Over the past several decades, major advances have been made in the practice of skin and wound care. Clinicians now closely monitor coordinated cellular and biochemical events that occur during healing. Manufacturers are partnering with clinicians to identify materials that help manage simple and complex skin conditions and wounds. At the same time, standard documentation has been defined and refined to help the clinician record skin and wound assessment. Now, more than ever before, a solid foundation of information exists to accelerate skin and wound healing. A complete understanding of the anatomy and physiology of the skin, the phases of healing, the types of wounds, and the options for wound repair is essential for recognizing factors that may complicate or delay wound healing. Each consideration plays a key role in assessing and managing wounds of all types.\(^1\)

Chronic wounds can exact an emotional, physical, and financial toll on patients and caregivers. At times, clinicians may be frustrated and confused when trying to determine a wound management pathway for a wound or skin condition, when to change to a different type of dressing or drug, how to document the progress of the wound or skin appropriately, and how to track outcomes based on care practices. What we do know (and this has not changed over time) is that identifying various factors delaying or impeding wound healing is paramount to the care of the patient. In this column, we examine the various factors that may delay or impede healing—local and systemic.

LOCAL FACTORS
Wound healing can be delayed by factors local to the wound itself, such as desiccation, infection or abnormal bacterial presence, maceration, necrosis, pressure, trauma, and edema.

- **Desiccation.** A moist environment allows wounds to heal faster and less painfully than a dry environment, in which cells typically dehydrate and die. This causes a scab or crust to form over the wound site, which impedes healing. If the wound is kept hydrated with a moisture-retentive dressing, epidermal cell migration is enhanced, encouraging epithelialization.
- **Infection or abnormal bacterial presence.** If an infection is present, as evidenced by purulent drainage or exudate, induration, erythema, or fever, obtain a wound culture to identify the offending bacteria and guide antibiotic therapy. When a pressure injury or full-thickness wound extending to the bone fails to heal, conduct appropriate tests to determine the cause of the delay. Report abnormal results so that appropriate antibiotics are prescribed to treat the infection.
- **Maceration.** Urinary and fecal incontinence can alter the skin’s integrity. Wound drainage overlapping on the periwound skin may alter the skin’s integrity too. Educating caregivers about proper skin care, how to evaluate the patient’s skin, and proper dressing management selection to limit maceration, if applicable, is essential for successful skin and wound management.
- **Necrosis.** Dead, devitalized (necrotic) tissue can delay healing. Slough and eschar are the two types of necrotic tissue that may appear in a wound. Slough is moist, loose, stringy necrotic tissue that is typically yellow. Eschar, which appears as dry, thick, leathery tissue, may be black. In most cases, necrotic tissue must be removed before repair and healing can occur.
- **Pressure.** When pressure at the wound site is excessive or sustained, the blood supply to the capillary network may be disrupted. This impedes blood flow to the surrounding tissue and delays healing.
- **Trauma and edema.** Wounds heal slowly—and may not heal at all—when they are repeatedly traumatized or deprived of local blood supply by edema.

SYSTEMIC FACTORS
Wound healing also can be delayed by systemic factors that bear little or no direct relation to the location of the wound itself. These include age, body type, chronic disease, immunosuppression and radiation therapy, nutrition status, laboratory values, and vascular insufficiencies.

- **Age.** Wounds in older patients may heal more slowly than those in younger patients, mainly because of comorbidities that occur as a person ages. Older patients may have inadequate nutrition intake; altered hormonal responses; poor hydration; and compromised immune...
circulatory, and respiratory systems, any of which can increase the risk of skin breakdown and delay wound healing.

- **Body type.** A patient who is obese may experience a compromise in wound healing because of poor blood supply to adipose tissue. In addition, some patients who are obese have protein malnutrition, which further impedes the healing. Conversely, when a patient is emaciated, the lack of oxygen and nutrition stores may interfere with wound healing.

- **Chronic disease.** Coronary artery disease, peripheral vascular disease, cancer, and diabetes mellitus are a few of the chronic diseases that can compromise wound healing. Some can also affect the overall condition of the patient’s skin, including its moisture level and texture. Patients with chronic diseases should be followed closely through their course of care to provide the best plan.

- **Immunosuppression and radiation therapy.** Suppression of the immune system by disease, medication, or age can delay wound healing. Radiation therapy can cause ulceration or change in the skin, either immediately after a treatment or after all treatment has ended.

- **Nutrition status.** Ongoing nutrition assessment is necessary because the visual appearance of the patient or the wound is not a reliable indicator of whether the patient is receiving the proper amount of nutrients. It is important to partner with your facility’s registered dietitian to review the patient’s medical record, provide a nutrition-focused physical assessment, review the patient’s laboratory values, and determine additional values to draw. The registered dietitian should interview the patient to determine current diseases and conditions, changes in weight or food intake, food allergies or intolerances, food-medication interactions, and wounds or pressure injuries.²

- **Laboratory values.** Nutrition markers are not the only laboratory values to consider. Measuring the hemoglobin level helps assess the oxygen-carrying capacity of the blood; however, it may also be necessary to assess hepatic, renal, and thyroid functions to determine the patient’s healing capacity.

- **Vascular insufficiency.** Various wounds or ulcers can affect the lower extremities. Decreased blood supply is a common cause of these ulcers. The clinician must identify the type of ulcer to ensure appropriate topical and supportive therapies.

**A PATHWAY TO HEALING**

To achieve successful skin and wound healing, the clinician must meticulously follow every step of skin and wound management, including assessment, planning, implementation, evaluation, and documentation. Clinicians are responsible for assessing the patient’s skin, wounds, and management modality (dressing, drug, and/or device); implementing wound care orders; selecting and changing the management modality; and preventing infection during procedures. Identifying and addressing local and systemic factors in wound healing also are important for successful outcomes.●

**REFERENCES**