

*EMS Provider
Injury Prevention*

- Stay in shape
 - Train
 - Stretch
 - Eat well and hydrate
 - Rest

*EMS Provider
Injury Prevention*

- Use safe lifting technique
 - head up, butt low, back straight
 - keep the load close to your body
 - avoid twisting
 - use enough people for the job
- Use appropriate safety gear
 - Supportive footwear
 - Litter carry straps
- Spot others during moves

In Review

- Assess
 - Scene Size-up and General Impression
 - Initial Assessment
 - Focused History and Physical Exam

In Review

- Treat
 - Manually stabilize
 - Reduce angulations / restore CSMT through TIL

 - Apply RICE
 - Explain the procedure
 - Apply immobilization
 - Re-assess PMS, patient comfort

In Review

- Evacuate as necessary
 - Ongoing assessment
 - Vitals

- Distal CSMT
- Patient comfort

- Adjust immobilization for best effectiveness

In Review

- Document
 - MOI
 - Presentation
 - Assessment & history (OPQRSTU, SAMPLE)
 - Treatment / care given
 - CSMT before / after injury & splinting
 - Changes during evacuation

Splinting is a dynamic and ongoing process

- Check for:
 - Patient Comfort
 - CSMT
 - Splint effectiveness
 - Support
 - Padding
 - Comfort
 - Protection

Femur Traction

- Used to maintain traction (pull) on a femur fracture.
 - Reduces internal bleeding
 - Relieves spasm (pain)
 - Prevents further damage from bone ends impacting / grating
 - Immobilizes extremity

Femur Traction

Protocol

- Indications for application:
 - Mid-shaft femur fracture
- Contraindications:
 - Knee or lower leg injury
 - Hip injury

Femur Traction

Splint Application

- Before applying the splint to the patient:
 - treat for shock (O₂, warm, PFA)
 - full assessment

Femur Traction

Splint Application

- ***Explain the process to the patient***
- 1. Begin manual traction / counter-traction
 - make an ankle hitch
 - 10-15 lb. of pull (counter-traction as necessary)

- 2. Size the splint to the good leg
 - top of splint at the hip
 - bottom end: 8-12” beyond foot
 - Make leg straps at appropriate positions
- 3. Lift / roll patient and position splint

Femur Traction

Splint Application

- 4. Secure groin strap
- 5. Apply mechanical traction
 - tighten band until it pulls as much as the manual traction, then a little more tension

Femur Traction

Splint Application

- 5. Tie a safety (backup) knot for the mechanical traction.
- 6. Apply thigh straps distal to proximal
 - no straps on knee or fracture site
- 7. Apply a compression dressing (e.g. ACE wrap or similar) to the injured area.

Femur Traction

Splint Application

- 8. Re-assess CSMT and patient comfort
 - Can use backboard to support splint
- 9. Conduct ongoing assessment frequently
 - Splint effectiveness
 - CSMTs
 - Remove mechanical traction (maintain manual) to restore circulation.
 - Protect against and watch for COLD INJURY

Fracture

- Common MOIs:
 - falls
 - MVAs
 - blunt trauma / collision / crush
 - osteoporotically precipitated breaks

Fracture

- Assessment
 - pain
 - point pain
 - sharp to dull
 - deformity / angulation
 - discoloration
 - swelling (hematoma)
 - decreased CSMT
 - inability to move / bear weight

Fracture

- Treatment (closed fracture):
 - Reduce angulation / restore CSMT through TIL
 - Immobilize (and re-check splint effectiveness)
 - RICE
 - frequently re-assess CSMT, patient Comfort
 - evacuate

Fracture

- Treatment (open fracture)
 - Control bleeding
 - Reduce angulation, restore CSMT through TIL
 - Bandage exposed bone w/ moist, sterile, occlusive dressings
 - Immobilize
 - Treat for shock
 - Evacuate

General Splinting

Goals

- Provide the injury and patient with:
 - Support
 - Joint above and below
 - Padding
 - BUFF
 - Comfort
 - Prevention of further injury
 - COLD INJURY
 - Decreased CSMT

Make your splints:

- BIG
 - immobilize the joint above and below the injury
- UGLY
 - use anything available to you that works
- FAT
 - create plenty of protection for the injury
- FLUFFY
 - use lots of fluffy padding to insulate

WHEN IN DOUBT, MAKE IT

FLUFFY:

ADD PLENTY OF PADDING

General Splinting

Sequence

- 1. Complete assessment
 - manually immobilize as needed
- 2. Explain the process
- 3. Size / mold the splint
 - use the uninjured side if possible
- 4. Apply the splint and secure it
 - Re-assess CSMT afterward

- knee twist / hyper-extension/flexion
- Falls
- Work-related over-exertion and resultant injury
- MVA (motor vehicle accident)

Sprain

- Assessment
 - pain (generalized joint)
 - deformity
 - discoloration
 - decreased CSMT
 - decreased (or increased) ROM
 - swelling
- NOTE: Chronic sprains are common!

Sprain → *dislocation*

Sprain

- Treatment
 - Immobilize
 - RICE as early as possible
 - If weight-bearing, try to attempt a supportive walking splint

Subluxation / Dislocation

- Structures Involved:
 - Joints
 - Ligaments
 - Cartilage
 - Vessels
 - Nerve tissue
 - Bones

Subluxation / Dislocation

- Assessment
 - **Pain**
 - **Clear** deformity
 - decreased CSMT
 - decreased / no ROM → “locked”
 - swelling

- discoloration

Subluxation / Dislocation

- PAINFUL
 - deformity
 - significant damage to internal structures
 - very likely CSM compromise
- Subluxation / Dislocation*

• **Treatment**

- Reduce injury / restore CSM through traction-in-line

- RICE
- immobilize in position of comfort / function / CSM
- frequently re-assess CSMT
- evacuate

Shoulder Drop

Sprain → *dislocation*

Fracture

- Structures Involved:
 - bone
 - soft tissue
 - vessels
 - nerves

- Isolated / multitrauma
- Physical Exam
 - Palpate
 - Inspect
 - Check PMS
- Detailed History
 - History of Present Injury
 - Mechanism
 - Precipitating event / cause
 - History of Incident
 - OPQRSTU
 - Past Medical History
 - Surgeries
 - Past Episodes

Types of Injuries

- Strain
- Sprain
- Subluxation / dislocation
- Fracture (closed / open)

General Treatment Principles of Musculoskeletal Injuries

- Assess
- Restore CSMT through Traction-in-Line
- Immobilize
- Apply RICE
- Monitor the injury over time

Some advice on evacs...

- Just to confuse you, we added another ABC:
 - Ambulate
 - **B**efore
 - Carry

Strain

- Structures involved
 - muscle (stretch and tear)
 - vessels
- Typical MOIs:
 - Over-exertion / under-flexible
 - Athletics (reach, dive, etc.)
 - Work (lift, reach, etc.)

Strain

- Assessment:
 - pain (burn, hot)
 - swelling
 - discoloration
 - reduced range-of-motion
 - feels weak / pain on use

Strain

- Treatment
 - RICE
 - Rest
 - Ice
 - Compress
 - Elevate
 - Assist patient in moving (as necessary)
 - Transport in position of comfort
 - AVOID MASSAGE EARLY ON

Sprain

- Structures involved:
 - ligament (bone-to-bone)
 - tendon (muscle-to-bone)
 - nervous tissue
 - vessels

Sprain

- Common MOIs
 - Sports:
 - Rolled ankle
 - Landing on wrist

- Extremity immobilization / isolated injury

Secondary Survey

- A good head-to-toe exam includes:
 - Inspection
 - Palpation
 - Compare symmetry
 - Talk to the patient as you examine
 - Assessment of distal function (CSM)
 - Circulation
 - Sensation
 - Motion

Palpate

- Use **BIG HANDS**
- Feel for:
 - deformity
 - crepitus (grating)
 - tenderness
 - swelling

Inspect

- Look for:
 - symmetry (compare side to side)
 - deformity / angulation
 - discoloration / bruising
 - scars from prior injury / surgery
 - soft tissue injuries

Inspect for symmetry

The importance of good assessment

Assess CSMT

- Compare each side to side for equality:
 - **Circulation**
 - Pulses Present? Strong? Weak?
 - Skin color?
 - Temperature?

– **Sensation**

- Check for sensation (pinches, ask about numbness)

– **Motion**

- Check pedal pushes & pulls, hand grips

– **Temperature**

- Compare the temperature of extremities

History

- History of Present Injury (HPI)
 - Mechanism of Injury
 - Height? Speed? Surface? Restraint? Helmet?
 - Any tumbling? Spinal involvement?
 - History of Incident
 - Paint a picture of the scene
 - body structures involved
 - position found
 - bystander stories
 - sounds / feelings (snap, crackle, pop)

History

- Past Medical History (SAMPLE)
 - Surgeries (what for? successful?)
 - Allergies (painkillers?)
 - Medications (anti-inflammatories? pain masking?)
 - Past Injuries
 - Chronic problems with / injuries of this joint / area?
 - Last Intake
 - Events leading up to injury
 - Precipitating event
 - Potential causes / other medical concerns to manage

Assessment Summary

- Size-up and Initial Assessment
 - Look around
 - Critical / non-critical

**Musculoskeletal Injuries
For the WFR
Nathan Orgain, WEMT-I**

The Musculoskeletal System

- Bones
- Muscles
- Connective Tissue
 - Tendons
 - Ligaments
 - Cartilage
 - Synovial Fluid, Bursae, etc.

Roles of the musculoskeletal system

- structure
- protection
- movement / articulation
- hemopoiesis

Joint types

- Gliding Joints
 - carpals / tarsals
 - intervertebral
- Hinge / Pivot Joints
 - fingers
 - toes
 - atlas / axis (C1-C2)

Joint Types

- Spheroid (Ball and Socket) Joints
 - Shoulder
 - Hip

Joint Types

- Cartilaginous Joints
 - Ribs / Sternum
 - Intervertebral Joints
- Synovial Joints
 - Knee
 - Wrist
 - Shoulder
 - Hip

– etc.

General Joint Structure

- bones
- cartilage
- ligaments (bone to bone)
- tendons (muscle to bone)
- blood vessels
- nerve tissue
- bursae, synovial fluid, etc.

EMS Role in Musculoskeletal Injury

WFR Additional Roles

- In cases of:
 - dislocations
 - displaced fractures
 - angulated fractures
 - compound (open) fractures
- WFRs should attempt reduction of injuries to help restore CSM

General Impression and

Scene Size-up

- Take a look around- what happened here?
- Get an impression of the patient:
 - Isolated complaint or injury?
 - Multitrauma?
 - Critical
 - Non-critical
- Who will be your best sources of information? Patient? Bystanders?

Initial Assessment

- ABCs
- Continue to assess whether your pt needs:
 - Rapid Transport
 - Critical patient = unstable
 - Universal immobilization = load & go
 - Delayed Transport
 - Non-critical patient = stable