Introduction to orthopedics

Orthopedic specialty is the branch of Surgery which deals with trauma and disease of Musculoskeletal system.

- **You will study not only bones but**

1. Joints
2. Muscles
3. Tendons
4. nerves •

Approach to patient

- History taking
- Examination
- Investigation

History taking

Symptoms and signs of orthopedic

- pain
- Stiffness
- Swelling
- Deformity
- Change in sensation
- Loss of function.

Pain

Pain is the most common symptom in orthopaedics. there are clearly differences between the throbbing pain of an abscess and the aching pain of chronic arthritis, between the 'burning pain' of neuralgia and the 'stabbing pain' of a ruptured tendon.

Severity is even more subjective. The main value of estimating severity is in assessing the progress of the disorder or the response to treatment. The commonest method is to invite the

patient to mark the severity on an analogue scale of 1–10, with 1 being mild and easily ignored and 10 being totally unbearable..

The following is suggested as a simpler system:

- Grade I (mild) Pain that can easily be ignored.
- Grade II (moderate) Pain that cannot be ignored, interferes with function and needs attention or treatment from time to

time.

Grade III (severe) Pain that is present most of the time,

demanding constant attention or treatment.

- Grade IV (excruciating) Totally incapacitating pain.

Stiffness

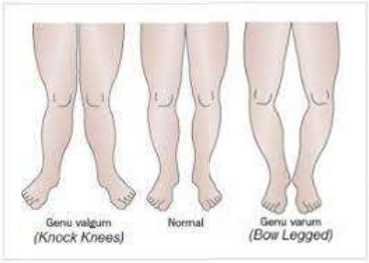
- any painful limitation of movement
- Stiffness may be generalized (typically in systemic disorders
- such as rheumatoid arthritis and ankylosing spondylitis) or
- localized to a particular joint

Swelling

- Swelling may be in the soft tissues, the joint or the bone;. It is important to establish whether it followed an injury, whether it appeared rapidly (think of a haematoma or a haemarthrosis) or slowly (due to inflammation, a joint effusion, infection or a
- tumour), whether it is painful (suggestive of acute inflammation, infection or a tumour)

Deformity

- The common deformities are described by patients in terms knock knees, bow legs, and flat feet.



Change in sensibility

- Tingling or numbness signifies interference with nerve function –
- pressure from a neighbouring structure (e.g. a prolapsed intervertebral disc),
- local ischaemia (e.g. nerve entrapment in a fibro-osseous tunnel) or
- a peripheral neuropathy

Loss of function

- Inability of patient to do usual Functional activity and its expression depends upon the needs of that particular patient. The patient may say ‘I can’t stand for long’ rather than ‘I have backache.

Examination

1. look:
2. feel:
3. move:
4. Neurovascular function:

1. look:

- Skin can show scars or color changes.
- Shape can show swelling, wasting or lump.
- Position e.g. some joint or nerve disorder can show characteristic

deformities

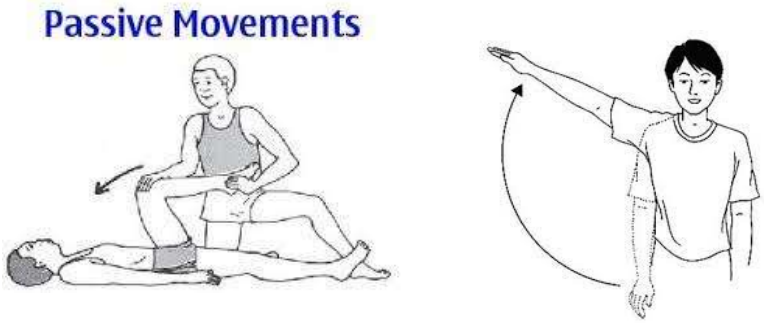


2. feel:

- 1. Skin can be cold, warm, and moist or show sensory
- disturbances.
- 2. Soft tissue can show e.g. a lump or we can assess the pulse.
- 3. Bone & joint outlines can be examined also we may assess
- synovial membrane thickening or increased joint fluid.
- Tenderness :Important as a new physician, indicated in any fracture to detect

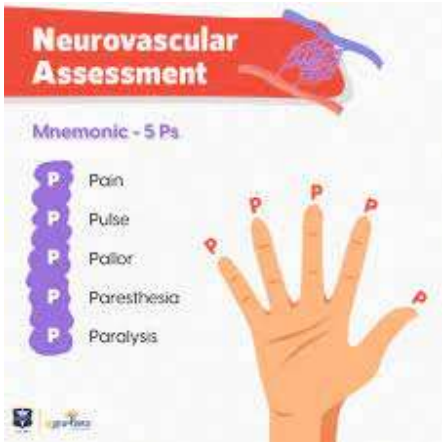
3. move

- The joint movement can be; passive, active or abnormal



4.neurovascular insult.

Important as a new physician, indicated in any fracture to detect neurovascular insult.



Investigation

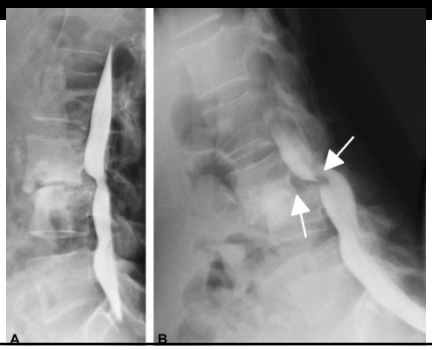
- **1 X- ray:**
- . At least two views AP & lateral.
- . Shows two joints one above & one below the area of examination.
- . Show two limbs for comparison.
- . Show the two bones in the forearm & leg.
- . Taken at two different occasions to diagnose the disease and follow its progression.

2. Contrast radiography:

- iodine-based liquids

which can be injected into sinuses, joint cavities or the spinal theca.

- Sinography To outline sinuses,
- arthrography to outline a joint or
- myelography to outline spinal cana



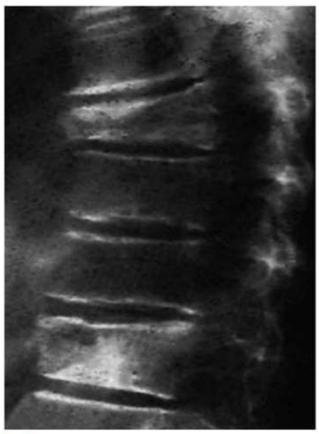
3. Plain Tomography: provides an image ‘focused’ on a selected plane

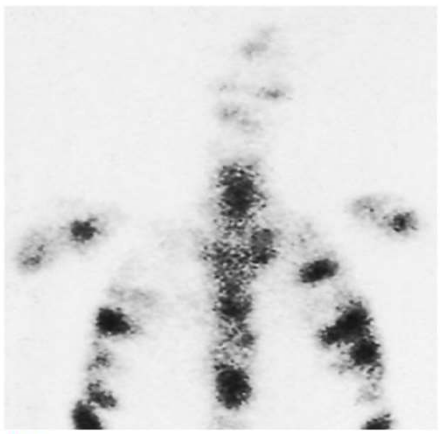
4. CT scan: its able to record bone & soft tissues in cross sections, its important to show tumor extension & shape in bone & soft tissue also its important for assessment of spinal canal. Newly there is the spiral CT scan that can give accurate three-dimensional views of bone & soft tissues in different planes and directions.

(a) (b) (c)

1.19 CT for complex fractures (a) A plain x-ray shows a fracture of the calcaneum but the details are obscure. CT sagittal and axial views (b,c) give a much clearer idea of the seriousness of this fracture.

5. Radioisotope scan: site of pathology as tumor, infection or fracture & then we assess the skeleton for radioactivity to identify the site of pathology in all the skeleton.





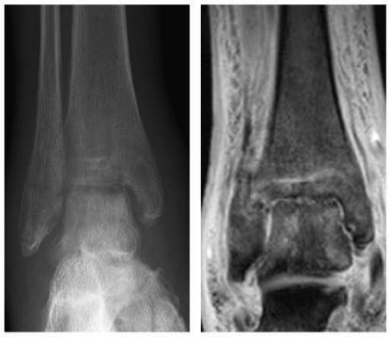
(a) (b)

1.22 Radionuclide scanning (a) The plain x-ray showed a pathological fracture, probably through a metastatic tumour. **(b)** The bone scan revealed generalized secondaries, here involving the spine and ribs.

6. Ultrasound: soft tissue mass, heamatoma, cysts, cartilage or joint effusion.

7. MRI: For soft tissues. It's most useful for the brain, spine & spinal cord.

1.20 **Magnetic resonance imaging** MRI is ideal for displaying soft-tissue injuries, particularly tears of the menisci of the knee; this common injury is clearly shown in the picture.



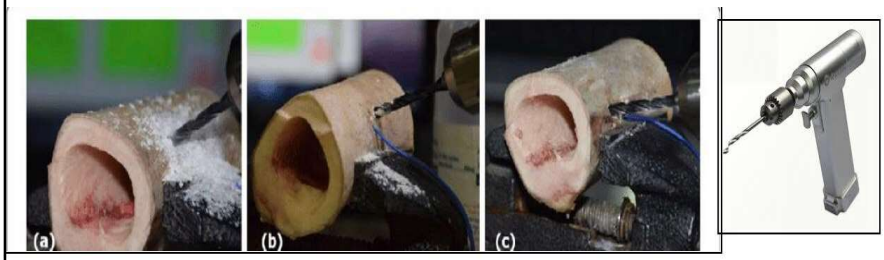
(a) (b)

1.21 **MRI** A case of septic arthritis of the ankle, suspected from the plain x-ray (a) and confirmed by MRI (b).

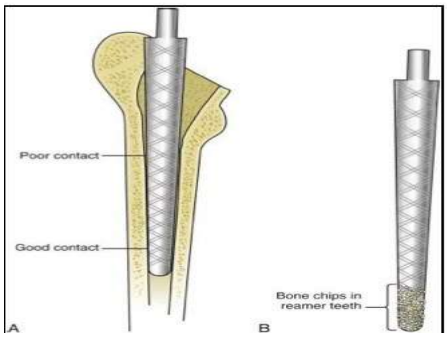
Clinical applications

Orthopedics procedures on bones:

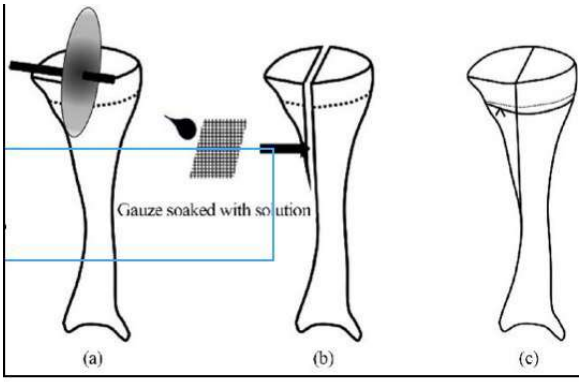
- Drilling:Hole for screw/abcsess



- Reaming meaning widening usually of medullary cavities •



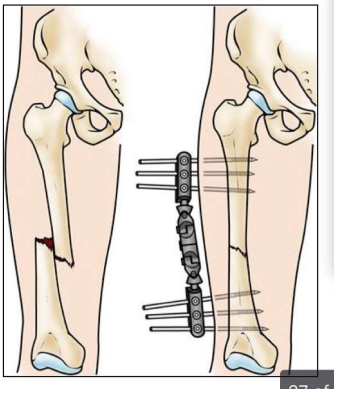
- Osteotomy: correct deformity or reshape the bone or to relieve pain of arthritis



Bone graft:
1. cancellous bone most usually taken from iliac crest or proximal tibia.
2. cortical bone piece e.g. fragments of fibula or sometimes its mixed corticocancellus graft.
• The graft usually taken from the patient himself and called AUTOGRAFT.
• Grafts can be from one individual to anther of the same species :ALLOGRAFT.

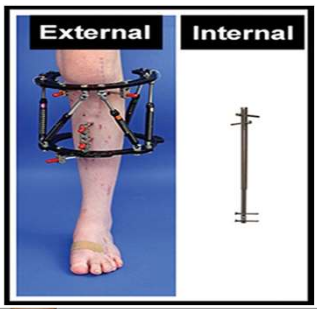
fixation

- 1. Internal fixation by screws, plate and screws, nails,
- wires. . Etc.
- 2. External fixation:
- We use long pins applied from outside through the skin
- to fix the bone away from the site of injury proximally &
- distally & those pins are connected from outside (without
- exposure of the wound or fracture) by long bars. •



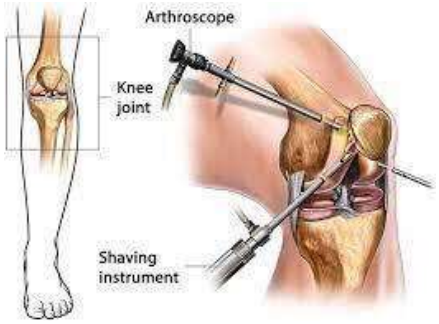
lengthening procedures.

- 1. shortening of less than 2cm can be compensated by the body.
- 2. but 2-4cm shortening needs shoe raise.
- 3. 4 cm and more needs surgical treatment by bone



Orthopedics procedures on joint:

- Arthroscope:
- see the joint to diagnose/treat intraarticular structure.



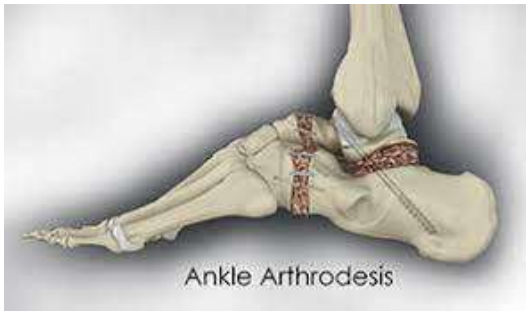
Arthrotomy

- a) To inspect the inside of the joint or taking synovial biopsy.
- b) To drain hematoma or abscess.
- c) To remove loose bodies or damaged structures like torn meniscus.
- d) To excise inflamed synovium (synovectomy)

arthrodesis

- it means fusion of the joint in functional position used for destroyed painful or unstable joint. There must be good functioning proximal & distal joints

- principle.
- a)Removal of both joint surfaces & exposure of underlying bone.
- b) The bones are apposed together in a functional position & fixing it by internal fixation.
- c) Bone graft is added to improve & hasten fusion.
- d) The limb is splinted for 3-6 months until joint fusion & union



Arthroplasty