

9: JOINTS

Classification of joints

Fibrous Fibrous tissue between bone ends

Primary cartilaginous Hyaline cartilage between bone ends

Secondary cartilaginous As for primary but fibrocartilage between the layers of hyaline cartilage (symphysis)

Synovial Joint cavity with synovial fluid. Hyaline cartilage on surface of bones. Articular disc can be present

Atypical synovial Joint cavity with synovial fluid. Fibrocartilage on surface of bones. Articular disc can be present

Types of synovial joint

Plane No degrees of freedom. Sliding only

Hinge (ginglymi) One plane of movement

Modified hinge (bicondylar) One plane of movement + rotation

Condylod (ellipsoid) Two planes of movement (circumduction)

Saddle condylod (sella) Two planes of movement + rotation

Pivot (trochoid) Rotation only

Ball and socket (spheroidal) Multi-axial

Joints with interarticular fibrocartilaginous discs

Acromioclavicular (usually incomplete)

Femorotibial (knee) (incomplete — menisci)

Radiocarpal (wrist)

Sternoclavicular

Temporomandibular

Joints with double cavities separated by intra-articular ligaments — not fibrocartilaginous discs

Costovertebral (ribs 2–10)

Sternochondral (2nd rib)

Joints classified by type

Fibrous joints

Arytenocorniculate (can be synovial)

Costotransverse (ribs 11 and 12)

Cuboideonavicular (can be synovial)

Gomphosis (teeth)

Radio-ulnar (interosseous membrane)

Skull sutures

(stylohyoid ligament)

Tibiofibular (inferior)

Tibiofibular (interosseous membrane)

Primary cartilaginous joints

Costochondral

Sternochondral (1st rib)

Secondary cartilaginous joints

Intervertebral

Manubriosternal

Sacrococcygeal

Symphysis pubis

Xiphisternal

Atypical synovial joints

Acromioclavicular

Sternochondral (ribs 2–7)

Sternoclavicular

Temporomandibular

Sacro-iliac (partially atypical)

Typical synovial

Acetabulofemoral (hip)

Atlanto-axial (dens & facets)

Atlanto-occipital

Calcaneocuboid

Carpometacarpal

Costotransverse (ribs 1–10)

Costovertebral

Crico-arytenoid

Crico-thyroid

Cuneocuboid

Cuneonavicular

Femorotibial (knee)

Glenohumeral (shoulder)

Humeroradial (elbow)

- Humero-ulnar (elbow)
 Intercarpal
 Interchondral (cartilages 6–7,7–8,8–9)
 Intercuneiform
 Intermetacarpal
 Intermetatarsal
 Interphalangeal
 Metacarpophalangeal
 Metatarsophalangeal
 Pisotriquetral
 Radiocarpal (wrist)
 Radio-ulnar (superior & inferior)
 Talocalcaneal
 Talocalcaneonavicular
 Tarsometatarsal
 Tibiofibular (superior)
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ACETABULOFEMORAL (hip)**Classification** Synovial**Type** Ball & socket**Articulation** Acetabulum with femur**ACROMIOCLAVICULAR****Classification** Atypical synovial**Type** Plane**Articulation** Acromion with clavicle**Notes** Often an articular disc in upper part of jnt, usually incomplete**ANKLE** (see tibiotalar)**ARYTENOCORNICULATE** (larynx)**Classification** Fibrous or synovial**Articulation** Arytenoid cartilage with corniculate cartilage**ATLANTO-AXIAL – LATERAL****Classification** Synovial**Type** Plane**Articulation** Articular facets of atlas with axis**ATLANTO-AXIAL – MEDIAN****Classification** Synovial**Type** Pivot**Articulation** Dens of axis with atlas**Notes** Second cavity (bursa) posteriorly**ATLANTO-OCCIPITAL****Classification** Synovial**Type** Condylloid**Articulation** Atlas with occipital bone**CALCANEOCUBOID** (midtarsal)**Classification** Synovial**Type** Saddle condyloid**Articulation** Calcaneus with cuboid**CARPOMETACARPAL – FINGERS**

2–5 (including intermetacarpal)

Classification Synovial**Type** Plane**Articulation** Carpal bones with MCs & between MCs**Notes** Usually continuous cavity between CMC, intermetacarpal & intercarpal jnts**CARPOMETACARPAL – THUMB****Classification** Synovial**Type** Saddle condyloid**Articulation** Trapezium with 1st MC**Notes** Joint is separate from others in hand**COSTOCHONDRAL****Classification** Primary cartilaginous**Articulation** Bony rib with costal cartilage**COSTOTRANSVERSE – RIBS 1–10****Classification** Synovial**Type** Plane**Articulation** Med facet of tubercle of rib with transverse process of own vertebra**COSTOTRANSVERSE – RIBS 11, 12****Classification** Ligamentous (fibrous)**Articulation** Tubercle of rib with transverse process of own vertebra**COSTOVERTEBRAL****Classification** Synovial**Type** Plane**Articulation** Head of rib with vertebral body**Notes** 1st rib articulates with T1 vertebra only (single cavity jnt). Ribs 2–10 with own vertebra & one above (double cavity jnts separated by intra-articular lig). Ribs 11 & 12 with own vertebra only (single cavity jnts)**CRICO-ARYTENOID** (larynx)**Classification** Synovial**Type** Ball & socket**Articulation** Cricoid cartilage with arytenoid cartilage

CRICOTHYROID (larynx)**Classification** Synovial**Type** Hinge**Articulation** Facet on side of cricoid cartilage with inf horn of thyroid cartilage**ELBOW** (see humeroradial & humero-ulnar)**FEMOROTIBIAL** (knee)**Classification** Synovial**Type** Modified hinge**Articulation** Femur with tibia**Notes** Menisci are incomplete discs of fibrocartilage**GLENOHUMERAL** (shoulder)**Classification** Synovial**Type** Ball & socket**Articulation** Glenoid fossa of scapula with humerus**GOMPHOSIS** (dento-alveolar)**Classification** Fibrous**Articulation** Tooth with bone of jaw**HIP** (see acetabulofemoral)**HUMERORADIAL** (elbow)**Classification** Synovial**Type** Hinge**Articulation** Capitulum of humerus with radial head**Notes** Jnt cavity is shared with humero-ulnar & sup radio-ulnar jnts**HUMERO-ULNAR** (elbow)**Classification** Synovial**Type** Hinge**Articulation** Trochlea of humerus with ulnar trochlear notch**Notes** Jnt cavity is shared with humero-radial & sup radio-ulnar jnts**INTERCARPAL (MIDCARPAL)** (see also pisotriquetral)**Classification** Synovial**Type** Plane individually but together give effective mixture of condyloid, saddle condyloid & ball & socket**Articulation** Between scaphoid, lunate, triquetral, hamate, capitate, trapezoid & trapezium**Notes** Single cavity between the seven bones usually communicating also with CMC & intercarpal jnts of fingers 2–5**INTERCHONDRAL****Classification** Synovial**Type** Plane**Articulation** Between costal cartilages 6/7, 7/8, 8/9**INTERMETATARSAL****Classification** Synovial**Type** Plane**Articulation** Between MTs**INTERPHALANGEAL** (fingers & toes)**Classification** Synovial**Type** Hinge**Articulation** Between phalanges**INTERTARSAL – CUBOIDEO-NAVICULAR****Classification** Fibrous (can be synovial)**Articulation** Cuboid with navicular**INTERTARSAL – CUNEOCUBOID****Classification** Synovial**Type** Plane**Articulation** Lat cuneiform with cuboid**Notes** Cuneocuboid shares cavity with cuneonavicular & intercuneiform jnts**INTERTARSAL-CUNEONAVICULAR****Classification** Synovial**Type** Plane**Articulation** Cuneiforms with navicular

Notes Cuneonavicular shares cavity with cuneocuboid and intercuneiform jnts

INTERTARSAL — INTERCUNEIFORM

Classification Synovial

Type Plane

Articulation Between cuneiforms

Notes Intercuneiform jnts share cavity with cuneonavicular & cuneocuboid jnts

INTERVERTEBRAL

Classification Secondary cartilaginous

Articulation Between vertebral bodies

INTERVERTEBRAL JOINTS OF LUSCHKA (neurocentral or uncovertebral)

Classification Unclassified

Type Unclassified

Articulation Posterolateral lip of upper surface of C3–7 & T1 vertebrae with adjacent disc

Notes Often small cavity which is degenerative (not synovial)

KNEE (see femorotibial)

MANUBRIOSTERNAL

Classification Secondary cartilaginous

Articulation Manubrium with sternum

Notes May cavitate to give appearance of synovial jnt

METACARPOPHALANGEAL

Classification Synovial

Type Condylloid

Articulation MCs with phalanges

METATARSOPHALANGEAL

Classification Synovial

Type Condylloid

Articulation MTs with phalanges

PISOTRIQUETRAL

Classification Synovial

Type Plane

Articulation Pisiform with triquetral

RADIOCARPAL (wrist)

Classification Synovial

Type Condylloid

Articulation Radius & triangular fibrocartilagenous articular disc with scaphoid, lunate & triquetral

RADIO-ULNAR — INFERIOR

Classification Synovial

Type Pivot

Articulation Radius with ulna

Notes Cavity separated from cavity of wrist by triangular fibrocartilagenous disc

RADIO-ULNAR — INTEROSSEOUS MEMBRANE & OBLIQUE CORD

Classification Fibrous

Articulation Radius with ulna

RADIO-ULNAR — SUPERIOR

Classification Synovial

Type Pivot

Articulation Radius with ulna

Notes Cavity is continuous with humero-ulnar & humeroradial jnts

SACROCOCCYGEAL

Classification Secondary cartilaginous

Articulation Sacrum with coccyx

SACRO-ILIAC

Classification Partially atypical synovial

Type Plane

Articulation Sacrum with iliac bone

Notes Has fibrocartilage on ilium

SHOULDER (see glenohumeral)

SKULL SUTURES**Classification** Fibrous**Articulation** Between diploae of skull**STERNOCHONDRAL** (sternocostal)**Classification** 1st: primary cartilaginous;
2nd–7th: atypical synovial**Type** Plane**Articulation** 1st rib with manubrium.

3rd–7th ribs with sternum. 2nd with both

Notes 2nd jnt has two cavities separated by
intra-articular lig**STERNOCLAVICULAR**

(manubrioclavicular)

Classification Atypical synovial**Type** Ball & socket**Articulation** Clavicle with manubrium**Notes** Separated into two cavities by
fibrocartilaginous disc**SYMPHYSIS PUBIS****Classification** Secondary cartilaginous**Articulation** Between pubic bones**Notes** May cavitate**TALOCALCANEAL** (subtalar)**Classification** Synovial**Type** Plane (effectively ball & socket)**Articulation** Talus with calcaneus**TALOCALCANEONAVICULAR****Classification** Synovial**Type** Ball & socket**Articulation** Talus with calcaneus &
navicular**Notes** Talocalcaneal part is part of subtalar
jnt. Talonavicular part is part of midtarsal
jnt.**TARSOMETATARSAL****Classification** Synovial**Type** Plane**Articulation** Tarsal bones with MTs**TEMPOROMANDIBULAR****Classification** Atypical synovial**Type** Condylod**Articulation** Temporal bone with mandible**Notes** Separated into two cavities by
fibrocartilaginous disc**TIBIOFIBULAR – INFERIOR****Classification** Fibrous**Articulation** Tibia with fibula**TIBIOFIBULAR – INTEROSSEOUS
MEMBRANE****Classification** Fibrous**Articulation** Tibia with fibula**TIBIOFIBULAR – SUPERIOR****Classification** Synovial**Type** Plane**Articulation** Tibia with fibula**TIBIOTALAL** (ankle)**Classification** Synovial**Type** Hinge**Articulation** Tibia with talus**WRIST** (see radiocarpal)**XIPHISTERNAL****Classification** Secondary cartilaginous**Articulation** Xiphoid with sternum**ZYGAPOPHYSEAL** (intervertebral facet)**Classification** Synovial**Type** Plane**Articulation** Between intervertebral facets