

Biology 223

Human Anatomy and Physiology 1

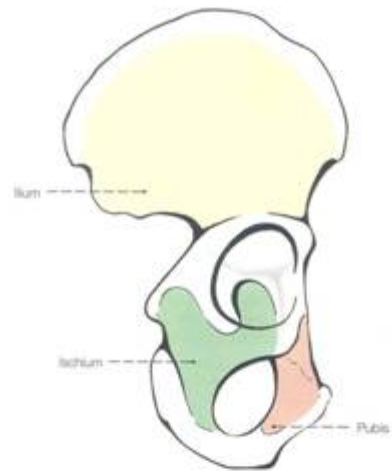
Week 7; Lecture 1; Monday

Dr. Stuart S. Sumida

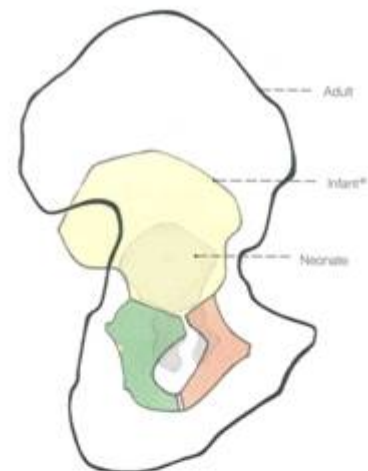
Pelvis and Perineum

Human Walking

Overview of Pelvis and Perineum

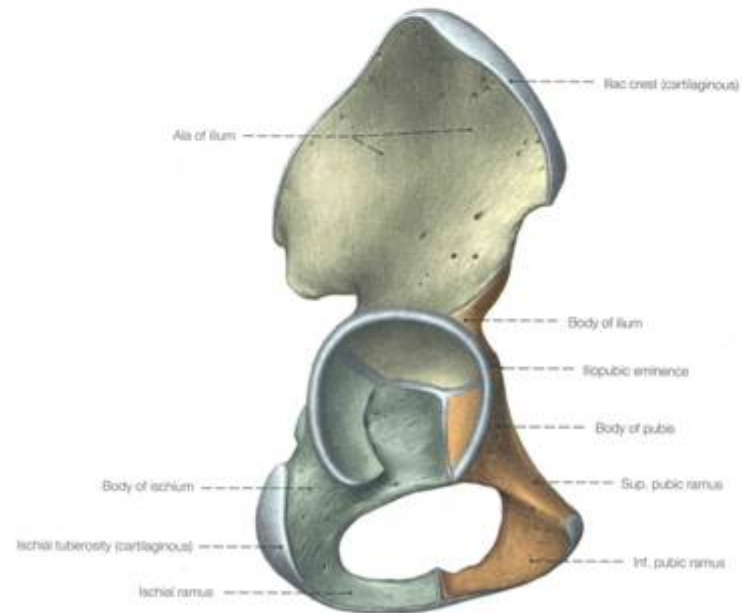


The right hip bone in a drawing showing the extent of its three osseous parts in a newborn, lateral aspect (110%).



The right hip bone in a drawing showing the extent of its three osseous parts at different ages, lateral aspect.

* At about 6 years of age



The right hip bone, developmental state in a 6-year-old child, lateral aspect (90%).

The three parts of the hip bone are connected with each other in the region of the acetabulum in a Y-shaped cartilaginous junction, which undergoes synostosis at about 13-18 years of age.



Fig. 389: Lateral View of the Adult Right Hip Bone

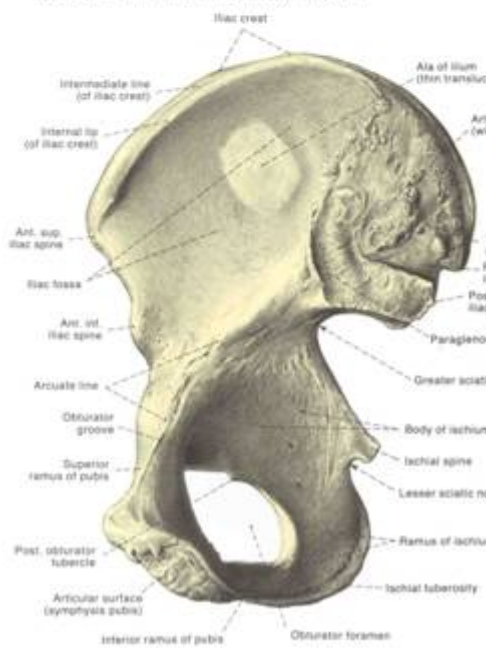


Fig. 390: Medial View of the Adult Right Hip Bone

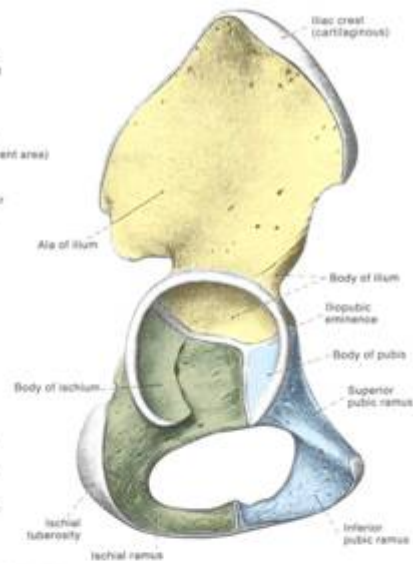


Fig. 391: Hip Bone of 5 Year Old Child: Lateral View

NOTE that the hip bone is formed by a fusion of the ilium (yellow), ischium (green) and pubis (blue). Although ossification of the inferior pubic ramus occurs during the 7th or 8th year, complete fusion of the three bones at the acetabulum occurs sometime between the 15th and 20th year.

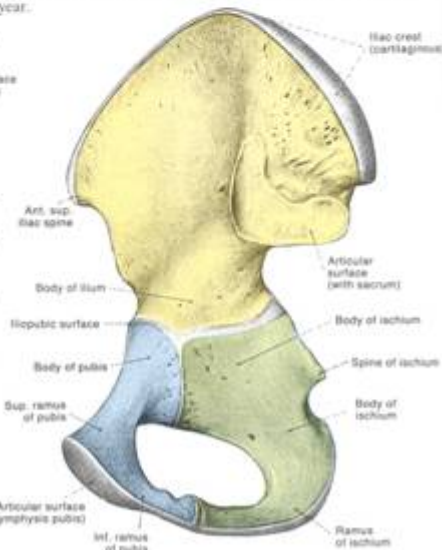
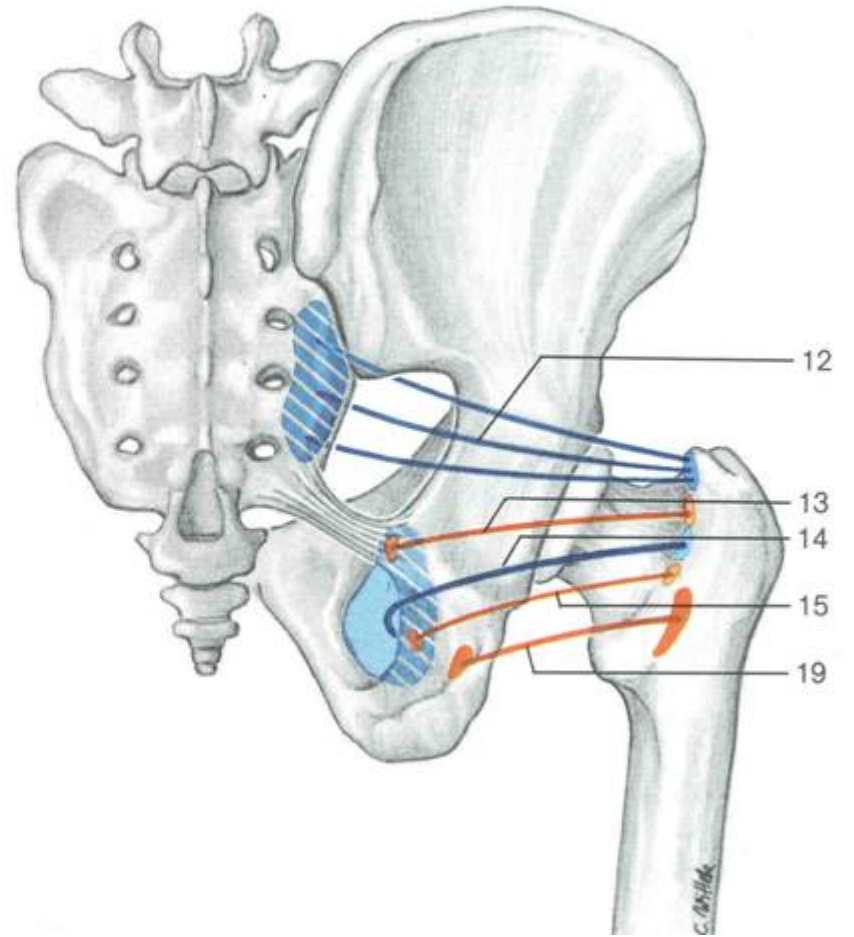
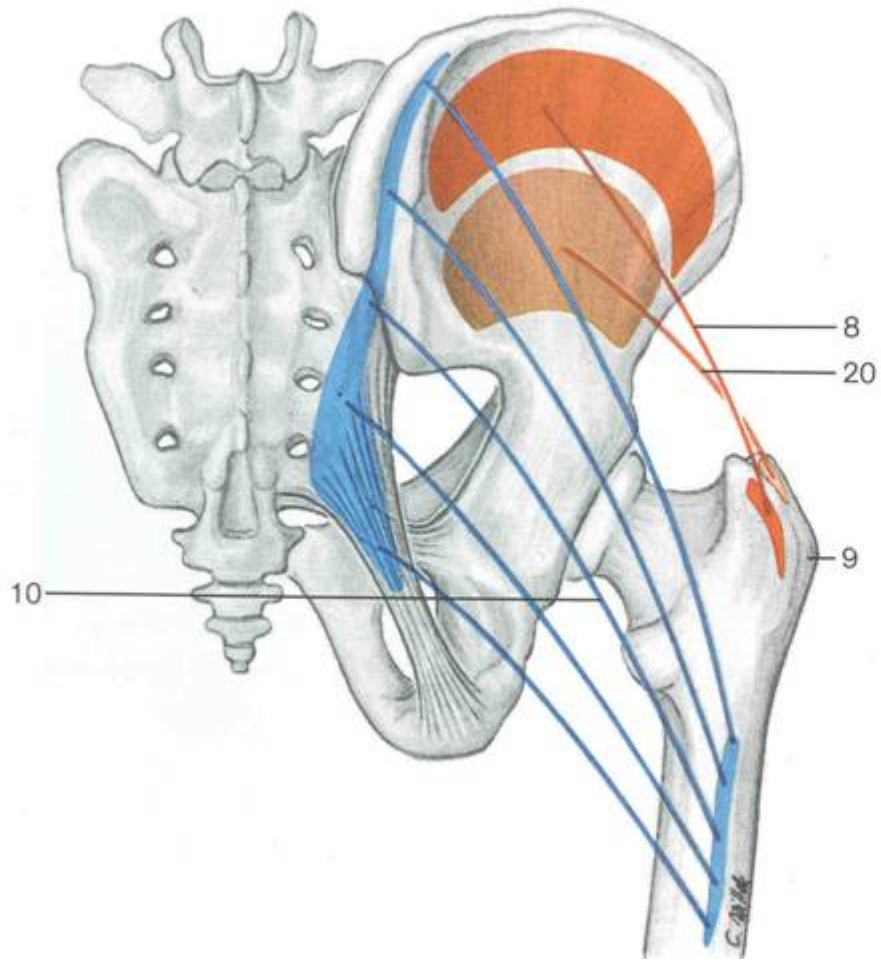
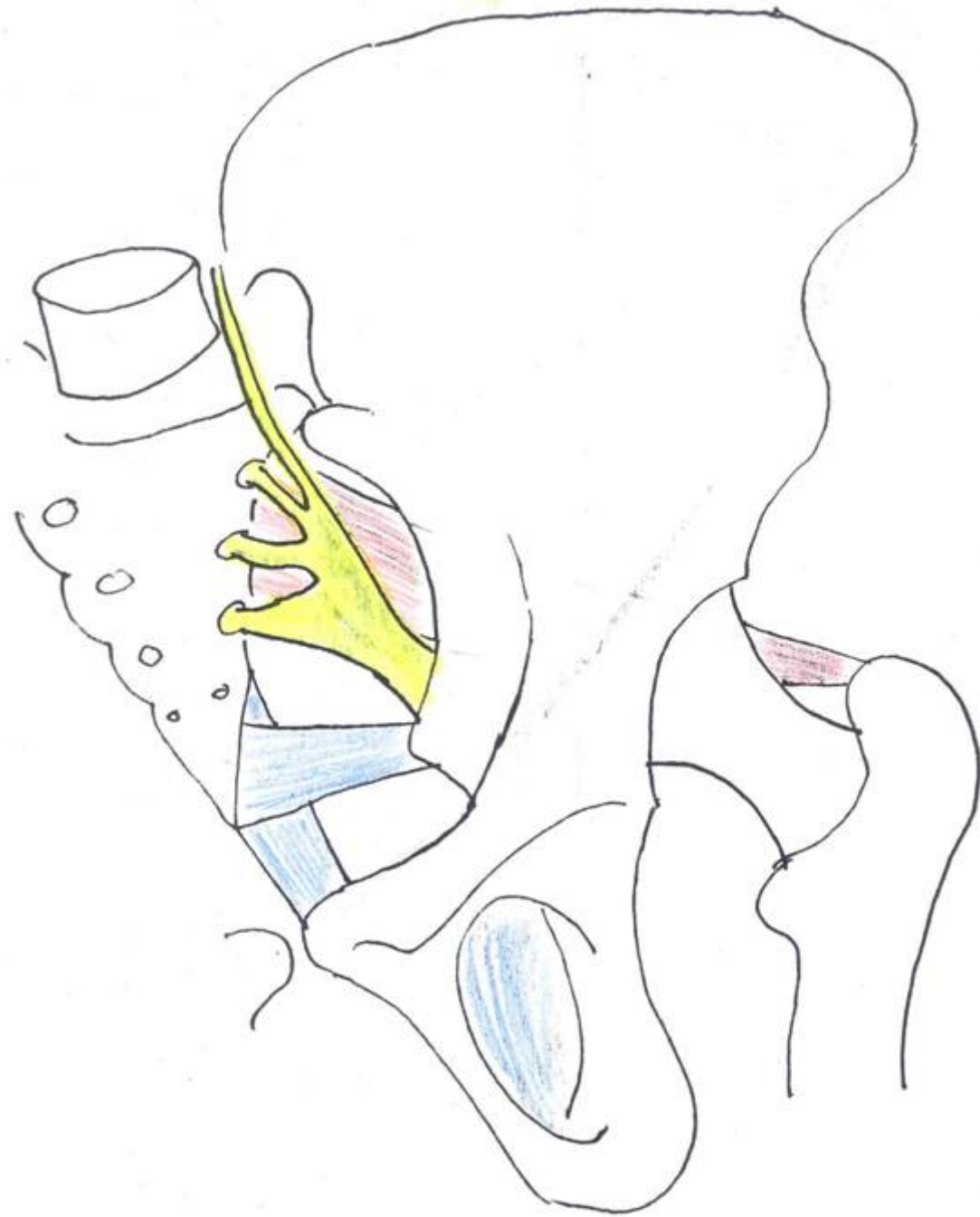
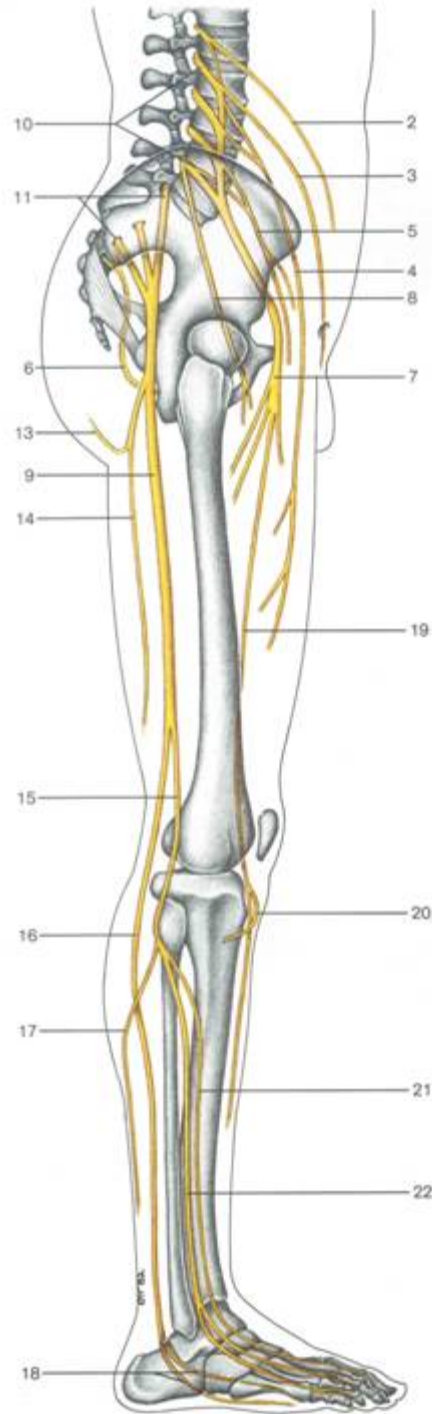


Fig. 392: Hip Bone of 5 Year Old Child: Medial View

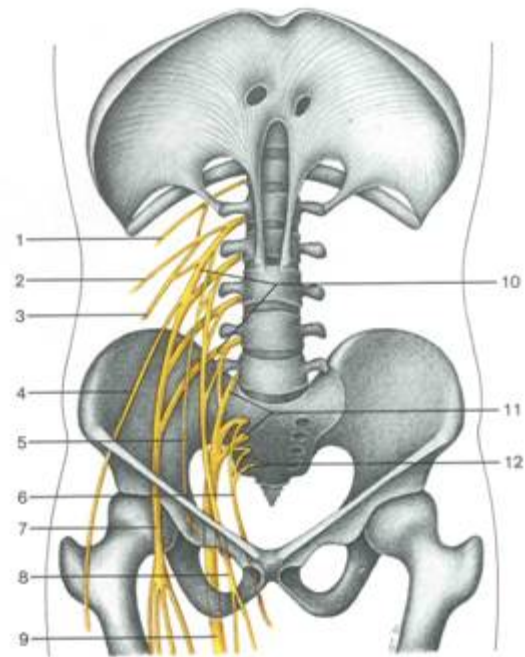
NOTE the lines of fusion of the three bones above the obturator foramen and the fusion of the inferior pubic ramus and the ischial ramus below that foramen.





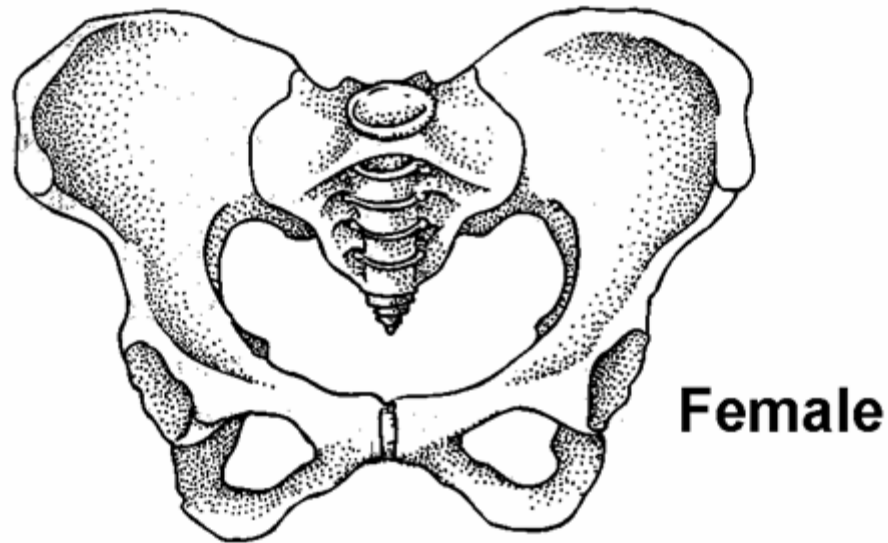
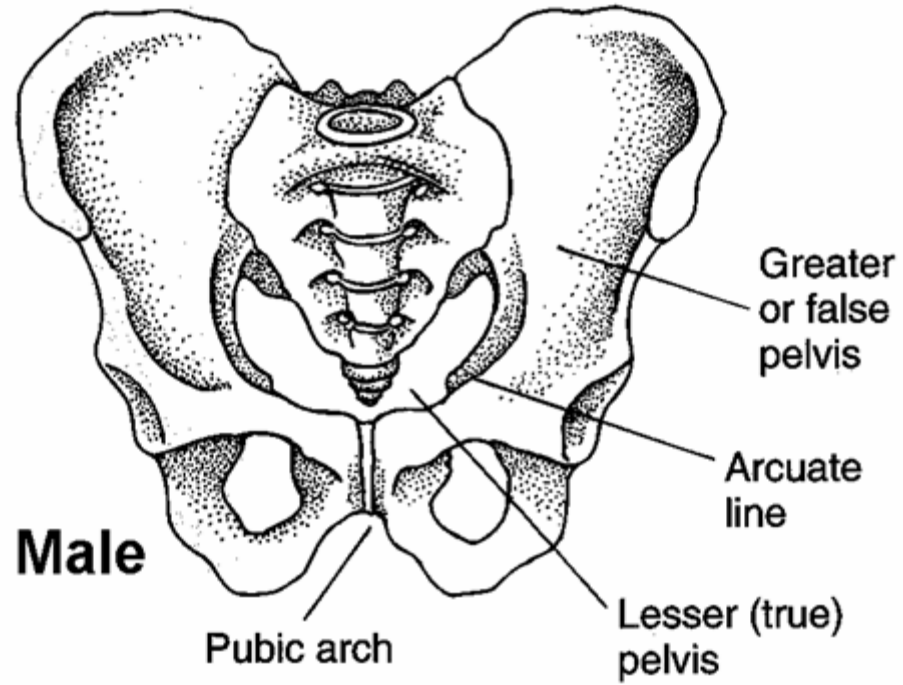


- 1 Subcostal nerve
 - 2 Iliohypogastric nerve
 - 3 Ilioinguinal nerve
 - 4 Lateral femoral cutaneous nerve
 - 5 Genitofemoral nerve
 - 6 **Pudendal nerve**
 - 7 **Femoral nerve**
 - 8 Obturator nerve
 - 9 **Sciatic nerve**
 - 10 Lumbar plexus (L₁-L₄)
 - 11 Sacral plexus (L₄-S₄)
 - 12 "Pudendal" plexus (S₂-S₄)
- } lumbosacral plexus
- 13 Inferior cluneal nerve
 - 14 Posterior femoral cutaneous nerve
 - 15 Common peroneal nerve
 - 16 **Tibial nerve**
 - 17 Lateral sural cutaneous nerve
 - 18 Medial and lateral plantar nerve
 - 19 Saphenous nerve
 - 20 Infrapatellar branch of saphenous nerve
 - 21 **Deep peroneal nerve**
 - 22 **Superficial peroneal nerve**



Factors Affecting Locomotion:

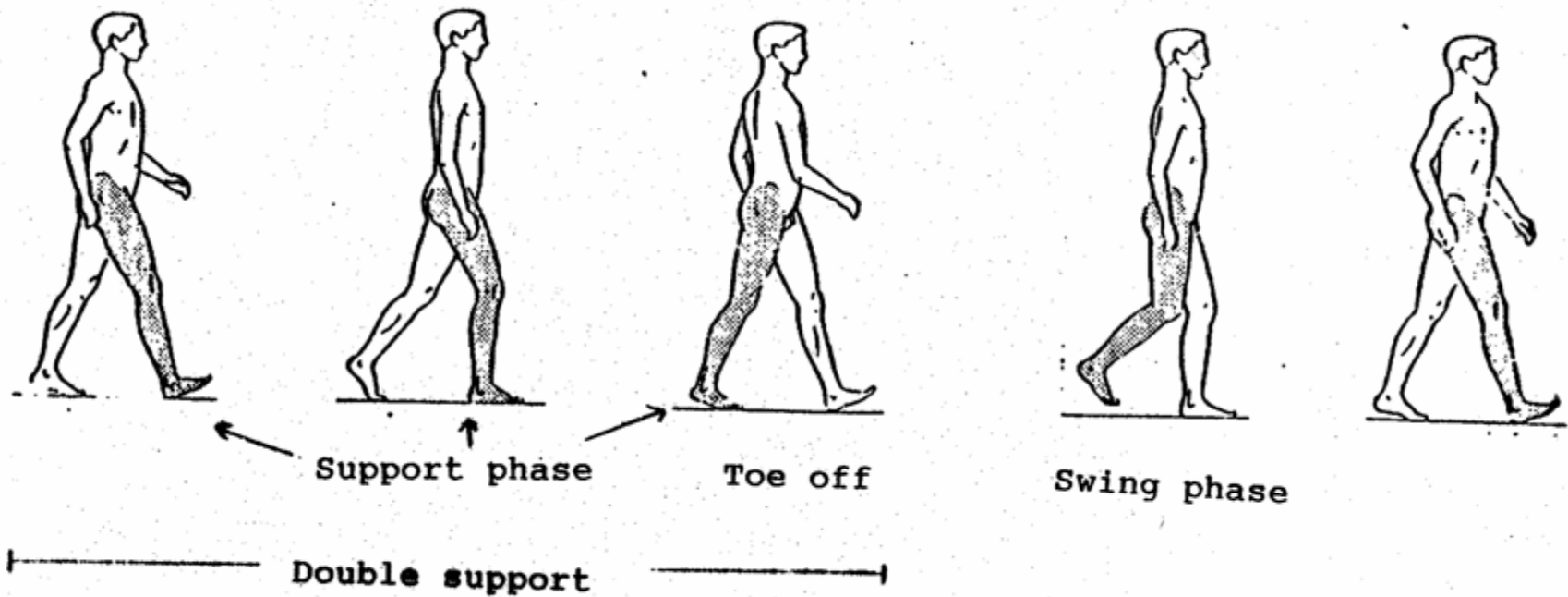
Walking



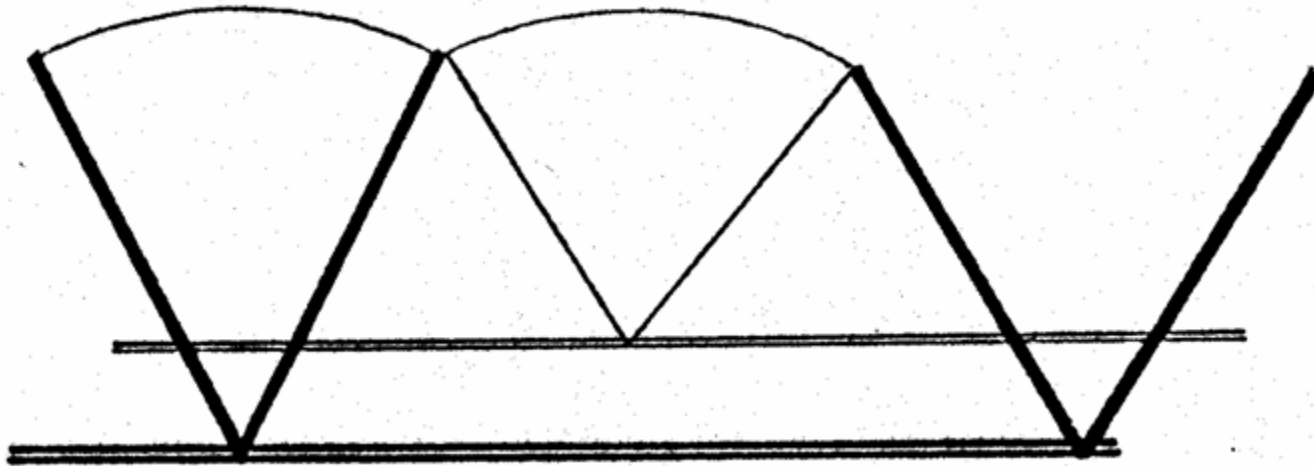


Walking: Has a Double Support Phase

Support Phase = when foot is on the ground.



The leg is like an inverted pendulum when walking...

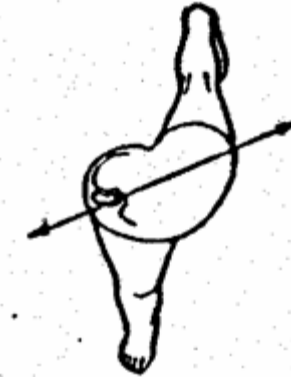


Nine Factors Influencing Walking:

1. Pelvic Rotation
2. Pelvic Tilt
3. Lateral Displacement of Pelvis
4. Bending of the Knee
5. Lateral Flexion of Trunk
6. Antero-posterior Flexion of Trunk
7. Dorsiflexion of Foot
8. Plantarflexion of Foot
9. Compliance of Foot

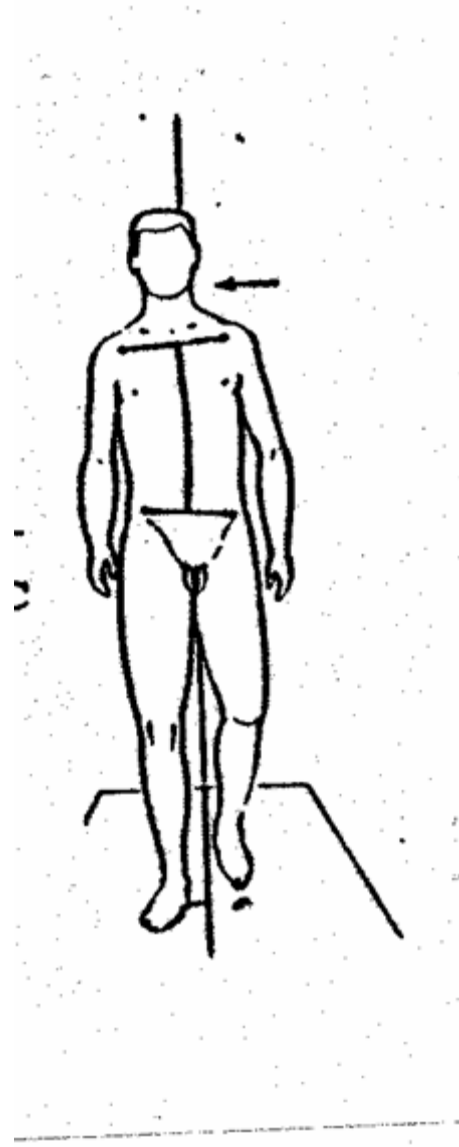
1. Pelvic Rotation

Lateral-medial axis
of pelvis rotates about
the center when walking.



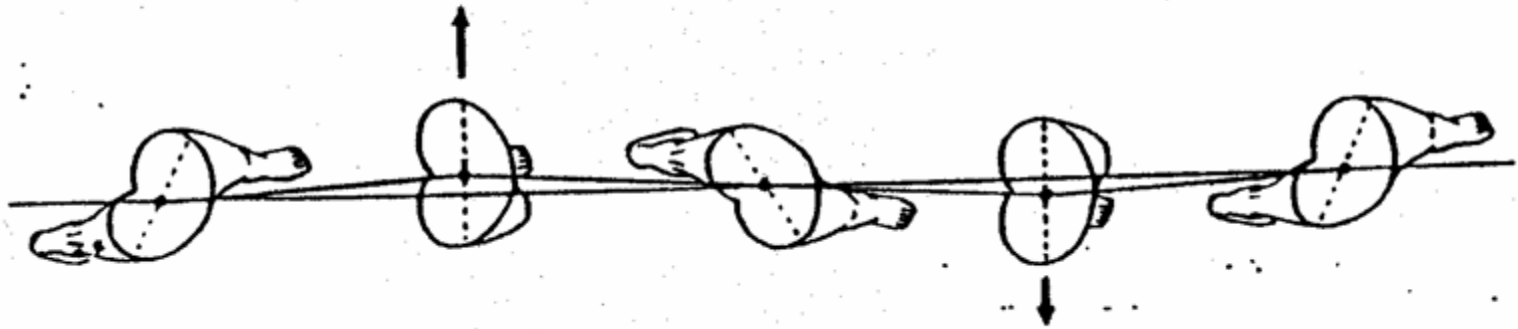
2. Pelvic Tilt

Hip tilts to compensate for the weight of the swing leg.



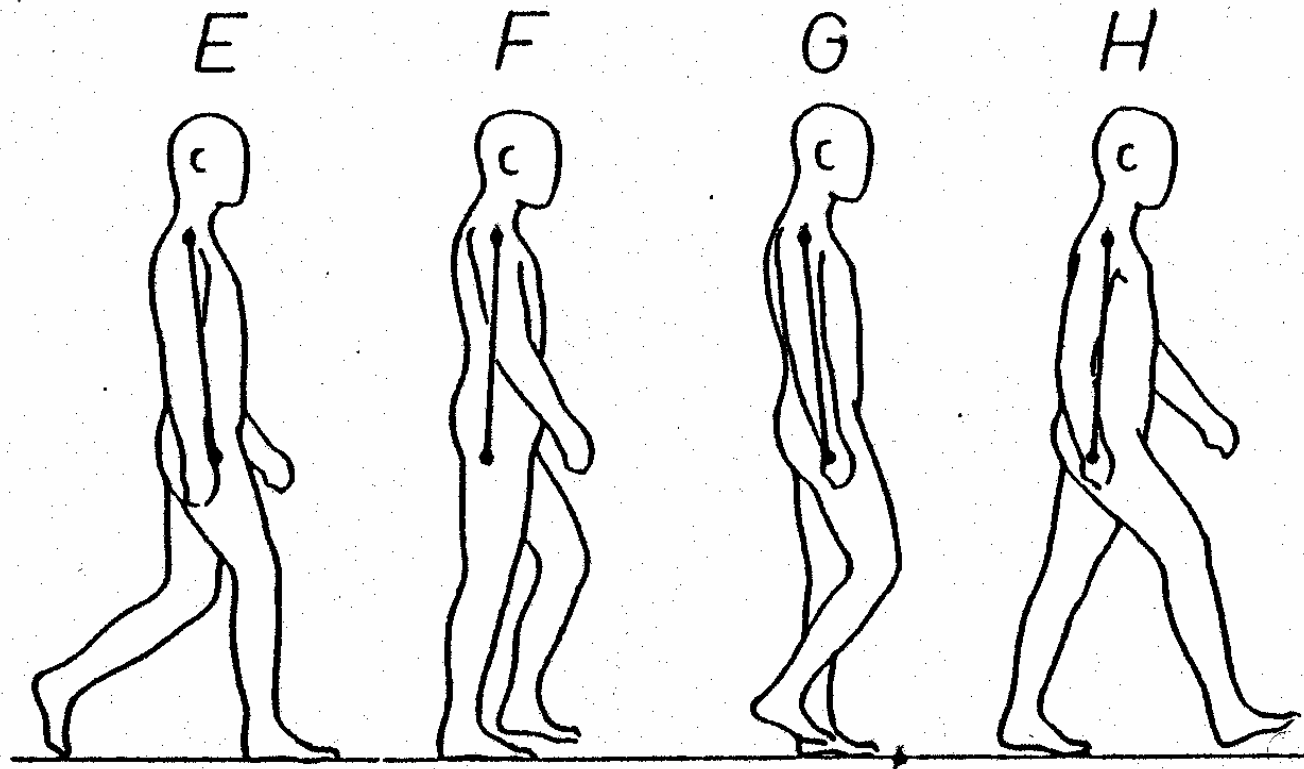
3. Lateral Displacement of Pelvis

Hips move from side to side to keep center of mass over support limb.



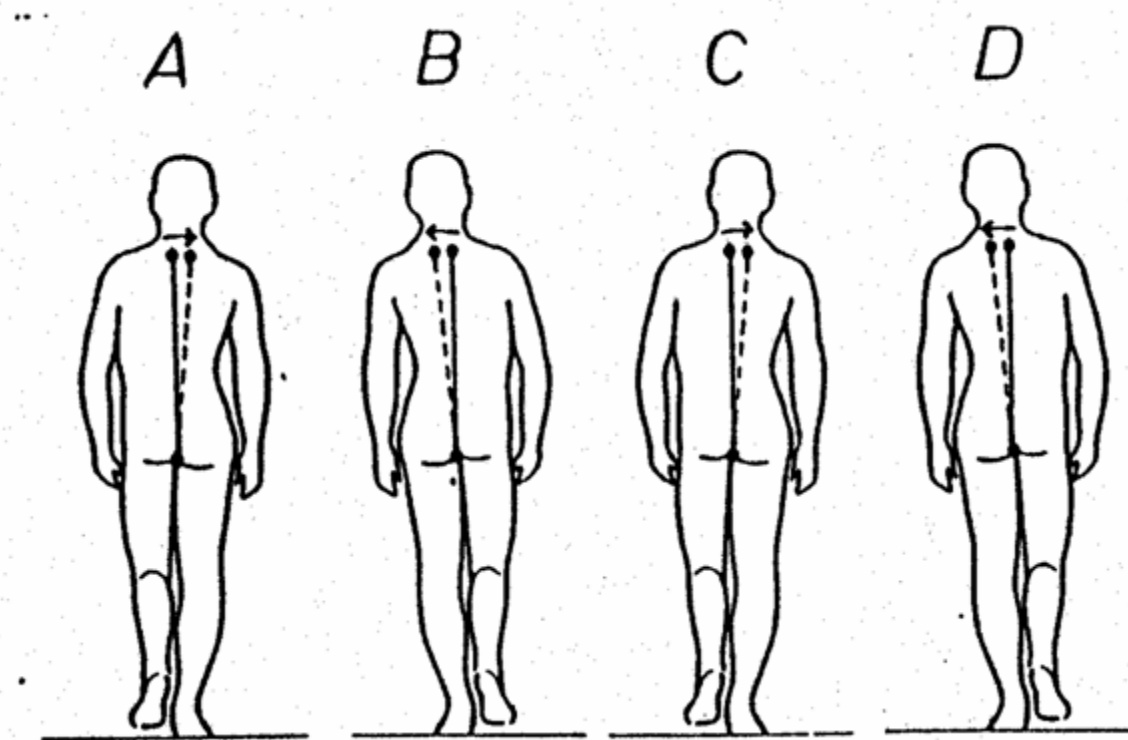
4. Bending of the Knee

Knee bends between heel-strike and pushoff.



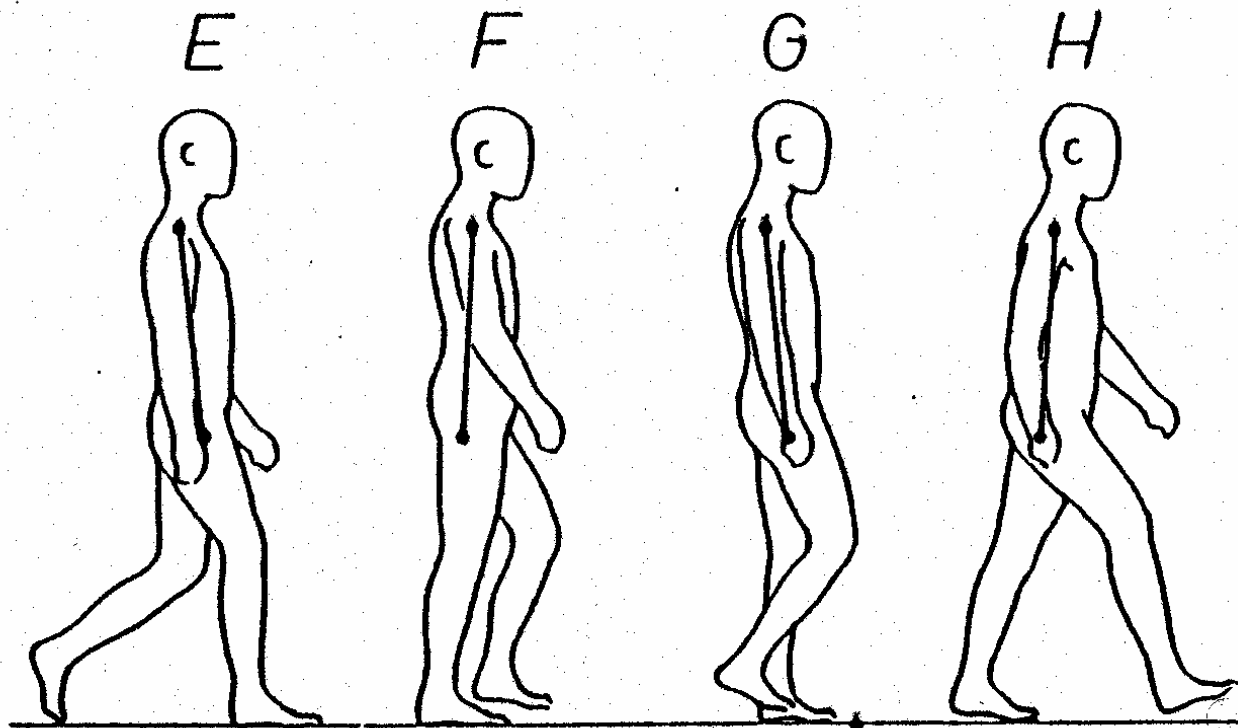
5. Lateral Flexion of Trunk

Trunk flexes laterally to help to keep center of mass over support limb.



6. Antero-posterior Flexion of Trunk

Trunk flexes anteriorly and posteriorly to help keep center of mass over support limb.



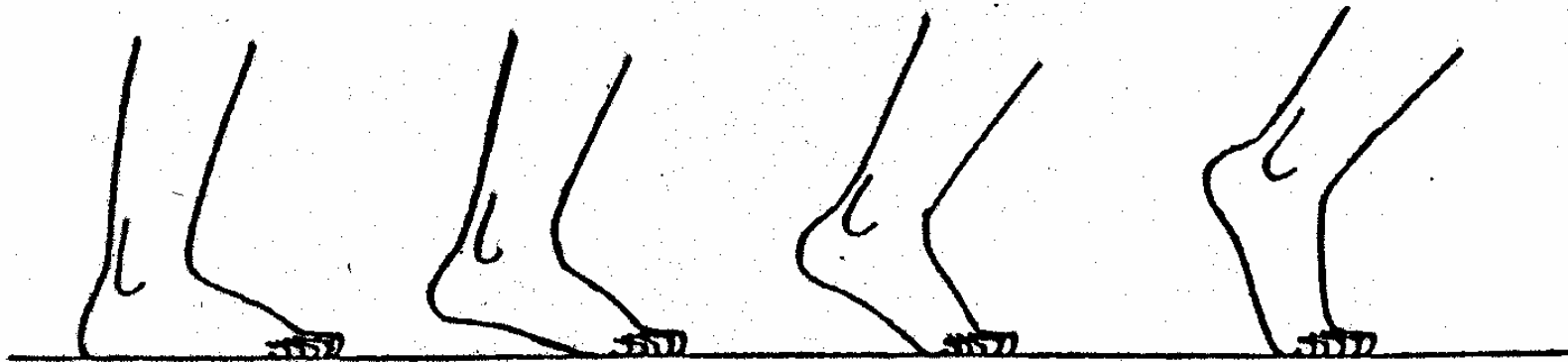
7. Dorsiflexion of Foot

- Foot flexes dorsally upon heel strike (with locked knee).
- Catches falling body.



8. Plantarflexion of Foot

Plantarflexion of foot provides power for toeoff.



9. Compliance of Foot

Flexibility of foot smooths oscillation at other joints.

