

Dr. Weyrich

Unit 1: Back and Thorax

Reading:

1. Gray's Anatomy for Students, Chapters 2 and 3
2. *Dissection Guide for Human Anatomy*, Labs 1-7

Objectives:

To know and understand the:

1. Surface anatomy of the back and thorax and its clinical importance
2. Identification of back muscles, their attachments, actions, and nerve supply
3. Characteristics of the vertebral column and its normal and abnormal curvatures
4. Basic understanding of the nervous system with emphasis on spinal cord anatomy
5. Understand the thoracic cage as a whole in relation to the organs it encloses
6. Know the anatomy of the thoracic muscles and breast, their blood supply, and innervation
7. Understand the pleurae, pleural cavities, and clinically related problems
8. Characteristics of each lung, their innervation, and blood supply
9. Know the anatomy of the heart and clinically related syndromes
10. Understand the subdivisions of the mediastinum and the contents of each division

Dr. Weyrich

G01: SUPERFICIAL BACK

- Reading:**
1. Gray's Anatomy for Students, Chapter 2
 2. *Dissection Guide for Human Anatomy*, Lab 1
- Objectives:**
1. Attachments and movements of extrinsic back muscles
- Clinical Correlates:**
1. Accessory nerve syndromes

Conceptual Overview of the Back (pp. 14-24)

Functions (pp. 15-16)

Support

Movement

Protection of the central and peripheral nervous systems

Component Parts (pp. 17-22)

Bones

Muscles

Vertebral Canal

Spinal Nerves

Dermatomes

Relationship to Other Regions (pp.22-23)

Head

Thorax, Abdomen, Pelvis

Limbs

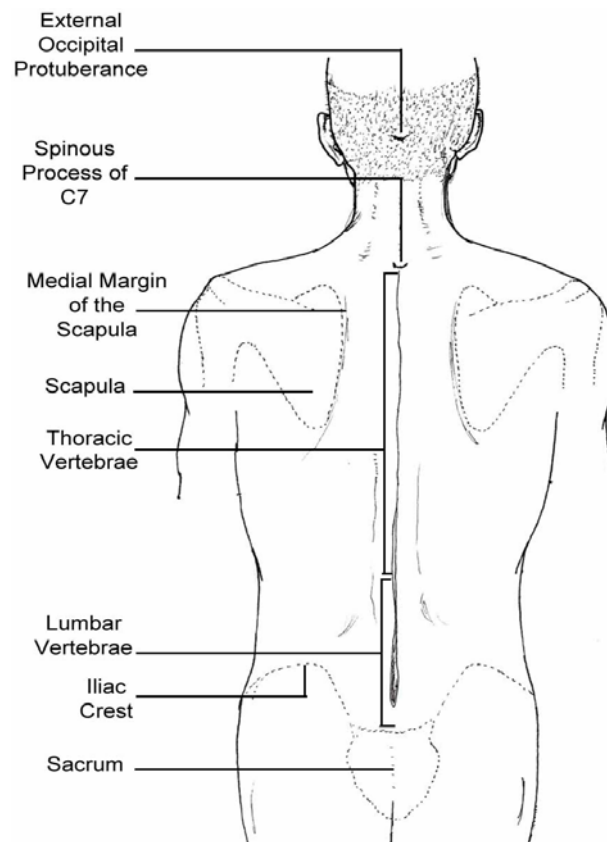
Key Features (pp. 24-25)

Long vertebral column and short spinal cord

Intervertebral foramina and spinal nerves

Innervation of the back

Superficial Back (p.47)



Superficial Back Landmarks

Osteologic Landmarks Used for Muscle Attachments

Posterior Aspect of the Skull (pp. 767-768)

Occipital Bone

- External occipital protuberance
- External occipital Crest
- Superior nuchal Line
- Inferior nuchal Line

Temporal bone

- Mastoid process

Scapula (pp. 623-625)

Spine
Coracoid process
Acromion
Borders

Clavicle (p. 623)

Proximal humerus (p. 625)

Vertebral Processes (pp. 27-31)

Spinous processes

Transverse processes

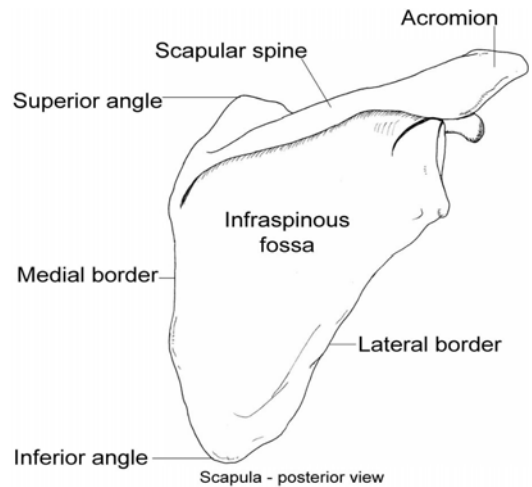
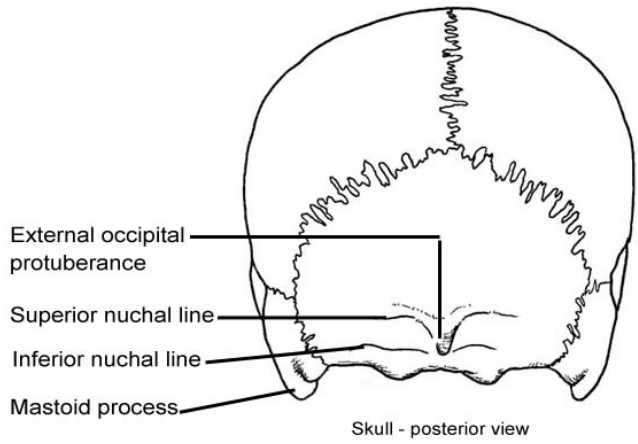
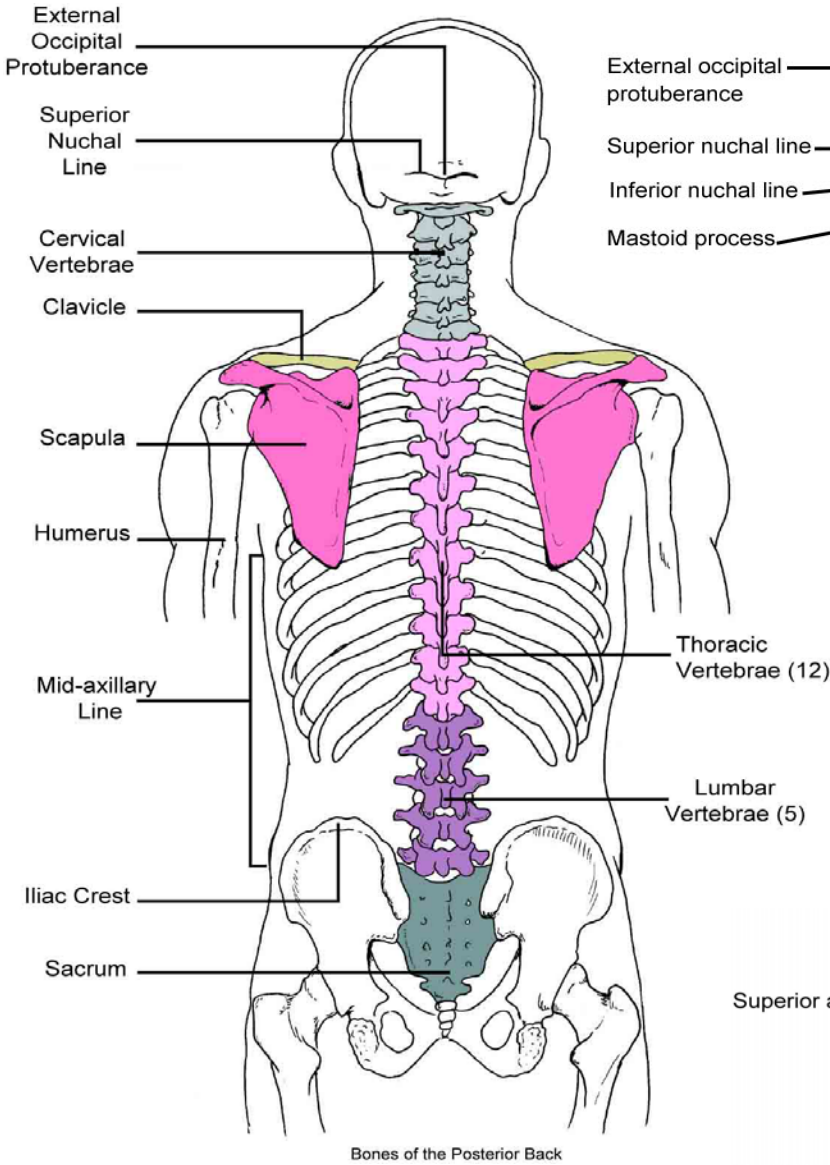
Ribs (pp. 120-122)

Angle of the rib

Ilium (p. 381)

Iliac crest

Basic Osteology of the Back



Superficial Back Muscles

(pp. 47-53)

Superficial Back Muscles (pp. 47-53 and table 2.1)

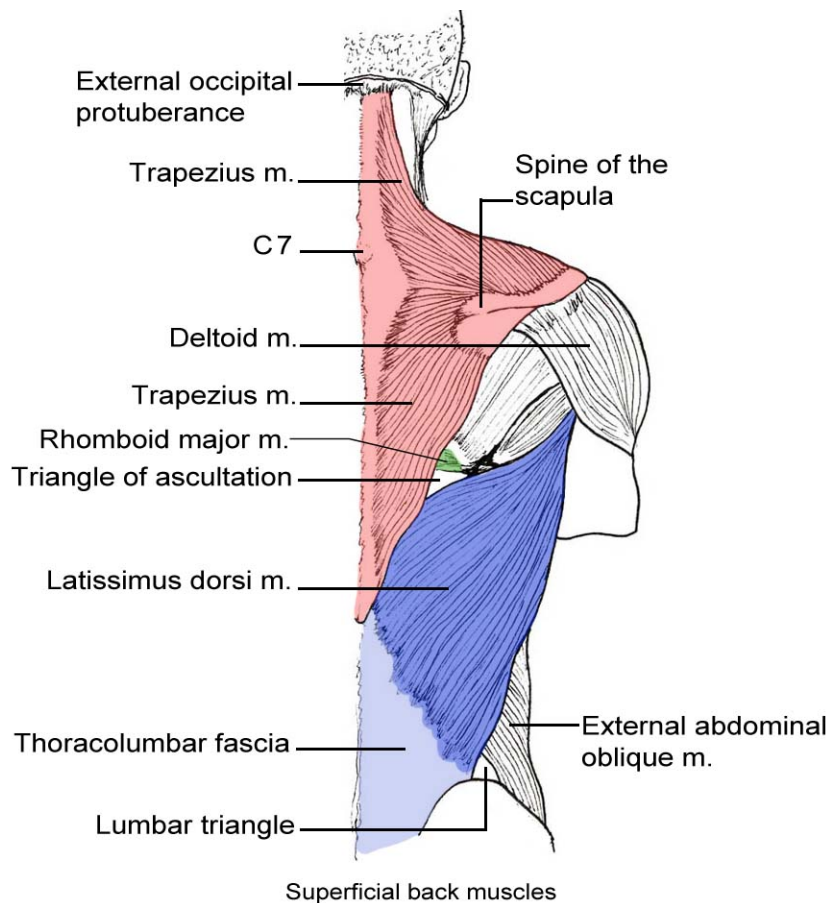
Trapezius

Medial attachments

- Superior nuchal line
- External occipital protuberance
- Nuchal ligament
- Spinous processes (C7-T12)

Lateral attachments

- Clavicle (lateral third)
- Acromion
- Spine of Scapula



Trapezius (Con't)

Innervation

- Spinal root of accessory nerve (CN XI)
- Cervical nerves C3 and C4

Main actions

- Elevate, retract, and rotate scapula

CLINICAL CORRELATE

- Accessory nerve syndromes

Latissimus Dorsi

Medial attachments

- Spinous processes of T7-T12
- Thoracolumbar fascia
- Iliac crest
- Inferior ribs (~9-12)

Lateral attachments

- Intertubercular groove of humerus

Innervation

- Thoracodorsal nerve (C6-C8)

Main actions

- Extends, adducts and medially rotates the humerus
- Raises body towards arms during climbing

Clinical Correlation

Triangle of auscultation

Lumbar triangle

Levator Scapulae

Medial attachments

- Transverse processes of C1-C4

Lateral attachments

- Superior angle of scapula

Innervation

- Dorsal scapular nerve (C4, C5)
- Cervical nerves C3 and C4

Main actions

- Elevate scapula

Rhomboid Major

Medial attachments

- Spinous processes of T2-T5

Lateral attachments

- Medial border of the scapula

Innervation

- Dorsal scapular nerve (C4, C5)

Main actions

- Retract scapula and rotate scapula medially
- Fix scapula to the trunk

Rhomboid Minor

Medial attachments

- Nuchal ligament
- Spinous processes of C7 and T1

Lateral attachments

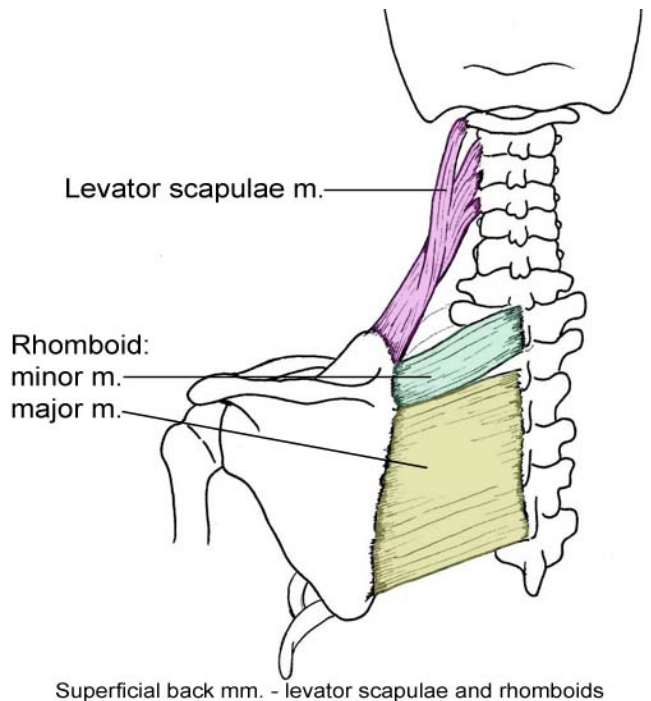
- Medial border of the scapula

Innervation

- Dorsal scapular nerve (C4, C5)

Main actions

- Retract scapula and rotate scapula medially
- Fix scapula to the trunk



Intermediate Back Muscles (p.53 and table 2.2)

Serratus Posterior Superior

Medial attachments

- Nuchal ligament
- Spinous processes of C7 and T3
- Supraspinous ligaments

Lateral attachments

- Superior borders of 2nd to 4th ribs

Innervation

- 2nd to 5th intercostal nerves

Main actions

- Elevates ribs 2-4

Serratus Posterior Inferior

Medial attachments

- Spinous processes of T11-L3

Lateral attachments

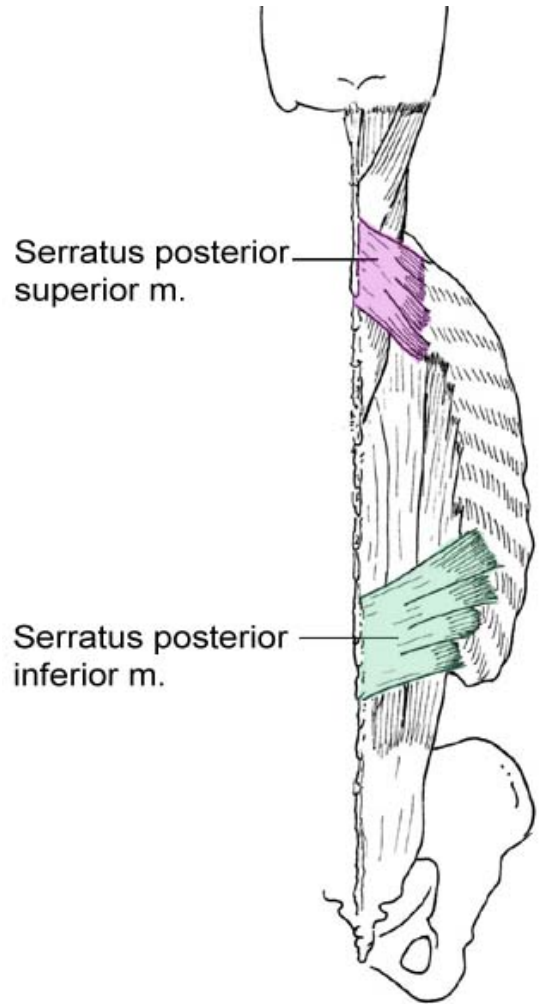
- Inferior borders of 9th to 12th ribs near their angles

Innervation

- 9th to 12th intercostal nerves

Main actions

- Depress ribs 9-12



Serratus posterior superior m.

Serratus posterior inferior m.

Intermediate back mm.

G02: Intrinsic (Deep) Muscles of the Back and Vertebral Column

- Reading:**
1. Gray's Anatomy for students, chapter 2
 2. *Dissection Guide for Human Anatomy*, Lab 2
- Objectives:**
1. Attachments and actions of intrinsic back muscles
 2. General features of vertebral column
 3. Regional characteristics of vertebral column
- Clinical Correlates:**
1. Kyphosis, scoliosis, lordosis
 2. "Ruptured disc"

Intrinsic Back Muscles

(pp. 54-60 and tables 2.3-2.5)

Spinotransversales Muscles (pp.55 and table 2.3)

Splenius Capitis

Inferior attachments

- Nuchal ligament
- Spinous processes of C7-T4

Superior attachments

- Mastoid process
- Just inferior to the superior nuchal line

Innervation

- Dorsal rami of spinal nerves

Main actions

- Bilateral – extend the head and neck
- Unilateral – laterally bends and rotates head to side of contracting muscle

Splenius Cervicis

Inferior attachments

- Spinous processes of T3-T6

Superior attachments

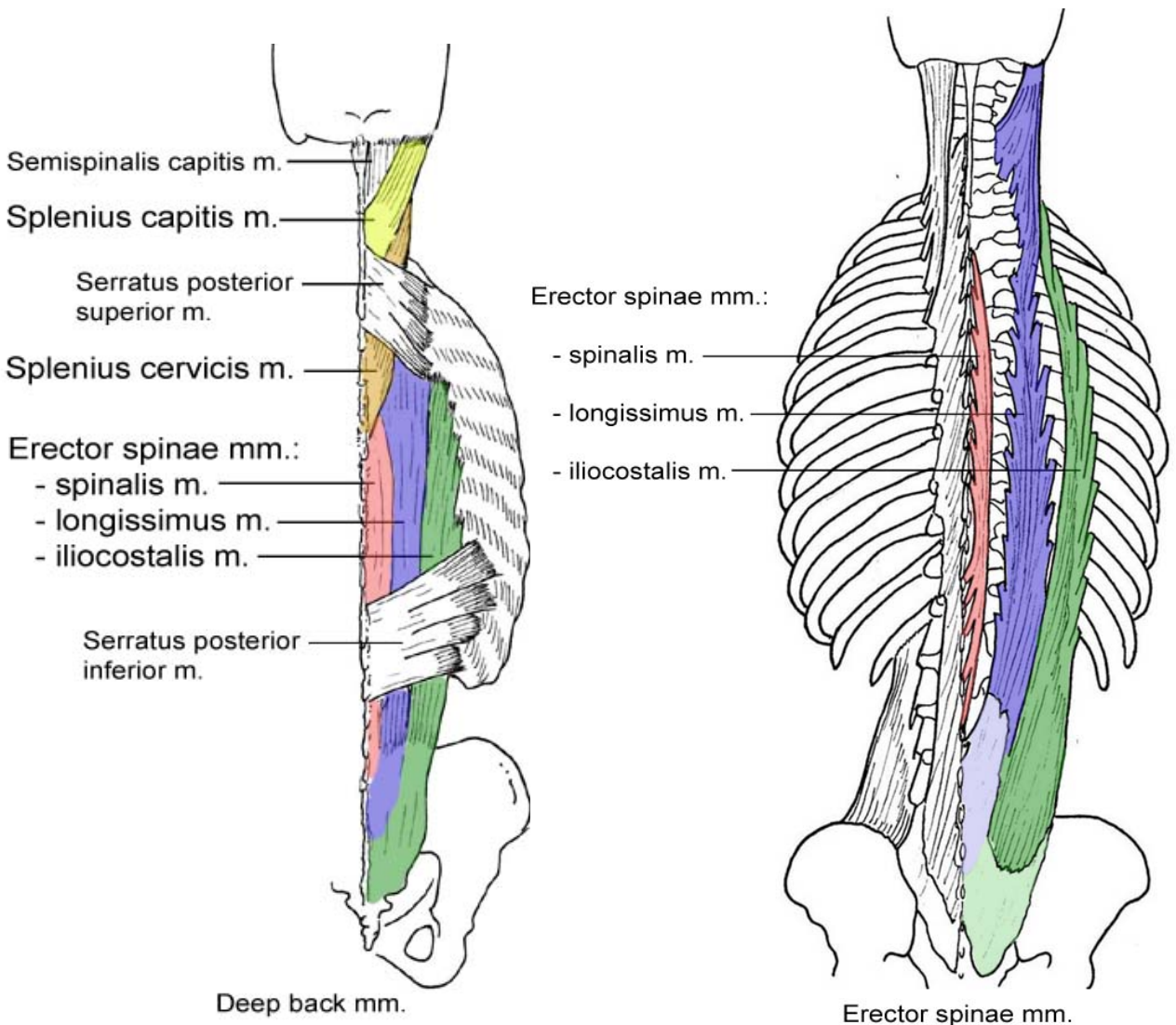
- Transverse processes of C1-C3

Innervation

- Dorsal rami of spinal nerves

Main actions

- Bilateral – extend the head and neck
- Unilateral – laterally bends and rotates head to side of contracting muscle



Erector Spinae Muscles (pp. 56-58 and table 2.4)

Erector Spinae Muscle Group (Iliocostalis, Longissimus, Spinalis)

Common inferior attachments

- Broad tendon from the posterior iliac crest
- Posterior sacrum
- Sacral and lumbar spinous processes
- Supraspinous ligaments

Superior attachments (varies among all three [see below])

Superior attachments for **Iliocostalis**

- Angles of the lower ribs
- Transverse processes of cervical vertebrae

Superior attachments for **longissimus**

- Ribs between the tubercles and angles
- Transverse processes of thoracic and cervical vertebrae
- Mastoid process

Superior attachments for **spinalis**

- spinous processes in upper thoracic region to skull

Innervation

- Dorsal rami of spinal nerves

Main Actions

- Bilaterally – extend the vertebral column and head
- Unilaterally – laterally bend the vertebral column

Transversospinales Muscles (pp. 58-60 and table 2.5)

Transversospinal Muscle Group (Semispinalis, Multifidus, Rotatores)

Inferior attachments

Inferior attachments for **semispinalis**

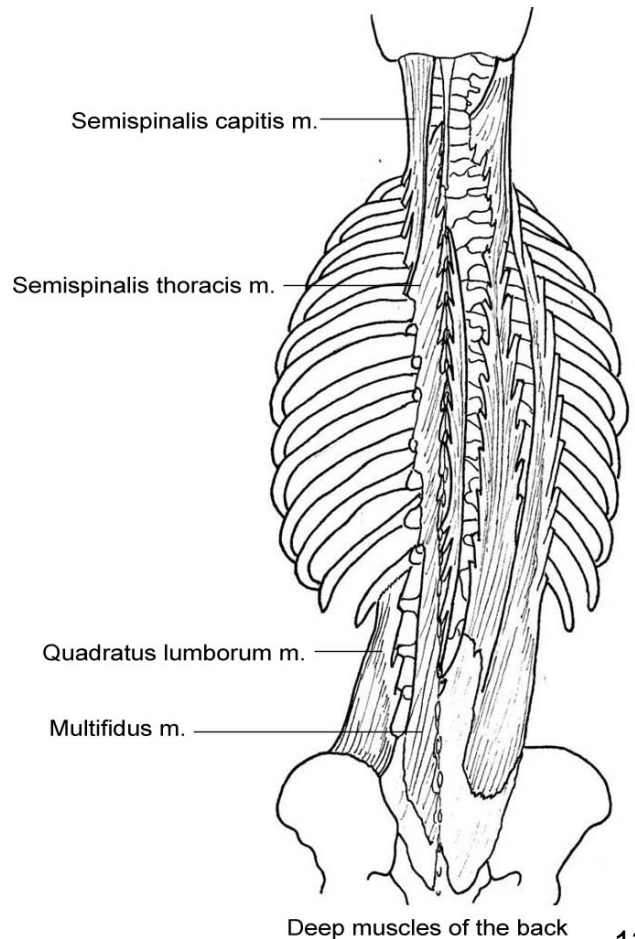
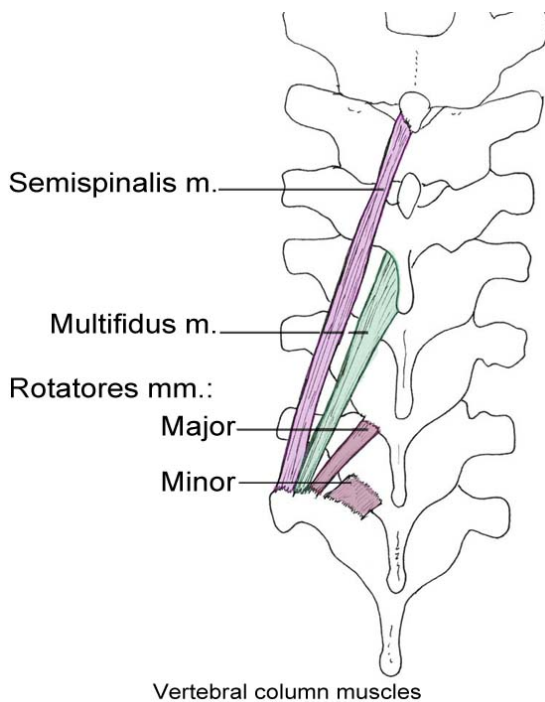
- Transverse processes of C4-T12

Inferior attachments for **multifidus**

- Sacrum and ilium
- Transverse processes of T1-T3
- Articular processes of C4-C7

Inferior attachments for **rotatores**

- Transverse processes of vertebrae, with best development in thoracic region



Superior attachments

Superior attachments for **semispinalis**

- Occipital bone
- spinous processes of thoracic and cervical region
- *Semispinalis usually span 4-6 vertebrae

Superior attachments for **multifidus**

- Spinous processes throughout most of the vertebral column
- *Multifidus usually span 2-4 vertebrae

Superior attachments for **rotatores**

- Junction of the lamina and transverse process
- *Rotatores usually span 1-2 vertebrae

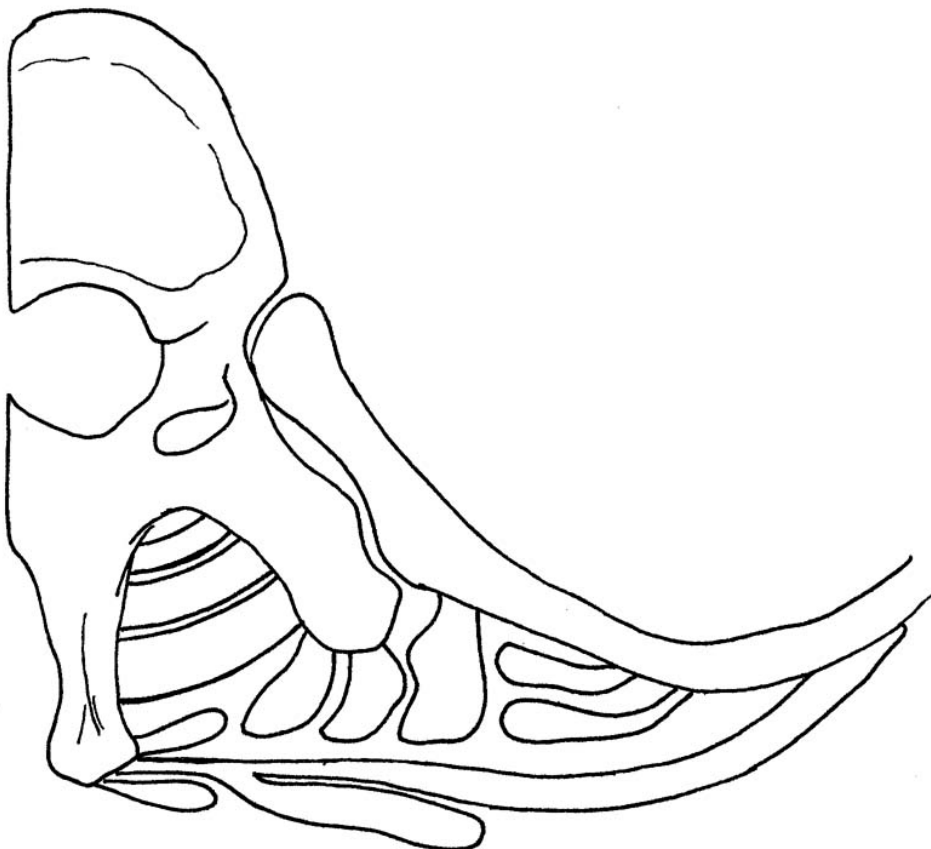
Innervation

Dorsal rami of spinal nerves

Main Actions

Bilaterally – extend the vertebral column

Unilaterally – turn the spinous processes towards the transverse processes of the same side; therefore, they turn the body to the opposite side



Segmental Muscles (p. 60 and table 2.6)

Interspinales

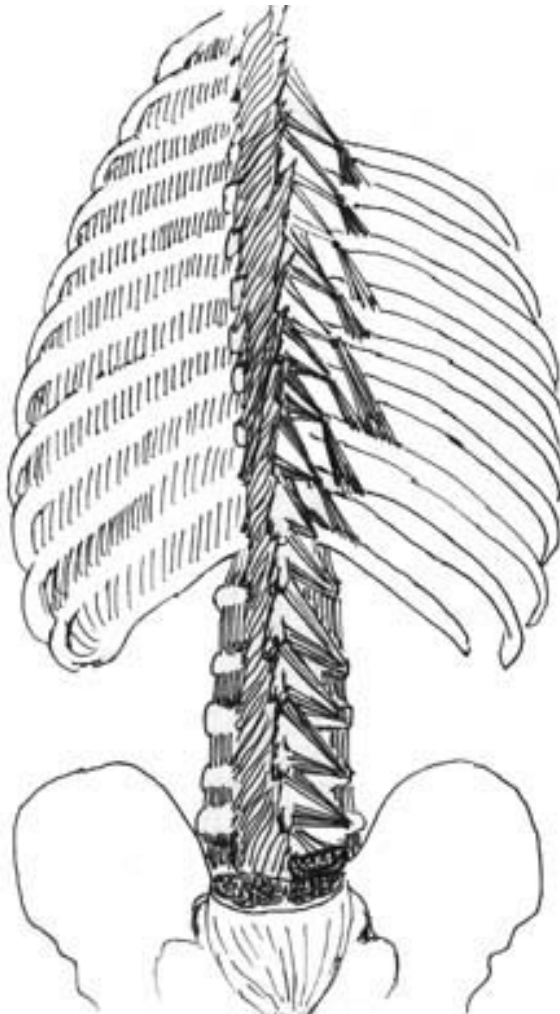
Bridge spinous processes; Aid in extension of vertebral column

Intertransversarii

Bridge transverse processes; Bilateral they stabilize the vertebral column and unilateral they aid in lateral bending of vertebral column

Levator costarum

Connect ribs to transverse processes of vertebral column; elevate the ribs and assist with inspiration. Also have a minor role in lateral bending of vertebral column



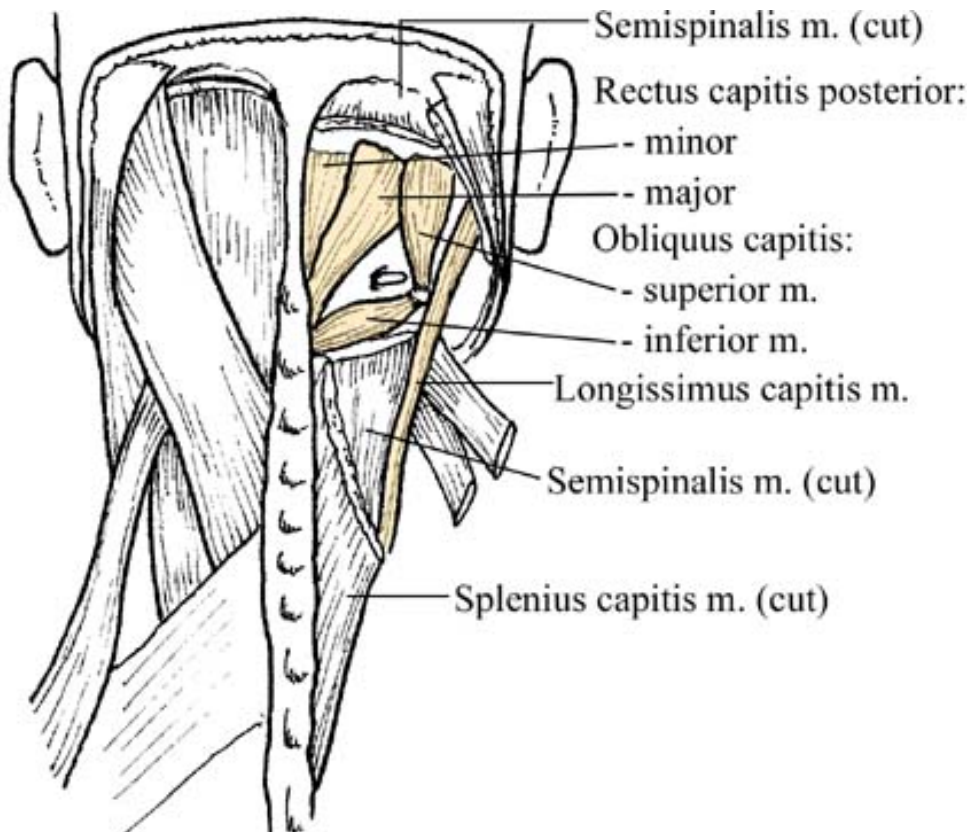
Suboccipital region (p. 60-61 and table 2.7)

Superior area of the neck below the occipital region; lies deep to the trapezius and semispinalis mm.

Muscles

- Rectus capitis posterior major m.
- Rectus capitis posterior minor m.
- Obliquus capitis superior m.
- Obliquus capitis inferior m.

Innervation to the suboccipital muscles arises from posterior ramus of C1



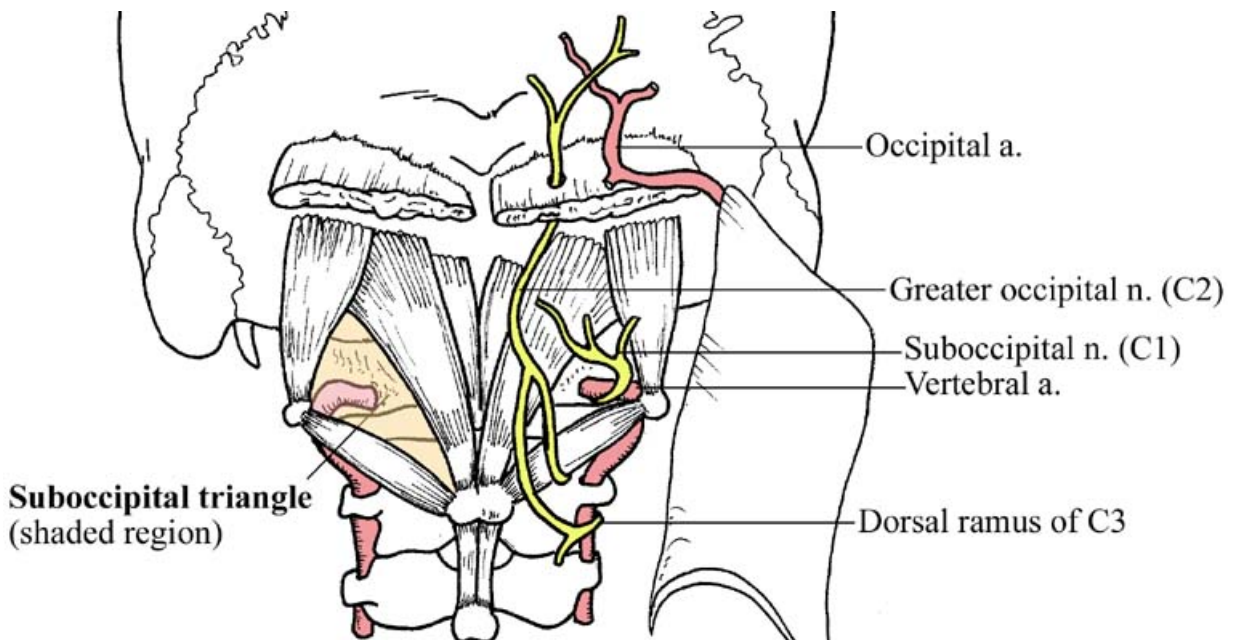
Suboccipital triangle

Borders

- Rectus capitis posterior major m.
- Obliquus capitis superior m.
- Obliquus capitis inferior m.

Contents

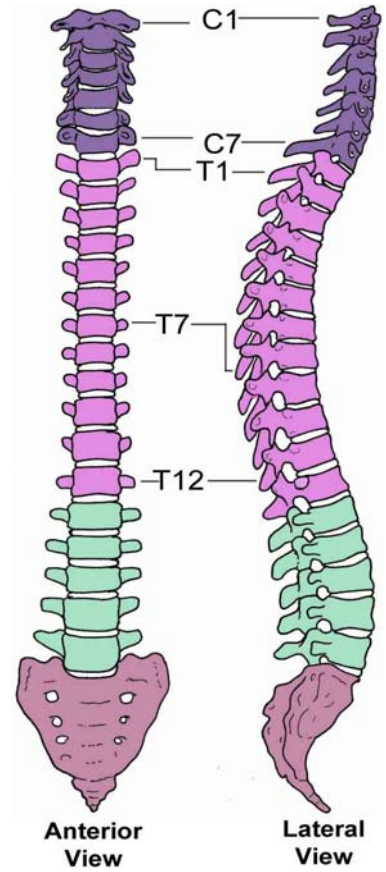
- Vertebral a.
- Suboccipital n. (dorsal ramus of C1 spinal n.)



Vertebral Column (pp. 26-47)

Regions of the Vertebral Column

- Cervical (7)
- Thoracic (12)
- Lumbar (5)
- Sacral (5 fused)
- Coccygeal (2-3)



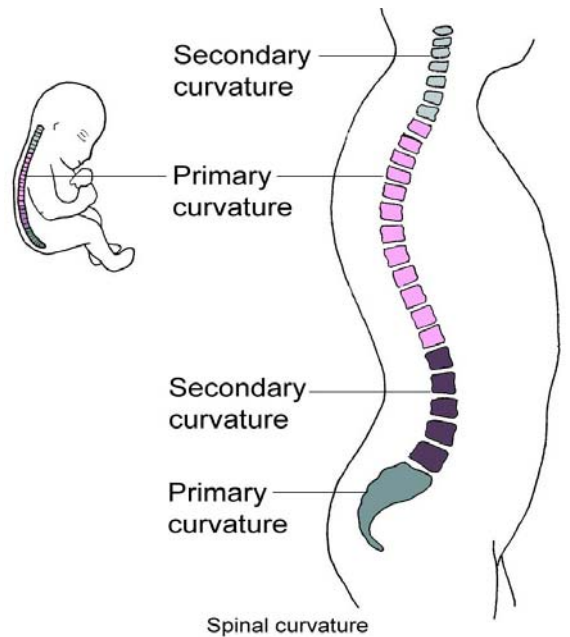
Normal Curvatures of the Vertebral Column (p. 15)

Primary curvatures

- Thoracic
- Sacral

Secondary curvatures

- Cervical
- Lumbar

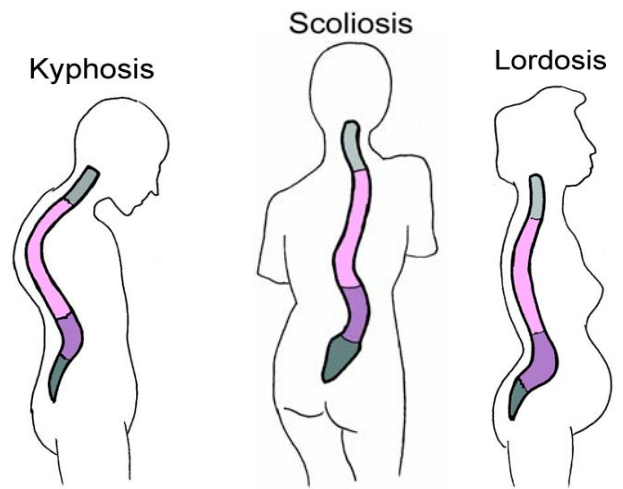


Clinical Correlates (p. 36)

Kyphosis

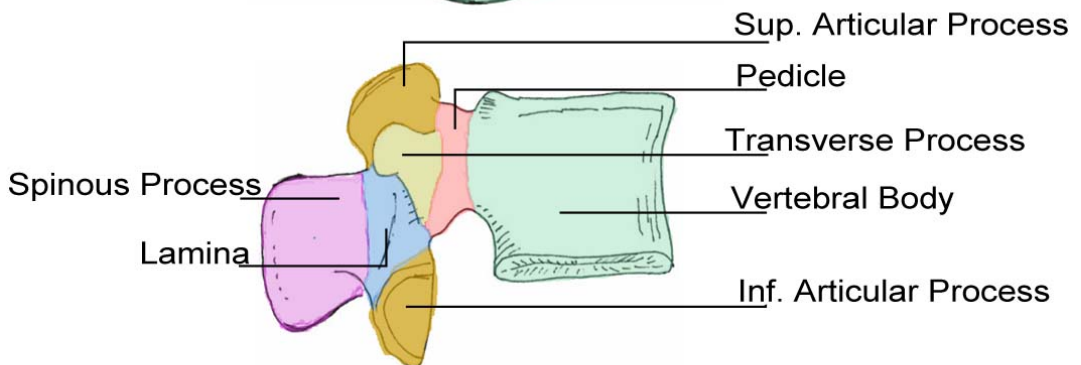
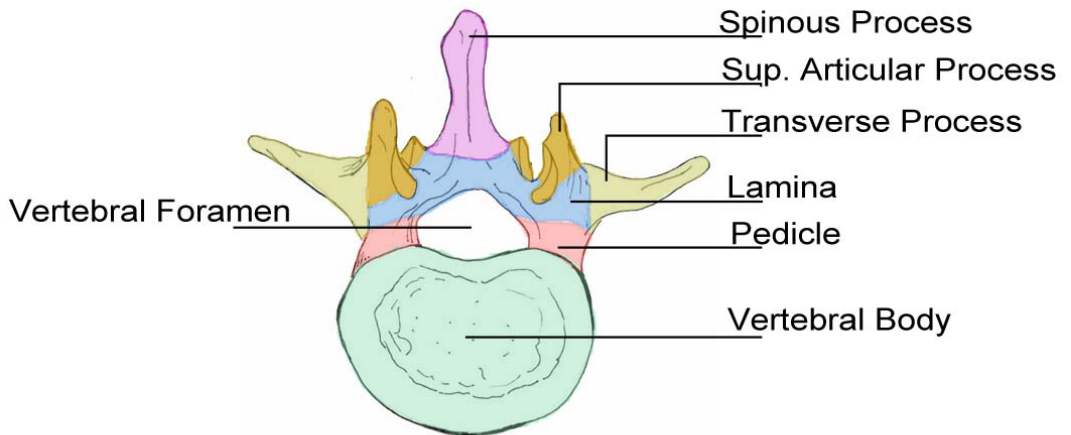
Scoliosis

Lordosis



Parts of a Typical Vertebra (pp. 27-31)

Body	Vertebral arch	Pedicle
Lamina	Vertebral foramen/canal	Intervertebral foramen
Spinous process	Transverse process	Articular processes

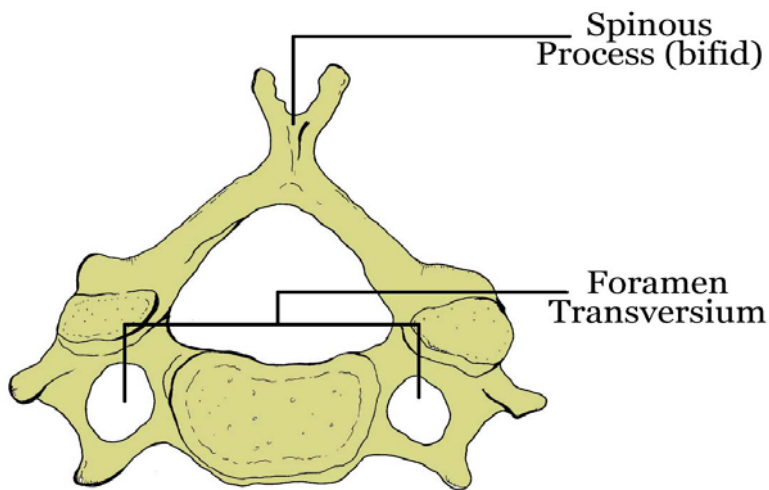
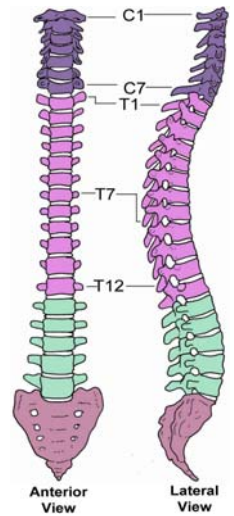


Vertebrae Superior & Lateral View

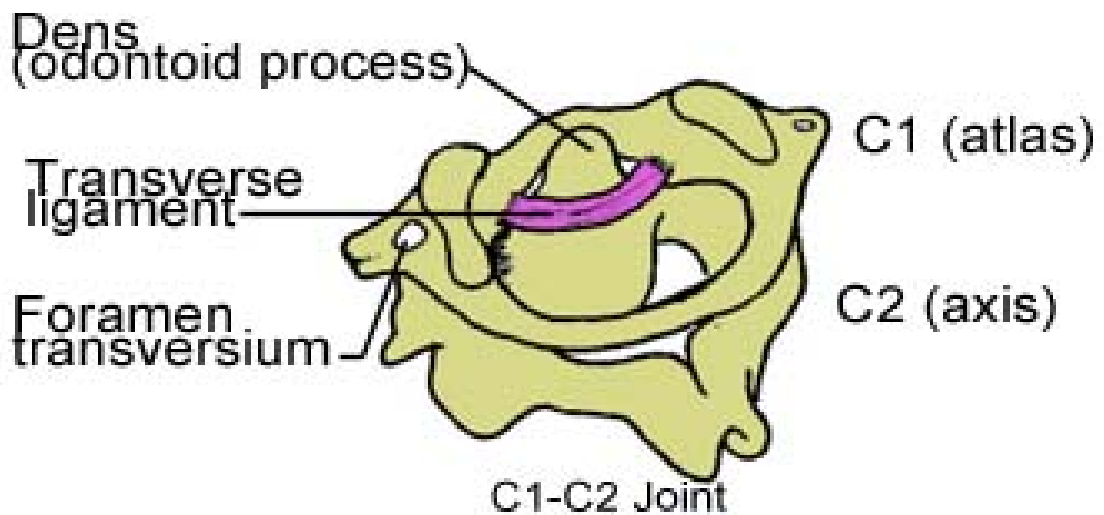
Regional characteristics of vertebrae

Cervical (p. 31)

- Atlas (C1)
- Axis (C2)
- Spinous process (bifid)
- Foramen transversarium (transmits vertebral a.)



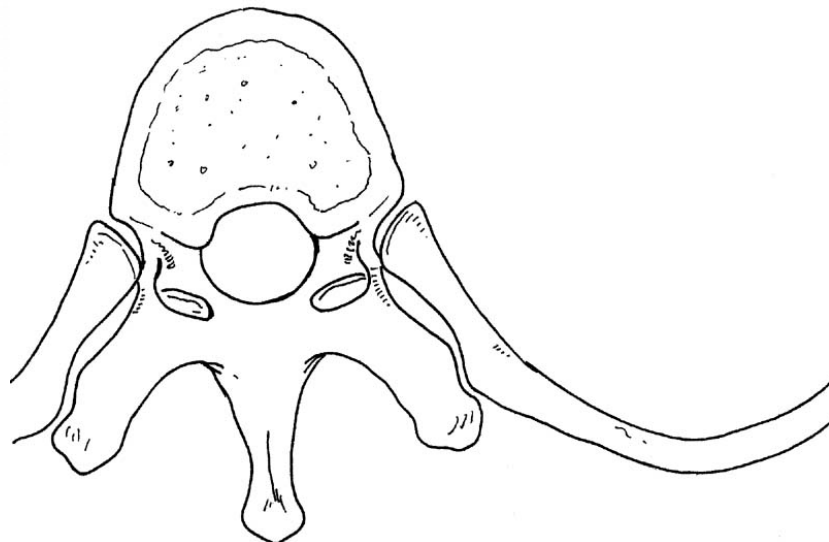
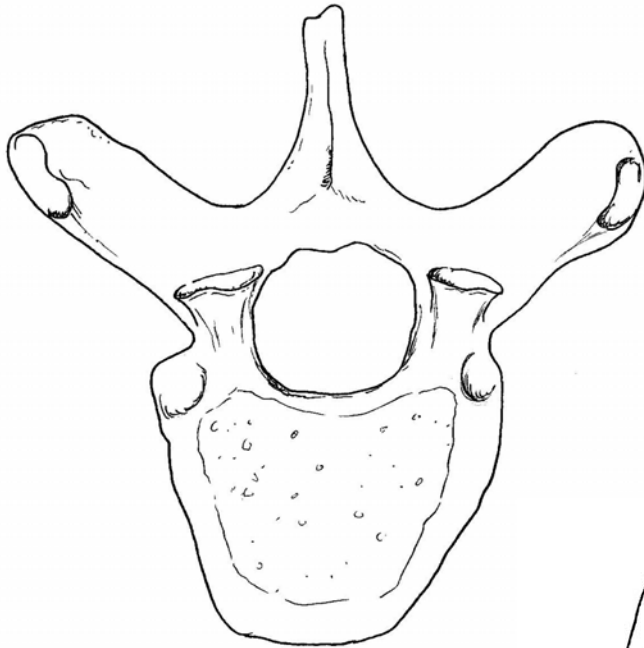
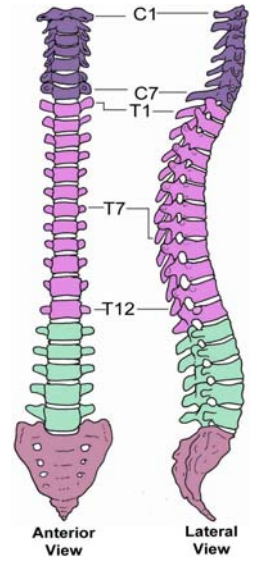
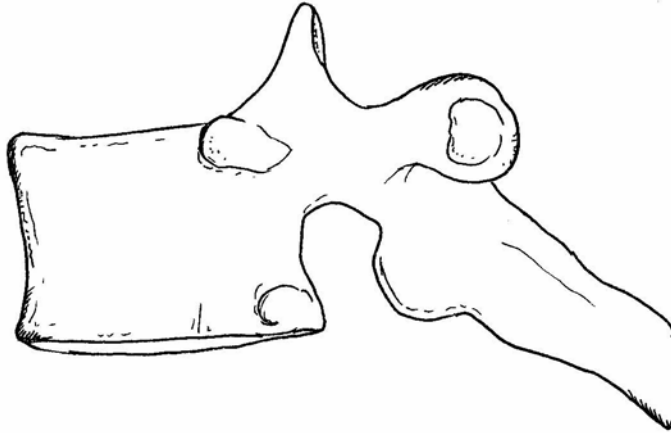
Superior View C6



Regional characteristics of vertebrae

Thoracic (p. 33)

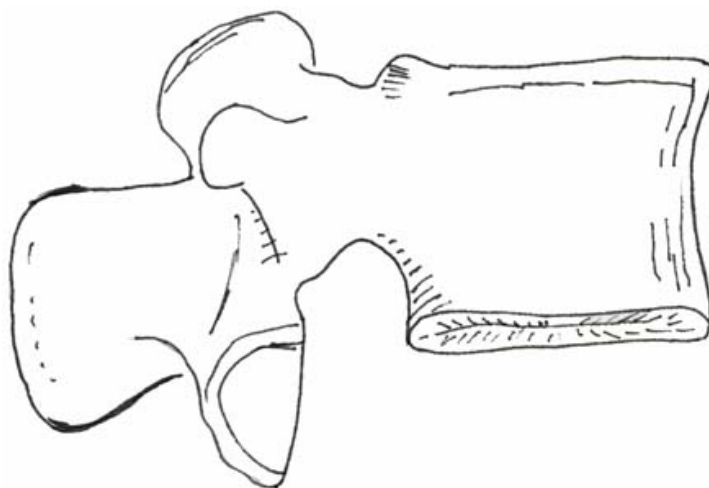
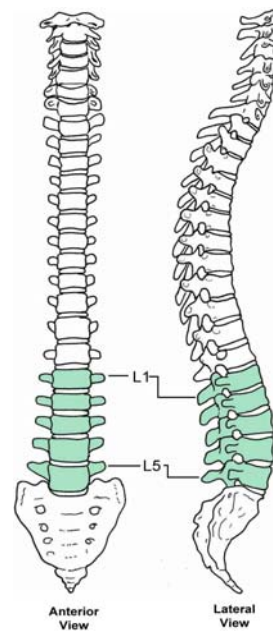
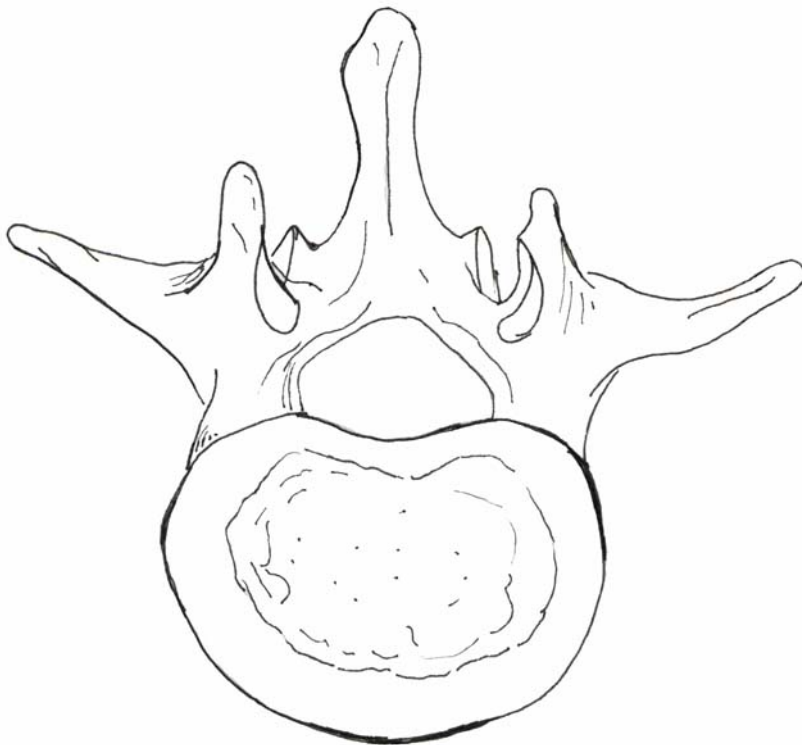
-Costal facets



Regional characteristics of vertebrae

Lumbar (p. 33)

-Massive bodies



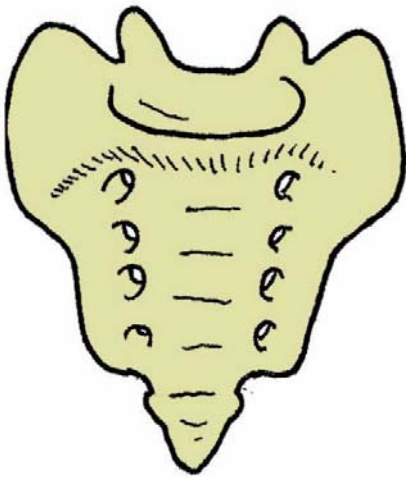
Regional characteristics of vertebrae

Sacrum

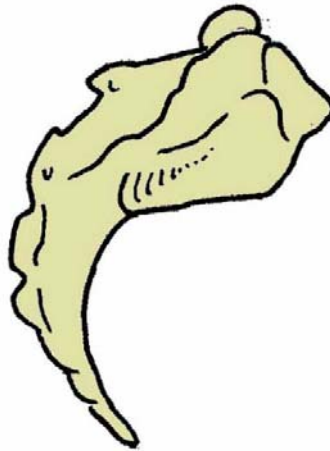
-5 fused vertebrae

Coccyx

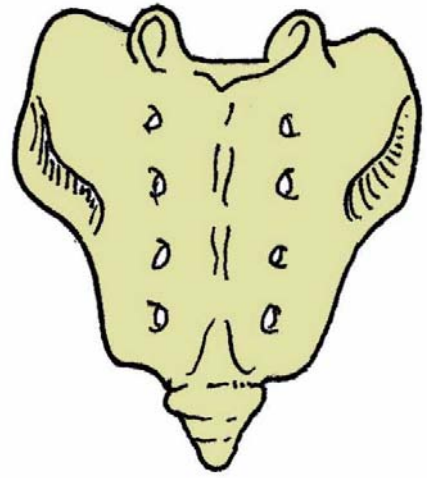
-Tiny, incomplete vertebrae



Anterior



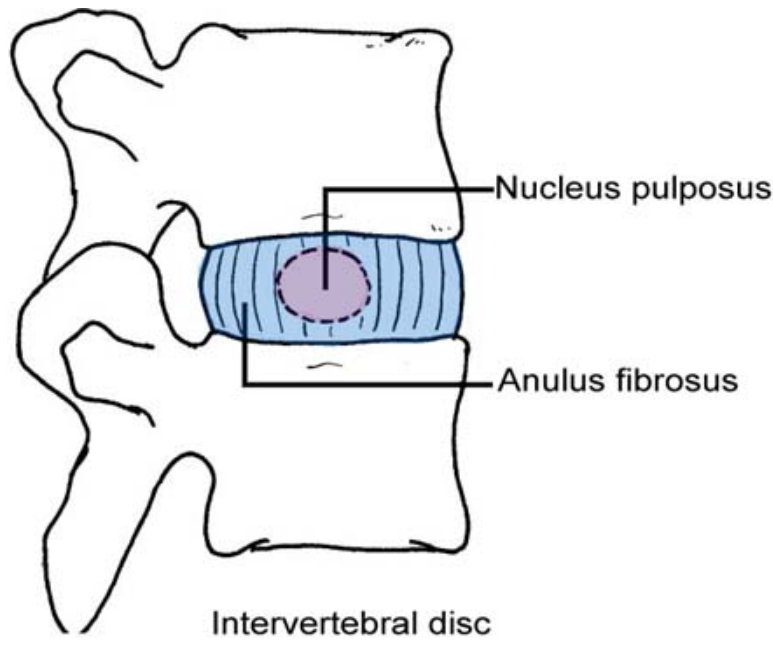
Lateral
Sacrum



Posterior

Intervertebral discs (p. 41)

- Anulus fibrosus
- Nucleus pulposus

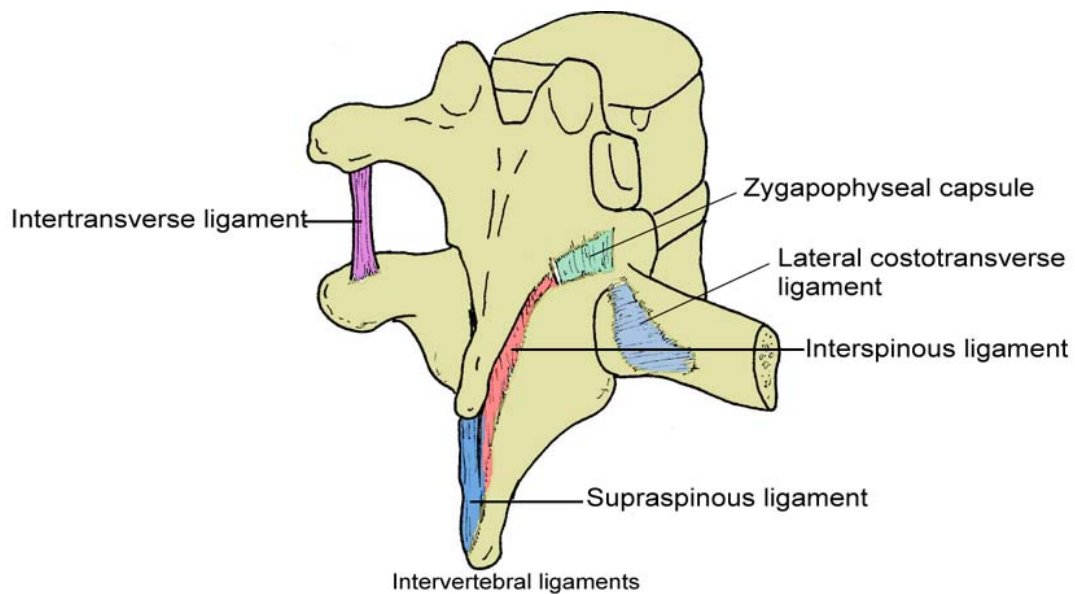


Clinical Correlate (p. 43)

“Ruptured disc”

Joints between vertebral arches (Zygapophyseal joints) (p. 42)

between superior and articular processes of adjacent vertebrae



Main Ligaments of the vertebral column (pp. 43-44)

Anterior longitudinal ligament

Posterior longitudinal ligament

Accessory ligaments of intervertebral joints (pp. 44-45)

-Ligamenta flava (“yellow”)

-Interspinous, intertransverse, and
supraspinous ligaments

