



# Wound Healing

## Yara İyileşmesi

Emel Fetil

Dokuz Eylül University Faculty of Medicine, Department of Dermatology and Venerology, İzmir, Turkey

### QUESTION 1: What are the types of wound healing?

Primary healing: Sutured wound.

Secondary healing: Open wound<sup>1</sup>.

### QUESTION 2: How does primary healing occur?

Reepithelization - occurs fast.

Tension strength - develops slowly<sup>1</sup>.

### QUESTION 3: How does secondary healing occur?

Superficial wound healing: From cutaneous adnexa, fast.

Deep wound healing: From wound edges, slow<sup>1</sup>.

### QUESTION 4: What are the factors affecting healing in a wound?

**Wound size:** Healing time is not directly proportional to the wound size. It takes large wounds only a little more time to close than small wounds.

**Wound site:** Those in acral regions heal later than those in central regions.

**Wound shape:** Healing time depends on the diameter of the broadest circle obtainable in the wound.

**Injury method:** The fastest healing occurs in wounds not involving denatured protein or necrotic debris. (Wounds occurring due to cryosurgery, electrosurgery, laser beams and acids require more time to heal).

**Agents used and recurring trauma:** Some antiseptic or haemostatic agents delay healing.

**Foreign objects:** If not removed from the wound, the inflammatory response is prolonged, causing infection and delay in healing<sup>1</sup>.

**Hematoma or seroma:** Creates an environment suitable for infection<sup>2</sup>.

**Heat:** In case of hypothermia, the tension strength expected to be achieved in the wound is delayed<sup>1</sup>.

**Amount of oxygen:** Tissue hypoxia impairs collagen synthesis and defense against bacterial infections, affecting wound healing negatively.

**Smoking:** Causes cutaneous vasoconstriction; restricts oxygen carrying capacity of the blood by increasing the amount of carboxyhemoglobin<sup>2</sup>.

**Infection:** Prolongs inflammatory process and delays wound healing. Likelihood of dehiscence increases and tension strength is delayed in sutured wounds<sup>1,2</sup>.

**Nutritional factors:** The need for energy (mostly for collagen synthesis) increases in severe injuries. In the absence of glucose, fat and protein are used for energy. Glucose metabolism disorder as in diabetes, protein malnutrition, lipid deficiency and zinc, vitamin C and vitamin A deficiencies negatively affect wound healing<sup>1-3</sup>.

**Medicines:** Corticosteroids: If given within 3 days before or after injury, they inhibit wound healing and delay formation of tension strength. Topical steroids also inhibit wound healing. Immunosuppressive and antineoplastic drugs counteract wound healing by inhibiting inflammatory cell functions. Resulting leucopenia increases vulnerability to infections. Non-steroid anti-inflammatory drugs (aspirin, phenylbutazone...) have been shown to reduce wound tension strength in animals. They involve increased risk of bleeding<sup>1,2</sup>.

**Radiotherapy:** With its direct impact on fibroblasts, it inhibits wound healing. Growth factor may partially reverse such impaired wound healing<sup>3,4</sup>.

**Systemic diseases:** Immunologic deficiency, malnutrition, malignities (due to inflammatory cell function disorder and malnutrition), hepatic diseases, renal impairment, neurological disorders, hypertension, hereditary factors, and alcoholism have negative impacts on wound healing<sup>3</sup>.

**Address for Correspondence/Yazışma Adresi:** Emel Fetil MD, Dokuz Eylül University Faculty of Medicine, Department of Dermatology and Venerology, İzmir, Turkey  
Phone.: +90 532 227 54 29 E-mail: emel.fetil@deu.edu.tr **Received/Geliş Tarihi:** 14.12.2017 **Accepted/Kabul Tarihi:** 18.12.2017

**ORCID ID:** orcid.org/0000-0003-2927-9052

## References

1. Zitelli JA: Wound healing by first and second intention. Roenigk & Roenigk's Dermatologic Surgery: Principles and Practice, Second Edition. In: Roenigk RK, Roenigk HH, editors. 2nd ed. New York: Marcel Dekker, 1996;101-30.
2. Ramasastry SS: Chronic problem wounds. Clin Plast Surg 1998;25:367-96.
3. Barbul A, Purtil WA: Nutrition in wound healing. Clin Dermatol 1994;12:33-40.
4. Tokarek R, Bernstein EF, Sullivan F, Uitto J, Mitchell JB: Effect of therapeutic radiation on wound healing. Clin Dermatol 1994;12:57-70.