When studying anatomy, there are three main approaches:
- Regional Anatomy (organizing the body into chunks)
- Systemic Anatomy (organizing the body into functions/systems)
- Clinical Anatomy (combining both regional and systemic anatomy to focus on patient care

Regional Anatomy

- based on the organization of the body into parts: head, neck, trunk (thorax, abdomen, pelvis, back), and paired upper/lower limbs
- surface anatomy is key to understanding regional anatomy (ie. someone treating a patient with stab wounds would need to know the structures affected underneath)

Systemic Anatomy

- based on the organization of the body into different bodily functions that work together
- none of the organ systems functions in isolation

Skeletal System	**osteology**	**consists of the bones and cartilage; provides support to body and protects essential organs**
Articular System	**arthrology**	**consists of joints and their associated movements; provides the sites at which movement occurs at**
Muscular System	**myology**	**consists of muscles that act to move or position parts of the body**
Nervous System	neurology	consists of the CNS (brain, spinal cord) and PNS (nerves, motor/sensory endings); controls and coordinates functions of organ systems
Circulatory System	angiology	consists of the cardiovascular and lymphatic systems; functions to distribute fluids within the body
Cardiovascular System	cardiology	consists of the heart and blood vessels that propel and conduct blood throughout body

- Anatomical Position refers to people standing erect with their:
  - head, eyes, and toes directed anteriorly
  - upper limbs by the sides with palms facing anteriorly
  - lower limbs close together with feet parallel and facing anteriorly

- Anatomical Planes
  - Median plane passes through longitudinally through center of body dividing it into right and left halves
  - Sagittal planes are vertical planes passing through the body parallel to the median plane; i.e., sagittal plane through midpoint of clavicle
  - Frontal (coronal) planes are vertical planes passing through the body at right angles to the median plane, dividing it into anterior and posterior
  - Transverse planes are planes passing through the posy at right angles to the median and frontal planes to divide the body into superior and inferior parts
- Sometimes combined terms describe intermediate positional arrangements:
  - Inferomedial (closer to the feet and nearer to the medial plane)
  - Superolateral (nearer to the head and farther from medial plane)

- Bilateral structures are paired by having left and right members (kidneys)
- One sided structures are considered unilateral (spleen)
- Ipsilateral means occurring on same side of body (right toe and right thumb)
- Contralateral means occurring on opposite side of body (right hand is contralateral to left hand)

Term	Meaning	Example
Superior (cranial)	Nearer to head	Heart is superior to stomach.
Inferior (caudal)	Nearer to feet	Stomach is inferior to heart.
Anterior (ventral)	Nearer to front	Sternum is anterior to heart.
Posterior (dorsal)	Nearer to back	Kidneys are posterior to intestine.
Medial	Nearer to median plane	Fifth digit (little finger) is on medial side of hand.
Lateral	Farther from median plane	First digit (thumb) is on lateral side of hand.
Proximal	Nearer to trunk or point of origin (e.g., of a limb)	Elbow is proximal to wrist; proximal part of artery is its beginning.
Distal	Farther from trunk or point of origin (e.g., of a limb)	Wrist is distal to elbow; distal part of lower limb is foot.
Superficial	Nearer to or on surface	Muscles of arm are superficial to its bone (humerus).
Deep	Farther from surface	Humerus is deep to arm muscles.
Intermediate	Between opposite pairs of terms above	Muscles are intermediate between skin and bones.
Dorsum	Surface of hand, foot, nose, or penis toward back in quadrupedal position	Veins are visible in dorsum of hand.
Palm	Anterior surface of hand	Skin creases are visible on palm.
Sole (plantar)	Inferior surface of foot	Skin is thick on sole of foot.

- Terms of movement are movements at the joints and have specific scientific descriptions:
  - flexion, extension, abduction, adduction, lateral rotation, medial rotation, circumduction, supination, pronation, plantarflexion, dorsiflexion, eversion, inversion, elevation, depression, protrusion, retrusion

The human skeleton is comprised of two main parts of bones and cartilage:

- The axial skeleton consists of the bones of the head (cranium, skull), neck (cervical vertebrae), and trunk (ribs, sternum, vertebrae, and sacrum)
- The appendicular skeleton consists of the bones of the limbs, including pectoral and pelvic girdles

Bone is a specialized hard form of connective tissue and is the chief supporter of the body. They provide:
- protection for vital structures
- support for the body and its vital cavities
- the mechanical basis for movement
- storage for salts (calcium)
- continuous supply of new blood cells (produced by marrow)

Cartilage is resilient, semirigid, avascular connective tissue and is where flexibility is needed
Articulating surfaces of bones participating in a synovial joint are capped with articular cartilage (smooth, low friction surface)

The proportion of bone to cartilage changes as the body develops (younger is more cartilage, older is less cartilage)
Periosteum is the fibrous connective tissue covering that surrounds the bone
Perichondrium is the ******
Both periosteum and perichondrium help nourish bone tissue, are capable of laying down more cartilage/bone, and attachment of tendons and ligaments

Two types of bone include compact bone and spongy bone
Compact bone provides strength for weight bearing
Differences include the dependancy on the relative amount os solid matter and the number/size of spaces they contain
All bones have a superficial thin layer of compact bone around the spongy bone *except* where the spongy bone is replaced by a marrow cavity

- Long bones: tubular structures (humerus, phalanges)
- Short bones: cuboidal, found only in ankle and wrist
- Flat bones: serve protective functions (cranium)
- Irregular bones: have various shapes other than long, short, flat (facial bones)
- Sesamoid bones: develop in certain tendons and protects them from excessive wear and tear (patella, kneecap)

Bone markings appear wherever tendons, ligaments and fascia are attached or adjacent arteries
- Condyle is a rounded articular area (condyles of the femur)
- Crest is a ridge of bone (iliac crest)
- Epicondyle is an eminence superior to a condyle
- Facet is a smooth flat area, usually covered with cartilage, where a bone articulates with

another bone
- Foramen is a passage through a bone
- Fossa is a hollow or depressed area
- Line is a linear elevation
- Malleolus is a rounded prominence
- Notch is an indentation at the edge of a bone
- Process is a projecting spine like part (spinous process of a vertebrae)
- Protuberance is a projection of bone
- Spine is a thorn like process (spine of the scapula)
- Trochanter is a large blunt like elevation
- Tubercle is a small, raised eminence
- Tuberosity is a large, rounded elevation

All bones are derived from mesenchyme by either intramembranous ossification or endochondral ossification
Intramembranous ossification forms membranous bones, and form during the embryonic period, and direct ossification of the mesenchyme begins in the fetal period
Endochondral ossification forms cartilaginous bones which form from mesenchyme during the fetal period, and born subsequently replaces most cartilage

- Nutrient arteries (+/< 1 per bone) pass through the shaft of a long bone via nutrient foramina, and split in the medullary cavity; supplies bone marrow, spongy bone, and deeper portions of the compact bone
- Periosteal arteries supply most of the bone - therefore if the periosteum is removed, the bone will die
- Metaphysial and epiphysial arteries supply the ends of bones
- Veins accompany the arteries along with lymphatic vessels

Nerves accompany all arteries or veins
Periosteum are richly supplied with sensory nerves that carry pain fibres (periosteal nerves) - which cause the acute pain when a fracture occurs
Vasomotor nerves cause either constriction or dilation of blood vessels, regulating blood flow through the bone marrow

A joint is an articulation or place of union between two or more rigid components
Some joints have no movement, others allow slight movement, and some are freely movable
Three main types of joints ->
- Fibrous Joints: united by fibrous tissue, the amount of movement is dependant on on the length of the fibres uniting the articular bones
- Cartilaginous Joints: united by hyaline cartilage or fibrocartilage. Primary cartilaginous joints use hyaline cartilage and permit growth of the bone with slight bending in early stages of life. Secondary cartilaginous joints use fibrocartilage and are strong, slightly mobile joints
- Synovial Joints: a space that contains synovial fluid which lubricates and nourishes the articular cartilage, and are reinforced by accessory ligaments that are either separate (extrinsic) or are thick (intrinsic)

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