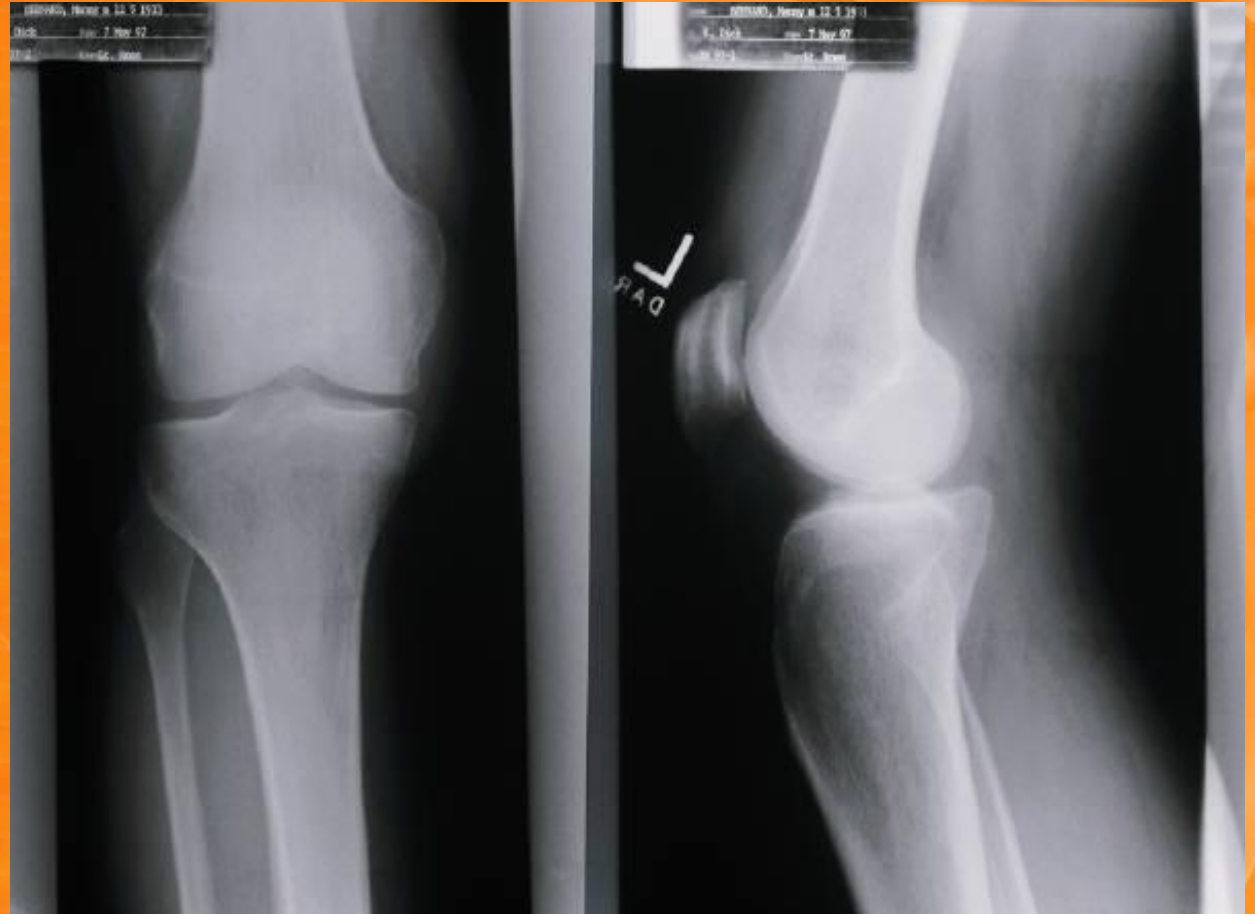


Musculoskeletal System

- The musculoskeletal system gives the body strength, structure, and capability of movement.
 - Bones are the framework.
 - Ligaments and tendons are the nails
 - Muscles are the way we move
- **Orthopedics** – physicians that study musculoskeletal system
- **Rheumatologists** - treat diseases of the joints



- There are 206 bones in the human body



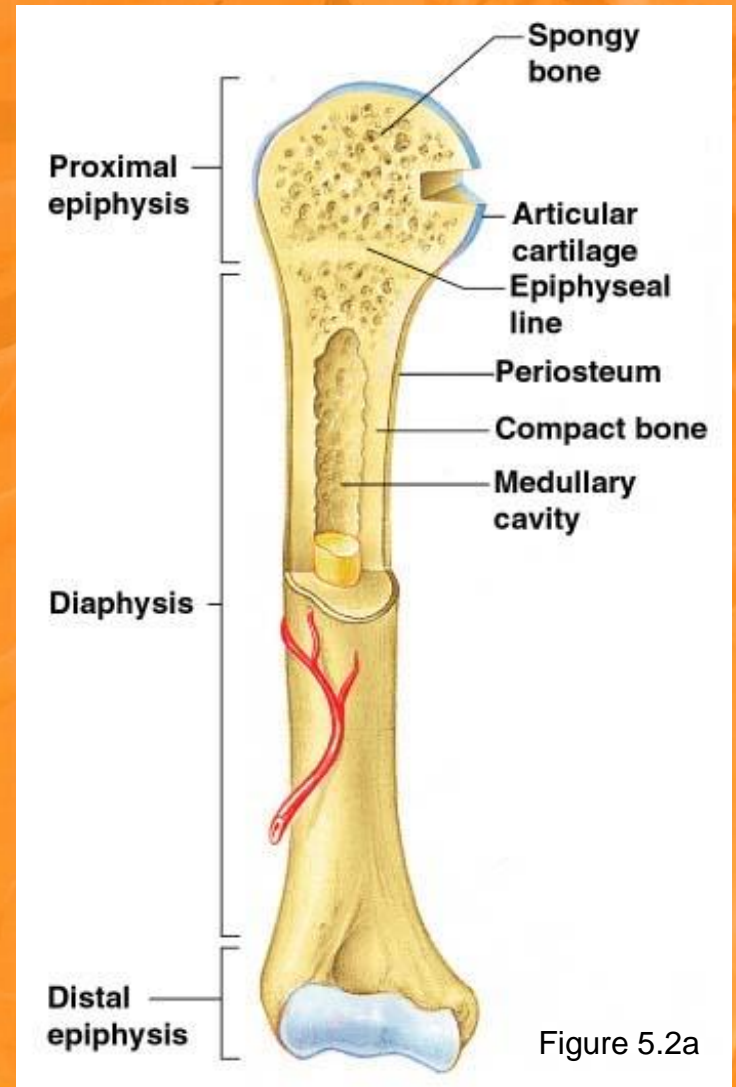


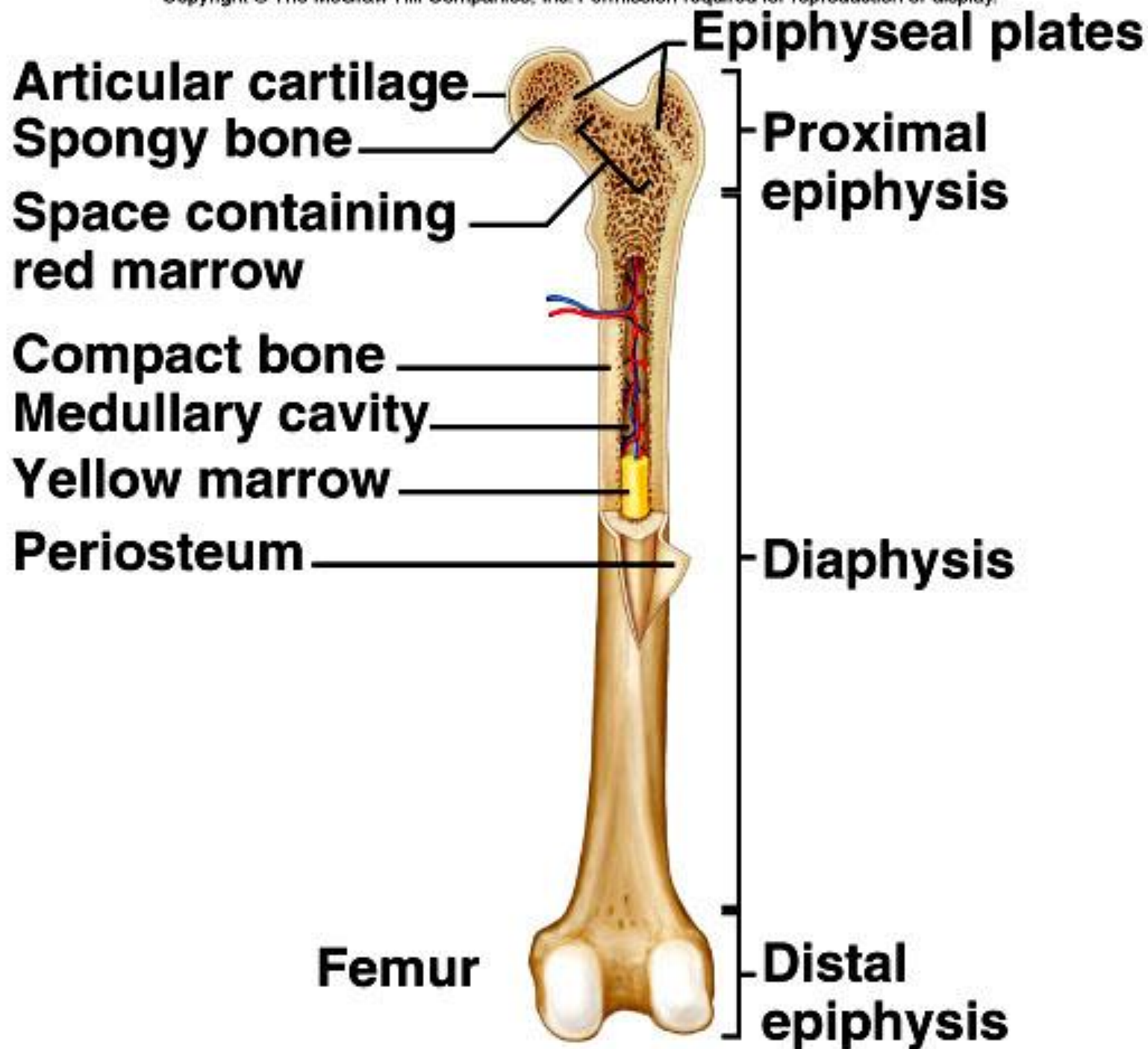
Bones are classified by their shape:


1. Long – humerus, radius, ulna, femur, tibia, fibula
2. Short – carpals, tarsals
3. Flat - sternum
4. Irregular - vertebrae

Gross Anatomy of a Long Bone

- **Diaphysis**
 - Shaft
 - Composed of compact bone
- **Epiphysis**
 - Ends of the bone
 - Composed mostly of spongy bone





- 
- **Osteocytes** -living cells of bone; they produce new bone
 - **Cartilage** - collagen fibers that cushion the ends of bone and provide flexibility
 - Bones join together to form joints.
 - Bones are held together with **ligaments**.
 - Only bone that does not have a joint – hyoid bone (neck)

Types of Joints

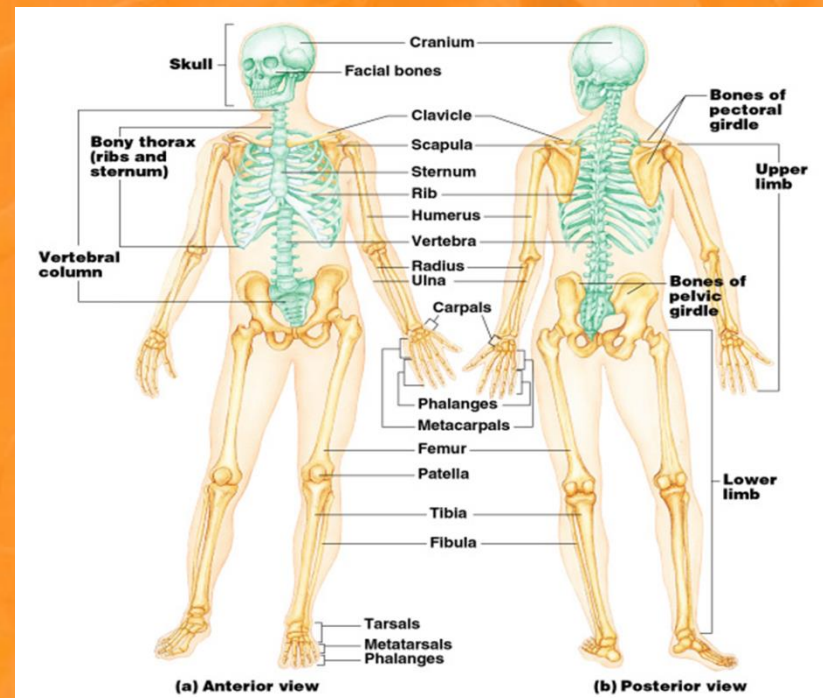
1. **Ball and socket** - hip; shoulder
2. **Hinge** - ankle; fingers
3. **Pivot** - elbow
4. **Saddle** - thumb
5. **Gliding** - intervertebral joint
6. **Condyloid** – wrist

Use your coloring sheet as a reference.



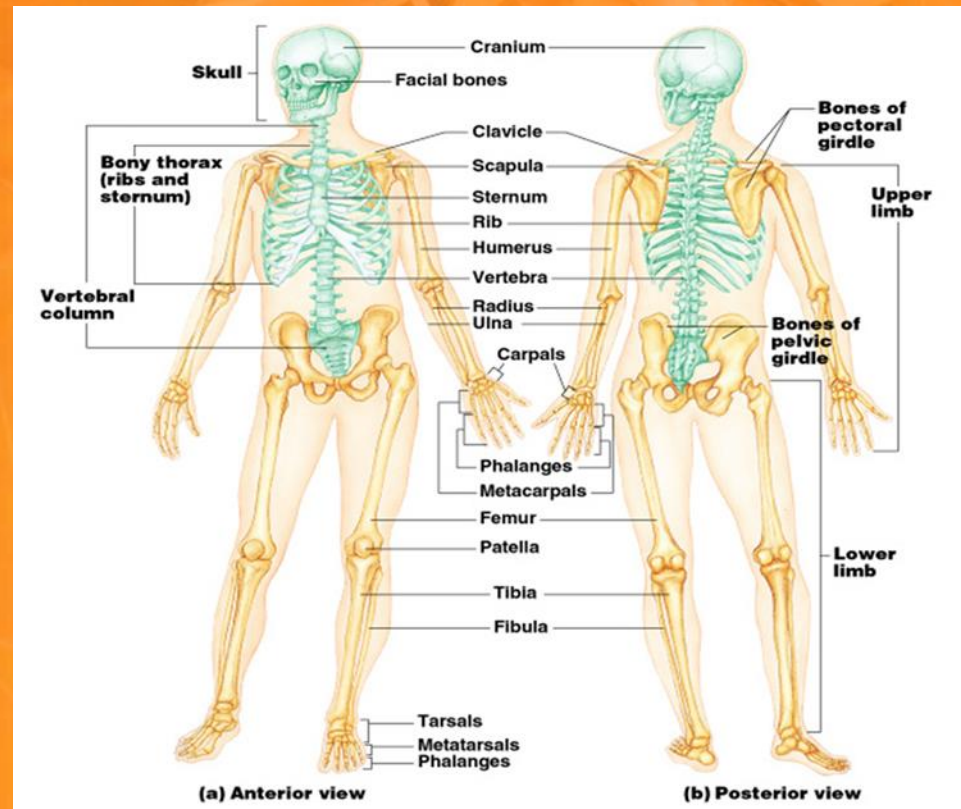
The Axial Skeleton

- Forms the longitudinal part of the body
 - Shown here in blue, reference your coloring sheet.
- Divided into three parts:
 - Skull
 - Vertebral column
 - Thorax



The Appendicular Skeleton

- Formed by the limbs and their girdles
 - Shown here in tan.
 - Reference your coloring sheet.



Bone Fractures (fx)

- Fx = break in a bone
- Types of bone fractures
 - Closed (simple) fracture – break that does not penetrate the skin
 - Open (compound) fracture – broken bone penetrates through the skin
- Bone fractures are treated by reduction (setting the bone back in place) and immobilization (cast).




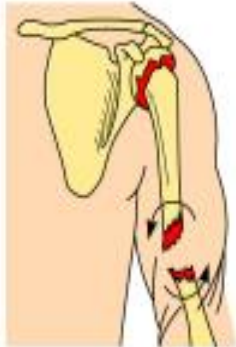


Fracture type	Illustration	Description	Comment
Comminuted		Bone breaks into many fragments.	Particularly common in the aged, whose bones are more brittle.
Compression		Bone is crushed. (i.e., osteoporotic bones).	Common in porous bones
Depressed		Broken bone portion is pressed inward.	Typical of skull fracture.
Impacted		Broken bone ends are forced into each other.	Commonly occurs when one attempts to break a fall with outstretched arms
Spiral		Ragged break occurs when excessive twisting forces are applied to a bone.	Common sports fracture.
Greenstick		Bone breaks incompletely, much in the way a green adults.	Common in children, whose bones are more flexible than those of

Table 5.2

Stages in the Healing of a Bone Fx

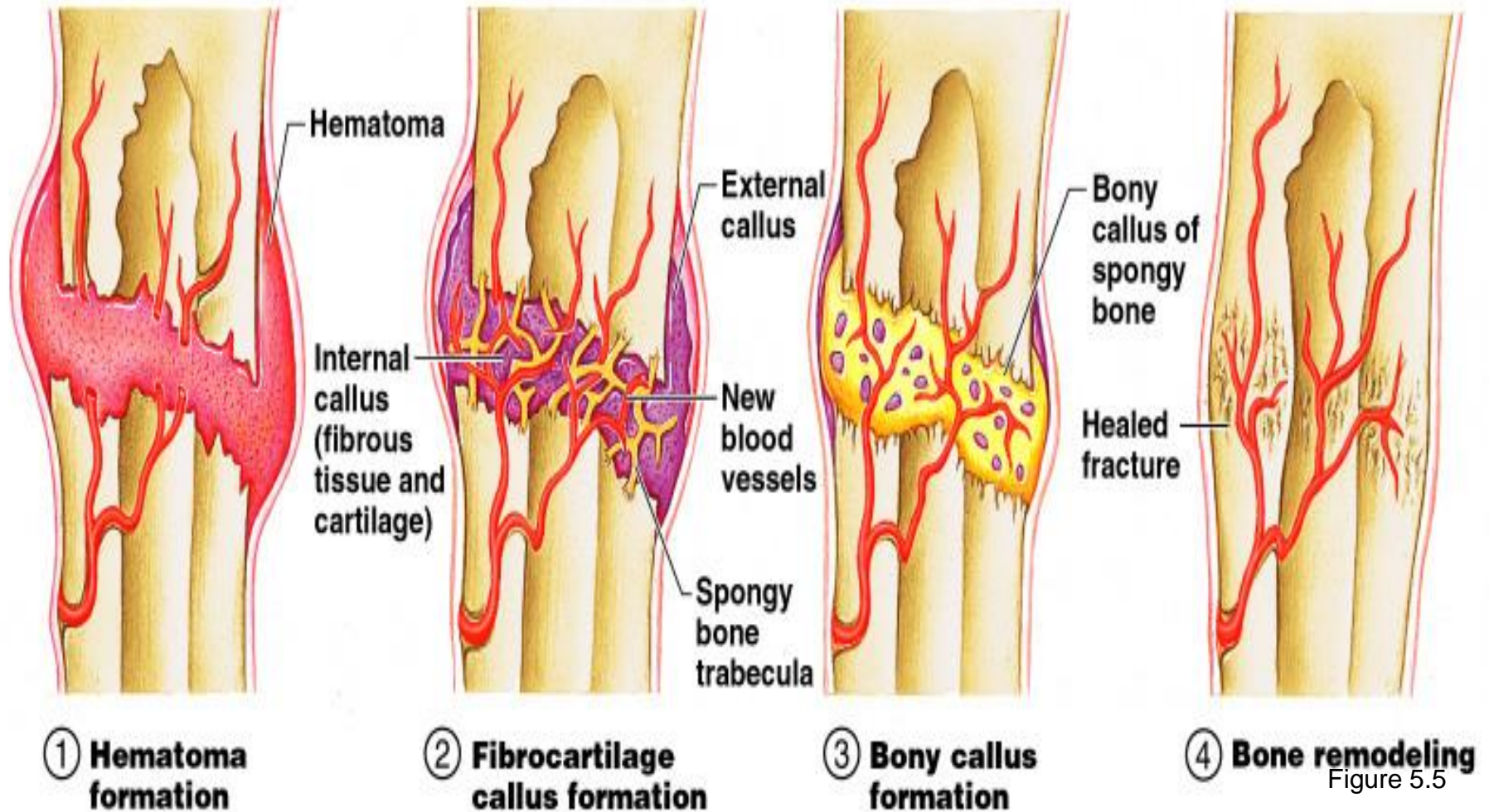
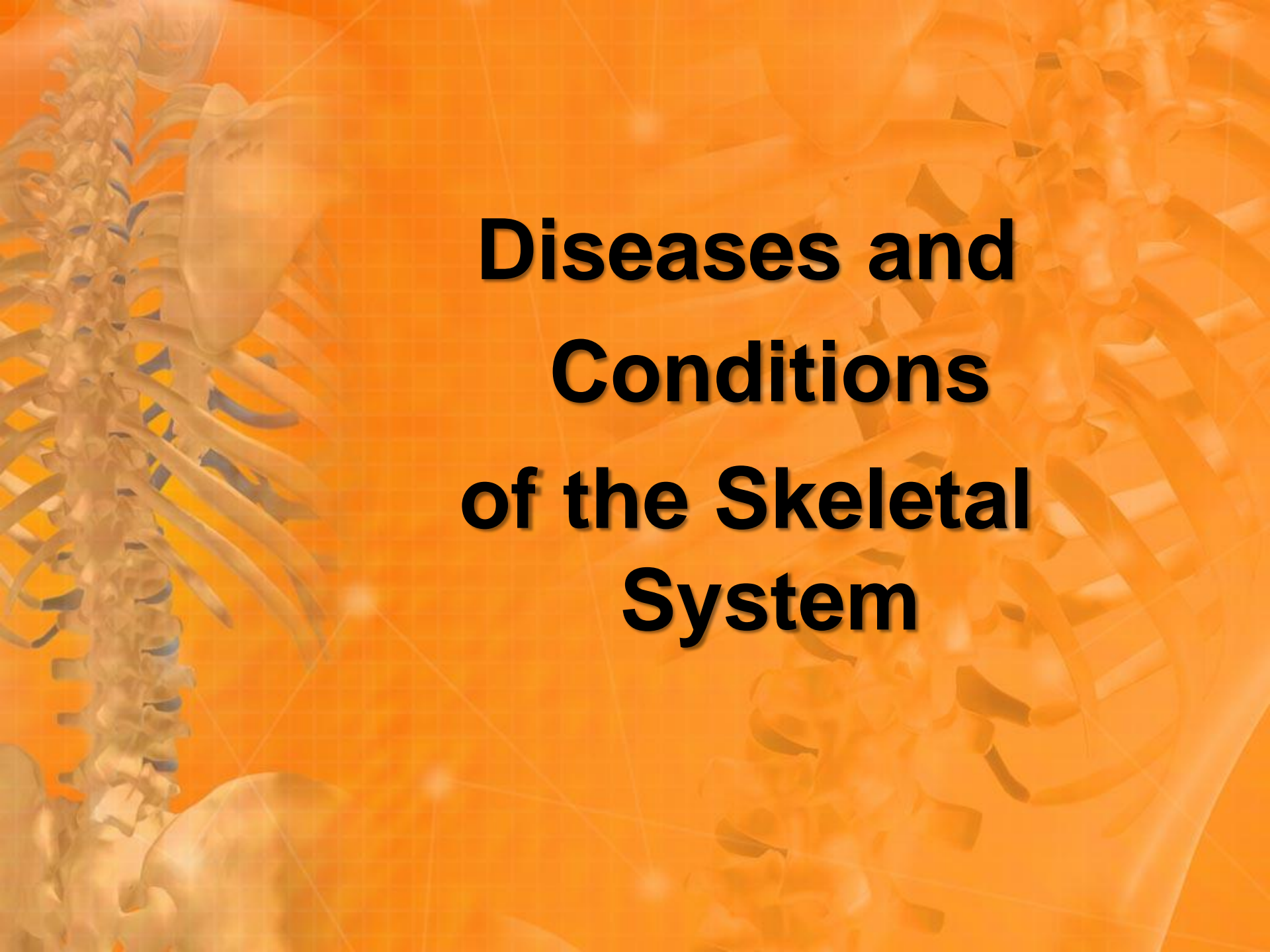
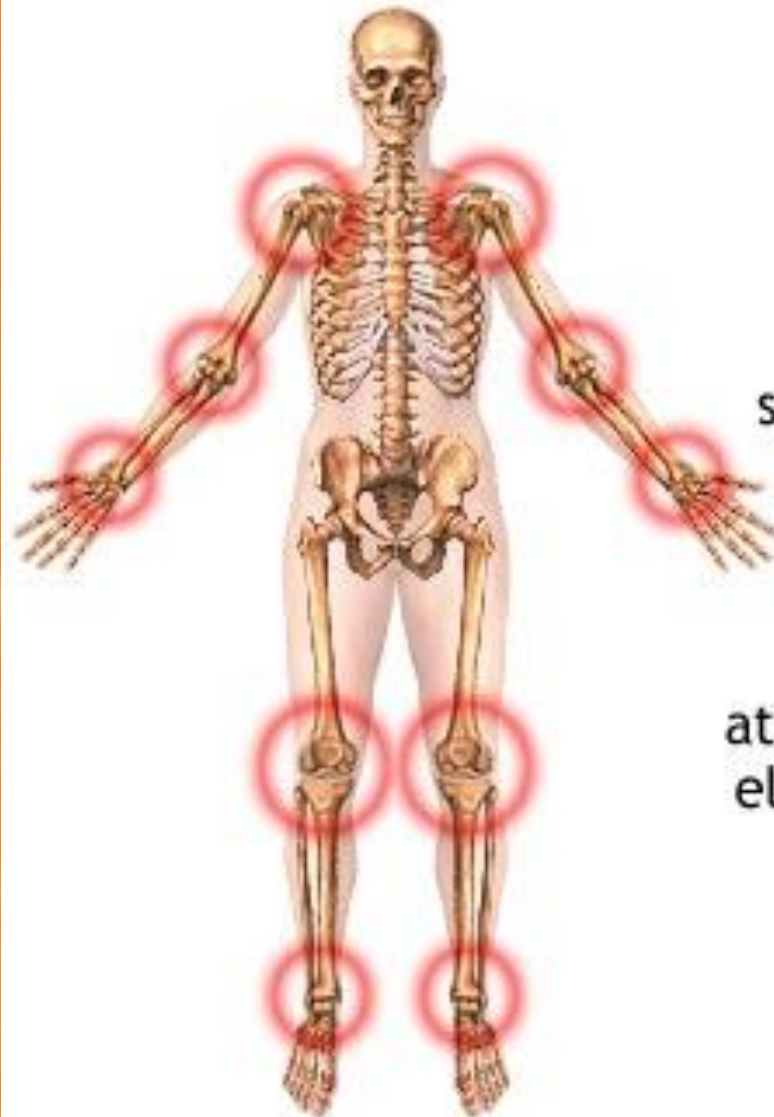


Figure 5.5



Diseases and Conditions of the Skeletal System

1. Arthritis



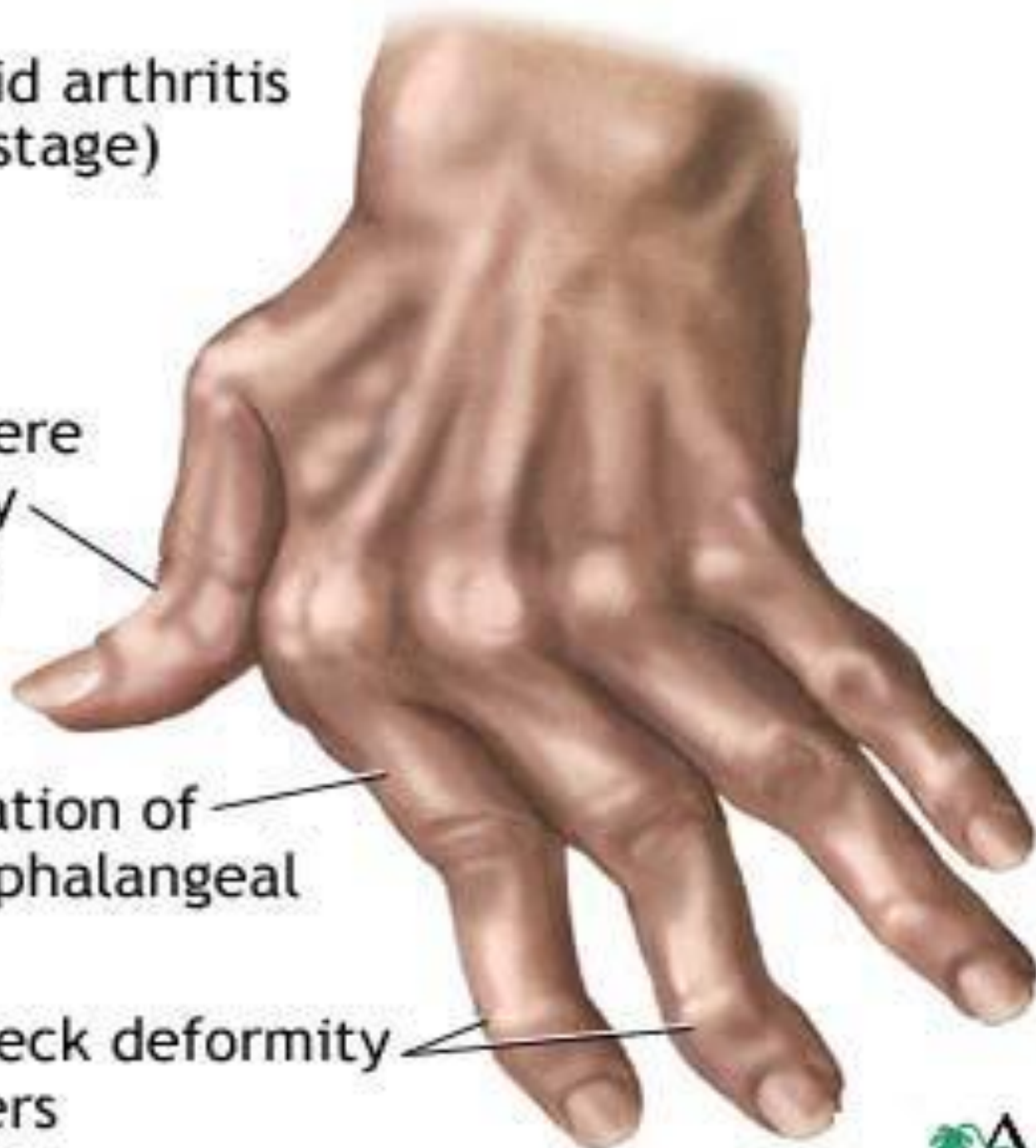
Rheumatoid arthritis usually affects joints symmetrically (on both sides equally), may initially begin in a couple of joints only, and most frequently attacks the wrists, hands, elbows, shoulders, knees and ankles

Rheumatoid arthritis (late stage)

Boutonniere
deformity
of thumb

Ulnar deviation of
metacarpophalangeal
joints

Swan-neck deformity
of fingers







2. Bursitis



- Inflammation of the Bursa (fluid filled sac surrounding the joint).
- A bursa can become inflamed from injury, infection, 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.

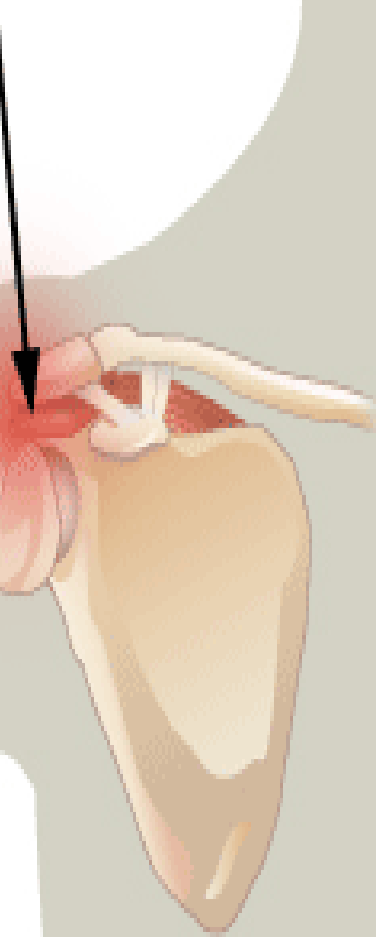
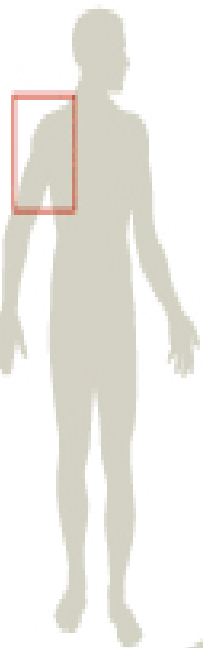


3. Tendinitis

- 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



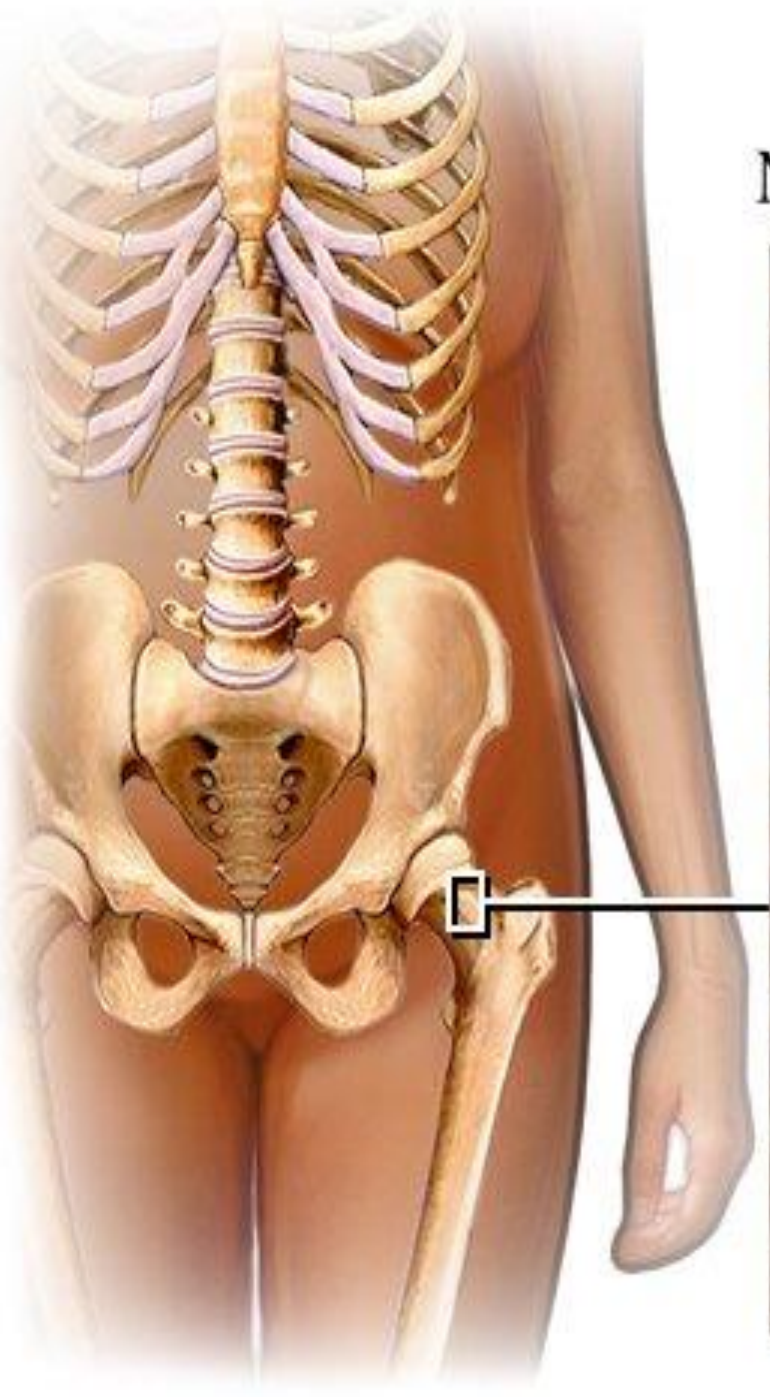
Inflammation of Achilles Tendon



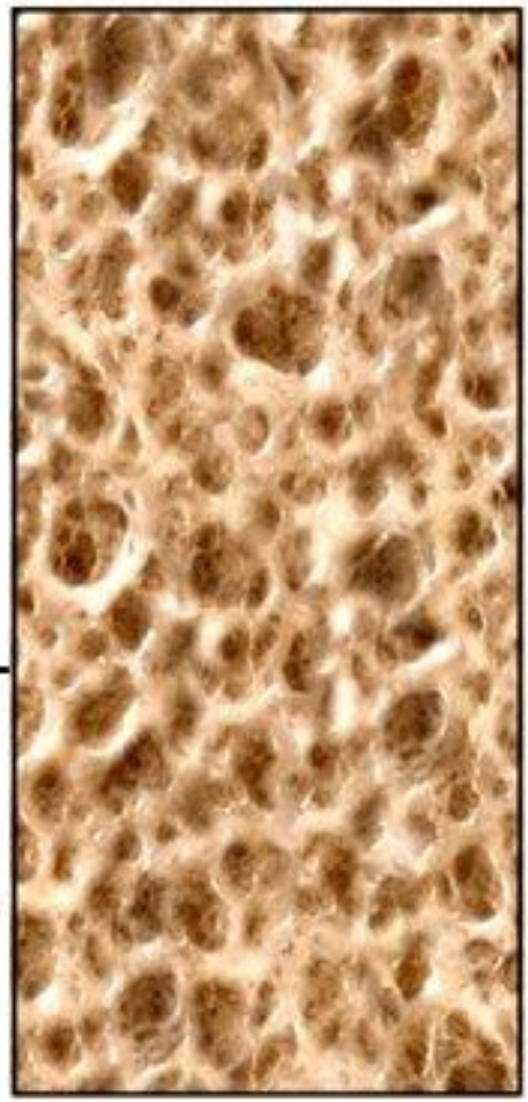
4. Osteoporosis

- Osteoporosis is a term that means “porous bones”.
- Affects men and women
- Bones do not have enough minerals and are weakened and brittle
- Fx occur in hip, back, and wrists





Normal bone matrix



Osteoporosis

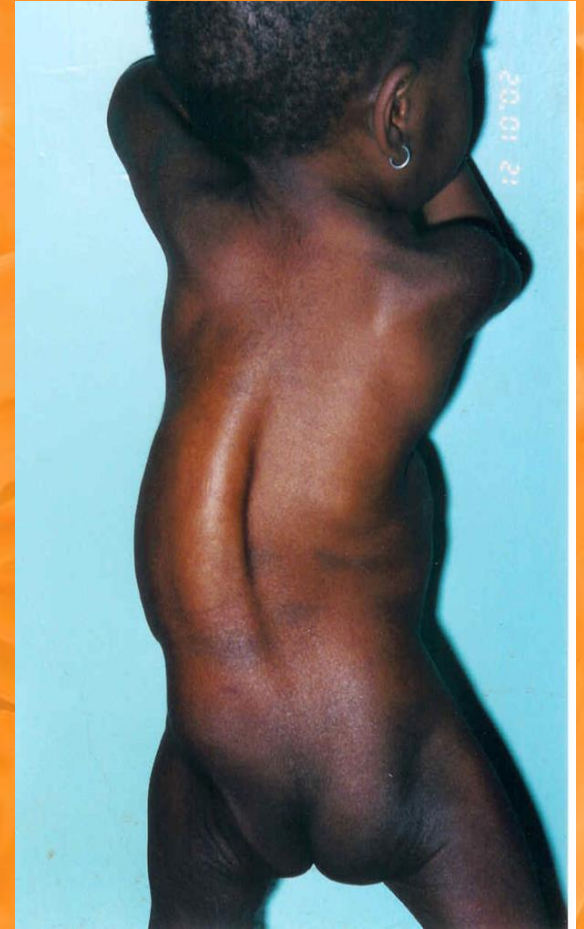


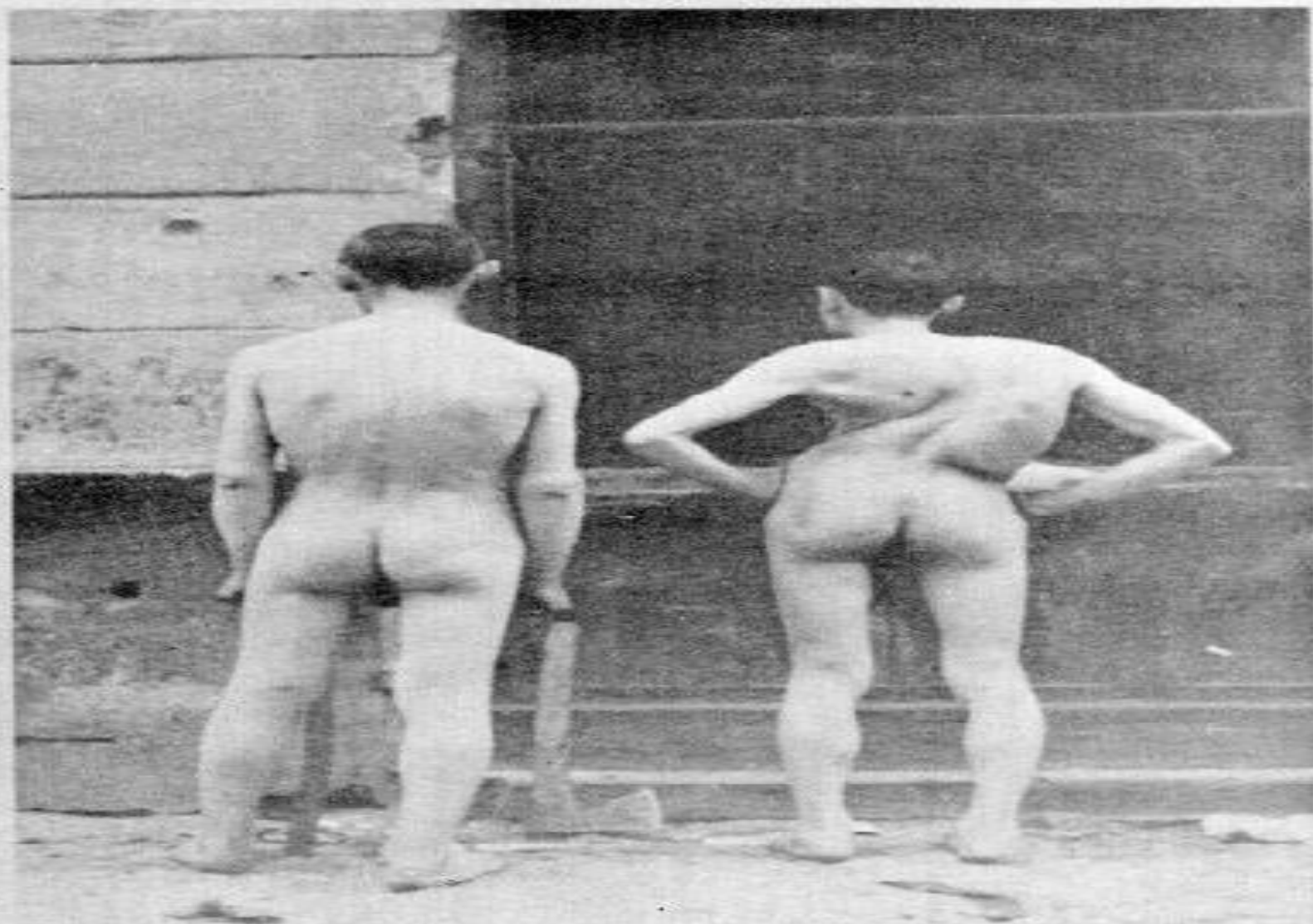


Deterioration of
vertebral support

5. Scoliosis

- Scoliosis is an abnormal curvature of the spine laterally.
- Affects girls more than boys





— Fotografium von J. J. J. J. J. —



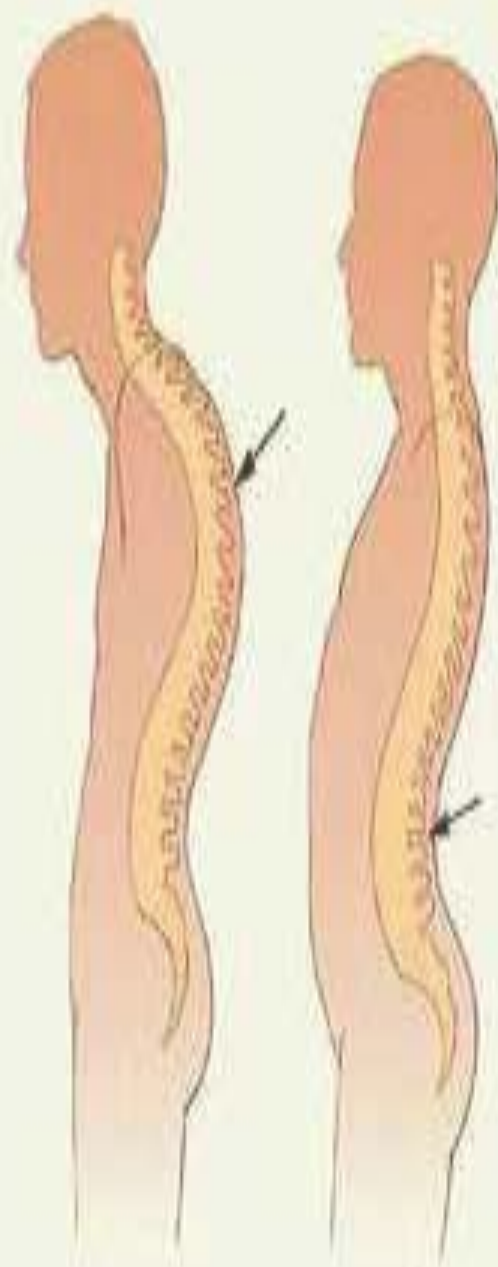
6. Kyphosis

- 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.



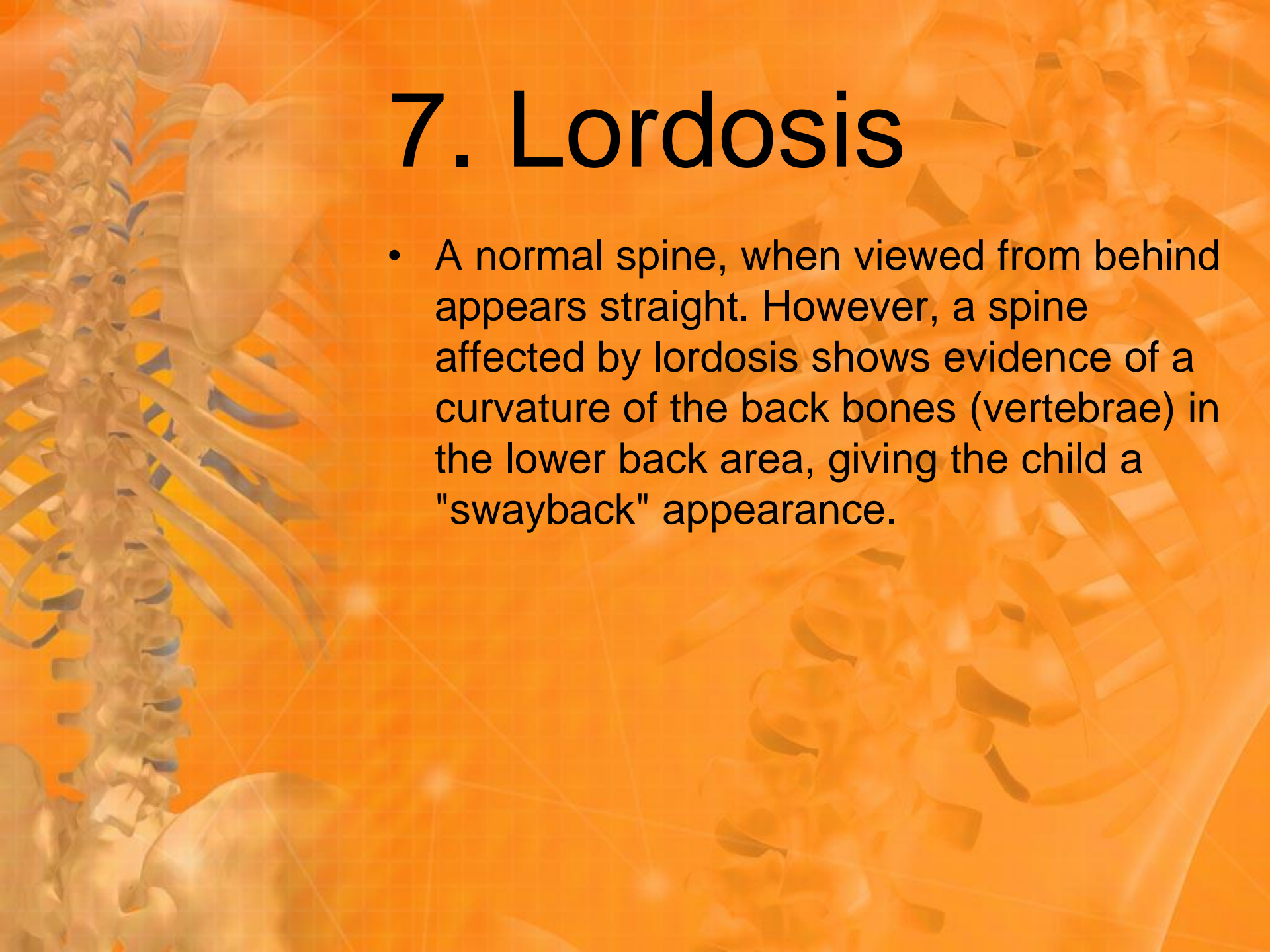


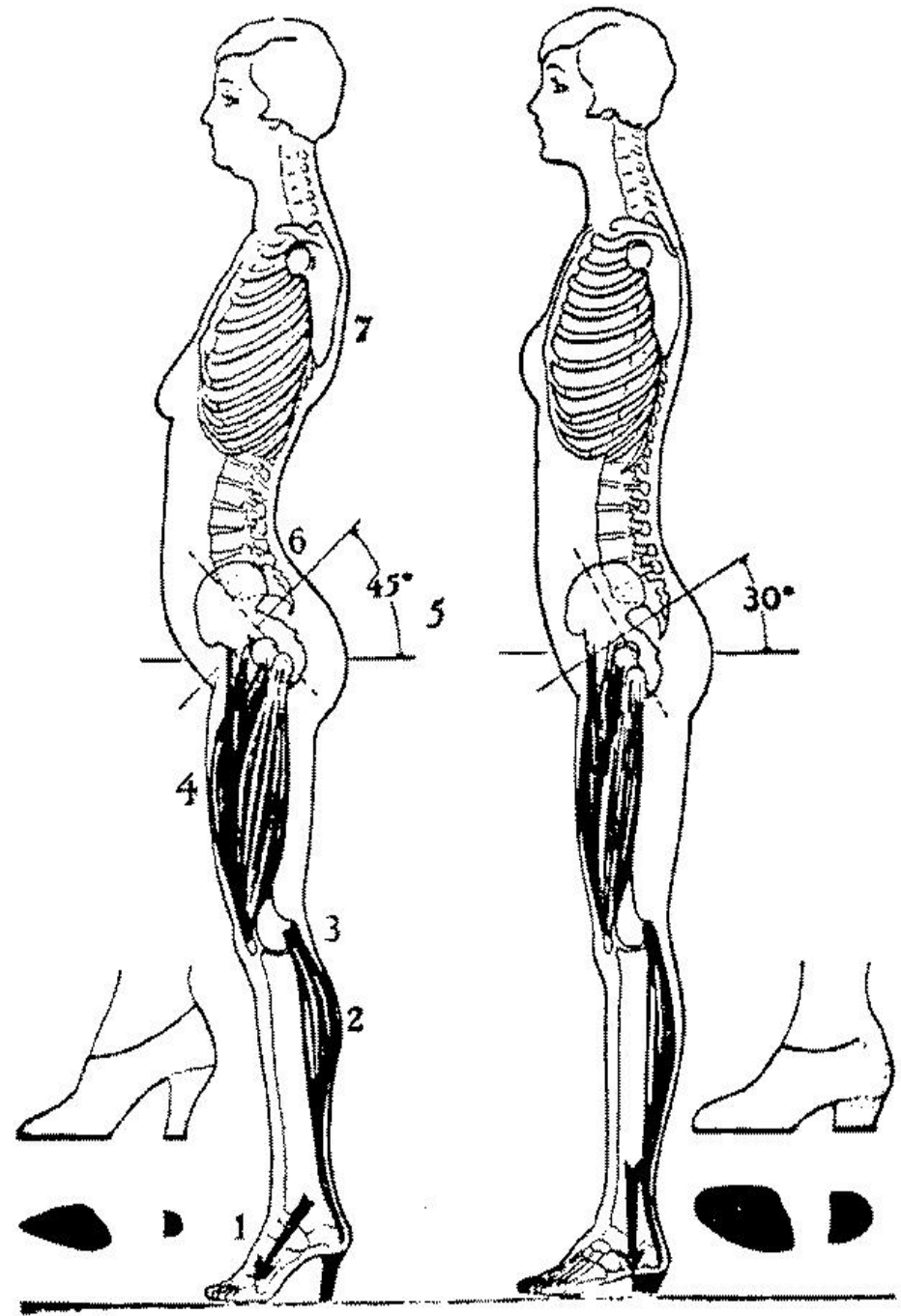
An adolescent male presents with excessive roundback localized to the thoracic spine. The severe kyphosis is most obvious when he bends forward.



7. 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.

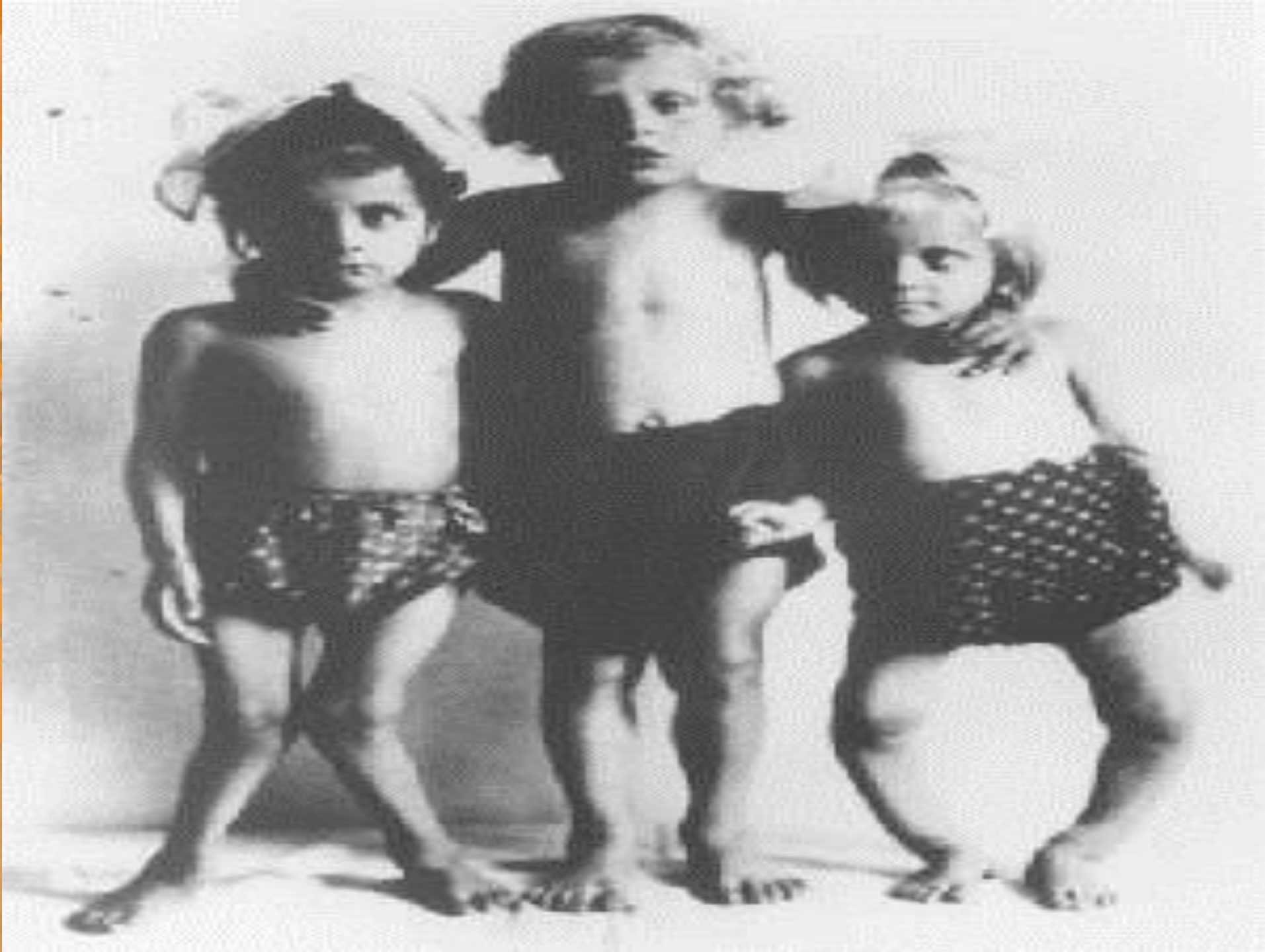


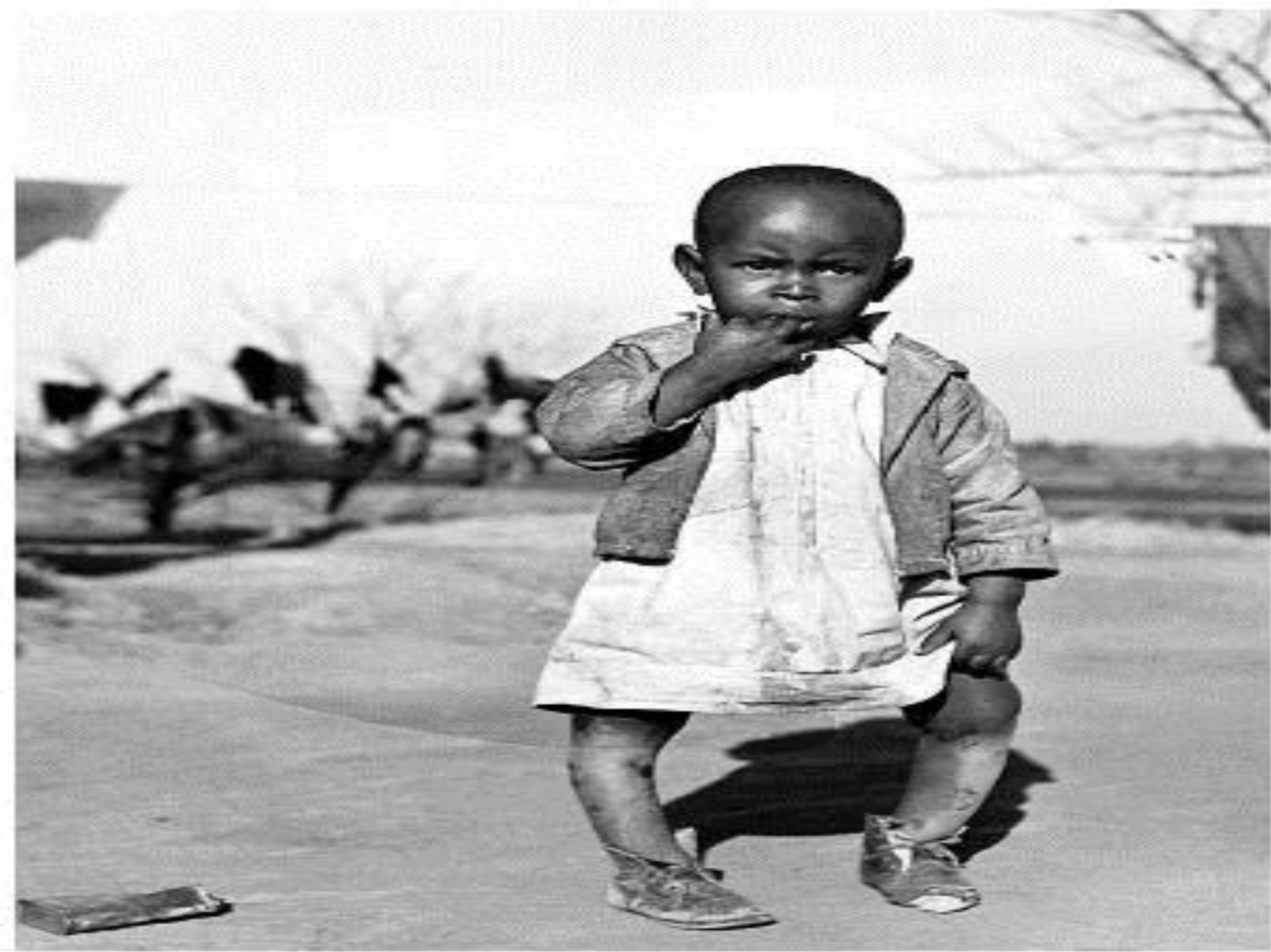


8. Rickets

- 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.







9. Scurvy

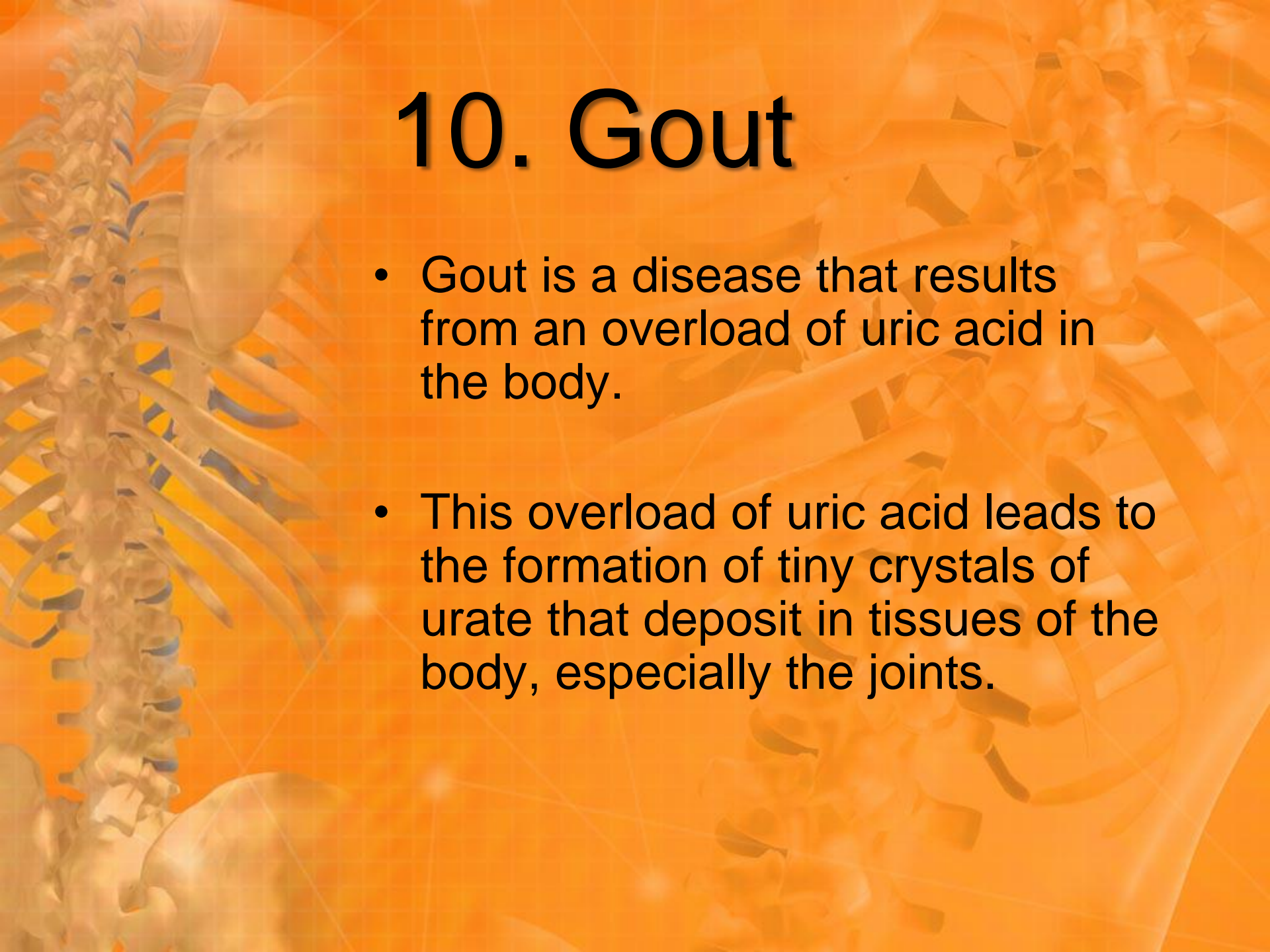
- The human body lacks the ability to synthesize and make vitamin C and therefore depends on exogenous dietary sources to meet vitamin C needs.
- Consumption of fruits and vegetables or diets fortified with vitamin C are essential to avoid ascorbic acid deficiency.





10. Gout

- Gout is a disease that results from an overload of uric acid in the body.
- This overload of uric acid leads to the formation of tiny crystals of urate that deposit in tissues of the body, especially the joints.



- When crystals form in the joints it causes recurring attacks of joint inflammation (arthritis).
- Chronic gout can also lead to deposits of hard lumps of uric acid in and around the joints and may cause joint destruction, decreased kidney function, and kidney stones.

