

Amerman Active-Learning Workbook: Chapter 8 Answers

Key Concept: Which structural and functional class of joints has the most stability?

Synarthroses, which are fibrous joints such as the sutures of the skull, provide a great deal of stability, but do not allow motion.

Key Concept: Which structural and functional class of joint has the most mobility? How does this affect stability?

Diarthroses, which are synovial joints structurally, provide a great deal of motion, but much less stability. There generally is a tradeoff of motion at the expense of stability in the structure and function of joints.

Key Concept: Why is it important that the bones in fibrous joints are united by collagen fibers? What do you think would happen if they were joined by elastic fibers instead?

The tough collagen fibers in dense regular connective tissue provide the greatest strength and stability for a joint. Elastic fibers would cause the joint to lose some stability.

Key Concept: Which type of synchondrosis allows the least motion? Why is this important for this joint's function?

The epiphyseal plate does not allow significant motion. Motion occurring at an epiphyseal plate could disrupt its function in long bone growth, producing deformities and corresponding long bones of unequal length.

Key Concept: What is the function of synovial fluid? Why do cartilaginous and fibrous joints lack synovial fluid?

Synovial fluid provides lubrication, metabolic functions such as supplying nutrients, and shock absorption. Cartilaginous and fibrous joints lack synovial fluid because they do not have the synovial membranes that produce the fluid. The fluid would be unnecessary for joints that permit little or no movement.

Complete It: Structures of a Synovial Joint

Fill in the blanks to complete the following paragraph that describes the properties of synovial joints.

Bones are held together in a synovial joint by fibrous cords called ligaments that are composed of dense regular collagenous connective tissue. Tendons are structures that connect a muscle to a

bone. Bursae are fluid-filled sacs often found between tendons and joints, and they function to minimize friction. Some tendons in high-stress areas are surrounded by tendon sheaths, which are long bursae.

Key Concept: How does destruction of articular cartilage in osteoarthritis affect the function of a synovial joint?

Since articular cartilage provides a smooth surface for bones in a joint and protects the joint by reducing friction and absorbing shock, pain and stiffness, as well as decreased joint mobility follows when the cartilage is damaged or destroyed.

Key Concept: Why, specifically, do multiaxial joints have a greater range of motion than do biaxial, uniaxial, and nonaxial joints?

Multiaxial joints, such as a ball and socket joint, allow motion around three axes. This allows movement in nearly any direction. The next most movable category, the biaxial joints (e.g. the metacarpophalangeal joint), only allows motion around two axes.

Key Concept: Which class of synovial joint is the most stable? Why? Which is least stable, and why?

Nonaxial plane joints are the most stable synovial joints. Multiaxial ball-and-socket joints are the least stable. In either case, as joints allow more movement, they become less stable (and vice versa).

Complete It: The Knee Joint

Fill in the blanks to complete the following paragraph that describes the properties of the knee joint.

The medial and lateral menisci rest on the tibial condyles and provide shock absorption. The two collateral ligaments provide resistance to medial and lateral stresses. The anterior cruciate ligament attaches the anterior tibia to the posterior femur, and prevents hyperextension. In contrast, the posterior cruciate ligament attaches the posterior tibia to the anterior femur, and it prevents posterior displacement of the tibia from the femur.