

HEALING OUTCOMES IN A CHRONIC WOUND PATIENT

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Wound healing is a complex process that begins with hemostasis, a local proinflammatory response, and the formation of exudate, accompanied by neutrophil activation and the activity of matrix metalloproteinases. This initial phase is followed by the proliferative phase, during which re-epithelialization occurs, facilitated by growth factors such as epidermal growth factor, fibroblast growth factor, and transforming growth factor beta. Finally, remodeling takes place with the assistance of collagen. This results in a completely healed wound with intact skin tissue on top.¹ However, this process does not always proceed smoothly. Sometimes, wound healing can be delayed and complicated by various factors. Such wounds are termed as chronic wounds. Apart from the obvious discomfort, immobility and need of care these wounds are highly prone to infections. Such patients end up getting hospitalized multiple times and some eventually need to get their limbs amputated.² Chronic wounds are thus one of the biggest expenditures in today's healthcare system.

Chronic wounds are more likely to develop in patients with diabetes, peripheral artery diseases and venous insufficiencies. Pressure on dependent areas in bedridden patients also leads to the development of hard-to-treat chronic wounds.

Several general factors can positively influence wound healing when managed properly. These factors include nutrition, smoking status, medications, diabetes, and cardiopulmonary diseases. It is recommended that all patients at risk of or already suffering from chronic wounds be managed in a way to optimize their healing. Following is a brief description of these factors and how they can be managed to ensure maximum benefit to the patient.

Nutrition is the most important factor in general health and growth as well as wound healing. Protein-calorie malnutrition has been associated with delayed healing and increasing mortality in chronic wound patients. This is because proteins play a crucial role in each step of the healing process, be it the inflammatory response, proliferative stage or remodeling.³ Patients should be advised protein diet and monitored weekly with prealbumin and transferrin levels for acute changes in their protein levels.⁴ Apart from this, micronutrients like magnesium and zinc have also shown increased wound healing in some trials. This is why patients suffering from deficiency of these minerals, should not be operated upon before they are treated properly, for better chances of wound healing.

Another common factor that influences wound healing is smoking. It delays wound healing as nicotine constricts blood vessels compromising oxygen and nutrients delivery to the

wound site. It also increases platelets adhesiveness thus increasing the chances of thrombi leading to local tissue ischemia.⁵ Smoking cessation can restore the micro-tissue environment and inflammatory response within four weeks, but proliferative response for definitive healing often requires more time.⁶ Patients suffering from or at the risk of chronic wound should be advised abstinence for longer times for better outcomes.

Patients should be assessed for any history of drugs use as many medications can adversely affect the wound healing process. For instance, corticosteroids alter the wound environment by decreasing fibroblast replication that in turn reduces collagen production. Similarly immunosuppressants can impede wound healing process by suppressing T-cell activity which is essential for inflammatory response and angiogenesis.⁷ Common medications like NSAIDs and chemotherapeutic agents may also negatively impact wound healing. Vitamin A supplementation on the other hand has been found to benefit in such cases.⁸ Therefore, it is important to adjust medications to improve healing in patients with chronic wounds.

Diabetes is probably the biggest risk factor for chronic wounds in our part of the world. It is linked with delayed wound healing due to hyperglycemia affecting the cellular mechanisms like inflammatory response and enzyme function. Studies have shown that for every single unit increase in Hb1Ac above 7 the healing rate worsens.⁹ In diabetic patients, diabetic foot syndromes represents a big chunk of hard-to-heal wounds, with rates as high as 10% in many countries.¹⁰ When going for surgery with diabetic patients, intensive perioperative glucose control is advised. Patients should be properly counselled and proper care should be taken if there is associated peripheral neuropathy, as that could further aggravate wound condition.

Special care should be taken in patients with history of cardiopulmonary illnesses as well. Patients suffering from cardiopulmonary diseases have a marked reduction in healing due to inefficient tissue perfusion and decreased ejection fraction. As a result these patients are at a higher risk for delayed wound healing and its complications.

REFERENCES

1. Razyeva K, Kim Y, Zharkinbekov Z, Kassymbek K, Jimi S, Saparov A. Immunology of Acute and Chronic Wound Healing. *Biom*. 2021; 11(5):700. <https://doi:10.3390/biom11050700>
2. Bowers S, Franco E. Chronic Wounds: Evaluation and Management. *Am Fam Physician*. 2020 Feb 1;101(3):159-166. PMID: 32003952.
3. Wang X, Yu Z, Zhou S, Shen S, Chen W. The Effect of a Compound Protein on Wound Healing and Nutritional Status. *Evid Based Complement Alternat Med*. 2022;2022:4231516. Published 2022 Mar 24. <https://doi:10.1155/2022/4231516>
4. Barchitta M, Maugeri A, Favara G, et al. Nutrition and Wound Healing: An Overview Focusing on the Beneficial Effects of Curcumin. *Int J Mol Sci*. 2019;20(5):1119. <https://doi:10.3390/ijms20051119>
5. Sørensen LT. Wound healing and infection in surgery. The clinical impact of smoking and smoking cessation: a systematic review and meta-analysis. *Arch Surg*. 2012;147(4):373-383. <https://doi:10.1001/archsurg.2012.5>
6. Sørensen LT. Wound healing and infection in surgery: the pathophysiological impact of smoking, smoking cessation, and nicotine replacement therapy: a systematic review. *Ann Surg*. 2012;255(6):1069-1079. <https://doi:10.1097/SLA.0b013e31824f632d>
7. Bennett G, Abbott J and Sussman G. The negative impact of medications on wound healing. *Wound Practice and Research*. 2024;32(1):17-24. DOI <https://doi.org/10.33235/wpr.32.1.17-24>
8. Zinder R, Cooley R, Vlad LG, Molnar JA. Vitamin A and Wound Healing. *Nutr Clin Pract*. 2019;34(6):839-849. <https://doi:10.1002/ncp.10420>
9. Christman AL, Selvin E, Margolis DJ, Lazarus GS, Garza LA. Hemoglobin A1c predicts healing rate in diabetic wounds. *J Invest Dermatol*. 2011;131(10):2121-2127. <https://doi:10.1038/jid.2011.176>