

Understanding Arthritis – Matthew O. Swartz, M.D.

1. What is arthritis?
2. Basic biology
3. The musculoskeletal system
4. Joint structure and function
5. Osteoarthritis

Introduction:

- A. What is arthritis? A disorder affecting joint (s) causing pain and loss of function
 1. May affect joints individually or multiples, the distribution frequently characteristic of the type of arthritis
 2. Functional loss may be acute (although rarely permanent) or chronic leading to frank disability
 3. Greek : arthron
 4. Latin : " itis " suffix meaning inflammation
 - a. Calor – heat
 - b. Rubor – redness
 - c. Dolor- pain
 - d. Tumor – swelling

- B. Basic biology
 1. Cell : The most fundamental unit of living things containing genetic information for the organism (nuclear proteins – DNA, RNA, mRNA) which codes for replication and function
 2. Tissues: a group of cells functionally unified
 3. Organs : tissues committed to a collective process (or processes)
 4. System: organs acting in concert toward a purpose (or purposes)

- C. The musculoskeletal system: Unification of specialized tissues that provide for the body's form and allows for movement
 1. Bones: tissue composed of calcium, collagen (complex proteins) and cells
 - a. Osteoblasts
 - b. Osteocytes
 - c. Osteoclasts
 - d. Vascular and neurologic supplied
 - e. Two types : cortical and cancellous or trabecular
 2. Muscle complex tissue which provides the energy for movement (striated and smooth)
 3. Cartilage : matrix of cells (chondrocytes) , collagen and proteoglycans (chondroitin, glucosamine , keratan and hyaluronic acid) and serves as a protective barrier between the bones of a joint and allows for (normally) smooth movement between joints

- D. Types of joints
 1. Diarthroses: movement in 2D or 3D planes
 2. Synarthroses: skull (joints allow birth and brain growth, close in late childhood forming suture lines), sacrum (sacroiliac joints, symphysis pubis) soften to allow for pelvic changes of pregnancy and birth, coccyx – no movement
 3. Amphiarthroses: sternoclavicular , acromioclavicular – limited movement:

- E. Structure of diarthroidal joints

Osteoarthritis: the resultant change in the condition of a joints due to mechanical (primary) or inflammatory (secondary) factors

1. Primary osteoarthritis – cartilage degradation
 - a. Chondrocyte dysfunction
 - b. Loss and inability to retain water
 - c. Cartilage stiffness and loss of resiliency

Contributing factors

- a. Age
- b. Genetics
- c. Injury
- d. Congenital (hip dysplasia)
- e. Inherited disorders of connective tissue – Marfans syndrome, Ehlers Danlos,ligamentous laxity)

Common joint targets

- a. Hands and feet (knobby knuckles and bunions)
 - b. Knees (meniscal cartilage v. hyaline cartilage)
 - c. Hips (old microfractures v. acetabular (ball and socket) changes
 - d. Spine (neck and lower back) – disc space narrowing, facet joint degeneration
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2. Secondary osteoarthritis – the influence of underlying extra-articular phenomena that lead to cartilage destruction and joint damage