

V. MUSCULAR SYSTEM / UPPER LIMB

NAME: _____

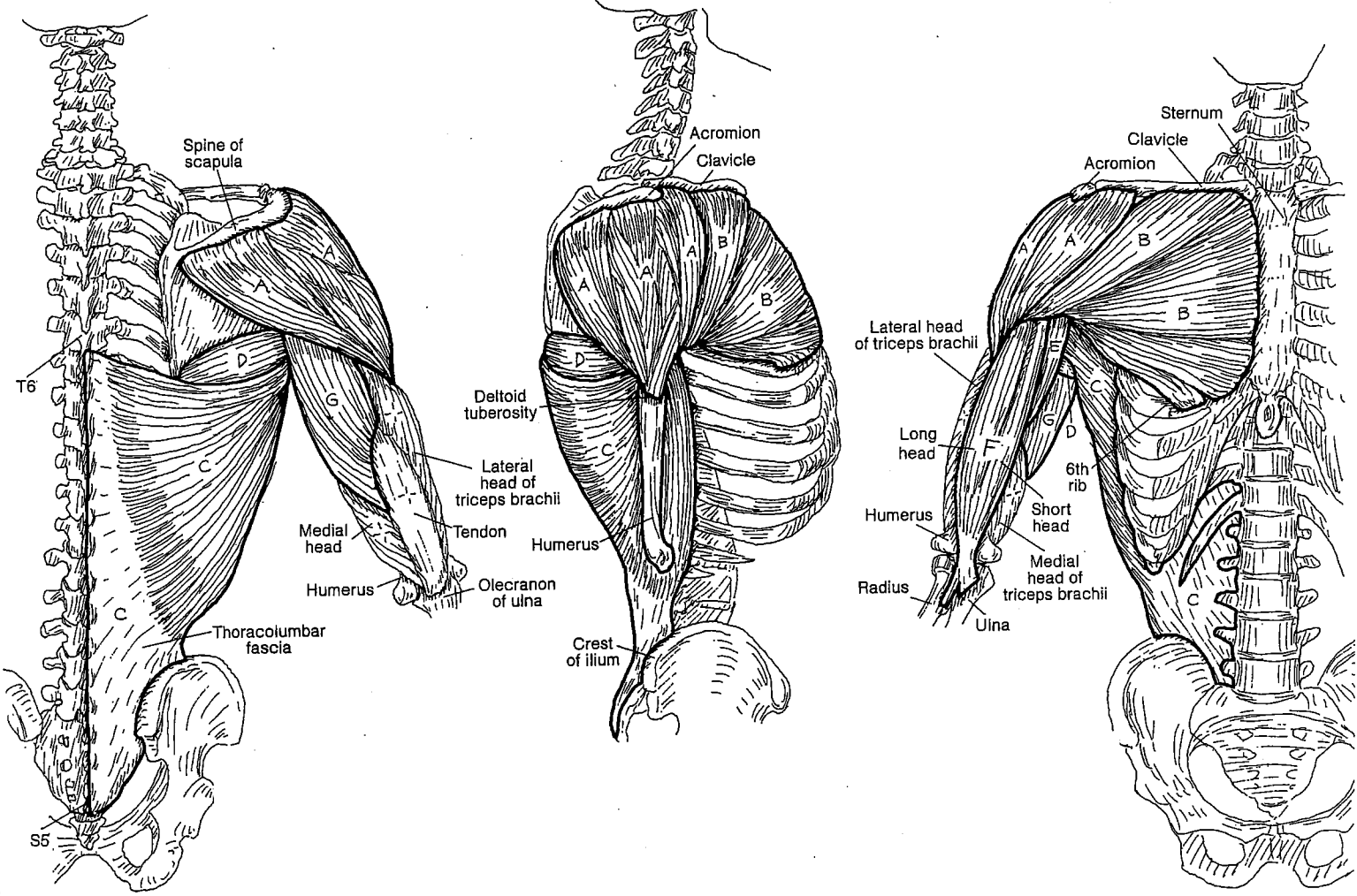
MOVERS OF SHOULDER JOINT

BLOCK: _____

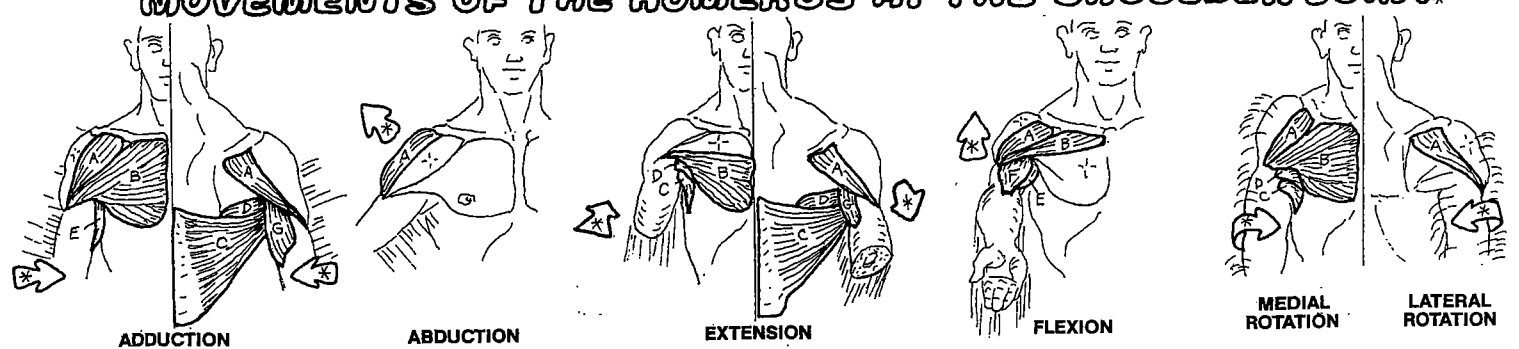
DELTOID, PECTORALIS MAJOR,
 LATISSIMUS DORSI,
 CORACOBRAHIALIS, BICEPS BRACHII,
 TRICEPS BRACHII (LONG HEAD):

POSTERIOR VIEW

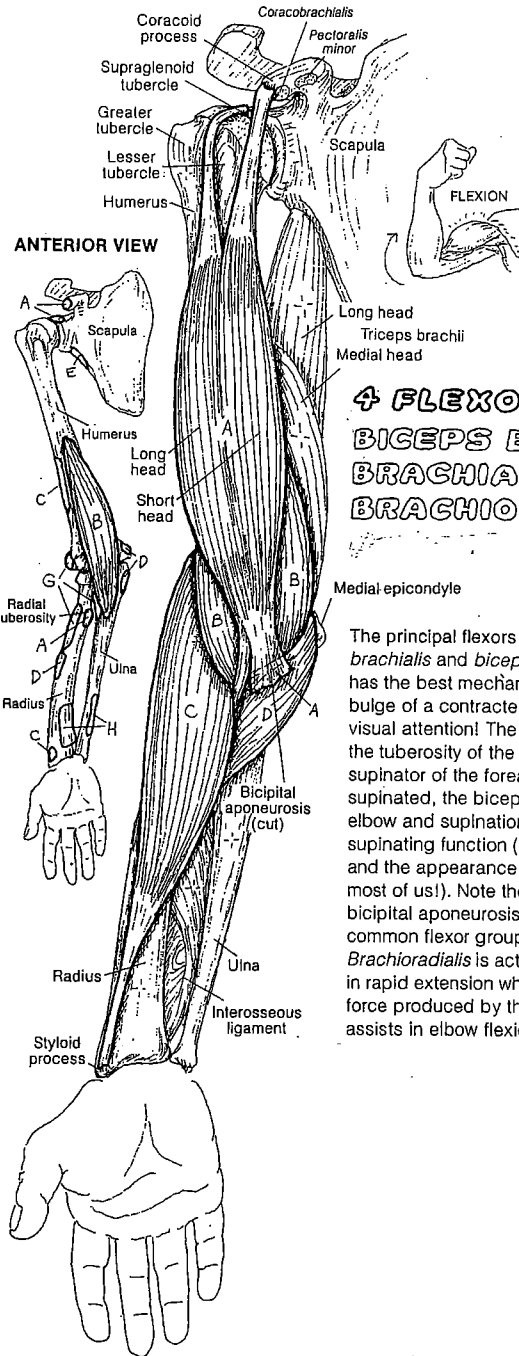
LATERAL VIEW



MOVEMENTS OF THE HUMERUS AT THE SHOULDER JOINT



MOVERS OF ELBOW & RADIOULNAR JOINTS



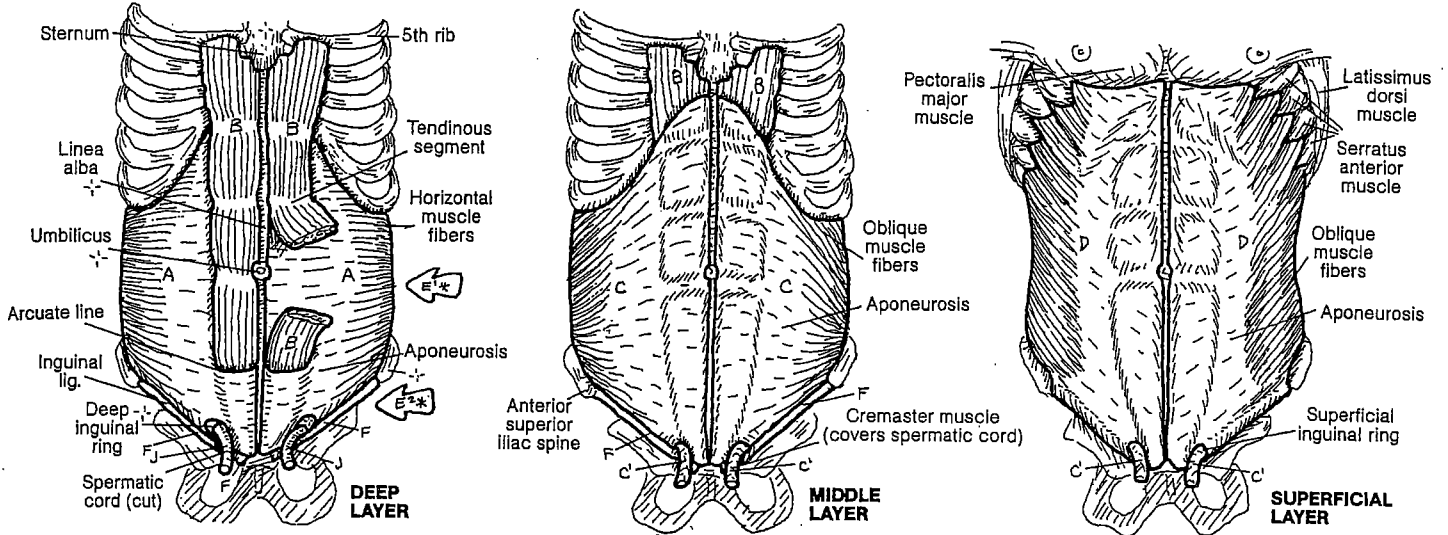
CN: Use the same colors for biceps brachii (A) and triceps brachii (E) as you did for those muscles on Plate 56. (1) Color the four flexors and their attachment sites on the drawings to their left. Do the same for the extensors on the right. (2) Color the supinators and pronators below, the arrows demonstrating their actions, and their attachment sites at upper left.

4 FLEXORS:
BICEPS BRACHII_A
BRACHIALIS_B
BRACHIORADIALIS_C

The principal flexors of the elbow joint are *brachialis* and *biceps brachii*, of which the former has the best mechanical advantage. Yet it's the bulge of a contracted biceps that gets all the visual attention! The tendon of biceps inserts at the tuberosity of the radius, making the muscle a supinator of the forearm as well. With the limb supinated, the biceps works to fulfill flexion of the elbow and supination of the elbow. Take away the supinating function (flexing the pronated elbow), and the appearance of biceps is disappointing (in most of us!). Note the additional attachment of the bicipital aponeurosis into the deep fascia of the common flexor group (not shown) in the forearm. *Brachioradialis* is active in flexion of the elbow and in rapid extension where it counters the centrifugal force produced by that movement. *Pronator teres* assists in elbow flexion as well as pronation.

ANT. ABDOMINAL WALL:*
TRANSVERSUS ABDOMINIS_A
RECTUS ABDOMINIS_B
INTERNAL OBLIQUE_C
EXTERNAL OBLIQUE_D

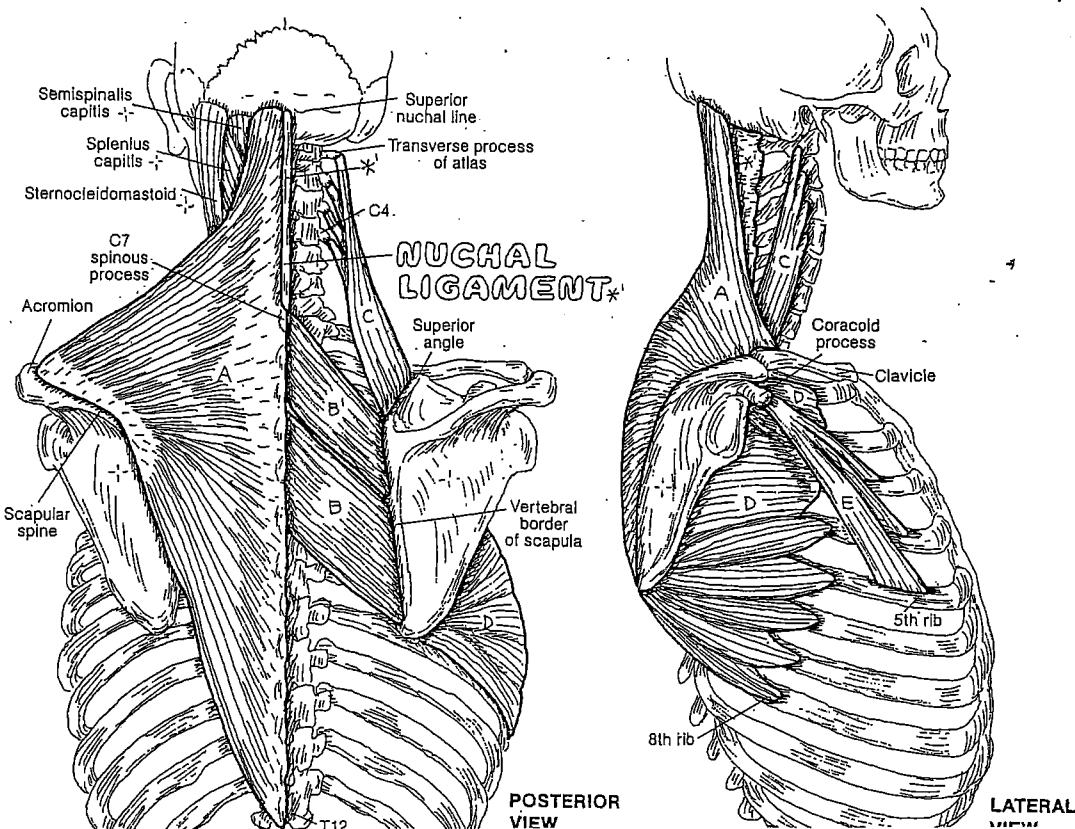
The anterior abdominal wall consists of three layers of flat muscles, the tendons (aponeuroses) of which interlace in the midline, and a vertically oriented pair of segmented muscles which are ensheathed incompletely by the aponeuroses of the three flat muscles (*sheath of the rectus abdominis*). The flat muscles arise from the lateral aspect of the torso (inguinal ligament, iliac crest, thoracolumbar fascia, lower costal cartilages, ribs). The lowest fibers of *external oblique* roll inwardly to form the *inguinal ligament*. These three muscles act to compress the abdominal contents during expiration, urination, and defecation. They assist in maintaining pressure on the curve of the low back, resisting "sway back" (excess lumbar lordosis) and extension of the low back.



MUSCLES OF SCAPULAR STABILIZATION

- TRAPEZIUS_A**
- RHOMBOID MAJOR_B, MINOR_B**
- LEVATOR SCAPULAE_C**
- SERRATUS ANTERIOR_D**
- PECTORALIS MINOR_E**

CN: (1) Color the six muscles of scapular stabilization. Note that the two rhomboids receive the same color (B). In the two main views, color gray the nuchal ligament and its title. (2) Color the attachment site diagrams at upper right. (3) In the illustrations below describing scapular movement, note that the three regions of trapezius (A) play different roles. Color gray the scapulae, the arrows, and the movement titles.



MUSCLES OF THE ANTERIOR THIGH

SARTORIUS_A

QUADRICEPS FEMORIS₋

RECTUS FEMORIS_;

VASTUS LATERALIS_;

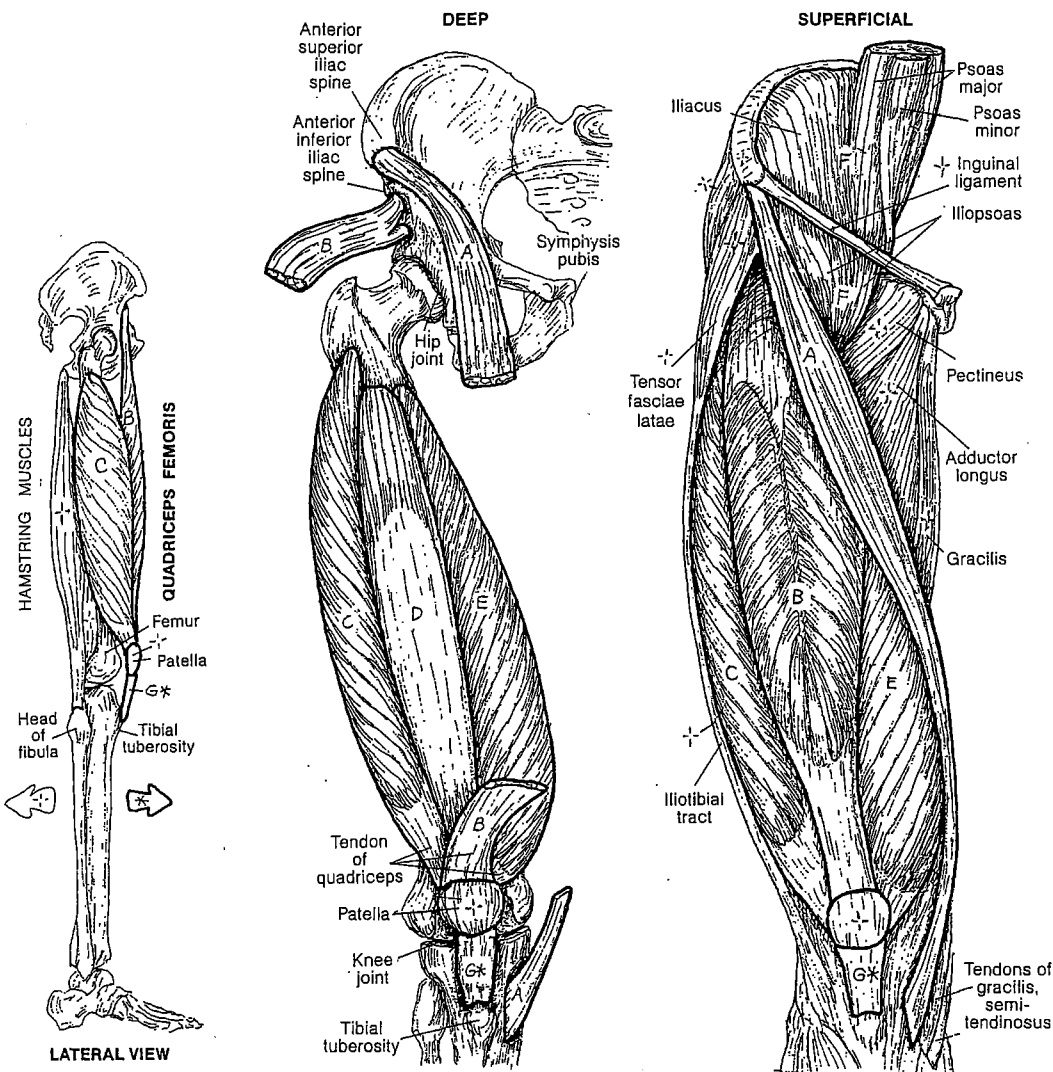
VASTUS INTERMEDIUS_;

VASTUS MEDIALIS_E

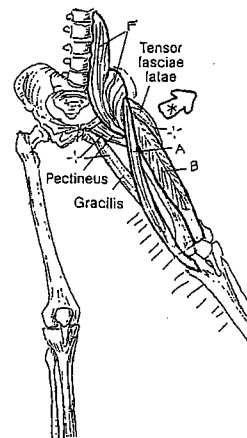
ILIOPSOAS_F

PATELLAR LIGAMENT_{G*}

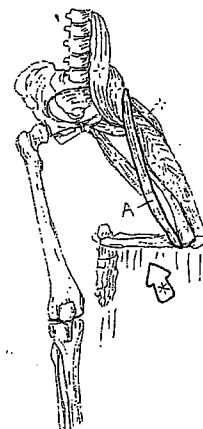
CN: The patellar ligament (G*) is colored gray but the patella is left uncolored.
 (1) Begin with the deep view of the thigh and then complete the superficial view. (2) On the far left, color the visualized portions of the quadriceps that are antagonists to the hamstring group. (3) Complete the action diagrams along the right margin.



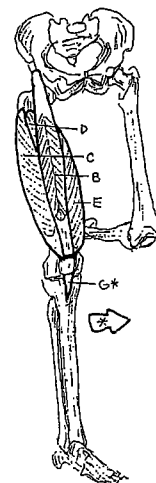
FLEXORS OF THE HIP JOINT*



FLEXOR OF THE KNEE JOINT*



EXTENSORS OF THE KNEE JOINT*



The sartorius ("tailor's" muscle; so-called because of the role of this muscle in enabling a crossed-legs sitting posture) is a flexor and lateral rotator of the hip joint and a flexor of the knee joint, as you can infer from its illustrated attachments. The quadriceps femoris muscle arises from four heads. The vastus medialis and lateralis arise from the linea aspera on the posterior aspect of the femur; the vastus intermedius arises from the anterior femoral shaft. All four converge onto the superior aspect (base) of the patella to form the patellar tendon. Some tendon fibers continue over the patellar surface to join the ligament below. At the inferior aspect (apex) of the patella, the tendinous fibers continue to the tibial tuberosity.

The tendon between the patella and the tibial tuberosity is called the patellar ligament. Rectus femoris, a strong hip joint flexor, is the only member of quadriceps to cross that joint. Quadriceps femoris is the only knee extensor. The significance of its role becomes crystal clear to those having experienced a knee injury; the muscles tend to atrophy and weaken rapidly with disuse, and "quad" exercises are essential to maintain structural stability of the joint. The iliopsoas is the most powerful flexor of the hip, having a broad thick muscle belly and attaching at the lesser trochanter at the proximal end of the femoral shaft. Recall Plate 50 for its posterior abdominal origin.

MUSCLES OF THE POSTERIOR THIGH

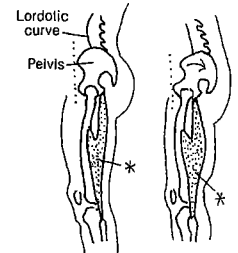
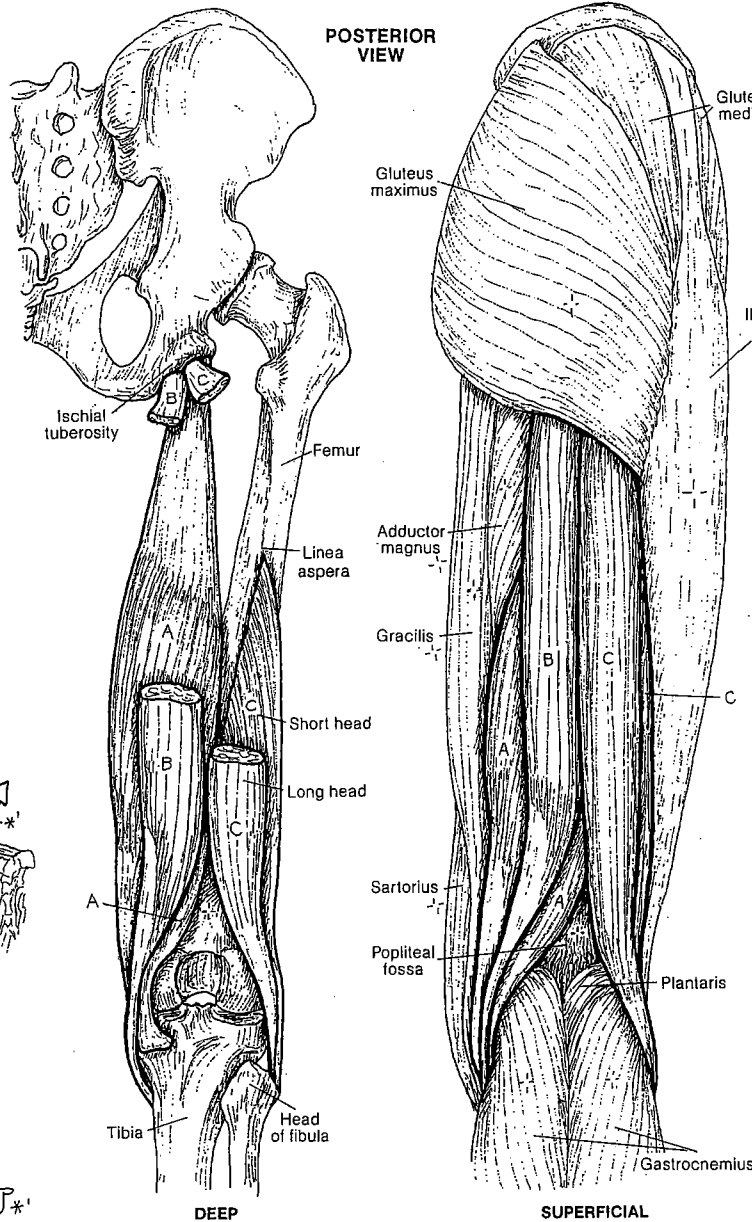
HAMSTRINGS*

- SEMIMEMBRANOSUS.
- SEMITENDINOSUS.
- BICEPS FEMORIS.

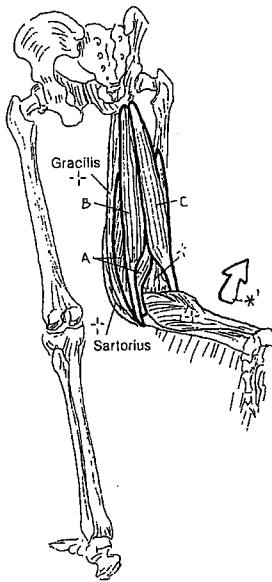


Tight hamstrings limit flexion of hip when knee joint is extended.

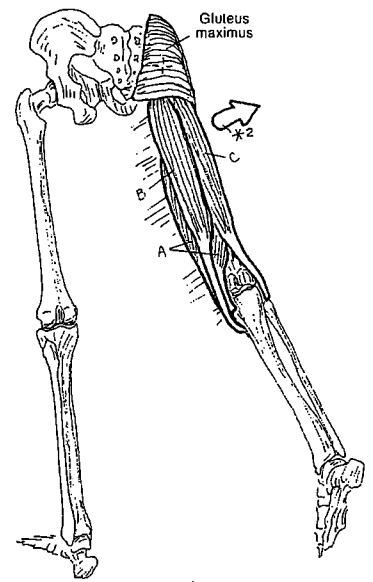
CN: (1) Color each hamstring muscle in the deep view before going on to the superficial. Then color the diagrams of flexion and extension. (2) Color gray the outline of the muscles in the drawings at upper right.



Tight hamstrings (at right) tilt pelvis backwards, flattening lordotic curve of lower back.



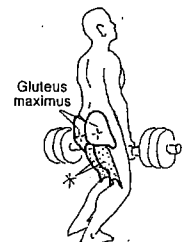
FLEXORS OF THE KNEE JOINT*



EXTENSORS OF THE HIP JOINT*²

The hamstring muscles are equally effective at both extension of the hip joint and flexion of the knee joint. Unlike the hip extensor gluteus maximus, the hamstrings are active during normal walking. In relaxed standing, both gluteus maximus and the hamstrings are inactive. In knee flexion, the hamstrings act in concert with sartorius, gracilis, and gastrocnemius (Plates 63 and 66). Long tendons of the hamstrings can be palpated just above the partially flexed knee on either side of the midline.

Reduced hamstring stretch ("tight hamstrings") limits hip flexion with the knee extended; flexion of the knee permits increased hip flexion. Try this on yourself. Tight hamstrings, by their ischial origin, pull the posterior pelvis down, lengthening the erector spinae muscles and flattening the lumbar lordosis, potentially contributing to limitation of lumbar movement and back pain. Tight hamstrings often cause posterior thigh pain on straight leg raise testing (subject is supine, lower limbs horizontal; one heel is lifted, progressively flexing the hip joint with knee extended). This pain from muscle stretch may be confused with sciatic nerve/nerve root pain, which normally shoots into the leg and foot.



Powerful extensors of the hip joints.