

# Sports Injuries And Prevention.

**Dr. Md. Mostafizur Rahman**

**MBBS (Dhaka Medical College)**

**MPH (Dhaka University)**

**MS in Biochemistry and Mol. Biology (BUHS)**

**Former Faculty Member**

**BPATC Savar Dhaka.**

# Outline of the Session

Define Sports Injury and its type

Common sport injuries

Causes of sports injuries.

Prevention of sports injuries.

Management of sports injuries.

# Sports Injuries

- Sports injuries are injuries that occur in athletic or sporting activities.
- They can result from acute trauma, or from overuse of a particular body part.
- A sports injury involves damage to part of your body due to sports, exercise or athletic activities.
- A sports injury can be acute (sudden) or chronic (develop over time).

# Types of Sports Injuries

Traumatic injuries can include:

- Contusion or bruise - damage to small blood vessels which causes bleeding within the tissues.
- Abrasion or open wound
- Strain - trauma to a muscle due to overstretching and tearing of muscle fibers
- Sprain - an injury in a joint, caused by the ligament being stretched beyond its own capacity
- Wound - abrasion or puncture of the skin
- Bone fracture
- Head injury
- Spinal cord injury

# Common Sports Injuries

- Ankle sprain
- Groin pull
- Hamstring strain
- Shin splints
- Knee injury: ACL tear
- Back pain
- Tennis elbow ()

Muscle pull/ Muscle cramp

Neck strain and pain

Frozen shoulder injury

Tennis elbow (epicondylitis)

# COMMON INJURIES

**DISLOCATION**

injury to the brain

**BRUISE**

joint displaced

**SPRAIN**

soft tissue injury

**FRACTURE**

overstretched ligament

**CONCUSSION**

cracked or broken bone

# Why sports injury prevention is important ?

Sports injury prevention is crucial for FTC participants' overall well-being, enabling them to perform better, train consistently, and enjoy sports longer, while also saving time and money on treatments, by minimizing physical stress and promoting safe movement to avoid issues from minor sprains to career-altering conditions. It protects physical and mental health, ensures consistent participation, and reduces significant healthcare costs.

# CLOSED INJURIES



Bruises occur when small blood vessels are damaged by an impact or sudden wrenching movement.

# Types of Sports Injuries

Bruise

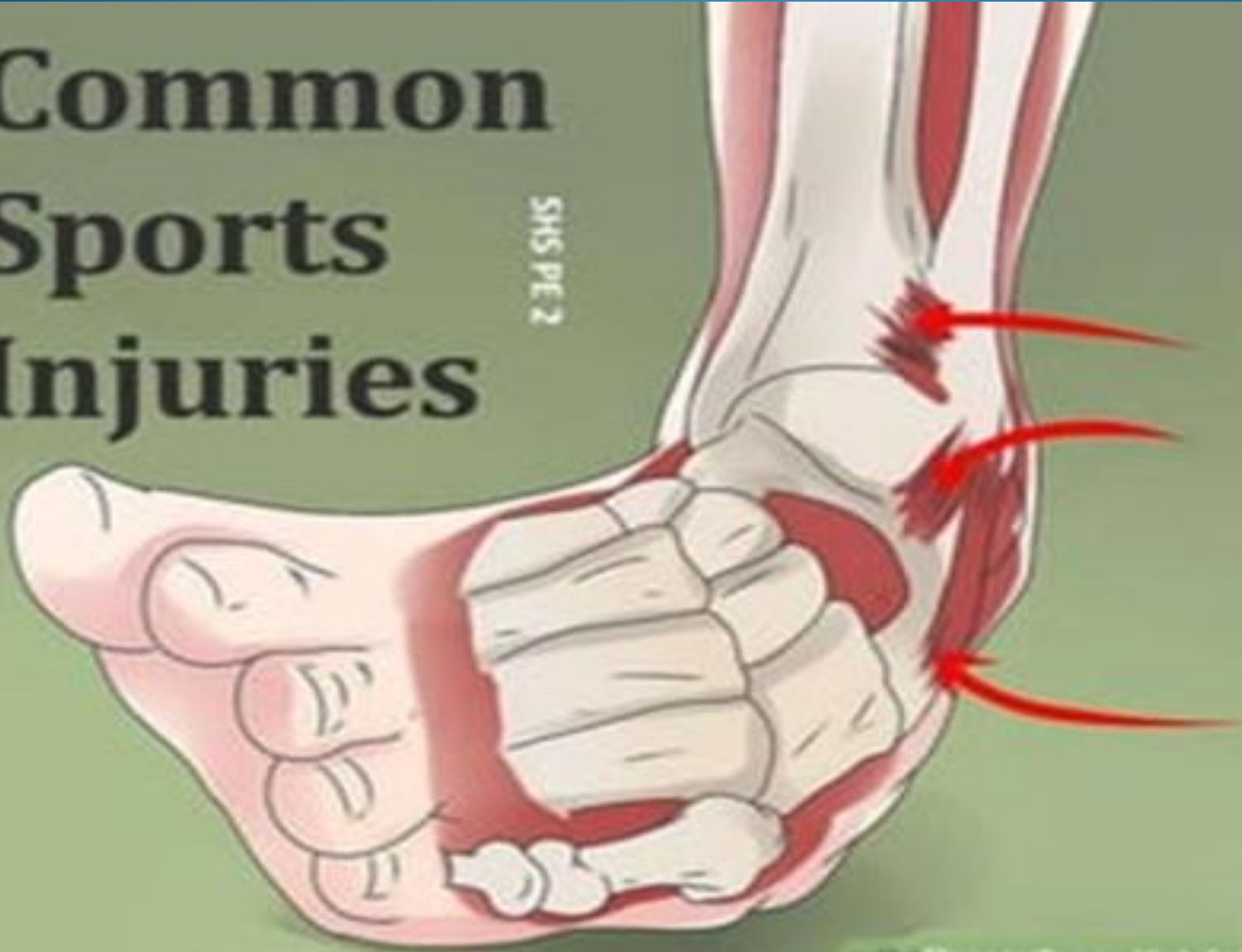
Abrasion

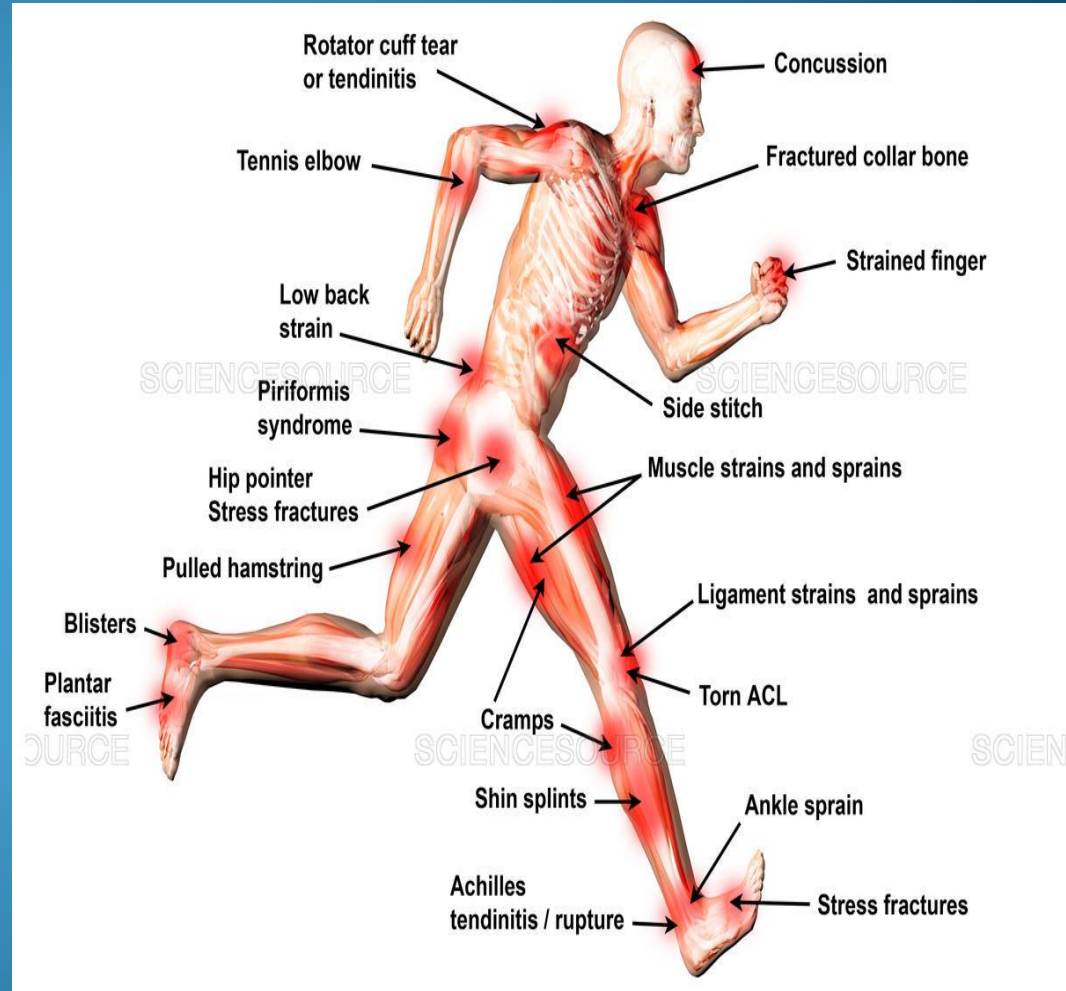


# Ankle Sprain

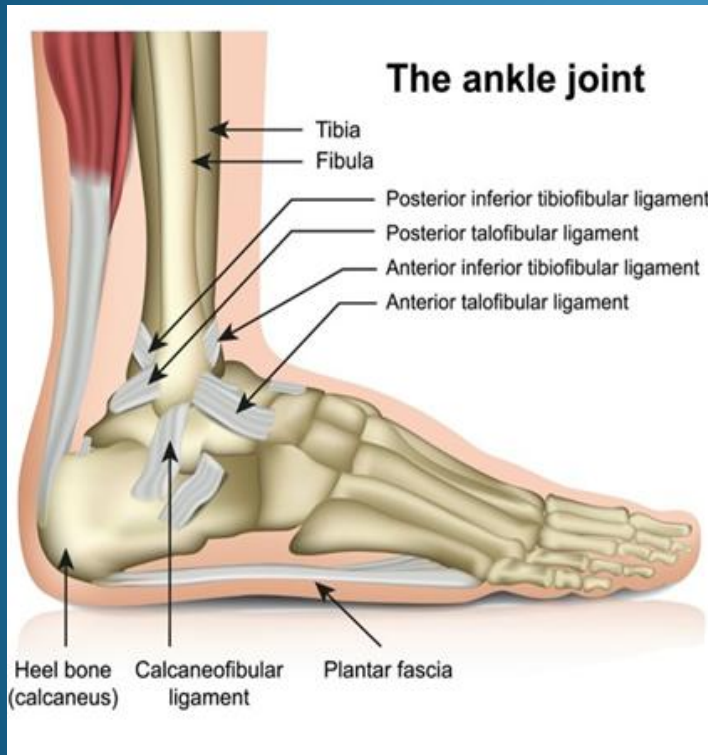
## Common Sports Injuries

SHS PE 2

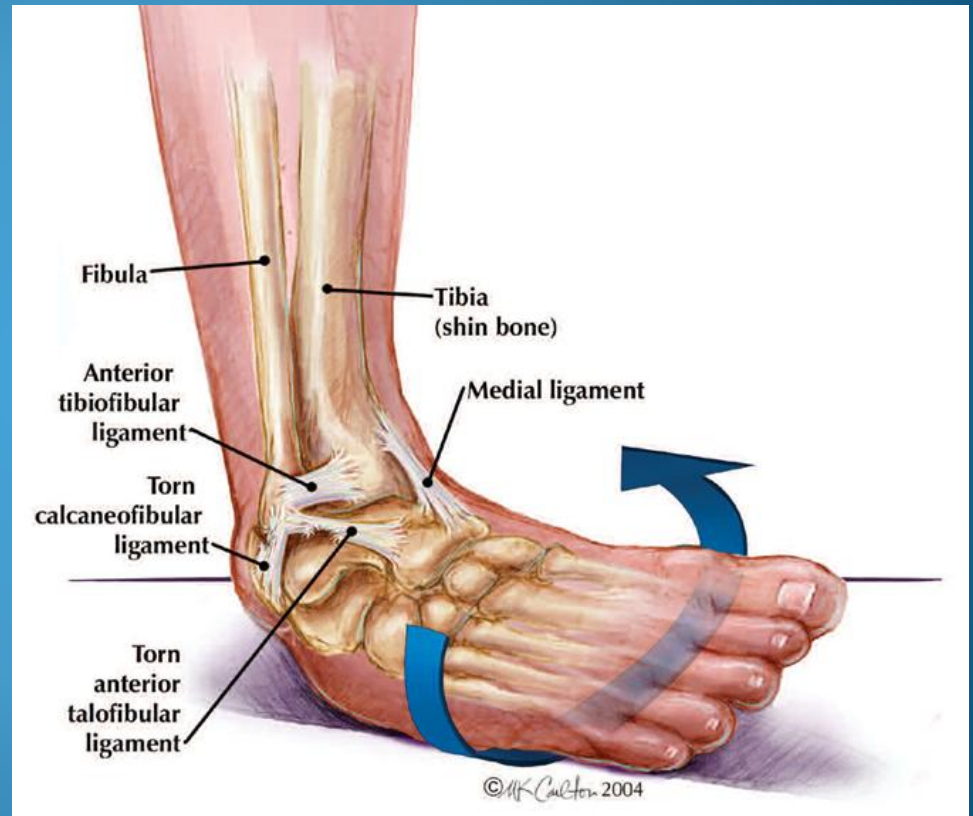




# Structures of Ankle Joint



Normal

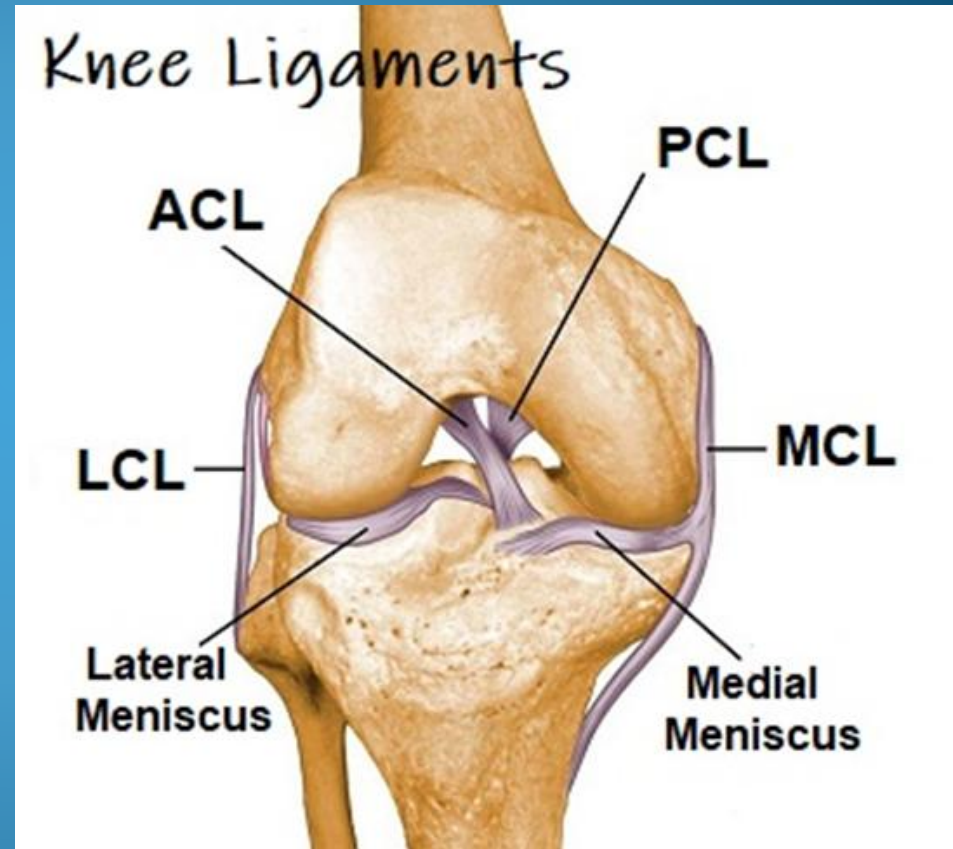
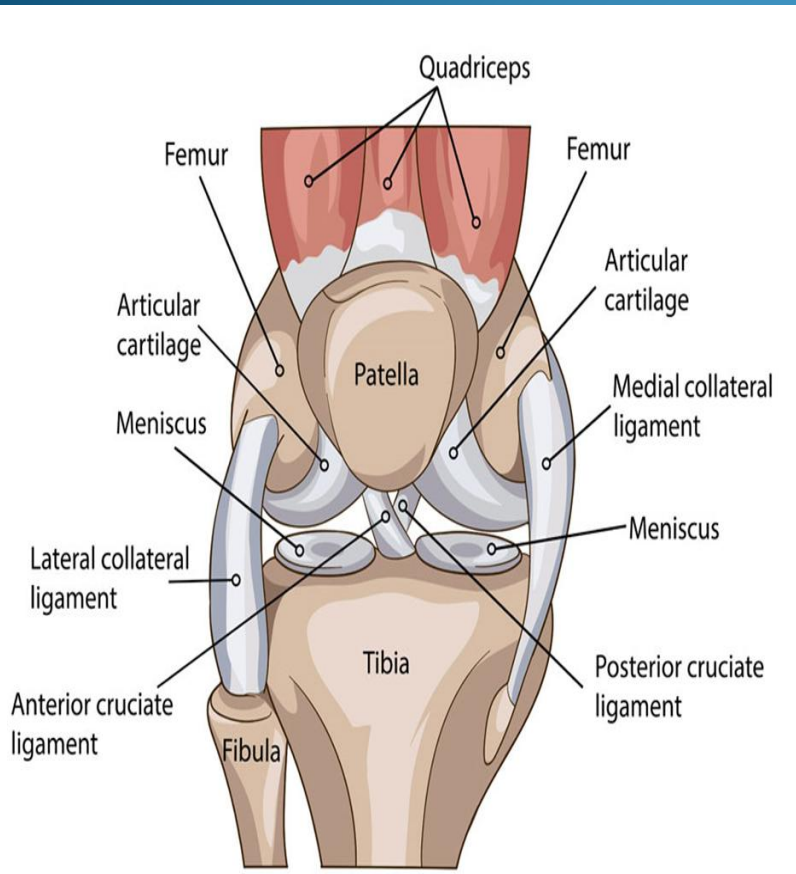


Sprain

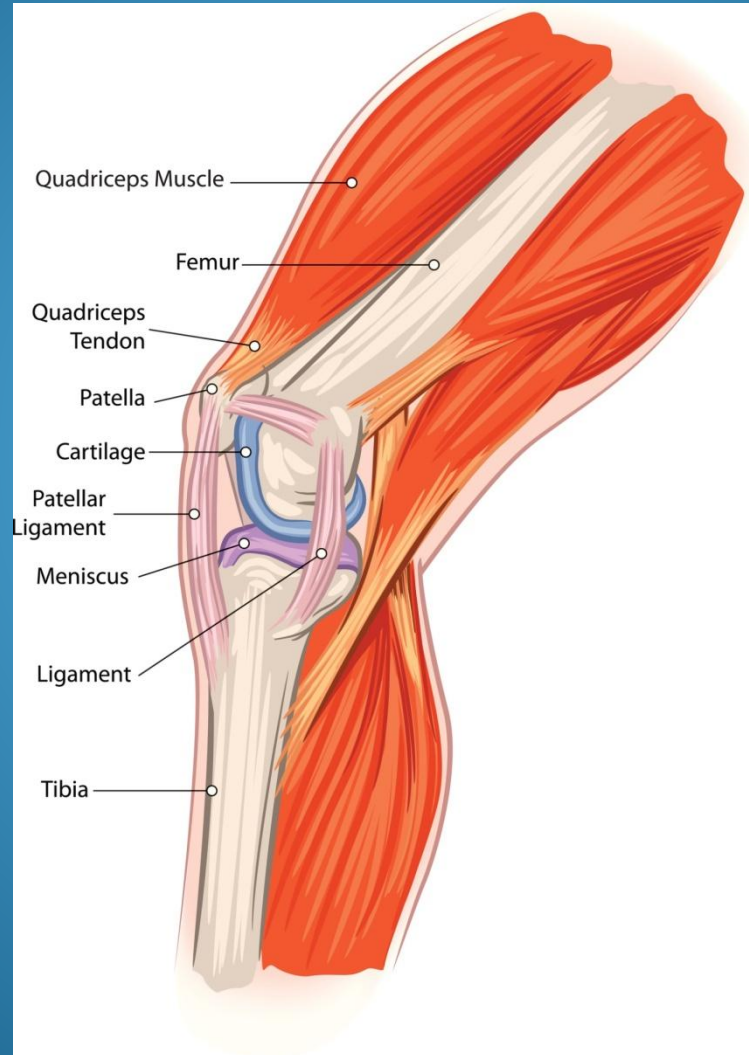
# Strain

- Strain is a twist, pull or tear of muscles or tendon (a cord of tissue that connect the muscle to bone).
- It is also an acute, non-contact injury that results from over stretching or over contraction.
- Sometimes, a muscle would contract and generate a force that is significantly higher than what is usually does. The forceful contraction rapidly pulls the muscle- tendon unit, which can result to a muscle strain.
- The most common strains are located in lower limbs, such as the hamstring calf muscle.
- An individual who suffers a strain will feel a sudden sharp pain at the muscle belly. The muscle will be painful to touch and movement will be weak.
- The healing process usually take six to eight weeks.

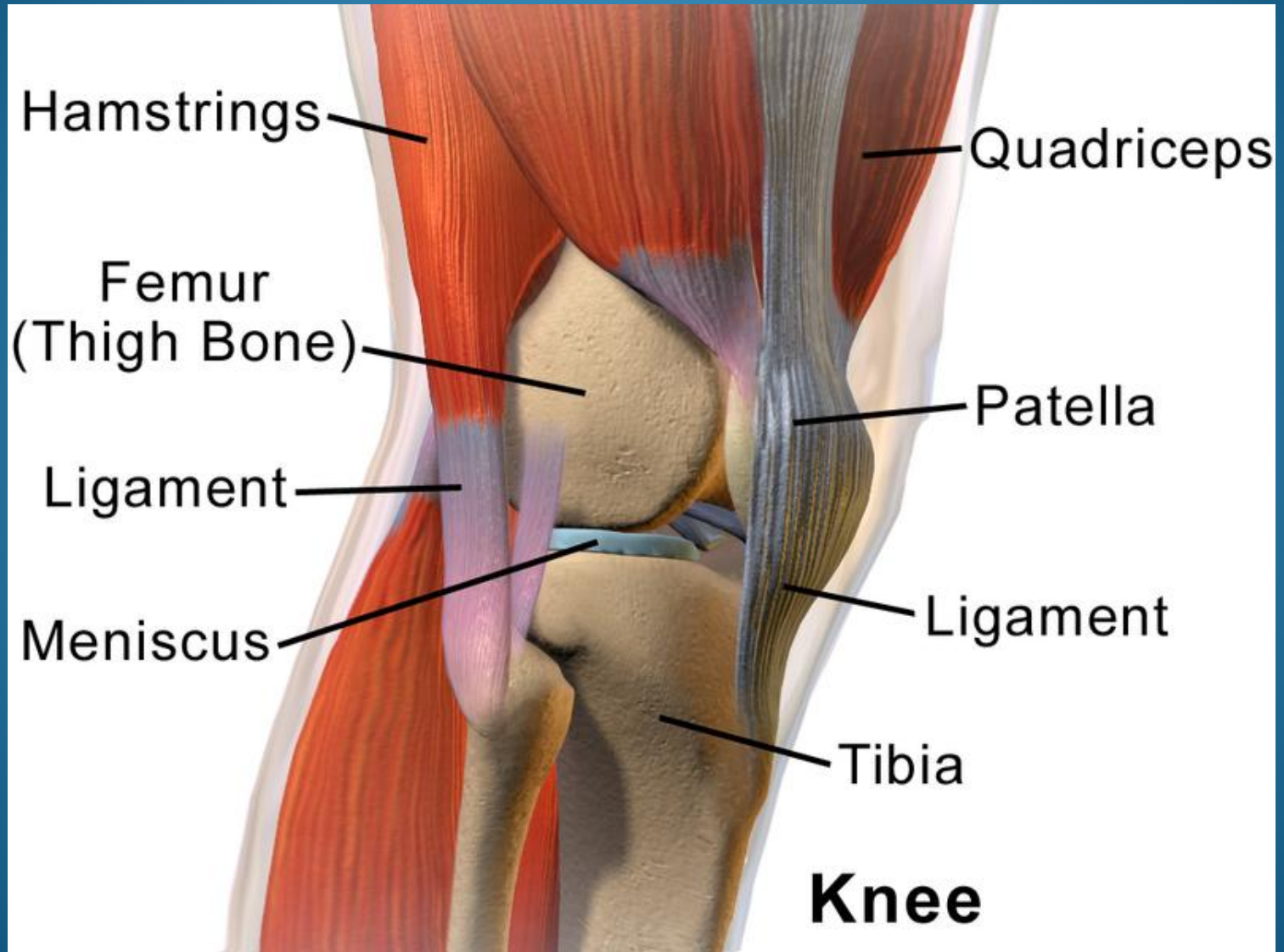
# Structures of Knee Joint



# Muscles of Knee Joint



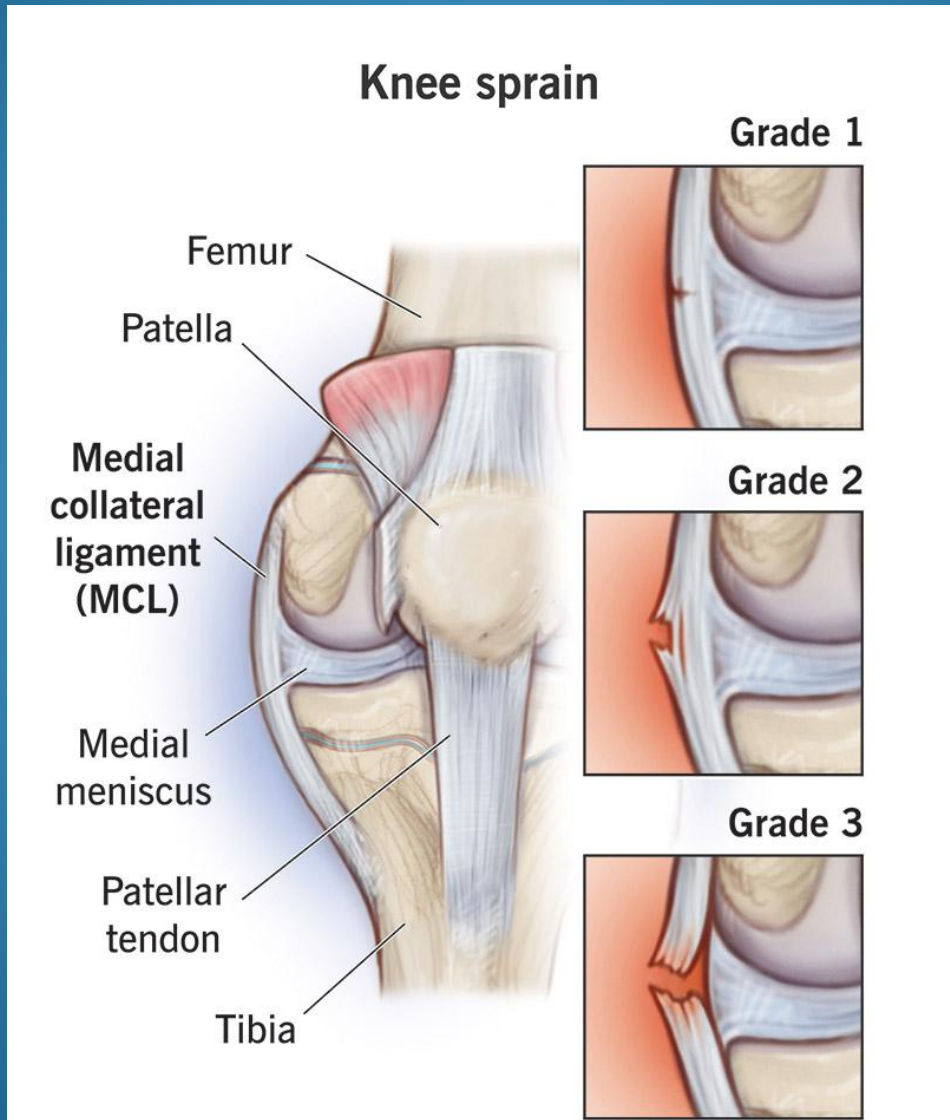
# Muscles of Knee Joint



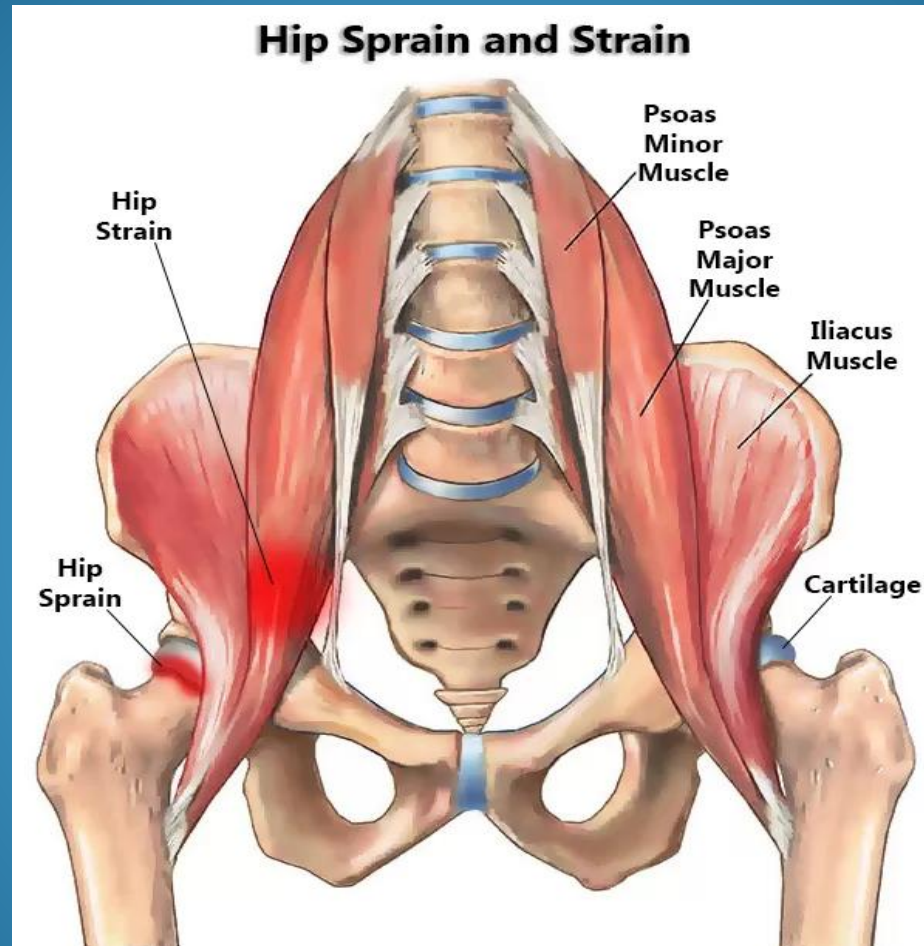
# Knee Joint Sprain



# Knee Joint Sprain



# Strain vs Sprain



Hip Joint Sprain and Strain

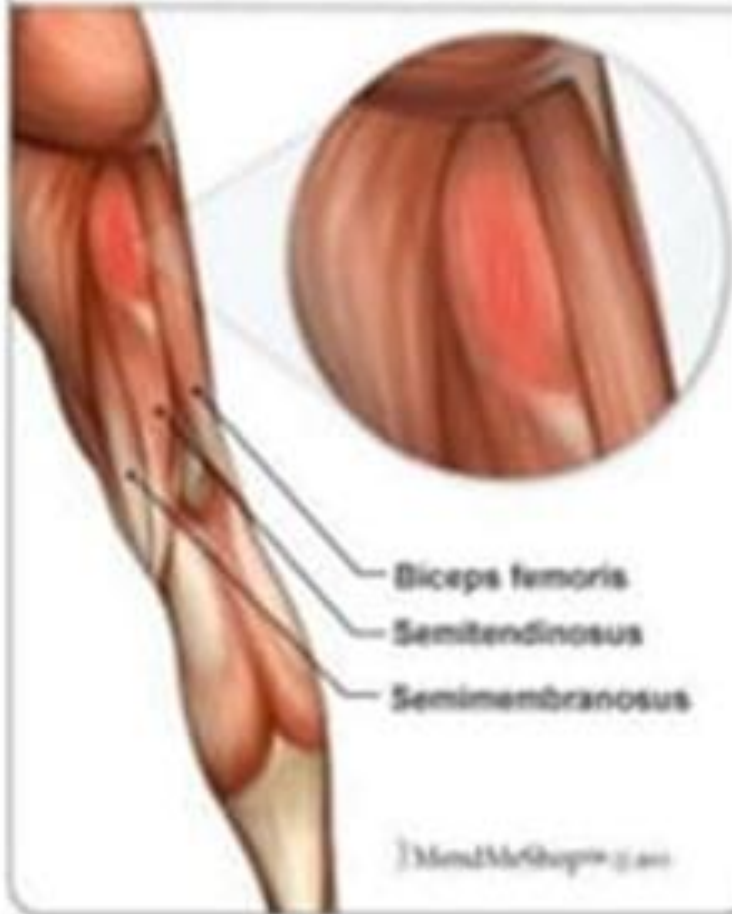
# Strain



# Strain

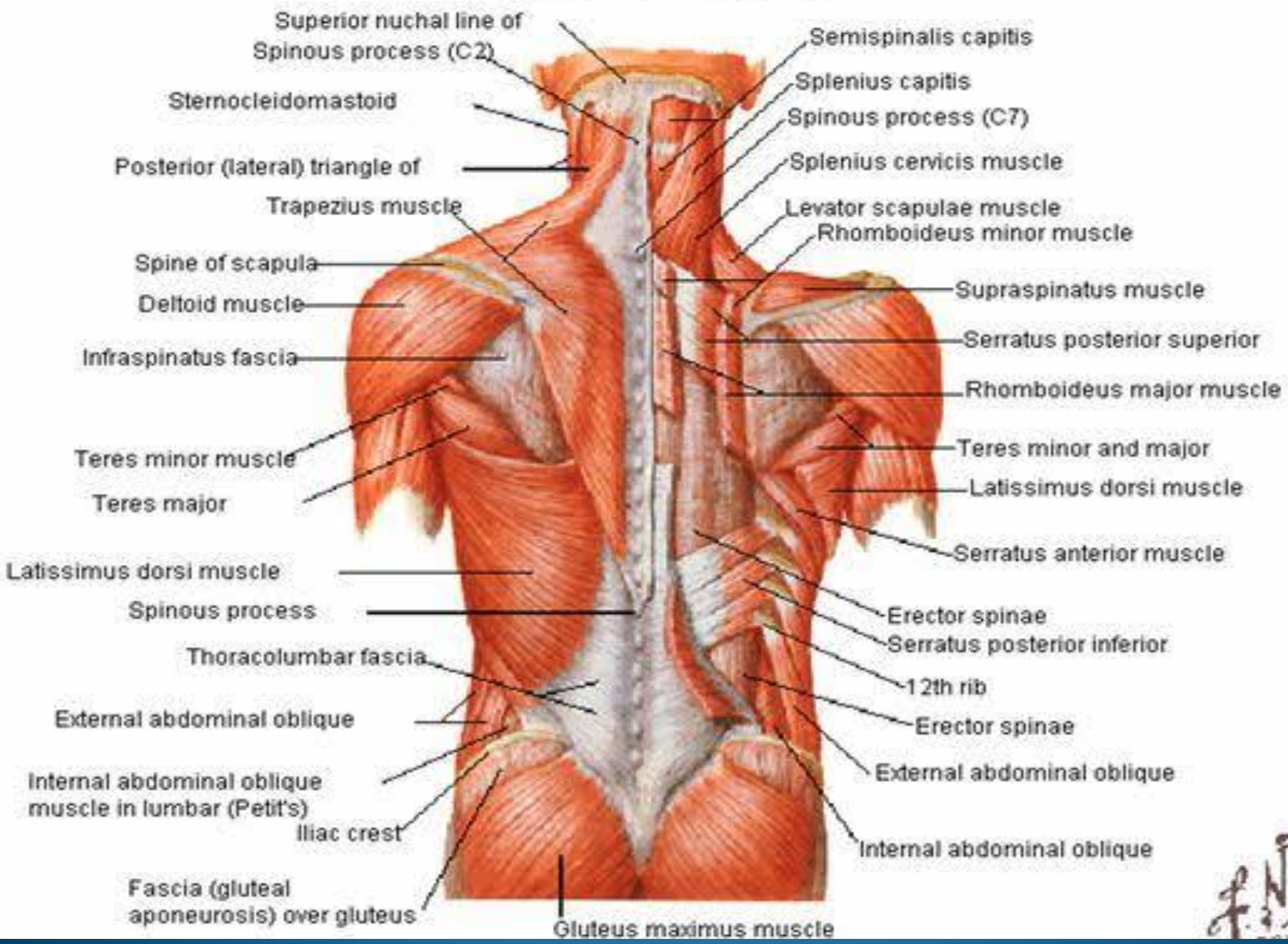


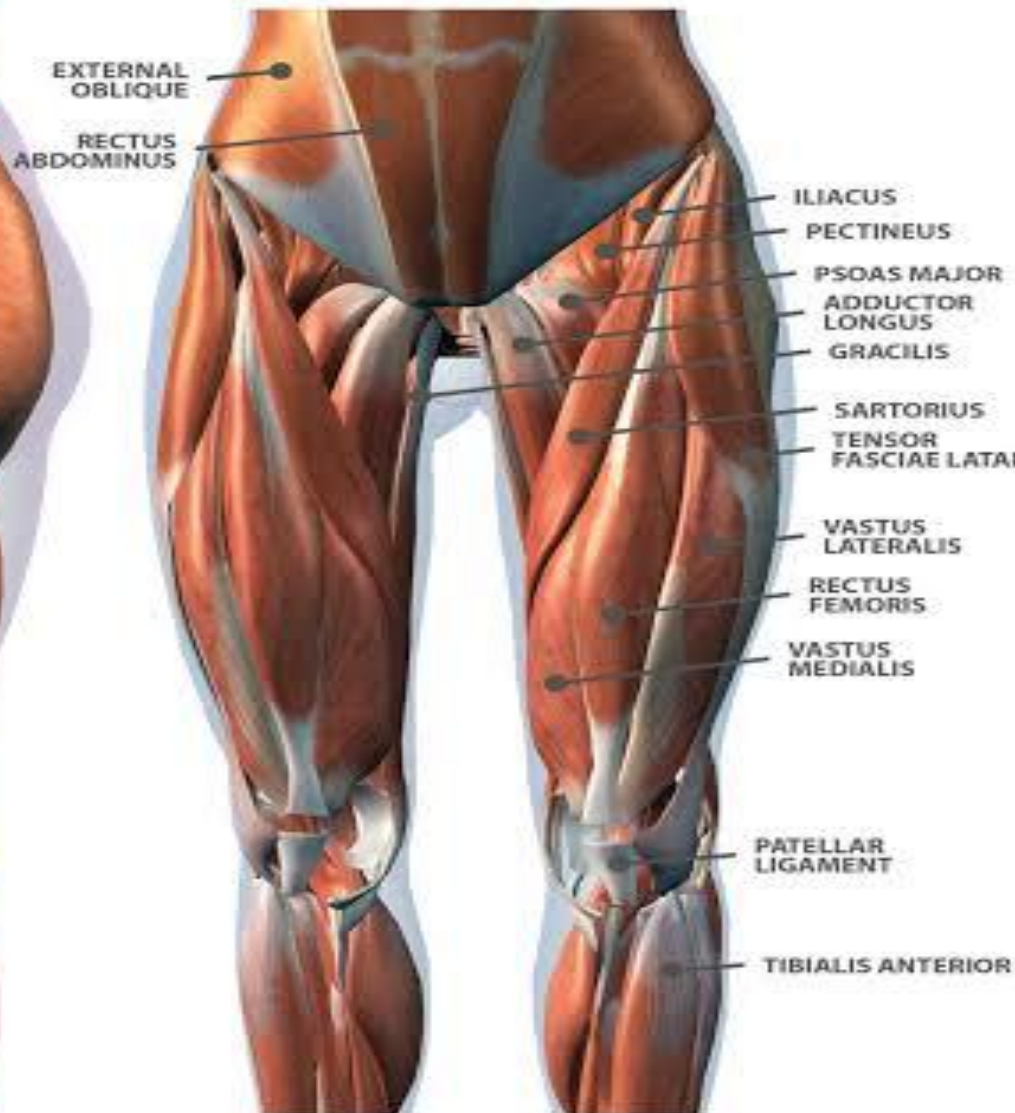
# Hamstring Strain



# Muscles of Back

## Superficial Layers





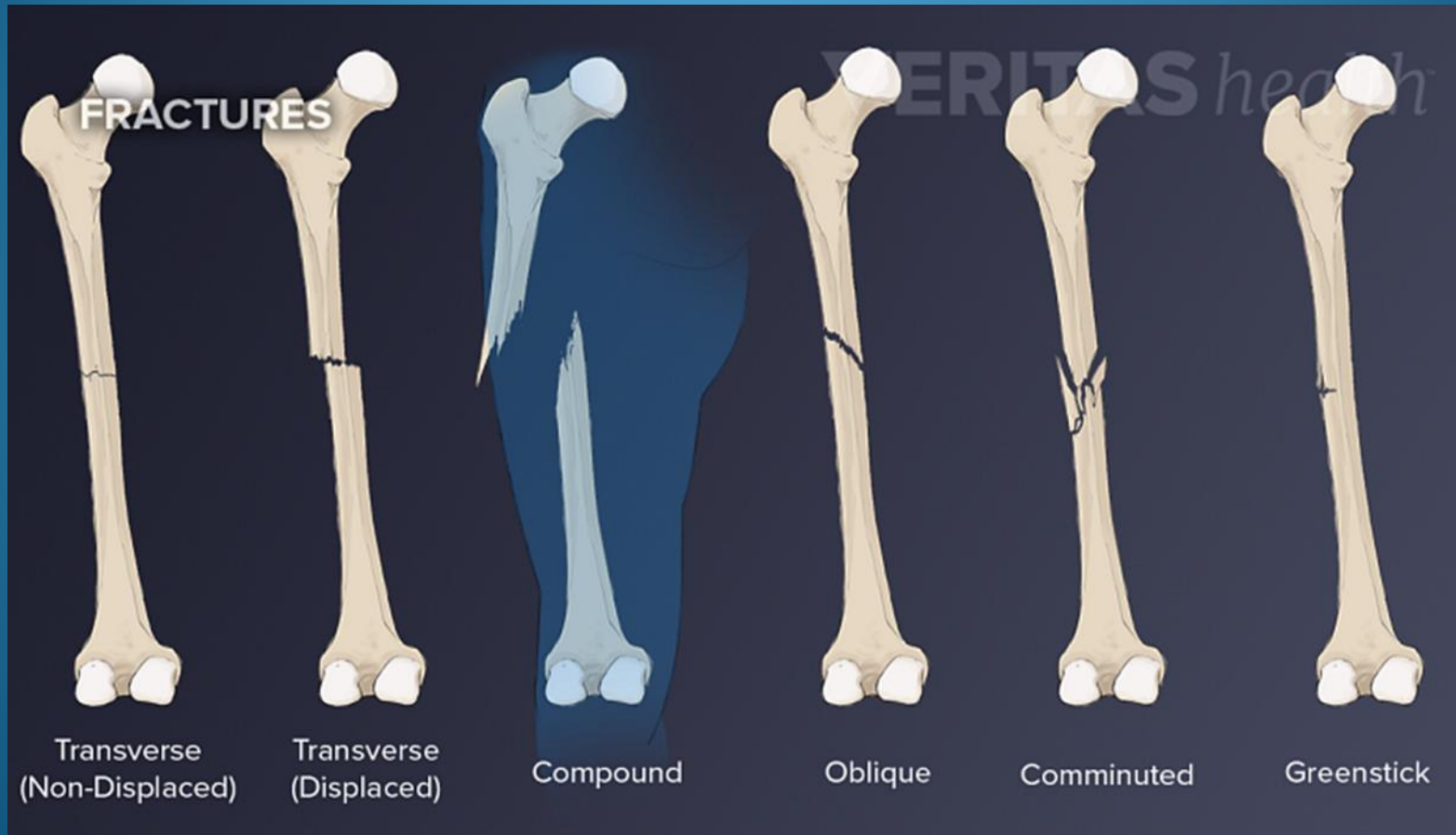
# ANATOMY OF THE HIP

# Fracture

- A fracture is a broken bone.
- The most common fractures are located at the upper limbs such as the hand and forearm.
- Fractures are common in growing bones because it is less dense.
- There are also a higher number of fractures in the upper extremities because it is not as strong as the bones of lower extremities.
- Fractures in the upper limb occur when individuals support their weight using their hands when they fall or slip.
- There are different types of fractures and the healing period is between three weeks to several months , depending on the severity of the injury.
- It is normally treated with immobilization by attaching a fixation or cast.



# Types of Fractures



# DISLOCATION

- Dislocation commonly occur in joints that allows greater range in motion.
- The most common dislocation are located at the upper limbs such as the elbows and shoulders. These joints are commonly affected when an individual uses his/her hand to support his/her weight when he/she falls.
- When the bone is pushed out of the proper alignment, the injury will cause a deformity and constant pain.
- The individual will not be able to move the affected limb. The pain will be relieved once the bone is repositioned.

# DISLOCATION

- Dislocation commonly occur in joints that allows greater range in motion.
- The most common dislocation are located at the upper limbs such as the elbows and shoulders. These joints are commonly affected when an individual uses his/her hand to support his/her weight when he/she falls.
- When the bone is pushed out of the proper alignment, the injury will cause a deformity and constant pain.
- The individual will not be able to move the affected limb. The pain will be relieved once the bone is repositioned.



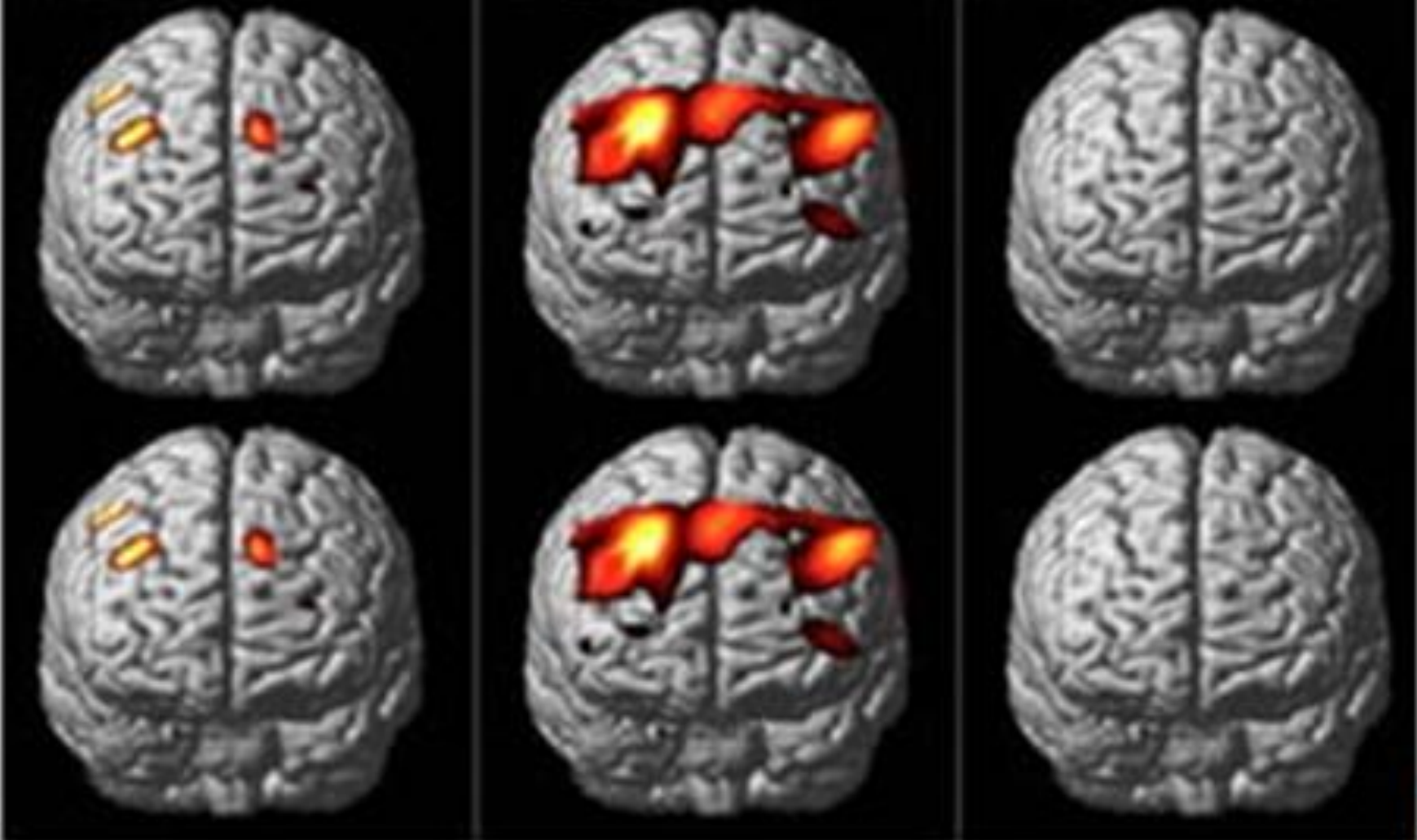
# Concussion

- Concussion are life threatening injuries because they disrupt the normal function of the brain.
- A severe blow to the head could cause blood vessels in the brain to rupture. As the blood leaks out of the ruptured blood vessels, it will accumulate inside the skull. As the blood increases, the pressure inside the skull starts to build up. The accumulated blood will put pressure on the brain, blocking the blood supply to different areas of the brain.
- If the condition is not resolved immediately, the brain starts to die.
- It is important for the individual to go to a medical facility as soon as possible so the injury will not worsen.

Before concussion

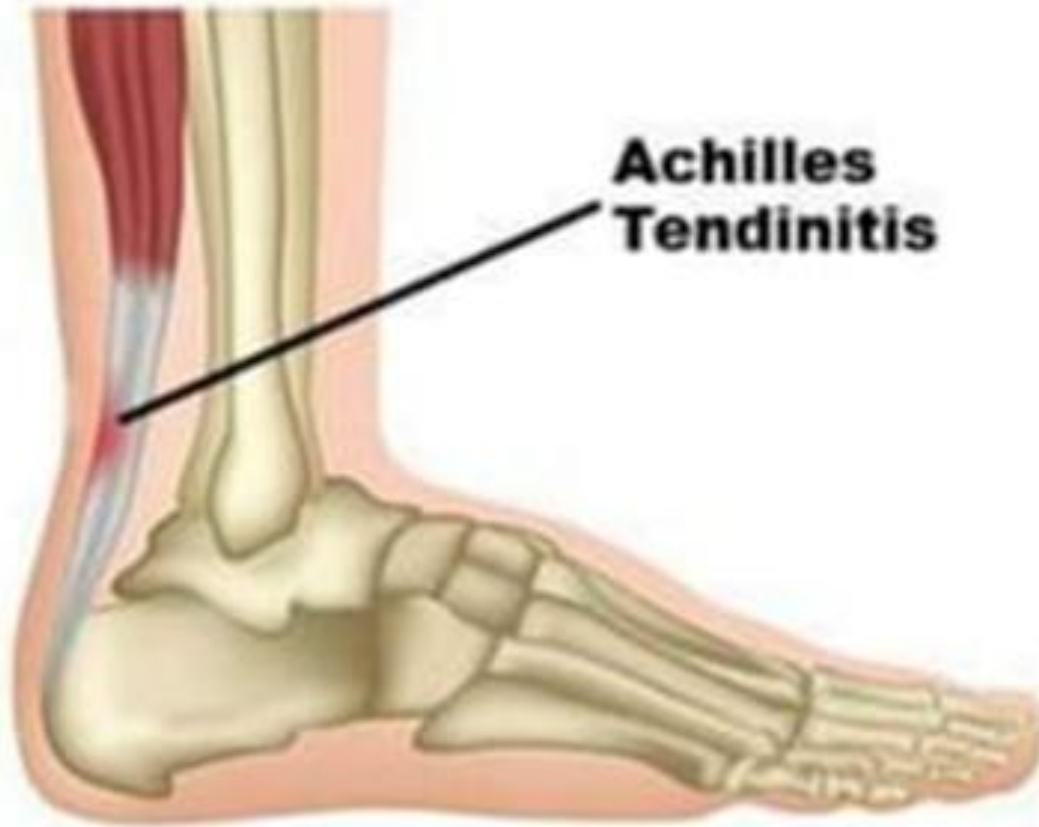
During concussion

4 weeks after concussion



# TENDINOPATHY/TENDINITIS

- The most common overuse injury in sports involves the muscle – tendon unit called tendinopathy or **tendinitis**.
- It is usually due to muscle imbalance between muscle pairs.
- The most common site of tendinitis in the upper limb involves the muscle – tendon units around the elbow (i.e. golfer's elbow, tennis elbow).
- The pain usually eases during activity but will worsen after playing.
- The individual should maintain fitness but avoid activities that utilize the injured muscle – tendon unit.
- The recovery period usually takes three weeks to several months.



**Achilles  
Tendinitis**

# OSTEOARTHRITIS

- Osteoarthritis is the wear and tear of a joint that results to its **deterioration**.
- The friction deteriorates the **cartilage** that protects the bones from rubbing against each other. The knee joint is the common site for the degenerative changes that occur in the cartilage.
- An individual feels pain and a grinding sensation as it worsens. The condition further aggravates when the individual is **overweight or obese**.
- The recovery period takes several months because of poor blood supply to the area. In severe cases, doctors may recommend surgery to replace the joint.



# BURSITIS

- The bursa is a sac – like musculoskeletal structure that provides support and cushioning to the joint. It protects commonly used joints such as the shoulders and knee from repetitive mechanical stress.
- This injury is common in **swimmers and runners**.
- The inflammation of the bursa interrupts the surrounding structures, causing pain during movement.
- The recovery period usually takes two weeks to a month.



© Healthwise Incorporated

# HARD & SOFT TISSUE INJURIES



Hard tissue injuries  
are bone injuries.



Soft tissue injuries involve  
damage to skin, muscles,  
tendons, ligaments or cartilage.

# DEHYDRATION

- When we exercise, especially in hot conditions, the body loses water as a result of sweating.
- If the performer does not re-hydrate by drinking lots of water, they may suffer from dehydration.



# UNCONSCIOUSNESS

Concussion is a common cause of unconsciousness while playing sport.

*Common causes:*

1. Fainting
2. Head injury
3. Heart attack or stroke
4. Asphyxia
5. Shock



# Managing an Unconscious Patient

## D.R.A.B.C. MANAGEMENT



**DANGER**

**RESPONSE**

**AIRWAY**

**BREATHING**

**CIRCULATION**

# INJURY DIAGNOSIS

TALK

OBSERVE

TOUCH

ACTIVE MOVEMENTS

PASSIVE MOVEMENTS

SKILLS TEST



# R.I.C.E. MANAGEMENT

**REST**



**ICE**



**COMPRESSION**



**ELEVATION**



**NO H.A.R.M.**



# Factors in the prevention of sports injuries

- Warm up
- Stretching
- Taping and Bracing
- Protective Equipment
- Suitable Equipment
- Environmental factors
- Appropriate Training
- Psychology
- Nutrition

## Warm Up

- Decreased number of injuries due to increased range of motion (ROM)
- Decreased stiffness of connective tissue leading to decreased likelihood of tears
- Increased cardiovascular response to sudden strenuous exercise
- Decreased sensitivity of muscle stretch

# Stretching

- Basic principles of stretching :
  - warm up prior to stretching
  - stretch before and after exercise/sport
  - stretch gently and slowly
  - stretch to the point of tension but not pain

# Stretching

- Types of stretching :
  - Static stretching
  - Ballistic stretching
  - Proprioceptive neuromuscular facilitation stretching

# Stretching

- **Static stretching:**
  - the stretch position is assumed slowly and gently held for 30-60 sec and relaxed
  - the athlete should not experience any discomfort.
  - Static stretching produces least amount of stretch and is the safest method to increase flexibility.

# Stretching

- **Ballistic stretching:**
  - the muscle is stretched to near its limit, then stretched further with a bouncing movement.
  - stretching a muscle against increased tension heightens the chances of injury, hence not commonly used
  - it is particularly used in gymnastics ballet and dance under appropriate training where maximum ROM is advantageous

# Stretching

## Proprioceptive Neuromuscular Facilitation Stretching(PNF) :

- Performed by alternating contraction and relaxation of both agonist and antagonist muscles
- PNF stretching may produce greater flexibility than other stretching techniques
- Major disadvantage is tendency to overstretch
- Performed under supervision.

## Stretching



Pectoralis stretch



Wrist stretch



Upper trapezius stretch



Standing hamstring stretch



Quadriceps stretch



Standing calf stretch



Hip flexor stretch



Piriformis stretch



Hip adductor stretch



Trunk rotation



Double knee to chest

## Nutrition

- Inadequate repletion of glycogen occurs due to undernutrition causes a reliance on fat and protein stores resulting in protein breakdown which in turn leads to soft tissue injury.
- Intense training causes skeletal muscle breakdown which is exacerbated by inadequate protein intake.
- Inadequate hydration may compromise blood flow to working muscles increasing susceptibility to injury.
- Inadequate intake of micronutrients like calcium, phosphorus result in altered bone metabolism resulting in injury.

## Warm Up

The possible benefits of warm up include :

- Increased blood flow to muscles
- Increased delivery of oxygen to muscles due to increased break down of oxyhemoglobin
- Decreased vascular resistance
- Reduced muscle viscosity leading to smoother muscle contraction
- Increased speed of nerve impulses
- Enhanced metabolism

# Tips to prevent sports injury

- Listen to your body or fuel the body.
- Stay hydrated.
- Warm up and Cool down. Every workout should begin with a warm up and end with a cool down period. ...
- Stretch. Dynamic stretches before and after you work out. ...
- Play smartly but not hard
- Limit repetitive movements. Inhibit Overuse
- Take pain seriously. Muscle fatigue is real
- Use the right dress and equipment.
- Have fun, reduce emotional stress and be relaxed
- Proper Rest. ...
-

# Technique of Brisk Walking



CHECK YOUR  
BODY POSTURE

PHYSICAL ACTIVITY



WRONG AND CORRECT WALKING POSTURE



STRAIGHT HEAD

COMPACT ARM SWING

BALANCED FORWARD

CADENCE TARGET  
100 STEPS/MIN

BENT KNEE

MID-FOOT  
STRIKE



WRONG AND CORRECT RUNNING POSTURE

# Technique of Brisk Walking

- Swing your arms.
- Keep your head up.
- Back straight and abdomen flat.
- Point your toes straight ahead.
- What are the 4 steps to a great walking technique?
- Bend your elbows 90 degrees.
- Partially close your hands, but do not clench them.
- With each step, the arm opposite your forward foot comes straight forward, not diagonally.
- As the forward foot goes back, the opposite arm comes straight back



# Technique of Walking

- Hold your head high and your chin parallel to the ground, looking forward, not down.
- Keep your neck, shoulders and back relaxed, engaging your abdominal muscles. ...
- Swing your arms loosely and freely with a slight bend in your elbows.
- Walk steadily, rolling your foot from heel to toe.
- What are the rules for brisk walking?
- Brisk walking at a rate of 50-70% of your maximum heart rate, can be beneficial to your health. Calculate your maximum heart rate by subtracting your age from 220 beats per minute (bpm).



# Technique of Walking

- Start slowly in order to warm up, and cool down by slowing down.
- Keep the shoulders down and relaxed while maintaining a long, straight back.
- Roll the foot forward from the heel.
- Gradually start including hills into your walking routes.
- What is the best time for a brisk walk?

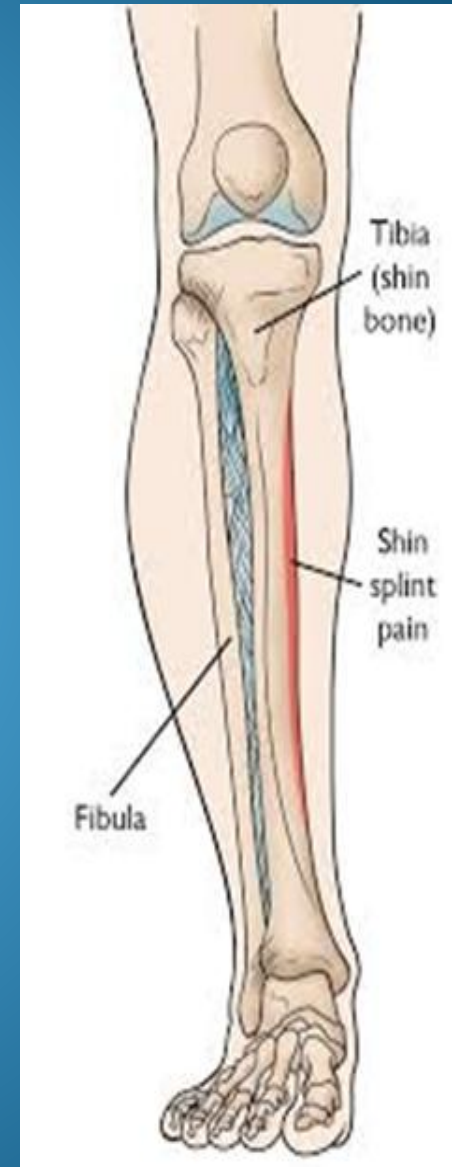
# Preventions

- Proper warm-up
- Reduce sports related emotional stress.
- Using proper equipment
- Stop when fatigue

“Muscle fatigue takes away all your protective mechanisms and really increases your risk of all injuries.” You can always come out to play again next weekend — if you don't get injured today.

# Shin splint

Shin splints refer to the pain and tenderness along or just behind the large bone in the lower leg. Shin splints develop when the muscle and bone tissue (periosteum) in the leg become overworked by repetitive activity. Shin splints often occur after sudden changes in physical activity



# Treatment

- The treatment for an any ankle sprain is Rest, Ice, Elevation and Compression. The goal is to limit internal bleeding and cut down on swelling.

# Management and Treatment of shin splint

- **Rest:** Take a break from sports, running and other activities to give your muscles and bones a chance to recover. You may need to rest and take it easy for a few weeks or longer.
- **Ice:** Apply a cold compress to your shins every 10 to 20 minutes, three to four times a day, for a few days. Ice helps relieve the swelling and pain of shin splints.
- **Pain relievers:** Over-the-counter (OTC) nonsteroidal anti-inflammatory drugs (NSAIDs) can ease pain and swelling.
- **Supplements:** A vitamin D3 supplement (1000 to 2000 IU daily) may help. Discuss supplements with your healthcare provider.

# Management and Treatment of shin splint

- Shin splint stretches: Gently stretching and flexing your lower leg muscles may be helpful.
- Slow increase in activity level: When you do become active again, start slowly. Increase your activities gradually to reduce the risk of shin splints returning.
- Supportive shoes and shoe inserts: For people who have flat feet, shoe inserts (orthotics) can be effective at relieving the pain of shin splints. Orthotics support your arches and reduce stress on the muscles and bones in your lower legs.
- Physical therapy: Physical therapy can help you get moving again by strengthening your legs and reducing your chance of repeated injury.

- **Tendinitis:** Tendinitis occurs when your tissues that connect muscles to bones (tendons) become swollen and inflamed. It's caused by repetitive movements over time. An example is jumper's knee (patellar tendonitis).
- **Sprains:** A sprain happens when a ligament stretches too much or tears. Ligaments connect bones and stabilize joints. These injuries can be mild or severe, and they're common in your ankle, knee and wrist.
- **Strains:** A strain occurs when you overextend a muscle and it stretches or tears. Examples include hamstring strain, back strain and abdominal strain.

# Tibial Compound Fracture



# Treatment

Sports injuries can be treated and managed by using the P.R.I.C.E.S... DR. ABC, and T.O.T.A.P.S regimes:

- **P** – Protect
- **R** – Rest
- **I** – Ice
- **C** – Compression
- **E** – Elevation
- **S** – Stabilize

# Common Sports Injuries

- Sprains and strains.
- Knee injuries.
- Swollen muscles.
- Achilles tendon injuries.
- Pain along the shin bone.
- Rotator cuff injuries.
- Fractures (broken bones)
- Dislocations.

## • **4 steps to sports injury prevention**

- Listen to your body.
- Stay hydrated.
- Use the right equipment.
- Have fun, reduce emotional stress.

# ADDITIONAL TIPS

- Drink enough water based on activity and temperature levels
- Educate athletes on proper nutrition for performance
- Supervise equipment maintenance
- Encourage athletes to speak with an athletic trainer, coach or physician if they are having any pain.



# ADDITIONAL TIPS

- Enforcing warm-up and cool down routines
- Encouraging proper strength training routines
- Mandating pre-competition physical exams



Sport is friendship ;  
Sport is health,  
Sport is education,  
Sport is life,  
Sport brings the world together.

Juan Antonio Samaranch  
1996 Olympic Games Opening Ceremony

# OPEN INJURIES



Cuts require immediate attention to stop bleeding and allow the blood to clot.



Grazes or abrasions where skin is scraped off the body, need to be cleaned carefully.