CPP TCCC

COMBAT PARAMEDIC/ PROVIDER

TACTICAL COMBAT CASUALTY CARE COURSE

MODULE 19: FRACTURES

Committee on Tactical Combat Casualty Care (CoTCCC)

TCCC TIER 1
All Service Members

TCCC TIER 2
Combat Lifesaver

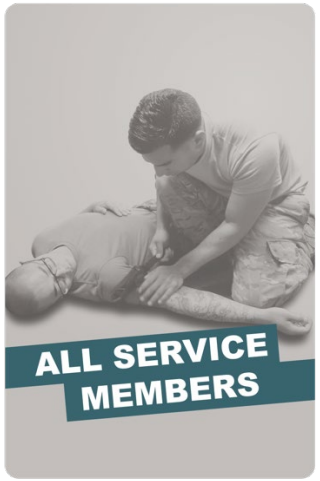
TCCC TIER 3
Combat Medic/Corpsman

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

1 x TERMINAL LEARNING OBJECTIVES

21 Given a combat or noncombat scenario, perform assessment and initial treatment of fractures during Tactical Field Care in accordance with CoTCCC Guidelines.

- **21.1** Identify signs of a suspected fracture.
- **21.2** Describe the principles of basic care and fracture management IAW CoTCCC Guidelines.
- **21.3** Demonstrate proper splint application using a malleable, rigid, or improvised splint to a suspected fracture in Tactical Field Care.
- **21.4** Identify any evidence-based medicine, best practices, casualty data, and Subject Matter Expert consensus on fracture management techniques in Tactical Field Care.

04 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

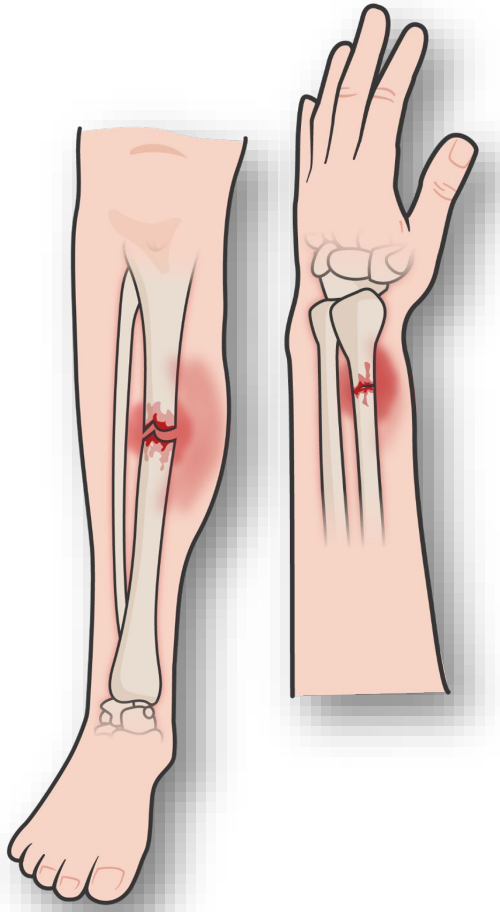
- **P** PAIN
- **A** ANTIBIOTICS
- **W** WOUNDS
- **S** SPLINTING

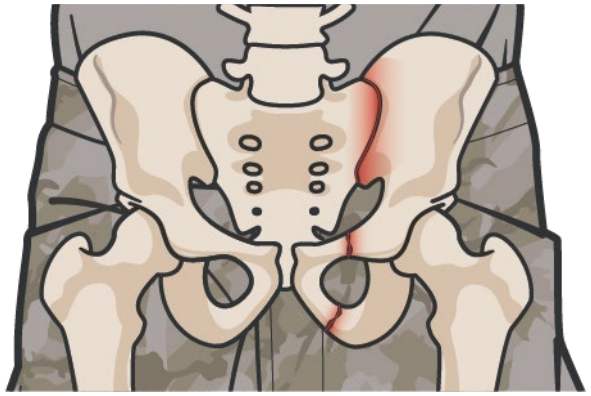
SIGNS OF A SUSPECTED CLOSED FRACTURE

Significant blood loss is possible when dealing with **Femur Fractures**:

Approximate Internal Blood Loss Associated with Fractures	
Bone fractured	**Internal blood loss *milliliters [ml] per fracture**
Rib	125ml
Radius or ulna	250-500ml
Humerus	500-700ml
Tibia or fibula	500-1,000ml
Femur	1,000-2,000ml
Pelvis	**1,000 - MASSIVE**

(Average total blood volume in an adult = 5,000 to 6,000 ml)





CLOSED FRACTURE

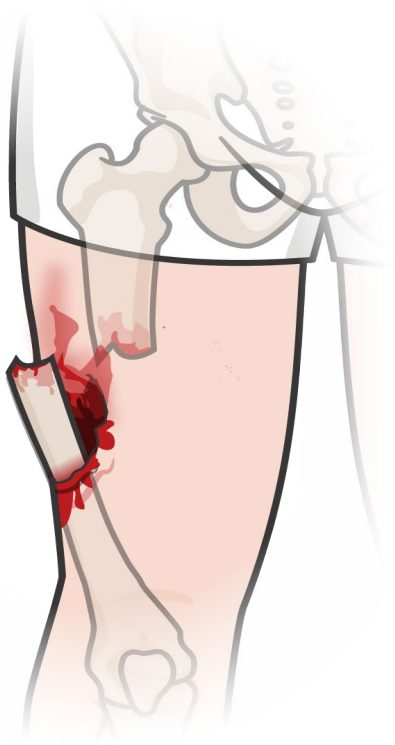
- No open wound (break in skin)
- Risk for tissue damage still significant

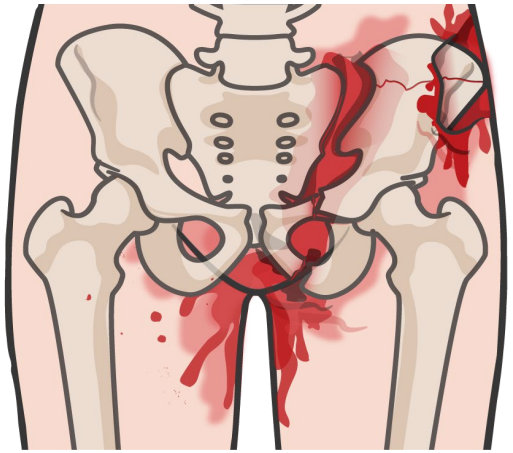
⚠ Treat all fractures with nearby skin wounds as open fractures

PAWS

SIGNS OF AN OPEN FRACTURE

WARNING SIGNS OF AN OPEN FRACTURE:
▪ Significant tenderness, pain and/or marked swelling
▪ Bone protruding from the wound
▪ Open wound near the site
▪ Bleeding
▪ Crepitus (crackling/popping under the skin)
▪ Different length or shape of limb
▪ Loss of pulse or sensation distally in the injured arm or leg





Open fracture to the pelvis may lacerate the rectum, perineum, or vagina, and an obvious source of external blood loss may not be readily apparent.

> Every effort should be made to control bleeding coming from the site, before any splinting is attempted

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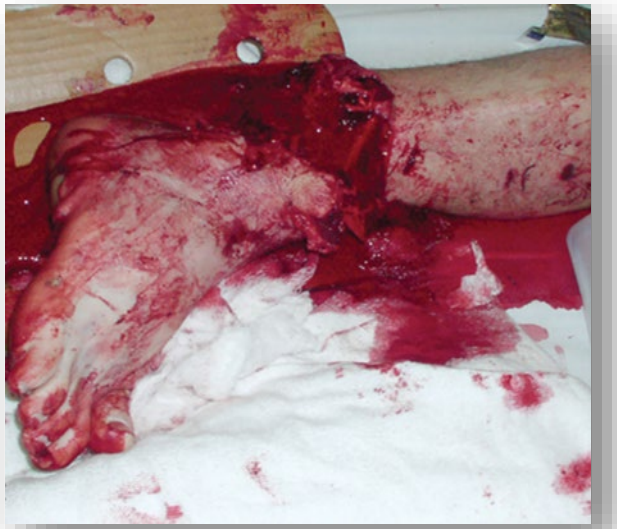
OPEN FRACTURES (Cont.)

Important Considerations with OPEN FRACTURES:
▪ Open wound(s) – associate with an overlying skin wound, significant risk of infection (osteomyelitis)
▪ Open fractures may not always be always be to identify in a trauma patient
▪ Wound(s) near a possible fracture is considered an open fracture and should be treated as such
▪ Protruding bone of bone end should not be replaced
▪ Bones occasionally return to a near-normal position when realigned



⚠ Treat all fractures with nearby skin wounds as open fractures

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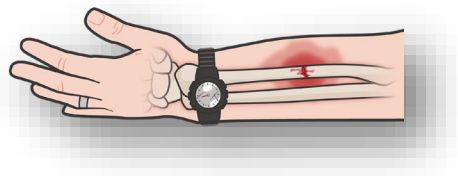
BASIC MANAGEMENT OF FRACTURES

PRIMARY OBJECTIVES of Fracture Treatment:

- Prevent further injury
- Protect nerves and vessels
- Make the casualty more comfortable (pain relief)

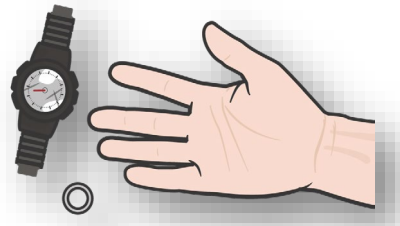
Identify the location of the fracture and place the extremity in a **NEUTRAL POSITION** or **POSITION** of **FUNCTION**.



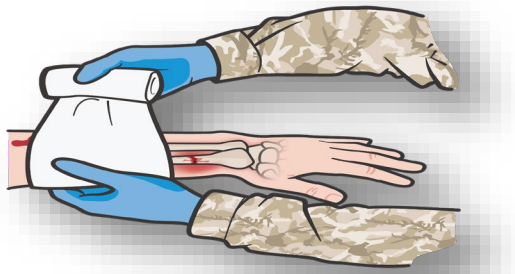
REASSESS BLEEDING control prior to further management of the fracture

CHECK PULSES, skin color, and sensorimotor function distal to the site of the fracture

REMOVE watches, rings, bracelets or potential constricting materials



DRESS ALL WOUNDS prior to splint application



Level of Evidence: C-LD

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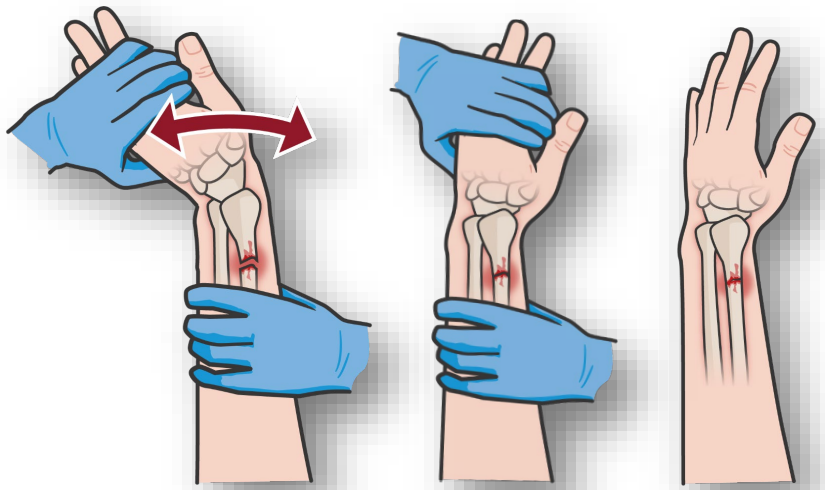
PRINCIPLES OF FRACTURE MANAGEMENT

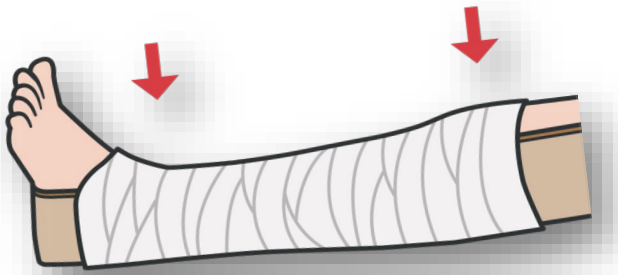
Prior to splinting, an injured extremity should be **returned to a normal anatomic position**, if feasible



Gentle manual traction | *Realign bones* | *Reduced*

⚠ Exercise caution during fracture reduction

Always incorporate the joint **proximal** and the joint **distal** to the site of the fracture in your splint



Once you have applied a splint, be sure to **reassess the pulses**, motor and sensory (PMS) function

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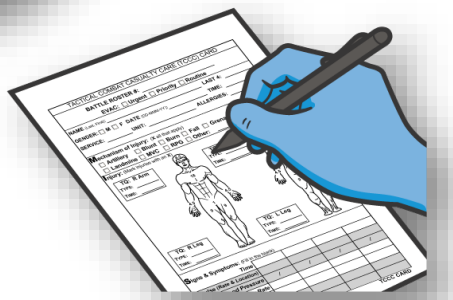
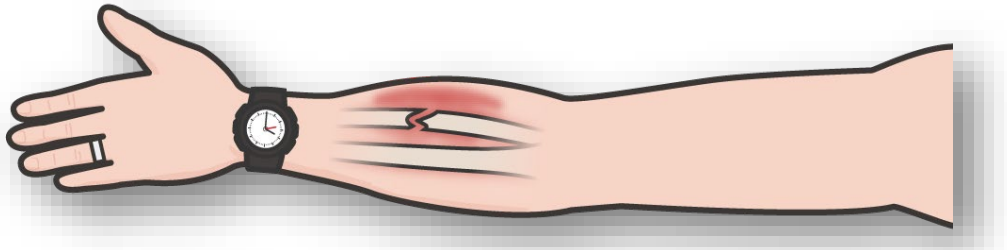
ADMINISTER pain medications and antibiotics, as appropriate

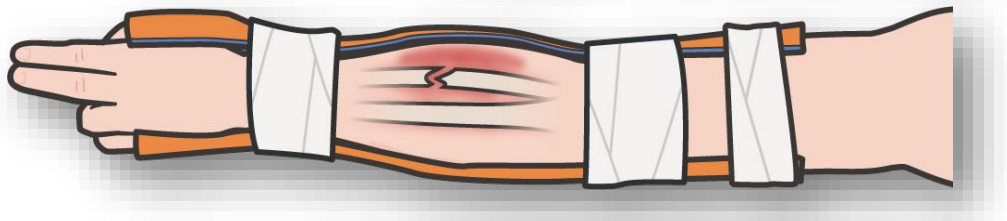


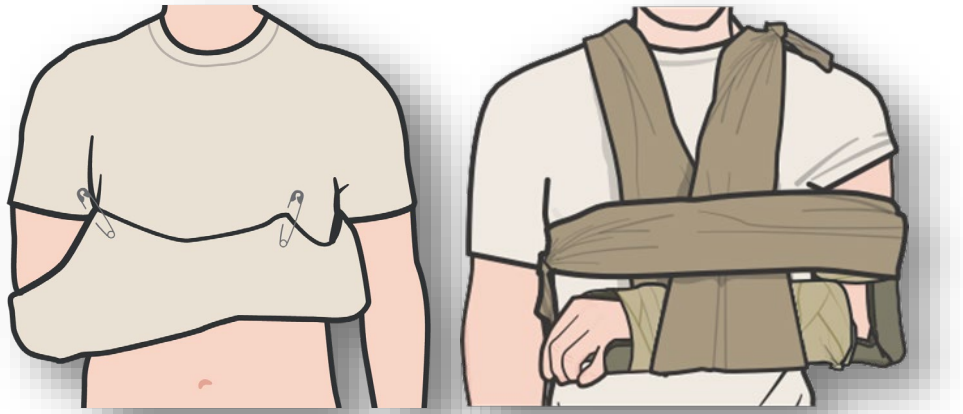
DOCUMENT all findings and treatments on a DD Form 1380 TCCC Casualty Card and attach it to the casualty

BASIC SPLINTING PRINCIPLES

- Collect materials for splints, padding and securing the splint prior to getting started
- Have a CLS or CMC assist you, when possible
- Use the unaffected extremity to mold or design your splint
- Incorporate one joint above and one below the fracture
- Pad all voids to prevent the splint from applying direct pressure to the injured site
- Secure splint with elastic bandage, cravats, tape, etc.
- Consider slings and/or swathes, including using the casualty's shirt or sleeve, if appropriate
- Check skin color and PMS before and after splinting







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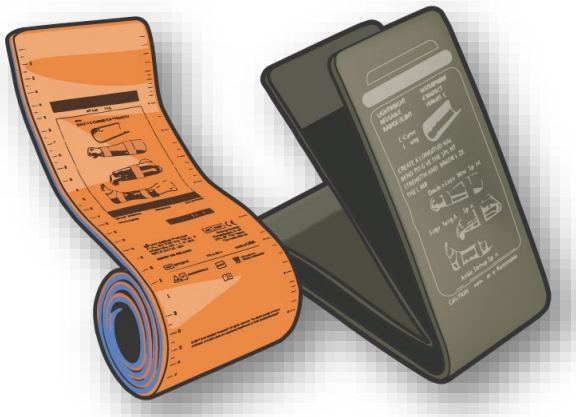
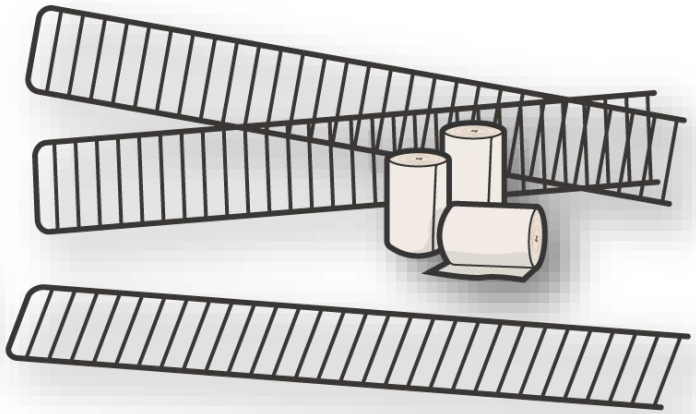
MALLEABLE SPLINTS

MALLEABLE SPLINTS gain rigidity by folding or creasing the metal framework

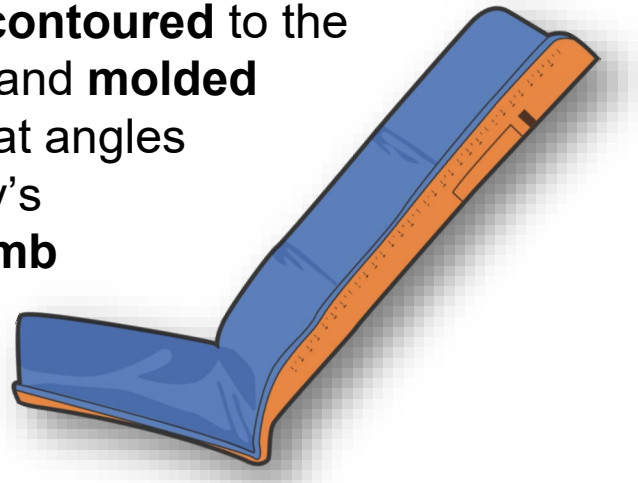


Foam-padded aluminum splints

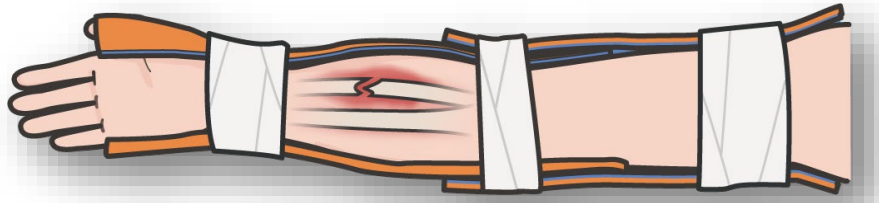


Wire ladder splints

They can be **contoured** to the area of injury and **molded** around joints at angles using casualty's **unaffected limb**



Good for shorter bones and angled splint positions; multiple malleable splints can be combined to support longer bone fractures



⚠ It is important to practice with the most common splints prior to deployment

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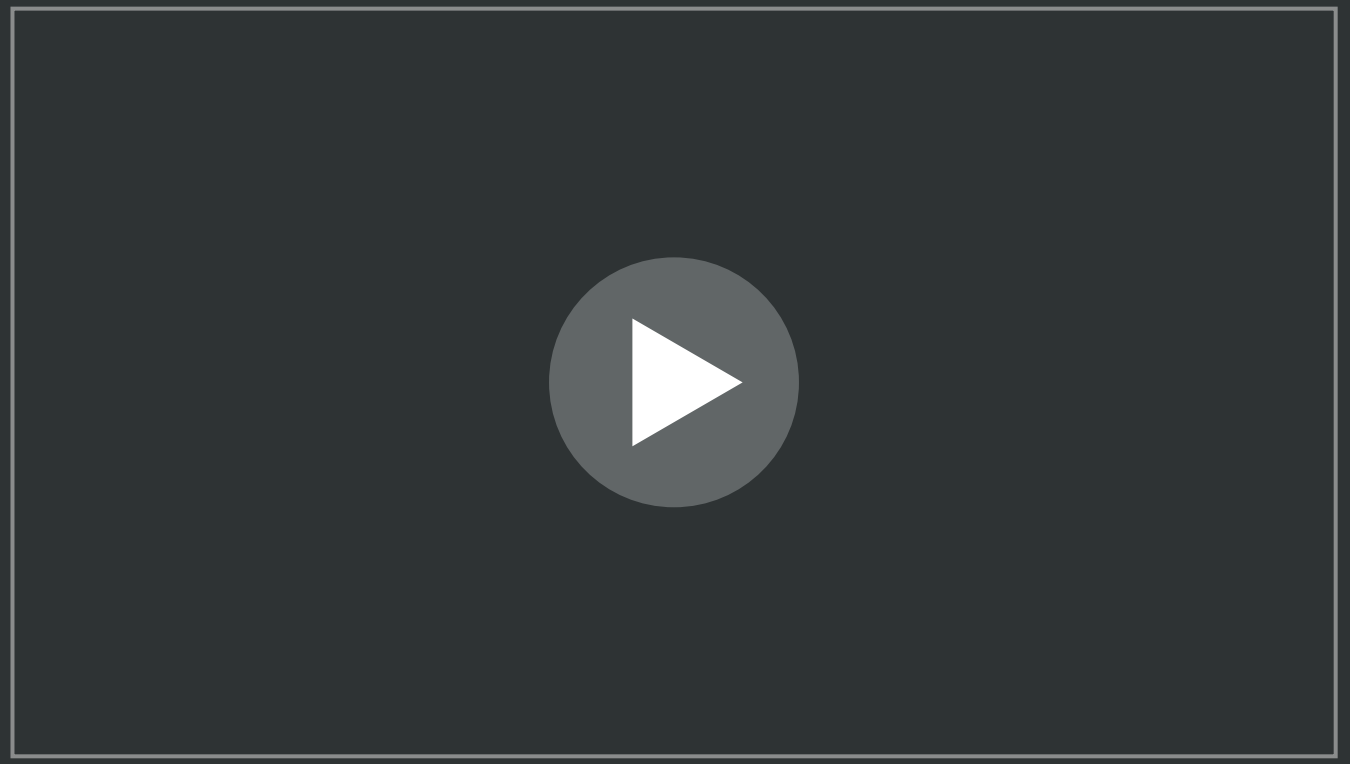
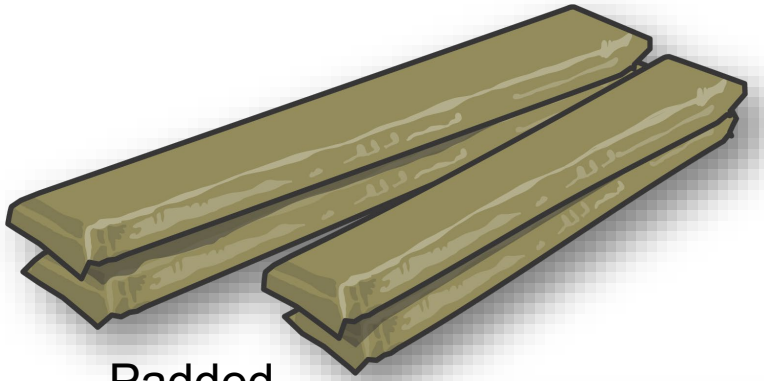
MALLEABLE SPLINTING VIDEO

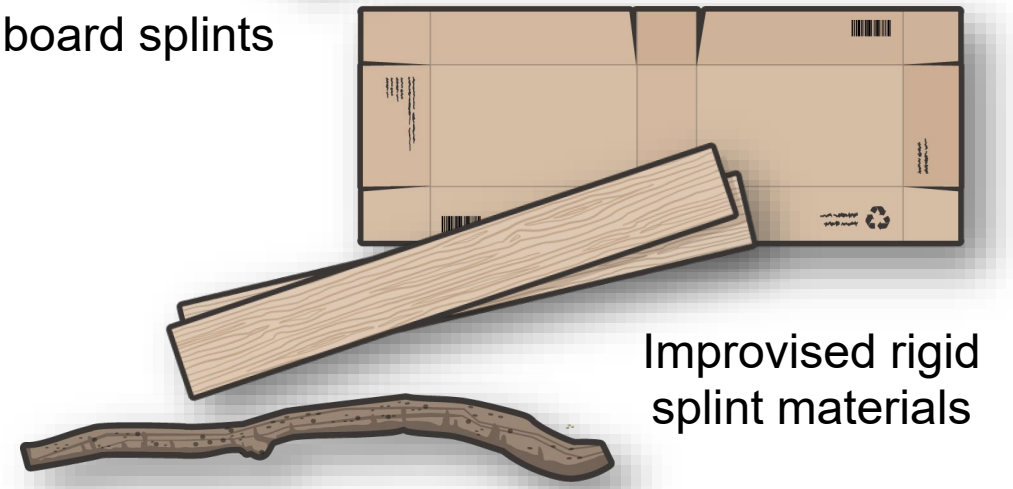


Video can be found on deployedmedicine.com

RIGID SPLINTS



Padded board splints



Improvised rigid splint materials

The lack of anatomic contours will usually require more padding

Often the ends of the splints stick out, creating a hazard during casualty transport

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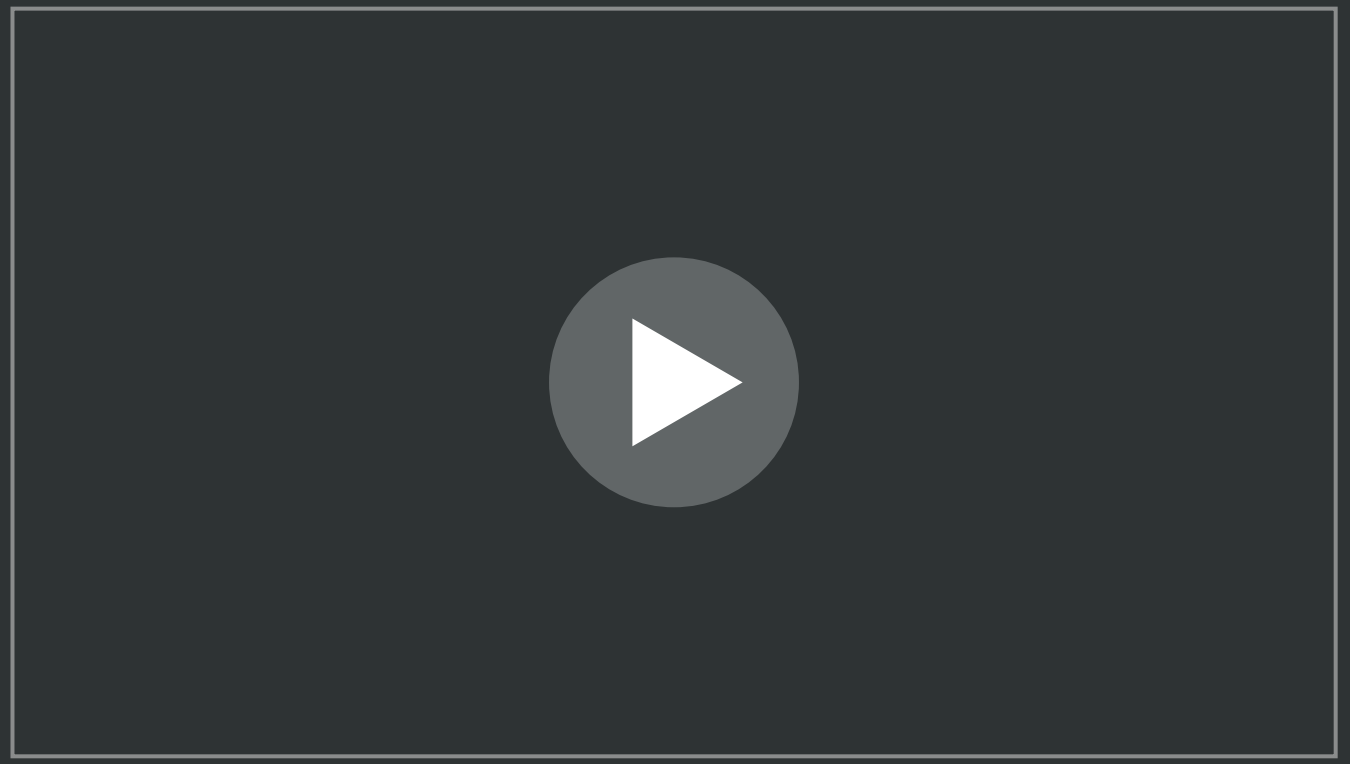
RIGID SPLINTING VIDEO



Video can be found on deployedmedicine.com

THINGS TO AVOID WHEN SPLINTING

- **Manipulating the fracture site too much**; resulting in pain, additional damage to tissues, blood vessels and nerves
- **Splinting near or over a wound** that has not be properly treated
- **Failing to immobilize joint** above and below fracture when possible
- **Securing too tightly**, cutting off blood flow
- **Failing to pad properly,** making casualty uncomfortable during transport/evacuation

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EVIDENCE SUPPORTING FRACTURE GUIDANCE

Subject Category	Study Types	Level of Evidence
Basic Management and Principles of Fracture	Meta-analysis of observational studies, lab evaluations and case studies	**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.	• 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.	

SKILL STATION

Splint Application

Splint application using **Malleable**, **Rigid**, and/or **Improvised** splinting materials

SUMMARY

Knowledge Topics

- Identifying the signs and symptoms of fractures
- Distinguishing open from closed fractures
- The basic management of fractures
- Evidence supporting the strategies for fracture management and splinting in TFC

Skills and Abilities

- Malleable, Rigid, and/or Improvised Splint application

CHECK ON LEARNING

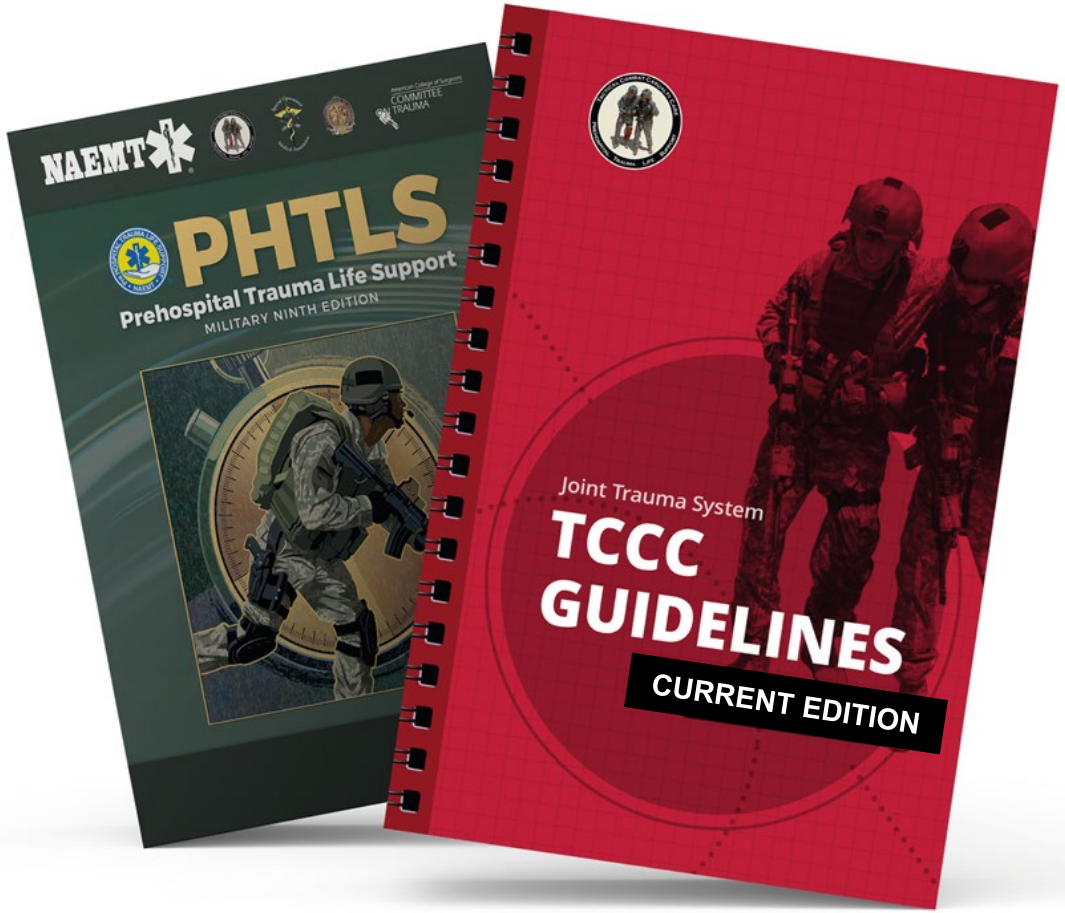
What are the three objectives of fracture management and splinting?

TRUE or FALSE: When applying a splint, ensure the joints above and below the fracture are immobilized in the splint whenever possible?

What should you assess before and after splinting?

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.