



PEER TO PEER TRAINING

ARTHRITIS



**Increasing the Conformance of Academia
towards Rehabilitation Engineering (i-CARE)**

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BATTI
Ideas transforming the future

joint



- A joint can be defined as a place where two or more bones meet.
- **There are three types of joints: fibrous, fibro-cartilaginous and synovial.**

Fibrous and fibro-cartilaginous joints

- These include the intervertebral discs, the sacroiliac joints, the pubic symphysis and the costochondral joints.
- Skull sutures are fibrous joints.
- **Little movement occurs at such joints.**



joint

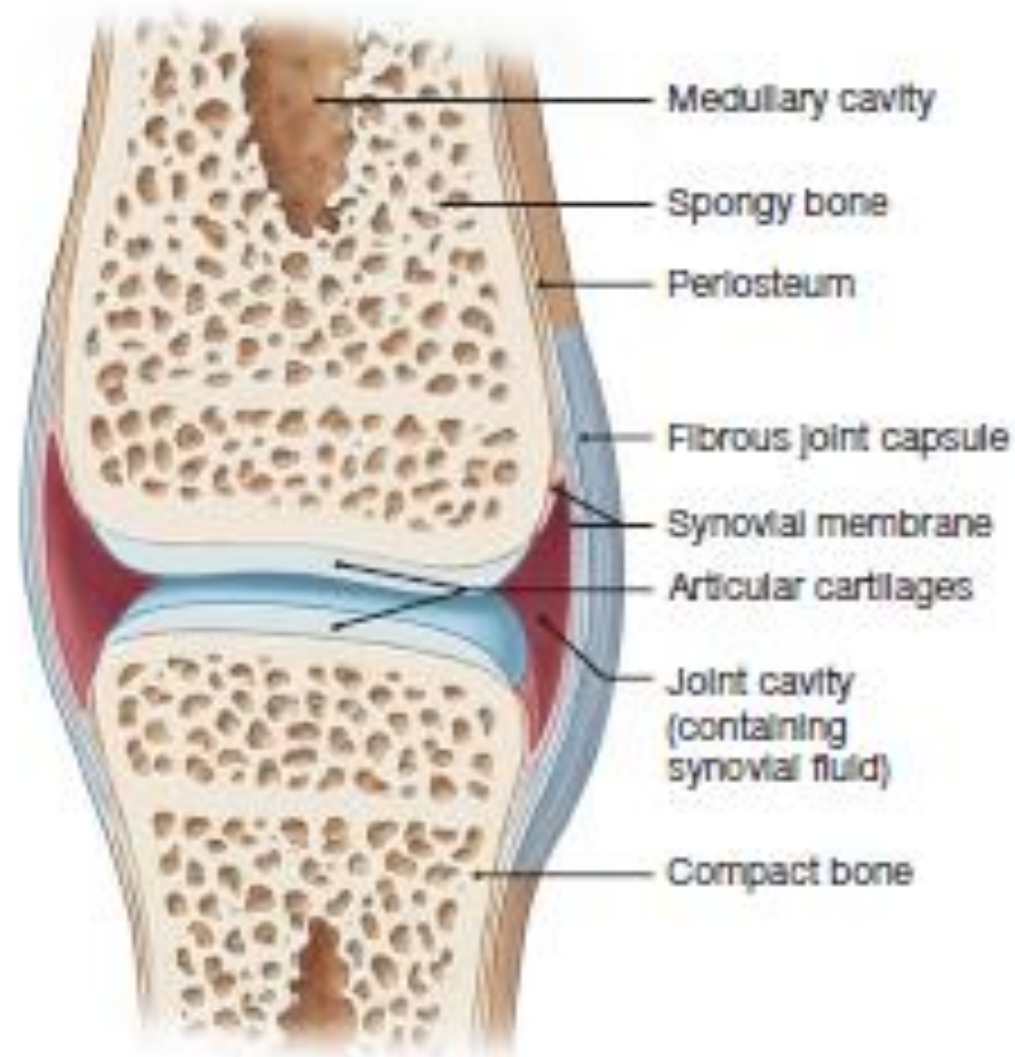


Synovial joints

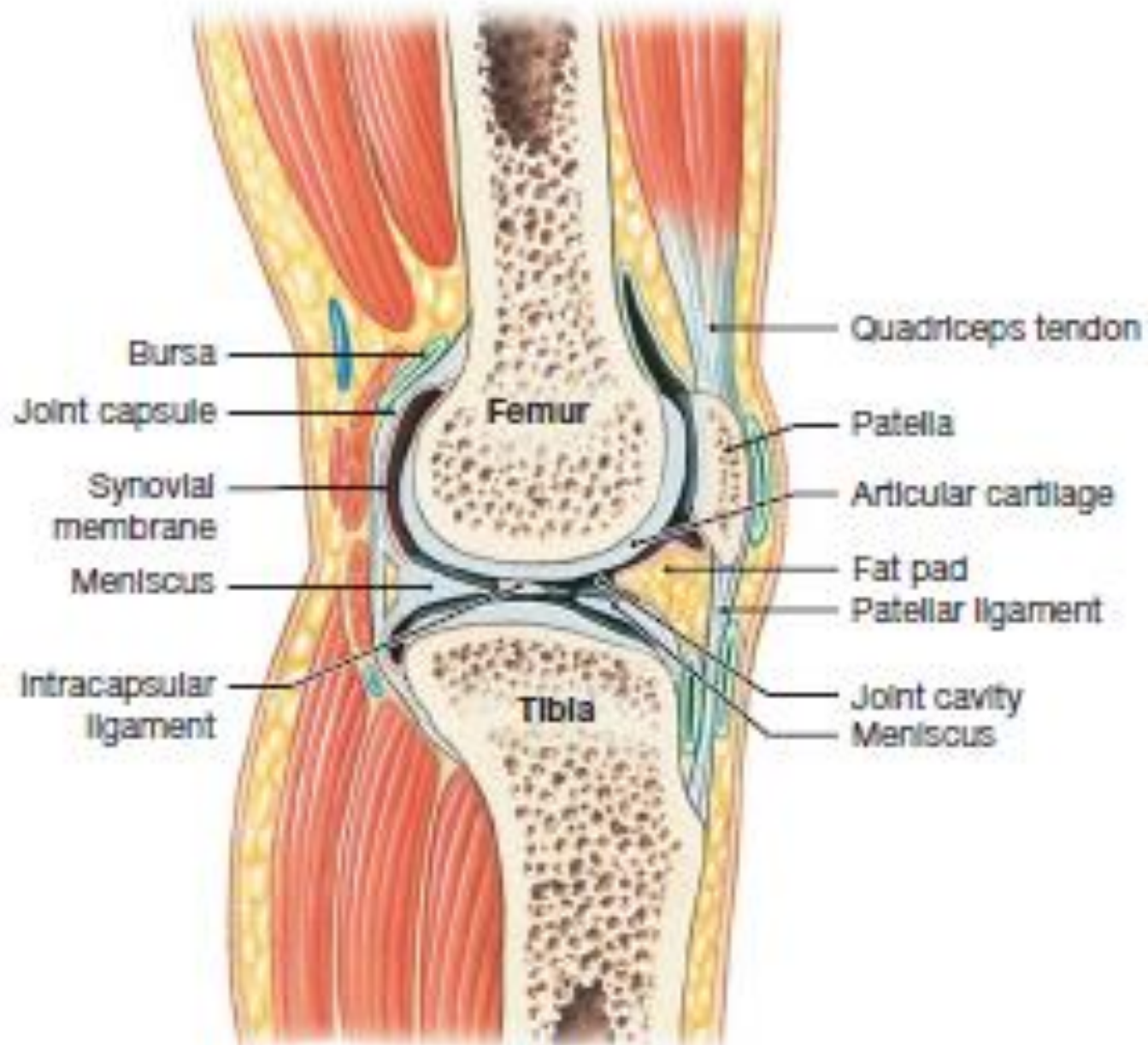
- Synovial joints include **the ball-and-socket** joints (e.g. hip) and the **hinge** joints e.g. interphalangeal).
- They are **designed to allow movement**, which is restricted to a required range, and stability is maintained during use.
- **The load is distributed across the surface**, thus preventing damage by overloading or disuse.
- **Each structural component of a synovial joint plays a key functional role, and different components are affected in different disease processes.**



Figure 9-1 The Structure of a Synovial Joint.



Synovial joint, sagittal section



b Knee joint, sagittal section

Articular cartilage



- The **hyaline cartilage lining the bones within a joint** is called articular cartilage.
- It is **avascular** and derives nourishment from synovial fluid.
- It is predominantly **composed of type II collagen**, encoded by the *COL2A1* gene, which forms a mesh-like network. **These molecules have a negative charge and retain water in the structure by producing a dynamic tension between the retaining force of the collagen matrix and the expansive effect of osmotic pressure.**
- **Intermittent pressure from 'loading' of the joint is essential to normal cartilage function and encourages movement of water, minerals and nutrients between cartilage and synovial fluid.**
- Defects in articular cartilage and underlying bone are features of *osteoarthritis*.



Synovium and synovial fluid



- **The joint capsule**, which is connected to the periosteum, is lined with **synovium**.
- As there are no macroscopic gaps, it is able to retain normal joint fluid, even under pressure.
- **The synoviocytes release hyaluronan into the joint space, which helps to retain fluid in the joint.**
- **Synovial fluid** is a highly viscous fluid secreted by the synovial cells and has a similar consistency to plasma.
- **Glycoproteins ensure a low coefficient of friction between the cartilaginous surfaces.**
- **Tendon sheaths and bursae are also lined by synovium.**
- **Inflammation of the synovium is a feature of *inflammatory arthritis*.**



Ligaments and tendons



- **These structures stabilize joints.** Ligaments are variably elastic and this contributes to the stiffness or laxity of joints .
- **Tendons are inelastic and transmit muscle power to bones.**
- **The joint capsule is formed by intermeshing tendons and ligaments.**
- The point where a tendon or ligament joins a bone is called an ***enthesis*** and may be the site of inflammation.
- **Inflammation or trauma to these joints can cause severe joint symptoms**



Blood vessels and nerves



- **The ligaments, periosteum, synovial tissue and capsule of the joint are richly supplied by blood vessels and nerves.**
- Pain usually derives from inflammation of these sites because the synovial membrane is relatively insensitive.
- **Connective tissue constantly undergoes repair and remodeling.**













Rheumatoid arthritis. A. Characteristic hand deformities. B. Early rheumatoid arthritis









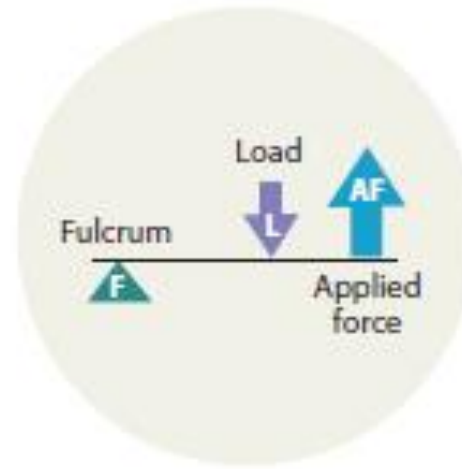
▲ **Figure 20–2.** Typical inflammatory changes of gout at first MTP joint (podagra). (Used, with permission, from



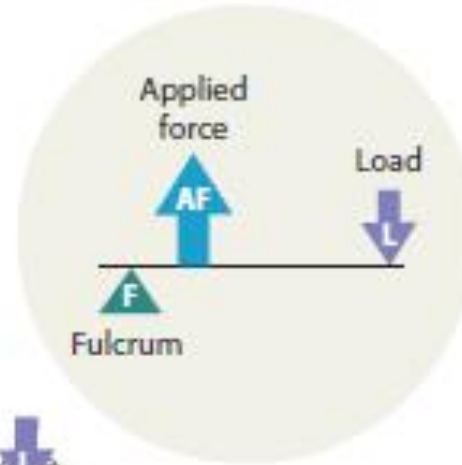
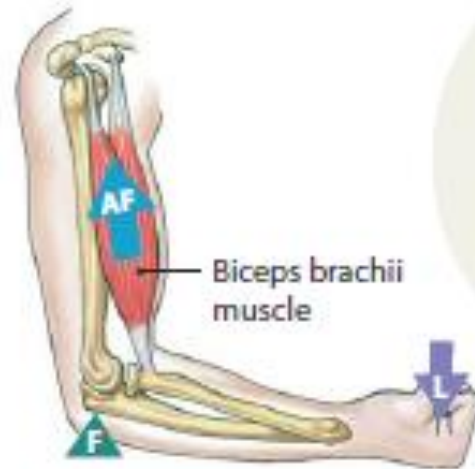




b Second-class lever.
The load lies between the applied force and the fulcrum.



c Third-class lever.
The force is applied between the load and the fulcrum.



Rapid examinations of the limbs

Upper limbs

Raise the arms sideways to the ears (abduction). Reach behind the neck and back.

Difficulties with these movements indicate a shoulder or rotator cuff problem.

Hold the arms forwards, with elbows straight and fingers apart, palm up and palm down.

Fixed flexion at the elbow indicates an elbow problem.

Examine the hands for swelling, wasting and deformity.

Place the hands in the 'prayer' position with the elbows apart.

Flexion deformities of the fingers may be due to arthritis, flexor tenosynovitis or skin disease.

Painful restriction of the wrist limits the person's ability to move the elbows out with the hands held together.

Make a tight fist.

Difficulty with this indicates a loss of flexion or grip. Grip strength can be measured.

Rapid examinations of the limbs

Lower limbs

Ask the patient to walk a short distance away from and towards you, and to stand still.

Look for abnormal posture or stance.

Ask the patient to stand on each leg.

Severe hip disease causes the pelvis on the non weight- bearing side to sag (positive Trendelenburg test).

Watch the patient stand and sit, looking for hip and/or knee problems.

Ask the patient to straighten and flex each knee.

Ask the patient to place each foot in turn on the opposite knee with the hip externally rotated.

This tests for painful restriction of the hip or knee. Abnormal hips or knees must be examined with the patient lying down.

Move each ankle up and down.

Examine the ankle joint and tendons, medial arch and toes while the patient is standing

Rapid examinations of the limbs

Examination of the joint

Look at the appearance of the joint

Swelling – could be bony, fluid or synovial .

Deformity:

- **Valgus**, where the distal bone is deviated laterally (e.g. knock-knees or genu valgum)
- **Varus**, where the distal bone is deviated medially (bow-legs or genu varum)
- **Fixed flexion or hyperextension**

Rash – especially psoriasis

Muscle wasting – easier to see in large muscles like the quadriceps

Scars – from surgery or trauma

Signs of inflammation

Symmetry:

- Are the right and left joints (e.g. hips, knees, any other paired joint) the same?
- If not, which do you think is abnormal?

Rapid examinations of the limbs



Feel

Swelling:

-Fluid swelling (effusion) usually represents increased synovial fluid in inflammatory arthritis, but can be due to blood or pus

– **Synovial swelling** is rubbery or boggy and usually occurs in inflammatory arthritis

– **Bony swelling**, such as Heberden's nodes in the fingers, is usually seen in osteoarthritis

Warmth – a warm joint may be inflamed or infected

Tenderness – may represent joint inflammation, but many people have chronic tenderness all over the body (e.g. in fibromyalgia)



Rapid examinations of the limbs

Move

Active movement:

- Is the range full and pain-free?
- Is the movement fluid?
- In the hands, can the patient perform fine movements?
- In the legs, can the patient walk properly?

Compare movements on the right and left sides

- are they symmetrical?

Is there crepitus when the joint is moved?

If active movement is limited, try passive movement:

- **In a joint problem both will usually be affected.**
- **In a muscle or nerve problem, passive movement may remain full.**

Thank You

Keep connected with i-CARE project:

Email: icare@alazhar.edu.ps

Rapid examinations of the spine

Stand behind the patient. And *ask the patient to*

(a) bend forwards to touch the toes with straight knees,

(b) extend backwards,

(c) flex sideways, and

(d) look over each shoulder, flexing and extending and side-flexing the neck.

Observe abnormal spinal curves –

scoliosis (lateral curve),

kyphosis (forward bending) or lordosis (backward bending).

A cervical and lumbar lordosis and a thoracic kyphosis are normal.

Muscle spasm is worse whilst standing and bending. Leg length inequality leads to a scoliosis that decreases on sitting or lying (the lengths are measured with the patient lying down).

Ask the patient to lie supine. Examine any restriction of straight-leg raising

Ask the patient to lie prone. Examine for anterior thigh pain during a femoral stretch test (flexing knee whilst prone), which indicates a high lumbar disc problem.

Palpate the spine and buttocks for tender areas.