Vertebral Column
And Thoracic Cage
Laboratory Exercise 14

Background

The vertebral column, consisting of twenty-six bones, extends from the skull to the pelvis and forms the vertical axis of the human skeleton. The column is composed of many vertebrae, which are separated from one another by cartilaginous intervertebral discs and are held together by ligaments. The thoracic cage surrounds the thoracic and upper abdominal cavities. It includes the ribs, the thoracic vertebrae, the sternum, and the costal cartilages.

Materials Needed

Textbook
Articulated human skeleton
Disarticulated human skeleton
Samples of cervical, thoracic, and lumbar vertebrae
Samples of sacrum and coccyx

Purpose of the Exercise

Examine the vertebral column and the thoracic cage of the human skeleton and identify the bones and major features of these parts.

Procedure

2. Examine the vertebral column of the human skeleton and locate as many features as possible.
3. Palpate your own vertebral column and identify as many features and bones as possible.
4. Compare the available samples of cervical, thoracic, and lumbar vertebrae by noting differences in size and shape. Identify the following features: body, pedicles, vertebral foramen, laminae, spinous process, vertebral arch.
5. Examine the sacrum and coccyx. Note their curvature.
6. Examine the thoracic cage of the human skeleton and note the number of ribs and the location of the costal cartilages.
7. Complete Parts A, B, C, and D.
Figure 14.1 Label the bones and features of the lateral view (left) and the posterior view (right) of the vertebral column.

Figure 14.2 Label the superior views of the atlas and axis.
Figure 14.3 Label the features of the cervical, thoracic, and lumbar vertebrae.
Figure 14.4  Label the coccyx and the features of the sacrum: Anterior view (left), posterior view (right).

Figure 14.5  Label the bones and features of the thoracic cage.
**Figure 14.6** Label the features of the ribs: Posterior view (top), superior view showing articulations with a thoracic vertebra (bottom).

**Critical Thinking Application**

Note the four curvatures of the vertebral column. What functional advantages exist with curvatures for skeletal structure instead of a straight vertebral column?
Part A

Complete the following statements:

1. The vertebral column encloses and protects the ______________.
2. The number of separate bones in the vertebral column of an infant is ______________.
3. The number of separate bones in the vertebral column of an adult is ______________.
4. The thoracic and pelvic curvatures of the vertebral column are called ______________ curves.
5. The ______________ of the vertebrae support the weight of the head and trunk.
6. The ______________ separate adjacent vertebrae, and they soften the forces created by walking.
7. The pedicles, laminae, and spinous process of a vertebra form the ______________.
8. The intervertebral foramina provide passageways for ______________.
9. Transverse foramina of cervical vertebrae serve as passageways for ______________ leading to the brain.
10. The first vertebra is also called the ______________.
11. The second vertebra is also called the ______________.
12. When the head is moved from side to side, the first vertebra pivots around the ______________ of the second vertebra.
13. The ______________ vertebrae have the largest and strongest bodies.
14. The number of vertebrae that fuse to form the sacrum is ______________.
15. The joint between a coxa of the pelvis and the sacrum is called the ______________ joint.
16. The upper, anterior margin of the sacrum that projects forward is called the ______________.
17. An opening called the ______________ exists at the tip of the sacral canal.
Part B

Based on your observations, compare typical cervical, thoracic, and lumbar vertebrae in relation to the characteristics indicated in the table. Consider characteristics such as size, shape, presence or absence, and unique features for your responses.

<table>
<thead>
<tr>
<th>Vertebra</th>
<th>Number</th>
<th>Size</th>
<th>Body</th>
<th>Spinous Process</th>
<th>Transverse Foramina</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cervical</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thoracic</td>
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<tr>
<td>Lumbar</td>
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</tbody>
</table>

Part C

Complete the following statements:

1. The adult skeleton of most men and women contains a total of _______________ bones.

2. The last two pairs of ribs that have no cartilaginous attachments to the sternum are sometimes called _______________ ribs.

3. The tubercles of the ribs articulate with facets on the _______________ processes.

4. Costal cartilages are composed of _______________ tissue.

5. The manubrium articulates with the _______________ on its superior border.

Part D

Identify the bones and features indicated in the radiograph (X ray) of the neck in figure 14.7.