Shockwave therapy could help with several 'difficult to treat' disorders

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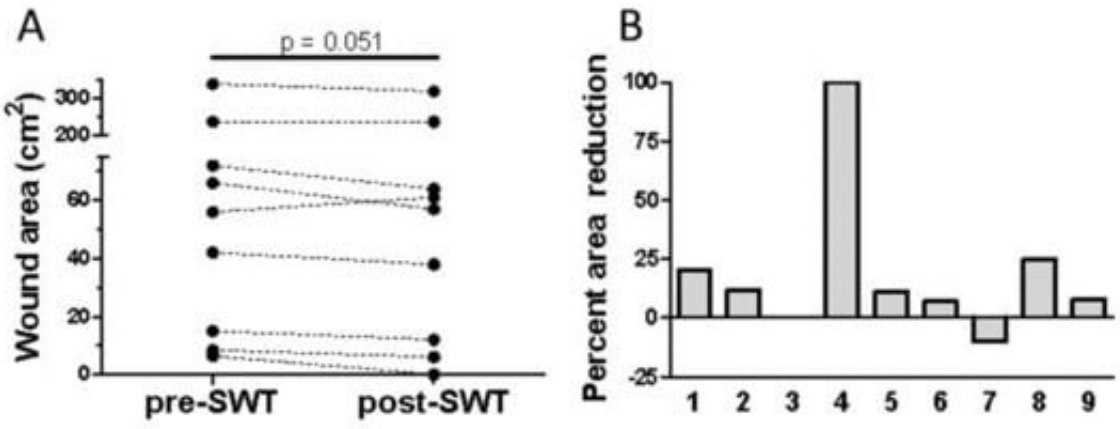

Figure 1. Extracorporeal shock wave therapy (ESWT) improves healing of chronic ulcers. (A) ESWT improved healing in seven out of the nine patients as determined by a decrease in total wound area (cm2) from baseline before ESWT and at 2 weeks post-therapy. (B) Seven out of nine patients showed a decrease in the percentage area of their wound from baseline to 2 weeks post-ESWT, one patient showed no change and one patient a decrease in reduction. Numbers shown on the x-axis (1–9) represent individual patients. Credit: DOI: 10.3390/ijms22157844

Shockwave therapy—used as a last resort to treat wounds that do not heal with conventional treatments—could have other, previously unknown benefits, University of Aberdeen researchers have found.

High intensity extracorporeal shock wave therapy (ESWT) has been used

to disintegrate urinary stones for over 30 years.

More recent studies also revealed that using low intensity waves, the technology might be suitable to assist the treatment of several conditions, including soft tissue wounds.

The new findings, published in the *International Journal of Molecular Sciences*, means that shockwave therapy might be suitable to assist the treatment, for example, of certain types of cancer.

The effectiveness of shockwaves was previously thought to be due to its ability to stimulate the production of more blood vessels to drive the healing process.

Now researchers from the University of Aberdeen and NHS Grampian's Department of Vascular Surgery have found that the treatment also kick-starts the properties of important white blood cells, so they develop functions that make wounds heal such as clearing away debris and infection.

The team discovered in more detail than ever before how shockwave therapy changes the function of white blood cells in wounds that had been ongoing and non-healing for over three months.

They saw that this change in white blood cell properties correlated with an improvement in healing yet if there was not a change in white blood cells, wounds did not heal.

They have also applied the same clinical intensity shockwaves to white blood cells in the laboratory to see in greater detail how their properties are affected.

The findings suggest other disorders where white blood cells are

dysregulated, such as certain cancers or autoimmune and inflammatory conditions, could also benefit from shockwave therapy.

In the clinic, shockwave therapy is only effective in healing for in a subgroup of patients, and this new research may help explain why this is the case—ensuring therapy is only used with patients who could benefit.

Lead researcher Heather Wilson, Professor of Immunology at the University of Aberdeen, said: "This new study shows the benefit of shockwave therapy could be wider than previously thought, though conversely, it may also explain why the therapy is not effective on all patients.

"More research is required of course, but the results of studying white blood cells in the laboratory while they are exposed to shockwaves suggests there may be wider uses for the therapy, and it also allows us to be more targeted in those who receive it."

More information: Jason S. Holsapple et al, Low Intensity Shockwave Treatment Modulates Macrophage Functions Beneficial to Healing Chronic Wounds, *International Journal of Molecular Sciences* (2021). DOI: 10.3390/ijms22157844

Provided by University of Aberdeen