

To Heal a WoundHelping the Skin Fix Itself

You've likely had countless cuts and scrapes in your life. Normally, when you get a small skin wound, your body can repair it quickly. But sometimes, the repair process doesn't work properly. If this happens, even a tiny tear in the skin can have trouble healing. That can lead to pain and distress and pose a risk for dangerous—or even deadly—infections.

Wounds that don't heal for three months or more are called chronic wounds. Your risk for getting a chronic wound increases with age. But there are ways you can help your body to heal.

Rebuilding Skin

When you have an open wound, blood can

get out of the body, and germs can get in.

"So the body's goal is to seal that wound as quickly as possible," says Dr. Maria Morasso, a skin biology researcher at NIH.

This normally involves an orderly series of steps. First, a clot forms over the wound to prevent blood loss. Next, cells from the immune system move into the area. These remove dead and damaged cells from the wound. This makes room for new, healthy cells. Immune cells also fight off any germs in the area, like bacteria. This process causes inflammation—heat, swelling, and redness around the wound.

The body next starts to make new cells to replace the damaged tissue. Finally, your skin begins to heal and creates a scar. This process is called remodeling.

Too much scarring can cause problems after a wound heals. Large scars may prevent nearby muscles and joints in the body from working properly. Scientists are looking for ways to help minimize this scarring.

Not all tissues in the body scar, explains Dr. Kaitlyn Sadtler, who studies the immune system at NIH. For example, the liver and the tissues inside the mouth can heal perfectly. Her lab and others are studying these tissues to find ways to coax other organs to grow back better.

Roadblocks to Healing

There are different ways the wound-healing process can go wrong. For example, too little or too much inflammation can lead to problems, Morasso explains.

Too much inflammation can damage nearby tissue. It can also prevent immune cells in a wound from working the way they're supposed to.

If immune cells aren't working properly or if there's too little inflammation, new tissue may not form over the wound. Then your body may not be able to protect itself from germs. If germs get into a wound, infection can set in. Untreated infections can lead to serious complications and become life-threatening.

Health conditions that interfere with blood flow around a wound can also affect the healing process. These conditions include diabetes or problems with blood vessels, such as varicose veins. Smoking, obesity, and aging can also make wounds heal more slowly. Slow

healing can put you at higher risk of developing a chronic wound.

If you have diabetes, getting your blood glucose (or blood sugar) under control is crucial for healing, explains Dr. Geoffrey Gurtner, a surgeon who specializes in wound healing at the University of Arizona. High blood glucose levels "make a wound-healing problem much worse," he says.

People with diabetes are at high risk of developing chronic wounds on their feet called foot ulcers. So it's important to wear well-fitted shoes and check your feet regularly. This is true for everyone with diabetes, whether or not your blood glucose is under control, Gurtner says. But it's especially important if you have nerve damage to your feet.

People with blood vessel problems may be advised to wear compression stockings to help stop small wounds from forming. And everyone can take steps to keep small cuts and scrapes clean and healthy. See the Wise Choices box for more about wound care.

If you have a wound that won't heal, talk with your doctor. They may consider removing some of the old, damaged tissue to start the healing process again. Or, they may give you special bandages or antibiotics. Some people may need surgery to place new skin over the wound or a special type of cast.

But new treatments are needed to help chronic wounds heal better, Gurtner says.

Finding New Treatments

Researchers are working to develop new ways to treat chronic wounds. Morasso and her team are comparing mouth wounds—which heal very rapidly—with normal skin wounds and nonhealing wounds.

Her team's recent study showed that diabetic foot ulcers lacked two proteins that are found in wounds that heal normally. Because the proteins were missing, immune cells weren't able to move into the wounds.

"If we can find key proteins, we could target them with drugs to increase or decrease them as needed," says Morasso. "This could help boost healing."

Sadtler and her lab are studying how biomaterials can help wound healing. Biomaterials can be made from substances found in the human body or synthetically



designed. Her team is testing whether biomaterials can be engineered to release different drugs at different times. These drugs would draw different immune cells into a wound in the order they're needed for healing.

"Immune cells are the body's defenders. But they're also the construction workers that help build new tissues," Sadtler explains. "We're looking at how we can use them to heal wounds and prevent scar tissue."

Researchers are working on "smart bandages" that could help wounds heal, too. These use features like electrical stimulation to boost wound healing. Smart bandages can also monitor wounds for signs of infection in real time.

Gurtner and others recently tested smart bandages in mice. They found that wounds underneath the bandage healed faster than those covered with a normal dressing.

"I think we're going to see this type of bandage in the clinic in the near future," Gurtner says.

For now, he encourages anyone with a wound that's not healing to ask their doctor for a referral to a wound-care center if possible.

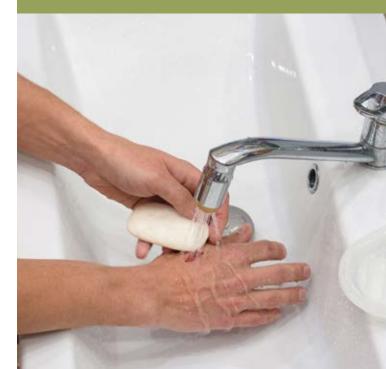
"These exist in most communities now," he says. "Having the kind of coordinated care they provide really makes a big difference for helping wounds heal."

Article reprinted from NIH-News In Health



Take Care of Injured Skin

- Keep open wounds clean.
 Washing thoroughly with soap and clean water reduces the potential for infection.
- Remove jewelry or clothing that could further irritate the wound.
- **Apply a bandage.** Keeping the wound clean and protected reduces the chance of infection. Don't cover wounds that can't be cleaned, like bites or deep punctures, and see a health care provider.
- Check the wound every 24 hours for signs of infection. These include redness, swelling, or oozing.
 See a health care provider if your wound becomes infected.
- Seek immediate medical care if you have fever, increasing pain, shortness of breath, fast heart rate, confusion, or disorientation.





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NOTICE OF ANNUAL MEETING OF MEMBERS

The Annual Meeting of the Members of Med-Sense Guaranteed Association will be held telephonically on Friday, December 1, 2023 at 3:30 p.m. (CST) for election of Directors and for the transaction of such other business as may properly come before the meeting and any adjournment thereof.

The above notice is given pursuant to the By-Laws of the Association.

PROXY

Med-Sense Guaranteed Association December 1, 2023 Annual Meeting of Members THIS PROXY IS SOLICITED ON BEHALF OF MED-SENSE GUARANTEED ASSOCIATION

The undersigned member of the Med-Sense Guaranteed Association does hereby constitute and appoint the President of Med-Sense Guaranteed Association, the true and lawful attorney(s) of the undersigned with full power of substitution, to appear and act as the proxy or proxies of the undersigned at the Annual Meeting of the Members of Med-Sense Guaranteed Association and at any and all adjournments thereof, and to vote for and in the name, place and stead of the undersigned, as fully as the undersigned might or could do if personally present, as set forth below:

- 1. FOR [], or to [] WITHHOLD AUTHORITY to vote for, the following nominees for Board of Directors: Don Breckenridge, Bart Bouchein, and John Clark.
- 2. In their discretion, the proxies are authorized to vote upon such other business as may properly come before the Meeting.

This proxy, when properly executed, will be voted in the manner directed by the undersigned member. If no direction is made, this proxy will be voted for the election of directors and officers.

DATED:	, 2023
	Signature
	Name (please print)

Please date and sign and return promptly to 12444 Powerscourt Drive, Suite 500A, St. Louis, Missouri 63131 whether or not you expect to attend this meeting. The Proxy is revocable and will not affect your right to vote in person in the event that you attend the meeting.

October 31, 2023

For information regarding your membership and association services, call or write:

Membership Services Office
Med-Sense Guaranteed Association
12444 Powerscourt Drive
Suite 500A
St. Louis, MO 63131
1-800-992-8044 or (636) 530-7200

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