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*By Bruce E. Ruben MD*

A non-healing wound is generally defined as a wound that will not heal within four weeks. If a wound does not heal within this usual time period, the cause is usually found in underlying conditions that have either gone unnoticed or untreated. In general, there are five reasons why wounds will not heal and more than one of these conditions can be operating at the same time.

They are:

1. Poor Circulation
2. Infection
3. Edema
4. Inadequate Nutrition
5. Repetitive Trauma to the Wound

## Poor Circulation

Wounds heal most efficiently when there is easy access to and from the wound site through the body's circulatory system. Here, the two issues impeding the healing process are arterial insufficiency, where there is compromised blood flow to a wound site through the arteries; and venous insufficiency [9], where spent blood and fluids cannot return up through the veins.

With arterial insufficiency, the most common cause is Peripheral Atherosclerosis Disease (PASD). This occurs when plaque forms on the inside of arteries and impedes blood flow. Treatments may include artery bypass or angioplasty to open the artery that is obstructed.

With venous insufficiency, the valves inside the veins that prevent the backflow of fluids are not functioning properly. Thus, blood and fluids leak out and pool in the lower extremities. The challenges presented involve forcing blood and fluids back into the tissues and veins and then manually or mechanically pumping them back up toward the heart. This can be accomplished through various kinds of compression therapy <sup>[10]</sup> including compression stockings and bands, manual lymphatic drainage and electronic sequential venopneumatic pumps. In extreme cases, a vein specialist can employ venous ablation where a tiny laser is passed into an insufficient vein. That vein closes down completely, allowing the body to re-route blood and fluids up through more viable veins.

## Infection

Infection <sup>[11]</sup> is the proliferation of bacteria, virus or fungus in or under a wound site that inhibits the natural and timely healing of the wound. Normally, when these invaders enter a wound site they are quickly overtaken and destroyed by the millions of fresh white blood cells the body makes every day.

But when the wound is compromised by any of the other four conditions described in this article, infections can be difficult to resolve. That's particularly true when the infection originates on or around a bone (osteomyelitis). With no other place to go, the infection "tunnels" up to the skin surface and forms a lesion or sore. Here, diagnosing the type of bacteria is the key to resolving the infection through excellent wound care and competent administration of IV antibiotics.

Infections may also be surgically excised as with abscesses and cysts. Once the infection is treated and eradicated, the body is then able to resume its normal course of organic wound healing.

## Edema

Edema <sup>[12]</sup> is fluid that accumulates in the skin, dermis or fatty tissue and usually occurs in the lower extremities. This fluid build up is typically due to venous insufficiency (poor venous return) and is a risk for developing sores (venous ulcers). Once those sores form, edema is also a major barrier to healing by blocking the flow of nutrients to and from the area.

As with poor circulation, various forms of compression therapy are employed to transport or force the fluids back into the circulatory system including manual lymphatic drainage, compression therapies and specific medications like Lasix. Once the edema has been resolved, proper wound healing can occur.

## Protein Malnutrition

Just as you cannot build a house without the building blocks, bricks or foundation, the body cannot build new tissues without an adequate supply of protein <sup>[13]</sup>. In fact, insufficient nutrition is, by far, the most overlooked reason why wounds will not heal.

Treating the outside of wounds with grafts, flaps, special compression wraps and debriding agents <sup>[14]</sup> can only heal wounds to the degree that there is adequate nutrition inside the body. So with malnutrition and insufficient protein intake, the wound-healing process is fundamentally halted until these insufficiencies are corrected.

This means a very substantial intake increase is needed to heal wounds in addition to the amounts needed to carry on normal daily body functions. In fact, the amount of protein alone needed can be

up to three times the recommended daily requirement. At Encompass HealthCare, we use blood work along with an [indirect calorimeter](#) <sup>[15]</sup> to determine a patient's nutritional needs during healing.

## Repetitive Trauma to the Wound

When a wound undergoes repetitive pressure due to bumping or rubbing against a surface, it is said to be undergoing repetitive trauma. This can lengthen the healing process or stop it completely. This problem is magnified in paraplegic patients since they cannot feel if one or both of their feet are continuously bumping on their wheelchair, for example.

Similarly, in spinal cord injury patients, pressure ulcers can develop due to lack of body movement such as when they are sleeping in the same position night after night without the ability to shift, or even when watching a two-hour movie without repositioning.

In these cases, diligent offloading and repositioning are keys to resolving repetitive trauma to the wound. Then, normal blood circulation can resume and wound healing can occur.

As you can see, it's important to understand the five reasons why a wound won't heal: poor circulation, infection, edema, insufficient nutrition, and repetitive trauma to the wound. The challenge to wound care providers is to recognize these conditions when they are occurring and also to understand that more than one condition can be operating at the same time.

**Editor's Note: This article was originally published on December 3, 2013 and has been updated for accuracy and comprehension.**

### About the Author

Dr. Bruce Ruben is the Founder and Medical Director of [Encompass HealthCare](#) <sup>[16]</sup>, an outpatient facility featuring advanced wound care, IV antibiotic therapies, hyperbaric oxygen treatment, nutritional assessment, and other treatment modalities. Dr. Ruben is board certified in Internal Medicine, Infectious Disease, and in Undersea and Hyperbaric Medicine. He is a member of the Medical and Scientific Advisory Committee and National Spinal Cord Injury Association (NSCIA) board.

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**Related patient condition:** [Arterial Ulcers](#) <sup>[17]</sup>  
[Chronic Wounds](#) <sup>[18]</sup>  
[Edema](#) <sup>[12]</sup>  
[Infected Wounds](#) <sup>[19]</sup>  
[Nutritional Support](#) <sup>[20]</sup>  
[Skin Graft Donor Sites](#) <sup>[21]</sup>  
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[Venous Ulcers](#) <sup>[23]</sup>

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