MedicalXpress

How electrical stimulation accelerates wound healing

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The most detailed study to date showing how electrical stimulation accelerates wound healing has been carried out in 40 volunteers by University of Manchester scientists.

Skin wounds that are slow to heal are a clinical challenge to physicians all over the world. Every year, the NHS alone spends £1 billion on treating chronic wounds such as lower limb venous and diabetic ulcers. Wounds become chronic when they fail to heal and remain open for longer than six weeks.

Researchers from The University of Manchester carried out the unique human volunteer study of skin wound healing in 40 individuals with the results published in the journal *PLOS ONE*.

This study has provided new data supporting previous work by the team, enabling a new partnership with Oxford BioElectronics Ltd, which in collaboration with the University, will develop and evaluate devices and dressings for faster healing of wounds.

In the new research, half-centimetre, harmless wounds were created on each upper arm of the volunteers. One wound was left to heal normally while the other was treated with electrical pulses over a period of two weeks. These pulses stimulated the process through which new blood vessels form – known as angiogenesis – increasing the blood flow to the damaged area and resulting in the wounds healing significantly faster.

Now, the researchers at the University's Institute of Inflammation and Repair led by Dr Ardeshir Bayat are to work with Oxford BioElectronics Ltd on a five-year project to develop and evaluate devices and dressings which use the same techniques to stimulate the body's nervous system to generate nerve impulses to the site of skin repair.

Dr Ardeshir Bayat, the principal investigator from the University, is also leading on the partnership. He said: "This research has shown the effectiveness of electrical stimulation in wound healing, and therefore we believe this technology has the potential to be applied to any situation where faster wound healing is particularly desirable, such as following human or veterinary surgical wounds, accidental, or military trauma and in sports injuries."

Dr Bayat, an international expert in the subject of wound healing added: "This is an exciting partnership, working on a pioneering project with the potential to change substantially the way cutaneous wounds are managed in the future."

Roly Allen, Managing Director of Oxford Bioelectronics, said: "We are delighted with our collaboration with Dr Bayat and his team at The University of Manchester. Healing of wounds, in particular chronic wounds, is a global problem and we expect, through this partnership, to lead the development of the next generation of wound repair solutions."

Dr Bayat concluded: "When used in acute and chronic wounds, bandages are essentially just a covering. With this technology we hope that the dressings will be able to make a significant functional contribution to healing the wounds and getting the patient back to full health as quickly as possible."

More information: "Angiogenesis Is Induced and Wound Size Is Reduced by Electrical Stimulation in an Acute Wound Healing Model in

Human Skin." *PLoS ONE* 10(4): e0124502. DOI: 10.1371/journal.pone.0124502