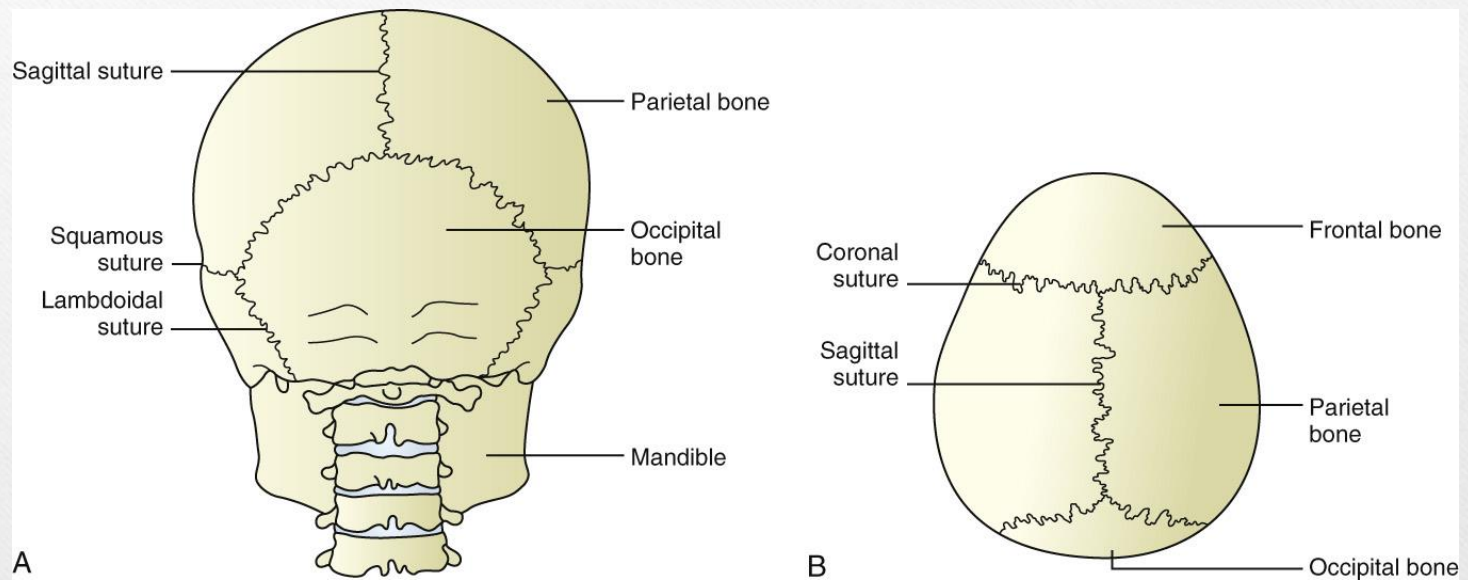


Identification and Palpation of Individual Joints of the Body

Joints of the Skull

Cranial sutures

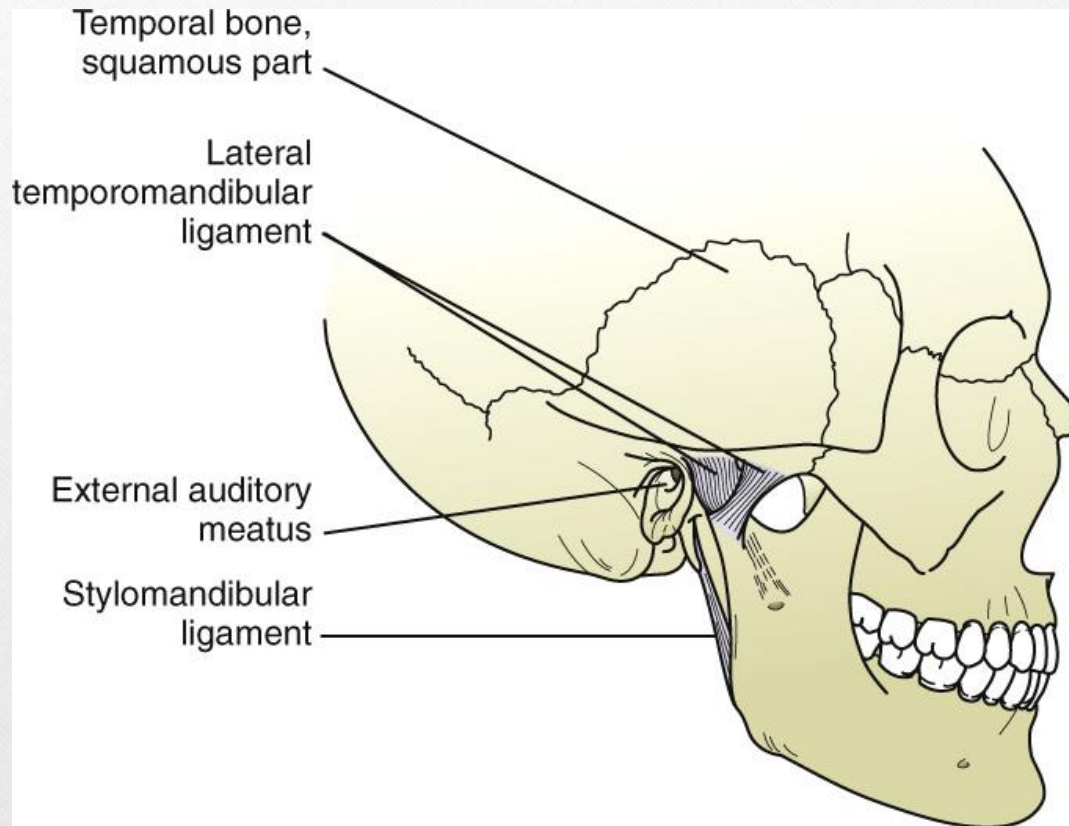


The four cranial sutures are the coronal suture, the sagittal suture, the squamous suture, and the lambdoidal suture.

The coronal suture is located on the top of the skull above the eyebrows. The sagittal suture is midway between the top of the ear and the eye. The squamous suture arcs above the ear, and the lambdoidal suture is behind the ear, just above the mastoid process in an arc superiorly and posteriorly.

Joints of the Skull

Temporomandibular joint

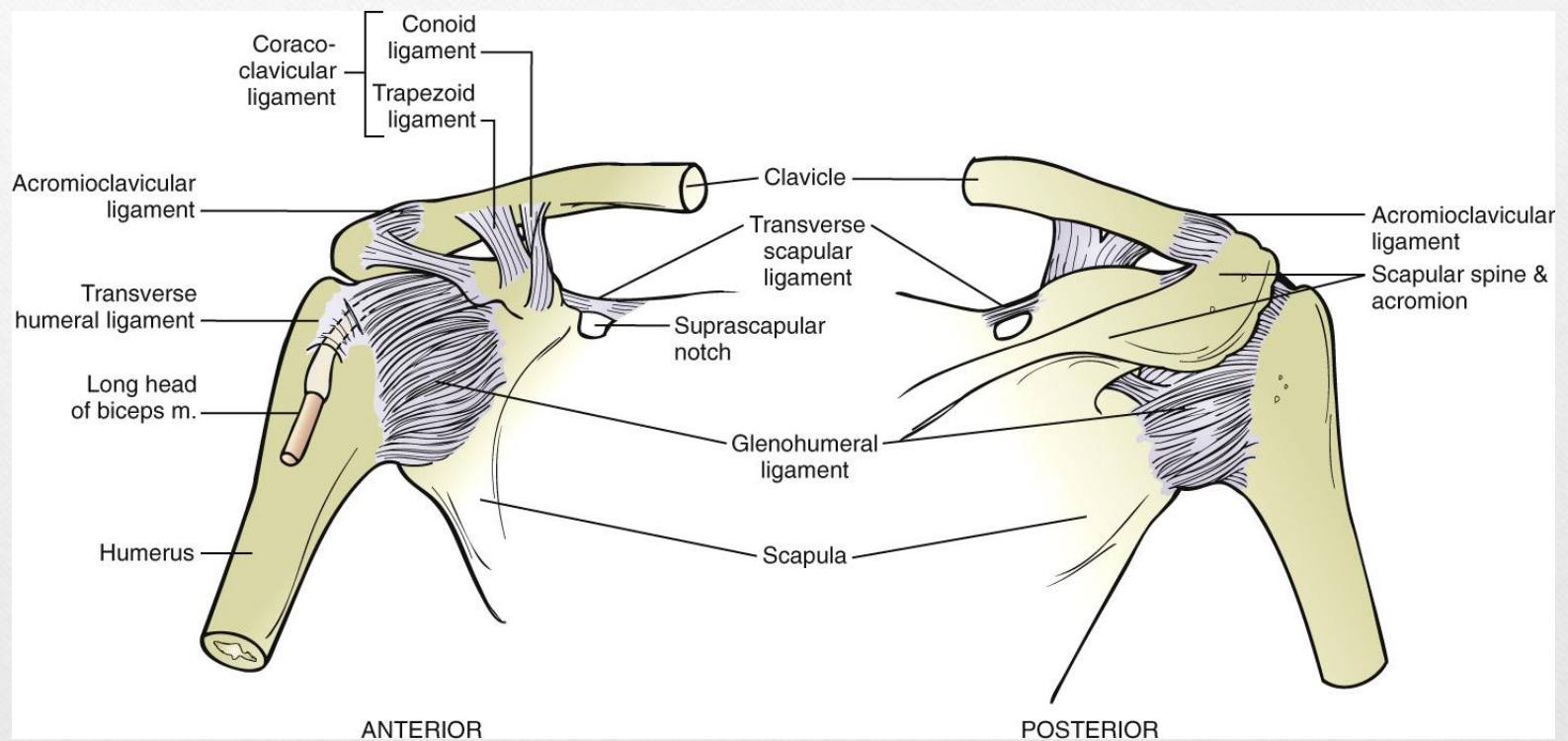


The temporomandibular joint consists of the temporal bone and mandible and is a synovial modified hinge joint.

The TMJ is one of the strongest joints in the body and is the only biarticular joint in the body.

Joints of the Shoulder

Glenohumeral joint

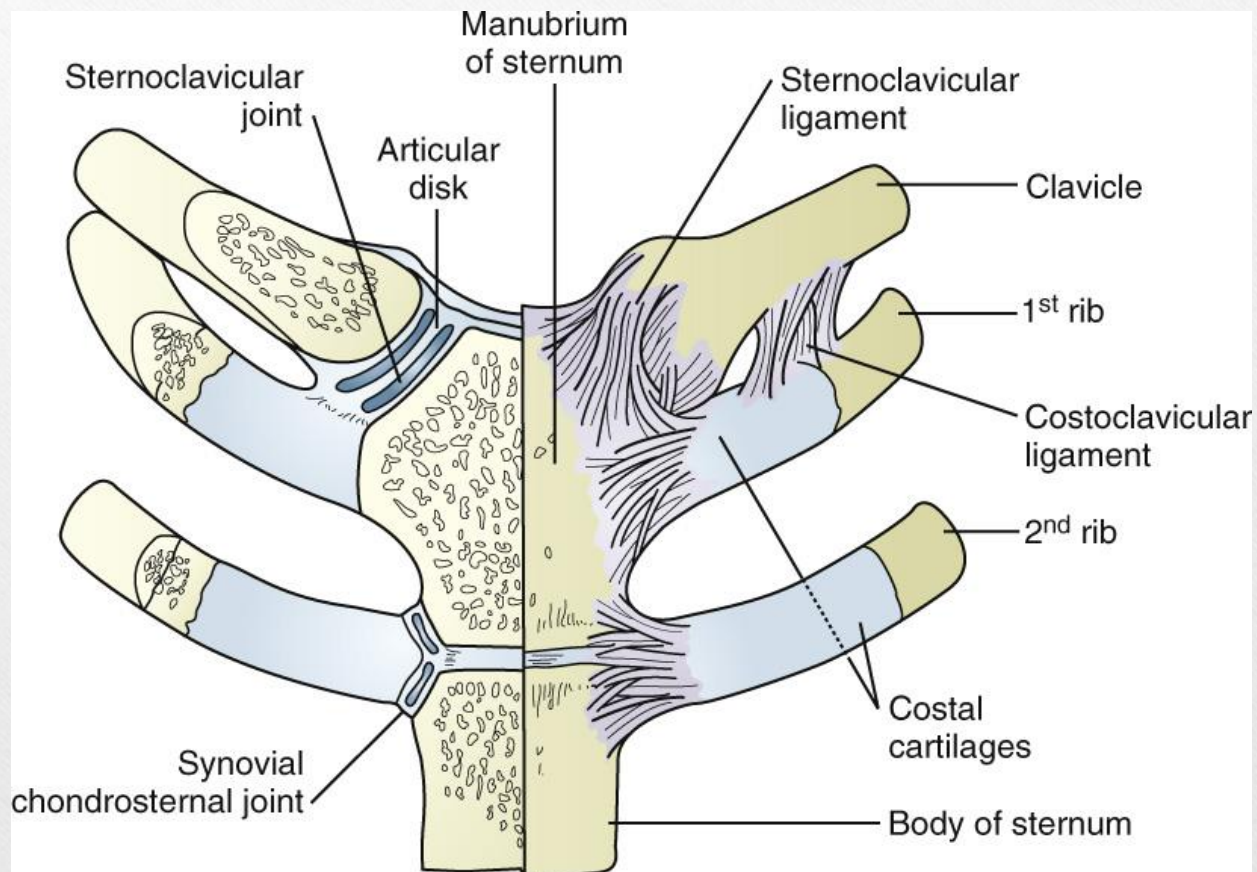


The glenohumeral joint is the main joint in the shoulder and the most mobile joint in the human body.

The previous figure shows the ligaments of the shoulder.

Joints of the Shoulder

Sternoclavicular joint



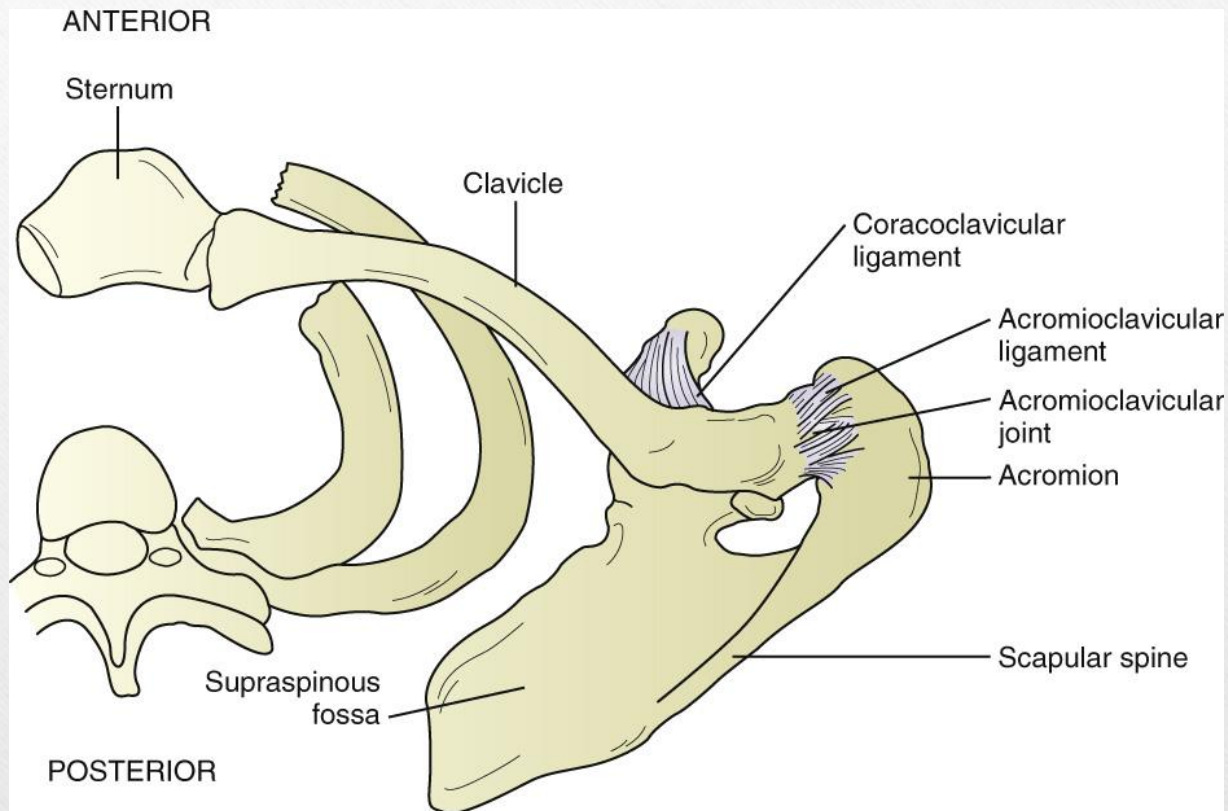
The movements of the sternoclavicular joint follow the movements of the scapula and clavicle because no muscle works directly on this joint.

A decrease or loss of mobility in this joint directly affects shoulder movement.

This joint is the only direct connection between the axial skeleton and the shoulder girdle and arm.

Joints of the Shoulder

Acromioclavicular

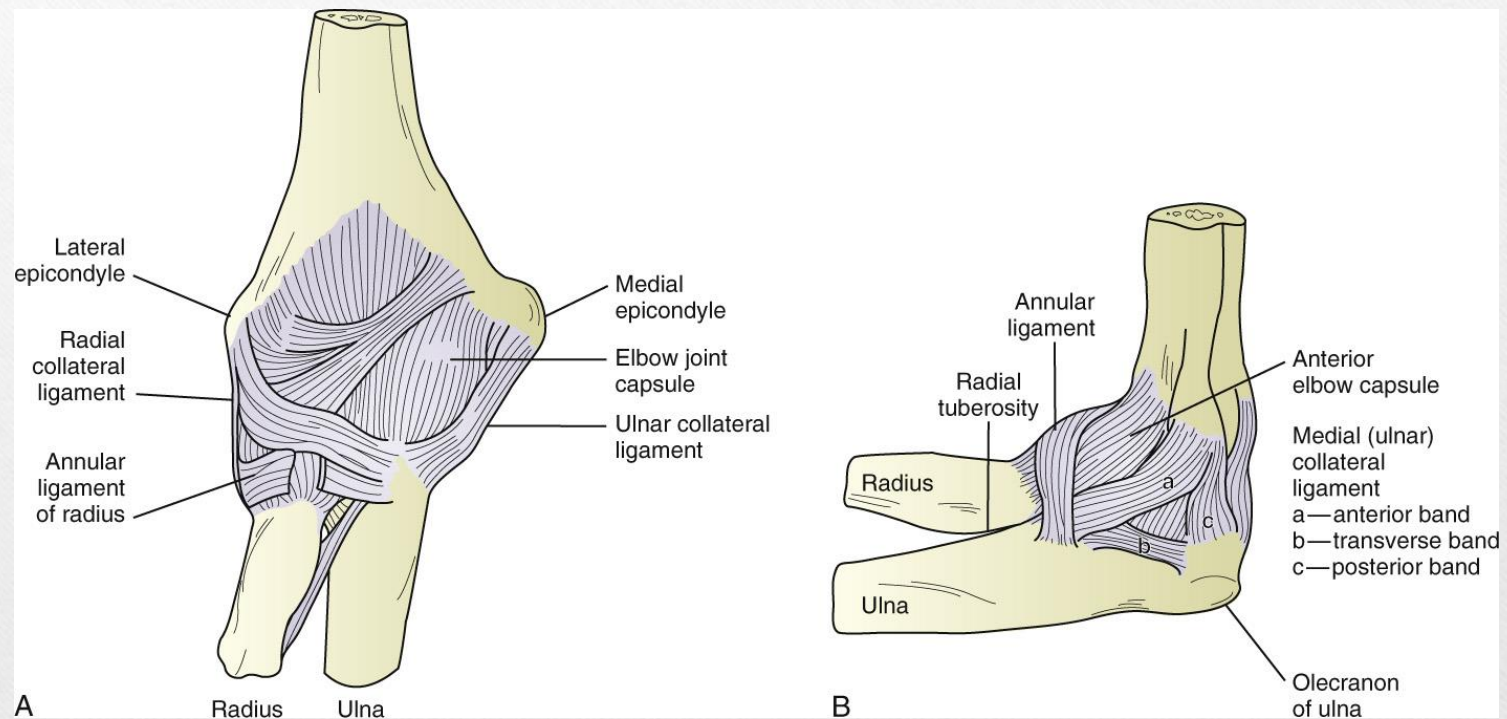


Although a small joint, the acromioclavicular joint is important for shoulder movements.

Some people do not have an acromioclavicular joint because the bones have fused.

Joints of the Elbow

Ulnohumeral and radiohumeral joints



These two joints allow flexion and extension.

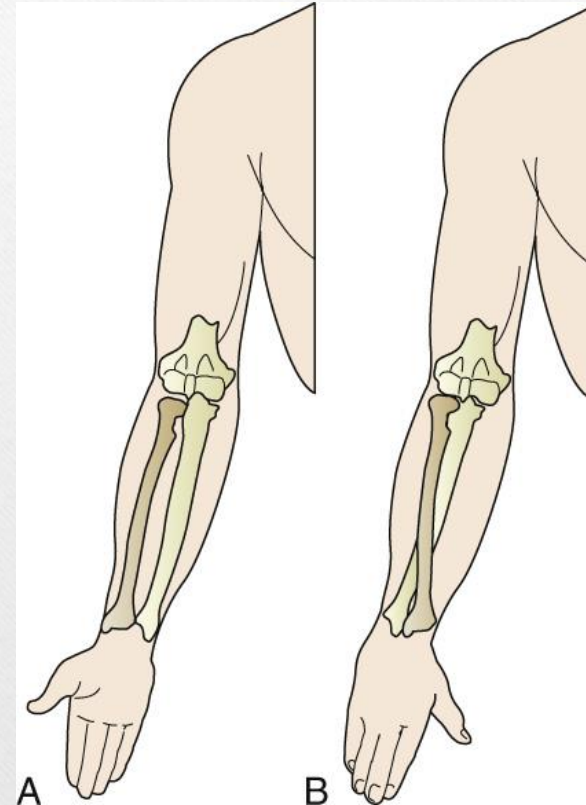
The olecranon process reaches its anatomic barrier at the olecranon fossa preventing hyperextension in most individuals.

Joints of the Elbow

Radioulnar joint

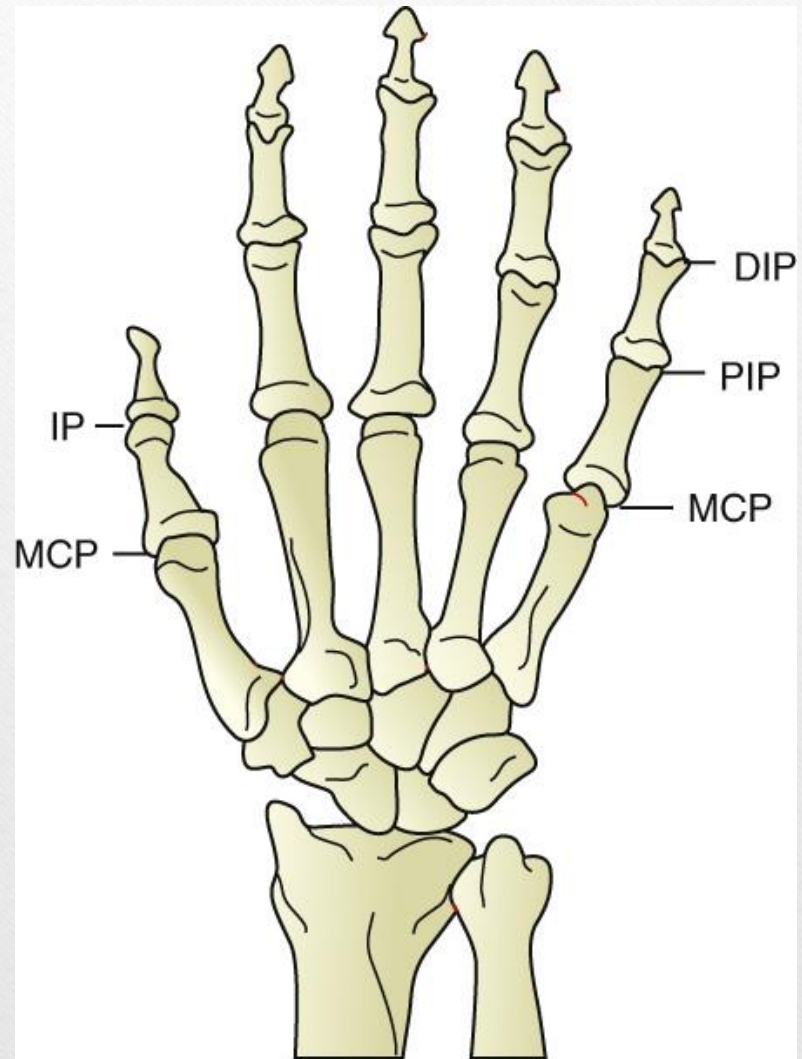
The radioulnar joint is a synovial pivot joint, as opposed to the ulnohumeral and radiohumeral joints, which are synovial hinge joints.

The proximal radioulnar joint allows the movements of pronation (shown on the right) and supination (shown on the left).



Joints of the Wrist and Hand

The hand is capable of acts of great strength and precision. Despite appearances, it cannot rotate. This illusion is accomplished through pronation and supination of the forearm combined with flexion of the wrist.

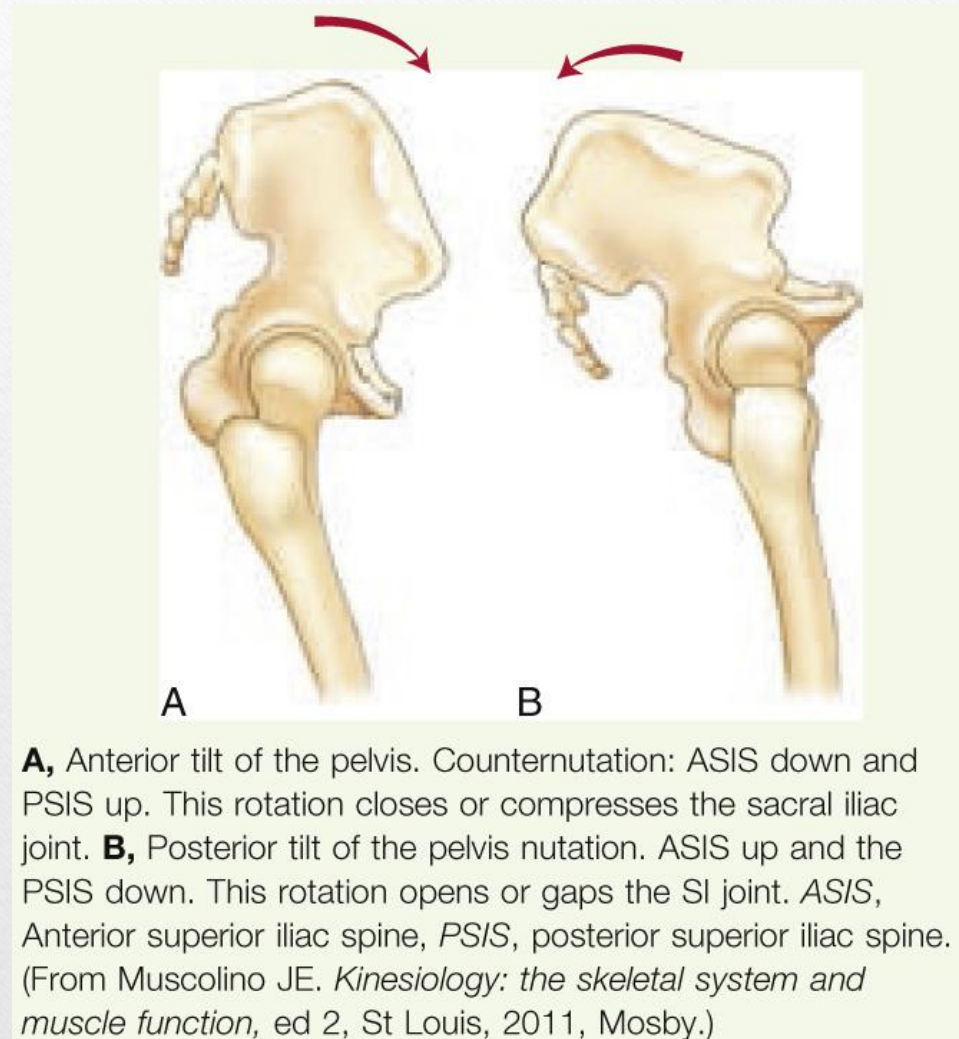


Joints of the Pelvis and Hip

Sacroiliac joint

The sacroiliac joints connect the ilia to the spine, transfer the weight of the body to the hip, and work as shock absorbers during walking and running.

No direct muscle action occurs at the sacroiliac joint. Instead, the sacroiliac joint moves as a result of other joint movements in the area.



Box 8-4 The Complex Pelvis

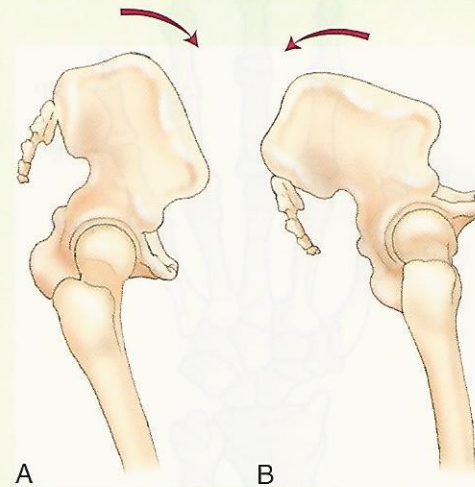
The pelvis comprises three bones arranged in a ring. The pelvis has three important functions:

1. Transmits weight from the axial skeleton to the lower limbs in the standing position or to the ischial tuberosities when sitting
 2. Provides proximal attachments for muscles that insert onto and move the legs
 3. Protects the lower structures of the digestive and urinary tracts and the reproductive systems of males and females
- During the birth of a baby, the head of the infant must pass through the ring (pelvic outlet) of the pelvic girdle.

The pelvis is connected to the skeleton of the upper body at the sacroiliac joint. The sacrum and the coccyx also have a connection to the pelvis.

The joints of the pelvis are capable of tiny movement. Much of this movement occurs at the sacroiliac (SI) joint.

- Nutation/Counternutation describes sacral movement in relationship to the movement of the ilium.
 - Nutation is the forward motion of the base of the sacrum into the pelvis (tuck your tail) or the backward rotation of the ilium on the sacrum.
 - Counternutation is the opposite movement of nutation. A lordotic position or anterior pelvic tilt is created by the rotation of ilium on the sacrum or backward motion of the base of the sacrum out of the pelvis (wag your tail).
- Iliosacral movement is ilium movement on the sacrum— anterior/posterior rotation, superior/inferior movement, and medial/lateral flaring.
- Sacroiliac motion is sacral movement on the ilium—flexion/extension and rotation.
- Symphysis pubis joint motion may be either superior or inferior. There is only approximately 2 mm of motion possible at this joint.
- **Outflare** is the external [outward] rotation of the ilium on the sacrum. This movement closes the SI joints and opens the pubis.



A, Anterior tilt of the pelvis. Counternutation: ASIS down and PSIS up. This rotation closes or compresses the sacral iliac joint. **B**, Posterior tilt of the pelvis nutation. ASIS up and the PSIS down. This rotation opens or gaps the SI joint. ASIS, Anterior superior iliac spine, PSIS, posterior superior iliac spine. (From Muscolino JE. *Kinesiology: the skeletal system and muscle function*, ed 2, St Louis, 2011, Mosby.)

- **Inflare** is the internal rotation of the ilium on the sacrum. This will open the SI joint in the back and close the pubis joint in the front.

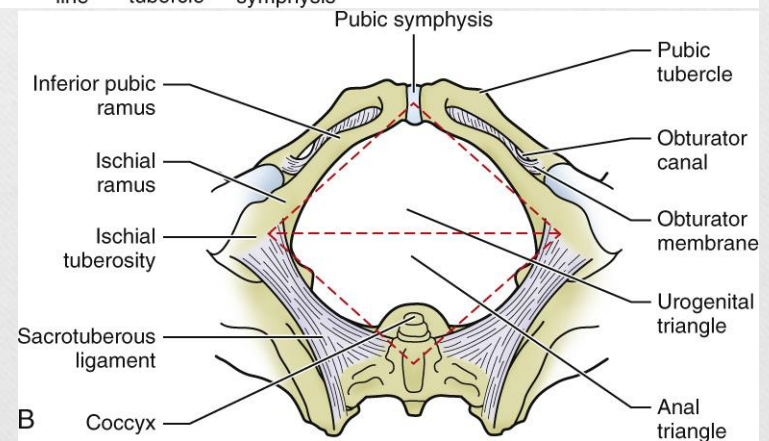
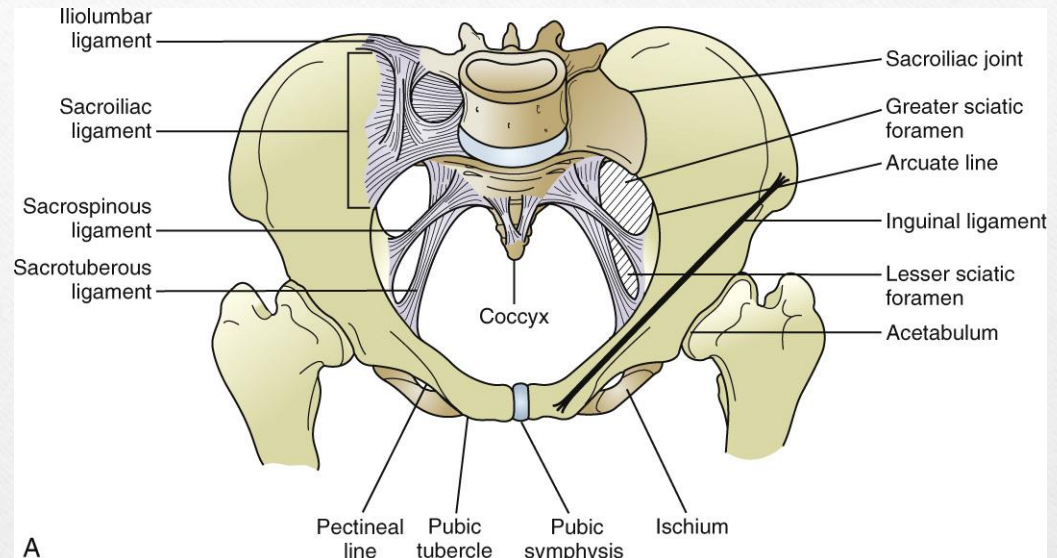
All these tiny movements can become very confusing. They all relate to the sacral iliac joint movement and the way the symphysis pubis moves. When these integrated but independent movements are disrupted, many pain patterns result.

Joints of the Pelvis and Hip

Symphysis pubis

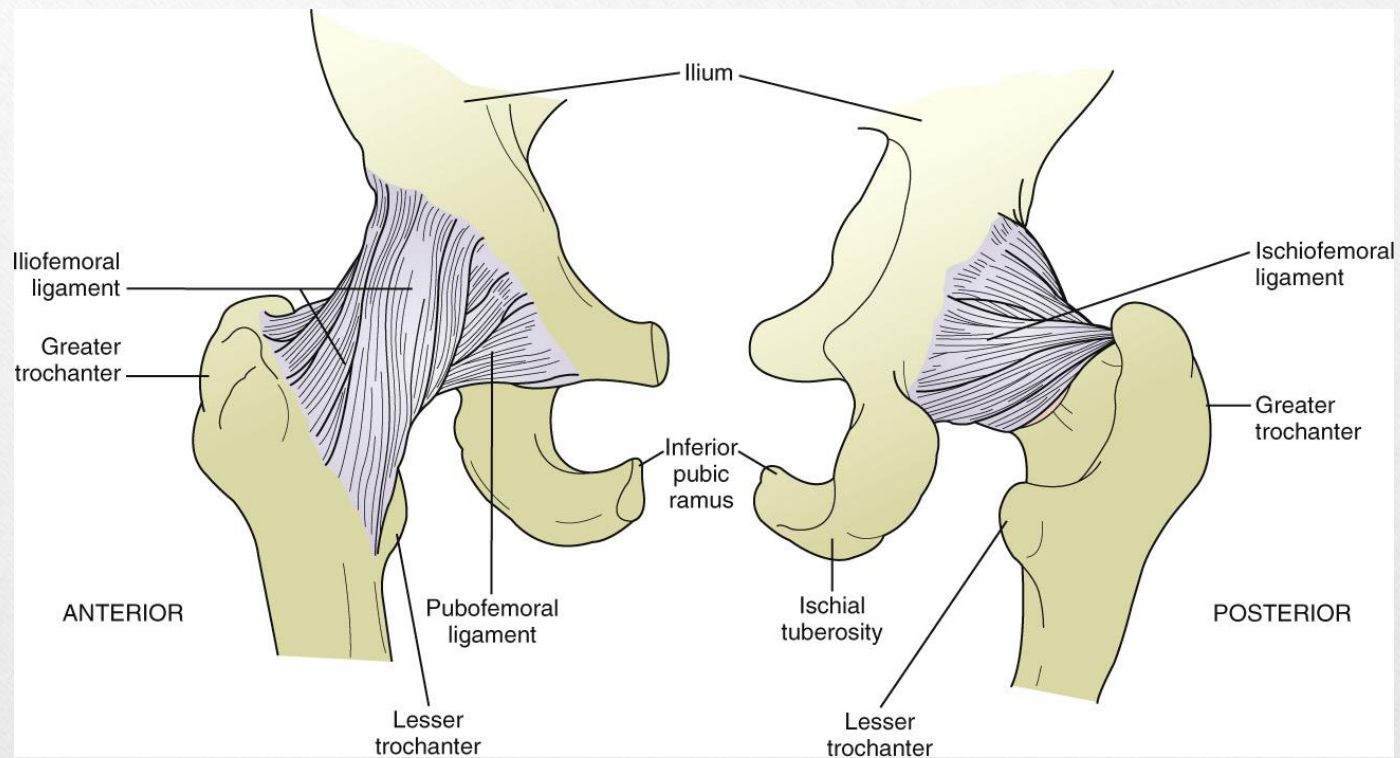
What movement does the symphysis pubis permit and when?

It separates slightly, especially during pregnancy and childbirth.



Joints of the Pelvis and Hip

Hip joint

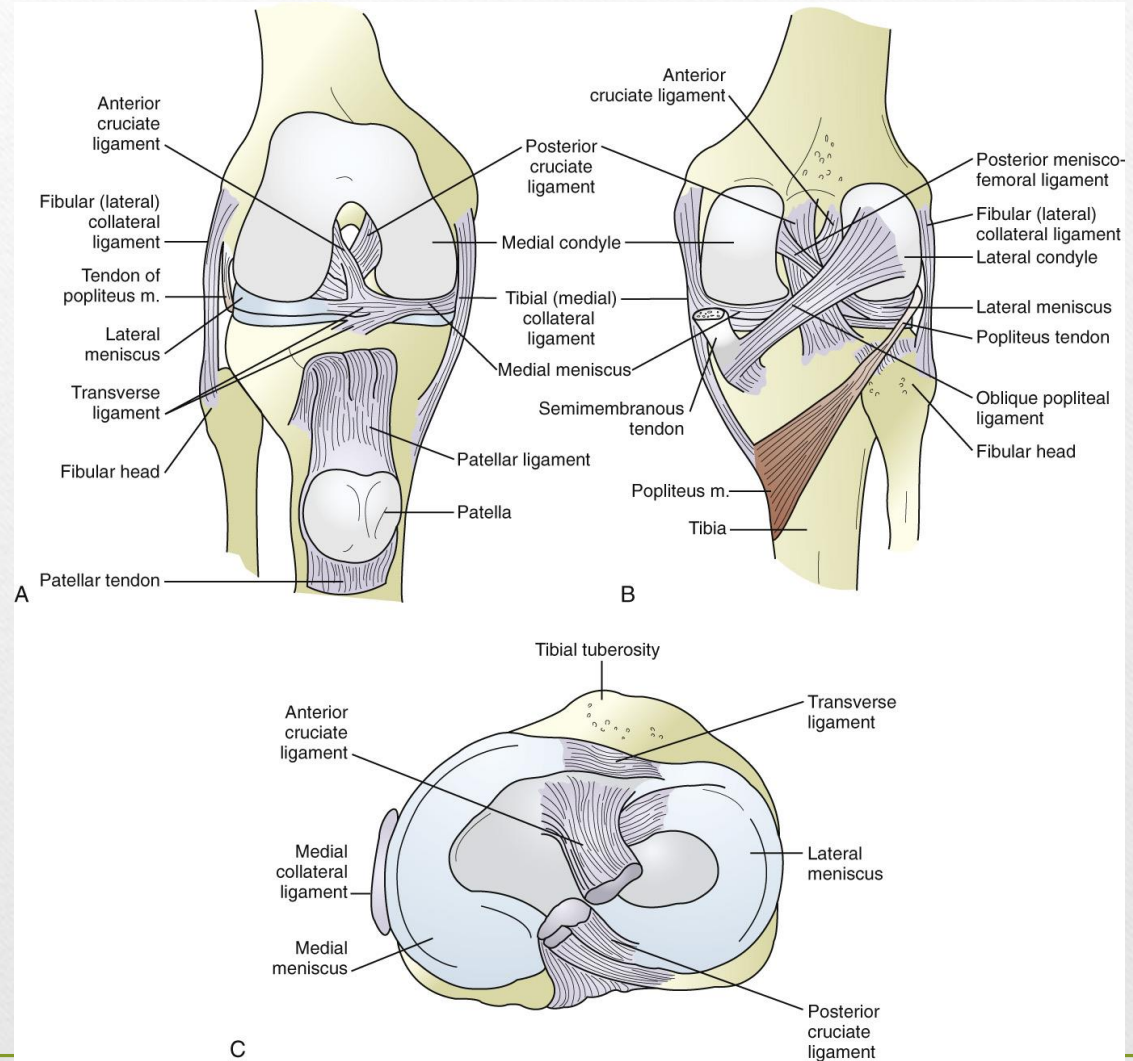


The hip joint is a massive, mobile ball-and-socket joint.

The hip joint is less mobile than the shoulder joint because of the round head of the femur fitting into the deep socket of the acetabulum of the pelvis. This structure provides stability.

Joints of the Knee

The knee joint is the most complicated joint in the body, is not as stable as other joints, and yet is one of the most frequently used joints.



Which movements does the knee joint allow?

Flexion, extension, medial rotation, and lateral rotation.

What protects the knee from external impact?

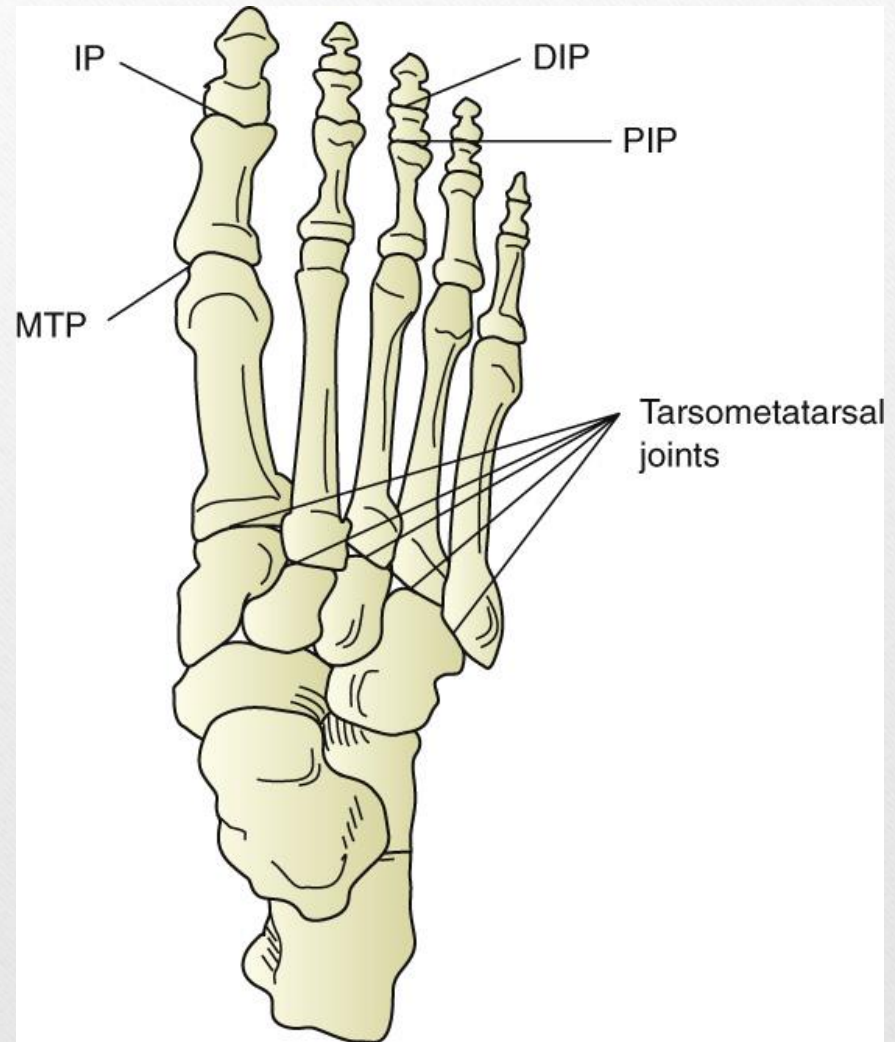
The patella protects the knee joint from external impact, such as falling forward onto the knees.

Joints of the Ankle and Foot

Foot joints

The metatarsals make up the body of the foot, and the phalanges make up the toes.

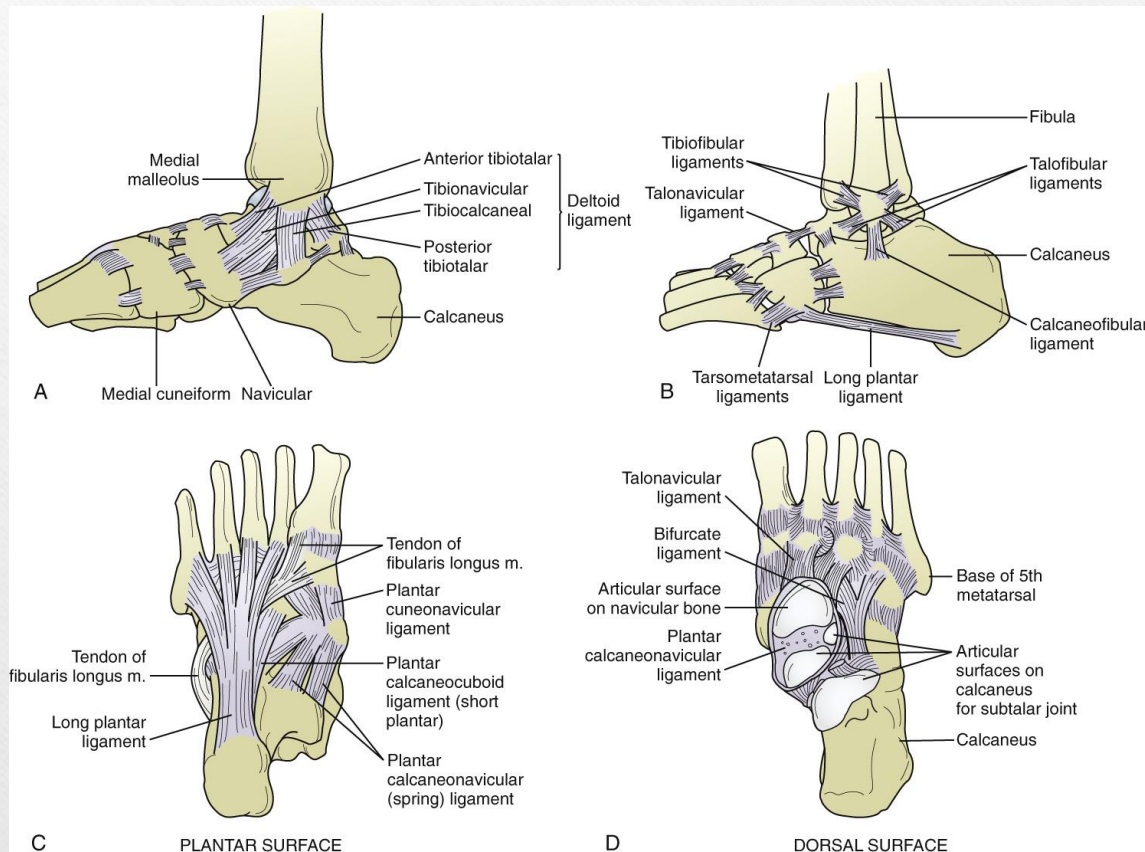
Interphalangeals are subdivided into proximal interphalangeals and distal interphalangeals, abbreviated as PIP and DIP, respectively.



Joints of the Ankle and Foot

Talocrural joint

Distal tibiofibular and subtalar/talocalcaneal joints



The talocrural joint is the ankle joint and consists of the tibia, fibula, and talus. It is a synovial hinge joint.

The distal tibiofibular joint is a fibrous syndesmosis joint that holds the tibia and fibula together. The ankle (talocrural) joint is formed by the distal ends of tibia and fibula meeting the talus.

Immediately distal to the ankle joint is the talocalcaneal joint, often referred to as the subtalar joint.

Joints of the Ankle and Foot

Foot joints

Intertarsal: between the tarsal bones

Tarsometatarsal: between the tarsals and the metatarsals

Metatarsophalangeal: between the metatarsals and the phalanges

Interphalangeal: between the proximal, middle, and distal phalanges

Joints of the Spine

Atlantooccipital

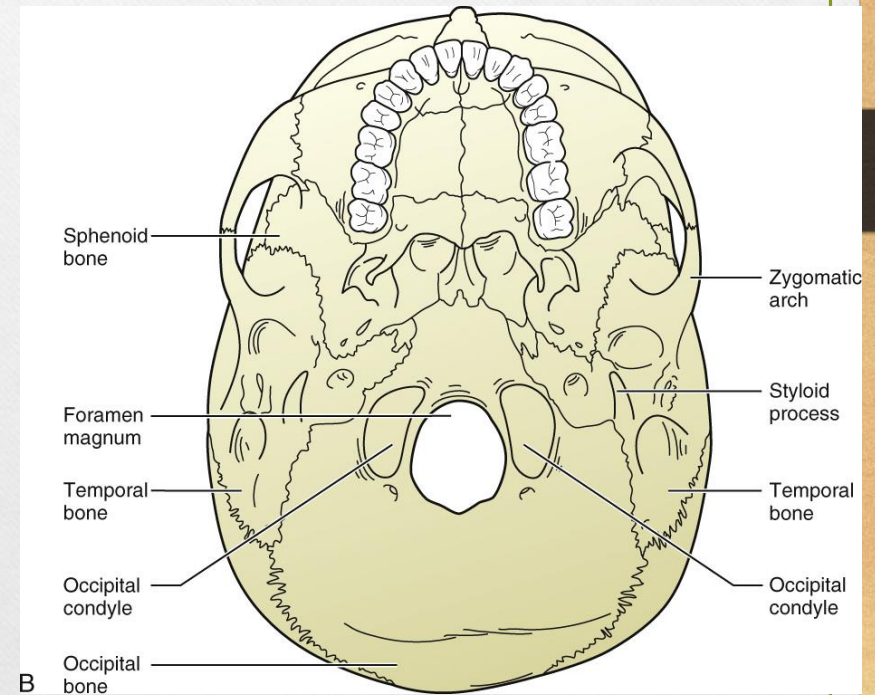
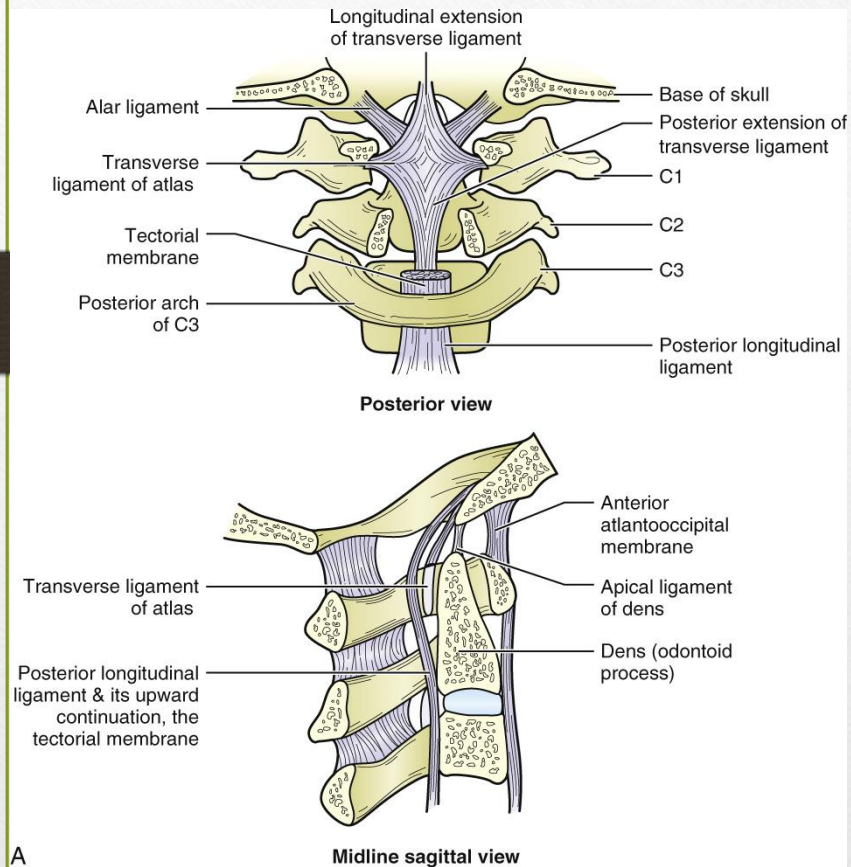
Atlantoaxial

Intervertebral

Zygapophyseal

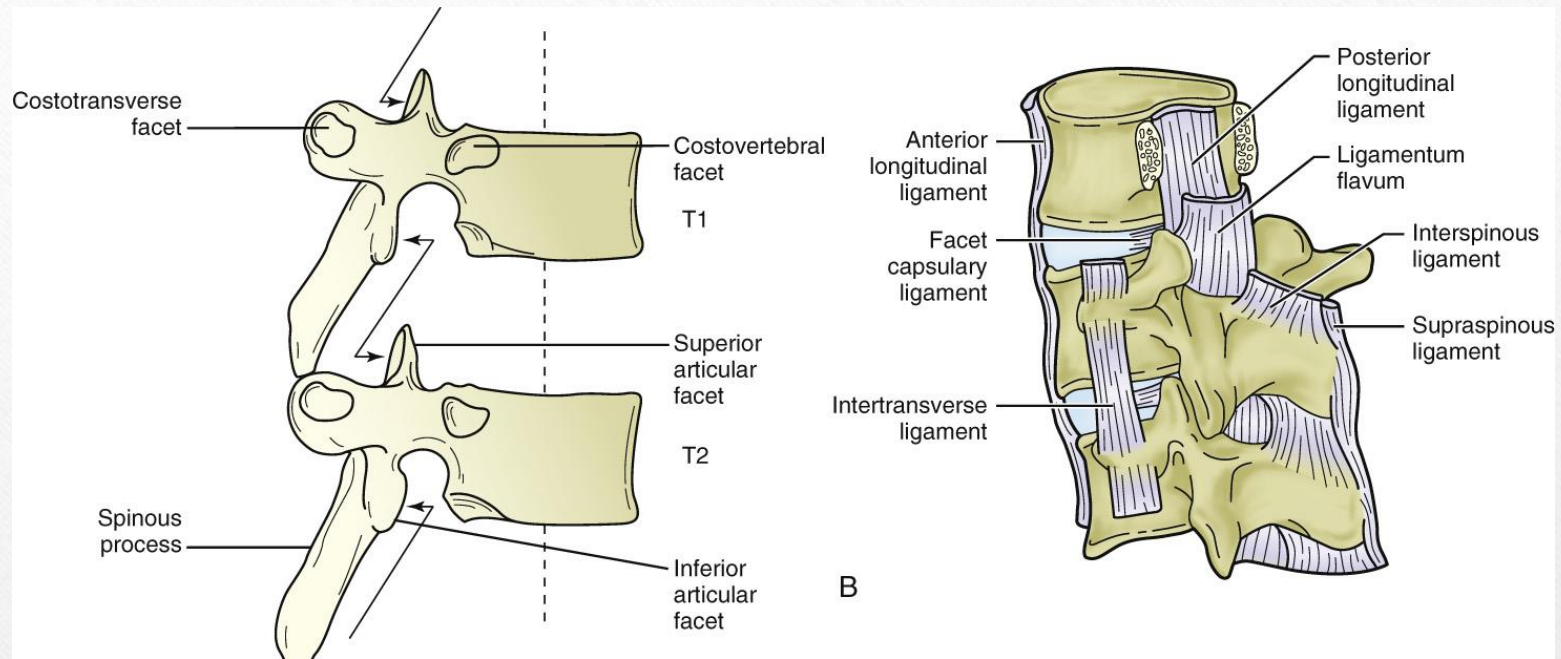
Individually, intervertebral joints allow little movement. As a whole, the spine is much more flexible

Ligaments connecting skull and vertebral column and the base of the skull



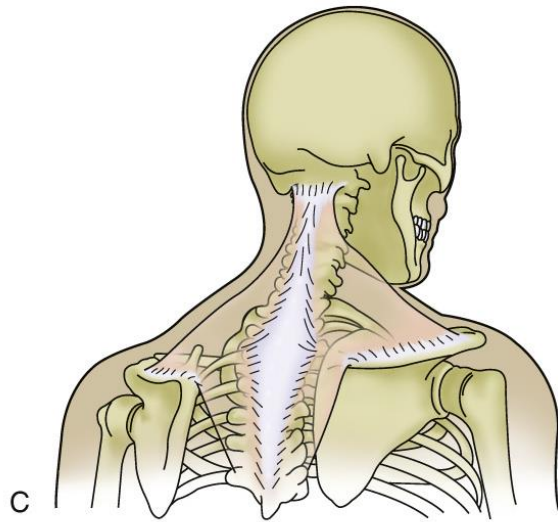
The most mobile portion of the spine is the neck; it can flex, extend, rotate, and bend laterally.

Most injuries occur in more flexible areas of the back, including the lumbar area.

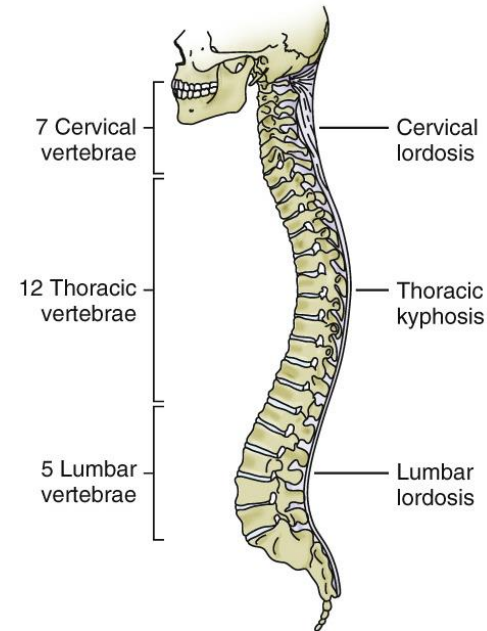


A, Vertebral articulations in the frontal plane. (In lumbar vertebrae [not shown] the articular facets are in the sagittal plane.) The vertical dashed line indicates the articulation of adjacent vertebral bodies. The jagged lines indicate the way articular facets align with one another.

B, Ligaments of the spine

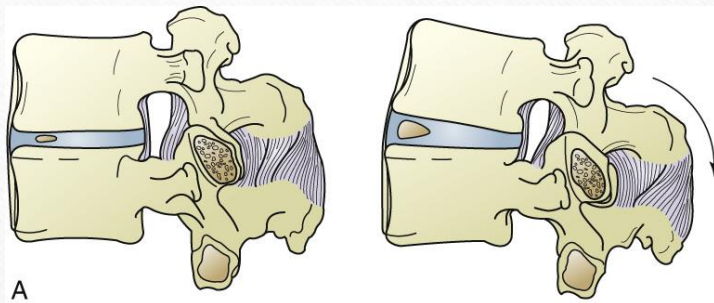


D

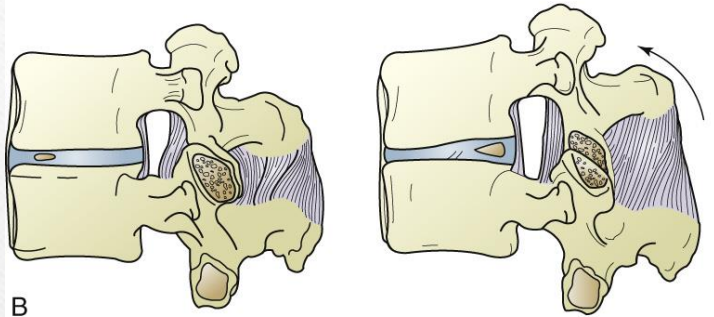


C, Ligamentum nuchae

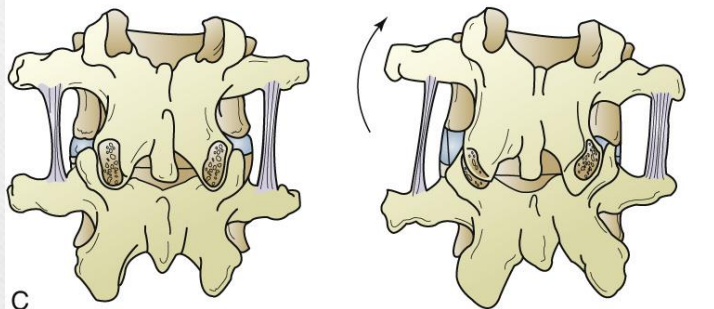
D, Cervical and lumbar lordoses and a thoracic kyphosis. The sacral curve forms a second kyphosis.



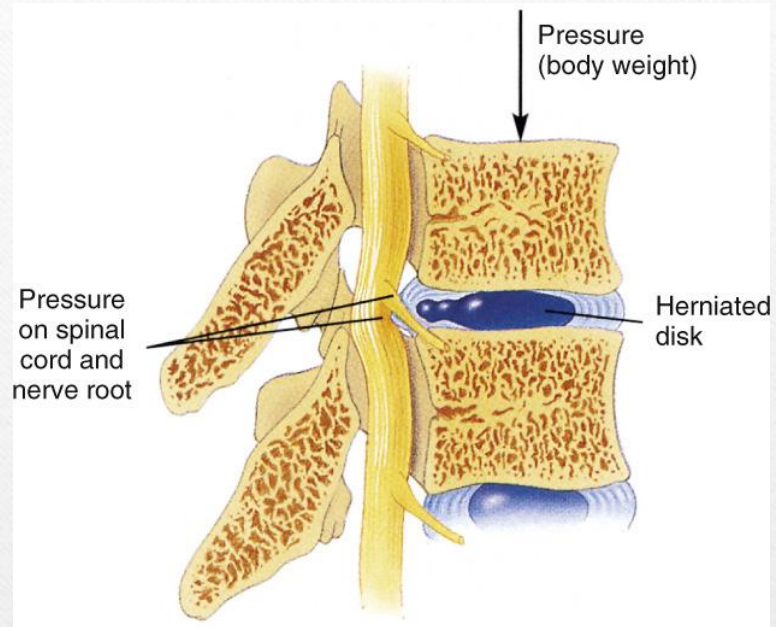
A



B



C



Motion between adjacent vertebrae is shown on the left, and a herniated disk is shown on the right.

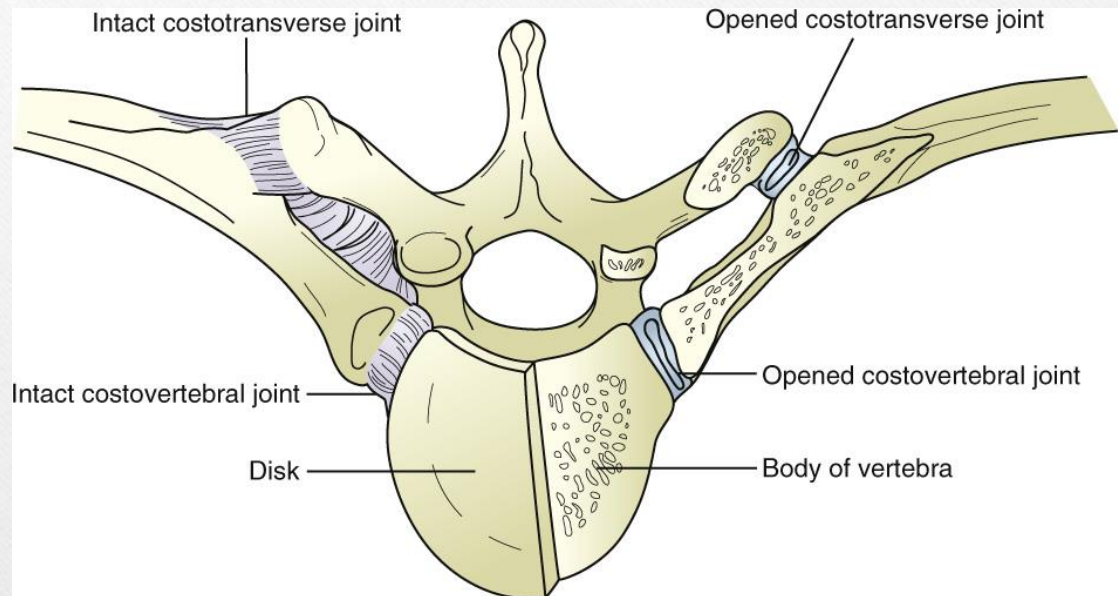
Joints of the Thorax

Costospinal joints

The costospinal joints consist of costovertebral and costotransverse joints.

The costospinal joints allow gliding.

This image shows the costospinal joints between the ribs and spine.

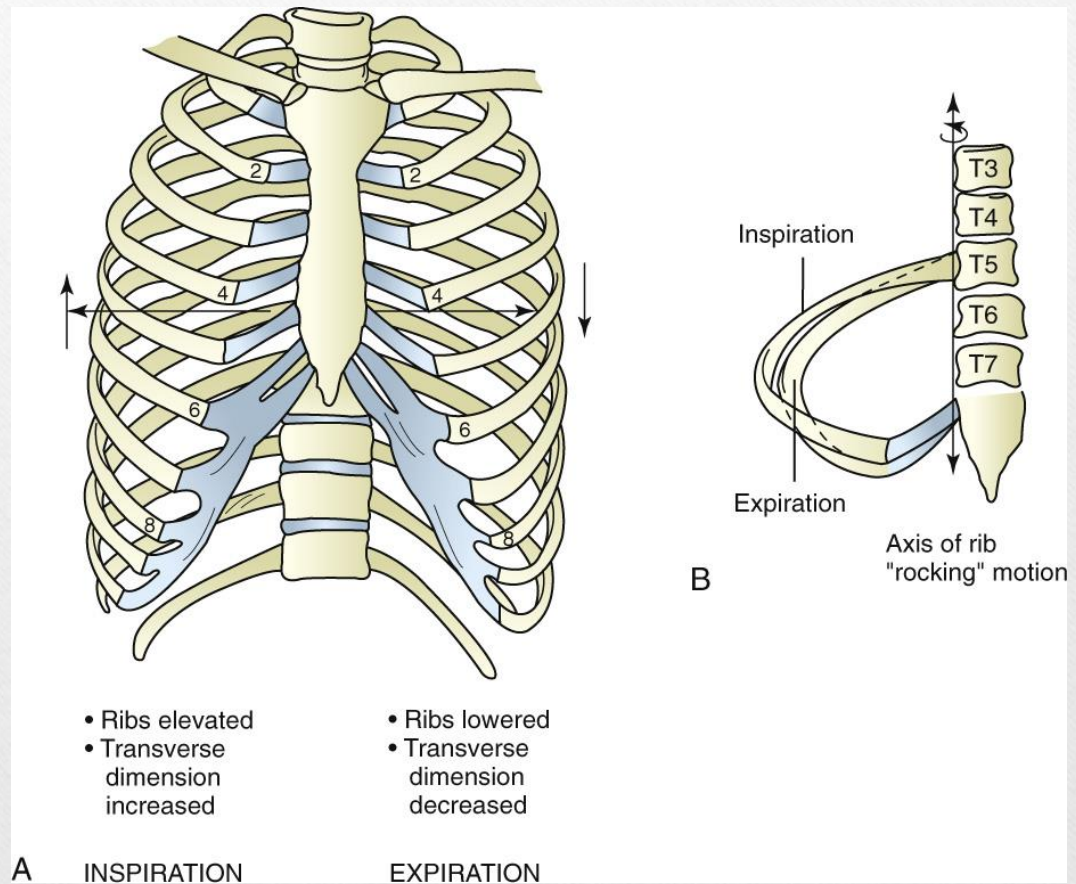


Joints of the Thorax

Sternocostal joints

Sternocostal joints consist of costochondral and chondrosternal joints.

The sternocostal and costospinal joints allow movements that enable inspiration to occur.



Integrating Joint Movement into Massage and Joint Pathology

Determining ROM

Average ROM varies by individual.

Available ROM measured from neutral anatomic position

Factors include:

- Shape of bones forming joint

- Tautness or laxness of ligament and capsule

- Length of soft tissue structure that supports and moves joint

- Whether joint is open chain or closed chain

The most important aspect of joint movement is that it is used to assess whether a jointed area is functioning effectively.

By comparing what is considered normal ROM for a joint to what the massage client is able to do, the massage therapist may be able to determine indications for massage intervention or possible referral.

Elements Causing Joint Dysfunction

Anatomic barriers

Determined by the shape and fit of the bones at the joint

Physiologic barriers

Result of the limits in ROM imposed by body for protection from injury

Pathologic barriers

Adaptation in a physiologic barrier that causes the protective function to limit instead of support optimal functioning

The anatomic barrier is seldom reached because the possibility of injury is greatest in this position.

The sensation at the physiologic barrier is soft and pliable.

Pathologic barriers often are manifested as stiffness, pain, or a “catch.”

Types of Joint Movement Methods

Active joint movement

Active assisted movement

Active resistive movement

Passive joint movement

If a client is paralyzed or very ill, only passive joint movement may be possible. Some clients do not wish to participate in active joint movement and prefer to take a very passive role during the massage.

In active joint movement, the client moves the area without any type of interaction by the massage practitioner. This is a good assessment method and should be used before and after any type of soft-tissue work and is a great self-help tool.

Applying Joint Movement Methods

Remain within physiologic barriers

Hand placement important

No squeezing, pinching, or restricted movement pattern

Movements are rhythmic, smooth, slow, and controlled.

During a massage session, strive to move every joint.

Joint movement should be incorporated into every massage when possible.

Pathologic Conditions of Joints: Conditions Caused by Movement

Repetitive overuse

Common to athletes, dancers, factory workers, office workers

Bursitis

Inflammation of bursae is one of the most common causes of joint pain.

Rest, rehabilitative exercise, ergonomically correct equipment, education, and other similar methods often are used to treat and manage overuse syndromes.

Lateral epicondylitis (epicondylosis)

Caused by repetitive extension of wrist or pronation-supination of forearm

Medial epicondylitis (epicondylosis)

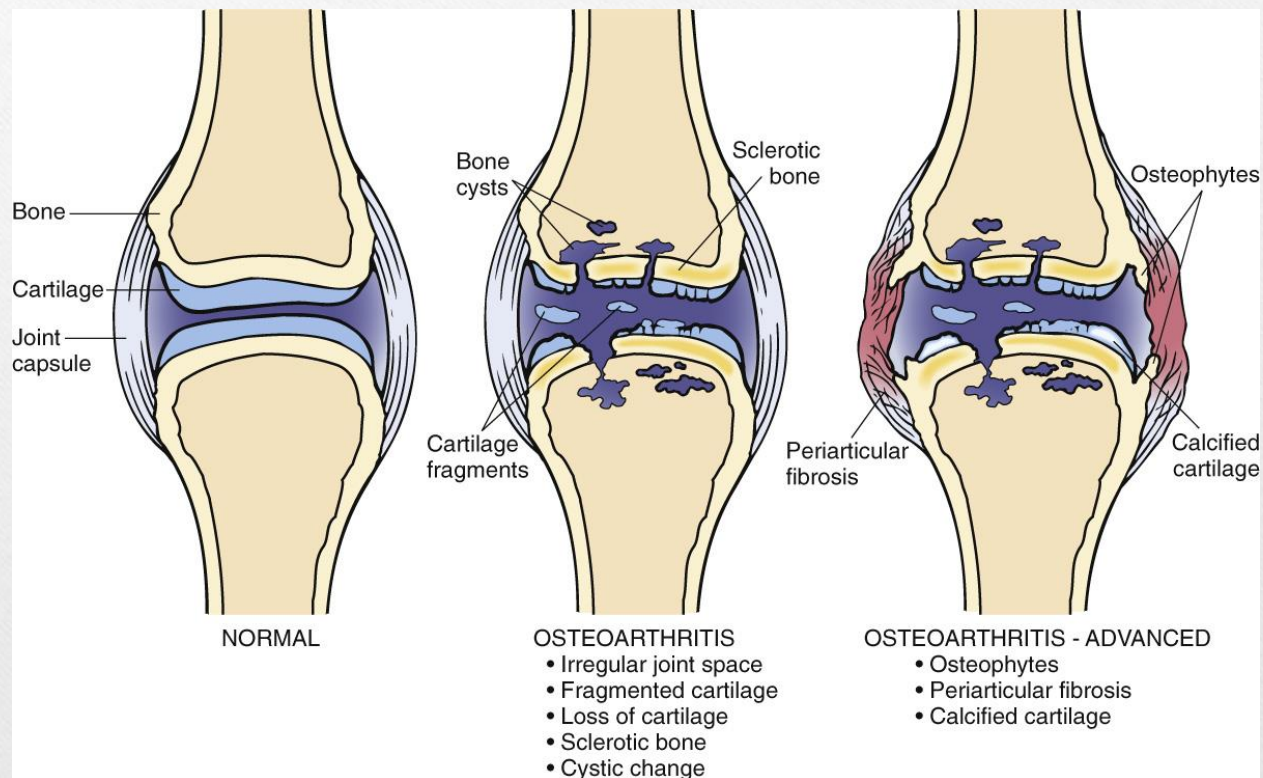
Caused by repetitive wrist flexion

Massage can restore and manage some types of connective tissue dysfunctions.

Movement modalities, such as active and passive joint movement, can be used to balance movement function and reduce tension patterns.

Pathologic Conditions of Joints: Inflammatory Joint Disease (Arthritis)

Physical stress-induced: osteoarthritis



In the advanced stages of osteoarthritis, osteophytes protrude into the adjacent soft tissues, causing irritation, inflammation, and fibrosis.

Osteoarthritis usually first occurs in middle age and progresses with the aging process as a result of normal wear and tear, but other factors, such as obesity, also can speed its presentation and intensity.

NSAIDs are a method of treatment, as well as moderate exercise.

Therapeutic massage can manage excessive protective muscle spasms that may develop.

Immune-related: rheumatoid arthritis

Most common immune-related form of inflammatory joint disease; autoimmune

Joints stiffen and become useless.

Cause unknown

Treatments include NSAIDs and sometimes steroids.

Massage indications/contraindications:

Avoid frictioning and other inflammatory techniques.

The disease is a crippling condition characterized by swelling of the joints in the hands, feet, and other parts of the body as a result of inflammation and overgrowth of the synovial membranes and other joint tissues.

Because the progression and flare-ups of the disease are often stress-related, the generalized gentle stress-reduction methods provided by massage therapy may be beneficial in long-term management of the condition, if supervised as part of a total care program.

Crystal-induced arthritis (gout)

Excess uric acid forms and deposits crystals around joints and body.

Affects men over middle-age

Regional massage contraindications

Gout is easily mistaken for cellulitis. Any joint can be involved, but the one most commonly affected is the MTP joint of the great toe.

Infectious arthritis

Brought on by infections (e.g., tuberculosis, gonorrhea)

Most common in children

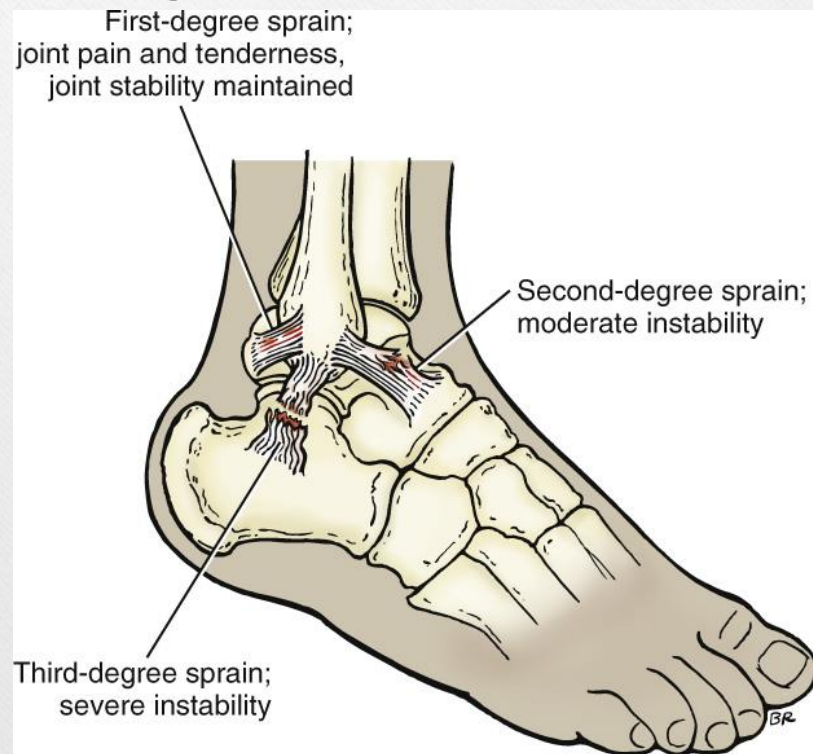
Massage contraindicated

Diagnosis of infectious arthritis may be difficult.

Pathologic Conditions of Joints: Conditions Caused by Injury

Ankle sprain – measurement in degrees

Joint injuries are usually classified as dislocations and sprains.



Immobilization

Casts and splints

Paralysis

Adhesive capsulitis (frozen shoulder)

Immobilization affects the surrounding soft tissues, the articular surfaces of the joint, and the underlying bone.

Immobilization helps the healing process of fractured bone but is detrimental to joint structure and function, usually compromising normal ROM.

Management and rehabilitation of joint problems are part of a long-term process that often requires a multidisciplinary approach.

Pathologic Conditions of Joints: Conditions Caused by Structural Deviations

Abnormal spinal curvatures

Ankylosing spondylitis

Hyperlordosis

Hyperkyphosis

Gibbus

List

Scoliosis

Functional scoliosis

Pathologic Conditions of Joints: Other Conditions of the Joints

Backache

Joint causes include disorders of intervertebral disks and abnormalities of the vertebrae, ligaments, and other supporting structures.

Massage is effective in reducing guarding and reducing pain.

Is backache usually a joint-related problem?

No, it is usually muscular in nature.

The massage goal is not to eliminate protective spasm totally but rather to support the body in managing dysfunctional patterns.

Complex backache involving the joint structures requires that therapeutic massage be incorporated into a total treatment program with supervision by the appropriate health care professional.

Ganglia

Cystic, round, usually nontender swellings located along tendon sheaths or joint capsules

Massage regionally contraindicated

Where are ganglia usually found on the body?

The dorsum of the hand and wrist is a frequent site of involvement. Ganglia also may develop elsewhere on the hands, wrists, ankles, and feet.

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