Principles of Biomedical Science

Virtual Learning

9-12 / PLTW® PBS

April 15, 2020

Principles of Biomedical Science

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Lesson: April 15 2020

Objective/Learning Target:

Students will be able to: Identify the parts of a sphygmomanometer, and stethoscope to develop skills used to take blood pressure. *(Reference: PLTW® 4.2.2 Heart Rate)*

Let’s Get Started (Bell Ringer):

Watch Videos: How to Take a Blood Pressure Manually

Read Article: MedicalNewsToday (How do you check your own blood pressure?)

Lesson/Activity:

Find your own resources to answer the following questions:

What are the names and functions of the numbered features on the sphygmomanometer to the right. Put your answers in your notebook or writing paper.

Answers:

#1

Bulb

The bulb pumps air into the cuff. An end (check) valve prevents air from escaping. ADC's latex-free bulbs are made from either spin cast PVC, or dip molded neoprene. Available in a larger size for use with bigger cuffs. ADLFOW filter screen-protected end valves provide an additional dust barrier.

#2 https://www.adctoday.com/learning-center/about-sphygmomanometers/anatomy-aneroid

Manometer:

The portion of the sphygmomanometer that measures the air pressure in mmHg. The aneroid contains a watch-like movement that measures the air pressure applied to the cuff. Within the gauge is a series of copper/berrylium diaphragms that expand when filled with air. Gears convert the linear movement of the diaphragms, turning the needle on a dial calibrated in mmHg. ADC gauges are serialized for traceability. ADC manometers are available in pocket, palm, and clock models. We even produce the first, and only, digital aneroid that replaces the mechanical movement with virtually indestructible electronic circuitry. Current standards require gauges to be accurate to, plus or minus, 3mmHg. ADC gauges exceed these standards by up to 66%.

#3

Cuff

The cuff is designed to hold the bladder around the limb during measurement. A properly designed cuff will ensure proper placement and positioning – essential for accurate measurement.

The ADCUFF's proprietary Size Guide™ marking system is among the MOST comprehensive available. Artery, index and range indicators combined with vivid graphics and color coding simplify cuff sizing, selection, and use. Other features include our gauge hang tab for convenient use with pocket aneroids, bladder flap to prevent bulging, and 'property of tag' for stock control. Available in 6 sizes and up to a dozen colors.

#4

Bladder

The bladder is the inflatable bag that, when filled, compresses the arm to occlude the artery. Bladders should follow very specific sizing parameters to ensure full arterial compression. ADC uses a revolutionary convertible latex-free bladder made from a remarkably elastic synthetic for ease of use. TPE bladder tubes remain flexible and elastic. ADC bladders are RF welded and have been tested to 50,000 cycles – 5x the industry standard. 100% leak tested before assembly. Available in single, or double, tube configurations to work with virtually all manual sphygs and NIBP monitors.

#5

Valve

The deflation valve allows for controlled deflation of the cuff – critical for accurate measurement. ADC's ADFLOW valve is machined from solid brass and plated in both nickel and chrome. Filter screen protection and microthread design ensure precision and long life.

Lesson/Activity continued:

Use the Bell Ringer Video to develop a written outline for taking someone's blood pressure. You may also find you own resource to do this as well. Place this outline in your notebook or other paper.

Answers:

Procedure Example: they may vary slightly but the basics should be the same.

- To begin blood pressure measurement, use a properly sized blood pressure cuff. The length of the cuff's bladder should be at least equal to 80% of the circumference of the upper arm.
- Wrap the cuff around the upper arm with the cuff's lower edge one inch above the antecubital fossa.
- Lightly press the stethoscope bell over the brachial artery just below the cuff's edge. Some health care workers have difficulty using the bell in the antecubital fossa, so we suggest using the bell or the diaphragm to measure the blood pressure.
- Rapidly inflate the cuff to 180mmHg. Release air from the cuff at a moderate rate (3mm/sec).
- Listen with the stethoscope and simultaneously observe the sphygmomanometer. The first knocking sound (Korotkoff) is the subject's systolic pressure. When the knocking sound disappears, that is the diastolic pressure (such as 120/80).
- Record the pressure in both arms and note the difference; also record the subject's position (supine), which arm was used, and the cuff size (small, standard or large adult cuff).
- If the subject's pressure is elevated, **measure blood pressure** two additional times, waiting a few minutes between measurements.
- A BLOOD PRESSURE OF 180/120mmHg OR MORE REQUIRES IMMEDIATE ATTENTION!

https://www.practicalclinicalskills.com/blood-pressure-measurement

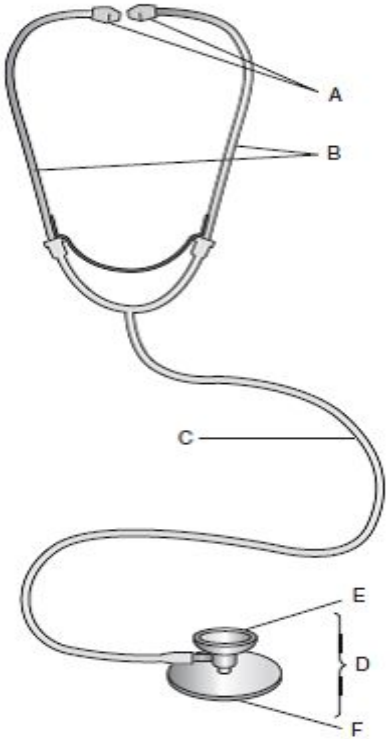
Lesson/Activity:

Find your own resources to label the stethoscope on the right?

What are the names and functions of the numbered features on the stethoscope to the right. Put your answers in your notebook or writing paper.

Answers:

A. Eartips
B. Binaurals/Eartube
C. Tubing
D. Chest-piece
E. Bell
F. Diaphragm



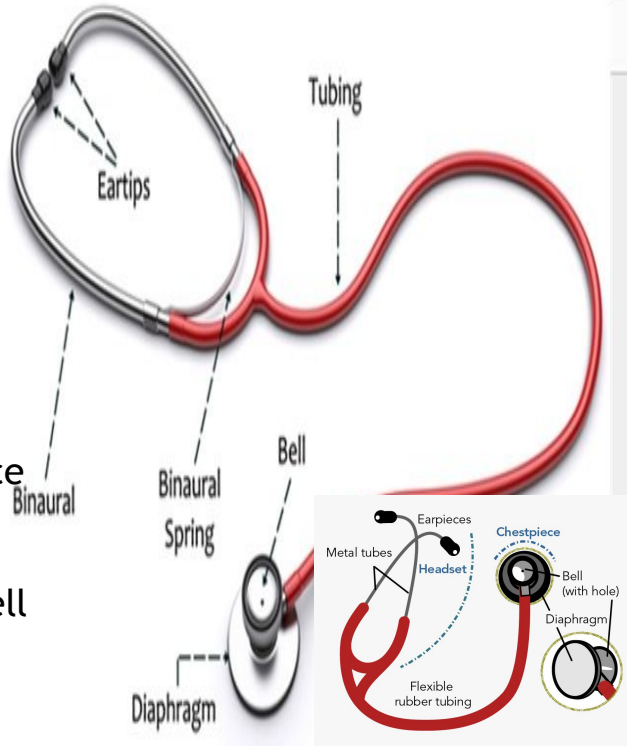
Practice:

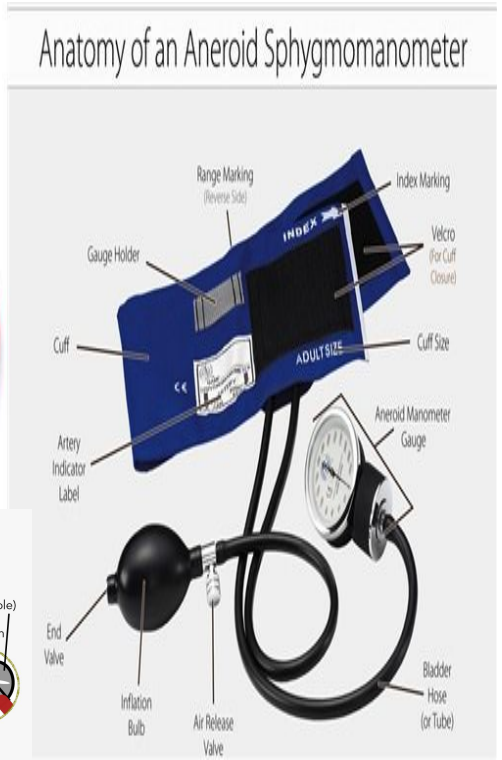
1. Create your own set of vocabulary flashcards for the major parts and pieces of the sphygmomanometer and stethoscope this should include words and pictures. Terms that you should include:

- Inflation Bulb
- Manometer
- Cuff
- Bladder
- Valve
- Eartips
- Binaurals
- Tubing
- Bell
- Chest-piece
- Diaphragm

Answers:

- Inflation Bulb = pumps up cuff
- Manometer = displays blood pressure
- Cuff = goes around arm, creates pressure on arm
- Bladder = fills up with air to make pressure
- Valve = releases air
- Eartips = goes in your ears
- Binaurals = where ear tips connect together
- Tubing = brings sound from Chestpiece to eartips
- Bell = low-pitched sounds
- Chest-piece = head of stethoscope bell and diaphragm
- Diaphragm= high-pitched sounds





Practice:

1. Quiz yourself, try this online quiz:

University of Rochester Medical Center (Take the Blood Pressure Quiz)