

**PRE-CLINICAL CLERKSHIP, YEAR 1**  
**Physical Examination**

**Session One A**  
**Vital Signs**  
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**1. Learning Objectives**

- To outline on the upper extremity, the brachial and radial artery pulses.
- To practice the technique of taking the blood pressure (positioning, sequencing, handling of the sphygmomanometer)—using palpation and auscultation methods.
- To practice the techniques of taking the pulse and respiratory rate.
- To describe and appreciate the defining features of the pulse, respiration, and systolic and diastolic blood pressure.

**2. Student Prep**

**Vital Signs**

**Read** pp. 413-416, Chapter 14 The Heart (Blood Pressure Assessment, The Arterial Pulse) and pp. 374-376, Chapter 13 The Chest (Assess the Respiratory Rate and Pattern)

**View** the companion portion of the CD

**Practice Exercises:**

**Inspection:** Outline on yourself or partner the cubital fossa, biceps tendon, brachial artery pulse, and radial artery pulse.

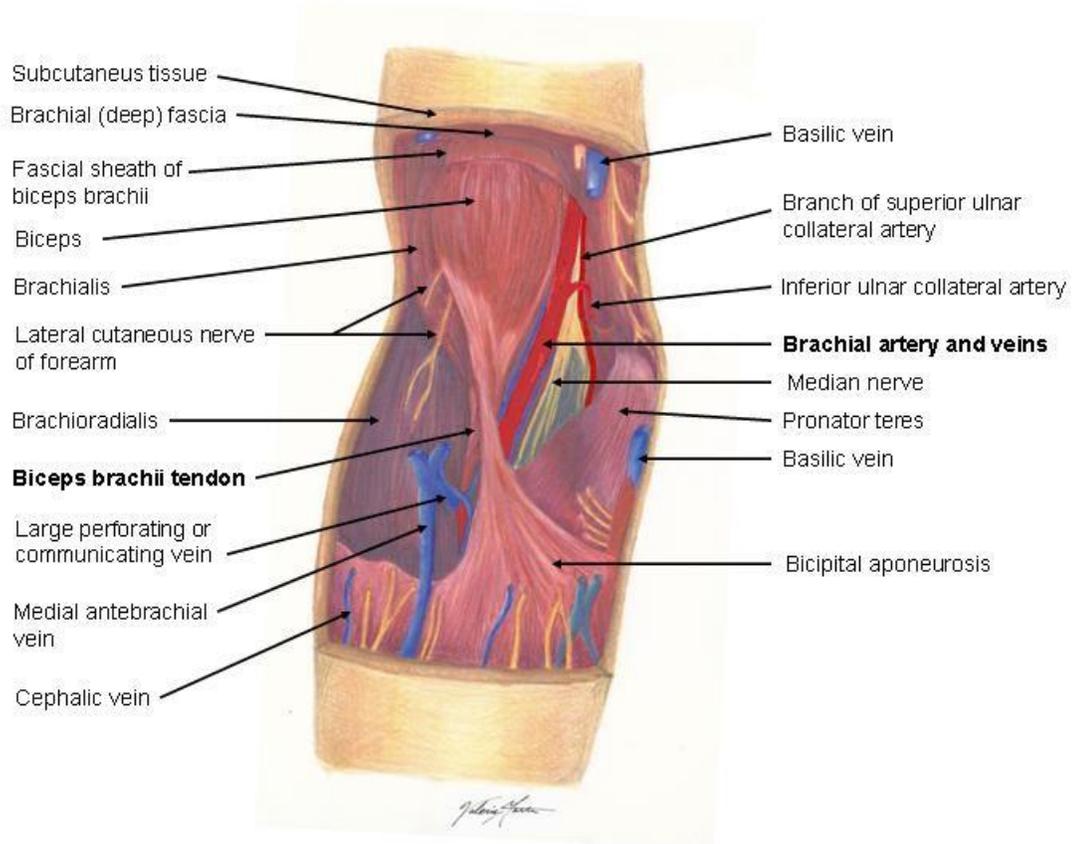
**Palpation:** Practice palpating the radial pulse in each arm. Place the pads of your index and middle fingers on the flexor surface of the wrist laterally and palpate for rate and rhythm for at least 15 secs. (multiply by 4 for rate/min). Pay attention to the defining features of rate and rhythm. Normal pulse is 60 to 100 beats/min and regular in a healthy adult at rest and symmetrical in both arms. (Palpation of the radial pulse is an accurate assessment of the heart rate for most regular rhythms. In irregular rhythms, such as atrial fibrillation, auscultation of the heart is required for an accurate assessment of heart rate.) Outline on yourself or partner the cubital fossa, biceps tendon, brachial artery pulse, and radial artery pulse.

### 3. Clinical Anatomical Landmarks

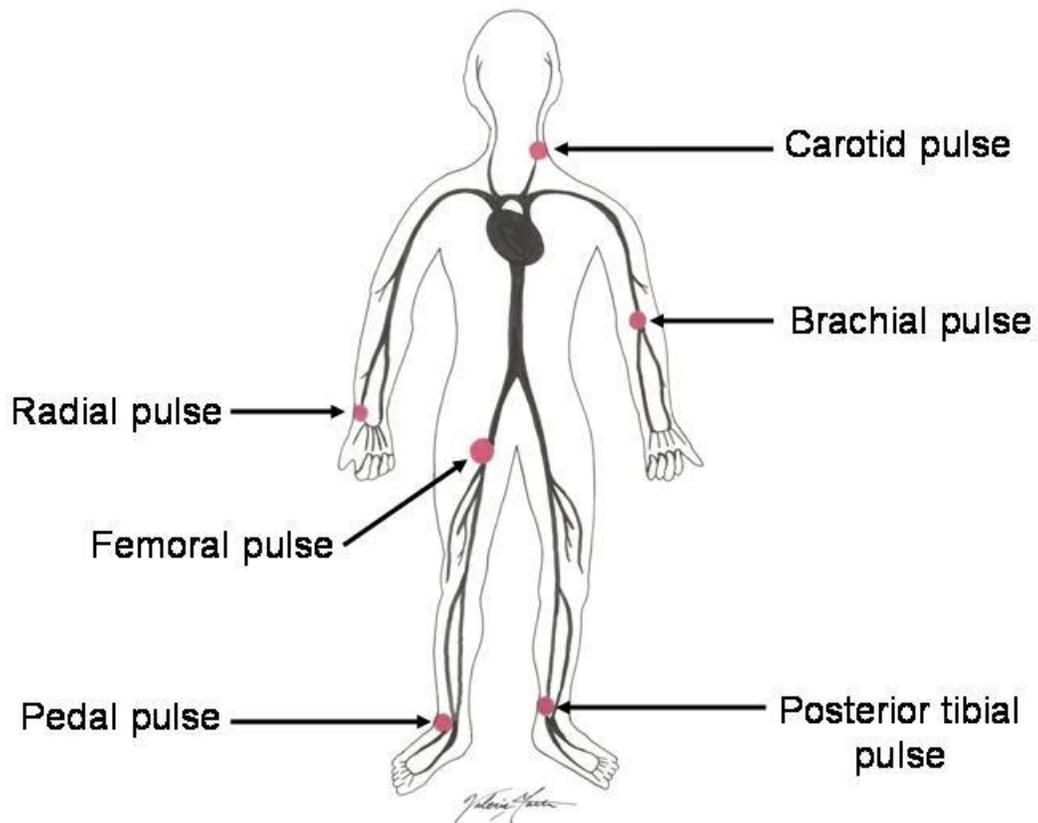
#### Vital Signs

Cubital fossa  
Biceps tendon  
Brachial artery pulse  
Radial artery pulse

Structures of the Cubital Fossa (view of right arm)



The brachial artery is just medial to the biceps tendon in the antecubital fossa.



#### 4. List of Maneuvers to be Demo/Practiced

##### Vital Signs

##### *Inspection with patient supine:*

Identify the following landmarks on your partner:

Cubital fossa, biceps tendon, brachial artery pulse, radial artery pulse. Observe respiratory rate and pattern for at least 30 secs. (multiply by 2 for rate/min). Normal rate is 10 -14 breaths/min in a healthy adult. Normal pattern is regular

rhythm and depth, and easy without laboring or use of accessory muscles (sternocleidomastoid or intercostal).

***Palpation with patient supine:***

Palpate the right radial pulse on the flexor surface of the wrist laterally with the pads of your index and middle fingers for rate and rhythm for at least 15 secs. (multiply by 4 for rate/min). Normal pulse is 60 to 100 beats/min and regular in a healthy adult at rest and symmetrical in both arms. (Palpation of the radial pulse is an accurate assessment of the heart rate for most regular rhythms. In irregular rhythms, such as atrial fibrillation, auscultation of the heart is required for an accurate assessment of heart rate.)

Palpate the left radial pulse on the flexor surface of the wrist laterally with the pads of your index and middle fingers for rate and rhythm for at least 15 secs.

Estimate blood pressure in right arm by palpation of the brachial or radial artery. Estimate blood pressure in left arm by palpation of the brachial or radial artery.

***Auscultation with patient supine, using diaphragm of stethoscope:***

Place the stethoscope medial to the biceps tendon in the right antecubital fossa over the brachial artery.

Measure blood pressure in right arm by brachial auscultation. Normal BP is up to 140 mm Hg systolic and up to 85 mm Hg diastolic in a healthy adult and symmetrical in both arms.

Place the stethoscope medial to the biceps tendon in the left antecubital fossa over the brachial artery. Measure blood pressure in left arm by brachial auscultation.

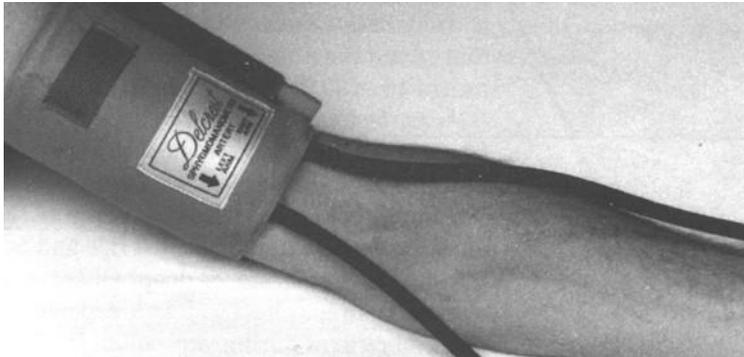
## **5. Procedural Tips**

**Handling the sphygmomanometer (BP cuff) and the palpation and auscultation**

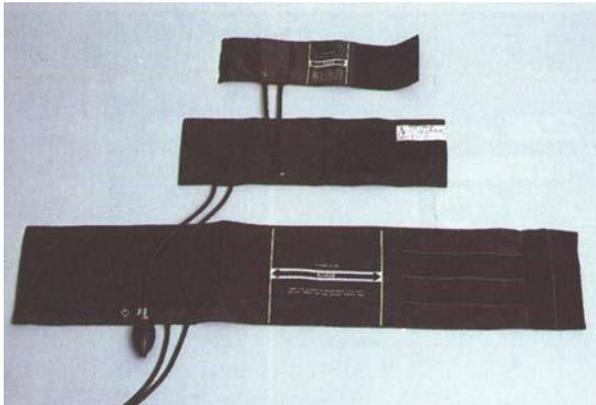
**methods of taking the BP:** Demonstrate with explanation the technique of handling the sphygmomanometer and the palpation and auscultation methods of taking the BP, and observe and guide students through the following steps.

**General handling of the sphygmomanometer (BP cuff):** 1. The patient's arm should be relaxed, slightly flexed, and supported at the level of the heart with the palm turned up. Apply the BP cuff snugly 2.5 cm (1 in) above the brachial pulse and align the arrow on the cuff bladder with the artery. 2. Check to see that the BP cuff is the proper size. The

length of the cuff's bladder should encircle at least 80 % of the arm circumference. Obese patients may require a large or thigh cuff; children or very slender adults may require a child cuff. Position the manometer in your line of vision.



1.



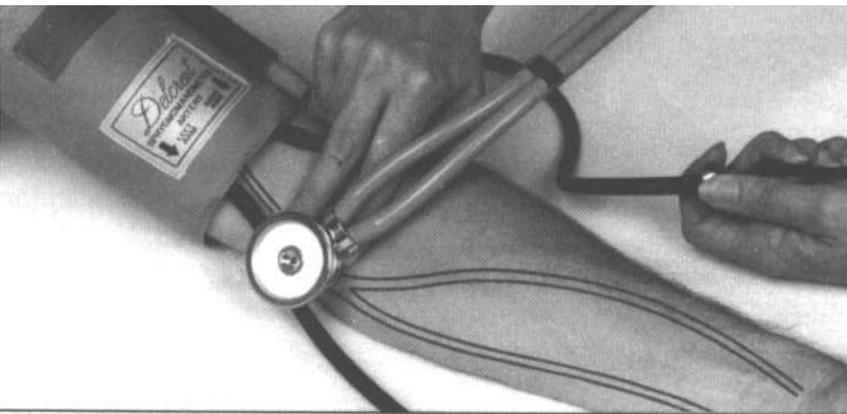
2. Top to bottom: Child, adult, and thigh cuff.

**Palpation method:** 3. Palpate the brachial (shown) or radial pulse with the pads of your index and middle fingers while inflating the cuff.



3.

**Auscultation method:** 4. Place the diaphragm of the stethoscope snugly (or the bell lightly) over the brachial pulse just medial to the biceps tendon in the antecubital fossa, and inflate the cuff to a pressure about 20 to 30 mm Hg above systolic pressure as first estimated by palpation of the brachial or radial pulse (Estimating first by palpation helps to avoid underestimating the systolic pressure in the setting of an auscultatory gap, the silence between initial appearance and reappearance of the phase 1 Korotkoff sound, as sometimes occurs in hypertension or peripheral vascular disease.). Slowly, smoothly release the pressure in the cuff (at a rate of 2 mm Hg/sec). Round off the reading to the nearest 2 mm Hg.



4.

## 6. Perceptual Tips

**Auscultation of the BP:** Illustrate how to identify the five Korotkoff phases of BP sounds (numbered in order of appearance during deflation of the BP cuff). Emphasize the defining features of the systolic and diastolic pressure outlined below.

| <b><u>Korotkoff phase</u></b> | <b><u>Features</u></b>       | <b><u>BP</u></b> |
|-------------------------------|------------------------------|------------------|
| Phase 1                       | initial tapping sound        | systolic BP      |
| Phase 2                       | swishing murmur              |                  |
| Phase 3                       | reappearance of soft tapping |                  |
| Phase 4                       | very soft murmur             | (muffling point) |
| Phase 5                       | disappearance of sound       | diastolic BP     |

Note that phase 5 correlates better with intra-arterial measurements of diastolic pressure than does phase 4.

## **7. Description of Key Features**

VS: Radial pulse (count the rate/15 sec and record the rate/min and the pattern of the rhythm), BP [measure the systolic (Korotkoff phase 1)/diastolic (Korotkoff phase 5) and record the BP systolic/diastolic in mm Hg in the right arm and in the left arm and note the patient's position for each reading—supine, sitting, or standing]