

Poor sleep + type 2 diabetes = Slower wound healing

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People with Type 2 diabetes who don't sleep well could need more time to heal their wounds, according to a new study published by researchers from the University of Tennessee, Knoxville.

The research, which appeared online in the journal *Sleep* on August 11, found that overweight mice with Type 2 diabetes and disrupted sleep needed more time to heal skin [wounds](#) than mice that also had disrupted sleep but didn't have Type 2 diabetes. These results confirm that sleep plays an especially important role in [wound healing](#) among [obese mice](#) with Type 2 diabetes.

For the experiment, scientists used obese mice with features of Type 2 diabetes and compared them to healthy mice of normal weight. While deeply anesthetized, both groups of mice got a small surgical wound on the skin of their backs. The scientists analyzed how long it took the wound to heal under two scenarios: a normal sleep schedule and sleep that was repeatedly interrupted.

The result: the diabetic mice with fragmented sleep needed about 13 days for their wounds to achieve 50 percent healing. By contrast, even with [sleep interruptions](#), the wounds of normal-weight healthy mice reached the same milestone in about five days.

Ralph Lydic, Robert H. Cole Endowed Professor of Neuroscience, co-authored the paper with a multidisciplinary team of researchers at UT Knoxville and the UT Graduate School of Medicine. UT Medical Center surgery resident John Mark McLain was the lead author of the study. He bridged the UT Graduate School of Medicine's Department of Surgery laboratory of Michael D. Karlstad and the UT Graduate School of Medicine's anesthesiology laboratories of Lydic and Helen A. Baghdoyan, another UT psychology professor. Both Baghdoyan and Lydic hold joint appointments in UT's Department of Psychology and UT Graduate School of Medicine's Department of Anesthesiology, as well as at Oak Ridge National Laboratory. UT alumni Wateen Alami and Chris Cooley and graduate student Zachary Glovak also participated in this research.

One in three adult Americans suffers from prediabetes, according to the Centers for Disease Control and Prevention. Individuals with prediabetes are at higher risk of developing Type 2 diabetes at some point in their lives.

In people with Type 2 diabetes, high glucose levels lead to poor blood circulation and nerve damage, making the body more vulnerable to infections, especially after surgery. Sleep disorders can also weaken the immune system and slow healing.

Treating wounds in diabetic patients is not only challenging at a clinical level, it can also get expensive. Just in the United States, the cost of treating nonhealing wounds is estimated to top \$50 billion a year.

"This is a public health issue, and we want to contribute to a solution," Lydic said.

Sleep disorders and Type 2 [diabetes](#) are intimately connected; it has been widely documented that lack of sleep can create metabolic changes like those seen in patients with insulin resistance.

Lydic plans to continue research on this topic.

"Next we want to explore the effect that specific drugs have on wound healing in these same groups of [mice](#) with disrupted sleep."

The paper "Sleep Fragmentation Delays Wound Healing in a Mouse Model of Type 2 Diabetes" was written in collaboration with Jason Collier and Susan Burke from the Pennington Biomedical Research Center in Baton Rouge, Louisiana, part of the Louisiana State University System.

More information: John Mark McLain et al, Sleep Fragmentation

Delays Wound Healing in a Mouse Model of Type 2 Diabetes, *Sleep* (2018). DOI: [10.1093/sleep/zsy156](https://doi.org/10.1093/sleep/zsy156)

Provided by University of Tennessee at Knoxville

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