

Joints: Where the Bones Meet and the Body Moves

Last time we talked about bones. Bones provide attachment points for the muscles and muscles contract to move those bones toward each other – remember a muscle can only contract. For the bones to move and remain connected, joints are required.

Types of Joints

Synarthroses: immovable (examples: bones of the skull and the distal tibiofibular joint)

Amphiarthroses: slightly movable (examples: vertebrae, held tightly together by fibrocartilaginous discs)

Diarthroses: freely movable These movements can be categorized into 4 kinds: gliding, angular, circumduction and rotational movements.

There are 7 different types of *diarthrodial* joints: condyloid, hinge, ball and socket, pivot, plane, saddles and ellipsoidal. Each of these is specific to enable support with movement and the type of joint is important to the first understanding of how the body can leverage it.

Structures of a Joint

Bone, Cartilage, Synovium, Synovial Fluid, Ligaments

Hyaline cartilage is the articular cartilage of the joints. It is 60-80% water and its water content enables a load response in a viscoelastic manner to disperse forces. It is nourished by the synovial fluid and its purpose is to disperse the forces transferred through the joints and allow movement with minimal friction and wear.

Meniscus is a type of cartilage in some joints like the knee where extra dispersement of forces are necessary. It used to be common practice to remove menisci if torn, but it has been shown that even a partial removal can increase the load by 350%. Today, the goal is to leave as much as possible.

Synovium, or the *Joint Capsule*, is the white fibrous connective tissue primarily made of collagen that surrounds each joint. The inner surface of the capsule is the *synovial membrane*. This membrane is a loose vascularized connective tissue that secretes *synovial fluid*.

Synovial fluid is the lubrication and nourishment for the joint. It is highly viscous with slow movements enabling greater pressure and thus, support. Rapid movement increases the elasticity of the fluid and that enables it to decrease joint friction. In addition to coating the articular surfaces, *synovial fluid* is stored in the spaces of the *hyaline cartilage*. With movement this fluid moves from the cartilage to the surface.

Bands of connective tissue that connect bone-bone are called *ligaments*. *Ligaments* can be capsular (a thickened point of the joint capsule), extracapsular or intra articular (inside of the joint).

Joints: Where the Bones Meet and the Body Moves (continued)

Arthritis

| Osteoarthritis | Rheumatoid Arthritis |
|---|---|
| Usually begins after age 40 | Usually begins between ages 25 and 50 |
| Affects 21 million adult Americans | Affects 2.1 million adult Americans |
| Usually develops slowly, over many years | May develop suddenly, within weeks or months |
| Affects a few joints | Usually affects many joints, primarily the small joints on both sides of the body |
| Joint redness, warmth and swelling are usually minimal. Morning stiffness is common and may be severe but brief (less than 20 minutes). | Causes redness, warmth, swelling and prolonged morning stiffness of the joints, often lasting for hours |
| Typically affects only certain joints, such as the hands, hips, knees and spine. Rarely affects wrists, elbows or ankles except after injury. | Affects many joints, including wrists, elbows and shoulders |
| Does not cause a general feeling of sickness | Often causes a general feeling of sickness and fatigue, as well as weight loss |

Rheumatoid Arthritis (RA) is an autoimmune disease. There is no single test to diagnose RA. Those genes that are known to be associated with RA are common and found in many people who will never develop RA. (Arthritis Foundation)

Prevention of Osteoarthritis (OA): Decrease stress to joints by decreasing body weight, increasing muscle strength, improving biomechanics. Increase water in joints by increasing daily water intake.

Supplementation? glucosamine and chondroitin

Treatment of Arthritis includes:

- Medication - Pain reducing medication
- For RA medications that affect the immune system
- Injectable Glucocorticoids
- Topical Analgesics
- Surgery
- Strengthen appropriate muscles
- Stretching over-tight muscles and fascia
- Endurance activity to keep on moving the fluid