

Basic Orthopaedic Anatomy

The following document is intended as a checklist for students doing the Orthopaedic rotation in Year 3, containing information I think is fundamentally important to grasp before starting the clinical attachment (it may help a bit for the anatomy exam as well, seeing as that tends to cover the same basic areas). Apologies for the lack of diagrams (I am no Da Vinci or Vesalius). My reference texts in writing this have been Gray's Anatomy for Students (*Drake et al. 2005 Churchill Livingstone*) and Essential Clinical Anatomy (*Moore et al, 2002 Lippincott Williams and Wilkins*), along with the combined wisdom of the Edinburgh anatomy staff, and I recommend either of those books, along with a colour atlas of anatomy, to help with the first few weeks of the attachment.

Types of Joints:

- Fibrous- Syndesmosis (interosseous membrane)
 - Gomphosis (teeth)
 - Sutures (skull)
- Cartilaginous- Synchrondrosis (growth plates)
 - Symphysis (intervertebral discs)
- Synovial- Hinge (humerus and ulna)
 - Pivot (Atlas and Axis)
 - Saddle (Trapezium and 1st metacarpal)
 - Plane (Acromioclavicular joint)
 - Ball and Socket (Hip)

Spine:

Know the basic elements of a vertebra: Body, lamina, pedicle, vertebral foramen, transverse processes, spinous process, superior and inferior articular processes, intervertebral foramen

Be able to distinguish the features of vertebra at different levels:

- Cervical- Bifid spinous process,
 - Foramen transversarium (vertebral arteries)
 - Articular processes (zygapophysial joints) are sloped
 - Atlas (no body, note posterior longitudinal ligament, and alar ligaments)
 - Axis (dens/odontoid peg)
 - Movements: flexion, extension, rotation, lateral bending
- Thoracic- Articular processes are vertical
 - Prominent transverse processes
 - Also note two partial facets for rib articulation
 - Movements: some lateral bending, and a small amount of rotation
- Lumbar- large vertebral bodies
 - Shorter transverse processes
 - Articular processes are said to be "wrapped"
 - Movements: flexion, extension. No rotation

Upper Limb:

- Brachial plexus- C5-T1
 - Lateral Cord- Musculocutaneous Nerve (anterior arm- biceps brachii and brachialis, sensation on lateral forearm)
 - Median Nerve (forearm flexors- abducts thumb)
 - Medial Cord- Median Nerve

Ulnar Nerve (hand- splaying of the fingers)

(note, ulnar nerve runs posterior to medial epicondyle)

Posterior Cord- Radial Nerve (posterior arm and forearm: wrist extensors)

Axillary Nerve (deltoid and teres minor; sensation over deltoid)

Shoulder and humerus- note: intertubercular sulcus (for long head of biceps brachii)

Anterior and posterior circumflex humeral arteries wrap around the surgical neck

Radial groove- for profunda brachii artery

(know the path of the main nerves and arteries)

Muscles- know rotator cuff

supraspinatus (abduction)

infraspinatus, teres minor (lateral rotation)

subscapularis (medial rotation)

Also know trapezius, deltoid, rhomboids, pectoralis muscles, latissimus dorsi and serratus anterior

Arm muscles (recognise and be able to explain actions of): Triceps brachii (extensor of elbow), biceps brachii, brachialis (both flexors at elbow, biceps also supinates forearm), coracobrachialis (flex arm at glenohumeral joint)

(Recognise which muscles cause pronation and supination of forearm)

Recognise annular ligament, lateral epicondyle (extensors attach) and medial epicondyle (flexors attach)

Know actions of flexor carpi radialis/ulnaris and extensor carpi radialis/ulnaris

Bones of hand- small bones (numerous mnemonics- e.g Students Like Taking Pizza To The Caledonian Hotel)

Carpal Tunnel: formed by flexor retinaculum

Median nerve runs deep to this

Ulnar nerve runs superficial to this

Flexor digitorum superficialis, flexor digitorum profundus and flexor pollicis longus all have tendons through the carpal tunnel

FDS's tendons act over PIP joints

FDP's tendons also act over DIP joints

Sensory nerve distribution (useful when checking a forearm cast)

Median Nerve, index finger on palmar side

Ulnar Nerve, little finger on palmar side

Radial Nerve, dorsal thumb

Lower Limb:

Hip and Thigh:

Know the route of the major arteries and nerves (femoral artery, sciatic nerve, and major branches of)

Hip- bones of pelvis (ilium, ischium, pubis)

Know- pubofemoral and iliofemoral ligaments (anterior)

Ischiofemoral ligament (posterior)

Greater and Lesser Trochanters of femur

Muscles- Gluteus Medius and Minimus (abduct femur)

Gluteus Maximus (extends femur)

Iliacus and Psoas major (flex thigh at hip)

Sartorius (flexes the hip and knee)

Medial compartment of thigh (adduction)- adductor longus, brevis and magnus

Along with obturator externus, gracilis and pectineus

There are also numerous small rotators

Knee:

Be able to recognise the anterior and posterior cruciate ligaments

And the medial and lateral collateral ligaments

Know (medial to lateral, from posterior) the popliteal artery, vein and nerves:

Tibial and common peroneal/common fibular

Know the muscles acting over the knee:

Anterior compartment- into quadriceps tendon: rectus femoris along with vastus medialis, intermedius and lateralis.

Posterior compartment- biceps femoris, semitendinosus and semimembranosus

Leg:

3 compartments-

Posterior, Anterior and Lateral. Know actions of muscles in each of the compartments (ie whether they are extensors, flexors, evertors or invertors at the ankle joint)

Also note that the common peroneal/fibular nerve curves around the proximal lateral fibula, and injury here can cause "foot drop"

Posterior compartment- Achilles' tendon made up of gastrocnemius, soleus (and plantaris)

Ankle (flexion/plantarflexion and extension/dorsiflexion)-

Ligaments:

Medial ligament- deltoid ligament made up of anterior tibiotalar part, tibiocalcaneal part, posterior tibiotalar part and the tibionavicular part

Posterior talofibular ligament

Calcaneofibular ligament

Anterior talofibular ligament

Mnemonic for remembering structures in the posterior compartment, medial malleolus to calcaneus, deep to flexor retinaculum: Tom (Tibialis Posterior), Dick (Flexor Digitorum Longus), But (tibial Blood vessels) Not (tibial Nerve) Harry (Flexor Hallicis Longus)

Extensor retinaculum is over anterior compartment

Foot:

Know the bones of the foot (talus, calcaneus, navicular, cuboid, cuneiforms, metatarsals and phalanges), and know what makes up the subtalar and midtarsal joints (and the movements at each joint- inversion and eversion)

Three arches of foot: medial longitudinal arch, lateral longitudinal arch and transverse arch

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