CHAPTER 8 JOINTS

Joints

• = articulation
• arthro - = joint
  • arthritis
  • arthroscopic surgery
• allows movement between bones

by structural tissue
  • fibrous joint          fibrous c.t.
  • cartilaginous joint  cartilage
  • synovial joint        synovial membrane

by function - amount of movement
  • synarthrosis           no movement
  • amphiarthrosis         little movement
  • diarthrosis            freely moving

fibrous joint
  • sutures                synarthroses skull bones
  • syndesmoses            amphiarthrosis tibia – fibula
  • gomphosis              synarthrosis teeth

cartilaginous joint
  • symphysis              amphiarthrosis pubic symphysis IVD
  • synchondroses          synarthrosis manubrium-1" rib

synovial joint  all diarthroses

Synovial joints

synovial cavity
  • synovial fluid         lubricant
    nourishes articular cartilage

articular capsule
  • connects bones
    fibrous capsule fibrous c.t.
    continuous with periosteum
  • synovial membrane      lines fibrous capsule
    secretes synovial fluid

articular cartilage
  • ends of epiphysis
    cushion bone
    smooth surface

joint reinforcements

ligaments
  • resist movement
    fibrous c.t.
    bone – bone

tendons
  • aid movement
    fibrous c.t.
    bone – muscle

articular discs = meniscus
  • fibrocartilage w/in joint cavity

bursa
  • fluid-filled sacs
    between tendons and bone

muscle tone
ROM = Ranges of Motion

- flexion / extension  
  most joints

- lateral flexion  
  spine

- rotations  
  spine; ball and socket

- dorsiflexion / plantarflexion  
  ankle

- abduction / adduction  
  hip; shoulder

- circumduction  
  shoulder

- supination / pronation  
  forearm; foot

- inversion / eversion  
  foot

- elevation / depression  
  shoulder; TMJ

- protraction / retraction  
  shoulder; TMJ

ROM

- flexion  
  decrease angle between bones
  bend joint (usually anteriorly)

- extension  
  increase angle between bones
  straighten joint

- lateral flexion  
  decrease angle laterally

- rotation  
  bone turns around another

  more ROM

- abduction  
  away from the midline

- adduction  
  toward the midline

- pronation  
  palm down  plantar down

- supination  
  palm up  plantar up

- dorsiflexion  
  decrease angle of ankle, anteriorly

- plantarflex  
  decrease angle of ankle, posteriorly

  even more ROM

- circumduction  
  combination of actions (shoulder)

- inversion  
  ankle supination + internal rotation

- eversion  
  ankle pronation + external rotation

- opposition  
  thumb to fingertips

- elevation  
  raise

- depression  
  lower

- protraction  
  forward

- retraction  
  back

  types of synovial joints

- ball and socket
- hinge
- pivot
- condyloid
- plane
- saddle
- hip
  - femur - acetabulum
- shoulder
  - humerus – glenoid cavity
- multiaxial
  - many ROM
- elbow
  - humerus - ulna
- knee
  - femur - tibia
- interphalangeal joints
- ankle: tibio – talar joint
- uni-axial
  - flex - extend
- atlas – axis
- ulna – radius
- rotations
- condylar (convex) surface fits into concave surface
- TMJ
  - occipital – atlas
  - metacarpal (metatarsal) – phalangeal
  - radiocarpal
- bi-axial
  - flex – extend
  - abduct - adduct
- flat planes gliding past each other
- carpals
- tarsals
- costovertebral
- acromioclavicular
- intervertebral facets
- convex and concave surfaces
- 1st carpo-metacarpal
- knee

  - largest joint
  - **femur – tibia** hinge
  - meniscus medial and lateral
    - fibrocartilage
    - stabilize femoral condyles

  - intracapsular ligaments
    - anterior cruciate lig
    - posterior cruciate lig
  - extracapsular ligaments
    - tibial and fibular collateral ligts
    - patellar ligament
    - retinaculum

- hip

  - = coxal joint ball and socket
  - femur head - acetabulum
  - acetabular labrum fibrocartilage ring
  - ligaments
    - iliofemoral lig
    - pubofemoral lig
    - ischiofemoral lig
    - ligamentum teres head of femur to acetabulum

- shoulder joint

  - = glenohumeral joint
  - glenoid cavity (fossa)
  - glenoid labrum fibrocartilage
    - deepens the glenoid cavity
  - ligaments
    - coracohumeral lig
    - glenohumeral lig
  - muscles
    - rotator cuff (4 muscles)
    - biceps - long head
  - A-C joint (acromioclavicular)

- elbow joint

  - humero-ulnar joint hinge
    - trochlea (humerus) - trochlear notch (ulna)
    - ligaments radial collateral
    - ulnar collateral

  - radial-ulnar
    - radial head to ulna
    - annular ligament

- wrist joint

  - radio-carpal joint
    - radius - scaphoid + lunate
    - condyloid
• intercarpal joint
  — gliding

• ankle

• = talocrural joint  hinge
  — talus - tibia + fibula

• intertarsal joints  inversion / eversion

• ligaments
  — medial (deltoid) ligt
  — lateral ligt

• TMJ

• tempo-mandibular joint

• mandibular head (condyle) - mandibular fossa

• articular disc (meniscus)

• condyloid

• motions: elevation – depression
  protrusion – retraction
  lateral excursion

• other joints

• carpal – metacarpal

• tarsal - metatarsal

• metacarpal – phalangeal

• interphalangeal  PIP  DIP

• what could go wrong?

• injury  sprain
  dislocation

• arthritis
  — Osteoarthritis
  — Rheumatoid Arthritis
  — Gout
  — Ankylosing Spondylitis

• CTS

• HNP

• TMJ

• intervertebral articulations

• vertebral arch  facets
  — superior articular process
  — inferior articular process

• vertebral bodies  intervertebral disc  (IVD)
  — same # as vertebra above
  — nucleus pulposus  gel / water
    hydraulic pressure
  — annulus fibrosus  fibrocartilage
    contains NP

• “herniated disc”