

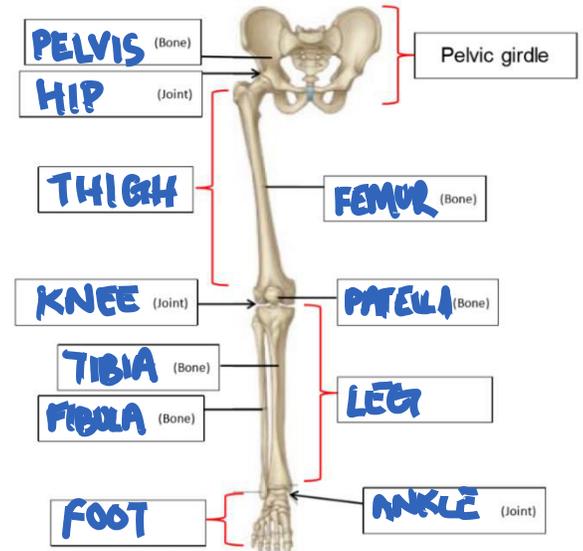
HBS2ALT topic two: lower limb, learning outcomes for flag test 2

INTRODUCTION TO THE LOWER LIMB

General

1. Define lower limb and describe its relationship to the pelvis girdle and axial skeleton. Identify the bones, joints and regions of the lower limb

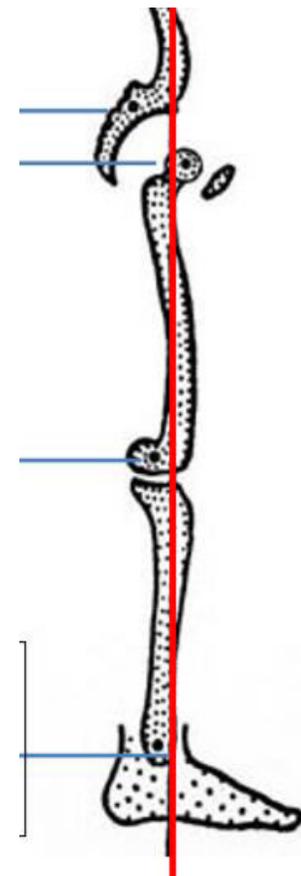
- The lower limb refers the area between the gluteal region all the way down to and including the foot
- The *PELVIC GIRDLE* refers to the two hip bones
 - o Note they are NOT a part of the axial skeleton, but rather the appendicular skeleton, articulating with the axial skeleton at the sacroiliac joints
- The *PELVIS* refers to the entire basin like structure, including the hip bones, sacrum and coccyx
- Bones of the lower limb include;
 - o Hip bones, femur, patella, tibia, fibula and the bones of the foot
- Joints in the lower limb include;
 - o Ankle, knee, hip and joints in the foot



2. Describe the position of the line of centre of gravity in the lower limb in the anatomical position and describe its significance for force moments created at principal joints of the lower limb. Apply the principle M14 to state the requirements for maintenance of normal balance and posture at each of these joints.

M14: maintenance of an upright posture depends, in part, upon the coordinated activity of flexor and extensor muscles

- The COG lies;
 - o ANTERIOR to the sacroiliac joint
 - Causes flexor moment
 - Trunk extensors (e.g. erector spinae) counteract this
 - o POSTERIOR to the hip joint
 - Causes extensor moment
 - Hip flexors (e.g. iliopsoas) counteract this
 - o ANTERIOR to the knee joint
 - Causes extensor moment
 - Flexor muscles (e.g. hamstrings and gastrocnemius) counteract this
 - o ANTERIOR to the ankle joint
 - causes a dorsiflexor moment
 - plantarflexor muscles counteract this
- the 'moments' are counteracted by muscles remaining tonically active



Origin and innervation of limbs

3. Define and identify on diagrams and models the following features of a developing limb bud:

a. Pre- and post-axial borders

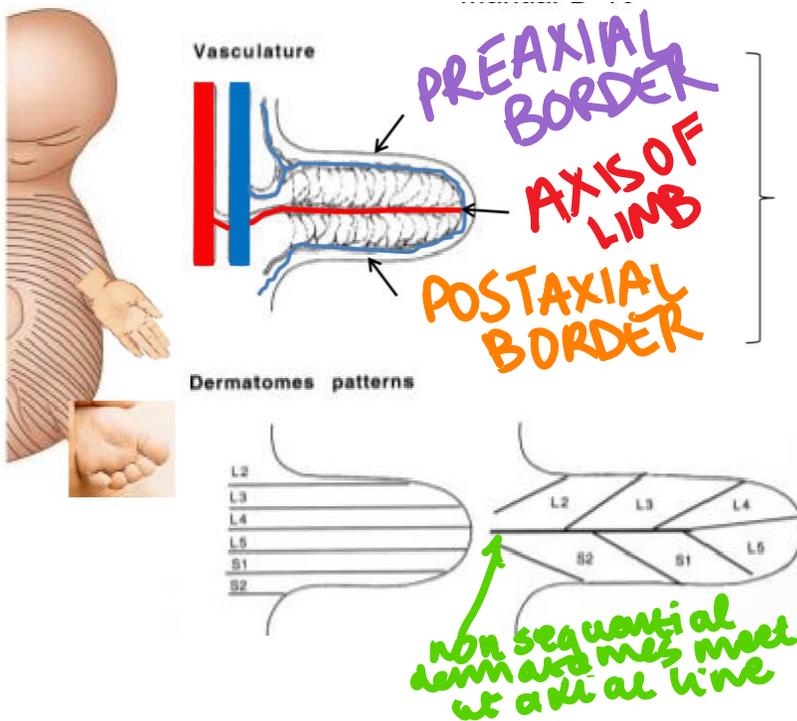
The preaxial border lies superior to the axis of the limb in the developing limb bud

The post axial border lies inferior to the axis of the limb bud in the developing limb bud

b. Ventral and dorsal surfaces

The ventral surface of the limb bud faces anteriorly

The dorsal surface of the limb bud faces posteriorly



Pre and post-axial borders are marked by superficial veins

dermatomes arranged sequentially down pre-axial to post-axial border

4. Describe the rotation of each of the lower limbs during development and therefore, the re-orientation of the ventral and dorsal surfaces and pre- and post-axial borders in the adult. Name the structures which mark the pre- and post-axial borders in both the developing limb bud and the adult limb. Apply principle E2 to distinguish between the use of ventral/dorsal and posterior/anterior in relation to the limbs. Describe the implications of the rotation for location of flexor and extensor muscle groups in the lower limb.

E2: in the foetus, the upper and lower limbs rotate in different directions from their original embryological position

- During development, the lower limbs rotate **MEDIALY**, causing the pre and post axial borders to move
 - o The pre-axial border lies medial on the developed limb
 - o The post-axial border lies posteriorly and slightly laterally on the developed limb
- In the adult, the borders are marked by the great and short saphenous vein
 - o The pre-axial border is marked by the great saphenous vein
 - Runs from dorsal venous arch medially (from greater toe) up the medial leg to the groin
 - o The post axial border is marked by the short saphenous vein
 - Runs from dorsal venous arch (from fifth met) to the back of the knee
 - o The great and short saphenous veins are joined by the dorsal venous arch (lies superficially on foot)

