SAWA UNIVERSITY

Musculoskeletal System

جامعة ساوة

كلية الصيدلـــــــــــــــــة

المرحلة الأولى

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MSc histology

Musculoskeletal System

The Skeleton defined as the hard framework of human body.

Components of Human Skeleton

Human skeleton is composed of three main components:

- **Bones.**
- **Associated cartilages.**
- **Joints.**

Axial Skeleton

It consists of Skull, Vertebral column and thoracic cage

1) Skull: Skull forms the bony framework of the head. Skull consist of 22 bones. All bones of cranium are flat bones and immovable joint that protect the brain

2) Vertebral Column:
It is a flexible column of vertebrae, connecting the trunk of human body to the skull and appendages. It is composed of 33 Vertebrae which are divided into 5 regions:

a. Cervical vertebrae - 7 bones
b. Thoracic vertebrae - 12 bones
c. Lumbar vertebrae – 5 bones
d. Sacral vertebrae - 5 bones
e. Coccygeal vertebrae - 4 bones

3) Thoracic Cage:

It is a bony cage enclosing vital human organs formed by the sternum , ribs and Vertebral Column which found in the back of thoracic cage.

There are 12 pairs of ribs that are divided into three groups:

A. True ribs (7).

B. False ribs (3).

C. Floating ribs (2).

Appendicular Skeleton

It consists of:

1) **Shoulder girdle.**
2) **Skeleton of upper limb.**
3) **Pelvic girdle.**
4) **Skeleton of lower limb**

1) **Shoulder Girdle (pectoral girdles) : It attaches the upper limb to body trunk and is formed by two bones: clavicle and scapula.**

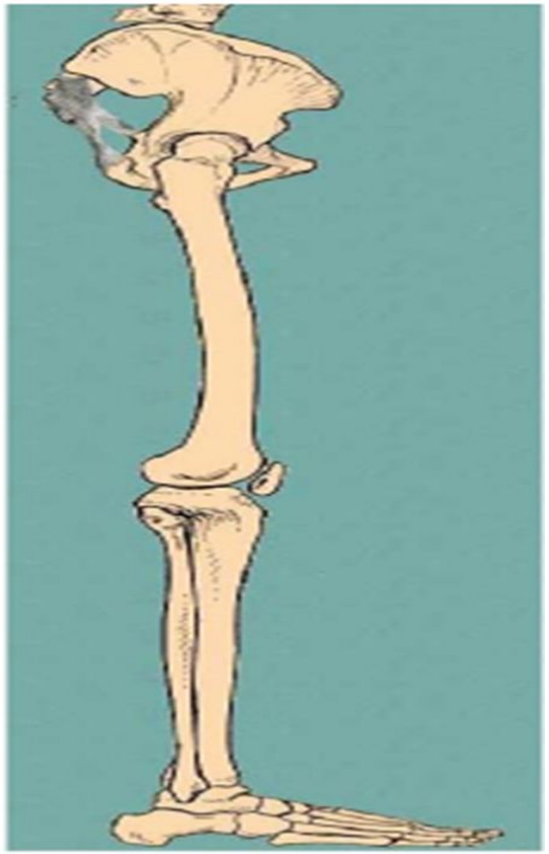
2) **Skeleton of Upper limb: The skeleton of each upper limb consists of 30 bones. These bones are: Humerus, Ulna, Radius, Carpals (8), Metacarpals (5), Phalanges (14)**

3) Pelvic Girdle:

There are two pelvic girdles (one for each lower limb).

4) Skeleton of Lower limb:

The skeleton of each lower limb consists of 30 bones. These bones are; Femur, Tibia, fibula, Patella, Tarsals (7), Metatarsals (5), Phalanges (14



Anatomy of a Bone

The Bones- Bone is a type of connective tissues. It is hard because of the calcification of its extracellular matrix and possesses a degree of elasticity because of the presence of organic fibers.

- Major Functions:

a) Protection for example, the skull and vertebral column protect the brain and spinal cord from injury, and the sternum and ribs protect the thoracic and upper abdominal viscera.

b) Are the main support of the body organs and soft tisuues.

c) Facilitates the movement of the body.

Long Bones

A long bone is one that is cylindrical in shape, being longer than it is wide. Keep in mind, however, that the term describes the shape of a bone, not its size. Long bones are found in the arms (humerus, ulna, radius) and legs (femur, tibia, fibula), as well as in the fingers (metacarpals, phalanges) and toes (metatarsals, phalanges). Long bones function as levers; they move when muscles contract.

Short Bones

A short bone is one that is cube-like in shape, being approximately equal in length, width, and thickness. The only short bones in the human skeleton are in the carpals of the wrists and the tarsals of the ankles. Short bones provide stability and support as well as some limited motion.

Flat Bones

The term " flat bone" is somewhat of a misnomer because, although a flat bone is typically thin, it is also often curved. Examples include the cranial (skull) bones, the scapulae (shoulder blades), the sternum (breastbone), and the ribs. Flat bones serve as points of attachment for muscles and often protect internal organs.

Irregular Bones

An irregular bone is one that does not have any easily characterized shape and therefore does not fit any other classification. These bones tend to have more complex shapes, like the vertebrae that support the spinal cord and protect it from compressive forces. Many facial bones, particularly the ones containing sinuses, are classified as irregular bones.

Sesamoid Bones

A sesamoid bone is a small, round bone that, as the name suggests, is shaped like a sesame seed. These bones form in tendons (the sheaths of tissue that connect bones to muscles) where a great deal of pressure is generated in a joint. The sesamoid bones protect tendons by helping them overcome compressive forces. Sesamoid bones vary in number and placement from person to person but are typically found in tendons associated with the feet, hands, and knees.

Joints

Bones are too rigid to bones together permitting some degree of movement. A joint (articulation) is a point of contact between two bones, between bone and cartilage or between bone and teeth. When we say one bone articulate with another bone we mean that the bones form a joint. Because most movements of the body occur at joints, You should appreciate their importance if you imagine how a cast over your knee joint makes walking difficult or how a splint on your finger limits you ability to manipulate small objects.

Some joints permit no movement, others permit slight movement and others afford fairly free movement.

There are many different types of joints, including:

- fixed joints (such as in the skull, which consists of many bones),
- hinged joints (such as in the fingers and toes),
- ball-and-socket joints (such as the shoulders and hips).

Joint classification

.The joints in the body are classified according to their structure and to their function

Structural classification .1

depends on the type of connective tissue that combines the bones together and whether there is a space between the articulating bones or not (:synovial cavity) and this classification is as the following

1-Fibrous joints : the bones are held together by fibrous connective tissue and the is no synovial cavity.

2- Cartilaginous joints : the bones are held together by cartilage and the is no synovial cavity.

3-Synovial joints: the bones are held together by capsule and ligaments and there is a synovial cavity.

2-Functional classification of the joints relates to the degree of movement they permit as the following:

1. **Synarthrosis :** An immovable joint.
2. **Amphiarthrosis :** A slightly movable joint.
3. **Diarthrosis** : A freely movable joint.