

# Ankle brachial index



## Purpose

The ankle brachial index (ABI) is a quantifiable measurement of lower leg blood supply. It's a comparison of the systolic pressure in the upper arm to the systolic pressure at the ankle. The ankle pressure should be equal to or slightly higher than the arm pressure in the absence of arterial occlusive disease. The test is used to rule out significant arterial disease and to determine the amount of compression that can be safely applied

## Policy

Measure the ABI on all patients with lower extremity wounds and lower extremity arterial disease. Perform the test every 3 months.

## Precautions

- Mercury or aneroid sphygmomanometer with cuff
- Handheld Doppler device with vascular probe (5-10 MHz)
- Conductivity gel compatible with the Doppler device
- Gauze or tissues
- Writing instruments and paper or documentation form

## Precautions

- False-positive or abnormal readings
- Noncompressible vessels secondary to medial calcification (very common in patients with diabetes and end-stage renal disease). If noncompressible vessels are suspected, other testing is required.

## Steps

### Key points

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| 1. Have the patient lie in a supine position with shoes and socks or stockings removed for at least 10 minutes before obtaining blood pressure measurements.  | Position with the extremities at the same level as the heart.   |
| 2. Apply the blood pressure cuff snugly on the upper arm, with the lower edge of the cuff 1 inch above the antecubital fossa, and palpate for the brachial pulse.   |   |
| 3. Apply conductivity gel over the brachial artery; then turn on the Doppler device and place the tip of the probe at the antecubital area at approximately a 60-degree angle to the surface of the skin. | Be sure you're centered on the pulse when you take the reading; if you're off to the side, the reading will be low.   |
| 4. Move the probe around until the clearest arterial pulse sounds are heard and keep the probe at that position.  | Listen for a whooshing sound, which indicates the brachial pulse.   |
| 5. Inflate the blood pressure cuff to approximately 20 mm Hg above the numerical reading where the pulse sounds cease.  |   |
| 6. Slowly deflate the cuff at a rate of 2 mm Hg/second until the first arterial pulse sound is heard. When this number is determined, deflate the cuff completely and record this systolic reading.       | The higher of these two systolic readings will be used for calculation.   |
| 7. Remove the gel from the patient's skin with a tissue.  |   |
| 8. Repeat the procedure in the other arm and record reading.  |   |
| 9. Apply the same blood pressure cuff snugly just above the ankle.  |   |
| 10. Palpate the area around the medial malleolus to find the posterior tibial (PT) arterial pulse. Apply a 1- to 2-cm ribbon of Doppler gel to the area. Keep the probe in that position.                 | If there is no palpable pulse, apply gel to the general area, turn on the Doppler probe, and move the probe around until the clearest arterial sound is heard |

*continued...*

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11. Inflate the blood pressure cuff to approximately 20 mm Hg above the numerical reading where the pulse sounds cease.

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12. Slowly deflate the cuff at a rate of 2 mm Hg/second until the first arterial pulse sound is heard. When this number is determined, deflate the cuff completely and record this systolic reading.

In a small percentage of patients, one of the ankle pressures will be nondetectable; use the detectable pressure for calculating the ABI.

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13. Palpate the dorsal arch of the same foot for the dorsalis pedis (DP) arterial pulse. Apply the Doppler gel and use the Doppler probe as before (Steps 10-12).

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14. Apply the blood pressure cuff to the opposite ankle and record the PT and DP pressures as before (Steps 9-12).

If arterial blood flow is normal, the pressure in the foot or ankle should be equal or only slightly higher than that of the arm.

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15. To determine the ABI, divide each ankle systolic pressure by the higher brachial pressure to calculate the ABI.

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16. ABI interpretation

<b>ABI score</b>	<b>Interpretation</b>
≥ 1.0	Normal
≤ 0.9	Minimal lower extremity arterial disease
≤ 0.6-0.8	Significant lower extremity arterial disease
≤ 0.5	Severe ischemia

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