

# Positive Stemmer's sign yields a definitive lymphedema diagnosis in 10 seconds or less

Learn how to perform this fast and easy test.

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In a busy wound clinic, quick and accurate differential diagnosis of edema is essential to appropriate treatment or referral for comprehensive care. According to a 2010 article in *American Family Physician*, 80% of lower extremity ulcers result from chronic venous insufficiency (CVI). In 2007, the German Bonn Vein Study found 100% of participants with active venous ulcers also had a positive Stemmer's sign, indicating lymphedema.

Lymphedema secondary to CVI is called phlebolymphe<sup>d</sup>ema ("phlebo" means veins). Whereas CVI warrants compression therapy alone, phlebolymphe<sup>d</sup>ema may require complete decongestive physiotherapy. To provide optimal care, a wound care clinician must differentiate between CVI and phlebolymphe<sup>d</sup>ema. Fortunately, differential diagnosis can be made in 10 seconds or less by performing Stemmer's test.

## How to perform Stemmer's test

Stemmer's test results in either a positive or negative sign for lymphedema. To perform it, try to pinch and lift a skinfold at

the base of the second toe or middle finger. If you can pinch and lift the skin, Stemmer's sign is negative. If you can't, the sign is positive. False positives never occur. On the other hand, a negative test doesn't rule out lymphedema.

Stemmer's test is diagnostic for phlebolymphe<sup>d</sup>ema or any other form of lymphedema. Not all wound-care clinicians need to determine the type or underlying causes of lymphedema. A positive Stemmer's sign means the patient has lymphedema and should be referred for further evaluation and treatment by a lymphedema specialist.

## Understanding the pathophysiology behind the test

A 10-second test might seem too good to be true. Also, how can Stemmer's sign never be falsely positive? The answers lie in understanding the pathophysiology behind the test.

The primary function of the lymphatic system is to recycle blood proteins. Half of plasma proteins leak into the interstitial space and are recovered by the lymphatic system each day. Think of them as delivery men carrying nutrients to cells. They deliver their packages and go back into the bloodstream via the lymphatics to make more deliveries. But when the lymphatic system is blocked or damaged, proteins accumulate in the tissues. This causes the pathologic changes that lead to a positive Stemmer's sign.

Like butter turning rancid, proteins accumulating in the tissues become denatured; macrophages migrate to the area to digest them. In what resembles the wound-healing process, macrophages release interleukin 1, which activates fi-

broblasts to produce collagen. This normal cascade becomes pathologic as excessive collagen is produced and denatured proteins trigger chronic inflammation. This process causes thickened, dense, fibrotic skin.

Typically, chronic lymphedema progresses from the toes or fingers proximally. The thin skin of the dorsum of the foot or hand is the first area to show signs of thickening, which leads to a positive Stemmer's sign. (See *Positive Stemmer's sign*.)

### Clinical considerations and test modifications

Unlike protein-rich lymphedema, edema in a patient with CVI or congestive heart failure (CHF) is watery. Proteins continue to circulate through the lymphatic system and don't accumulate in tissues. If your patient has only CVI, no swelling occurs in the toes, and Stemmer's sign is negative. Hemosiderin staining, the classic sign of CVI, likely will occur in the lower legs. (See *Negative Stemmer's sign in a patient with CVI*.)

In contrast, a patient with CHF has swelling of the toes and dorsum of the foot. In this case, when performing the Stemmer's test, allow sufficient time for pitting edema to displace. Then note skin texture and try to pinch a skinfold. Edema solely from CHF displaces slowly, and Stemmer's sign is negative. If the sign is positive, it means the patient has both CHF and lymphedema.

### What happens in phlebolymphe- dema

Phlebolymphe-  
dema refers to lymphede-  
ma caused by CVI—a disorder that leads to valvular failure of the veins and in-

### Positive Stemmer's sign

These photos show a positive Stemmer's sign at the base of the second toe (left) and at the base of the middle finger (right).



### Negative Stemmer's sign in a patient with CVI

This photo shows a negative Stemmer's sign in a patient with chronic venous insufficiency (CVI).



creased tissue edema. Normally, as skin stretches from edema, elastic fibers pull open the lymphatic capillaries via their attachments by anchoring filaments. However, extreme distention causes rupture of these filaments and shredding of lymphatic capillary walls. What's more, lymphatic overloading to compensate for

## Phlebolymphe<sup>d</sup>ema

These photos of a patient with phlebolymphe<sup>d</sup>ema show dense hemosiderin staining in the gaiter area caused by chronic venous insufficiency (left); papillomatosis in the gaiter area, indicating lymphhe<sup>d</sup>ema (middle); and a positive Stemmer's sign at the base of the toe, indicating lymphhe<sup>d</sup>ema (right).



venous insufficiency can lead to valvular failure of lymphatic vessels. As lymphhe<sup>d</sup>ema progresses, the skin thickens and becomes lumpy, and wartlike knobs or projections may develop. Called papillomatosis, this condition indicates advanced lymphhe<sup>d</sup>ema. (See *Phlebolymphe<sup>d</sup>ema*.)

Sometimes localized lymphatic damage occurs, with skin changes arising only in affected areas such as periwound tissues. In this case, you can modify Stemmer's test by assessing skin texture in affected areas.

Understanding localized periwound lymphhe<sup>d</sup>ema and its treatment aids healing of chronic wounds. White blood cells use lymphatics to drag bacteria and toxins to lymph nodes, in turn triggering an immune response. As wound care clinicians, we are acutely aware of bacterial bioburden and its negative effect on wound healing. Without a continuous flow of lymph, the body's natural ability to fight bacteria is compromised. Further, debris, dead cells, and other byproducts of wound healing—normally removed via the lymphatics—cause stag-

### Clinical wisdom: Stemmer's sign

- A positive Stemmer's sign is always diagnostic for lymphhe<sup>d</sup>ema.
- Lymph fluid is the same as serous drainage from a wound.
- Wound bioburden decreases when the lymphatic system functions normally.
- Lymphhe<sup>d</sup>ema results from protein accumulation in tissues.
- Protein accumulation in periwound tissues results in chronic inflammation and fibrosis.
- Localized or systemic lymphhe<sup>d</sup>ema impairs wound healing.
- Papillomatosis (lumpy, bumpy skin or wartlike skin projections) indicates advanced lymphhe<sup>d</sup>ema.

nation of the wound environment and slow wound healing.

### What a negative sign may mean

As mentioned, a negative Stemmer's sign

# A negative Stemmer's sign doesn't rule out lymphedema.

doesn't rule out lymphedema. For example, a malignant tumor may cause lymphedema proximally in a limb; because lymphedema onset is acute and swelling is worse proximally, Stemmer's sign may be negative.

## Useful screening tool

Stemmer's sign is a useful tool for screening patients in the wound clinic and promotes recognition of many lymphedema cases that otherwise might go undiagnosed and untreated. (See *Clinical wisdom: Stemmer's sign.*) Remember that patients with CVI and chronic venous ulcers have a high prevalence of secondary lymphedema. Also keep in mind that while a positive Stemmer's sign always indicates lymphedema, a negative test doesn't exclude lymphedema. Refer lymphedema patients to a lymphedema specialist for further assessment and treatment.

Click here [www.lympho.org/resources.php](http://www.lympho.org/resources.php) to download *International Consensus: Best Practice for the Management of Lymphoedema*.

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