Chapter 14

Skeletal, Muscular, and Nervous Systems

1. The Skeletal System
2. The Muscular System
3. The Nervous System

#Onedaylwokeup #Doppitup

Lesson 1 — The Skeletal System

Your skeletal system is made up of **206 bones** and the connective tissues that bind them together. It provides structural support, protects vital organs, acts as a framework for muscle attachment, produces blood cells in red bone marrow, and stores minerals including calcium and phosphorus.

Connective Tissue

- **Cartilage** — Strong, flexible tissue cushioning joints. Bones begin as cartilage before ossification (conversion to bone) takes place.
- **Ligaments** — Bands of fibrous tissue connecting bone to bone at joints.
- **Tendons** — Fibrous cords attaching muscle to bone. When a muscle contracts, it pulls the tendon, which pulls the bone.

Key Updates: Vitamin D Recommendation

Teens need **600 IU (15 mcg)** of Vitamin D daily (significantly higher than older 200 IU recommendation) to absorb calcium for bone growth. About 17,900 new spinal cord injuries occur each year in the U.S. (updated from textbook's 10,000 figure).

> *Your bone mass peaks around ages 25–30. What you do NOW — eating calcium-rich foods, getting enough Vitamin D, and doing weight-bearing exercise — directly affects your bone health for the rest of your life.*

Lesson 2 — The Muscular System

The body has three types of muscle tissue:

■ **Smooth**	Involuntary muscles lining hollow organs and passageways — digestive tract, blood vessels, airways
■ **Skeletal**	Muscles attached to bones that produce voluntary movement. Work in opposing pairs — flexors close joints, extensors open them
❤■ **Cardiac**	Specialized involuntary muscle found only in the heart — beats about 100,000 times/day

Lesson 3 — The Nervous System

Your nervous system has two main divisions:

■ **Central Nervous System (CNS)**	Brain and spinal cord — receives messages, interprets them, sends instructions
■■ **Peripheral Nervous System (PNS)**	All nerves extending outward from CNS — gathers information and delivers responses

The Brain

Cerebrum	Largest part; conscious thought, learning, memory, voluntary movement; divided into 4 lobes
Cerebellum	Coordinates skeletal muscle movement, balance, and posture — makes movements smooth and precise
Brain Stem	Stalk connecting spinal cord to brain; regulates heartbeat, breathing, and reflexes
Hypothalamus	Regulates body temperature, appetite, sleep, and hormonal activity; controls fight-or-flight

Meningitis — A Critical Update

Bacterial meningitis can be life-threatening within hours. A **meningococcal vaccine** is now routinely recommended for teens at ages 11–12, with a booster at 16 — not mentioned in the original textbook. Approximately **600,000+ children and teens** sustain traumatic brain injuries in the U.S. annually (updated from textbook's 435,000 figure).

Chapter Vocabulary

Lesson 1

Cartilage	Strong, flexible connective tissue that cushions joints and forms soft structures like the nose and ears
Ossification	The process by which cartilage is converted into bone during development
Ligament	A band of fibrous connective tissue that connects bone to bone at a joint
Tendon	A fibrous cord that connects muscle to bone
Scoliosis	An abnormal lateral (side-to-side) curvature of the spine
Osteoporosis	A condition of progressive bone tissue loss that makes bones weak and fracture-prone

Lesson 2

Smooth muscles	Involuntary muscles lining the body's hollow organs and passageways
Skeletal muscles	Muscles attached to bones that produce voluntary body movements
Flexor	A muscle that closes a joint (e.g., biceps closes the elbow)
Extensor	A muscle that opens a joint (e.g., triceps opens the elbow)
Cardiac muscle	The involuntary striated muscle that forms the walls of the heart
Tendinitis	Inflammation of a tendon, usually from overuse or injury

Lesson 3

Neurons	Nerve cells that transmit messages to and from the brain and spinal cord
Cerebrum	The largest part of the brain; center of conscious thought, learning, memory, and voluntary movement
Cerebellum	The part of the brain that coordinates skeletal muscle movement, balance, and posture

Brain stem	The stalk connecting the spinal cord to the rest of the brain; regulates vital involuntary functions
Epilepsy	A neurological disorder characterized by recurrent, unpredictable seizures