


ARTHROLOGY

Bone connections

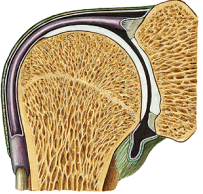
Synarthrosis – connection provided with connective tissue



Fibrous tissue (syndesmosis) Cartilage (synchondrosis) Bone (synostosis)


Diarthrosis – joint

- moveable connection of two or more bones
- connection – articulation facets
- Special joint apparatus




Syndesmosis (articulatio fibrosa)

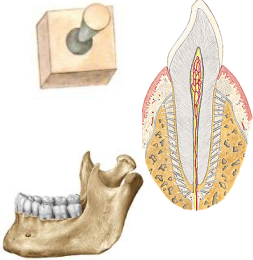
Ligamenta




Membranae




Gomphosis




Syndesmosis – suturae



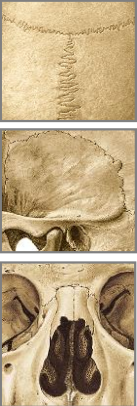
Sutura serrata



Sutura squamosa




Sutura plana

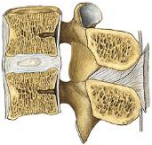


Synchondrosis (articulatio cartilaginea)

Symphysis pubica

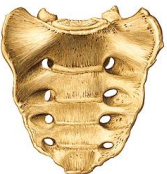


Discus intervertebralis




Synostosis

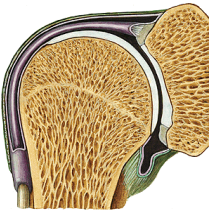
Os sacrum



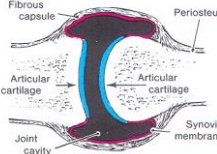
Os coccygis

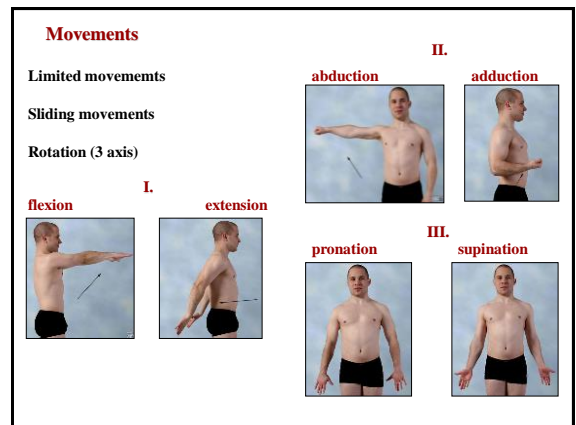
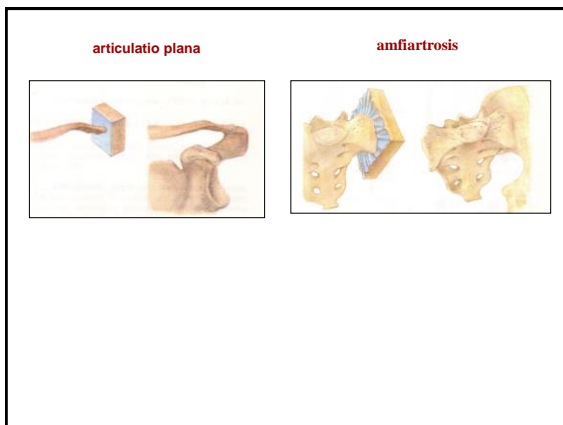
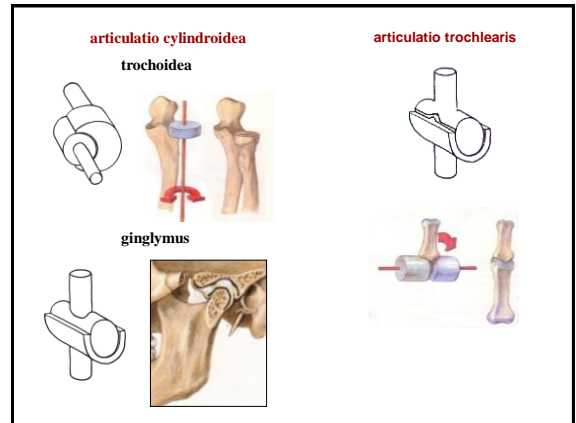
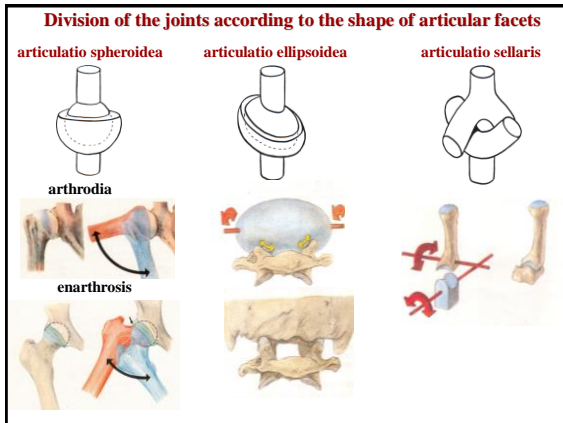
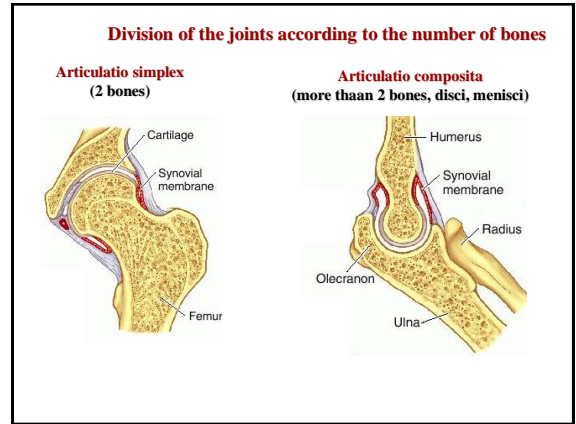
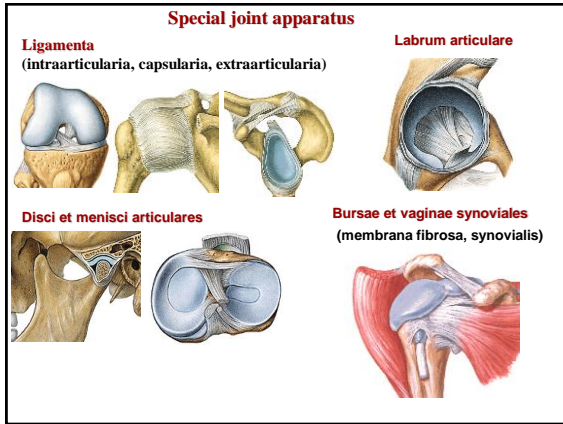


Diarthrosis – Articulatio synovialis









- Facies articulares (cartilaginee articulares)
- Capsula articularis (stratum fibrosum, synoviale)
- Cavitas articularis (plicae, villi synoviales)
- Synovia (nutrition of the articular cartilages)
- Special joint apparatus





Division of the joints according to the number of axis

monoaxial	biaxial	triaxial
		
Trochlear joint	Sellar joint	
		
Wheel joint	Ellipsoid joint	Ball-and-socket joint

Special arthrology

Joint description

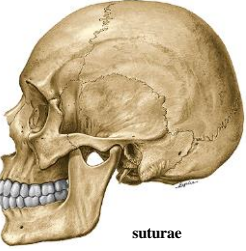
1. name
2. Articular facets
3. Joint capsule
4. Joint apparatus
5. Type of the joint, movements

Connections on the skull

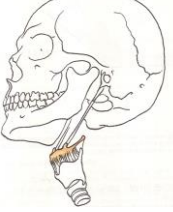
Synarthrosis (syndesmosis, synchondrosis, synostosis)

Diarthrosis (articulatio temporomandibularis, craniovertebral connections)

Syndesmosis cranii

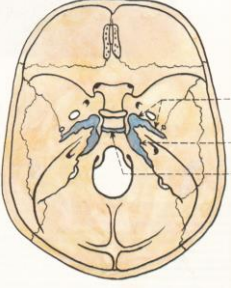


suturae



ligamentum stylohyoideum

Synchondrosis cranii



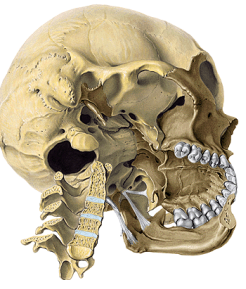
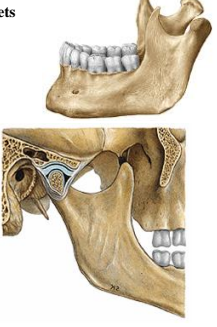
- synchondrosis sphenopertosa
- synchondrosis petrooccipitalis
- synchondrosis sphenoccipitalis

Articulatio temporomandibularis

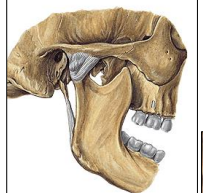
Articular facets: caput mandibulae, fossa mandibularis + tuberculum articulare

Joint capsule: margins of the articular facets

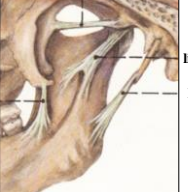
Joint apparatus: discus articularis

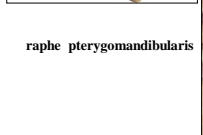
Articulatio temporomandibularis




lig. laterale



lig. pterygospinale



raphe pterygomandibularis



lig. sphenomandibulare
lig. stylomandibulare

Articulatio temporomandibularis

Type: articulatio composita - pars discotemporalis et discomandibularis

Movements: pars discotemporalis (translatory movement), pars discomandibularis (rotation), elevation, depression, protraction, retraction, chewing



Craniovertebral connections - articulatio atlantooccipitalis

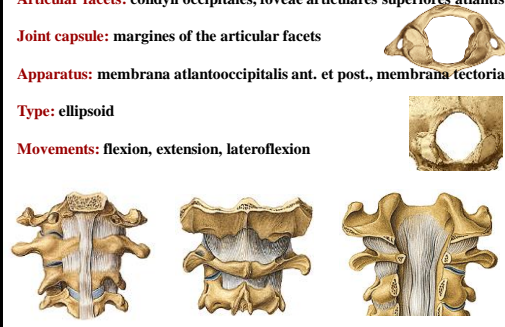
Articular facets: condyli occipitales, foveae articulares superiores atlantis

Joint capsule: margins of the articular facets

Apparatus: membrana atlantooccipitalis ant. et post., membrana tectoria

Type: ellipsoid

Movements: flexion, extension, lateroflexion



Craniovertebral connections - articulatio atlantoaxialis

Articulatio atlantoaxialis mediana

facies articularis ant. et fovea dentis

facies articularis post. et lig. transversum atlantis

Articulatio atlantoaxialis lateralis

facies articulares inferiores atlantis

proc. articulares sup. axis



Articulatio atlantoaxialis mediana et lateralis

Apparatus:
lig. apicis dentis

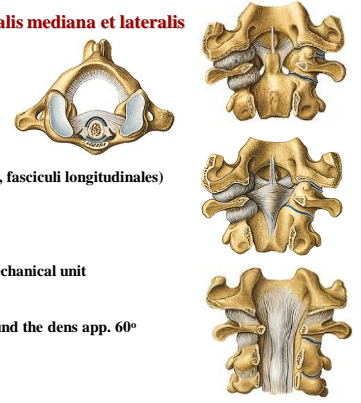
ligg. alaria

lig. cruciforme atlantis
(lig. transversum atlantis, fasciculi longitudinales)

membrana tectoria

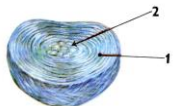
Type:
articulatio composita, mechanical unit

Movements:
Rotation of the atlas around the dens app. 60°



Juncturae columnnae vertebralis

Disci intervertebrales – connection between the bodies of vertebrae

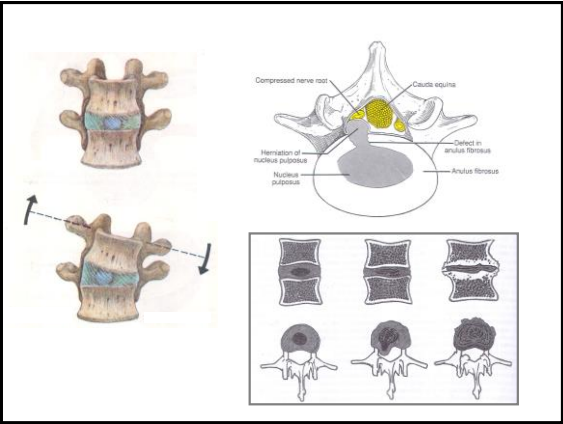
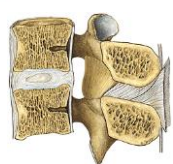
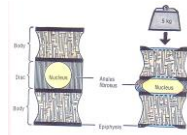


number: 23

app 1/4 length of column

anulus fibrosus

nucleus pulposus



Articulationes intervertebrales

Articular facets: processus articulares sup. et inf. of adjacent vertebrae
(position of the facets - C oblique, Th front, L sagittal)

Joint capsule: margines of the articular facets

Type: articulatio plana (translatory movements)



Short ligaments of the spine:

ligamenta flava (arches)

ligamenta interspinalia (proc. spinosi)

ligamenta intertransversalia (proc. transversi)

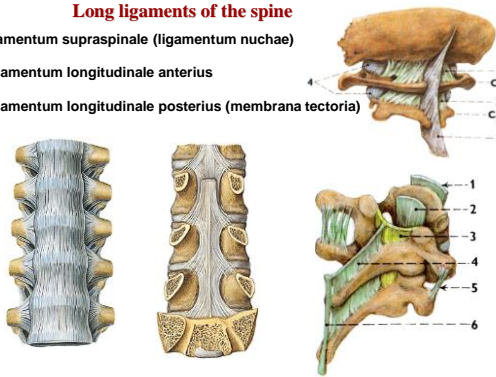


Long ligaments of the spine

ligamentum supraspinale (ligamentum nuchae)

Ligamentum longitudinale anterius

Ligamentum longitudinale posterius (membrana tectoria)



Shape of the spine:

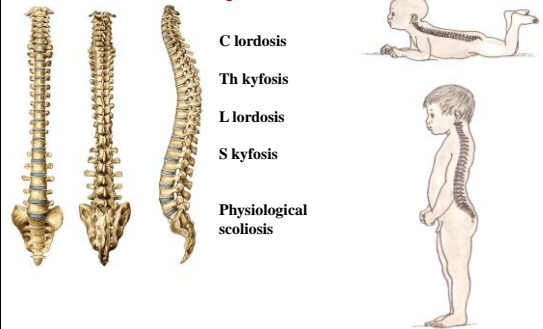
C lordosis

Th kyfosis

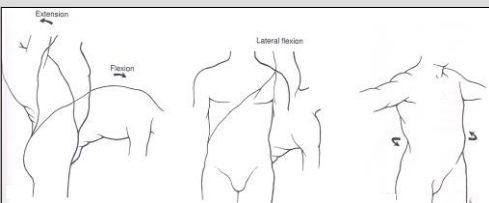
L lordosis

S kyfosis

Physiological scoliosis



Movements of the spine



anteflexion till 135°

lateroflexion till 70°

rotation 90-95°

retroflexion till 105°

Springy movements

Juncturae thoracis – articulationes costovetebrales

Articulatio capitis costae

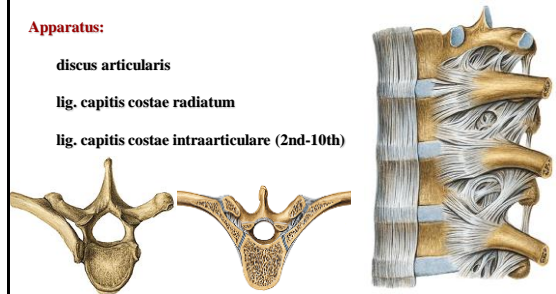
Articular facets: facies articularis capitis costae, foveae costales sup. et inf.

Apparatus:

discus articularis

lig. capitis costae radiatum

lig. capitis costae intraarticulare (2nd-10th)



Articulatio costotransversaria

Articular facets: facies articularis tuberculi costae, fovea costalis proc. transversarii

Apparatus:

- lig. costotransversarium
- lig. costotransversarium laterale
- lig. costotransversarium superius
- lig. lumbocostale

Movements: elevation of the ribs

Juncturae sternocostales

Symphondrosis sternocostalis (1st, 6th and 7th)

Articulationes sternocostales (2nd – 5th)

Articular facets:

Rib cartilages, incisurae costales sterni

Apparatus:

- ligg. sternocostalia radiata
- membrana sterni externa
- membrana sterni interna

Juncturae intercostales

Articulationes interchondrales

Articular facets: cartilages 5th – 9th rib

Membranae intercostales

- membrana intercostalis externa
- membrana intercostalis interna

Rib cage shape

- Apertura thoracis superior
- Spatia intercostalia
- Cavum thoracis
- Apertura thoracis inferior

Movements of the rib cage

Connections of the girdle of the upper extremity
(juncturae ossium cinguli extremitatis superioris)

- Articulatio sternoclavicularis
- Articulatio acromioclavicularis
- Syndesmosis scapulae

Articulatio sternoclavicularis

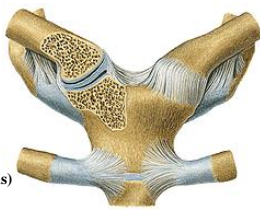

Articular facets: incisura claviculae sterni, facies articularis sternalis claviculae

Joint capsule: tough

Apparatus:
 discus articularis
 lig. sternoclaviculare ant. a post.
 lig. interclaviculare (incisura jugularis)
 lig. costoclaviculare

Type: composed, spheroid

Movements: limited,
 depends on movements of scapula

Dysostosis cleidocranialis

Articulatio acromioclavicularis

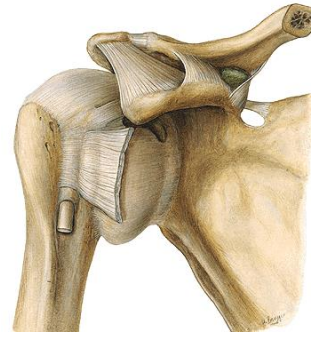
Articular facets: facies articularis acromialis claviculae, facies articularis acromii

Joint capsule: tough

Apparatus:
 discus articularis
 lig. acromioclaviculare
 lig. coracoclaviculare

Type:
 composed, limited


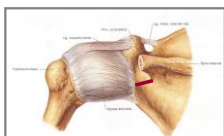
Depends on movements of scapula and shoulder



Syndesmosis scapulae

Lig. transversum scapulae superius et inferius

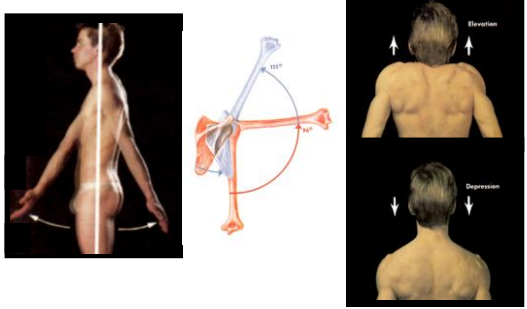
Lig. coracoacromiale (fornix humeri)

Movements of the scapula

protraction (lateroventral, during ante flexion) elevation

retraction (dorsomedial, during retro flexion)





Connections of the free upper extremity
 (juncturae ossium extremitatis superioris liberae)

Articulatio humeri (shoulder joint)

Articular facets:
 caput humeri, cavitas glenoidalis + labrum glenoidale

Joint capsule:
 margines, med. on collum anat. humeri – distally
 vagina synovialis intertubercularis

Articulatio humeri – articular apparatus

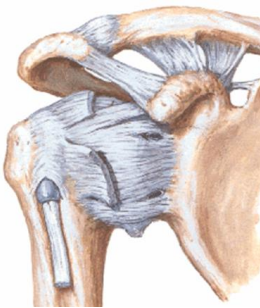

labrum glenoidale

ligg. glenohumeralia (sup., inf., ant.)

lig. coracohumerale

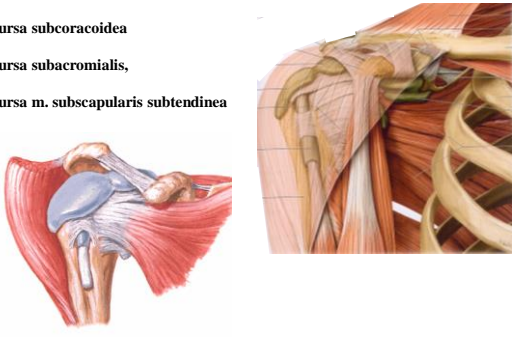
lig. coracoacromiale

Firmed by tendons (rotator cuff)

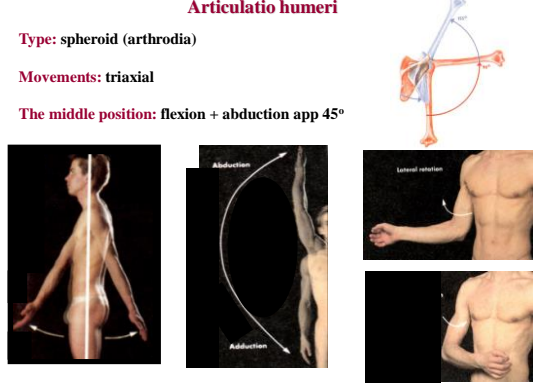
Articulatio humeri - bursae synoviales

Bursa subdeltoidea
 Bursa subcoracoidea
 Bursa subacromialis,
 Bursa m. subscapularis subtendinea



Articulatio humeri


Type: spheroid (arthrodia)
 Movements: triaxial
 The middle position: flexion + abduction app 45°



Articulatio cubiti (elbow joint)

Articulatio composita:


- 1. Articulatio humeroradialis (articulatio spheroida)**
capitulum humeri, fovea capitis radii
- 2. Articulatio humeroulnaris (articulatio trochlearis)**
trochlea humeri, incisura trochlearis ulnae
- 3. Articulatio radioulnaris proximalis (articulatio trochoidea)**
circumferentia articularis capitis radii, incisura radialis ulnae



Articulatio cubiti

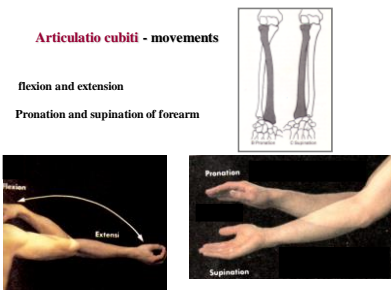
Articulation capsule:
 Epicondyles of the humerus EXTRACAPSULAR, foveae of the humerus INTRACAPSULAR
 recessus sacciformis

Apparatus:
 lig. anulare radii
 lig. collaterale radiale
 lig. collaterale ulnare



Articulatio cubiti - movements

flexion and extension
 Pronation and supination of forearm



References:

Putz, R. (2008):
 Atlas of Human Anatomy Sobotta. Elsevier Books.

Keith L. Moore, Arthur F. Dalley (2005):
 Clinically Oriented Anatomy. Williams and Wilkins.

Platzer, W., Kahle, W., Leonhardt H. (1992):
 Locomotor system. Georg Thieme Verlag, Stuttgart, New York, 4th edition.

Čihák, R. (1987):
 Anatomie 1. Avicenum, Zdravotnické nakladatelství.

Netter, F. H. (1997):
 Interactive Atlas of Clinical Anatomy. Novartis, USA.