I Just Fell on the Trail (and Can't Get Up) – Now What?

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OUCH!!

- You and two friends are backpacking into Jefferson Wilderness
- You are 6 miles from the trailhead when you hear a stumble and a groan behind you
- One of your friends has fallen several feet down the slope and is holding their right ankle
- Now What?

Overview

- Types of Injuries
- Principles of Injury Assessment
- Principles of Injury Management
- Outdoor Essentials
  - *Be Prepared!*

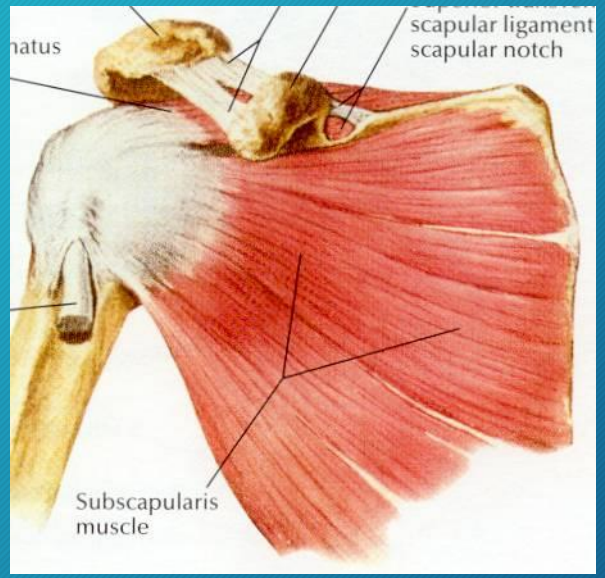
Musculoskeletal Injuries

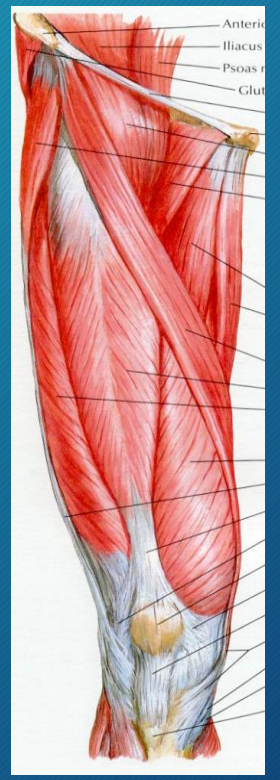
Tendons
Muscles
Ligaments
Bone
Bursa
Joints
Nerves

Know the patterns!

Tendons

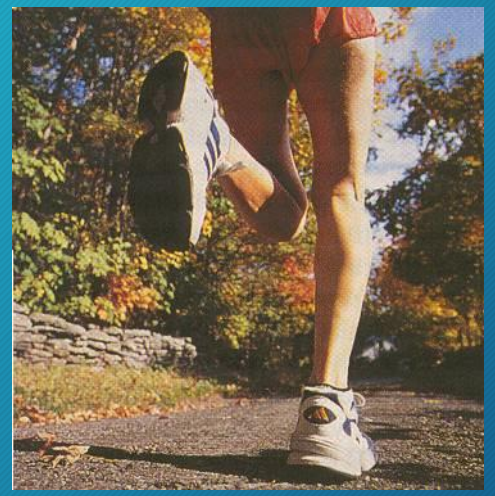
- Function
  - Transmits muscle force with elongation





Tendinitis

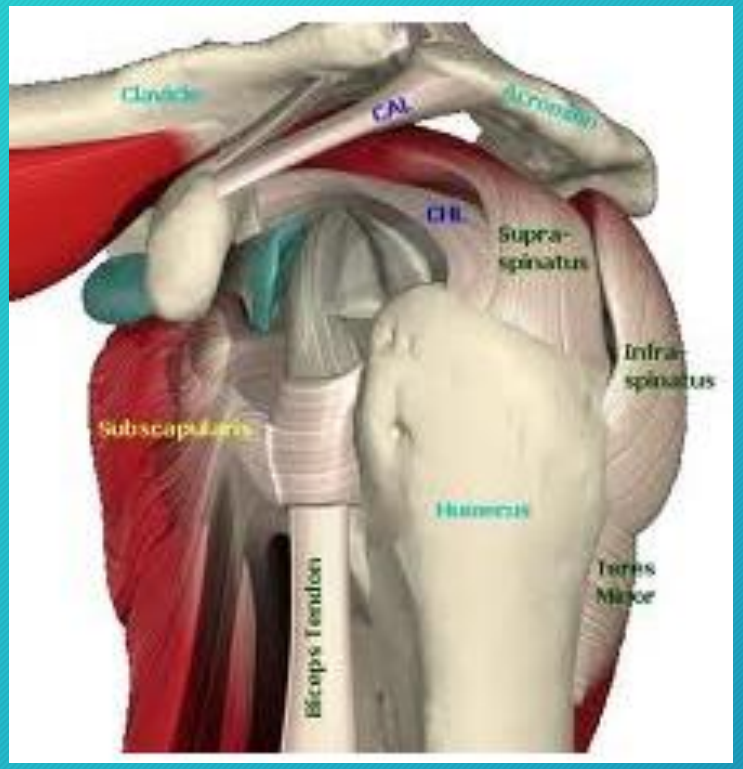
- Injury Mechanism
  - Quickly developing tension
  - Oblique tension prior to loading
  - Muscle maximal contraction with external stretch
  - Relative weakness



Tendinitis vs Tendinosis

- Acute Tendinitis
  - Acute inflammatory reaction
- Chronic Tendinitis
  - Tendinosis
  - Chronic repetitive microtrauma
- Impact on recovery and rehabilitation

Tendinitis

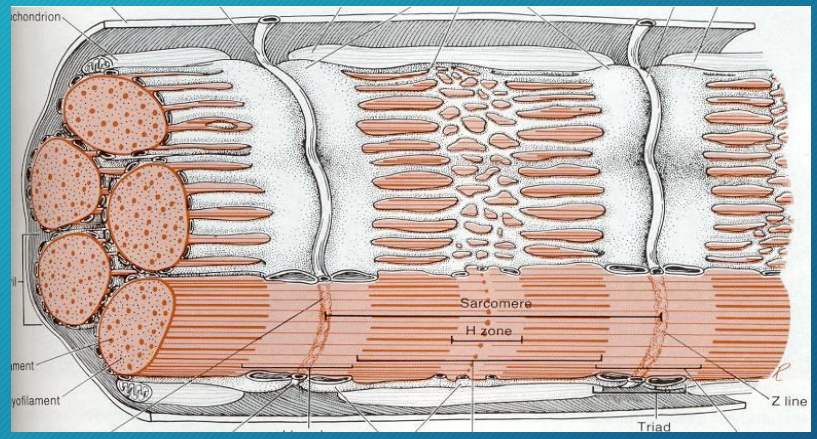


Know the patterns!

- Pain with palpation
- Pain with passive stretch
- Pain with contraction against resistance

Muscles

- Function
  - Strength
  - Flexibility
  - Proprioception



Muscle Injuries

- Injury Mechanism
  - Clinical vs. subclinical
  - Eccentric contraction
  - Myotendinous junction failure
  - Tissue damage
- Symptoms Resolve
  - Functional deficits persist

Definitions

Strains

- A stretching or tearing of muscle or tendon.

Muscle Strain Classification

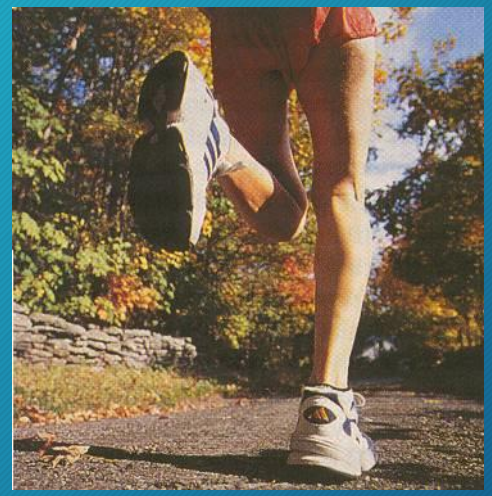
I. No appreciable tissue tearing, no loss of function or strength, only a low-grade inflammatory response.
II. Tissue damage, strength of the musculotendinous unit reduced, some residual function.
III. Complete tear of musculotendinous unit, complete loss of function.

O'Donoghue 1962

Muscle Injuries / Strains

Know the patterns!

- Pain with palpation
- Pain with passive stretch
- Pain with contraction against resistance



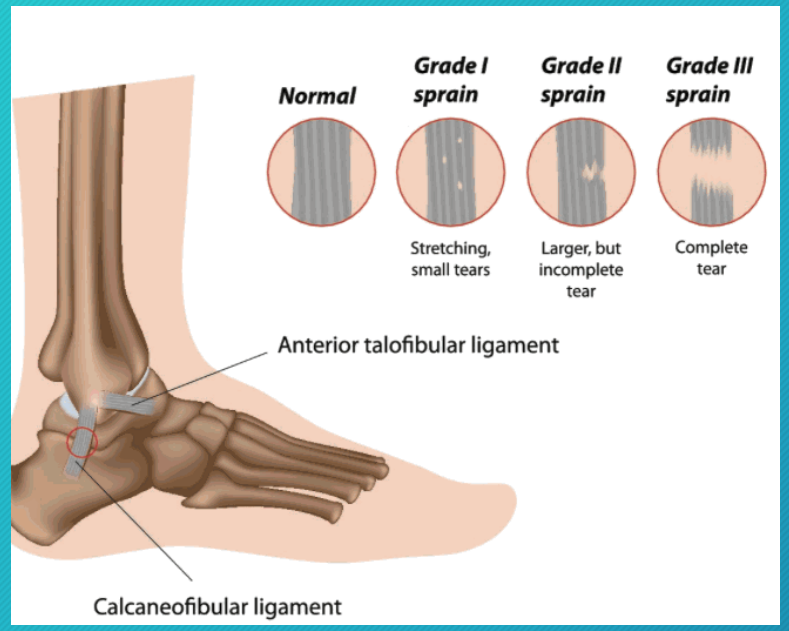
Ligaments

- Function
  - Passive stabilizer
  - Proprioception
- Injury Mechanism
  - Contact/non-contact
  - Acute overload of rapid, large force
  - Common joint injury

Definitions

Sprains

- A stretching or tearing of a ligament.



Ligament Sprain Classification

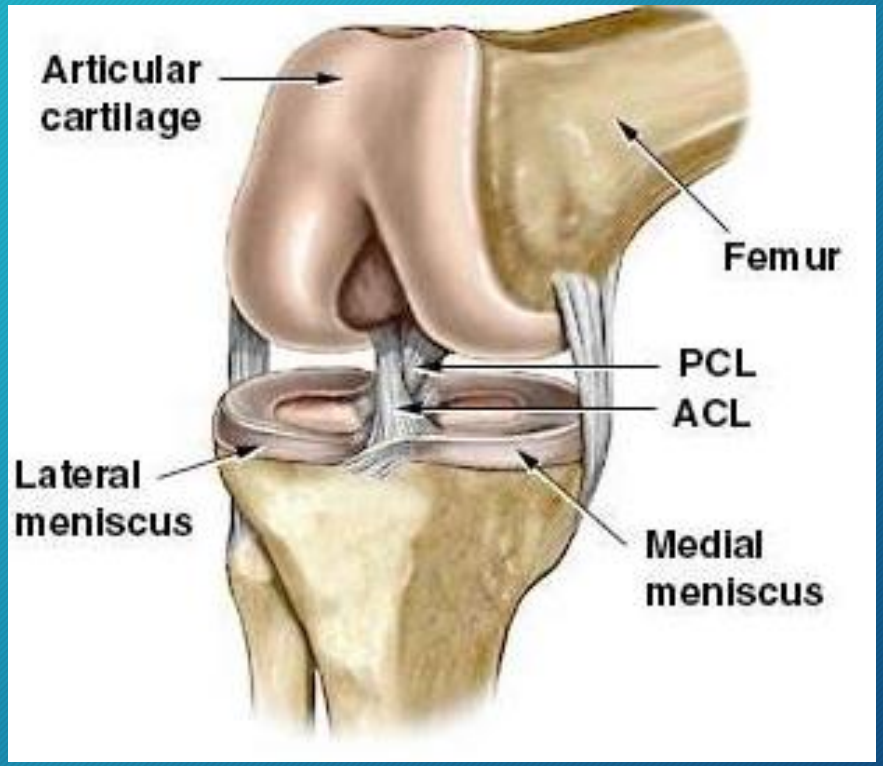
I. Microscopic tearing of collagen fibers. Exam with tenderness and no instability.
II. Complete tears of some but not all collagen fibers. Exam with pain and endpoint.
III. Complete tear / rupture of ligament. Exam with pain and no endpoint.

Bernstein 2003

Ligament Injuries

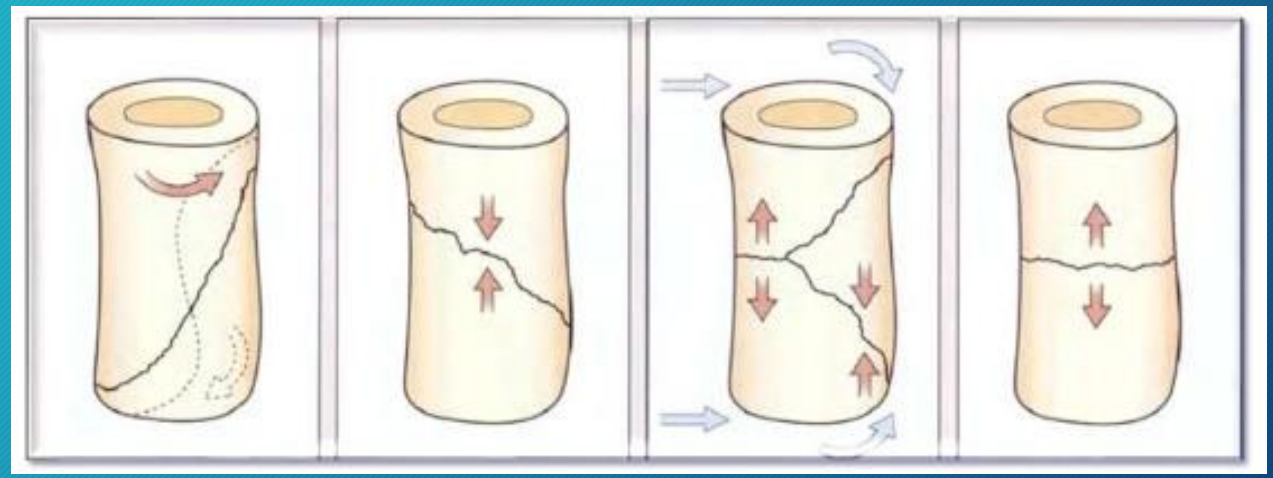
Know the patterns!

- Pain with palpation
- Pain with passive stretch
- Joint instability



Bone

- Function
  - Structural support
  - Weight bearing
  - Movement
- Injury Mechanism
  - Twisting
  - Compression
  - Bending
  - Tension



Bone Injuries

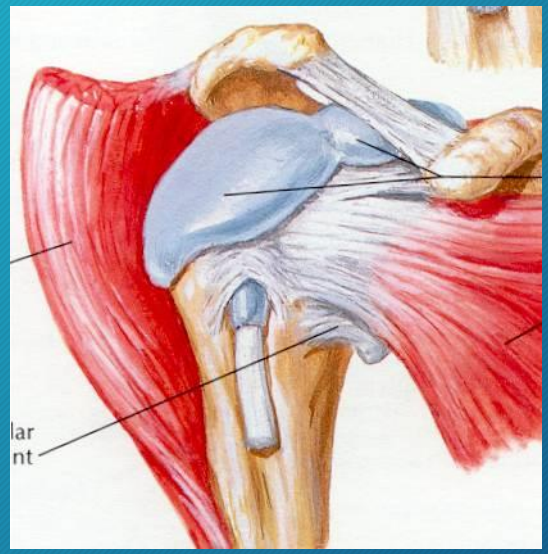
Know the patterns!

- Pain and swelling at the fracture site.
- Tenderness close to the fracture.
- Paleness and deformity (sometimes).
- Bleeding or bruising at the site.
- Weakness and inability to bear weight.
- Loss of pulse below the fracture, usually in an extremity (this is an emergency).
- Numbness, tingling or paralysis below the fracture (rare; this is an emergency).

Bursa

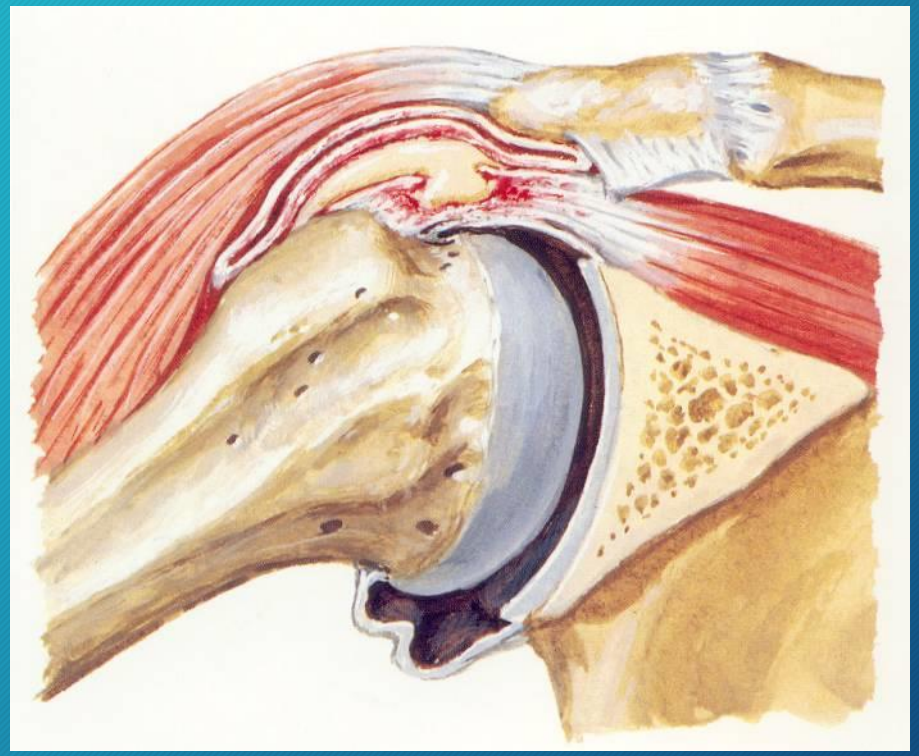
Function

- Decrease friction between tendon, skin, muscle and bone



Bursitis

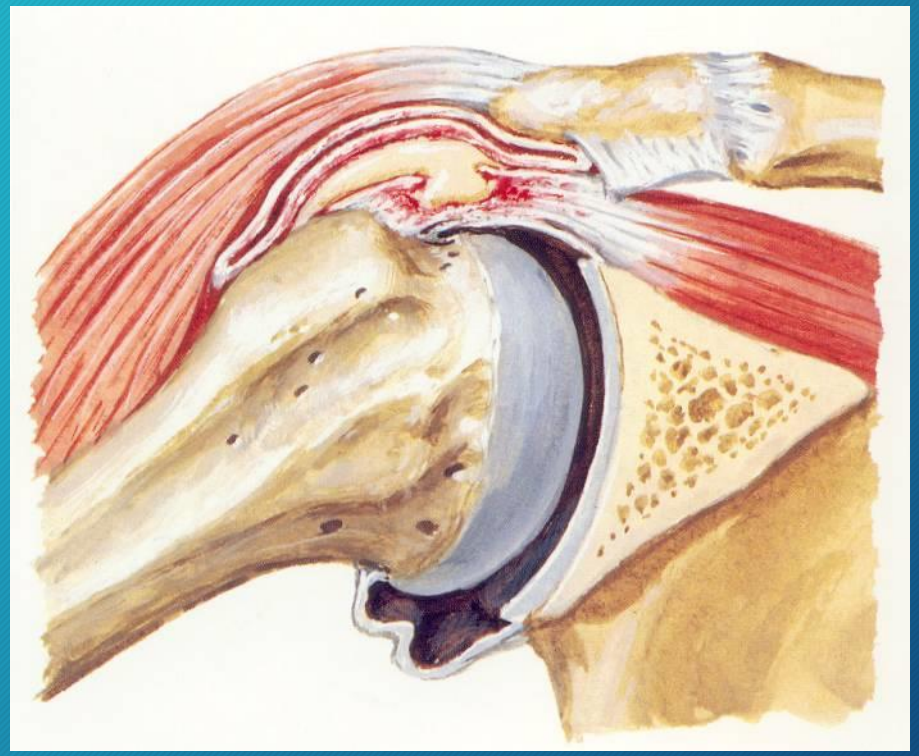
- Injury mechanism
  - Overuse, repetitive trauma
  - Friction from tendon, external pressure
- Inflammation
  - Tissue irritation, effusion, thickening



Bursitis

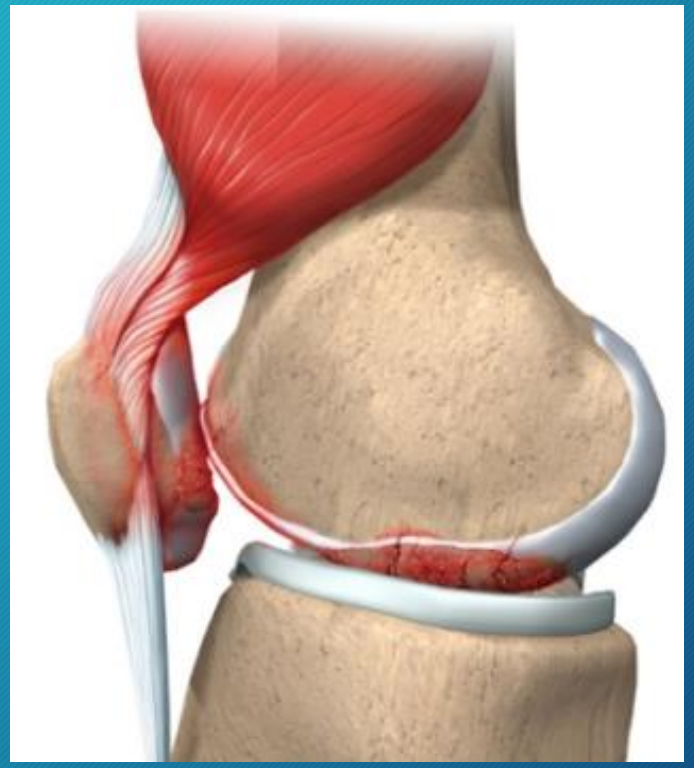
Know the patterns!

- Pain with motion
- Pain with palpation



Joints/Cartilage

- Function
  - Mediate the frictional, compressive, shear and tensile loading forces at joints.
  - Provide motion.



Arthritis/Fibrocartilage

- ***Know the patterns!***

  - Pain with motion
  - Pain with loading

Nerve Injuries

- *Know the patterns!*
  - Numbness
  - Weakness
  - Radiating pain

OUCH!!

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- Now what?

Perform an Initial Environmental Assessment

- Establish Control
  - Discuss leadership
    - Have a plan in case of an emergency *before* a situation arises
  - Be competent
    - Know your stuff
    - Be capable and ready to act
  - Appear confident
    - Speak with quiet authority
    - Listen

Wilderness First Aid Curriculum and Doctrine Guidelines, BSA

Perform an Initial Environmental Assessment

- Assess the Scene
  - Survey the situation
  - Try to determine mechanism of injury
  - Don’t rush in and have additional injuries
    - Wilderness First Aid Curriculum and Doctrine Guidelines, BSA

Evaluate the Patient

https://sapientclinician.com/

Perform an Initial Patient Assessment

ABCDE

- **Airway**
  - Speaking = open airway
- **Breathing**
  - Speaking does not rule out difficulty breathing
- **Circulation**
  - Scan for bleeding
  - Control bleeding
- **Disability**
  - Immobilize if spinal injury suspected
- **Environment**
  - Consider ambient/body temperature
  - If necessary, treat for shock
    - Wilderness First Aid Curriculum and Doctrine Guidelines, BSA

Perform a Musculoskeletal Injury Assessment

DOTS

- **Deformities**
  - Compare sides
  - Often seen with fracture
- **Open wounds**
  - May be hidden, have to look
  - Stop bleeding
- **Tenderness**
  - Will occur prior to swelling or bruising
  - Gently palpate area of injury
- **Swelling**
  - Seen with soft tissue injuries and fractures
  - May not be obvious with initial assessment
    - What does DOTS Stand For?, November 1, 2015 by John Furst

Principles of Musculoskeletal Injury Evaluation

LAF

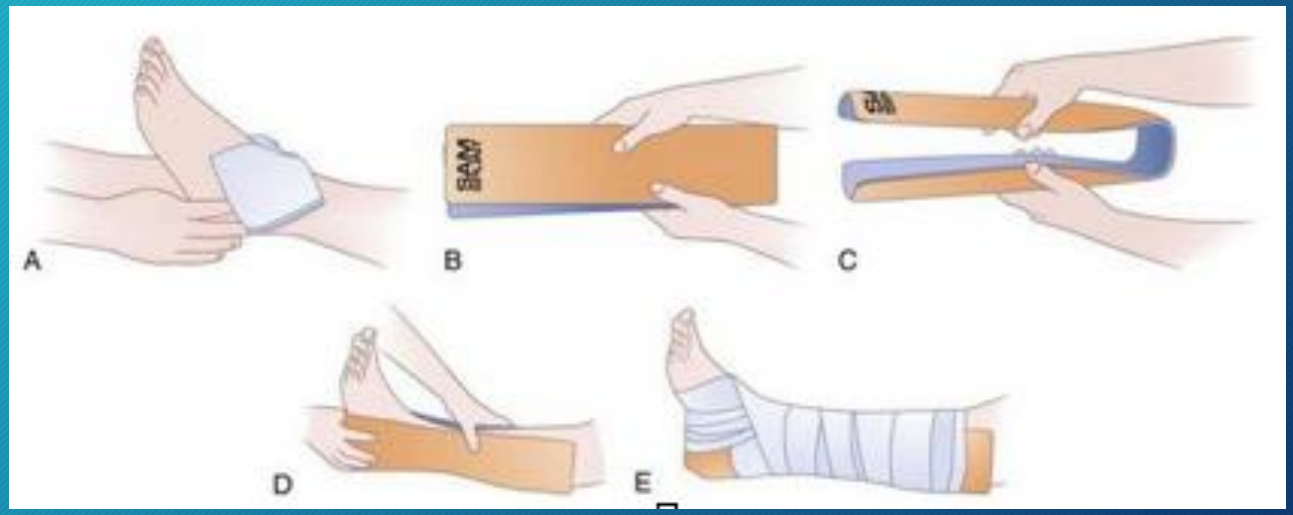
- **Look**
  - For blood and discoloration
- **Ask (if conscious)**
  - Ask about pain, bleeding, popping or snapping sounds
  - Ask the patient how bad the pain is on a scale of 1-10
- **Feel**
  - Gently palpate area of injury
  - Perform a usability test (able to weight bear?)
    - Wilderness First Aid Guide for Common Muscle and Joint Injuries, August 5, 2020 by Claire Polansky

Principles of Injury Management

- HI-RICE
  - Hydration
    - With MSK injury, make sure patient stays hydrated
  - Ibuprofen
    - Consider an NSAID if in significant pain
  - Rest
    - Minimize motion of affected area
  - Ice
    - Use chemical ice pack or towel/clothes soaked in cold water
  - Compression
    - Compression and splinting to stabilize injury
    - Check circulation and sensation
  - Elevation
    - Elevate limb higher than heart to limit swelling

Splinting Principles

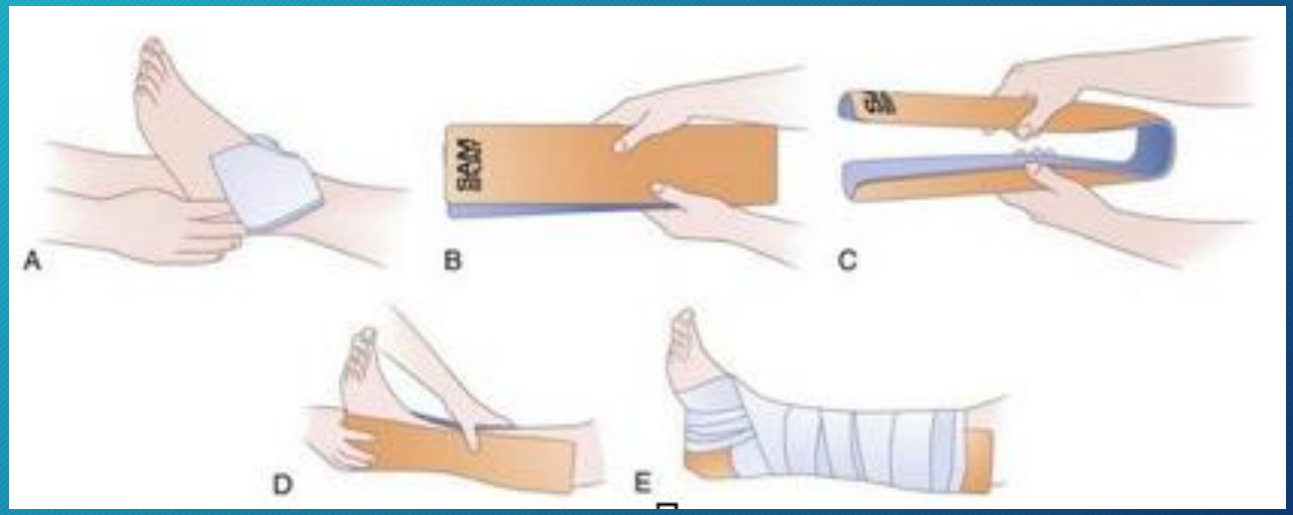
- Visualize the injured body part
- Cover open wounds with sterile dressings



- University of Colorado, Section of Wilderness and Environmental Medicine

Splinting Principles

- Continually recheck the patient's neurovascular status
- Traction is indicated if the pulse is not palpable
- Gentle traction involves less than 10 lbs of force



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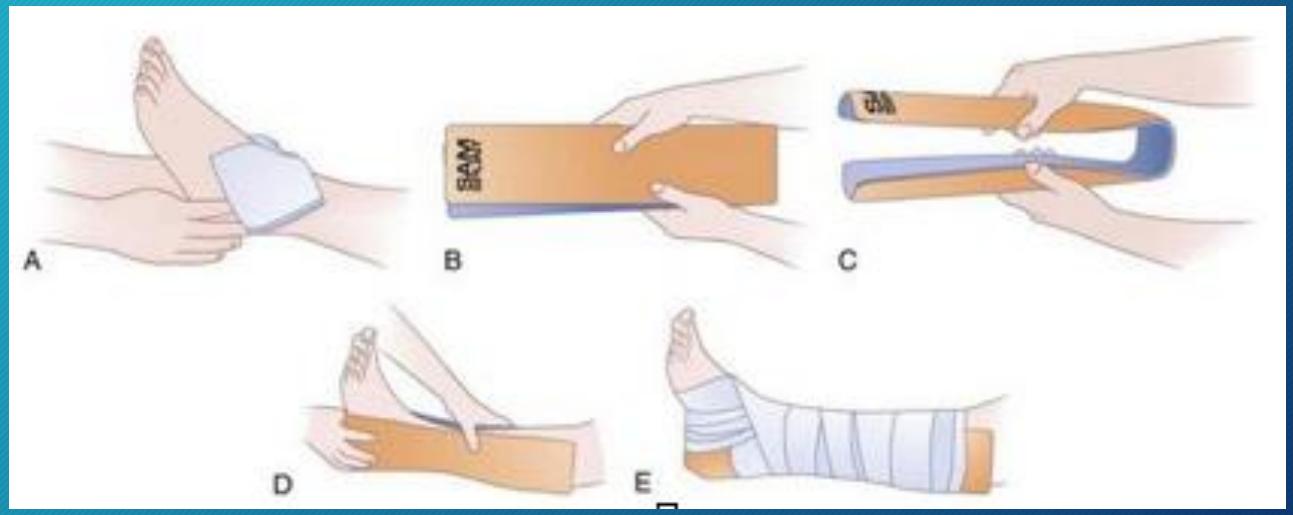
Splinting Principles

- Immobilize the joints above and below the injury
- Padding prevents further tissue damage
- Ice and elevate the injury after immobilization



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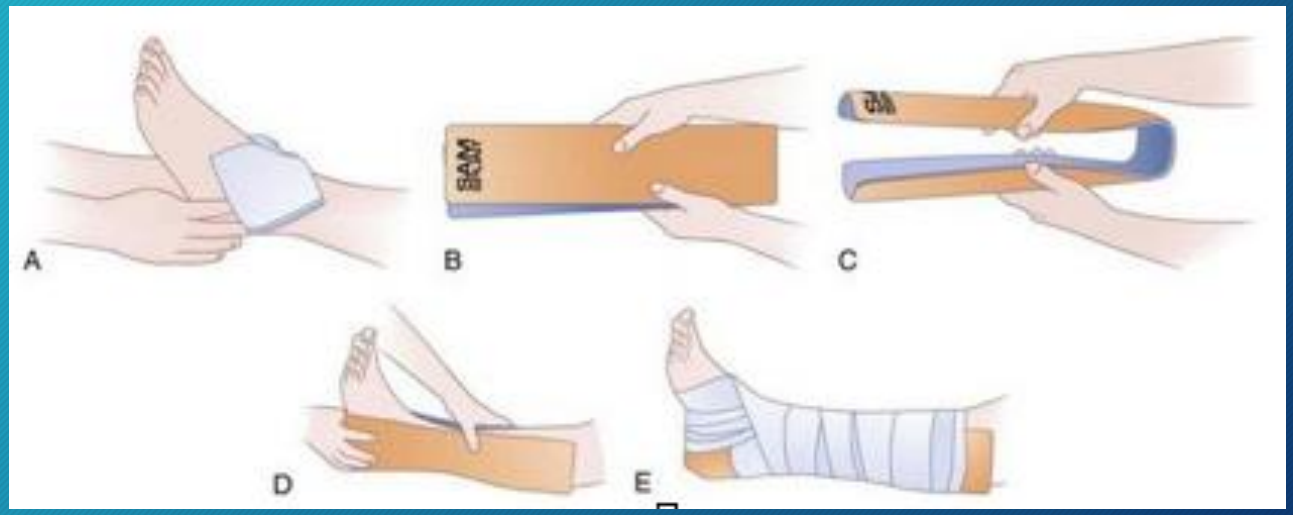
Splinting Principles

- Do not reset open or protruding fractures
- Splint the extremity in the position in which it was found
- Splint the patient before transport (if he or she is stable)



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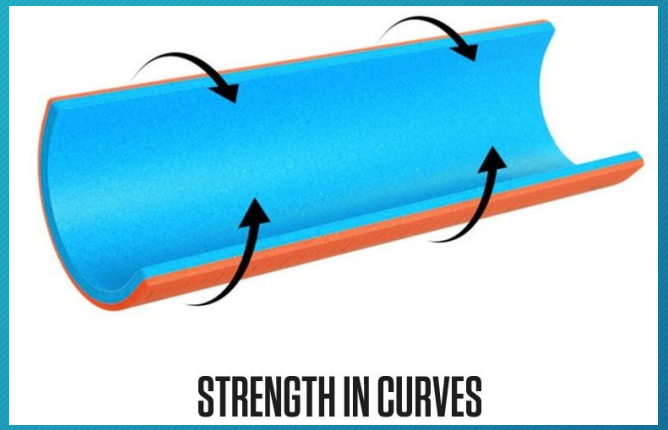
Splinting Materials for your First Aid kit



Splinting Materials in the Field

Splint Examples - Finger

https://www.wildernessarena.com/skills/first-aid-health-and-first-aid/treating-broken-bones

- Secure material for the splint. It should be straight and firm. A small stick or rolled up cloth will suffice.
- Place the splint under the finger. Make sure it is long enough to extend into the palm of the hand.
- Tie a strip of cloth above and below the fracture, around the finger and splint, and around the finger next to it for stability. Do not tie the splint too tightly and do not tie it directly over the fractured bone.

Splint Examples - Hand

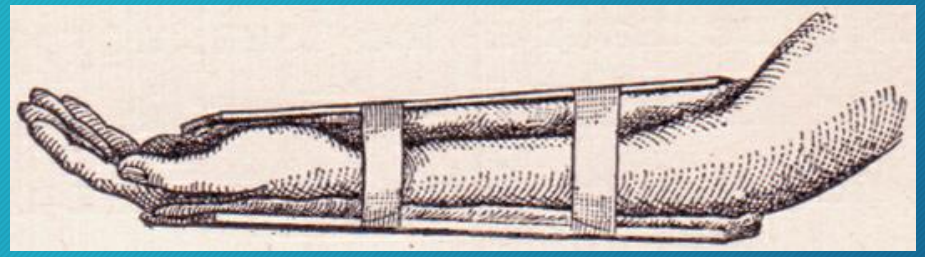
https://www.wildernessarena.com/skills/first-aid-health-and-first-aid/treating-broken-bones

- Make sure the wrist is straight and the hand is in a normal position, slightly opened.
- Place a wad of cloth in the palm of the hand. You will need enough cloth to ensure the hand stays in its normal position with the fingers slightly opened.
- Place the splint on the underside of the wrist and hand so it extends from above the wrist to the end of the fingers.
- Fold the splinting material up and around the sides of the wrist.
- Secure the splint with gauze by wrapping the gauze around the wrist and hand from one end of the splint to the other end of the splint.
- Stuff padding in the space between the splint and the wrist and hand.

Splint Examples -Arm

https://www.wildernessarena.com/skills/first-aid-health-and-first-aid/treating-broken-bones

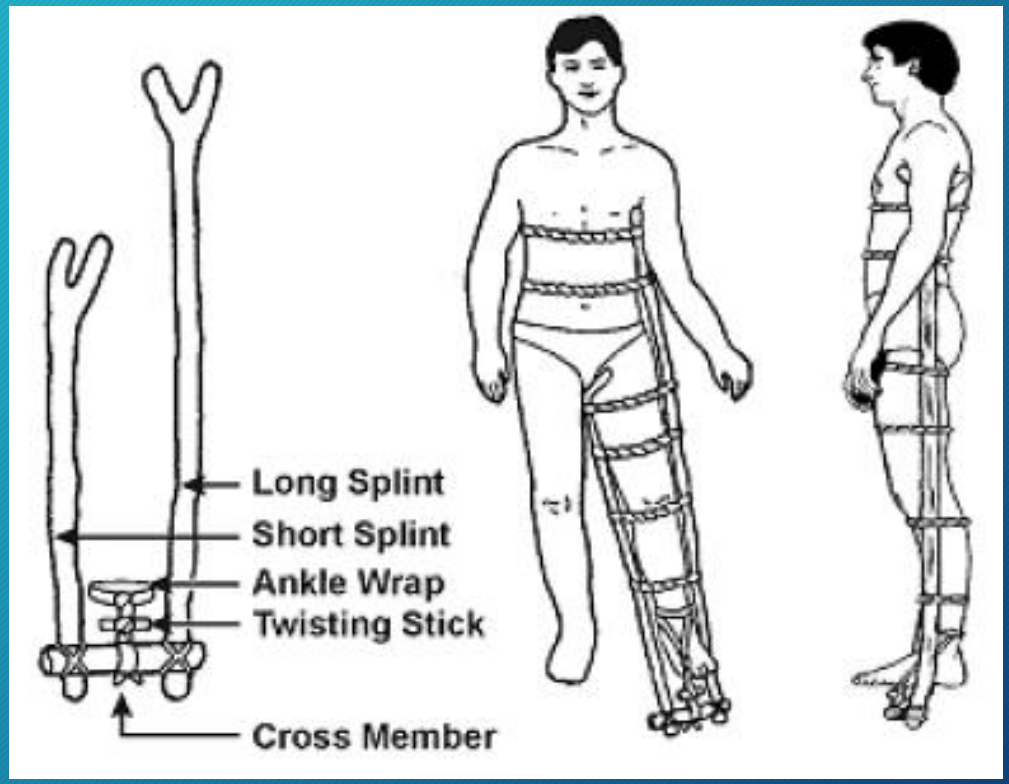
- Adjust the arm to its natural position.
- Secure material for the splint, two sticks can serve as splint material. They must be long enough to extend past the wrist and elbow joint.
- Use a clean shirt or other material to pad the arm.
- Place the sticks on both sides of the arm, equal distances from each other.
- With forearm fractures the sticks should extend beyond the wrist. With upper arm fractures, the sticks should extend beyond the elbow.
- Wrap the cloth around the sticks at least six inches above and six inches below the fracture.
- Do not tie the splint too tightly. You should be able to slip two fingers under the wrapping.
- A sling is required to prevent the arm from moving and causing further damage. The elbow should be at a 90 degree angle. If this causes pain, lower the forearm until you find a comfortable position.



Splint Examples - Leg

https://www.wildernessarena.com/skills/first-aid-health-and-first-aid/treating-broken-bones

- Get two forked branches or saplings at least 5 centimeters in diameter. Measure one from the patient's armpit to 20 to 30 centimeters past his unbroken leg. Measure the other from the groin to 20 to 30 centimeters past the unbroken leg. Ensure that both extend an equal distance beyond the end of the leg.
- Pad the two splints. Notch the ends without forks and lash a 20- to 30-centimeter cross member made from a 5-centimeter diameter branch between them.
- Using available material (vines, cloth, rawhide), tie the splint around the upper portion of the body and down the length of the broken leg. Follow the splinting guidelines.
- With available material, fashion a wrap that will extend around the ankle, with the two free ends tied to the cross member.
- Place a 10- by 2.5-centimeter stick in the middle of the free ends of the ankle wrap between the cross member and the foot. Using the stick, twist the material to make the traction easier.
- Continue twisting until the broken leg is as long or slightly longer than the unbroken leg.
- Lash the stick to maintain traction.



Splint Examples - Ankle

https://www.wildernessarena.com/skills/first-aid-health-and-first-aid/treating-broken-bones

- Place cloth or other padding over the rigid splint material for padding.
- Place the splint under the leg and foot. The splint should extend halfway to the knee and far enough under the foot to immobilize the foot and ankle.
- Fill in the space between the ankle and the splint with a wad of cloth.
- Extend the sides of the splint up and secure them in place.
- Pad any space between the splint and leg, ankle, or foot with wads of cloth.

The Ten Essentials

- First aid kit
- Flashlight
- Trail food
- Fire starter/matches
- Sun protection
- Whistle
- Rain gear
- Water (and purification)
- Map and compass
- Knife (or multitool)

Additional Essentials

- Garbage bags
  - 2 – 5 ounces
- Rope (nylon cord)
  - 100 feet – 5 ounces
- Multitool
  - With saw – 8 ounces
- Day pack
  - 7 ounces

Principles of Injury Management

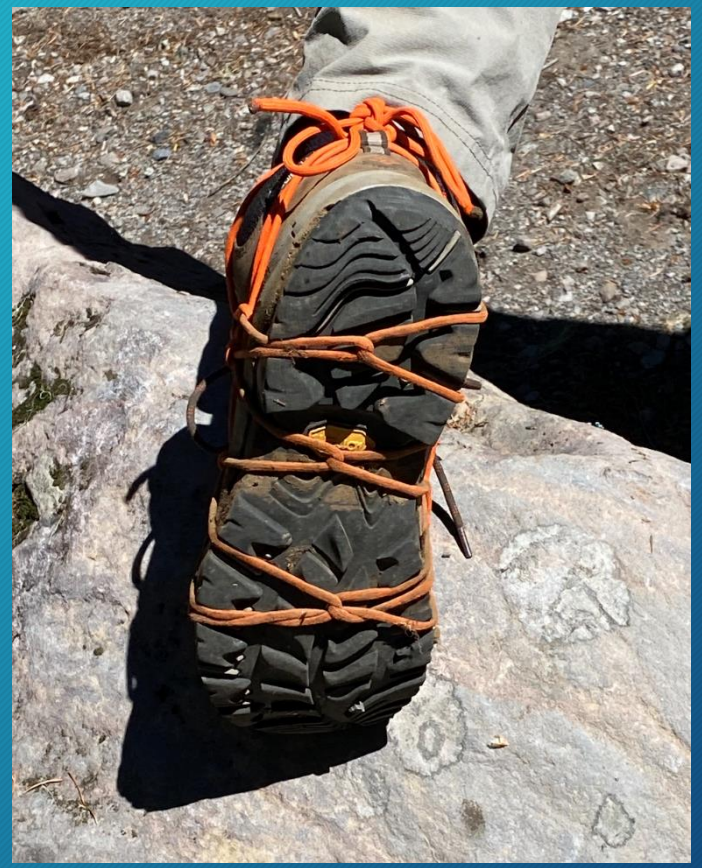
- Evacuating Patient
  - Can patient walk out?
  - Can you assist patient out?
  - Do you need help to get the patient out?

Getting Help

- https://www.instagram.com/reel/C-owGtlRQBX/?igsh=MWM2cW9zdDU4N2Y0Mg==

Use What You Have
(You May Have to be Creative)

Use What You Have
(You May Have to be Creative)



Thank you!

- Tomorrow's workshops will include:
  - Know your knots!
  - Splinting cases

OUCH!!

- Now what?
- Management
  - NSAIDs/hydration
  - Non-weight bearing
  - Elevate
  - Ice?
  - Splint

OUCH!!

- Now what?
- Acute Injury
  - Differential Diagnosis - Likely
    - Ankle sprain
    - Possible fracture
  - Differential Diagnosis – Unlikely
    - Tendinitis
    - Muscle strain
    - Arthritis
    - Nerve injury
    - Bursitis
- Management?

OUCH!!

- Now what?
- You inspect the injured leg
  - No deformity noted
  - No ecchymosis or swelling at this time
- You examine the injured leg
  - Marked tenderness to palpation at the lateral ankle
  - Neurovascular status intact
- You do a functional assessment
  - Unable to weight bear due to extreme pain

OUCH!!

- Now what?
- Your friend is conscious and speaking
- In pain, but no additional, obvious injuries
  - No bleeding noted
  - No head or neck injury
- It is a warm, dry day

OUCH!!

- Now what?
- Your friend is lying in pain, 6-7 feet down a rocky slope
- You can safely access your friend without risk of falling or injury to yourself
- You make your way down the slope to assess the injury

OUCH!!

- Now what?
- Outcome
  - With a splint and a fabricated crutch, your friend is able to slowly make his way back to the trailhead with your group's assistance and frequent rest/RICE breaks
  - If unable to make way out, options include:
    - Leave injured friend with companion, and other backpacker hike out for help (or call for help)
    - Build a stretcher/litter and carry injured friend out