

# LESSON 14

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- **Developmental Aspects**

# Developmental Aspects of the Skeletal System

- At birth, the skull bones are incomplete
- Bones are joined by fibrous membranes called **fontanel**s
- Fontanels are completely replaced with **bone** within two years after birth



# Ossification Centers in a 12-week-old Fetus

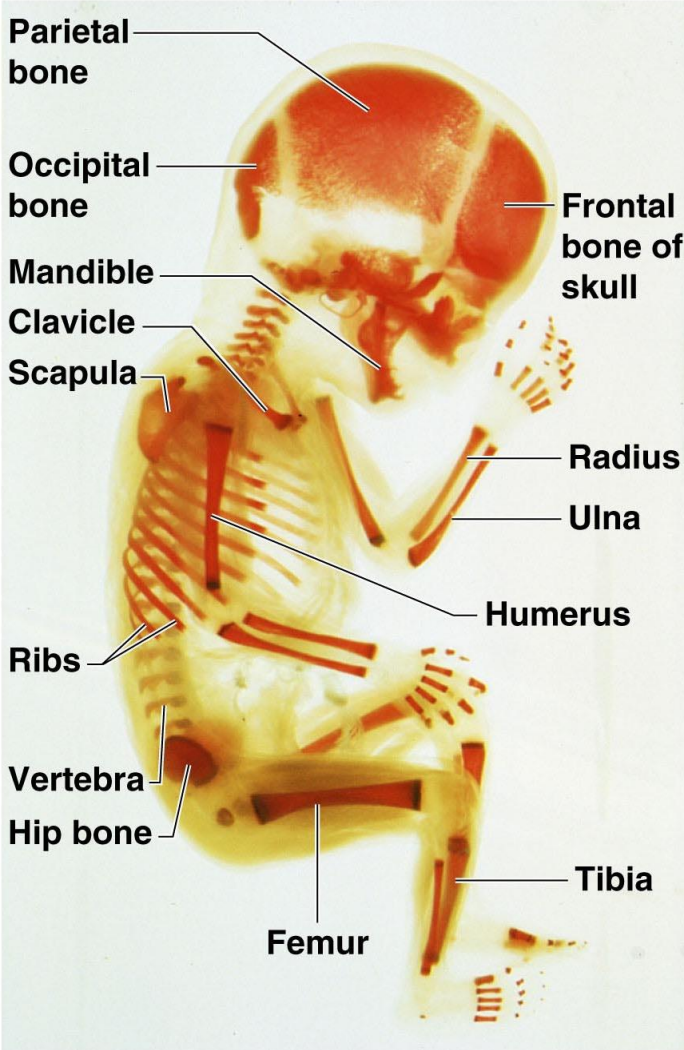


Figure 5.32

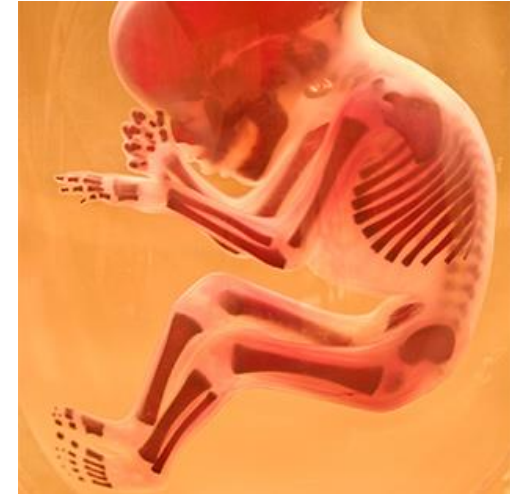
# Skeletal Changes Throughout Life

## ■ Fetus

- Long bones are formed of **hyaline cartilage**
- **Flat** bones begin as fibrous membranes
- Flat and long bone models are converted to bone

## ■ Birth

- **Fontanel**s remain until around age **2**

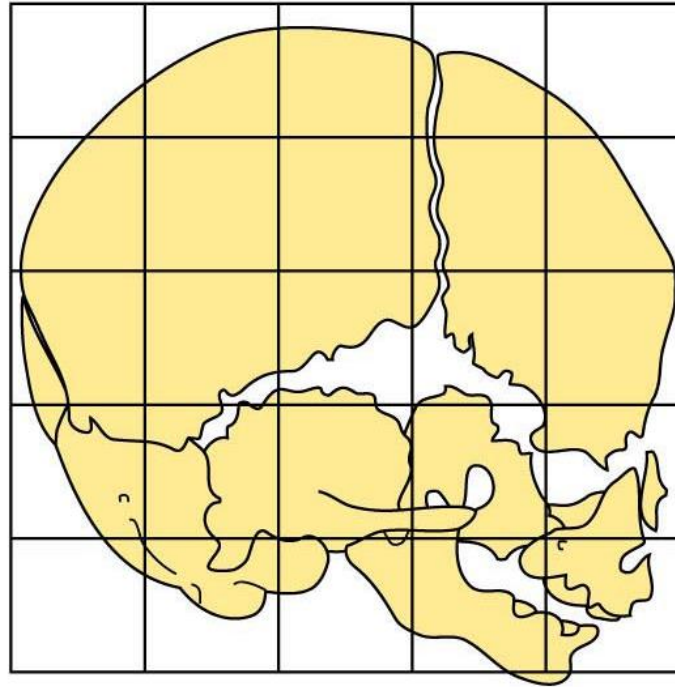


# Skeletal Changes Throughout Life

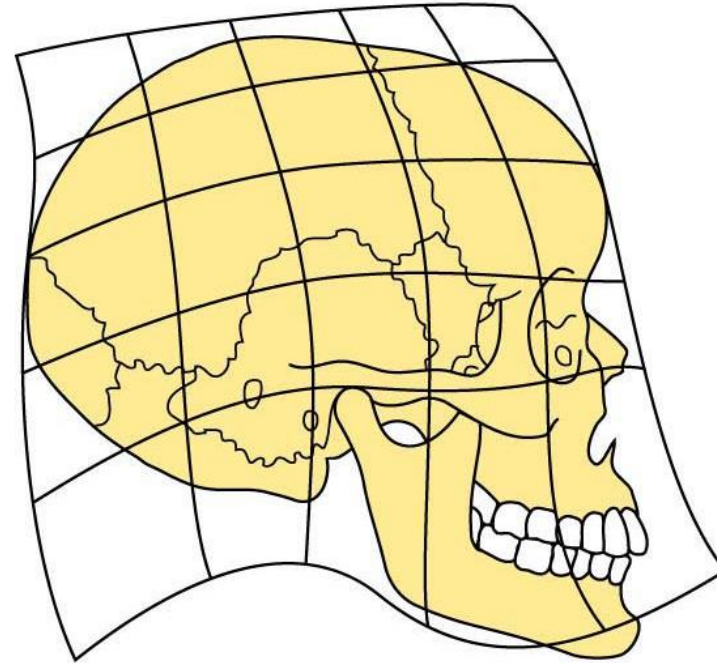
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- **Adolescence**
  - Epiphyseal **plates** become ossified and long bone growth **ends**
- **Size of cranium in relationship to body**
  - 2 years old—skull is **larger** in proportion to the body compared to that of an adult
  - 8 or 9 years old—skull is **near** adult size and proportion
  - Between ages 6 and 11, the face grows out from the skull

# Skeletal Changes Throughout Life



**Human newborn**



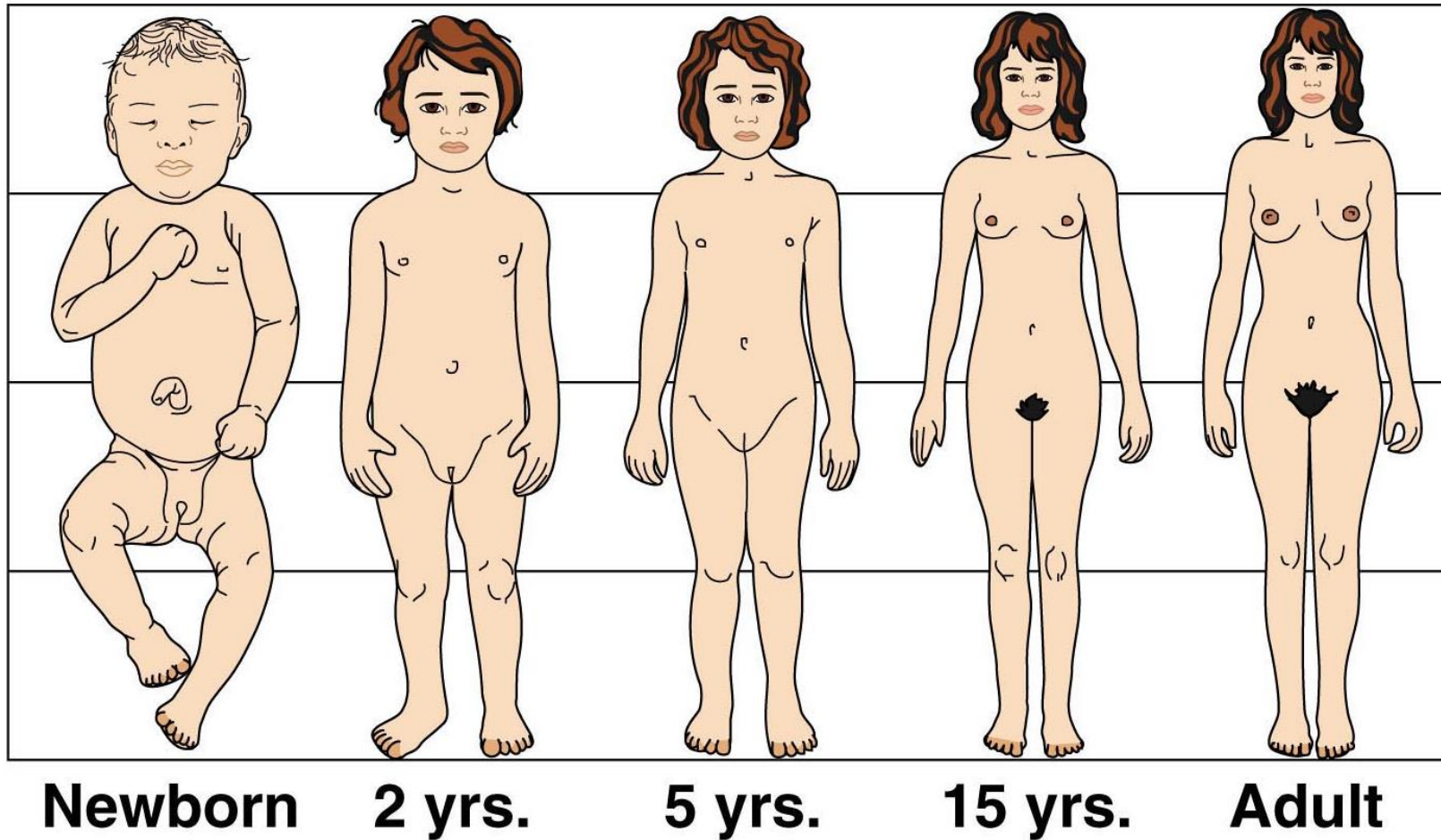
**Human adult**

**(a)**

Figure 5.33a



# Skeletal Changes Throughout Life

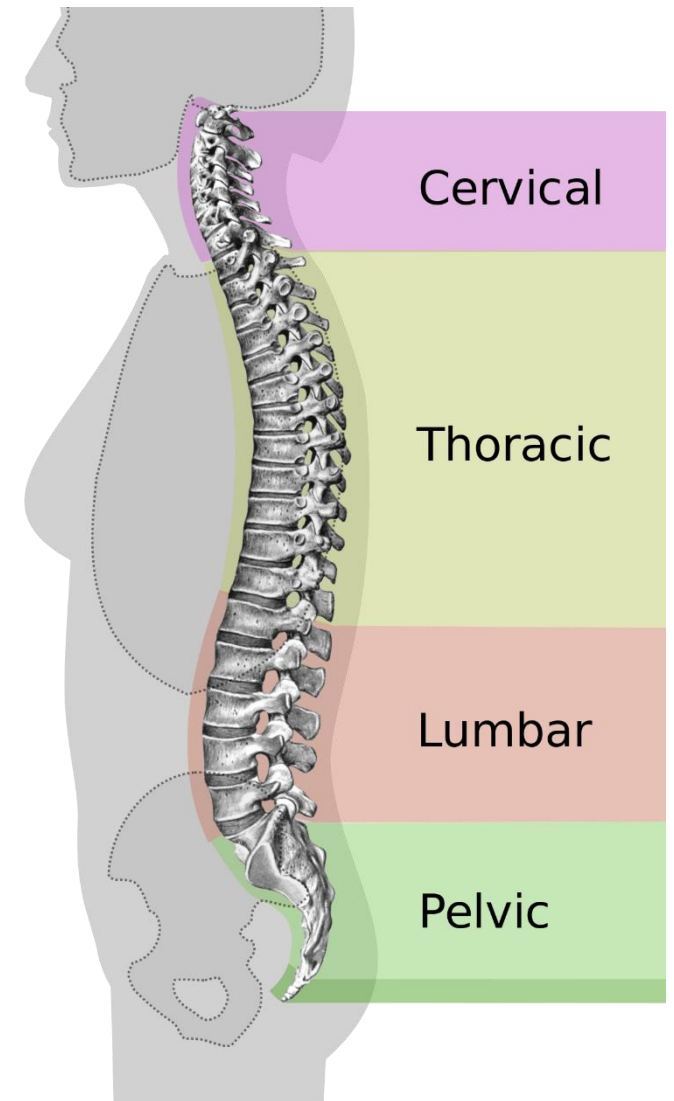


**(b)**

Figure 5.33b

# Skeletal Changes Throughout Life

- **Curvatures of the spine**
  - **Primary curvatures - present at birth and are convex posteriorly**
  - **Secondary curvatures - associated with a child's later development and are convex anteriorly**
  - **Abnormal spinal curvatures (scoliosis and lordosis) are often congenital**





# Skeletal Changes Throughout Life



**Scoliosis**



**Kyphosis**



**Lordosis**

**Figure 5.16**

# Skeletal Changes Throughout Life

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- Osteoporosis
  - **Bone-thinning** disease afflicting
    - 50% of women over age 65
    - 20% of men over age 70
  - Disease makes bones **fragile** and bones can easily **fracture**
  - Vertebral collapse results in **kyphosis** (also known as dowager's hump)
  - **Estrogen** aids in health and normal **density** of a female skeleton

# Skeletal Changes Throughout Life



**Osteoporotic Bone**



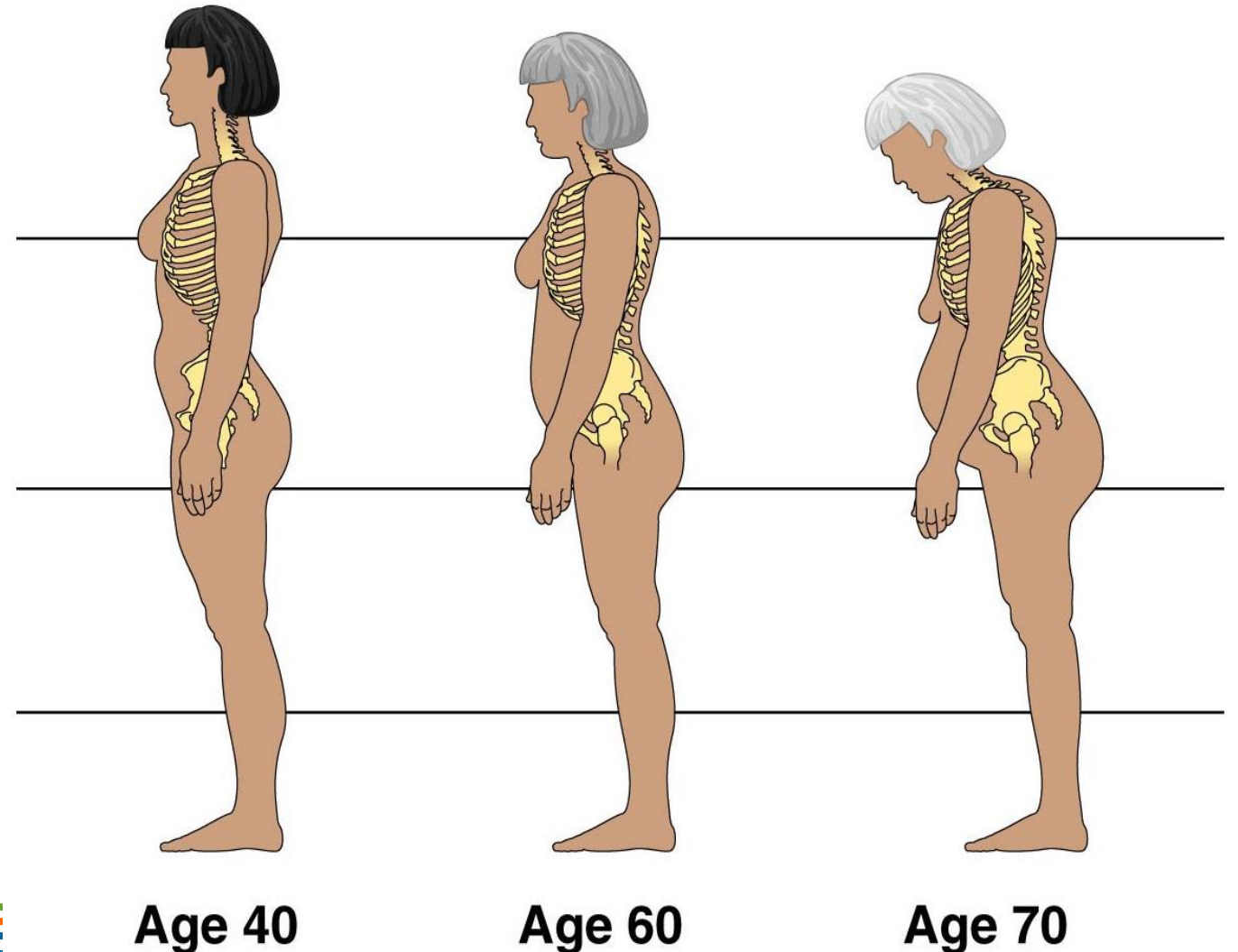
**Normal Bone**

Figure 5.34

# Skeletal Changes Throughout Life

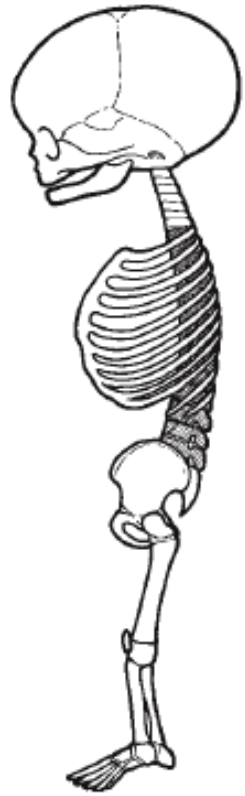
## Vertebral collapse due to Osteoporosis

- Loss of height
- Tilted rib cage
- Dowager's hump
- Protruding abdomen





# Skeleton Changes Across a Life Span



**INFANT**  
(LESS THAN 1 YEAR)



**TODDLER**  
(AGE 1 TO 2)



**YOUNGSTER**  
(AGE 3 TO 9)



**YOUTH**  
(AGE 10 TO 13)



**ADOLESCENT/  
YOUNG ADULT**  
(AGE 14 TO 25)



**ADULT**



**AGED ADULT  
WITH  
OSTEOPOROSIS**