

**Semey State Medical
University**

SIW

Pathophysiology of loco-motor system

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The Skeletal System

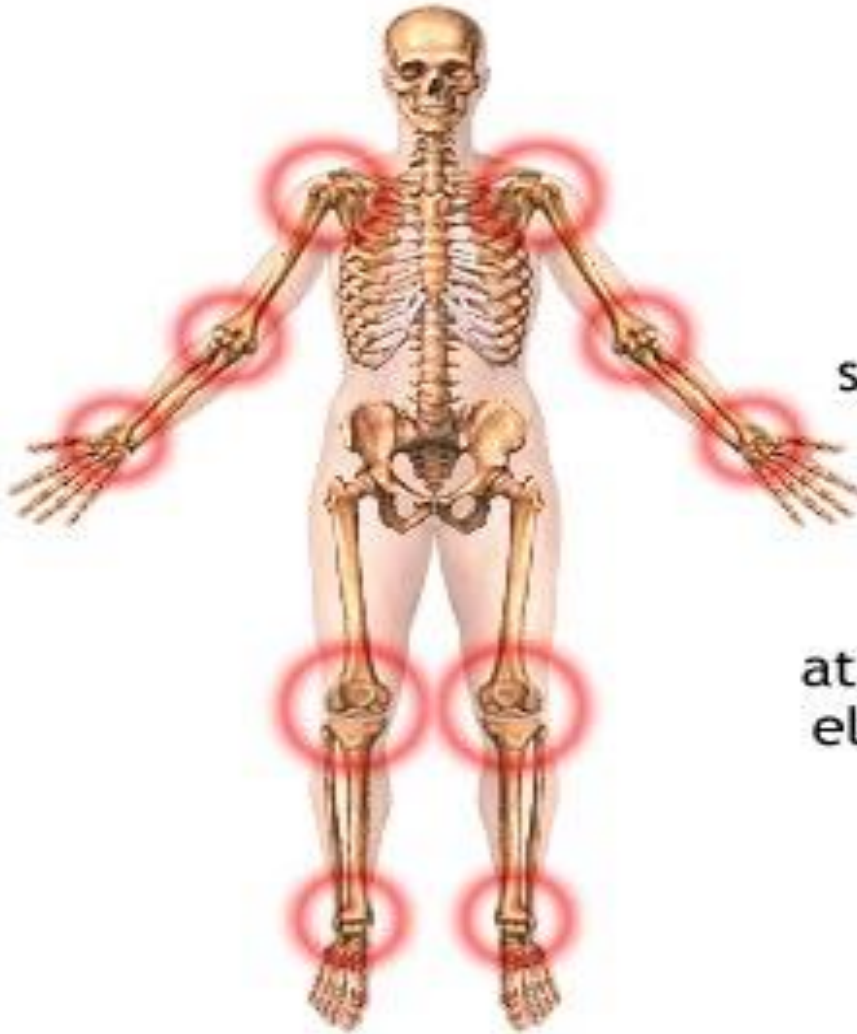
- Parts of the skeletal system
 - Bones (skeleton)
 - Joints
 - Cartilages
 - Ligaments (bone to bone)(tendon=bone to muscle)
- Divided into two divisions
 - Axial skeleton
 - Appendicular skeleton – limbs and girdle

Functions of Bones

- Support of the body
- Protection of soft organs
- Movement due to attached skeletal muscles
- Storage of minerals and fats
- Blood cell formation

Diseases and Conditions of the Skeletal System

Arthritis



Rheumatoid arthritis usually affects joints symmetrically (on both sides equally), may initially begin in a couple of joints only, and most frequently attacks the wrists, hands, elbows, shoulders, knees and ankles

Rheumatoid arthritis
(late stage)

Boutonniere
deformity
of thumb

Ulnar deviation of
metacarpophalangeal
joints

Swan-neck deformity
of fingers







Bursitis

- Inflammation of the Bursa (fluid filled sac surrounding the joint).
- A bursa can become inflamed from injury, infection (rare in the shoulder), or due to an underlying rheumatic condition.
- Bursitis is typically identified by localized pain or swelling, tenderness, and pain with motion of the tissues in the affected area.

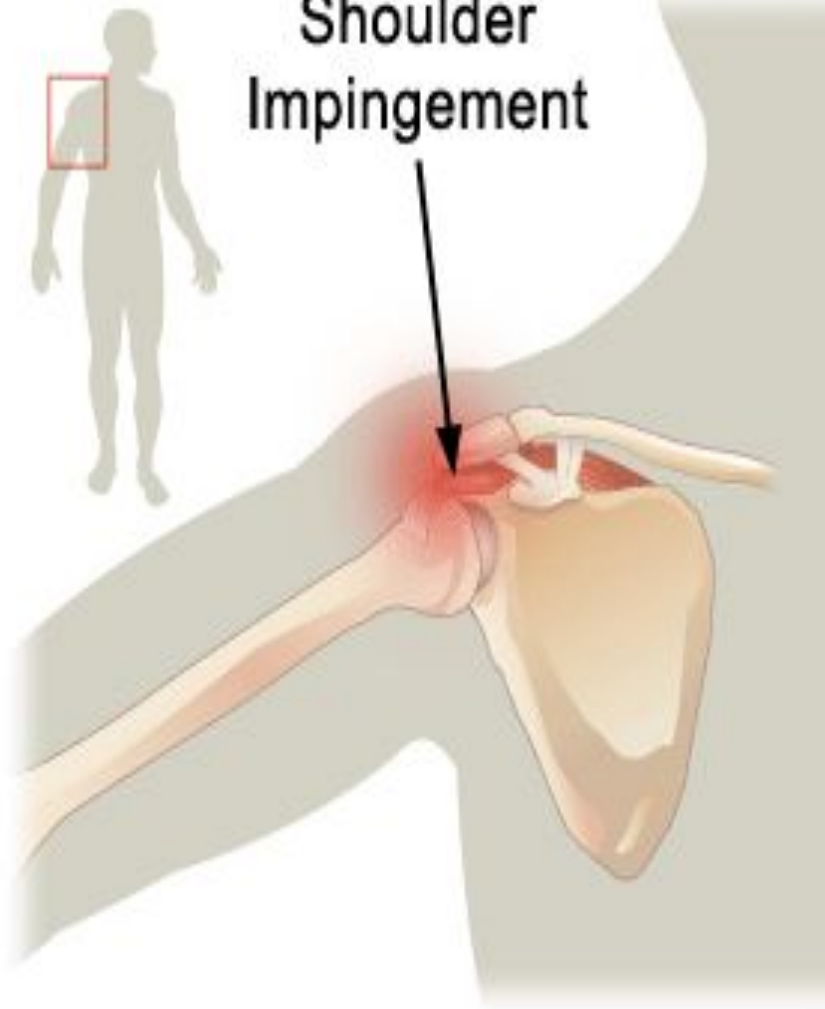




Tendonitis

- Sometimes the tendons become inflamed for a variety of reasons, and the action of pulling the muscle becomes irritating. If the normal smooth gliding motion of your tendon is impaired, the tendon will become inflamed and movement will become painful. This is called tendonitis, and literally means inflammation of the tendon.
- The most common cause of tendonitis is overuse.

Shoulder Impingement



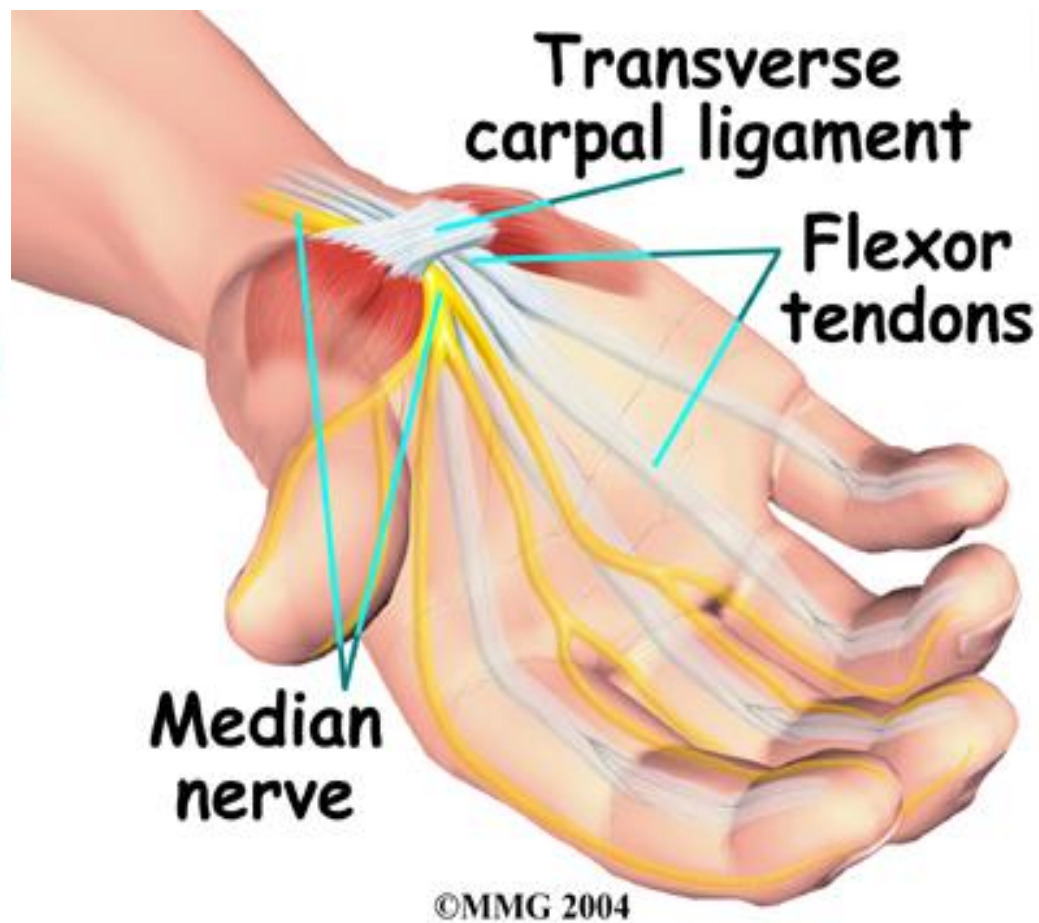
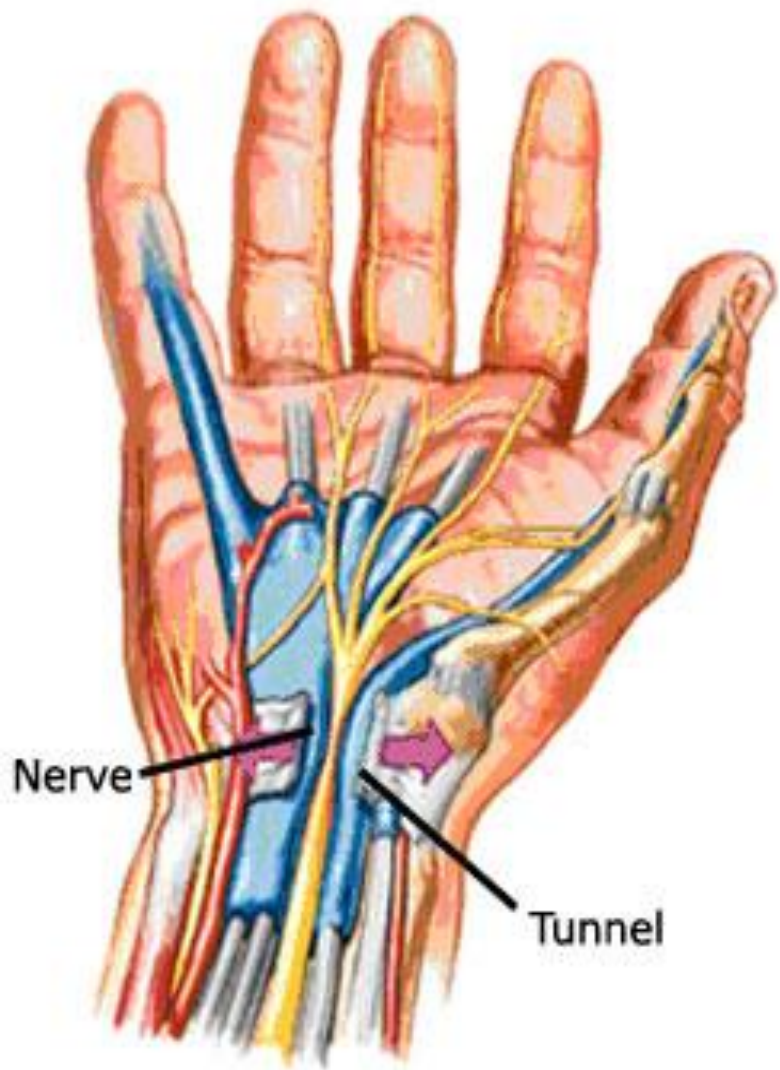
Inflammation of Achilles Tendon



Carpal Tunnel Syndrome

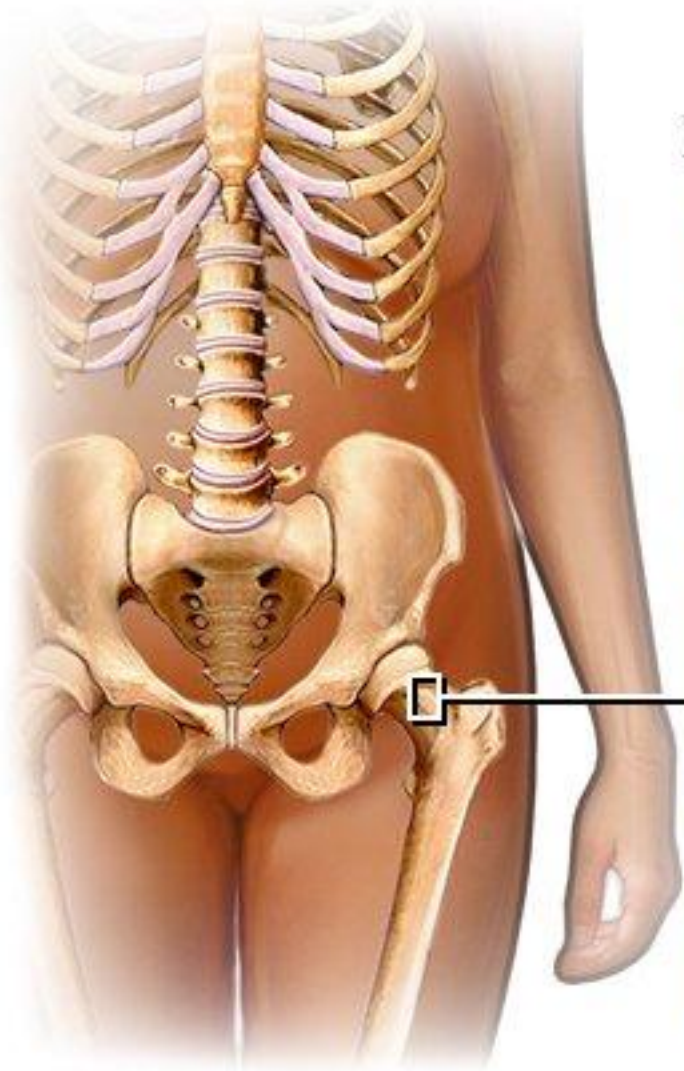
- Any condition that causes swelling or a change in position of the tissue within the carpal tunnel can squeeze and irritate the median nerve. Irritation of the median nerve in this manner causes tingling and numbness of the thumb, index, and the middle fingers, a condition known as "carpal tunnel syndrome."



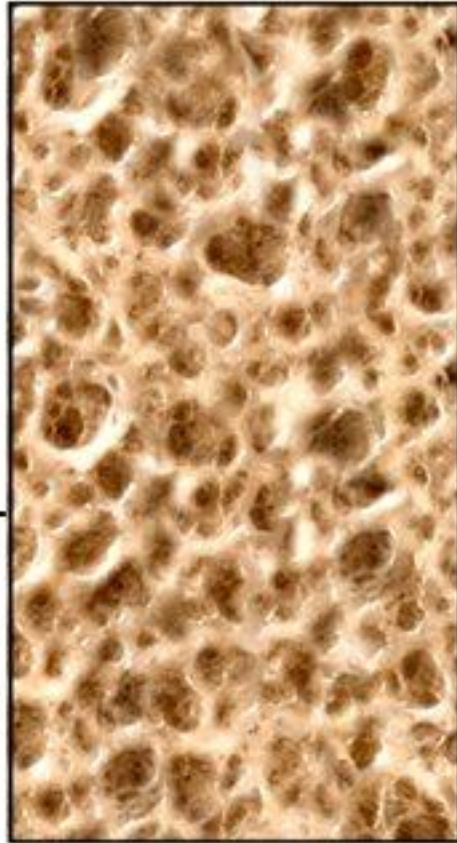


Osteoporosis

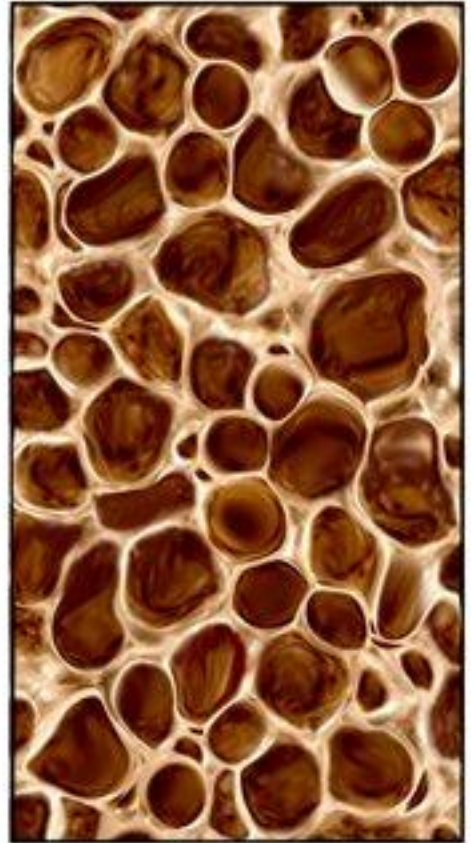
- Osteoporosis is a term that means "porous bones." It is a skeletal disease affecting women and men. Osteoporosis is a condition in which bones have lost minerals especially calcium, making them weaker, more brittle, and susceptible to fractures (broken bones). Any bone in the body can be affected by osteoporosis, but the most common places where fractures occur are the back (spine), hips, and wrists.



Normal bone matrix



Osteoporosis



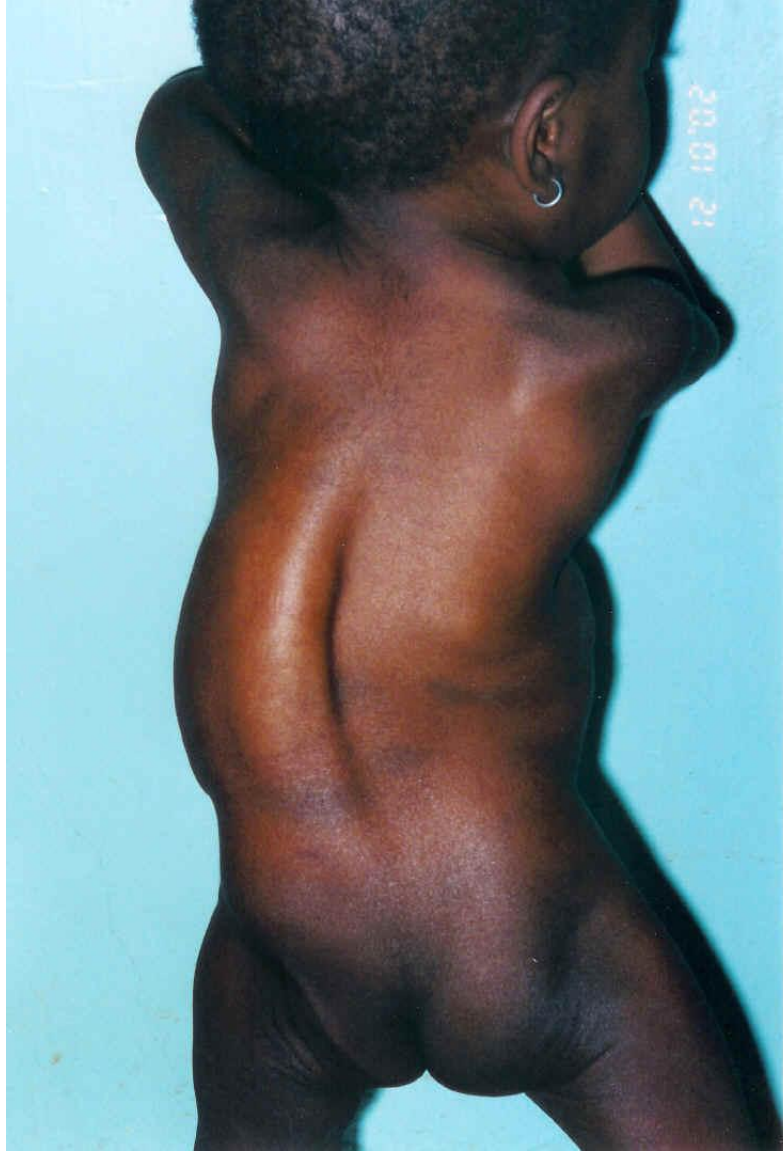


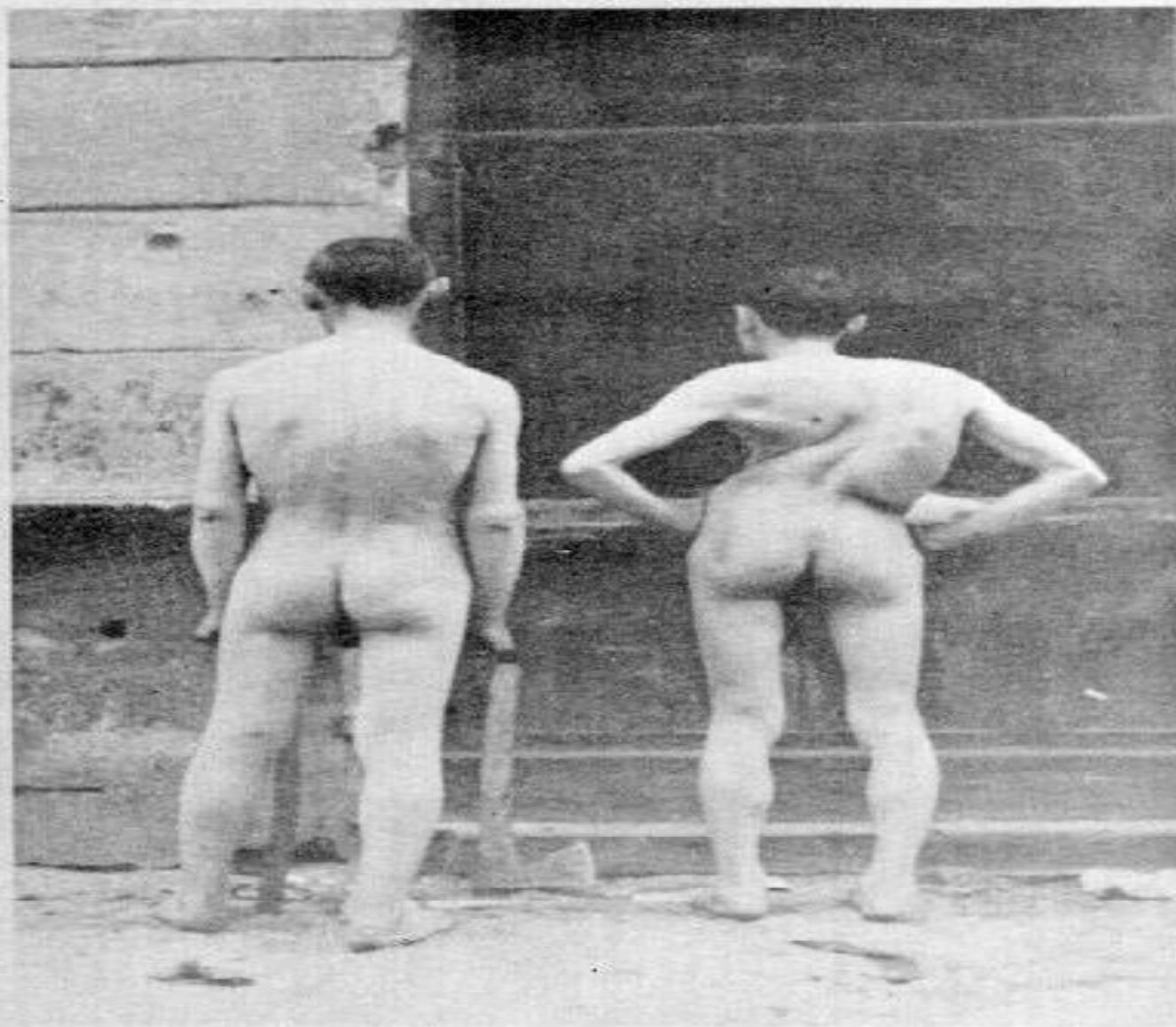
Deterioration of
vertebral support



Scoliosis

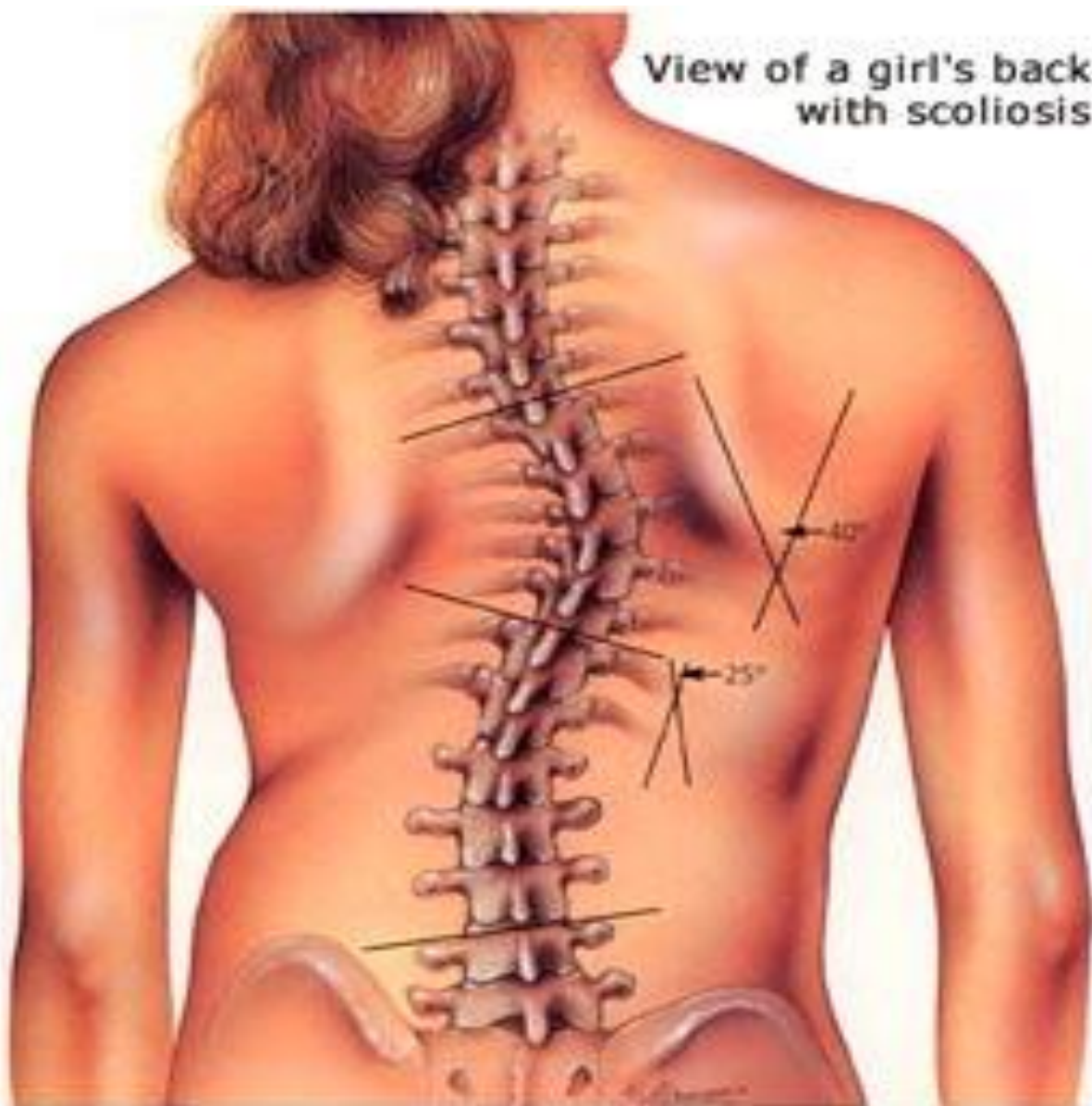
- Scoliosis is an abnormal curvature of the spine. If your child has scoliosis, the view from behind may reveal one or more abnormal curves. Scoliosis runs in families, but doctors often don't know the cause. More girls than boys have severe scoliosis. Adult scoliosis may be a worsening of a condition that began in childhood, but wasn't diagnosed or treated. In other cases, scoliosis may result from a degenerative joint condition in the spine.





— Fotografium von Tempelhoff. —

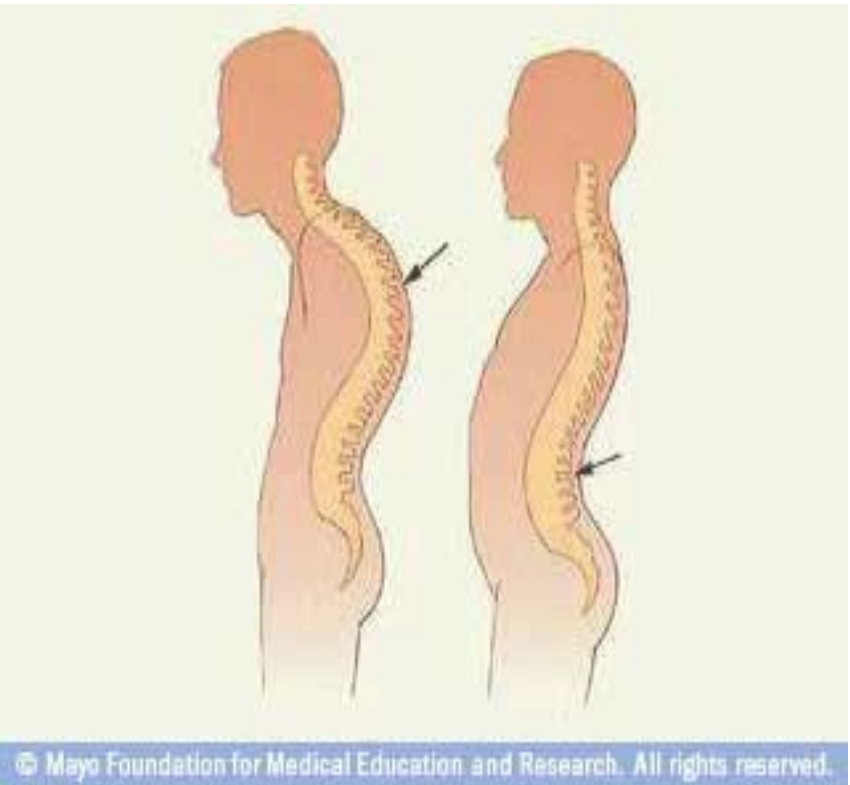
View of a girl's back
with scoliosis





Kyphosis

- With kyphosis, your spine may look normal or you may develop a hump. Kyphosis can occur as a result of developmental problems; degenerative diseases, such as arthritis of the spine; osteoporosis with compression fractures of the vertebrae; or trauma to the spine. It can affect children, adolescents and adults.

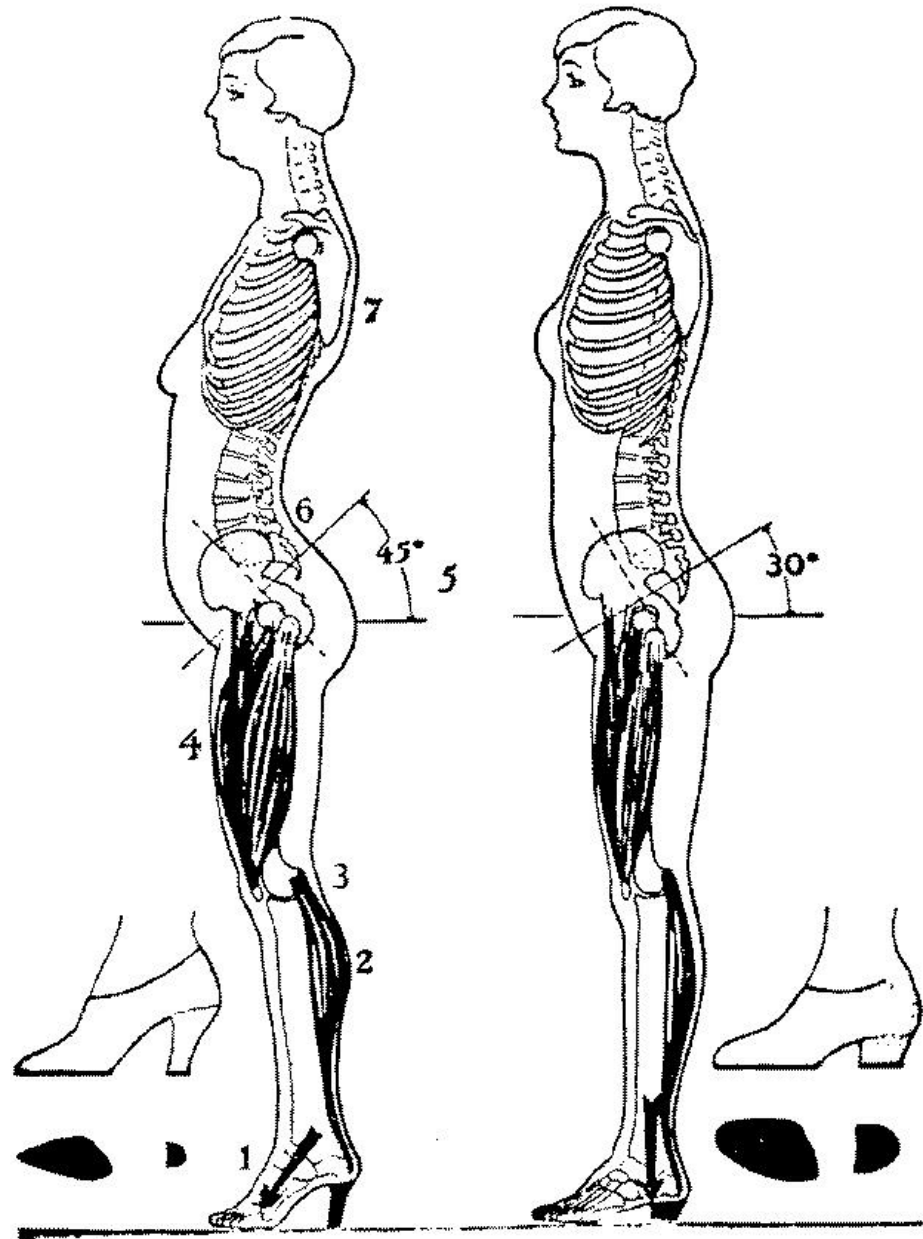


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An adolescent male presents with excessive roundback localized to the thoracic spine. The severe kyphosis is most obvious when he bends forward.

Lordosis

- A normal spine, when viewed from behind appears straight. However, a spine affected by lordosis shows evidence of a curvature of the back bones (vertebrae) in the lower back area, giving the child a "swayback" appearance.



Rickets

- Rickets is the softening and weakening of bones in children, usually because of an extreme and prolonged vitamin D deficiency.
- Some skeletal deformities caused by rickets may need corrective surgery.



Acromegaly

- Acromegaly is a serious condition that occurs when the body produces too much of the hormones that control growth. • The hormone most often affected is called growth hormone, or GH. It is produced by the pituitary gland, a tiny organ at the base of the brain. • Growth hormone promotes growth of bone, cartilage, muscle, organs, and other tissues. • When there is too much growth hormone in the body, these tissues grow larger than normal. This excessive growth can cause serious disease and even premature death.



Muscle Fatigue

Discuss muscle fatigue:

- What causes muscle fatigue?
- How does the body correct muscle fatigue?
- Is muscle fatigue dangerous? Why / why not?
- Discuss aerobic and anaerobic exercise.
 - Give examples of each.



Muscle fatigue: decline in ability of a muscle to generate force

Correction of muscle fatigue:

Nutrition – Maintain a well-balanced diet that includes complex proteins, fruits, vegetables, and carbohydrates.

Eating Schedule – Eat a light meal or snack about two hours before working out. It is not recommended to work out on a full stomach or an empty stomach. Make sure to eat within one hour after you work out. This will help repair and refuel the muscles that were broken down during exercise.

Hydration – Drinking water throughout the day and drinking sports drinks during exercise is crucial to prevent dehydration, electrolyte loss, and muscle fatigue.

Endurance – Improve your aerobic capacity. As your respiratory muscles begin to fatigue, oxygen will be redirected from the muscles of your limbs to those of your diaphragm

Body Mechanics – Use correct form when exercising

Fibromyalgia

**Chronic muscle pain
lasting longer than 3
months**

Symptoms:

Fatigue

Headache

Numbness/tingling

Joint pain

Treatment Goal:

Pain Relief No Cure

Treatment Modalities:

Massage

Chiropractor

Stretching

Sleep/Rest

Relaxation techniques

Pain Meds



Hernia

Hernia: organ protrusion out of a weak muscle

Types:

- 1.abdominal: organs protrude through the abdominal wall**
- 2.Inguinal: organs protrude in the inguinal area**
- 3.Hiatal: stomach pushes through the diaphragm**

Causes:

Anything that exerts increased pressure in the abdomen (overweight, carrying or pushing heavy objects, persistent coughing or sneezing)

In addition, obesity, poor nutrition, and smoking, can all weaken muscles and make hernias more likely

Treatment:

Surgical repair

Muscle Spasms

(Involuntary hypertonicity)

- A muscle spasm, or muscle cramp, is an involuntary contraction of a muscle. Muscle spasms occur suddenly, usually resolve quickly, and are often painful. Often due to dehydration or or overuse of the muscle.
- Treatment:
- Prevention is key. Drink plenty of fluids and stretch prior to any strenuous activity or exercise. Once the spasm occurs stretching it out will usually alleviate the symptoms.

Muscular Dystrophy

- Muscular dystrophy is a group of genetic diseases in which muscle fibers are unusually susceptible to damage. These damaged muscles become progressively weaker. Most people who have muscular dystrophy will eventually need to use a wheelchair.
- Duchenne muscular dystrophy
- About half of all muscular dystrophy cases are the Duchenne variety, which most commonly occurs in boys. Signs and symptoms typically first surface when the child begins to walk and may include:
 - Frequent falls
 - Difficulty getting up from a lying or sitting position
 - Trouble running and jumping
 - Waddling gait
 - Large calf muscles
 - Learning disabilities