

Key Reading

- Biel (2011) Trail Guide to the Body: How to Locate Muscles, Bones and More (4th Ed).
- Cael (2010) Functional Anatomy: Musculoskeletal Anatomy, Kinesiology, and Palpation for Manual Therapists.
- Field & Owen Hutchinson (2006) Field's Anatomy Palpation & Surface Marking (4th Ed).
- Watkins (2010) Structure and Function of the Musculoskeletal System (2nd Ed).





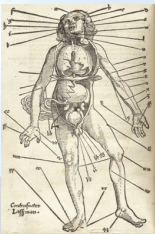




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History of Anatomy



- Established by medical schools in 17th century
- Anatomical museums in many cities
- Began to be published in 18th & 19th century
- Shortage of cadavers for study = grave robbing (pro's)
- Medical teachers and students committed murder for cadavers to
- Anatomy Act passed in 1832 to stop this




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Anatomy - Basically

- Identification, description, arrangement, positioning and relationship with other structures
- Musculoskeletal Anatomy = Subsection
- Covers muscles, bones, joints and associated structures

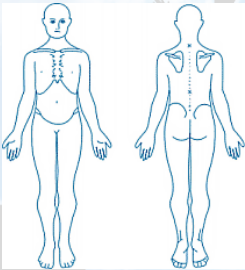

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Areas of Anatomy



- Osteology – bones and skeletal system
- Arthrology – joints and joint structures
- Myology – muscles and muscular system
- Kinesiology – movement

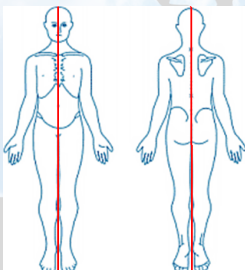
Anatomical Position





- A person stood in the anatomical position is:
 1. Standing erect
 2. Head, eyes and toes pointing forward
 3. Feet together
 4. Arms by either side
 5. Palms of the hands facing forward

Midline of the Body



- Straight line vertically through the body
- Used to help describe movements and anatomical locations
- Reference point

Anatomical/Medical Terminology

- Anatomy and medicine have their own international vocabulary
- Terms are used to clarify direction, location and position of the body and structures
- Used when writing in files, communicating with other medically trained professions and whenever clarity is required
- They replace common descriptive terms when in the professional clinic but.... **not when talking to patients**



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Anatomical Terms

- Superior
- Posterior
- Medial
- Distal
- Superficial
- Inferior
- Anterior
- Lateral
- Proximal
- Deep

WHAT DO YOU THINK THEY REFER TO?



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Anatomical Terminology

TERM	MEANING
Superior	Close to, above, or higher toward the head (e.g. elbow is superior to wrist)
Inferior	Away from the head, below or more towards the feet (e.g. shin is inferior to thigh)
Posterior	Towards the back
Anterior	Towards the front



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Anatomical Terminology

TERM	MEANING
Medial	Towards the midline
Lateral	Away from the midline
Proximal	Nearer to midline/point of origin
Distal	Farther from midline/point of origin
Superficial	Closer to the surface of the skin
Deep	Away from surface of the skin

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Anatomical Terminology

PERTAINING TO THE HANDS	PERTAINING TO THE FEET
Palmar Surface	Dorsal Surface
Dorsal Surface	Plantar Surface

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Task 1

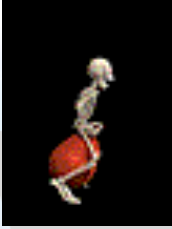
- Using medical terminology describe the location of the following anatomical structures in relation to other structures of the body.

- Biceps Brachii
- Femur
- Trapezius
- 4th metacarpal
- Patella

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The Skeletal System

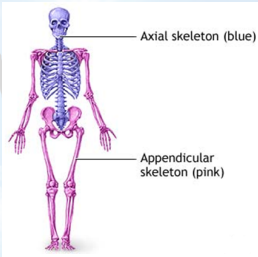
- Bones are linked together to form the skeleton
- 206 distinct bones in an adult body
- Axial skeleton = 74
- Appendicular skeleton = 126



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Skeleton


- The skeleton is divided into 2 sections.
- The **AXIAL** skeleton comprises of; cranium, vertebral column, ribs, sternum, and hyoid bone
- The **APPENDICULAR** skeleton comprises of; arms, legs, pectoral girdle and pelvis.



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What are the Functions of the skeleton?

- **Support**
Forms a framework to support muscles and organs.
- **Movement**
Bones come together to form joints which create levers for movement.
- **Haematopoiesis**
Produces red blood cells to carry O₂ to working muscles.
- **Protection**
Forms bony cavities around organs which may receive trauma such as the brain, heart and lungs. Red marrow in bones produce white blood cells which protect against infection and disease.
- **Mineral storage**
Forms a reservoir of minerals especially calcium to strengthening bones and facilitate muscle contraction.

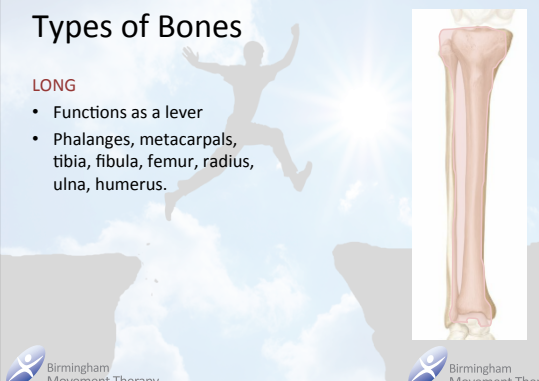


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Types of Bones

LONG

- Functions as a lever
- Phalanges, metacarpals, tibia, fibula, femur, radius, ulna, humerus.

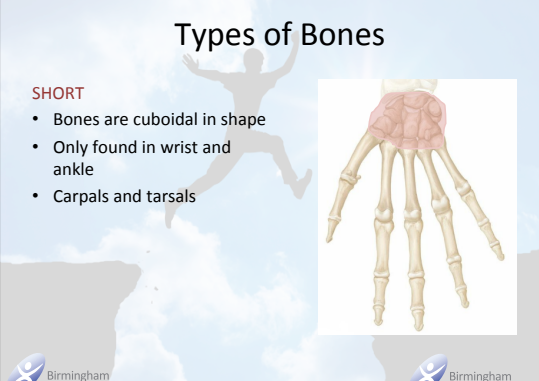


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Types of Bones

SHORT

- Bones are cuboidal in shape
- Only found in wrist and ankle
- Carpals and tarsals

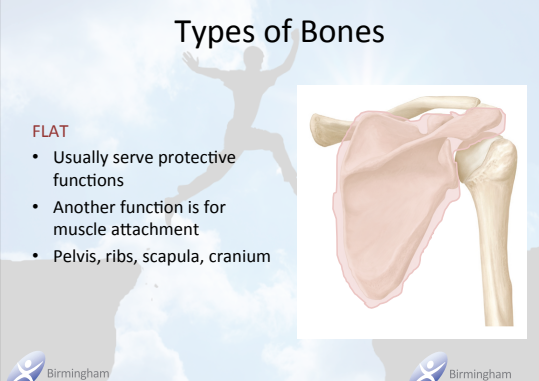


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Types of Bones

FLAT

- Usually serve protective functions
- Another function is for muscle attachment
- Pelvis, ribs, scapula, cranium




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Types of Bones

SESAMOID

- Embedded in tendon
- Develops after birth
- Can provide mechanical advantage
- Can develop through trauma or stress
- Patella and hallux (big toe)

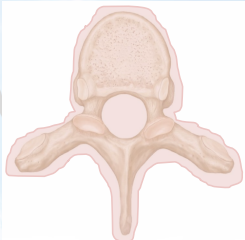


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Types of Bones

IRREGULAR


- Irregular in shape
- Provides features for muscle attachment or articulation
- Vertebrae, ischium (pelvis), sutural (skull)



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Task 2



- Choose any 10 bones of the skeleton.
- Identify whether each bone is in the axial or appendicular skeleton.
- Now classify each bone by type based on its structure.



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Glossary of Bony Landmarks

TERM	MEANING
Condyle	Rounded area of articulation
Crest	Ridge
Epicondyle	Point superior to condyle
Facet	Smooth flat area of articulation
Foramen	Hole
Fossa	Hollow or depression
Groove	Furrow
Line	Elevated line



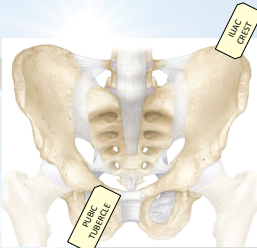
Glossary of Bony Landmarks



TERM	MEANING
Malleolus	Rounded process
Notch	Indentation on edge of bone
Protuberance	Bony projection
Spine	Like a more elevated line
Spinous process	Spine-like part
Trochanter	Large lump
Tubercle	Smaller lump
Tuberosity	Elevated lump



Task 3

- Using the skeletal models, identify an example of each of the bony landmarks types from the glossary pages.
- Mark these on your models with athletic tape.





Types of Joint by Movement

SYNARTHROSES	AMPHIARTHROSES	DIARTHROSES
Non-Movable	Semi-movable	Freely moveable
Most fibrous joints	Mostly cartilaginous	Synovial joints
Example; Sutures of the cranium	Example; Intervertebral discs	Example; Knee joint

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Planes of Movement

- Imaginary lines through the body:
- Sagittal or Median
- Frontal or Coronal
- Transverse or Horizontal

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Planes of Movement

SAGITTAL or MEDIAN

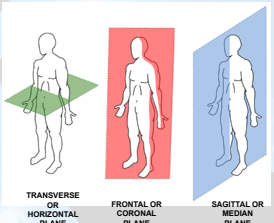
- Divides body into left and right

FRONTAL or CORONAL

- Divides body into front and back

TRANSVERSE or HORIZONTAL

- Divides body into upper and lower





TRANSVERSE OR HORIZONTAL PLANE FRONTAL OR CORONAL PLANE SAGITTAL OR MEDIAN PLANE

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Movements

- Flexion
- Abduction
- Medial (internal) Rotation
- Plantarflexion
- Pronation
- Extension
- Adduction
- Lateral (external) Rotation
- Dorsiflexion
- Supination





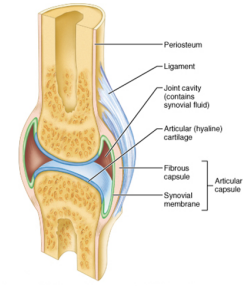
Planes and their Movements

SAGGITAL OR MEDIAN	FRONTAL OR CORONAL	TRANSVERSE OR HORIZONTAL
Flexion and extension	Abduction and adduction	Medial (internal) and lateral (external) rotation
Plantarflexion and dorsiflexion	Inversion and eversion	Pronation and supination



Synovial Joints

- Joint cavity + synovial fluid
- Joint capsule
- Synovial membrane
- Articular cartilage
- Ligaments



Muscular Contraction

- 3 Types:
 - Concentric – shortening against resistance
 - Eccentric – lengthening against resistance
 - Isometric – no change in length against resistance



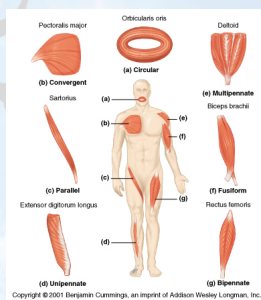
Contraction Terminology

- **Agonist**
Primary muscle responsible for the movement
- **Antagonist**
Muscle opposing the agonist
- **Synergist**
Prevent movement of the intervening joint when an agonist is a biaxial muscle. They compliment the agonistic muscle
- **Fixators**
Steady proximal parts while the movement occurs distally



Muscle Fibres

- **Flat or Parallel Muscles**
Parallel fibres
- **Pennate Muscles**
Feather like can be uni, bi, or multi
- **Fusiform Muscles**
Spindle shaped
- **Convergent Muscles**
Broad origin to narrow insertion
- **Circular Muscles**
Surround an opening



Task 4

- Take a photo of someone in your group demonstrating a sporting movement.
- Now you need to identify:
 - Movements occurring at joints
 - Planes movements are occurring in
 - Muscles responsible for movements





Re-cap Quiz

- What are the 3 planes of movement?
- What are the 5 types of bone?
- What are the 2 distinct parts of the skeleton?
- What do medial, anterior and distal mean?
- What is the anatomical position?
- Name the 4 recommended texts...

