

SNS COLLEGE OF ALLIED HEALTH SCIENCE

Affiliated to The Tamil Nadu Dr. M.G.R Medical University, Chennai

DEPARTMENT OF RADIOGRAPHY AND IMAGING TECHNOLOGY

COURSE NAME :CLINICAL RADIOGRAPHY POSITIONING

UNIT :EXTREMITIES RADIOGRAPHY

TOPIC : FOOT TO KNEE JOINT

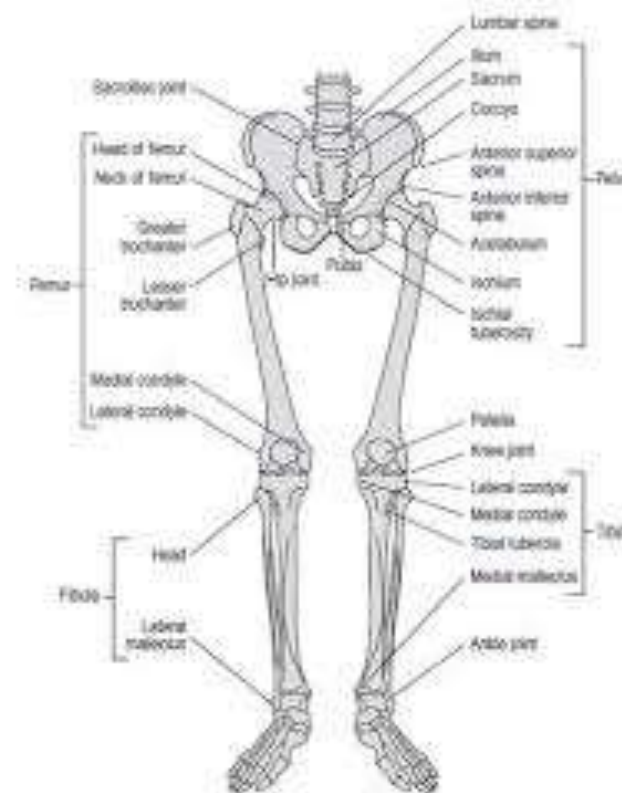
FACULTY NAME : MRS.G.HELANA JOY

INTRODUCTION (DEFINE)

Definition: Radiography of the lower extremities, including the foot, toes, tarsal bones, ankle joint, knee joint, patella, tibia, fibula, femur, hip joint, pelvis, and sacroiliac joint, is essential for evaluating trauma, degenerative diseases, and congenital abnormalities.

Common Indications:

- Trauma (e.g., fractures, dislocations)
- Arthritis (osteoarthritis, rheumatoid arthritis)
- Soft tissue injuries (e.g., ligament tears, tendon ruptures)
- Bone tumors or lesions Joint effusions or infections



- **Standard Views:** Anteroposterior (AP) view Lateral view Oblique view (for specific structures like tarsals or sacroiliac joints) Mortise view (for ankle)
- **Importance:** Proper positioning provides clear images of bones, joints, and soft tissues, reducing overlap and distortion.



Foot (Toes and Tarsal Bones):

Bones: Phalanges (proximal, middle, distal), metatarsals, tarsals (calcaneus, talus, navicular, cuboid, cuneiforms)

Joints: Interphalangeal, metatarsophalangeal, tarsometatarsal

- **Landmarks:** Sesamoid bones, base of 5th metatarsal, Bohler's angle on calcaneus

Ankle Joint:

Bones: Distal tibia, fibula, talus

Joints: Tibiotalar, tibiofibular, subtalar

- **Landmarks:** Medial/lateral malleoli, talar dome, mortise joint



ANATOMY OF THE FOOT AND ANKLE

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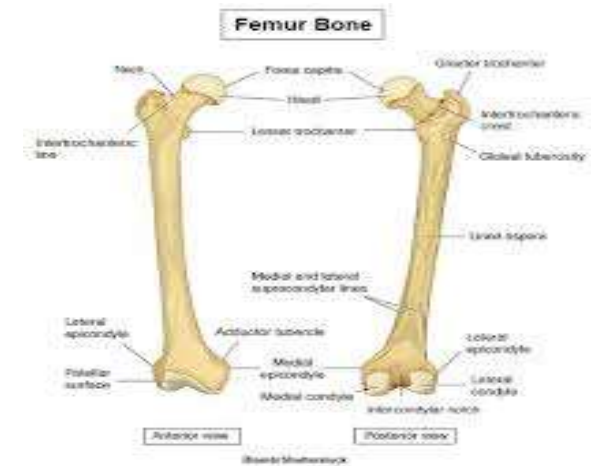
ANATOMY OF THE KNEE AND FEMUR

- **Knee Joint (including Patella, Tibia, Fibula):**
Bones: Distal femur, proximal tibia/fibula, patella
- Joints: Tibiofemoral, patellofemoral, proximal tibiofibular
- Landmarks: Tibial plateau, fibular head, patellar facets, intercondylar notch

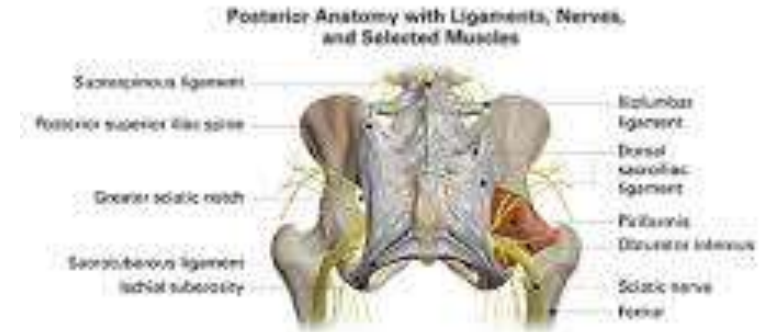


Femur and Hip Joint:

- Bones: Femur (head, neck, shaft, condyles), acetabulum
- Joints: Hip (femoroacetabular), sacroiliac
- Landmarks: Greater/lesser trochanters, femoral neck, acetabular rim



- Bones: Ilium, ischium, pubis, sacrum
- Joints: Pubic symphysis, sacroiliac
- Landmarks: Iliac crests, ASIS, PSIS, obturator foramen



TECHNICAL FACTORS



- **kVp:** 50-80 kVp (lower for foot/ankle, higher for pelvis/hip depending on thickness)
- **mAs:** 2-20 mAs (adjusted for bone detail vs. soft tissue)
- **SID (Source-to-Image Distance):** 100 cm (40 inches)
- **Grid:** Not required for foot/ankle/toes; used for knee, femur, hip, pelvis in adults to reduce scatter
- **Collimation:** Tight to area of interest to minimize scatter and improve contrast
- **Importance:** Optimal settings ensure clear visualization of trabecular bone, joint spaces, and soft tissues without overexposure.

- *Position*: Patient supine or seated, knee flexed, plantar surface on IR.
- *CR*: Perpendicular to metatarsophalangeal joint of interest.
- *Collimation*: To toe(s) of interest, including distal half of metatarsal(s).
- *Purpose*: Evaluates phalanges for fractures, dislocations, gout, osteoarthritis.

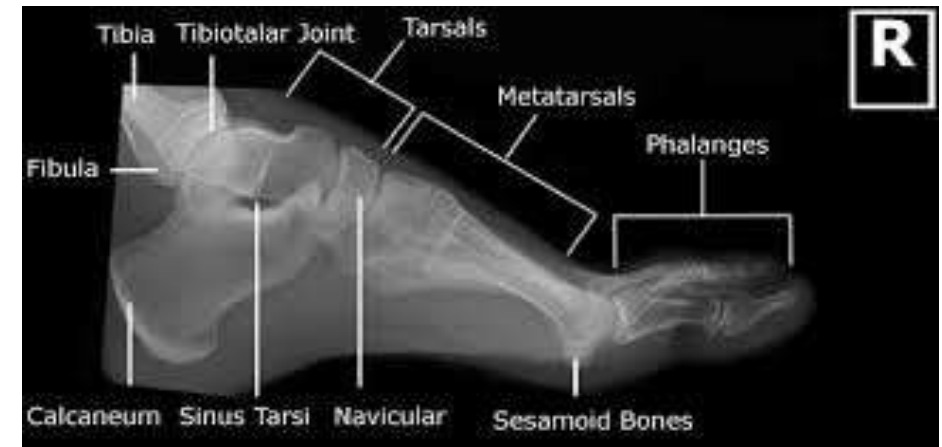
- *Position*: Foot medially rotated 45°, plantar surface at 45° to IR.
- *CR*: Perpendicular to metatarsophalangeal joint.
- *Collimation*: To distal phalanges and distal half of metatarsal(s).
- *Purpose*: Assesses joint abnormalities, fractures with obliquity.



RADIOGRAPHIC POSITIONING FOR THE FOOT (TOES AND TARSAI BONES)

Toes Lateral View:

- *Position:* Leg rotated medially/laterally depending on toe, unaffected toes separated.
- *CR:* To interphalangeal joint (1st) or proximal interphalangeal (2nd-5th).
- *Collimation:* To skin margins of toe(s), including distal half of metatarsals.
- *Purpose:* Detects dorsal/plantar displacement in fractures.



RADIOGRAPHIC POSITIONING FOR THE FOOT (TOES AND TARSAL BONES)

Foot AP (Dorsoplantar) View:

- *Position:* Leg flexed, plantar surface on IR; use wedge if needed for trauma.
- *CR:* Angled 10° posteriorly to base of 3rd metatarsal.
- *Collimation:* To skin margins, including calcaneum.
- *Purpose:* Visualizes phalanges, metatarsals, tarsals for fractures, foreign bodies.



Foot Oblique View:

- *Position:* Foot rotated 45° medially.
- *CR:* Perpendicular to base of 3rd metatarsal.
- *Collimation:* Similar to AP.
- *Purpose:* Better visualization of tarsometatarsal joints.

RADIOGRAPHIC POSITIONING FOR THE FOOT (TOES AND TARSAL BONES)

Foot Lateral View:

- *Position:* Leg externally rotated, lateral foot on IR, dorsiflexed.
- *CR:* To midfoot.
- *Collimation:* To distal phalanges and calcaneus.
- *Purpose:* Assesses talocrural joint, soft tissue effusions.



RADIOGRAPHIC POSITIONING FOR THE ANKLE JOINT

AP View:

- *Position:* Supine, foot dorsiflexed, toes pointing up.
- *CR:* To midpoint of malleoli.
- *Collimation:* To skin margins, distal tibia/fibula to metatarsals.
- *Purpose:* Assesses distal tibia/fibula, talus for fractures.

Lateral View:

- *Position:* Lateral recumbent, foot dorsiflexed.
- *CR:* To medial malleolus.
- *Collimation:* To hindfoot, distal tibia/fibula, plantar foot.
- *Purpose:* Views talus, calcaneus, Bohler angle.



RADIOGRAPHIC POSITIONING FOR THE ANKLE JOINT

Mortise View:

- *Position:* Leg internally rotated 15-20°, foot dorsiflexed.
- *CR:* To midpoint of malleoli.
- *Collimation:* Similar to AP.
- *Purpose:* Evaluates mortise joint for talar fractures, dislocations.



RADIOGRAPHIC POSITIONING FOR THE KNEE JOINT (INCLUDING PATELLA, TIBIA, FIBULA)

Knee AP View:

- *Position:* Supine, leg extended, no rotation.
- *CR:* 1.5 cm distal to patellar apex.
- *Collimation:* Distal femur to proximal tibia/fibula.
- *Purpose:* Assesses tibiofemoral joint, fractures, osteoarthritis.



Knee Lateral View:

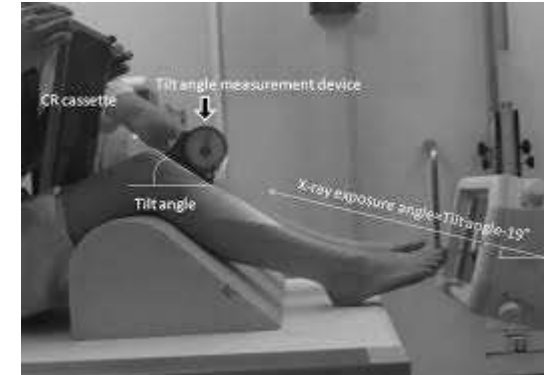
- *Position:* Lateral recumbent, knee flexed 30°.
- *CR:* To knee joint, 1.5-2 cm distal to patellar apex.
- *Collimation:* Distal femur to proximal tibia/fibula.
- *Purpose:* Views patellofemoral joint, effusions.



RADIOGRAPHIC POSITIONING FOR THE KNEE JOINT (INCLUDING PATELLA, TIBIA, FIBULA)

Patella Skyline View:

- *Position:* Prone, knee flexed 40-50°, IR under thigh.
- *CR:* Angled 15-20° caudad through patellofemoral joint.
- *Collimation:* To patella and joint space.
- *Purpose:* Detects patellar fractures, subluxation.



RADIOGRAPHIC POSITIONING FOR THE KNEE JOINT (INCLUDING PATELLA, TIBIA, FIBULA)

Tibia/Fibula (Lower Leg) AP View:

- Position: Supine, leg extended, internally rotated if possible.
- CR: Mid-shaft.
- Collimation: Ankle to knee joints.
- Purpose: Views entire tibia/fibula for fractures.

Tibia/Fibula Lateral View:

- Position: Lateral, leg bent or straight.
- CR: Mid-shaft.
- Collimation: Similar to AP.
- Purpose: Assesses alignment, cortical irregularities.



COMMON PATHOLOGIES AND RADIOGRAPHIC FINDINGS

Foot and Toes:

- Fractures: Metatarsal (e.g., Jones fracture), phalangeal.
- Findings: Cortical breaks, displacement. Lisfranc
- Injury: Tarsometatarsal dislocation.

Ankle:

- Fractures: Malleolar, talar.
- Findings: Widened mortise, joint effusion.
- Sprains: Ligament tears (e.g., anterior talofibular).



COMMON PATHOLOGIES AND RADIOGRAPHIC FINDINGS

Knee:

- Fractures: Tibial plateau, patellar.
- Findings: Joint space narrowing in osteoarthritis, effusion (suprapatellar pouch). Meniscal Tears, ACL Rupture.

Tibia/Fibula:

- Fractures: Spiral, stress.
- Findings: Angulation, periosteal reaction.



SUMMARY



References

- Bontrager, K. L., & Lampignano, J. P. (Latest Edition). Textbook of Radiographic Positioning and Related Anatomy. St. Louis, MO: Elsevier. (Excellent source for positioning details and evaluation criteria).
- Radiopaedia: Foot Radiograph. Available at: <https://radiopaedia.org/articles/foot-ap-view>
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