

Introduction to Cardiopulmonary Resuscitation and Use of an AED

Course

Principles of Health Science

Unit VI

First Aid and CPR

Essential Question

How can the average person know the actions to take in the event of a cardiac emergency?

TEKS

130.202 (c) 7A, 10B

Prior Student Learning

Students should have completed the unit of Anatomy & Physiology: Cardiovascular and Respiratory system

Estimated time

3-4 hours depending on class size

Rationale

Healthcare professionals have a responsibility to respond appropriately to all situations, including emergencies. The students will respond to emergency situations consistent with their level of training.

Objectives

Upon completion of this lesson, the student will be able to:

- list the signs and symptoms of a heart attack;
- administer rescue breathing to an adult;
- administer CPR to an adult;
- communicate what an AED does; and
- communicate the steps for using an AED

Engage

Ask the students if they'd like to be able to save a life. Have them think about someone they love, and ask if they would like to learn how to save that person's life. Explain that it does not take years of education or a medical degree to be able to save a life in some cardiac emergencies.

Key Points

*Note to teacher: This lesson is not designed to take the place of the American Heart Association *Heartsaver* course. It is designed to introduce life-saving CPR techniques that can be expanded on in an advanced-level course. You must complete the AHA BLS Instructor course in order to give your students a Heartsaver course completion card.

- I. There are five elements in the cardiac chain of survival:
 - A. Early recognition of the signs of a heart attack
 - B. Early access to medical care (911)
 - C. Early CPR
 - D. Early defibrillation
 - E. Early advanced life support
- II. Signs and Symptoms of a Heart Attack
 - A. Some victims of a heart attack may deny the symptoms.
 - B. Signs and symptoms vary depending on amount of heart damage.
 - C. Heart attack victims may have all or just a few of the symptoms and signs associated with a heart attack or cardiac arrest.
 - a. Severe painful pressure under the sternum, with pain radiating to the shoulders, arms, neck and jaw
 - b. Shortness of breath
 - c. Mucous membranes appear pale or cyanotic

- d. Weakness
- e. Anxiety or apprehensiveness
- f. Nausea and/or vomiting
- g. Diaphoresis
- h. Loss of consciousness
- D. If any combination of these symptoms are seen
 - a. Encourage the victim to stay calm and relax.
 - b. Put the victim in a comfortable position.
 - c. Avoid unnecessary stress and movement.
 - d. Loosen tight clothing.
 - e. If the person takes medications for chest pain, have him or her do so.
 - f. If pain persists, call 911 or obtain medical help as soon as possible.
- E. If your victim becomes unresponsive or unconscious, start the steps of CPR.

III. The unconscious victim

- A. Never attempt CPR on a person that is responsive.
- B. Establish unresponsiveness.
 - a. Shake and Shout
 - i. Tap the victim on the shoulder for a response.
 - ii. Shout, "Hey, are you okay?"
 - iii. Shout for help: "Call 911 and get the AED."
 - b. If there is no response from the victim, call 911 or have someone call 911 and get the AED for you.
 - i. Answer all the 911 dispatcher's questions.
 - ii. Wait until the dispatcher disconnects the phone connection before you do.
 - c. Anytime you have an unresponsive victim you should call 911, even if you don't know why the victim is unconscious.
 - d. Be prepared to begin CPR.

IV. Adult CPR

- A. The age of an adult is eight years of age and older.
- B. Child CPR should be used on an unresponsive victim between the ages of one and eight (taught in the Health Science course).

V. Steps of adult CPR

- A. Make sure the scene is safe.
 - a. Is the victim in a dangerous place?
 - b. Are there any obvious threats or dangers to you or the victim?
- B. Make sure the victim is lying on his or her back on a firm, flat surface.
 - a. If the victim is lying face-down, carefully roll him onto his back.

- b. If the victim is face-up on a bed or other soft surface, place a board or other firm object under his back.
 - i. A soft surface diminishes the effect of chest compressions.
 - ii. Effective chest compressions can only be performed on a firm surface.
- C. Kneel at the victim's side and open the airway using the head tilt-chin lift method.
 - a. Tilt the head by pushing back on the forehead.
 - b. Lift the chin by putting your fingers on the bony part of the chin.
 - c. Do not press the soft tissues on the neck or under the chin.
 - d. Lift the chin to move the jaw forward.
- D. Check for normal breathing (at least one breath every 5 seconds).
 - a. Look, Listen and Feel
 - i. Put your ear next to the victim's mouth and nose.
 - ii. Look to see if the chest rises.
 - iii. Listen for breaths.
 - iv. Feel for breaths on your cheek.
 - b. If the victim is breathing normally
 - i. Roll the victim to his side.
 - ii. Wait for trained help to take over.
 - iii. If the victim stops breathing, start the steps of CPR from the beginning.
- E. If there is no normal breathing, give 2 breaths.
 - a. Hold the airway open with a head tilt-chin lift.
 - b. Pinch the nose closed.
 - c. Take a normal breath and cover the victim's mouth with your mouth, creating an airtight seal.
 - d. Give 2 breaths, about 1 second each.
 - e. Watch for the chest to rise as you give each breath.
 - f. If the first breath does not go in, re-open the airway with a head tilt-chin lift, and try again.
 - g. Room air is 21% oxygen (O₂).
 - i. We only use part of the 21% O₂ we breathe in.
 - ii. We breathe out waste products and "leftover O₂."
 - iii. It is enough O₂ to be of help to the non-breathing victim.
 - h. *Note to instructor: Foreign body airway obstruction will be taught in a separate lesson.
- F. Remove clothes from the front of the chest.
 - a. Clothing is removed so that you can see your "landmark" for placing your hands in the correct position.
 - b. Clothing gets in the way when using the automated external defibrillator (AED).
- G. Give 30 chest compressions.

- a. Put the heel of one hand on the center of the victim's chest.
 - i. The center of the chest is between the nipples.
 - ii. This puts your hands on the lower part of the sternum, but away from the xiphoid process.
- b. Put the heel of your other hand on top of the first hand
- c. Push hard and fast.
 - i. Push straight down on the chest, from 1½ to 2 inches, with each chest compression.
 - ii. Push at a rate of 100 compressions per minute.
- d. After each compression, release pressure on the chest to let it come back to its normal position.
- e. A chest compression is an artificial heart beat.
 - i. Compressions pump blood to the brain and heart.
 - ii. When the heart stops beating, the sooner you start compressions, the better.
 - 1. Blood is still oxygen-rich at the time the heart stops.
 - 2. Each compression will be delivering oxygen-rich blood to the body organs.

H. Keep giving CPR

- a. Until the AED arrives; or
- b. The victim starts to move; or
- c. Trained help takes over (i.e. EMT, nurse, doctor)

VI. What is an AED?

- A. Automated external defibrillator
- B. A machine with a computer inside
 - a. Recognizes cardiac arrest that requires a shock
 - b. Tells the rescuer when a shock is needed
 - c. Gives the shock if needed
 - d. Can stop the abnormal heart rhythm and allow a normal rhythm to return
- e. A machine that is accurate and easy to use
 - i. Uses visual and audible prompts
 - ii. Simple steps

VII. When to use an AED

- A. The person performing CPR continues until the AED arrives.
- B. As soon as the AED arrives and is set up, CPR stops and the AED is put into use.

VIII. Steps in using an AED

- A. Turn the AED on.
 - a. Push the "ON" button or open the lid.
 - b. Follow the visual and audible prompts.
- B. Attach the pads.

- a. Choose the correct pads.
 - i. Some AEDs can deliver a smaller shock for children if you use child pads, or a child “key” or switch.
 - ii. Always use the larger adult pads and adult shock
 - b. DO NOT use child pads or a “child dose” on an adult.
 - c. Open the AED pad package and peel away the plastic backing.
 - d. Attach the sticky side of the pads directly to the victim’s bare chest.
 - e. The picture on the pad will show you where to put the pads.
- C. Clear the victim
- a. Make sure no one is touching the victim, not even you.
 - b. The victim’s body must be motionless for the AED to analyze the heart rhythm or give a shock.
 - c. Look around to make sure no one touches the victim.
- D. Allow the AED to check the heart rhythm.
- a. Many AEDs audibly say, “Analyzing now.”
 - b. The AED will say, “Shock advised,” or, “No shock needed.”
 - c. If “Shock advised” is said, then you will hear the AED charging.
- E. Push the SHOCK button if the AED tells you to do so.

IX. Special Situations when using the AED

A. Water

- a. DO NOT deliver shock if the victim is
 - i. Lying in water
 - ii. Covered with water
 - 1. Victim is covered with sweat
 - 2. Victim has just been pulled from a pool of water
 - 3. If the victim is lying in a small puddle of water or snow, but the chest is not covered with water, you can give shocks.
- b. Move the victim away from standing water.
- c. Quickly wipe the victim’s chest before you attach the pads.
- d. Water may cause the shock to flow over the skin from one pad to the other: the energy won’t go to the heart.

B. Medicine patch

- a. Do not put an AED pad over a medicine patch.
 - i. The patch may block some of the shock.
 - ii. The pad may burn the victim if placed over a medicine patch.
 - iii. Take the medicine patch off while wearing gloves.
- b. Before you put on the pad, wipe the chest where the patch was.

C. Pacemaker or Defibrillator

- a. Look for a lump under the skin of the chest that looks smaller than a deck of cards.
- b. If you see this lump where the pads should go, put the pads at least 1 inch away from the lump.
- c. You may use the AED on victims with pacemakers or internal defibrillators, as long as you keep the AED pad 1 inch away from the device

D. Hairy chest

- a. If the pads stick to the hair instead of the skin, press down firmly on each pad.
- b. If the AED still tells you to check the pads, quickly pull off the pads to remove the hair.
- c. If a lot of hair still remains where you will put the pads, shave the area with the razor in the AED carrying case.
- d. Put on a new set of pads, then follow the AED's visual and audible prompts.

X. The teacher will demonstrate each step of CPR and the use of an AED

Activity

Students will practice the steps of CPR/AED on a practice manikin.

Assessment

Students will perform the steps of CPR and the use of an AED.

Rubric

Materials

One CPR manikin for every 3 students

Manikin cleaning supplies

Manikin mouth shields

AED trainer

Accommodations for Learning Differences

Students needing reinforcement will receive one-on-one coaching during CPR practice.

For enrichment, the student will practice to compete in the HOSA CPR/FA contest.

National and State Education Standards

National Healthcare Foundation Standards and Accountability Criteria:

Foundation Standard 2

2.11 interpret verbal and nonverbal communication

2.14 Recognize the elements of communication using a sender-receiver

model.

2.15 Apply speaking and active listening skills

2.22 Use medical abbreviations to communicate information

Foundation Standard 10: Technical Skills;

Healthcare professionals will apply technical skills required for all career specialties. They will demonstrate skills and knowledge as appropriate.

Accountability Criteria

10.1 Technical Skills

10.12 Apply skills to obtain training or certification in cardiopulmonary resuscitation (CPR), automated external defibrillator

(AED), foreign body airway obstruction (FBAO) and first aid.

Additional technical skills may be included in a program of study based on career specialties

TEKS

130.202 (c)(7)(A) explain the concept of teaming to provide quality health care; and

130.202 (c)(10)(B) relate industry safety standards such as standard precautions, fire prevention, safety practices, and appropriate actions to emergency situations.

Texas College and Career Readiness Standards

Science Standard,

I. Nature of Science C. Collaborative and safe working practices

Demonstrate skill in the safe use of a wide variety of apparatuses, equipment, techniques, and procedures.

Cross-Disciplinary Standards,

I. Key Cognitive Skills D. Academic Behavior: 1. Self monitor learning needs and seek assistance when needed, 3. Strive for accuracy and precision, 4.

Persevere to complete and master task. E. Work habits: 1. Work independently, 2. Work collaboratively

II. Foundation Skills A. 2. Use a variety of strategies to understand the meaning of new words. 4. Identify the key information and supporting details.

Introduction to Health Science

CPR/AED Checklist

| Steps | Action | Successfully completed |
|------------------------|--|--|
| Step 1 | Check for a response: Tap the victim and ask loudly, “Hey are you okay?” | <input type="checkbox"/> completed <input type="checkbox"/> skipped |
| Step 2 | Tell someone to call 911 and get the AED. | <input type="checkbox"/> completed <input type="checkbox"/> skipped |
| Step 3 | Open the airway with the head tilt-chin lift. | <input type="checkbox"/> completed <input type="checkbox"/> skipped |
| Step 4 | Look, listen and feel for breaths. | <input type="checkbox"/> completed <input type="checkbox"/> skipped |
| Step 5 | Give two 1-second breaths (keeping the airway open). | <input type="checkbox"/> completed <input type="checkbox"/> skipped |
| Step 6 | Bare the victim’s chest and place the hands in the proper position to begin CPR. | <input type="checkbox"/> completed <input type="checkbox"/> skipped |
| Step 7 | Give 30 compressions at the rate of 100 beats per minute, and about 1½ to 2 inches deep. | <input type="checkbox"/> completed <input type="checkbox"/> skipped |
| Step 8 | Give two 1-second breaths. | <input type="checkbox"/> completed <input type="checkbox"/> skipped |
| <i>The AED arrives</i> | | |
| Step 9 | Stop CPR and turn on the AED. | <input type="checkbox"/> completed <input type="checkbox"/> skipped |
| Step 10 | Select and apply the proper pads correctly. | <input type="checkbox"/> completed <input type="checkbox"/> skipped |
| Step 11 | Clear the victim to analyze. | <input type="checkbox"/> completed <input type="checkbox"/> skipped |
| Step 12 | If shock is advised, clear the victim for shock and press the shock button. | <input type="checkbox"/> completed <input type="checkbox"/> skipped |

| | | |
|---------|--|--|
| Step 13 | Resume CPR, starting with chest compressions, if the AED instructs you to continue CPR. | <input type="checkbox"/> completed <input type="checkbox"/> skipped |
| Step 14 | Give two 1-second breaths (keeping the airway open). | <input type="checkbox"/> completed <input type="checkbox"/> skipped |
| Step 15 | Give 30 compressions at the rate of 100 beats per minute, and about 1½ to 2 inches deep. Continue CPR until the AED is ready to reanalyze the victim, the victim is revived, or emergency medical personnel arrive to take over. | <input type="checkbox"/> completed <input type="checkbox"/> skipped |

15 steps completed = 100
 14 steps completed = 92
 13 steps completed = 87
 12 steps completed = 80
 11 steps completed = 73 and needs remediation.

Comments:
