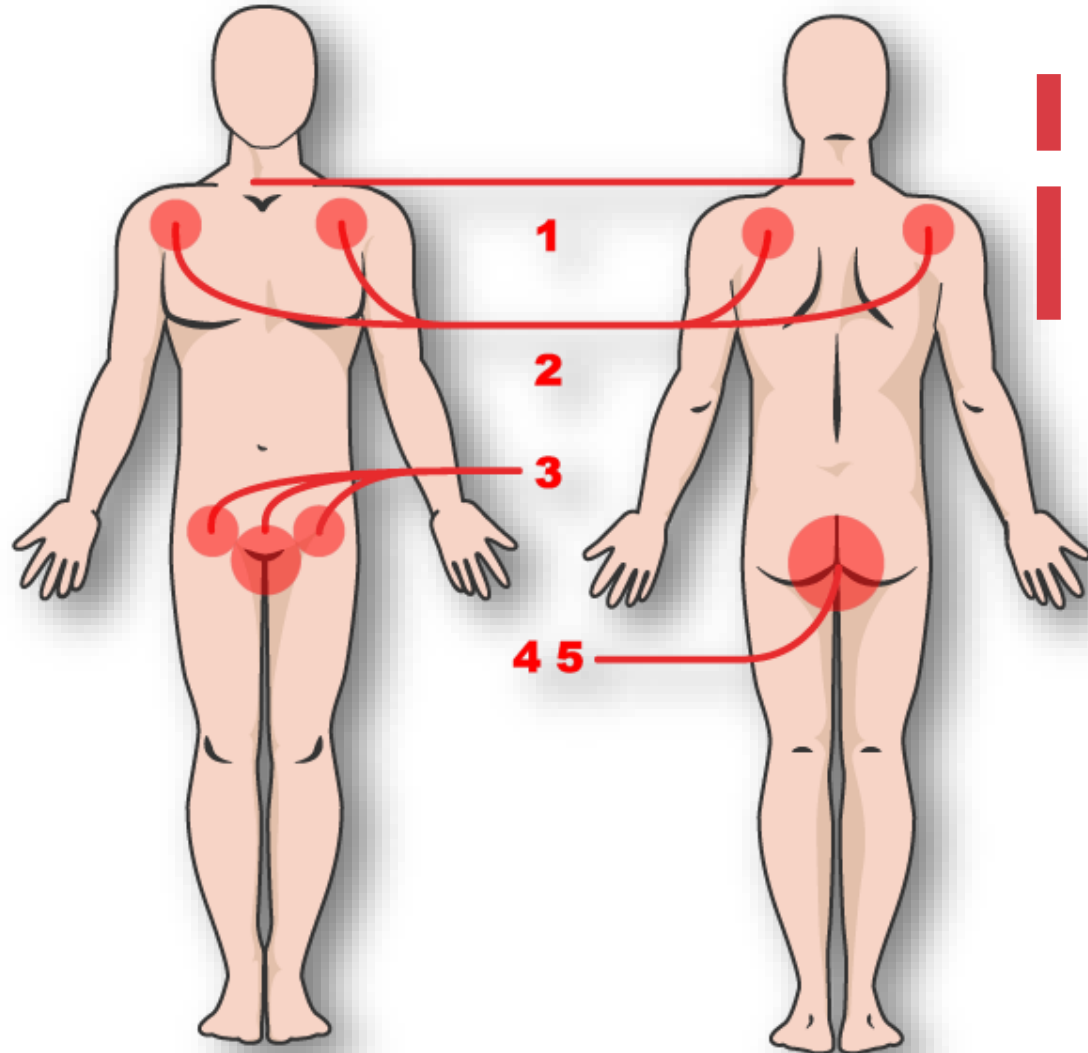


Video can be found on [DeployedMedicine.com](https://www.deployedmedicine.com)

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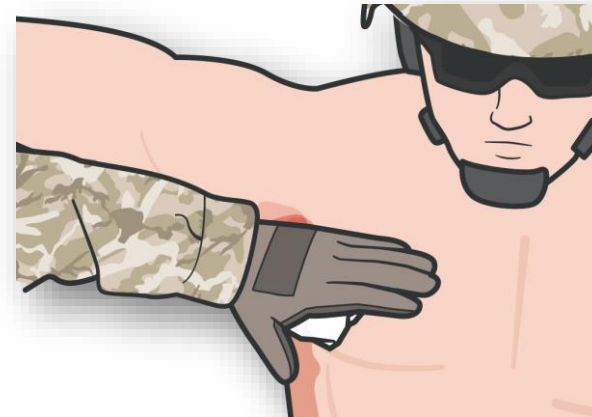
JUNCTIONAL HEMORRHAGE

JUNCTIONAL ANATOMY



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

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



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

JUNCTIONAL HEMORRHAGE

NECK JUNCTIONAL HEMORRHAGE CONTROL



Pack the wound



Apply pressure for **3 MINUTES**



Secure with bandage

If the bandage has a pressure bar, **pull the bandage TIGHT**, and reverse it back over the top of the pressure bar, **forcing** it **down** onto the pad

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MASSIVE HEMORRHAGE CONTROL

NECK JUNCTIONAL HEMORRHAGE CONTROL



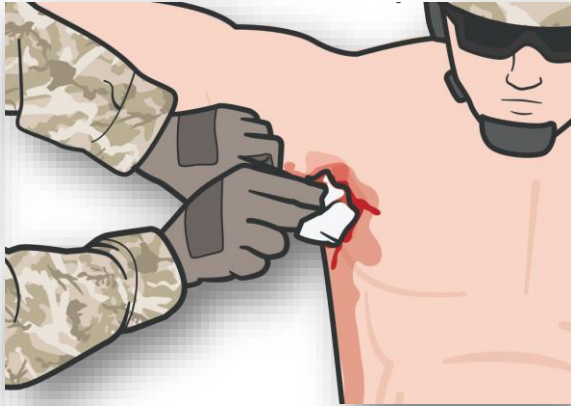
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JUNCTIONAL HEMORRHAGE

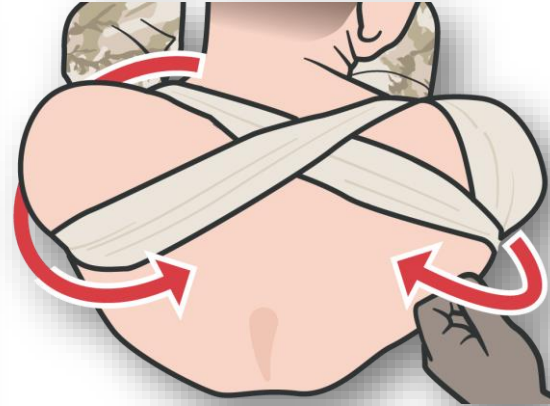
AXILLARY JUNCTIONAL HEMORRHAGE CONTROL



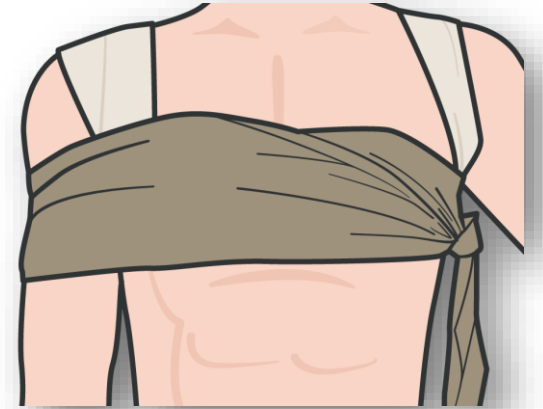
Expose the wound



Pack the wound



Secure the dressing in place



Swath the (injured side) upper arm to the side of the chest using a **cravat**

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MASSIVE HEMORRHAGE CONTROL

AXILLARY JUNCTIONAL HEMORRHAGE CONTROL



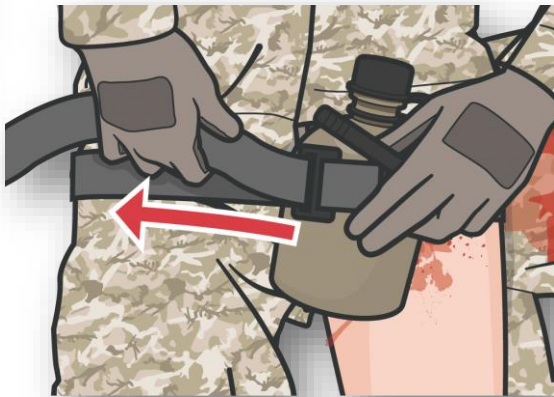
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MASSIVE HEMORRHAGE CONTROL

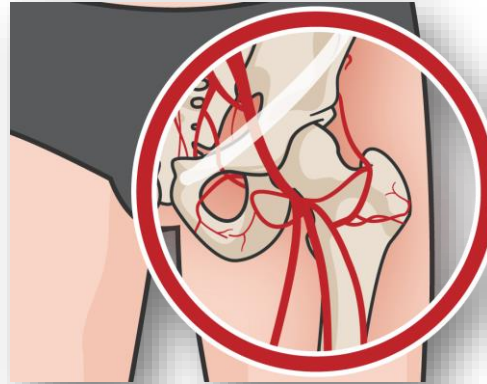
JUNCTIONAL HEMORRHAGE CONTROL WITH A PRESSURE DELIVERY DEVICE (PDD)



A PDD is made by using such materials as a **shoe/boot, full water bottle, or canteen**



For groin injuries packed with hemostatic dressing, use an improvised junctional PDD to **SECURE** the **gauze**



The PDD is placed in the inguinal gutter while **CONTINUOUSLY MAINTAINING** pressure to the gauze

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

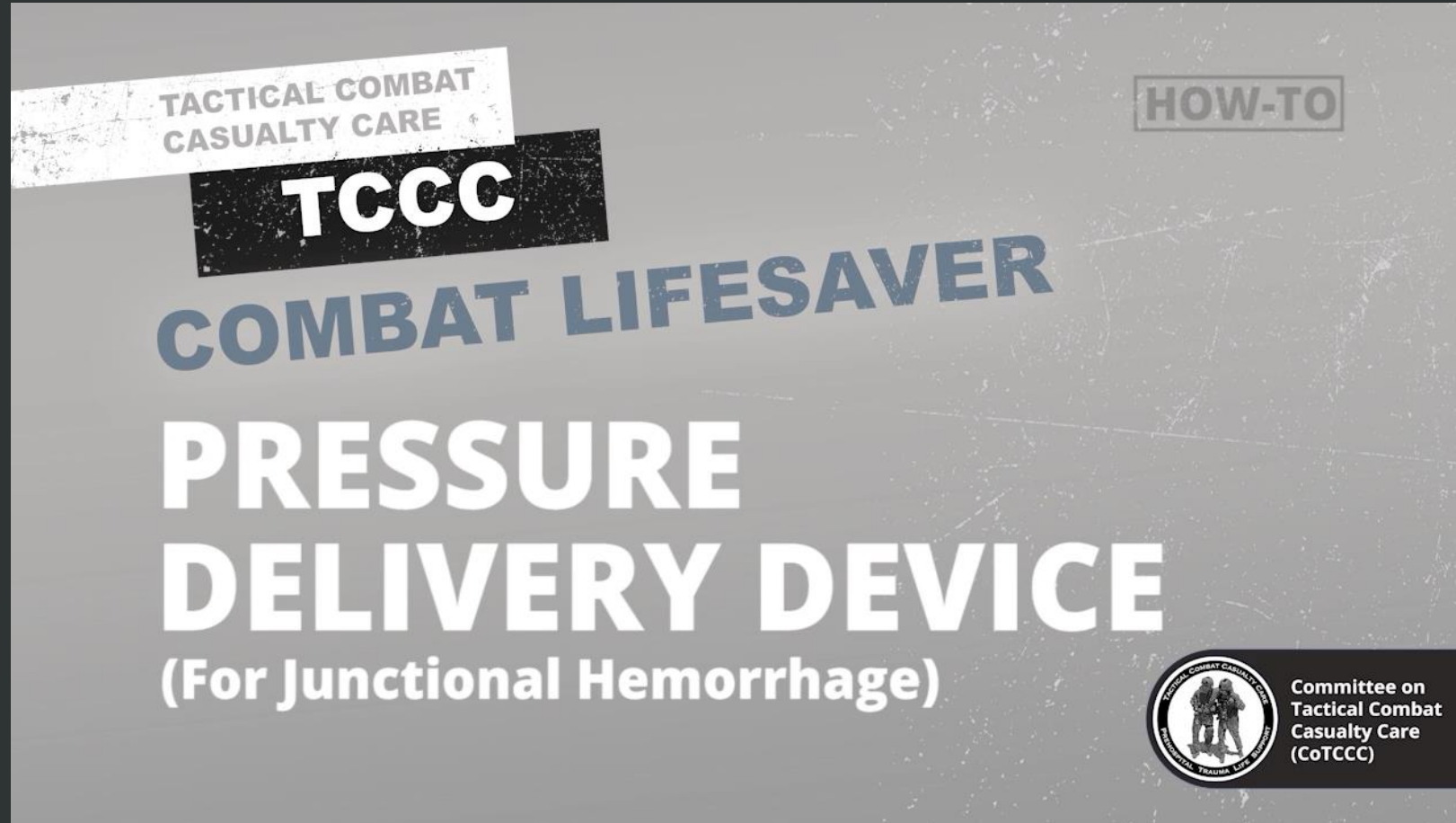
You may need to put **two TQs TOGETHER** when improvising a PDD

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MASSIVE HEMORRHAGE CONTROL

INGUINAL IMPROVISED JUNCTIONAL WITH PDD



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

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MASSIVE HEMORRHAGE CONTROL

SKILL STATION

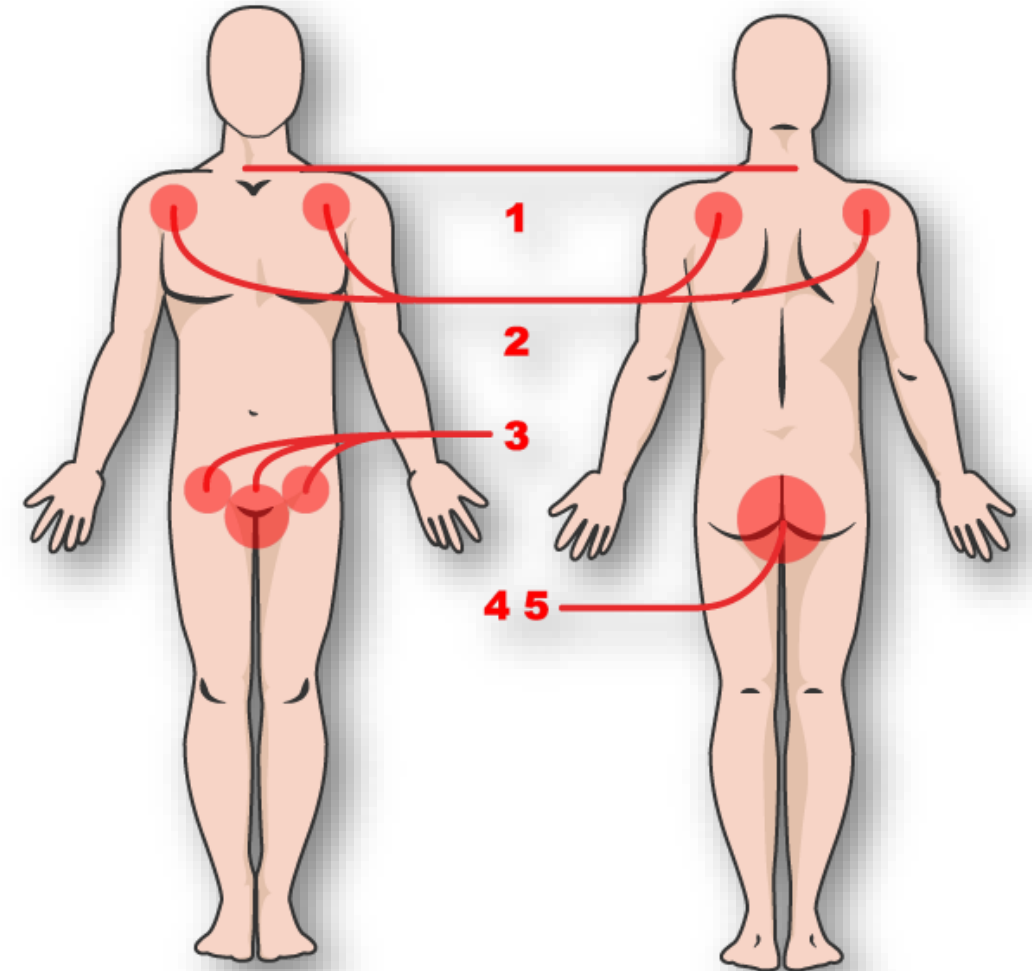
TFC Hemorrhage Control (Skills)

- **Wound Packing With hemostatic dressing and Pressure Bandage**
- **Neck Junctional Hemorrhage Control**
- **Axillary (Armpit) Junctional Hemorrhage Control**
- **Inguinal (Groin) Hemorrhage Control With Improvised Junctional Pressure Delivery Device (PDD)**

MASSIVE HEMORRHAGE CONTROL SUMMARY

Pressure bandages over areas like the:

- Base of the neck
- Axilla
- Groin
- Buttocks
- Perineum
- Junctional areas have **specific** application techniques that **MAXIMIZE** the amount of pressure they exert on the gauze
- **Recheck** the dressing **FREQUENTLY**, especially while transporting the casualty to **next level of care**
- **WATCH FOR RE-BLEEDING**



MASSIVE HEMORRHAGE CONTROL

CHECK ON LEARNING

- What is the proper distance a deliberate tourniquet should be placed from the bleeding site in TFC?
- What is the difference between the need for high & tight/hasty tourniquets in CUF as opposed to deliberately placed tourniquets in TFC?.
- How long should direct pressure be applied onto packed hemostatic dressings?
- Why is it important to check the pulse after applying a pressure bandage?
- What additional intervention beyond packing with hemostatic dressing and wrapping with a pressure bandage is necessary to stop the bleeding from a groin wound?

MASSIVE HEMORRHAGE CONTROL

ANY QUESTIONS?