

Human Skeleton

Human have around 300 bones at birth

206 bones when adult

18% of total body weight

Bone

Along bone has 3 distinct regions Epiphysis, Diaphysis and Metaphysis

3 types of cells, Osteoblast, Osteoclast & Osteocytes

Cartilage

Only one type of cells chondrocytes

3 types of cartilage, Hyaline, Elastic & Fibrocartilage

Axial Skeleton

Consists of skull, vertebral column, sternum and ribs

Skull parts; Cranium, facial and Ear ossicles

Cranium 8 bones

Facial 14 bones

Ear ossicles 6 bones

1 hyoid bone

In Cranium, 2 paired bones named Parietal and Temporal bones

In Cranium, 4 unpaired bones named Sphenoid, Occipital, Frontal and Ethmoid

In Facial bones, 6 paired bones named Palatine, Maxilla, Lacrimal, Nasal, Inferior concha and Zygomatic

In Facial bones, 2 unpaired bones named Vomer & Mandible

In Ear ossicles, 3 paired bones named Malleus, Incus & Stapes

Axial Skeleton (cont)

Vertebral column parts; Cervical, Thoracic, Lumbar & Pelvic

Cervical - 07 vertebrae

Thoracic - 12 vertebrae

Lumbar - 05 vertebrae

Pelvic - 09 vertebrae fusion into 2 named Sacrum 05 vertebrae & Coccyx 04 vertebrae

Total Vertebrae no: 26

Ribs types True, False & Floating

True ribs number 14 (07 pairs)

False ribs number 06 (03 pairs)

Floating ribs number 04 (02 pairs)

Total bones in Axial Skeleton Skull-29, Vertebral column - 26, Sternum-01 and Ribs-24 = 80 bones

Appendicular Skeleton

consists of 126 bones

Divisions: Pectoral girdle + Fore limb & Pelvic girdle & Lower limb

Total no of bones associated with Pectoral girdle = 64 bones (both sides)

2-Clavicle, 2-scapula in pectoral girdle both sides (Total 4)

Anterior limb (Arm) bones: 2-humerus, 2-radius, 2-ulna, 16-carpals, 10-metacarpals & 28 phalanges in both both limbs

Total no of bones associated with Pelvic girdle = 62

2-coxal bones, posterior limbs include, 2-femur, 2-tibia, 2-fibula, 2-patella, 14-tarsals, 10-metatarsals & 28 phalanges

Joints

Site 2 or more bones meet

Approximately 360 joints in our body

3 types: Fibrous, Cartilaginous & Synovial

Different types of synovial joints present in our body like Hinge, Pivot, Ball & Socket, Condyloid, Gliding Joint

Disorders of Skeleton

Mainly: Disc slip, Spondylosis, Sciatica & Arthritis

Muscles, its types & Structure

Half of the human body mass

3 types of muscles: Skeletal, Cardiac & Smooth

Muscle fibre diameter 10-100µm

Myofibrils diameter 1-2µm

Myosin filament is thick, 16nm in diameter

Actin filament is thin, 7-8nm in diameter

The Sliding Filament Model of muscle contraction proposed by Hugh Huxley & Jean Hanson in 1954

Energy of muscle contraction

ATP & Phosphocreatine

ATP: Immediate source of energy for muscle contraction

Energy of muscle contraction (cont)

Phosphocreatine: reserve of high-energy phosphate compound. Of the total energy expended in muscle contraction, only 35% is utilized for the performance of work: remaining is liberated in the form of heat, which is employed to maintain body temperature

Muscle Problems

Cramps, Muscle Fatigue & Tetany

Muscle cramps often occur after exercise or at night, lasting a few seconds to several minutes