The estimate of systolic BP from the palpatory method is then used to determine how much the cuff needs to be inflated when measuring BP using the auscultatory technique. In this way, you can avoid over- or underinflating the cuff for clients with low or high blood pressures, respectively.

6. Position the ear pieces of the stethoscope so that they are aligned with the auditory canals (i.e., angled anteriorly).

7. Place the head (bell) of the stethoscope over the brachial pulse (about 1 cm or 0.4 in superior and medial to the antecubital fossa). Make certain that the entire head of the stethoscope is contacting the skin. To avoid extraneous noise, do not place any part of the head of the stethoscope underneath the cuff.

8. Close the valve, and quickly and steadily inflate the cuff pressure to about 20 to 30 mmHg above the estimated systolic pressure previously determined by palpation.

9. Partially open the valve to slowly release the pressure at a rate of 2 to 3 mmHg per second. Note when you hear the first sharp thud caused by the sudden rush of blood as the artery opens. This is known as the first Korotkoff sound and corresponds to the systolic pressure (Phase I).

10. Continue reducing the pressure slowly (no more than 2 mmHg per second), noting when the metallic-tapping sound becomes muffled (Phase IV diastolic pressure) and when the sound disappears (Phase V diastolic pressure). Typically, the Phase V value is used as the index of diastolic pressure. However, both Phase IV and V diastolic pressures should be noted. During rhythmic exercise, the Phase V pressure tends to decrease due to reduction in peripheral resistance. In some cases, it may even drop to zero (Pollock, Wilmore, and Fox 1978).

11. After noting the Phase V pressure, continue deflating the cuff for at least 10 mmHg, making certain that no additional sounds are heard. Then rapidly and completely deflate the cuff.

12. Record all three BP values (Phase I, IV, and V) to the nearest 2 mmHg. Wait at least 30 seconds and repeat the measurement. Use the average of these two measurements.

It takes a great deal of practice to become proficient at measuring blood pressures. When you are first learning this method, it is highly recommended that you practice with a trained BP technician, using a dual- or multiple-head stethoscope so that you both can listen simultaneously and compare BP readings for the same trial.

Measuring BP during exercise is much more difficult than during rest. You should not attempt to measure exercise BP until you have demonstrated competency and confidence in your ability to measure resting BP. It is particularly difficult to obtain accurate BP measurements when the client is running on the treadmill, because of extraneous noise and movement of the arms while running. Sometimes you will not be able to determine diastolic BP due to the noise and vibration during exercise. Novice BP technicians should practice taking blood pressures during bicycle ergometer exercise first and then try measuring BP during treadmill exercise.

Measurement Error

Sources of error in measuring blood pressure are numerous (Reeves 1995). You need to be aware of the following sources of error and do as much as possible to control them:

- Inaccurate sphygmomanometer
- Improper cuff width or length
- Cuff not centered, too loose, or over clothing
- Arm unsupported, or elbow lower than heart level
- Poor auditory acuity of technician
- Improper rate of inflation or deflation of the cuff pressure
- Improper stethoscope placement or pressure
- Expectation bias and inexperience of the technician
- Slow reaction time of the technician
- Parallax error in reading the manometer
- Background noise
- Client holding treadmill handrails or cycle ergometer handlebars

Heart Rate Assessment

The client should rest 5 to 10 minutes in either a supine or seated position before you assess the resting heart rate. It is important that you measure