**Wound Care, Part 1**

   

The goal of this program is to update nurses’ wound assessment skills. After you study the information presented here, you will be able to —

* List five laboratory tests that indicate overall nutrition status.
* Describe eight wound assessment parameters necessary to monitor and evaluate the progress of wound healing.
* Identify the four stages of pressure ulcers.

**Nursing Care**

* Nurses in any setting frequently encounter acute and chronic wounds during routine patient care. By applying the appropriate nursing measures and carefully selecting the right products, they can promote optimal healing. This program presents nurses with current concepts in wound care within the framework of the nursing process.
* **Patient assessment**
* The first step in managing wounds is a complete patient assessment. This includes a health history with medical diagnosis and a physical examination to gather comprehensive, accurate data. The health history of a patient with an obvious wound, especially a chronic one, concentrates on five areas that have an impact on healing.
* **Disease Processes:** Diseases that affect circulation and the perfusion of blood into vital organs and tissues, such as arteriosclerosis, venous insufficiency, hypertension, hyperlipidemia, obesity, diabetes mellitus, and malignant neoplasms, can interfere with nutrition and oxygenation of cells. As they diminish the body’s ability to transport leukocytes and macrophages, the immune response for controlling infection is also impaired.
* **Medications:** Past and current medication use, including anticoagulants, corticosteroids, immunosuppressives, and antineoplastics, may adversely affect wound healing.
* **Radiation:** Any area of the body that has been exposed to radiation treatments should be examined for potential breakdown of internal tissue as well as skin. Even if radiation therapy has not been recent, its effects may extend over a long period of time.
* **Nutrition and Hydration:** Malnutrition deprives the body of protein and calories required for cell growth and repair. Dehydration, by reducing blood pressure, and over-hydration, which increases the distance within intracellular spaces, can impair the transport of oxygen and nutrients.
* Factors that mark the possibility of malnutrition include a recent weight loss of 10% of usual body weight, NPO status for more than three days with or without IV fluid support, and problems such as malabsorption syndromes, draining wounds, or fistulae, infection, or fever. Poor nutritional status will impair wound healing regardless of which treatment is chosen to promote healing. It is always advisable to consult with a registered dietitian.
* **Laboratory Data:** Evaluation of lab values that represent nutritional status and potential for wound healing need to be based on several tests.
* Serum Albumin (normal 3.5 g/dL to 5.0 g/dL) — Albumin, important for regenerating tissue for wound healing, comprises more than 50% of total serum protein. A low level may indicate that cells are in a destructive or catabolic state, which can lead to tissue necrosis and infection.
* Serum Prealbumin (normal 18 mg/dL to 48 mg/dL) — Prealbumin has a half-life of one to two days. Because of the shorter half-life, prealbumin is a more accurate measure of protein stores than albumin.
* Serum Total Protein (normal 6 g/dL to 8 g/dL) — Low values are associated with reduced colloid osmotic pressure, so that fluids, especially plasma, are not flowing into the cells. A decline in flow leads to poor oxygenation, cell nutrition, and tissue edema.
* Serum Transferrin (normal 180 mg/dL to 260 mg/dL) — Transferrin is a glycoprotein that helps transport iron in the plasma, where it is required for oxygen transport to cells and for collagen synthesis. Because most iron is transported to the bone marrow for use in hemoglobin synthesis, inadequate levels may lead to anemia.
* Total Lymphocyte Count (TLC) (normal 1,500 cells to 3,000 cells) — Some components of the immune system, such as lymphocytes, are indicators of protein status. Although a depressed TLC may indicate malnutrition, levels may also be depressed by chemotherapy, autoimmune diseases, stress, and infection.
* The next step is to determine the type of wound — acute or chronic — and its cause, such as trauma, surgical, diabetic neuropathic, venous, arterial, or pressure. This information will contribute to defining the plan of care and evaluating the healing process.
* An acute wound results from an injury (surgery or trauma) and progresses through the phases of wound healing in approximately one month. In a patient who is healthy and without underlying disease, healing usually occurs without complex topical treatments.1
* A chronic wound does not proceed through the phases of wound healing in an orderly or timely fashion. Underlying disease (diabetes, venous/arterial insufficiency) or external factors (pressure) contribute to the failure of the healing process.2 If a wound has not shown evidence of healing or has not healed within two weeks, it may be a chronic wound. The underlying disease and/or external factors must be addressed within the plan of care.
* **Wound assessment**
* Wound assessment is a complex process that involves a thorough examination of the entire wound. Nurses visually assess wounds and document their findings to monitor and evaluate the progress of wound healing. Documentation needs to address the following eight areas.
* **Location:** Describe the anatomic location of the wound to ensure accurate documentation and communication to other members of the healthcare team. Location seems to influence the rate of healing; for instance, wounds closer to the upper body usually have a greater potential for healing than wounds on the lower body.
* **Dimensions:** Measure the length, width, and depth of the wound in centimeters for consistency in documentation. A nursing note might describe a wound as “4.5 cm L x 2 cm W x 1.5 cm D.” When measuring the depth of a wound, gently insert a sterile cotton-tipped applicator into the deepest part. Measure from the tip of the applicator to skin level. Never estimate.
* **Undermining and Sinus Tract Formation:** Inspect ulcers, especially stage III and IV — full thickness — wounds for undermining and/or sinus tract formation. Using a sterile cotton-tipped applicator, gently probe the margins of the lesion for extensions into surrounding tissue (undermining) and beyond the wound base (for sinus tract formation). Both conditions result in dead space, open areas beneath the skin that can lead to further tissue destruction and infection.
* Document the extent of undermining using a clock orientation, such as “undermining from 2 o’clock to 5 o’clock measuring 2.5 cm.” When describing sinus tract formation, include the direction of the tract.
* **Tissue Viability:** Healthy tissue consists of granulation tissue, which has a red, moist, beefy appearance, and epithelialized tissue — new pink, shiny epidermis. Necrotic tissue is avascular and is described as either slough or eschar tissue. Slough appears in an array of yellows, greys, greens, and browns. Eschar is a hard, black, leathery tissue.
* Document tissue viability by describing the percentage of healthy and necrotic tissue relative to the entire wound; for example, “an ulcer with 60% granulation tissue and 40% yellow, slough tissue.” Also note the condition of the tissue at the wound edges. Wound edges that are rolled down, epiboly, often represent a nonhealing wound and may require debridement. Wound edges may also exhibit hyperkeratosis (hard, white/gray, firmly attached tissue), which also may need debridement for the wound to heal.
* **Exudate:** Assess the exudate for volume, color, consistency, and odor. Volume of exudate is described as scant, small, moderate, or copious, and includes the number of dressings soaked with drainage. Consistent documentation allows nurses to monitor trends in wound drainage. Odor, color, and consistency of exudate can alert the nurse to the presence or absence of wound infection.
* **Periwound Condition:** The condition of periwound skin, the area surrounding the wound opening, provides further information concerning the patient’s health status, the efficacy of a dressing’s absorption of exudate, and the presence of local infection. The nurse needs to observe this area for erythema, induration, crepitus, hematoma formation, maceration, desiccation, denudation, blistering, and pustule formation.
* New tissue growth at the lesion’s margins supports epithelial migration and contraction of the wound. A moist wound environment is essential. Epithelial tissue will not migrate into wounds with necrotic tissue or wounds deprived of oxygen secondary to a patient’s underlying disease process.
* **Pain:** Note any wound-related pain. Is the patient experiencing pain only with dressing changes or is the pain constant? How does the patient rate the pain on a scale from one to five (one being mild, five excruciating)? Where is the pain? Pain may be an early symptom of infection, leading to investigation for other signs of sepsis.
* **Stage or Extent of Tissue Damage:** For pressure ulcers, use the National Pressure Ulcer Advisory Panel criteria (see sidebar “SNPUAP Pressure Ulcer Definition and Stages”) to describe the extent of tissue damage. For other wounds, such as vascular or diabetic, terms such as partial thickness or full thickness are useful to describe the extent of tissue damage.3
* The condition of the wound dictates how often a wound is reassessed. Frequency also depends on the work setting, the patient’s overall condition and underlying disease process, the type of wound, and the type of dressing used in treatment. The Wound, Ostomy and Continence Nurses Society [www.wocn.org](http://www.wocn.org) guidelines recommend pressure ulcer reassessment at least once a week.4
* **Other factors**
* After assessing the patient’s general physical and wound status, the nurse needs to gather data about previous wound care treatments, support surfaces (products that help to reduce pressure on bony prominences by redistributing the patient’s weight over a larger surface area), and psychosocial-economic elements associated with the care of the patient.
* In the case of chronic wounds, previous treatments must be evaluated to determine the rate of success or failure. Occasionally, a dressing or product that has been discontinued may be appropriate as the wound changes.
* If a patient is at low risk for developing pressure ulcers, standard nursing measures, such as scheduled repositioning, can be implemented for prevention of skin breakdown, and special support surfaces are usually not necessary. However, if the patient is at greater risk or has already developed pressure ulcers, consider the use of an overlay, replacement mattress, or specialty bed. Wounds that are created by pressure will not heal unless the pressure is reduced.
* In a healthcare facility where a nurse is usually the primary caregiver, sophisticated care can be implemented, whereas in the home where a family member or even the patient is the caregiver, the level of care may be limited. Insurance coverage also varies from setting to setting: What may be considered a “covered item or service” in the hospital may not be reimbursable in a home situation or in a long-term care facility. Each nurse should individually assess such issues.
* **Ulcers of the lower extremities**
* Many chronic, nonhealing ulcers occur on lower legs and feet. These include diabetic foot ulcers, venous stasis ulcers, and arterial ulcers.
* Foot ulcers occurring in patients with diabetes mellitus (both insulin and noninsulin dependent) can be due to several factors associated with the disease process and usually involve both lower extremities. The development involves degenerative metabolic and vascular changes and polyneuropathy. Alterations affect motor, sensory, and autonomic nerves of the legs and feet, and result in impaired sensation to temperature, pain, and pressure.
* In addition, compromised motor and sensory function in the foot causes atrophy of muscle in the pedal arch and shifts body weight from the toes to the metatarsal-phalangeal joints. In response to the abnormal pressure on these joints, the underlying metatarsal fat pads atrophy and a plantar callus forms. Additional pressure on the callus during ambulation causes it to rupture, leading to the formation of a neuropathic ulcer. Patients usually remain unaware of the ulcer formation because of their diminished sensitivity to pain.
* Diabetic ischemic ulcers differ from neuropathic ulcers. Ischemic ulcers are typically a result of wearing improperly fitting footwear that causes irritation and/or pressure over bony prominences on the foot. Regardless of type, foot ulcers in a diabetic patient heal more slowly than in nondiabetics, and these patients are at greater risk for infection because of chronic degenerative changes.
* Venous ulcers arise from disorders of the deep venous system. Chronic venous hypertension causes changes in the microcirculation, which alters the inflammatory mechanism. These changes are linked to the accumulation of white blood cells at the capillary level, which is termed the “white blood cell-trapping hypothesis.” Transient elevations in venous pressures decrease capillary blood flow and trap white blood cells at the capillary level. In turn, the white blood cells plug capillary loops causing localized ischemia, which can lead to ulceration.
* Arterial ulcers, or ischemic ulcers, are caused by arterial occlusive disease often associated with peripheral vascular disease (PVD). Factors that contribute to PVD are both genetic and environmental, such as hypertension, hyperlipidemia, diabetes mellitus, smoking, obesity, and a sedentary lifestyle.
* The differences between diabetic/neuropathic, venous, and arterial/ischemic ulcers are not always discernible. Management and successful treatment of any lower extremity ulcer are dependent on the skills of the healthcare provider in assessing and recognizing the cause and pathogenesis of each type. The WOCN has a series of evidence-based clinical practice guidelines for pressure ulcers, arterial ulcers, and neuropathic ulcers.5,6,7
* **Staging**
* A four-stage classification system based on the extent of tissue involvement aids in the consistent identification of skin breakdown. These criteria are endorsed by WOCN and have recently been revised by the NPUAP. (See sidebar “NPUAP Pressure Ulcer Definition and Stages.”)
* A word of caution: Both the WOCN and the NPUAP state reverse staging or down-staging of wounds is not appropriate. The tissue replaced in a wound space is not the same as the tissue lost. Muscle and subcutaneous tissue do not fill in the healing wound; granulation (scar tissue) is the replacement. Therefore, as a wound heals, it should be documented as a “healing stage III,” not reversed to stage II.8,9
* Unlike pressure ulcers, surgical wounds and lower extremity ulcers are not classified under the WOCN staging system. Only pressure ulcers are staged; all other types of wounds should be described as either partial-thickness or full-thickness, along with a further description of the wound.
* **Nursing diagnosis and planning**
* When all aspects of the assessment are completed, a nursing diagnosis and plan are formulated. The nursing diagnosis is the identification of actual or potential health problems that nursing intervention can help change, diminish, or resolve. Two frequently used diagnoses related to wounds from the North American Nursing Diagnosis Association are “altered tissue perfusion” and “impaired tissue integrity.”
* Effective planning includes determining priorities, setting appropriate short- and long-term goals, and selecting interventions to achieve desired outcomes based on the nursing diagnosis. A successful plan is both specific to the needs of the patient and realistic for the practice setting (e.g., facility or home).
* Goals for wound care include promoting wound healing, providing patient comfort, and preventing complications such as infection. Depending on all factors involved, promotion of wound healing may be a desired, but not necessarily an achievable, goal.
* After collaborating with the patient’s primary healthcare provider, the next step of the nursing process — implementation — can begin. Part II of this course will consider product selection and implementation.
* Scenario:
* Mr. B. is a 75-year-old, obese male with a 20-year history of insulin-dependent type II diabetes with neuropathy and retinopathy. He is being treated at home for a diabetic ulcer on the plantar surface of his right foot that he has had for six months. The wound bed is full-thickness with pale pink, dry tissue and measures 1 cm x 0.5 cm x 0.3 cm depth. Undermining or sinus tracts have not occurred. A callous surrounds the ulcer. The periwound is normal, and he denies any pain. Pedal pulses are palpable but weak. He does not follow his diabetic diet, and his blood sugars are consistently elevated. Due to the above comorbidities, he cannot reach, see, or feel his feet. He cannot perform self-care due to his poor eyesight and obesity. His neuropathy impairs his ability to identify any type of skin breakdown. He lives alone but has a supportive girlfriend who has agreed to act as his caregiver.
* **1 ) The ulcer on the patient’s right foot can be characterized as —**
* An acute wound.
* A chronic wound.
* A traumatic wound.
* **2 ) Due to impaired sensation to temperature, pain, and pressure, diabetic ulcers are also called —**
* Ischemic ulcers.
* Pressure ulcers.
* Neuropathic ulcers.
* **3 ) The most important factor preventing wound healing in this patient is —**
* Obesity.
* Neuropathy.
* Uncontrolled diabetes.
* **4 ) Which lab value represents potential for wound healing?**
* CBC
* Prealbumin
* TSH

**More Questions…..**

* **1 ) Which of the following is true about serum albumin?**
* It comprises greater than 50% of total serum protein.
* It is important in creating osmotic pressure
* It transports iron required for cellular oxygenation.
* None of the above
* **2 ) Wound assessment includes examination of the entire wound including —**
* Wound depth.
* Presence/absence of undermining.
* Presence of exudate.
* All of the above
* **3 ) Many nonhealing, chronic ulcers occur —**
* On the lower leg and foot.
* At the incision site.
* On the hip area.
* All of the above
* **4 ) Venous ulcers are —**
* Always on the foot.
* The result of stasis of blood.
* Explained by the white blood cell trapping hypothesis.
* All of the above
* **5 ) Wound assessment parameters necessary to monitor and evaluate the progress of wound healing include —**
* Dimension, age, color, and exudates.
* Location, dimension, pain, and exudates.
* Location, dimension, color, and date.
* Dimension, duration, color, and nutritional status.
* **6 ) Staging is done on —**
* All ulcers.
* Pressure ulcers.
* Partial thickness ulcers.
* Surgical wounds.
* **7 ) Malnutrition should be suspected if —**
* The patient has been NPO for more than three days with or without IV therapy.
* The patient has recently lost 10% of body weight.
* The patient has a diagnosed malabsorption syndrome or draining wound.
* All of the above
* **8 ) The presence or absence of undermining and/or sinus tract formation is particularly important in which stage(s)?**
* III
* III & IV
* I
* I & II
* **9 ) Normal lab values for serum total protein, a necessary parameter of patient nutrition, are —**
* 6 g/dL to 8 g/dL.
* 3.5 g/dL to 5.0 g/dL.
* 180 mg/gL to 260 mg/gL.
* None of the above
* **10 ) Wound exudate is assessed for —**
* Volume.
* Consistency.
* Color and odor.
* All of the above
* **11 ) A wound that is characterized by deep tissue destruction including subcutaneous tissue is —**
* Stage II.
* Stage IV.
* Stage I.
* Stage III.
* **12 ) A wound characterized by full thickness tissue loss through the dermis is —**
* Stage II.
* Stage IV.
* Stage I.
* Stage III.