Medical Terminology and Anatomy and Physiology
OBJECTIVES

5.1 Define key terms introduced in this chapter. Slides 12, 20, 31, 41, 48, 65–73

5.2 Describe the importance of the proper use of medical terminology. Slides 12, 16–17

5.3 Apply definitions of common prefixes, suffixes, and roots to determine the meaning of medical terms. Slides 12–15

continued
OBJECTIVES

5.4 Recognize the meaning of acronyms and abbreviations commonly used in EMS. Slide 16

5.5 Give examples of when it is better to use a common or lay term to describe something than it is to use a medical term. Slide 17

continued
OBJECTIVES

5.6 Use anatomical terms of position and direction to describe the location of body structures and position of the body. Slides 22–29

5.7 Utilize topographical anatomical landmarks as points of reference. Slide 24

continued
OBJECTIVES

5.8 Describe the structures and functions of each of the following body systems: musculoskeletal, respiratory, cardiovascular, nervous, digestive, integumentary, endocrine, renal, and male and female reproductive. Slides 31–73

continued
OBJECTIVES

5.9 Given a series of models or diagrams, label the anatomical structures of each of the following body systems: skeletal, respiratory, cardiovascular, nervous, skin, endocrine, renal/urinary, and male and female reproductive. Slides 32–38, 41, 49–52, 65–66, 68–70, 72–73

continued
5.10 Describe differences in the respiratory anatomy of children as compared to adults. Slides 47

5.11 Apply understanding of anatomy and physiology to explain the function of the life support chain. Slide 20
MULTIMEDIA

- Slide 17 Medical Term Components Video
- Slide 18 Terms Involved With Medical Specialties Video
CORE CONCEPTS

• Medical terminology and how terms are constructed
• Directional terms
• Positional terms
• The structure and function of major body systems
Topics

- Medical Terminology
- Anatomy and Physiology
- Anatomical Terms
- Body Systems
Medical Terminology
Components of Medical Terms

• Words made from parts
  – Root: *pnea*, *arthr*
  – Root with combining form: *therm-o* + *meter* = *thermometer*
  – Prefix: *dys*-pnea, *tachy*-pnea
  – Suffix: *arthr*-itis, *hemophil*-iac

• Compounds of two or more words: *smallpox*
Word Component Example

tachy (fast)  →  cardia (heart)

↓

tachycardia (fast heart rate)
Word Component Example

hemo (blood) — thorax (chest) — hemothorax (blood in chest cavity)
Word Component Example

cardio (heart)

ology (study of)

ist (specialist)

cardiologist (doctor specializing in cardiac care)
Acronyms and Abbreviations

• Acronym: abbreviation made up of initials that can be pronounced as a word
  – CPAP (see-pap): Continuous Positive Airway Pressure

• Abbreviation: letters or symbols used in place of words or phrases
  – DNR: Do Not Resuscitate
Click [here](#) to view a video on the topic medical term components.
Terms Involved
With Medical Specialties Video

Click [here](#) to view a video on the topic of terms involved with medical specialties.
Anatomy and Physiology
Anatomy and Physiology

- Anatomy—study of body structure
- Physiology—study of body function
Anatomical Terms
Anatomical Position

- Facing forward, hands at sides, palms facing forward
Anatomical Planes

- Posterior (dorsal)
- Anterior (ventral)
- Superior
- Mid-axillary
- Inferior
- Midline
- Mid-clavicular
- Medial
- Proximal
- Distal
- Lateral
- Left
- Right
- Dorsal
Abdominal Quadrants

- Horizontal and vertical lines through navel
- Right upper quadrant (RUQ)
- Left upper quadrant (LUQ)
- Right lower quadrant (RLQ)
- Left lower quadrant (LLQ)
Positional Terms—Supine
Positional Terms—Prone
Positional Terms—Recovery Position
Positional Terms—Fowler/Semi-Fowler Position
Positional Terms—
Trendelenburg Position
Body Systems
Musculoskeletal System

• Gives body shape
• Protects body organs
• Allows for movement
Skeletal System

- Extends into all parts of the body
- Consists of skull and spine, ribs and sternum, shoulders and upper extremities, pelvis and lower extremities
Skull

Cranium

Orbit
Nasal bone
Maxilla
Face
Zygomatic bone (cheek)
Mandible (jaw)
Thoracic Cavity

- Superior lobe, right lung
- Transverse fissure
- Middle lobe, right lung
- Inferior lobe, right lung
- Falciform ligament
- Liver, right lobe
- Boundary between right and left pleural cavities
- Superior lobe, left lung
- Fibrous layer of pericardium
- Inferior lobe, left lung
- Cut edge of diaphragm
- Liver, left lobe
Pelvis

Ilium

Pelvis

Femur head

Acetabulum

Pubis

Ischium

Sacral spine
Lower Extremities

- Pelvis
- Femur head
- Acetabulum
- Pubis
- Ischium
- Sacral spine
- Radius
- Coccyx (tail bone)
- Carpals (wrist)
- Metacarpals (hand)
- Phalanges (fingers)
- Femur (thigh bone)
- Patella (knee cap)
- Tibia
- Fibula
- Medial malleolus
- Lateral malleolus
- Tarsals (ankle)
- Metatarsals (foot)
- Phalanges (toes)
- Calcaneus (heel)
Upper Extremities

Skull
Cervical spine (neck)
Acromion process
Manubrium
Sternal (breast bone)
Xiphoid process
Thoracic spine
Costal cartilage
Lumbar spine
Ilium
Pelvis
Femur head
Acetabulum
Pubis
Ischium

Clavicle (collarbone)
Scapula (shoulder blade)
Ribs
Humerus
Elbow
Ulna
Radius
Sacral spine
Joints

Ball-and-socket joint

Hinge joint
Muscle

- Voluntary (skeletal)
- Involuntary (smooth)
- Cardiac
Respiratory System

- Brings in oxygen via inhalation
- Excretes carbon dioxide via exhalation
Respiratory Physiology

• Inhalation (active process)
  – Diaphragm and intercostal muscles contract; diaphragm moves downward
  – Negative pressure pulls air into lungs

• Exhalation (passive process)
  – Diaphragm and intercostal muscles relax
  – Positive pressure pushes air out of lungs
Inhalation
Exhalation
Ventilation and Respiration

• Ventilation: movement of gases to and from alveoli
• Respiration: exchange of gases between cells and bloodstream

continued
Ventilation and Respiration

- Oxygenated blood travels from lungs to heart, then is pumped to rest of the body.
- At capillary level, oxygen ($O_2$) is exchanged with cells for waste carbon dioxide ($CO_2$).
- Deoxygenated blood returns to the heart, then to lungs to exchange waste $CO_2$ for $O_2$. 
Pediatric Differences: Respiratory System

- Child has smaller nose and mouth.
- In child, more space is taken up by tongue.
- Child's trachea is narrower.
- Cricoid cartilage is less rigid and less developed.
- Airway structures are more easily obstructed.
Cardiovascular System

- Heart
- Blood
- Circulatory system
Conduction System

Superior Vena Cava
Aorta

Sinoatrial (SA) node
Left Atrium

Right Atrium
Atrioventricular (AV) node

Right Ventricle
Left Ventricle

Inferior Vena Cava

Ventricular conduction system
Coronary Arteries

- Base (superior)
- Right coronary artery
- Left coronary artery
- Anterior descending branch
- Apex (inferior)
Circulation of the Blood

MAJOR ARTERIES
- Carotid
- Pulmonary artery
- Aorta
- Brachial
- Radial
- Femoral
- Posterior tibial
- Dorsal pedis

MAJOR VEINS
- Pulmonary vein
- Superior vena cava
- Inferior vena cava

Vein Artery
Valve
Venules
Arterioles
Capillary bed
Composition of the Blood

- **Plasma**
  - More than half of blood’s volume
- **Red blood cells**
  - RBCs, erythrocytes, red corpuscles
- **White blood cells**
  - WBCs, leukocytes, white corpuscles
- **Platelets**
  - Help with clotting
Pulse

- Wave of blood flowing down an artery when the left ventricle contracts
- Can be felt when an artery is near the surface of the skin and over a bone
Peripheral and Central Pulses

- Peripheral (outer parts of body)
  - Radial
  - Brachial
  - Posterior tibial
  - Dorsalis pedis
- Central (core of body)
  - Carotid
  - Femoral
Central Pulses

- Pulses near the center or core of the body
- Carotid
- Femoral
- Carotid pulse should be used to determine pulselessness rather than a peripheral pulse
Carotid Pulse
Brachial Pulse
Radial Pulse
Femoral Pulse
Dorsalis Pedis Pulse
Blood Pressure

• Pressure inside arteries
• Systolic (upper reading)—arterial pressure when left ventricle contracts
• Diastolic (lower reading)—pressure when left ventricle refills
Perfusion

- Adequate circulation of blood and exchange of oxygen and waste products
- Hypoperfusion (shock): when flow becomes inadequate
Think About It

- How is the function of the respiratory system related to the function of the circulatory system?
Central Nervous System

- Brain
- Spinal cord
Peripheral Nervous System

• Sensory
  – Messages from body to brain

• Motor
  – Messages from brain to body
Digestive System

Liver
Right kidney
Colon
Pancreas
Gallbladder

Liver
Spleen
Left kidney
Stomach
Colon
Pancreas

RIGHT UPPER QUADRANT

RIGHT LOWER QUADRANT

Left kidney
Colon
Small intestines
Major artery and vein to the right leg
Ureter
Appendix

Bladder

LEFT UPPER QUADRANT

LEFT LOWER QUADRANT

Major artery and vein to the left leg
Ureter
Integumentary System—Functions

- Capillary network
- Sebaceous glands
- Shaft of hair
- Hair follicle
- Hair root
- Bulb papilla
- Sweat gland
- Deep fascia
- Epidermis
- Dermis
- Subcutaneous fatty tissue
- Muscle fibers
Integumentary System—Layers

- Capillary network
- Sebaceous glands
- Shaft of hair
- Hair follicle
- Hair root
- Bulb papilla
- Sweat gland
- Deep fascia
- Epidermis
- Dermis
- Subcutaneous fatty tissue
- Muscle fibers
Endocrine System

- Pituitary
- Hypothalamus
- Pineal gland
- Parathyroids (on posterior surfaces)
- Thyroid
- Remnants of thymus gland
- Pancreas
- Adrenal glands located on top of kidneys
- Ovary
- Testis (outside the body in scrotum)
Renal System

- Helps body regulate fluid levels, chemicals, and pH levels
- Kidneys
- Bladder
- Ureters
- Urethra
Male Reproductive System

- Sigmoid colon (cut and reflected)
- Rectus abdominis
- Urinary bladder
- Rectum
- Internal urethral orifice
- Prostatic urethra
- Prostate gland
- Ejaculatory duct
- Membranous urethra
- Penile urethra
- Bulbospongiosus muscle
- Penis
- Penile urethra and corpus spongiosum
- Corpus cavernosum
- Pubic symphysis
- Epididymis
- Ductus deferens
- Scrotum
- Testis
Female Reproductive System
Chapter Review
Chapter Review

- Medicine has a language of its own. You will frequently communicate with medical professionals who speak this language.
- Medical terms generally consist of a root with a prefix and/or suffix.
Chapter Review

• Your knowledge of the anatomy, or structure, and the functions, or physiology, of the body will be important in allowing you to assess your patient and communicate your findings with other EMS personnel and hospital staff accurately and efficiently.
Chapter Review

• Major body systems with which you should be familiar are musculoskeletal, respiratory, cardiovascular, nervous, digestive, integumentary, endocrine, renal, and reproductive.
Remember

• Medical terminology is the language of health care. Roots, prefixes, and suffixes can lend clues to the meaning of many terms.

• Understanding anatomy and physiology is like reviewing the owner’s manual for the body.

continued
Remember

- Anatomical terminology brings precision and accuracy to descriptions.
- Understanding an overview and the basic function of body systems will improve both assessment and treatment of patients.
Questions to Consider

• Is my use of medical terms accurate and descriptive?
• Can I identify critical organs and structures that reside in an area where a patient has a complaint or traumatic injury?
Critical Thinking

You respond to a teenage boy who has taken a hard fall from his dirt bike. He has a deep gash on the outside of his left arm halfway between shoulder and elbow and another on the inside of his right arm just above the wrist. His left leg is bent at a funny angle about halfway between hip and knee.
Critical Thinking

- When you cut away his pants leg, you see a bone sticking out of a wound on the front side. How will you describe your patient’s injuries over the radio to the hospital staff?
Please visit Resource Central on www.bradybooks.com to view additional resources for this text.