

# Fat grafting shows promise for cancer patients with radiation-induced skin injury

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As cancer survival rates improve, more people are living with the aftereffects of cancer treatment. For some patients, these issues include chronic radiation-induced skin injury—which can lead to potentially severe cosmetic and functional problems.

Recent studies suggest a promising new approach in these cases, using [fat grafting](#) procedures to unleash the healing and regenerative power of the body's natural adipose stem cells (ASCs). "Preliminary evidence suggests that fat grafting can make skin feel and look healthier, restore lost soft tissue volume, and help alleviate pain and fibrosis in patients with radiation-induced [skin injury](#) after [cancer treatment](#)," says J. Peter Rubin, MD, MBA, FACS, American Society of Plastic Surgeons (ASPS) President-Elect and Chair of the Department of Plastic Surgery at University of Pittsburgh Medical Center. He is one of the authors of a new review of the clinical evidence on fat grafting for radiation-induced skin and soft tissue injury.

"But while promising, available research has some key weaknesses that make it difficult for us to determine the true benefits of fat grafting right now," Dr. Rubin adds. The review appears in the April issue of *Plastic and Reconstructive Surgery*, the official medical journal of the ASPS.

More than half of patients diagnosed with cancer receive radiation therapy. Because skin cells turn over rapidly, they are exquisitely sensitive to the damaging effects of radiation. In the first few months after treatment, many patients develop acute radiation injury with skin

inflammation, peeling, swelling, pain and itching. In most cases, symptoms resolve over time. However, if inflammation continues, radiation-induced skin injury can become a chronic problem leading to tight, stiff skin (fibrosis) with a risk of poor wound healing, ulcers, and tissue loss.

Fat grafting procedures—transferring the patient's own fat cells from one part of the body to another—have become widely used in many cosmetic and reconstructive plastic surgery procedures. In their review, Dr. Rubin and colleagues round up promising research on fat grafting for patients with radiation-induced skin injury.

In studies of breast cancer patients, fat grafting procedures have reduced pain and other symptoms of radiation-induced skin injury—backed up by more-normal cellular appearance of skin cells under the microscope. In other studies, fat grafting has led to reduced risks and better outcomes of breast reconstruction after mastectomy.

For patients with radiation-induced skin injury after treatment for head and neck cancer, fat grafting has led to improvements in voice, breathing, swallowing, and movement. Good outcomes have also been reported in patients with radiation-induced skin injury in the area around the eye or in the limbs.

"The good news is fat grafting has the potential to really help patients with discomfort and disability caused by radiation-induced skin damage," according to Dr. Rubin. While research is ongoing, the benefits of fat grafting seem to result from the wide-ranging effects of ASCs—including anti-scarring, antioxidant, immune-modulating, regenerative, and other actions.

"However," he adds, "the available evidence has a lot of shortcomings, including small sample sizes, lower-quality research designs, and a lack

of comparison groups." Variations in fat cell collection and processing, as well as the timing and "dose" of fat grafting, make it difficult to compare results between studies. There are also unanswered questions regarding potential risks related to ASC injection and concerns that fat grafting might affect cancer follow-up.

The reviewers outline some steps for further research to clarify the benefits of fat grafting for radiation-induced skin and soft tissue [injury](#), including approaches to clinical assessment and imaging studies, testing of [skin](#) biomechanics and circulation, and cellular-level analyses. For all of these outcomes, standardized measures are needed to achieve more comparable results between studies.

"We hope our review will inform efforts to establish the benefits of specific types of fat grafting procedures in specific groups of patients," says Dr. Rubin. "To do that, we'll need studies including larger numbers of patients, adequate control groups, and consistent use of objective outcome measures."

**More information:** Elizabeth M. Kenny et al. Fat Grafting in Radiation-Induced Soft-Tissue Injury: A Narrative Review of the Clinical Evidence and Implications for Future Studies, *Plastic & Reconstructive Surgery* (2021). [DOI: 10.1097/PRS.00000000000007705](https://doi.org/10.1097/PRS.00000000000007705)

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