ORTHOTICS IN REHABILITATION

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Who is the Orthotist?

- 4 year degree course- Anatomy/Physiology/Biomechanics/Mechanical Engineering.
- Assessment of clients functional and cosmetic needs
- Design,fabrication and fitting of orthosis
- Educating the client on appropriate use
- Member of the multi-disciplinary team

What is an orthosis?

- **An external device attached to a body segment that facilitates or improves function by supporting, correcting or compensating for skeletal deformity or weakness**
- **Silicone heel pad to 4 point pressure spinal brace**

Orthotics

- Insoles
- Shoes
- A.F.O's
- Ankle Braces
- Flexible/ Functional Knee Brace
- Full length K.A.F.O's
- Wrist Braces
- Collars
- Spinal braces
- Hip orthosis

Nomenclature

Upper limb	Lower limb	Spine
Shoulder	Hip	Cervical
Elbow	Knee	Thoracic
Wrist	Ankle	Lumbar
Hand	Foot	Sacroiliac

FO= foot orthosis

KO= knee orthosis

AFO= ankle-foot orthosis

KAFO= knee-ankle-foot orthosis

Ideal Characteristics

- Biomechanically effective
- Lightweight
- Durable
- Cosmetically pleasing
- Easy to put on and take off
- Rapid provision and replacement
- Cheap
- Washable
- Adjustable
- Comfortable
- Free from pressure areas

Functional characteristics

- Provision of support
  - To prevent stretching of weak muscles/ligaments
  - To support joints surrounded by weakened muscles/ligaments
- Limitation of motion
  - KO for hyperextension
- Correction of deformity
  - TLSO
  - Serial splinting

Functional characteristics

- Assistance of motion
  - HKAFO to aid walking in myelomeningocele
- Combination (KAFO for Polio)
  - **Support**
  - **Limits** movement at knee
  - **Correct deformity** at ankle
  - Spring to **assist** ankle dorsiflexion

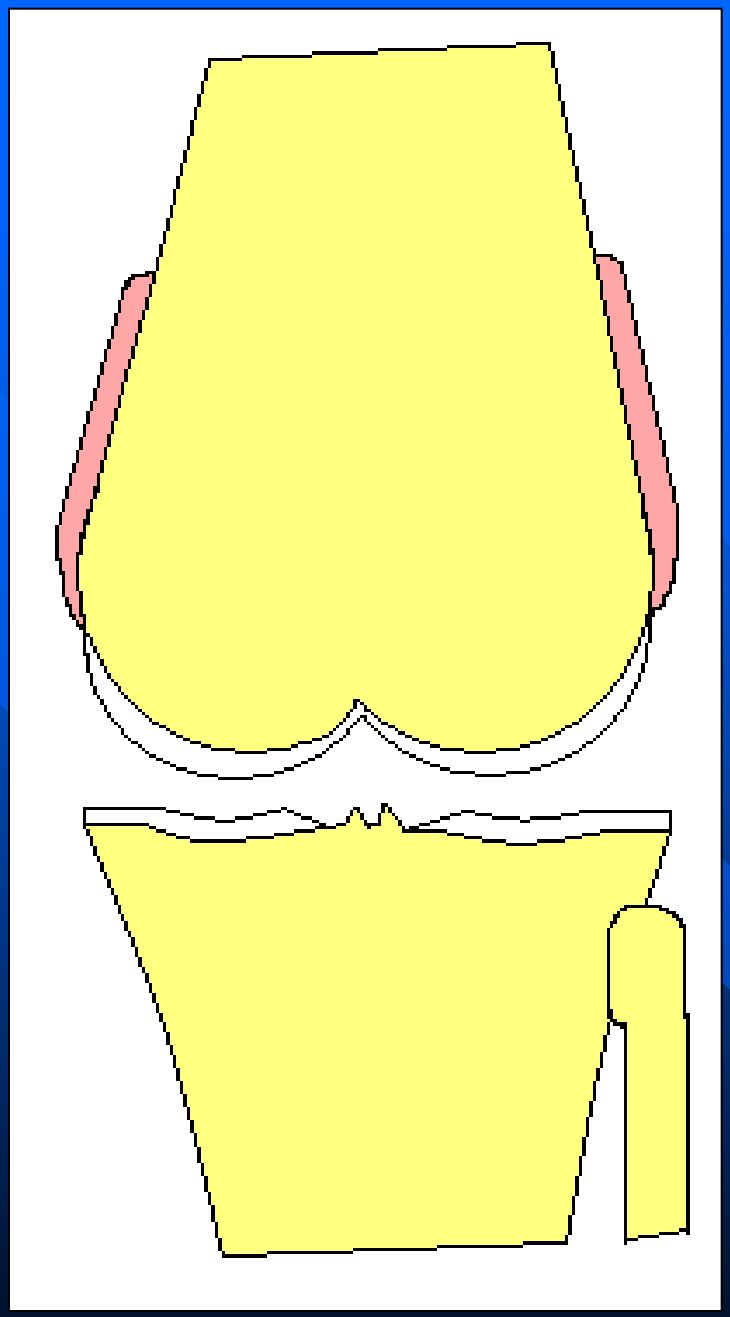
Functional characteristics

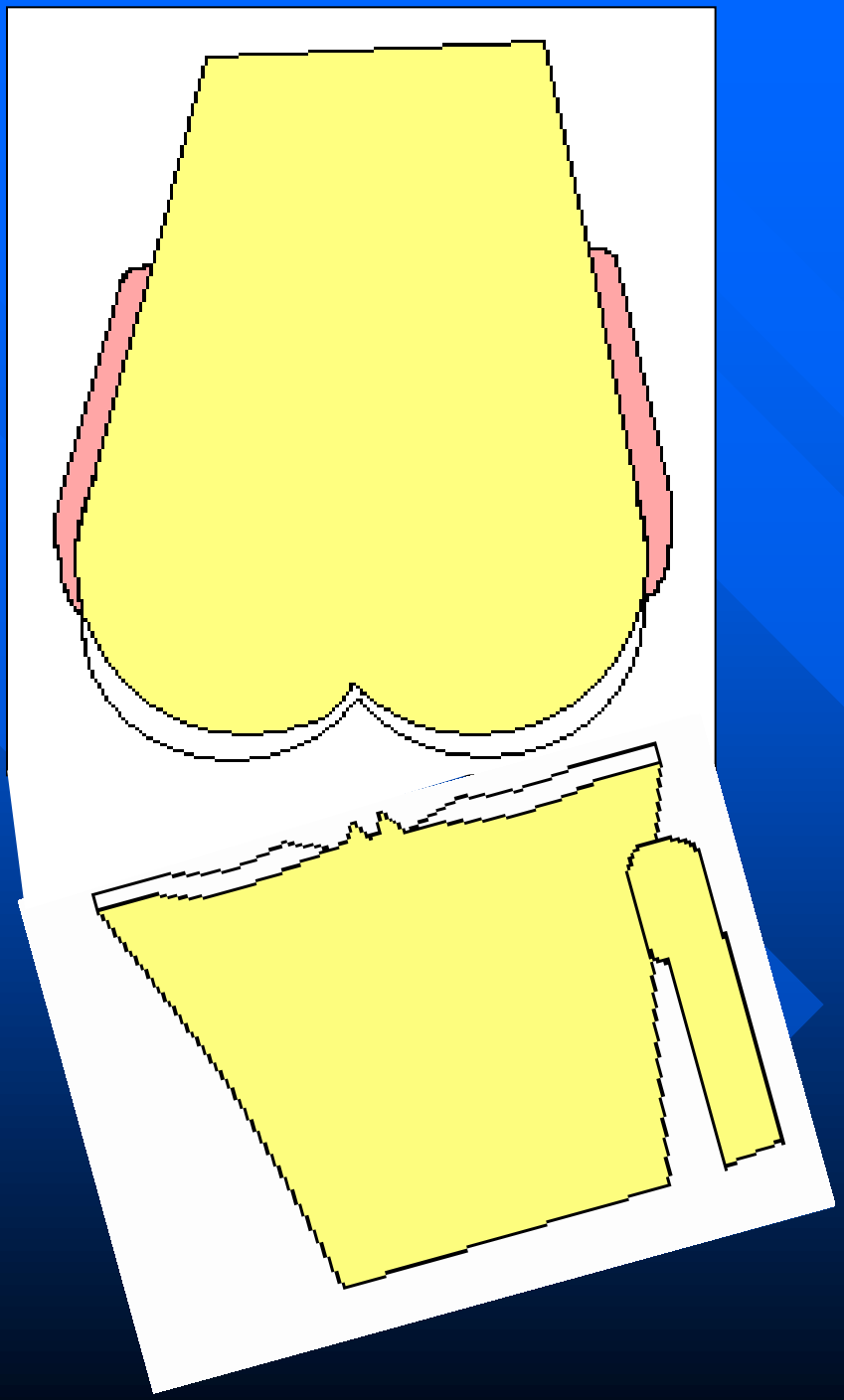
- Static (passive)
  - No moving parts: immobilises body part in particular position
- Dynamic (lively)
  - Moving parts controlled by an energy store

How do they work? Biomechanics of orthoses

- Control of moments about a joint
- Control of translational forces
- Control of axial forces
- Control of line of action of ground reaction force (GRF)

Control of moments

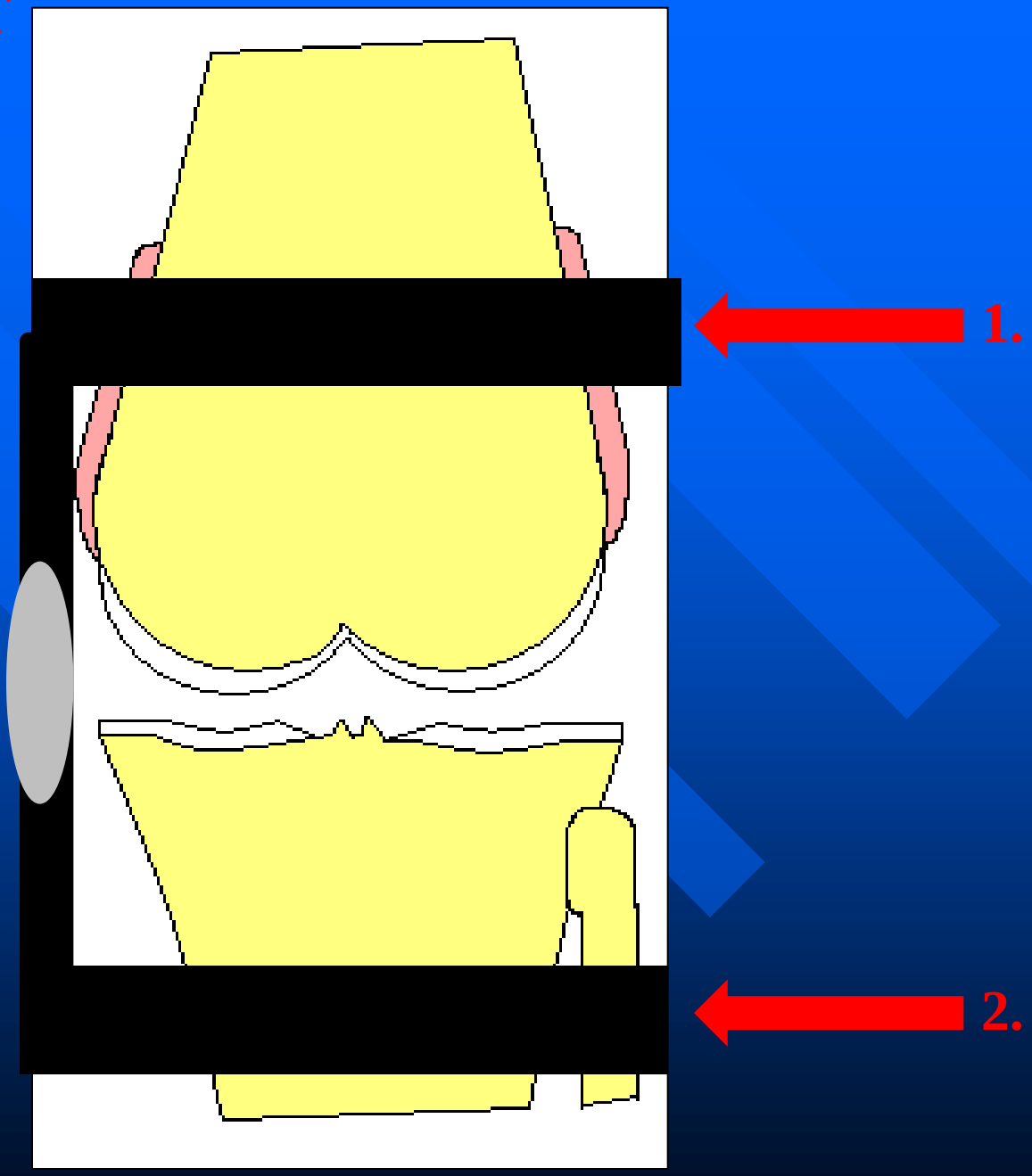




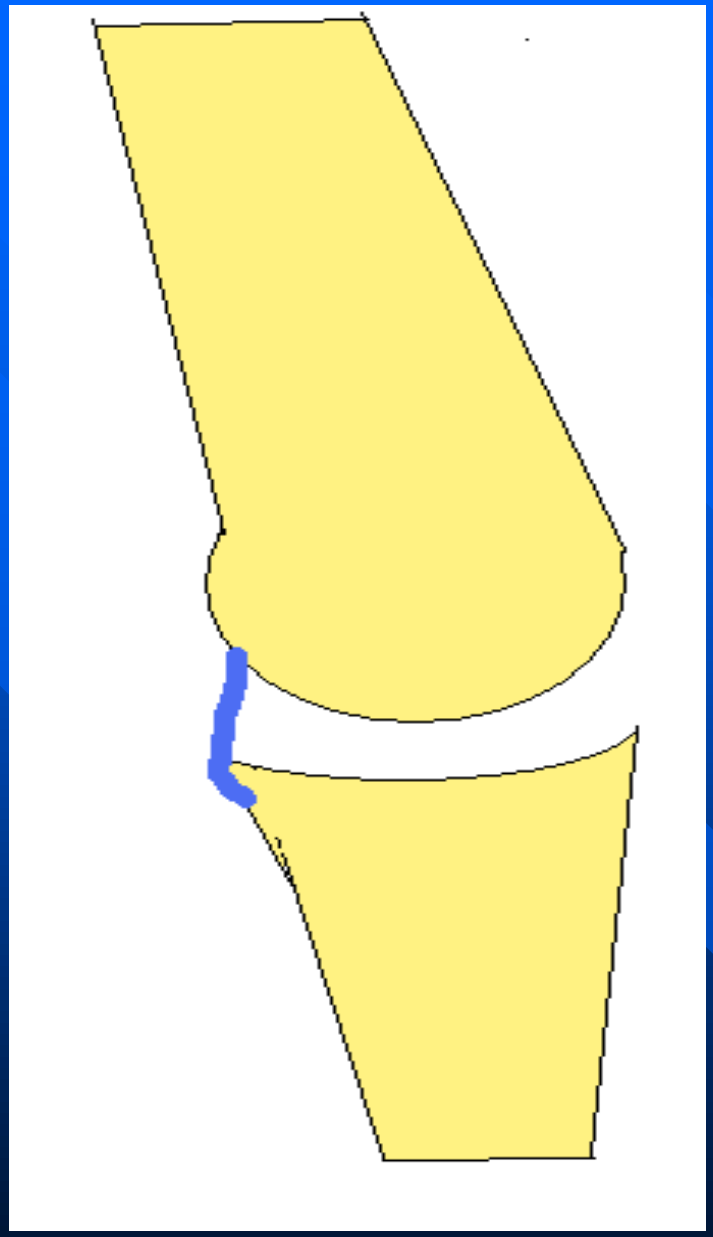
THREE POINT FIXATION

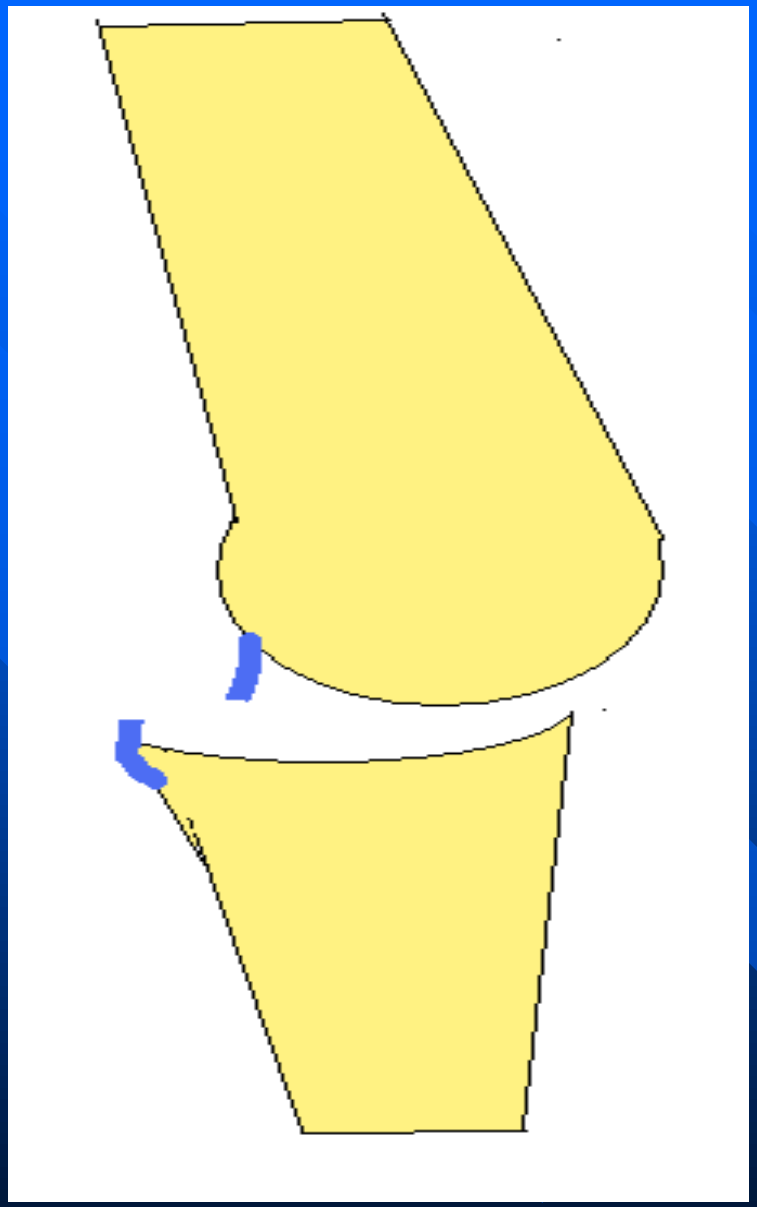
1 & 2 control coronal forces

3 controls transverse force



Control of translation



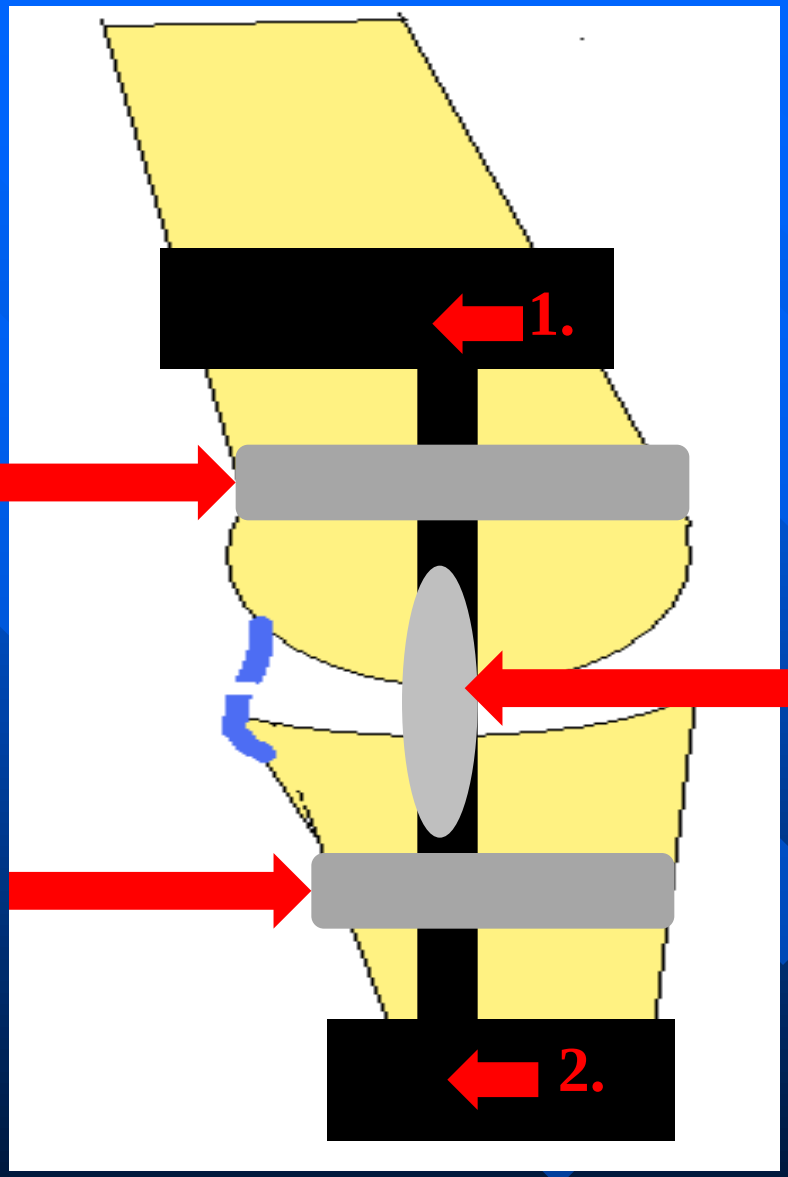


FOUR POINT FIXATION

1 & 2 control coronal forces

3 controls transverse force

4 controls translational force



Control of axial forces

- Load sharing
- Useful for arthritic joints

Control of line of action of GRF

- Modifies point of action and line of GRF
- Can modify abnormally high moments
- Can change joint alignment
  - Lateral heel wedge transfers GRF from medial aspect of varus knee to lateral joint

Materials

- Plastic (polypropylene)
- Metal
- Leather
- Synthetic fabric
- Carbon fibre
- Combinations

Bracing for scoliosis

- Benefit has been demonstrated for infantile and juvenile idiopathic scoliosis
- Usefulness in idiopathic scoliosis in the skeletally mature still debated
- Role varies in other subtypes as per patient situation
- Important to monitor and intervene if curve progresses

Small Toe Deformites

- 25% referrals to orthotic dept
- Referrals from ankle foot team,rheumatology, diabetic,vascular and chiropody
- More common in patients over 65
- Women more likely to develop these toe problems due to improper fit of shoes

Goals of Treatment

- To relieve pain so toe deformity does not limit activities
- To prevent problem getting worse

Conservative Treatment

- BOFAS recommends wide deep toe cage with soft leather uppers
- Avoidance of high heels
- Insoles to reduce pressure and improve joint function
- Pads on toes
- Conservative treatment aims to slow down progression while alleviating discomfort while accommodating the deformity

Types of orthosis used

- Wide deep toe cage shoes which minimize irritation of deformed toes
- Insoles with or without pads
- Toe caps or slings
- Taping
- Corn pads

Conclusion

- Patient realism on shoe wear is essential
- 88% of women have shoes that are too small
- 75% of women have not had their feet measured

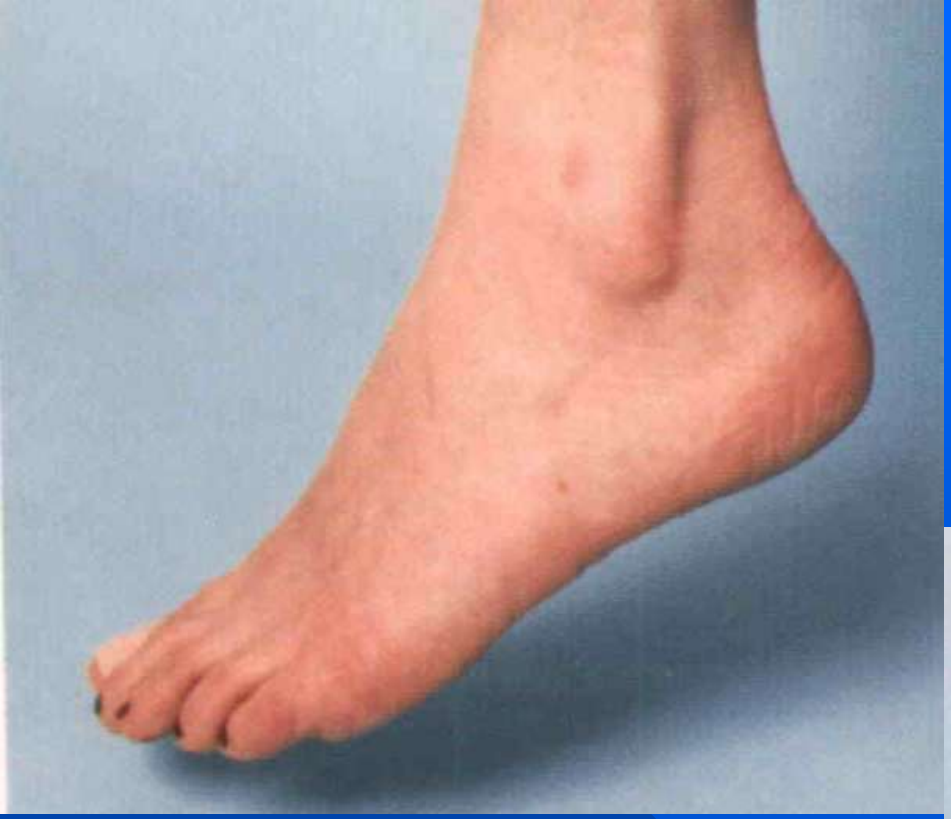
Case Study 1

- **54 year old man with R.A.**
- **Unable to get shoes to fit**
- **Unable to walk >20 mins without pain**

Case Study 2

- **52 year old postman, and ex- Gateshead Harrier runner**
- **(R) ant.knee pain and (L) plantar faciitis - unable to run > 5 mins.**
- **(R) knee arthroscopy and physiotherapy - no change.**

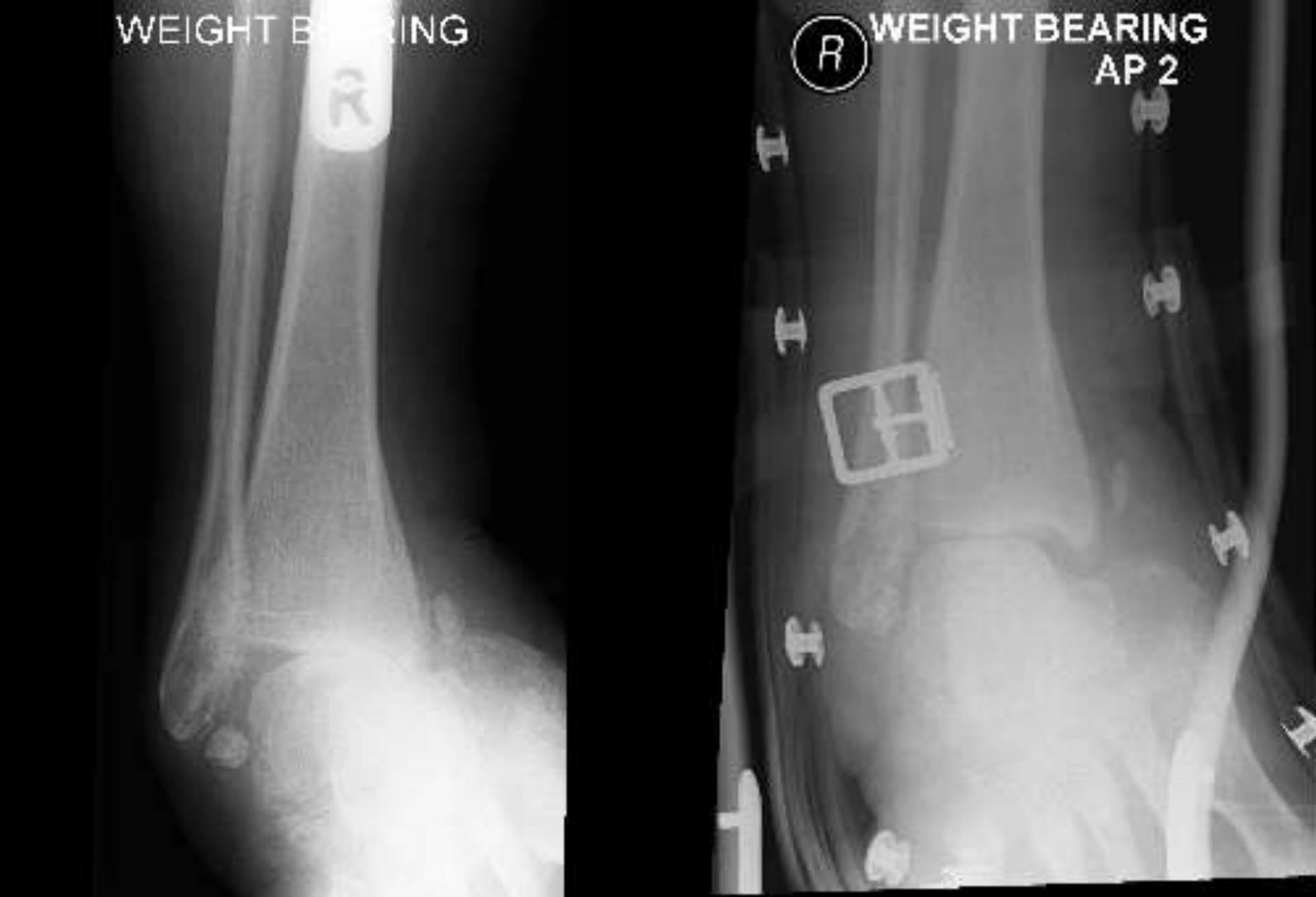
Case study 3



Case study 4


R
WEIGHT BEARING


WEIGHT B ING
R


WEIGHT BEARING
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WEIGHT BEARING
AP 2

Case study 5


FILA

Case study 6

Case Study 7

- 58 year old lady
- Leg length discrepancy
- (L) leg paralysis with unstable knee and foot drop.
- Valgus (L) ankle
- Unable to mobilise independently

THANK YOU