



Injury Prevention

Martin - PAF 30M

Page 16



The 6 factors affecting our well-being:

MENTAL	EMOTIONAL	SOCIAL
Knowing our interests Learning new things Taking responsibility Making good decisions Setting & achieving goals	Expressing feelings positively Dealing with stress, anger & other emotions healthily Respecting yourself	Respecting others Accepting differences Giving & asking for support Listening & bettering communication
SPIRITUAL	PHYSICAL	ENVIRONMENTAL
Connected w/self & world Sense of peace Awareness of purpose Unconditional Love Making a difference	Eating healthily Exercising Getting enough sleep Caring for our bodies Avoiding "risky" behaviors	Our relationship with surroundings... Air, water, land, scenery, noise, etc. Taking care of our world

What
you ca

Most Common Sports Injuries

Shin Splints

Ankle Sprains

Hamstring Strain

Dislocated Shoulder

ACL Tear

Groin Pull

Tennis Elbow

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Anatomy and Physiology: (page 17)

- Anatomy describes body of any living thing
- Physiology describes how various body parts and work together

Anatom

- Per
- toes
- Fee
- side
- Pal

The standard position

The body is directly facing the observer: feet apart, palms full forward. This is called the "standard anatomical position."



and

to the

Positions and Relationships: (page 19 textbook)

- Anterior/Posterior (Towards front/back)
- Superior/Inferior (Higher/lower)
- Medial/Lateral (Towards/away from midline)
- Proximal/Distal (Closer/further from attachment to body)

Example Questions:

The wrist is _____ to the shoulder.

The thumb is _____ to the baby finger.

The pectorals are _____ to the lats.

The skull is _____ to the knees.

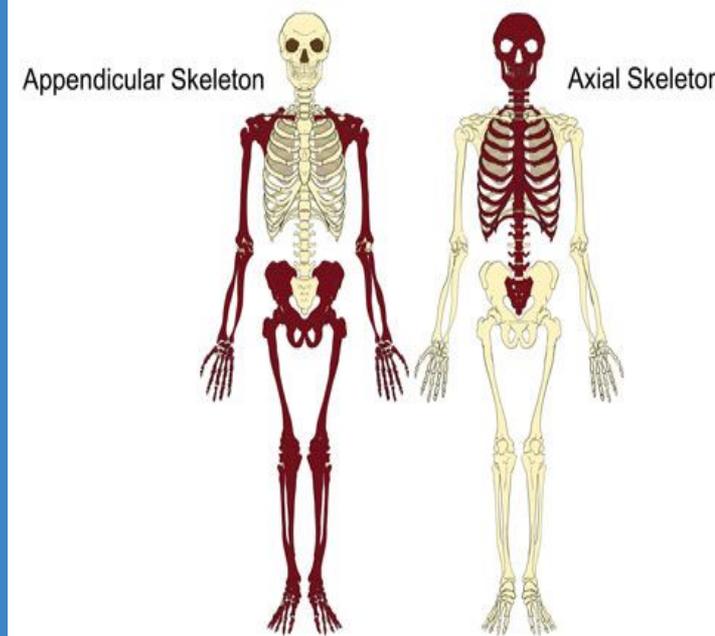
The Skeletal System: (page 22)

Axial skeleton - 80 bones

Skull, spinal column, sternum,
rib cage, and sacrum

Appendicular skeleton - 126 bones

Arms, shoulder blades, forearms,
hands, pelvic girdle, legs, and feet.



Types of Bones: (page 22)

1. Long Bones - arms and legs ex. Femur
2. Flat Bones - roof of skull ex. Frontal bone
3. Irregular Bones - spine ex. Vertebrae
4. Sesamoid Bones - in tendons ex. Patella
5. Short Bones - wrist/ankle ex. Carpal Bones

Turn to pages 24 & 25

Take a photo of both pages. Please memorize the labels for the test. You may also use your previous quiz from earlier in the year to help prepare for the test.

Break - Take 3 minutes

Review: How much do you remember? (You may use your notes to help you answer)

Name 3 of the most common sports injuries.

Review: How much do you remember? (You may use your notes to help you answer)

Name the opposite term:

Anterior - _____

Proximal - _____

Medial - _____

Inferior - _____

Review: How much do you remember? (You may use your notes to help you answer)

Using pages 24 & 25 find a new example for each type of bone.

1. Long Bones - arms and legs ex.
2. Flat Bones - roof of skull ex.
3. Irregular Bones - spine ex.
4. Sesamoid Bones - in tendons ex.
5. Short Bones - wrist/ankle ex.

Review: How much do you remember? (You may use your notes to help you answer)

With a partner stand in the correct standard anatomical position:

-Name something that is distal to something else on your partner.

-Name something that is medial to something else on your partner.

The Muscular System: (page 26)

There are three muscle types in the body.

Smooth Muscles - Contract involuntarily and automatically. Ex. Esophagus, stomach, intestines

Cardiac Muscle - Contract involuntarily Ex. Heart

Skeletal Muscles - Contract voluntarily. Connect tendons to bones. Ex. Biceps

Turn to pages 30 & 31

Take a photo of both pages. Please memorize the labels for the test. You may also use your previous quiz from earlier in the year to help prepare for the test.

Name an exercise that is performed by the:

1. Pectorals:
2. Triceps:
3. Biceps:
4. Deltoids:
5. Latissimus Dorsi:
6. Abdominals:
7. Hamstrings:
8. Quadriceps:
9. Glutes:

Ligaments, Tendons, and Joints:

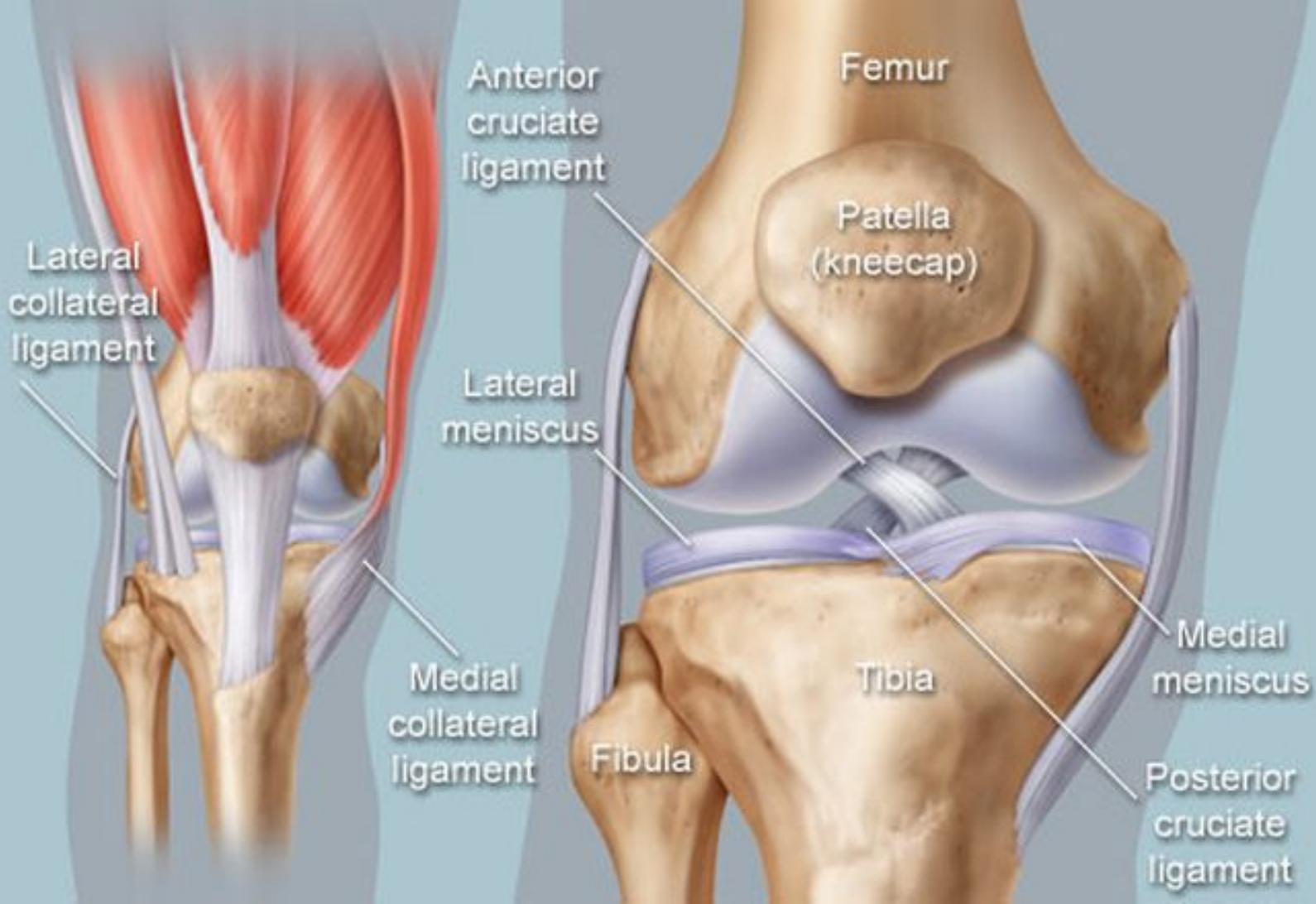
<https://www.khanacademy.org/science/health-and-medicine/human-anatomy-and-physiology/skeletal-system/v/ligaments-tendons-and-joints>

Joints: (page 32-33)

A location where two or more bones meet that include connective tissues such as ligaments, muscles, cartilage, and tendons.

Ligaments - Attach bone to bone
eg. Anterior Cruciate Ligament

Tendons - Attach bone to muscle
eg. Patellar Tendon



Types of Joints: (page 34)

1. Fibrous Joints - Immovable joints
Ex. Teeth connection to mandible (jaw)
2. Cartilaginous Joints - Slightly moveable joints
Ex. Stacked vertebrae in the spine
3. Synovial Joints - Freely moveable joints
Ex. Shoulder joint

Types of Synovial Joints: (page 35)

Ball-and-socket - Most movement Ex. Hip

Gliding - Flat or slightly curved bones Ex. Foot bones

Hinge - Convex bone fits into concave bone

Ex. Fingers

Pivot - Move on one axis Ex. Axis vertebrae (neck)

Ellipsoid - Similar to hinge but more movement

Ex. Wrist

Saddle - Similar to ellipsoid Ex. Thumb

Types of Movement at Joints: (pages 36 and 37)

Flexion/Extension - Decrease/increase joint angle

Abduction/Adduction - Away/towards body

Supination/Pronation - Palm up/down

Dorsiflexion/Plantar Flexion - Toes up/Point toes

Inversion/Eversion - Stand on outer/inner edge of foot

Internal/External Rotation - Twist body part
towards/away from midline

Circumduction - Flexion, extension, abduction, and adduction combined in one circular motion.

Types of Movement at Joints: (page 37)

Stand up and perform an example of each movement:

Flexion/Extension -

Abduction/Adduction -

Supination/Pronation -

Dorsiflexion/Plantar Flexion -

Inversion/Eversion -

Internal/External Rotation -

Circumduction -

Break - Take 3 minutes

Review: How much do you remember? (You may use your notes to help you answer)

Name the three different types of muscles.

Review: How much do you remember? (You may use your notes to help you answer)

Name an example of a ligament connecting two bones.

Review: How much do you remember? (You may use your notes to help you answer)

Name the most likely muscles used in the exercise:

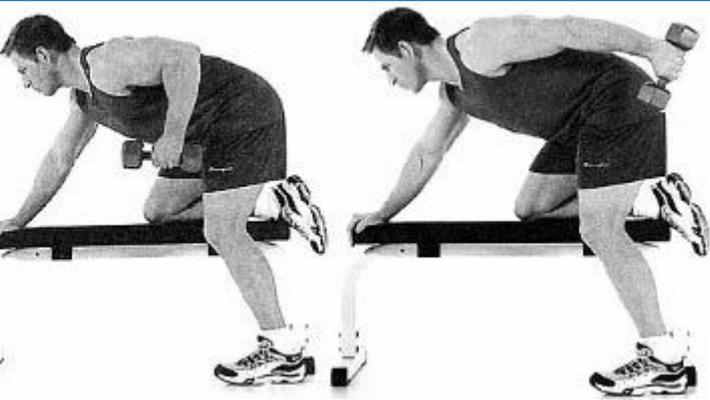
Bench Press -

Shoulder Press -

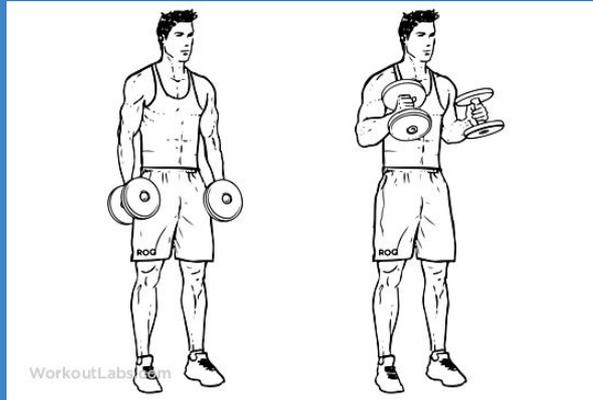
Seated Cable Rows -

Review: How much do you remember? (You may use your notes to help you answer)

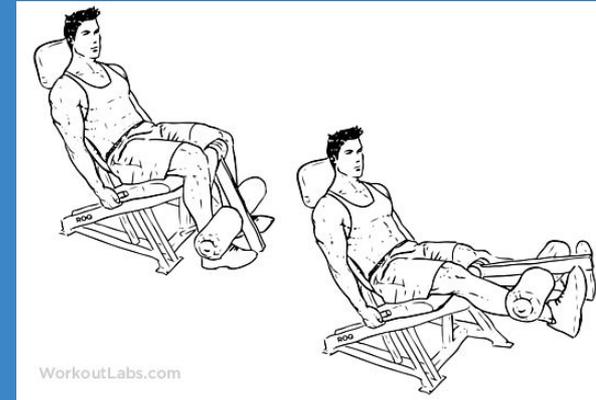
Name the most likely muscles used in the exercise:



A.



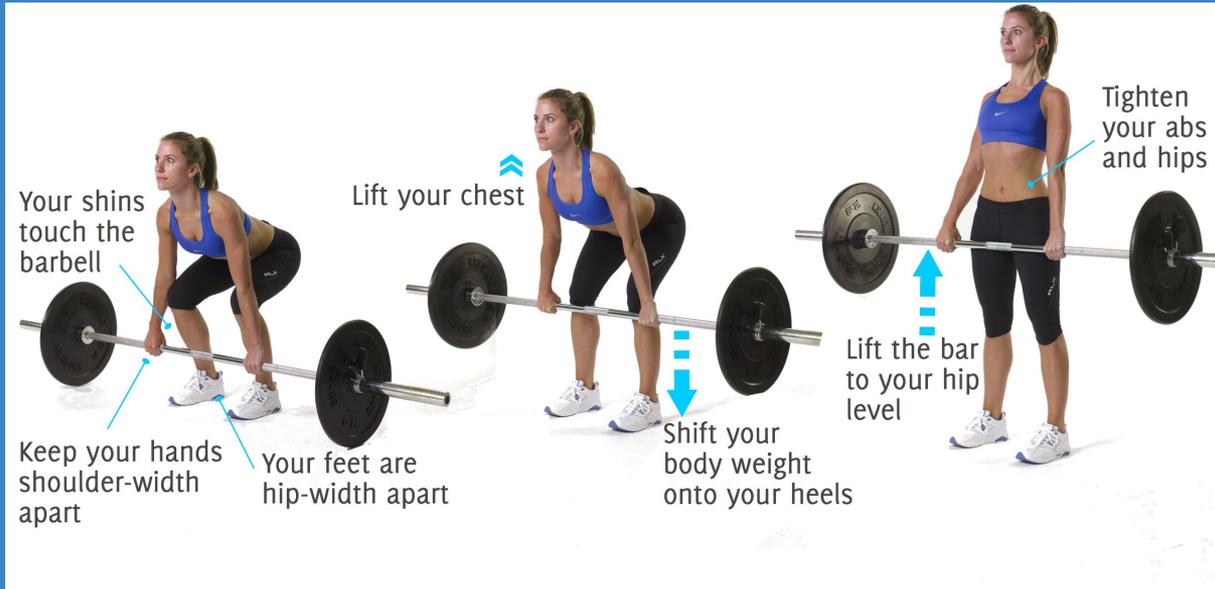
B.



C.

Review: How much do you remember? (You may use your notes to help you answer)

Name the most likely muscles used in the exercise:



Preventing Injury: (page 138-139)

Warm-up Exercises - Usually 10-15 minutes.

- Aerobic activity (ex. jogging) & dynamic stretching (ex. High knees or lunges).
- Increases blood flow to muscles and prepares joints for movement



Preventing Injury: (page 138-139)

Cool-down Exercises - Usually 5-10 minutes.

- Brief aerobic (ex. 1 lap jog) & static stretching (ex. Hamstring or butterfly stretch).
- Brings body to resting state and helps remove lactic acid and carbon dioxide



Delayed Onset Muscle Soreness (DOMS): (pg 140)

- Occurs between 24-48 hours after working out
- A result of micro-tears to deep **muscle fibres**
- Considered a minor injury. Often when starting a new exercise or getting back into it

Generally pain goes away after 2-5 days. Can include swelling of the muscle. Try to reduce activity that uses this muscle group. Can be minimized by performing warm-up and cool-down, as well as consistent training.

Muscle & Tendon Strain or Tear: (pg 140)

- Twisting or pulling **muscle or tendon** resulting in pain or swelling (ex. 'Pulled' hamstring or groin)

Acute Strain: sudden occurrence from impact or improper weight lifting

Chronic Strain: occur over extended period of time from repetitive overuse and not enough rest.

1st Degree - least severe (1-3 days to heal)

2nd Degree - more severe (physiotherapy)

3rd Degree - most severe (surgery or rehabilitation and may take 6-12 months to recover)

Tendonitis: (page 141)

- Inflammation of a tendon caused by irritation due to prolonged or abnormal use
- Tends to be a nagging injury that reoccurs

Ex. Tennis Elbow or Achilles Tendonitis



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Muscle & Tendon Injury Recovery: (pages 140-141)

Diagnosing:

S - swelling of affected area

H - heat or increased temperature of area

A - altered joint (joint does not function properly)

R - redness

P - painful to move or touch

Muscle & Tendon Injury Recovery: (pages 140-141)

Recovery within first 24 hours:

R - rest

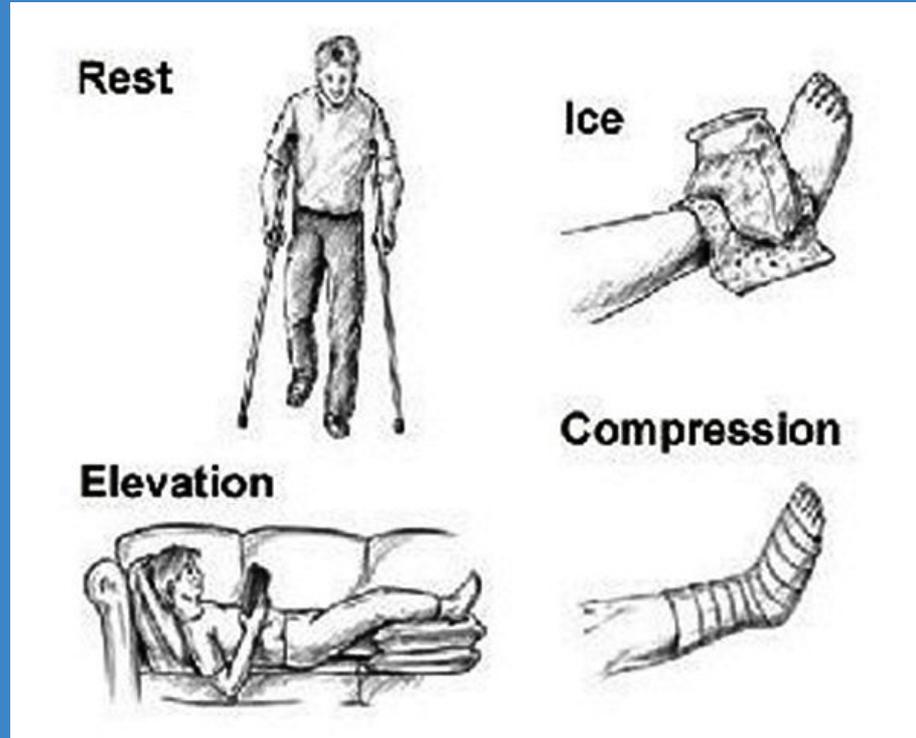
I - ice wrapped in paper towel with pressure

C - compression or tensor

E - elevate while icing and pressure

Muscle & Tendon Injury Recovery: (pages 140-141)

Recovery within first 24 hours:



Break - Take 3 minutes

Turn to page 151. Answer questions 1 and 2 in your notes.

Ligament & Joint Injury Recovery: (page 142)

Ligaments are inflexible when they are pulled or twisted they tend to tear.

A **sprain** occurs when a ligament is overstretched or torn. (Ex. Torn ACL)

1st degree sprain - relatively easy treatment

2nd degree sprain - larger tear and more treatment

3rd degree sprain - require surgery to repair a fully torn ligament

Ligament & Joint Injury Recovery: (page 142)

1st and 2nd degree tears:

R.I.C.E. for first 24 hours.

Recovery in the next days and weeks:

M - mobilization

I - ice - more specifically hydrotherapy

C - compression

E - elevation



Ligament & Joint Injury Recovery: (page 142)

Example H.E.M. ankle rehab system

- A. Alternating 1 minute hot and 1 minute cold ankle baths for 14 minutes. (Contrast hydrotherapy circulation 'pump')



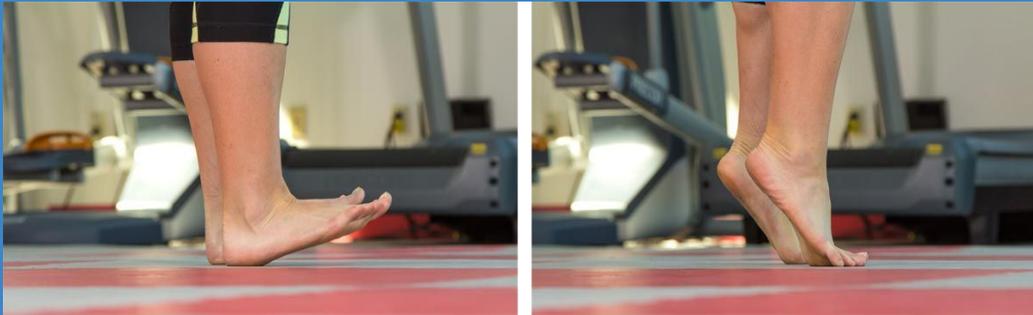
Ligament & Joint Injury Recovery: (page 142)

Example H.E.M. ankle rehab system

B. Mobility exercises (ex. ankle rotations)



C. Strength exercises (ex. calf raises)



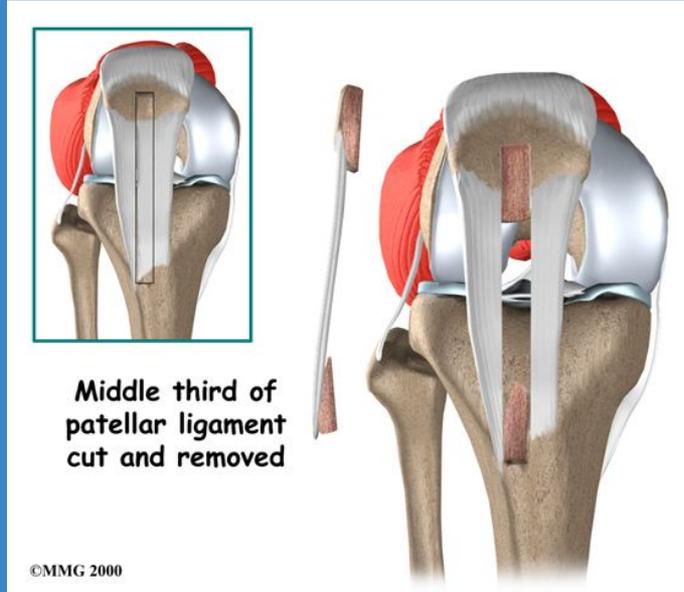
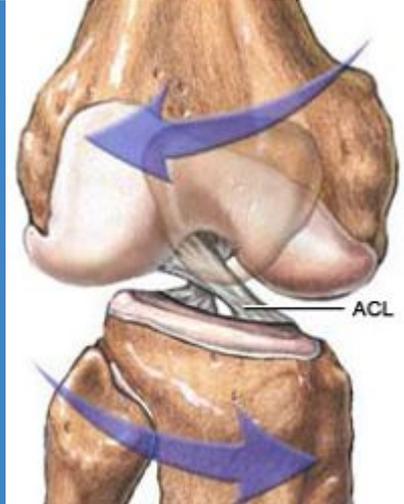
Ligament & Joint Injury Recovery: (page 142)

NBA ACL injuries:

https://www.youtube.com/watch?v=Qsb17G_ASqo

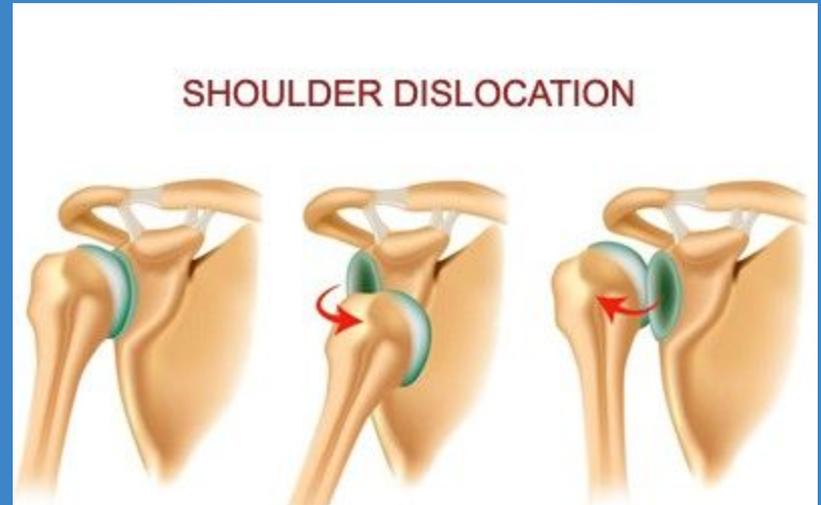
Ligament & Joint Injury Recovery: (page 142)

3rd degree tear example - ACL injury:



Ligament & Joint Injury Recovery: (page 142)

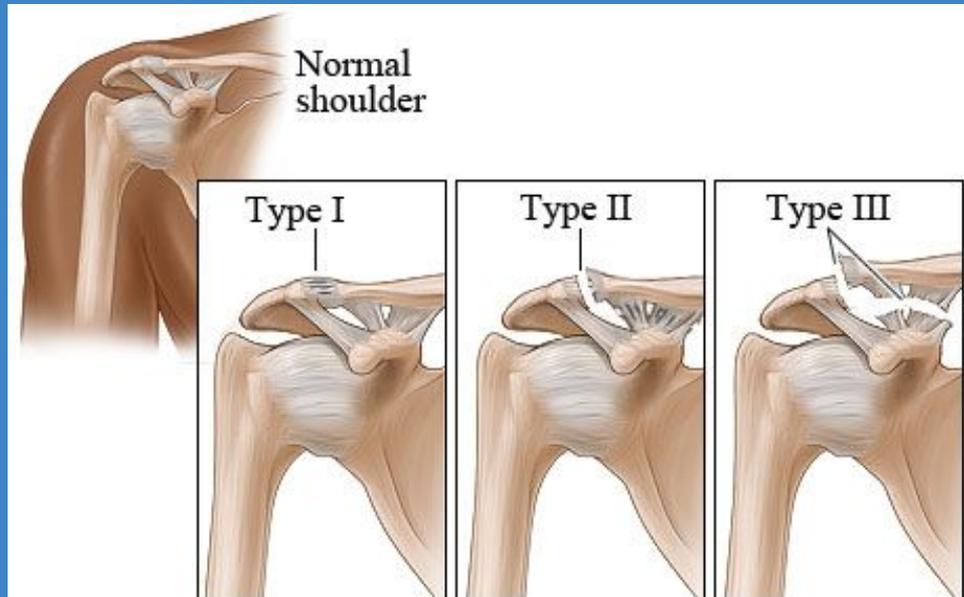
A **dislocation** occurs when a bone is displaced from its joint. This is typically caused by collisions or falls. The most common sites for dislocations are fingers and shoulders.



Ligament & Joint Injury Recovery: (page 142)

A **separation** occurs when a ligament is torn and two bones separate from each other.

Example: Clavicle and scapula (shoulder joint)



Ligament & Joint Injury Recovery: (page 142)

The treatment for dislocations and separations varies, but should include medical professionals such as paramedics, nurses, or doctors. It is possible surgery may be required.

Pain Relief Medications:



Pain Relief Cheat Sheet

Are you using the right pain reliever for your situation?
Dr. Jeffrey Steinbauer, professor and Chief Medical Information Officer, breaks down the differences.

Ibuprofen

Use for:
Pain Reliever
Reduces inflammation

Limitations
Works faster, but doesn't last as long as Naproxen

Risks
Can damage stomach lining or digestive tract if not taken properly

Acetaminophen

Use for:
Pain Reliever
Fever Reducer

Limitations
Does not reduce inflammation

Risks
Too much for extended periods of time can damage liver.

Naproxen

Use for:
Pain Reliever
Reduces inflammation

Limitations
Lasts longer, but takes longer to start working than Ibuprofen

Risks
Can damage stomach lining or digestive tract if not taken properly

Growing Pains: Osgood-Schlatter Syndrome (pg 143)

Read page 143 in your textbook. With a partner, summarize:

- 1) The cause of OSS
- 2) 2 symptoms of OSS
- 3) Treatment of OSS

Break - Take 3 minutes

Turn to page 151. Answer question 3 in your notebook.

Bone & Head Injuries: (page 144)

Fractures - when a bone breaks

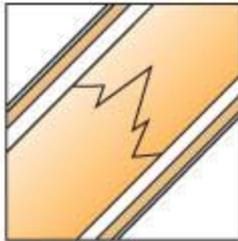
Simple (closed) - small crack in a bone

Compound (open) - breaks into separate pieces

Comminuted - breaks into many small pieces

Bone & Head Injuries: (page 144)

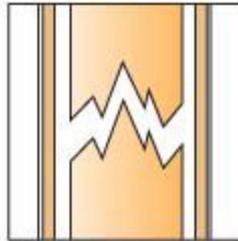
Fractures - when a bone breaks



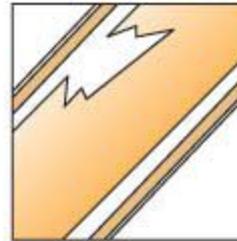
Closed or simple fracture



Open or compound fracture



Transverse fracture



Greenstick fracture



Comminuted fracture

Bone & Head Injuries: (page 144)

Fractures:

1. Hearing a crack or snap
2. Feeling sick or dizzy and vomiting
3. Limb looks deformed or broken through skin



Bone & Head Injuries: (page 144)

Fractures:

4. Will require medical attention
5. Typically take around 6 weeks to fully heal. A cast is often required to guide recovery and keep bone immobilized.



Bone & Head Injuries: (page 144)

Shin Splints:

Tearing of connective tissue between the tibia and fibula along the front shaft of the shin bone

Stress Fractures:

Tiny cracks along the bone that are virtually undetectable by an X-ray

Bone & Head Injuries: (page 144)

Both shin splints and stress fractures are very painful and nagging injuries. They are caused by:

1. Going from small to large amounts of physical activity with little rest
2. Running, jogging, or skipping on hard surfaces
3. Using inappropriate or worn out shoes

Bone & Head Injuries: (page 144)

Shin/Stress Fracture Recovery:

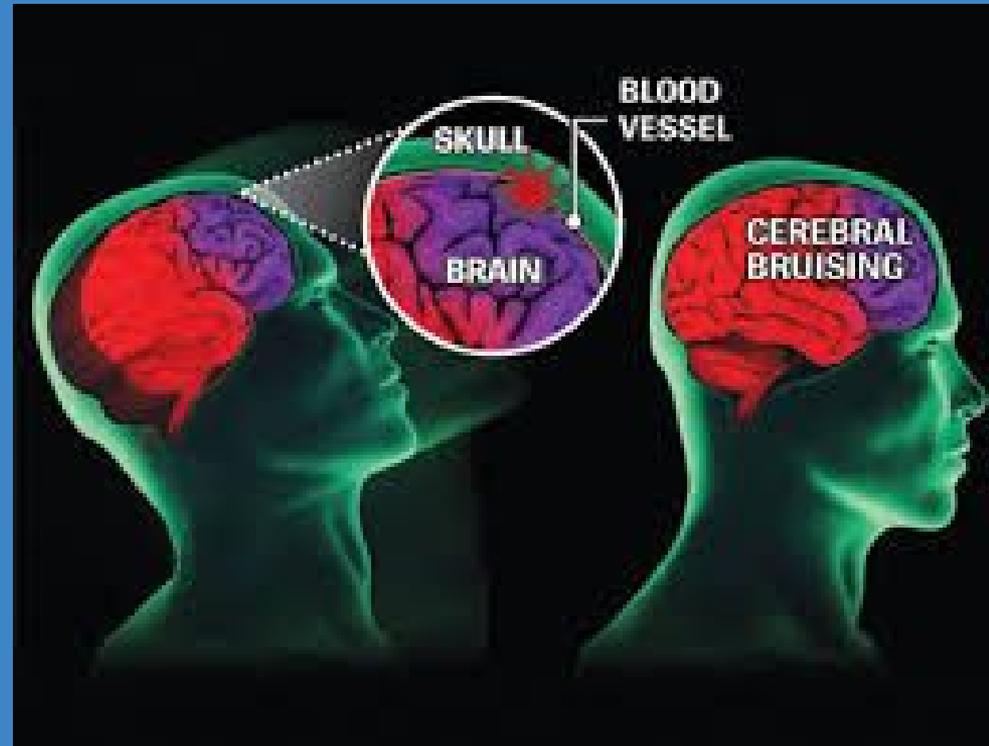
1. Reduce activity
2. Use RICE principle with pain relief drugs
3. Full rest may be required in symptoms persist

Turn to page 151. Answer questions 4 & 6 in your notebook.

Bone & Head Injuries: (page 144)

Concussion:

The brain hits the wall of the skull causing nerve damage and bruising from bleeding blood vessels.



Bone & Head Injuries: (page 144)

Concussion:

Turn to page 145. Please read the section on concussions.

https://www.youtube.com/watch?v=_55YmbIG9YM

Bone & Head Injuries: (page 145)

Concussion:

High risk sports such as:

- Football, biking, skateboarding, lacrosse, rugby, soccer, and hockey etc.
- Even with protective headgear concussions still occur

Bone & Head Injuries: (page 145)

Concussion Symptoms:

- Feeling nauseous
- Dizzy or light-headed
- Trouble with memory of what happened
- Headaches, blurred vision, sensitivity to light
- Mumbled/Blurred speech
- Difficulty concentrating or thinking
- Feeling out of character
- Feeling overly tired

Bone & Head Injuries: (page 145)

Example - Concussion protocol for NFL Football:

1. When a player shows signs of a possible concussion, he must be immediately removed from the game. Each game has team physicians plus a neurotrauma consultant split between the field and booth levels to watch for and identify signs.
2. The physician and the consultant review film of the play and perform a test of the symptoms.
3. If suspicion of a concussion continues, the player is escorted to the locker room for a full examination.
4. If the player is diagnosed with a concussion, he is out for the remainder of that game. If he passes the exam, he can return but will be monitored for additional symptoms throughout the game. The league identifies seven of these:
 - Loss of consciousness
 - Blank look
 - Slow to get up after a hit to the head
 - Clutching head after contact
 - Motor coordination or balance issues
 - Signs of displacement, like unawareness of surroundings
 - Visible facial injury as a result of one of the above

Bone & Head Injuries: (page 145)

Example - Concussion protocol for NFL Football:

- **Return to play: Five steps**
- The protocol officially begins when a player has been diagnosed with a concussion. This can happen in-game, as detailed above, or if symptoms show up in the days after a contest, which does happen with concussions. Lions center Travis Swanson, for example, played all 70 snaps of a Week 12 win over the Saints and then entered the concussion protocol the next week.
- **1. Rest and recovery:** A player is removed from all team meetings, electronic devices and social media, focusing instead on simple physical activities like stretching and balance work. He leaves this phase when he returns to the "baseline" of signs and symptoms.
- **2. Light aerobic exercise:** This includes riding a stationary bike or working on a treadmill without resistance. The NFL recommends 10 to 20 minutes of this per day, monitored by a trainer to see if concussive symptoms appear.
- **3. Continued aerobic exercise and introduction of strength training:** The cardiovascular work increases in length and intensity, and strength training is added, with a trainer still monitoring for behavioral signs.
- **4. Football-specific activities:** The player can return to non-contact football activities for up to a full practice.
- **5. Full football activity/clearance:** Once the team and an independent neurologist clears a player to return, he can regain all the former responsibilities, including playing a full game.

[Bone & Head Injuries: \(page 145\)](#)

TDSB Concussion Documents:

<http://www2.tdsb.on.ca/ppf/uploads/files/live/100/1932.pdf>

http://www.tdsb.on.ca/Portals/0/Elementary/docs/SupportingYou/Res_Concussion%20Guidelines%20for%20Parents.pdf

Bone & Head Injuries: (page 145)

Chronic traumatic encephalopathy (CTE) is a progressive degenerative disease found in people who have had a severe blow or repeated blows to the head.

CTE has been most commonly found in professional athletes participating in American football, rugby, ice hockey, boxing, professional wrestling, stunt performing, bull riding, rodeo, Association football and other contact sports who have experienced repeated concussions or other brain trauma.

Symptoms of CTE generally begin 8–10 years after experiencing repetitive mild traumatic brain injury. First stage symptoms include deterioration in attention as well as disorientation, dizziness, and headaches. Further disabilities appear with progressive deterioration, including memory loss, social instability, erratic behavior, and poor judgment. Third and fourth stages include progressive dementia, slowing of muscular movements, hypomimia, impeded speech, tremors, vertigo, deafness, and suicidality.

Currently, CTE can only be definitively diagnosed by direct tissue examination, including full autopsies and immunohistochemical brain analyses but not on living patients.

Turn to page 151. Answer question 5 in your notebook.

Weather-Related Injuries: (146-147)

Hot Weather and direct sunlight:

Heat Cramps - Dehydration (loss of water and salt) due to sweating causing cramping muscles and also darker or more yellow urine. Feel dizzy or light-headed and mouth is dry and sticky.

Heat Exhaustion - Worse than cramps with short breaths, weak pulse, shivering, chills, and clammy skin

Heat Stroke (sunstroke) - Such a lack of water that body begins to shut down. Life threatening condition requiring serious medical attention.

Weather-Related Injuries: (146-147)

Solutions to heat related injuries?

- Drink water
- Drink electrolytes (salts) such as gatorade
- Rest
- Find shade
- Wear a hat, sunglasses, or more appropriate clothing
- Wear sunscreen

Weather-Related Injuries: (146-147)

Cold Weather/Water:

Hypothermia - body temperature has dropped below normal due to cold weather or water.

Need to warm up using:

- Warm clothing that is wind resistant
- Change out of wet clothes
- Metal blanket that retains heat well
- Having a warm drink such as tea



Weather-Related Injuries: (146-147)

Cold Weather/Water:

Frostbite - unprotected skin freezes and tissue dies. Amputation may be required. Common sites are fingers, ears, toes, and nose. If tingling persists for more than half an hour once you have returned indoors seek medical attention.



Using Equipment Safely: (148-149)

- A. Safety in the gym**
- B. Safety on the field**
- C. Weight room safety.**

Turn to pages 148-149. Please take a picture of each page and memorize 3 rules of safety for each athletic location listed above.

Turn to page 151. Answer question 6 in your notebook.

Turn to page 150. Read about the 4 career options in sports medicine.

Turn to page 151. Answer question 12 in your notebook.