P B L

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This sheet is way too easy please don’t spend much time studying it

We will start our lecture with reviewing the history of a case " patient" :

1- 70 year old lady, diabetic, she suffers from hypertension also

2- Bilateral mechanical knee pain for 10 years progressively increasing with time.

mechanical means that pain increases with mechanical movement and it decreases at rest, **non-mechanical** pain is that which mechanical movement or resting doesn't alter pain level, **bilateral** means we have pain at both knee joints.

3- She noticed a deformity in her lower limbs 2 years ago, and a deformity with occasional pain in the small joints of both hands.

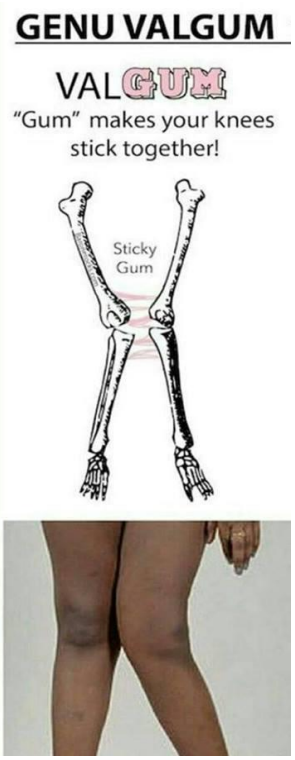
Now we will examine the patient:

- **Knee examination:**

- Varus deformity bilaterally as the lower leg is deviated towards the midline which is called bowing of legs (Genu Varum)
- Tender medial joint line bilaterally (pain at the medial side of knee joint). Tenderness is a physical sign when you examine a patient, while pain is a symptom.
- Range of knee motion ROM "flexion–extension" : 10 – 100 degrees "limitation". Normal ROM at the knee is considered to be 0 degrees of extension (completely straight knee joint) to 135 degrees of flexion (fully bent knee joint) and it normally varies between individuals.

Just to differentiate between varus and valgus

Genu Varum

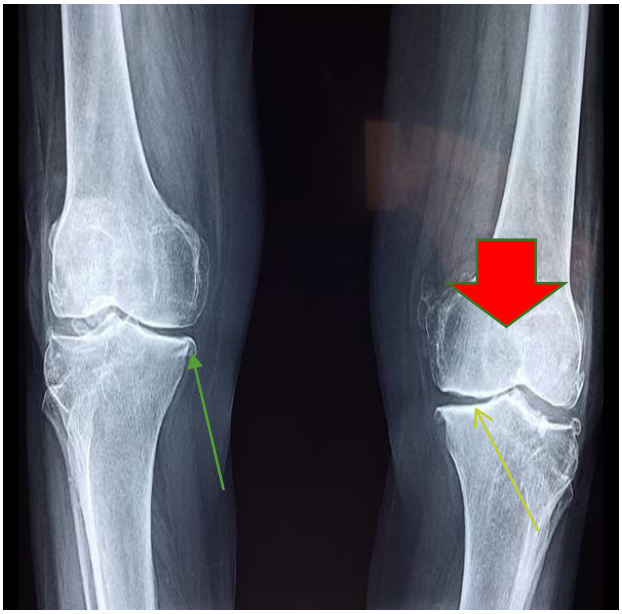


General causes for limitation of motion: maybe the patient had recurrent inflammatory healing processes "fibrosis" on the knee joint which caused decreased malleability **OR** the articular cartilage is degenerated **OR** the soft tissue around the joint is compressing it **OR** the patient is suffering joint pain **BUT** muscle atrophy has no relation with limitation of movement it just causes weakness.

When we use the terms Valgus and Varus, we're referring to the part that is distal to the apex of the deformity

- **Hand examination:**
  - Multiple small joint nodules: hard swelling of PIP (proximal interphalangeal joints) and DIP (distal interphalangeal joints)
  - No redness "so we have no inflammation"

Remember that the problem here is not inflammation but we have a little inflammation that maybe caused fibrosis or any complication.



Now as usual we do X-rays:

Normally only calcified tissues appear on X-rays but cartilage isn't calcified so it doesn't appear.

By looking at the medial side of the joint we notice that medial cartilage is degenerated compared to the lateral side causing decreased joint space "this is more prominent on the right joint"

Also we have extremely white parts because of increased calcification the yellow arrow "left leg" "**subchondral sclerosis**" in response to increased pressure. Subchondral means: below the articular surface

The green arrow "right leg" shows bony structures called **osteophytes** which are exostoses (bony projections) that form along joint margins. It is caused by increased pressure on the bone as a consequence of cartilage degeneration.

What is the function of cartilage and the meniscus?

Cartilage: To protect the bone and to distribute the load applied on the bone so it won't break, and the **meniscus** is shock absorbent so it is C shaped for the compatibility with its function.

So osteophytes are the bone's response to cartilage degeneration by increasing its surface area to compensate the role of ***load distribution of the cartilage***

Last thing is a cyst "red thick arrow" it is darker than the patella as the patella is calcified

In conclusion we have: osteophytes, Varus deformity; as the joint space is decreased medially, subchondral sclerosis and a cyst

This is NOT gout because it is an inflammation typically on the big toe, NOT septic arthritis "infection" because she is suffering from the pain for 10 years, maybe it is a multiple inflammatory disease such as Systemic Lupus Erythematosus SLE, or osteoarthritis, or rheumatoid arthritis, or osteo**arthrosis**

IT IS OSTEOARTHROOOOSSSIISSS "degenerative disease of the cartilage"

What is the difference between osteoarthrosis and osteoarthritis?
Actually the inflammation occurs in the synovium not in the cartilage so the correct name is osteoarthrosis not osteoarthritis "osteoarthritis is the old name of osteoarthrosis"

Osteoarthrosis is a problem in the metabolism of chondrocytes (less proteoglycan production) which can be due to genetics (familial disposition) or other factors like obesity.

How to differentiate **rheumatoid** arthritis **RA** "in the picture" from osteoarthrosis ?

Typically rheumatoid arthritis doesn't affect the distal interphalangeal "DIP" joints ***but*** osteoarthrosis affects them ***refer to the picture in the 1st page***. Also RA patients have synovitis of the tendon sheath and **soft** nodules on the PIPs because the reason of swelling is not bone deformity but it is synovitis. Moreover, RA flare ups are non-mechanical.

Hyaline cartilage function: Decreases friction and distributes loads… Composed of:

- Extracellular matrix
1. water (65-80%)
2. 90% type II collagen "we have other types" (10-20%),
3. proteoglycans (10-15%)
- cells (chondrocytes)
- Cartilage is avascular; nourished by:
  - ✓ synovial fluid at the surface
  - ✓ subchondral bone at the base

Joint pathology involves the following:

<u>Articular cartilage</u>: increased water content, alterations in proteoglycans: *eventual decrease in amount,* ***collagen abnormalities:*** *organization and orientation are lost,* ***binding of proteoglycans to hyaluronic acid***

<u>Synovium and capsule</u>: changes here are responsible for the swelling conditions:

- ***early phase: mild inflammatory changes in synovium***
- ***middle phase: moderate inflammatory changes of synovium, hypervascular***
- ***late phases: synovium becomes increasingly thick and vascular***

<u>Bone</u>: subchondral bone attempts to remodel "osteophytes and sclerosis " AND bone cysts form in late stages

The stages of the disease are not required in details:

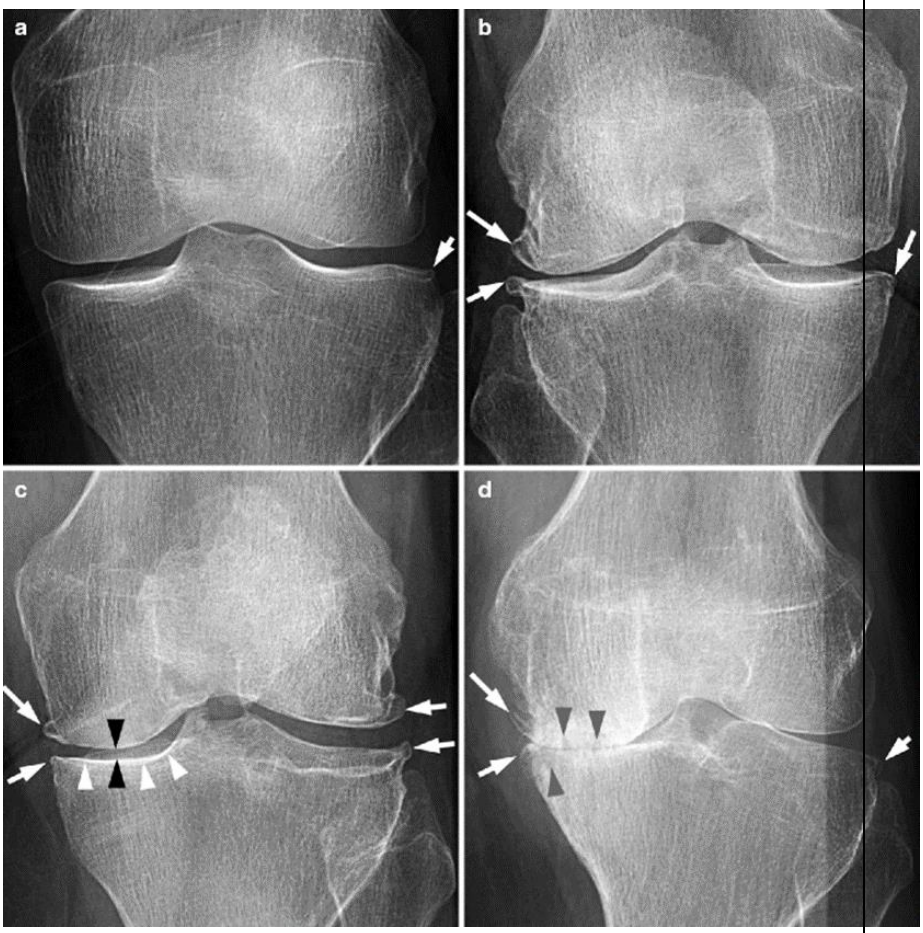
A: Normal joint.

B: decreased joint space and osteophytes start to appear

And the joint illness progress to reach "D"

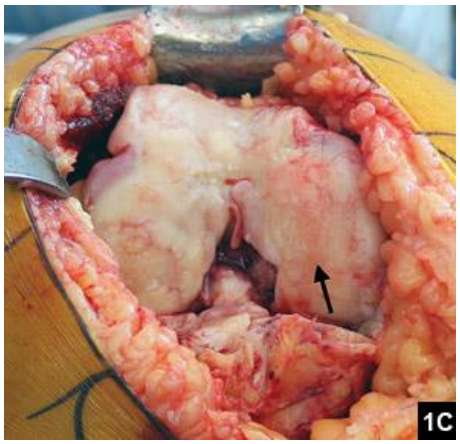
The patient that we tested before was in the C stage.

We can see spiking/sharpening of the tubercles of the intercondylar eminence of the tibial plateau (less smooth and more pointy).



This picture shows normal femur covered uniformly with cartilage →

And this one shows abnormal femur covered with cartilage at specific areas and other areas are not covered with cartilage at all, and the bone is articulating directly with the bone, also we can see osteophytes →



Can we regenerate cartilage? NO and we can't do a transplant.

The treatment here is physiotherapy and analgesics at first then we do joint replacement as in the picture below.

We put polyethylene between the two metal heads of the bone

We have many types of osteoarthrosis such as :

1-monoarticular : one joint disease
2- generalized : multiple joints and typically it starts at the hands (like this case).