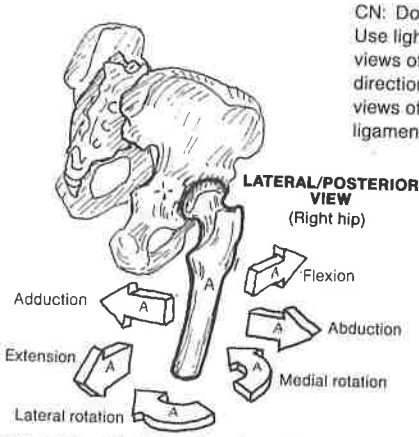
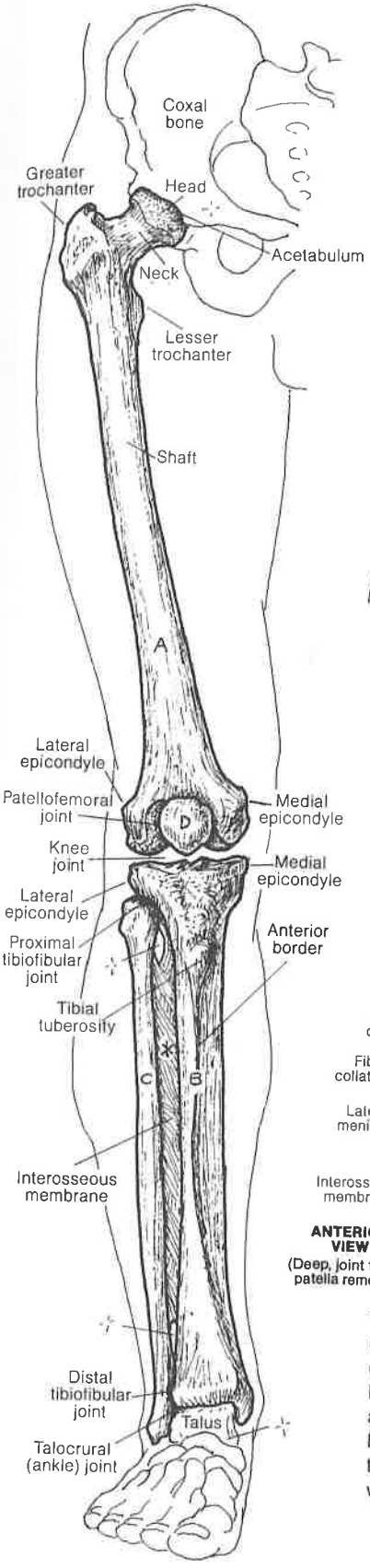
THIGH & LEG BONES

FEMUR A TIBIA B
FIBULA C
PATELLA D

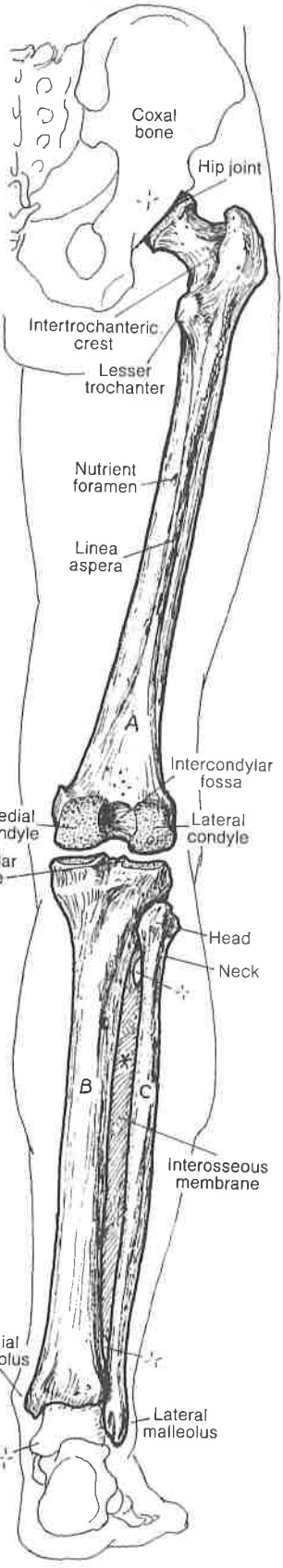
CN: Do not use the color used for the ilium on Plate 29. Use light colors and a bright color for F. (1) Color the two large views of the lower limb. (2) Next color the femur and the six directional arrows for the hip joint. (3) Color the extension/flexion views of the knee joint. (4) Color the two views of the major ligaments and the menisci of the knee joint.



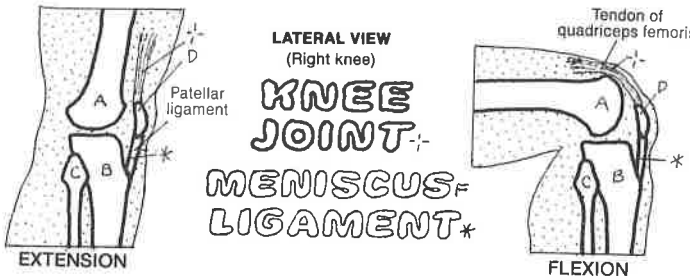
ANTERIOR VIEW
(Right limb)



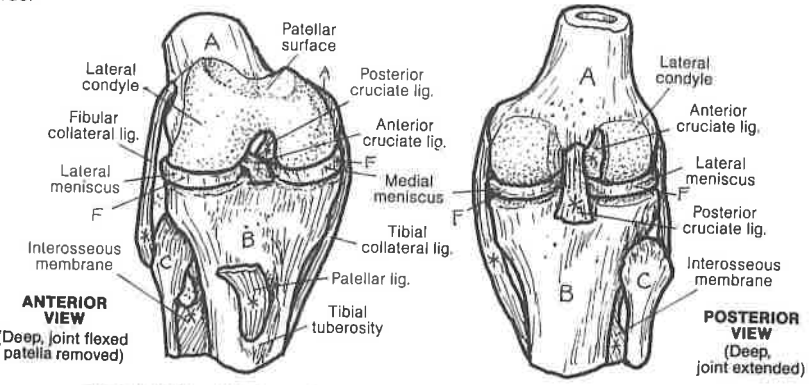
POSTERIOR VIEW
(Right limb)



The hip (coxal) joint (multiaxial, ball and socket synovial joint) is concerned with the transmission of considerable weightbearing forces; the head of the femur is particularly subject to pathologic changes with any significant alteration of blood supply (avascular necrosis). The greater trochanter is the site of attachment for several important muscles crossing the hip joint.



The knee (genual) joint consists of two condylar-type, synovial (tibiofemoral) joints between the condyles of the *femur* and the flat, plateau-like articular surfaces on the condyles of the *tibia*. The principal movements at these joints are flexion and extension. The knee joint includes the saddle-type synovial (patellofemoral) joint between the *patella* and femur. The deep surface of the patella is cartilaginous and exhibits medial and lateral facets (note patellar surface of the femur). Premature wear of the patellar cartilage is common (chondromalacia patellae). The patella is a sesamoid bone which develops in the tendon of the quadriceps femoris muscle; as such, it resists the stress imposed on that tendon during knee movements.



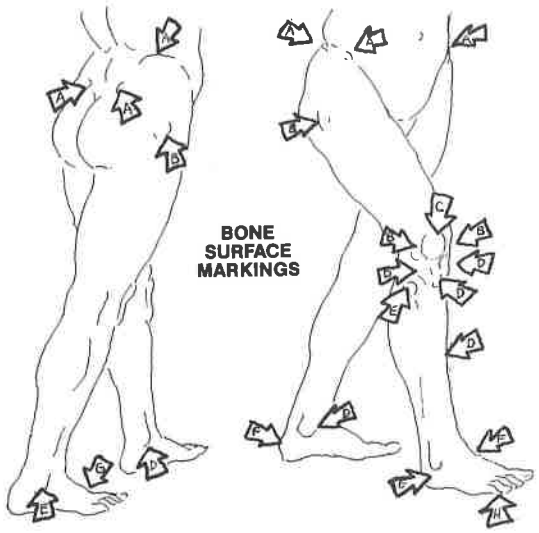
The stability of the knee joint comes from ligaments and the muscles crossing the joint. The collateral ligaments resist sideward displacement and rotation. The cruciate (crossing) ligaments resist hyperextension (anterior cruciate) and hyperflexion (posterior cruciate) of the joint. The C-shaped menisci (the medial larger than the lateral) deepen the articulating surfaces of the tibial condyles. Often torn by misuse of the knee joints (rotation and adduction/abduction with weightbearing), the menisci can often be repaired by arthroscopy.

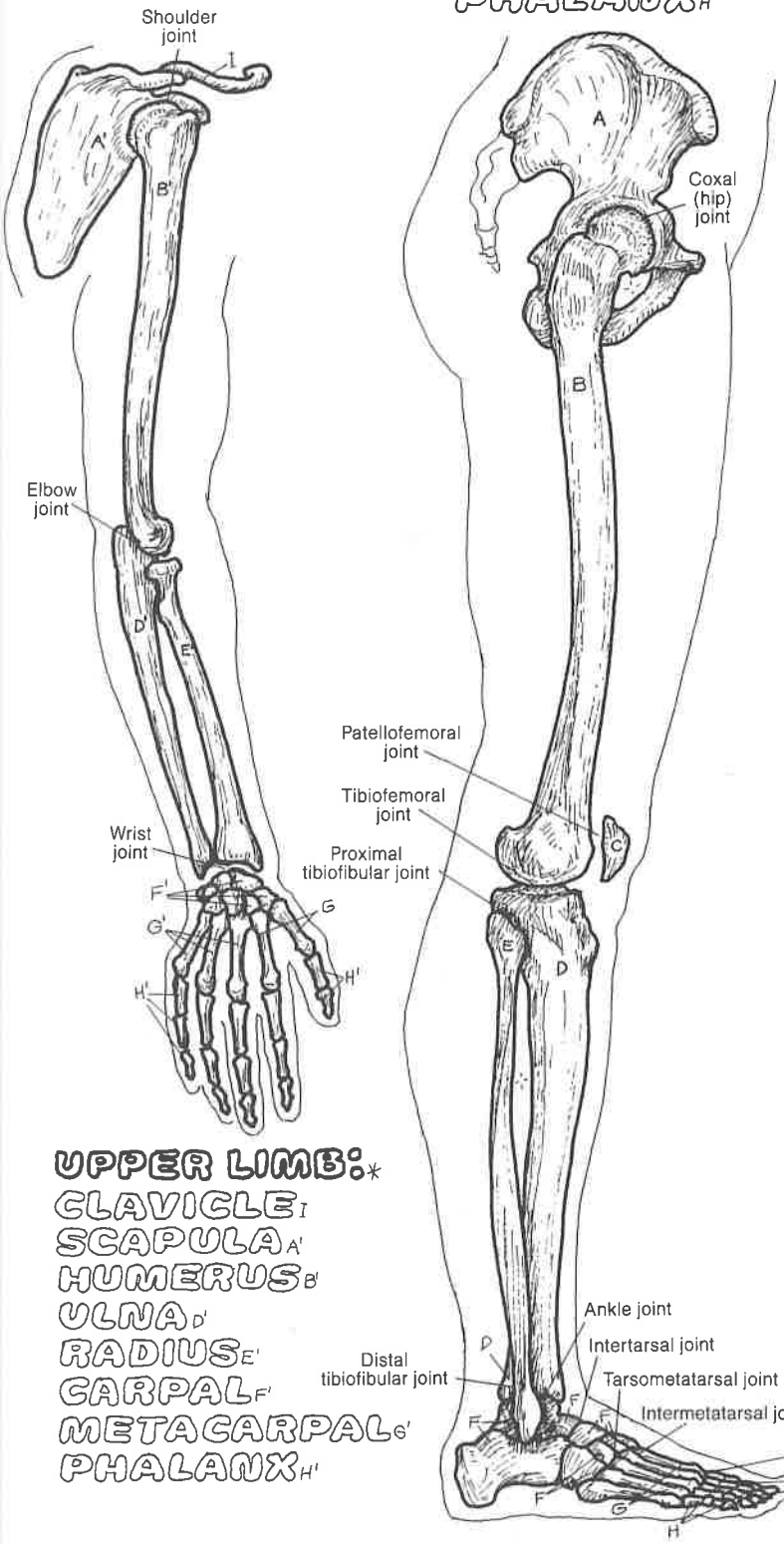
III. SKELETAL SYSTEM/LOWER LIMB

BONES IN REVIEW

CN: Use the same colors for these bones that you used for them on Plates 29-31. In the case of the coxal bone (A), use the color given to the ilium on Plate 29; for the tarsal bones (F), use any one of the tarsal colors. (1) Color the bones of the lower limb, their surface markings, and the corresponding bones on the hind limb of the dog. (2) Color the names and bones of the upper limb and the forelimb of the dog. The clavicle of the dog is not shown in this view.

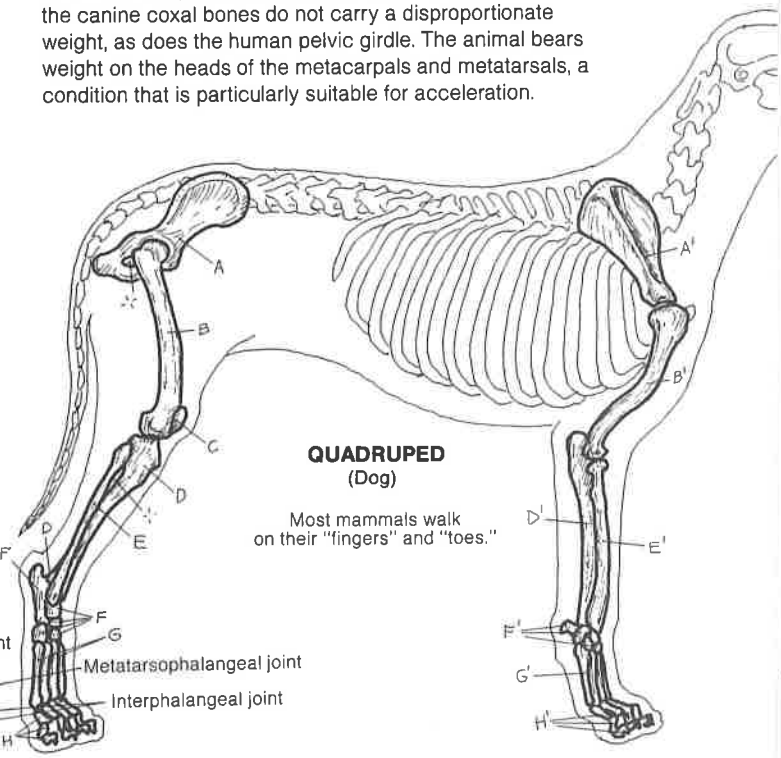
LOWER LIMB:*
- COXAL A
- FEMUR B
- PATELLA C
- TIBIA D
- FIBULA E
- TARSAL F
- METATARSAL G
- PHALANX H





The structure of a part reflects an adaptation for function. The truth of this statement is borne out in comparing the bones of the upper and lower limbs in a biped (human) with those of a quadruped. The pectoral girdle provides a basis for mobility; the more sturdy pelvic girdle provides stability in both locomotion and weight bearing. The limb bones of the lower limb are large and solid, consistent with weight-bearing; the related joints are structurally secure, except the knee, which gives up stability for flexibility. In the upper limb, the bones are lighter, and the joints are more flexible and capable of greater ranges of motion (compare shoulder with hip, elbow with knee, wrist with ankle). Although forearm and leg each have two bones, there is little functional correlation between those pairs of bones. The foot is clearly adapted for locomotion and weight bearing, the hand (especially the thumb) for mobility and dexterity.

The quadruped (in this case, the domestic dog) uses both forelimbs and hindlimbs for supporting body weight and locomotion. The girdle (coxal/scapular) bones are adapted for locomotion, and are not as differentiated structurally or functionally as they are in humans. The canine scapula has much less scapulothoracic motion than the human scapula; the canine coxal bones do not carry a disproportionate weight, as does the human pelvic girdle. The animal bears weight on the heads of the metacarpals and metatarsals, a condition that is particularly suitable for acceleration.



QUADRUPED
(Dog)

Most mammals walk on their "fingers" and "toes."

UPPER LIMB:*
- CLAVICLE I
- SCAPULA A'
- HUMERUS B'
- ULNA D'
- RADIUS E'
- CARPAL F'
- METACARPAL G'
- PHALANX H'