

Anatomy & A&P 07 Axial Skeleton Essay

Author: OpenStax College

Published 2014

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4. Chapter: A&P 07 Axial Skeleton Essay

1. A&P 07 Axial Skeleton Essay Questions

4.1.1. Watch this video (<http://openstaxcollege.org/l/skull1>) to view a ro...

Author: OpenStax College

Watch this video (<http://openstaxcollege.org/l/skull1>) to view a rotating and exploded skull with color-coded bones.

Which bone (yellow) is centrally located and joins with most of the other bones of the skull?

- The sphenoid bone joins with most other bones of the skull. It is centrally located, where it forms portions of the rounded brain case and cranial base.

Check the answer of this question online at QuizOver.com:

Question: [Watch this video http://openstaxcollege.org/l/skull1](http://openstaxcollege.org/l/skull1) OpenStax College Anatomy

4.1.2. View this animation (<http://openstaxcollege.org/l/headblow>) to see ...

Author: OpenStax College

View this animation (<http://openstaxcollege.org/l/headblow>) to see how a blow to the head may produce a contrecoup (counterblow) fracture of the basilar portion of the occipital bone on the base of the skull.

Why may a basilar fracture be life threatening?

- A basilar fracture may damage an artery entering the skull, causing bleeding in the brain.

Check the answer of this question online at QuizOver.com:

Question: [View this animation http://openstaxcollege.org/l/headblow](http://openstaxcollege.org/l/headblow) OpenStax College Anatomy

4.1.3. Osteoporosis is a common age-related bone disease in which bone den...

Author: OpenStax College

Osteoporosis is a common age-related bone disease in which bone density and strength is decreased.

Watch this video (<http://openstaxcollege.org/l/osteoporosis>) to get a better understanding of how thoracic vertebrae may become weakened and may fractured due to this disease.

How may vertebral osteoporosis contribute to kyphosis?

- Osteoporosis causes thinning and weakening of the vertebral bodies. When this occurs in thoracic vertebrae, the bodies may collapse producing kyphosis, an enhanced anterior curvature of the thoracic vertebral column.

Check the answer of this question online at QuizOver.com:

Question: [Osteoporosis is a common age-related bone OpenStax College Anatomy](#)

4.1.4. Watch this animation (<http://openstaxcollege.org/l/diskslip>) to see...

Author: OpenStax College

Watch this animation (<http://openstaxcollege.org/l/diskslip>) to see what it means to "slip" a disk.

Watch this second animation (<http://openstaxcollege.org/l/herndisc>) to see one possible treatment for a herniated disc, removing and replacing the damaged disc with an artificial one that allows for movement between the adjacent vertebrae.

How could lifting a heavy object produce pain in a lower limb?

- Lifting a heavy object can cause an intervertebral disc in the lower back to bulge and compress a spinal nerve as it exits through the intervertebral foramen, thus producing pain in those regions of the lower limb supplied by that nerve.

Check the answer of this question online at QuizOver.com:

Question: [Watch this animation http://openstaxcollege.org/l/diskslip](http://openstaxcollege.org/l/diskslip) OpenStax College Anatomy

4.1.5. Use this tool (<http://openstaxcollege.org/l/vertcolumn>) to identify...

Author: OpenStax College

Use this tool (<http://openstaxcollege.org/l/vertcolumn>) to identify the bones, intervertebral discs, and ligaments of the vertebral column.

The thickest portions of the anterior longitudinal ligament and the supraspinous ligament are found in which regions of the vertebral column?

- The anterior longitudinal ligament is thickest in the thoracic region of the vertebral column, while the supraspinous ligament is thickest in the lumbar region.

Check the answer of this question online at QuizOver.com:

Question: [Use this tool http://openstaxcollege.org](http://openstaxcollege.org) [OpenStax College Anatomy](#)

4.1.6. View this video (<http://openstaxcollege.org/l/skullbones>) to review...

Author: OpenStax College

View this video (<http://openstaxcollege.org/l/skullbones>) to review the two processes that give rise to the bones of the skull and body.

What are the two mechanisms by which the bones of the body are formed and which bones are formed by each mechanism?

- Bones on the top and sides of the skull develop when fibrous membrane areas ossify (convert) into bone. The bones of the limbs, ribs, and vertebrae develop when cartilage models of the bones ossify into bone.

Check the answer of this question online at QuizOver.com:

Question: [View this video http://openstaxcollege.org/l/skullbones](http://openstaxcollege.org/l/skullbones) OpenStax College Anatomy Quest

4.1.7. Define the two divisions of the skeleton.

Author: OpenStax College

Define the two divisions of the skeleton.

- The axial skeleton forms the vertical axis of the body and includes the bones of the head, neck, back, and chest of the body.
It consists of 80 bones that include the skull, vertebral column, and thoracic cage.
The appendicular skeleton consists of 126 bones and includes all bones of the upper and lower limbs.

Check the answer of this question online at QuizOver.com:

Question: [Define the two divisions of the skeleton OpenStax College Anatomy](#)

4.1.8. Discuss the functions of the axial skeleton.

Author: OpenStax College

Discuss the functions of the axial skeleton.

- The axial skeleton supports the head, neck, back, and chest of the body and allows for movements of these body regions.
It also gives bony protections for the brain, spinal cord, heart, and lungs; stores fat and minerals; and houses the blood-cell producing tissue.

Check the answer of this question online at QuizOver.com:

Question: [Discuss the functions of the axial skeleton OpenStax College Anatomy](#)

4.1.9. Define and list the bones that form the brain case or support the f...

Author: OpenStax College

Define and list the bones that form the brain case or support the facial structures.

- The brain case is that portion of the skull that surrounds and protects the brain. It is subdivided into the rounded top of the skull, called the calvaria, and the base of the skull. There are eight bones that form the brain case. These are the paired parietal and temporal bones, plus the unpaired frontal, occipital, sphenoid, and ethmoid bones. The facial bones support the facial structures, and form the upper and lower jaws, nasal cavity, nasal septum, and orbit. There are 14 facial bones. These are the paired maxillary, palatine, zygomatic, nasal, lacrimal, and inferior nasal conchae bones, and the unpaired vomer and mandible bones.

Check the answer of this question online at [QuizOver.com](http://www.quizover.com):

Question: [Define and list the bones that form the OpenStax College Anatomy](#)

4.1.10. Identify the major sutures of the skull, their locations, and the b...

Author: OpenStax College

Identify the major sutures of the skull, their locations, and the bones united by each.

- The coronal suture passes across the top of the anterior skull.
It unites the frontal bone anteriorly with the right and left parietal bones.
The sagittal suture runs at the midline on the top of the skull.
It unites the right and left parietal bones with each other.
The squamous suture is a curved suture located on the lateral side of the skull.
It unites the squamous portion of the temporal bone to the parietal bone.
The lambdoid suture is located on the posterior skull and has an inverted V-shape.
It unites the occipital bone with the right and left parietal bones.

Check the answer of this question online at QuizOver.com:

Question: [Identify the major sutures of the skull OpenStax College Anatomy](#)

4.1.11. Describe the anterior, middle, and posterior cranial fossae and the...

Author: OpenStax College

Describe the anterior, middle, and posterior cranial fossae and their boundaries, and give the midline structure that divides each into right and left areas.

- The anterior cranial fossa is the shallowest of the three cranial fossae.
It extends from the frontal bone anteriorly to the lesser wing of the sphenoid bone posteriorly.
It is divided at the midline by the crista galli and cribriform plates of the ethmoid bone.
The middle cranial fossa is located in the central skull, and is deeper than the anterior fossa.
The middle fossa extends from the lesser wing of the sphenoid bone anteriorly to the petrous ridge posteriorly.
It is divided at the midline by the sella turcica.
The posterior cranial fossa is the deepest fossa.
It extends from the petrous ridge anteriorly to the occipital bone posteriorly.
The large foramen magnum is located at the midline of the posterior fossa.

Check the answer of this question online at QuizOver.com:

Question: [Describe the anterior middle and posterior OpenStax College Anatomy](#)

4.1.12. Describe the parts of the nasal septum in both the dry and living s...

Author: OpenStax College

Describe the parts of the nasal septum in both the dry and living skull.

- There are two bony parts of the nasal septum in the dry skull.
The perpendicular plate of the ethmoid bone forms the superior part of the septum.
The vomer bone forms the inferior and posterior parts of the septum.
In the living skull, the septal cartilage completes the septum by filling in the anterior area between the bony components and extending outward into the nose.

Check the answer of this question online at QuizOver.com:

Question: [Describe the parts of the nasal septum in OpenStax College Anatomy](#)

4.1.13. Describe the vertebral column and define each region.

Author: OpenStax College

Describe the vertebral column and define each region.

- The adult vertebral column consists of 24 vertebrae, plus the sacrum and coccyx. The vertebrae are subdivided into cervical, thoracic, and lumbar regions. There are seven cervical vertebrae (C1-C7), 12 thoracic vertebrae (T1-T12), and five lumbar vertebrae (L1-L5). The sacrum is derived from the fusion of five sacral vertebrae and the coccyx is formed by the fusion of four small coccygeal vertebrae.

Check the answer of this question online at [QuizOver.com](http://www.quizover.com):

Question: [Describe the vertebral column and define OpenStax College Anatomy](#)

4.1.14. Describe a typical vertebra.

Author: OpenStax College

Describe a typical vertebra.

- A typical vertebra consists of an anterior body and a posterior vertebral arch. The body serves for weight bearing. The vertebral arch surrounds and protects the spinal cord. The vertebral arch is formed by the pedicles, which are attached to the posterior side of the vertebral body, and the lamina, which come together to form the top of the arch. A pair of transverse processes extends laterally from the vertebral arch, at the junction between each pedicle and lamina. The spinous process extends posteriorly from the top of the arch. A pair of superior articular processes project upward and a pair of inferior articular processes project downward. Together, the notches found in the margins of the pedicles of adjacent vertebrae form an intervertebral foramen.

Check the answer of this question online at [QuizOver.com](http://www.quizover.com):

Question: [Describe a typical vertebra. OpenStax College Anatomy Physiology](#)

4.1.15. Describe the sacrum.

Author: OpenStax College

Describe the sacrum.

- The sacrum is a single, triangular-shaped bone formed by the fusion of five sacral vertebrae. On the posterior sacrum, the median sacral crest is derived from the fused spinous processes, and the lateral sacral crest results from the fused transverse processes. The sacral canal contains the sacral spinal nerves, which exit via the anterior (ventral) and posterior (dorsal) sacral foramina. The sacral promontory is the anterior lip. The sacrum also forms the posterior portion of the pelvis.

Check the answer of this question online at [QuizOver.com](http://www.quizover.com):

Question: [Describe the sacrum. OpenStax College Anatomy Physiology 07: Axial](#)

4.1.16. Describe the structure and function of an intervertebral disc.

Author: OpenStax College

Describe the structure and function of an intervertebral disc.

- An intervertebral disc fills in the space between adjacent vertebrae, where it provides padding and weight-bearing ability, and allows for movements between the vertebrae. It consists of an outer annulus fibrosus and an inner nucleus pulposus. The annulus fibrosus strongly anchors the adjacent vertebrae to each other, and the high water content of the nucleus pulposus resists compression for weight bearing and can change shape to allow for vertebral column movements.

Check the answer of this question online at QuizOver.com:

Question: [Describe the structure and function of an OpenStax College Anatomy](#)

4.1.17. Define the ligaments of the vertebral column.

Author: OpenStax College

Define the ligaments of the vertebral column.

- The anterior longitudinal ligament is attached to the vertebral bodies on the anterior side of the vertebral column.

The supraspinous ligament is located on the posterior side, where it interconnects the thoracic and lumbar spinous processes.

In the posterior neck, this ligament expands to become the nuchal ligament, which attaches to the cervical spinous processes and the base of the skull.

The posterior longitudinal ligament and ligamentum flavum are located inside the vertebral canal.

The posterior longitudinal ligament unites the posterior sides of the vertebral bodies. The ligamentum flavum unites the lamina of adjacent vertebrae.

Check the answer of this question online at QuizOver.com:

Question: [Define the ligaments of the vertebral OpenStax College Anatomy Quest](#)

4.1.18. Define the parts and functions of the thoracic cage.

Author: OpenStax College

Define the parts and functions of the thoracic cage.

- The thoracic cage is formed by the 12 pairs of ribs with their costal cartilages and the sternum. The ribs are attached posteriorly to the 12 thoracic vertebrae and most are anchored anteriorly either directly or indirectly to the sternum.
The thoracic cage functions to protect the heart and lungs.

Check the answer of this question online at [QuizOver.com](http://www.quizover.com):

Question: [Define the parts and functions of the OpenStax College Anatomy Quest](#)

4.1.19. Describe the parts of the sternum.

Author: OpenStax College

Describe the parts of the sternum.

- The sternum consists of the manubrium, body, and xiphoid process.
The manubrium forms the expanded, superior end of the sternum.
It has a jugular (suprasternal) notch, a pair of clavicular notches for articulation with the clavicles, and receives the costal cartilage of the first rib.
The manubrium is joined to the body of the sternum at the sternal angle, which is also the site for attachment of the second rib costal cartilages.
The body receives the costal cartilage attachments for ribs 3-7. The small xiphoid process forms the inferior tip of the sternum.

Check the answer of this question online at QuizOver.com:

Question: [Describe the parts of the sternum. OpenStax College Anatomy](#)

4.1.20. Discuss the parts of a typical rib.

Author: OpenStax College

Discuss the parts of a typical rib.

- A typical rib is a flattened, curved bone. The head of a rib is attached posteriorly to the costal facets of the thoracic vertebrae.
The rib tubercle articulates with the transverse process of a thoracic vertebra.
The angle is the area of greatest rib curvature and forms the largest portion of the thoracic cage.
The body (shaft) of a rib extends anteriorly and terminates at the attachment to its costal cartilage.
The shallow costal groove runs along the inferior margin of a rib and carries blood vessels and a nerve.

Check the answer of this question online at [QuizOver.com](http://www.quizover.com):

Question: [Discuss the parts of a typical rib. OpenStax College Anatomy Quest](#)

4.1.21. Define the classes of ribs.

Author: OpenStax College

Define the classes of ribs.

- Ribs are classified based on if and how their costal cartilages attach to the sternum.
True (vertebrosternal) ribs are ribs 1-7.
The costal cartilage for each of these attaches directly to the sternum.
False (vertebrochondral) ribs, 8-12, are attached either indirectly or not at all to the sternum.
Ribs 8-10 are attached indirectly to the sternum.
For these ribs, the costal cartilage of each attaches to the cartilage of the next higher rib.
The last false ribs (11-12) are also called floating (vertebral) ribs, because these ribs do not attach to the sternum at all.
Instead, the ribs and their small costal cartilages terminate within the muscles of the lateral abdominal wall.

Check the answer of this question online at [QuizOver.com](http://www.quizover.com):

Question: [Define the classes of ribs. OpenStax College Anatomy Physiology 0](#)

4.1.22. Discuss the processes by which the brain-case bones of the skull ar...

Author: OpenStax College

Discuss the processes by which the brain-case bones of the skull are formed and grow during skull enlargement.

- The brain-case bones that form the top and sides of the skull are produced by intramembranous ossification. In this, mesenchyme from the sclerotome portion of the somites accumulates at the site of the future bone and differentiates into bone-producing cells. These generate areas of bone that are initially separated by wide regions of fibrous connective tissue called fontanelles. After birth, as the bones enlarge, the fontanelles disappear. However, the bones remain separated by the sutures, where bone and skull growth can continue until the adult size is obtained.

Check the answer of this question online at QuizOver.com:

Question: [Discuss the processes by which the brain OpenStax College Anatomy](#)

4.1.23. Discuss the process that gives rise to the base and facial bones of...

Author: OpenStax College

Discuss the process that gives rise to the base and facial bones of the skull.

- The facial bones and base of the skull arise via the process of endochondral ossification. This process begins with the localized accumulation of mesenchyme tissue at the sites of the future bones. The mesenchyme differentiates into hyaline cartilage, which forms a cartilage model of the future bone. The cartilage allows for growth and enlargement of the model. It is gradually converted into bone over time.

Check the answer of this question online at QuizOver.com:

Question: [Discuss the process that gives rise to OpenStax College Anatomy Quest](#)

4.1.24. Discuss the development of the vertebrae, ribs, and sternum.

Author: OpenStax College

Discuss the development of the vertebrae, ribs, and sternum.

- The vertebrae, ribs, and sternum all develop via the process of endochondral ossification. Mesenchyme tissue from the sclerotome portion of the somites accumulates on either side of the notochord and produces hyaline cartilage models for each vertebra. In the thorax region, a portion of this cartilage model splits off to form the ribs. Similarly, mesenchyme forms cartilage models for the right and left halves of the sternum. The ribs then become attached anteriorly to the developing sternum, and the two halves of sternum fuse together. Ossification of the cartilage model into bone occurs within these structures over time. This process continues until each is converted into bone, except for the sternal ends of the ribs, which remain as the costal cartilages.

Check the answer of this question online at [QuizOver.com](http://www.quizover.com):

Question: [Discuss the development of the vertebrae OpenStax College Anatomy](#)