SIXTH EDITION

Atlas of Skeletal Muscles

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Biology

Atlas of Skeletal Muscles
6th Edition

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Preface

This book is a study guide and reference for the anatomy and actions of human skeletal muscles. It is designed for use by students of anatomy, physical education, and health-related fields. It also serves as a compact reference for the practicing professional.

The first chapter presents photographic illustrations of the major features of the skeleton. These photos have been selectively enhanced and combined to emphasize important features. They are thus a hybrid between drawings and unretouched photographs. The philosophy embraced is that the teacher function as a lens to focus attention on selected facts and observations. A master numbering system is used so that each structure is labeled with the same number in all drawings.

The second chapter describes through illustration and description the various movements of the body.

In chapters 3 through 9, the origin, insertion, action, and innervation of the skeletal muscles are described, and each muscle is presented on a separate page with a line drawing.

The spinal cord levels of the nerve fibers that innervate each muscle are included in parentheses after the name of each nerve.

Labeled drawings of major muscle groups are presented throughout chapters 3 through 9. Notes and relationships among muscles have been included on many pages.

The drawings include the following important features:

1. Bones and cartilage containing muscle attachments are shaded.
2. Adjacent structures are shown.
3. Muscle fibers are drawn by direction.
4. Muscle fibers are shown on the undersurface of bone and cartilage as dashed lines.
5. Tendons and aponeuroses are shown.
6. Labeled muscle groups are included.

These features aid in visual orientation and understanding of the action of the muscles. We have noticed that many students find it useful to color the illustrations.

Notes have been included on many pages to show how muscles are used. Relationships among many of the muscles have also been indicated where appropriate.

Some users of previous editions have advised that some of the smaller muscles should be enlarged and shown with less skeletal background. We have purposely standardized the skeletal views to allow an appreciation of the relative sizes and positions of the muscles. Skeletal muscles, at the gross level, are relatively simple anatomical structures, so very little additional information would be included by enlargement, and many comparative relationships would be lost.

Our primary objective is to describe the muscles moving the skeleton, therefore we have not included the muscles of the peritoneum, eye, tympanic cavity, tongue, larynx, pharynx, or palate.

We extend our appreciation to Mr. George Boykin, for many years the jolly proprietor of the gross anatomy laboratories at the State University of New York at Stony Brook, for his help and encouragement. We also thank Mr. Vincent Verdisco for his technical advice and the many students who have offered valuable suggestions over the years.

We would also like to thank the many reviewers who have made helpful suggestions for improving past editions of this atlas, as well as Leann Blem, *University of Montana;* Christine A. Byrd-Jacobs, *Western Michigan University;* Pamela B. Fouche, *Walters State Community College;* Candice Francis, *Palomar College;* Michael Hendrix, *Missouri State University;* Steven L. Keffer, *James Madison University;* Dennis Landin, *Louisiana State University;* Malinda McMurry, *Morehead State University;* Virginia L. Naples, *Northern Illinois University;* Donna Newhouse, *Lakehead University;* Russell Nordeen, *University of Arkansas at Monticello;* David Pearson, *Ball State University;* Mark L. Wagner, *CollegeAmerica* for their input on the sixth edition.

Robert J. Stone

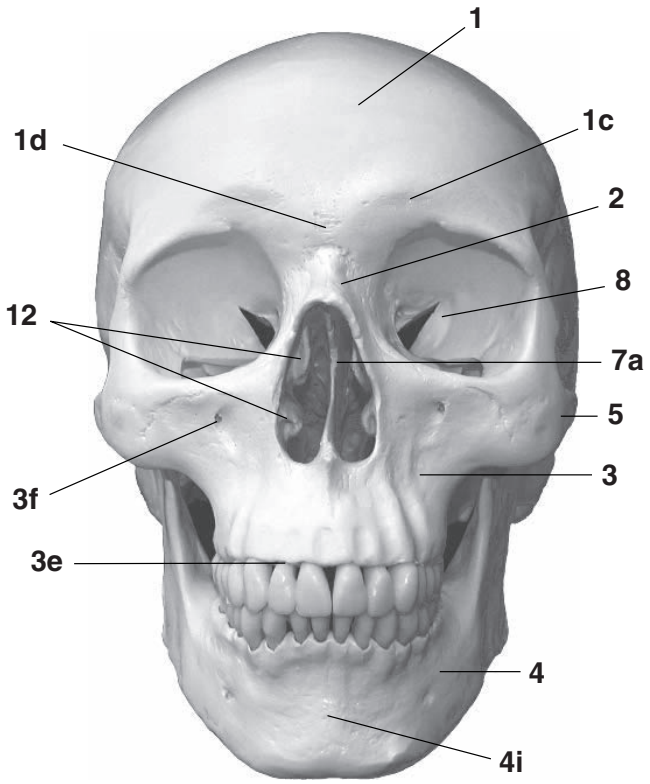
Judith A. Stone

Notes				

CHAPTER ONE

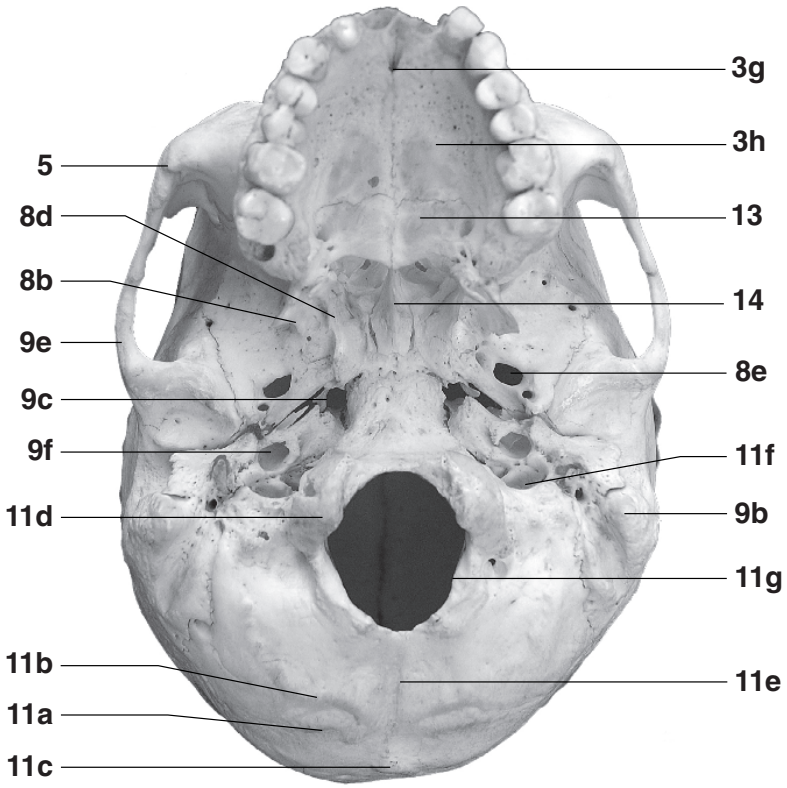
The Skeleton

SKULL—ANTERIOR VIEW

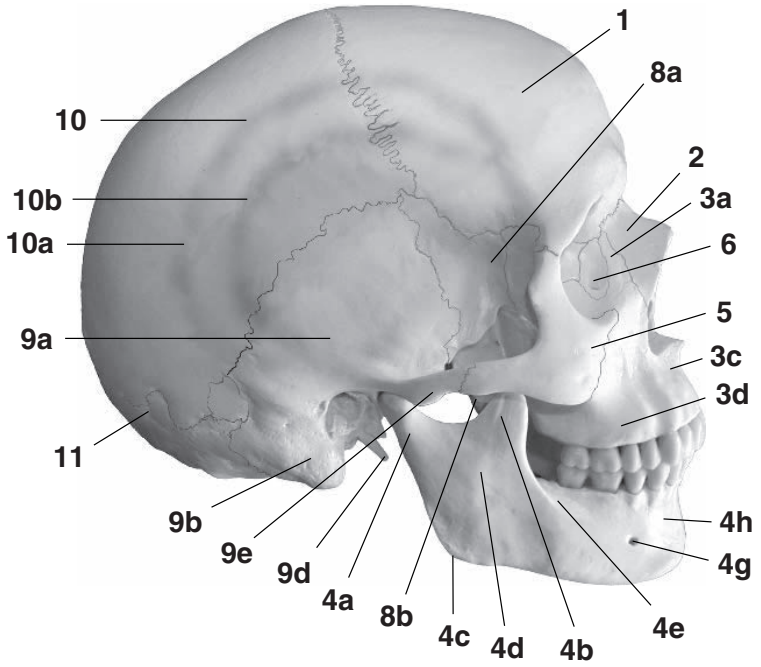


1. Frontal bone
1c. Superciliary arch
1d. Glabella
2. Nasal bone
3e-h. Maxilla
3e. Alveolar border
3f. Infraorbital foramen
3g. Incisive foramen
3h. Palatine process
4. Mandible
4i. Symphysis
5. Zygomatic bone
7a. Perpendicular plate of ethmoid bone
8. Sphenoid
8b. Lateral pterygoid plate
8d. Medial pterygoid plate
8e. Foramen ovale
9b-f. Temporal bone
9b. Mastoid process (temporal bone)
9c. Foramen lacerum
9e. Zygomatic process (temporal bone)
9f. Carotid canal
11a. Superior nuchal line (occipital bone)
11b. Inferior nuchal line (occipital bone)
11c. External occipital protuberance (occipital bone)
11d. Occipital condyle (occipital bone)
11e. External occipital crest (occipital bone)
11f. Jugular foramen
11g. Foramen magnum
12. Turbinates
13. Palatine bone
14. Vomer

SKULL—INFERIOR (BASAL) VIEW



SKULL—LATERAL VIEW

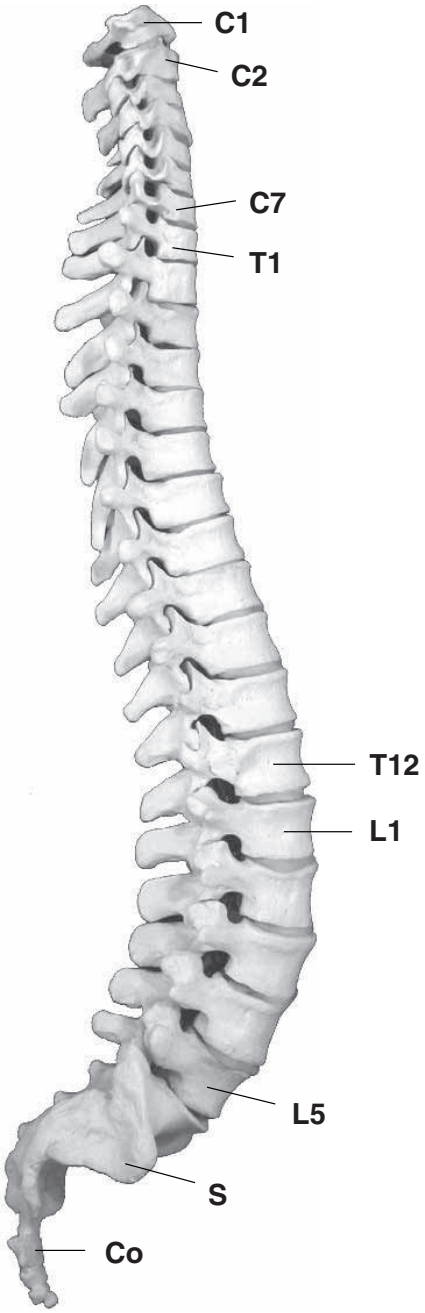


1. Frontal bone
2. Nasal bone
3a-d. Maxilla
3a. Frontal process
3c. Incisive process
3d. Canine fossa
4a-h. Mandible
4a. Neck of condyle
4b. Coronoid process
4c. Angle
4d. Ramus
4e. Oblique line
4g. Mental foramen
4h. Incisive fossa
5. Zygomatic bone
6. Lacrimal bone
8a. Greater wing of sphenoid bone
8b. Lateral pterygoid plate of sphenoid bone
9a-e. Temporal bone
9a. Temporal fossa (squamous part of temporal bone)
9b. Mastoid process
9d. Styloid process
9e. Zygomatic process
10. Parietal bone
10a. Superior temporal line
10b. Inferior temporal line
11. Occipital bone

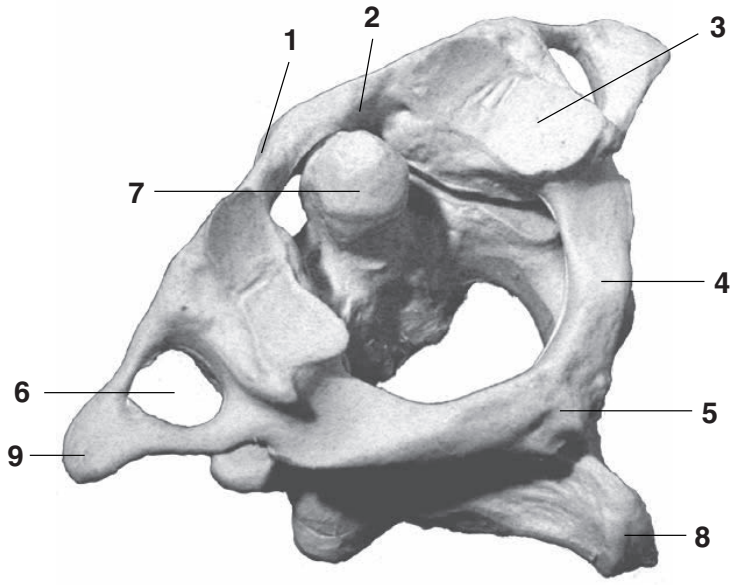
Note: The zygomatic arch is formed by the zygomatic process of the temporal bone meeting the zygomatic bone.

VERTEBRAL COLUMN—LATERAL VIEW

C1-7. Cervical vertebrae
C1. Atlas
C2. Axis
C7. Seventh cervical vertebra
T1-12. Thoracic vertebrae
T1. First thoracic vertebra
T12. Twelfth thoracic vertebra
L1-5. Lumbar vertebrae
L1. First lumbar vertebra
L5. Fifth lumbar vertebra
S. Sacrum
Co. Coccyx



ATLAS AND AXIS



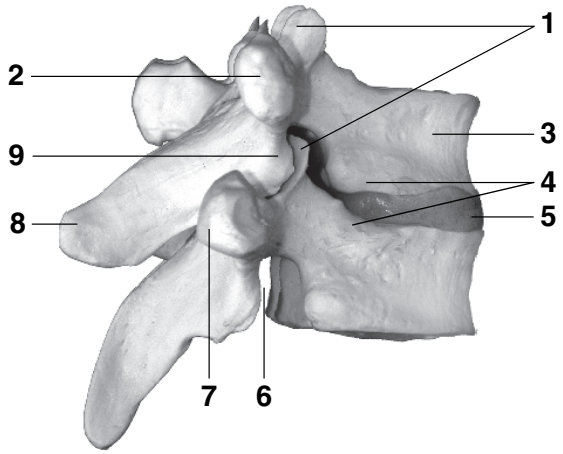
Atlas

1. Anterior tubercle
2. Anterior arch
3. Superior articular facet
4. Posterior arch
5. Posterior tubercle
6. Transverse foramen

Axis

7. Dens (odontoid process)
8. Spinous process
9. Transverse process

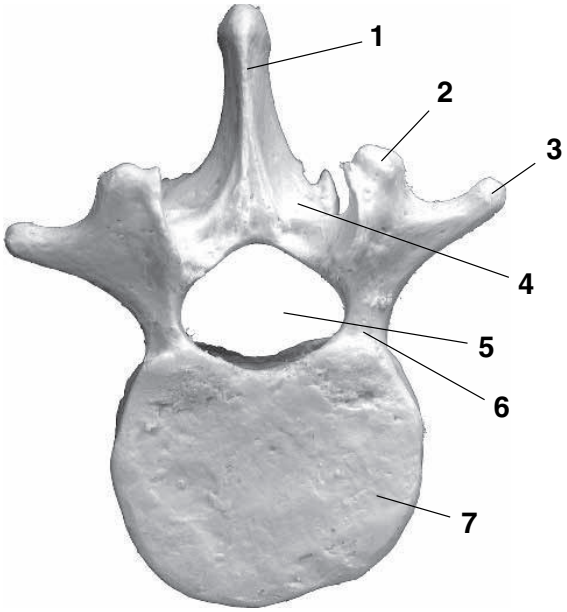
THORACIC VERTEBRAE—LATERAL VIEW



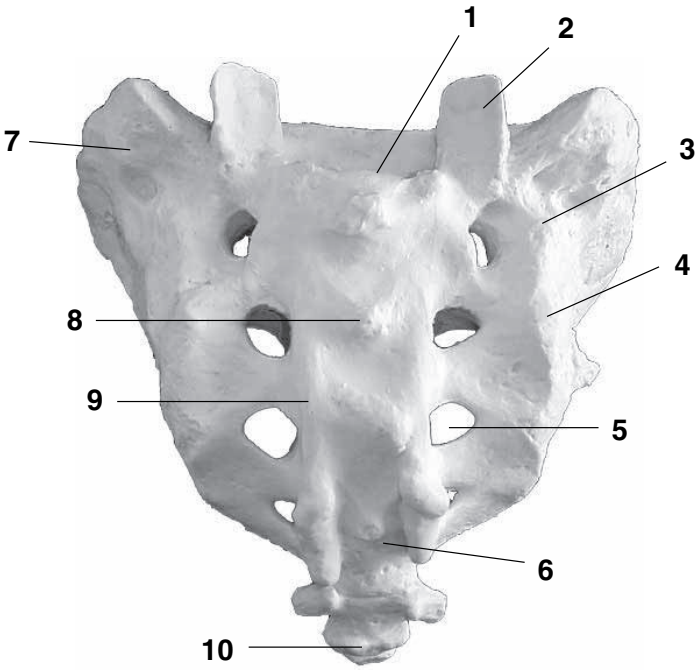
1. Superior articular process
2. Transverse process
3. Body
4. Demifacets (for ribs)
5. Disk
6. Inferior vertebral notch
7. Facet (for rib tubercle)
8. Spinous process
9. Inferior articular process

LUMBAR VERTEBRA—SUPERIOR VIEW

1. Spinous process
2. Mammillary process
3. Transverse process
4. Lamina
5. Vertebral foramen
6. Pedicle
7. Body (centrum)

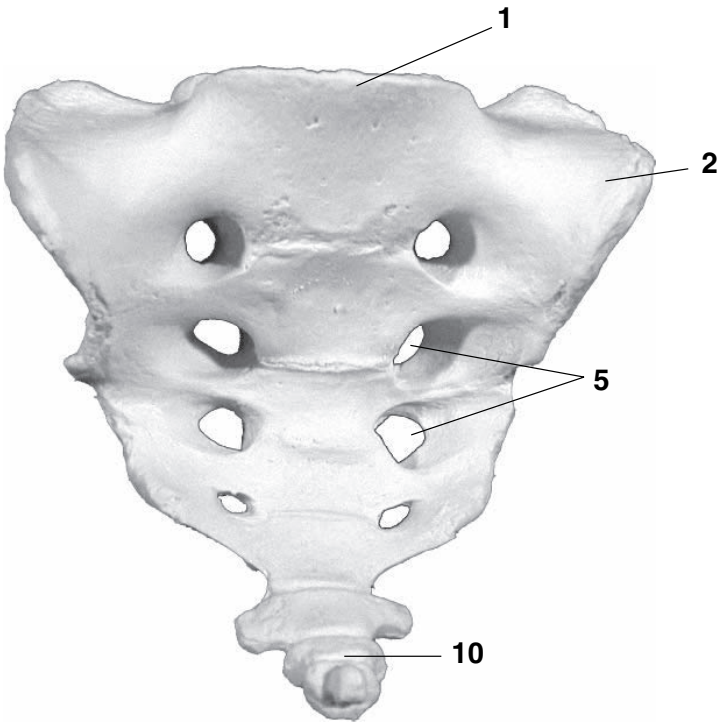


SACRUM—POSTERIOR VIEW



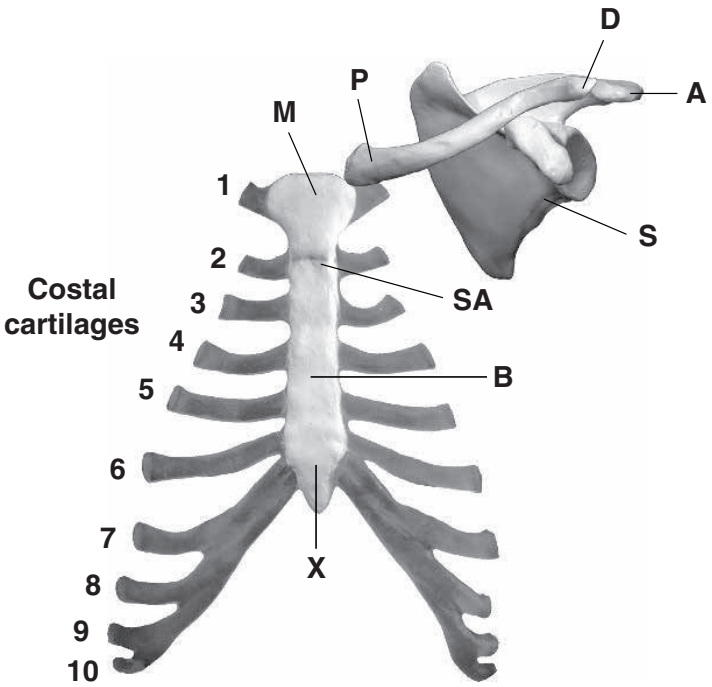
1. Sacral canal
2. Superior articular facet
3. Sacral tuberosity
4. Lateral crest
5. Posterior sacral foramen
6. Sacral hiatus (opening of sacral canal)
7. Auricular surface
8. Median crest
9. Intermediate crest
10. Coccyx

SACRUM—PELVIC VIEW



1. Promontory
2. Ala
5. Sacral foramina
10. Coccyx

STERNUM AND CLAVICLE WITH SCAPULA



Clavicle
P = proximal end (sternal)
D = distal end (acromial or lateral)
Scapula (S)
A = acromion
Sternum
M = manubrium
SA = sternal angle
B = body
X = xiphoid process

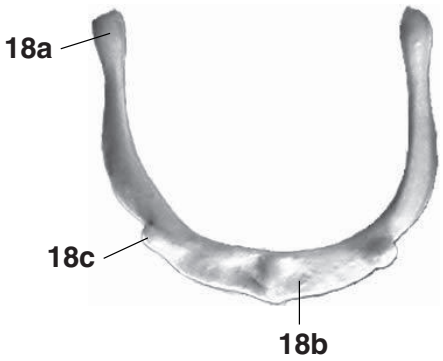
The proximal (sternal) end of the clavicle forms the sternoclavicular joint with the manubrium of the sternum.

The distal (scapular) end forms the acromioclavicular joint with the acromion of the scapula. This is the only bony articulation of the upper limb with the torso.

The second rib cartilage articulates at the sternal angle between the manubrium and the body of the sternum.

The cartilages of ribs 7-10 are fused to form the costal arch.

HYOID BONE—SUPERIOR VIEW



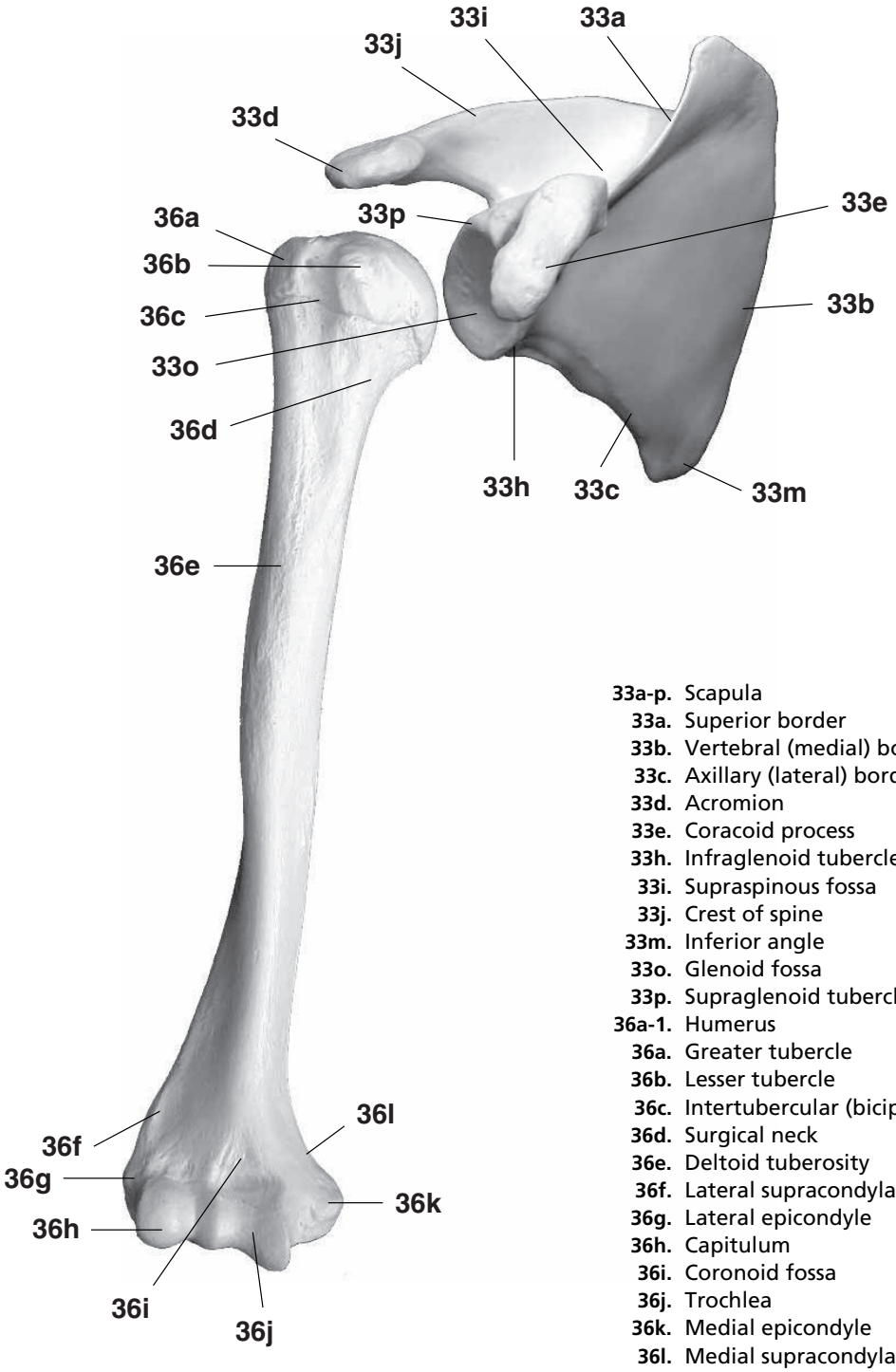
18a-c. Hyoid bone
18a. Greater horn
18b. Body
18c. Lesser horn

The greater horn of the hyoid bone attaches to the styloid processes of the temporal bones by the styloid ligaments. It attaches to the thyroid cartilage by the thyrohyoid ligament and supports the upper respiratory tract.

RIB ARTICULATIONS

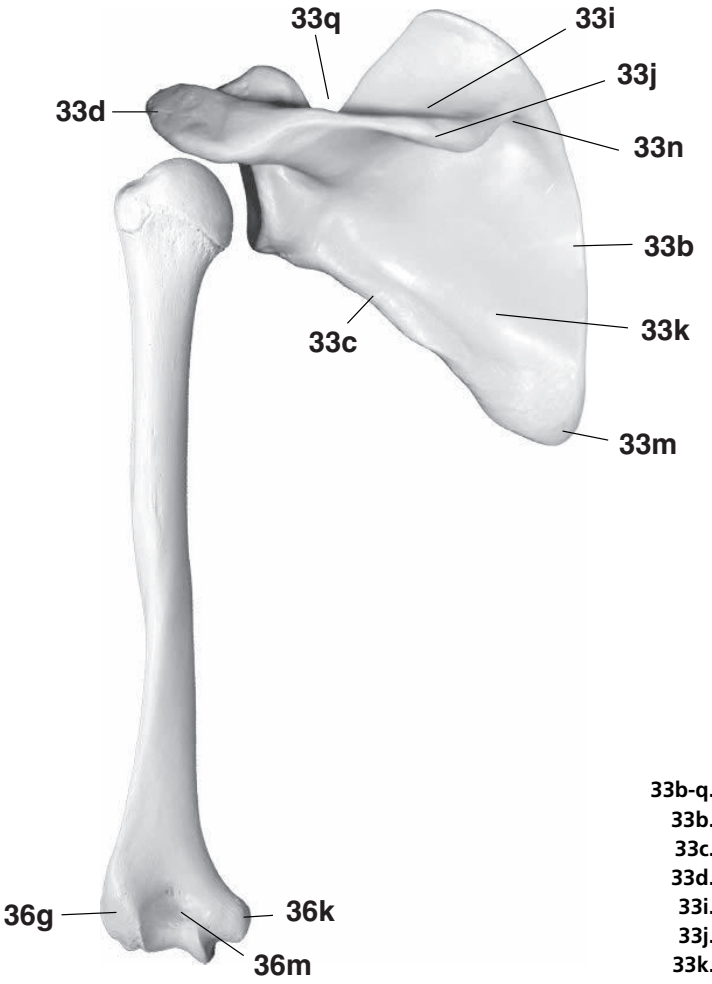
The head (H) of a rib articulates with the demifacets of two adjacent vertebrae. The tubercle (T) joins the facet of the transverse process of the upper vertebra. The anterior end (A) meets the costal cartilage, which then joins the sternum.

SCAPULA AND HUMERUS—ANTERIOR VIEW



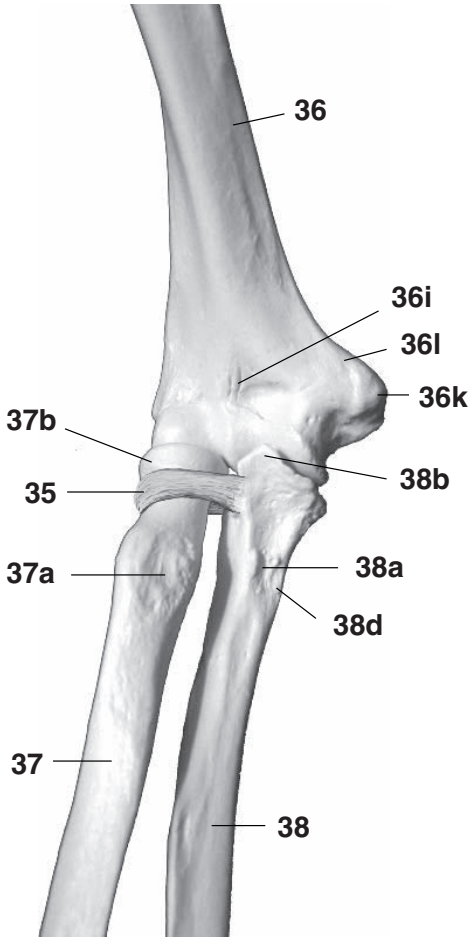
33a-p. Scapula
33a. Superior border
33b. Vertebral (medial) border
33c. Axillary (lateral) border
33d. Acromion
33e. Coracoid process
33h. Infraglenoid tubercle
33i. Supraspinous fossa
33j. Crest of spine
33m. Inferior angle
33o. Glenoid fossa
33p. Supraglenoid tubercle
36a-1. Humerus
36a. Greater tubercle
36b. Lesser tubercle
36c. Intertubercular (bicipital) groove
36d. Surgical neck
36e. Deltoid tuberosity
36f. Lateral supracondylar ridge
36g. Lateral epicondyle
36h. Capitulum
36i. Coronoid fossa
36j. Trochlea
36k. Medial epicondyle
36l. Medial supracondylar ridge

SCAPULA AND HUMERUS—POSTERIOR VIEW



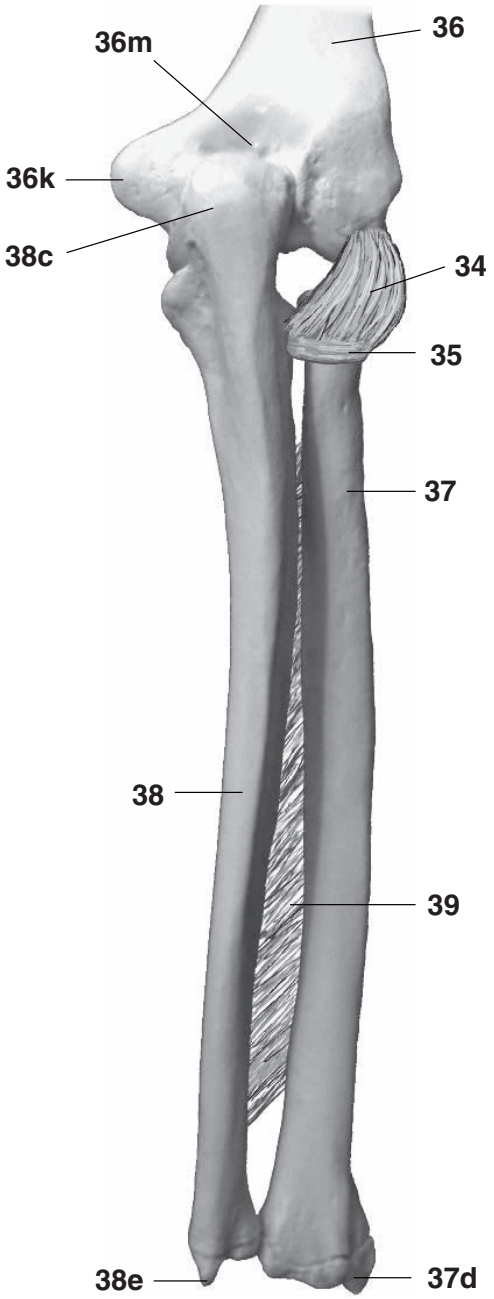
33b-q. Scapula
33b. Vertebral (medial) border
33c. Axillary (lateral) border
33d. Acromion
33i. Supraspinous fossa
33j. Crest of spine
33k. Infraspinous fossa
33m. Inferior angle
33n. Root of spine
33q. Suprascapular notch
36g-m. Humerus
36g. Lateral epicondyle
36k. Medial epicondyle
36m. Olecranon fossa

ELBOW—ANTERIOR VIEW



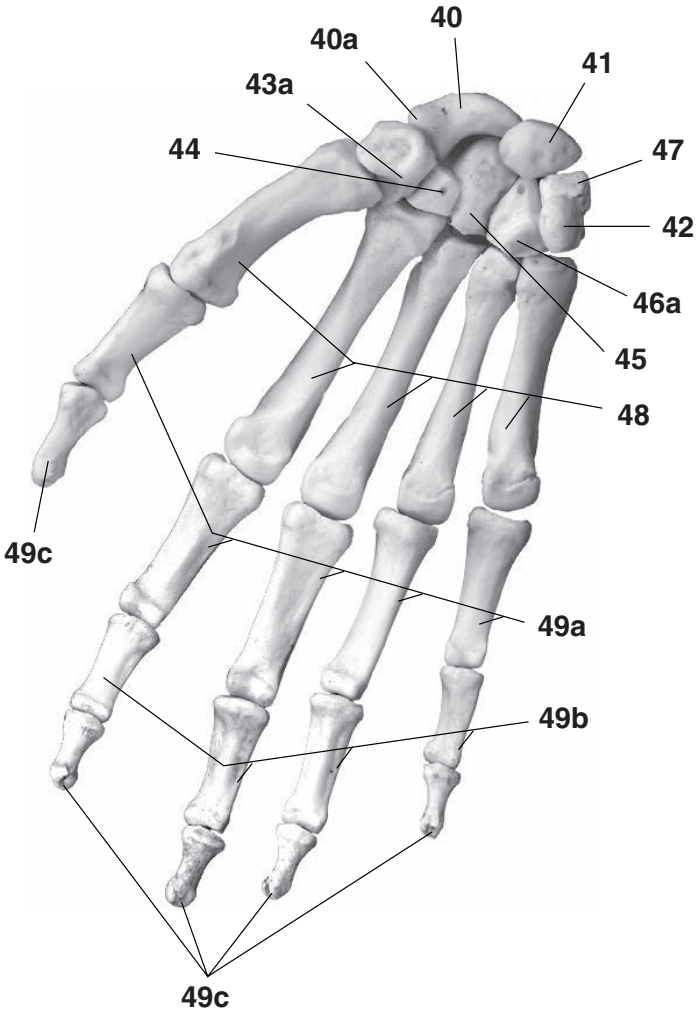
35. Annular ligament
36i-l. Humerus
36i. Coronoid fossa
36k. Medial epicondyle
36l. Medial supracondylar ridge
37a, b. Radius
37a. Radial tuberosity
37b. Head of radius
38a-d. Ulna
38a. Ulnar tuberosity
38b. Coronoid process
38d. Supinator crest

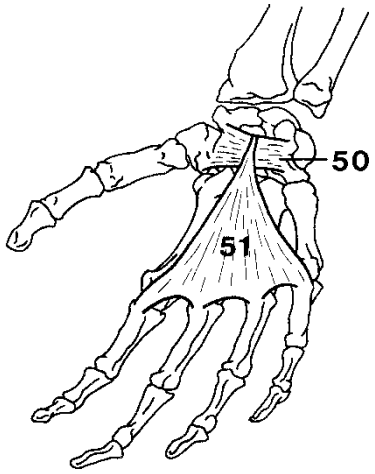
FOREARM—POSTERIOR VIEW



34. Radial (lateral) collateral ligament
35. Annular ligament
36k-m. Humerus
36k. Medial epicondyle
36m. Olecranon fossa
37. Radius
37d. Styloid process of radius
38c-e. Ulna
38c. Olecranon
38e. Styloid process
39. Interosseous membrane

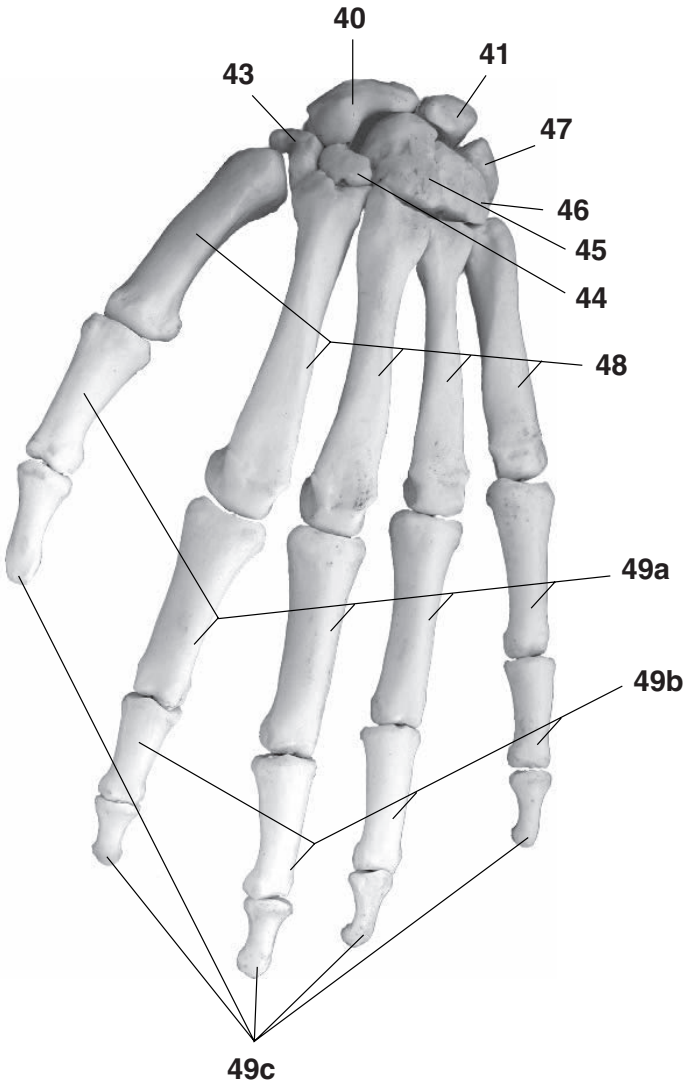
HAND—PALMAR VIEW





40. Scaphoid
40a. Tubercle of scaphoid
41. Lunate
42. Pisiform
43a. Tubercle of trapezium
44. Trapezoid
45. Capitate
46a. Hook of hamate
47. Triquetrum
48. Metacarpals
49a. Proximal (first) phalanges
49b. Middle (second) phalanges
49c. Distal (third) phalanges
50. Flexor retinaculum
51. Palmar aponeurosis

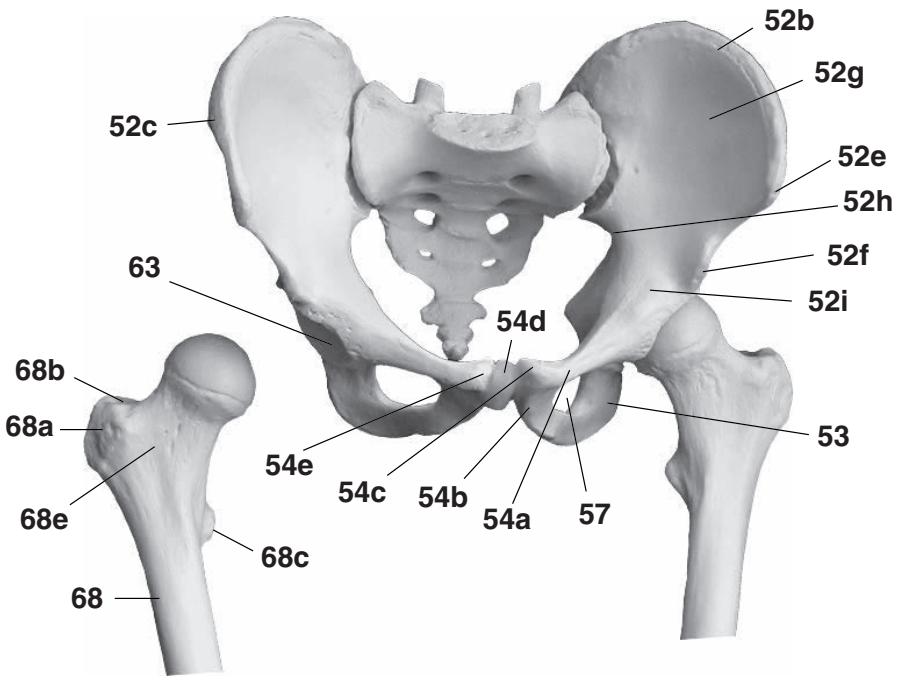
HAND—DORSAL VIEW



40. Scaphoid
41. Lunate
43. Trapezium
44. Trapezoid
45. Capitate
46. Hamate
47. Triquetrum
48. Metacarpals

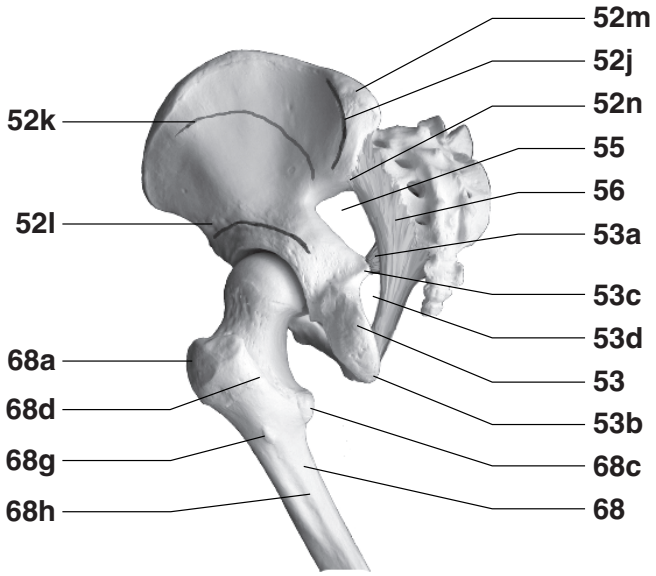
49a. Proximal (first) phalanges
49b. Middle (second) phalanges
49c. Distal (third) phalanges

PELVIS—ANTERIOR VIEW



52b-i. Ilium
52b. Iliac crest
52c. Iliac tubercle
52e. Anterior superior iliac spine
52f. Anterior inferior iliac spine
52g. Iliac fossa
52h. Arcuate line
52i. Iliopectineal eminence
53. Ischium
54a-e. Pubis
54a. Superior ramus
54b. Inferior ramus
54c. Pubic crest
54d. Pubic symphysis
54e. Pubic tubercle
57. Obturator foramen
63. Acetabulum
68a-e. Femur
68a. Greater trochanter
68b. Trochanteric fossa
68c. Lesser trochanter
68e. Intertrochanteric line

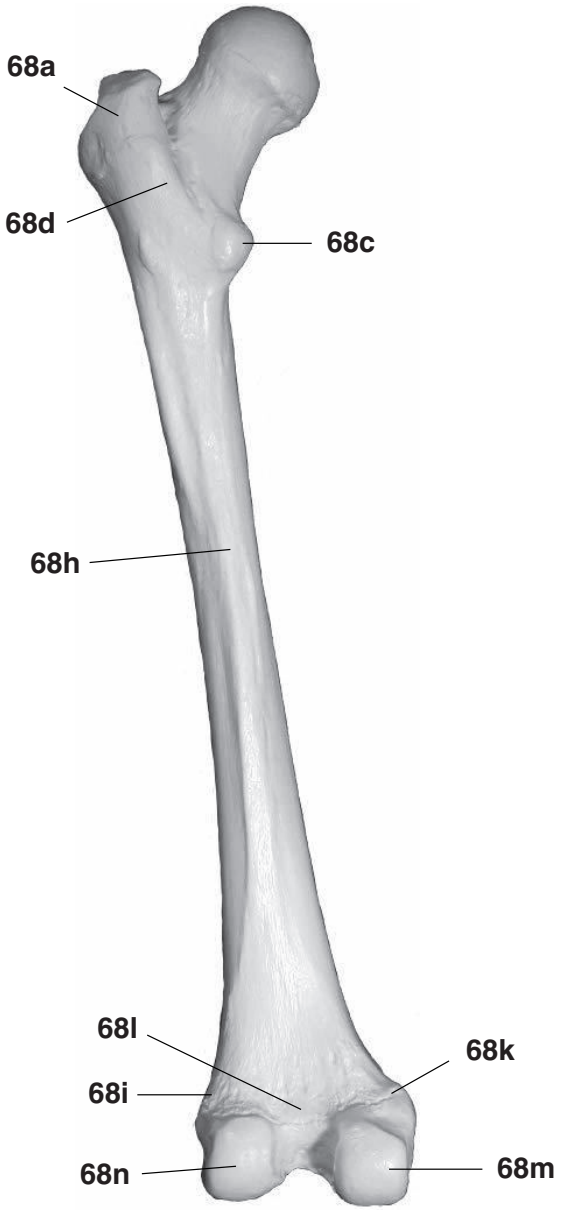
PELVIS—THREE QUARTER POSTERIOR VIEW



52j-n. Ilium
52j. Posterior gluteal line
52k. Middle gluteal line
52l. Inferior gluteal line
52m. Posterior superior iliac spine
52n. Posterior inferior iliac spine
53a-d. Ischium
53a. Sacrospinous ligament
53b. Ischial tuberosity
53c. Ischial spine
53d. Lesser sciatic notch (lesser sciatic foramen)*
55. Greater sciatic notch (greater sciatic foramen)*
56. Sacrotuberous ligament
68a-h. Femur
68a. Greater trochanter
68c. Lesser trochanter
68d. Intertrochanteric crest
68g. Gluteal tuberosity
68h. Linea aspera

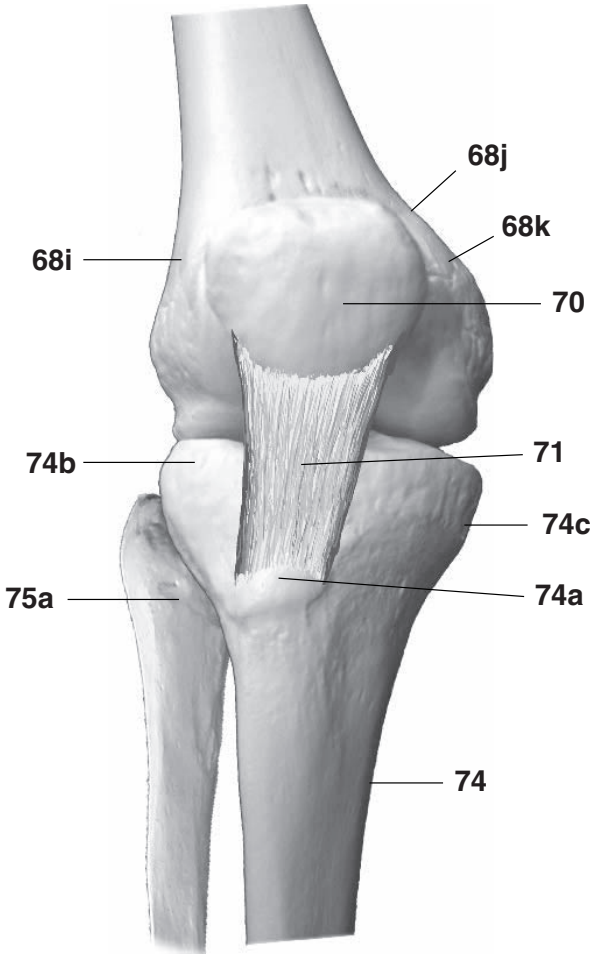
*Note: These bony notches are converted to foramina by the two ligaments.

FEMUR—POSTERIOR VIEW



68a-n. Femur
68a. Greater trochanter
68c. Lesser trochanter
68d. Intertrochanteric crest
68h. Linea aspera
68i. Lateral supracondylar ridge
68k. Adductor tubercle
68l. Popliteal surface
68m. Medial condyle
68n. Lateral condyle

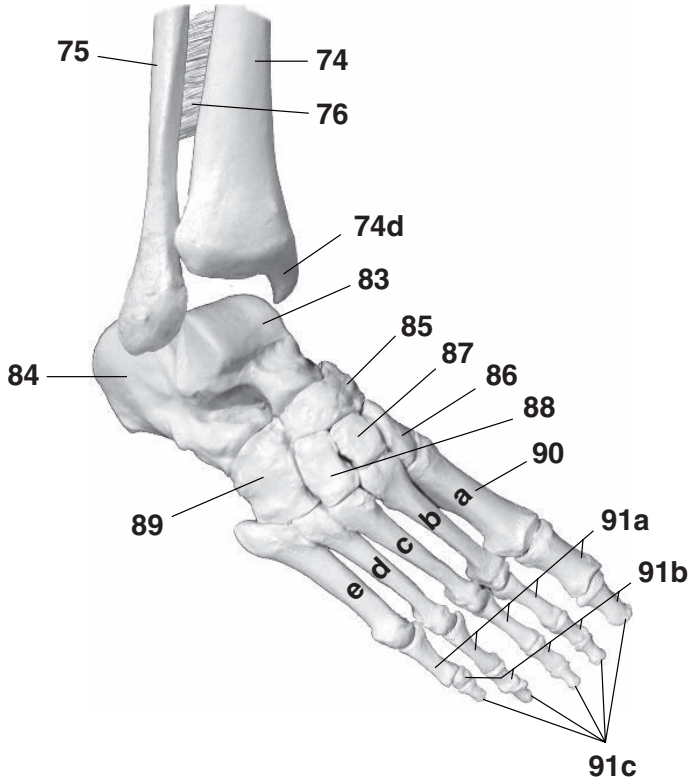
KNEE—ANTERIOR VIEW



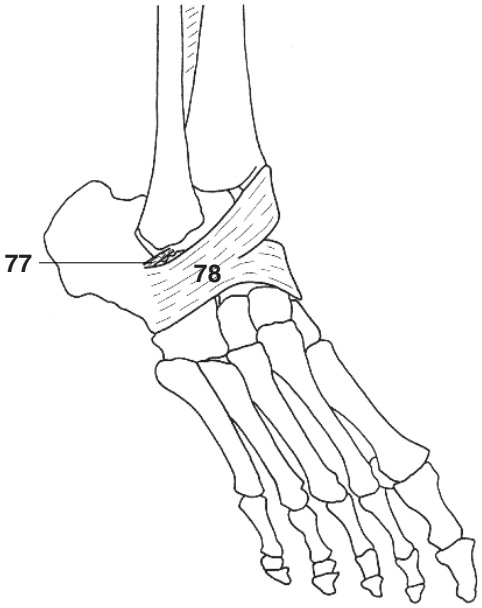
68i-k. Femur
68i. Lateral supracondylar ridge
68j. Medial supracondylar ridge
68k. Adductor tubercle
70. Patella
71. Patellar ligament
74a-c. Tibia
74a. Tibial tuberosity
74b. Lateral condyle
74c. Medial condyle
75a. Head of fibula

Note: The quadriceps tendon continues through the patella and becomes the patellar ligament.

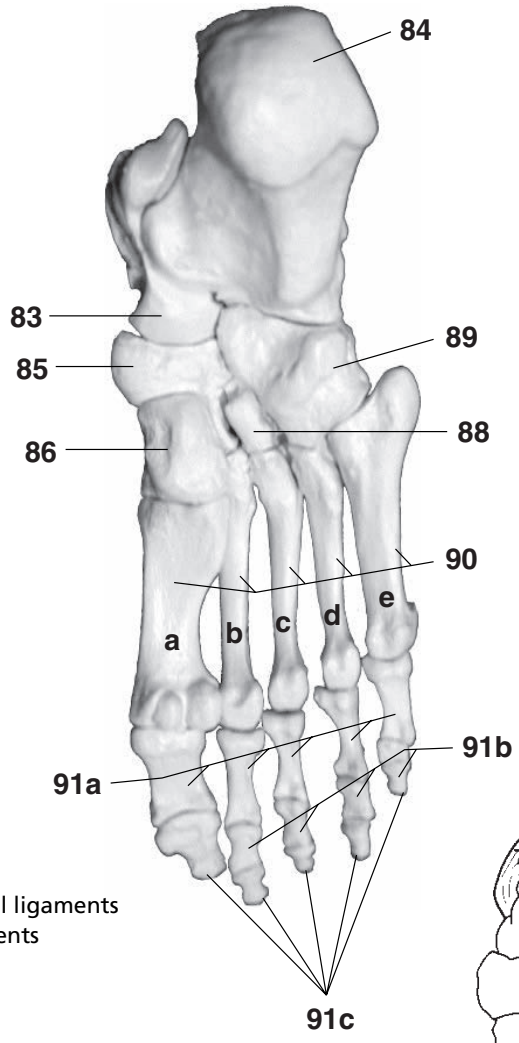
ANKLE AND FOOT—ANTEROLATERAL VIEW

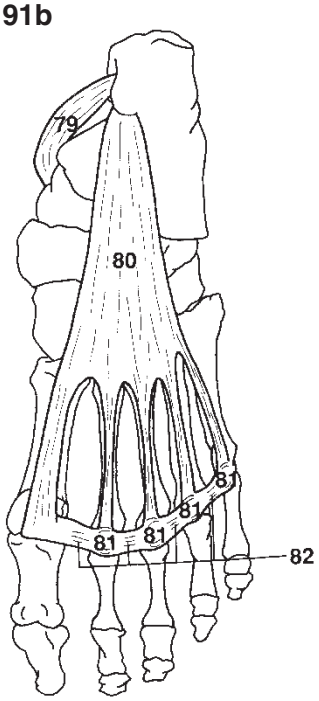


74. Tibia
74d. Medial malleolus of tibia
75. Fibula
76. Interosseous membrane
77. Lateral talocalcaneal ligament
78. Inferior extensor retinaculum
83. Talus
84. Calcaneus
85. Navicular
86. Medial cuneiform
87. Intermediate cuneiform
88. Lateral cuneiform
89. Cuboid
90a-e. Metatarsal bones
90a. First metatarsal
90b. Second metatarsal
90c. Third metatarsal
90d. Fourth metatarsal
90e. Fifth metatarsal
91a. Proximal phalanges
91b. Middle phalanges
91c. Distal phalanges



FOOT—PLANTAR VIEW

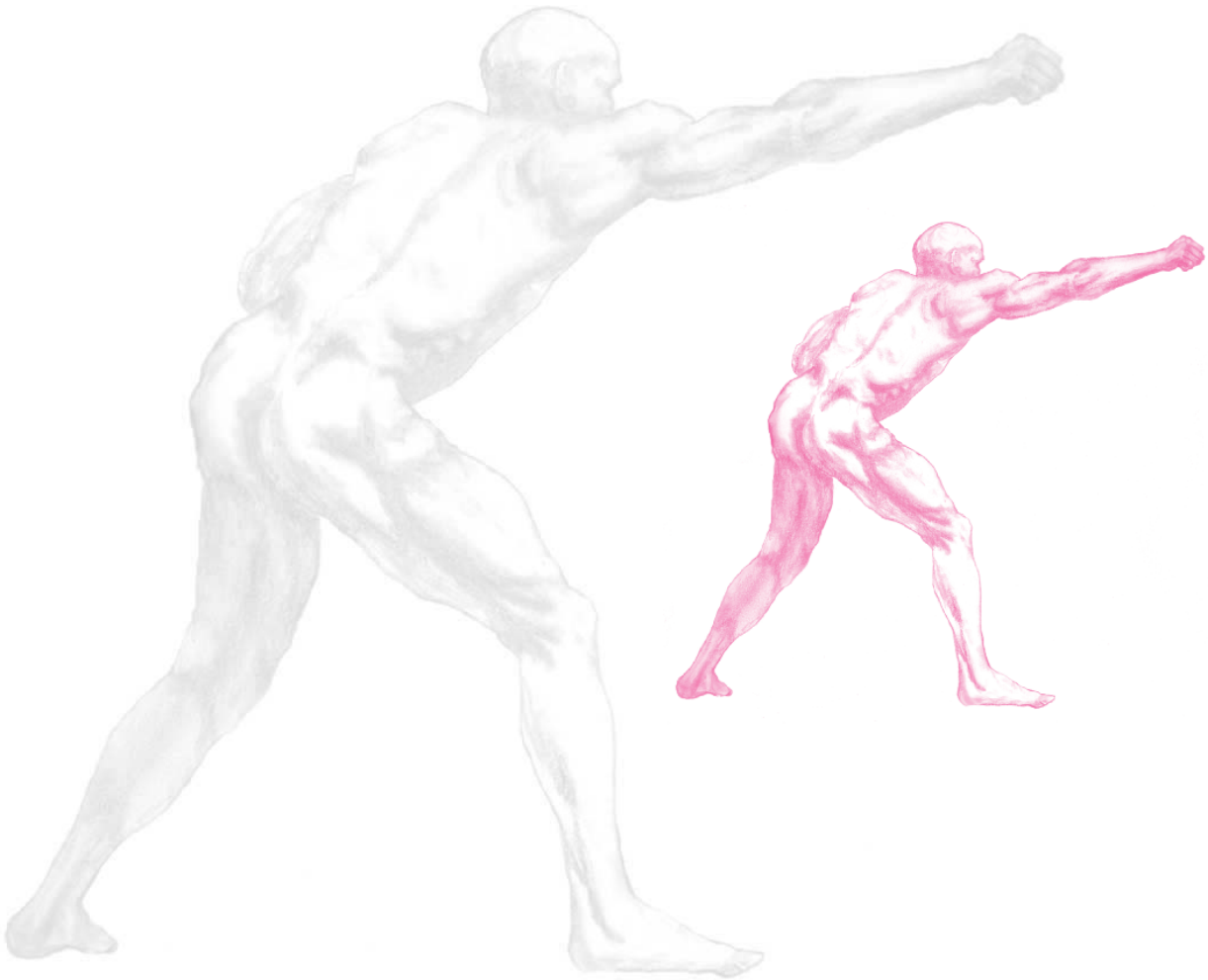




79. Flexor retinaculum
80. Plantar aponeurosis
81. Plantar metatarsophalangeal ligaments
82. Transverse metatarsal ligaments
83. Talus
84. Calcaneus
85. Navicular
86. Medial cuneiform
88. Lateral cuneiform
89. Cuboid
90. Metatarsal bones
90a. First metatarsal
90b. Second metatarsal
90c. Third metatarsal
90d. Fourth metatarsal
90e. Fifth metatarsal
91a. Proximal phalanges
91b. Middle phalanges
91c. Distal phalanges

CHAPTER TWO

Movements of the Body



Anatomical position—A subject in the anatomical position is standing erect with the head, eyes, and toes facing forward and the arms hanging straight at the sides with the palms of the hands facing forward.

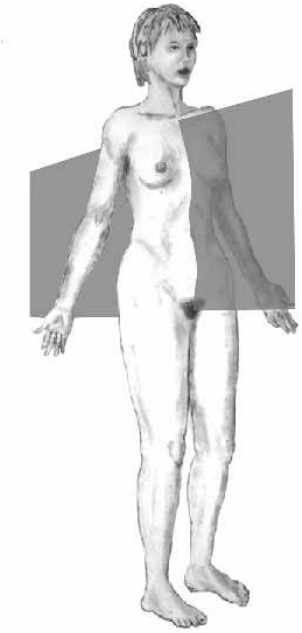


FIGURE 2.1
Median or midsagittal plane—Passes vertically through the body from anterior (front) to posterior (back). It divides the body into right and left sides. Other sagittal planes are parallel to this plane.

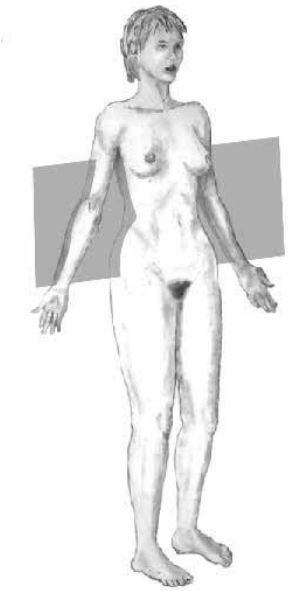


FIGURE 2.2
Coronal (frontal) planes—Pass vertically through the body from side to side. They divide the body from front to back.

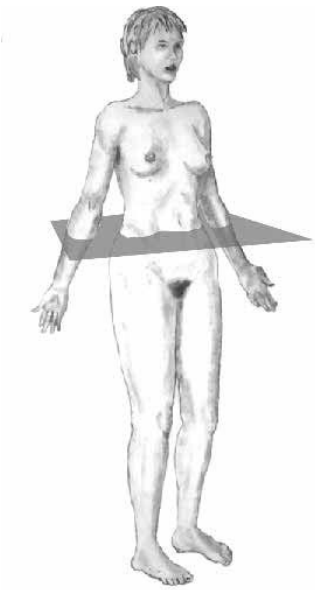


FIGURE 2.3
Transverse planes (cross sections)—Pass horizontally through the body parallel to the ground.

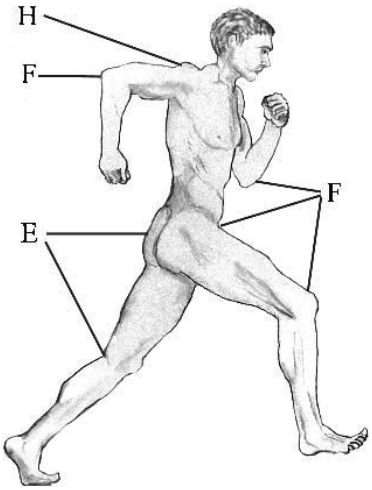


FIGURE 2.4
Flexion-extension—Starting from the anatomical position, movement is anterior or posterior in a sagittal plane. In the hinge joints *flexion* results in a decrease in the angle made by the bones in the joint, and *extension* brings the bones toward a 180° angle. Hyperextension is permitted in the shoulder, wrist, and vertebrae where movement continues posterior to anatomical position. In the knee, hip, and elbow, hyperextension is prevented by bone structure or ligaments.

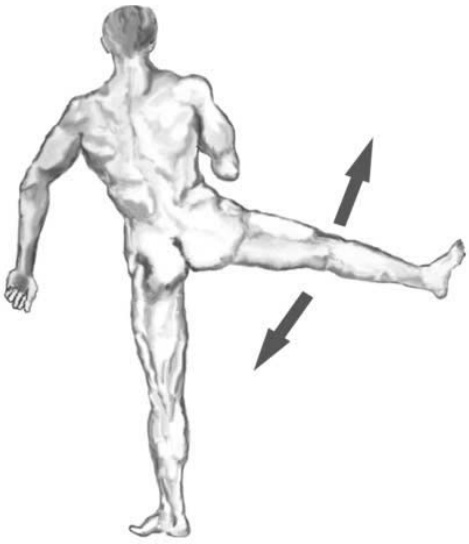


FIGURE 2.6
Abduction—The right leg moves laterally in the coronal plane.
Adduction—The leg is returned medially in the coronal plane.

Note: If the foot is fixed, this motion results in tilting the pelvis upward on the opposite side.

FIGURE 2.5
Lateral flexion—The torso (or head) bends laterally in the coronal plane.

FIGURE 2.7
Medial rotation—The anterior of the arm (or thigh) is moved toward the median plane.
Lateral rotation—The anterior of the arm (or thigh) is moved away from the median plane.

MOVEMENTS OF THE SCAPULA

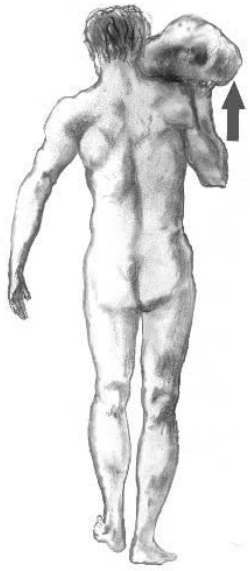


FIGURE 2.8
Elevation—The right scapula of this figure is drawn superiorly against the resistance of the rock.

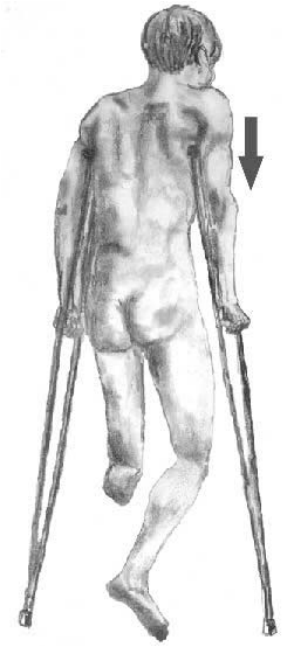


FIGURE 2.9
Depression—The right scapula of this figure is pushing the arm inferiorly.

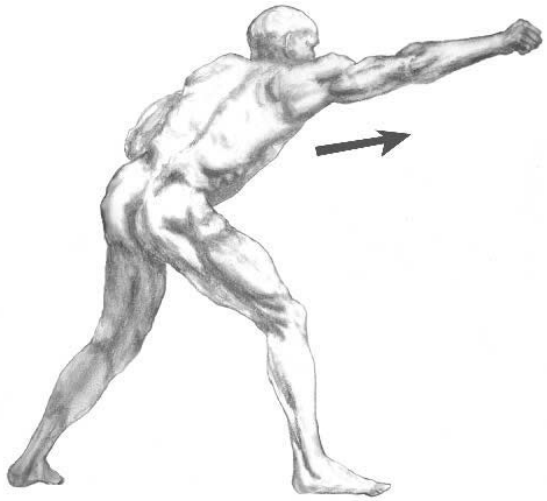


FIGURE 2.10
Protraction—The scapula pushes the arm forward in a sagittal plane.

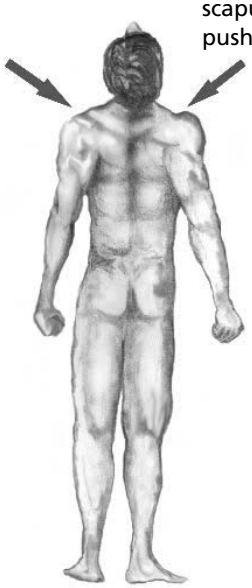


FIGURE 2.11
Retraction—The scapula is pulled back from protraction in a sagittal plane. The scapula slides around the ribs toward the median plane, so it becomes adduction.

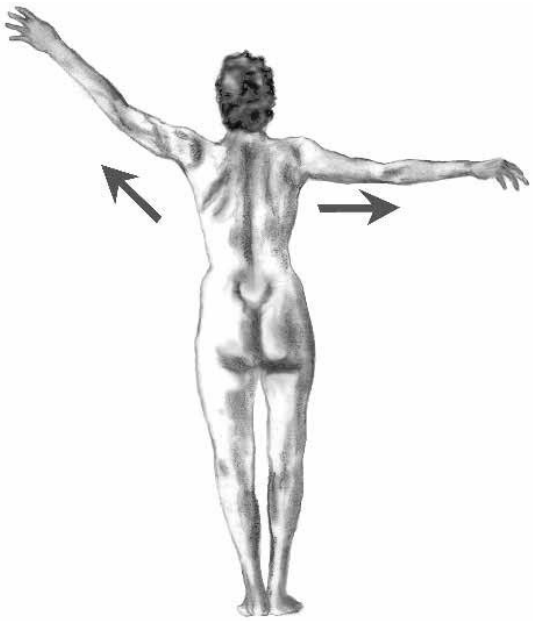


FIGURE 2.12
Rotation—For abduction of the arm to continue above the height of the shoulder, the scapula must rotate on its axis so that the glenoid fossa turns upward.

MOVEMENTS OF THE HAND AND FOREARM

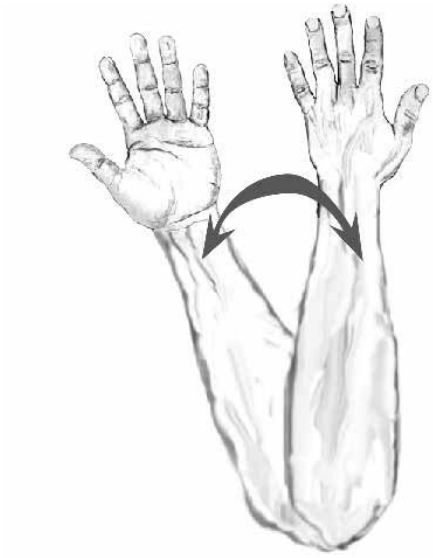


FIGURE 2.13
Pronation—The forearm is rotated away from the anatomical position so that the palm turns medially, then posteriorly. If the forearm is flexed at the elbow, then the palm turns inferiorly.
Supination—The forearm is rotated so that the palm turns anteriorly (or superiorly if the forearm is flexed). Also see figure 2.19.

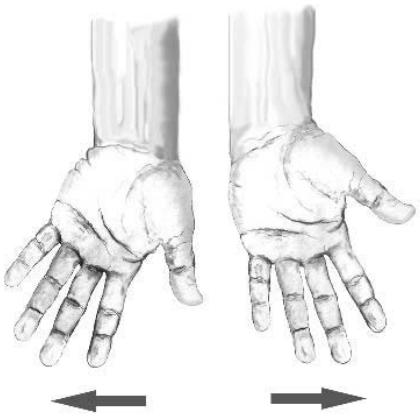


FIGURE 2.15
Radial deviation (abduction)—The hand, at the wrist, is moved laterally toward the radius. In anatomical position this moves the hand away from the body in the coronal plane.
Ulnar deviation (adduction)—The hand, at the wrist, is moved medially toward the ulna.

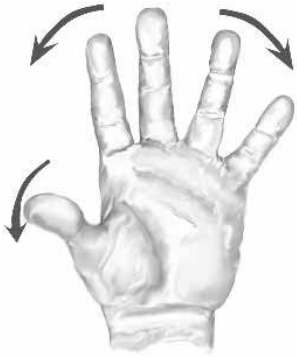


FIGURE 2.14
Abduction—The fingers are moved away from the midline of the hand.

FIGURE 2.16
Adduction—The fingers are moved toward the midline of the hand.

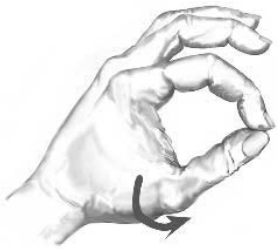


FIGURE 2.17
Opposition—The saddle joint between the trapezium and first metacarpal allows the thumb to turn so its anterior surface can touch the anterior surfaces of the four fingers when they are partially flexed.

MOVEMENTS OF THE FOOT

FIGURE 2.18
Dorsiflexion—Elevating the foot, decreasing the angle between the foot and the leg.
Plantar flexion—Depressing the foot, increasing the angle between the foot and the leg.

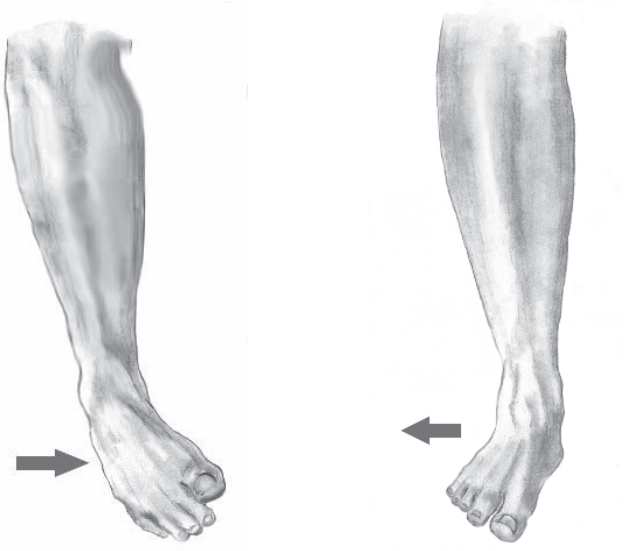
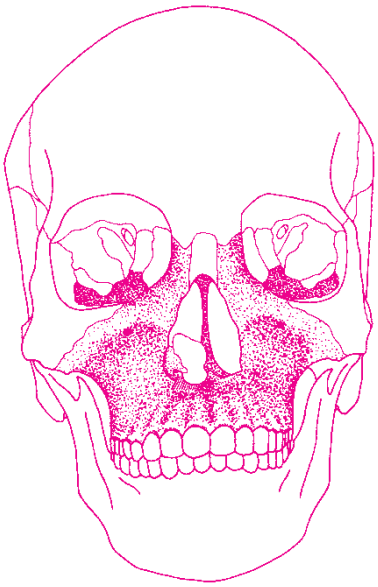


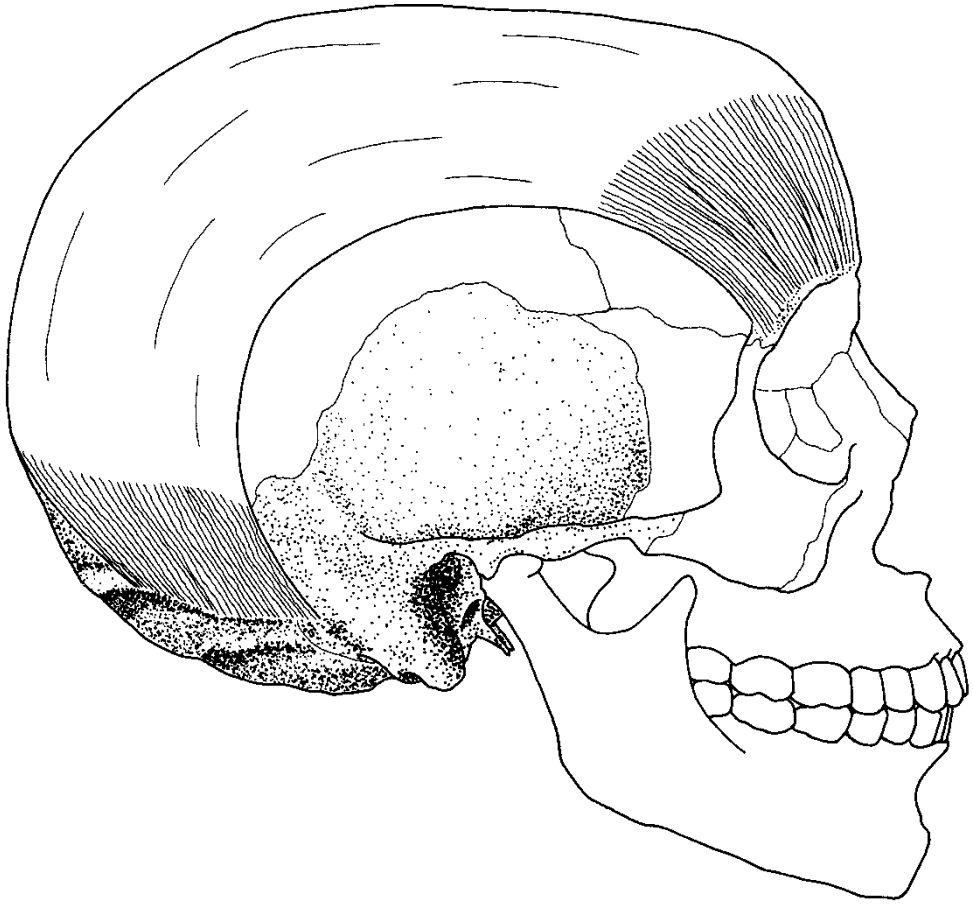
FIGURE 2.19
Inversion-eversion—During *inversion* the sole of the foot turns medially, and during *eversion* it returns or turns slightly laterally. Most of this movement is permitted by the gliding of the intertarsal and tarsometatarsal joints but because the articulating surface of the talus is narrower posteriorly, it permits some lateral movement when the ankle is plantar flexed.

CHAPTER THREE

Muscles of the Face and Head



EPICRANIUS



Skull—lateral view

Occipital belly *(occipitalis)*

■ Origin
Lateral two-thirds of superior nuchal line of occipital bone, mastoid process of temporal bone

■ Insertion
Galea aponeurotica (an intermediate tendon leading to frontal belly)

■ Action
Draws back scalp, aids frontal belly to wrinkle forehead and raise eyebrows

■ Nerve
Posterior auricular branch of facial nerve

Frontal belly *(frontalis)*

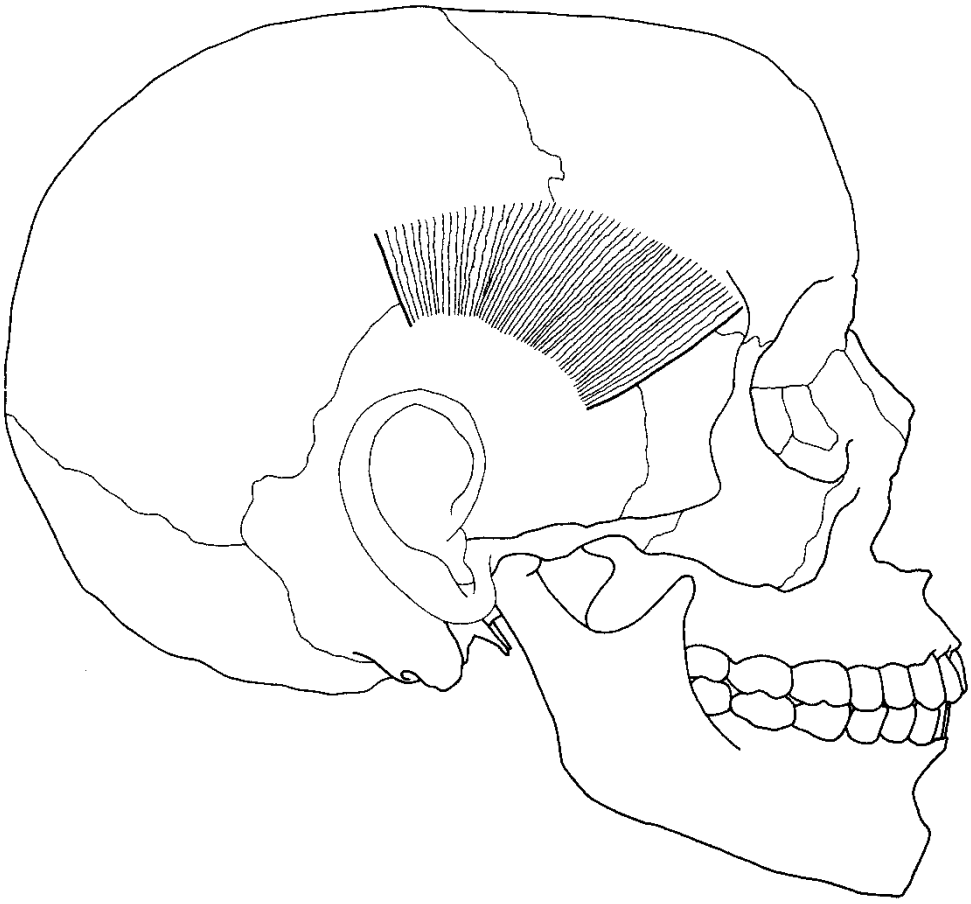
■ Origin
Galea aponeurotica

■ Insertion
Fascia of facial muscles and skin above nose and eyes

■ Action
Draws back scalp, wrinkles forehead, raises eyebrows

■ Nerve
Temporal branches of facial nerve

TEMPOROPARIETALIS



Skull—lateral view

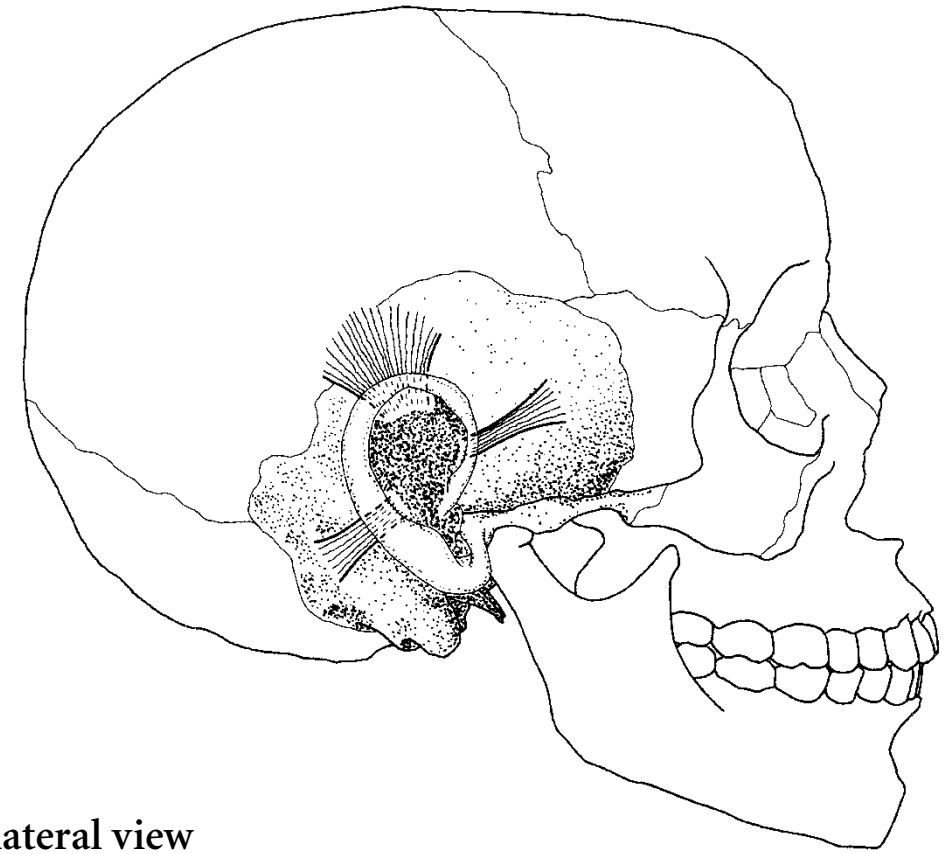
■ **Origin**
Fascia over ear

■ **Insertion**
Lateral border of galea aponeurotica

■ **Action**
Raises ears, tightens scalp

■ **Nerve**
Temporal branch of facial nerve

AURICULARIS ANTERIOR, SUPERIOR, POSTERIOR



Skull—lateral view

Auricularis anterior

■ **Origin**
Fascia in temporal region

■ **Insertion**
Anterior to helix of ear

■ **Action**
Draws ear forward in some individuals, moves scalp*

■ **Nerve**
Temporal branch of facial nerve

Auricularis superior

■ **Origin**
Fascia in temporal region

■ **Insertion**
Superior part of ear

■ **Action**
Draws ear upward in some individuals, moves scalp*

■ **Nerve**
Temporal branch of facial nerve

Auricularis posterior

■ **Origin**
Mastoid area of temporal bone

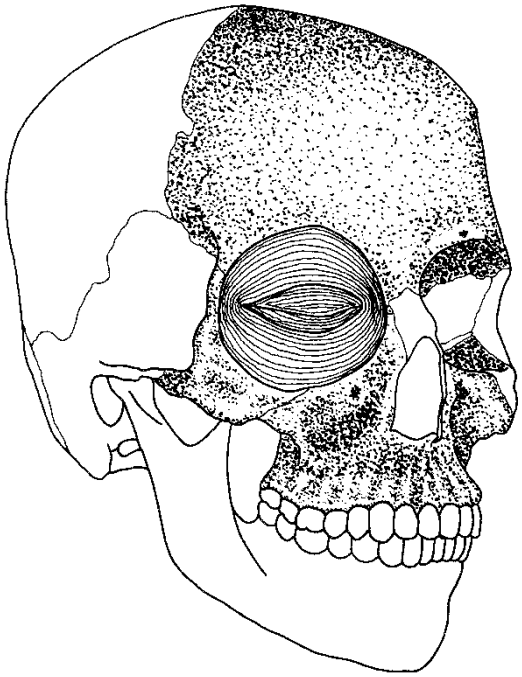
■ **Insertion**
Posterior part of ear

■ **Action**
Draws ear upward in some individuals*

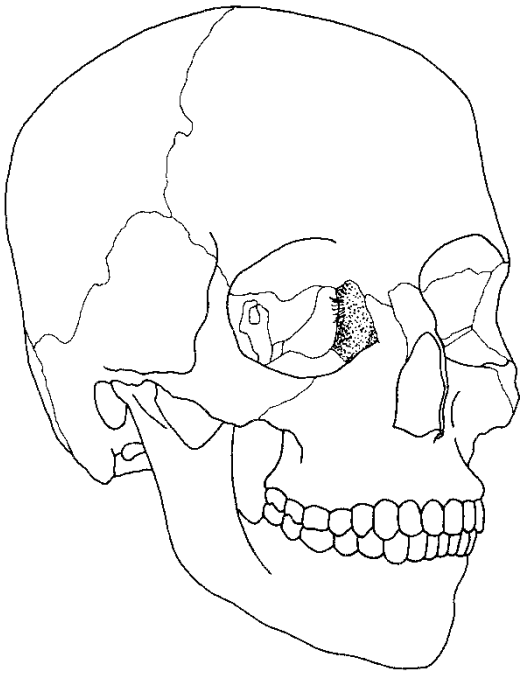
■ **Nerve**
Posterior auricular branch of facial nerve

*This muscle is nonfunctional in most people.

ORBICULARIS OCULI



ORBITAL AND PALPEBRAL PARTS



LACRIMAL PART

Skull—three-quarter anterior view

Orbital part

■ **Origin**
Frontal bone, maxilla (medial margin of orbit)

■ **Insertion**
Continues around orbit and returns to origin

■ **Action**
Strong closure of eyelids

■ **Nerve**
Temporal and zygomatic branches of facial nerve

Palpebral part *(in eyelids)*

■ **Origin**
Medial palpebral ligament

■ **Insertion**
Lateral palpebral ligament into zygomatic bone

■ **Action**
Gentle closure of eyelids

■ **Nerve**
Temporal and zygomatic branches of facial nerve

Lacrimal part *(behind medial palpebral ligament and lacrimal sac)*

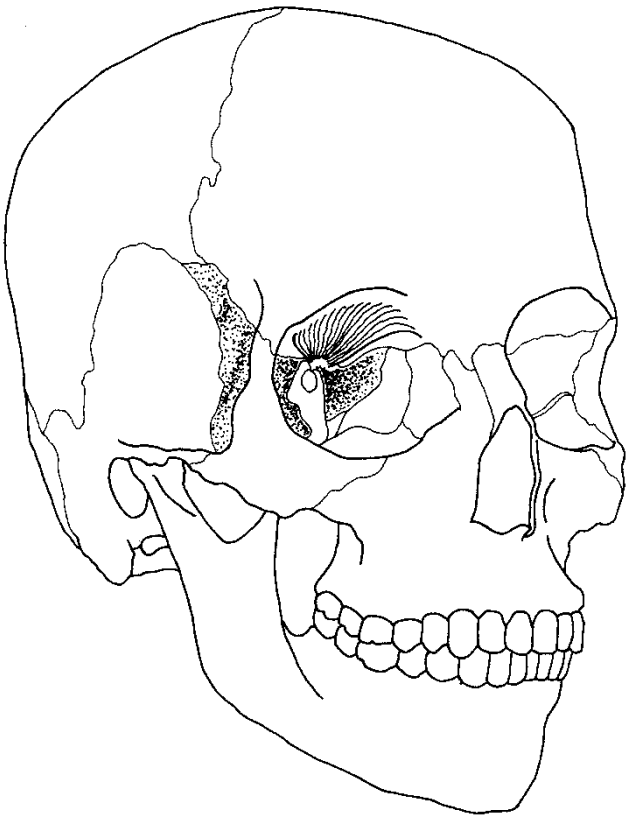
■ **Origin**
Lacrimal bone

■ **Insertion**
Lateral palpebral raphe

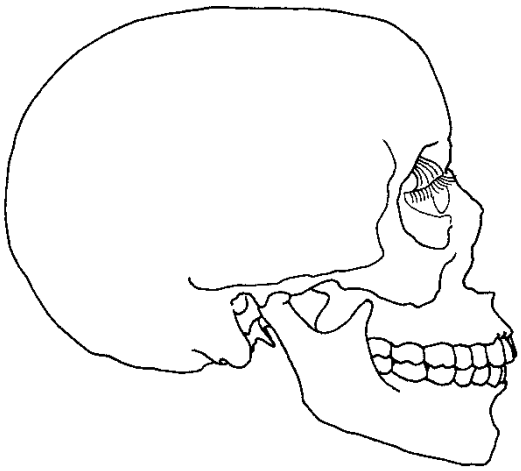
■ **Action**
Draws lacrimal canals onto surface of eye

■ **Nerve**
Temporal and zygomatic branches of facial nerve

LEVATOR PALPEBRAE SUPERIORIS



Skull—three-quarter anterior view



Skull—lateral view

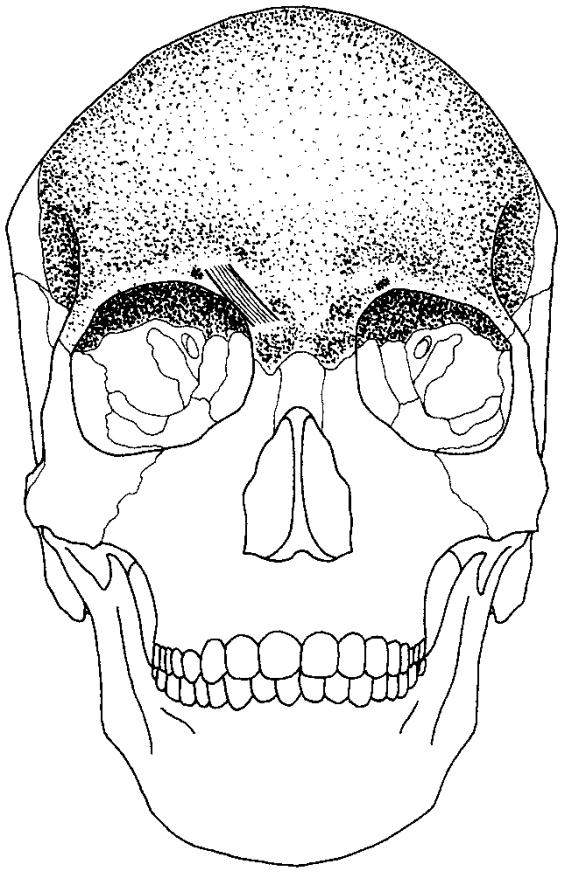
■ Origin
Inferior surface of lesser wing of sphenoid

■ Insertion
Skin of upper eyelid

■ Action
Raises upper eyelid

■ Nerve
Oculomotor nerve

CORRUGATOR SUPERCILII



Skull—anterior view

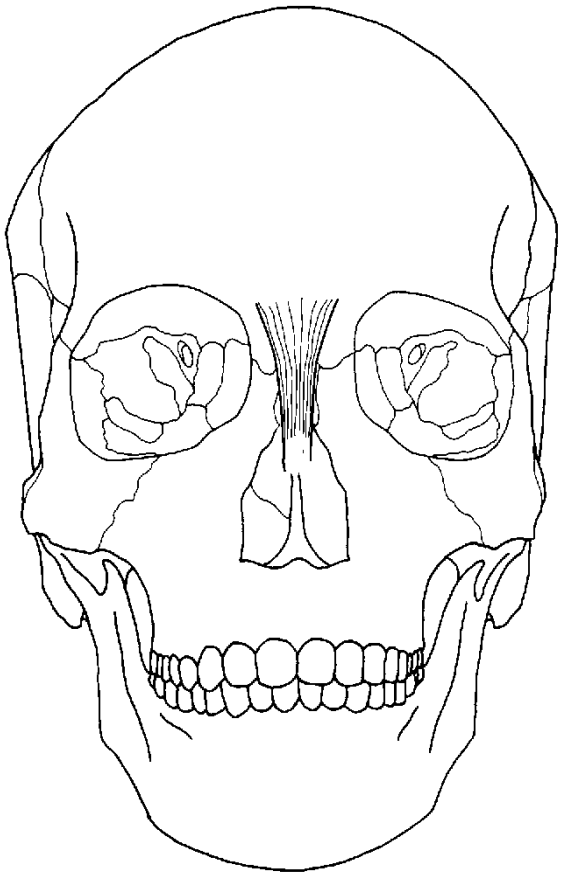
■ **Origin**
Medial end of superciliary arch

■ **Insertion**
Deep surface of skin under medial portion of eyebrows

■ **Action**
Draws eyebrows downward and medially

■ **Nerve**
Temporal branch of facial nerve

PROCERUS



Skull—anterior view

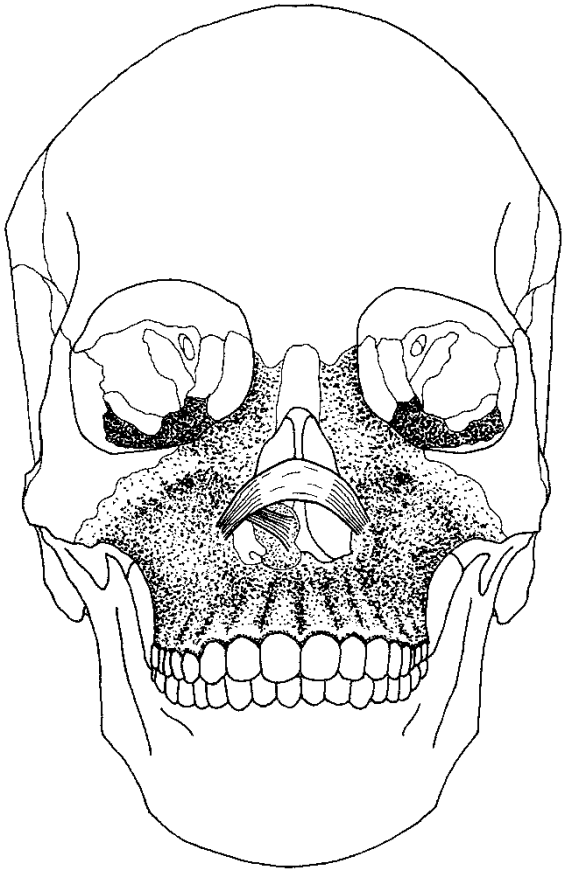
■ **Origin**
Fascia over nasal bone and lateral nasal cartilage

■ **Insertion**
Skin between eyebrows

■ **Action**
Draws down medial part of eyebrows, wrinkles nose

■ **Nerve**
Buccal branches of facial nerve

NASALIS



Skull—anterior view

Transverse part

Origin
Middle of maxilla

Insertion
Muscle of opposite side over bridge of nose

Alar part

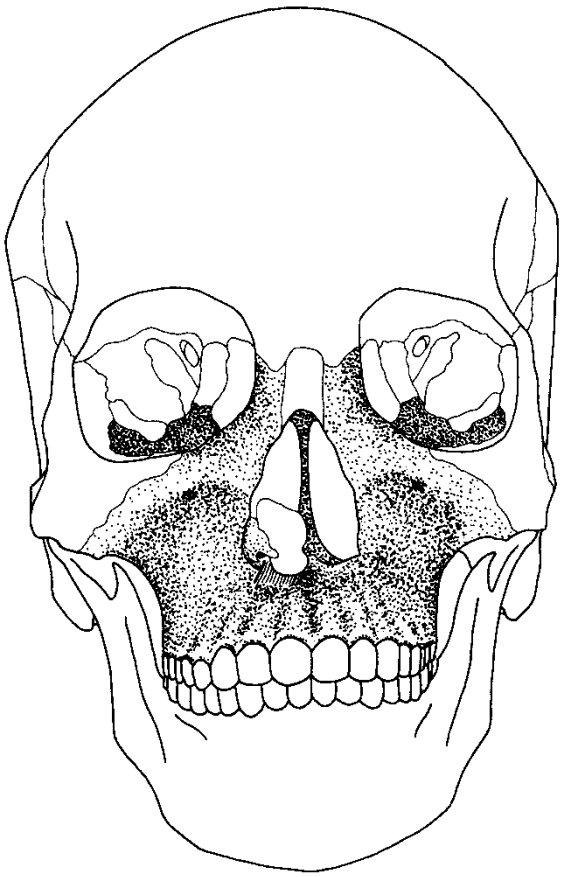
Origin
Greater alar cartilage, skin on nose

Insertion
Skin at point of nose

Action
Both parts maintain opening of external nares during forceful inspiration

Nerve
Buccal branches of facial nerve

DEPRESSOR SEPTI



Skull—anterior view

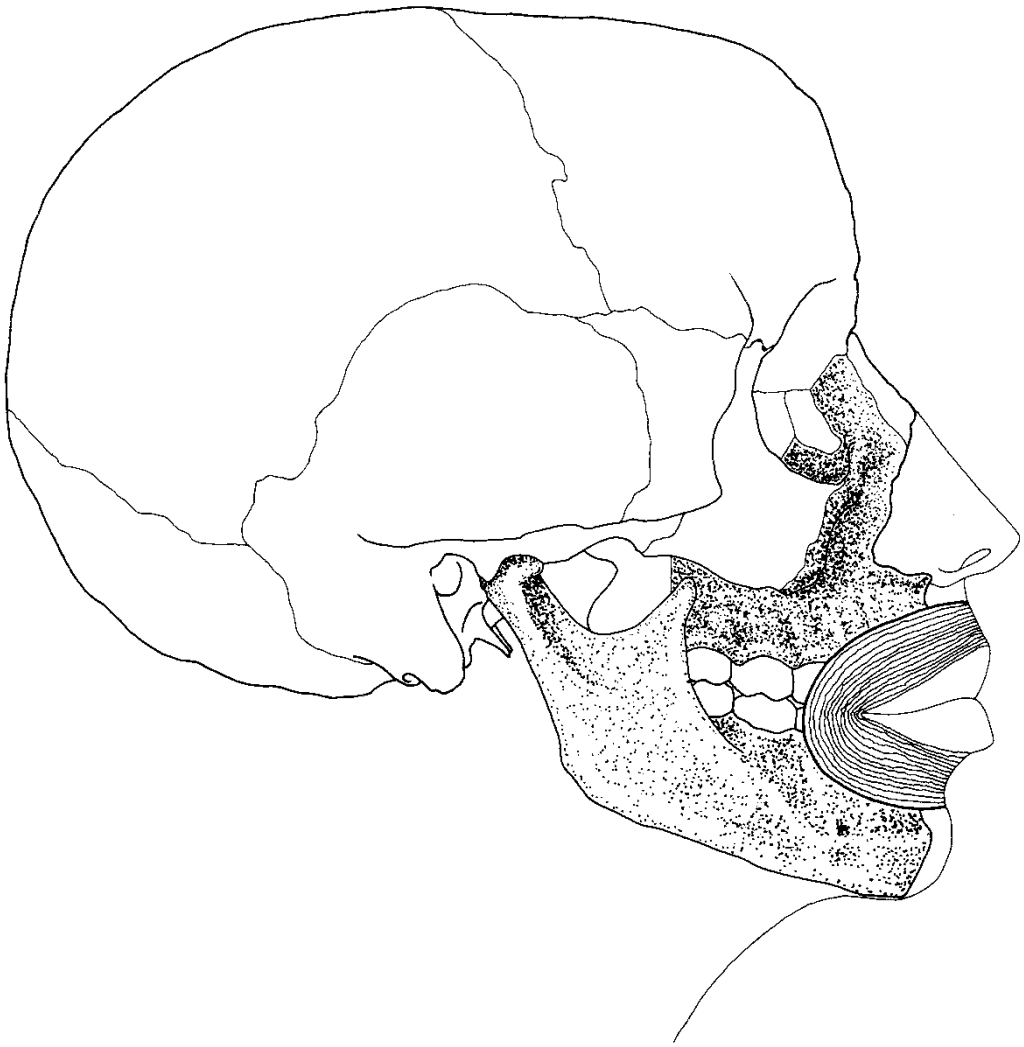
■ **Origin**
Incisive fossa of maxilla

■ **Insertion**
Nasal septum and ala

■ **Action**
Constricts nares

■ **Nerve**
Buccal branches of facial nerve

ORBICULARIS ORIS



Skull—lateral view

■ Origin
Lateral band—alveolar border of maxilla

Medial band—septum of nose

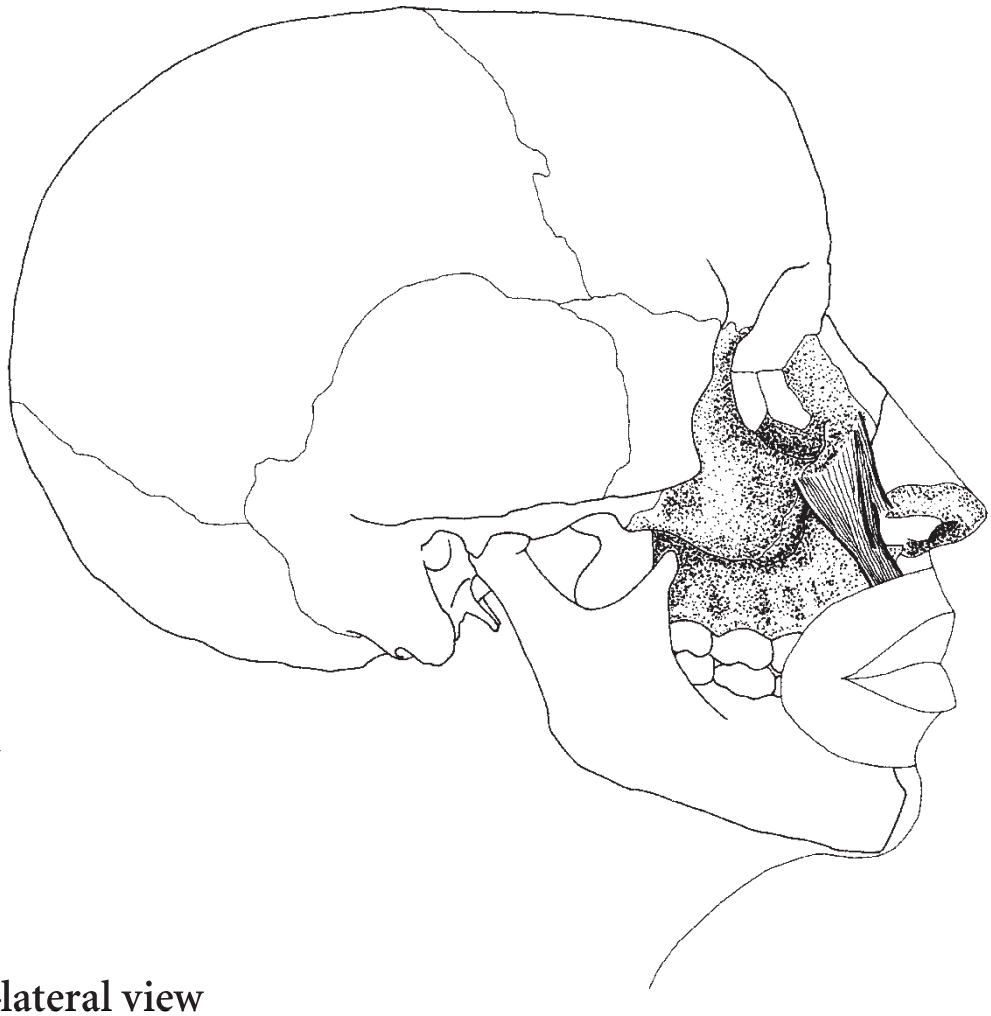
Inferior portion—lateral to midline of mandible

■ Insertion
Becomes continuous with other muscles at angle of mouth

■ Action
Closure and protrusion of lips

■ Nerve
Buccal and mandibular branches of facial nerve

LEVATOR LABII SUPERIORIS



Skull—lateral view

Angular head *(aleque nasi)*

■ **Origin**
Frontal process of maxilla and zygomatic bone

■ **Insertion**
Greater alar cartilage and skin of nose, upper lip

■ **Action**
Elevates upper lip, dilates nares, forms nasolabial furrow

■ **Nerve**
Buccal branches of facial nerve

Note: The angular head is frequently referred to as a separate muscle, levator labii superioris aleque nasi.

Infraorbital head

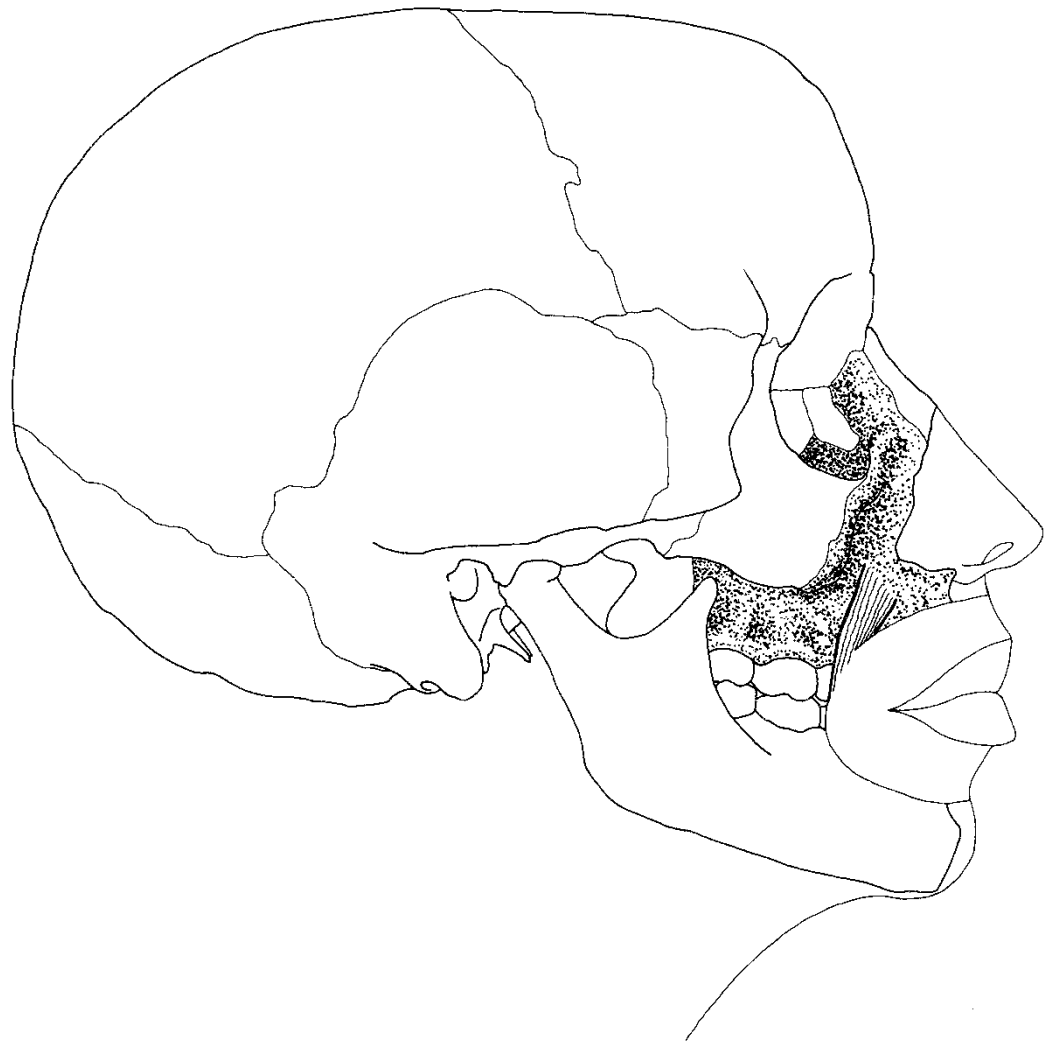
■ **Origin**
Infraorbital margin of maxilla

■ **Insertion**
Skin of lateral half of upper lip

■ **Action**
Elevates upper lip, forms nasolabial furrow

■ **Nerve**
Buccal branches of facial nerve

LEVATOR ANGULI ORIS



Skull—lateral view

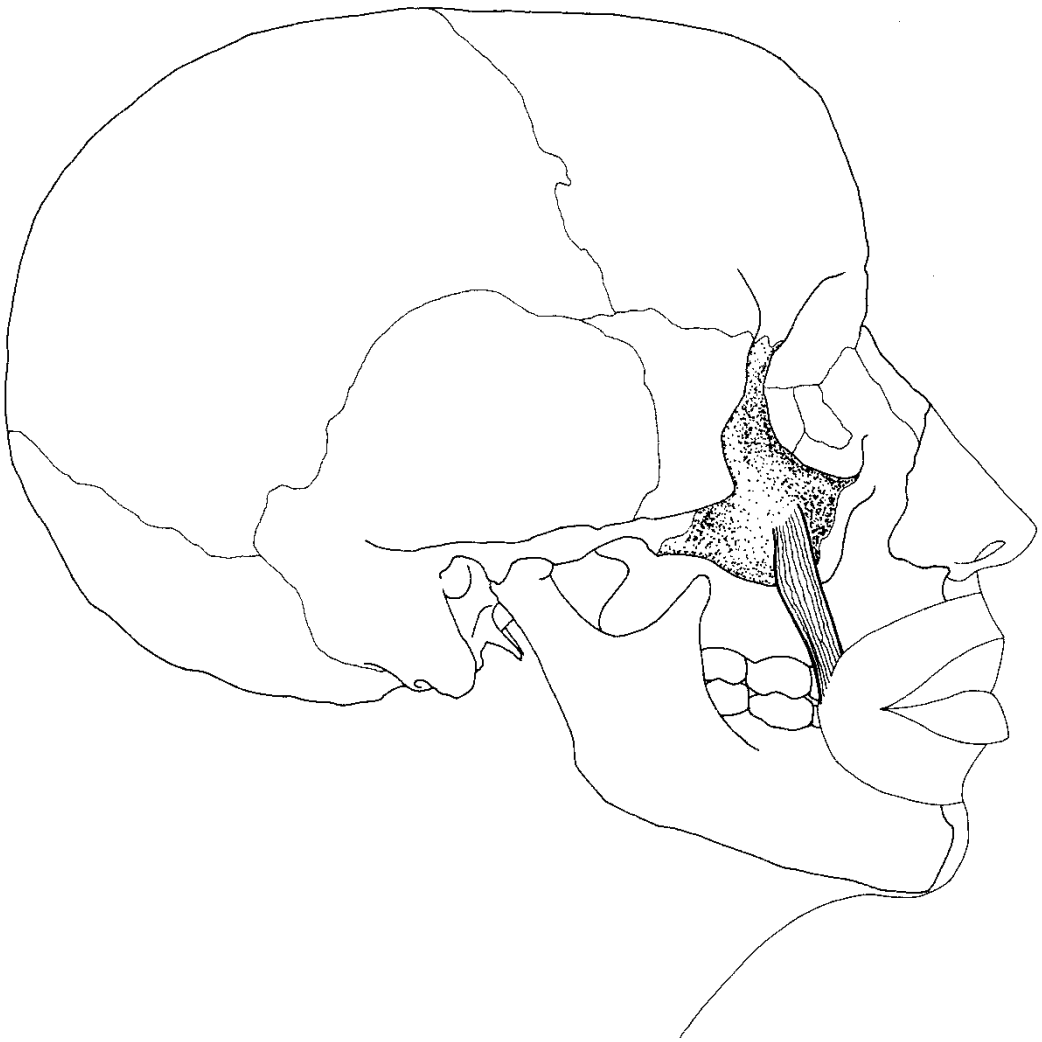
■ **Origin**
Canine fossa of maxilla

■ **Insertion**
Angle of mouth

■ **Action**
Elevates corner (angle) of mouth

■ **Nerve**
Buccal branches of facial nerve

ZYGOMATICUS MAJOR



Skull—lateral view

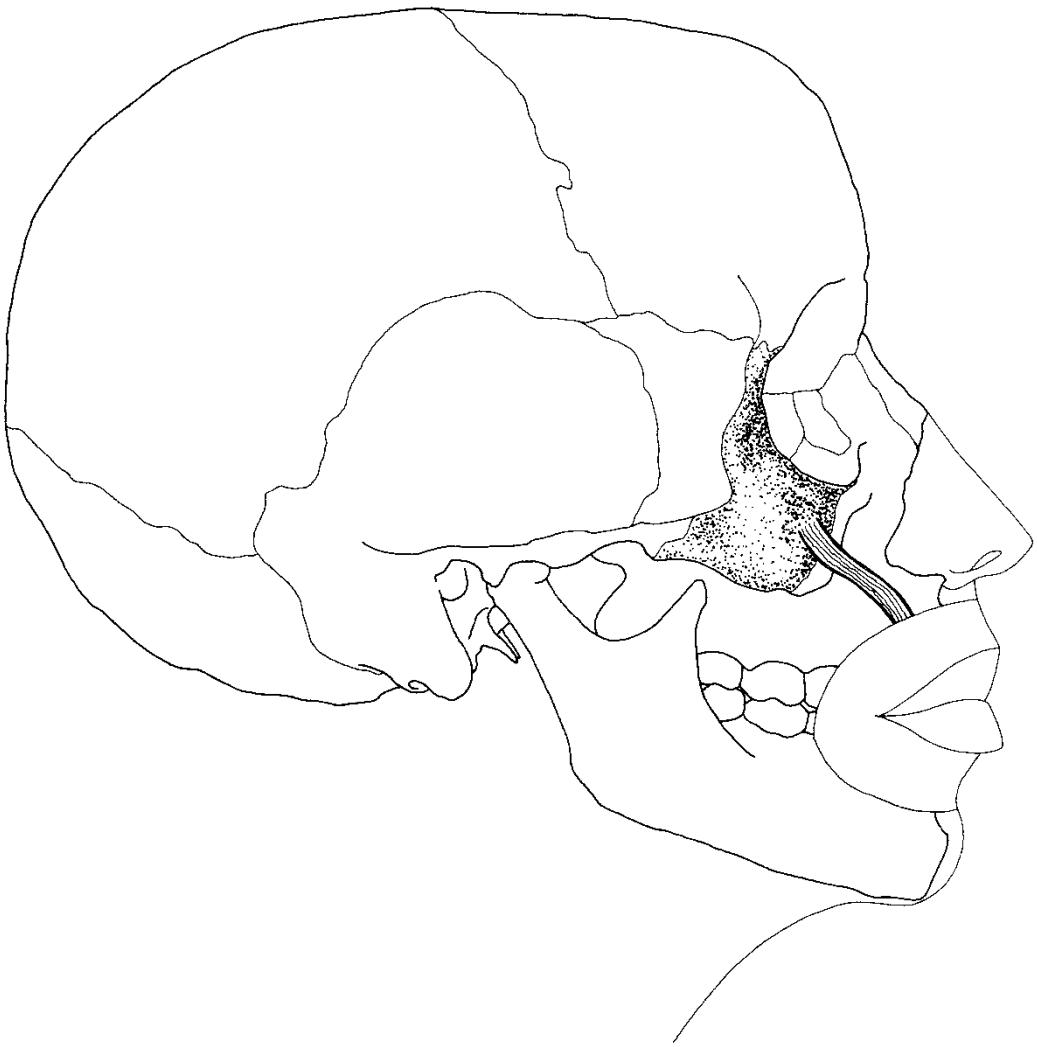
■ **Origin**
Zygomatic bone

■ **Insertion**
Angle of mouth

■ **Action**
Draws angle of mouth upward and backward (laughing)

■ **Nerve**
Buccal branches of facial nerve

ZYGOMATICUS MINOR



Skull—lateral view

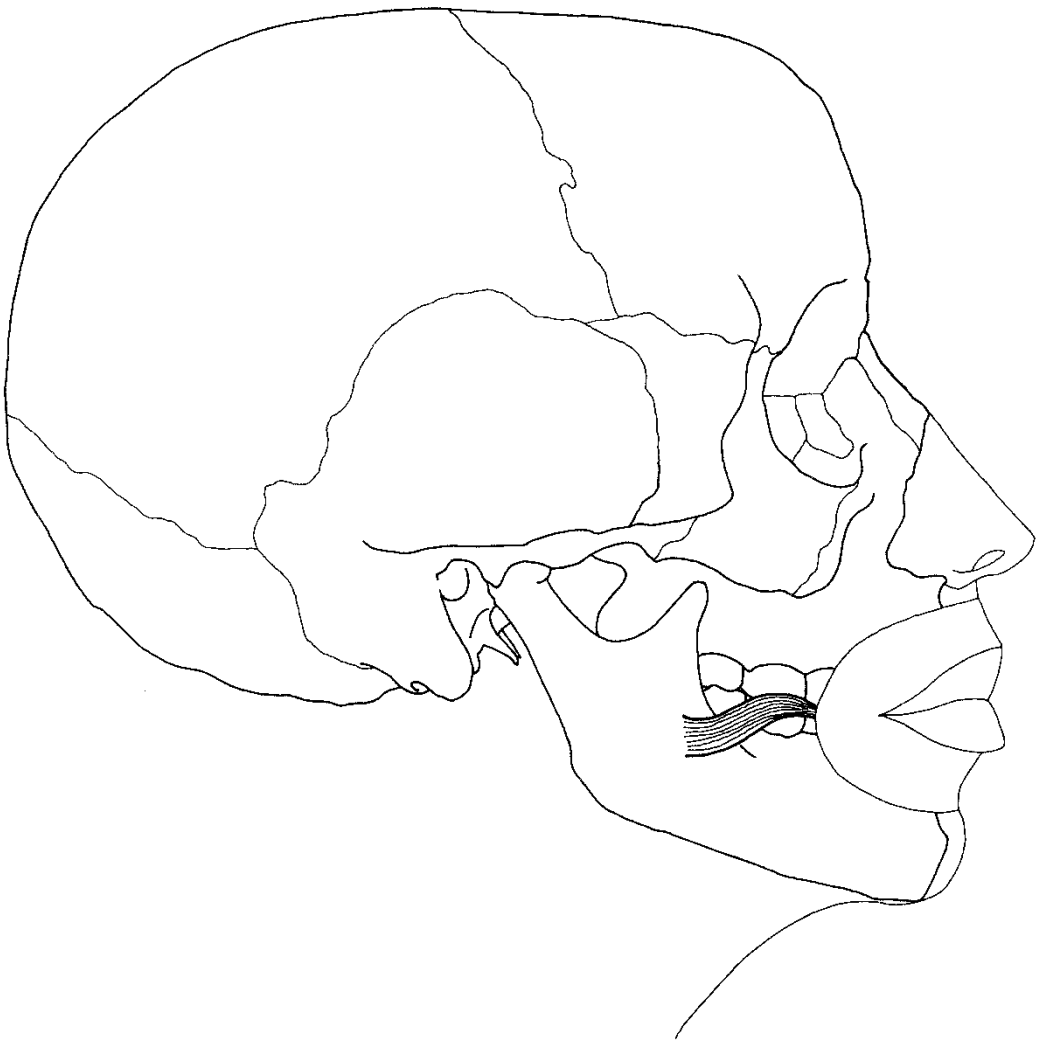
■ **Origin**
Zygomatic bone

■ **Insertion**
Upper lip lateral to levator labii superioris

■ **Action**
Forms nasolabial furrow

■ **Nerve**
Buccal branches of facial nerve

RISORIUS



Skull—lateral view

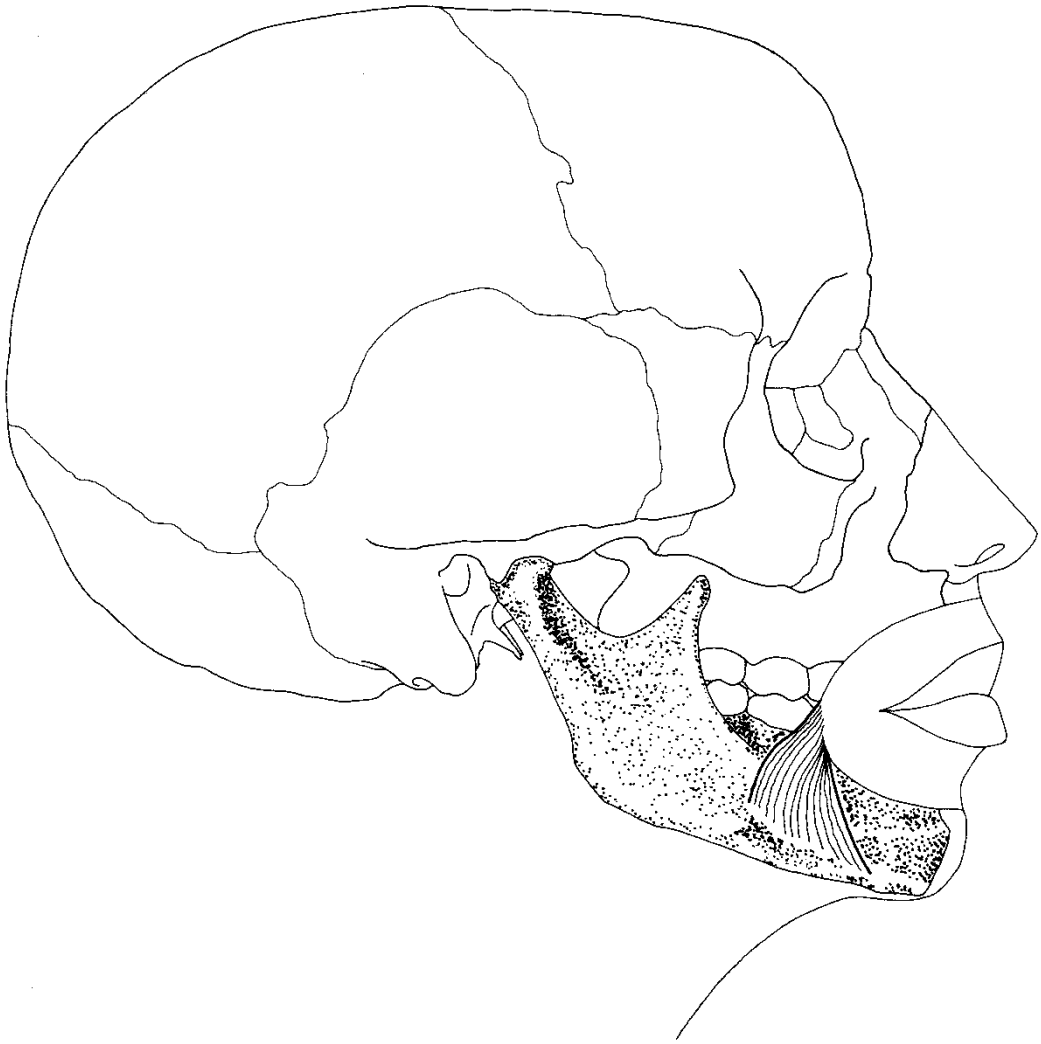
■ **Origin**
Fascia over masseter

■ **Insertion**
Skin at angle of mouth

■ **Action**
Retracts angle of mouth, as in grinning

■ **Nerve**
Buccal branches of facial nerve

DEPRESSOR LABII INFERIORIS



Skull—lateral view

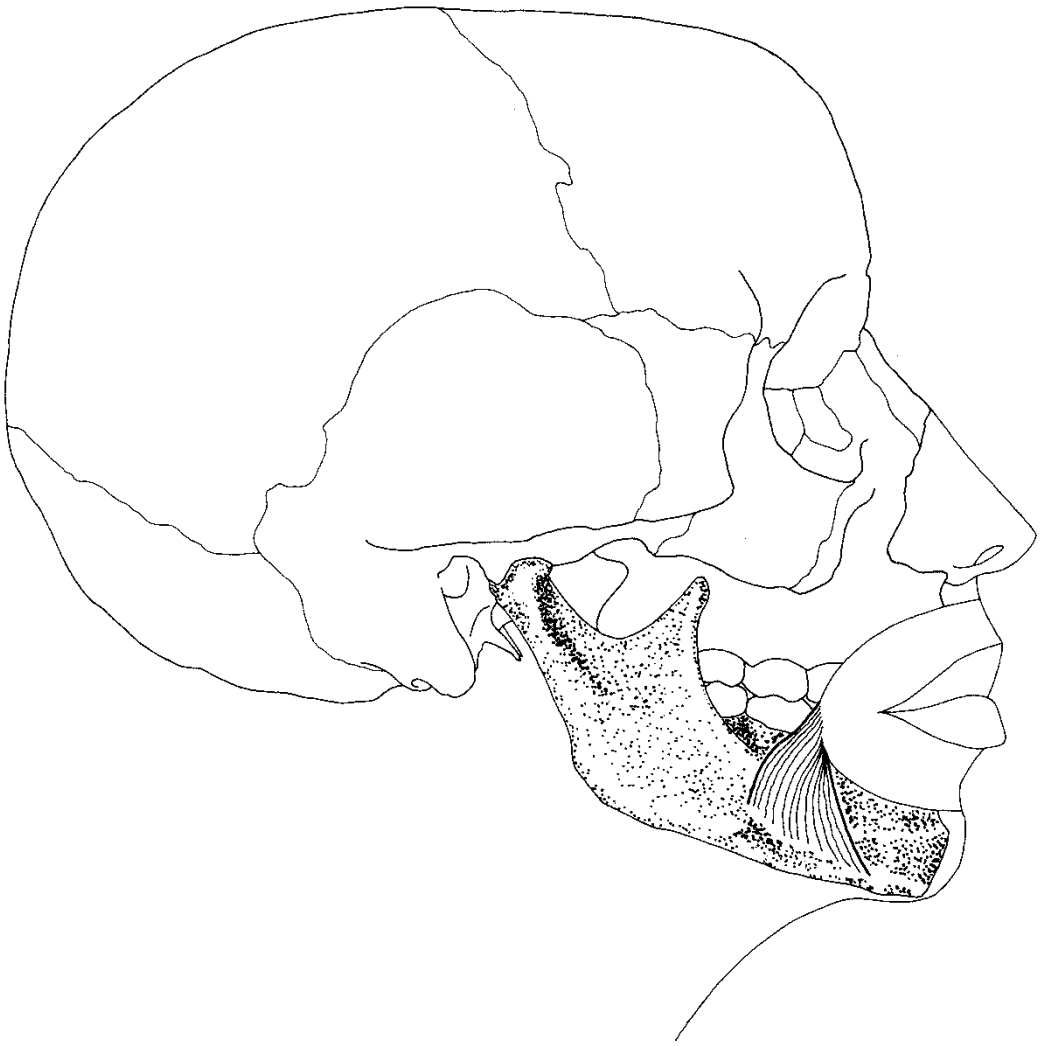
■ **Origin**
Mandible, between symphysis and mental foramen

■ **Insertion**
Skin of lower lip

■ **Action**
Draws lower lip downward and laterally

■ **Nerve**
Mandibular branch of facial nerve

DEPRESSOR ANGULI ORIS



Skull—lateral view

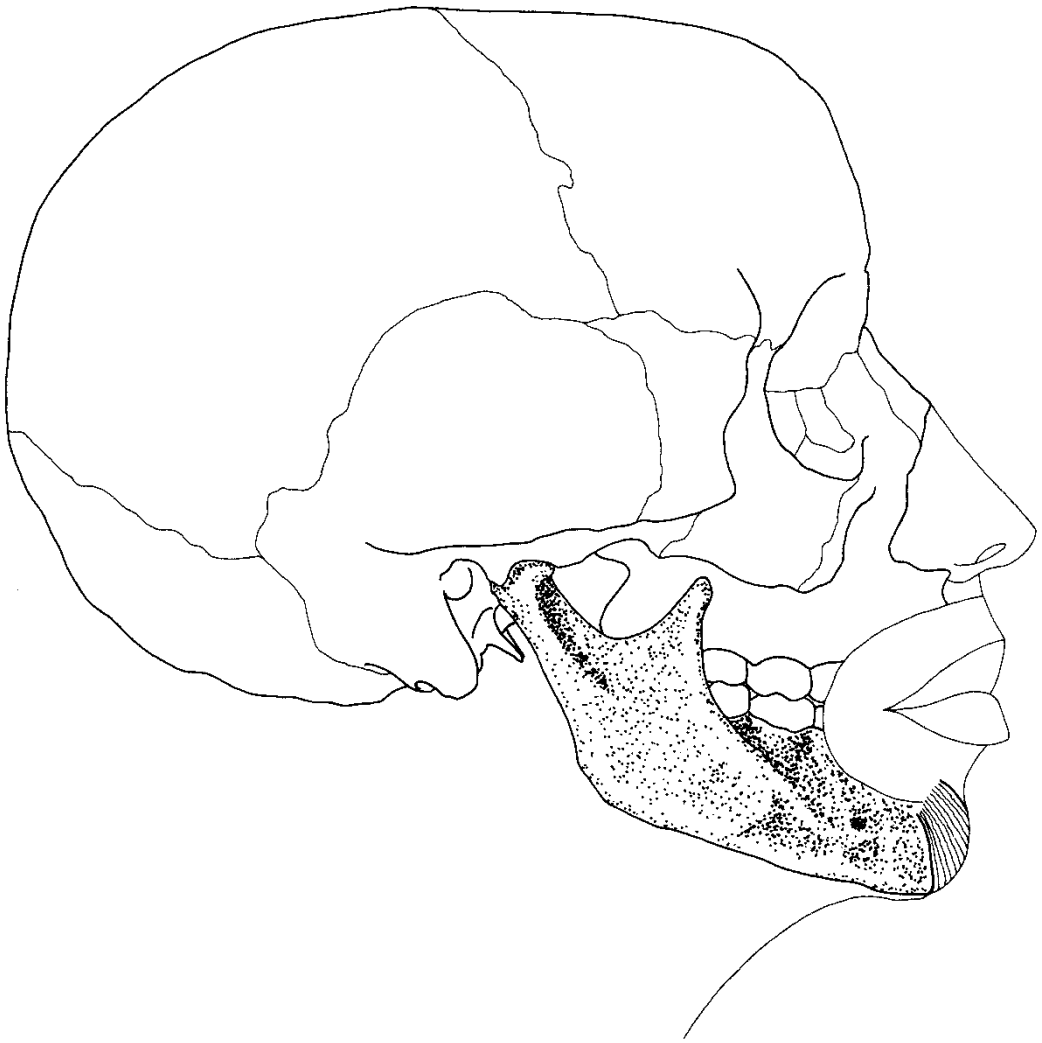
■ **Origin**
Oblique line of the mandible

■ **Insertion**
Angle of the mouth

■ **Action**
Depresses angle of mouth, as in frowning

■ **Nerve**
Mandibular branch of facial nerve

MENTALIS



Skull—lateral view

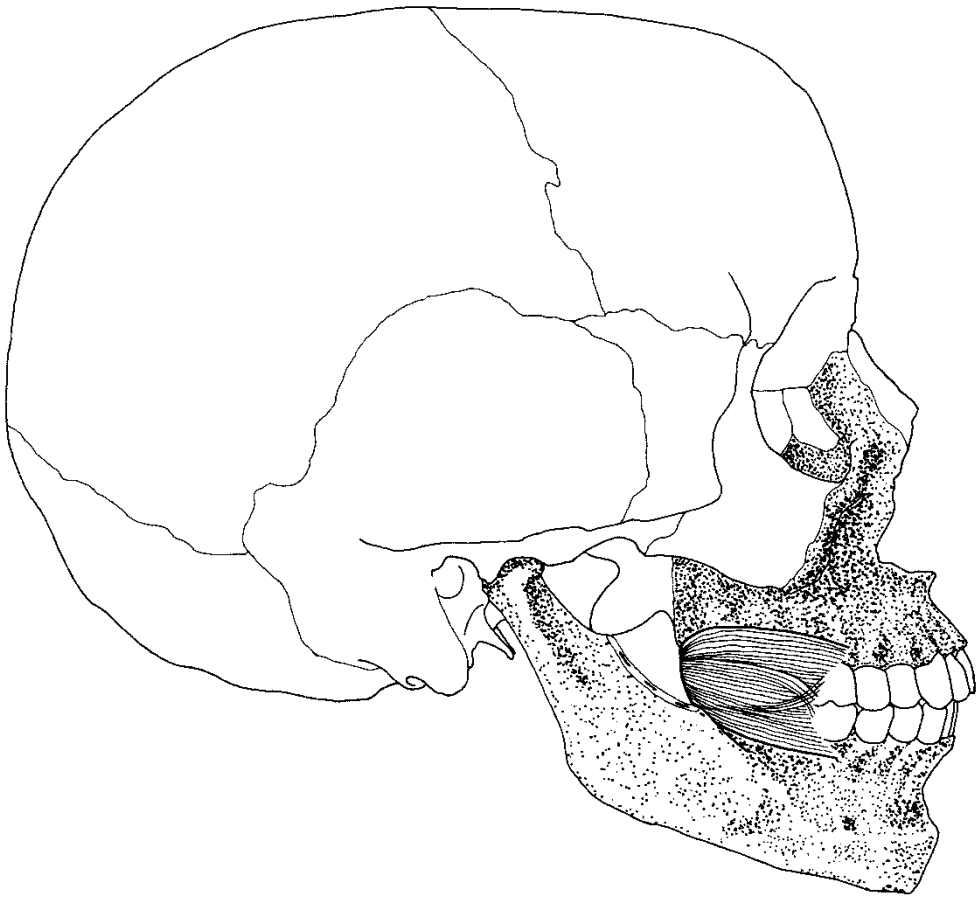
Origin
Incisive fossa of mandible

Insertion
Skin of chin

Action
Raises and protrudes lower lip, wrinkles skin of chin

Nerve
Mandibular branch of facial nerve

BUCCINATOR



Skull—lateral view

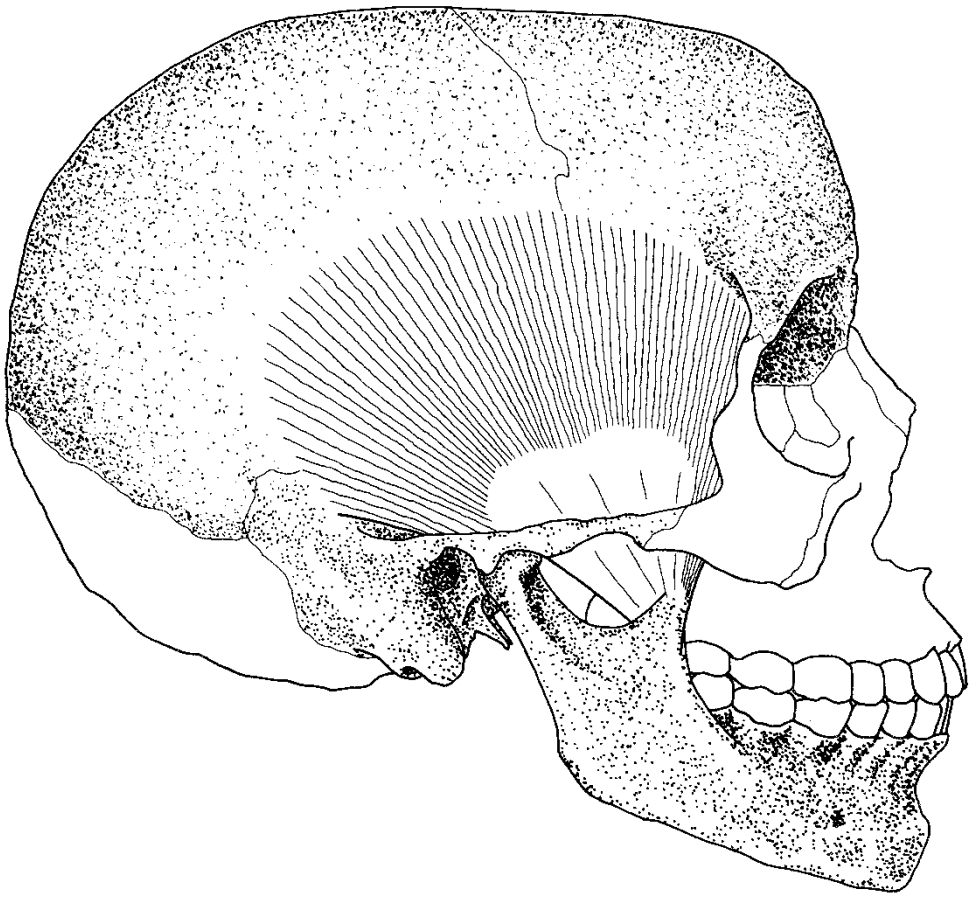
■ Origin
Outer surface of alveolar processes of maxilla and mandible over molars and along pterygomandibular raphe

■ Insertion
Deep part of muscles of lips

■ Action
Compresses cheek

■ Nerve
Buccal branches of facial nerve

TEMPORALIS



Skull—lateral view

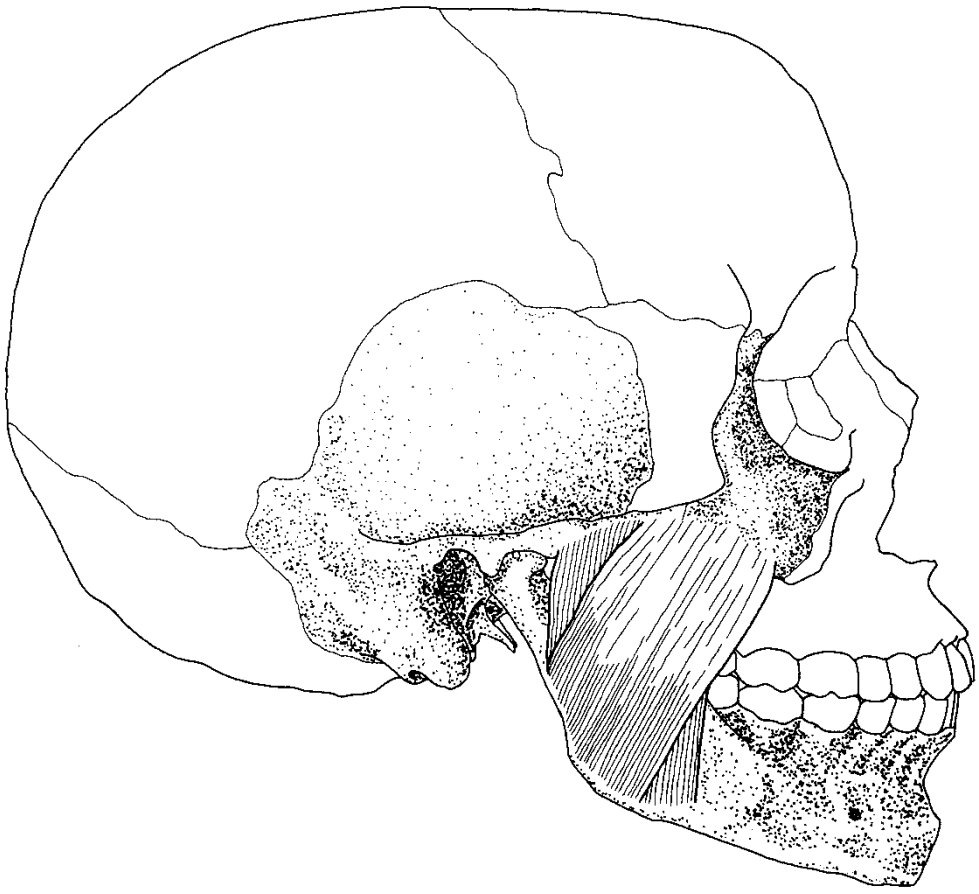
■ **Origin**
Temporal fossa including frontal, parietal, and temporal bones

■ **Insertion**
Coronoid process and anterior border of ramus of mandible

■ **Action**
Elevates, retracts mandible (rotation at tempero-mandibular joint) closing mouth, biting

■ **Nerve**
Mandibular division of trigeminal nerve

MASSETER



Skull—lateral view

■ **Origin**
Zygomatic process of maxilla, medial and inferior surfaces of zygomatic arch

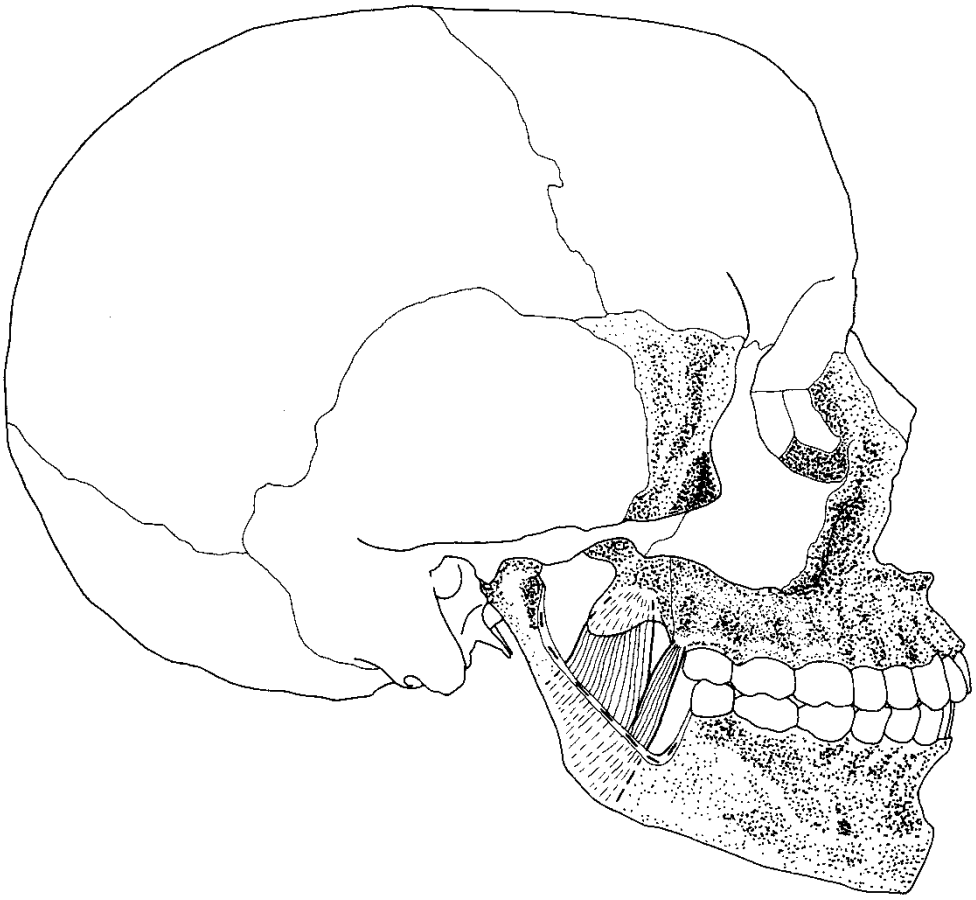
■ **Insertion**
Angle and ramus of mandible, lateral surface of coronoid process of mandible

■ **Action**
Elevates mandible (rotation at temperomandibular joint) closing mouth, biting

■ **Nerve**
Mandibular division of trigeminal nerve

Note: Superficial fibers slightly protract jaw (see lateral pterygoid).

MEDIAL PTERYGOID *(Pterygoideus Medialis)*



Skull—lateral view

(Part of mandible cut away)

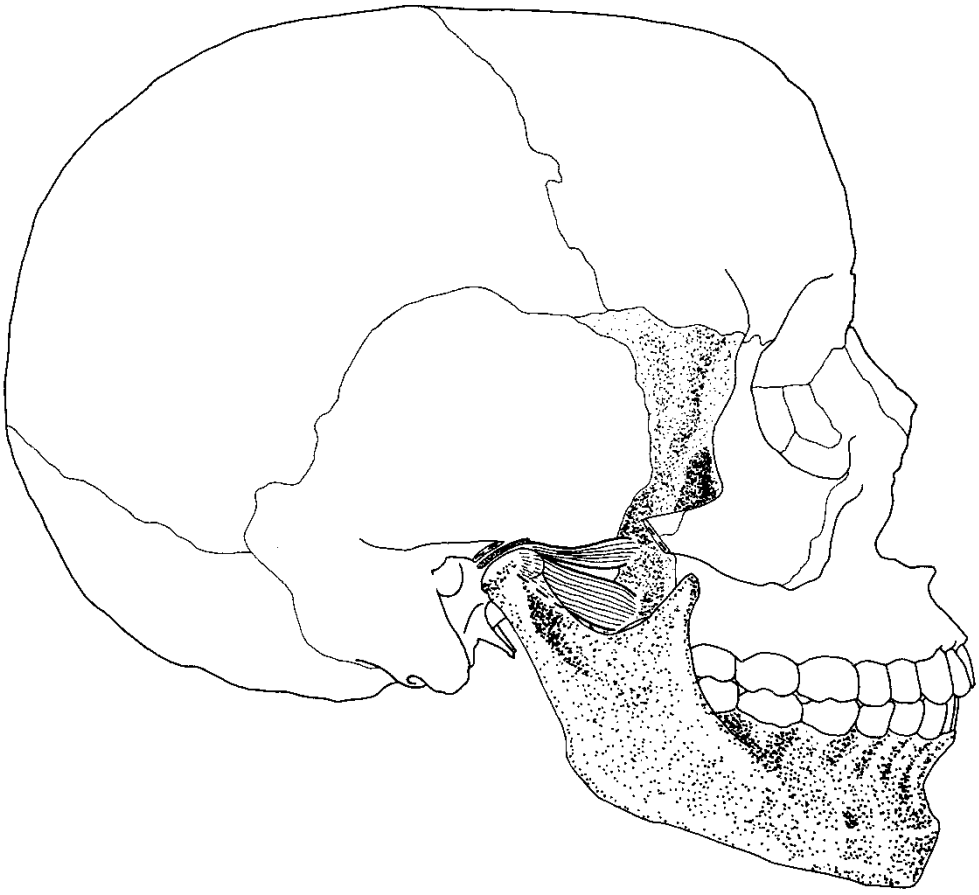
■ Origin
Medial surface of lateral pterygoid plate of sphenoid bone, palatine bone, and tuberosity of maxilla

■ Insertion
Medial surface of ramus and angle of mandible

■ Action
Elevates mandible, assists in protruding mandible

■ Nerve
Mandibular division of trigeminal nerve

LATERAL PTERYGOID *(Pterygoideus Lateralis)*



Skull—lateral view

■ Origin
Superior head—lateral surface of greater wing of sphenoid

Inferior head—lateral surface of lateral pterygoid plate

■ Insertion
Condyle of mandible, temporomandibular joint

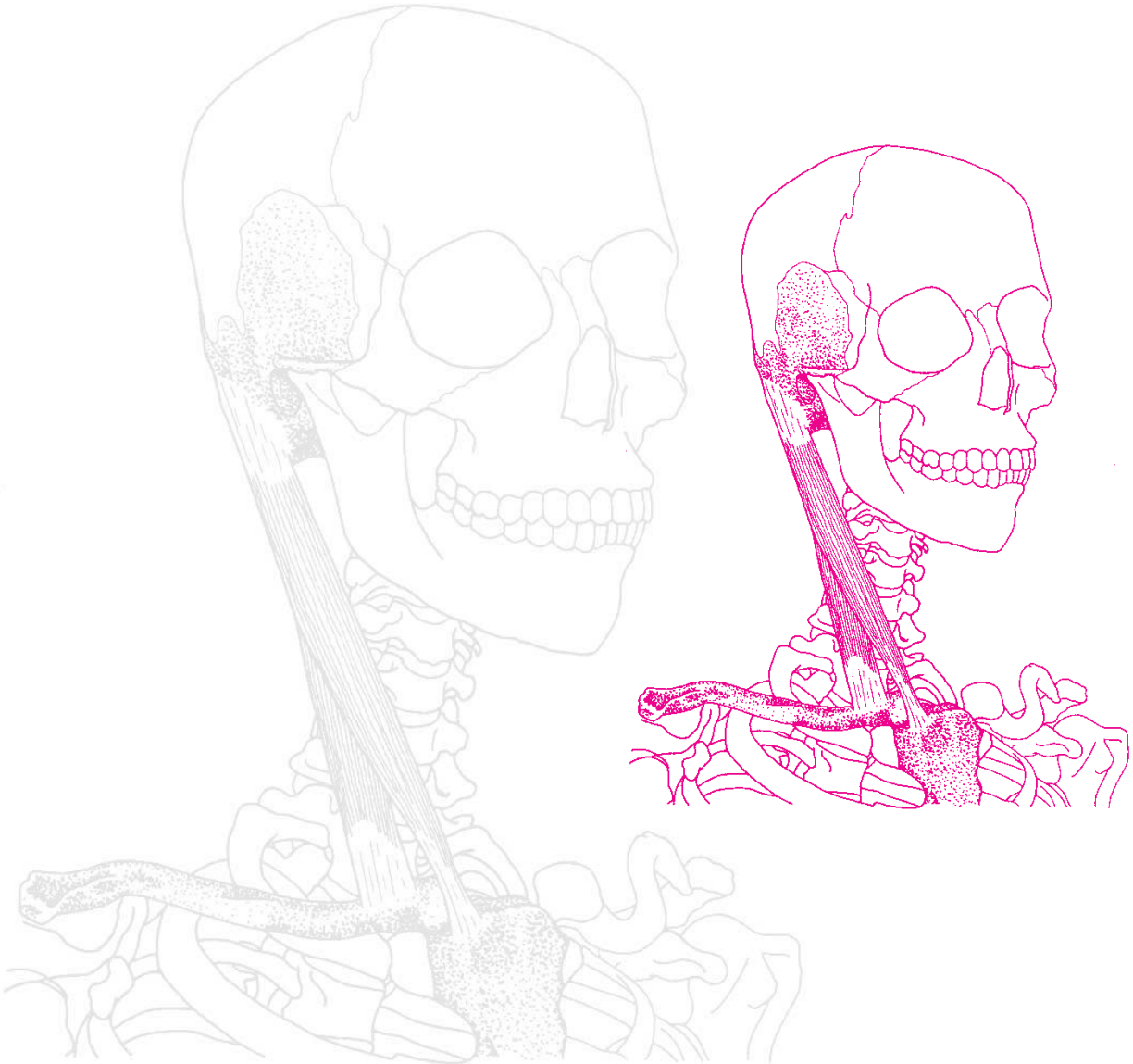
■ Action
Opens jaw, protrudes mandible, moves mandible laterally for grinding teeth

■ Nerve
Mandibular division of trigeminal nerve

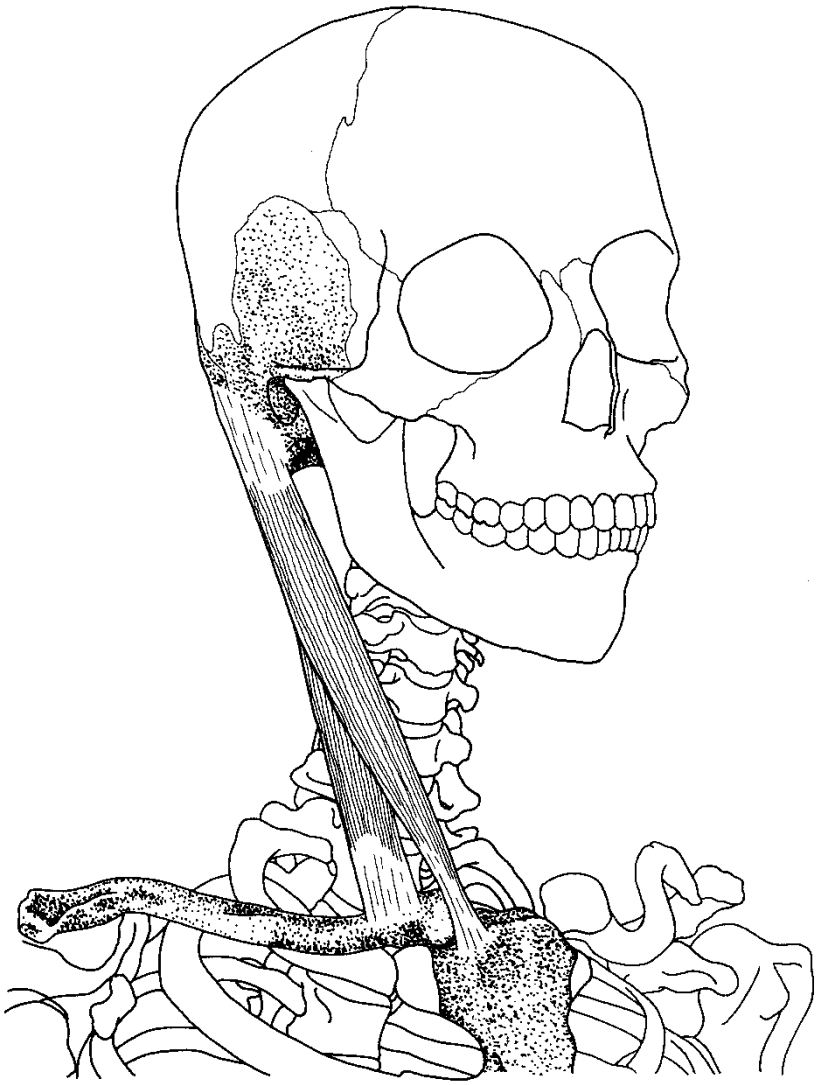
Note: This sideward movement, aided by superficial fibers of masseter, causes chewing movements.

CHAPTER FOUR

Muscles of the Neck



STERNOCLEIDOMASTOID



Three-quarter frontal view

■ Origin
Sternal head—manubrium of sternum

Clavicular head—medial part of clavicle

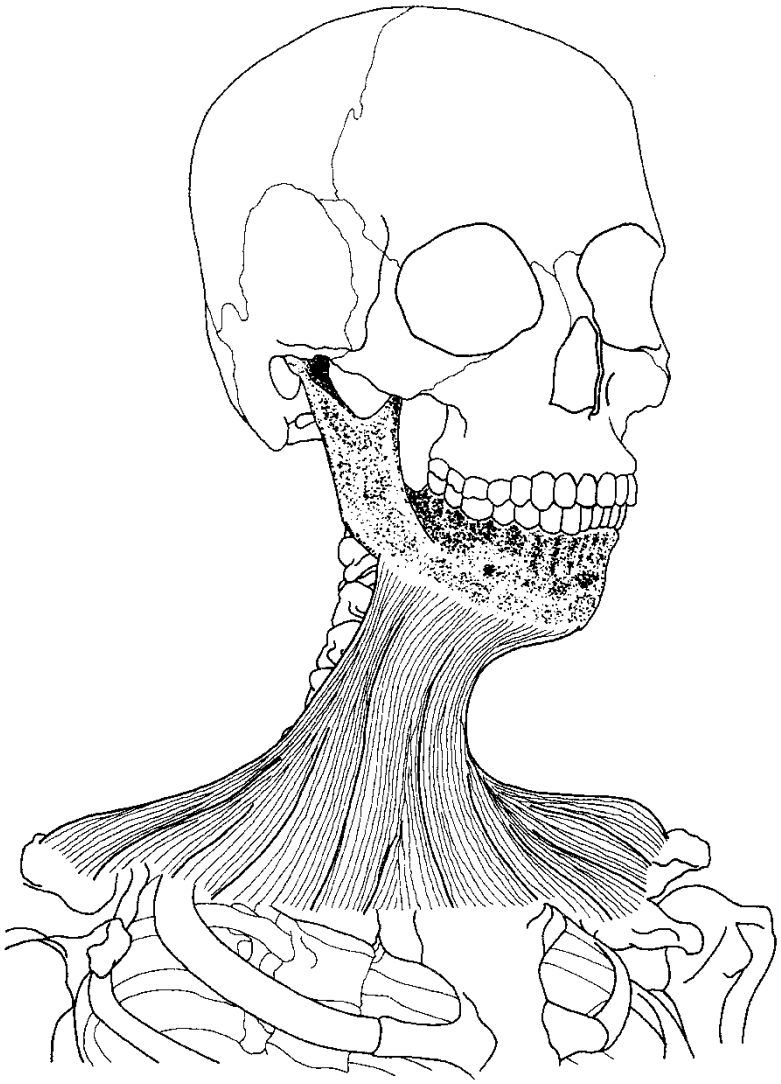
■ Insertion
Mastoid process of temporal bone, lateral half of superior nuchal line of occipital bone

■ Action
Unilateral—bends neck laterally, rotates head to opposite side

Bilateral—flexes neck, draws head ventrally and elevates chin, draws sternum superiorly in deep inspiration

■ Nerve
Spinal part of accessory nerve (C2, C3)

PLATYSMA



Three-quarter frontal view

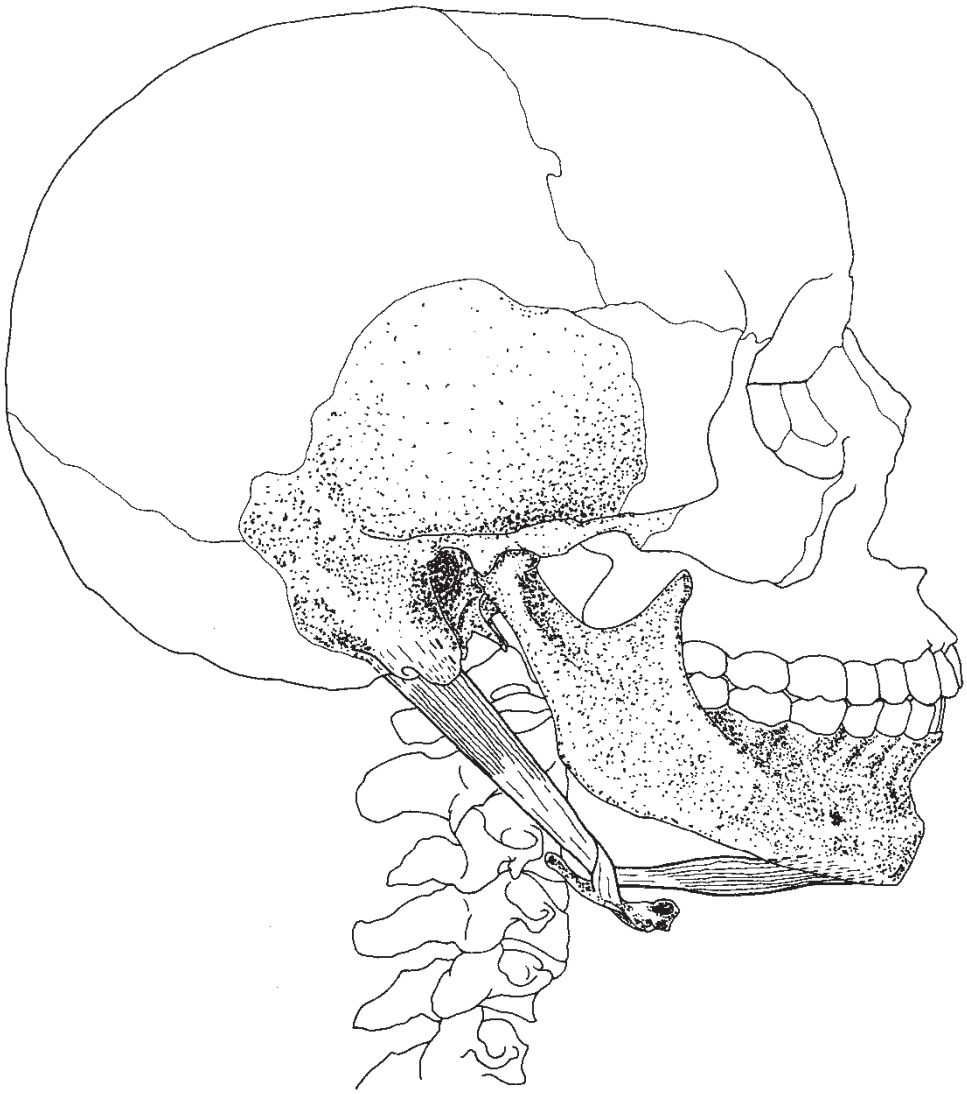
■ Origin
Subcutaneous fascia of upper one-fourth of chest just below the clavicle

■ Insertion
Subcutaneous fascia and muscles of chin and jaw, mandible

■ Action
Depresses and draws lower lip laterally, draws up skin of chest, depresses mandible

■ Nerve
Cervical branch of facial nerve

DIGASTRICUS



Lateral view

■ Origin
Posterior belly—mastoid notch of temporal bone

Anterior belly—inner side of inferior border of mandible near symphysis

■ Insertion
Intermediate tendon attached to hyoid bone

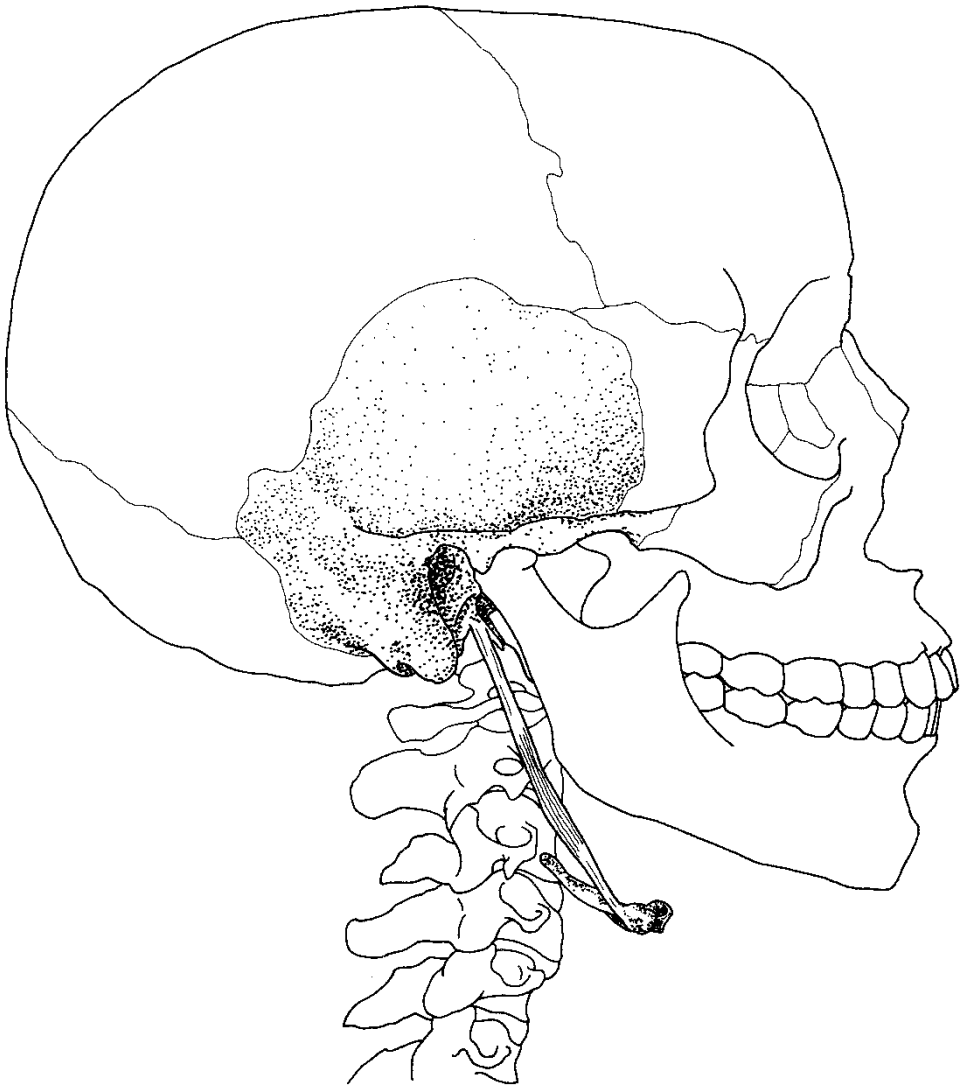
■ Action
Raises hyoid bone, depresses mandible, moves hyoid forward or backward

■ Nerve
Posterior belly—facial nerve

Anterior belly—mandibular division of trigeminal

Note: The two bellies are joined at an intermediate tendon by a fibrous loop at the side of the body and the greater horn of the hyoid bone.

STYLOHYOID



Lateral view

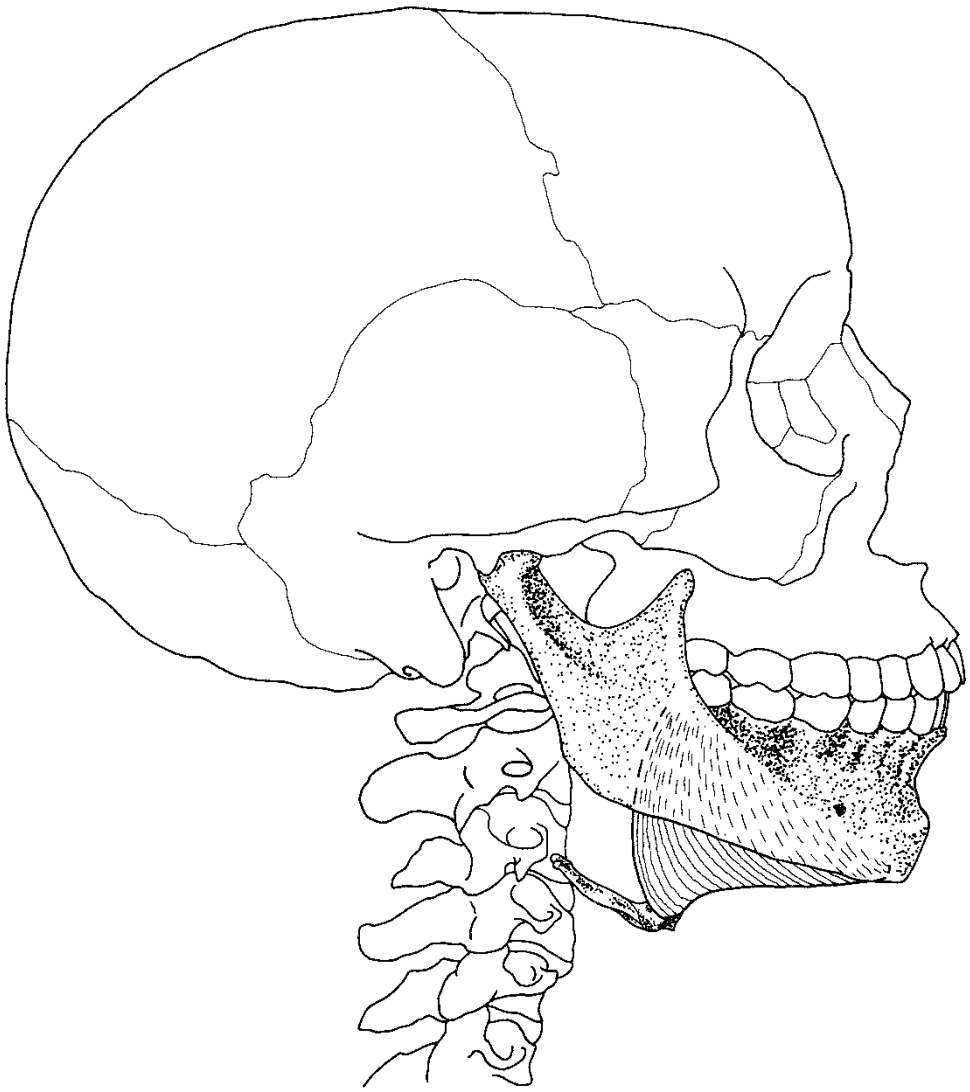
■ **Origin**
Styloid process of temporal bone

■ **Insertion**
Hyoid bone

■ **Action**
Elevates and draws hyoid bone posteriorly, elevates tongue

■ **Nerve**
Facial nerve

MYLOHYOID



Lateral view

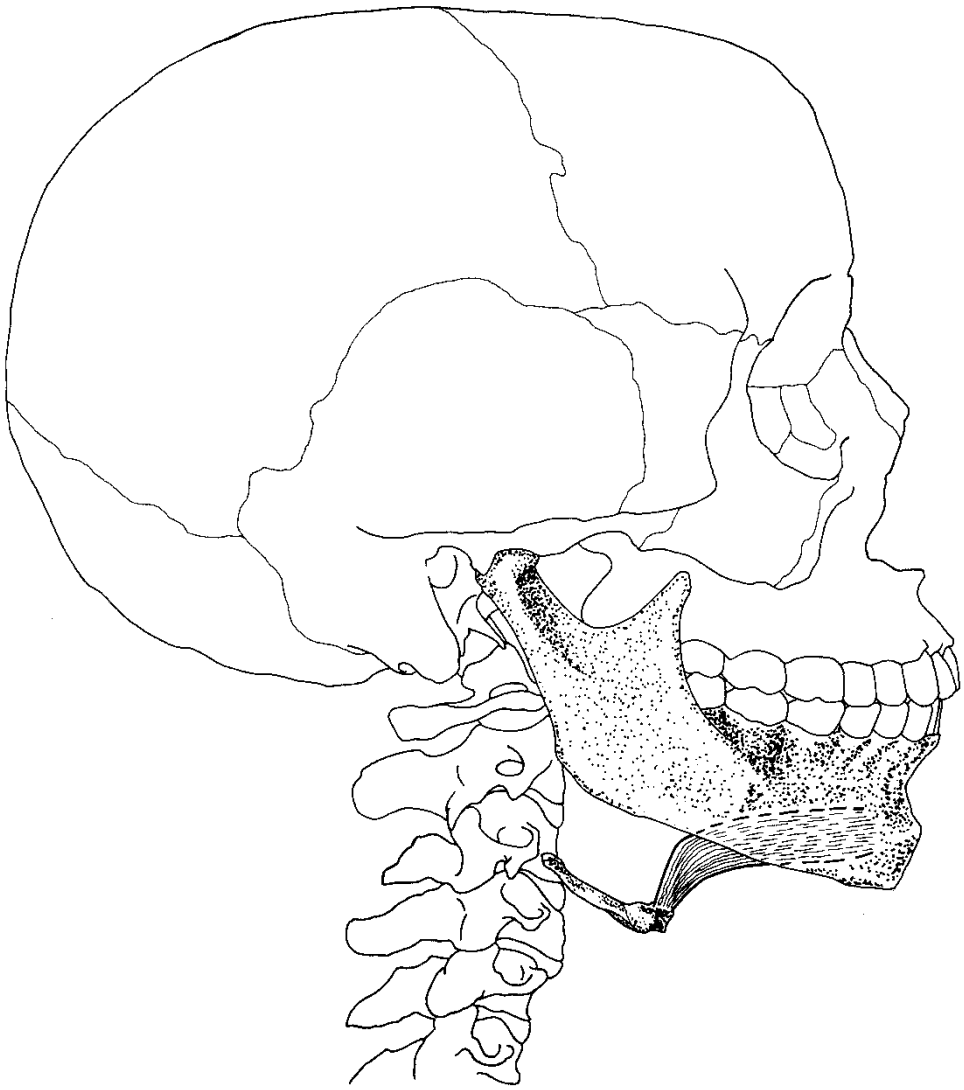
■ **Origin**
Inside surface of mandible from symphysis to molars (mylohyoid line)

■ **Insertion**
Hyoid bone

■ **Action**
Elevates hyoid bone, raises floor of mouth and tongue

■ **Nerve**
Mandibular division of trigeminal nerve

GENIOHYOID



Lateral view

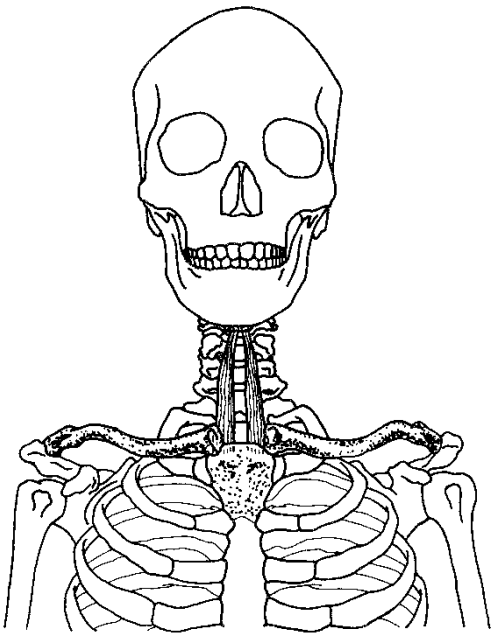
■ **Origin**
Inferior mental spine on interior medial surface of mandible

■ **Insertion**
Body of hyoid bone

■ **Action**
Protrudes hyoid bone and tongue

■ **Nerve**
Branch of C1 through hypoglossal nerve

STERNOHYOID



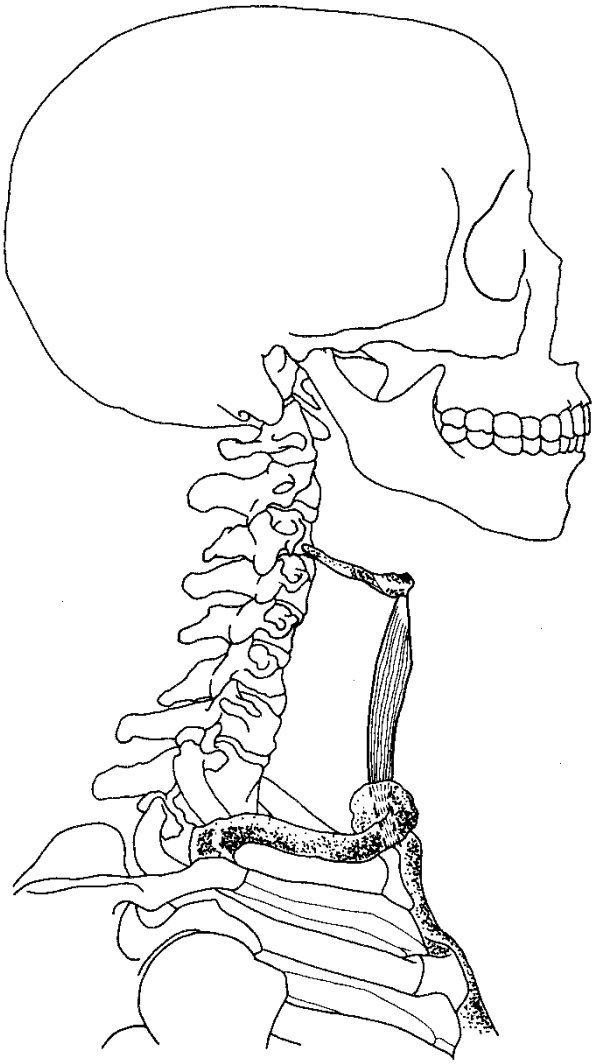
Frontal view

■ **Origin**
Medial end of clavicle, manubrium of sternum

■ **Insertion**
Body of hyoid bone

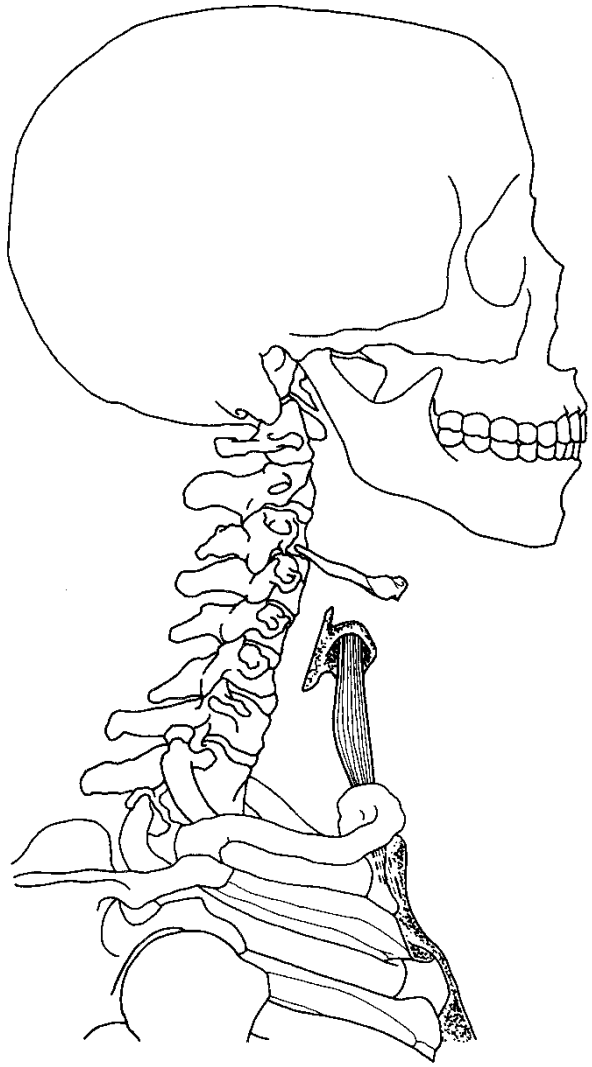
■ **Action**
Depresses hyoid bone

■ **Nerve**
Ansa cervicalis (C1–C3)

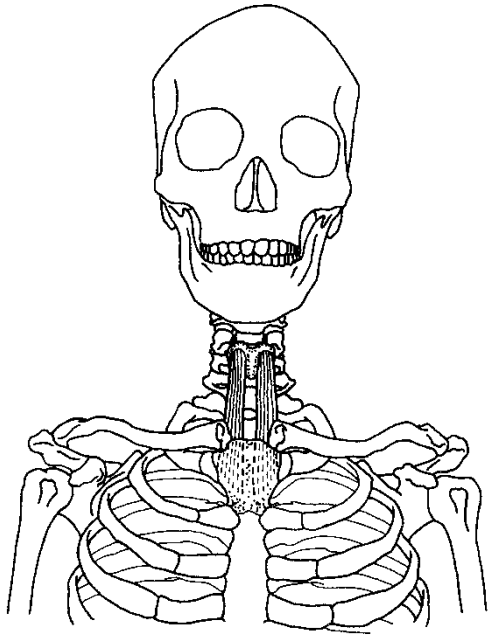


Lateral view

STERNOTHYROID



Lateral view



Frontal view

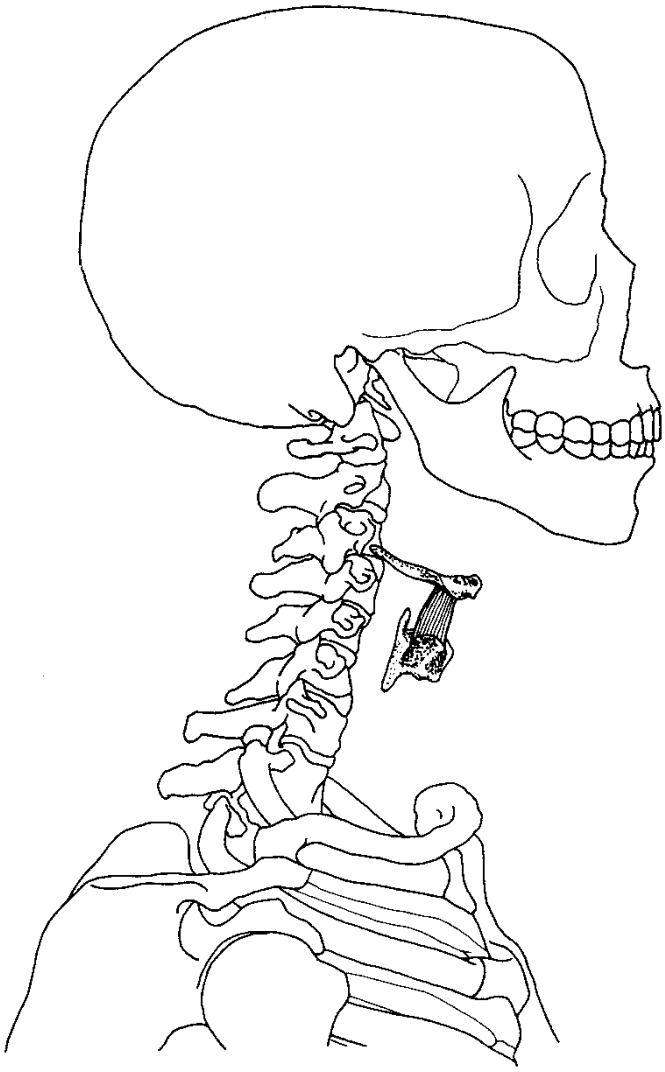
■ **Origin**
Dorsal surface of manubrium of sternum

■ **Insertion**
Lamina of thyroid cartilage

■ **Action**
Depresses thyroid cartilage

■ **Nerve**
Ansa cervicalis (C1–C3)

THYROHYOID



Lateral view

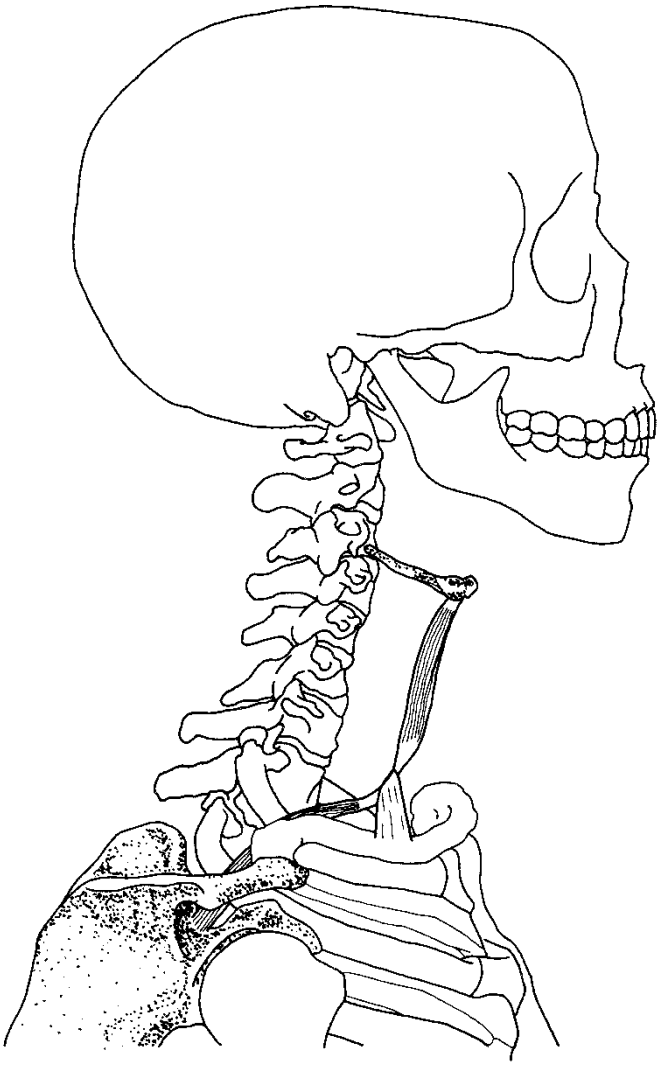
■ **Origin**
Lamina of thyroid cartilage

■ **Insertion**
Inferior border of body and greater horn of hyoid bone

■ **Action**
Depresses hyoid or raises thyroid

■ **Nerve**
C1 through hypoglossal nerve

OMOHYOID



Lateral view

■ **Origin**
Superior border of scapula

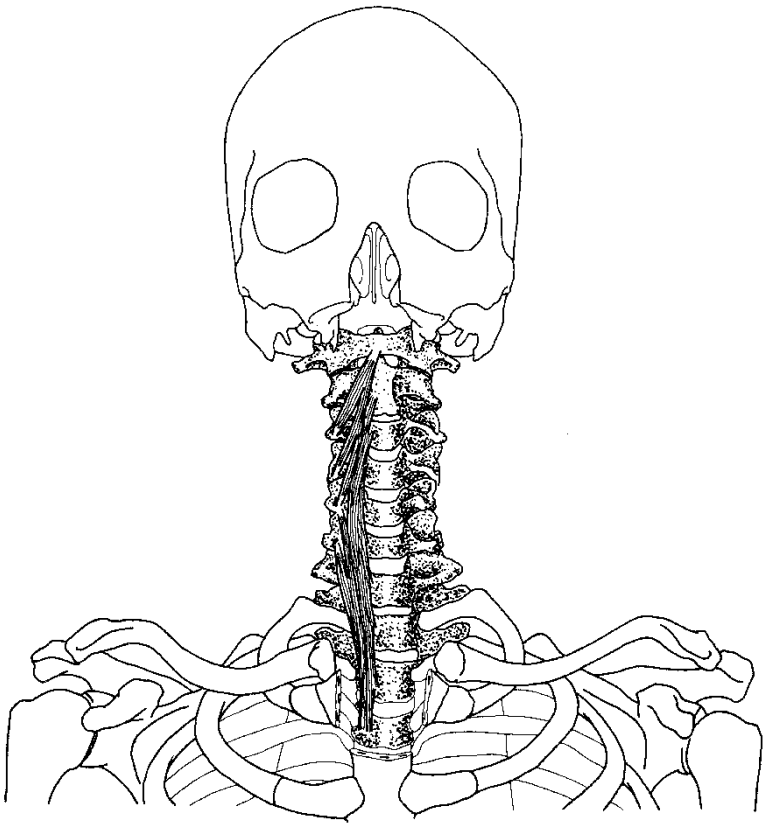
■ **Insertion**
Inferior belly—bound to clavicle by central tendon

Superior belly—continues to body of hyoid bone

■ **Action**
Depresses hyoid bone

■ **Nerve**
Ansa cervicalis (C2, C3)

LONGUS COLLI



Frontal view

(Mandible and part of maxilla removed)

Superior oblique part

■ **Origin**
Transverse processes of third, fourth, and fifth cervical vertebrae

■ **Insertion**
Anterior arch of atlas

Inferior oblique part

■ **Origin**
Anterior surface of bodies of first two or three thoracic vertebrae

■ **Insertion**
Transverse processes of fifth and sixth cervical vertebrae

Vertical part

■ **Origin**
Anterior surfaces of bodies of upper three thoracic and lower three cervical vertebrae

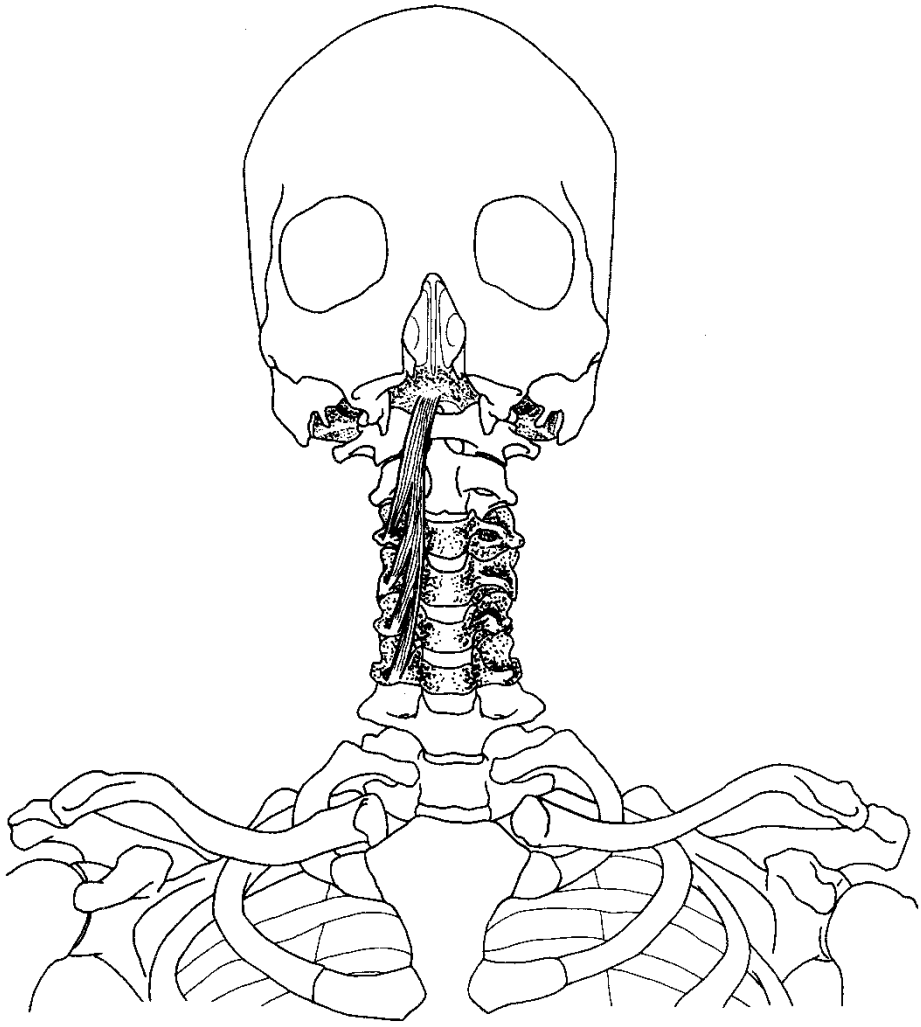
■ **Insertion**
Anterior surfaces of the second, third, and fourth cervical vertebrae

■ **Action**
All three parts flex cervical vertebrae

■ **Nerve**
C2–C7

Note: Cervical hyperextension injuries (whiplash) may strain these muscles and/or sprain the anterior ligaments of vertebrae.

LONGUS CAPITIS



Frontal view

(Mandible and part of maxilla removed)

■ Origin
Anterior tubercles of transverse processes of third through sixth cervical vertebrae

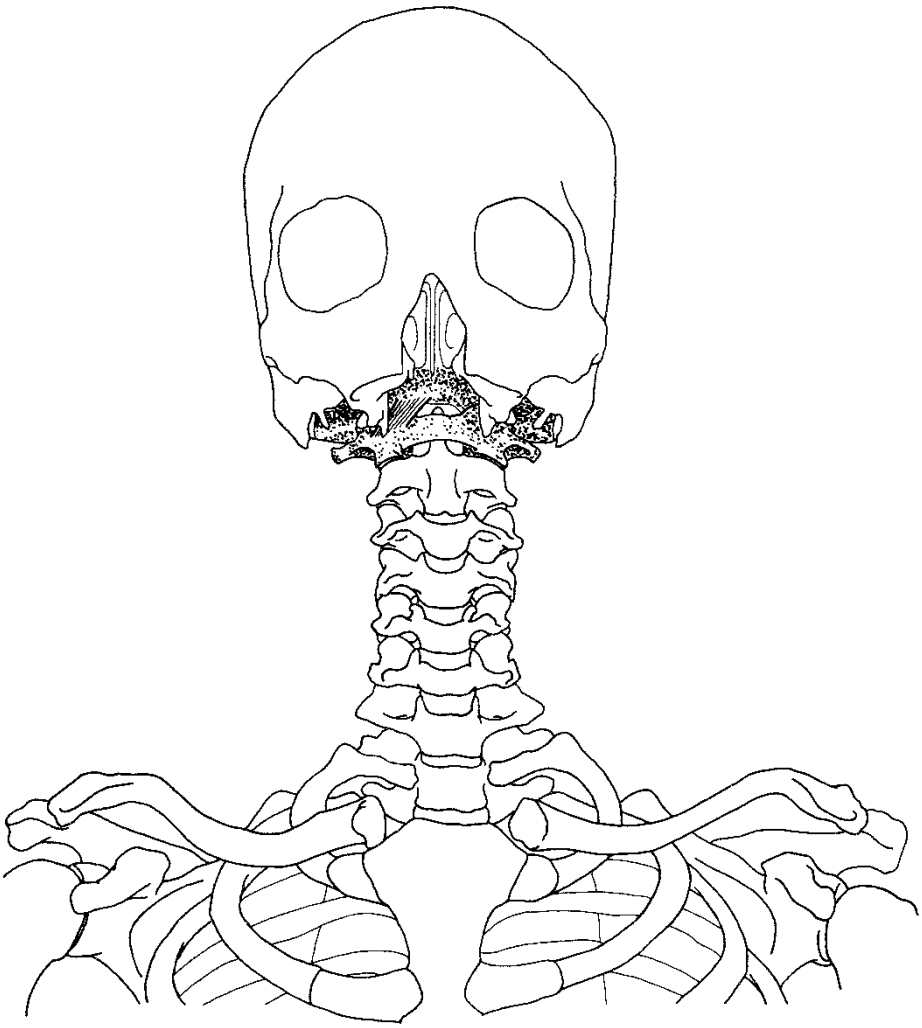
■ Insertion
Occipital bone anterior to foramen magnum

■ Action
Acting together (bilaterally)—flex head

Acting on one side only—rotate head

■ Nerve
C1–C3

RECTUS CAPITIS ANTERIOR



Frontal view

(Mandible and part of maxilla removed)

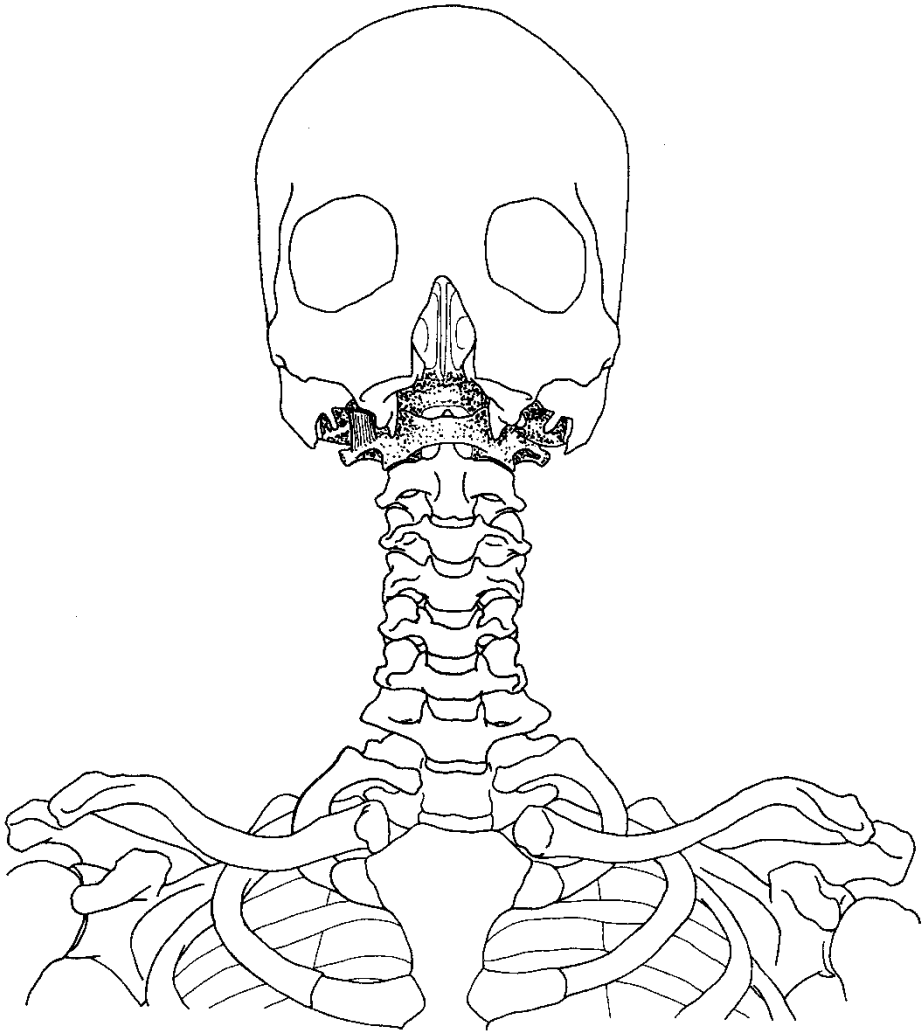
■ Origin
Anterior base of transverse process of atlas

■ Insertion
Occipital bone anterior to foramen magnum

■ Action
Flexes head

■ Nerve
C1, C2

RECTUS CAPITIS LATERALIS



Frontal view

(Mandible and part of maxilla removed)

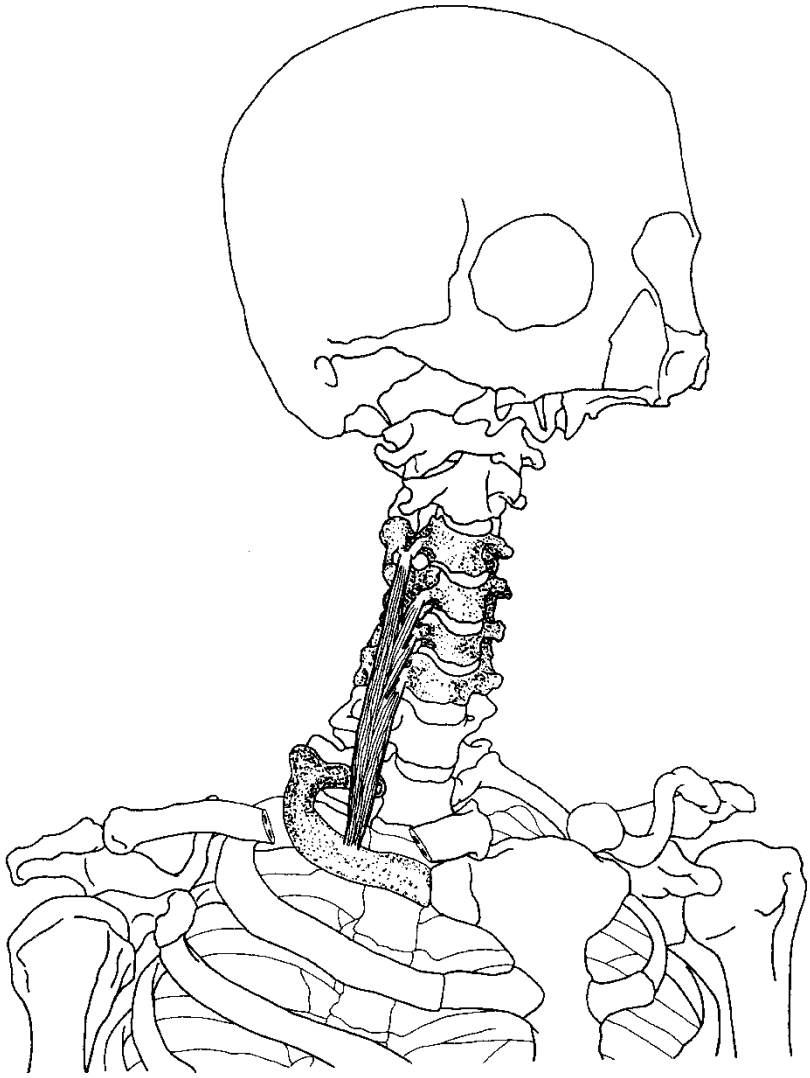
■ Origin
Transverse process of atlas

■ Insertion
Jugular process of occipital bone

■ Action
Bends head laterally

■ Nerve
C1, C2

SCALENUS ANTERIOR



Three-quarter frontal view

(Mandible and part of maxilla removed)

■ Origin

Transverse processes of third through sixth cervical vertebrae

■ Insertion

Inner border of first rib (scalene tubercle)

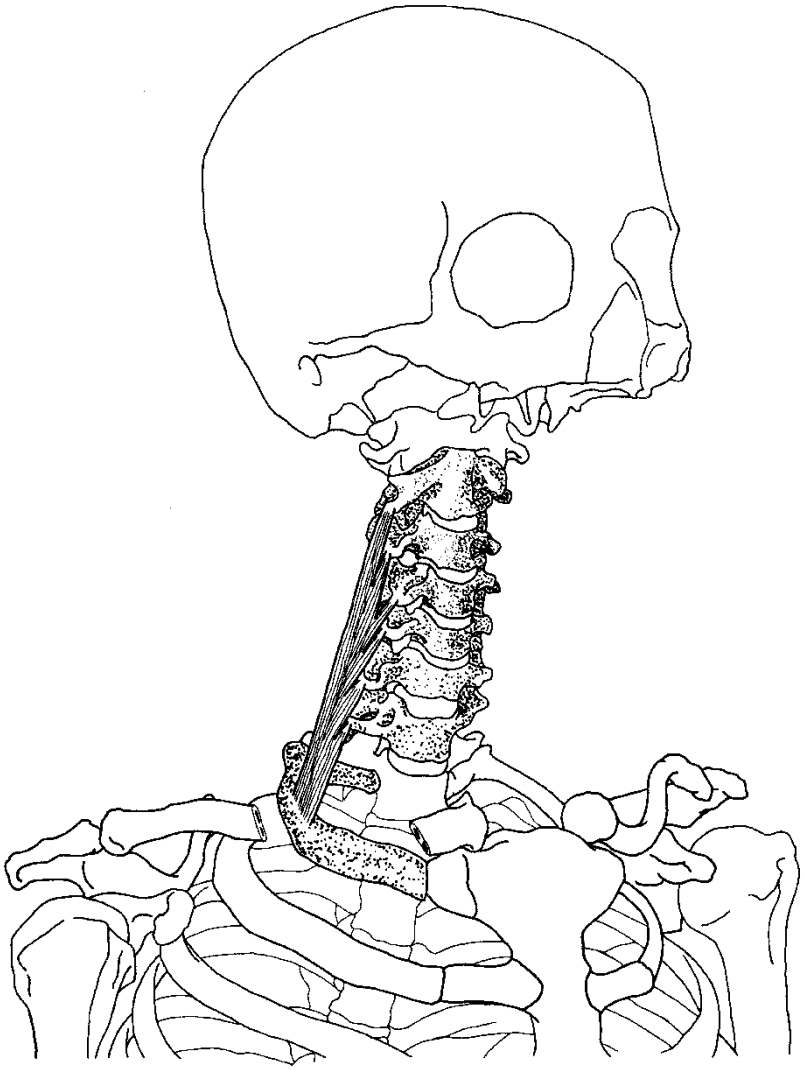
■ Action

Raises first rib (respiratory inspiration); acting together, they flex neck; acting on one side, they laterally flex, rotate neck

■ Nerve

Ventral rami of cervical nerves (C4–C6)

SCALENUS MEDIUS



Three-quarter frontal view

(Mandible and part of maxilla removed)

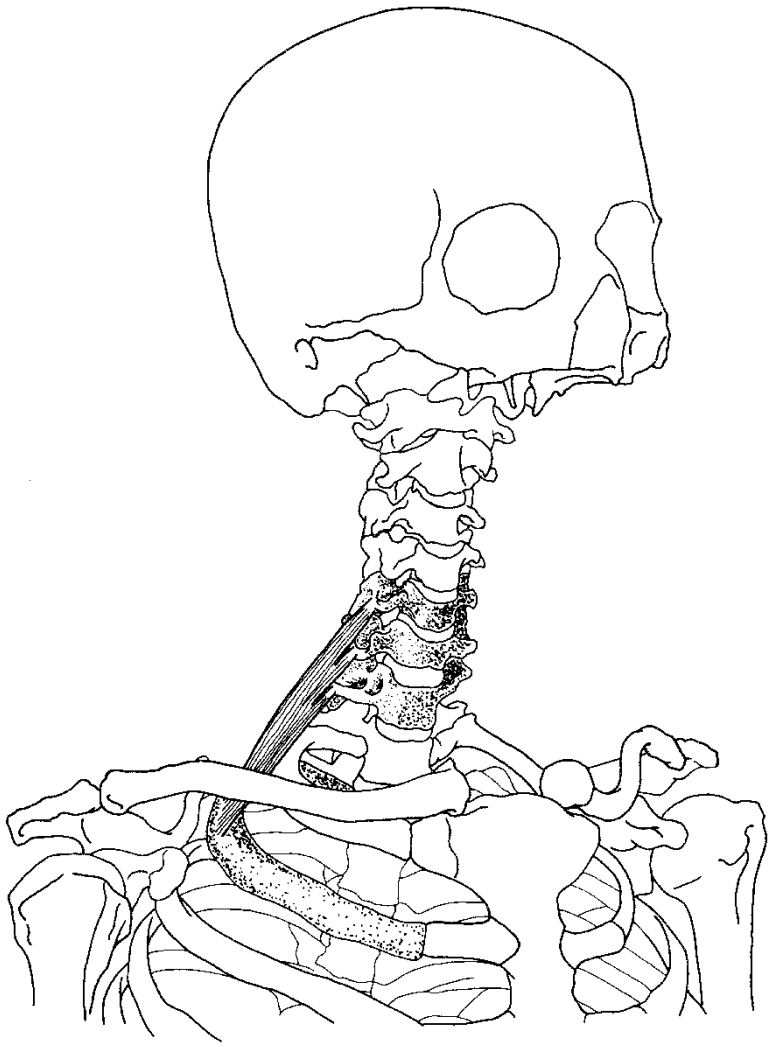
■ Origin
Transverse processes of lower six cervical vertebrae (C2–C7)

■ Insertion
Upper surface of first rib

■ Action
Raises first rib (respiratory inspiration); acting together, they flex neck; acting on one side, they laterally flex, rotate neck

■ Nerve
Ventral rami of cervical nerves (C3–C8)

SCALENUS POSTERIOR



Three-quarter frontal view

(Mandible and part of maxilla removed)

■ Origin

Transverse processes of lower two or three cervical vertebrae (C5–C7)

■ Insertion

Outer surface of second rib

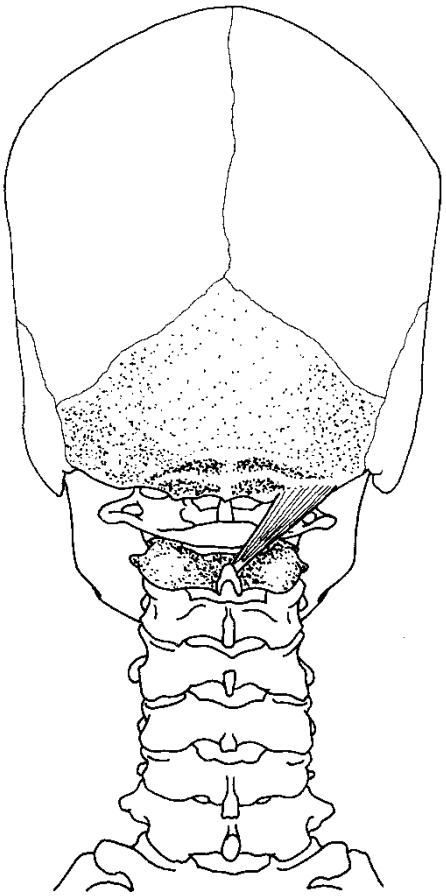
■ Action

Raises second rib (respiratory inspiration); acting together, they flex neck; acting on one side, they laterally flex, rotate neck

■ Nerve

Ventral rami of lower three cervical nerves

RECTUS CAPITIS POSTERIOR MAJOR



Posterior skull and cervical vertebrae

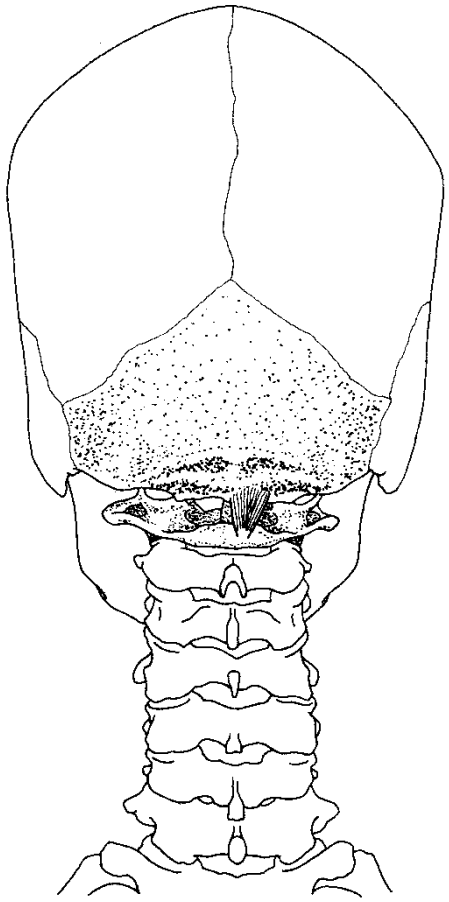
Origin
Spinous process of axis

Insertion
Lateral portion of inferior nuchal line of occipital bone

Action
Extends and rotates head

Nerve
Suboccipital nerve

RECTUS CAPITIS POSTERIOR MINOR



Posterior skull and cervical vertebrae

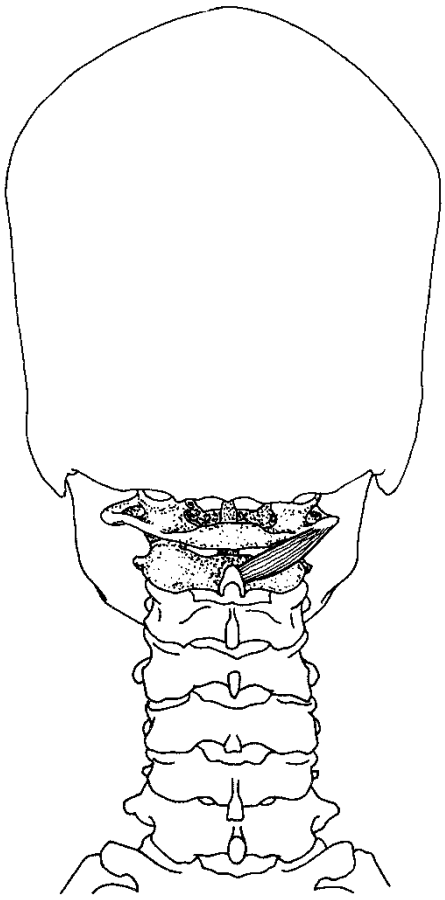
■ **Origin**
Posterior arch of atlas

■ **Insertion**
Medial portion of inferior nuchal line of occipital bone

■ **Action**
Extends head

■ **Nerve**
Suboccipital nerve

OBLIQUUS CAPITIS INFERIOR



Posterior skull and cervical vertebrae

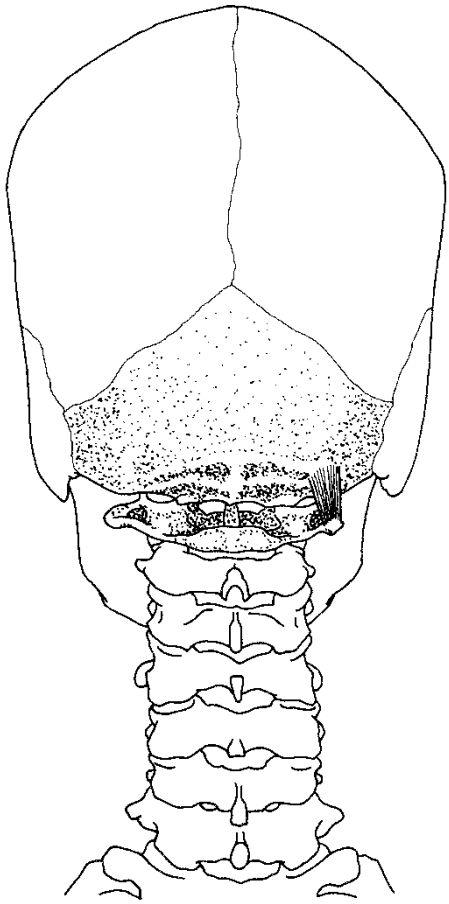
Origin
Spinous process of axis

Insertion
Transverse process of atlas

Action
Rotates atlas

Nerve
Suboccipital nerve

OBLIQUUS CAPITIS SUPERIOR



Posterior skull and cervical vertebrae

■ **Origin**
Transverse process of atlas

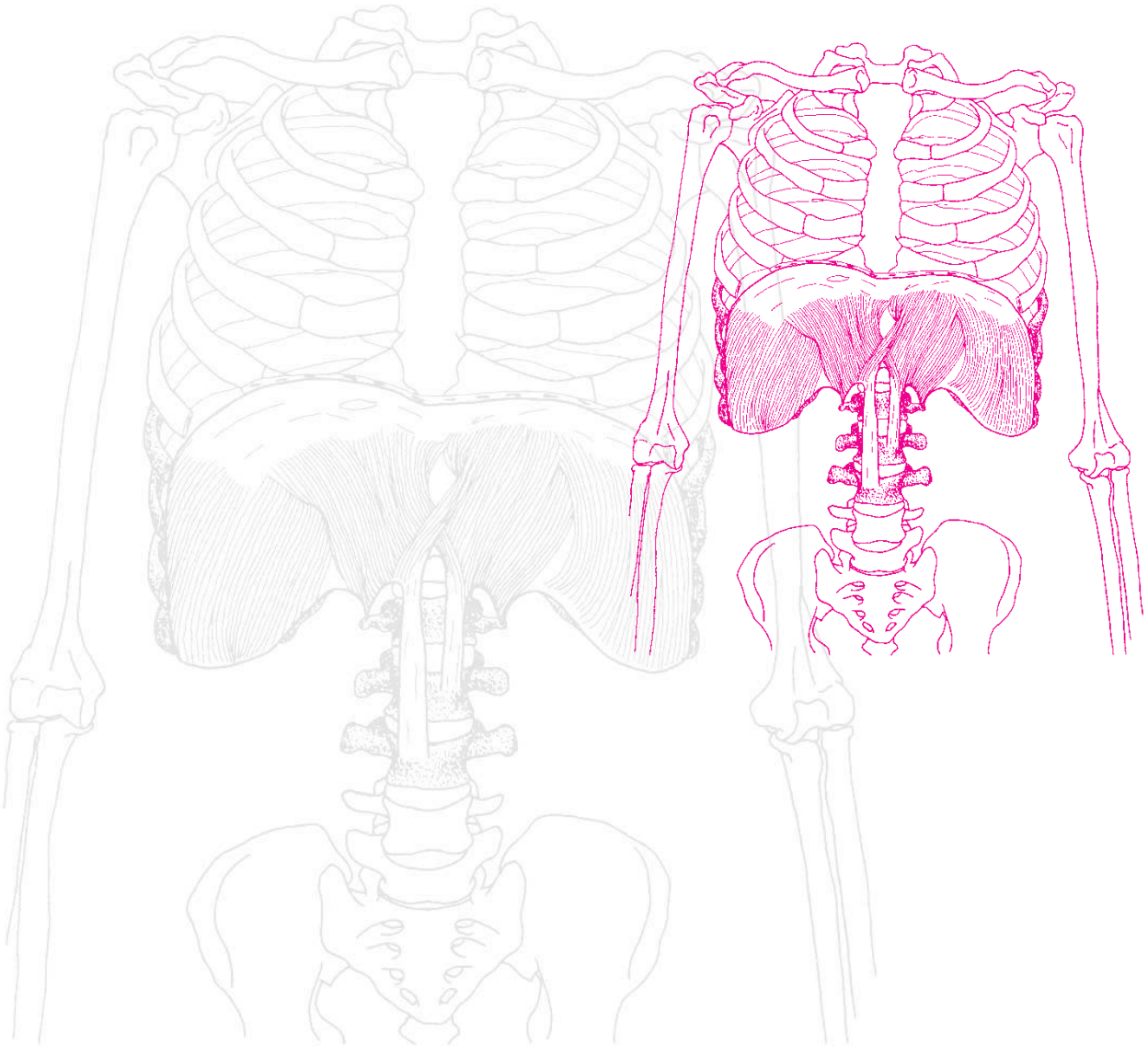
■ **Insertion**
Occipital bone between inferior and superior nuchal lines

■ **Action**
Extends head and flexes head laterally to the same side (ipsilaterally)

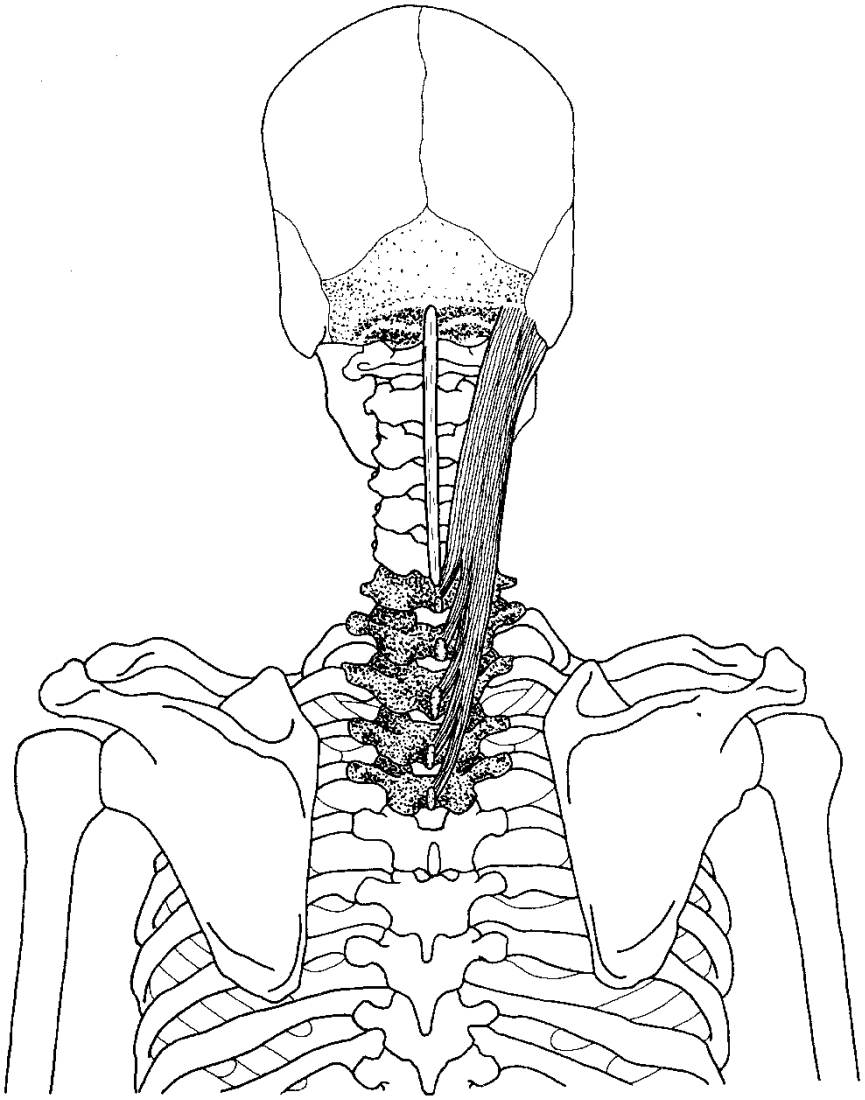
■ **Nerve**
Suboccipital nerve

CHAPTER FIVE

Muscles of the Trunk



SPLENIUS CAPITIS



Posterior skull, neck, and back

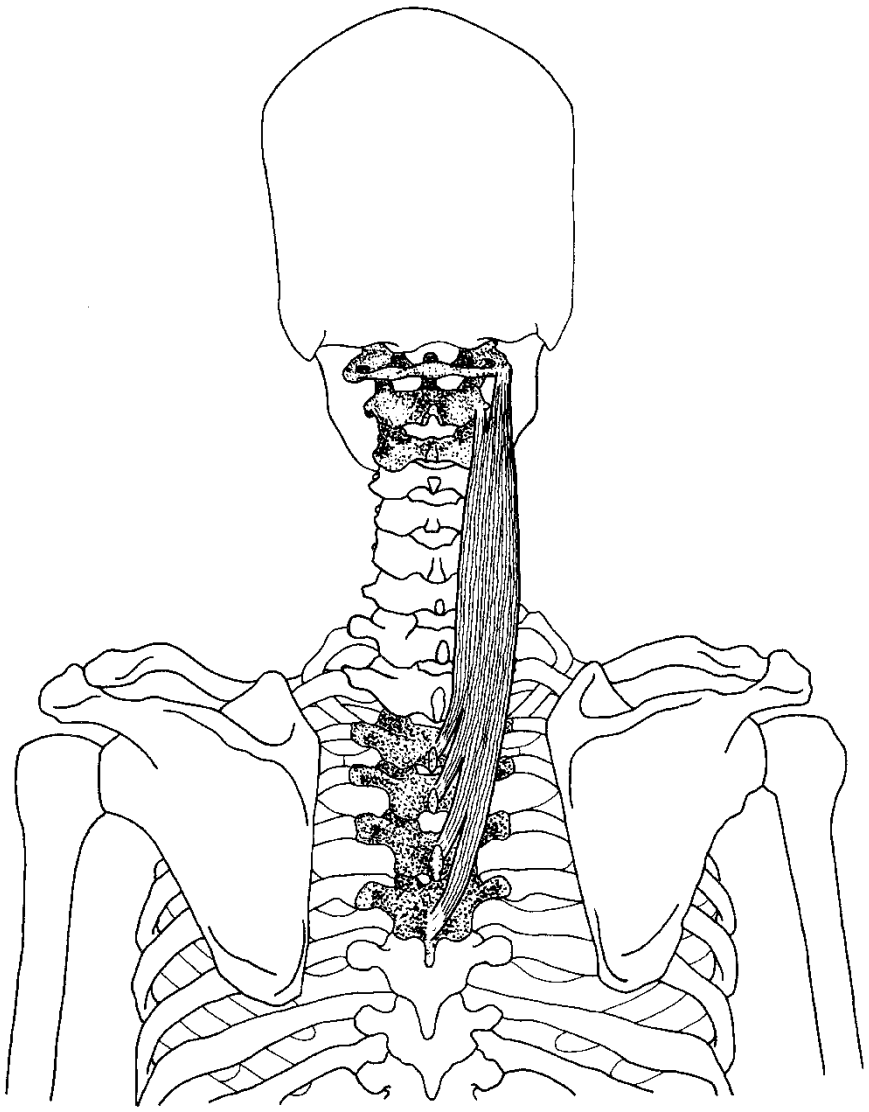
■ Origin
Lower part of ligamentum nuchae, spinous processes of seventh cervical vertebra (C7) and upper three or four thoracic vertebrae (T1–T4)

■ Insertion
Mastoid process of temporal bone and lateral part of superior nuchal line

■ Action
Acting together, they extend, hyperextend head, neck; acting on one side, they laterally flex, rotate head, neck

■ Nerve
Lateral branches of dorsal primary divisions of middle and lower cervical nerves

SPLENIUS CERVICIS



Posterior skull, neck, and back

■ Origin
Spinous processes of third through sixth thoracic vertebrae (T3–T6)

■ Insertion
Transverse processes of upper two or three cervical vertebrae (C1–C3)

■ Action
Acting together, they extend, hyperextend head, neck; acting on one side, they laterally flex, rotate head, neck

■ Nerve
Lateral branches of dorsal primary divisions of middle and lower cervical nerves

ERECTOR SPINAE

Iliocostalis cervicis

■ **Origin**
Angles of third through sixth ribs

■ **Insertion**
Transverse processes of fourth, fifth, and sixth cervical vertebrae

■ **Action**
Extension, lateral flexion of vertebral column

■ **Nerve**
Dorsal primary divisions of spinal nerves

Iliocostalis thoracis

■ **Origin**
Angles of lower six ribs medial to iliocostalis lumborum

■ **Insertion**
Angles of upper six ribs and transverse process of seventh cervical vertebra

■ **Action**
Extension, lateral flexion of vertebral column, rotates ribs for forceful inspiration

■ **Nerve**
Dorsal primary divisions of spinal nerves

Iliocostalis lumborum

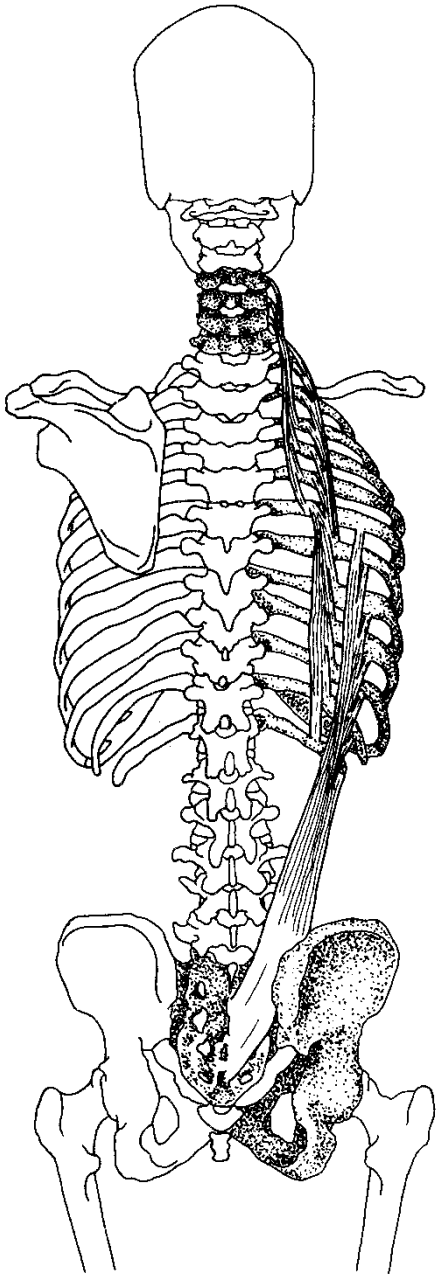
■ **Origin**
Medial and lateral sacral crests and medial part of iliac crests

■ **Insertion**
Angles of lower six ribs

■ **Action**
Extension, lateral flexion of vertebral column, rotates ribs for forceful inspiration

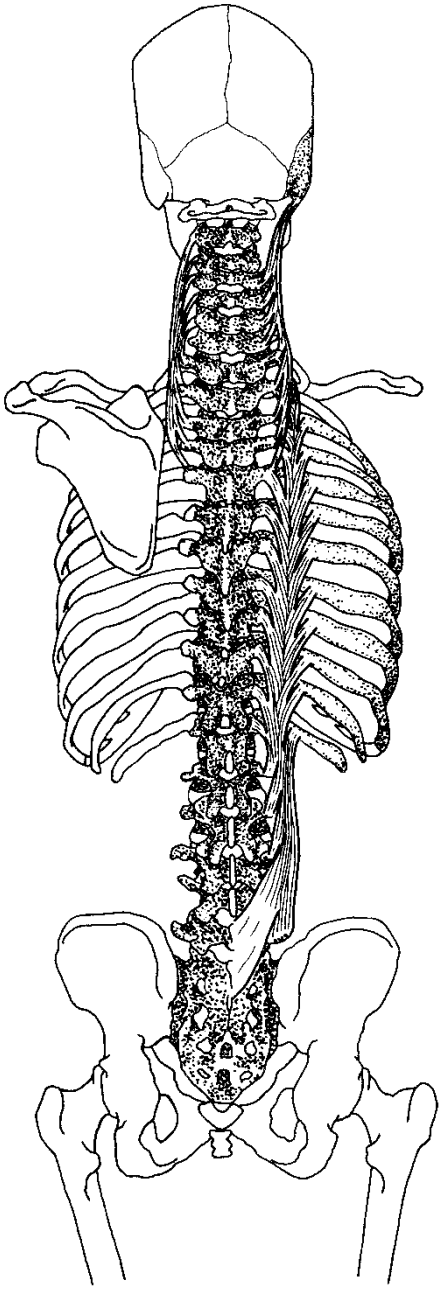
■ **Nerve**
Dorsal primary divisions of spinal nerves

Note: The erector spinae (sacrospinalis) is a complex of three sets of muscles: iliocostalis, longissimus, and spinalis. The origin of this group is the medial and lateral sacral crests, the medial part of iliac crests, and the spinous processes and supraspinal ligament of lumbar and eleventh and twelfth thoracic vertebrae.



Trunk—dorsal view

ERECTOR SPINAE



Trunk—dorsal view

Longissimus capitis

Origin
Transverse processes of upper five thoracic vertebrae (T1–T5), articular processes of lower three cervical vertebrae (C5–C7)

Insertion
Posterior part of mastoid process of temporal bone

Action
Extends and rotates head

Nerve
Dorsal primary divisions of middle and lower cervical nerves

Longissimus cervicis

Origin
Transverse processes of upper four or five thoracic vertebrae (T1–T5)

Insertion
Transverse processes of second through sixth cervical vertebrae (C2–C6)

Action
Extension, lateral flexion of vertebral column

Nerve
Dorsal primary divisions of spinal nerves

Longissimus thoracis

Origin
Medial and lateral sacral crests, spinous processes and supraspinal ligament of lumbar and eleventh and twelfth thoracic vertebrae, and medial part of iliac crests

Insertion
Transverse processes of all thoracic vertebrae, between tubercles and angles of lower nine or ten ribs

Action
Extension, lateral flexion of vertebral column, rotates ribs for forceful inspiration

Nerve
Dorsal primary divisions of spinal nerves

ERECTOR SPINAE

Spinalis capitis
(Medial part of semispinalis capitis)

Spinalis cervicis

■ **Origin**
Ligamentum nuchae, spinous process of seventh cervical vertebra

■ **Insertion**
Spinous process of axis

■ **Action**
Extends vertebral column

■ **Nerve**
Dorsal primary divisions of spinal nerves

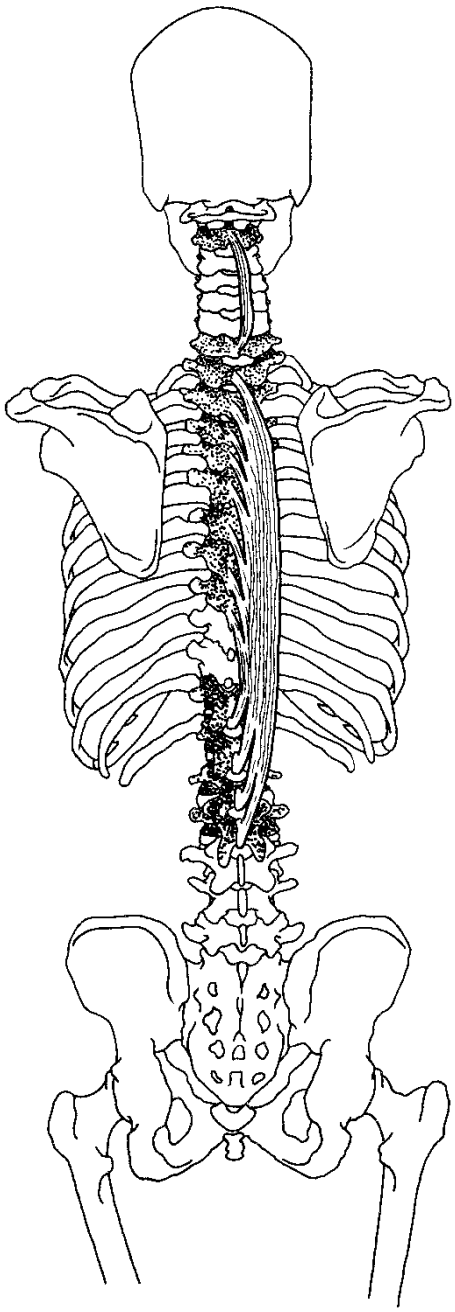
Spinalis thoracis

■ **Origin**
Spinous processes of lower two thoracic (T11, T12) and upper two lumbar (L1, L2) vertebrae

■ **Insertion**
Spinous processes of upper thoracic vertebrae (T1–T8)

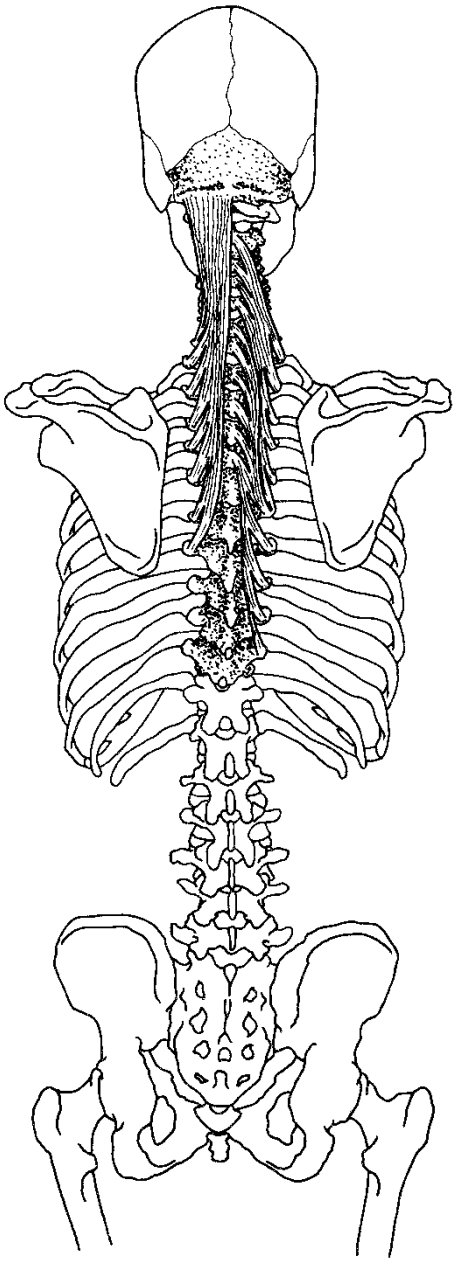
■ **Action**
Extends vertebral column

■ **Nerve**
Dorsal primary divisions of spinal nerves



Trunk—dorsal view

TRANSVERSOSPINALIS



Trunk—dorsal view

Semispinalis capitis

(Medial part is spinalis capitis)

■ Origin
Articular processes of cervical vertebrae C4–C6 and transverse processes of C7 and upper six or seven thoracic vertebrae (T1–T7)

■ Insertion
Between superior and inferior nuchal lines of occipital bone

■ Action
Extends and rotates head

■ Nerve
Dorsal primary divisions of spinal nerves

Semispinalis cervicis

■ Origin
Transverse processes of upper five or six thoracic vertebrae (T1–T6)

■ Insertion
Spinous processes of second to fifth cervical vertebrae (C2–C5)

■ Action
Extends and rotates vertebral column

■ Nerve
Dorsal primary divisions of spinal nerves

Semispinalis thoracis

■ Origin
Transverse processes of the sixth through tenth thoracic vertebrae (T6–T10)

■ Insertion
Spinous processes of the lower two cervical (C6, C7) and upper four thoracic (T1–T4) vertebrae

■ Action
Extends and rotates vertebral column

■ Nerve
Dorsal primary divisions of spinal nerves

Note: The transversospinalis is composed of groups of small muscles generally extending upward from transverse processes to spinous processes of higher vertebrae. They are deep to erector spinae. They include semispinalis, multifidi, and rotatores.

MULTIFIDIS*

Trunk—dorsal view

■ Origin
Sacral region—along sacral foramina up to posterior superior iliac spine

Lumbar region—mammillary processes† of vertebrae

Thoracic region—transverse processes

Cervical region—articular processes of lower four vertebrae (C4–C7)

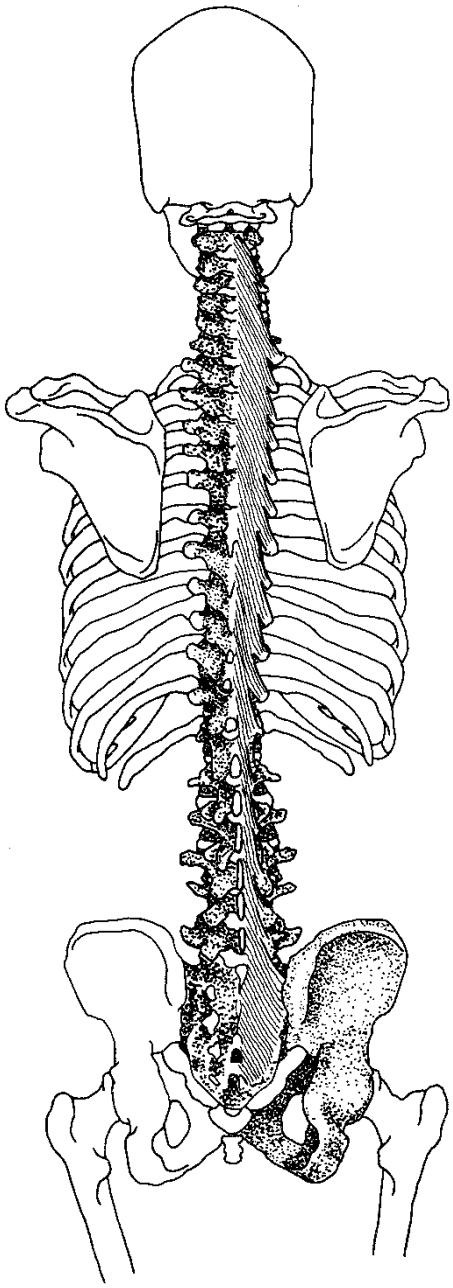
■ Insertion
Spinous process two to four vertebrae superior to origin

■ Action
Extend and rotate vertebral column

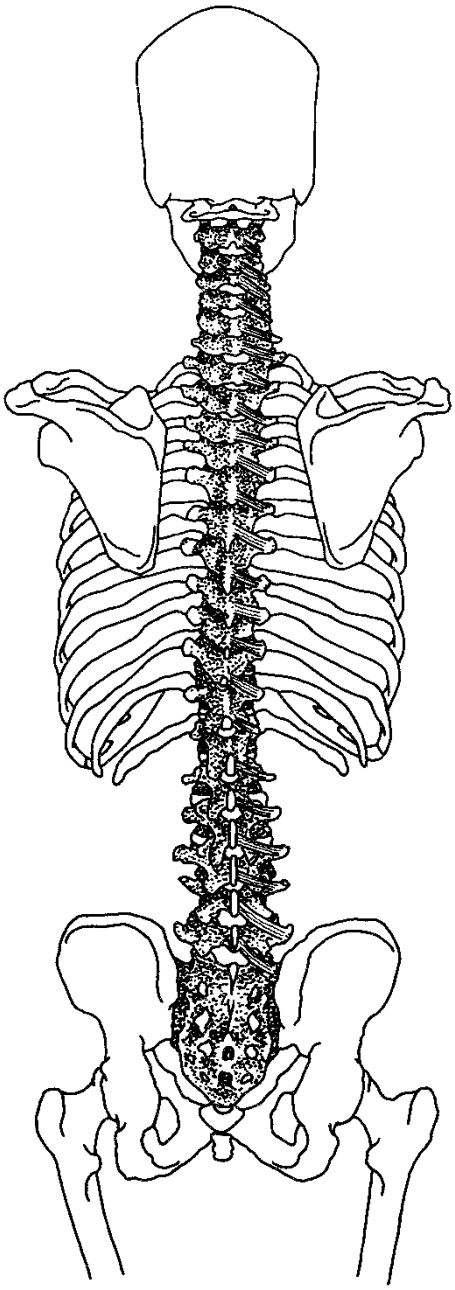
■ Nerve
Dorsal primary division of spinal nerves

*Part of transversospinalis.

†Posterior border of superior articular process.



ROTATORES*



Trunk—dorsal view

Origin
Transverse process of each vertebra

Insertion
Base of spinous process of next vertebra above

Action
Extend and rotate vertebral column

Nerve
Dorsal primary division of spinal nerves

*Part of transversospinalis.

INTERSPINALES *(Paired on either side of interspinal ligament)*

Trunk—dorsal view

■ Origin
Cervical region—spinous processes of third to seventh cervical vertebrae (C3–C7)

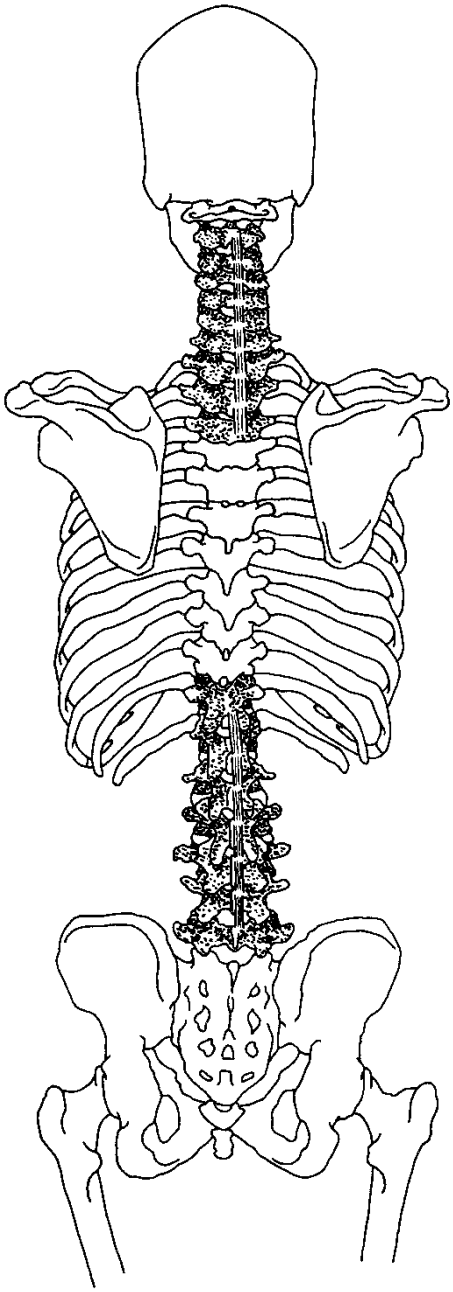
Thoracic region—spinous processes of first to third (T1–T3) and eleventh and twelfth thoracic vertebrae (T11, T12)

Lumbar region—spinous processes of second to fifth lumbar vertebrae (L2–L5)

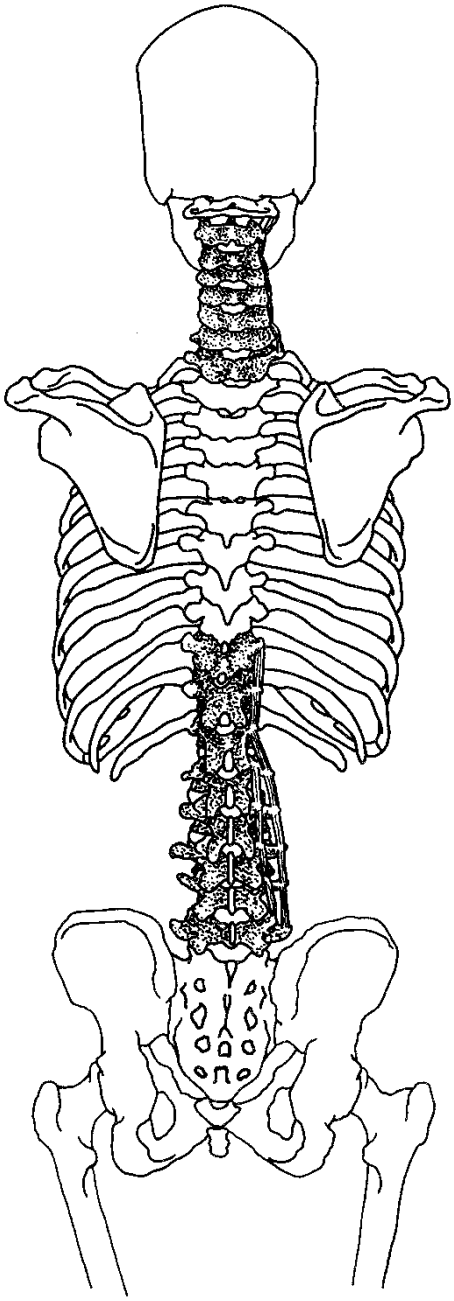
■ Insertion
Spinous process of next vertebra superior to origin

■ Action
Extend vertebral column

■ Nerve
Dorsal primary division of spinal nerves



INTERTRANSVERSARII



Trunk—dorsal view

Cervical region

Intertransversarii anteriores

- **Origin** Anterior tubercle of transverse processes of vertebrae from first thoracic to axis
- **Insertion** Anterior tubercle of next superior vertebra
- **Action** Lateral flexion of vertebral column
- **Nerve** Ventral primary division of spinal nerves

Intertransversarii posteriores

- **Origin** Posterior tubercle of transverse processes of vertebrae from first thoracic to axis
- **Insertion** Posterior tubercle of next superior vertebra

Thoracic region

- **Origin** Transverse processes of first lumbar to eleventh thoracic vertebrae
- **Insertion** Transverse processes of next superior vertebra

Lumbar region

Intertransversarii laterales

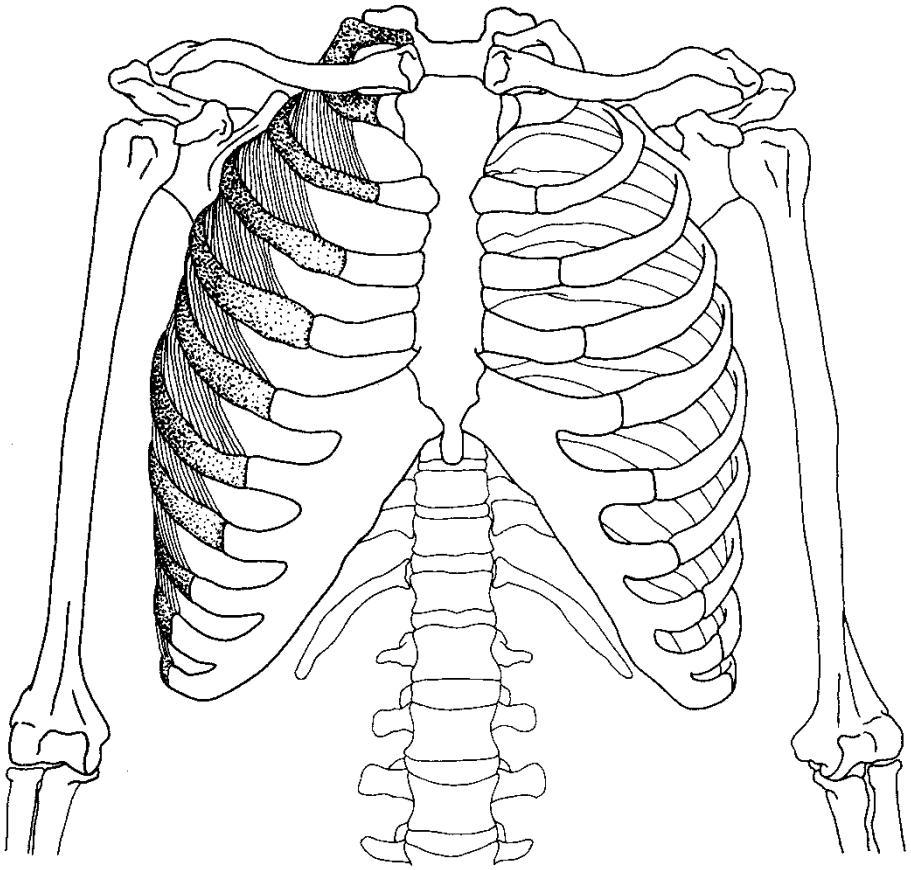
- **Origin** Transverse processes of lumbar vertebrae
- **Insertion** Transverse process of next superior vertebra
- **Action** Lateral flexion of vertebral column
- **Nerve** Ventral primary division of spinal nerves

Intertransversarii mediales

- **Origin** Mammillary process* of each lumbar vertebra
- **Insertion** Accessory process of the next superior lumbar vertebra
- **Action** Lateral flexion of vertebral column
- **Nerve** Dorsal primary division of spinal nerves

*Posterior border of superior articular process.

EXTERNAL INTERCOSTALS *(Intercostales Externi)*



Trunk—anterior view

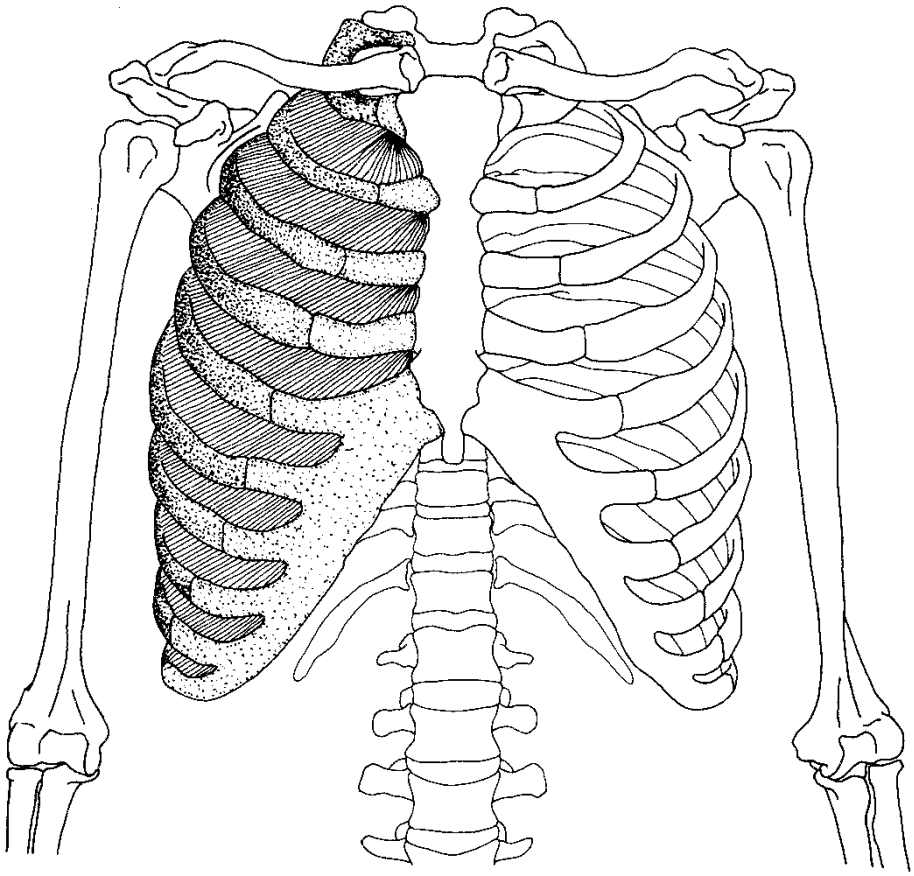
■ Origin
Lower margin of upper eleven ribs

■ Insertion
Superior border of rib below (each muscle fiber runs obliquely and inserts toward the costal cartilage)

■ Action
Draw ventral part of ribs upward, increasing the volume of the thoracic cavity for inspiration

■ Nerve
Intercostal nerves

INTERNAL INTERCOSTALS *(Intercostales Interni)*



Trunk—anterior view

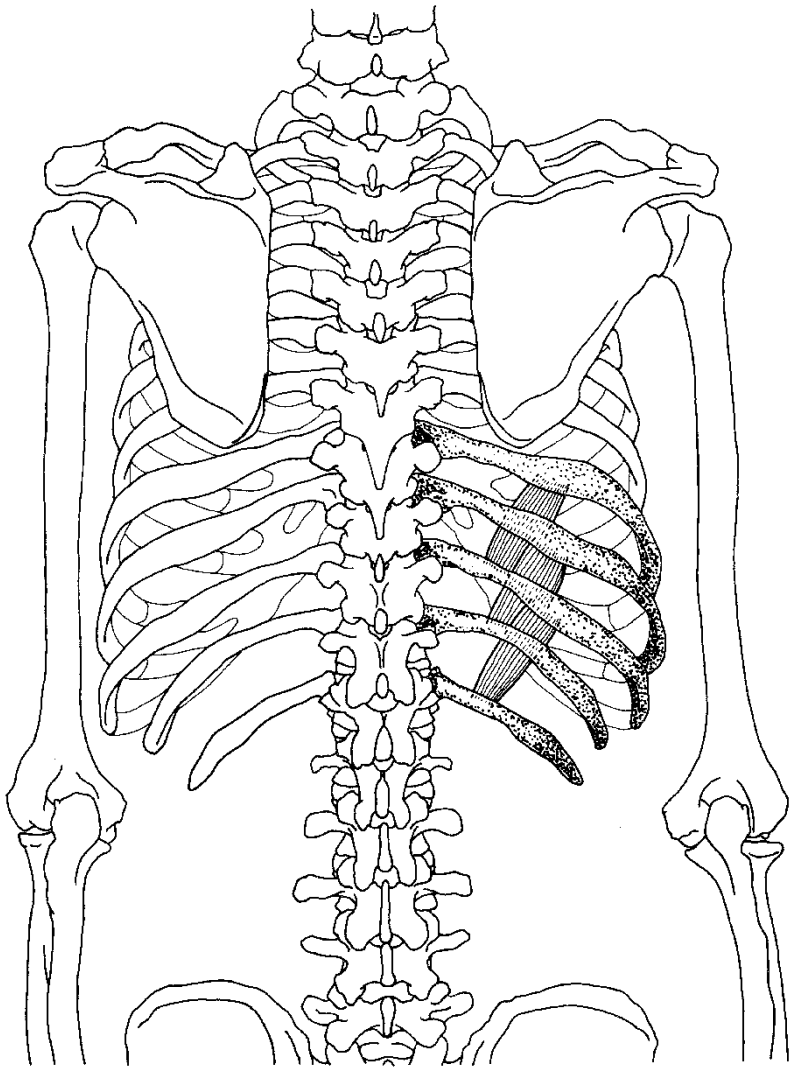
■ **Origin**
From the cartilages to the angles of the upper eleven ribs

■ **Insertion**
Superior border of the rib below (each muscle fiber runs obliquely and inserts away from the costal cartilage)

■ **Action**
Draw ventral part of ribs downward, decreasing the volume of the thoracic cavity for expiration

■ **Nerve**
Intercostal nerves

SUBCOSTALS *(Subcostales)*



Trunk—dorsal view

■ Origin
Inner surface of each rib near its angle

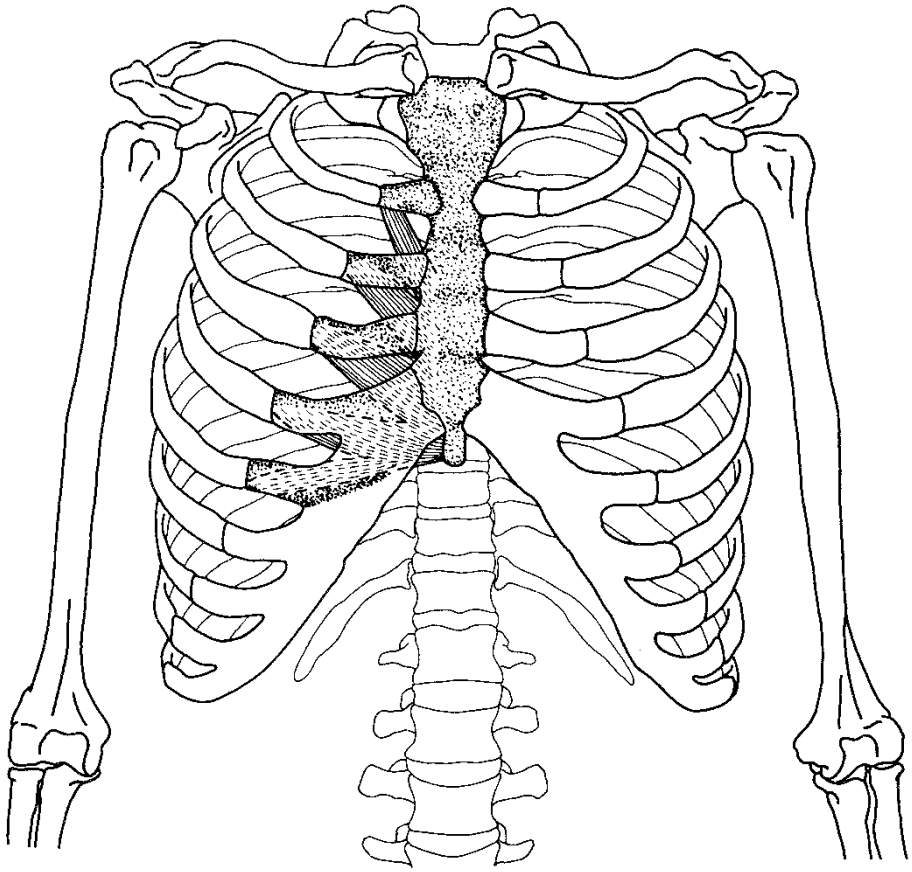
■ Insertion
Medially on the inner surface of second or third rib below

■ Action
Draw ventral part of ribs downward, decreasing the volume of the thoracic cavity for forceful expiration

■ Nerve
Intercostal nerves

Note: These muscles are deep to the internal intercostals. They continue distally between single ribs, where they are known as innermost intercostal muscles.

TRANSVERSUS THORACIS



Trunk—anterior view

Origin
Inner surface of lower portion of sternum and adjacent costal cartilages

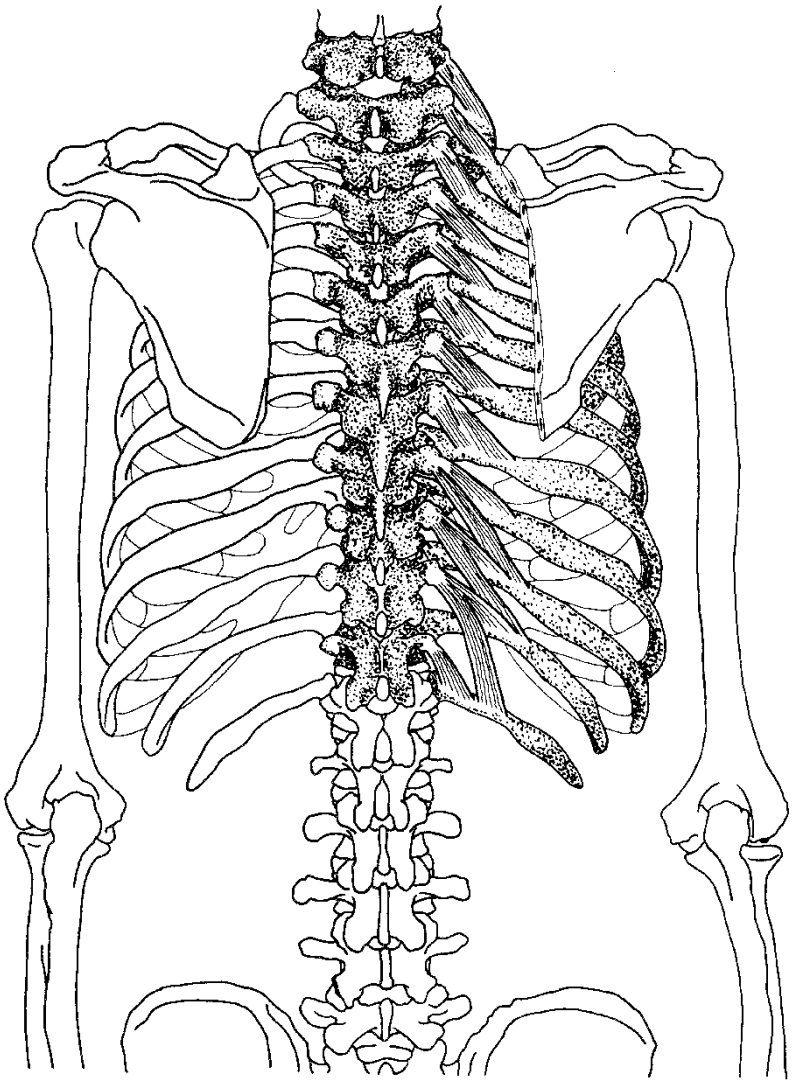
Insertion
Inner surfaces of costal cartilages of the second through sixth ribs

Action
Draws ventral part of ribs downward, decreasing the volume of the thoracic cavity for forceful expiration

Nerve
Intercostal nerves

Note: These muscles are deep to the internal intercostal muscles.

LEVATORES COSTARUM



Trunk—dorsal view

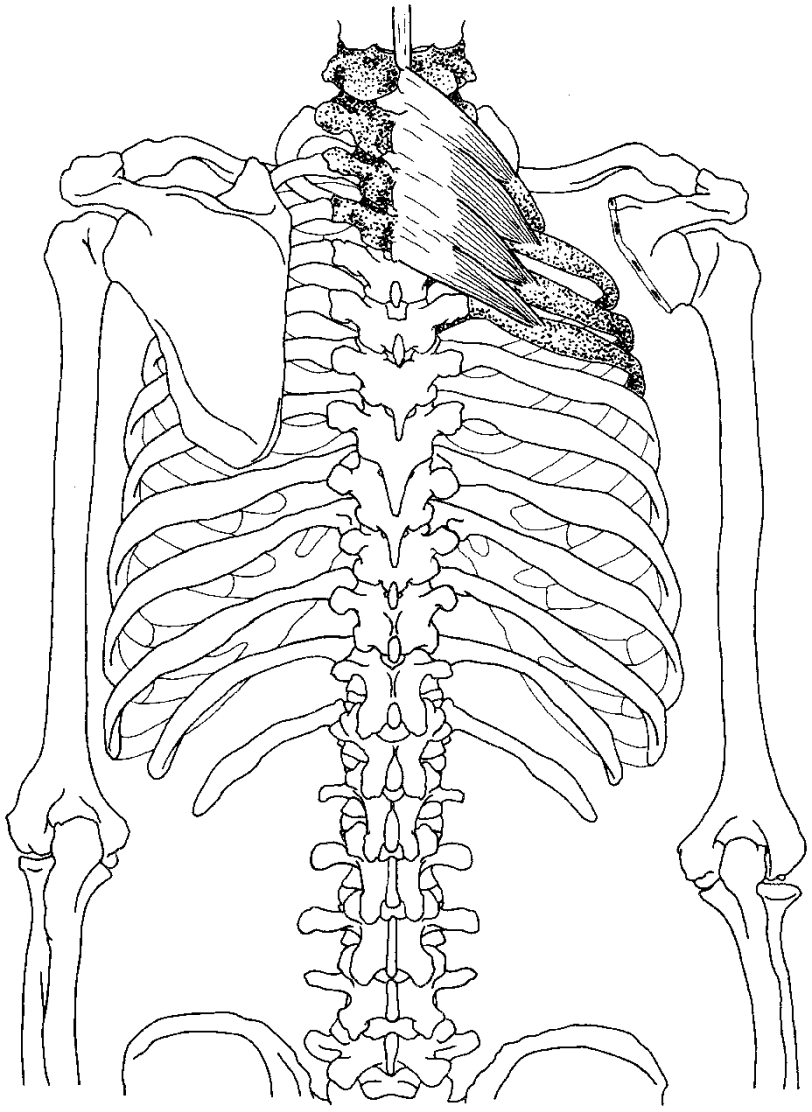
■ Origin
Transverse processes of the seventh cervical and the upper eleven thoracic vertebrae

■ Insertion
Laterally to outer surface of next lower rib (lower muscles may cross over one rib)

■ Action
Raises ribs; extends, laterally flexes, and rotates vertebral column

■ Nerve
Intercostal nerves

SERRATUS POSTERIOR SUPERIOR



Trunk—dorsal view

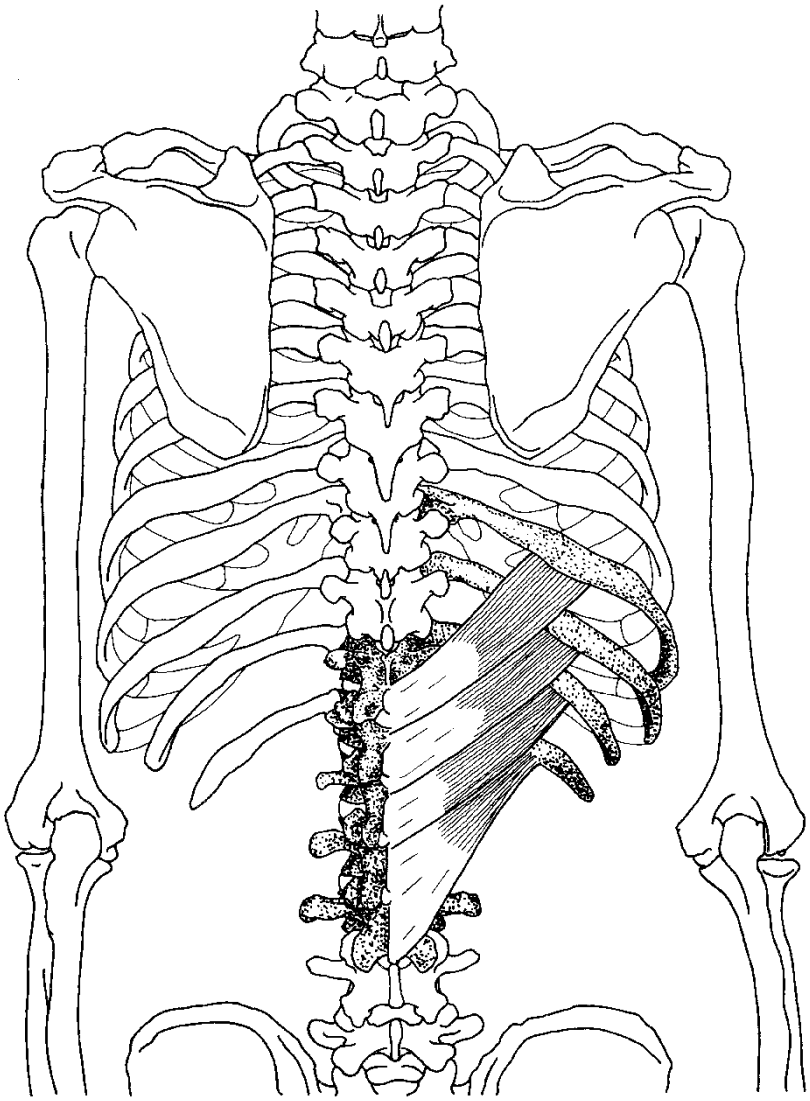
■ Origin
Ligamentum nuchae, spinous processes of seventh cervical and first few thoracic vertebrae

■ Insertion
Upper borders of the second through fifth ribs lateral to their angles

■ Action
Raises ribs in inspiration

■ Nerve
T1–T4

SERRATUS POSTERIOR INFERIOR



Trunk—dorsal view

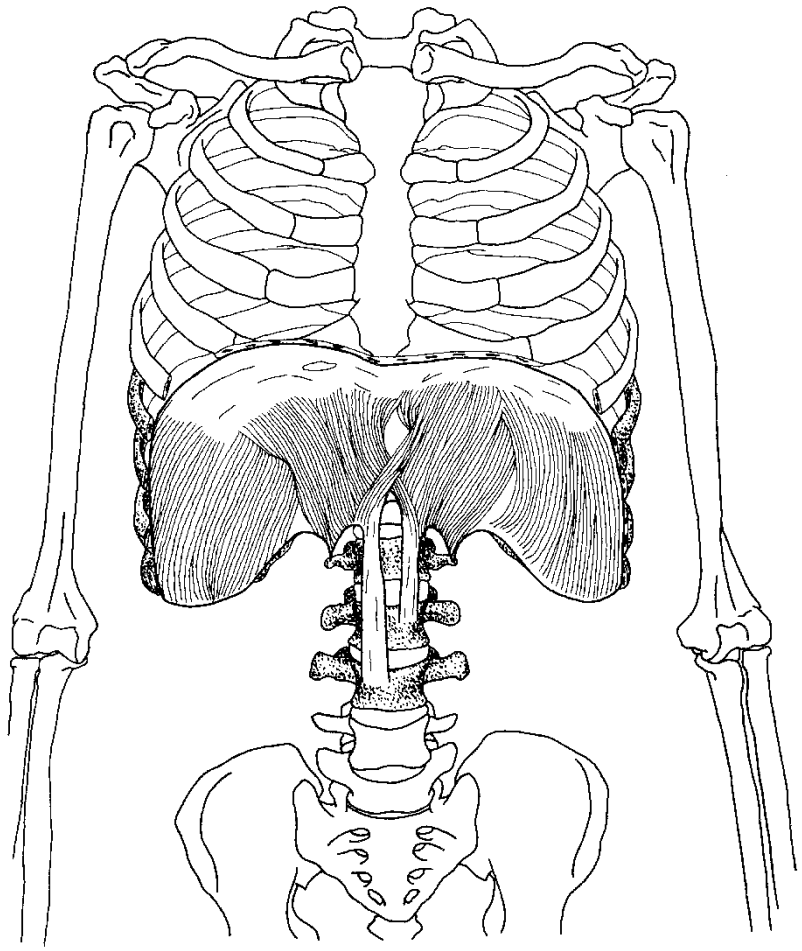
■ Origin
Spinous processes of the lower two thoracic and the upper two or three lumbar vertebrae

■ Insertion
Lower borders of bottom four ribs

■ Action
Pulls ribs down, resisting pull of diaphragm

■ Nerve
T9–T12

DIAPHRAGM



Trunk—anterior view

(Lower costal cartilages removed)

■ Origin

Sternal part—inner part of xiphoid process

Costal part—inner surfaces of lower six ribs and their cartilages

Lumbar part—upper two or three lumbar vertebrae and lateral and medial lumbocostal arches*

■ Insertion

Fibers converge and meet on a central tendon

■ Action

Draws central tendon inferiorly, for inspiration

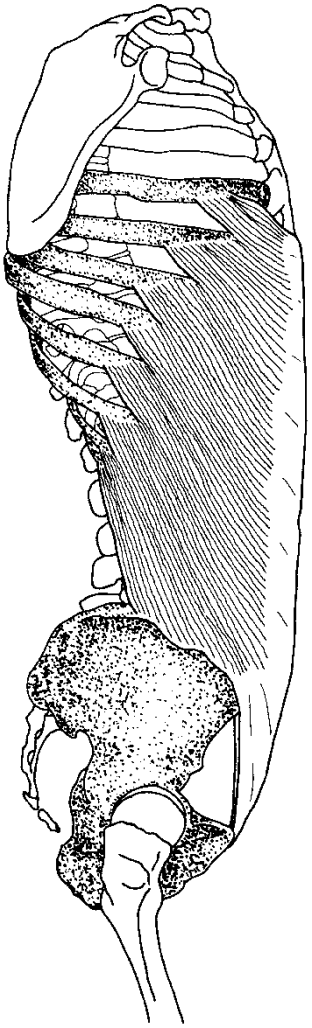
■ Nerve

Phrenic nerve (C3–C5)

Note: This muscle inserts upon itself. Its action is to change the volume of the thoracic and abdominal cavities.

*These tendinous structures, also known as the medial and lateral arcuate ligaments, allow the diaphragm to bridge the upper parts of the psoas major and quadratus lumborum muscles.

EXTERNAL OBLIQUE *(Obliquus Externus Abdominis)*



Trunk—lateral view

■ Origin
Lower eight ribs

■ Insertion
Anterior part of iliac crest, abdominal aponeurosis (rectus sheath) to linea alba

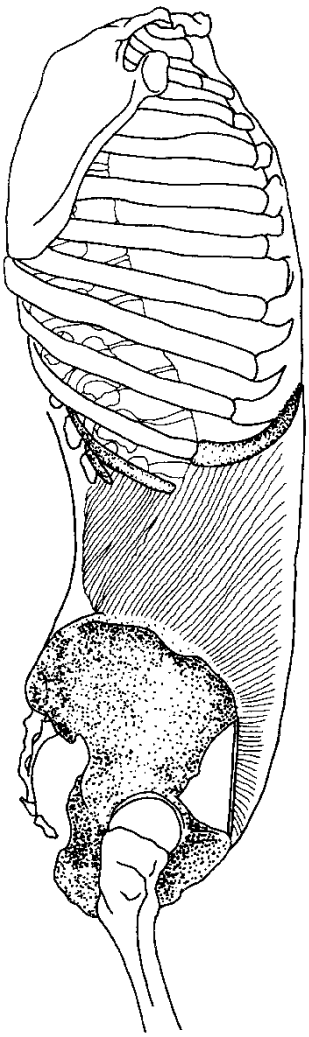
■ Action
Compresses abdominal contents, laterally flexes and rotates vertebral column

■ Nerve
Eighth to twelfth intercostal, iliohypogastric, ilioinguinal nerves

■ Relationship
Most superficial of the three lateral abdominal muscles

Note: Important in forced expiration, coughing, sneezing.

INTERNAL OBLIQUE *(Obliquus Internus Abdominis)*



Trunk—lateral view

■ Origin
Lateral half of inguinal ligament, iliac crest, thoracolumbar fascia

■ Insertion
Cartilage of bottom three or four ribs, abdominal aponeurosis (rectus sheath) to linea alba

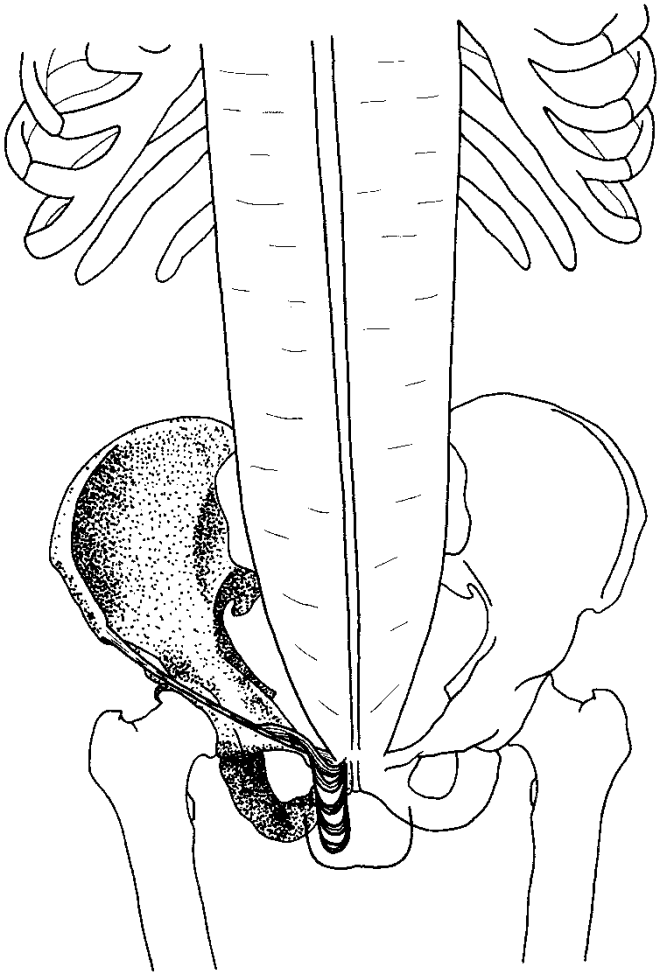
■ Action
Compresses abdominal contents, laterally flexes and rotates vertebral column

■ Nerve
Eighth to twelfth intercostal, iliohypogastric, ilioinguinal nerves

■ Relationship
Middle layer of the three lateral abdominal muscles

Note: Important in forced expiration, coughing, sneezing.

CREMASTER



Trunk—anterior view

■ Origin
Inguinal ligament

■ Insertion
Pubic tubercle, crest of pubis, sheath of rectus abdominis

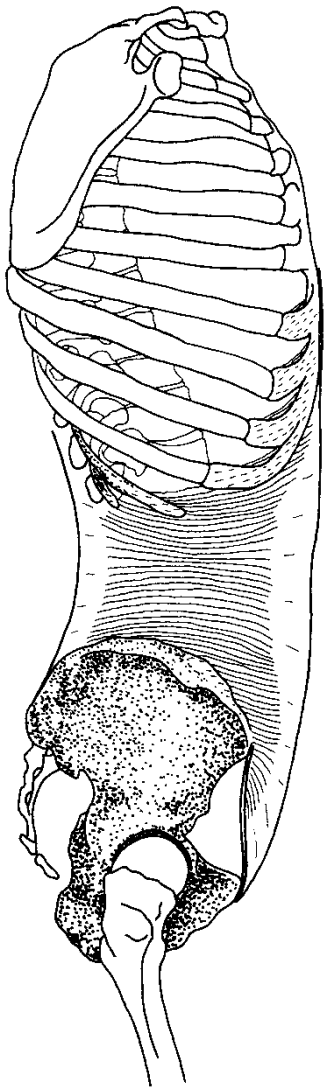
■ Action
Pulls testes toward body

■ Nerve
Genital branch of genitofemoral nerve

■ Relationship
This muscle is continuous with the internal abdominal oblique.

Note: The cremaster regulates the temperature of the testes, important for spermatogenesis.

TRANSVERSE ABDOMINAL *(Transversus Abdominis)*



Trunk—lateral view

■ Origin
Lateral part of inguinal ligament, iliac crest, thoracolumbar fascia, cartilage of lower six ribs

■ Insertion
Abdominal aponeurosis (rectus sheath) to linea alba

■ Action
Compresses abdomen

■ Nerve
Seventh to twelfth intercostal, iliohypogastric, ilioinguinal nerves

■ Relationship
Deepest of the three lateral abdominal muscles

Note: Important in forced expiration, coughing, sneezing.

RECTUS ABDOMINIS*

Trunk—anterior view

■ **Origin**
Crest of pubis, pubic symphysis

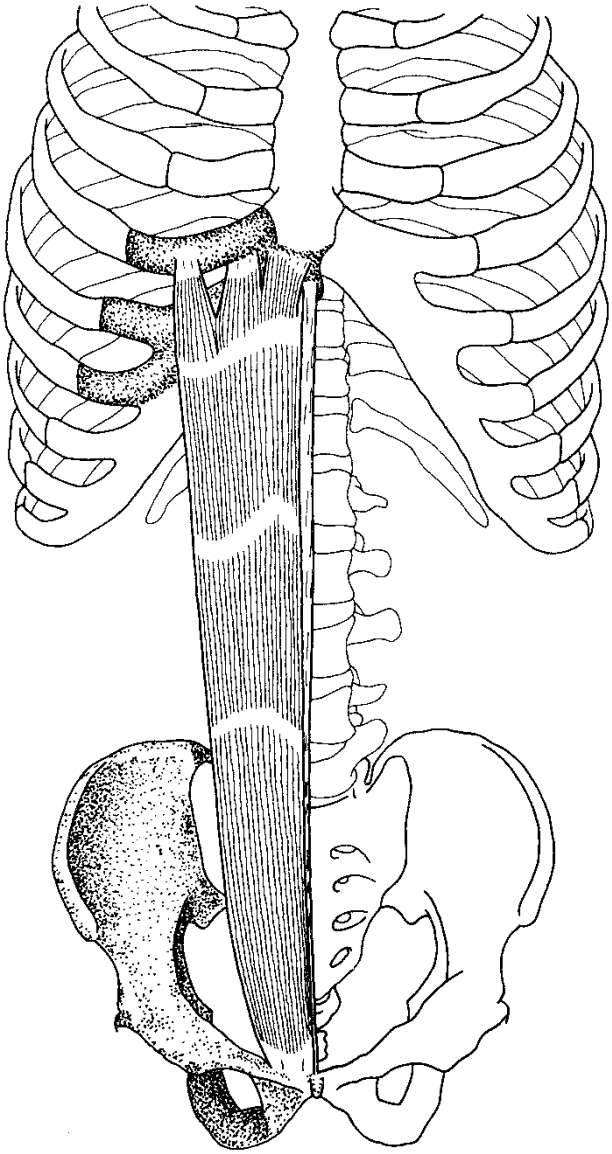
■ **Insertion**
Cartilage of fifth, sixth, and seventh ribs, xiphoid process

■ **Action**
Flexes vertebral column, compresses abdomen

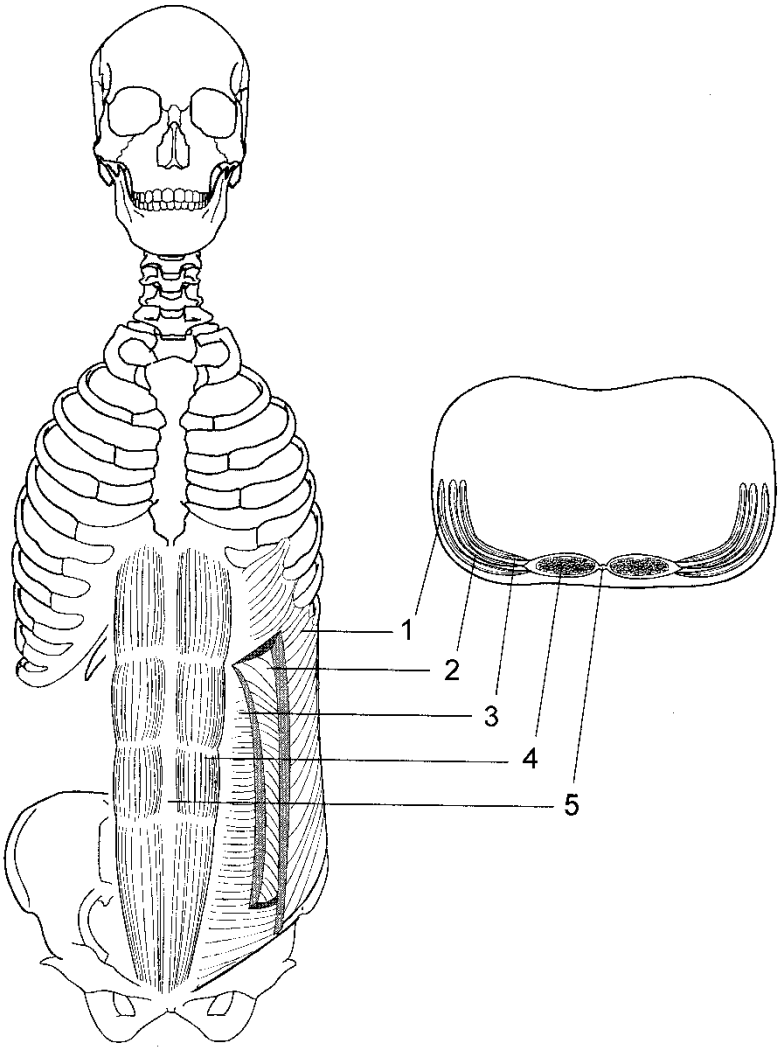
■ **Nerve**
Seventh through twelfth intercostal nerves

*Tendinous bands divide each rectus into three or four bellies. Each rectus is sheathed in aponeurotic fibers from the lateral abdominal muscles. These fibers meet centrally to form the linea alba.

Note: The pyramidalis is a small, unimportant muscle that extends from the ventral surface of the pubis to the lower part of the linea alba. It is frequently absent.



ABDOMINAL MUSCLES



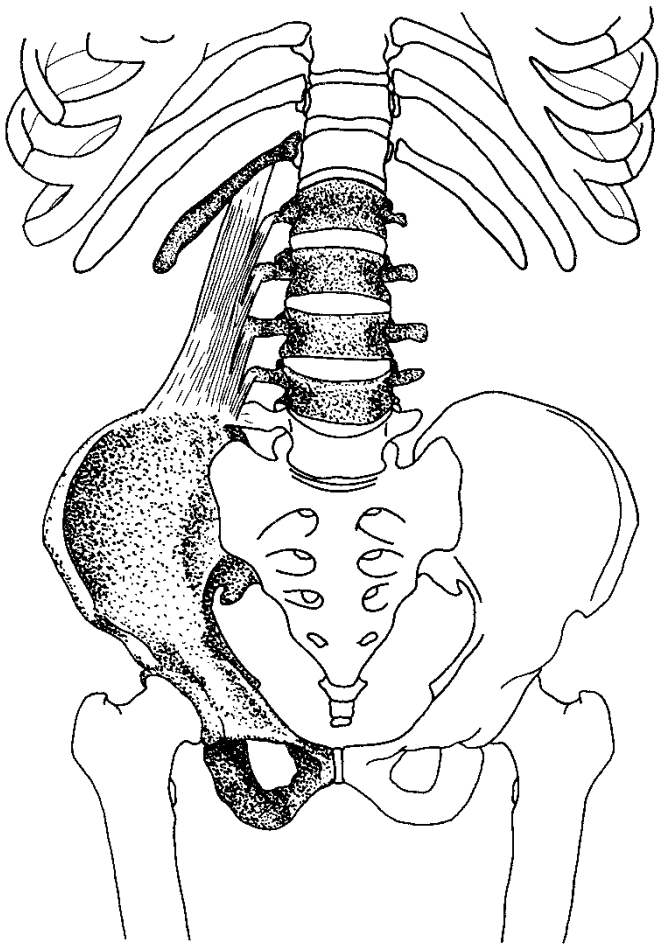
Trunk—anterior and cross-sectional views

1. External oblique
2. Internal oblique
3. Transverse abdominal
4. Rectus abdominis
5. Linea alba

Note: The aponeuroses (broad, flat tendons) of the three lateral abdominal muscles join to form the fascial sheath surrounding the rectus abdominis.

The rectus abdominis is separated into four bellies by tendinous sheaths.

QUADRATUS LUMBORUM



Lower trunk—anterior view

■ **Origin**
Iliolumbar ligament, iliac crest

■ **Insertion**
Twelfth rib, transverse processes of upper four lumbar vertebrae

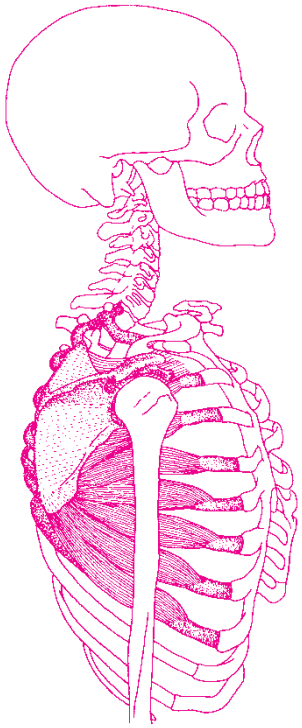
■ **Action**
Laterally flexes vertebral column, fixes ribs for forced expiration

■ **Nerve**
T12, L1

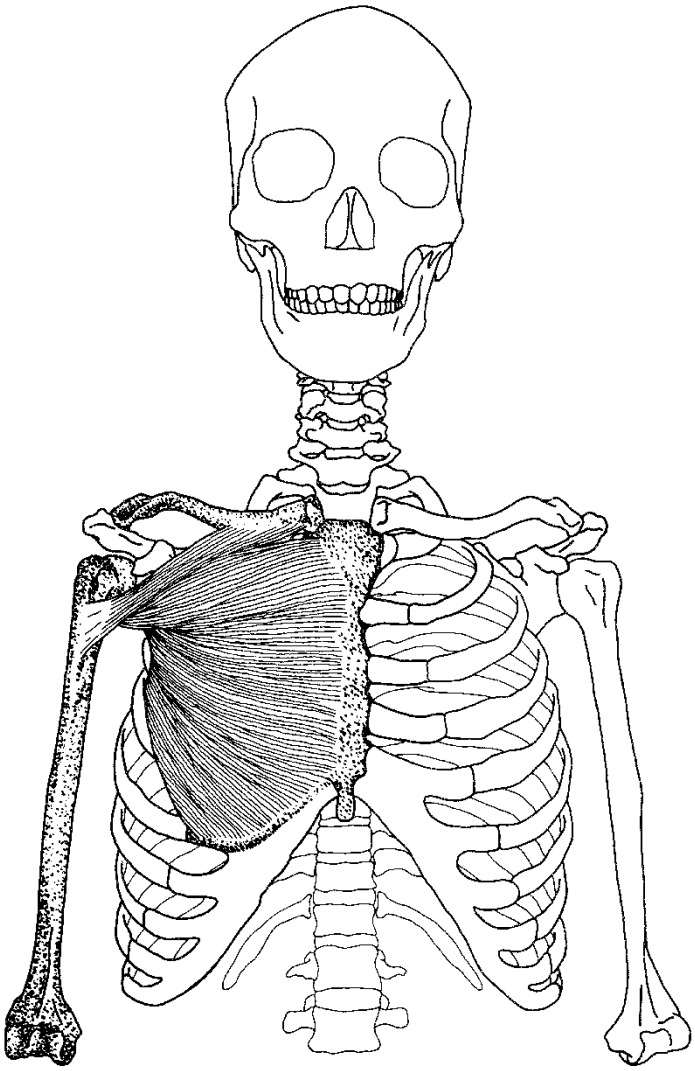
Note: Fixation of the ribs may provide a stable attachment of the diaphragm for voice control in singers.

CHAPTER SIX

Muscles of the Shoulder and Arm



PECTORALIS MAJOR



Anterior view

■ Origin
Clavicular part—medial half of the clavicle

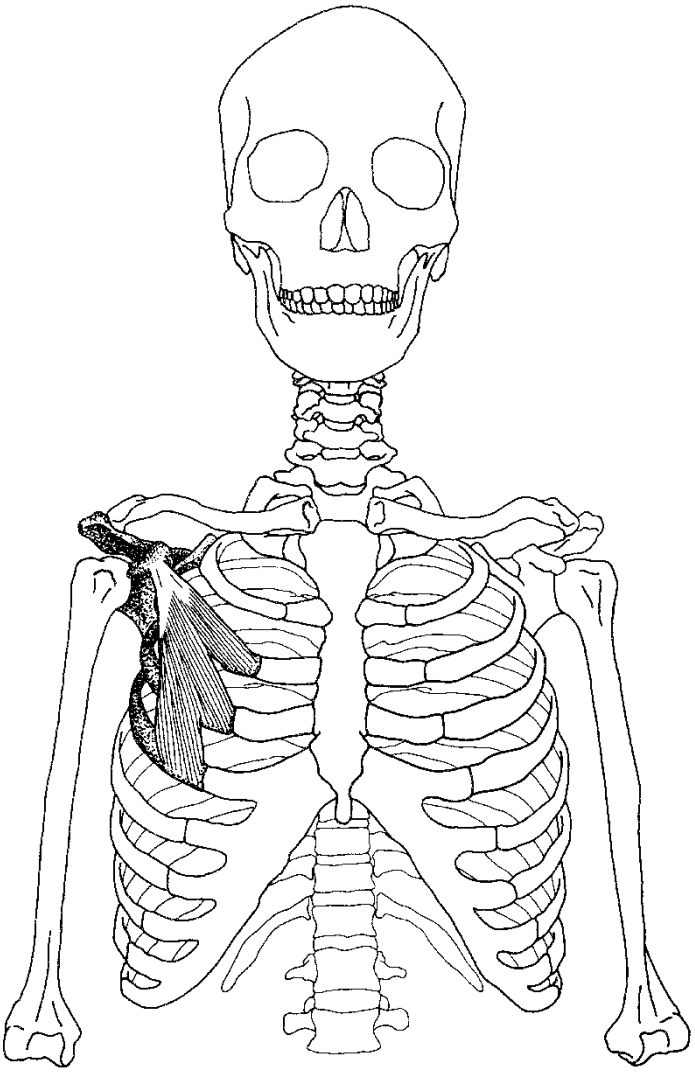
Sternocostal part—sternum, upper six costal cartilages, aponeurosis of external oblique

■ Insertion
Lateral lip of intertubercular (bicipital) groove of humerus, crest below greater tubercle of the humerus

■ Action
Both parts adduct, medially rotate arm; clavicular part flexes arm from full extension; sternocostal part extends the flexed arm

■ Nerve
Medial and lateral pectoral nerves (C5–C8, T1)

PECTORALIS MINOR



Anterior view

■ **Origin**
External surfaces of the third, fourth, and fifth ribs

■ **Insertion**
Coracoid process of the scapula

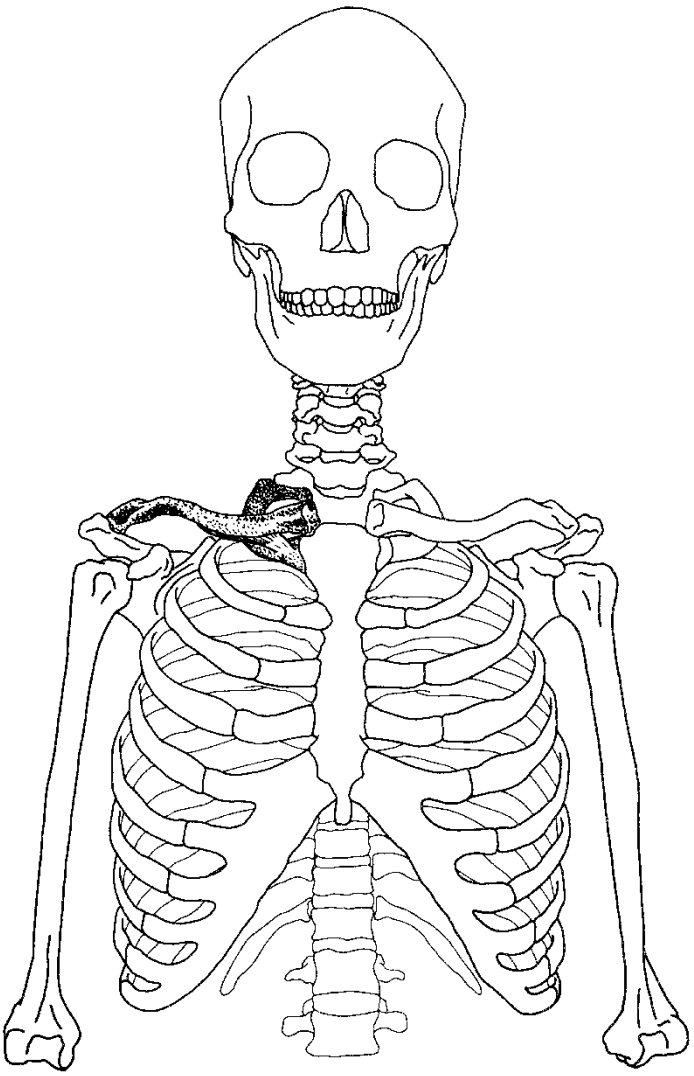
■ **Action**
Draws scapula forward and downward, raises ribs* in forced inspiration

■ **Nerve**
Medial pectoral nerve (C8, T1)

■ **Relationship**
Deep to pectoralis major; medial pectoral nerve pierces this muscle

*Raising the ribs requires stabilization of the scapula by the rhomboids and trapezius.

SUBCLAVIUS



Anterior view

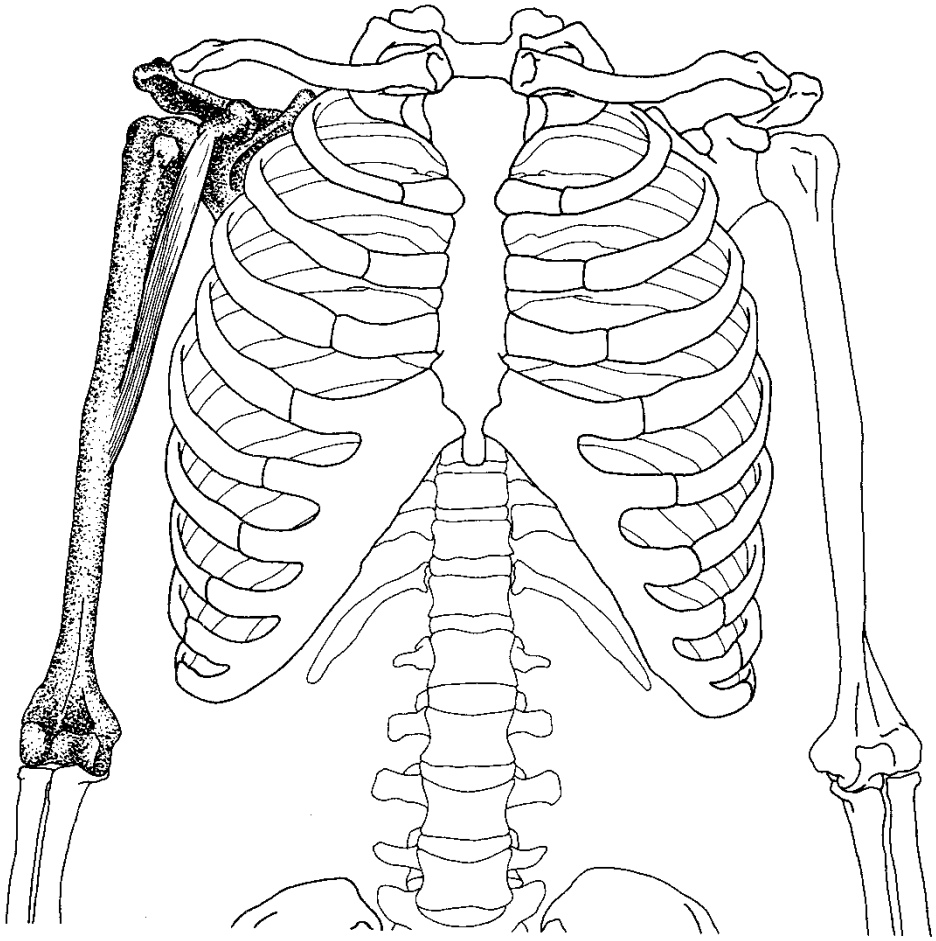
■ **Origin**
Junction of the first rib with its costal cartilage

■ **Insertion**
Groove on the inferior (lower) surface of the clavicle

■ **Action**
Steadies clavicle during movements of the shoulder girdle

■ **Nerve**
Nerve to the subclavius from upper trunk of brachial plexus (C5, C6)

CORACOBRACHIALIS



Anterior view

■ **Origin**
Tip (apex) of the coracoid process of scapula

■ **Insertion**
Middle third of the medial surface and border of the humerus

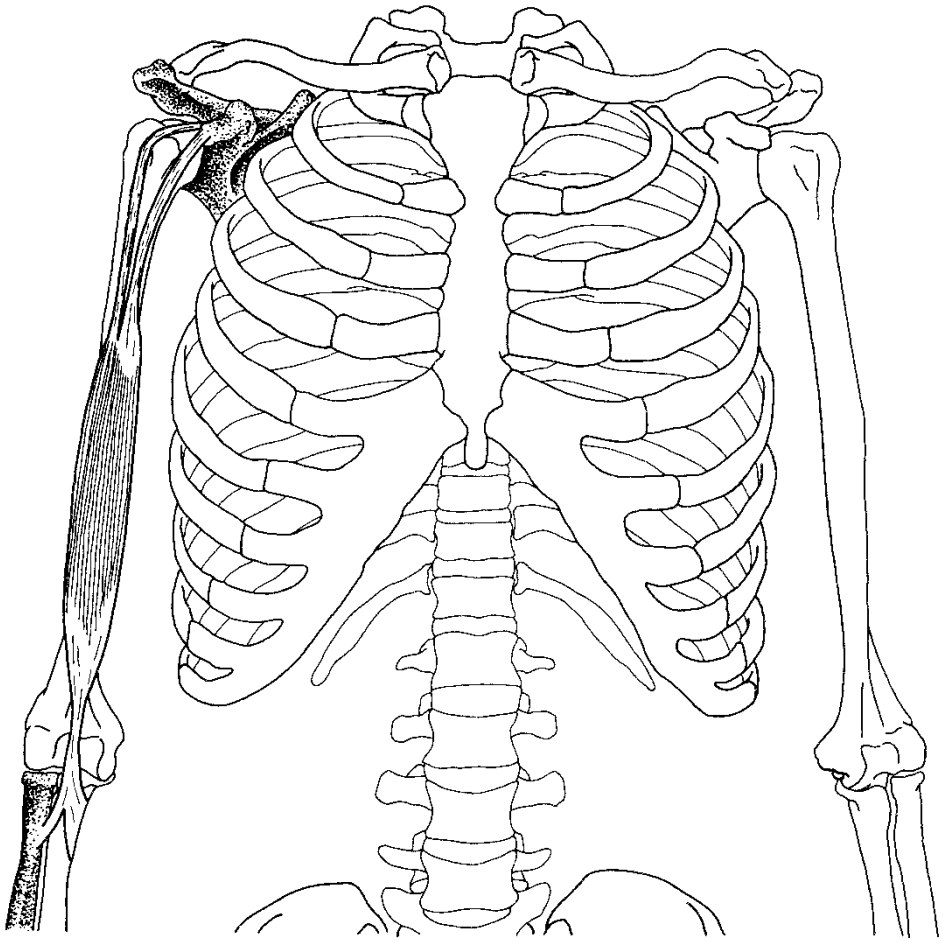
■ **Action**
Weakly adducts arm (flexion unsubstantiated), aids in stabilizing humerus

■ **Nerve**
Musculocutaneous nerve (C6, C7)

■ **Relationship**
Deep to short head of biceps

Note: The musculocutaneous nerve usually pierces this muscle.

BICEPS BRACHII



Anterior view

■ Origin
Long head—supraglenoid tubercle of scapula

Short head—coracoid process of scapula

■ Insertion
Tuberosity of radius, bicipital aponeurosis into deep fascia on medial part of forearm

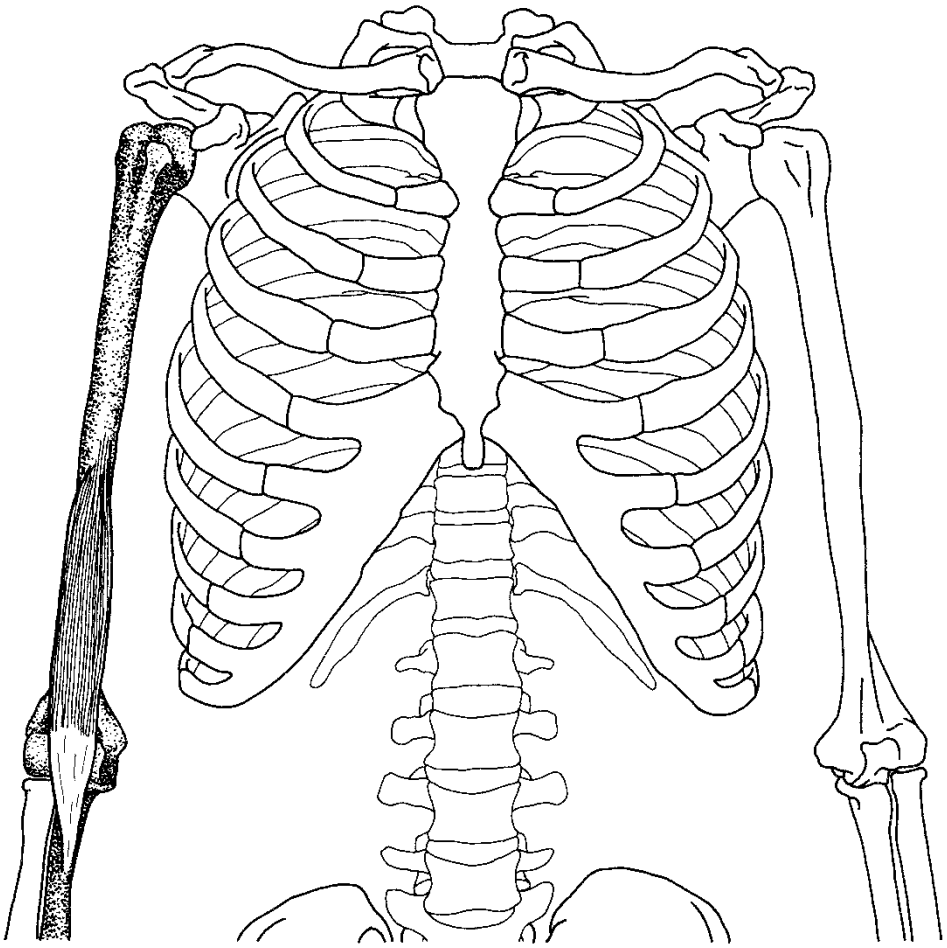
■ Action
Supinates forearm, flexes forearm, weakly flexes arm at shoulder

■ Nerve
Musculocutaneous nerve (C5, C6)

■ Relationship
Long head passes through intertubercular (bicipital) groove, then inside glenohumeral joint capsule

Note: As a two joint muscle, its contribution to shoulder flexion mainly occurs when both joints are extended.

BRACHIALIS



Anterior view

Origin
Anterior of lower half of humerus

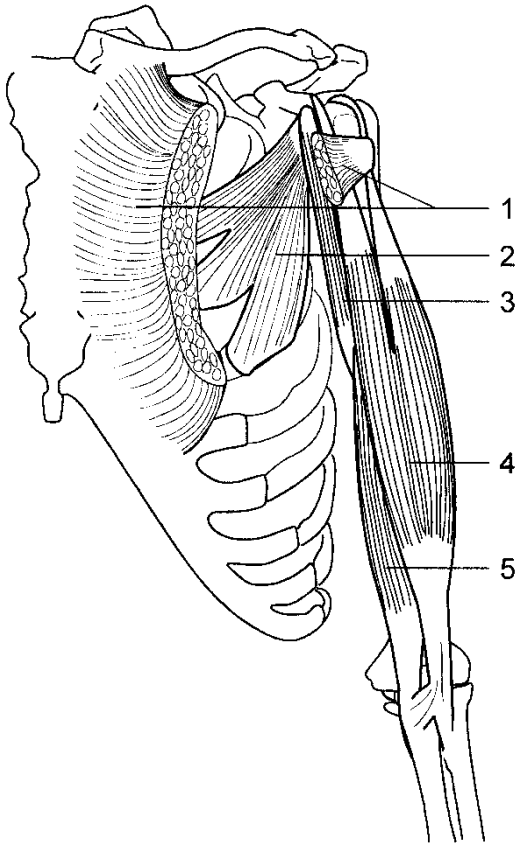
Insertion
Coronoid process of ulna, tuberosity of ulna

Action
Flexes forearm

Nerve
Musculocutaneous nerve (C5, C6)

Relationship
Deep to biceps brachii

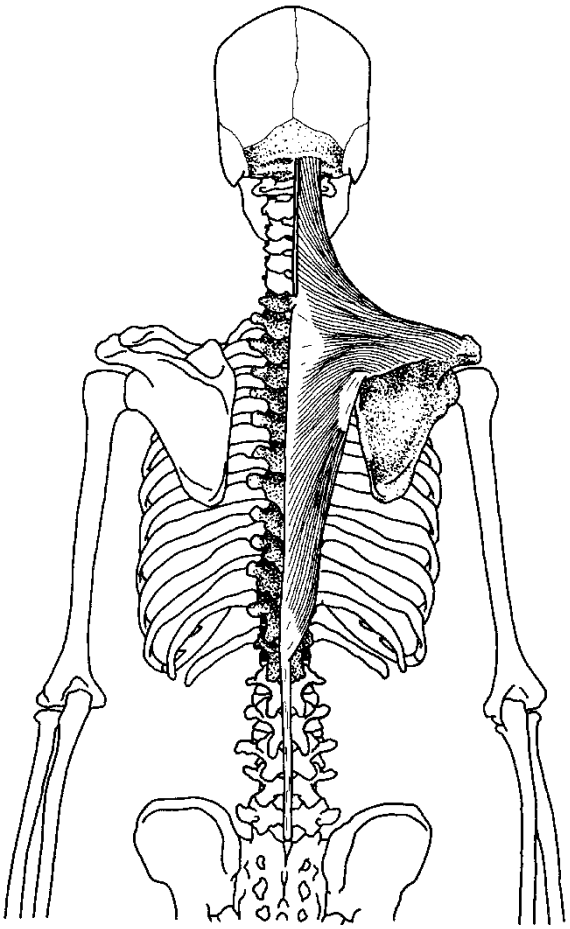
MUSCLES OF THE ANTERIOR CHEST AND ARM



Shoulder—anterior view

1. Pectoralis major (cut)
2. Pectoralis minor
3. Coracobrachialis
4. Biceps brachii
5. Brachialis

TRAPEZIUS



Posterior view

■ Origin
Medial third of superior nuchal line, external occipital protuberance, ligamentum nuchae, spinous processes and supraspinous ligaments of seventh cervical and all thoracic vertebrae

■ Insertion
Upper part—lateral third of clavicle

Middle part—acromion and spine of scapula

Lower part—medial portion of spine of scapula (tubercle)

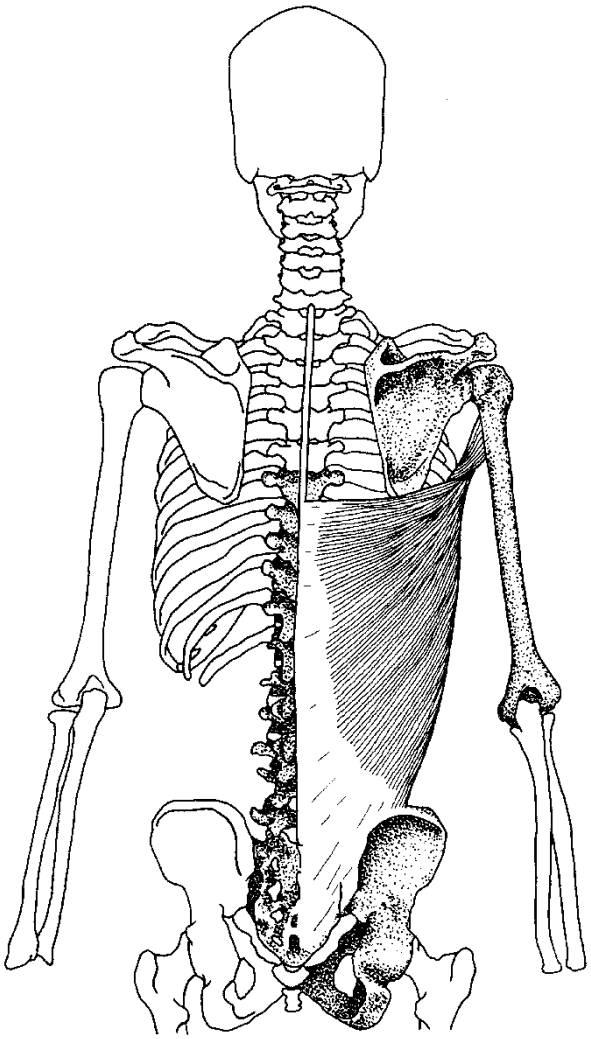
■ Action
Upper part elevates scapula*, middle part retracts (adducts) scapula, lower part depresses scapula, upper and lower parts together rotate scapula (important in elevating arm)

■ Nerve
Accessory (eleventh cranial), C3, C4

■ Relationship
Most superficial muscle of back

*Upper part stabilizes scapula against downward rotation, as when weight is carried in the hand.

LATISSIMUS DORSI



Posterior view

■ Origin
Spinous processes of lower six thoracic vertebrae, spinous processes of all lumbar and sacral vertebrae (through thoracolumbar fascia), supraspinal ligament and iliac crest, outer surfaces of lower three or four ribs, inferior angle of scapula

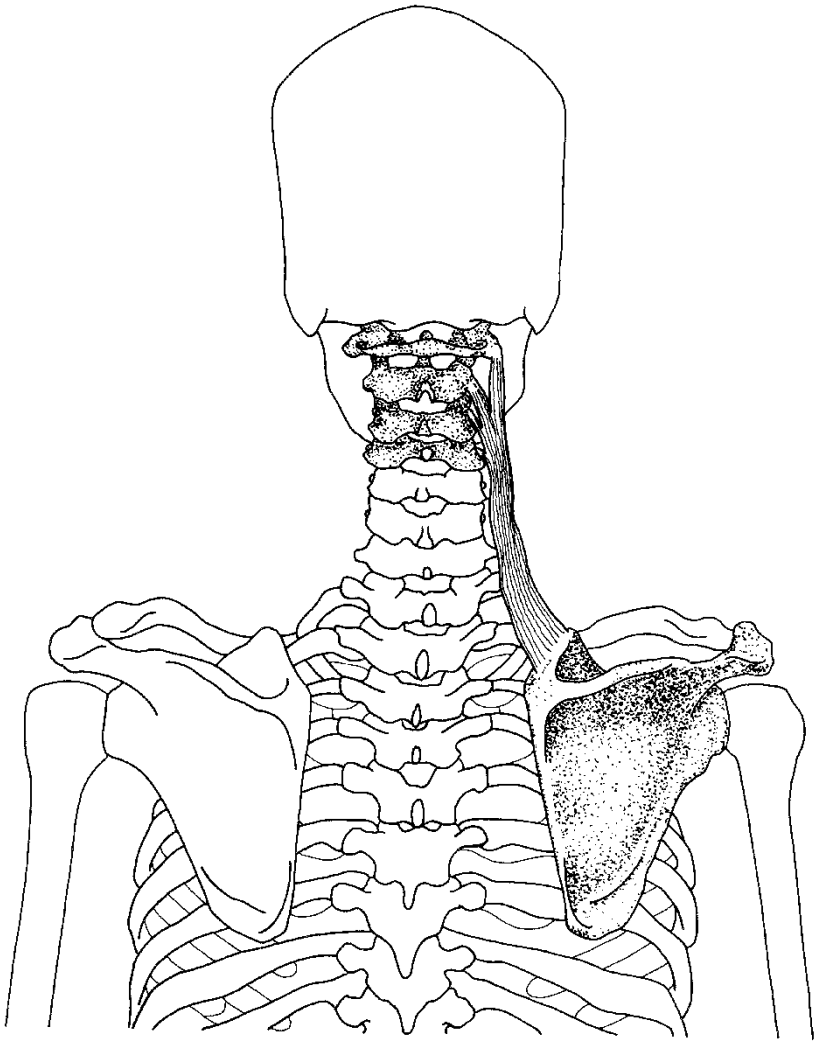
■ Insertion
Bottom of intertubercular (bicipital) groove

■ Action
Extends, adducts, and medially rotates the arm; draws the shoulder downward and backward; keeps inferior angle of scapula against the chest wall; accessory muscle of respiration

■ Nerve
Thoracodorsal nerve (C6–C8)

Note: This muscle is used for the crawl (freestyle) stroke in swimming.

LEVATOR SCAPULAE



Posterior view

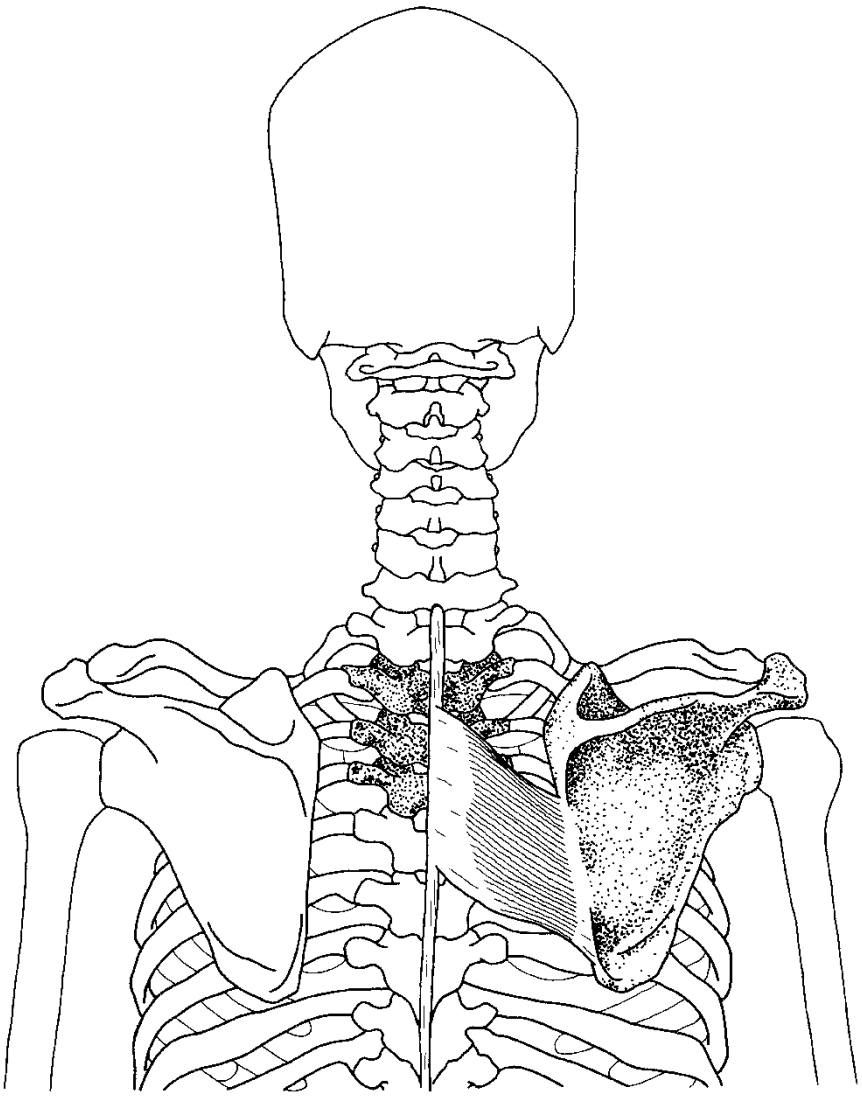
■ Origin
Posterior tubercles of the transverse processes of the first four cervical vertebrae

■ Insertion
Vertebral (medial) border of the scapula at and above the spine

■ Action
Elevates medial border of scapula, rotates scapula to lower the lateral angle, acts with trapezius and rhomboids to pull scapula medially and upward, bends neck laterally

■ Nerve
Dorsal scapular nerve (C5)

RHOMBOID MAJOR



Posterior view

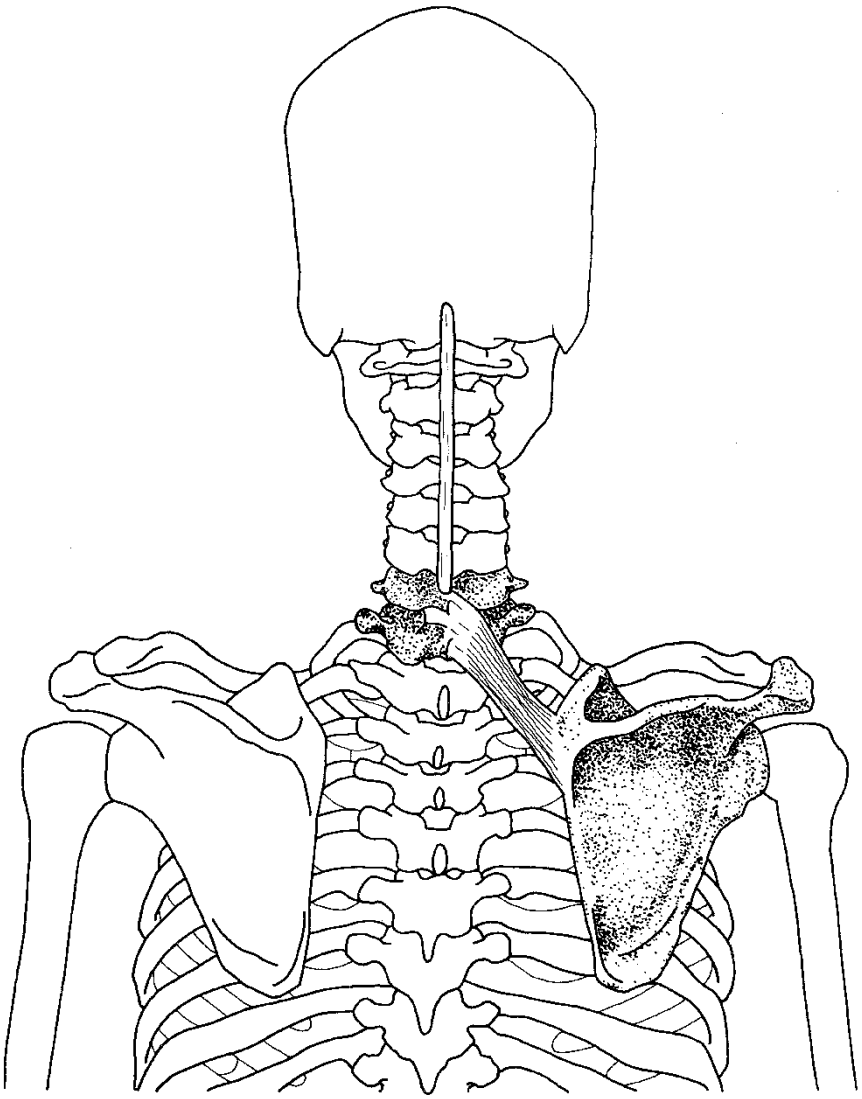
■ Origin
Spines of the second to fifth thoracic vertebrae, supraspinous ligament

■ Insertion
Medial border of the scapula below the spine

■ Action
Retracts and stabilizes scapula, elevates the medial border of the scapula causing downward rotation, assists in adduction of arm

■ Nerve
Dorsal scapular nerve (C5)

RHOMBOID MINOR



Posterior view

■ Origin
Spines of the seventh cervical and first thoracic vertebrae, lower part of the ligamentum nuchae

■ Insertion
Medial border of the scapula at the root of the spine

■ Action
Retracts and stabilizes scapula, elevates the medial border of the scapula, rotates the scapula to depress the lateral angle (assists in adduction of arm)

■ Nerve
Dorsal scapular nerve (C5)

SERRATUS ANTERIOR

Lateral view

■ Origin
Outer surfaces and superior borders of first eight or nine ribs, and fascia covering first intercostal space

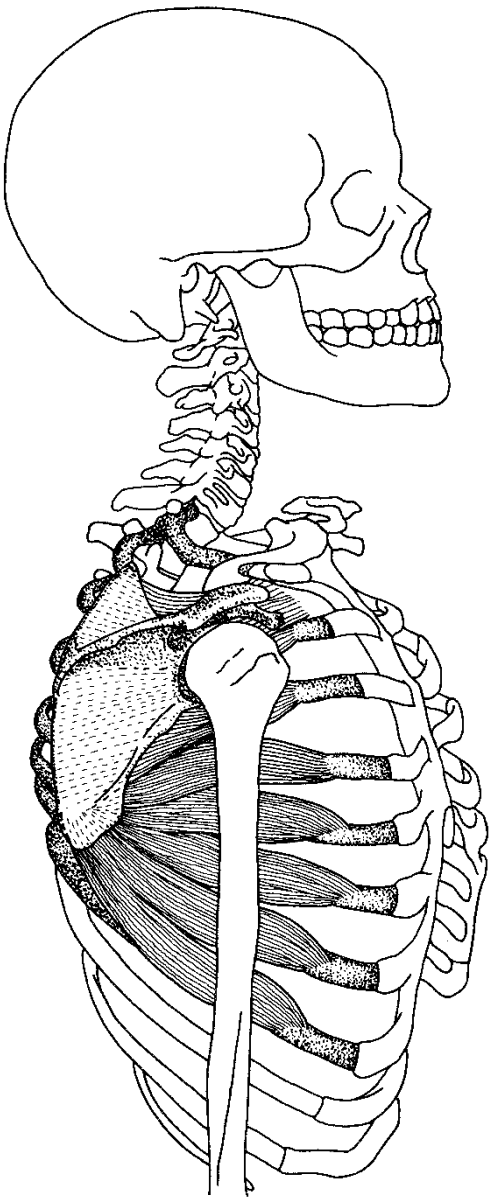
■ Insertion
Anterior surface (costal surface) of the medial border of the scapula

■ Action
Rotates scapula for abduction and flexion of arm, protracts scapula

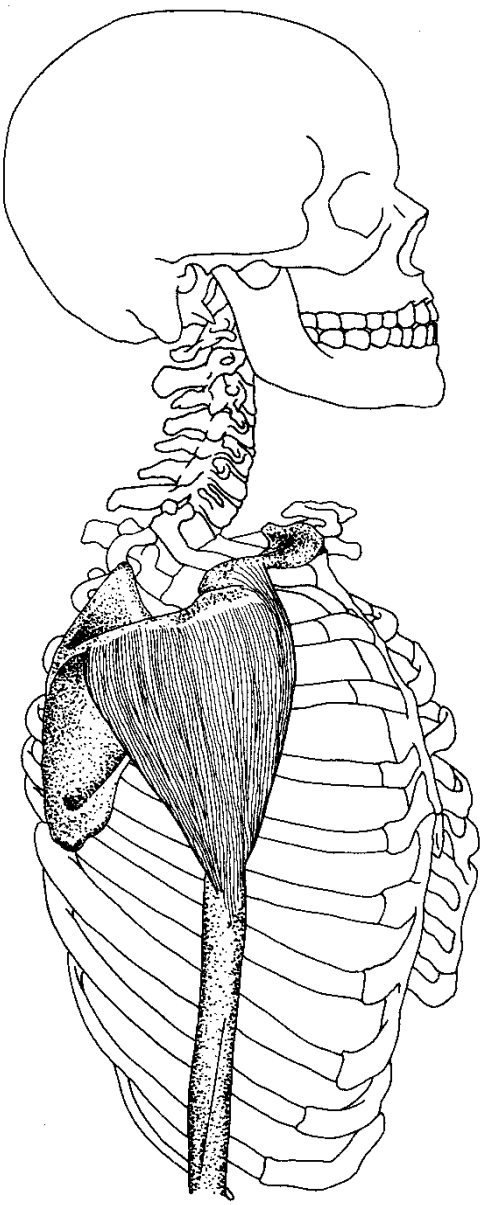
■ Nerve
Long thoracic nerve (C5–C7)

■ Relationships
Serratus anterior and rhomboids both insert on the medial border of scapula; they are antagonists causing protraction and retraction; long thoracic nerve lies on the superficial surface of this muscle

Note: When the arm is fixed, this muscle can assist in rib movement for ventilation.



DELTOID



Lateral view

■ Origin

Anterior portion—anterior border and superior surface of the lateral third of the clavicle

Middle portion—lateral border of the acromion process

Posterior portion—lower border of the crest of the spine of the scapula

■ Insertion

Deltoid tuberosity, on the middle of the lateral surface of the shaft of the humerus

■ Action

Anterior portion—flexes and medially rotates arm

Middle portion—abducts arm

Posterior portion—extends and laterally rotates arm

■ Nerve

Axillary nerve (C5, C6)

SUPRASPINATUS *(Rotator Cuff*)*

Lateral view

■ Origin
Supraspinous fossa of scapula

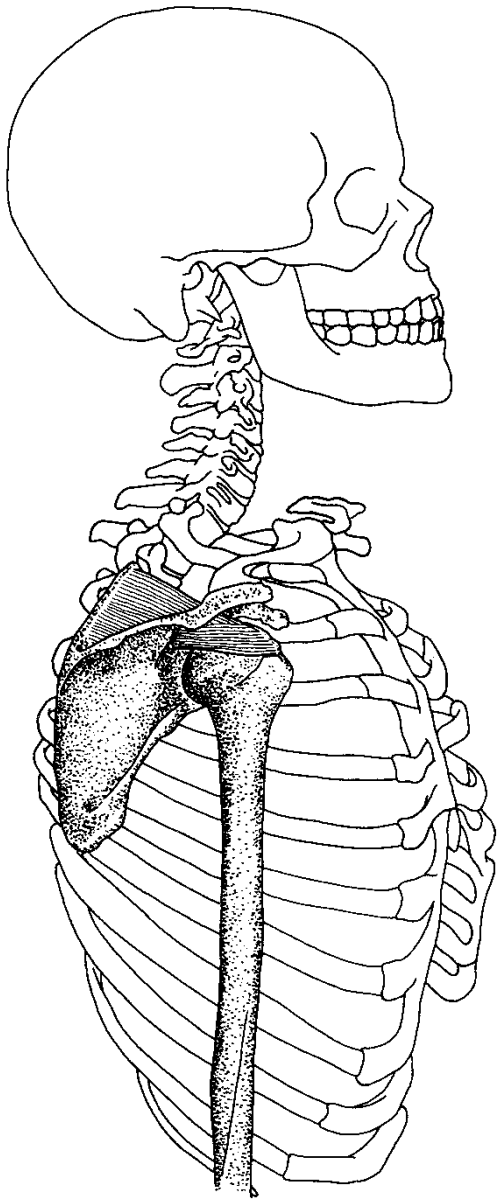
■ Insertion
Upper part of the greater tuberosity of the humerus, capsule of the shoulder joint

■ Action
Aids deltoid in abduction of arm; draws humerus toward glenoid fossa, preventing deltoid from forcing humerus up against acromion

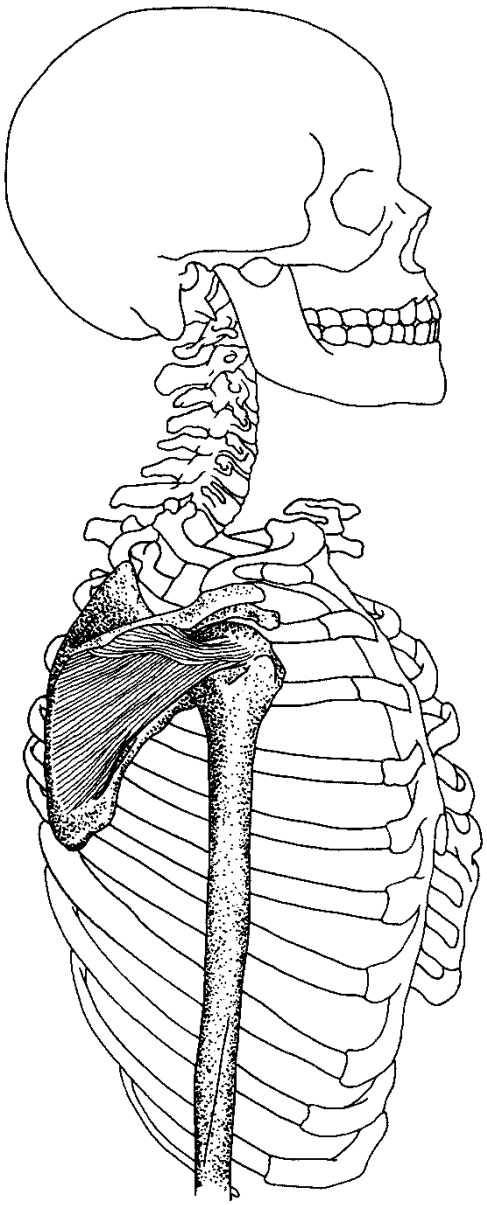
■ Nerve
Suprascapular nerve (C5)

*Supraspinatus, infraspinatus, teres minor, and subscapularis together are called the rotator cuff.

Note: The joint capsule and its ligaments cannot provide necessary support because of the great range of motion between the humerus and scapula. The rotator cuff muscles prevent dislocation of the humerus throughout most of the arm's range of motion.



INFRASPINATUS *(Rotator Cuff)*



Lateral view

Origin
Infraspinous fossa of the scapula

Insertion
Middle facet of the greater tuberosity of the humerus, capsule of the shoulder joint

Action
Draws humerus toward glenoid fossa, thus resisting posterior dislocation of arm, as in crawling; laterally rotates; aids in stabilization of humerus during abduction

Nerve
Suprascapular nerve (C5, C6)

TERES MINOR *(Rotator Cuff)*

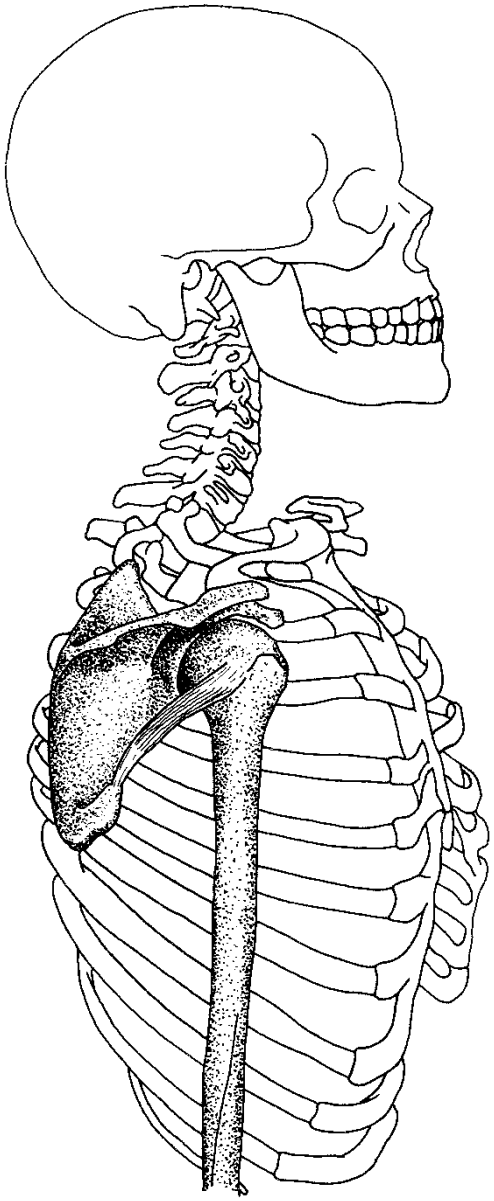
Lateral view

■ Origin
Upper two-thirds of the dorsal surface of the axillary border of the scapula

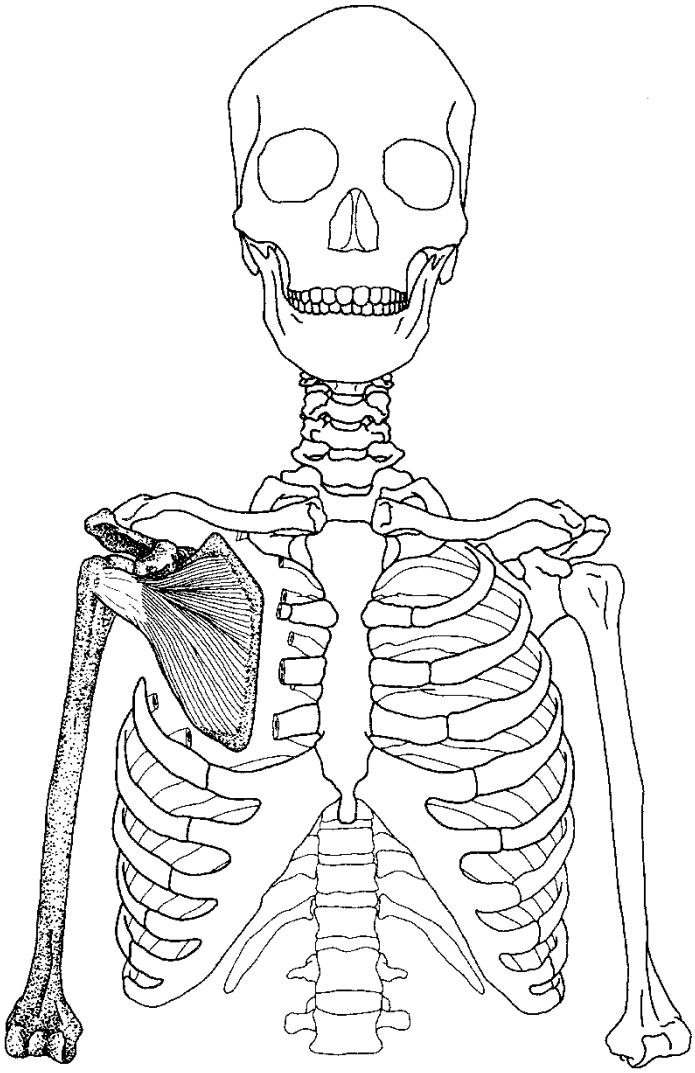
■ Insertion
The capsule of the shoulder joint, the lower facet of the greater tuberosity of the humerus

■ Action
Laterally rotates arm, weakly adducts arm, draws humerus toward glenoid fossa

■ Nerve
Axillary nerve (C5)



SUBSCAPULARIS *(Rotator Cuff)*



Anterior view

(Upper ribs cut away)

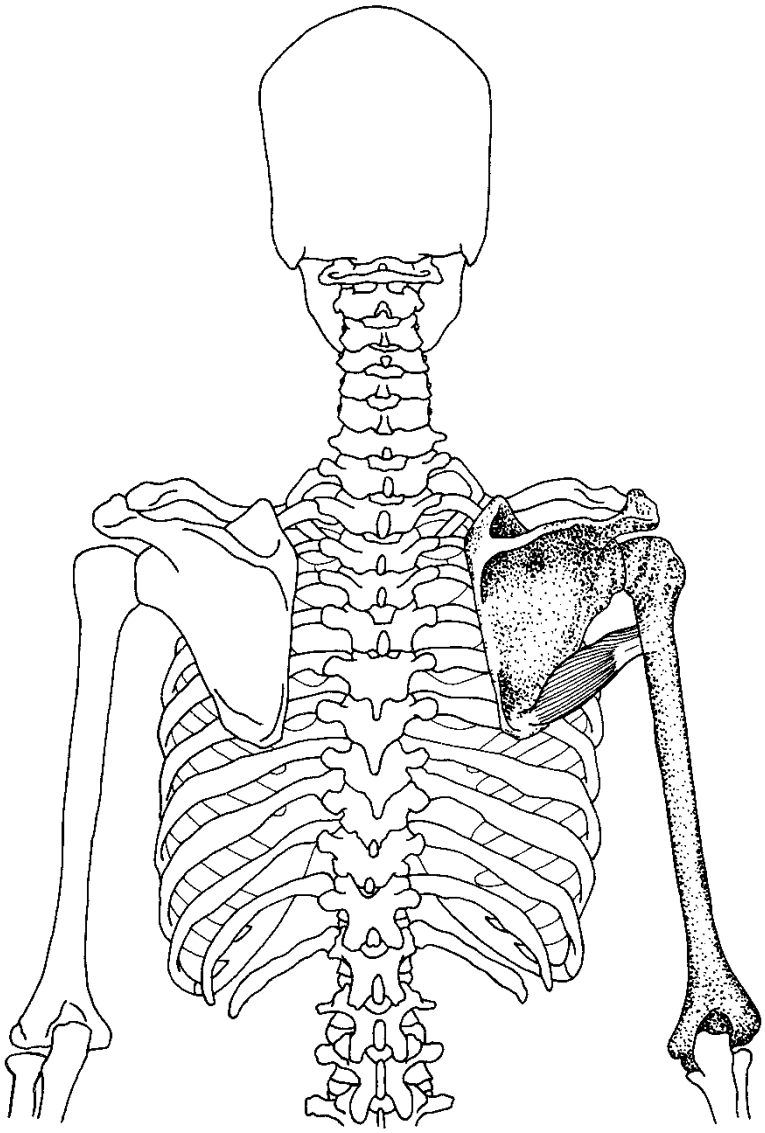
■ Origin
Subscapular fossa on the anterior surface of scapula

■ Insertion
Lesser tuberosity (tubercle) of the humerus, ventral part of the capsule of the shoulder joint

■ Action
Medially rotates arm, stabilizes glenohumeral joint

■ Nerve
Upper and lower subscapular nerves (C5, C6)

TERES MAJOR



Posterior view

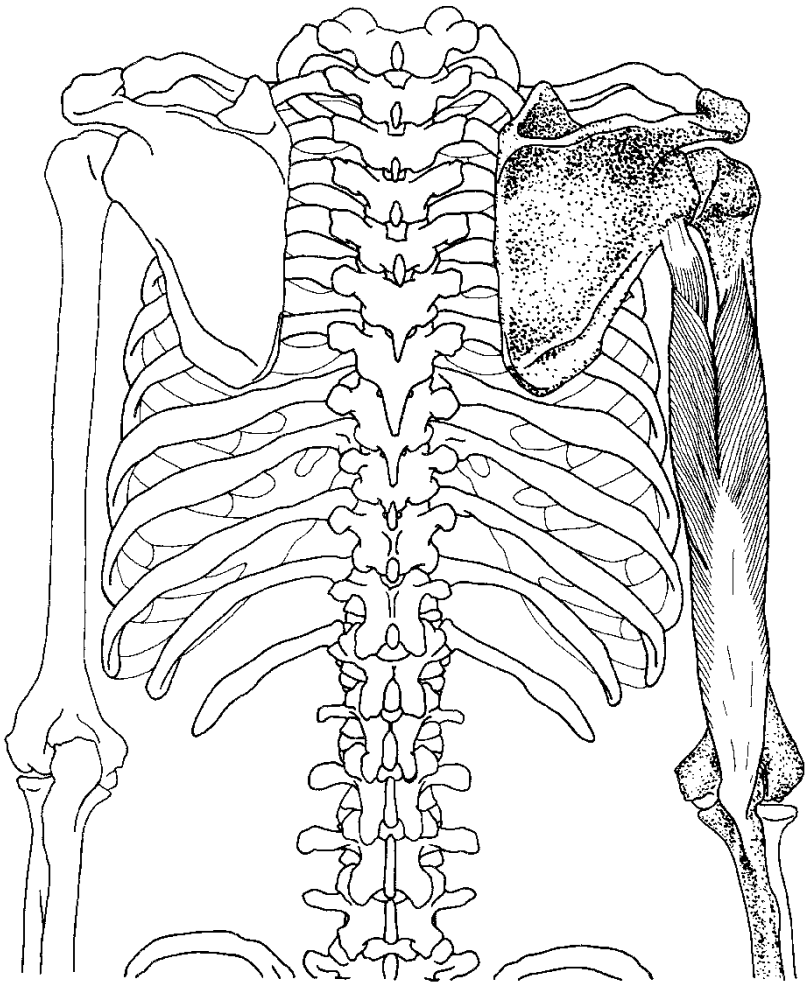
■ Origin
Lower third of the posterior surface of the lateral border of the scapula, near the inferior angle

■ Insertion
Medial lip of the intertubercular (bicipital) groove of the humerus

■ Action
Medially rotates arm, adducts arm, extends arm

■ Nerve
Lower subscapular nerve (C5, C6)

TRICEPS BRACHII



Posterior view

■ Origin

Long head—infraglenoid tubercle of the scapula

Lateral head—upper half of the posterior surface of the shaft of the humerus

Medial head—posterior surface of the lower half of the shaft of the humerus

■ Insertion

Posterior part of olecranon process of the ulna

■ Action

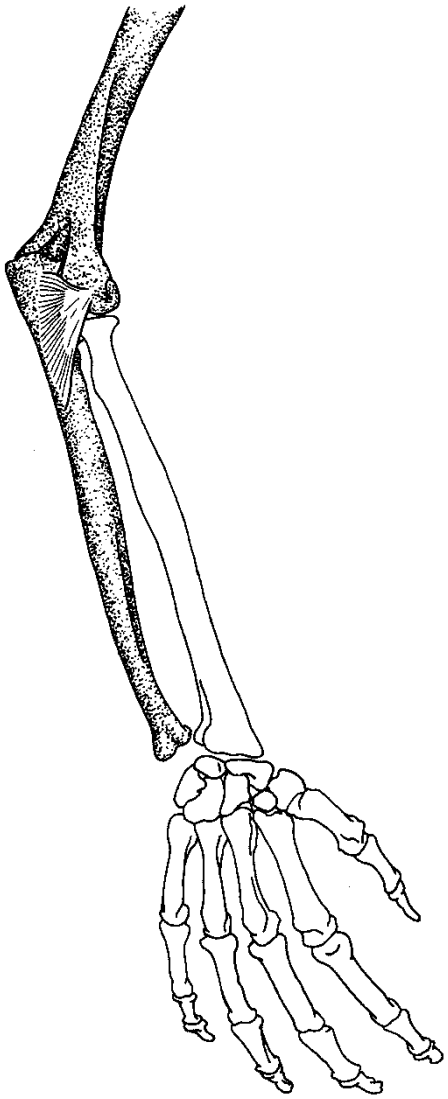
Extends forearm, long head aids in adduction if arm is abducted

■ Nerve

Radial nerve (C7, C8)

Note: The radial nerve comes from the axilla (armpit) and passes along the humerus between the medial and lateral heads. It can be compressed against the humerus, so it is one of the most commonly injured peripheral nerves.

ANCONEUS



Posterior view of arm

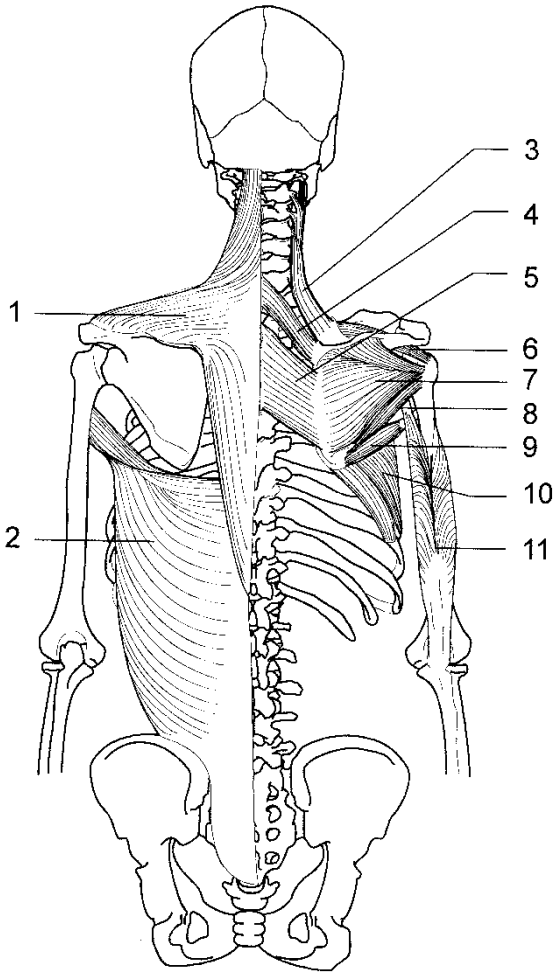
Origin
Posterior part of lateral epicondyle of the humerus

Insertion
Lateral surface of the olecranon process and posterior surface of ulna

Action
Extends forearm (assists triceps)

Nerve
Radial nerve (C7, C8)

POSTERIOR BACK, SHOULDER, AND ARM MUSCLES



Trunk—posterior view

Superficial layer

1. Trapezius
2. Latissimus dorsi

Deep layer

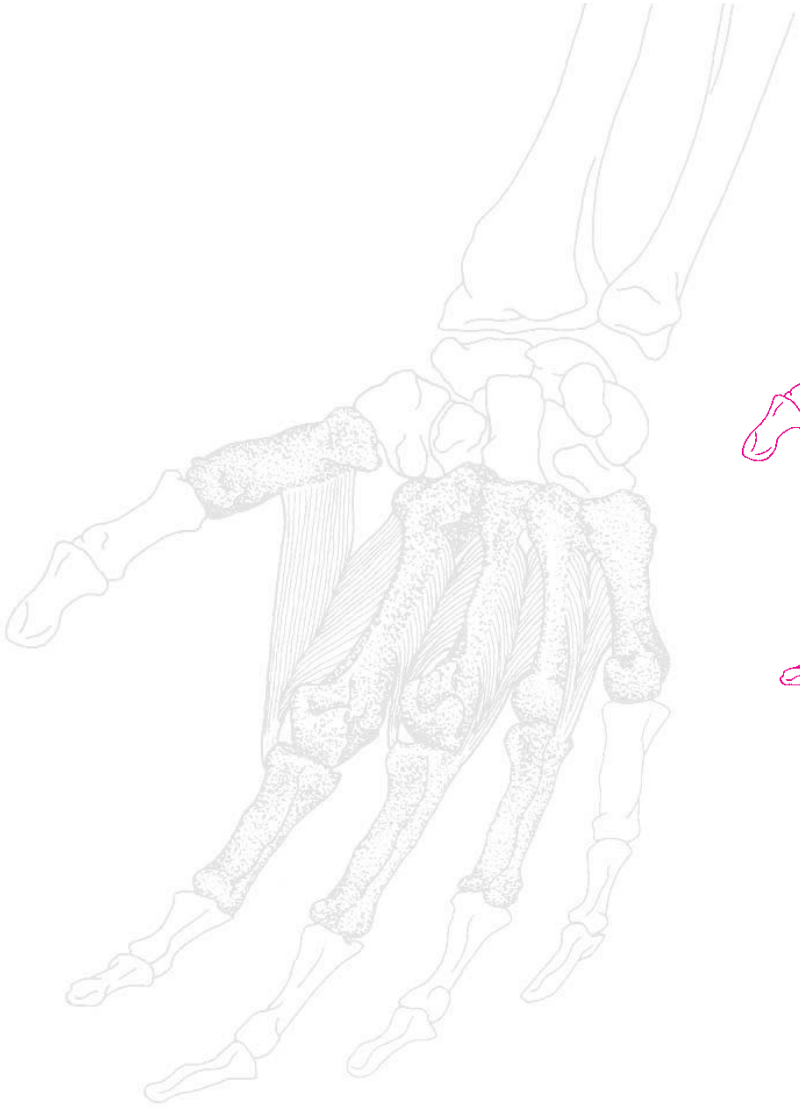
3. Levator scapulae
4. Rhomboid minor
5. Rhomboid major
6. Supraspinatus (rotator cuff)
7. Infraspinatus (rotator cuff)
8. Teres minor (rotator cuff)
9. Teres major
10. Serratus anterior

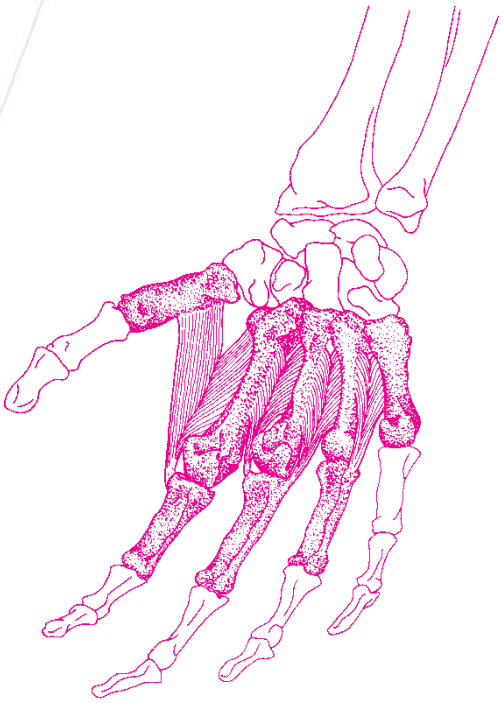
Posterior arm

11. Triceps brachii

CHAPTER SEVEN

Muscles of the Forearm and Hand





PRONATOR TERES *(Superficial Group)*

Forearm—anterior view

■ Origin
Humeral head—medial supracondylar ridge and medial epicondyle of the humerus

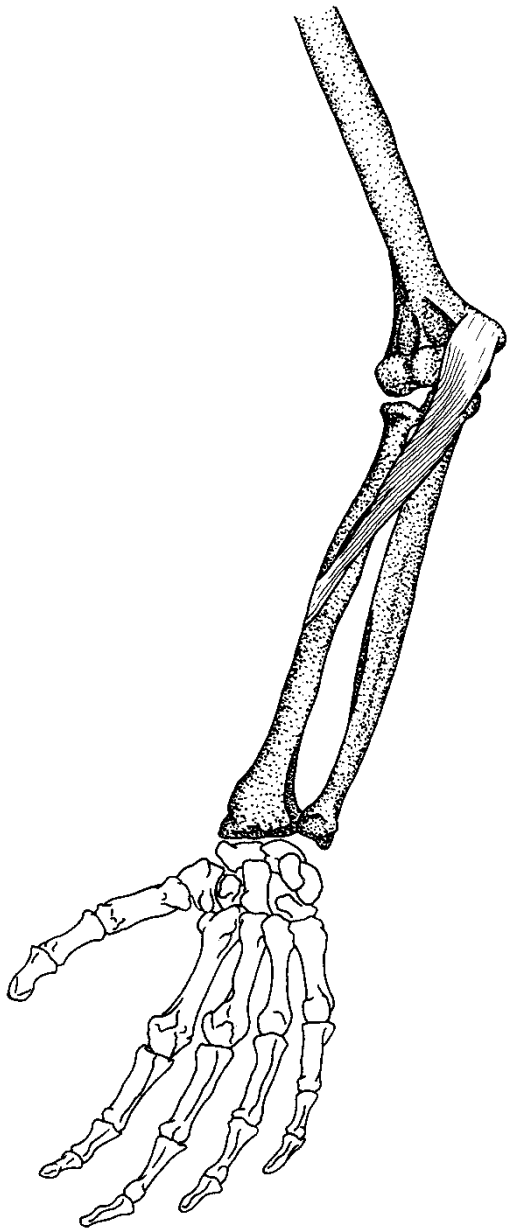
Ulnar head—medial border of the coronoid process of the ulna

■ Insertion
Middle of lateral surface of the radius (pronator tuberosity)

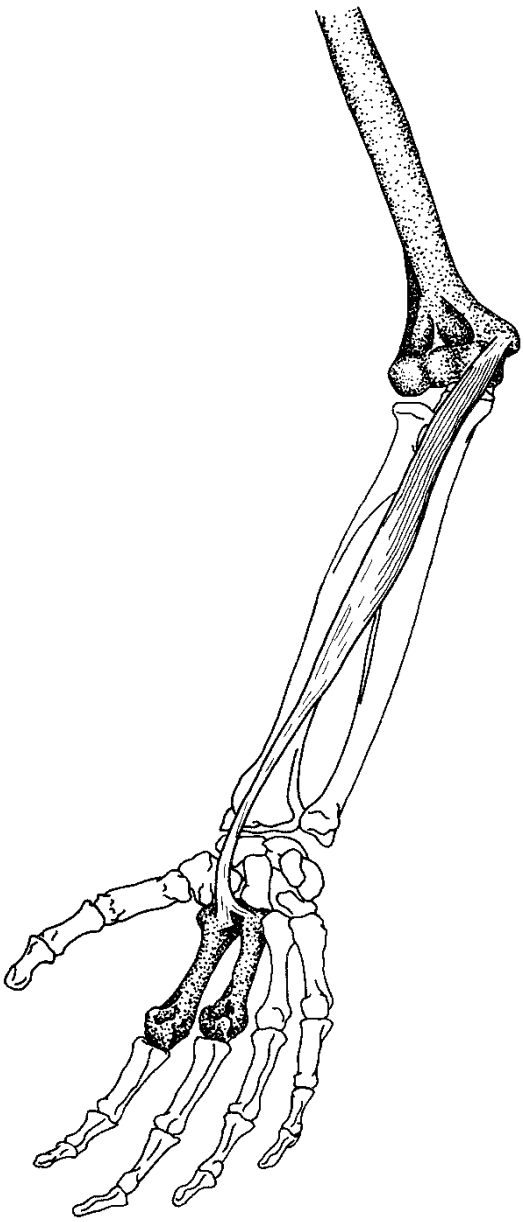
■ Action
Pronates and flexes forearm

■ Nerve
Median nerve (C6, C7)

Note: The median nerve passes between the humeral and ulnar heads of this muscle.



FLEXOR CARPI RADIALIS *(Superficial Group)*



Forearm—anterior view

Origin
Medial epicondyle of the humerus through the common tendon

Insertion
Front of the bases of the second and third metacarpal bones

Action
Flexes hand, synergist in abduction with extensor carpi radialis longus and brevis

Nerve
Median nerve (C6, C7)

PALMARIS LONGUS *(Superficial Group)*

Forearm—anterior view

Origin
Medial epicondyle of the humerus through the common tendon

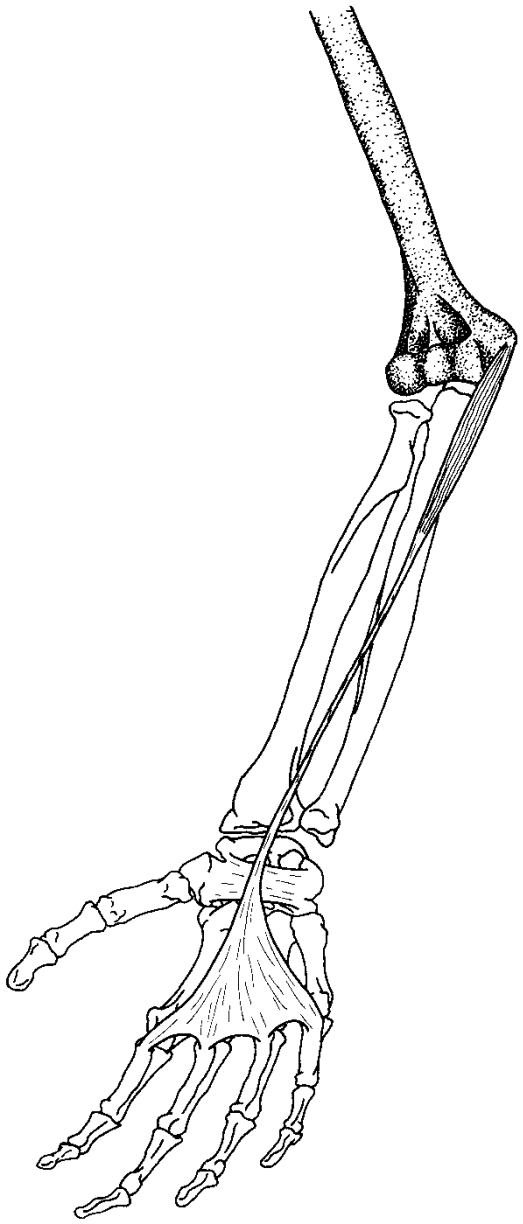
Insertion
Front (central part) of the flexor retinaculum and apex of the palmar aponeurosis

Action
Flexes the hand

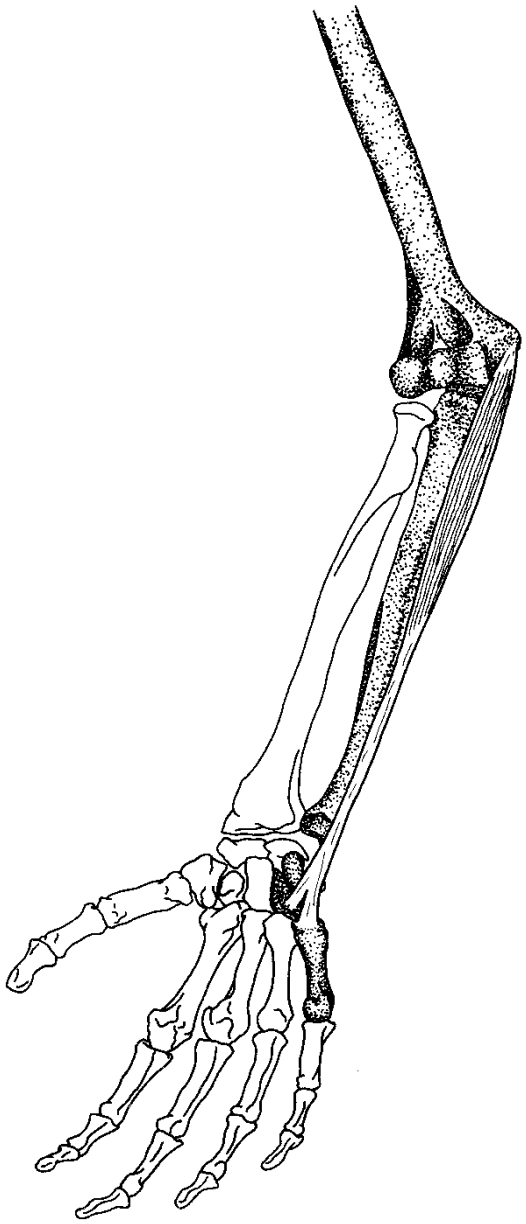
Nerve
Median nerve (C6, C7)

Note: This muscle is absent in about 14% of limbs.

Reference: Agur, Amr: *Grant's Atlas of Anatomy,* 9th ed. Williams & Wilkins, Baltimore, 1991.



FLEXOR CARPI ULNARIS *(Superficial Group)*



Forearm—anterior view

Origin
Humeral head—medial epicondyle of the humerus through the common tendon

Ulnar head—medial margin of olecranon process of ulna, dorsal border of shaft of the ulna

Insertion
Pisiform bone, hook of the hamate, and base of the fifth metacarpal bone

Action
Flexes hand, synergist in adduction of hand with extensor carpi ulnaris

Nerve
Ulnar nerve (C8, T1)

SUPERFICIAL MUSCLES OF THE FOREARM

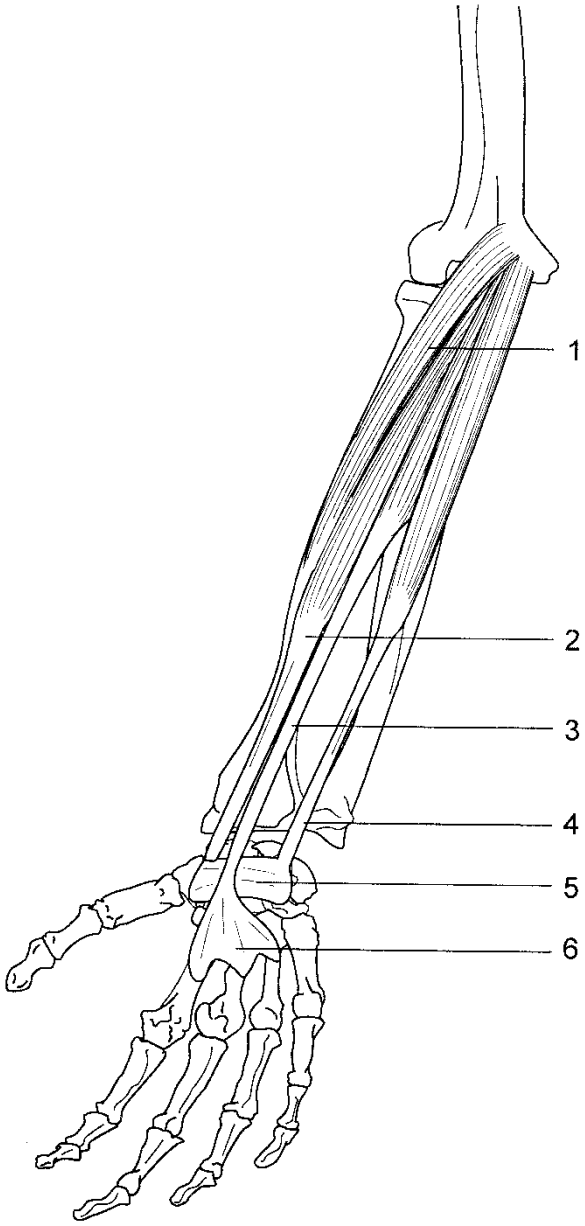
Forearm—anterior view

Muscles

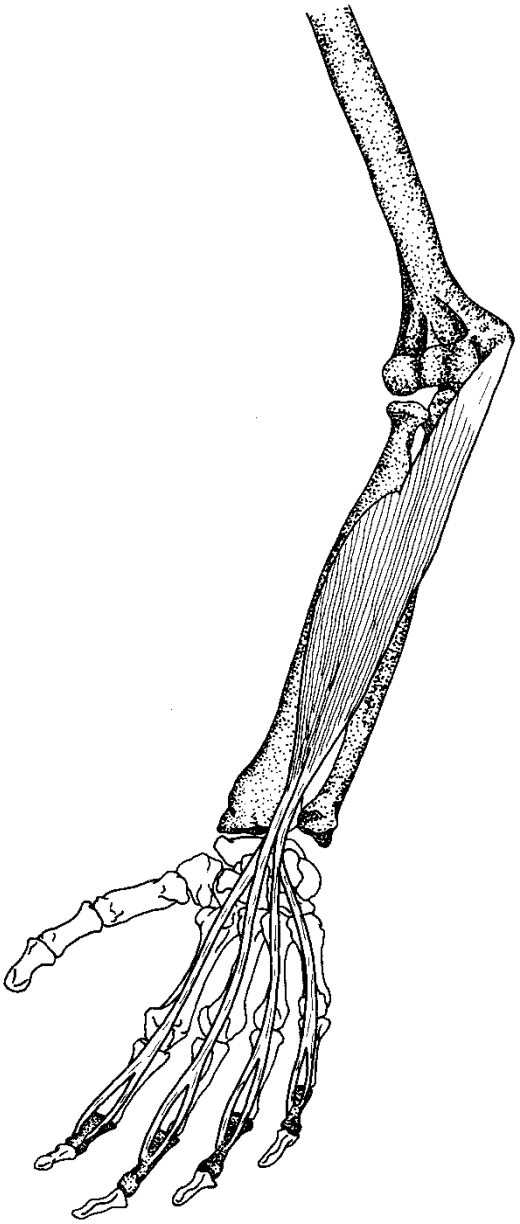
1. Pronator teres
2. Flexor carpi radialis
3. Palmaris longus
4. Flexor carpi ulnaris

Associated structures

5. Flexor retinaculum
6. Palmar aponeurosis



FLEXOR DIGITORUM SUPERFICIALIS



Forearm—anterior view

Origin
Humeroulnar head—medial epicondyle of the humerus through common tendon*, medial margin of the coronoid process of ulna

Radial head—anterior surface of shaft of radius

Insertion
Four tendons divide into two slips each; slips insert into the sides (margins of the anterior surfaces) of the middle phalanges of four fingers

Action
Flexes the middle phalanges of the fingers

Nerve
Median nerve (C7, C8, T1)

Relationship
Deep to superficial flexors

*See superficial flexors.

Note: The tendons of flexor digitorum superficialis split and attach to the middle phalanx. The tendons of flexor digitorum profundus pass through this split and continue to the distal phalanx.

FLEXOR DIGITORUM PROFUNDUS

Forearm—anterior view

Origin
Upper three-fourths of anterior and medial surfaces of shaft of ulna and medial side of the coronoid process, interosseous membrane

Insertion
Front of base of distal phalanges

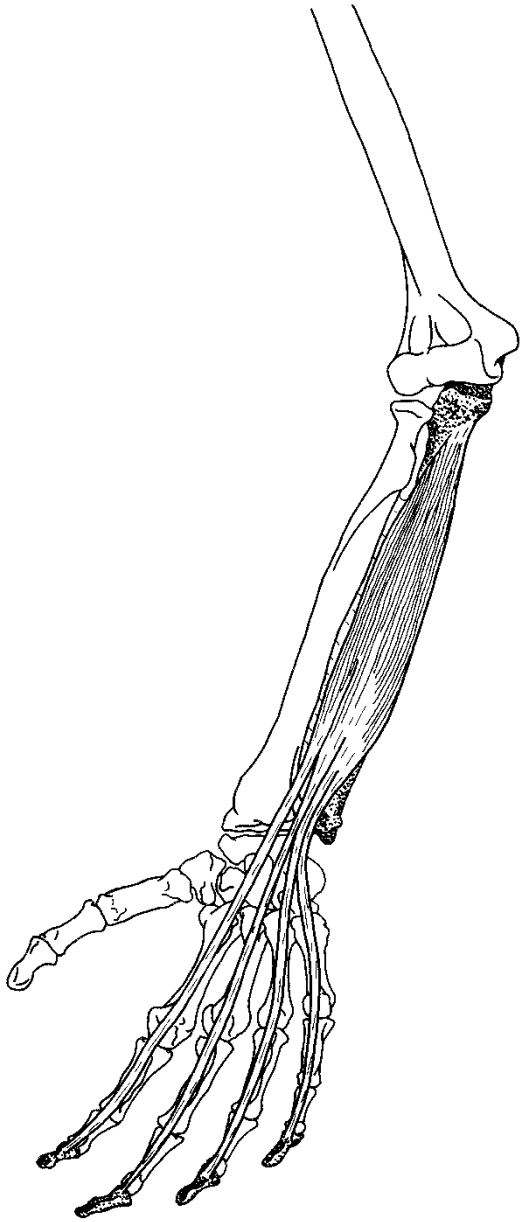
Action
Flexes distal phalanges

Nerve
Ulnar nerve supplies the medial half of the muscle (going to the fourth and fifth fingers)

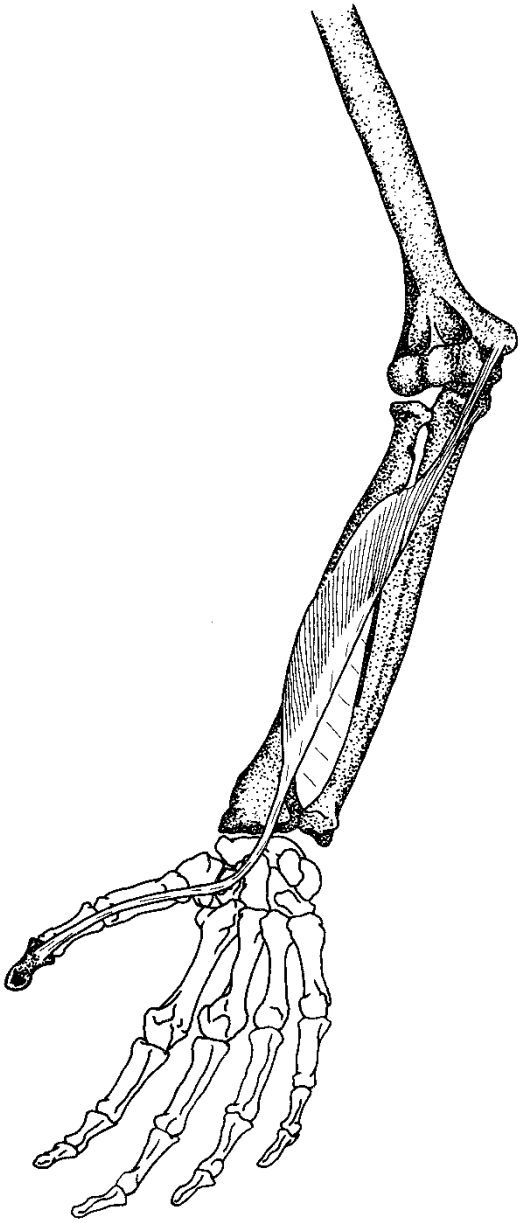
Anterior interosseous branch of median nerve supplies lateral half (going to index and middle fingers) (C8, T1)

Relationship
Deep to flexor digitorum superficialis

Note: Flexor digitorum muscles, flexor pollicis longus, and the median nerve pass under the flexor retinaculum (p. 134) in the wrist. When irritated, the synovial sheaths of these muscles can compress the median nerve, causing the sensory and motor deficits known as carpal tunnel syndrome.



FLEXOR POLLICIS LONGUS



Forearm—anterior view

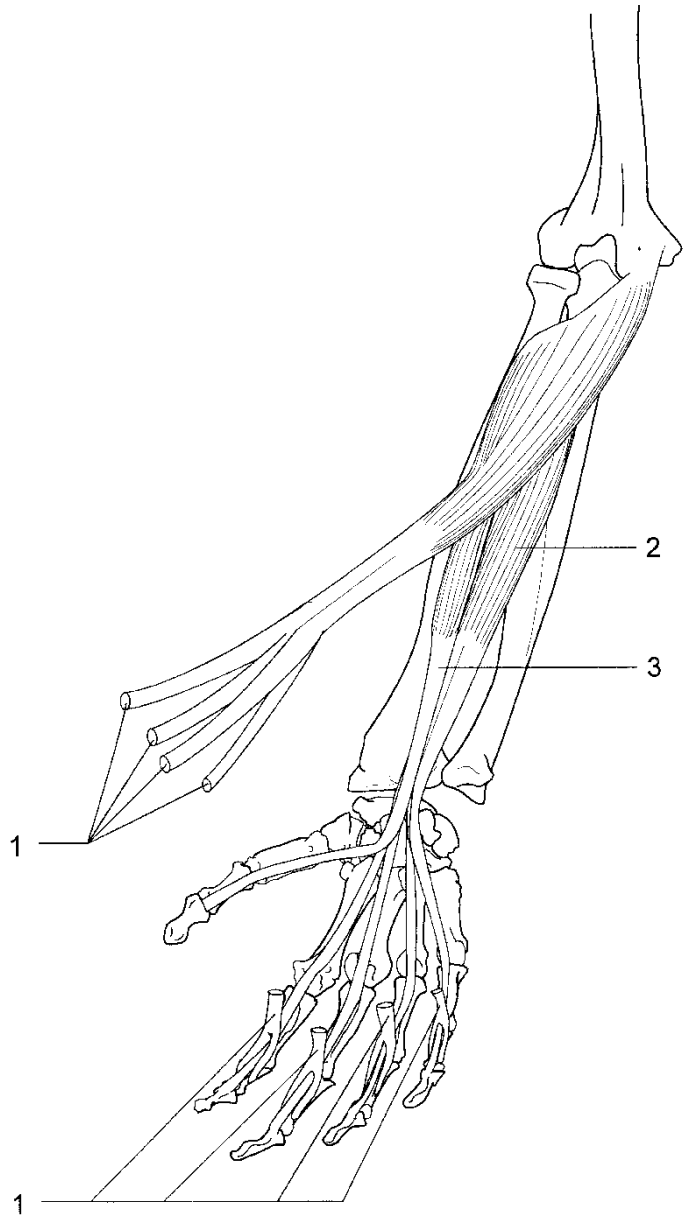
Origin
Middle of anterior surface of shaft of radius, interosseous membrane, medial epicondyle of humerus, and often coronoid process of ulna

Insertion
Palmar aspect of base of the distal phalanx of thumb

Action
Flexes the thumb

Nerve
Anterior interosseous branch of median nerve (C8, T1)

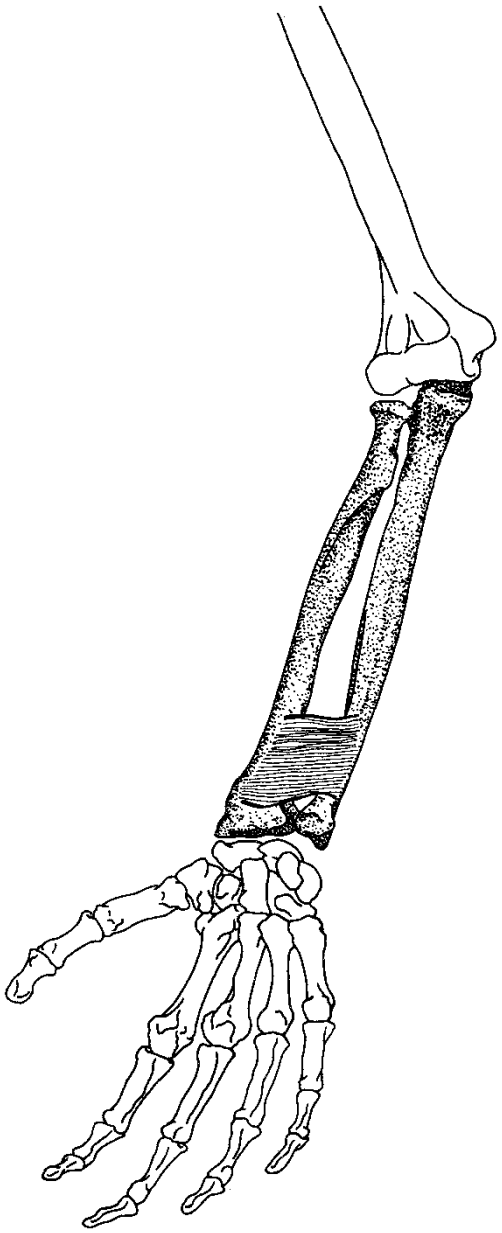
FLEXORS OF THE FINGERS



Forearm—anterior view

1. Flexor digitorum superficialis (cut)
2. Flexor digitorum profundus
3. Flexor pollicis longus

PRONATOR QUADRATUS



Forearm—anterior view

Origin
Anterior surface of distal part of shaft of ulna

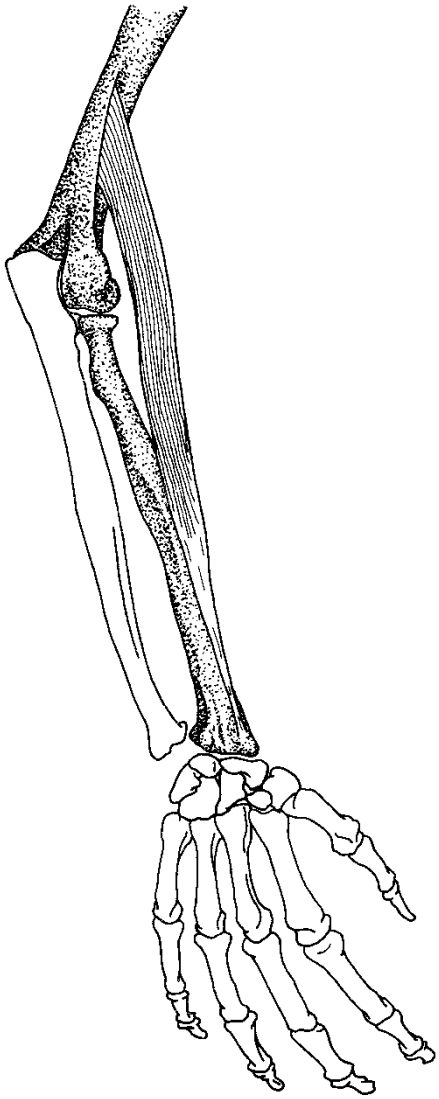
Insertion
Lower portion of anterior surface of shaft of radius, distal part of lateral border of radius

Action
Pronates forearm and hand

Nerve
Anterior interosseous branch of median nerve (C8, T1)

Relationship
Deepest forearm muscle

BRACHIORADIALIS



Forearm—dorsal view

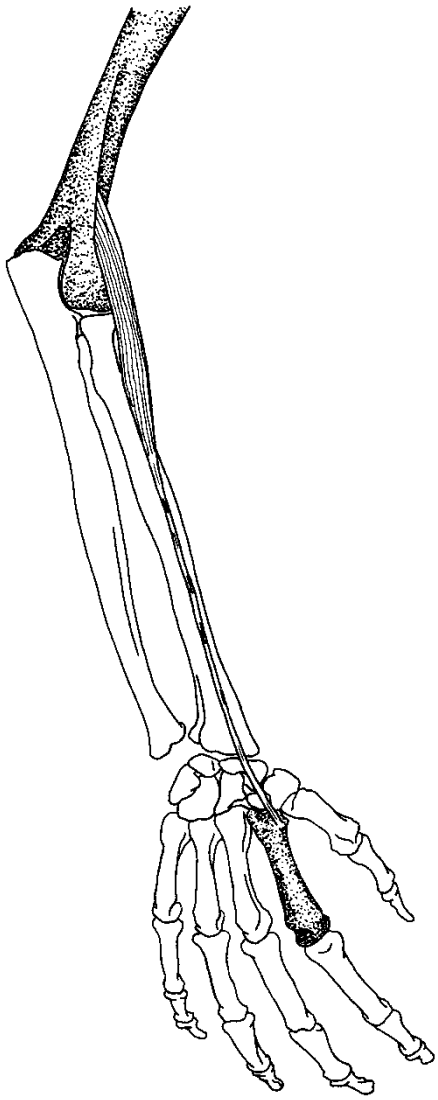
■ **Origin**
Upper two-thirds of lateral supracondylar ridge of humerus

■ **Insertion**
Base of styloid process and lateral surface of radius

■ **Action**
Flexes forearm

■ **Nerve**
Radial nerve (C5, C6)

EXTENSOR CARPI RADIALIS LONGUS



Forearm—dorsal view

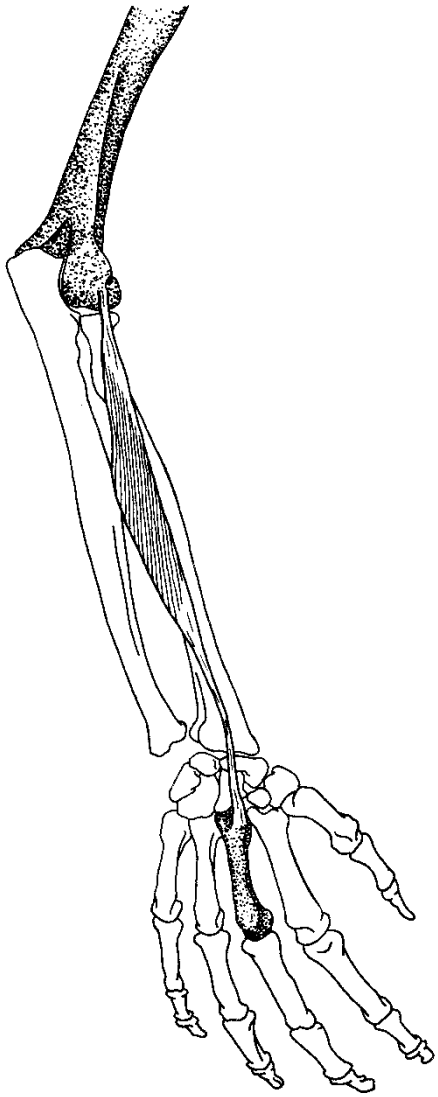
Origin
Lower third of lateral supracondylar ridge of humerus

Insertion
Dorsal surface of the base of the second metacarpal bone

Action
Extends hand, synergist in abduction of hand with flexor carpi radialis

Nerve
Radial nerve (C6, C7)

EXTENSOR CARPI RADIALIS BREVIS



Forearm—dorsal view

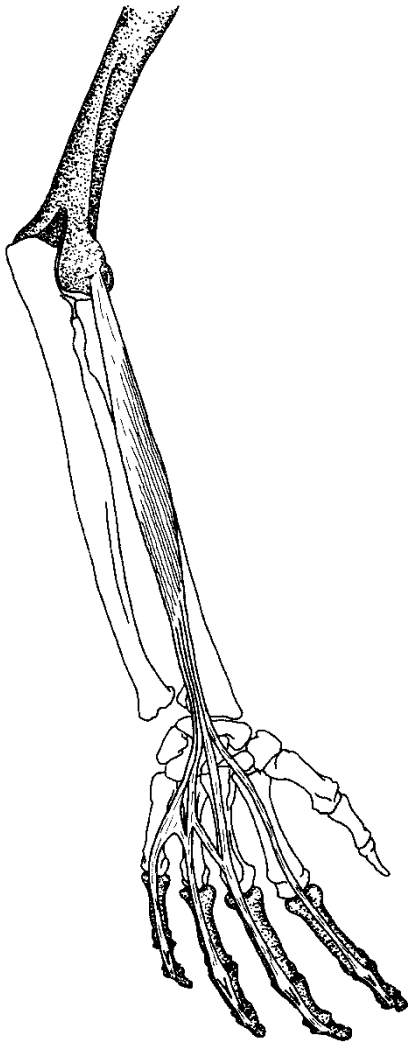
■ **Origin**
Lateral epicondyle of humerus

■ **Insertion**
Dorsal surface of third metacarpal bone

■ **Action**
Extends hand, synergist in abduction of hand with flexor carpi radialis

■ **Nerve**
Radial nerve (C7, C8)

EXTENSOR DIGITORUM



Forearm and hand—dorsal view

■ **Origin**
Common tendon attached to lateral epicondyle of humerus

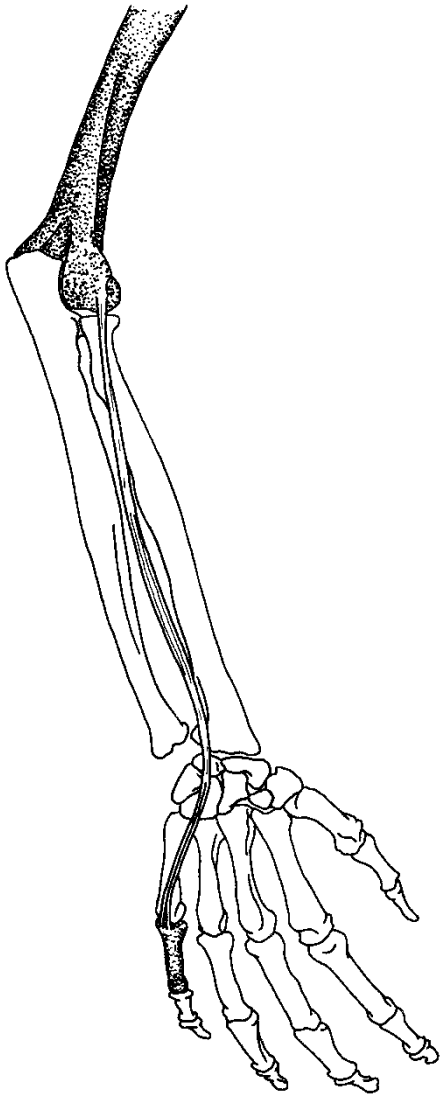
■ **Insertion**
Lateral and dorsal surfaces of all the phalanges of the four fingers

■ **Action**
Extends the fingers and wrist

■ **Nerve**
Deep branch of radial nerve (C7, C8)

■ **Relationship**
Tends to hyperextend the metacarpophalangeal joint causing "claw hand"; its action is balanced by the lumbricales and interossei

EXTENSOR DIGITI MINIMI



Forearm and hand—dorsal view

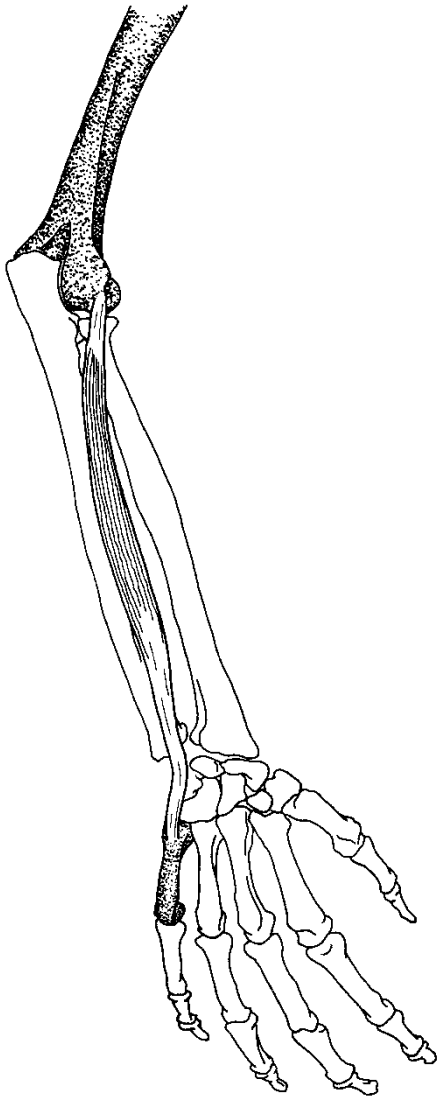
■ **Origin**
Common tendon attached to lateral epicondyle of humerus

■ **Insertion**
Dorsal surface of base of first phalanx of fifth finger

■ **Action**
Extends fifth finger

■ **Nerve**
Radial nerve (C7, C8)

EXTENSOR CARPI ULNARIS



Forearm and hand—dorsal view

■ Origin
Common tendon attached to lateral epicondyle of humerus

■ Insertion
Dorsal surface of base of fifth metacarpal bone

■ Action
Extends hand, synergist in adduction of hand with flexor carpi ulnaris

■ Nerve
Radial nerve (C7, C8)

SUPINATOR

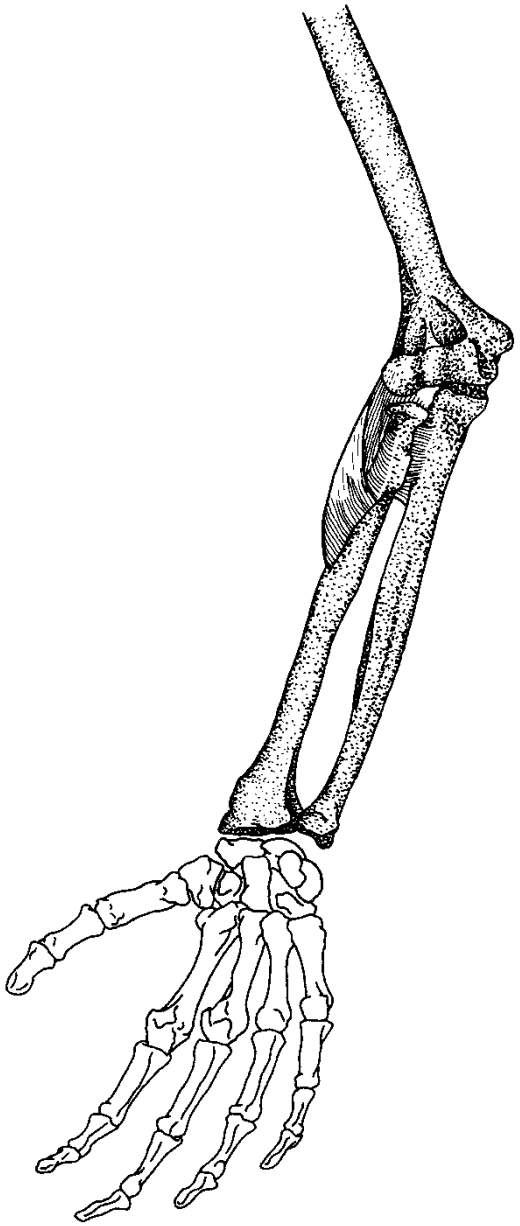
Forearm and hand—anterior view

Origin
Lateral epicondyle of humerus, lateral ligament (radial collateral) of elbow, annular ligament of superior radioulnar joint, supinator crest of ulna

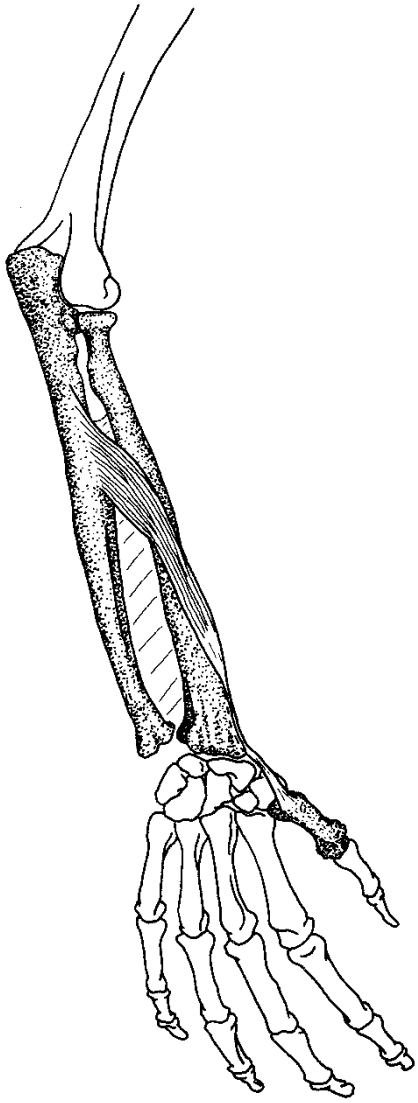
Insertion
Dorsal and lateral surfaces of upper third of radius

Action
Supinates forearm

Nerve
Radial nerve (C5, C6)



ABDUCTOR POLLICIS LONGUS



Forearm and hand—dorsal view

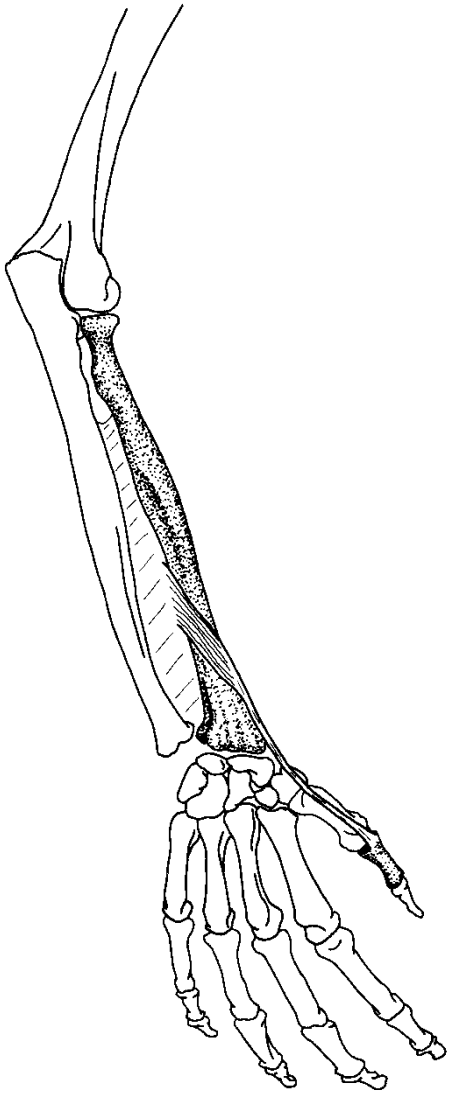
■ **Origin**
Posterior (dorsal) surface of shaft of radius, ulna, interosseous membrane

■ **Insertion**
Dorsal surface of base of first metacarpal bone

■ **Action**
Abducts, laterally rotates, and extends thumb; abducts wrist

■ **Nerve**
Radial nerve (C7, C8)

EXTENSOR POLLICIS BREVIS



Forearm and hand—dorsal view

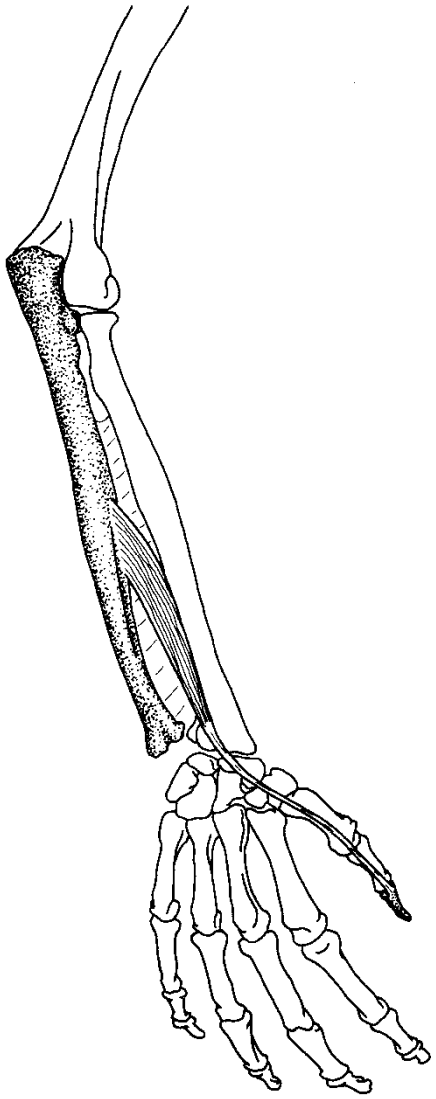
■ **Origin**
Dorsal surface of radius, adjacent part of interosseous membrane

■ **Insertion**
Base of proximal phalanx of thumb

■ **Action**
Extends thumb, abducts hand

■ **Nerve**
Radial nerve (C7, C8)

EXTENSOR POLLICIS LONGUS



Forearm and hand—dorsal view

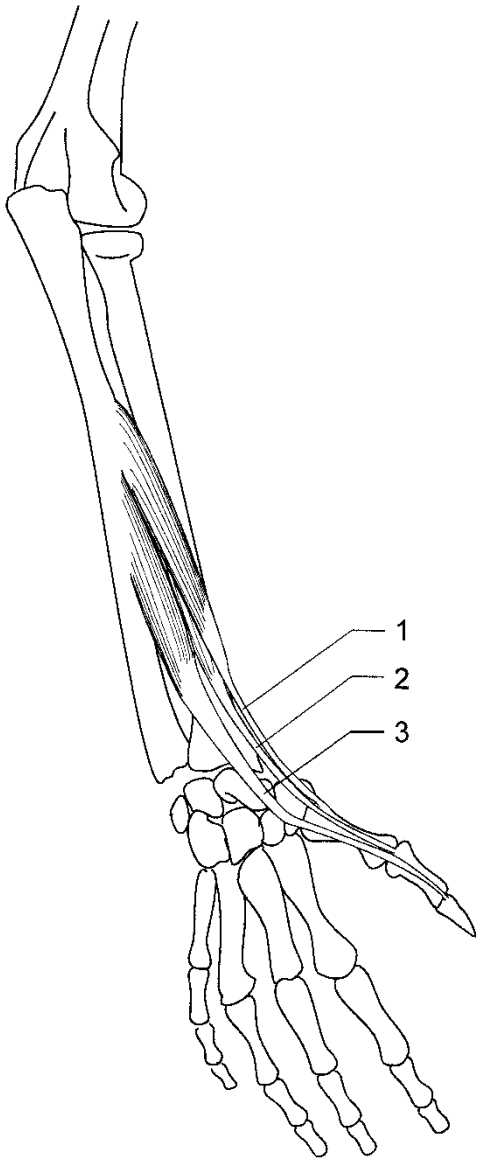
■ **Origin**
Middle third of dorsal surface of ulna, interosseous membrane

■ **Insertion**
Base of distal phalanx of thumb

■ **Action**
Extends thumb

■ **Nerve**
Radial nerve (C7, C8)

EXTENSORS OF THE THUMB

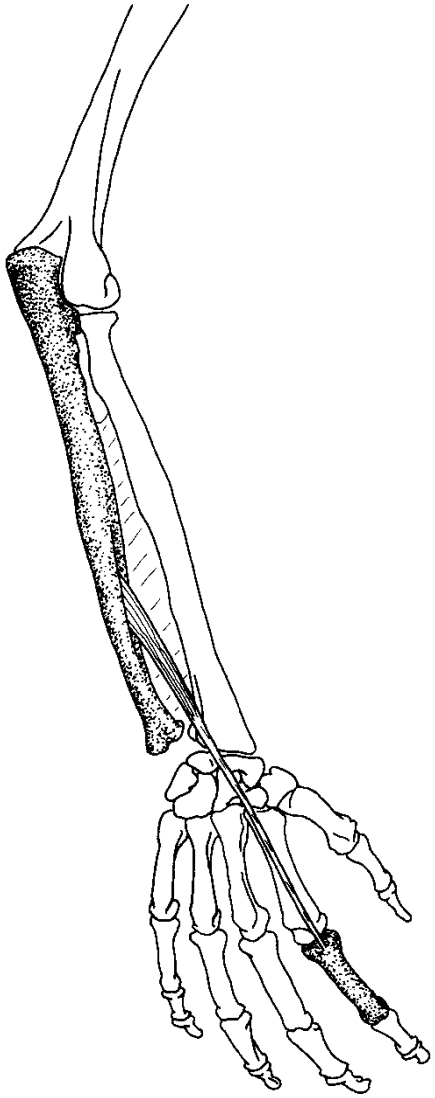


Forearm—posterior view

1. Abductor pollicis longus
2. Extensor pollicis brevis
3. Extensor pollicis longus

Note: Beginning at the styloid process of the radius, the tendons of the extensor pollicis longus (medially) and the extensor pollicis brevis (laterally) form a hollow depression known as the anatomical snuff box.

EXTENSOR INDICIS



Forearm and hand—dorsal view

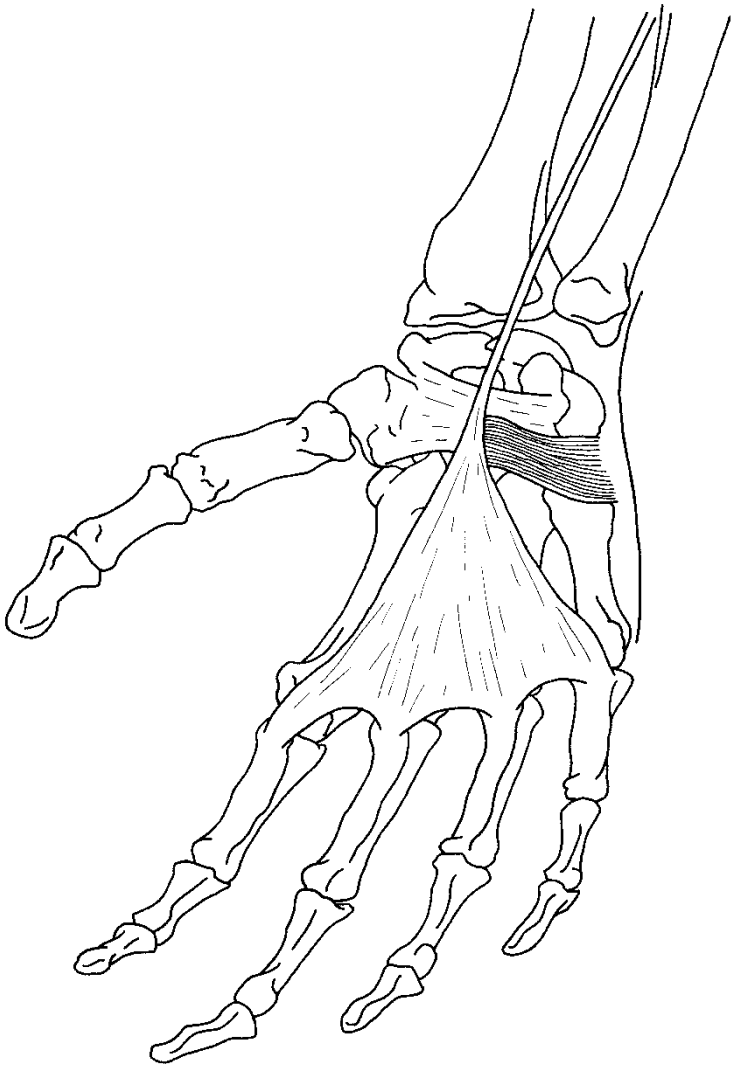
■ **Origin**
Posterior surface of ulna and adjacent part of interosseous membrane

■ **Insertion**
Extensor expansion on dorsal surface of proximal phalanx of index finger

■ **Action**
Extends index finger

■ **Nerve**
Radial nerve (C7, C8)

PALMARIS BREVIS



Hand—palmar view

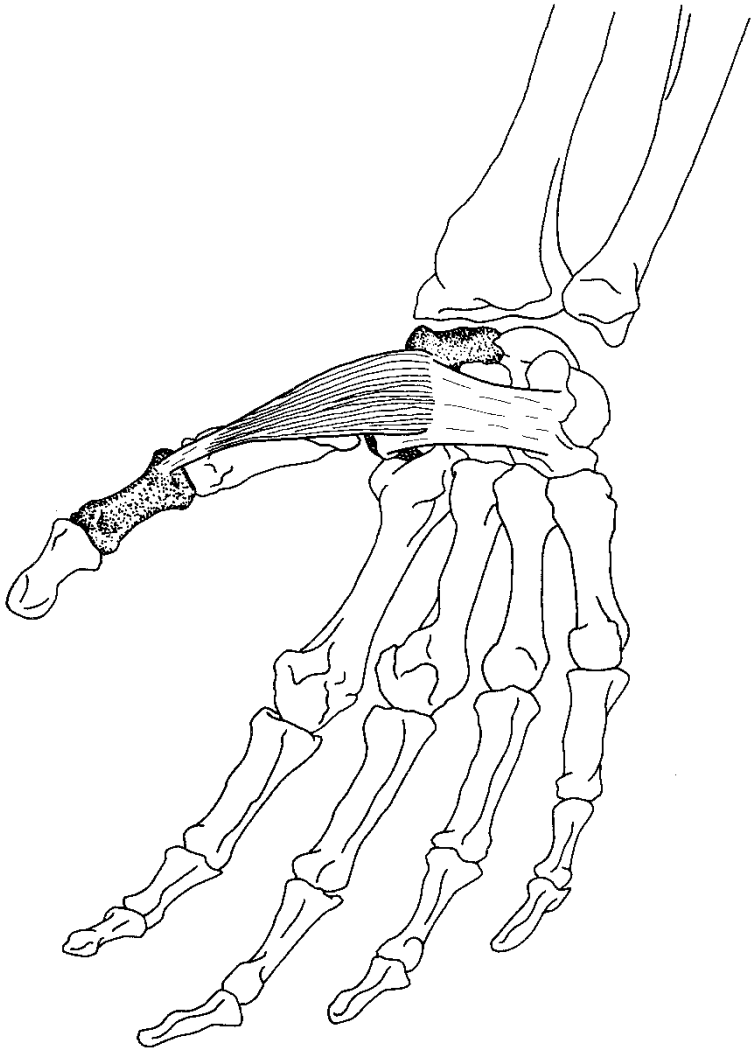
■ **Origin**
Flexor retinaculum, palmar aponeurosis

■ **Insertion**
Skin of the palm

■ **Action**
Corrugates lateral skin of palm

■ **Nerve**
Ulnar nerve (C8, T1)

ABDUCTOR POLLICIS BREVIS *(Thenar Eminence)*



Hand—palmar view

■ Origin
Tubercle of scaphoid, tubercle of trapezium, flexor retinaculum

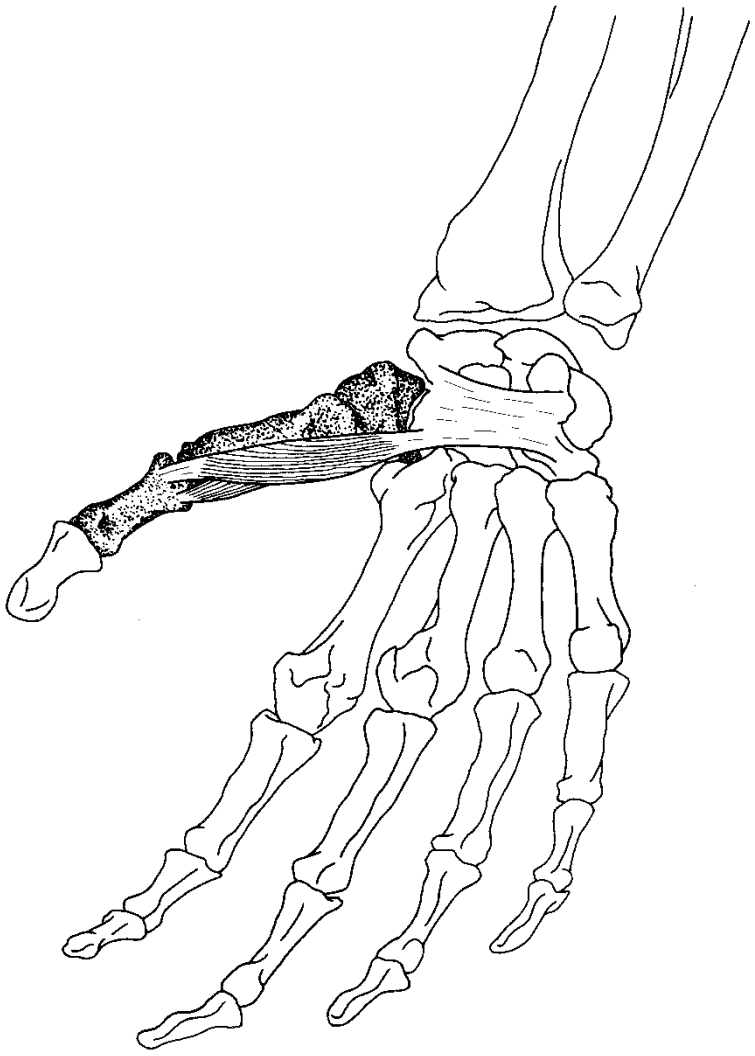
■ Insertion
Base of proximal phalanx of thumb

■ Action
Abducts thumb and moves it anteriorly, acts together with other muscles of thenar eminence to oppose thumb to other fingers

■ Nerve
Median (C8, T1)

Note: The abductor pollicis brevis, flexor pollicis brevis, and opponens pollicis form the thenar eminence at the base of the thumb.

FLEXOR POLLICIS BREVIS *(Thenar Eminence)*



Hand—palmar view

■ Origin
Flexor retinaculum and trapezium, and first metacarpal bone

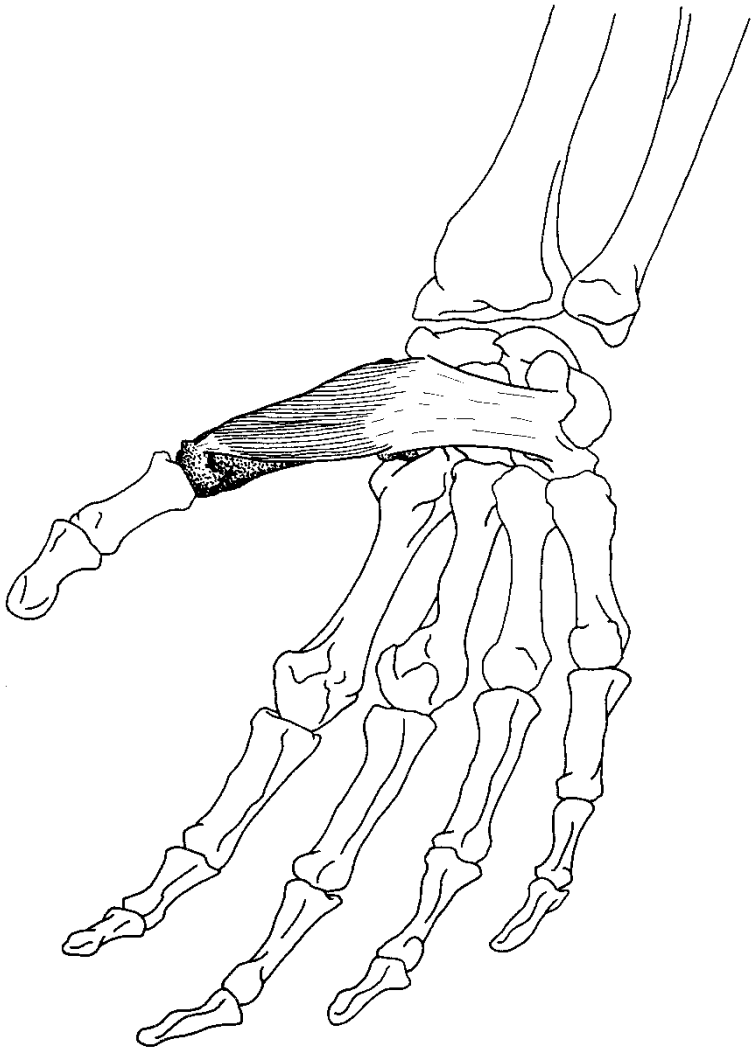
■ Insertion
Base of proximal phalanx of thumb

■ Action
Flexes metacarpophalangeal joint of thumb, assists in abduction and rotation of thumb, acts together with other muscles of thenar eminence to oppose thumb to other fingers

■ Nerve
Lateral portion—median nerve (C8, T1)

Medial portion—ulnar nerve (C8, T1)

OPPONENS POLLICIS *(Thenar Eminence)*



Hand—palmar view

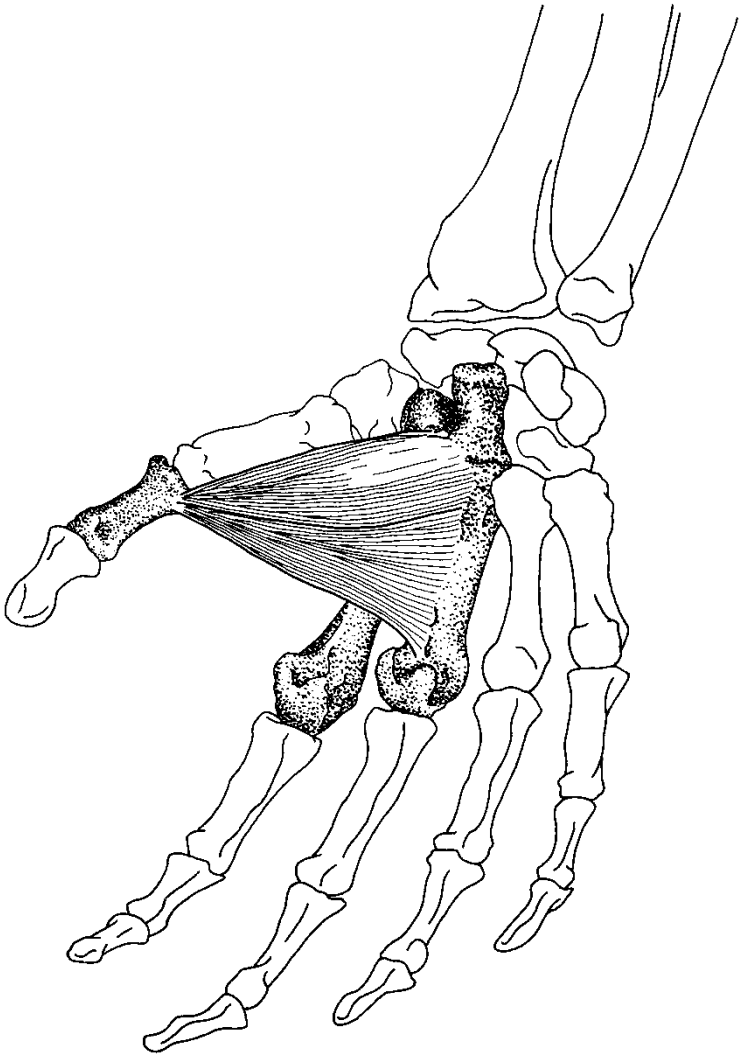
■ Origin
Flexor retinaculum, tubercle of trapezium

■ Insertion
Lateral border of first metacarpal bone

■ Action
Rotates thumb into opposition with fingers, acts together with other muscles of thenar eminence to oppose thumb to other fingers

■ Nerve
Median nerve (C8, T1)

ADDUCTOR POLLICIS



Hand—palmar view

■ Origin
Oblique head—anterior surfaces of second and third metacarpals, capitate, trapezoid

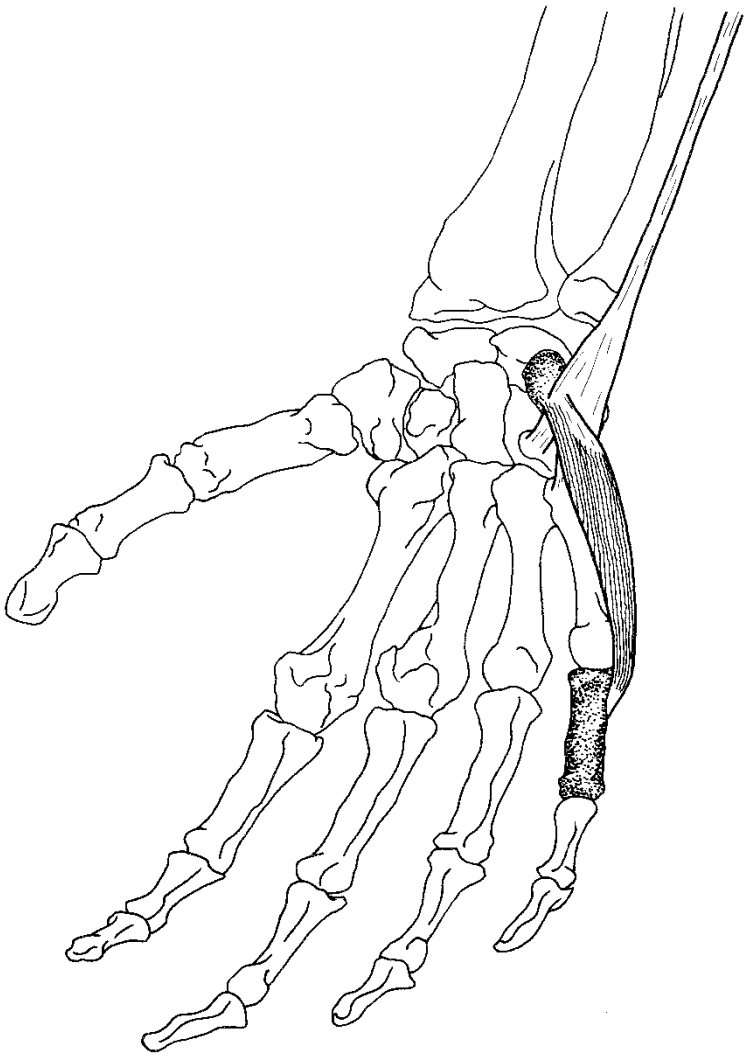
Transverse head—anterior surface of third metacarpal bone

■ Insertion
Medial side of base of proximal phalanx of thumb

■ Action
Adducts thumb

■ Nerve
Ulnar nerve (C8, T1)

ABDUCTOR DIGITI MINIMI *(Hypothenar Eminence)*



Hand—palmar view

■ Origin
Pisiform bone, tendon of flexor carpi ulnaris

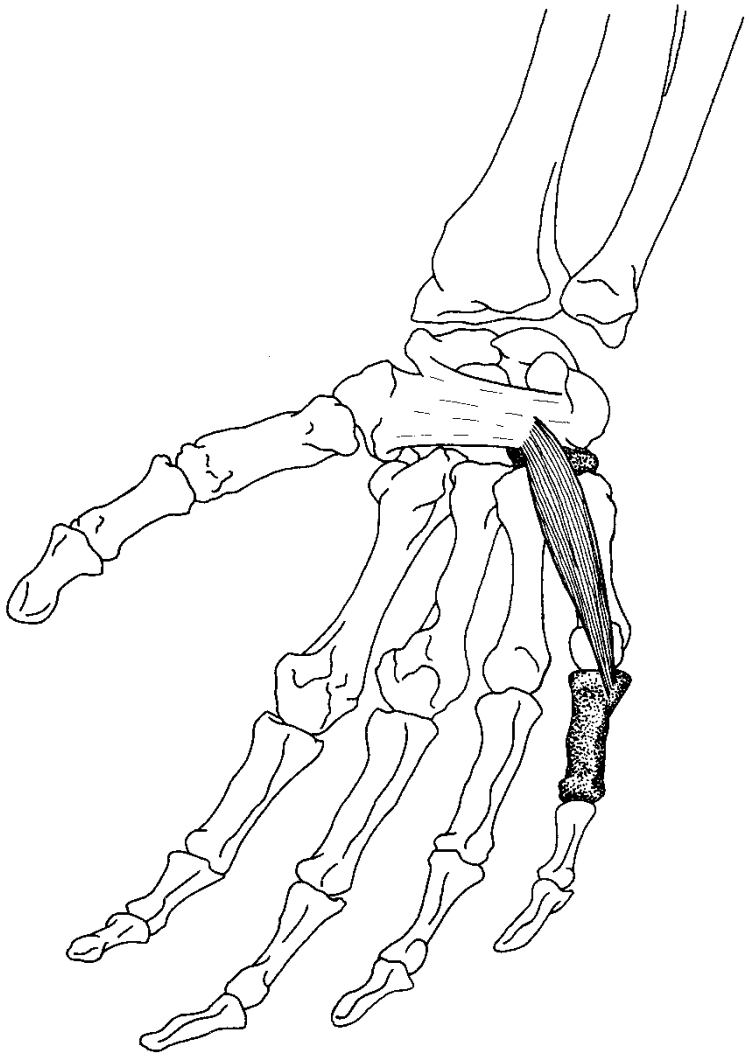
■ Insertion
Medial side of base of proximal phalanx of fifth finger

■ Action
Abducts fifth finger

■ Nerve
Ulnar nerve (C8, T1)

Note: The hypothenar eminence is less prominent than the thenar eminence, and the fifth finger obviously cannot oppose the other digits.

FLEXOR DIGITI MINIMI BREVIS *(Hypothenar Eminence)*



Hand—palmar view

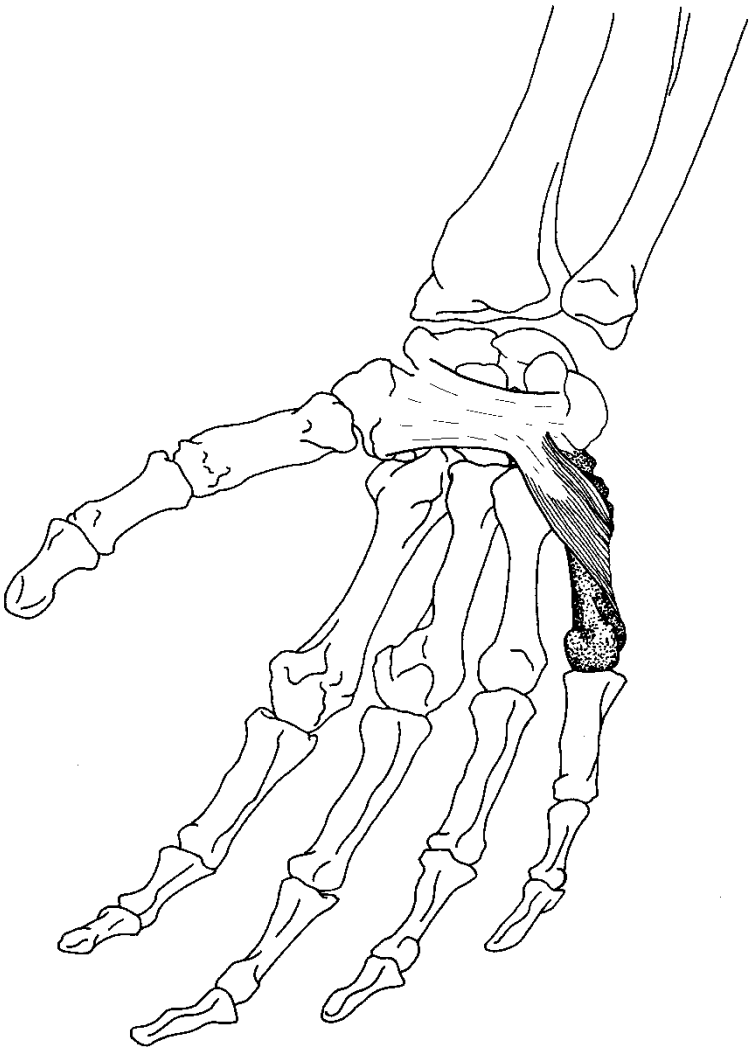
■ **Origin**
Anterior surface of flexor retinaculum, hook of hamate

■ **Insertion**
Medial side of base of proximal phalanx of fifth finger

■ **Action**
Flexes fifth finger at metacarpophalangeal joint

■ **Nerve**
Ulnar nerve (C8, T1)

OPPONENS DIGITI MINIMI *(Hypothenar Eminence)*



Hand—palmar view

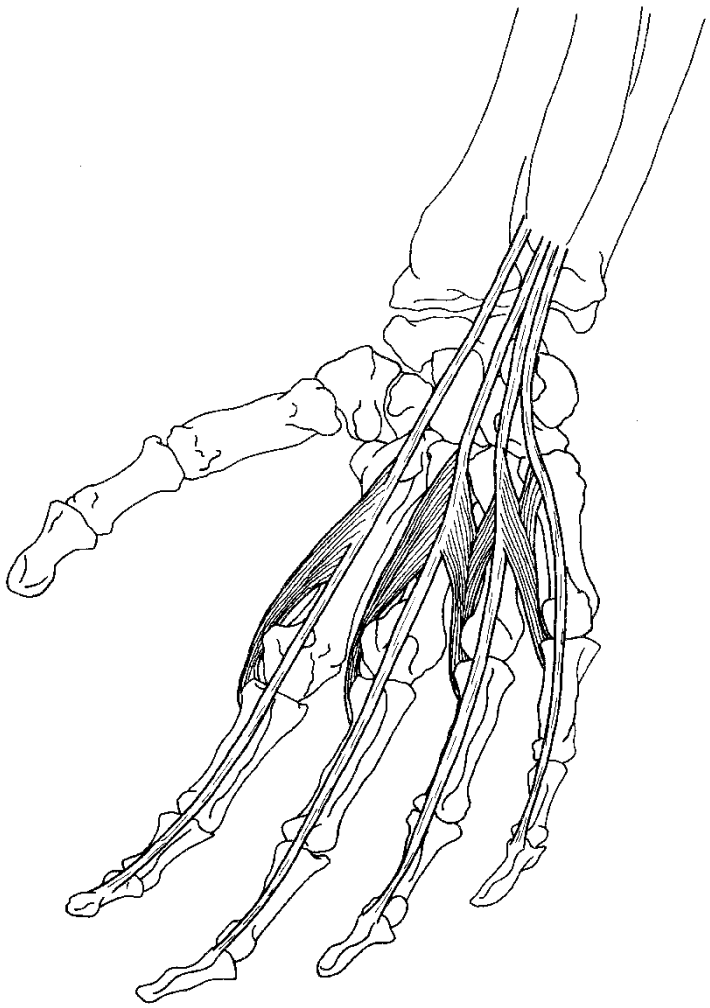
■ Origin
Anterior surface of flexor retinaculum, hook of hamate

■ Insertion
Whole length of medial border of fifth metacarpal bone

■ Action
Rotates fifth metacarpal bone, draws fifth metacarpal bone forward, assists flexor digiti minimi brevis in flexing carpometacarpal joint of fifth finger

■ Nerve
Ulnar nerve (C8, T1)

LUMBRICALES* *(Four Muscles)*



Hand—palmar view

■ Origin
Tendons of flexor digitorum profundus in palm

■ Insertion
Lateral side of corresponding tendon of extensor digitorum on fingers

■ Action
Extend fingers at interphalangeal joints, weakly flex fingers at metacarpophalangeal joints

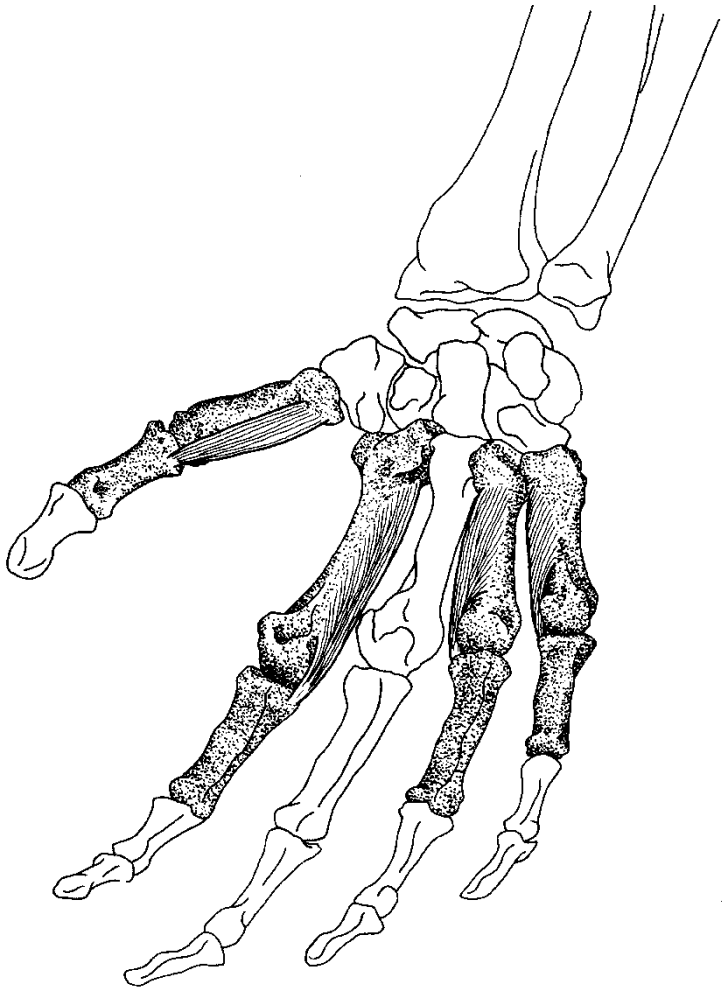
■ Nerve
Lateral lumbricals (first and second)—median nerve (C8, T1)

Medial lumbricals (third and fourth)—ulnar nerve (C8, T1)

■ Relationship
Assist extensor digitorum communis in extending fingers without hyperextension at the metacarpophalangeal joints

*Associated with the tendons of flexor digitorum profundus.

PALMAR INTEROSSEI



Hand—palmar view

■ Origin

First—medial side of base of first metacarpal bone

Second, third, and fourth—anterior surfaces of second, fourth, and fifth metacarpal bones

■ Insertion

First—medial side of base of proximal phalanx of thumb

Second—medial side of base of proximal phalanx of index finger

Third and fourth—lateral side of proximal phalanges of ring finger and fifth finger

■ Action

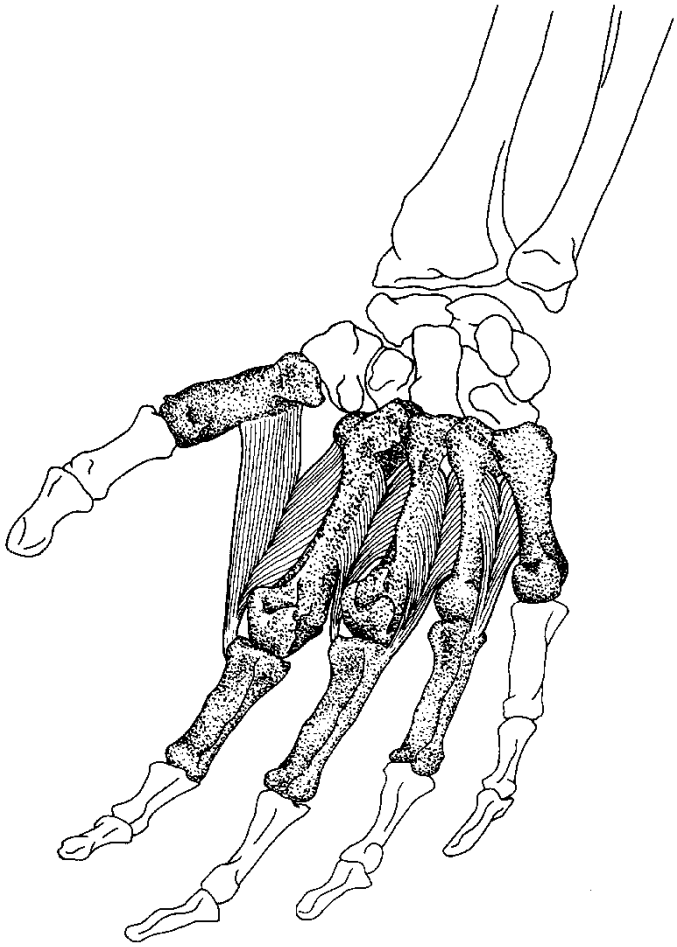
Adduct fingers toward center of third finger at metacarpophalangeal joints, assist in flexion of fingers at metacarpophalangeal joints

■ Nerve

Ulnar nerve (C8, T1)

Note: The palmar interosseus of the thumb is called the palmar interosseus of Henle. Most anatomists claim that it is usually absent while some argue for its common occurrence.

DORSAL INTEROSSEI



Hand—palmar view

■ Origin
By two heads from adjacent sides of first and second, second and third, third and fourth, and fourth and fifth metacarpal bones

■ Insertion
First—lateral side of base of proximal phalanx of index finger

Second—lateral side of base of proximal phalanx of middle finger

Third—medial side of base of proximal phalanx of middle finger

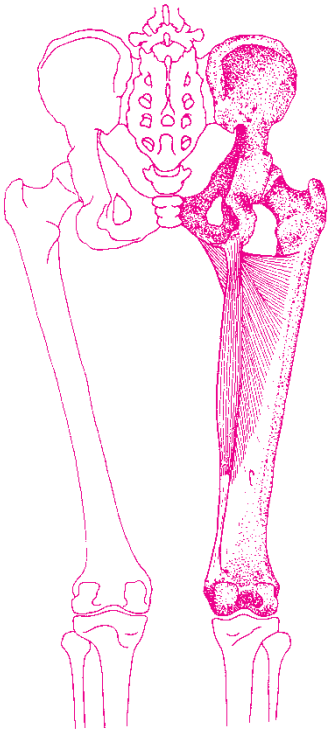
Fourth—medial side of base of proximal phalanx of ring finger

■ Action
Abduct fingers away from center of third finger at metacarpophalangeal joints, assist in flexion of fingers at metacarpophalangeal joints

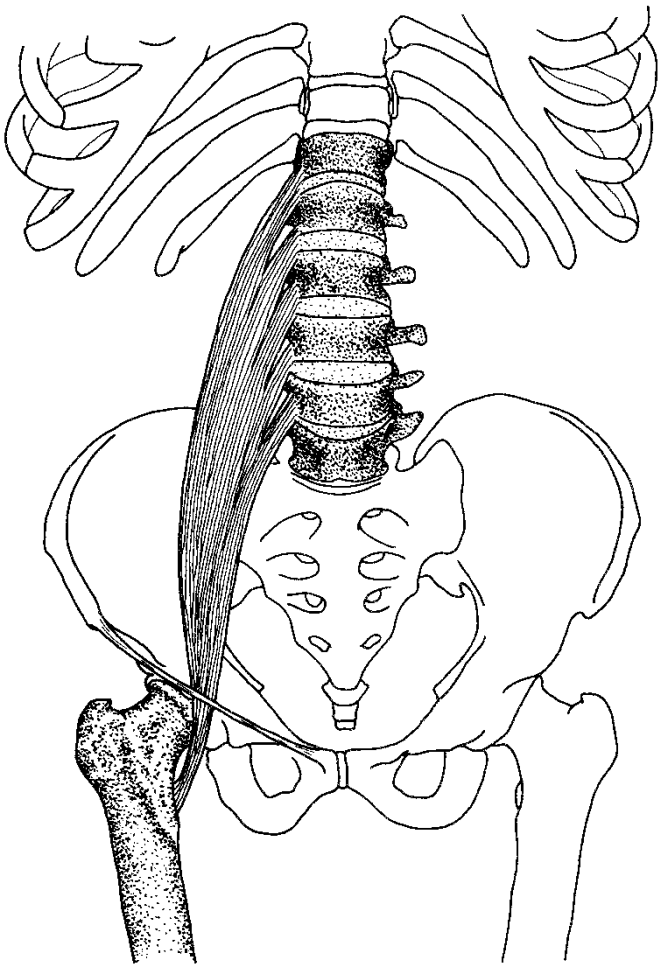
■ Nerve
Ulnar nerve (C8, T1)

CHAPTER EIGHT

Muscles of the Hip and Thigh



PSOAS MAJOR *(Part of Iliopsoas)*



Lumbar region, hip, and thigh—anterior view

■ Origin
Bases of transverse processes of all lumbar vertebrae, bodies of twelfth thoracic and all lumbar vertebrae, intervertebral disks above each lumbar vertebra

■ Insertion
Lesser trochanter of femur

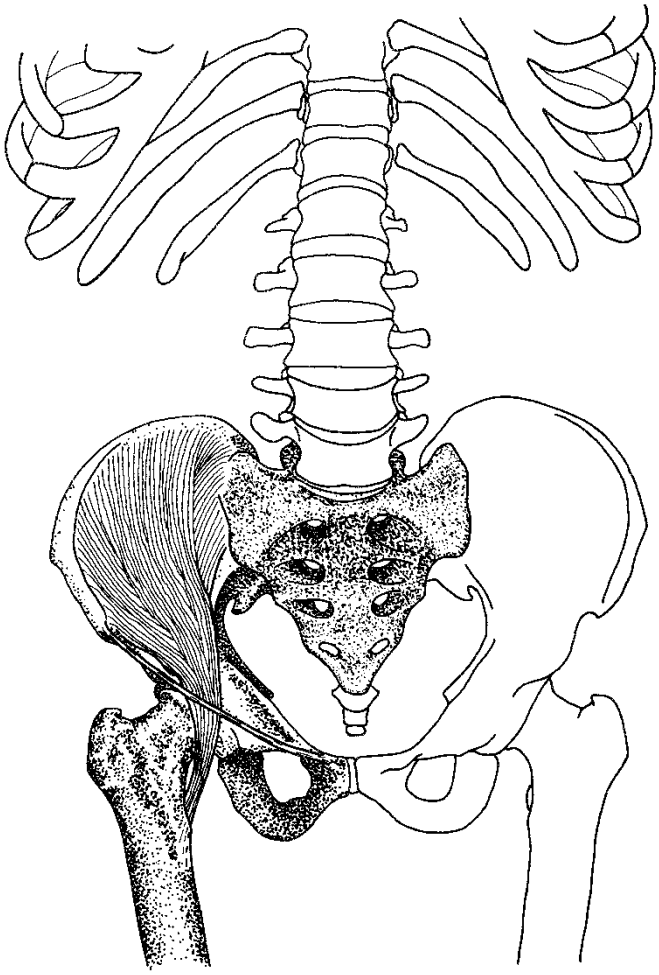
■ Action
Flexes thigh*, flexes vertebral column

*See note on p. 188.

■ Nerve
Branches from lumbar plexus (L2, L3) and sometimes L1 or L4

Note: Some upper fibers insert onto the hip bone from the arcuate line to the iliopectineal eminence to form the *psoas minor*. This muscle has little function and is frequently absent.

ILIACUS *(Part of Iliopsoas)*



Lumbar region, hip, and thigh—anterior view

■ Origin
Upper two-thirds of iliac fossa, ala of sacrum and adjacent ligaments, anterior inferior iliac spine

■ Insertion
Onto tendon of psoas major, which continues into lesser trochanter of femur (together the two muscles form the iliopsoas)

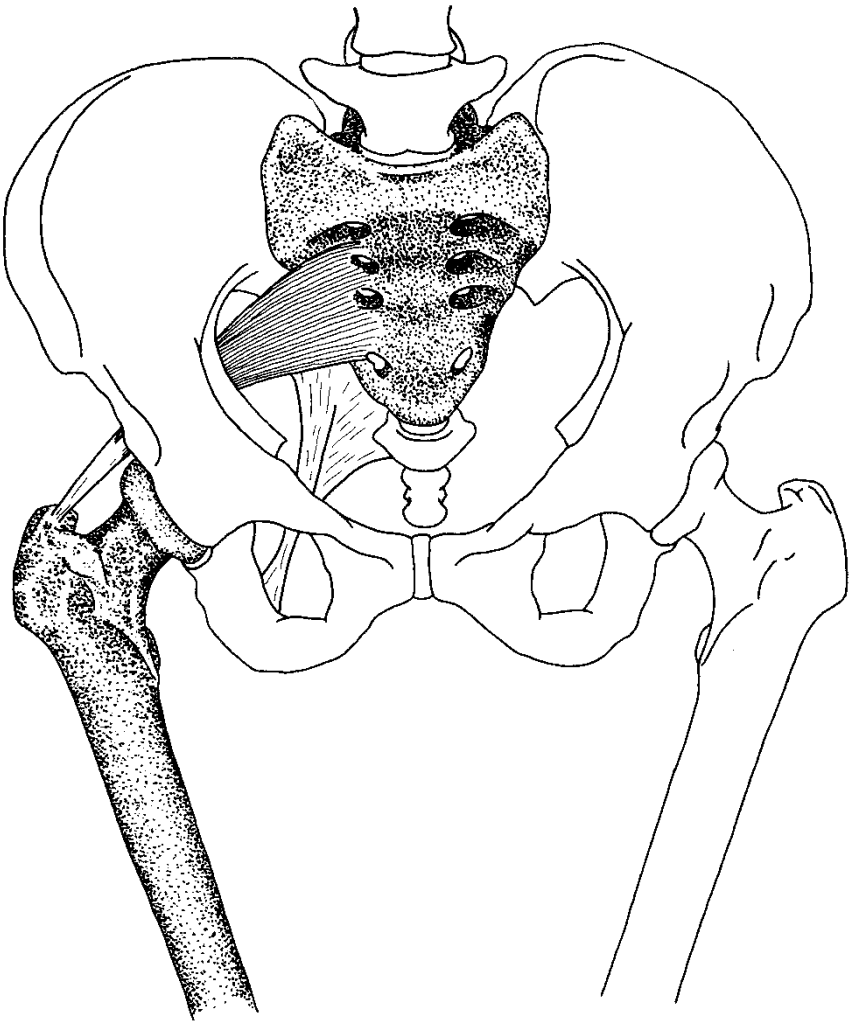
■ Action
Flexes thigh*

■ Nerve
Femoral nerve (L2, L3)

Note: The iliacus brings swinging leg forward in walking or running.

*See note on p. 188.

PIRIFORMIS



Hip and thigh—anterior view

■ **Origin**
Internal surface of sacrum, sacrotuberous ligament

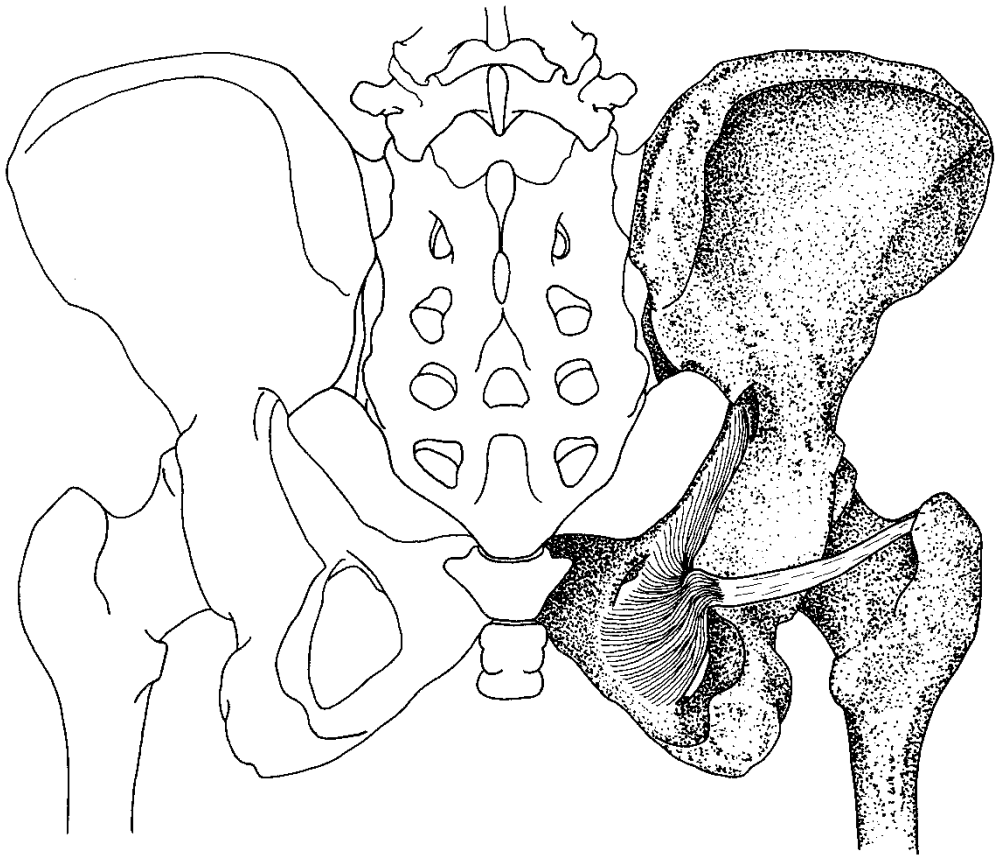
■ **Insertion**
Upper border of greater trochanter

■ **Action**
Laterally rotates thigh, abducts thigh

■ **Nerve**
Anterior rami of first and second sacral nerves

Note: The common peroneal part of the sciatic nerve may emerge through the belly of the piriformis instead of below its inferior border along with the tibial part.

OBTURATOR INTERNUS



Hip—posterior view

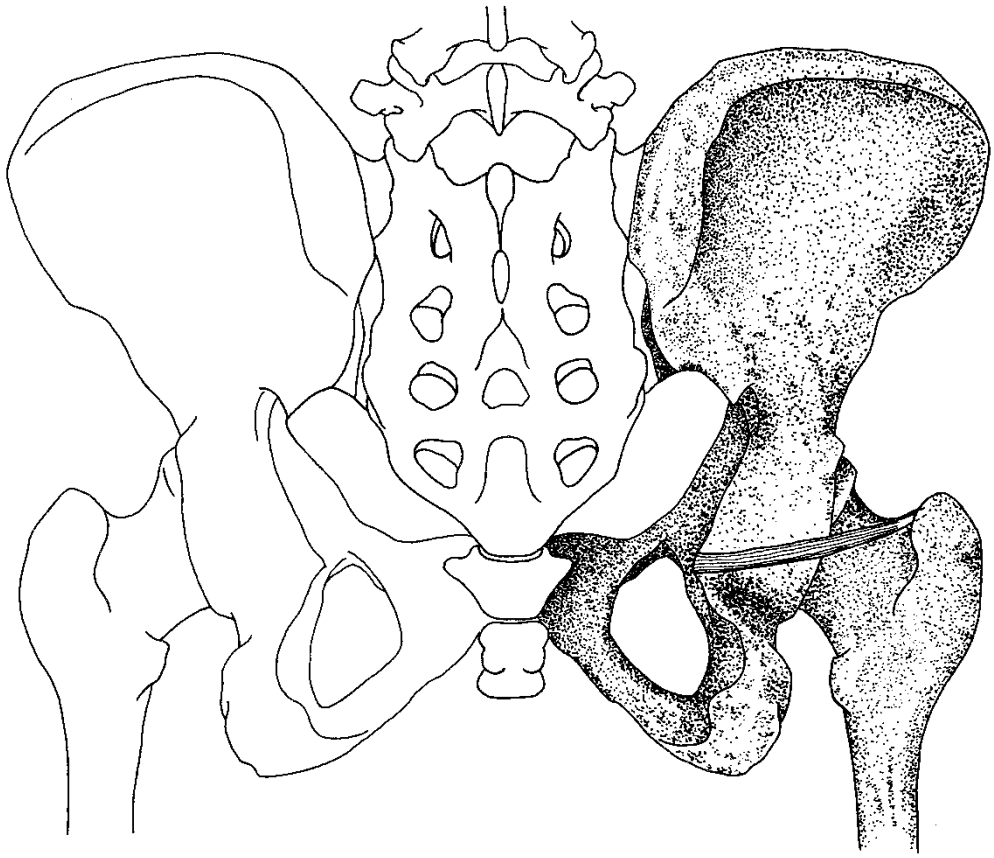
■ Origin
Pelvic surface of obturator membrane and surrounding bones (ilium, ischium, pubis)

■ Insertion
Common tendon with superior and inferior gemelli to medial surface of upper border of greater trochanter

■ Action
Laterally rotates thigh

■ Nerve
Nerve from sacral plexus (L5, S1)

GEMELLUS SUPERIOR



Hip—posterior view

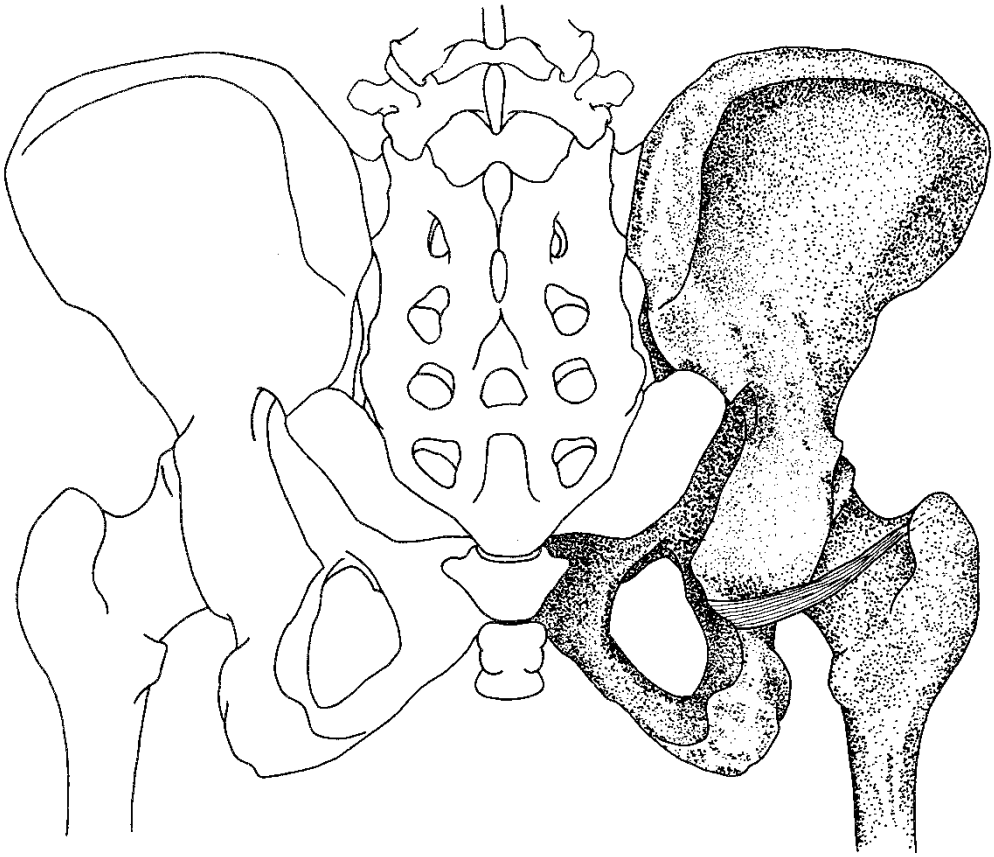
■ Origin
Spine of ischium

■ Insertion
With tendon of obturator internus into medial surface of upper border of greater trochanter

■ Action
Laterally rotates thigh

■ Nerve
Branch of nerve to obturator internus from sacral plexus (L5, S1)

GEMELLUS INFERIOR



Hip—posterior view

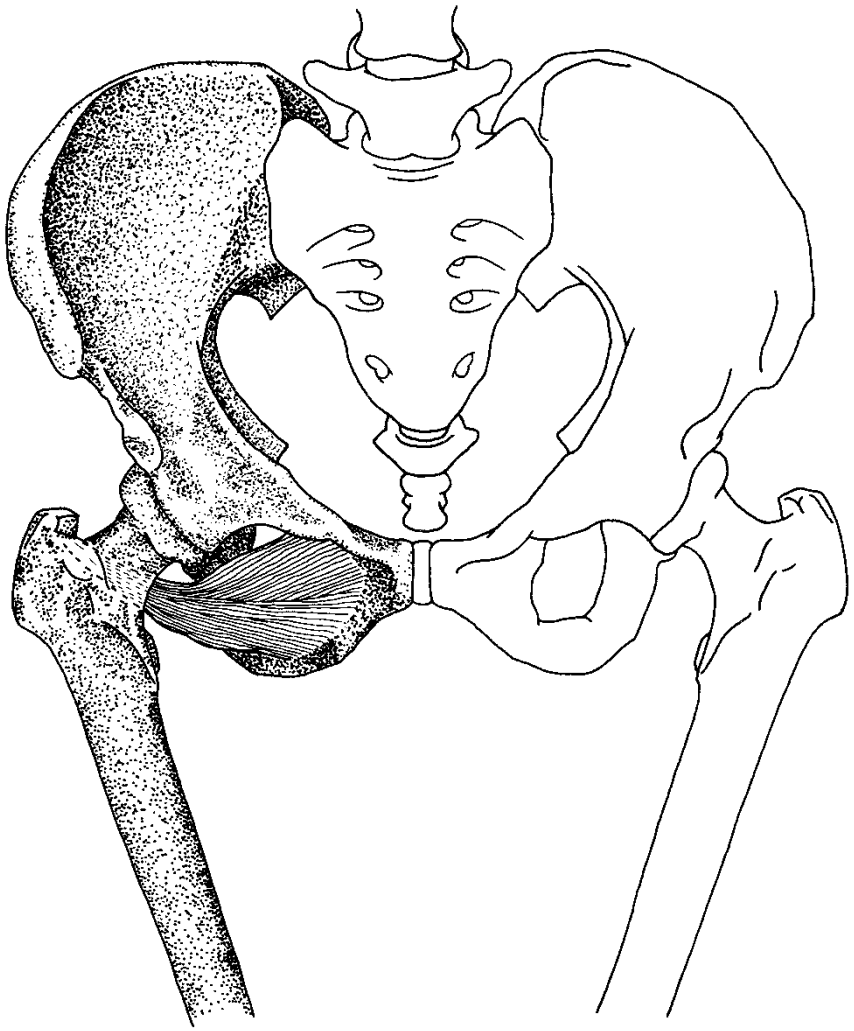
Origin
Upper margin of ischial tuberosity

Insertion
With tendon of obturator internus into medial surface of upper border of greater trochanter

Action
Laterally rotates thigh

Nerve
Branch of nerve to quadratus femoris from sacral plexus

OBTURATOR EXTERNUS



Hip and thigh—anterior view

■ Origin
Outer surface of superior and inferior rami of pubis and ramus of ischium surrounding obturator foramen

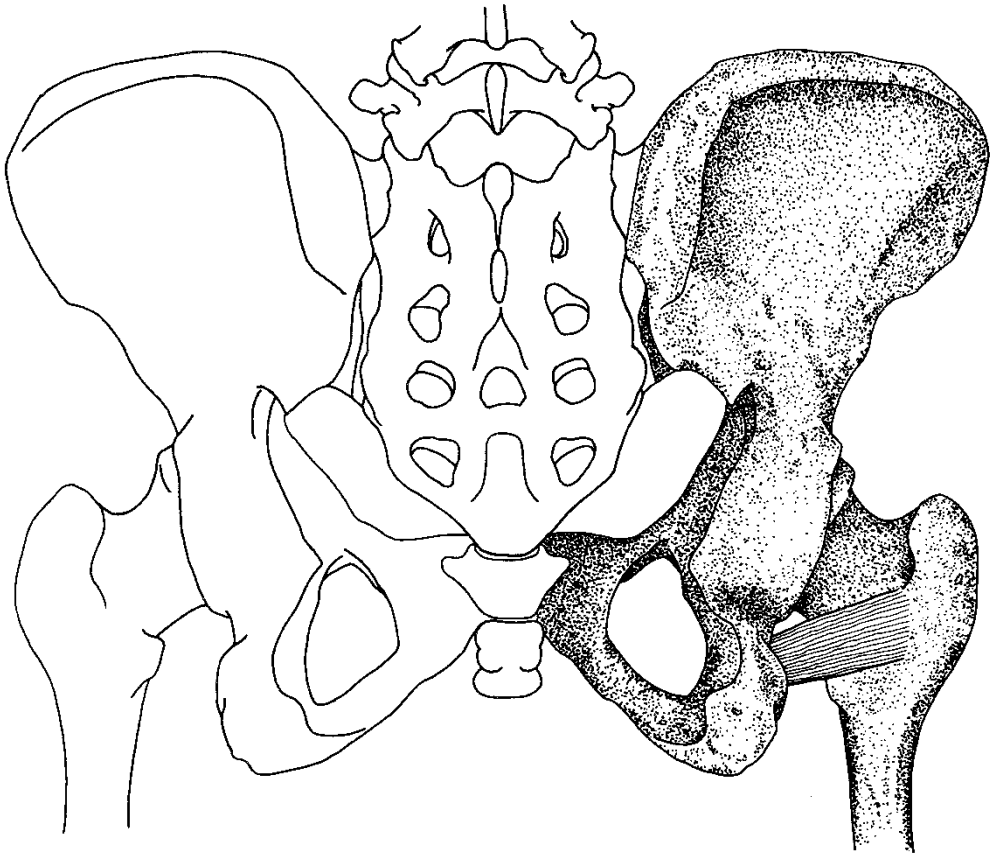
■ Insertion
Trochanteric fossa of femur

■ Action
Laterally rotates thigh

■ Nerve
Obturator nerve (L3, L4)

Note: Part of this muscle can be seen posteriorly by separating the gemellus inferior and quadratus femoris. It is deep within this cleft.

QUADRATUS FEMORIS



Hip and thigh—posterior view

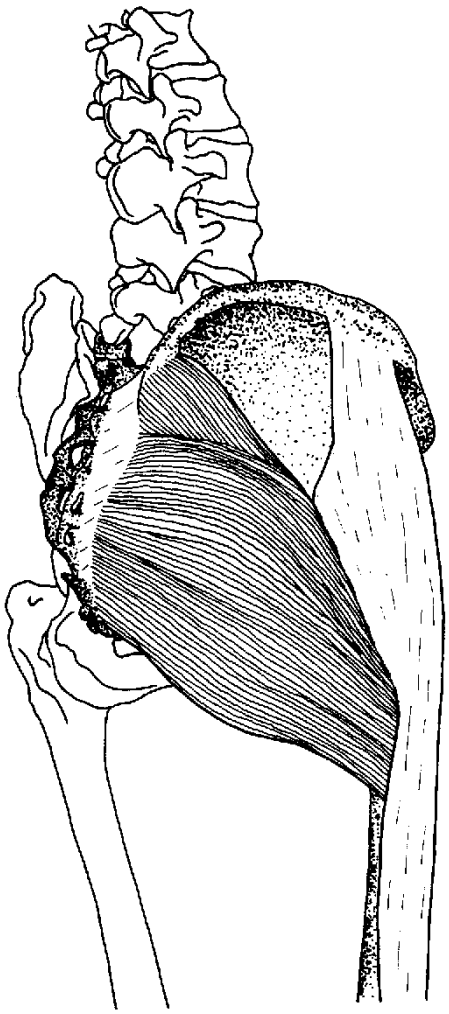
■ **Origin**
Lateral border of ischial tuberosity

■ **Insertion**
Below intertrochanteric crest (quadrate line)

■ **Action**
Laterally rotates thigh

■ **Nerve**
Branch from sacral plexus (L5, S1)

GLUTEUS MAXIMUS



Hip and thigh—lateral view

■ Origin
Outer surface of ilium behind posterior gluteal line, adjacent posterior surface of sacrum and coccyx, sacrotuberous ligament, aponeurosis of erector spinae (sacrospinalis)

■ Insertion
Iliotibial tract of fascia lata, gluteal tuberosity of femur

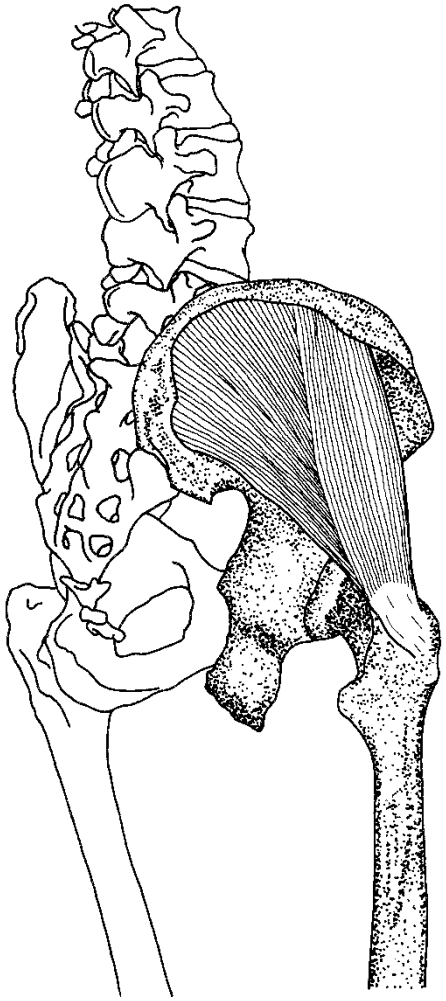
■ Action
Upper part—abducts, laterally rotates thigh

Lower part—extends, laterally rotates thigh, extends trunk, assists in adduction of thigh

■ Nerve
Inferior gluteal nerve (L5, S1, S2)

Note: This is not a postural muscle; it is not used in walking but only in forceful extension, as in running, climbing, or rising from a seated position.

GLUTEUS MEDIUS



Hip and thigh—lateral view

■ Origin
Outer surface of ilium inferior to iliac crest

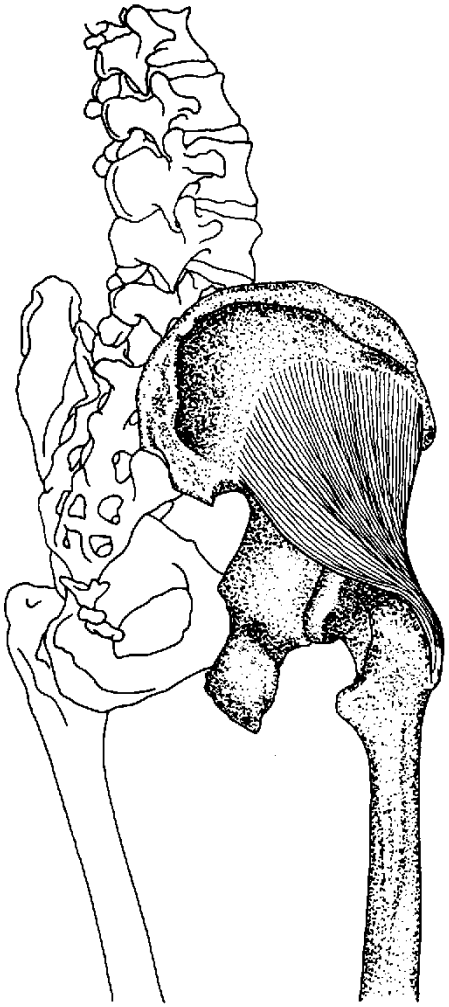
■ Insertion
Lateral surface of greater trochanter

■ Action
Abducts femur and rotates thigh medially

■ Nerve
Superior gluteal nerve (L4, L5, S1)

Note: In locomotion, this muscle (along with the gluteus minimus) prevents the pelvis from dropping (adduction of thigh) toward the opposite swinging leg.

GLUTEUS MINIMUS



Hip and thigh—lateral view

■ **Origin**
Outer surface of ilium between middle (anterior) and inferior gluteal lines

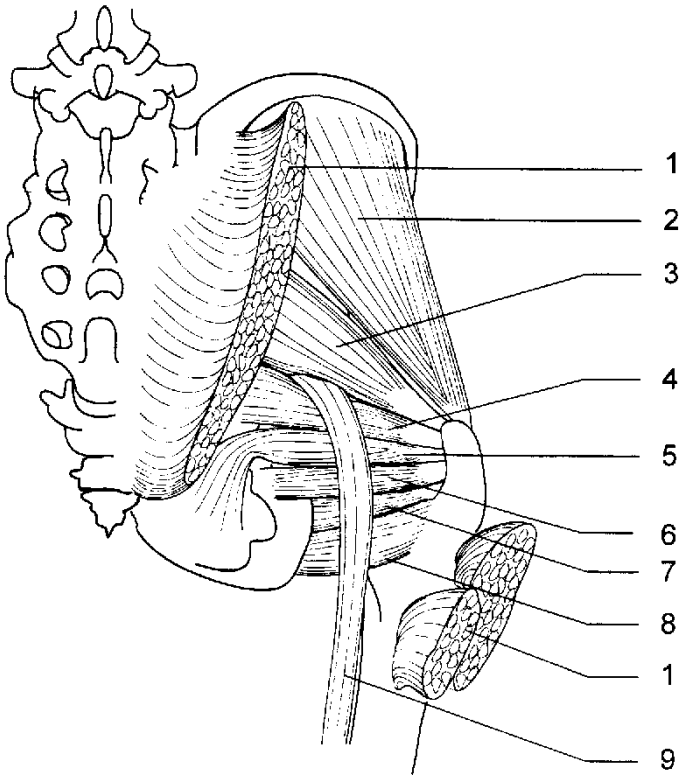
■ **Insertion**
Anterior surface of greater trochanter

■ **Action**
Abducts femur, rotates thigh medially

■ **Nerve**
Superior gluteal nerve (L4, L5, S1)

See note on p. 173.

MUSCLES OF THE HIP



Hip—posterior view

1. Gluteus maximus (cut)
2. Gluteus medius
3. Piriformis
4. Gemellus superior
5. Obturator internus
6. Gemellus inferior
7. Obturator externus
8. Quadratus femoris
9. Sciatic nerve

Note: Gemellus inferior and quadratus femoris have been shown separated to expose the deeply placed obturator externus.

TENSOR FASCIAE LATAE

Hip and thigh—lateral view

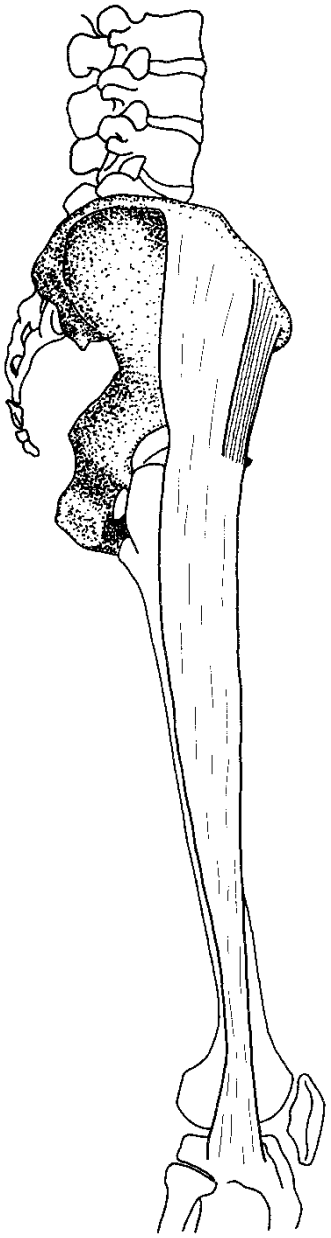
■ Origin
Outer edge of iliac crest between anterior superior iliac spine and iliac tubercle

■ Insertion
Iliotibial tract on upper part of thigh

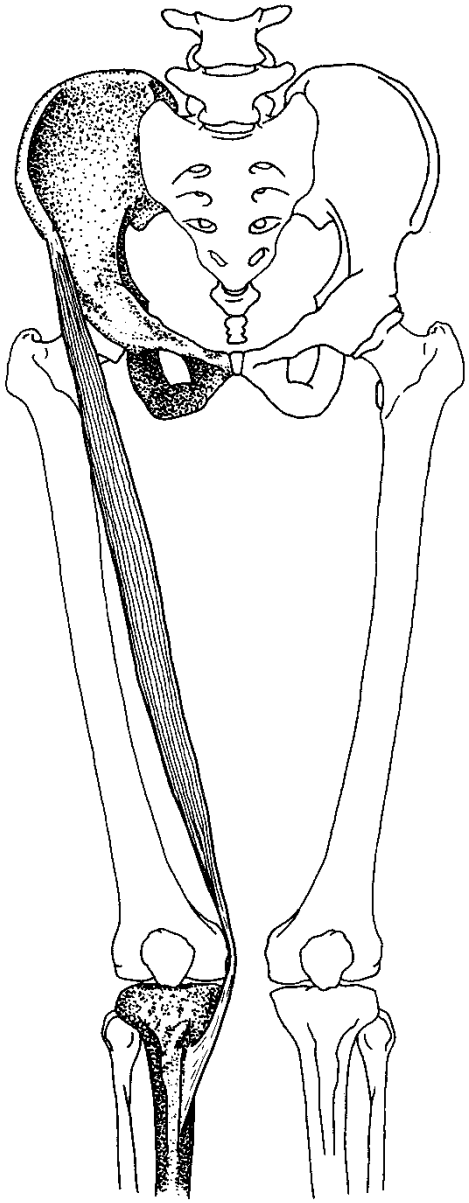
■ Action
Flexes, abducts thigh

■ Nerve
Superior gluteal nerve (L4, L5, S1)

Note: This muscle, along with gluteus maximus, draws the fascia lata upward, stabilizing the knee.



SARTORIUS



Hip, thigh, and leg—anterior view

Origin
Anterior superior iliac spine and area immediately below it

Insertion
Upper part of medial surface of shaft of tibia

Action
Flexes, abducts, and laterally rotates thigh, flexes and slightly medially rotates leg at knee joint after flexion

Nerve
Femoral nerve (L2, L3)

Relationship
Insertions of sartorius, gracilis, and semitendinosus fuse on the medial tibia; these tendons, called the pes anserinus (goose foot), give medial support to the knee

Note: This muscle is used to bring swinging leg forward in walking and running.

RECTUS FEMORIS *(One of Quadriceps Femoris)*

Hip, thigh, and leg—anterior view

■ Origin
Anterior head—anterior inferior iliac spine

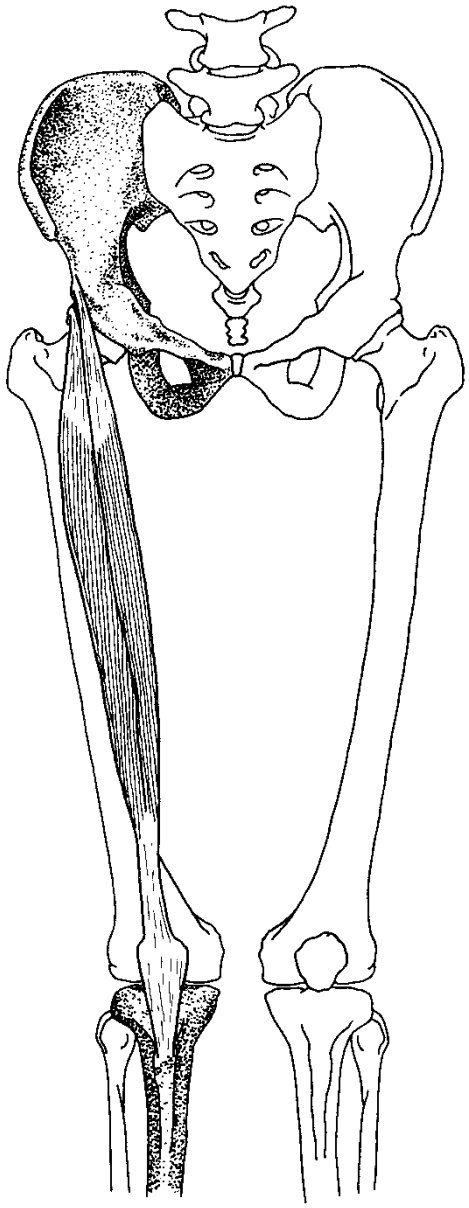
Posterior head—ilium above acetabulum

■ Insertion
Patella, then by patellar ligament to tuberosity of the tibia

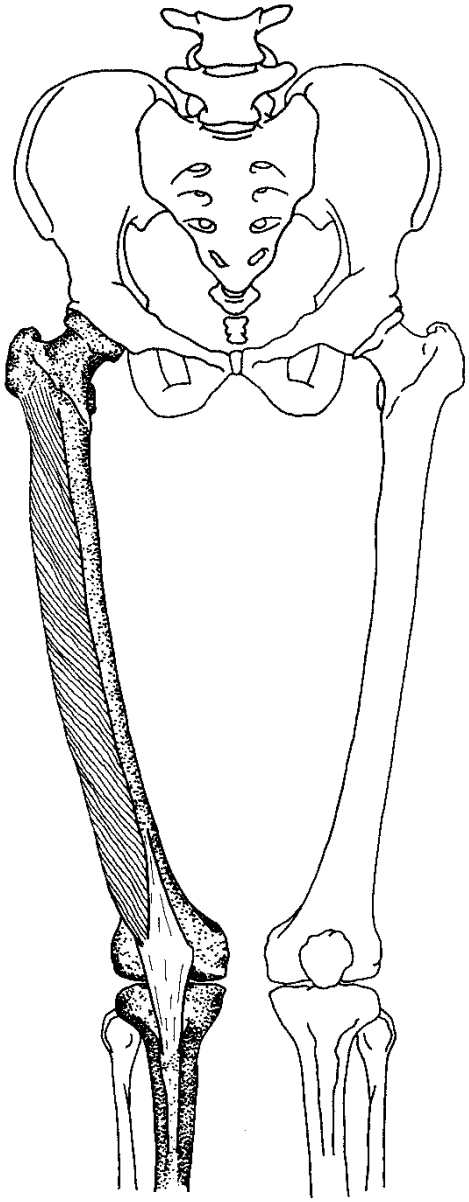
■ Action
Extends leg at knee joint, flexes thigh

■ Nerve
Femoral nerve (L2–L4)

Note: This muscle is used when thigh flexion and leg extension are needed together, such as in kicking a football. In walking, the quadriceps prevent the knee from flexing during heel strike and early support phase.



VASTUS LATERALIS *(One of Quadriceps Femoris)*



Hip, thigh, and leg—anterior view

Origin
Intertrochanteric line, inferior border of greater trochanter, gluteal tuberosity, lateral lip of linea aspera of femur

Insertion
Lateral margin of patella, then by patellar ligament to tuberosity of tibia

Action
Extends leg

Nerve
Femoral nerve (L2–L4)

VASTUS MEDIALIS *(One of Quadriceps Femoris)*

Hip, thigh, and leg—anterior view

■ Origin
Intertrochanteric line, medial lip of linea aspera of femur, medial intermuscular septum of adductor magnus and adductor longus, medial supracondylar ridge

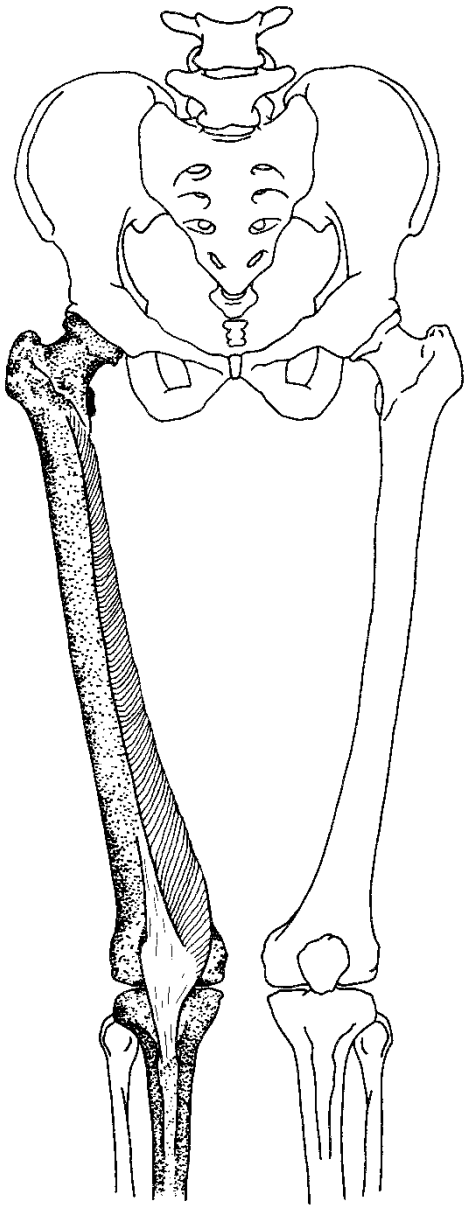
■ Insertion
Medial border of the patella, then by patellar ligament into tibial tuberosity, medial condyle of tibia

■ Action
Extends leg, draws patella medially

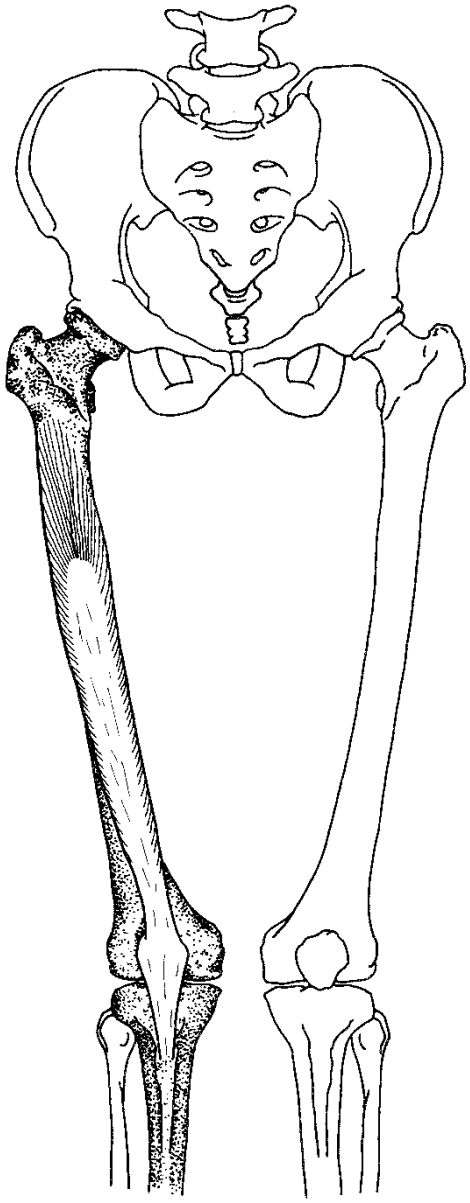
■ Nerve
Femoral nerve (L2–L4)

Note: Although they are not anatomically separate[1], the lower portion of the vastus medialis is referred to as the vastus medialis obiliquus (VMO). Its action is to stabilize the patella and prevent its lateral dislocation.

[1]Noric, M. M., Mitchell, J., de Klerk, D. (1997) A comparison of the proximal and distal parts of the vastus medialis muscle. *Australian Journal of Physiotherapy,* 43(4):277–281.



VASTUS INTERMEDIUS *(One of Quadriceps Femoris)*



Hip, thigh, and leg—anterior view

Origin
Anterior and lateral surfaces of upper two-thirds of femur, lateral intermuscular septum, linea aspera, lateral supracondylar ridge

Insertion
Deep aspect of quadriceps tendon, then through patella to tibial tuberosity

Action
Extends leg

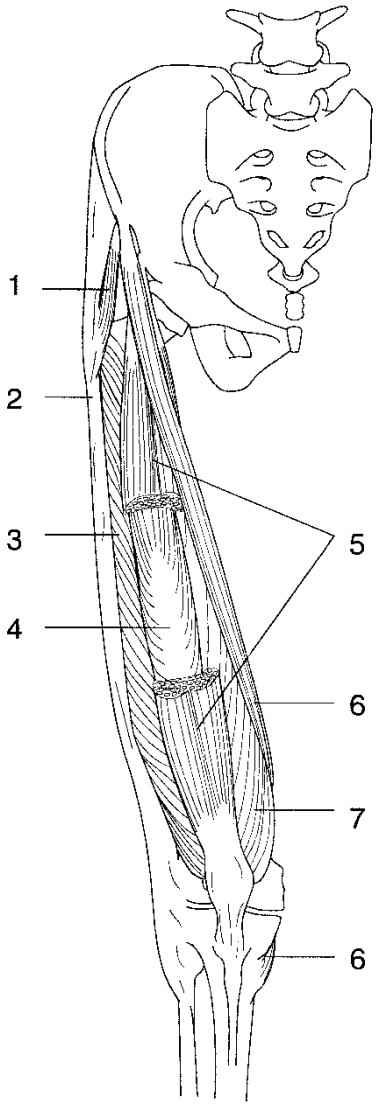
Nerve
Femoral nerve (L2–L4)

Note: A few bundles of fibers from this muscle insert onto the upper part of the joint capsule of the knee. They probably draw the capsule superiorly during extension of the leg, preventing it from binding in the joint. They are called *articularis genus*.

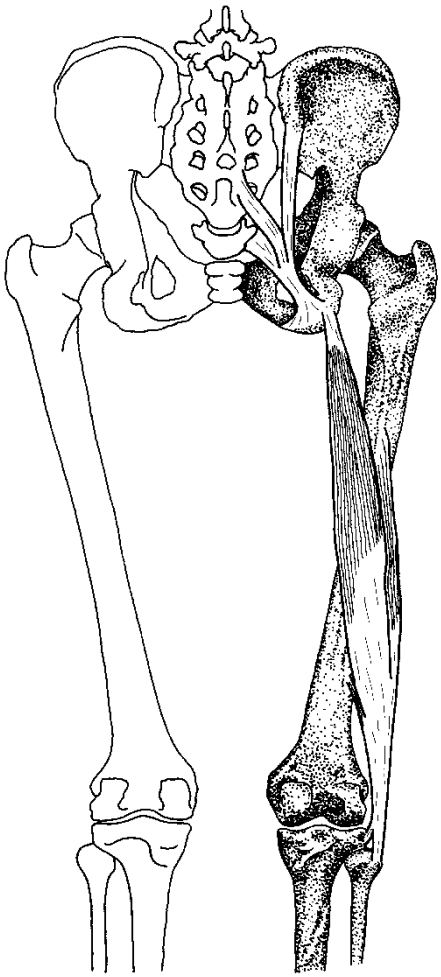
MUSCLES OF THE ANTERIOR THIGH

Hip and thigh—anterior view

1. Tensor fasciae latae
2. Iliotibial tract
3. Vastus lateralis (quadriceps femoris)
4. Vastus intermedius (quadriceps femoris)
5. Rectus femoris (cut) (quadriceps femoris)
6. Sartorius
7. Vastus medialis (quadriceps femoris)



BICEPS FEMORIS *(Part of Hamstrings)*



Hip and thigh—posterior view

■ Origin
Long head—ischial tuberosity, sacrotuberous ligament

Short head—linea aspera, lateral supracondylar ridge, lateral intermuscular septum

■ Insertion
Lateral side of head of fibula and lateral condyle of tibia

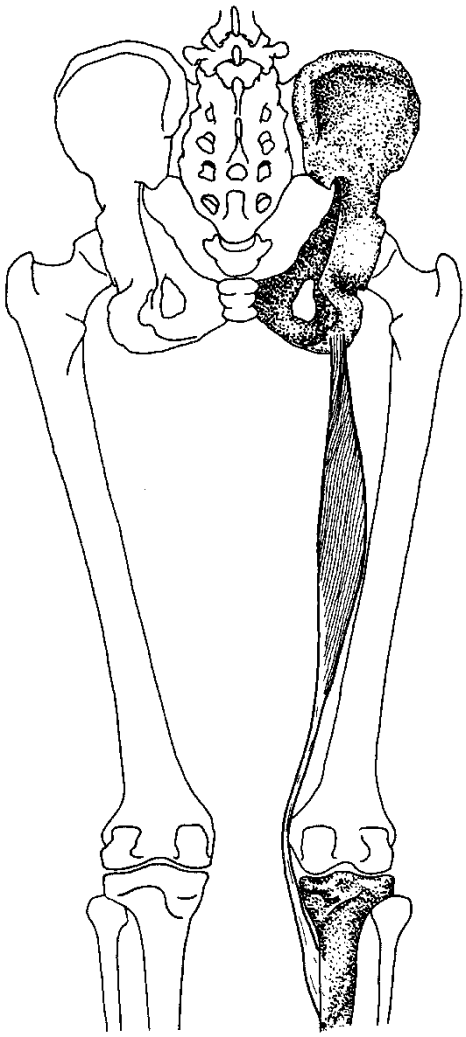
■ Action
Flexes leg, long head also extends thigh

■ Nerve
Long head—tibial part of sciatic nerve (S1–S3)

Short head—common peroneal part of sciatic nerve (L5, S1, S2)

Note: During walking or running, the hamstrings are used to slow down the leg at the end of its swing and prevent the trunk from flexing at the hip. They are susceptible to being strained by resisting the momentum of these body parts.

SEMITENDINOSUS *(Part of Hamstrings)*



Hip and thigh—posterior view

■ Origin
Ischial tuberosity

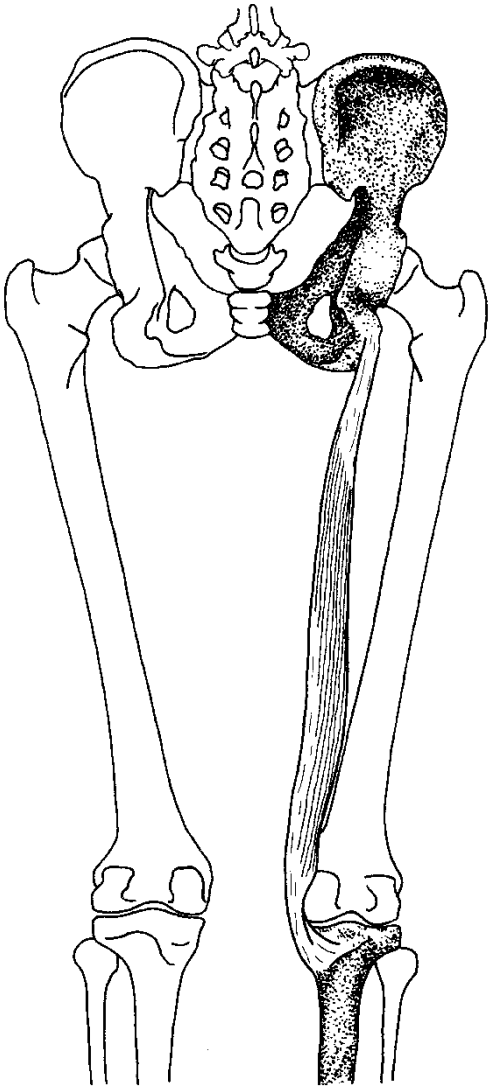
■ Insertion
Medial surface of shaft of tibia

■ Action
Flexes and slightly medially rotates leg; after flexion, extends thigh

■ Nerve
Tibial portion of sciatic nerve (L5, S1, S2)

See note on p. 183 and Relationship section on p. 177.

SEMIMEMBRANOSUS *(Part of Hamstrings)*



Hip and thigh—posterior view

■ **Origin**
Ischial tuberosity

■ **Insertion**
Posterior part of medial condyle of tibia

■ **Action**
Flexes and slightly medially rotates leg; after flexion, extends thigh

■ **Nerve**
Tibial portion of sciatic nerve (L5, S1, S2)

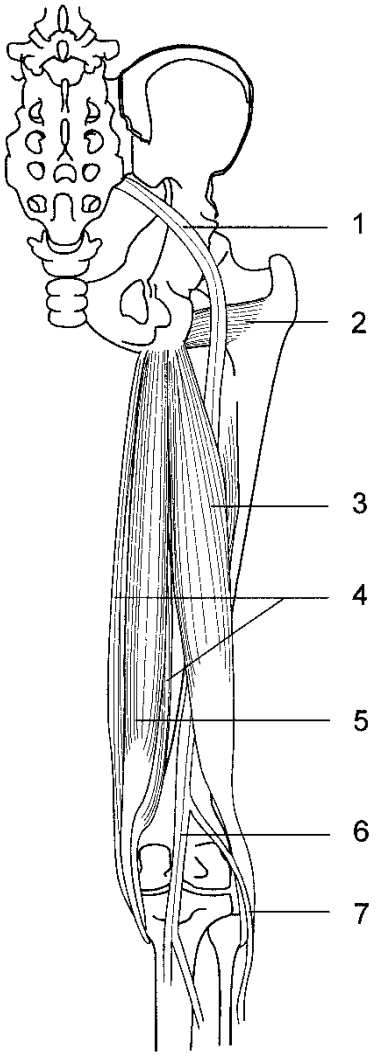
See note on p. 183.

HAMSTRING MUSCLES

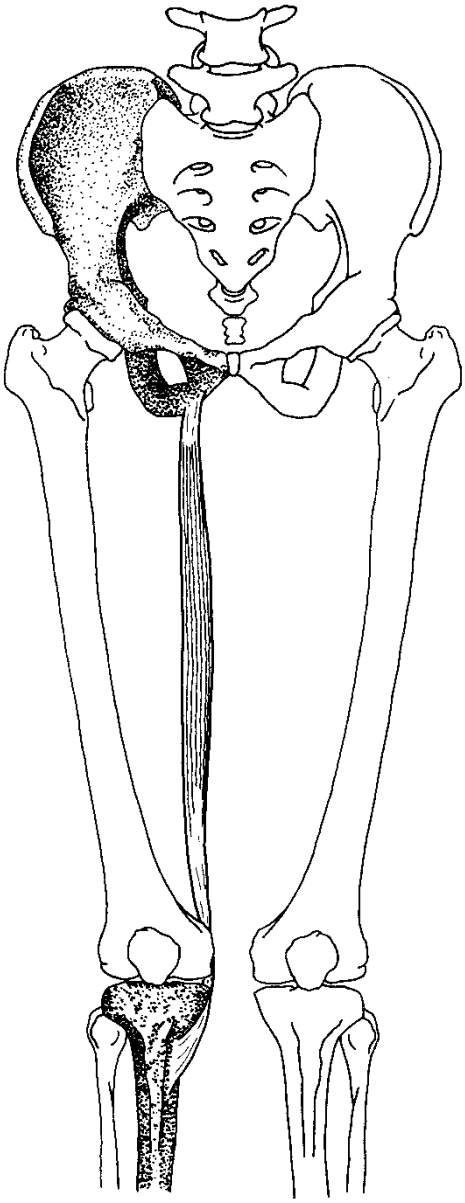
Hip and thigh—posterior view

1. Sciatic nerve
2. Quadratus femoris
3. Biceps femoris
4. Semimembranosus
5. Semitendinosus
6. Tibial nerve
7. Common peroneal nerve

Note: The common peroneal nerve is exposed to compression and damage as it passes over the head of the fibula. The quadratus femoris, a lateral rotator, is included for reference.



GRACILIS



Hip and thigh—anterior view

Origin
Lower margin of body and inferior ramus of pubis

Insertion
Upper part of medial surface of shaft of tibia

Action
Adducts thigh at hip joint and flexes leg, with leg flexed, assists in medial rotation

Nerve
Obturator nerve (L2–L4)

See Relationship section on p. 177.

PECTINEUS

Hip and thigh—anterior view

■ Origin
Pectineal line on superior ramus of pubis

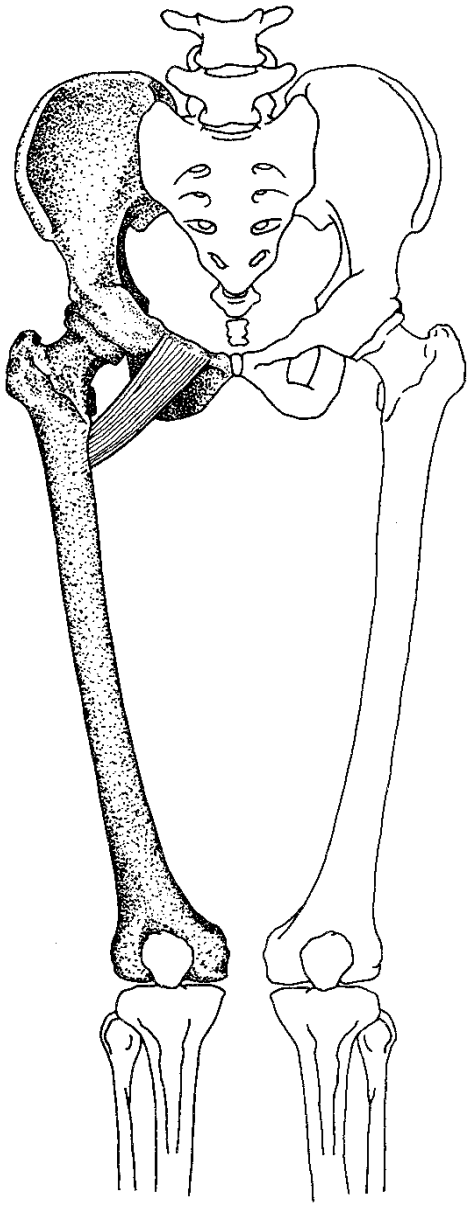
■ Insertion
From lesser trochanter to linea aspera of femur

■ Action
Flexes thigh, assists in adduction when hip is flexed

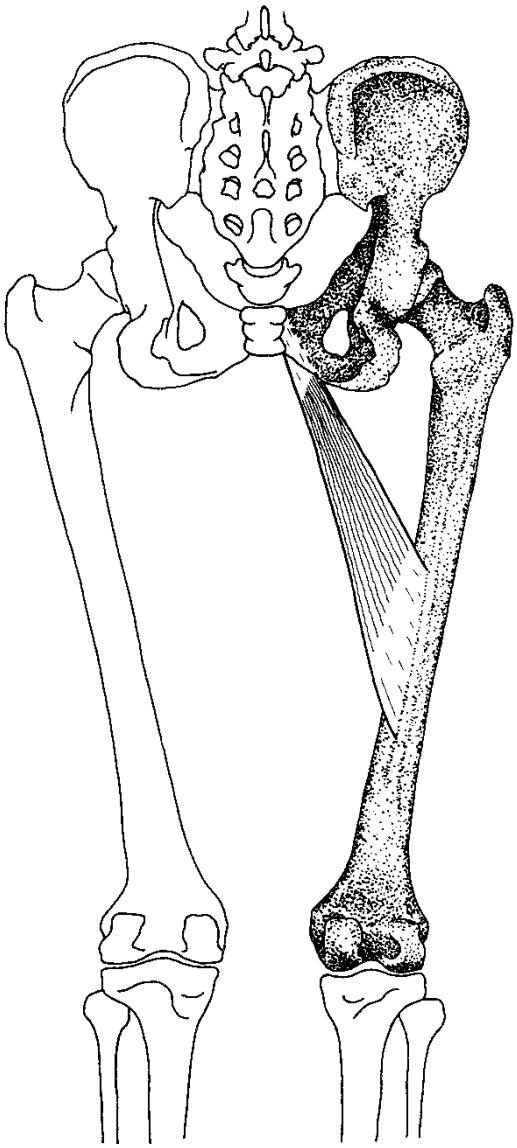
■ Nerve
Femoral nerve (L2, L3), (sometimes a branch of obturator nerve)

Note: The rotational component of thigh muscle action depends upon the starting position of the hip joint. The pectineus, adductor longus, adductor brevis, and psoas major probably assist in medial rotation when the thigh is in anatomical position but may shift to assisting in lateral rotation as the thigh flexes and abducts.

The iliacus and adductor tubercle part of adductor magnus probably assist in medial rotation throughout the range of motion of the hip joint while the linea aspera part of the adductor magnus may be a slight lateral rotator.



ADDUCTOR LONGUS



Hip and thigh—posterior view

■ **Origin**
Anterior of body of pubis

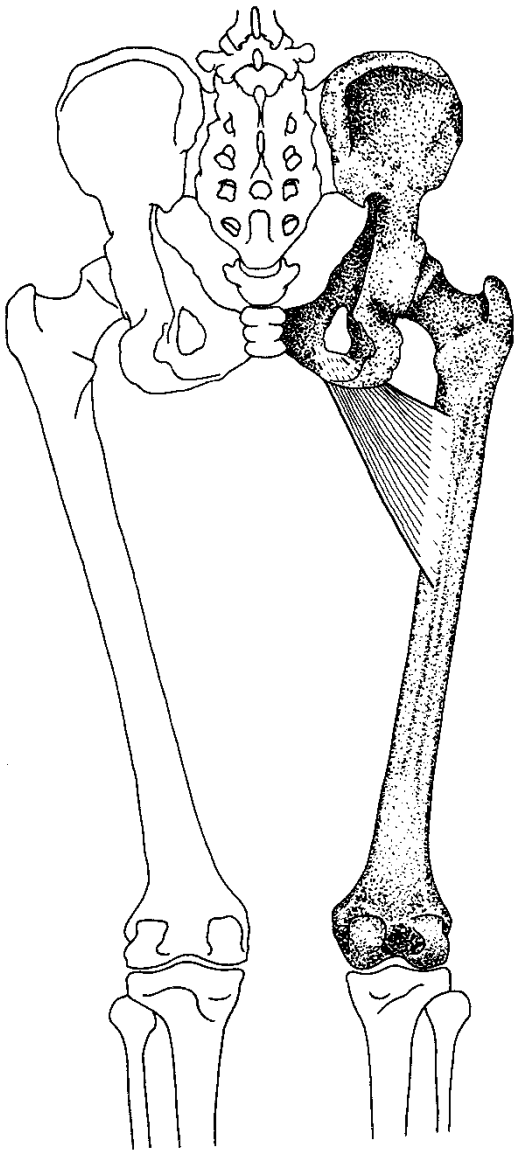
■ **Insertion**
Medial lip of linea aspera

■ **Action**
Adducts, flexes thigh, assists in medial rotation*

■ **Nerve**
Obturator nerve (L2–L4)

*See note on p. 188.

ADDUCTOR BREVIS



Hip and thigh—posterior view

■ Origin
Outer surface of inferior ramus of pubis

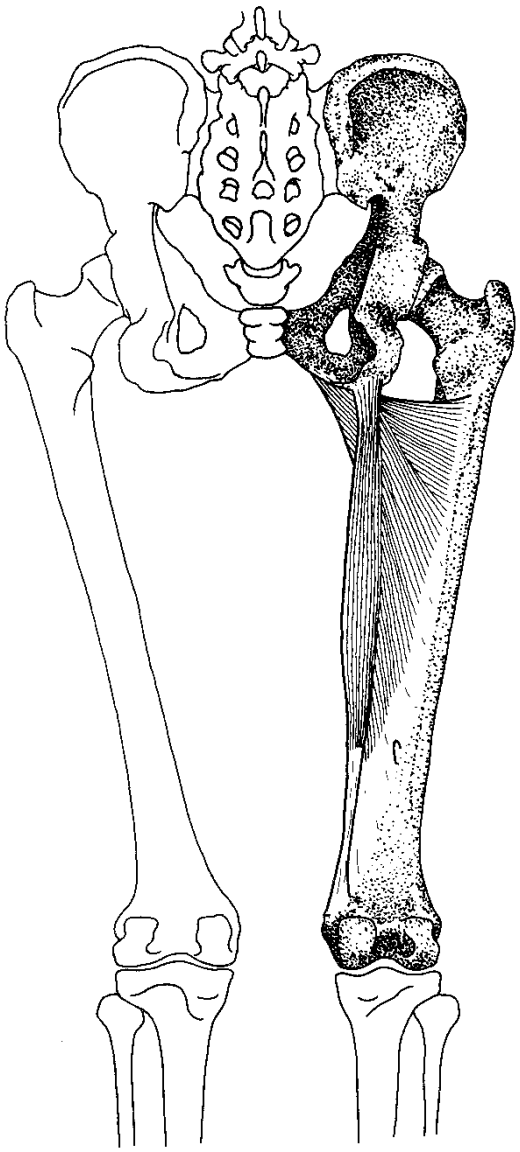
■ Insertion
From below lesser trochanter to linea aspera and into proximal part of linea aspera

■ Action
Adducts thigh, assists in flexion, medial rotation*

■ Nerve
Obturator nerve (L2–L4)

*See note on p. 188.

ADDUCTOR MAGNUS



Hip and thigh—posterior view

■ Origin
Inferior ramus of pubis, ramus and lower part of tuberosity of ischium

■ Insertion
Linea aspera, adductor tubercle of femur

■ Action
Adducts, extends thigh, lower portion (adductor tubercle insertion) assists in medial rotation*

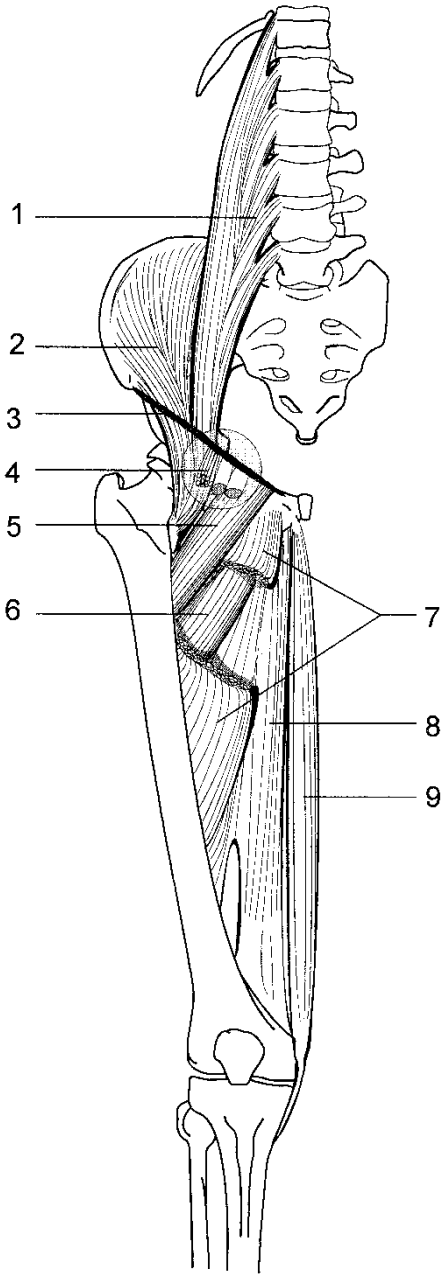
■ Nerve
Obturator nerve (L2–L4), sciatic nerve

*See note on p. 188.

HIP FLEXORS AND ADDUCTORS

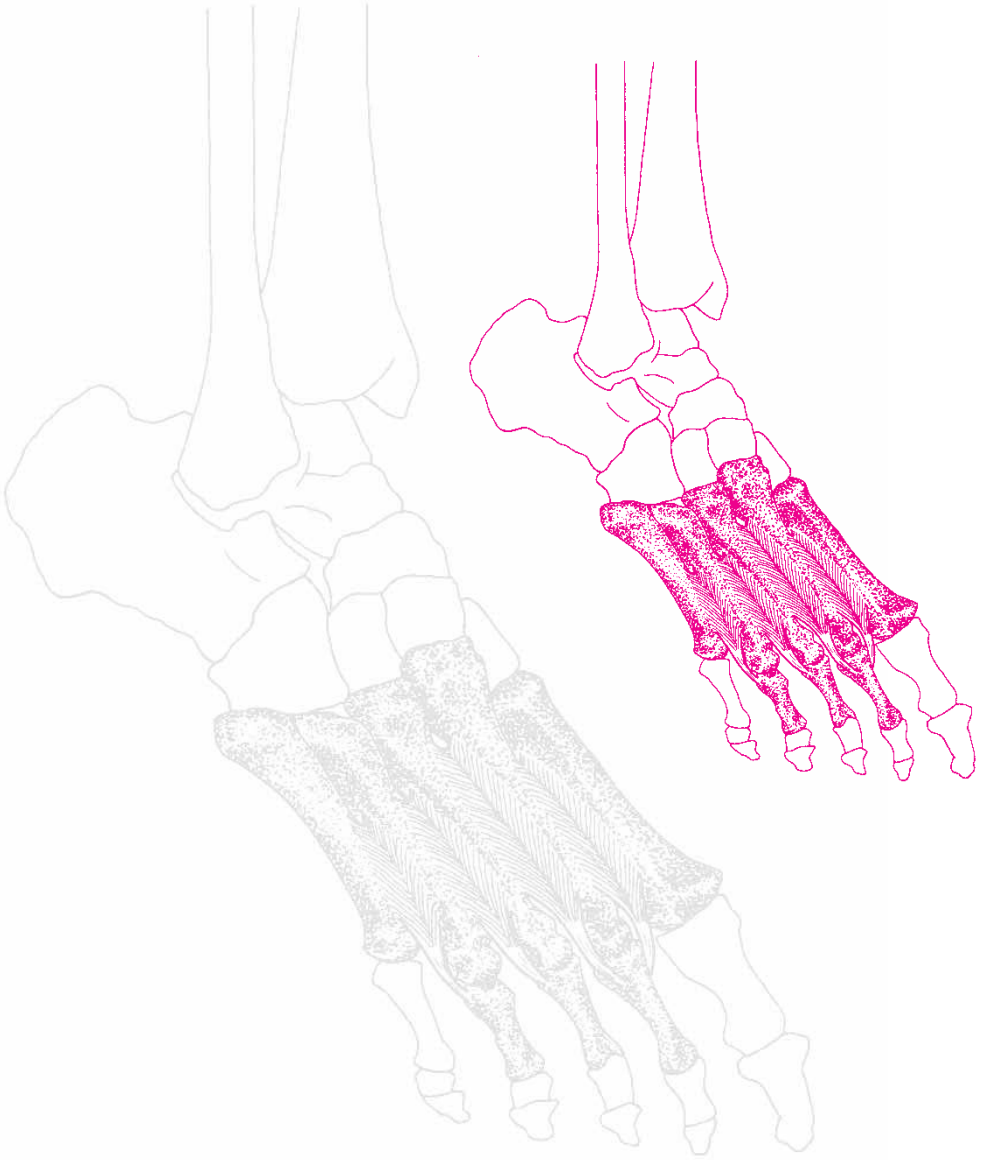
Hip and thigh—anterior view

1. Psoas major
2. Iliacus
3. Inguinal ligament
4. Femoral nerve, vein, artery
5. Pectineus
6. Adductor brevis
7. Adductor longus (cut)
8. Adductor magnus
9. Gracilis



CHAPTER NINE

Muscles of the Leg and Foot



TIBIALIS ANTERIOR

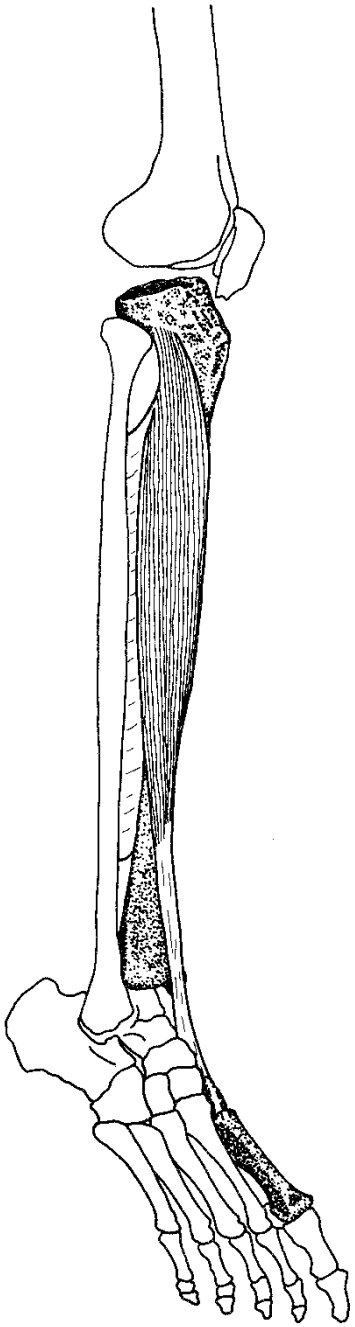
Leg—anterolateral view

■ Origin
Lateral condyle of tibia, upper half of lateral surface of tibia, interosseous membrane

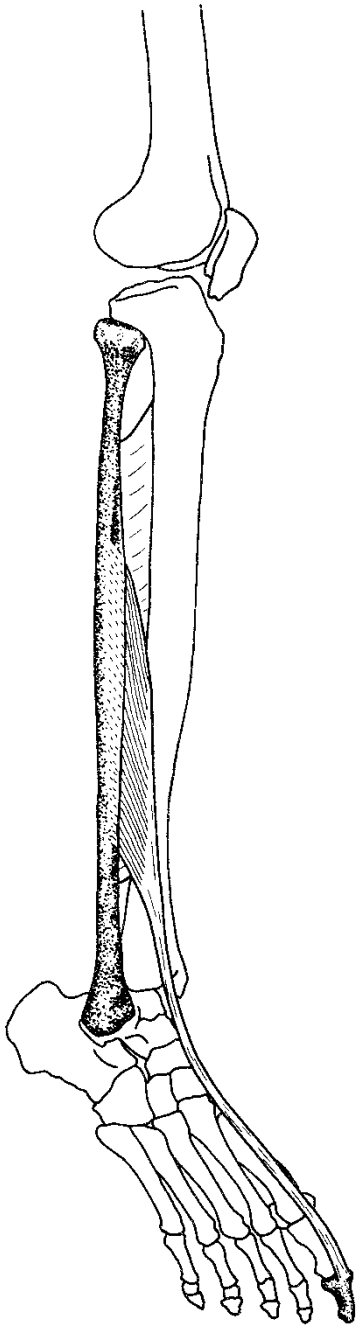
■ Insertion
Medial side and plantar surface of medial cuneiform bone, base of first metatarsal bone

■ Action
Dorsiflexes foot, inverts (supinates) foot

■ Nerve
Deep peroneal nerve (L4, L5, S1)



EXTENSOR HALLUCIS LONGUS



Leg—anterolateral view

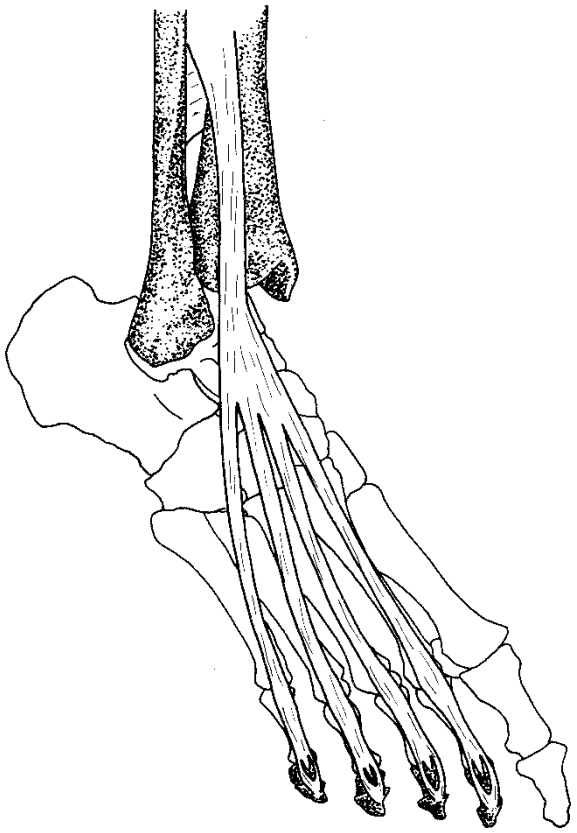
Origin
Middle half of anterior surface of fibula and interosseous membrane

Insertion
Base of distal phalanx of great toe

Action
Extends, hyperextends great toe, dorsiflexes and inverts (supinates) foot

Nerve
Deep peroneal nerve (L4, L5, S1)

EXTENSOR DIGITORUM LONGUS



Foot—anterolateral view

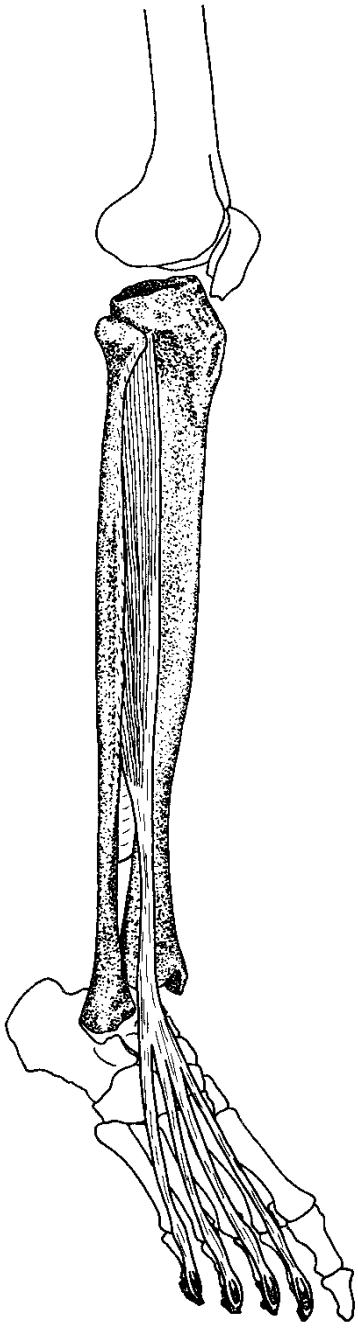
■ Origin
Upper two-thirds of anterior surface of fibula, interosseous membrane, lateral condyle of tibia

■ Insertion
Along dorsal surface of four lateral toes, and then to bases of middle and distal phalanges

■ Action
Extends toes, dorsiflexes foot, everts foot

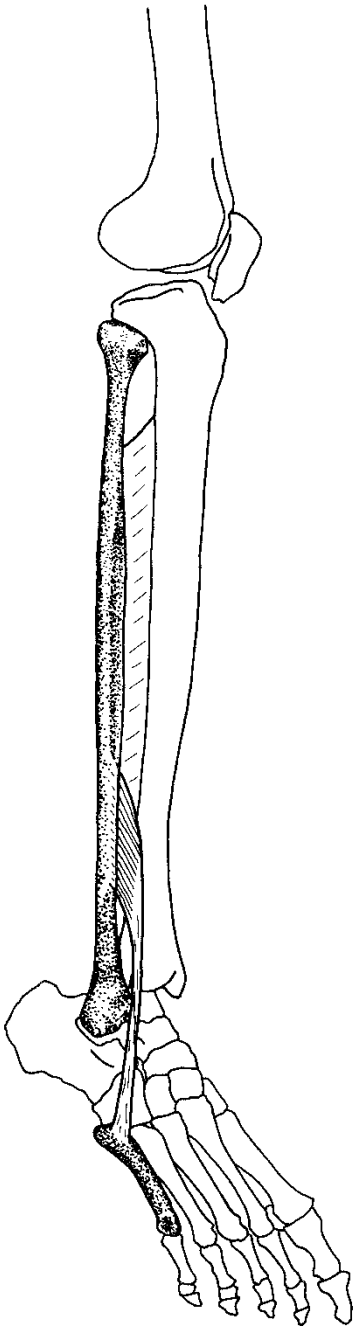
■ Nerve
Deep peroneal nerve (L4, L5, S1)

Note: The lower lateral part of this muscle makes a separate insertion onto the dorsal surface of the fifth metatarsal and is called *peroneus tertius.*



Leg—anterolateral view

FIBULARIS TERTIUS *(Peroneus Tertius)*



Leg—anterolateral view

Origin
Lower third of anterior surface of fibula and interosseous membrane

Insertion
Dorsal surface of base of fifth metatarsal bone

Action
Dorsiflexes and everts foot

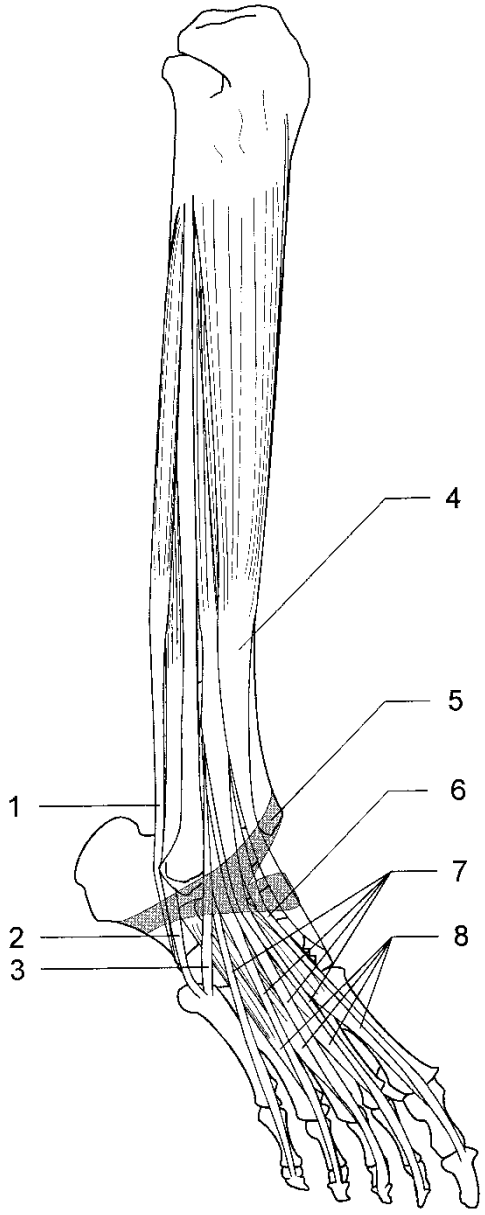
Nerve
Deep peroneal nerve (L4, L5, S1)

Note: This muscle is not present in all individuals. It may be described as the fifth tendon of extensor digitorum longus.

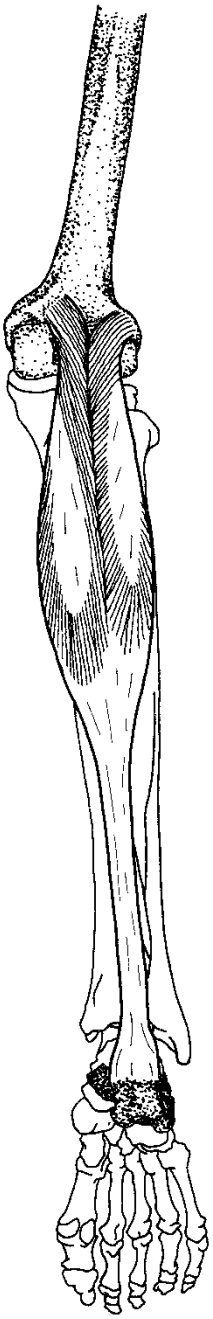
ANTERIOR AND LATERAL LEG MUSCLES

Leg—anterolateral view

1. Fibularis longus
2. Fibularis brevis
3. Fibularis tertius
4. Tibialis anterior
5. Extensor retinaculum
6. Extensor hallucis longus
7. Extensor digitorum longus
8. Extensor digitorum brevis



GASTROCNEMIUS *(Part of Triceps Surae)*



Leg—posterior view

Origin
Lateral head—lateral condyle and posterior surface of femur

Medial head—popliteal surface of femur above medial condyle

Insertion
Posterior surface of the calcaneus

Action
Plantar flexes foot, flexes leg when foot is dorsiflexed and knee is extended

Nerve
Tibial nerve (S1, S2)

SOLEUS *(Part of Triceps Surae)*

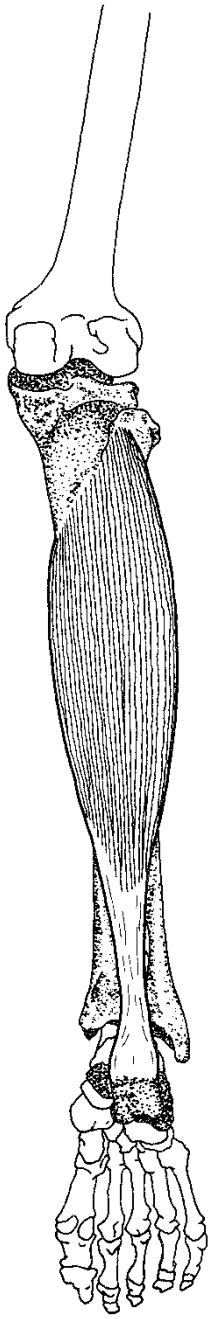
Leg—posterior view

■ Origin
Posterior surface of the tibia (soleal line), upper third of posterior surface of fibula, fibrous arch between tibia and fibula

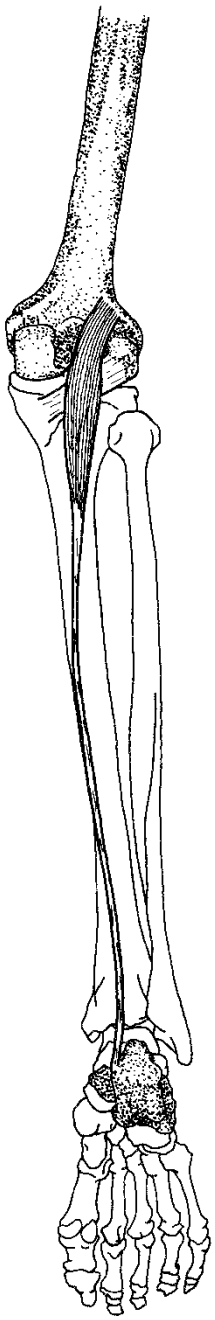
■ Insertion
Posterior surface of the calcaneus

■ Action
Plantar flexes foot

■ Nerve
Tibial nerve (S1, S2)



PLANTARIS



Leg—posterior view

Origin
Lateral supracondylar ridge of femur, oblique popliteal ligament

Insertion
Posterior surface of the calcaneus

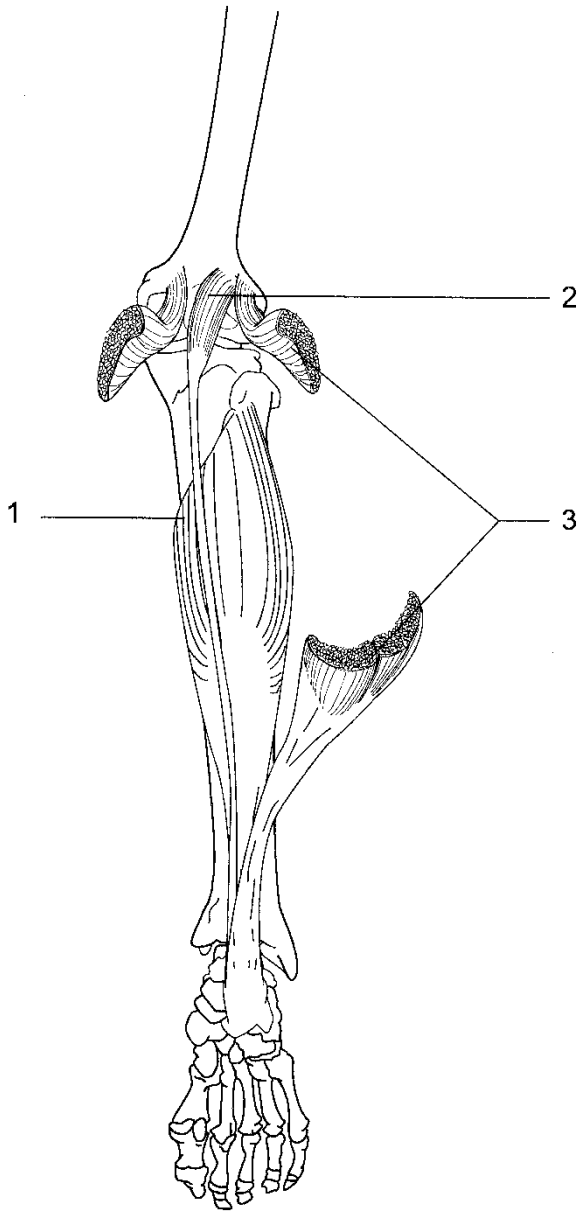
Action
Plantar flexes foot, flexes leg

Nerve
Tibial nerve (S1, S2)

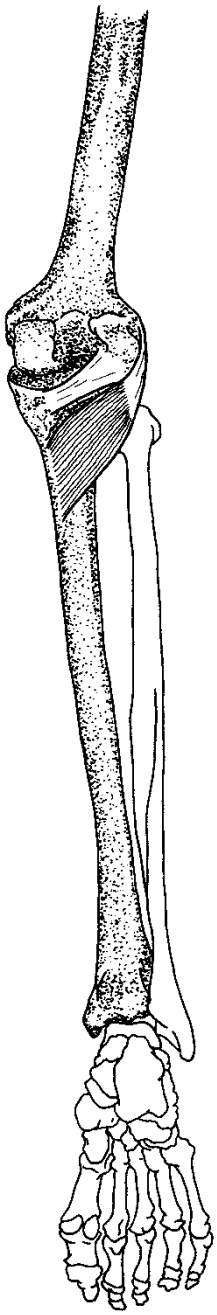
MUSCLES OF THE CALF

Leg—posterior view

1. Soleus
2. Plantaris
3. Gastrocnemius (cut)



POPLITEUS



Leg—posterior view

Origin
Lateral surface of lateral condyle of femur

Insertion
Upper part of posterior surface of tibia

Action
Rotates leg medially, flexes leg

Nerve
Tibial nerve (L4, L5, S1)

Note: Stern contends that this muscle stabilizes the knee by preventing lateral rotation of the tibia during medial rotation of the thigh while the foot is planted. Knee stabilization allows standing without undue fatigue to the quadriceps.

Reference: Stern, J. T. *Essentials of Gross Anatomy,* F. A. Davis Company, Philadelphia, 1988.

FLEXOR HALLUCIS LONGUS

Leg—posterior view

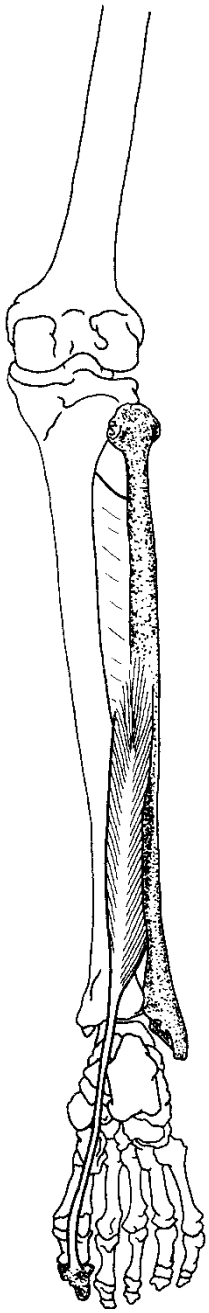
■ Origin
Lower two-thirds of posterior surface of shaft of fibula, posterior intermuscular septum, interosseous membrane

■ Insertion
Base of distal phalanx of great toe

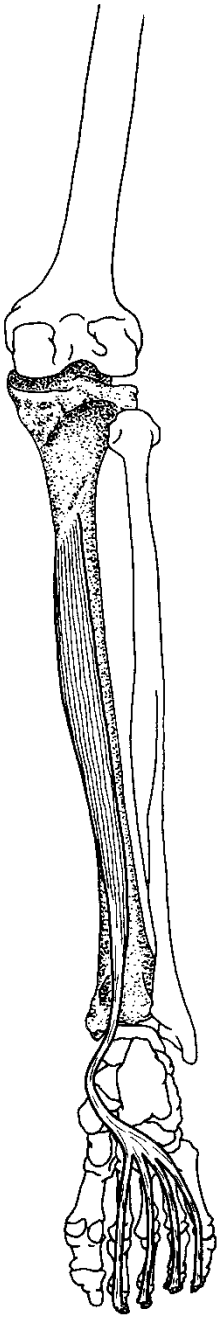
■ Action
Flexes distal phalanx of great toe, assists in plantar flexing foot, inverts foot

■ Nerve
Tibial nerve (L5, S1, S2)

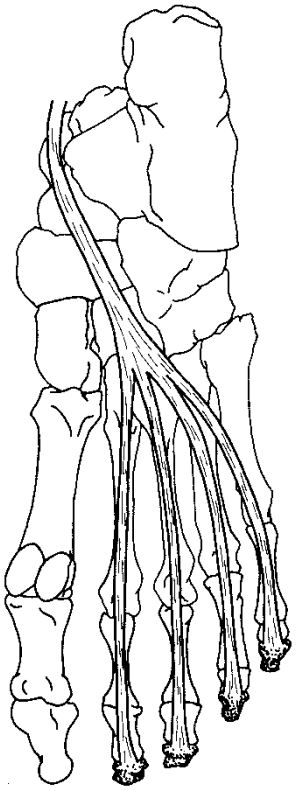
Note: This muscle is important in pushing off the surface in walking, running, jumping.



FLEXOR DIGITORUM LONGUS



Leg—posterior view



Foot—plantar view

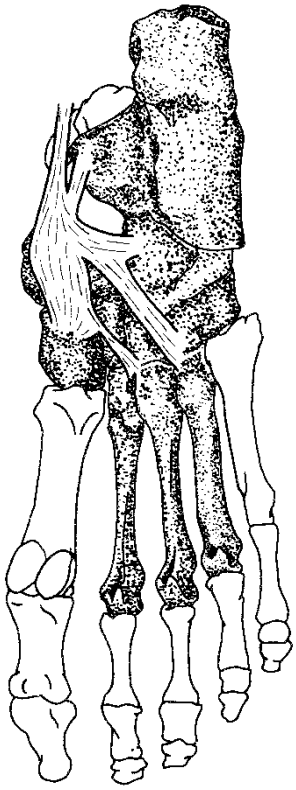
■ **Origin**
Medial part of posterior surface of tibia

■ **Insertion**
Bases of distal phalanges of second, third, fourth, and fifth toes

■ **Action**
Flexes distal phalanges of lateral four toes, assists in plantar flexing foot, inverts foot

■ **Nerve**
Tibial nerve (L5, S1)

TIBIALIS POSTERIOR



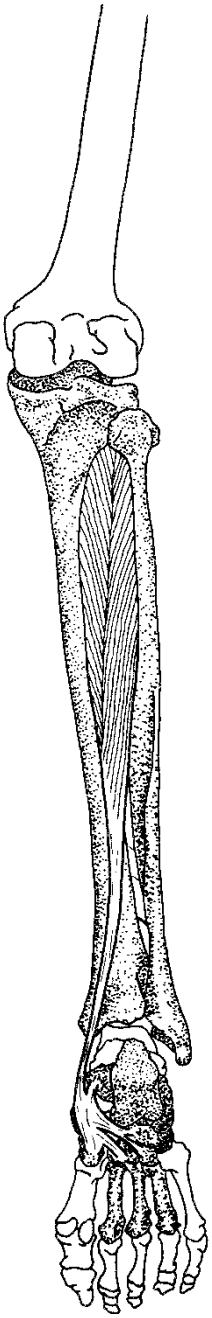
Foot—plantar view

■ **Origin**
Lateral part of posterior surface of tibia, interosseous membrane, proximal half of posterior surface of fibula

■ **Insertion**
Tuberosity of navicular bone, cuboid, cuneiforms, second, third, and fourth metatarsals, sustentaculum tali of calcaneus

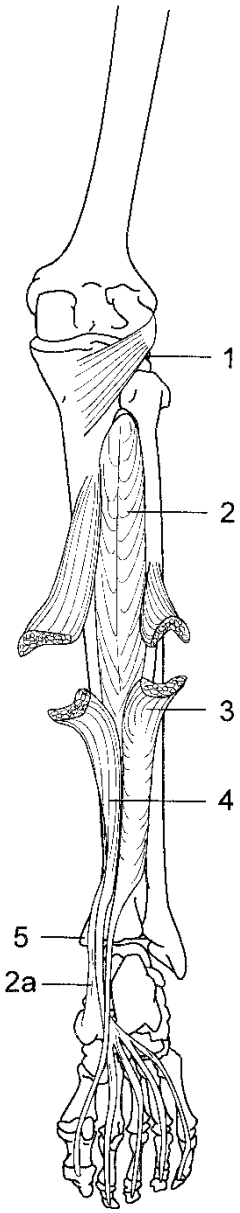
■ **Action**
Plantar flexes, inverts foot

■ **Nerve**
Tibial nerve (L5, S1)



Leg—posterior view

DEEP POSTERIOR LEG MUSCLES

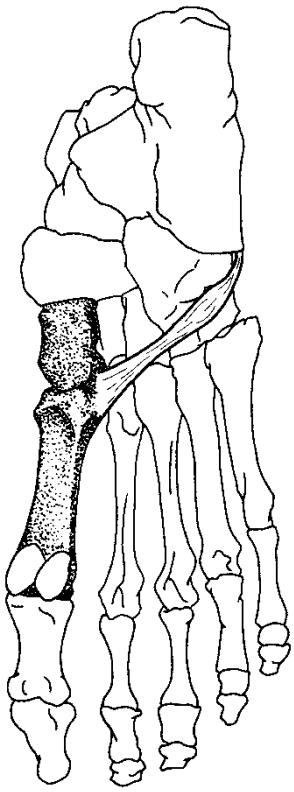


Leg—posterior view

1. Popliteus
2. Tibialis posterior
2a. Tendon of tibialis posterior
3. Flexor hallucis longus (cut)
4. Flexor digitorum longus (cut)
5. Medial malleolus

Note: The order of the three tendons, from anterior to posterior, passing posterior to the medial malleolus can be remembered by the following mnemonic: Tom (*t*ibialis posterior), Dick (flexor *d*igitorum), Harry (flexor *h*allucis longus).

FIBULARIS LONGUS *(Peroneus Longus)*



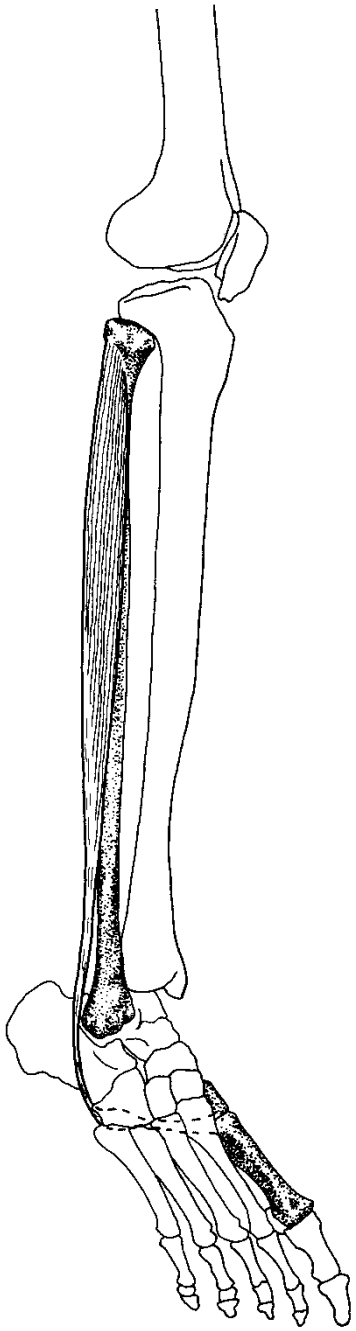
Foot—plantar view

■ **Origin**
Upper two-thirds of lateral surface of fibula

■ **Insertion**
Lateral side of medial cuneiform, base of first metatarsal

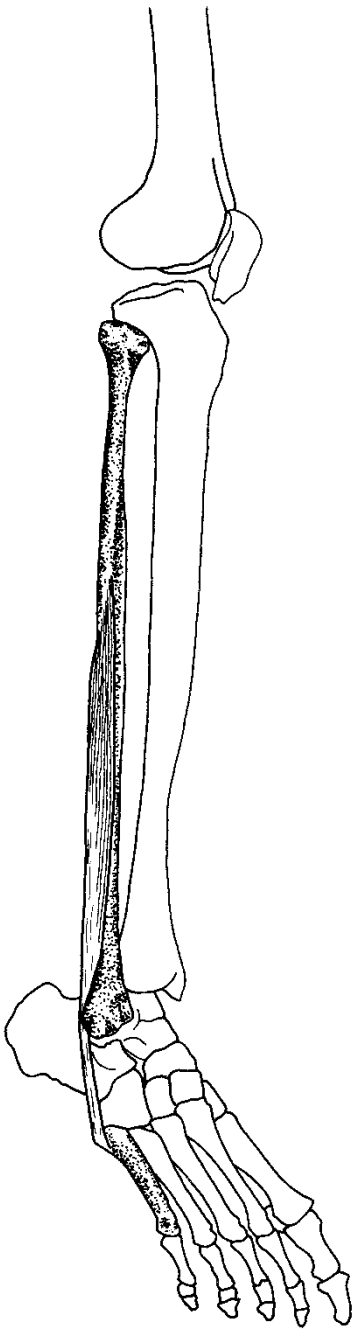
■ **Action**
Plantar flexes, everts foot

■ **Nerve**
Superficial peroneal nerve (L4, L5, S1)



Leg—anterolateral view

FIBULARIS BREVIS *(Peroneus Brevis)*



Leg—anterolateral view

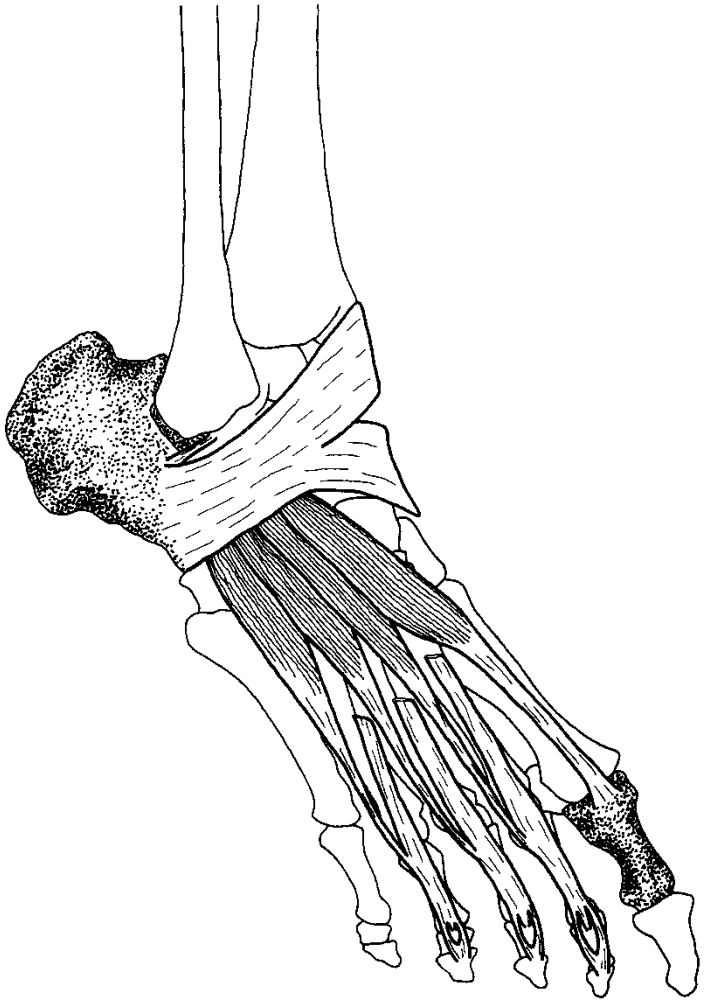
Origin
Lower two-thirds of lateral surface of fibula

Insertion
Lateral side of base of fifth metatarsal bone

Action
Everts, plantar flexes foot

Nerve
Superficial peroneal nerve (L5, S1, S2)

EXTENSOR DIGITORUM BREVIS



Foot—anterolateral view

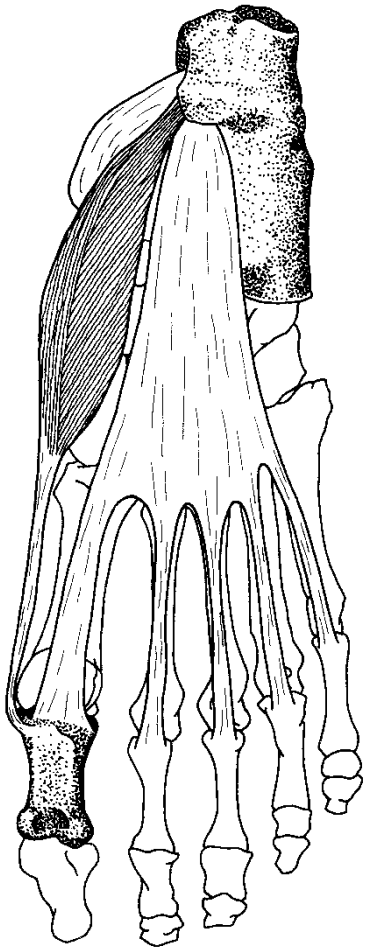
■ Origin
Anterior and lateral surfaces of calcaneus, lateral talocalcaneal ligament, inferior extensor retinaculum

■ Insertion
Into base of proximal phalanx of great toe; into lateral sides of tendons of extensor digitorum longus of second, third, and fourth toes

■ Action
Extends the four toes

■ Nerve
Deep peroneal nerve (S1, S2)

ABDUCTOR HALLUCIS *(First Layer)*



Foot—plantar view

■ **Origin**
Tuberosity of calcaneus, flexor retinaculum, plantar aponeurosis

■ **Insertion**
Medial side of base of proximal phalanx of great toe

■ **Action**
Stabilizes great toe (with adductor hallucis)

■ **Nerve**
Medial plantar nerve (L4, L5)

Note: The muscles of the sole of the foot can be divided into four layers (from superficial to deep):

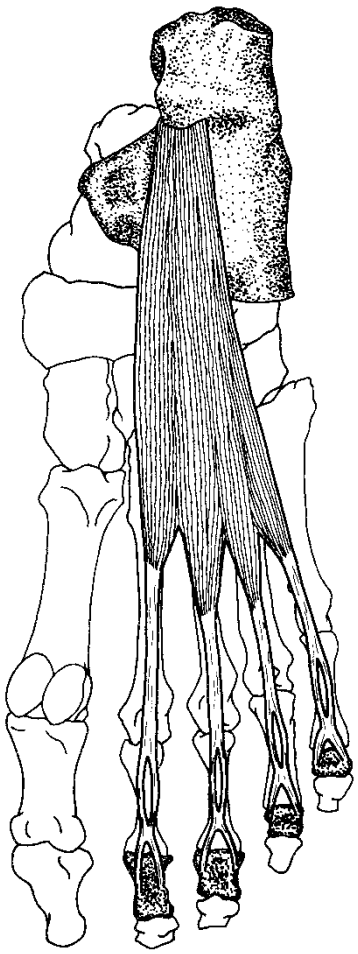
First layer—abductor hallucis, flexor digitorum brevis, abductor digiti minimi

Second layer—quadratus plantae, lumbricales (tendons of flexor hallucis longus and flexor digitorum longus pass through this layer)

Third layer—flexor hallucis brevis, adductor hallucis, flexor digiti minimi brevis

Fourth layer—interossei (tendons of tibialis posterior and peroneus longus pass through this layer)

FLEXOR DIGITORUM BREVIS *(First Layer)*



Foot—plantar view

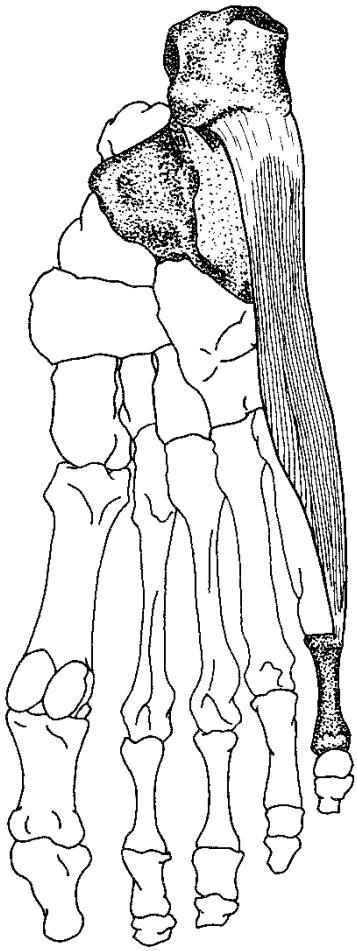
■ Origin
Tuberosity of calcaneus, plantar aponeurosis

■ Insertion
Sides of middle phalanges of second to fifth toes

■ Action
Flexes proximal phalanges and extends distal phalanges of second through fifth toes

■ Nerve
Medial plantar nerve (L4, L5)

ABDUCTOR DIGITI MINIMI *(First Layer)*



Foot—plantar view

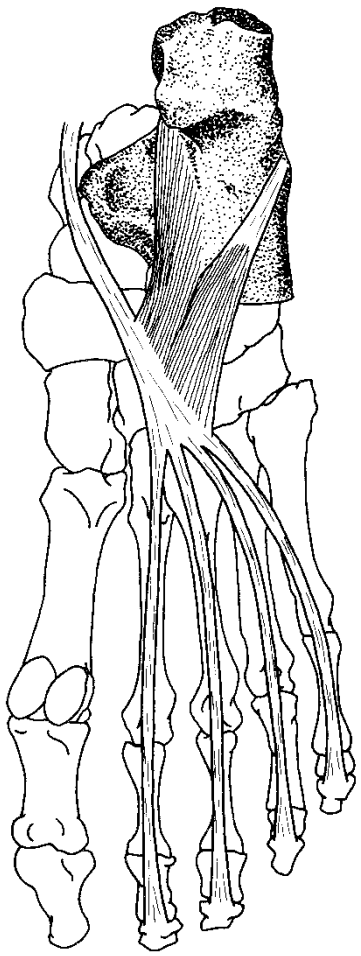
■ Origin
Tuberosity of calcaneus, plantar aponeurosis

■ Insertion
Lateral side of proximal phalanx of fifth toe

■ Action
Abducts fifth toe

■ Nerve
Lateral plantar nerve (S1, S2)

QUADRATUS PLANTAE *(Second Layer)*



Foot—plantar view

■ Origin
Medial head—medial surface of calcaneus

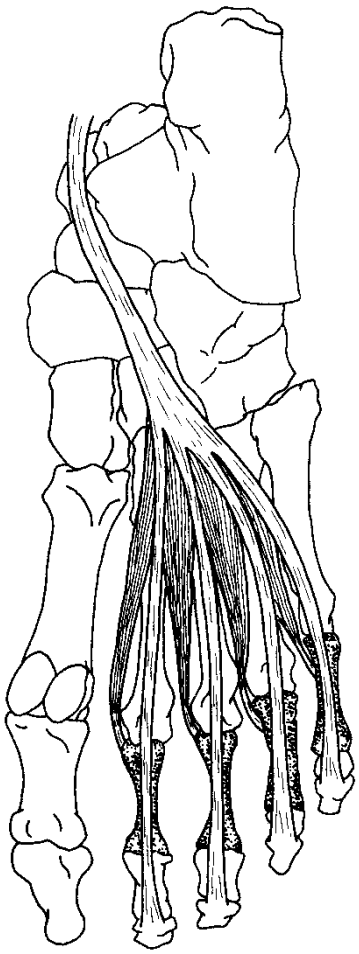
Lateral head—lateral border of inferior surface of calcaneus

■ Insertion
Lateral margin of tendon of flexor digitorum longus

■ Action
Flexes terminal phalanges of second through fifth toes

■ Nerve
Lateral plantar nerve (S1, S2)

LUMBRICALS *(Second Layer)*



Foot—plantar view

■ Origin
Tendons of flexor digitorum longus

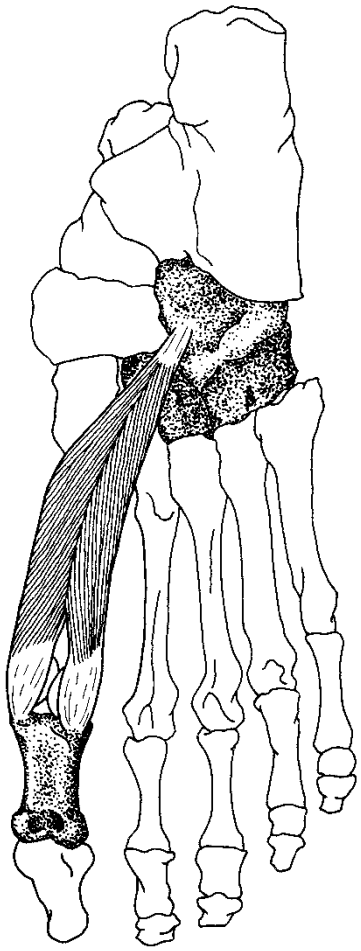
■ Insertion
Dorsal surfaces of proximal phalanges

■ Action
Flex proximal phalanges of second through fifth toes

■ Nerve
First lumbricalis—medial plantar nerve (L4, L5)

Second through fifth lumbricales—lateral plantar nerve (S1, S2)

FLEXOR HALLUCIS BREVIS *(Third Layer)*



Foot—plantar view

■ **Origin**
Cuboid bone, lateral cuneiform bone

■ **Insertion**
Medial part—medial side of base of proximal phalanx of great toe

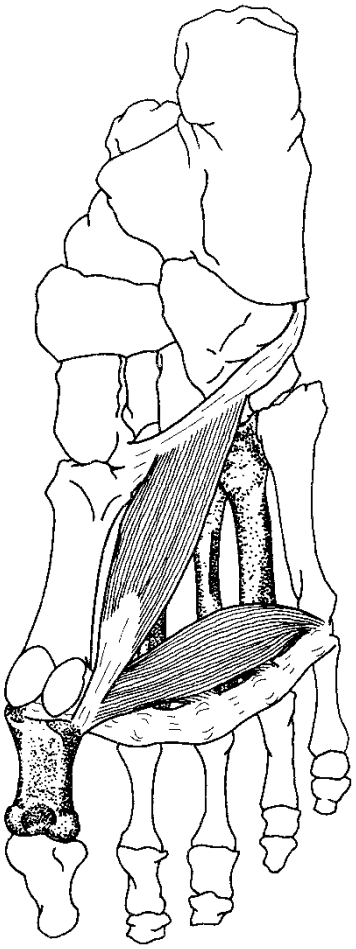
Lateral part—lateral side of base of proximal phalanx of great toe

■ **Action**
Flexes proximal phalanx of great toe

■ **Nerve**
Medial plantar nerve (L4, L5, S1)

Note: The tendons of insertion contain sesamoid bones.

ADDUCTOR HALLUCIS *(Third Layer)*



Foot—plantar view

■ Origin
Oblique head—second, third, and fourth metatarsal bones, and sheath of peroneus longus tendon

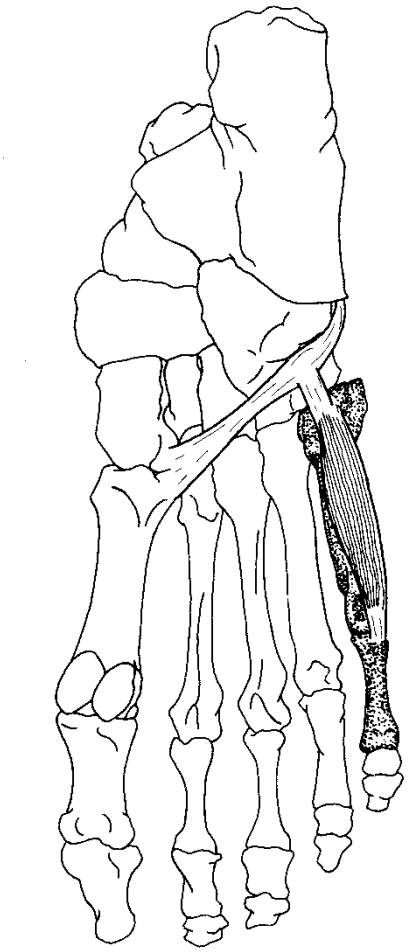
Transverse head—plantar metatarsophalangeal ligaments of third, fourth, and fifth toes, and transverse metatarsal ligaments

■ Insertion
Lateral side of base of proximal phalanx of great toe

■ Action
Stabilizes great toe (with abductor hallucis)

■ Nerve
Lateral plantar nerve (S1, S2)

FLEXOR DIGITI MINIMI BREVIS *(Third Layer)*



Foot—plantar view

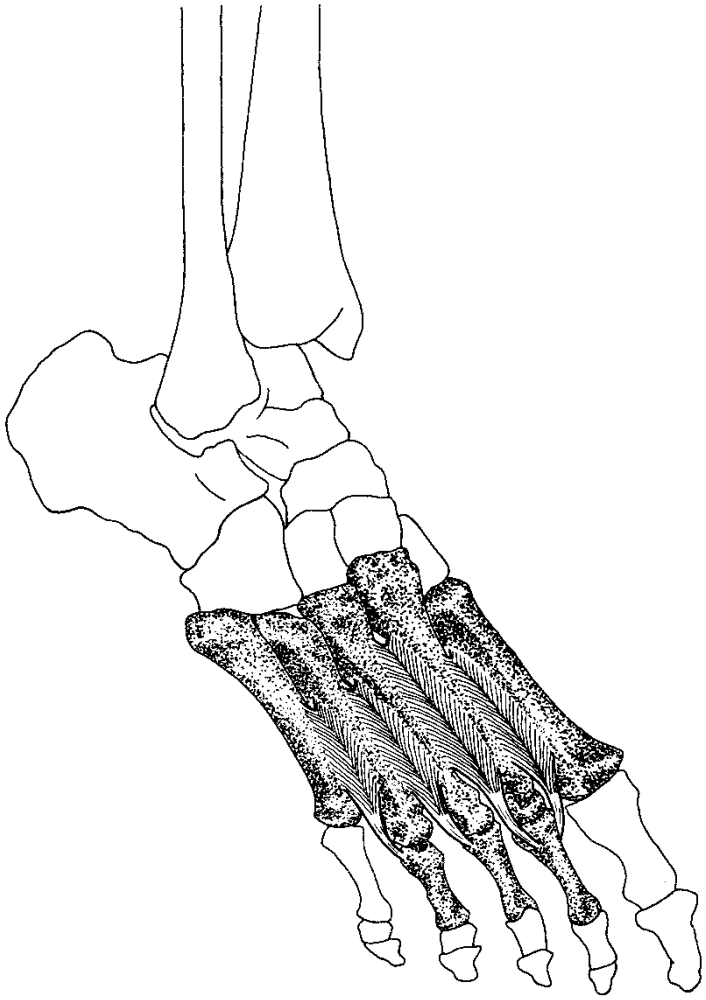
■ **Origin**
Base of fifth metatarsal, sheath of peroneus longus tendon

■ **Insertion**
Lateral side of base of proximal phalanx of fifth toe

■ **Action**
Flexes proximal phalanx of fifth toe

■ **Nerve**
Lateral plantar nerve (S1, S2)

DORSAL INTEROSSEI *(Fourth Layer; Four Muscles)*



Foot—anterolateral view

■ Origin
Adjacent sides of metatarsal bones

■ Insertion
Bases of proximal phalanges

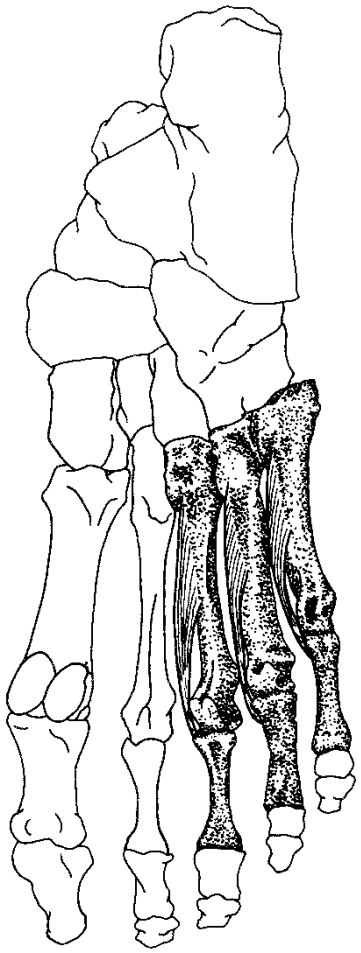
First—medial side of proximal phalanx of second toe

Second, third, fourth—lateral sides of proximal phalanges of second, third, and fourth toes

■ Action
Abduct toes, flex proximal phalanges

■ Nerve
Lateral plantar nerve (S1, S2)

PLANTAR INTEROSSEI *(Fourth Layer; Three Muscles)*



Foot—plantar view

■ **Origin**
Bases and medial sides of third, fourth, and fifth metatarsal bones

■ **Insertion**
Medial sides of bases of proximal phalanges of same toes

■ **Action**
Adduct toes, flex proximal phalanges

■ **Nerve**
Lateral plantar nerve (S1, S2)

Alphabetical Listing of Muscles

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Notes