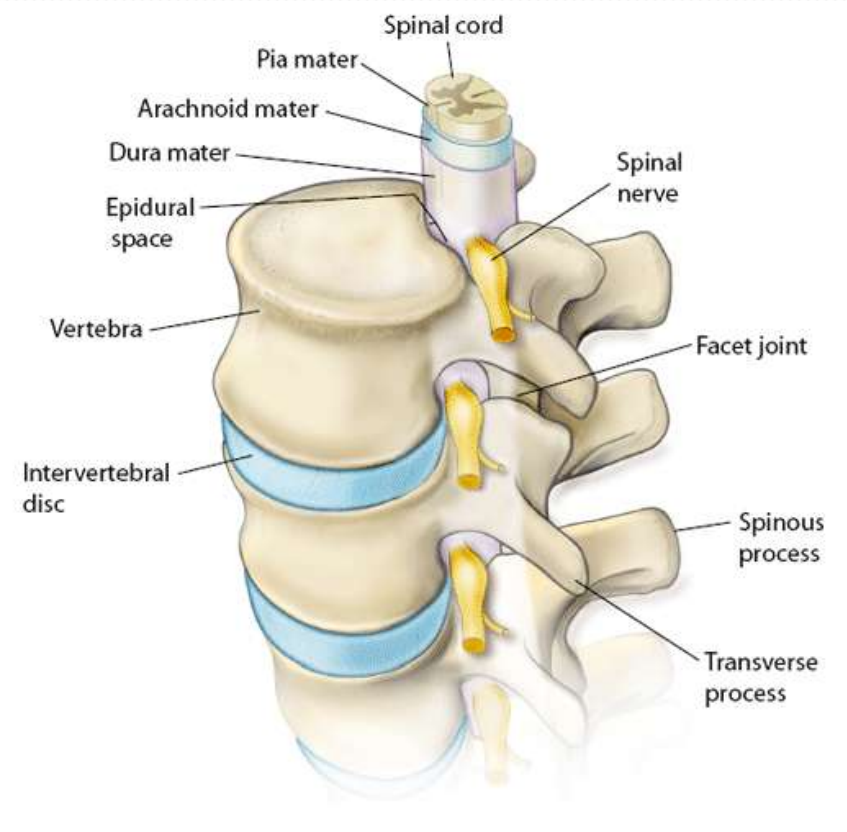
THE PREVENTION AND MANAGEMENT OF BACK AND KNEE INJURIES

Drs. Richard and Aaron Coopersmith
Newtown Chiropractic Health Center
54 South Main Street
Newtown, Ct. 06470
(203) 426-2490

Anatomy of the Back

The Back is Made Up Of

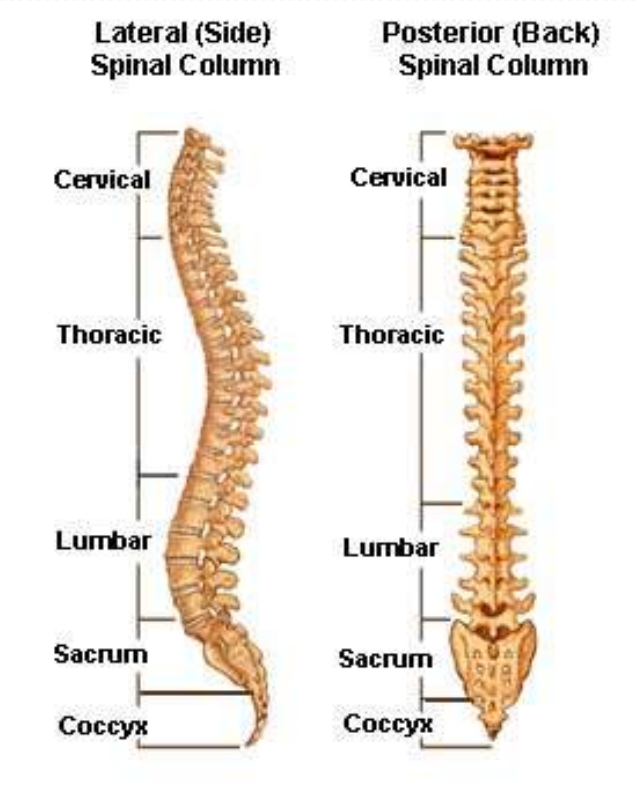
- Muscles
- Ligaments
- Tendons
- Joints
- Discs
- Nerves



What is the Lumbar Spine?

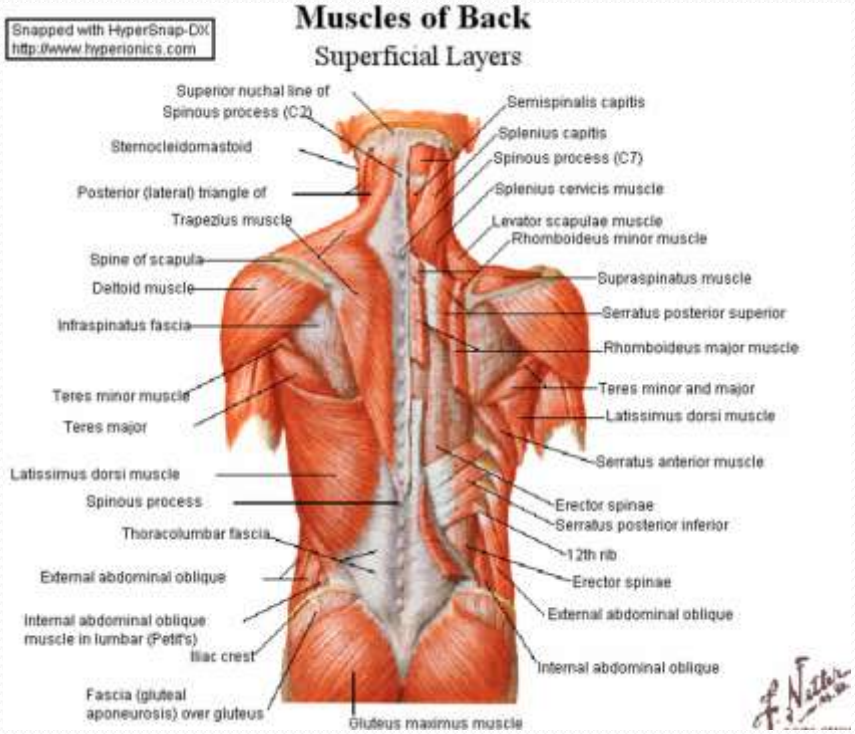
The Lumbar Spine - or Low Back -

- Is the third major region of the spine.
- Most people have five bones or vertebrae in the lumbar spine, although it is not unusual to have six.
- Each vertebra is stacked on top of the other and between each vertebra is a gel-like cushion called a disc (intervertebral disc).
- The discs help to absorb pressure, distribute stress, and keep the vertebrae from grinding against each other.



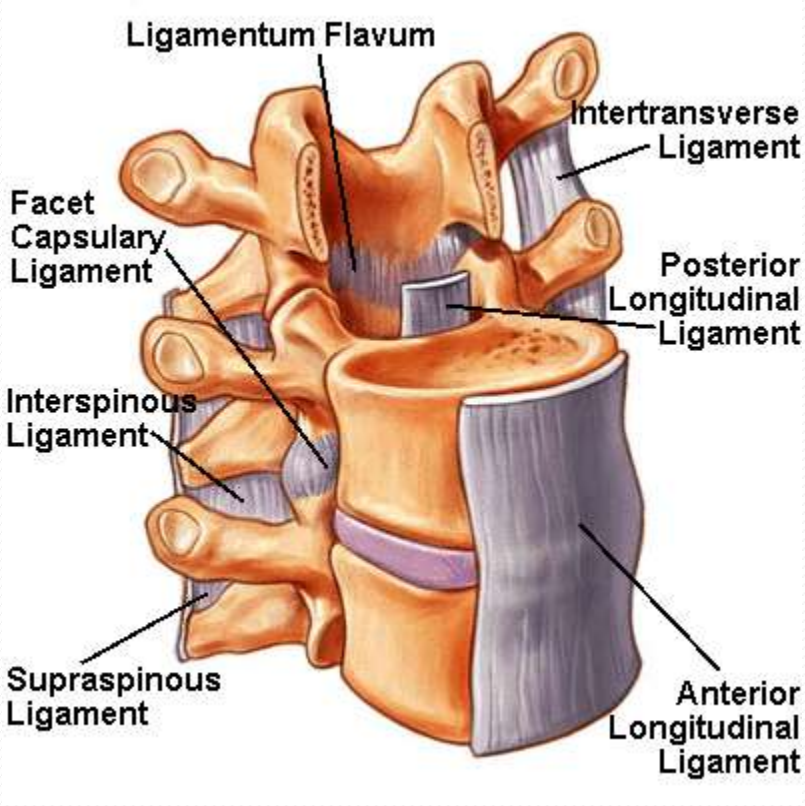
Muscles of the BacK

- There are many muscles that are responsible for the delicate concert of movement in the low back.
- Each muscle either contracts or relaxes in order to perform such movements as flexing, extending, and rotating the waist.
- The controlled movement of the low back is greatly related to the proper movement of the lower extremities.



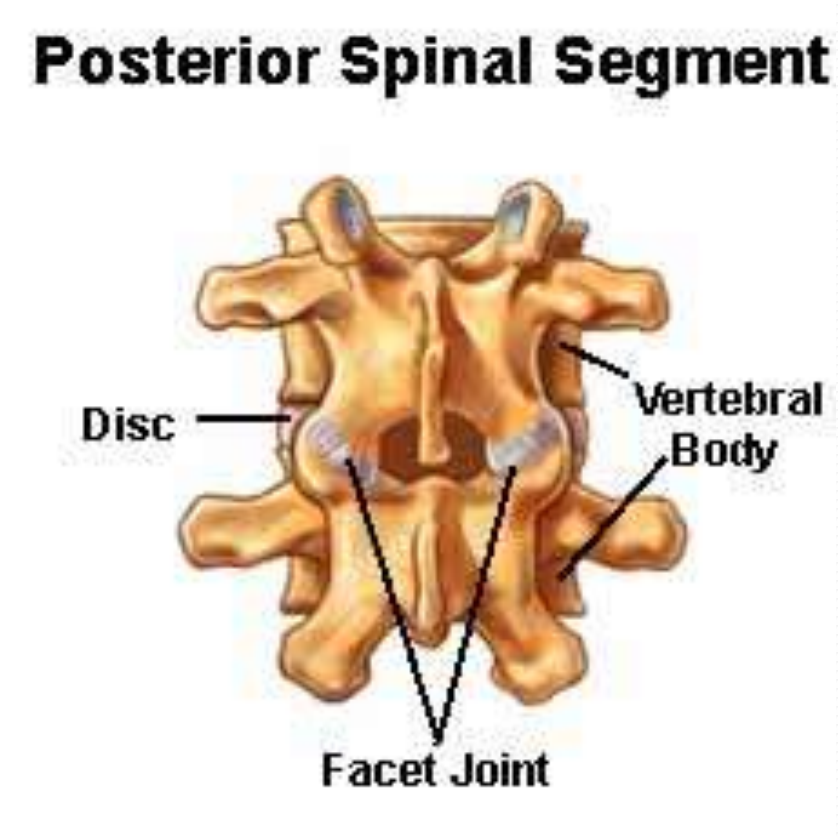
Ligaments and Tendons

- The vertebrae and discs are held together by groups of ligaments.
- *Ligaments* connect **bone** to **bone**, where as *Tendons* connect **muscle** to **bone**.
- In the spine, tendons connect muscles to the vertebrae.
- The ligaments and tendons help to stabilize the spine and guard against excessive movement in any one direction.



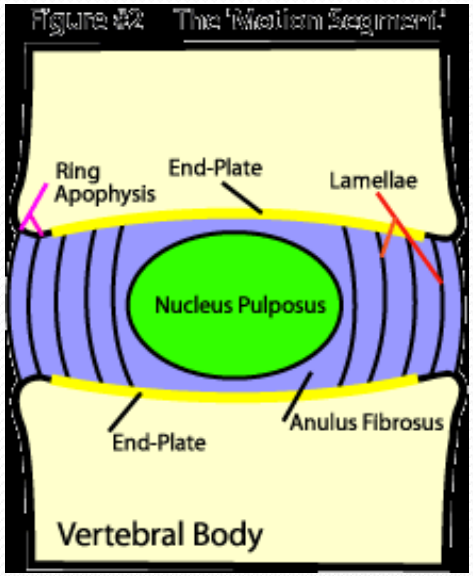
Spinal Joints

- The spinal joints are called facet joints.
- The facet joints can be described as finger-like and link the vertebrae together.
- The facet joints are located at the posterior area of the spinal column.
- The facet joints help to make the spine flexible.



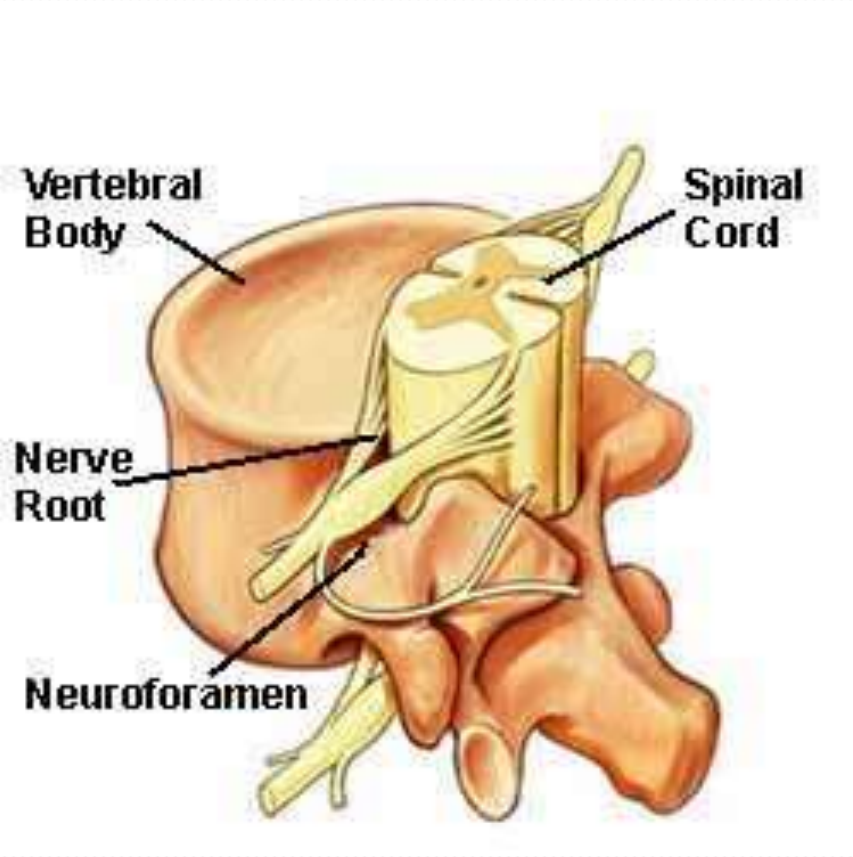
Disc Anatomy

- The annulus fibrosus is the outer portion of the disc that surrounds the nucleus.
- The nucleus is a "*jelly*" like substance filled with "*proteoglycan*" which are molecules that hold water.
- The annulus fibrosus encircle the disc and, in concert with the nucleus, give the disc tremendous axial load strength.



Nerve Center

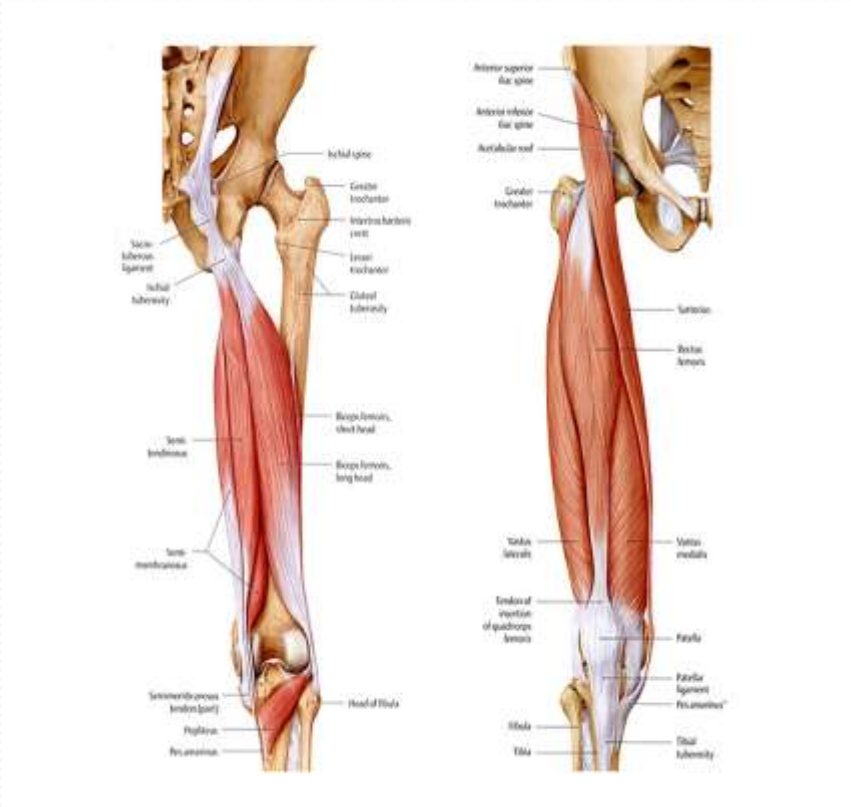
- In the center of the **spinal column** is a vertical hole called the spinal canal; it contains the spinal cord.
- The bones that create the **spinal canal** serve as armor to help protect the **spinal cord** from injury.
- Small nerve roots branch off from the **spinal cord** through spaces on between each vertebra and extend out into the entire body
- The **spinal cord** and the nerves are part of the central nervous system that includes the brain.
- The nerves are the body's neural message system.



Anatomy of the Upper Leg

The Upper Leg is Made Up Of

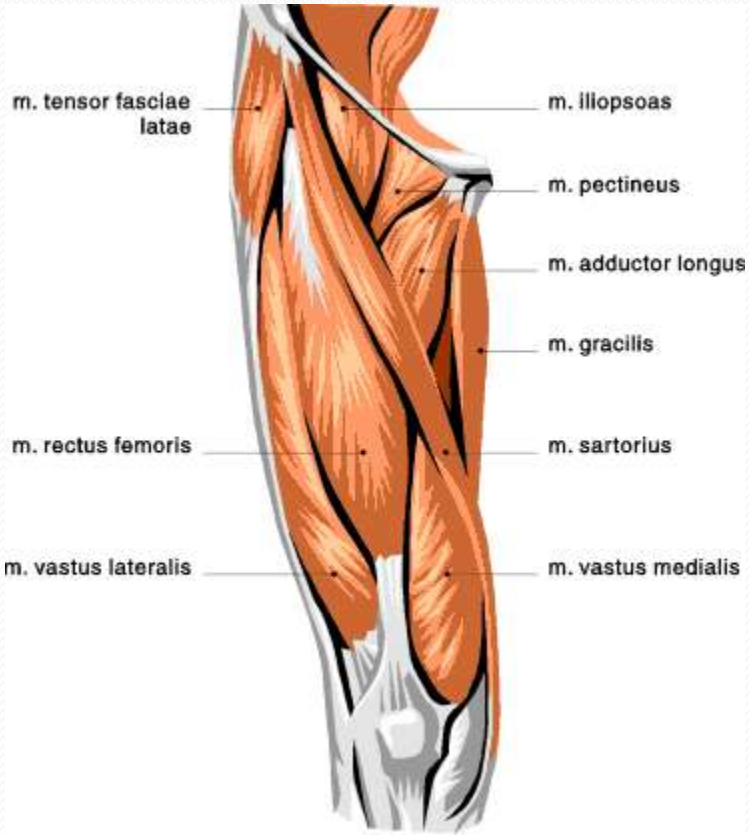
- Muscles
- Ligaments
- Tendons
- Joints
- Nerves



Muscles (**THE QUADRICEPS)**

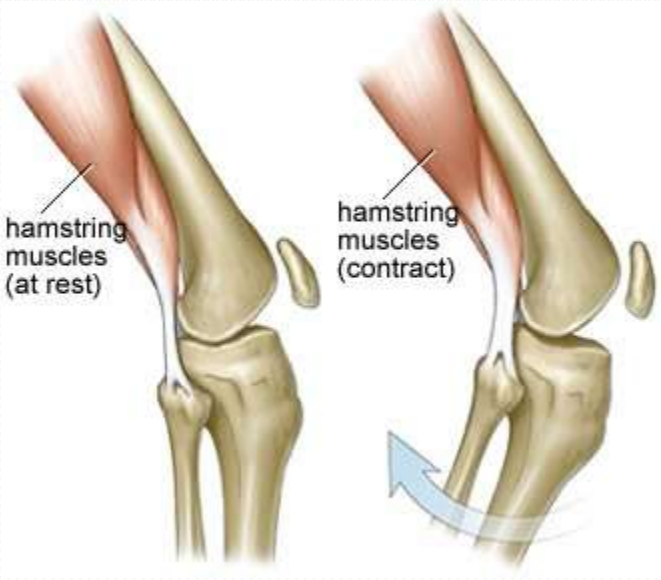
- Muscles
  - Vastus Medialis
  - Vastus Intermedius
  - Vastus Lateralis
  - Rectus Femoris.

- *Action*
  - The **quadriceps** control the straightening of the knees and movement of the kneecap.
  - The quadriceps is used to extend the leg,
  - It is *essential* for standing up, walking upstairs, walking uphill, and running.



Muscles (**THE HAMSTRINGS**)

- **Muscles**
  - Semitendinosus
  - Semimembranosus
  - Biceps femoris long and short head
- **Action**
  - The hamstrings are used to bend the knee and are also needed when you are pushing against something.

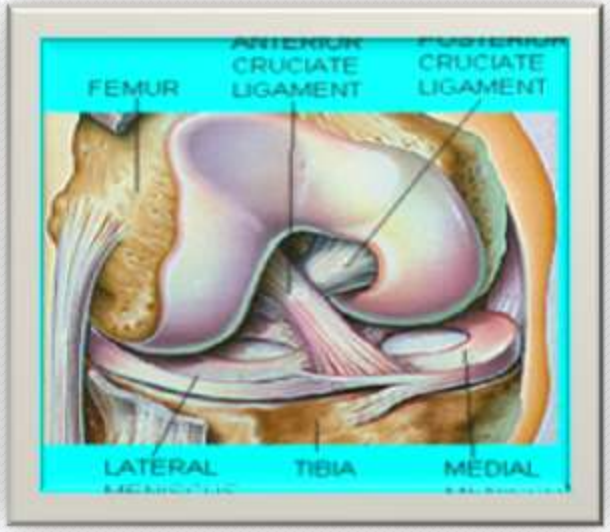


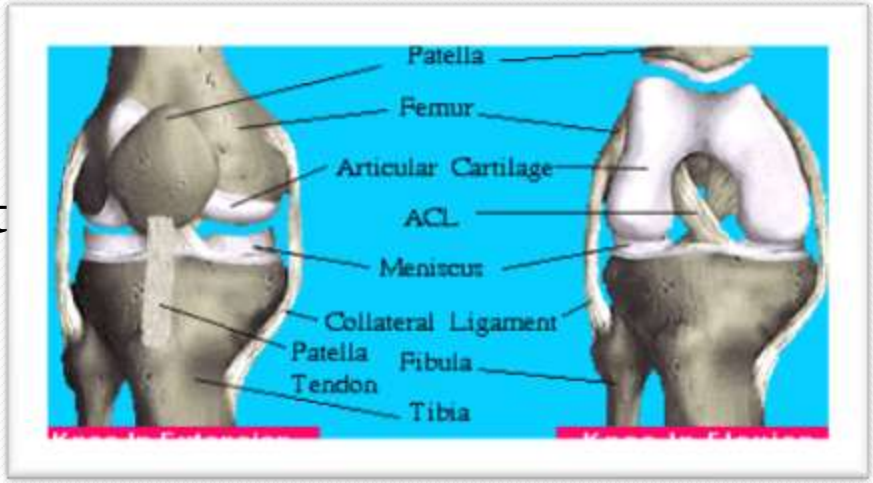
Bones

- The knee is essentially made up of four bones.
- The ***femur***, which is the large bone in your thigh, attaches by ligaments and a capsule to your ***tibia***.
- Just below and next to the ***tibia*** is the ***fibula***, which runs parallel to the ***tibia***.
- The ***patella***, or what we call the "knee cap", rides on the knee joint as the knee bends.

Joint and Ligaments

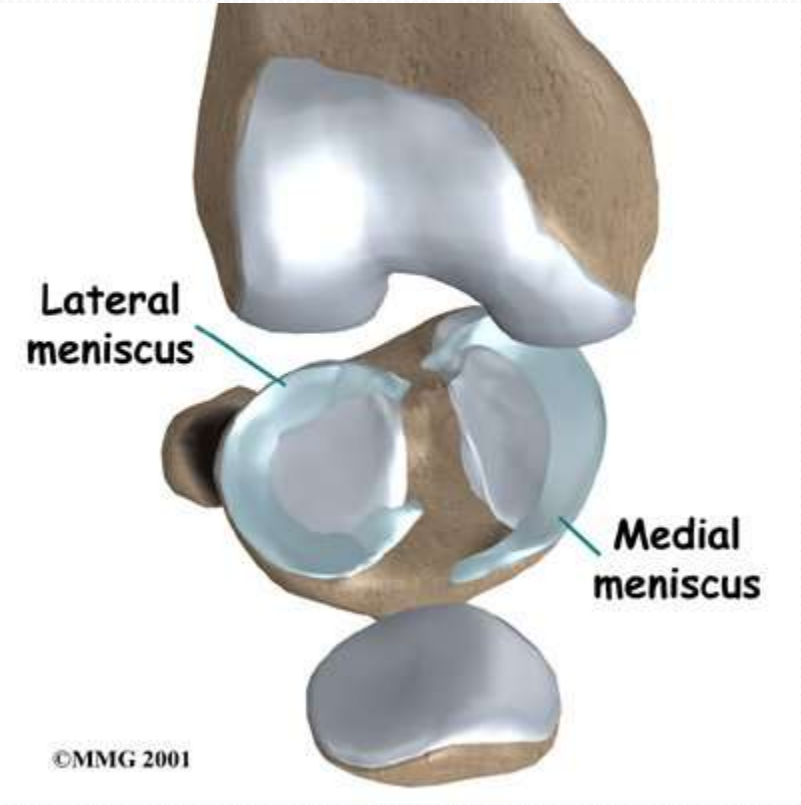
- There are four ligaments essential for the stability of the knee
- The **medial** and **lateral collateral ligaments**
- The **anterior** (*ACL*)and **posterior** (*PCL*)**cruciate ligaments** located in the center of the knee joint.
- The **anterior cruciate ligament** (*ACL*) and the **posterior cruciate ligament** (*PCL*) are the major stabilizing ligaments of the knee.





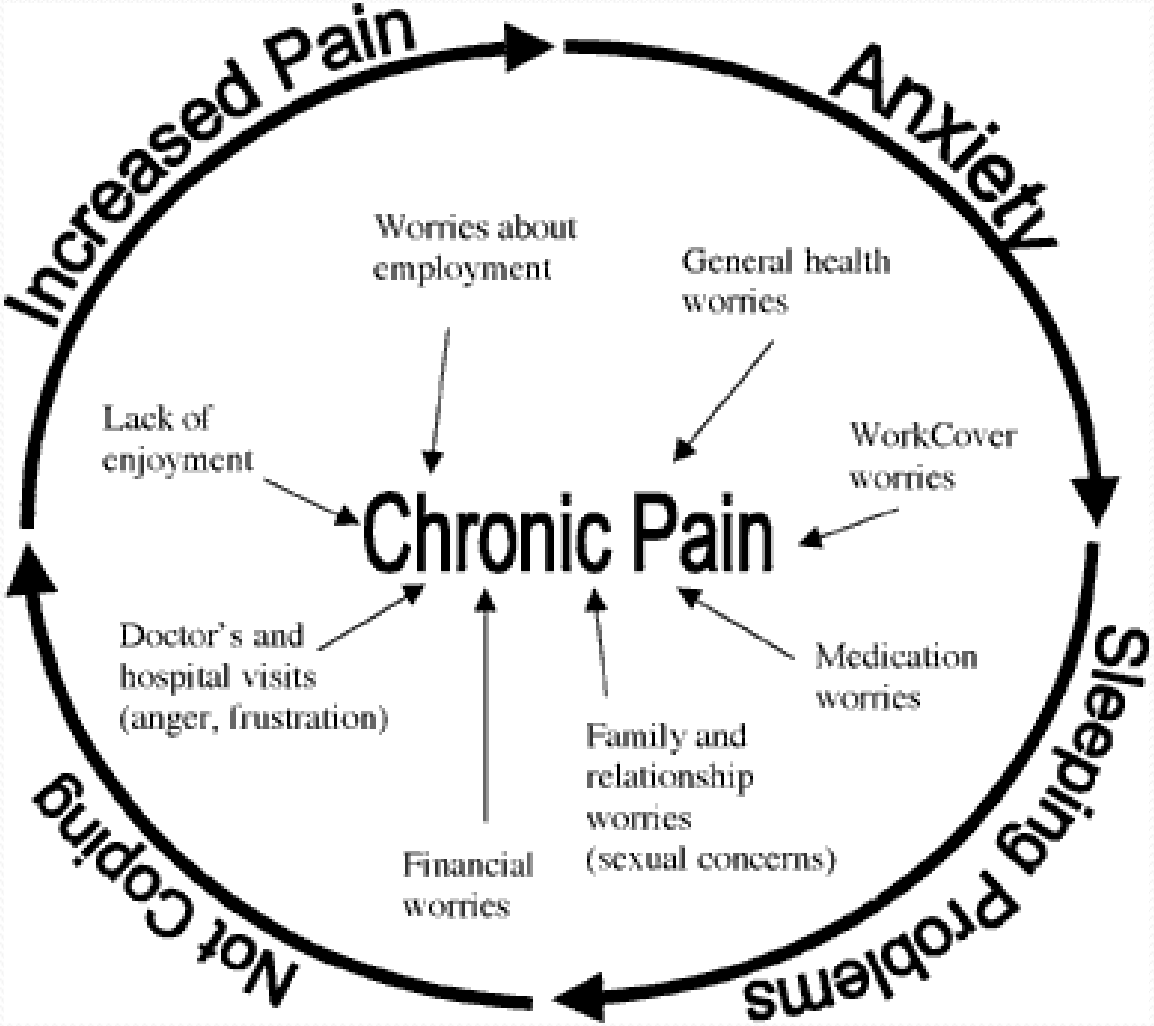
Meniscus

- **Function**
  - The meniscus function to distribute your body weight across the knee joint.
  - 75% of your body weight is on the medial meniscus
- **Anatomy**
  - There are two menisci in your knee; each rests between the thigh bone (femur) and shin bone (tibia).
  - The menisci are made of tough cartilage and conform to the surfaces of the bones upon which they rest.
  - One meniscus is on the inside of your knee; this is the medial meniscus.
  - The other meniscus rests on the outside of your knee, the lateral meniscus.



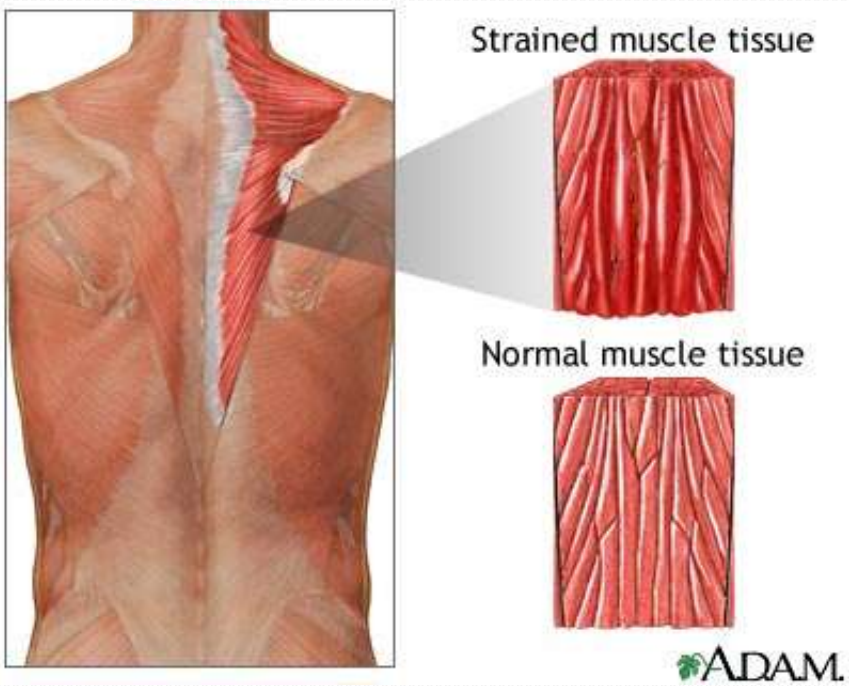
MAJOR TYPES OF INJURIES

STRAINS
SPRAINS
HERNIATIONS
TEARS



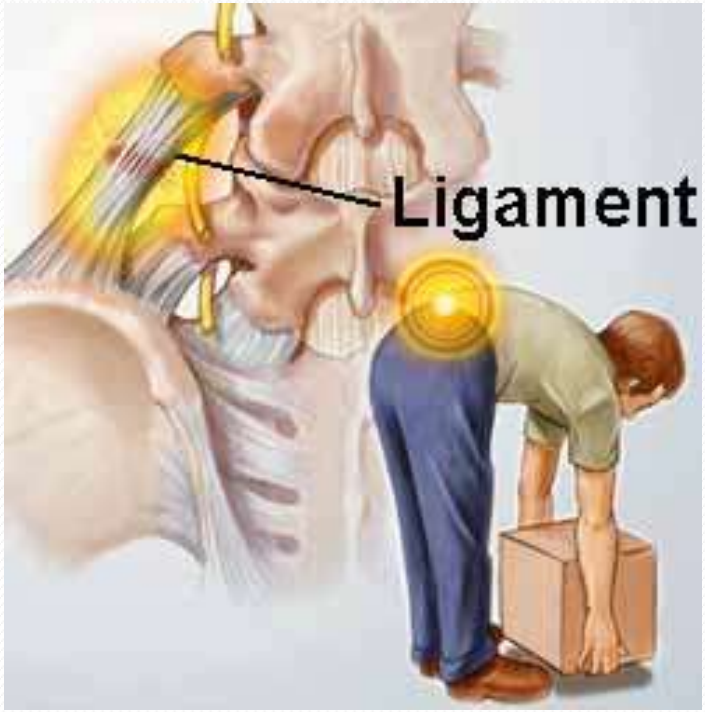
STRAINS

- **What is it**
  - Muscle strain or muscle pull or even a muscle tear implies damage to a muscle or its attaching tendons.
- **Mechanism**
  - Pressure on muscles during the course of normal daily activities, with sudden, quick heavy lifting, during sports, or while performing work tasks.
- **Symptoms**
  - Swelling, bruising or redness, or open cuts as a consequence of the injury.
  - Pain when the specific muscle or the joint in relation to that muscle is used.
  - Weakness of the muscle or tendons.
  - Inability to use the muscle at all



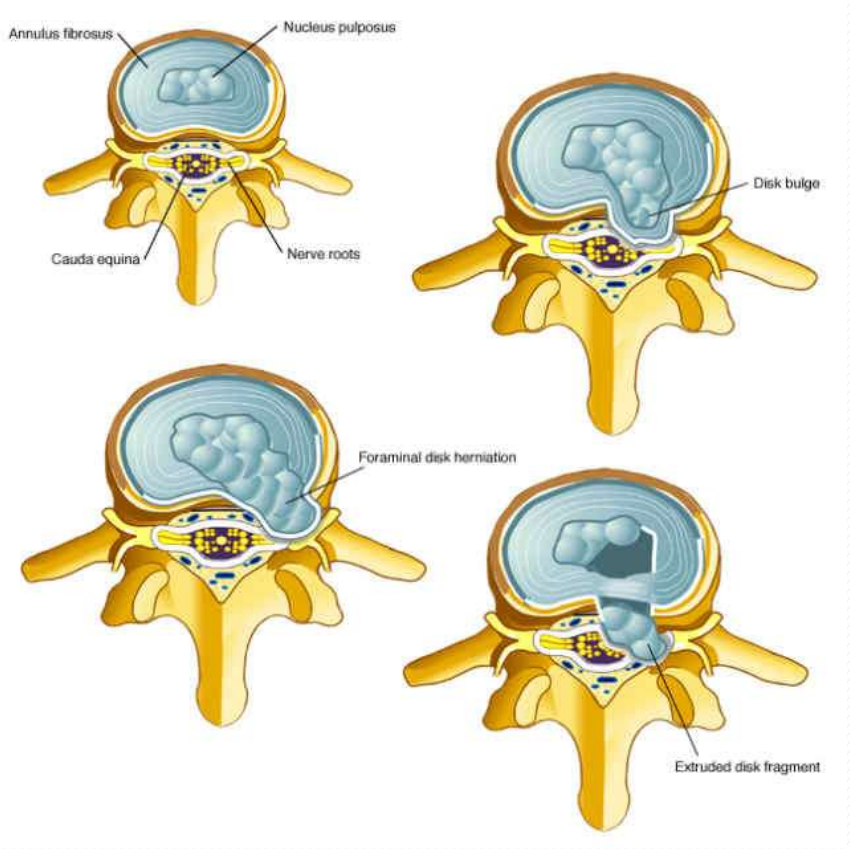
SPRAINS

- **What is it**
  - A sprain is an injury to a ligament. A ligament is a thick, tough, fibrous tissue that connects bones together.
- **Mechanism**
  - You can put undue pressure on muscles during the course of normal daily activities, with sudden, quick heavy lifting, during sports, or while performing work tasks.
- **Symptoms**
  - Swelling, bruising or redness.
  - You have pain and cannot put any weight on the injured joint.
  - The injured area looks crooked or has lumps and bumps (other than swelling) that you do not see on the uninjured joint.



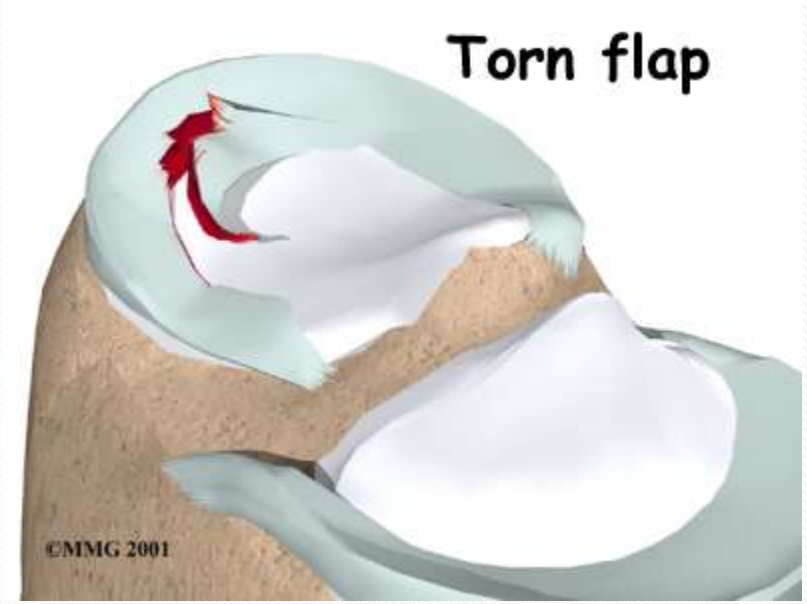
HERNIATIONS

- **What is it?**
  - When the herniated disc ruptures and pushes out, the nerves may become pinched.
- **Mechanism**
  - A herniated disc may occur suddenly in an event such as a fall or an accident, or may occur gradually with repetitive straining of the spine.
- **Symptoms**
  - Electric shock pain
  - Muscle weakness
  - Tingling and numbness
  - Bowel and bladder problems



Meniscus Tear

- **Function**
  - The meniscus function is to distribute your body weight across the knee joint.
- **What is it**
  - A tear in the C shaped Cartilage that is known as the meniscus
- **Mechanism**
  - The most common mechanism of a traumatic meniscus tear occurs when the knee joint is bent and the knee is then twisted.
- **Symptoms**
  - Knee pain
  - Swelling of the knee
  - Tenderness when pressing on the meniscus
  - Limited motion of the knee joint

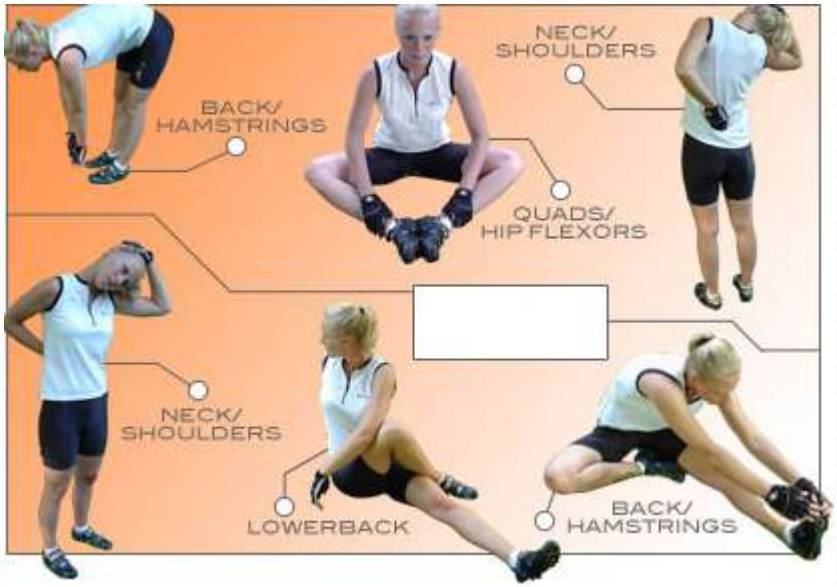


AVOIDING INJURIES

- STRETCHING AND WARMING UP
- PROPER BENDING
- PROPER LIFTING
- STRENGTHENING KEY MUSCLE GROUPS

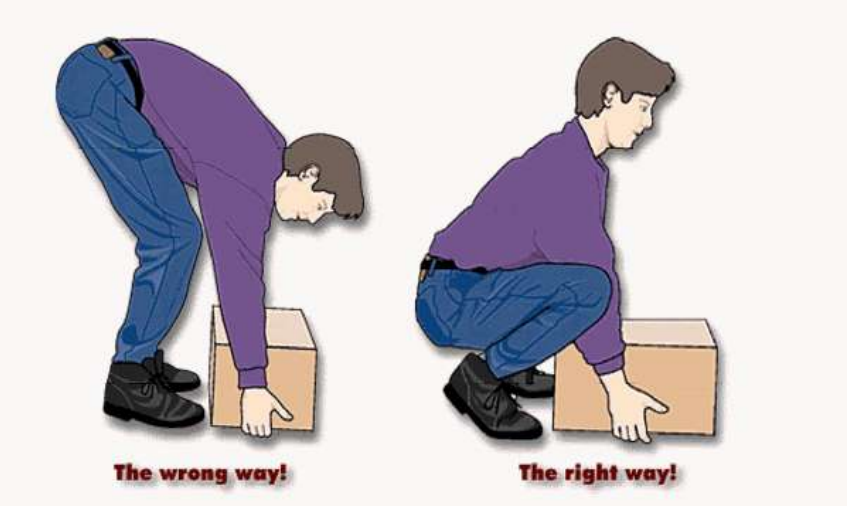
Warming up

- Before you perform any task, warm up your body.
- Stretching increases blood flow to the muscles and is important component for injury prevention.
- A set of 3-5 stretches with each position held for 15-20 seconds is sufficient to get the maximum out of each routine.



How to Lift

- Plan ahead before lifting.
- Lift close to your body.
- Feet shoulder width apart.
- Bend your knees and keep your back straight.
- Tighten your stomach muscles.
- Lift with your legs.
- If you're straining, get help.



GET STRONGER – DON'T QUIT

- **Abdominals**
  - *Why*?
  - Balances the tension in your back and reduce the load of daily activities on your hip and pelvis.
- **Gluts**.
- *Why*?
  - Balances the tension in hip flexors, groin, low back, ribs and quadriceps.
- **Inner thigh**
- *Why*?
  - Balances groin, calves, shins, vastus medialis, vastus laterialis, and I.T band.

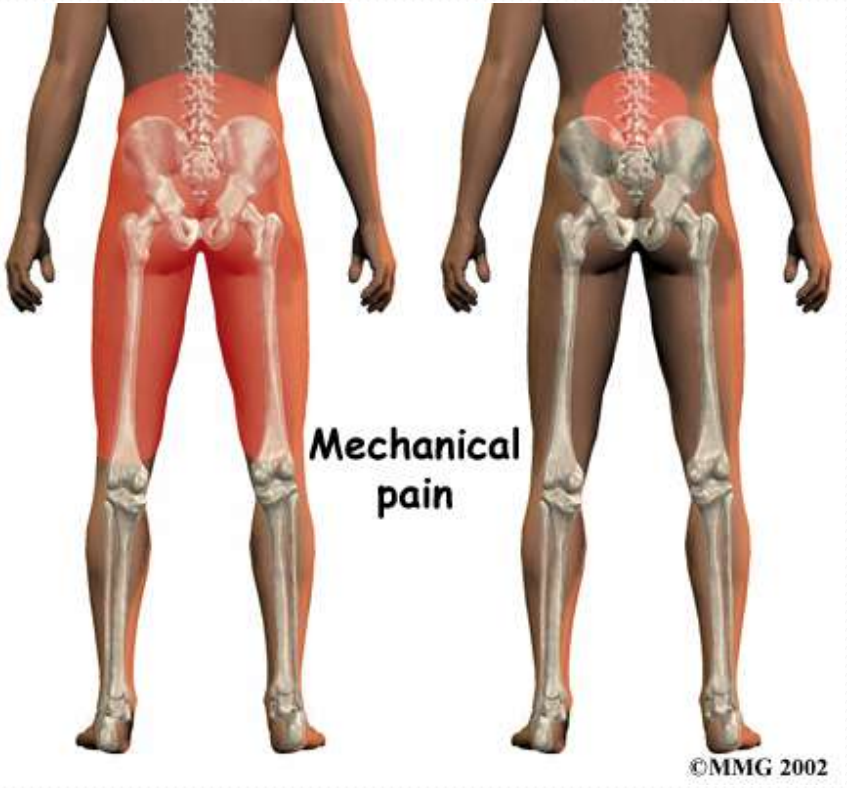
INJURY MANAGEMENT

- CONSERVATIVE MANAGEMENT
- OTHER TREATMENT OPTIONS

"I already diagnosed myself on the Internet. I'm only here for a second opinion."

Chiropractic

- **Chiropractic** is a branch of the healing arts that provides a specialized approach to the management of injuries of the ***neuromusculoskeletal*** system
- The Chiropractor uses **conservative physical medicine** consisting of *gentle* manipulation in conjunction with other modalities and rehabilitative exercises to restore normal movement to the body.



Questions

- If you ever have any questions:
- Please contact:
  - Dr. Aaron Coopersmith
    - DrA@newtownchiros.com
  - Dr. Richard Coopersmith
    - DrC@newtownchiros.com

Newtown Chiropractic Health Center

voice: **203-426-2490**

fax: **203-426-8631**

54 South Main Street

Newtown, Ct. 06470

1 mile south of the flag pole