38.3A: Classification of Joints on the Basis of Structure and Function

Joints, responsible for movement and stability of the skeleton, can be classified based on structure or function.

LEARNING OBJECTIVES

Differentiate among the types of skeletal joints based on structure and function

KEY TAKEAWAYS

Key Points

- Fibrous joints contain fibrous connective tissue and cannot move; fibrous joints include sutures, syndesmoses, and gomphoses.
- Cartilaginous joints contain cartilage and allow very little movement; there are two types of cartilaginous joints: synchondroses and symphyses.
- Synovial joints are the only joints that have a space (a synovial cavity filled with fluid) between the adjoining bones.
- The presence of synovial fluid and an articular capsule give synovial joints the greatest range of movement among the three joint types; however, they are the weakest of the joint types.
- Based on function, joints can be divided into synarthroses, amphiarthroses, and diarthroses.
- Synarthrosis joints include fibrous joints; amphiarthrosis joints include cartilaginous joints; diarthrosis joints include synovial joints.
Key Terms

- **synovial fluid**: a viscous, fluid found in the cavities of synovial joints whose main purpose is to reduce friction between the articular cartilage of synovial joints during movement
- **diarthrosis**: a joint that can move freely in various planes
- **synarthrosis**: immovable joint in which two bones are connected rigidly by fibrous tissue
- **amphiarthrosis**: slightly movable joint in which the surfaces of bones are connected by ligaments or cartilage

Classification of Joints on the Basis of Structure and Function

The point at which two or more bones meet is called a joint or articulation. Joints are responsible for movement (e.g., the movement of limbs) and stability (e.g., the stability found in the bones of the skull). There are two ways to classify joints: on the basis of their structure or on the basis of their function.

The structural classification divides joints into fibrous, cartilaginous, and synovial joints depending on the material composing the joint and the presence or absence of a cavity in the joint. The functional classification divides joints into three categories: synarthroses, amphiarthroses, and diarthroses.

Fibrous Joints

The bones of fibrous joints are held together by fibrous connective tissue. There is no cavity, or space, present between the bones, so most fibrous joints do not move at all. There are three types of fibrous joints: sutures, syndesmoses, and gomphoses. Sutures are found only in the skull and possess short fibers of connective tissue that hold the skull bones tightly in place.
Sutures: Sutures are fibrous joints found only in the skull.

Syndesmoses are joints in which the bones are connected by a band of connective tissue, allowing for more movement than in a suture. An example of a syndesmosis is the joint of the tibia and fibula in the ankle. The amount of movement in these types of joints is determined by the length of the connective tissue fibers. Gomphoses occur between teeth and their sockets; the term refers to the way the tooth fits into the socket like a peg. The tooth is connected to the socket by a connective tissue called the periodontal ligament. Fibrous joints classified as synarthroses, or immovable, include: sutures, gomphoses, and synchondroses.

Gomphoses: Gomphoses are fibrous joints between the teeth and their sockets.

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Cartilaginous Joints

Cartilaginous joints are those in which the bones are connected by cartilage. There are two types of cartilaginous joints: synchondroses and symphyses. In a synchondrosis, the bones are joined by hyaline cartilage. Synchondroses are found in the epiphyseal plates of growing bones in children. In symphyses, hyaline cartilage covers the end of the bone, but the connection between bones occurs through fibrocartilage. Symphyses are found at the joints between vertebrae and between the pubic bones. Amphiarthroses allow only slight movement; therefore, either type of cartilaginous joint is an amphiarthrosis.

Synovial Joints

Synovial joints are the only joints that have a space between the adjoining bones. This space, referred to as the synovial (or joint) cavity, is filled with synovial fluid. Synovial fluid lubricates the joint, reducing friction between the bones and allowing for greater movement. The ends of the bones are covered with articular cartilage, a hyaline cartilage. The entire joint is surrounded by an articular capsule composed of connective tissue. This allows movement of the joint as well as...
Articular capsules may also possess ligaments that hold the bones together. Synovial joints are capable of the greatest movement of the three structural joint types; however, the more mobile a joint, the weaker the joint. Knees, elbows, and shoulders are examples of synovial joints. Since they allow for free movement, synovial joints are classified as diarthroses.

**Synovial Joints**: Synovial joints are the only joints that have a space or “synovial cavity” in the joint.