

# Vascular Disorders

Vascular disorders are problems with arteries and veins. Arteries are pipes that bring oxygen-rich blood from the heart to the fingers. Veins are pipes that return the used blood back to the heart and lungs. At the wrist, the radial and ulnar arteries bring blood into the hand. These arteries connect into two arches that branch out to supply blood to each of the fingers (**Figure 1**).

Vascular disorders are less common in the upper extremities (arms) than in the lower extremities (legs), but they still affect about 10% of people. They can cause problems such as pain, open wounds, or even loss of body parts.

## Causes

People with diseases such as diabetes, high blood pressure, or kidney failure can be more likely to have vessel problems. Working with vibrating tools, being in cold temperatures, and smoking can worsen vascular problems.

Causes of vascular disorders usually fit into one of 5 groups:

1. Traumatic, which occur after injury
2. Compressive, which occur when the pipes flatten
3. Occlusive, which occur when pipes are blocked
4. Tumors (growths) or malformations (deformed, tangled pipes), which may or may not be present at birth
5. Vessel spasms, which occur when abnormal control of vessels causes them to narrow

## Signs and Symptoms

Symptoms of vascular disorders can include:

- Pain
- Abnormal color changes in the fingertips
- Ulcers or wounds that do not heal
- Hand problems when in cold temperatures or locations
- Numbness or tingling of the fingertips
- Swelling
- Cool or cold fingers and/or hands

## Diagnosis

Your doctor will perform a physical examination and may find:

- Decreased or no pulses at the armpit, elbow, wrist, or fingers
- Full veins
- Masses
- Wounds or gangrene at the fingertips

Diagnostic tests that your doctor may run include:

- Doppler or ultrasound examination of blood flow in the arteries and veins (**Figure 2**)
- Artery pressure and pulse recordings to measure blood flow in the arm and finger vessels, using small blood pressure cuffs and an ultrasound
- Magnetic resonance angiography, which is an MRI of the affected area that pays special attention to the vessels (**Figure 3**)
- Cold stress test, where the temperature and blood pressure in the finger(s) are recorded before and after the hand is placed in cold water
- Arteriography, where a special dye is injected into the vessels, and x-rays of the hand and arm are taken. This is the most invasive test, but it can show the most vessel detail.

## Treatment

Treatment will vary depending on the condition:

**Trauma** – Traumatic injuries can cause a vessel to be partially or completely cut, such as from a knife wound. The vessel can be hit or stretched badly enough to damage its lining and cause a blood clot. Poor blood flow after trauma makes the fingers turn white, cold, and painful. The vessel needs to be repaired as soon as possible if blood flow has stopped. Sometimes nearby arteries can help to continue blood flow to the parts. In this case, the injury may not be an emergency or might not even require repair.

**Aneurysms** – An aneurysm is a weakness in the artery wall that expands like a balloon (**Figure 4**). A soft, painless swelling may be noticed over the artery. A clot inside the artery can block the blood flow or may scatter smaller clots out to the fingertips. Other symptoms include pain, numbness, color changes, or gangrene (death) of the fingertips. Treatment may include surgery to reconstruct the artery or tie it off, depending on the circumstances.

**Vascular malformations** – Tangled veins or arteries can be present at birth, but might not be noticed until they begin to expand. Some of these malformations might include abnormal connections between veins and arteries. Symptoms can include swelling, pain, warmth, increased growth of a part, and bleeding. Treatment choices include garments or wraps to apply pressure, clotting the vessels to try to shrink them, or removing part or all of the abnormal vessels with surgery.

**Raynaud's** – Patients with Raynaud's phenomenon or disease have finger arteries that narrow more than normal when they are in cold temperatures. The fingers turn white and painful and then blue. Recovery of blood flow turns the fingers pink or red. Treatment includes avoiding the conditions that trigger the reaction, using protective clothing such as mittens or gloves, taking medications that increase blood flow to the fingers, and surgery. Wounds or ulcers on the fingers can heal poorly due to the low blood flow. Surgery to lessen the vessel narrowing or replace blocked parts of vessels can be considered if pain cannot be controlled or wounds do not heal.

Figure 1. Vascular anatomy of the hand.

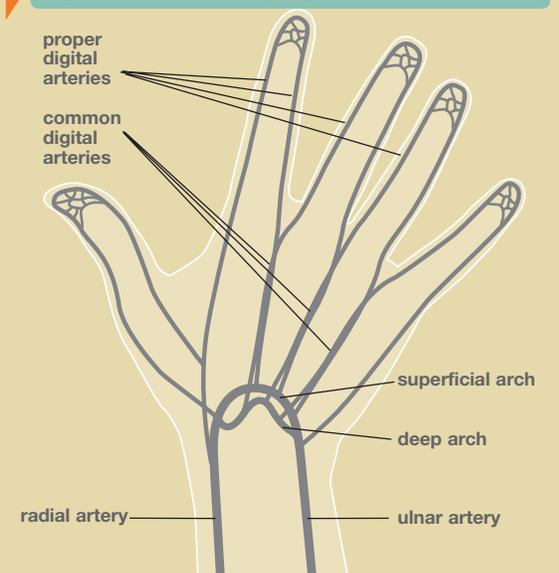


Figure 2. Doppler ultrasound of the radial artery.

Figure 3. Magnetic resonance angiography (MRA) of the hand.

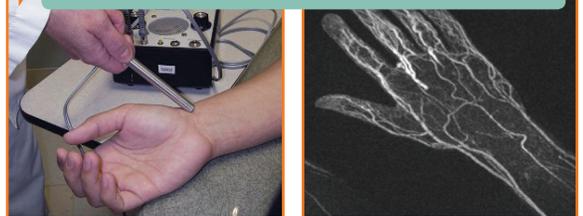


Figure 4. Two different types of aneurysms of the hand.

