

## LifeDop™ ABI Vascular System ABI Diagnostic Examination Guide

### Setup

1. In a warm room, have the patient take off shoes and socks and rest in a supine position for approximately 5 minutes prior to taking pressures. Patient should wear thin, loose fitting clothing. Avoid rolling up sleeves or pant cuffs in such a manner that it obstructs blood flow <sup>[1]</sup>. Bulky items such as sweaters should be removed.
2. Wrap the cuffs snugly around the arms and ankles as shown below (Figures 1 and 2). The edge of the cuff should be placed approximately 1 to 2 inches above the site of examination. Select the proper cuff width, equivalent to 40% of the patient's limb circumference. In general, average sized adults use 10 cm cuffs, while larger adults use 12 cm cuffs <sup>[1]</sup>.



Figure 1

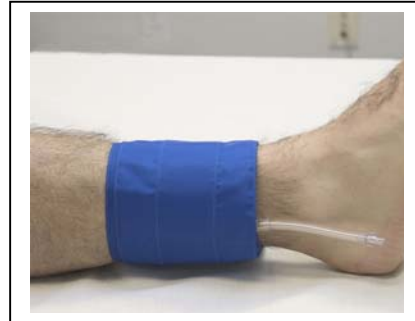


Figure 2

While applying the cuffs, it may be a good time to explain the examination to the patient and answer any questions they may have during this period.

### Brachial Pressures

3. Apply a small amount of gel to the brachial artery site and place the Doppler probe at approximately 45 degrees, pointing toward the shoulder as shown in Figure 3. Slide the probe laterally across the arm to find the brachial artery and obtain the loudest signal.



Figure 3

4. Find a stable and comfortable position to brace the probe hand while quickly inflating the cuff 20 mmHg above the occlusion pressure, at this point Doppler sounds are no longer heard. Be sure that the Doppler probe stays on the artery during inflation <sup>[2]</sup>.
5. Deflate the cuff at approximately 2 mmHg per second by gently squeezing the pressure release trigger on the inflator. Listen for the blood flow sounds to return. When the flow sounds return, this is the systolic pressure. Once this pressure is obtained, rapidly deflate the remaining pressure in the cuff <sup>[2]</sup>.
6. Repeat this process for both arms and record the results on the ABI Assessment Chart as shown in Figure 6 below.
7. The greater of the two pressures will be used to calculate the ABI. A pressure difference of 20 mmHg or more between the two brachial sites is an indication of upper extremity stenosis. The pressures should be re-confirmed and further testing should be considered if repeatable <sup>[2]</sup>.

#### **Ankle Pressures and Printout**

8. Before the ankle systolic pressure are determined, acquire the Doppler signal at either the PT or DP as shown below for a minimum of 4 seconds. Press the red button on the side of the LifeDop to buffer the waveform for printing. Turn on the printer and connect the cable. Once the printer communication with the LifeDop is established, the waveform will begin to print. Mark the print for future reference when creating the report as shown in Figure 8 below.

*Refer to the LifeDop User Manual or Quick Reference Guide for further assistance on printing a waveform.*

9. For ankle pressures, use either the Posterior Tibial (PT) - Figure 4, or Dorsalis Pedis (DP) – Figure 5, arteries as shown below. Pressures from both pedal arteries should be obtained for patients with tibial artery disease, suspected thromboembolus, or those who have undergone tibial bypass procedures. Otherwise, a single pressure from each ankle is sufficient - using the pedal vessel (PT or DP) with the strongest signal <sup>[2]</sup>.



**Figure 4**



**Figure 5**

In either case, apply a small amount of gel to the site and angle the Doppler probe at approximately 45 degrees, pointing the probe tip toward the calf. Slide the probe slowly across the site until the loudest signal is obtained.

10. Find a stable and comfortable position to brace the probe hand while quickly inflating the cuff 20 mmHg above the occlusion pressure when Doppler sounds are no longer heard. Be sure that the Doppler probe stays on the artery during inflation <sup>[2]</sup>.
11. Deflate the cuff at 2 mmHg/sec by gently squeezing the pressure release trigger on the inflator. Listen for the blood flow sounds to return - this is the systolic pressure. Once blood flow returns, rapidly deflate the remaining pressure in the cuff <sup>[2]</sup>.
12. Repeat this process for both ankles and record the systolic pressure results on the ABI Assessment Chart.


ABI Results			
Right Arm 156 mmHg		Left Arm 152 mmHg	Left ABI Left Ankle Pressure = 146 Higher Arm Pressure = 156
Right Ankle 149 mmHg		Left Ankle 146 mmHg	Right ABI Right Ankle Pressure = 149 Higher Arm Pressure = 156

Figure 6

If the ankle pressure is significantly greater than the higher of the two brachial pressures, the artery may be calcified and non-compressible. The pressures should be re-confirmed and further testing should be considered if repeatable <sup>[3]</sup>.

### **Calculate the ABI and Complete the Form**

13. For the left side ABI, divide the left ankle pressure by the higher of the two brachial pressures and record the result. This can be done with a calculator or by using the provided ABI Calculator Chart.

Repeat this step for calculating the right side ABI, again using the higher of the two brachial pressures <sup>[3]</sup>.

14. Apply the Doppler waveforms to the ABI Assessment form by folding the printout in half lengthwise and peeling the protective paper from the label as shown below in figure 7.



Figure 7

15. Check the appropriate boxes on the form to indicate the vessel location and complete the form by filling in the patient risk factors and symptoms.

**Ankle-Brachial Index / Risk Assessment Form**

Patient Name Smith, Mark ID Number 76-2104 Date 9-28-04

<b>Risk Factors</b> <input type="checkbox"/> Tobacco Use <input type="checkbox"/> Diabetes <input type="checkbox"/> Heart Disease <input type="checkbox"/> Current Age <u>42</u> <input type="checkbox"/> Surgery <input type="checkbox"/> Other	<input checked="" type="checkbox"/> Hypertension <input type="checkbox"/> Hyperlipidemia <input type="checkbox"/> Stroke/TIA <input type="checkbox"/> Previous Vasc	<b>Current Symptoms</b> <input type="checkbox"/> Intermittent Claudication <input type="checkbox"/> Numbness, tingling in feet <input type="checkbox"/> Ulcerations <input type="checkbox"/> Other	<b>ABI / Severity of Disease</b> 0.90-1.30 - Normal 0.70-0.89 - Mild 0.40-0.69 - Moderate 0.00-0.39 - Severe
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**ABI Results**

<b>Right Arm</b> <u>156</u> mmHg		<b>Left Arm</b> <u>152</u> mmHg	<b>Left ABI</b> Left Ankle Pressure = <u>146</u> mmHg Higher Arm Pressure = <u>156</u> mmHg $\frac{146}{156} = .94$
<b>Right Ankle</b> <u>149</u> mmHg		<b>Left Ankle</b> <u>146</u> mmHg	<b>Right ABI</b> Right Ankle Pressure = <u>149</u> mmHg Higher Arm Pressure = <u>156</u> mmHg $\frac{149}{156} = .96$

<b>Summit Sphygmomanometer</b> Patient Name: Patient ID: Date/Time: Notes:		<input type="checkbox"/> LEFT <input checked="" type="checkbox"/> RIGHT <input checked="" type="checkbox"/> PT <input type="checkbox"/> DP <input type="checkbox"/> BRACHIAL
<b>Summit Sphygmomanometer</b> Patient Name: Patient ID: Date/Time: Notes:		<input checked="" type="checkbox"/> LEFT <input type="checkbox"/> RIGHT <input checked="" type="checkbox"/> PT <input type="checkbox"/> DP <input type="checkbox"/> BRACHIAL

Figure 8

Your satisfaction is our highest priority. Please contact us at 1-800-554-5090 for questions regarding this ABI Diagnostic Examination.

**References:**

- [1] Human Blood Pressure Determination by Sphygmomanometry: American Heart Association (AHA), 2001
- [2] Techniques in Noninvasive Vascular Diagnosis – an Encyclopedia of Vascular Testing; Daigle RJ, Summer Publishing, 2002: 137-148
- [3] Olin JW. Clinical Evaluation and Office-Based Detection of Peripheral Arterial Disease, contained in Primary Care Series: Peripheral Arterial Disease and Intermittent Claudication; Hirsch AT (Ed), Excerpta Medica, Inc., 2001