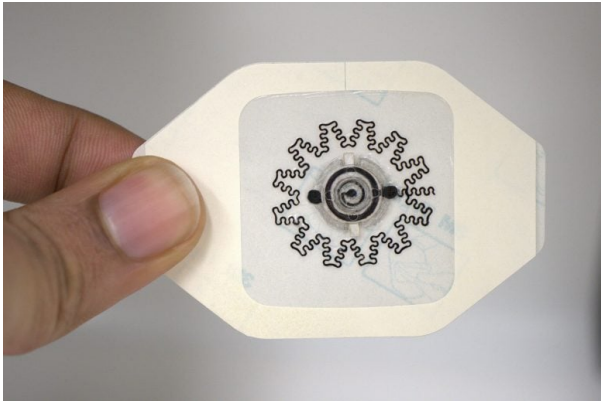


New Electric Bandages: 30% Faster Wound Healing

Posted by [Okachinepa](#) 08/19/2024



Courtesy of SynEvol
Credit: Rajaram Kaveti

Open wounds classified as chronic heal very slowly, if at all. For instance, some diabetic individuals have persistent lesions, such as sores. These wounds are very dangerous since they greatly raise the risk of amputation and death and frequently return even after treatment. Unfortunately, patients experience further issues as a result of the high costs associated with the current choices for treating chronic wounds.

Recently, scientists have created a low-cost bandage that stimulates the healing of chronic wounds using an electric field. In experiments on animals, wounds treated with these electric bandages healed thirty percent quicker than wounds treated with traditional bandages.

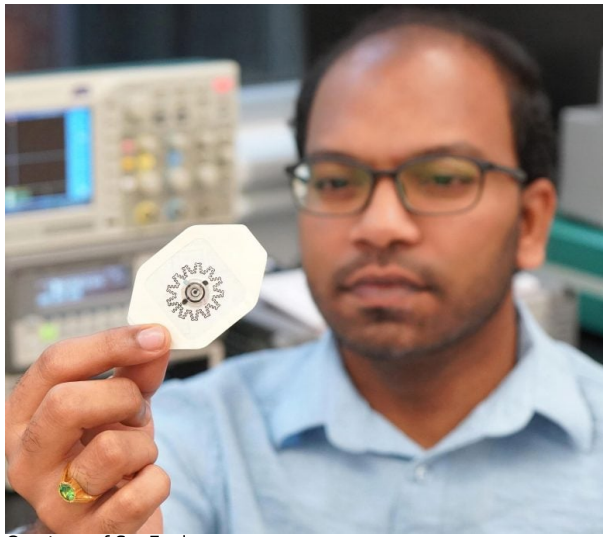
The work's co-corresponding author and assistant professor of electrical and computer engineering at North Carolina State University, Amay Bandodkar, states, "Our goal here was to develop a far less expensive technology that accelerates healing in patients with chronic wounds." Additionally, we wanted to ensure that the technology wasn't limited to what patients could only get in professional settings and that it was simple enough for people to utilize at home.



Courtesy of SynEvol
Credit: Rajaram Kaveti

According to Sam Sia, a Columbia University biomedical engineering professor and co-corresponding author of the work, "this project is part of a bigger DARPA project to accelerate wound healing with personalized wound dressings." "This collaborative project demonstrates that wounds healed at a similar rate to bulkier and more expensive wound treatment, faster than the control group, thanks to these lightweight bandages that can provide electrical stimulation simply by adding water."

In particular, the study team created water-powered, electronics-free dressings (WPEDs), which are single-use wound dressings with a tiny, biocompatible battery on one side and electrodes on the other. In order for the electrodes to make touch with the wound, the dressing is put to the patient. The battery is then activated by applying a drop of water to it. The bandage creates an electromagnetic field that lasts for several hours once it is turned on.



Courtesy of SynEvol
Credit: Gurudatt Nanjanagudu Ganesh

"It's well known that electric fields speed up healing in chronic wounds, so that electric field is essential," explains co-first author Rajaram Kaveti, a post-doctoral researcher at NC State.

The electrodes are made to be flexible enough to bend with the bandage and fit the surface of chronic wounds, which are frequently deep and asymmetrical.

According to Kaveti, "this conformability is essential because we want the electric field to be directed from the wound's periphery toward the wound's center." Electrodes must come into touch with the patient at both the edge and the center of the wound for the electric field to be focused properly. Furthermore, you need electrodes that can adapt to a wide range of surface features because these wounds might be deep and asymmetrical.

"We evaluated the dressings on diabetic mice, which are a widely used model for human wound healing," explains Columbia graduate student Maggie Jakus, who is also one of the study's co-first authors. "We discovered that the electrical stimulation from the device reduced inflammation, accelerated the rate of wound closure, and encouraged the formation of new blood vessels, all of which point to overall improved wound healing."

In particular, the researchers discovered that compared to mice treated with traditional bandages, mice treated with WPEDs healed almost 30% faster.

"However, it's also crucial that these bandages be made at a reasonable cost—we're talking about a few dollars in overhead costs for each dressing," Bandonkar said.

Aristidis Veves, a Beth Israel Deaconess Center surgical professor and co-author of the study, states that diabetic foot ulceration is a dangerous condition that can result in lower extremity amputations. Since the last therapeutic method to receive FDA approval was created more than 25 years ago, there is an urgent need for new ones. My team is extremely fortunate to be a part of this research initiative, which looks into novel and effective approaches that could completely change the way diabetic foot ulcers are managed.

Furthermore, the WPEDs are simple and quick to apply. Patients are able to move around and engage in everyday activities after the application. Patients are more likely to cooperate with treatment when they may receive it at home because of this feature. Put differently, since patients don't have to go to a clinic or stay immobile for long periods of time, they are less prone to skip therapy sessions or take short cuts.

Our next course of action entails carrying out more research to improve our capacity to lessen electric field fluctuations and prolong field duration. In addition, we are carrying out more research that will bring us one step closer to clinical trials and, eventually, useful applications that can benefit people, says Bandonkar.