Introduction to Anatomy: The Skeletal System

Welcome

Introduction

The Skeletal System

Shapes of Bones

Skull Bones

Vertebrae (Spine) 1

Vertebrae (Spine) 2

Vertebrae (Spine) 3

Upper Limb Bones

Hip (Coxal) Bones

Lower Limb Bones

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Acknowledgements
When you first start studying Anatomy, it can feel a lot like trying to learn a new language! There are a lot of new concepts and words to learn, which can feel overwhelming.

This tutorial will introduce you to the skeletal system. It provides information about the functions of the skeletal system, the shapes of bones, and introduces the major bones of the skeleton. The goal is to provide a basic foundation you can build upon as you learn and become more confident with Anatomy.

Each labelled slide is followed by an unlabelled one, allowing you to practice.

There are two quizzes at the end of this module to help test your knowledge.

Good luck!
The **Skeletal System** has many important functions:

- Providing support for the body
- Storing minerals (calcium, phosphate)
- Producing red blood cells
- Protecting the organs and tissues
- Allowing movement (the bones act as levers)

The skeleton can be subcategorized into two divisions:

The **Axial Skeleton** (*left, in blue*)
Includes: Bones of the skull, vertebrae, sternum, ribs, and sacrum

The **Appendicular Skeleton** (*right, in pink*)
Includes: Bones of the upper and lower limbs, scapula, clavicles, and hip bones,
Bones can be classified according to their **shape**:

- **Long Bones**: Bones that are longer than they are wide
  - *Examples*: Humerus

- **Short Bones**: Bones that are as wide as they are long
  - *Example*: Carpal bones in the hands

- **Irregular Bones**: Bones that have complex, irregular shapes
  - *Example*: Spinal vertebrae

- **Flat Bones**: Bones that are flat and light
  - *Example*: Rib bones

- **Sesamoid Bones**: Bones that are flat, small, and round
  - *Example*: Patella (kneecap)
Bones of the **Skull**

- Parietal bone
- Frontal bone
- Nasal bone
- Zygomatic bone
- Occipital bone
- Sphenoid bone
- Temporal bone
- Maxilla
- Mandible

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Bones of the Skull

Parietal bone
Frontal bone
Nasal bone
Sphenoid bone
Zygomatic bone
Occipital bone
Temporal bone
Maxilla
Mandible
Spinal Vertebrae

The Spinal Vertebrae are categorized into 5 types/regions:

- **Cervical**: 7 Bones
- **Thoracic**: 12 bones
- **Lumbar**: 5 Bones
- **Sacroiliac (Sacrum)**: 5 fused bones
- **Coccyx (Tail bone)**: 3-5 fused bones

**Memorization Hint:**
To remember the number of bones in the CERVICAL, THORACIC, and LUMBAR spine, use the following memory aid:

- Cereal (CERVICAL) for breakfast at 7:00 am
- Tasty lunch (THORACIC) at 12:00 pm
- Light dinner (LUMBAR) at 5:00 pm
The Spinal Vertebrae are categorized into 5 types/regions:

- **Cervical**: 7 Bones
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**Cervical Vertebrae**

There are three types of cervical bones:

- **C1/Atlas**
  - Articulates with the Skull
  - Allows nodding ("Yes")

- **C2/Axis**
  - Articulates with C1 (Atlas)
  - Allows rotation of head ("No")

**Memorization Hint:**

In Greek mythology, Atlas was a Titan who led a (failed) rebellion against Zeus. As punishment, Atlas was condemned to carry the weight of the world on his shoulders for eternity. Imagine **C1/Atlas** as holding up the weight of the head, which is spherical and heavy like a globe.
Thoracic, Lumbar, and Sacral Vertebrae

**Thoracic**
- 12 bones
- Long spinous processes
- Articulate with the ribs

**Lumbar**
- 5 bones
- Thick vertebral bodies

**Sacrum**
- 5 fused bones
- Articulates with Coxal bones

*Did You Know?*
The bones of the **SACRUM** start to fuse at puberty, and are fully fused by 25-30 years of age.
The bones of the **COCCYX** (not pictured) begin to fuse at around age 26, and are not fully fused until late life.
Bones of the **Upper Limb**

**Memorization Hint:**
The RADIUS is rad!
The RADIUS is the forearm bone closest to your thumb. Give a thumbs up to get oriented!

**Did you know?**
When you hit your funny bone, it feels strange and HUMERUS. The tingling sensation you feel is produced when the Ulnar Nerve is compressed against the HUMERUS bone.

* The Sternum is not a bone of the upper limb. It is included here for reference.
Bones of the **Upper Limb**

- Clavicle
- Scapula
- Humerus
- Ulna
- Radius
- Carpals
- Metacarpals
- Phalanges
**Coxal bones** (also called **Hip bones, Pelvic bones**)

The **Coxal bones** are comprised of three bones:

- **Iliac bone**
- **Pubic bone**
- **Ischium bone**

*Did You Know?*

The **Coxal bones** are fully fused by age 25.
Coxal bones (also called Hip bones, Pelvic bones)

The Coxal bones are comprised of three bones:

- Iliac bone
- Pubic bone
- Ischium bone

Did You Know?
The Coxal bones are fully fused by age 25.
Coxal bones (also called Hip bones, Pelvic bones)
Bones of the **Lower Limb**

**Memorization Hint:**
The PATELLA is a *Sesamoid bone*. Think of it as shaped like a giant upside-down sesame seed.

**Did you know?**
The FEMUR is the longest bone in the body. Its length is roughly $\frac{1}{4}$th that of a person's total height!
Bones of the **Lower Limb**

- Femur
- Patella (Kneecap)
- Tibia
- Fibula
- Tarsals
- Metatarsals
- Phalanges (Toes)
**Quiz 1**

Choose the correct Anatomical region:

(Write your answers on paper and check with the Quiz Answer Key at the end)

1) Pubic bone

2) Radius

3) Mandible

4) C1/Atlas (Cervical Vertebrae)
## Quiz 2

**Match:**

(Write your answers on paper and check with the Quiz Answer Key at the end)

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
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</thead>
<tbody>
<tr>
<td>1) Long bone of the Upper Limb</td>
<td>A)</td>
</tr>
<tr>
<td>2) Sesamoid bone</td>
<td>B)</td>
</tr>
<tr>
<td>3) Anatomical name for bones of Fingers</td>
<td>C)</td>
</tr>
<tr>
<td>4) Anatomical name for Hip Bones</td>
<td>D)</td>
</tr>
<tr>
<td>5) Includes Skull, Vertebra, Sternum, Ribs</td>
<td>E)</td>
</tr>
<tr>
<td>6) Skull bones are this shape</td>
<td>F)</td>
</tr>
<tr>
<td>7) Number of fused bones in Sacrum</td>
<td>G)</td>
</tr>
<tr>
<td>8) Long bone of the Lower Limb</td>
<td>H)</td>
</tr>
<tr>
<td>9) Includes Limb bones, Scapula, Hip bones</td>
<td>I)</td>
</tr>
<tr>
<td>10) Number of Thoracic vertebrae</td>
<td>J)</td>
</tr>
<tr>
<td>11) Name of C2 Cervical Bone</td>
<td>K)</td>
</tr>
<tr>
<td>12) Name of one of the Coxal Bones</td>
<td>L)</td>
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### Quiz Answer Keys

#### Quiz 1 Answers

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<table>
<thead>
<tr>
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<tbody>
<tr>
<td>1</td>
<td>Pubic Bone</td>
</tr>
<tr>
<td>2</td>
<td>Radius</td>
</tr>
<tr>
<td>3</td>
<td>Mandible</td>
</tr>
<tr>
<td>4</td>
<td>C1/Atlas</td>
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#### Quiz 2 Answers

<p>| | |</p>
<table>
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</table>
Bones found in this module, organized alphabetically by *shape*:

<table>
<thead>
<tr>
<th>Flat</th>
<th>Irregular</th>
<th>Long</th>
<th>Short</th>
<th>Sesamoid</th>
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</thead>
<tbody>
<tr>
<td>Rib bones</td>
<td>Coxal Bones</td>
<td>Femur</td>
<td>Carpals</td>
<td>Patella</td>
</tr>
<tr>
<td>Scapulae</td>
<td>Vertebrae</td>
<td>Fibula</td>
<td>Tarsals</td>
<td></td>
</tr>
<tr>
<td>Skull bones</td>
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<td>Humerus</td>
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<td></td>
</tr>
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<td>Metacarpals</td>
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<td></td>
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<tr>
<td></td>
<td></td>
<td>Tibia</td>
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Acknowledgements
Created for UBC MDUP FLEX 429, Spring 2020
Student: Kimberlee Hart (Island Medical Program, Class of 2022)
Supervisor: Kurt McBurney, Associate Teaching Professor, Island Medical Program

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References


Medical Illustrations
Paige Blumer