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#PH130 - Blood Pressure Measurement for the BSLPRO

The most common form of indirect blood pressure measurement employs a pressure cuff, pump and pressure transducer. This complete assembly is commonly referred to as a Sphygmomanometer.

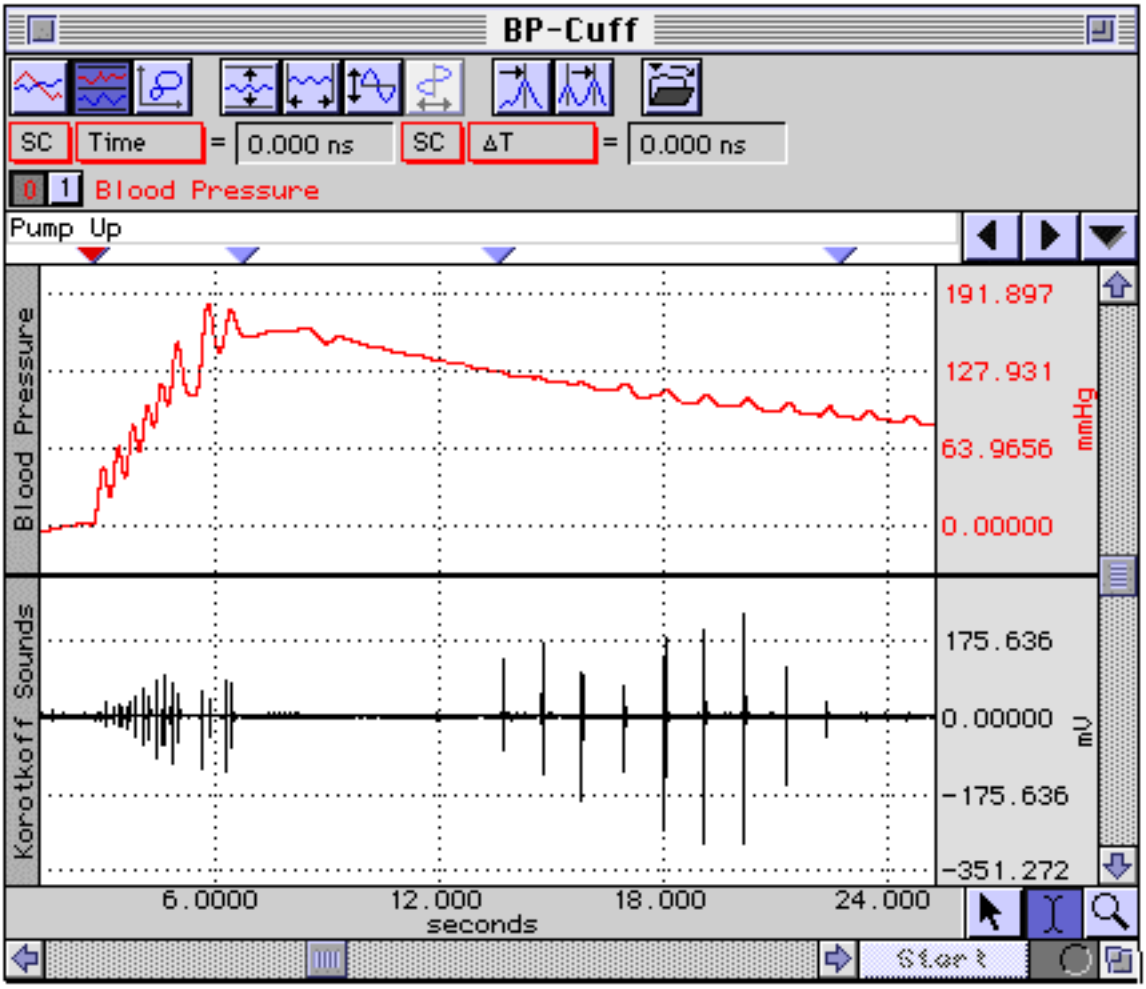
Typically, the cuff is wrapped around the upper arm and is inflated to a pressure exceeding that of the brachial artery. This amount of pressure collapses the artery and stops the flow of blood to the arm. The pressure of the cuff is slowly reduced as the pressure in the cuff is monitored by the pressure transducer. As the pressure drops, it will eventually match the systolic (peak) arterial pressure. At this point, the blood is able to "squirt" through the brachial artery. This squirting results in turbulence which creates the Korotkoff sounds. The Korotkoff sounds are detected using an SS17L physiological sounds transducer. As the cuff pressure continues to drop, the pressure will eventually match the diastolic pressure of the artery. At this point the Korotkoff sounds stop completely, because the blood is now flowing unrestricted through the artery.

The following graph illustrates a typical recording using the SS19L and SS17L. The SS19L pressure signal is recorded by using the pressure preset found in setup, under the MP30 menu. The SS17L Korotkoff signal is recorded by selecting setup from the MP30 menu. In this window you will select a gain of 200, input coupling to AC, .05 HZ HP and 5 KHZ LP. Then you will set one digital filter to 300HZ LP.

The signal for the SS17L is usually further conditioned by the BIOPAC Student Lab Pro software. In a calculation channel, the SS17L signal is bandpass filtered from 40 to 100 Hz. Accordingly, the sampling rate for the entire recording needs to be about 500 Hz, assuming the SS17L transducer is used. The filtered data is shown in the graph on the next page.

As the cuff is wrapped around the upper arm of the subject, be sure to place the

SS17L transducer underneath the blood pressure cuff, directly over the brachial artery. The SS17L placement is very important to get the best possible recordings of Korotkoff sounds. Finish wrapping the cuff around the upper arm and secure it with the Velcro® seal. Now start inflating the cuff with the pump bulb.



Cuff Blood Pressure Versus Korotkoff Sounds

The pressure trace shows the hand pump driving up the cuff pressure to about 150 mmHg. Then the cuff pressure is slowly released by adjusting the pump bulb deflation orifice. Notice as the cuff pressure drops to about 125 mmHg, the Korotkoff sounds begin appearing (bottom trace). As the pressure continues to drop, the Korotkoff sounds eventually disappear at about 85 mmHg. The systolic pressure would be identified at 125 mmHg and the diastolic pressure would correspondingly be 85 mmHg.

The SS19Lís built-in pressure transducer will require an initial calibration prior to use. To calibrate the transducer, wrap the cuff into a roll and begin to inflate the cuff slowly with the pump bulb. You will notice the pressure change on the mechanical indicator. Set the cuff pressure to one lower pressure (typically 20 mmHg) and then one higher pressure (typically 100 mmHg). In this manner you can calibrate the pressure transducer using the standard procedure in the SCALING dialog. To use the cuff at a future date, simply save the calibration settings in a stored file.

SS19L -Blood Pressure Cuff Specifications

- Cuff circumference range: 25.4 cm to 40.6 cm
- Pressure range: 20 mmHg to 300 mmHg
- Manometer accuracy: ±3 mmHg
- Includes shielded 2 meter cable

SS17L - Physiological Sounds Transducer Specifications

- Frequency Response: 35 Hz to 3500 Hz
- Housing: Chrome plated steel
- Transducer weight: 9 grams
- Dimensions: 29 mm diameter, 6 mm thick
- Includes shielded 2 meter cable

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